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ILLINOIS NATURAL HISTORY SURVEY

Bulletin

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the State of Illinois



The Thrips, or Thysanoptera, of Illinois

LEWIS J. STANNARD

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION

NATURAL HISTORY SURVEY DIVISION
Urbana, Illinois

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Volume 29, Article 4

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Urbana, Illinois

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FOREWORD

THE Illinois Natural History Survey's interest in thrips dates back many years. In 1908 J. D. Hood, then a part-time employee of the Survey, described several new species. Little attention was given to the order in Illinois for the next two decades.

In the early 1930's the unconnected activities of two entomologists who never worked seriously on thrips led to a rejuvenation of the Survey's interest in this order. Survey entomologist M. D. Farrar began using berlese funnels to investigate chinch bug hibernation habits. His duff samples from forest floor stations netted large numbers and a considerable variety of thrips. At about the same time Orlando Park, then at the University of Illinois and a specialist in beetles of the family Pselaphidae, enlisted the aid of the Survey's Faunistic Section in processing berlese samples from different areas in Illinois in order to obtain pselaphid beetles. Again large numbers of thrips were encountered. Because the Survey collection of thrips was virtually nonexistent, the thrips material was segregated and stored, pending an opportunity to study the group in greater detail.

By that time it had become obvious that there were no adequate keys to identify midwestern thrips, that the thrips had large numbers of diagnostic characters that had never been illustrated, and that our knowledge of the geological distribution, food preferences, and ecological relationships of the thrips were but scantily known for North America.

In the early 1950's Dr. L. J. Stannard began a project aimed at producing a comprehensive treatment of the order for Illinois. With intensive collecting, species after species was added to the list. In order to under-

stand the distribution patterns, collecting was extended into surrounding states and finally a scattering of collections was obtained for the entire eastern half of the continent. Following the tradition of ecological orientation tracing back to early Survey publications of a century ago, information was gathered on the seasonal distribution of the various species of thrips and on their food relationships. Thanks to the unstinting cooperation of Survey botanist R. A. Evers, accurate host data were established for the phytophagous species.

As the research progressed, so did the difficulties. The introduction of phase microscopy demanded water-based mounting media, such as Hoyer's, but the arid indoor conditions during the Illinois winters presented an almost unsurmountable problem of slide maintenance. This problem has still to be solved satisfactorily.

The greatest problems were those concerning the delineation and naming of genera. With assistance from the Guggenheim Foundation and the National Science Foundation, Dr. Stannard was able to study genotypes of practically all the world genera of thrips, and only after this comprehensive review was a relatively stable generic classification possible. It is remarkable that such small insects as thrips raise so many large problems.

We take great pleasure in presenting this account of the thrips of Illinois as one of the Survey's series of faunistic accounts of the animal groups of the State.

HERBERT H. ROSS
*Assistant Chief and
Head of Section of Faunistic
Surveys and Insect Identification*

This report is dedicated to Professor Doctor Hermann Priesner of Linz, Austria, master of the Thysanoptera, in commemoration of his seventy-fifth birthday. His thoughtful and numerous contributions to the systematics of thrips over more than a half-century have given stability and lasting good leadership to our science.

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The Thrips, or Thysanoptera, of Illinois

Lewis J. Stannard

THRIPS ARE COMMONPLACE in Illinois. A few kinds are notorious as a scourge to onion farmers and gladiolus growers, and to picnickers in midsummer, when in certain years the oats thrips swarm in such high numbers that they can be noticed from a distance as clouds. Thrips are in almost every flower, in vagrant daisies and dandelions, in the finest peonies and roses, in prairie legumes and composites, and even in Indian Pipes. Thrips are under sheaths of corn, under bark, in leaf mold, and oddly enough on water lily pads and skunk cabbage. So common are they that nearly everyone is aware of them.

It is by their abundance and not by their lilliputian appearance, however, that thrips are so generally known. Thrips as a whole, the order Thysanoptera, are the smallest of the pterygote insects. In Illinois the largest thrips measures at the most 5 mm, the smallest 0.6 mm, and the average is only 1.5 mm. More than likely thrips are popularly perceived as mere black specks, or only their damage is noticed. The detailed nature of the thrips is the special province of but a few entomologists and naturalists.

This report* is presented to make our tiny thrips better known—to show what thrips really are, to explain which ones are harmful and which ones are beneficial, and to introduce the many thrips that are of no direct economic consequence to man but are a part of the native fauna of Illinois. As will be shown, thrips are exquisite creatures, complicated in form, delicate in habit, and most dis-

tinct from the usual run of insects. About 200 species of thrips have been collected in Illinois. Herein is an account of those species and of some others that may occur, but so far have not been found, in our state.

ACKNOWLEDGMENTS

The background preparations for this report began so long ago (just before the 1950's) that I have forgotten in some cases which person gave me a precise idea, or brought to my attention certain correlations or modes in the faunal composition of various sections of Illinois and adjacent states. I am indebted to all who have aided in this work, even though proper thanks no longer can be given to some individuals due to the passage of time and my imperfect memory.

Specifically, I wish to thank my colleagues, peers, and superiors of the Illinois Natural History Survey for helping me collect the specimens which document this report. In particular I am indebted to Drs. W. S. Brooks, B. D. Burks, H. B. Cunningham, G. C. Decker, R. J. Dysart, J. M. Kingsolver, J. A. Lowe, W. H. Luckmann, H. B. Mills, C. O. Mohr, W. C. Moye, T. E. Moore, W. R. Richards, H. H. Ross, M. W. Sanderson, P. W. Smith, and J. D. Unzicker; Messers J. S. Ayars, M. E. Braasch, J. D. Felix-Williams, Dannel McCollum, E. O. Moll, G. L. Nordin, S. J. Roberts, G. L. Rotramel, and J. T. Shaw; Mrs. Leonora Gloyd; and many others whose names appear on the data given for the species preserved in our permanent collection.

Further I am most obliged to Mesdames Marie Fischer and Charlene Koeling; Drs. W. S. Brooks, H. B. Cunningham, and T. E. Moore; and Messers R. G. Altig, T. G. Brooks,

*Reference to the literature was concluded, for the most part, early in 1965 when this report was essentially completed. One of the few references subsequently added, Mound's proposals to the International Commission of Zoological Nomenclature (1966), was included because of the important name changes involving *Phlaeothrips* and *Haplothrips*.

W. C. Faatz, E. O. Moll, and G. L. Nordin for their excellent slide preparations and for many favors.

I shall always be grateful to my fellow thysanopterists, who have counseled me, continually supplied me with specimens and notes from their collections, and told me of their experiences and postulations. Prof. Dr. Hermann Priesner of Linz, Austria, Miss Kellie O'Neill of Washington, D.C., and the late Mr. Dudley Moulton of San Gabriel, California, were the three with whom I had the most communication and to whom my obligations are particularly great.

The conclusions in this report are based not only on the Illinois fauna, but to the extent possible on the total world fauna. In the course of my studies, I received travel grants from the John Simon Guggenheim Memorial Foundation, the National Science Foundation, and Sigma Xi to consult the majority of the world's collections of Thysanoptera. I wish to acknowledge my appreciation to these organizations for their aid, as well as to the curators of the collections consulted, namely: American Museum of Natural History, Bernice P. Bishop Museum, British Museum (Natural History), California Academy of Sciences, Canadian National Museum, Field Museum of Natural History, University of Florida (Experiment Station Collection), University of Kansas (Snow Collection), Philadelphia Academy of Natural Sciences, and U.S. National Museum. The private collections of Dean Floyd Andre and Dr. R. L. Post in the United States of America, Prof. Dr. Hermann Priesner in Austria, and Dr. C. B. Williams in England were also kindly made available to me, for which I am most obliged.

Many foreign and exotic collections were donated to our reference collection by Drs. J. T. Allen, E. C. Becker, Federico Bonet, W. L. Brown, Jr., G. C. Decker, Jean and R. R. Graber, G. E. Haas, R. L. Hass, H. C. Hanson, G. C. Hoff, Makram Kaiser, G. F. Knowlton, W. L. N. Krauss, H. B. Mills, E. L. Mockford, H. H. Ross, G. C. Sanderson, M. W. Sanderson,

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Mrs. A. A. Prickett executed many of the pen-and-ink drawings, Mrs. Diana Slavens drew the *Anaphothrips sandersoni* for the frontispiece and several other figures, Mr. W. D. Zehr was responsible for most of the photographs, Messers R. W. Rehling, R. M. Sheets, and W. L. Taylor prepared other illustrative material, Mr. O. F. Glissendorf edited the manuscript, Mesdames Bernice Sweeney and Bess White and Miss Sandra Krencius typed the manuscript and preliminary drafts, and Mr. G. L. Nordin helped prepare the bibliography. Especially to these persons from our Survey, I wish to express my fullest appreciation.

Finally, over and above other acknowledgments, to Dr. H. H. Ross, my immediate superior, and to Drs. R. A. Evers, M. W. Sanderson, and P. W. Smith, my colleagues, I submit my unqualified gratitude for their direct aid, perpetual encouragement, and infectious enthusiasm, and for their willingness to share with me their extensive knowledge of the biota of Illinois.

NATURAL HISTORY

Feeding

In an American textbook, wherein insects are arranged according to their type of feeding habits, the Thysanoptera are placed alone in the rasping-sucking division (Metcalf & Flint, revised by Metcalf 1962). Almost certainly the rasping-sucking designation is inappropriate, but even so the feeding method of the Thysanoptera is unique.

The precise manner in which thrips feed is still not known. It is recorded in the literature (Reyne 1921) that in

one species of Terebrantia, the single mandible is driven through the surface of the leaf, by a woodpecker-like movement of the head. Thereafter, it is presumed, the maxillary stylets are introduced into the hole thus made in the leaf epidermis, and by asynchronous movements of these stylets the underlying leaf cells are punctured. Fluid from the ruptured cells probably oozes to the outside where it is sucked into the appressed mouth cone of the thrips. Rasping or scraping of outer leaf surface probably does not occur.

Observations of pollen feeding by nine species of flower thrips, representing the families Aeolothripidae, Thripidae, and Phlaeothripidae, was made by Grinfel'd (1959). He reported that the thrips grasps grains of pollen by the fore legs, securing hold by means of protuberances on the anterior tibiae. After each grain is brought by the legs to the mouth cone, the labial and maxillary palps serve to hold and carry it. Upon feeding the thrips presses the pollen grain against the substrate and thrusts the single mandible into it. Later, possibly either the oozing liquid is sucked directly from the puncture or the maxillary stylets are inserted to help somehow in imbibing the liquid. Grinfel'd noted that feeding may take place 2-20 seconds for each pollen grain, subject to the size of the grain, the species of thrips, and the air temperature. Both larvae and adults of these flower thrips feed on pollen grains. In other instances Grinfel'd has seen thrips drink nectar from flowers.

An unusual type of feeding was observed by Downey (1965). Species of *Taeniothrips*, examined under a binocular microscope, were seen to imbibe secretions of the abdominal exudate glands of mature larvae and one pupa of lycaenid butterflies. Ordinarily these glands do not secrete unless stimulated by the caressing touches of ants. Seemingly the thrips were able to provide proper incitement to the butterfly larvae to cause the glands to exude liquid.

Some thrips are well known predators or are on occasions predators (Bailey 1951, and Ebeling 1950). In

fact several species will bite man and cause a minor itching sensation (Bailey 1936). Frequently, in the Tubulifera, many members of which have long, flexible maxillary stylets, the food seems to be fungi and other substances rather than flower pollens or plant juices, according to our collection data. I have found in the gut of an *Oedaleothrips* a concentration of Phaeophragmiae-type spores which were dark colored, cross septate, and four celled. Each was approximately $6 \times 20 \mu$ in size. Possibly such small fungus spores are commonly ingested by the Megathripinae, at least.

Movements to feeding spots, as well as other activities, may be governed by the relative humidity and adjustment of thrips to body water balance. Cederholm (1963) has secured correlations of the diurnal movement of certain species of thrips with humidity and cloud cover in Sweden.

Larvae and adults rid the body of excess water and waste through the anus. In some larval thrips the excreted liquid is held as a droplet between the anal hairs. When the droplet reaches a specific size, it is deposited on a leaf surface. Dark-colored spots of excretia near light-colored feeding zones are characteristic signs of larval and adult thrips damage. No feeding occurs in the pupal stages.

Senses

Despite long, historic, employment of sensory organs as taxonomic characteristics, the extent and the true nature of the senses of thrips are not well known.

The antenna usually contains thin-walled circular or conical sensoria on segments III-VI. Another circular sensorium occurs on the dorsal surface of antennal segment II and what seems to be a Johnson's organ lies within the apical pit of antennal segment II. Presumably these antennal sense organs are chemoreceptors. I have observed species of Terebrantia flick their antennae back and forth towards the substrate much in the manner of ichneumonid wasps, supposedly to test the environment by

bringing the sensoria close to objects. Sensorial pores also may be found at the bases of the femora.

Often males and occasionally females exhibit abdominal sternal gland-like areas of unknown function.

According to Carthy (1958), a species of *Thrips* seems to have no color vision. On the other hand Wilde (1962) presented data which indicate that some Thysanoptera (*Taeniothrips* sp.) prefer white to yellow. *Gynaikothrips ficorum* is attracted to yellow and orange, much to the annoyance of visitors to Hawaii who often wear gaily-colored sport shirts (J. W. Beardsley, University of Hawaii, personal communication, 1964).

Tactile Setae and Spurs

Tactile setae are common and are frequently so stable in their position and form that even generic limits and key characteristics are based upon them. Many are expanded at the tips (Fig. 1 and 2).

Cocoon-breaking hooks are present on adults of several families, and presumably they aid in freeing the emerging imago.

Some leg setae are used for grooming. I have often observed *Frankliniella tritici* brush the wings with the heavy bristles that line the inside of the hind tibiae. These movements apparently comb and straighten the fringe cilia of the wings when the wings are in place over the abdomen. Bristles on the fore legs play a part in the brushing and grooming of the an-

tennae. The mid legs are also used for cleaning, to groom the hind legs especially. Once while watching a brachypterous female of *Frankliniella fusca*, I observed the thorough brushing of the abdomen by the hind legs. In the process this female bent the abdomen upwards and then sideways so she could reach the terminal parts of the abdomen with the hind tarsi. Frequently pairs of legs are rubbed together. Watson (1920) in his article on the toilet of thrips stated that grooming was a major preoccupation of thrips.

Other setae and spurs may be employed for holding the partners during mating. In the Tubulifera abdominal wing-holding setae (Fig. 1) engage the fringe cilia of the wings when in repose.

Sound Production

Some Thysanoptera may produce sound. Hood (1950b) and Faure (1955) described the stridulatory apparatus of certain Tubulifera to be the ridges on the fore coxa and the prolongations of the inner apex of the fore femur. Presumably when these surfaces are rubbed together tonal vibrations are made. Zur Strassen (1959a) illustrated a possible stridulatory organ in the Terebrantia, located on abdominal tergite IV in the African *Frankliniella megalops*.

Reproduction

It is generally presumed that reproduction in the Thysanoptera is primarily by bisexual union (Bailey 1933, and Pesson in Grassé 1951). Collectors of thrips have observed, however, that females are the commonest sex found, and, in fact, males of many species are rare or still unknown.

The apparent paucity of males has led to the belief that parthenogenetic reproduction is also frequent. Actually thelytoky parthenogenesis (virgin females producing only female offspring) has been demonstrated in the laboratory for several species including the grass thrips *Anaphothrips obscurus* (= *striatus*) (Shull 1914). This type of parthenogenesis seems to be common

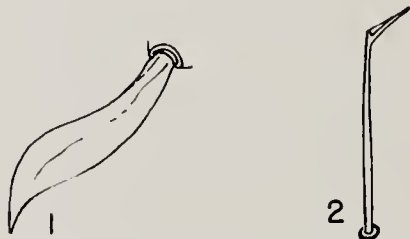


Fig. 1-2.—Types of setae: 1, wing-holding seta of *Neurothrips magnafemoralis*; 2, body seta with expanded tip of *Hydiiothrips atomarius*.

in introduced species of thrips. Further Shull (1917) showed that in *Haplothrips verbasci* virgin females could produce eggs that resulted in males only (arrhenotoky parthenogenesis). Still other species are purported to be cyclic in that, because of temperature, production of males may be suppressed during particular seasons (Jordan 1888). As pointed out by Bournier (1956a), certain species which have but a single generation may have short-lived males. In these cases, females, possessing a longer life span, are apt to be noted by the collector more frequently than males. Thus a false impression as to the likelihood of parthenogenetic reproduction might be formed.

Apparently females are always diploid and males are haploid in the Thysanoptera (Whiting 1945). Hood's statement (1954b) to the contrary was unsupported by published evidence, if any evidence existed at all.

In mating (Fig. 3), the male grasps the female around the pterothorax, attains a superior position, then twists the abdomen underneath for copulation (Buffa 1907). Appendages and certain setae may be engaged to help hold the mating couples in position. Males may successively mate with several females. An unusual type of

mating is reported for the species *Limoithrips denticornis*. In this species the male does not mate with the adult female, but instead effectively inseminates the female pupa (Bournier 1956a). By contrast, Davies (1961) did not find evidence of such precocial mating in *L. cerealium*.

Franssen & Mantel (1964) illustrate preserved, slide-mounted Terebrantia in copulation and summarize information on the reproductive organs of the Thysanoptera.

Sperm is stored in the female in the spermatheca. Overwintering females of some species retain the spermatozoa within the spermatheca to fertilize eggs laid next spring.

The Terebrantia, and ordinarily the Tubulifera, lay eggs. Many females of the Terebrantia split plant epidermis by means of their saw and deposit each egg in the tissues. On the other hand, females of the terebrantian *Chirothrips obesus* deposit eggs on the surfaces of leaves (Pesson, *in* Grassé 1951). In the Tubulifera, females of which lack saws, eggs are secured to plant surfaces by gelatinous materials, or laid in cracks and crevices or in galleries in wood formed by other insects. In the Megathripinae, several cases of ovoviviparity have been observed, where eggs are retained in the body of

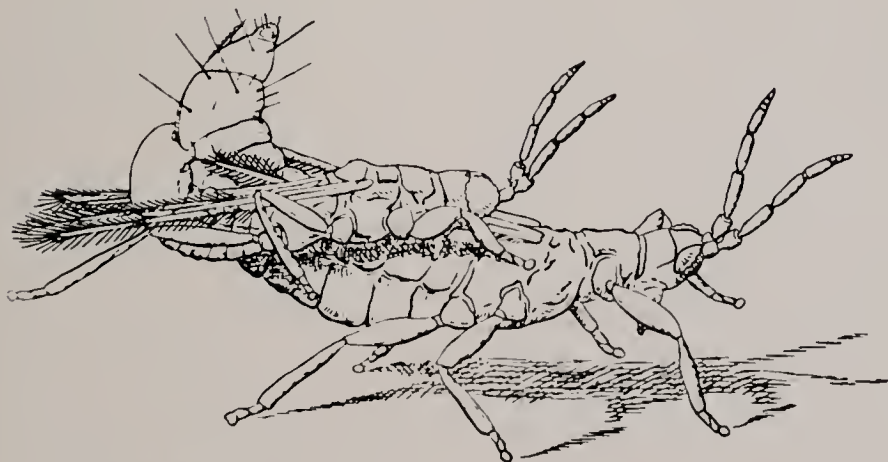


Fig. 3.—*Aeolothrips fasciatus*, ♂ and ♀ in copulation. From Melis (1959).

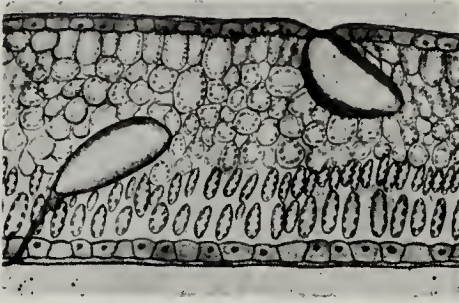


Fig. 4.—Eggs of *Scirtothrips citri* in tissues of orange leaf (from U.S. Department of Agriculture, Circular 708, 1944).

the female until fully formed larvae have developed (Bournier 1957). Bagnall (1915a) reported a case of a thrips sitting over eggs.

Eggs of Thysanoptera are relatively large in relation to the size of the female that lays them. Terebrantian eggs (Fig. 4) are usually smooth, with a thinly developed, light-colored chorion. Eggs of the Tubulifera are often sculptured with hexagonal reticulations. Not many eggs are laid by a female in one day although it has been estimated that over the season individual females of a tubuliferon have each deposited several hundred eggs (Melis 1935).

Immature Stages

Customarily thysanopterists (Priesner 1926a, 1926b–1928, Morison 1947–1949, Speyer 1935, etc.) have called the postembryonic forms of thrips *larvae* (Fig. 5, 6, 7, 9, and 10), and the remaining quiescent, nonfeeding, pre-adult instars *pupae* (Fig. 8, 11, 12, 13, and 14). These traditional terms are applied herein, irrespective of the various objections to the contrary expressed by entomologists, including some thysanopterists (Bailey 1957, Cott 1956, and others).

In the postembryonic period there are two larval stages. These larvae ingest all food necessary for development to the adult form. As in holometabolus insects the larval period is followed by the nonfeeding pupal period.

Among the Terebrantia there are one (in species of *Franklinothrips*) or more commonly two quiescent pupal stages. Pupae, if disturbed, are capable of walking. First there is a *pre-pupal* stage in which the antennae are short and positioned forward of the head, and the wing buds (when present) are moderately short and placed along the sides of the body. This is followed by the *pupal* stage (Fig. 8),

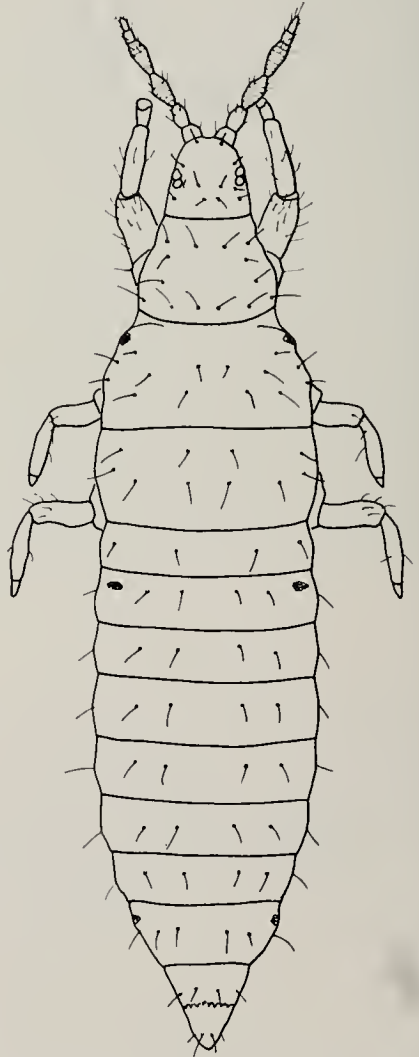


Fig. 5.—Larva of *Thrips monotropae*, showing morphological characteristics.

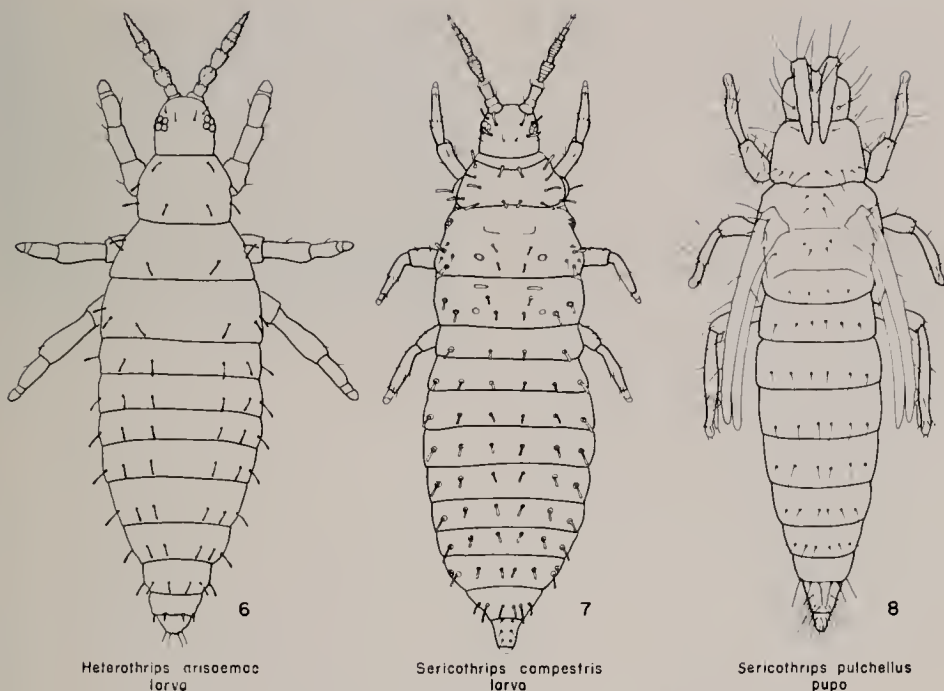


Fig. 6-8.—Terebrantia, immature forms of species indicated.

characterized by the antennae placed over the head dorsally and the wing buds elongated. The imago transforms from this stadium.

Among the Tubulifera there are usually three pupal stages. In the first (*primipupal*) stage, the antennae, which project laterally from the head, and the legs are shortened (Fig. 12). In the *prepupal* stage (Pupa I of some previous authors), the antennae lie along the side of the head (Fig. 13), and wing buds (if wings are to be present in the adult) lie along the side of the body. In the pupal stage (Pupa II of some previous authors) the antennae are elongated and the wing buds extend to curl slightly over the abdomen (Fig. 14).

Neither larvae nor pupae of thrips bear ocelli, as in most members of the Corrodentia-Thysanoptera-Hemiptera phyletic line (Stannard 1956a).

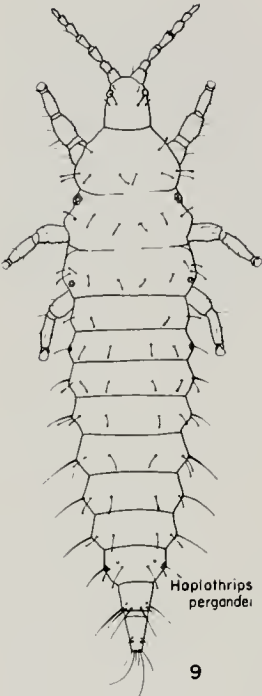
Pupae are often developed in cocoons (Fig. 15) spun by the second instar larvae in the Aeolothripidae and Heterothripidae, or on leaves, and

even in earthen cells, as in the case of the Thripidae.

Orbtl (1963) reports that in *Odonothrips loti* of the Thripidae the second instar larva leaves the flowers of the host plant to migrate into the soil. Within 24 hours, while in the soil, the larva molds an earthen cell lined with silk spun from terminal abdominal glands. Inside this cell the prepupa emerges and remains in that stage for 31-39 hours. Finally the pupal stage is produced from which an adult emerges 60-69 hours later.

The special fore tarsal hooks found in the Aeolothripidae and Heterothripidae (Fig. 76 and 77) are believed to enable the newly emerged adult to break the cocoon and escape. Species of *Odonothrips* and *Taeniothrips inconsequens* also have claws or hooks (Fig. 78) on the fore legs which may help them to break loose from their earthen, silk-lined, cells.

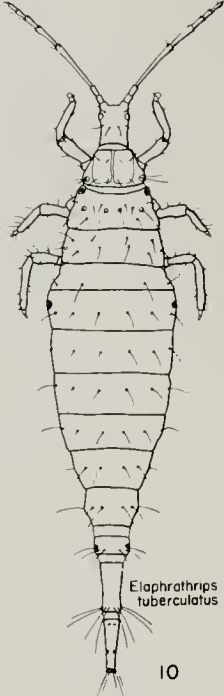
Pupation in the Tubulifera occurs on or near the substrate where the larva has fed.



*Hoplothrips
pergandei*

9

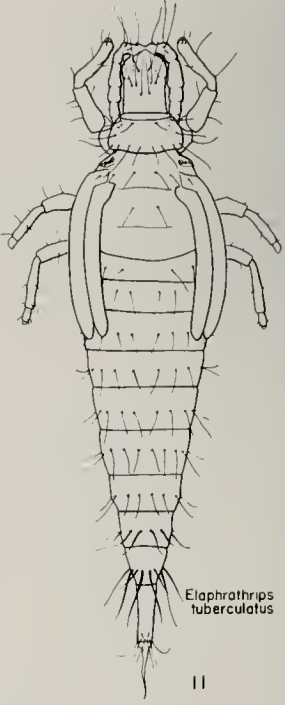
Larva II



*Elaphrothrips
tuberculatus*

10

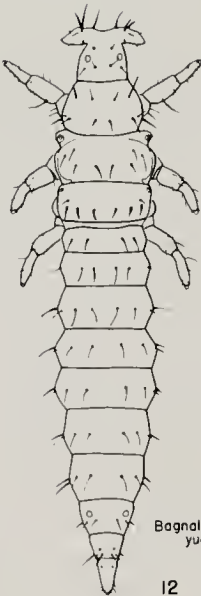
Larva II



*Elaphrothrips
tuberculatus*

11

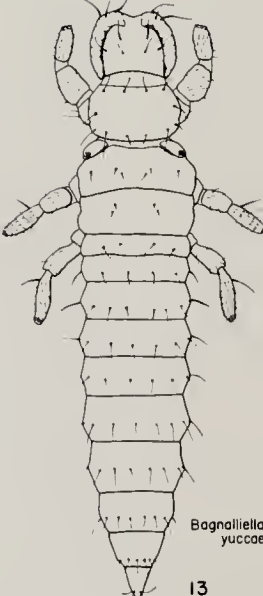
Pupa



*Bagnatiella
yuccae*

12

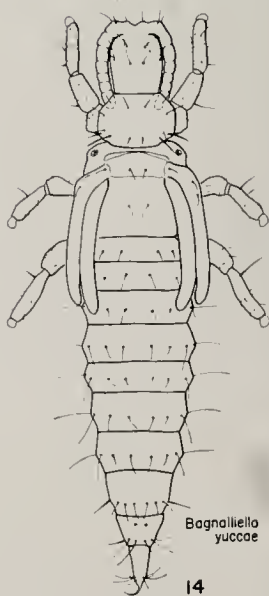
Primipupa



*Bagnatiella
yuccae*

13

Prepupa



*Bagnatiella
yuccae*

14

Pupa

Fig. 9-14.—Tubulifera, immature forms of species indicated.



Fig. 15.—Pupal cocoons of *Frankliniopsis vespiformis*. Photo by Walter Ebeling, University of California.

Hibernation and Aestivation

Neither the mode nor the hibernacula of overwintering Thysanoptera have been much investigated.

In general those Thysanoptera that live in leaf mold on the forest floor and those that occur regularly in summer in the accumulated debris of stools of prairie clump grasses (Fig. 36) can be found there in winter also, primarily in the adult stage. *Frankliniella tenuicornis*, an introduced European species that feeds during the summer on corn (*Zea mays*), is often collected in winter months from clump grasses.

Some of the subcortical species probably withdraw deep into cracks or crevices of bark during the cold weather, as reported by Bailey (1931) for *Poecilothrips*. Some species probably spend the winter in the earth in cells, possibly as pupae or newly formed adults, as is the case in *Taeniothrips inconsequens* (Moulton 1905). Others, such as *Elaphrothrips armatus*, hibernate in the hollow stems of dead herbs. The introduced *Bagnalliella yuccae* and *Haplothrips verbasci* usually can be found behind the appressed leaves of their respective host plants throughout the year.

Whether or not some thrips overwinter in Illinois in the egg stage is unknown. Probably the delicate eggs of Terebrantia would desiccate during the winter unless imbedded in a fleshy part of a plant not subject to hardening or drying. On the other hand, the tougher eggs of Tubulifera might survive in protected places.

Possibly some thrips populations die out during our rigorous winters, to be replaced each year by migrations from the South, as indicated in the trapping done by Henneberry, Taylor, and Smith (1961).

In summer, flights of the oats bug, *Limothrips cerealium*, going into aestivation and hibernation, take place at the time of the oats harvest. These thrips seek out spaces under loose bark, and even enter houses to congregate in picture frames or curtain hems where they go into a state of diapause. They do not reappear again until next spring (those in houses usually die from desiccation in the dry, artificial atmospheres). It is not known whether any thrips has a summer aestivating period as is the case in some insects, such as the coma butterfly; nor is it known whether any thrips can undergo two or more years of diapause as occurs in many sawflies and other insects.

Locomotion

Thrips are noted for their bladder-like cap at the tip of each of the tarsi (Fig. 76-79). Formerly thrips were known as Physapoda or, in German, Blasenfüsse, in reference to these bladders. Mounted specimens usually show the bladders in a collapsed state. In life, when walking at least, each bladder is turgent and is the part that touches the substrate. This manner of walking creates the illusion of toe-pirouetting ballerinas.

According to McGuffin (1937) the legs of thrips when walking move in the following sequence:

Left side	Right side
F - 1	F - 4
M - 3	M - 6
H - 5	H - 2

Certain species, especially those with greatly developed internal metafurcae to which strong muscles are attached, are capable of leaping. Leaping is apparently a good escape foil, and is most common in open-leaf feeders, particularly those species in the Dendrothripini of the Thripidae.

Ordinarily thrips are slow to take off, possibly because of the slight de-

The species introduced by man are:

AEOLOTHRIPIDAE

- Aeolothrips albicinctus*—from Europe
- Aeolothrips fasciatus*—from Europe
- Aeolothrips melaleucus*—from Europe
- Aeolothrips vittatus*—from Europe

THRIPIDAE

- Anaphothrips obscurus*—from Europe
- Chirothrips manicatus*—from Europe
- Dendrothrips ornatus*—from Europe
- Drepanothrips reuteri*—from Europe
- Frankliniella tenuicornis*—from Europe
- Heliethrips haemoïrrhoidalis*—in greenhouses only, from Central and South America
- Limothrips denticornis*—from northern Europe
- Limothrips cerealium*—from middle and southern Europe
- Parthenothrips dracaenae*—in greenhouses only, possibly from Africa

- Pseudodendrothrips mori*—from Asia
- Taeniothrips simplex*—from Africa
- Thrips nigropilosus*—from Europe
- Thrips physapus*—from Europe
- Thrips tabaci*—from Europe and North Africa

PHILAEOTHRIPIDAE

- Bagnalliella yuccae*—from the east coast of North America
- Haplothrips leucanthemi*—from Europe
- Haplothrips verbasci*—from Europe
- Nesothrips bicolor*—from Europe

A few introduced thrips once recorded from Illinois have not been retaken in recent years. Other non-American thrips, such as the pear thrips, long found on both coasts of North America, as yet have not extended their ranges to Illinois.

Our native Thysanoptera follow broad distributional patterns similar



Fig. 17. Distribution of *Chirothrips manicatus* in Illinois.

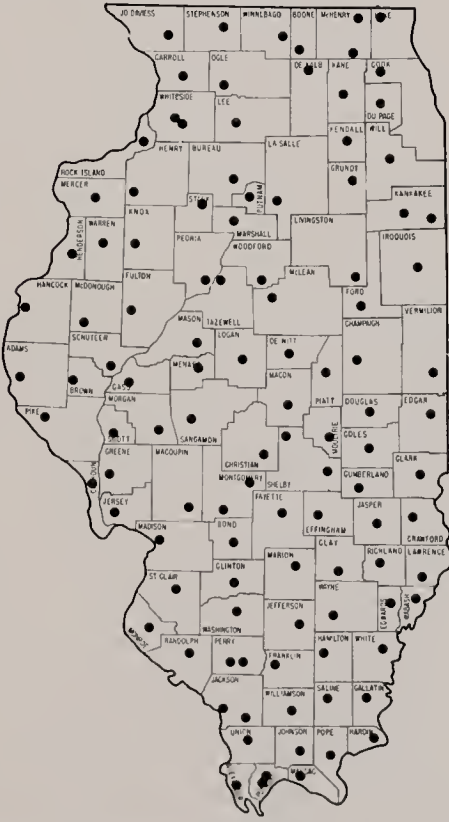


Fig. 18. —Distribution of *Haplothrips (Neohcegeria) verbasci* in Illinois.

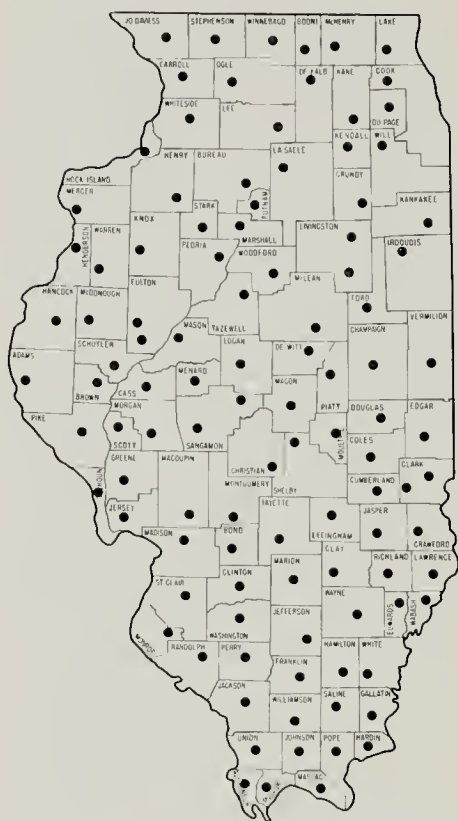


Fig. 19.—Distribution of *Bagnalliella yuccae* in Illinois.

to those of other northeastern U.S. animals (Smith 1961) and plants (Winterringer & Evers 1960). Several distinctive faunal zones occur in Illinois, and while many thrips are state-wide inhabitants, a few are restricted to these various zones (Fig. 20-25).

The Austroriparian zone, particularly in Union County, is richest in numbers of species whereas the purported driftless area in the Illinoian zone (Jo Daviess County) appears to be the most depauperate. The Ozark Hills in Alexander, Jackson, Union, and Randolph counties are a unique reliquary. This is the section of Illinois that possibly bears the oldest, continuously existing, floras and faunas supposedly dating back to Miocene times when the worldwide Arcto-tertiary forest flourished there (Braun 1955). Most other areas in Illinois have at one time or another been cov-



Fig. 20.—Distribution of *Amphibolothrips (Trachythrips) watsoni*. Dots indicate localities from which specimens were collected for this study. The heavy line marks the terminal moraines of the Wisconsin glacier, modified from Horberg (1955).



Fig. 21.—Distribution of *Allothrips nubilicauda*. Dots indicate localities from which specimens were collected for this study. The heavy line marks the terminal moraines of the Wisconsin glacier, modified from Horberg (1955).

ered by ice sheets in Pleistocene times, and because they are in more northerly regions, or because they have not yet matured geologically with the result that the diversity of environmental niches is less, the biota is poorer than in the unglaciated Ozarks. Some species of the Deep South, for

example *Scirtothrips taxodii* (Fig. 25), extend up the Mississippi river valley to southern Illinois. From another direction some eastern Appalachian species reach their northwestern limits in the Shawnee Hills, particularly in mesic valleys in Pope, Gallatin, and Hardin counties.

Some 20 or more species of Thysanoptera occur up to but not much beyond the terminal moraine of the Wisconsin ice sheet (Fig. 20 and 21). Although this ice lobe was present about 25,000 years ago, with various retreats and advances up to 10,000 years ago, it might be concluded that these thrips have not yet spread into this formerly glaciated area because their exacting environmental requirements so far have not developed on this relatively new land, and not because of time. One of these thrips, the wingless

Amphibolothrips (*Trachythrips*) *watsoni* (Fig. 20), may have expanded its range by walking a few inches or a few feet yearly since deglaciation. It has now dispersed into the Wisconsin drift area as far as La Salle and Danville along broad river valleys, but so far it has not penetrated the flat interior of the drift area.

The disputed theory that there have been one or more large faunal shifts during some supposed Xerothermic period after deglaciations (Smith 1957) lacks evidence to convince me of its possibilities. Rather it appears that conclusive evidence to the contrary is available (Stannard 1963a). At any rate the thrips fauna of Illinois has been strongly influenced by Pleistocene events and possibly only the southwestern tip of the state escaped much defaunization.



Fig. 22.— Distribution of *Caliothrips striatus* in Illinois.



Fig. 23.— Distribution of *Echinothrips americanus* in Illinois.

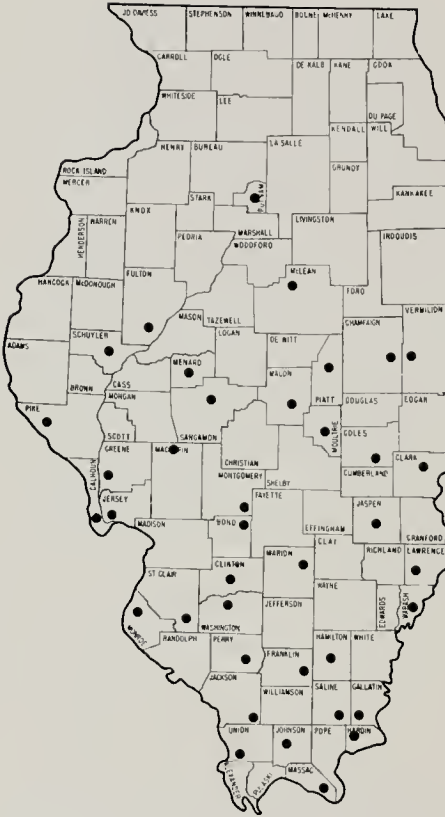


Fig. 24.—Distribution of *Leucothrips piercei* in Illinois.



Fig. 25.—Distribution of *Scirtothrips taxodii* in Illinois.

In brief, it appears that the glaciated regions were repopulated by species coming from the Ozarkian refugia via the Mississippi-Illinois river valley system, and from the Appalachian refugia via the Tennessee, Kentucky, and Wabash river valley system. The distribution of the Ozarkian *Oedaleothrips hookeri* from Union County to Pere Marquette State Park along the Mississippi River and the presence of the Appalachian *Phthirothrips morgani* and *Aeolothrips crassus* in the extreme southeastern counties, both species possible immigrants up the Tennessee river valley, are examples of these two types of dispersal. Thrips specific to hosts with archaic and limited distribution, such as *Heterothrips azaleae* restricted to *Azalea*, remain confined with their hosts. Other thrips living on widespread vegetation have more or less followed

their hosts back onto the glaciated areas.

Complete association of all thrips with their host plants over the entire range of those hosts is not always the case, however. *Liothrips usitatus*, found only on *Rhus copallina*, occurs in southern Illinois but not in northern Illinois where *Rhus copallina* sporadically reinvades our state along the Indiana borders of Will, Kankakee, and Cook counties.

In the 100 or so years of intensive agricultural cultivation in Illinois, much of the original environment has either been damaged or destroyed. Whereas a widespread prairie thrips once may have been abundant, it now may be confined to but a few fence rows or along railroad tracks in an isolated clone of grass or herb. The ultimate fate of our thrips, especially those highly restricted to a rigidly cir-

cumscribed natural niche, is undoubtedly extinction except in the prairie and forest preserves protected in parks, university sanctuaries, and nature conservancy scientific areas. The bulldozer, weed killer, insecticide, fire, and other human derived forces are such continuing threats to the remaining wild habitats that the distribution of the native thrips of Illinois, as well as other species in the biota, shall become increasingly limited in future years.

Evolution

Fundamentally the Thysanoptera show strong affinities to the Corrodentia-Anoplura-Mallophaga-Homoptera-Hemiptera phyletic line of insects (Stannard 1957*b*). Some of the features that attest to the close relationship of these orders of insects are the homology of the maxillary stylets of the Thysanoptera with the chisel-like lacinia of the Corrodentia and the more elaborate stylets of the Homoptera-Hemiptera, together with the common reduction of the mallipigian tubules to four (or less in the higher groups); the general lack of larval ocelli (Stannard 1956*a*); and the similarity of the antennal sense comes as exemplified by those found on phloresid psocids, thrips, and aphids. Because the Thysanoptera have retained maxillary and labial palps and have simplified maxillary stylets, they ought to be placed before the Homoptera-Hemiptera in phylogenetic sequence. Most members of the Homoptera-Hemiptera order have lost these palps and usually they have an extra segment in each stylet of the maxillae.

According to Grinfel'd (1959), the origin of the Thysanoptera may have been correlated with the development of the right mandible, with a corresponding reduction of the left which disappeared, as an instrument for piercing pollen granules for food. Certainly the single mandible is more effective in piercing pollen than two would be. Thus it may have been in the pollen-feeding niche that the early Thysanoptera proliferated into a full-fledged order.

The Terebrantia, on the basis of their possession of wing veins, retention of well-developed female gonopods, and in some cases three segments (instead of two) in the maxillary palps, are undoubtedly of stock more primitive than the Tubulifera (Fig. 26).

In the Terebrantia, the family Aeolothripidae—many members of which have slightly broadened wings with several longitudinal veins, nine segments in the antennae, and basically three segments in the maxillary palps—is conceded by thysanopterists to be the most generalized family. The earliest fossil, *Permothrips longipennis* Martynov, seems to be closer to the Aeolothripidae than to any other family in the Thysanoptera.

From the Aeolothripidae-like ancestor, the families Merothripidae, Heterothripidae, and Thripidae evolved. The Thripidae are the most advanced, mostly by reduction of structures or elaborations of vestiture.

Still existing today are intermediate genera, *Fauriella* and *Opisthrips*, between the Aeolothripidae and Heterothripidae, and the intermediate genus, *Erotidothrips*, between the Aeolothripidae and Merothripidae. Although the Heterothripidae and Merothripidae have often retained the nine-segmented antennae and frequently kept the flat membranous sensoria of the intermediate antennal segments, as in the Aeolothripidae, they have lost some wing veins, and male glandular-like areas on the abdominal sternites have evolved as new structures.

The family Thripidae, containing the largest number of diverse entities of the Terebrantia, specialized by having the antennae reduced to eight or seven segments (secondarily nine or six segments in some genera) and by having a further narrowing of the wings.

Throughout their evolution the Terebrantia mostly retained the propensity to feed on vascular plants and their pollen.

Possibly from an ancestor similar to members of the Heliothripini, a seemingly early derived tribe of the Thripidae, the primitive Tubulifera arose.

still represented by the single family Phlaeothripidae (Stannard 1957b). In their advancement the Phlaeothripidae developed longer maxillary stylets, lost almost all traces of wing veins and female gonopods, and proliferated into niches primarily involving fungi, as for

example in molding dead leaves, under bark, or on dead twigs. A few, however, still feed on juices of vascular plants or make galls.

In the evolution of the Thysanoptera a number of seemingly parallel developments occurred. These similar

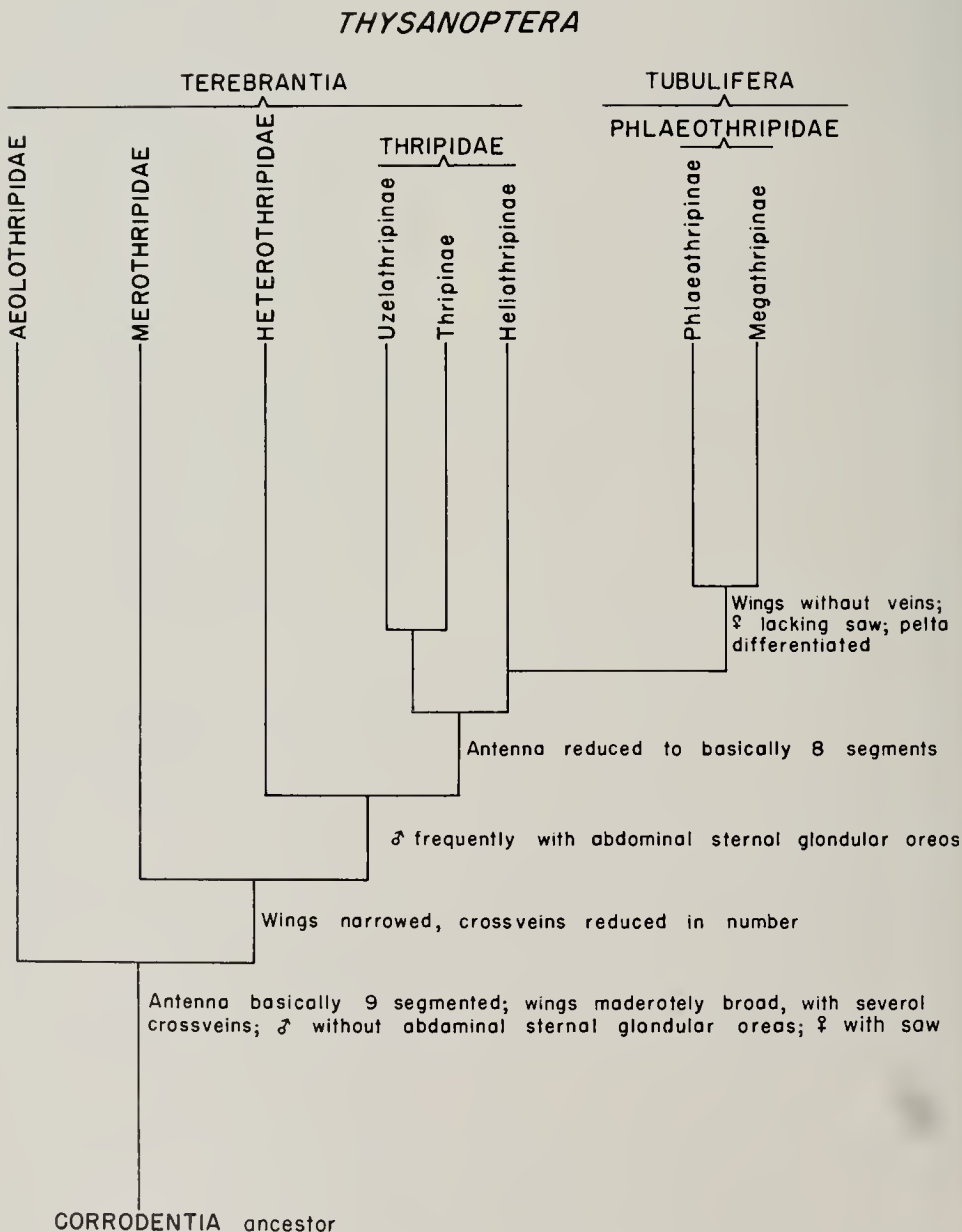


Fig. 26.—Phylogenetic tree of the Thysanoptera, indicating probable origins of the major taxa.

productions of form are apparently the result of response to present environmental factors and do not necessarily reflect direct-line descent. For example, in the Terebrantia the metafurca is well developed and enlarged in thrips that are good jumpers, and this characteristic is repeated in divergent phyletic lines, the Dendrothripini, the *Sericothrips* complex, and others. In the Tubulifera certain characteristics seem to be correlated, irrespective of phyletic line, for unknown reasons or for structural compatibility. For example, in the Tubulifera, when the mouth cone is short and broadly rounded, the maxillary stylets generally are placed far apart and do not extend far (or only moderately so) into the head; the converse is ordinarily true for those thrips having a pointed mouth cone. Furthermore in the Tubulifera, it is often observed that the broader the fore wing, the closer the fringe cilia are placed together; and the greater the number of accessory fringe cilia on the fore wing, the darker in color that wing is likely to be.

A basic feature of the Thysanoptera is their cilia- or fringe-lined wings (Fig. 83), as reflected in their name. Although this type of wing is not unique in these insects, it is confined to many very small insects. For example, similar fringe wings are found in—

Coleoptera: Clambidae, Orthoperidae, Phaenoccephalidae, Ptiliidae, Sphaeridiidae

Hymenoptera: Cynipidae, Mymaridae, Trichogrammatidae

Lepidoptera: Elachistidae, Gelechiidae, Tineidae

Trichoptera: Hydrotilidae

Although the flight of small insects has been reviewed by Horridge (1956), the aerodynamic principles have not been worked out. It would seem that induced drag is disproportionately great in relationship to lift in wings as tiny as those found in thrips and others. Horridge suggests, however, that flight is possible with small wings when the drag on the upstroke is less than on the downstroke. Possibly bristles on the wings tend to reduce

the drag on the upstroke. Further, with fringes, a "slotting" effect is seemingly obtained, somewhat like the "notched" condition produced by a vulture when the primary quill feathers are spread, so that a high angle of incidence of climb in flight can be made. Thus fringed wings seemingly allow thrips to climb nearly vertically as a helicopter would upon takeoff and, thereby, gain a more favorable lift-drag ratio.

Whereas the fringe-type wing is apparently advantageous to minute insects such as thrips, this wing form may limit, by its very nature, the future size of all descendants. Before large thrips could develop, undoubtedly there would need to be a reversal in the evolution of the wings back to the broad, nonfringed type for flight.

The statistical odds of reversing the evolutionary wing trends present in the Thysanoptera are presumably so high that most likely thrips are doomed to retain fringed wings and to continue, as a consequence, as small insects in their future course of evolution.

Enemies of Thysanoptera

Despite their small size, thrips are definite parts of the food chain of many biotic communities.

Among Hymenoptera some species in *Spilomena*, *Ammoplanus*, and *Xysma* (Specoidea) provision their nests with immature Thysanoptera (Musebeck, Krombein, Townes, et al. 1951; and Krombein 1958). *Tetrastichus thripophonus* and several species of *Ceraninus* (= *Thripoctenus*) (Eulophidae) also select Thysanoptera as hosts (Russell 1912, Mason 1922, Bailey 1933, and de Santis 1961). The tiny wasp, *Megaphragma mymaripenne* (Trichogrammatidae), develops within the eggs of thrips (McMurtry 1961). Another minute wasp, *Dasyscarpus parvipennis*, has been used in Maryland to aid in the control of greenhouse thrips and in California for thrips that feed on avocado (McMurtry & Johnson 1963).

In the Diptera, immature stages of Syrphidae, for example *Sphaerophoria*,

are predators of Tubulifera (Stuckenberg 1954). Larvae of Cecidomyiidae are said to be predacious on the olive thrips (Melis 1935).

In addition, insects belonging to the families Anthocoridae (Fig. 27), Coccinellidae, Staphylinidae, Cucujidae, and Chrysopidae, as well as mites of the families Laelaptidae, Cheyletidae, and Amystidae have been reported attacking thrips (Bailey 1933, Melis 1935, and Illingworth 1931). Russell (1912) further records a nematode parasite of the bean thrips.

Even certain predacious thrips, *Aeolothrips*, *Franklinothrips* (Fig. 28), *Scolothrips*, and *Aleurodothrips*, occasionally feed on other thrips (Bailey 1933, McMurtry 1961, and Ebeling 1950), and instances of cannibalism have been observed (Grinfel'd 1959).

Both Shull (1911) and Hood (1914c) surmise that hummingbirds eat flower thrips, in the temperate region as well as in the tropics.

Several thrips have been described from specimens taken from the stomachs of lizards, *Anolis stratulus* and *pulchellus* (Morgan 1925a). Knowlton (1938) has recorded Thysanoptera from the stomachs of the lizards *Uta s. stansburiana* and *Sceloporus g. graciosus*. Recently Moll (1963) recovered *Frankliniella tritici* from the stomach of smallmouthed salamanders (*Ambystoma texanum*) in Illinois in the sum-



Fig. 28.—Larva of *Franklinothrips vespi-formis* feeding on another thrips larva. Photo by Walter Ebeling, University of California.

mer. Hamilton (1930) found thrips in all but a few stomachs of young American toads examined.

Besides predators and parasites, many hazards of climate and change in the environment destroy Thysanoptera. Heavy rains are said to be responsible for reducing populations of thrips that are pests on crops (Russell 1912). Fire in particular is deleterious to colonies of thrips living in leaf duff and crowns of prairie clump grasses. Burned prairies are especially depauperate in native Thysanoptera, particularly those thrips which are usually flightless. Information on the rate of recolonization of devastated areas is scarce. In one study conducted in Illinois, eight species of native prairie thrips had not returned to an area once treated by the insecticide dieldrin even after a period of eight years (Moye, Stannard, & Luckmann, 1966).



Fig. 27.—Nymphs of *Ectemnus reduvinus* (Anthocoridae) feeding on *Liothrips oleae* in southern Europe. From Melis (1935).

ECONOMIC IMPORTANCE

Bailey (1940) has listed the 32 thrips most destructive to crops in the United States. Many of these same thrips cause concern in Europe and other temperate regions. Elsewhere, Ananthakrishnan (1956) has reviewed the worst thrips pests of India, several of which are also found in other countries with tropical climates. Some thrips of economic importance in the Neotropical regions are discussed by Ebeling (1950).

In Illinois, a number of thrips, mostly introduced species, can cause serious direct damage to crops. Among these *Taeniothrips simplex* is of importance to commercial gladiolus growers in the Kankakee area. Another, *Thrips tabaci*, must be controlled in the onion-growing areas south of Chicago, although many of the farmers believe that in some cases a mild infestation of thrips may help thin closely grown seedling onions. Rose and chrysanthemum growers must protect against the flower thrips, *Frankliniella tritici*, sometimes even in the winter in greenhouses. Fruit growers in nearby Indiana have reported dimpling of apples by the same flower thrips in the spring (Anonymous 1963a). The grass thrips *Anaphothrips obscurus* causes silver top of blue grass (Fig. 99), and occasionally damages young corn so severely that replanting is necessary. In addition a number of species of grass thrips infesting grains and pastures cause varying degrees of production losses (Bailey 1948; Rihard 1954). Other important thrips include *Limothrips cerealium* which can destroy oats crops (Körting 1930) and *Dendrothrips ornatus* which attacks privet hedges and lilacs, especially in the northern and central portions of Illinois.

Besides causing mechanical injury, some thrips transmit plant virus diseases. *Frankliniella fusca* and *Thrips tabaci* have been shown to transmit tomato spotted wilt virus (Sakimura 1963), although their role in spreading this plant disease in Illinois is not known.

On the other hand some thrips—*Scolothrips pallidus*, *Haplothrips* (*Haplothrips*) *subtilissimus*, and *Haplothrips* (*Leptothrips*) *mali*—feed on spider mites or small insects and thus are of benefit to horticulturists.

As a nuisance, *Limothrips cerealium* often enters houses and settles everywhere—hardly a crack or hem is too small for it to penetrate. Several species of thrips can also be mildly annoying when they bite a person's bare arm or head. Bailey (1936) has listed the names of those thrips that have been known to bite human beings. Westwood (1840) repeats the supposedly reliable story of the person who, suffering from headache, discharged thrips which had lodged in his nostrils. Such mishaps are apparently rare and should not be considered as a particular trait of thrips in general.

Negative reaction to thrips by bees was mentioned by Parks (1927). He wrote that there were many records of bees not working mesquite because of the presence of thrips in the bloom.

FAUNAL MONOGRAPHS IN NORTH AMERICA

At the time (1895) of Uzel's monograph of the Thysanoptera in which about 160 names of extant species were recorded for the world, Alice M. Beach published the first list of thrips in North America, a list of 17 species from Iowa. Some of these species were then regarded as varieties. (By 1936 Moulton & Andre raised the total of known Iowan thrips to 85 species, and in later records the number was further increased.) Following Miss Beach, Hinds (1902) treated about 39 species, as now recognized, for the whole of North America. Subsequently Daniel (1904) published a list of eight species for California. More recently Cott (1956) and Bailey (1957) keyed and described a total of 182 California species, climaxing years of discovery and study by thysanopterists.

The growth of knowledge of the North American fauna was fairly

rapid. Within 10 years after Hinds' monograph, Moulton (1911) had increased the number to about 115 species as currently recognized. Watson (1924a) enumerated about 335 species for our continent including a few names that have since been synonymized. In 1926 Hood and Herrick recorded 74 species from the state of New York alone. Additional partial and small lists, several in unpublished theses, have been prepared for Indiana, Florida, Oregon, North Carolina, New Jersey, and other states. Without listing the names, Hood (1954a) stated that 213 species were known in Florida. My revision of the Tubulifera (1957b) included 486 species in this suborder for North America from Alaska to Panama.

The treatments given by Bailey and Cott for California, as previously mentioned, are comprehensive modern guides suitable for many of the states west of the continental divide. The Illinois report presented herewith covers 225 species including some not yet found within the state borders and the keys are designed to include all genera in states east of the 100th meridian.

The faunas of Texas, the Southwest, the central plains states, and Canada still need to be investigated more thoroughly, at least at the "beta" level that Bailey, Cott, and I have done on the West and East, before a reasonable idea can be gained of the kinds and overall distribution of our temperate North American thrips. Probably this fauna will amount to nearly 500 species out of a world total of 4,500-5,000 known species. (In 1960 Dr. Zur Strassen counted 4,050 names of species as of then proposed for the Thysanoptera in the extensive card index maintained by Dr. J. C. Faure.)

COLLECTING AND PRESERVING THYSANOPTERA

Thysanoptera may be collected by three general techniques—sweeping, beating, and the Berlese extraction method. Direct observations of plant leaves are advisable also, especially for

light-colored species such as those on redbud, *Tilia*, *Sambucus*, and mulberry.

A heavy sweeping net, when swept over grasses, herbs, and shrub or tree leaves, yields an initial survey of the active thrips of an area. If a mixed stand of vegetation is swept for thrips, it may be necessary to retrace the area covered, examining each species of plant until the actual host of a particular thrips previously captured can be ascertained.

A broad, flat cloth (Fig. 29) is excellent for receiving thrips dislodged by beating dead branches or by shaking flowers and leaves. After the beating, the cloth can be carefully searched for thrips as the fallen individuals delay many minutes before taking to flight. In an emergency, a piece of cardboard, or one's shirt, can be used as a substitute for the collecting cloth.

Once located, the thrips may be lifted from surfaces by touching them with a fine, moistened, watercolor brush. Adhering specimens may then be shaken off into a vial of preserving fluid.

Many cryptic thrips of the humus and bark can be collected by sifting the material over a cloth, but by far the easier method is the Berlese method. Leaf mold on the forest floor (Fig. 30), moss, old nests, bark, or freshly dug grass clumps (Fig. 36) can be put into Berlese funnels (Fig. 31), which are heated by suspended, glowing, light bulbs or encircling steam or hot water pipes. The tips of the funnels are inserted into bottles of 70-percent alcohol. Thrips and other insects are driven down and out of the substrate by the heat, and fall into the alcohol (Fig. 32).

A suitable fluid (AGA) made of eight parts of 95-percent alcohol, five parts of water, one part of glycerine, and one part of glacial acetic acid kills and preserves thrips in a relaxed condition, allowing them to be easily mounted. After several months in AGA, the specimens should be mounted or stored in 70-percent alcohol.

Although Hoyer's medium (Baker & Wharton 1952:10) is excellent for



Fig. 29.—Beating and jarring leaves and branches over cloth to collect Thysanoptera. Photo by W. E. Clark.

making whole mounts of thrips, it is not always long lasting. For the permanent collection, thrips should be mounted in balsam.

In making balsam mounts it is advisable to remove the thrips from AGA to 70-percent alcohol, and pierce a hole in the abdomen with a fine, sharp pin. This hole allows for quick passage of balsam into the body to prevent collapsing. From the 70-percent alcohol solution change the thrips to 95-percent alcohol and then briefly to oil of wintergreen to fix the tissues prior to placement in balsam on the slide. Pieces of glass (fragments of broken cover slips will serve) placed to the anterior and posterior of the specimen before the cover slip is put in place prevent eventual mashing and distortion by the cover slip as the medium hardens. Wings and legs should be spread for clear vision. Customarily thrips are mounted dorsal side up. Very dark specimens might



Fig. 30.—Collecting forest litter for processing in Berlese funnel to recover thrips in the leaf mold habitat. Photo by Wilmer Zehr.

be macerated with KOH treatment prior to mounting.

A good research microscope (Fig. 33) with a high dry (40 times magni-



Fig. 31.—Berlese funnels in operation. Forest litter is placed in funnels and then warmed and dried by heat to drive insects down into bottles of preservative (70-percent alcohol) below. Photo by Wilmer Zehr.

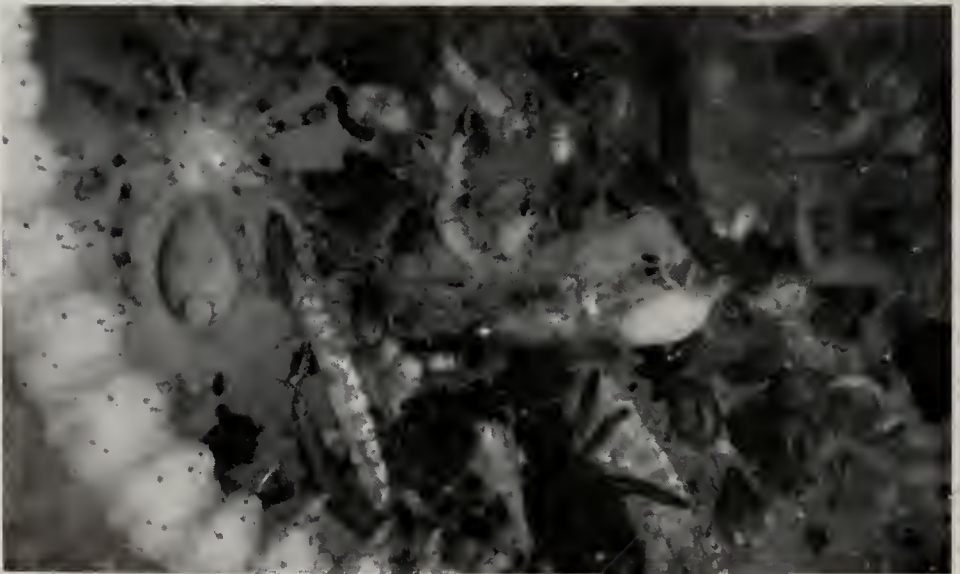


Fig. 32.—Samples of insects, including thrips, recovered from forest litter by the Berlese funnel method. Photo by Wilmer Zehr.



Fig. 33.—Type of research microscope needed for the study of Thysanoptera. Photo by Wilmer Zehr.

fication) objective and with a light source that can be adjusted for Köhler illumination is necessary for the study of Thysanoptera. A hand lens of 20 power magnification is useful in making observations in the field.

Not all thysanopterists are in agreement on every phase of collecting or mounting thrips, or even in storing the slides. The search for the perfect mounting medium still goes on. Meanwhile, however, the major collections of Thysanoptera in the world are composed primarily of specimens preserved in balsam on 3- by 1-inch, 1 mm thick slides, stored in boxes or trays. Such uniformity allows much convenience in exchanging specimens.

In learning to recognize the subtle features of many of the genera and species of thrips, it is advantageous to have a named reference collection available. Lacking access to such a collection, a helpful series of specimens can be gathered from hosts known to harbor specific thrips. In this manner representatives, especially of the Terebrantia, can be obtained

quickly and identified with reasonable assurance of accuracy.

The following partial list should aid in this regard:

Plant Hosts of Thysanoptera of Illinois

TEREBRANTIA

Aeolothrips vittatus conifers
Aeolothrips vittipennis locust trees
Heterothrips aesculi red buckeye flowers
Heterothrips analis wild rose flowers
Heterothrips arisaemae jack-in-the-pulpit flowers
Heterothrips auranticornis flowers of sunflowers, autumn
Heterothrips azaleae flowers of azalea
Heterothrips quercicola oak catkins
Heterothrips salicis male catkins of sand bar willow
Heterothrips vitis opening buds of grape flowers
Anaphothrips sandersoni heads of slough grass
Caliothrips striatus leaves of yellow poplar
Ctenothrips bridwelli leaves of may apple, skunk cabbage
Dendrothrips ornatus leaves of privet hedge, lilac
Drepanothrips reuteri leaves of grape
Leucothrips piercei leaves of redbud
Pseudodendrothrips mori leaves of Japanese mulberry
Scirtothrips brevipennis red cedar
Scirtothrips taxodii bald cypress
Sericothrips annulipes leaves of locust trees
Sericothrips baptisiae false indigo
Sericothrips beachae leaves of hops
Sericothrips campestris leaves of wild four-o'clock
Sericothrips langei leaves of *Nymphaea* water lily
Sericothrips pulchellus leaves of wafer ash
Sericothrips sambuci leaves of elderberry
Sericothrips tiliae leaves of linden

Taeniothrips betulae . . . leaves of willow
Taeniothrips simplex gladiolus
Taeniothrips vulgarissimus
 cow parsnip
Thrips impar jewel weed
Thrips monotropae
 flowers of Indian pipe
Thrips pallicornis hickory
Thrips physapus dandelion
Thrips varipes
 flowers of leather flower
Thrips winnemanae
 leaves of coral berry

TUBULIFERA

Bagnalliella yuccae
 sheaths of yucca (Fig. 34)
Haplothrips aculeatus grasses
Haplothrips leucanthemi
 flowers of daisy
Haplothrips malifloris
 leaves of *Froelechia*
Haplothrips shackelfordi . . . slough grass
Haplothrips verbasci
 leaves and flower buds of mullein
Liothrips citricornis
 leaves of hickory
Liothrips pruni under bark of cherry
Liothrips russelli
 leaves of virginia creeper (Fig. 35)
Liothrips usitatus
 buds of dwarf sumac
Malacothrips zonatus
 clump grass (Fig. 36)

Elaphrothrips coniferarum conifers
Elaphrothrips tuberculatus
 hanging dead oak leaves (Fig. 37)



Fig. 35.— Virginia creeper, host plant of *Liothrips russelli*. Photo by Wilmer Zehr.



Fig. 34.— *Yucca filamentosa*, host plant of the thrips, *Bagnalliella yuccae*. Photo by Wilmer Zehr.



Fig. 36.— Clump of *Andropogon gerardi*, host plant of several native prairie thrips. Photo by Wilmer Zehr.



Fig. 37.—Dead hanging oak leaves, niche of *Elaphrothrips tuberculatus*. Photo by Wilmer Zehr.

GREENHOUSE THIRPS

(* = not yet found in Illinois)

- **Aleurodothrips fasciapennis*
- Anaphothrips obscurus*
- **Asprothrips antennatus* Moulton
(= *raui* Crawford, new synonymy)
- Chaetanaphothrips orchidii*
- **Frankliniella occidentalis*
- Frankliniella tritici*
- **Franklinothrips vespiformis*
- Heliothrips haemorrhoidalis*
- **Leucothrips nigripennis*
- **Liothrips vaneeckei*
- Parthenothrips dracenaee*
- **Taeniothrips xanthius*

EXTERNAL MORPHOLOGY

Modern investigations of the morphology of the Thysanoptera have been done by several students. Among these, Doekson (1941) illustrated and described in the Dutch language both the Terebrantia and the Tubulifera. Pesson (*in* Grassé 1951) gave an exceptionally thorough treatment of both suborders in French. Melis (1959) also described in detail the principal structures of both suborders in Italian.

Jones (1954), reported in English on the external morphology of *Chirothrips hamatus* (Terebrantia), and Davies (1958) presented an analysis of the morphology of the head and mouth parts of the Thysanoptera as based on knowledge of the musculature. Priesner (*in* Tuxen 1956) described the genitalia and secondary sexual appendages. Peterson's work (1915) on the heads of both suborders still stands as a fundamental reference. Other contributions to the morphology of thrips are found scattered in the various taxonomic papers.

The principal characteristics which are used herein for taxonomic purposes are illustrated and named in the several accompanying outline drawings (Fig. 38-61). Additional or singular characteristics are described or illustrated on subsequent pages when appropriate.

Although no morphological feature is absolutely indicative of a taxonomic level, certain structures have proved to be generally useful in the separation of the major groups in the Thysanoptera.

At the family level, the overall form of the antennae and the sense cones, the shape of the fore wing including the venation and setae, and the secondary sexual structures, particularly the ovipositor, glandular areas, and spines, tend to serve as the principal key characters.

At the generic level, details of the antennae, the length and type of setae, the placement of the maxillary stylets (in the Tubulifera), body sculpture, and fore leg armature are frequently used as the main, basic characteristics.

At the specific level, color and chaetotaxy are the most useful spot characteristics. The head shape, individual antennal segment lengths, arrangement of the prothoracic and wing setae, sculpture of the metanotum, and the shape of the pelta (in the Tubulifera) are also often diagnostic.

Some structures, such as ordinary setae, may serve functions incidental to the thrips well-being. These setae may act as pollen holders and thereby

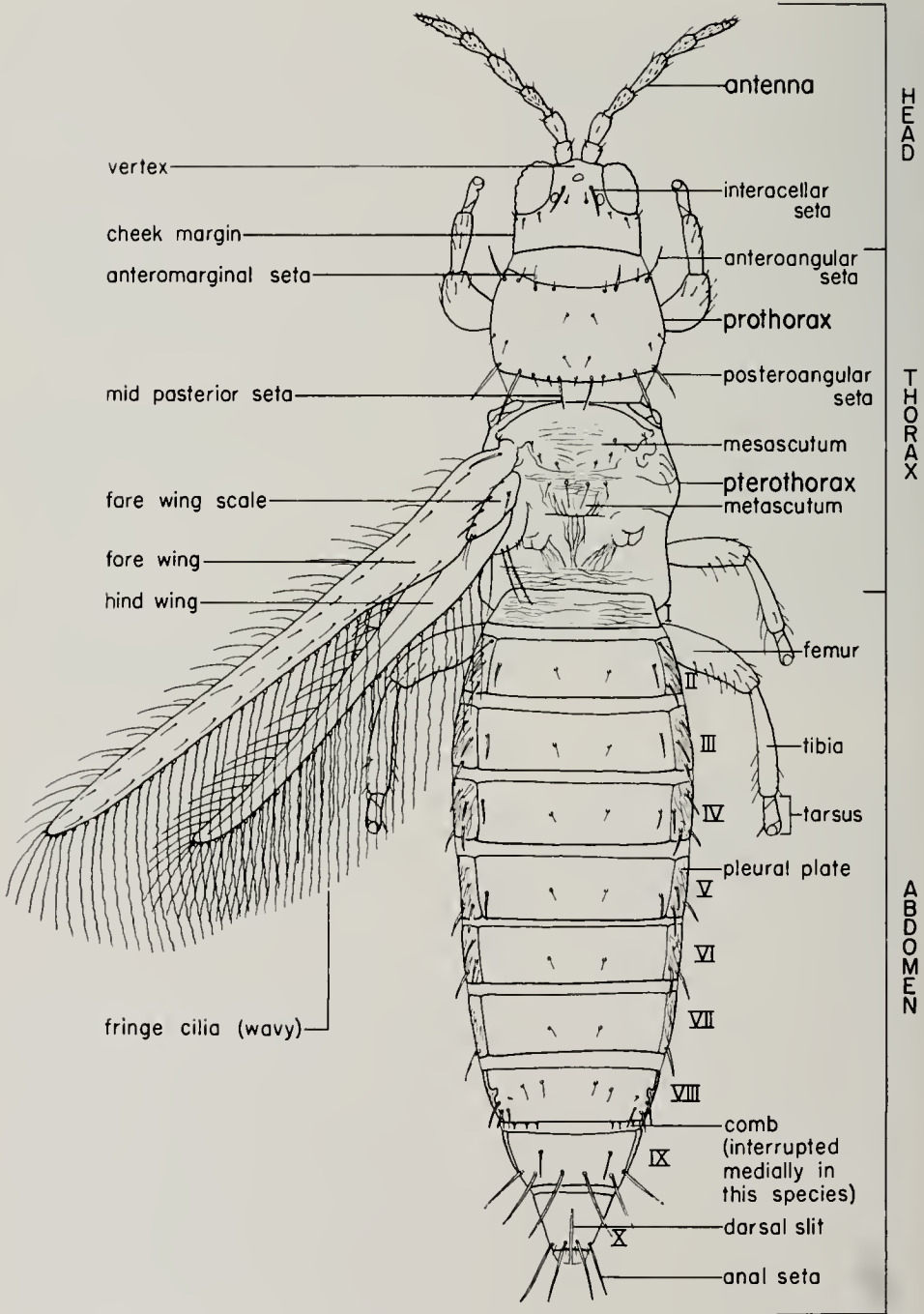
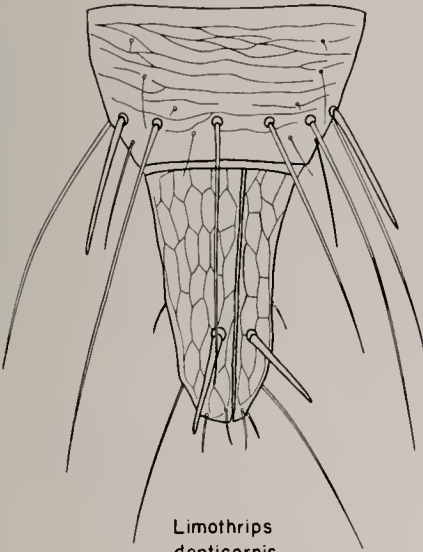
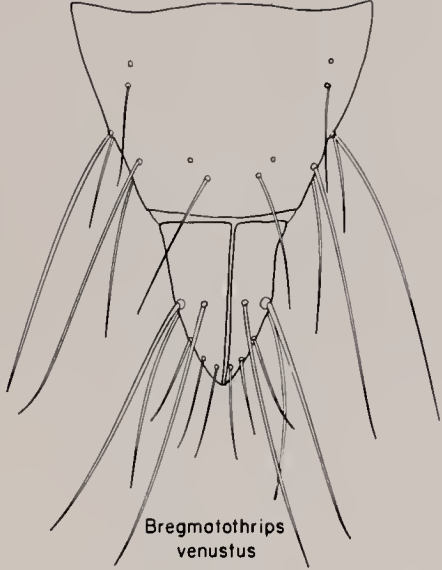


Fig. 38.—Morphological features of the Terebrantia as exemplified by *Frankliniella tritici*, dorsal aspect.



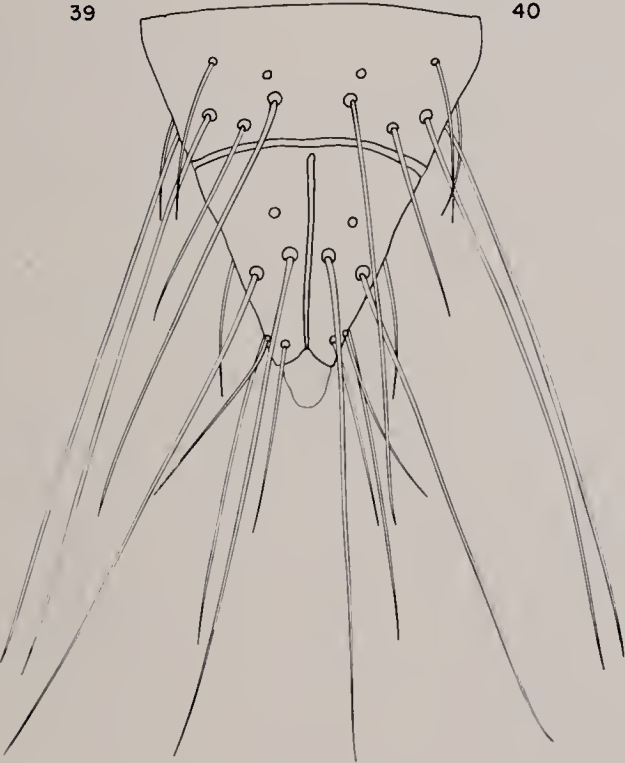
Limothrips
denticornis

39



Bregmotothrips
venustus

40



Plesiothrips *perplexus*

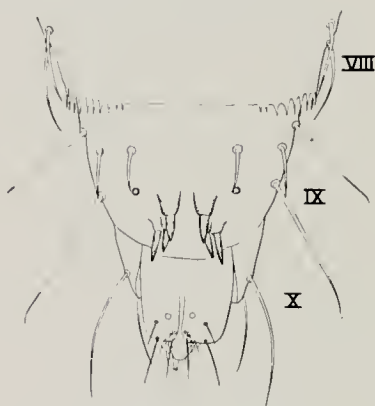
41

Fig. 39-41.—Abdominal terminalia, ♀, of the Thripidae as exemplified by species indicated.

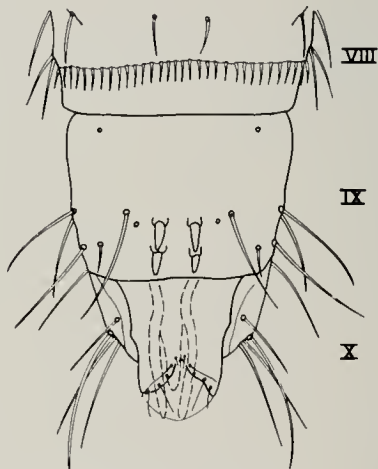
be of advantage to the host plant. According to observations by Shaw (1914) most of the thrips examined from beet flowers in Ogden, Utah, bore among their body setae numerous pollen grains. Annand (1926) noted that "Thysanoptera having heavy well-developed bristles are better able to carry pollen grains on the body." Whether particular setae have evolved into their special form as pollen traps is an unanswered question.

Morphological characteristics that

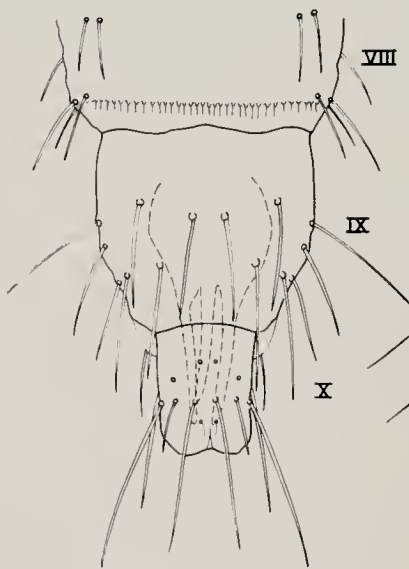
separate the sexes are more obvious in the Terebrantia than in the Tubulifera. In the Terebrantia, the female bears a conspicuous sawlike ovipositor whereas this structure is absent in the male. In the Tubulifera, the female may be recognized by a short, internal rod (fustis) lying just forward of the base of the tube (abdominal segment X) (Fig. 53, F.). By contrast, the male tubuliferon lacks the rod and has the central portion of the basal sternal margin of the tube incised (Fig. 52).



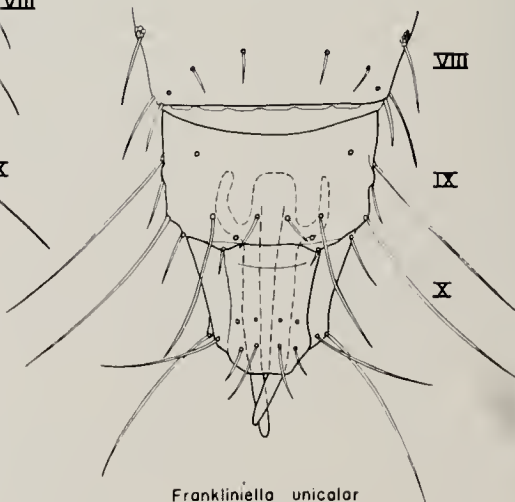
Hercinothrips femoralis
42



Anaphothrips sandersoni
43



Echinothrips americanus
44



Frankliniella unicolor
45

Fig. 42-45.—Abdominal terminalia, ♂, of the Thripidae as exemplified by species indicated. Fig. 42 from Hood, in White (1916).

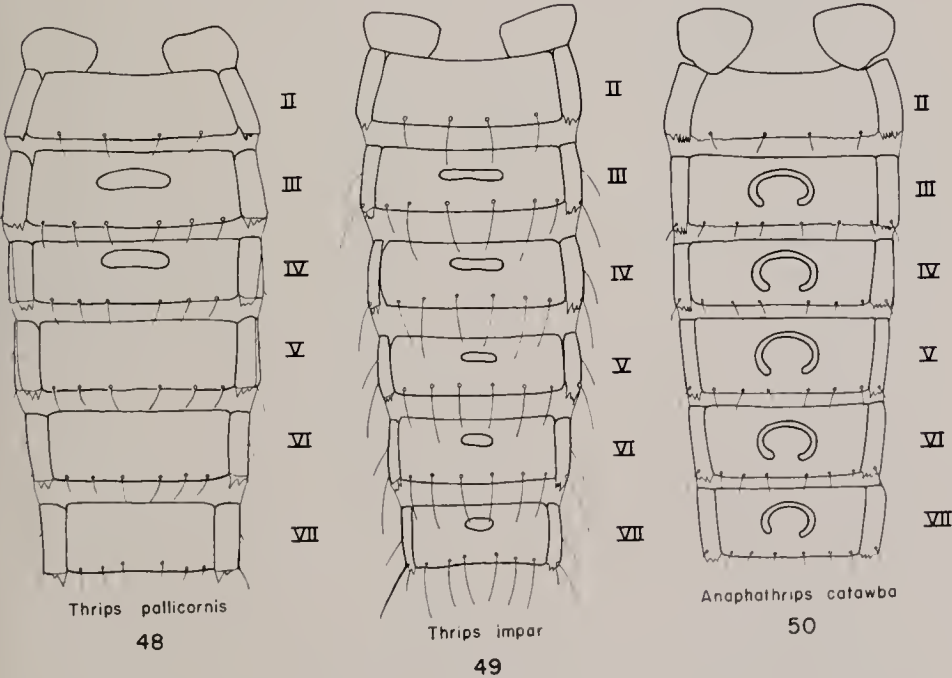
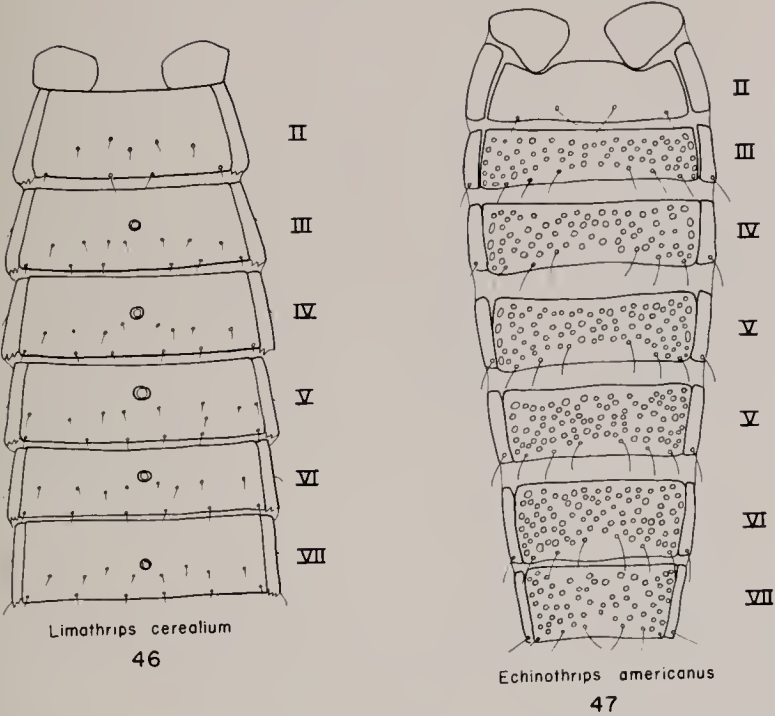


Fig. 46-50.—Types of glandular areas on abdominal sternites, ♂, of the Thripidae as exemplified by species indicated.

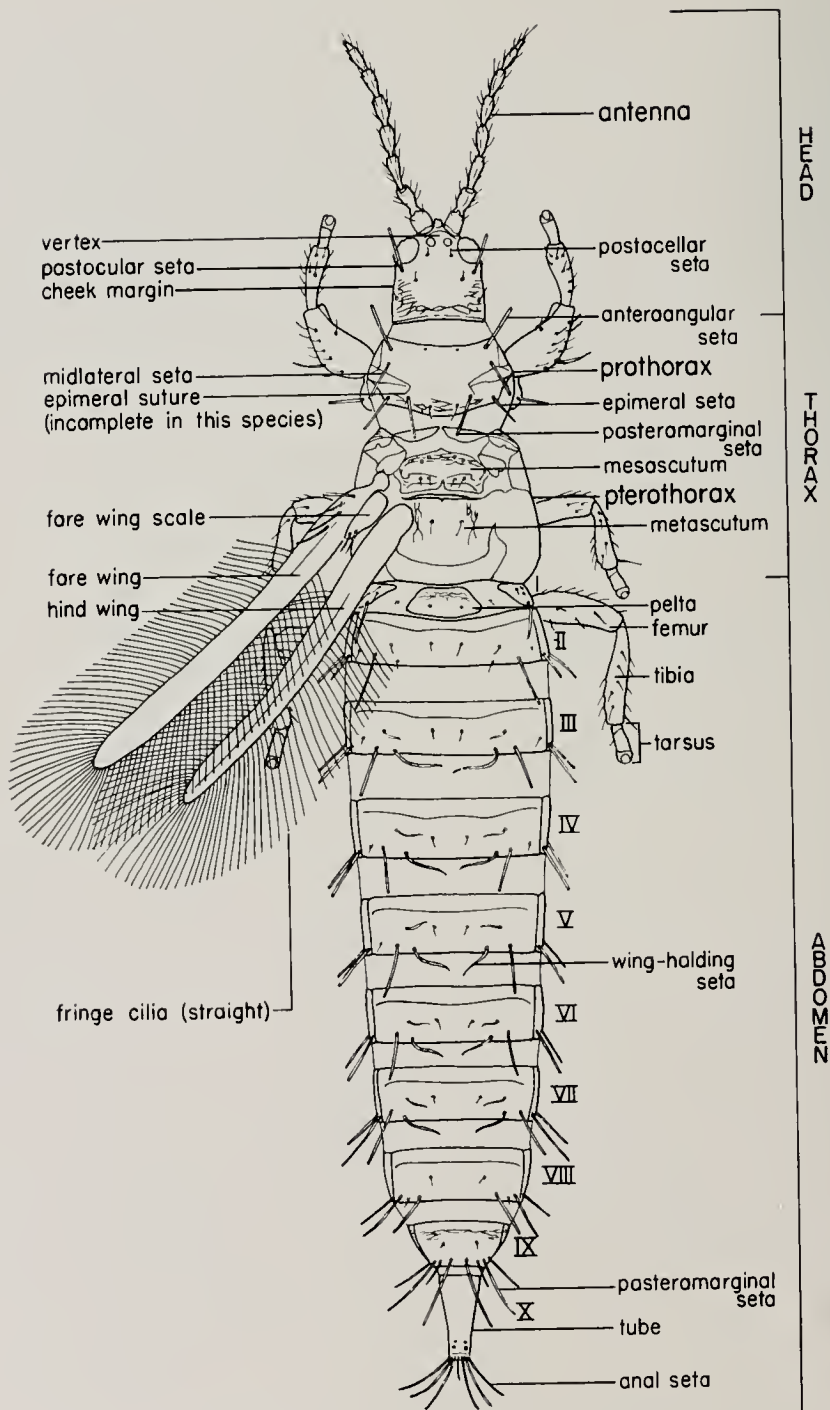


Fig. 51.—Morphological features of the Tubulifera as exemplified by *Eurythrips ampli-ventralis*, dorsal aspect.

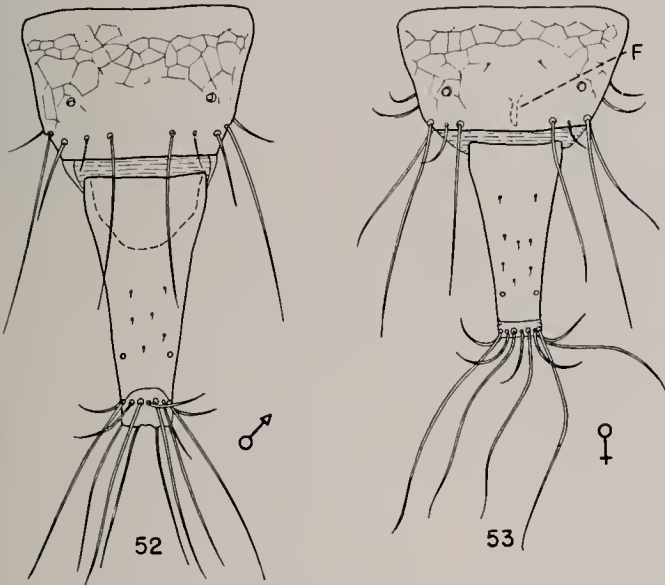
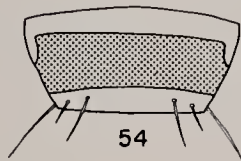
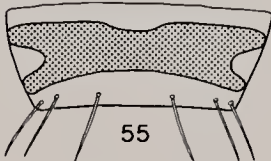


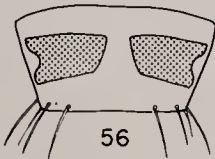
Fig. 52-53.—Secondary sexual characteristics of the abdominal terminalia useful in distinguishing the sexes in the Tubulifera as exemplified by *Hoplothrips pergandei*: 52, ♂; 53, ♀. F—fustis.



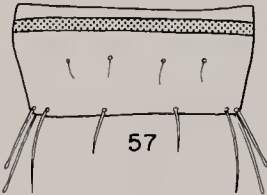
Eurythrips ampliventris



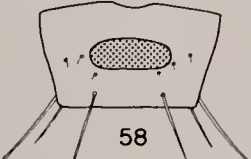
Eurythrips tarsalis



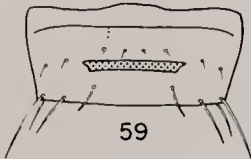
Eurythrips batesi



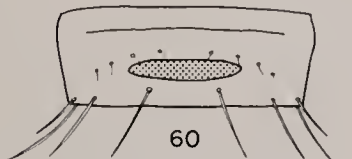
Erkosothrips interior



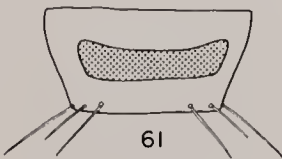
Adroneothrips exiguus



Acanthothrips nodicornis



Hoplothrips americanus



Hoplothrips fieldsi

Fig. 54-61.—Types of glandular areas on abdominal sternite VIII, ♂, of the Phlaeothripidae as exemplified by species indicated.

TAXONOMIC TREATMENT

Order THYSANOPTERA

Haliday 1836

1744—genus *Physapus* DeGeer

1758—genus *Thrips* Linneaus

1806—family Vesitarses or Physapodes Duméril

1814—family Thripsides Fallén

1835—order Thripsites Newman

1836—order Thysanoptera Haliday

1838—order Physapoda Burmeister

1855—order Thripsina Newman

Extremely small pterygote insects, averaging between 1.5 and 2 mm in length (extremes 0.6 and 14 mm). Body frequently sculptured or setose, with three or four pairs of spiracles.

Head opisthognathus, i.e., base of mouth parts directed posteriorly. Antennae composed of four to nine segments, these often with thin-walled sensoria. Adults usually bearing compound eyes or closely set facets; larvae with eyes reduced, composed of only a few facets. Ocelli often present in adults, never in larvae or pupae. Left mandible atrophied, right mandible stylet-like. Lacinae of maxillae prolonged into stylets, which when retracted extend into the mouth cone or into the head sometimes as far as up to the eyes. Labial and maxillary palps present, usually reduced to a few segments. Mouth parts forming an asymmetrical cone.

Prothorax moderately large, often with strong tactile setae at outer angles. Pterothorax often bearing four membranous wings which are bordered with long fringe cilia; wing veins reduced to a few major veins or absent. Wings occasionally reduced in size to pads or apterous. Legs each with one or two tarsal segments terminating in claws and a bladder; sometimes legs with spurs or especially elaborated setae.

Abdomen consisting of 10 well-defined segments, segment XI rudimentary, segment I closely attached to pterothorax. Often dorsal abdominal setae modified as wing-holding setae, lateral setae usually becoming longer on the apical segments. With or without glandular-like areas on certain sternites. Terminal segment cylindri-

cal or tapering as a cone. Anal setae long. With or without sawlike ovipositor. Cerci absent.

Sexual dimorphism frequently occurring. Oviparous or oviparous. Eggs oval to reniform. Larval stages two, pupal stages one, two, or three.

Existing as a recognizable order since Permian times. Most numerous today in tropical regions, less abundant in temperate zones, scarce in arctic areas.

Customarily the Thysanoptera are arranged in two suborders and five families.

KEY TO SUBORDERS

ADULTS

- Last abdominal segment (X) tubelike; female without sawlike ovipositor; major anal setae arising from platelets attached to end of tube.....suborder **Tubulifera**
 Last abdominal segment rarely tubelike; female always with sawlike ovipositor; major anal setae arising from subapical region of abdominal segment X, never from separate terminal platelets.....suborder **Terebrantia**

IMMATURES

1. Antennae distinctly segmented; wing sheaths never present (Fig. 5 and 9).....**LARVAE 2**
 Antennae fused into a sheath that is rarely segmented; wing sheaths present or absent (Fig. 11 and 13).....**PUPAE 3**
2. Intermediate antennal segments with microsetae bearing rings (Fig. 6 and 7); abdominal segment X seldom tubelike, with anal setae arising from apex.....**Terebrantia**
 Antennal segments smooth, not ringed (Fig. 9 and 10); abdominal segment X usually tubelike, often strongly sclerotized and tanned, with anal setae arising from separate platelets.....**Tubulifera**
3. Antennal sheath either extended forward of head or lying over the head, often reaching to the pronotum (Fig. 8).....**Terebrantia**
 Antennal sheath either hornlike and curved around head, or aligned along side of head, often reaching below the prosternum (Fig. 12-14).....**Tubulifera**

All of the subsequent keys presented herein pertain to adults known to occur in Illinois and neighboring states unless otherwise stated.

Records, if only a few, are given with full data; if there are many, the data are summarized and localities are listed by counties only. All records are documented by specimens in the col-

lections of the Illinois Natural History Survey (INHS) unless otherwise noted.

Body length is given in this report as being exclusive of the antennae and projecting setae.

Suborder TEREBRANTIA

Antennae six to nine segmented (Fig. 62-75), with sensoria in the form of flat surface areas or raised and seta-like, often forked. Postocular setae usually minute or absent. Maxillary stylets usually confined to or within the mouth cone, not much retracted into the head when at rest. Maxillary palps two or three segmented, secondarily many segmented.

Prothoracic notum rarely with epimeral sutures; sternum without praepectal plates, often setose or granular. Mesopraesternum absent. Mesospina-sternum separate or fused to meta-

sternum. Tarsi each one or two segmented, never both conditions in same species. Wings when fully developed usually with one or several longitudinal veins, with microsetae, with fringe cilia straight or wavy, parallel when at repose over abdomen.

Abdominal tergite I usually entire, without pelta, with stippled membranous posterior border. Abdominal segments often with pleural plate, never with dorsal sigmoidal wing-holding setae. Females with a sawlike ovipositor, which in some species may be degenerate. Males often, and females occasionally, with sternal glandular-like areas. Abdominal segment X often tapered, rarely tubular. Major anal setae arising directly from abdominal segment X.

Pupal instars usually two, secondarily one in number.

Contains four families: Aeolothripidae, Heterothripidae, Merothripidae, and Thripidae.

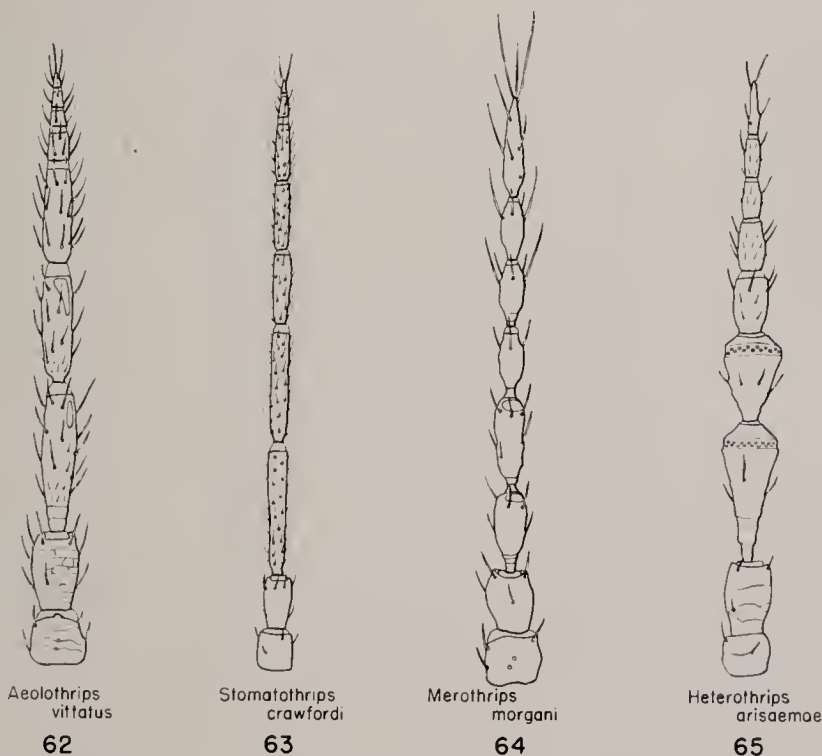


Fig. 62-65.—Right antenna, dorsal aspect, of species indicated, representatives of the Aeolothripidae, Merothripidae, and Heterothripidae.

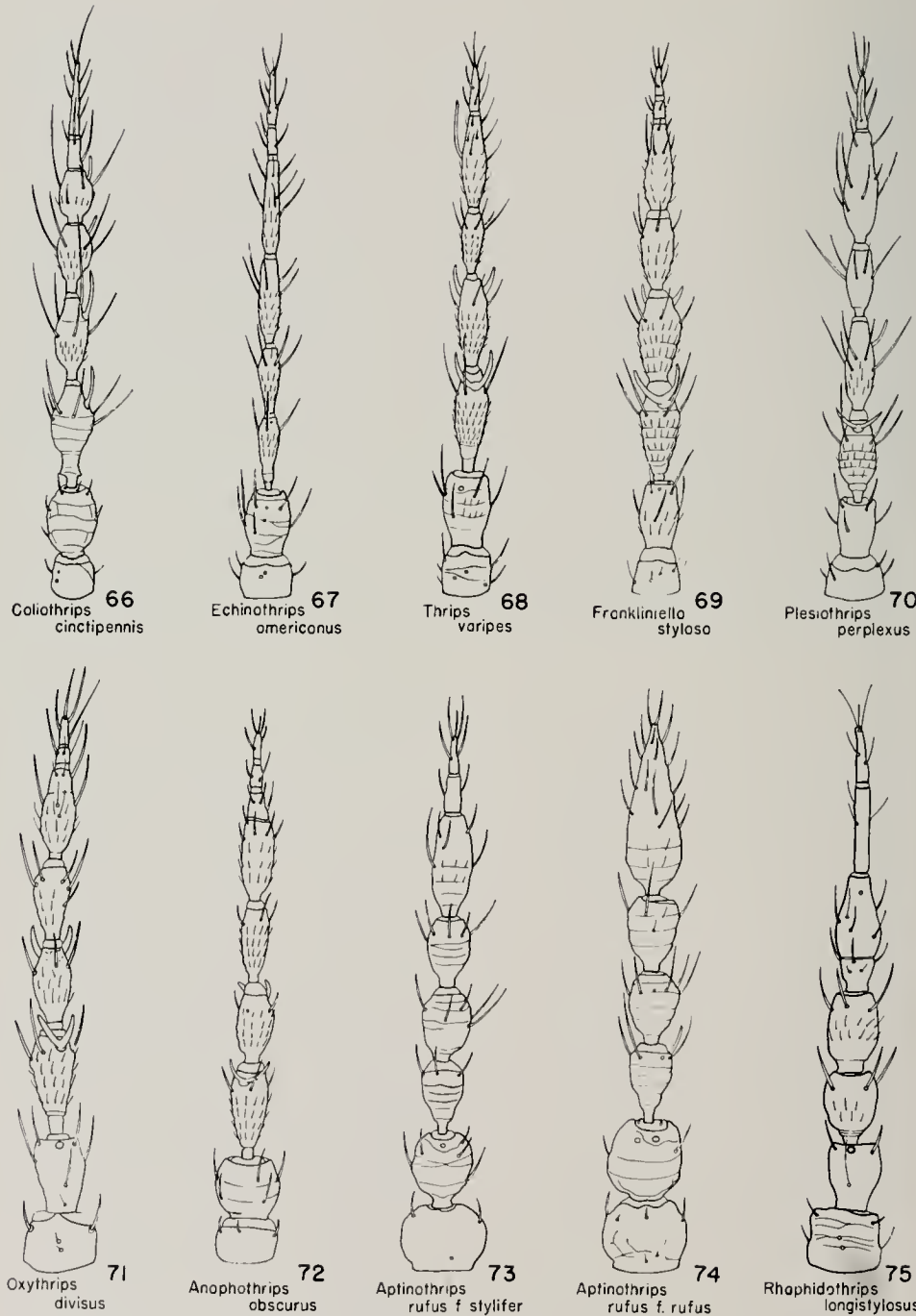


Fig. 66-75.—Right antenna, dorsal aspect, of species indicated, representatives of the Thripidae.

KEY TO
FAMILIES OF TEREBRANTIA
(ILLINOIS AND NEIGHBORING STATES)

- 1. Antennae nine segmented with sensoria of segments III and IV each placed longitudinally; fore wings broad and rounded at tips; ovipositor of female upturned **Aeolothripidae**
Antennae six, seven, eight, or nine segmented with sensoria either protruding as forked or simple sense cones or as flat areas encircling apex of each of these segments; fore wings generally narrower and usually pointed at tips; ovipositor of female downturned 2
- 2. Sensoria of antennal segments III and IV each protruding as a single or forked sense cone; cocoon-breaking hooks lacking on fore tarsi **Thripidae**
Sensoria of antennal segments III and IV encircling apex of each segment, flat, not protruding as a cone; cocoon-breaking hooks present (Fig. 76-78) or absent (Fig. 79) on fore tarsi 3
- 3. Light yellowish brown thrips; antennae each eight segmented, segments III and IV with apical sensorial areas as single, large sensoria (Fig. 64); ovipositor of female weakly developed.
Dark brown thrips; antennae each nine segmented, segments III and IV with circumpolar sensorial areas composed of numerous small circular sensoria (Fig. 65); ovipositor of female strongly developed. **Heterothripidae**

AEOLOTHRIPIDAE
Uzel (1895)

These primitive thrips may be distinguished from all others in Illinois by the combination of relatively broad wings (when present), upturned ovipositor of the female, nine-segmented antennae, and elongate oval or longitudinal sensoria on antennal segments III and IV. As do those in the Heterothripidae, members of this family bear cocoon-breaking hooks on the fore tarsi.

Only two genera occur in our state, *Aeolothrips* and *Stomatothrips*. About a half dozen more genera are found in the southern and western regions of North America, still other genera occur elsewhere in the world, and even some fossil representatives are known. Two genera from Africa, *Fauriella* and *Opisthothrips*, stand intermediate between this family and the next phylogenetically advanced family, the Heterothripidae. Another genus, *Erotido-*

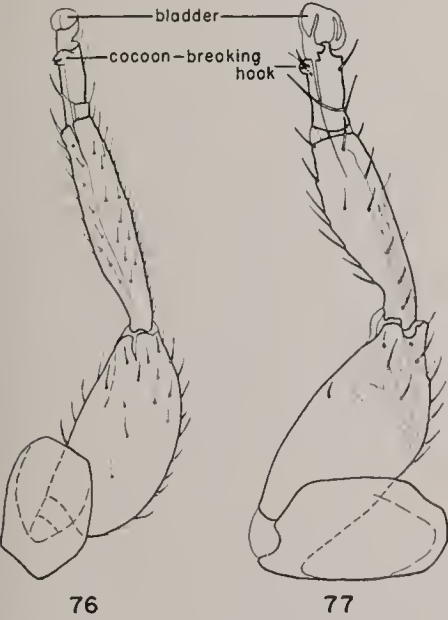


Fig. 76-77.—Right fore leg showing cocoon-breaking hooks: 76, *Aeolothrips melaleucus*; 77, *Heterothrips salicis*.

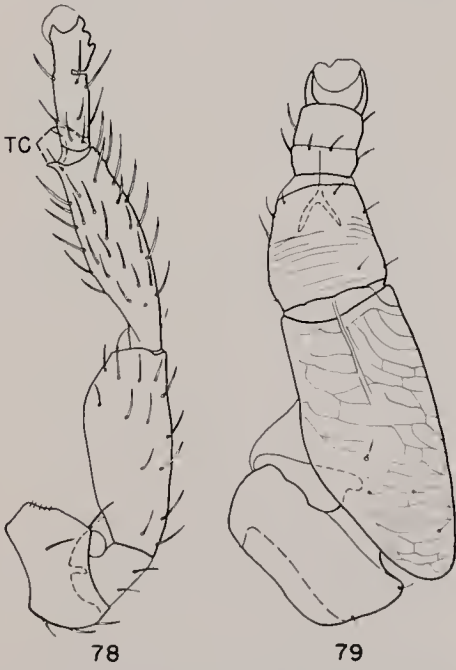


Fig. 78-79.—Right fore leg showing presence or absence of tibial claws: 78, *Odontothrips pictipennis*; 79, *Chirothrips texanus*. TC—tibial claws.

thrips, from Asia and Africa, has intermediate characteristics between Aeolothripidae and Merothripidae.

KEY TO GENERA
(EASTERN UNITED STATES)

1. Maxillary palps eight segmented; antennal segments III and IV with narrow sensoria (Fig. 82) *Stomatothrips*
Maxillary palps three segmented; antennal segments III and IV with wider sensoria (Fig. 62, 80, and 81) 2
2. Antennae with segment III greatly elongate (Fig. 80); sensoria of segments III and IV each extending almost entire length of its respective segment (Fig. 80 and 81); not yet found in Illinois *Franklinothrips*
Antennae with segment III shorter (Fig. 62); sensoria of segments III and IV each confined to the apical half of its respective segment (Fig. 62) *Aeolothrips*

Aeolothrips Haliday

Aeolothrips Haliday (1836:451). Type-species by monotypy.—*Aeolothrips* (*Aeolothrips*) *albicincta* Haliday. Valid designation according to International Code of Zoological Nomenclature, Article 61 (a) (1961).

Aeolothrips subgenus *Coleothrips* Haliday (1836:451). Type-species by subsequent designation by Westwood (1839).—*Thrips fasciata* Linnaeus. Raised to full generic rank by Amyot and Serville (1843). Synonymized by implication by Uzel (1895).

Head about as wide as or wider than long. Ocelli present. Eyes prolonged ventrally. Antennae eight segmented, terminal segments closely joined, segments III and IV elongate, segments usually more elongate in male than in female. Sensoria on antennal segments III and IV oval to linear, not subdivided as is the case in *Stomatothrips*. Maxillary palps three segmented, labial palps four segmented.

Pronotum without any long setae. Mesospinasternum separated from metascutum by a complete suture. All tarsi two segmented. Fore tarsi each with cocoon-breaking hooks. Macrop-terous or brachypterous. Fore wings broad, not expanded at apex, with two complete longitudinal veins and several crossveins, fringe cilia straight.

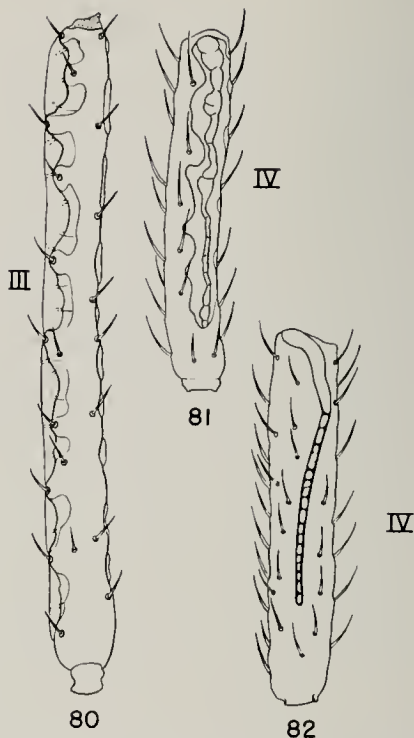


Fig. 80-82.—Antennal segments III or IV as indicated: 80, *Franklinothrips vespiformis*, ♂; 81, *Franklinothrips vespiformis*, ♀; 82, *Stomatothrips crawfordi*, ♀.

Abdomen constricted at base. Abdominal tergites with median pair of setae placed far apart. Abdominal sternites with a few accessory setae at sides. Abdominal tergite VIII without a posterior comb of setae. Females with well-developed, upturned ovipositor. Males with abdominal tergite I usually bearing two longitudinal ridges, without sternal glandular areas, and with or without genital claspers.

Sexual dimorphism is particularly noticeable in the comparative lengths of the antennal segments and sometimes in color in the species in which both males and females are known. The species whose life histories have been studied have two larval instars and two pupal instars. Prior to pupation a cocoon is spun, usually in cracks in the ground. Apparently all species, as larvae and as adults, are primarily predacious on other insects. Some at

least, also may feed on plants occasionally.

Eight of the 35 or so species and subspecies recorded from North America occur in Illinois. These eight can be categorized conveniently into the following three groups based on the color pattern of the fore wings of the females.

The **fasciatus** group (*fasciatus*, *albicinctus*, *bicolor* and *nasturtii*): These species have two separate, complete, dark crossbands on each fore wing except in the short-wing forms of *albicinctus*, the only species of *Aeolothrips* in Illinois which is brachypterous. The species *bicolor* and *nasturtii* can be separated further from the other two by the comparative length of antennal segment VI. In both *bicolor* and *nasturtii*, antennal segment VI is long, more than half as long as segment V; whereas in *fasciatus* and *albicinctus*, antennal segment VI is shorter, much less than half as long as segment V.

The **vittatus** group (*vittatus*, *vittipennis*, and *crassus*): In this group each fore wing is darkly banded along the trailing margin. Sometimes a single, partial or complete, crossband is connected to this dark margin.

The **melaleucus** group (*melaleucus*): The sole Illinois representative has two complete, dark crossbands which are connected along the trailing edge of the fore wing.

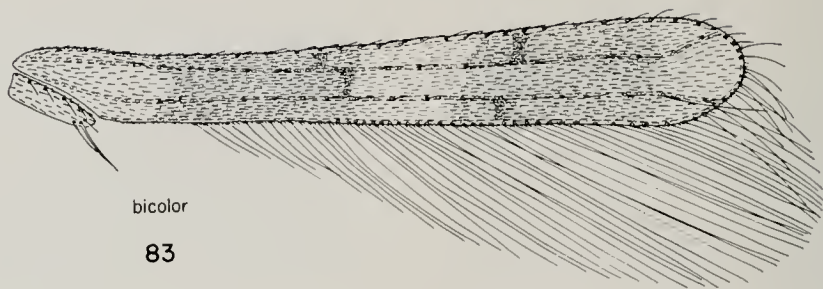
Possibly four of the species, *fasciatus*, *albicinctus*, *vittatus*, and *melaleucus*, were introduced from Europe. Almost certainly the other four are indigenous. All those in the **fasciatus** group are dwellers of the open fields. Those in the **vittatus** and **melaleucus** groups occur in woodlands.

Bailey (1951) presented a key to the North American species and Priesner (1948) published a key to the European and North African species.

KEY TO SPECIES

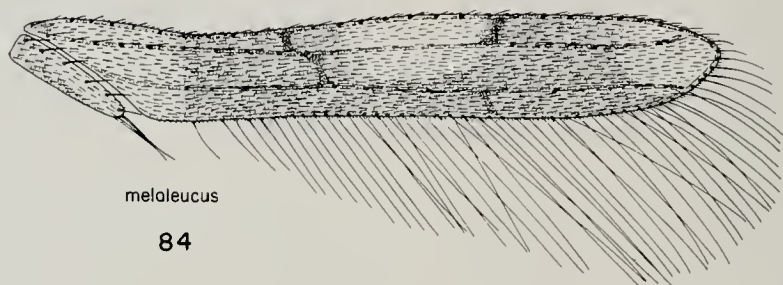
- 1. Brachypterous (brachypterous form of *fasciatus* not yet found in Illinois and unavailable to me for study).....a form of *albicinctus* Macropterous.....2
- 2. Females.....3
- Males (males of *crassus*, *hartleyi*, *melaleucus*, *nasturtii*, *versicolor*, and *vittatus* are still unknown).....12

- 3. Fore wing with two completely separated, darkly colored, crossbands (Fig. 83).....4
- Fore wing with one crossband, with two connected crossbands, or with only a longitudinal posterior band.....7
- 4. Antennal segment VI longer than half the length of segment V.....5
- Antennal segment VI shorter than half the length of segment V.....6
- 5. Abdominal segments II and III light in color in sharp contrast to rest of abdomen.....*bicolor*
- All abdominal segments dark in color.....*nasturtii*
- 6. Antennal segment V longer than the apical four segments collectively; abdominal segments II and III pale in color.....*albicinctus*
- Antennal segment V about equal to or shorter than the apical four segments collectively; abdominal segments dark in color.....*fasciatus*
- 7. Fore wing with two dark crossbands connected along the posterior margin (Fig. 84).....*melaleucus*
- Fore wing with a dark posterior band, with or without a single, partial, or complete crossband.....8
- 8. Base of sense cone on dorsum of antennal segment V linear; basal part of posterior band on fore wing continued to include scale (Fig. 85).....*vittipennis*
- Base of sense cone on dorsum of antennal segment V round or oval; basal part of posterior band on fore wing not continued to include scale.....9
- 9. Fore wing without a complete crossband arising from the posterior band (Fig. 86).....*crassus*
- Fore wing with a complete crossband arising from the posterior band.....10
- 10. Antennal segment IV brown; from western states and New York; not yet found in Illinois.....*hartleyi*
- Antennal segment IV predominantly yellow.....11
- 11. Fore wing with brown crossband occupying most of median region; anterior portion of tibiae and all tarsi yellow; from Europe and New York, not yet found in Illinois.....*versicolor*
- Fore wing with brown crossband smaller; legs brown.....*vittatus*
- 12. Lateral margins of abdominal segment IX having bifid clasper-like processes (Fig. 87); fore wing with two separated, complete crossbands.....13
- Lateral margins of abdominal segment IX without such processes; fore wing with only one crossband arising from posterior longitudinal band.....*vittipennis*
- 13. Abdominal tergites IV and V, at the least, each with a pair of posterolateral truncate projections; antennal segment VI about equal to segments VII-IX combined.....*fasciatus*
- Abdominal tergites without such projections; antennal segment VI much longer than VII-IX combined.....*bicolor*



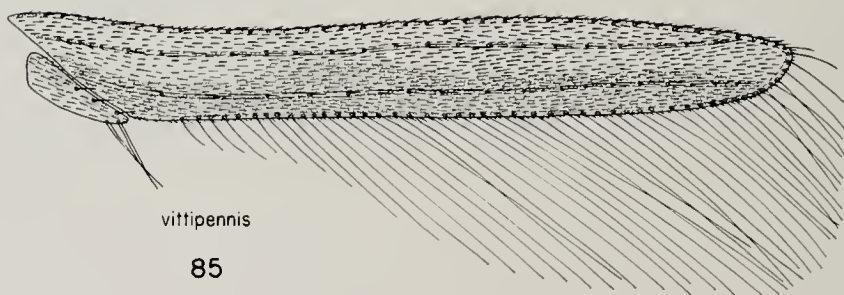
bicolor

83



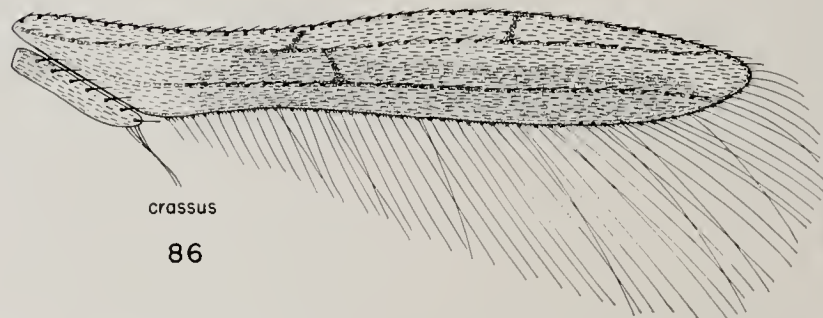
melaleucus

84



vittipennis

85



crassus

86

Fig. 83-84.—Right fore wing: 83, *Acolothrips bicolor*; 84, *Acolothrips melaleucus*.

Fig. 85-86.—Right fore wing: 85, *Acolothrips vittipennis*; 86, *Acolothrips crassus*.

Aeolothrips albicinctus Haliday

Aeolothrips albicincta Haliday (1836: 451). ♀. Type-locality.—England.

FEMALE (brachypterous).—Length distended nearly 2 mm. Bicolored dark brown and yellow. Dark brown: head, antennal segments IV–IX, prothorax, metathorax, abdominal segment I, abdominal segments IV–IX inclusive, and legs. Yellow: antennal segments II and III except extreme apex, sides of mesothorax, abdominal segments II and III except thin median anterior line, and abdominal segment X. Light brown: antennal segment I and median portion of mesothorax. Subintegumental pigment red.

Antennae moderately elongate, last four segments each small. Head weakly striate; abdominal segment I finely and closely transversely striate.

FEMALE (macropterous).—Similar in structure and color to brachypterous female except mesothorax darker along sides. Fore wings each with two separate, complete, dark crossbands.

MALE (brachypterous).—Length distended nearly 1.5 mm. Colored much as in female except somewhat lighter and antennal segment III brownish in the apical half. Intermediate antennal segments longer than in female. Abdominal tergite I not transversely striate but with two heavy, longitudinal streaks. Abdominal segment IX without claspers. Abdominal segments without dorsal truncate posterior projections. As far as is known males are always brachypterous.

Only the wingless (brachypterous) form of this species has been taken in Illinois. Fully winged individuals have been found to occur in New York (Hood 1915*b*) and Europe.

A. albicinctus was first reported in North America by Hood in 1915 and undoubtedly is a European introduction. Apparently it has not extended its range farther west than Iowa. It is common in the northern half of Illinois in disturbed, nonforested sections such as roadsides, pastures, and cultivated fields where it seeks its prey.

In structure this species is most distinctive. The close striations of abdominal tergite I of the female, and the brachypterous condition of both sexes permit easy recognition of *albicinctus* in the Illinois fauna. In other respects, bicolored yellow and brown and living in open fields, it resembles *bicolor*. Perhaps *albicinctus* was originally the European equivalent of our native *bicolor*.

Illinois records.—Collected from April through August, from one to several localities in the following counties: BUREAU, COOK, DE WITT, DOUGLAS, EDGAR, IROQUOIS, KANKAKEE, MCLEAN, MERCER, MORGAN, PUTNAM, ROCK ISLAND, STEPHENSON, WINNEBAGO, and WOODFORD.

Aeolothrips bicolor Hinds

Aeolothrips bicolor Hinds (1902:130). ♀, ♂. Type-locality.—Amherst, Massachusetts.

FEMALE (macropterous).—Length distended over 2 mm. Bicolored brown and pale yellow with much red subintegumental pigment. Dark brown: head, antennae except basal seven-eighths of segment III, thorax, legs, and abdomen except segments II and III. Light yellow: antennal segment III except for brown ring at apex and abdominal segments II and III. Fore wings each with two separated, dark crossbands (Fig. 83).

Head weakly striate. Antennal segment VI decidedly more than half as long as segment V.

Abdominal segment I not closely nor strongly striate.

MALE (macropterous).—Length distended nearly 1.5 mm. General color lighter than female, that is, areas which are brown in female are yellowish brown in male, antennal segment III becoming yellowish brown in apical half. Abdominal segments II–IV nearly colorless.

Antennal segments VI and VII more elongate than in female.

Abdominal tergite I with two submedian, longitudinal ridges. Abdominal tergites without truncate posterior projections. Abdominal tergite IX

with well-developed genital claspers (Fig. 87).

In color this species is much like the introduced *albicinctus* but in structure it is more like *nasturtii*. Both *nasturtii* and *bicolor* have antennal segment VI elongated, a condition which sets them apart from their congeners in Illinois. The male of *bicolor* has antennal segments VI and VII considerably elongated. Unfortunately, no males of *nasturtii* are known and comparisons cannot be made with *bicolor* in this sex.

Outside of Illinois the western *brunneipictus* is even more closely related to *bicolor*. Unlike *bicolor*, the typical *brunneipictus* has a pair of brown spots on abdominal tergites II and III which are otherwise yellow. In *bicolor*, abdominal tergites II and III are entirely yellow to nearly white. Possibly *bicolor* and *brunneipictus* intergrade in sections of western North America. According to Bailey (1951), the Floridian populations of *bicolor* differ somewhat from the typical form.

This native grassland species is one of the most common members of *Aeo-*

lothrips in our state. Although females are more abundant than males, males are by no means rare, at least not in Illinois. *Aeolothrips bicolor* still persists in the prairie remnants and has successfully invaded the European type pastures and roadsides cultivated in the past 100 years. Its total range includes most of temperate eastern North America, west to about the 100th meridian.

Illinois records.—Collected from April to October, from one to several localities in the following counties: ADAMS, BOND, BUREAU, CARROLL, CHAMPAIGN, CLARK, CLAY, COOK, DE WITT, DOUGLAS, EFFINGHAM, FAYETTE, GREENE, GRUNDY, HARDIN, IROQUOIS, JACKSON, JEFFERSON, JO DAVIESS, JOHNSON, KANKAKEE, LA SALLE, LAWRENCE, LEE, MADISON, MARION, MASON, MCHENRY, MERCER, MONROE, MORGAN, OGLE, PIATT, PIKE, POPE, PULASKI, RANDOLPH, ROCK ISLAND, SANGAMON, STARK, STEPHENSON, TAZEWELL, UNION, VERMILION, WABASH, WASHINGTON, WAYNE, and WOODFORD.

Aeolothrips crassus Hood

Aeolothrips crassus Hood (1912c:130).

♀. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1.8 mm. Body color dark brown with much red subintegumental pigment. Antennal segments III and IV yellow except for a narrow brown band at the apex of segment IV, rest of antennae brown. Fore wings each with a dark posterior band that does not reach the scale and which is thickened at the base as a rudimentary, incomplete crossband (Fig. 86).

Head weakly striate. Antennae relatively short and stout, each of the last four segments short. Abdominal tergites not closely nor strongly striate.

MALE.—Unknown.

Undoubtedly *crassus* is closely related to *vittatus*. They are best distinguished by the fore wing markings. The species *vittatus* has a single complete crossband arising from the posterior band on the fore wing, whereas

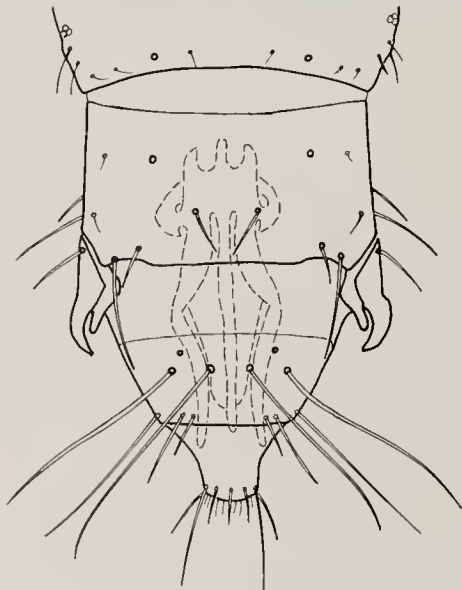


Fig. 87. — Terminalia of *Aeolothrips bicolor*, ♂, showing pair of clasper-like processes on abdominal tergite VIII.

crassus has only a rudimentary cross-band arising from this posterior band.

Originally recorded from Maryland (Hood 1912c) and later from Virginia (Bailey 1951), this rare species is now known for the first time to be in Illinois. In his description of *crassus*, Hood doubtfully listed a specimen of this species from Urbana, Illinois, but that specimen proved to be *vittatus* and not *crassus*. Our few authentic representatives of this species are from southern Illinois.

Illinois records.—GALLATIN COUNTY: Pounds Hollow Recreation Area, April 24, 1963, Evers, Stannard, vegetation in woods, 2 ♀. HARDIN COUNTY: Elizabethtown, May 4, 1950, Sanderson, Stannard, sweeping vegetation in woods, 1 ♀.

Aeolothrips fasciatus (Linneaus)

Thrips fasciata Linneaus (1758:457).

? ♀. Type-locality.—Not given, but undoubtedly in northern Europe.

Physapus fasciata (Linneaus). Transferred by Sulzer (1761).

Aeolothrips (Coleothrips) fasciata (Linneaus). Subgeneric assignment by Haliday (1836).

Coleothrips fasciata (Linneaus). Transferred by Amyot and Serville (1843).

Coleothrips trifasciata Fitch (1855a: 385). ? ♀. Type-locality.—Washington County, New York. Synonymized by Priesner (1926b).

Aeolothrips propinquus Bagnall (1924: 269). ♀. Type-locality.—Surrey, England. Synonymized by Priesner (1926b).

FEMALE (macropterous).—Length distended over 2 mm. General color blackish brown with much red subintegumental pigment. Antennal segment III yellowish, fading to brown at the apex. Fore wings each with two separate, complete, dark crossbands.

Head weakly striate. Last four antennal segments small.

Abdominal tergite I not closely nor strongly striate.

MALE.—Length distended about 1.5 mm. Lighter in color than female, generally light brown. Antennal segments similar to female.

Abdominal tergite I elongate, with two longitudinal, submedian ridges. Abdominal tergites IV and V each with a pair of truncate lateral projections. Abdominal segment IX with a pair of bifid, lateral projections (Fig. 87).

Males have not yet been found in Illinois.

This species is one of the four species of thrips described by Linneaus in the 10th edition of *Systemae Naturae*. It can be distinguished from other species of *Aeolothrips* in Illinois by the combination of the wing colors, the small size of antennal segment VI, and the uniformly dark color.

By way of speculation, it may be that *fasciatus* s. str. was originally confined to the Palearctic realm. Close relatives of *fasciatus* in the Nearctic region occurred natively only in the western part of North America. Eventually man accidentally introduced the European form of the species complex into eastern North America where it has become established and widespread. In the northern half of Illinois, *fasciatus* is common in fields and along roadsides.

Illinois records.—Collected from May to September, from one to several localities in the following counties: CARROLL, CHAMPAIGN, COOK, DOUGLAS, DU PAGE, FULTON, HENDERSON, IROQUOIS, JO DAVIESS, KANE, KANKAKEE, LAKE, MCHENRY, MCLEAN, PIKE, PUTNAM, TAZEWELL, WAYNE, WILL, and WINNEBAGO.

Aeolothrips melaleucus Haliday

Aeolothrips melaleuca Haliday (1852: 1117). ♀. Type-locality.—England.

Aeolothrips fasciatus var. *coniunctus* Priesner (1914b:259). ♀. Type-locality.—Linz, Austria. Synonymized by Priesner (1926b).

Aeolothrips annectans Hood (1916d: 109). ♀. Type-locality.—Great Falls, Maryland. Synonymized by Priesner (1926b).

FEMALE (macropterous).—Length distended nearly 2 mm. Body color dark brown with much red subinteg-

umental pigment. Antennal segment III and dorsal part of antennal segment IV yellow, rest of antennae brown. Fore wings fully developed, each with two broad crossbands which are connected posteriorly by a dark band as in Fig. 84.

Head only faintly transversely striate. Antennal segments III and IV moderately elongate, last four segments short. Abdominal tergites not closely nor strongly striate.

MALE.—Unknown.

According to Priesner (1926b) Uzel misidentified *melaleucus* in his 1895 monograph. Priesner believes that Uzel's *melaleuca* represents but a form or subspecies of *Aeolothrips versicolor*. It would be better if this form or subspecies were called *Aeolothrips versicolor maculosus* Bagnall, the first available name, rather than, as is the prevailing custom, *Aeolothrips versicolor melaleucus* Uzel which is homonymous with the full species *Aeolothrips melaleucus* Haliday.

Hood has published records of *A. melaleucus* as being in North America at least since 1913. Undoubtedly it was introduced from Europe and has since spread throughout the United States and into parts of Canada (Bailey 1951). It occurs now over the entire state of Illinois but even so it is only locally abundant.

Illinois records.—Collected in spring and summer, from one to many localities in the following counties: CARROLL, COOK, GALLATIN, HARDIN, JERSEY, JO DAVIESS, PEORIA, POPE, PUTNAM, and UNION.

Aeolothrips nasturtii Jones

Aeolothrips nasturtii Jones (1912:2). ♀. Type-locality.—San Jose, California.

Franklinothrips nasturtii (Jones). Transferred by Bagnall (1913). Recombined with *Aeolothrips* by Hood (1915b).

Aeolothrips tuolumnei Moulton (1927b: 187). ♀. Type-locality.—Tuolumne County, California. Synonymized by Bailey (1949b).

FEMALE (macropterous).—Length distended slightly less than 2 mm. Body color dark brown with much red subintegumental pigment. Antennal segment III yellow except brown ring at the apex. Fore wing with two separate, complete, dark crossbands.

Head weakly striate. Antennal segment VI elongate, about half as long as segment V. Abdominal segment I not strongly cross striate.

MALE.—Unknown.

A. nasturtii is very similar to *bicolor*, but whereas *bicolor* has abdominal segments II and III light yellow, *nasturtii* has these segments brown.

Although undoubtedly a western species, *nasturtii* is occasionally found all the way to the East Coast. Possibly this species has been or is still being introduced by man into the eastern states including Illinois. So far *nasturtii* has been taken only twice within the borders of our state.

Illinois records.—COOK COUNTY: West Chicago, August 5, 1959, Evers, Mockford, Stannard, prairie grasses, 5 ♀. MCHENRY COUNTY: Algonquin, July 2, 1913, sweeping on Jayne Hill, 1 ♀.

Aeolothrips vittatus Haliday

Aeolothrips (Coleothrips) vittata Haliday (1836:451). ♀. Type-locality.—England.

Aeolothrips limbata Reuter (1879:222). ? ♀. Type-locality.—Finland. Synonymized by Priesner (1926b).

FEMALE (macropterous).—Length distended about 1.8 mm. Body color dark brown with much red subintegumental pigment; antennal segments III and IV yellow except for a narrow brown band at the apexes, rest of antenna brown; fore wings with a dark posterior band that does not reach the scale and which is thickened at the base into a complete crossband.

Head faintly striate. Antenna short and stout, last four segments each short (Fig. 62). Abdominal tergite I not closely nor strongly striate.

MALE.—Unknown.

This species is similar to *crassus* and *hartleyi*. It differs from *crassus* in that the crossband of the fore wing is complete and touches the fore margin, and from *hartleyi* in that antennal segment IV is almost entirely yellow instead of predominantly brown.

Apparently *vittatus* prefers to hunt its prey in conifer trees. Although possibly introduced from Europe, it was first taken in Illinois as early as 1908 as doubtfully included by Hood (1912c) under the name *crassus*. That specimen was found on a conifer in Urbana, an area which never contained any native coniferous trees, not even red cedar (*Juniperinus*). Lately it has been found near Chicago on introduced jack pine and at Oquawka around pine plantations. Bailey (1951) also lists this species in North America from New Jersey, New York, and Ontario. It has been recorded from many places in Europe.

Illinois records.—CHAMPAIGN COUNTY: Urbana, May 21, 1908, Bopp, on conifer, 1 ♀ (reported by Hood in 1912). COOK COUNTY: Thornton, June 22, 1949, Ross, Stannard, sweeping planted jack pine, 2 ♀. HENDERSON COUNTY: Oquawka, May 9, 1952, Stannard, sweeping near pine plantations, 1 ♀.

Aeolothrips vittipennis Hood

Aeolothrips vittipennis Hood (1912c: 129). ♀, ♂. Type-locality.—Topeka, Illinois.

Aeolothrips floridensis Watson (1916: 126). ♀. Type-locality.—Gainesville, Florida. Synonymized by Bailey (1951).

FEMALE (macropterous) (Fig. 88).—Length distended about 2 mm. Body dark brown with much red sub-integumental pigment. Antennal segment III yellow except for brown ring at apex; segment IV yellow in basal half, brown in apical half; segment V generally brown but slightly yellowish brown basally; rest of antennal segments brown. Fore wings with a dark band in the posterior half which extends from the base, including the

scale, to the tip of the wing (Fig. 85); rarely with crossband (Bailey 1951).

Head closely and distinctly transversely striate. Antennae fairly short, segment V decidedly smaller than IV, terminal four segments short. Base of sense cone on antennal segment V unusually elongate, definitely linear instead of round or oval.

Abdominal tergite I not closely or strongly striate.

MALE (macropterous).—Length distended about 1.5 mm. Colored much as in female except lighter brown in the intermediate abdominal segments. Fore wings with a brown posterior band as in female but always with a complete crossband arising from the posterior band about in the middle of the wing.

Antennal segment V just slightly smaller to about equal in length to segment IV.

Abdominal tergite I without two longitudinal ridges. Abdominal segment IX without genital claspers. Abdominal tergites without dorsal truncate posterior projections.

Males of this species differ markedly from the females in the length of antennal segment V and in the coloration of the fore wings. Both sexes exhibit an extensive brown posterior band on the fore wing, including the scale, and by this characteristic *vittipennis* may be distinguished from other Illinois species. Other species in Illinois which have posterior wing bands, *crassus* and *vittatus*, have the scale predominantly colorless. Also the head of *vittipennis* is more distinctly striate than in either *crassus* or *vittatus*.

Aeolothrips vittipennis is locally common in Illinois, on locust trees (*Gleditsia* and *Robinia*) in association with *Sericothrips annulipes*, upon which it may prey. Typical populations are known from the District of Columbia, Florida, Illinois, New Jersey, North Carolina (INHS records), and Tennessee. Related populations in the West and Southwest have been accorded a subspecific rank by Bailey (1951).

Illinois records.—Collected during

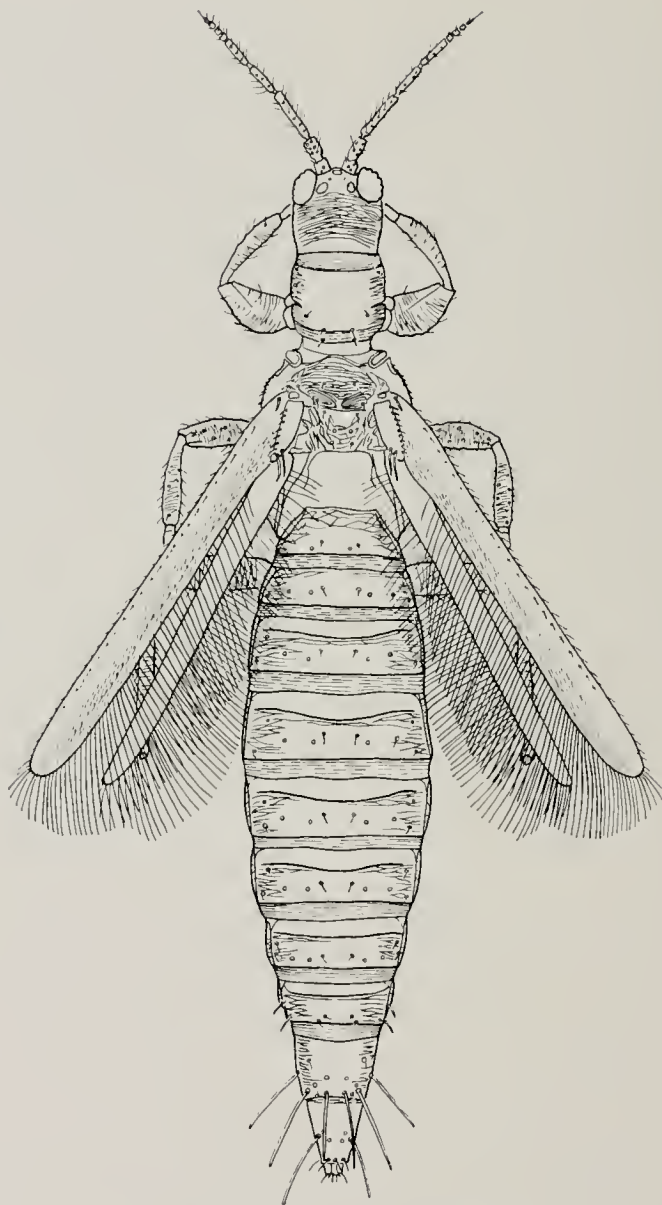


Fig. 88.—*Acolothrips vittipennis*, dorsal aspect.

the spring and summer, from one to several localities in the following counties: CHRISTIAN, CLINTON, COOK, GREENE, HANCOCK, HARDIN, JACKSON, JERSEY, JO DAVIESS, MARION, PIKE, PULASKI, SANGAMON, STEPHENSON, UNION, and VERMILION.

Stomatothrips Hood

Stomatothrips Hood (1912a:63). Type-species by original designation.—*Stomatothrips flavus* Hood.

Head about as wide as long, only slightly prolonged beyond eyes. Ocelli

present, widely spaced. Eyes not prolonged or only slightly prolonged ventrally. Antennae nine segmented, terminal segments closely joined, intermediate segments elongate, segments more elongate in male than in female. Sensoria on antennal segments III and IV linear and much subdivided, similar, in a lesser degree, to those found in *Franklinothrips*. Maxillary palps seven or eight segmented, labial palps five segmented.

Prothorax setose but without any long setae. Mesospinasternum well separated from metascutum by a complete suture. All tarsi two segmented. Fore tarsi each with cocoon-breaking hooks. Macropterous or micropterous. Fore wings moderately broad, expanded at apex, with two complete longitudinal veins and several cross-veins, fringe cilia straight.

Abdomen constricted at base. Abdominal tergites with median pair of setae placed well apart. Abdominal sternites with accessory setae. Abdominal tergite VIII without a posterior comb of setae. Female with well-developed, upturned ovipositor. Males with abdominal tergite I bearing two longitudinal ridges, without sternal glandular areas, and without genital claspers. Eggs obliquely truncate at anterior end.

This genus is easily distinguished from all others in Illinois by the eight-segmented maxillary palps.

According to Bailey (1952), who reviewed and keyed the species, members of *Stomatothrips* are probably predacious and presumably spin pupal cocoons.

Generally this is a group of the New World tropics and warm-temperate zones. The new species *crawfordi*, however, ranges into Illinois.

Stomatothrips crawfordi new species

FEMALE (micropterous) (Fig. 89).—Length distended over 2 mm. General color yellowish tan and brown. Brown: head, prothorax, parts of pterothorax, mid and hind tarsi, and terminal segments of antennae. Abdominal seg-

ments II and X largely yellow. Antennal segments I and II yellow to light yellowish tan, segment III pale, segment IV pale except apex which is brown, and segments V–IX brown. Ocellar pigment red. Fore wings with two separated, broad, brown cross-bands on the intermediate part of the fore wing, and with the apex and extreme base brown.

Antennae (Fig. 63 and 82) with segment VII $2\frac{1}{2}$ times as long as VIII. Maxillary palps eight segmented.

Abdominal tergite IX with major setae all equally long.

FEMALE (macropterous).—Similar to micropterous form except wings longer.

MALE (macropterous).—Length distended about 1.5 mm. Similar to female with the following exceptions. Generally lighter in color. Antennal segments I–IX brown except base of segment III with a pale ring above pedicel. Antennal segments, especially subterminal segments, proportionately longer than in female. Abdominal tergite IX with median pair of setae much shorter than other major setae.

Holotype.—Female, Gorham (Fountain Bluff), Jackson County, Illinois, August 16, 1950, Stannard, sweeping *Andropogon* on hill prairie. **Allotype**.—Male, same data as for holotype. **Paratypes**.—4 ♀, 1 ♂, same data as for holotype. Types deposited in the collections of the Illinois Natural History Survey, Urbana. Additional specimens have been collected in Illinois in summer, from one to several localities in the following counties: Greene, Hardin, Iroquois, Jasper, Marion (USNM), Ogle, Pike, Pulaski, Vermilion, and Washington (USNM).

As suspected by Bailey (1952), Hood's original material, now available at the U.S. National Museum, turns out to be a mixture of two species. The holotype of *flavus*, from Monterrey, Mexico, differs from the Illinois species, described herein, by having antennal segment VII only twice as long as segment VIII, antennal segments III and IV slightly shorter, the fore wings somewhat broader at the

widest portion, the hind tibiae shorter, and the mesoscutum with more setae. The species *brunneus* from Arkansas is much like *flavus* in many characteristics, and, indeed, both latter names may represent the same species.

The new species described here is named in honor of the late James C. Crawford who was a master of the Thysanoptera and freely shared his knowledge with all students who sought his assistance.

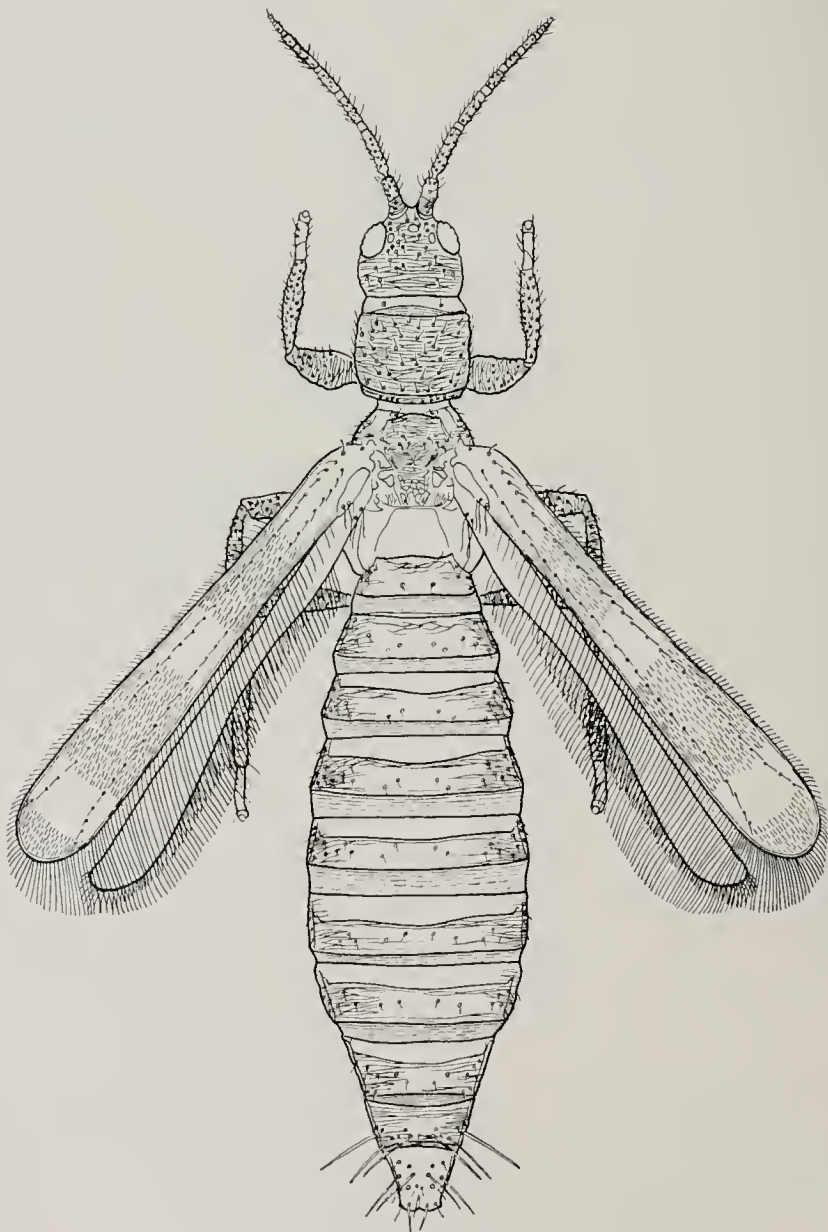


Fig. 89.—*Stomatothrips crawfordi*, dorsal aspect.

HETEROTHRIPIDAE Bagnall

(1912b)

As concerns the Illinois fauna only, this family may be characterized by the feature of the circumpolar rings on antennal segments III and IV which are composed of small circular sensoria (Fig. 65).

The genus *Heterothrips* alone represents the family in eastern North America. Another North American genus, *Oligothrips*, with quite different antennal sensorial characteristics, occurs in California.

Heterothrips Hood

Heterothrips Hood (1908c:361) (*nec* Buffa 1908). Type-species by monotypy.—*Heterothrips arisaemae* Hood.

Phyllothrips Buffa (1908:123) (*nec* Hood 1908a). Type-species by monotypy.—*Phyllothrips pilosus* Buffa. Synonymized by Bagnall (1911a).

Phyllothripsiolus Strand (1911:287). New name for *Phyllothrips* Buffa, preoccupied. Synonymized by Hood (1913a).

Head wider than long. Ocelli present, fore ocellus small. Antennae nine segmented, segment III with two white subbasal bands giving that segment the appearance of having a two-jointed petiole, segments III and IV each with a circumpolar ring composed of circular sensoria. Maxillary palps three segmented. Labial palps two segmented.

Prothorax with short bristles only. Mesospinasternum separated from metasternum by a wide suture. Metascutum with striae in the form of concentric rings. All tarsi two segmented, fore tarsi each with cocoon-breaking spurs, fore femora enlarged. Fore wings enlarged at base, narrowed in apical three-fourths, with two longitudinal veins uniformly set with setae; nearly all wing fringe cilia straight, rarely wavy.

Abdomen without differentiated pleural plates; usually with most regions covered by microsetae; and posterior margins of the segments ex-

tensively fringed by setae, which in the intermediate tergites are often coalesced at base into plates. Median pair of tergal setae placed close together on the intermediate segments. Males often with abdominal sternal glandular areas and sometimes with finger-like projections on abdominal tergite IX. Females with downturned ovipositor.

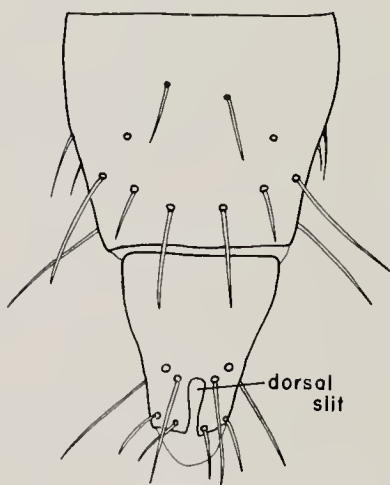
This genus nicely connects the more primitive thrips, the Aeolothripidae, with the advanced Thripidae. The nine-segmented antenna and cocoon-breaking spurs are also qualities of the Aeolothripidae, and the reduced narrow wings and downward curved ovipositors are features shared in common with the Thripidae. The combination of these generalized and specialized characteristics makes it easy to recognize the members of *Heterothrips*.

Bailey and Cott (1955) reviewed the genus for North America. They listed 21 species for North America and a total of slightly over 40 for the New World, the area to which this genus seems confined. A third of the North American species listed by these authors have been found in Illinois, and it is expected that several more will be found in future searches.

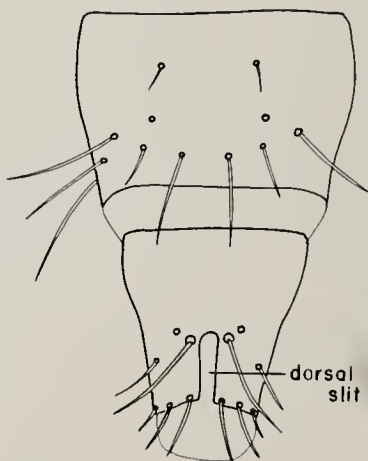
KEY TO SPECIES (ILLINOIS AND NEARBY AREAS)

1. Females, with sawlike ovipositor. 2
Males, without ovipositor. 10
2. Intermediate abdominal tergites with posterior lateral comb setae each strongly fused to several other setae at the base. 3
Intermediate abdominal tergites with posterior lateral comb setae each independent and free or only barely fused to other setae at base. 7
3. Abdominal tergites II–VIII each with a complete row of posterior setae. *limbatus*
Abdominal tergites II–V, at the least, each with the posterior row of setae interrupted in the median region. . . . 4
4. Antennal segments III and IV exceptionally wide (segment III about twice as wide as segment V at their greatest width), with broad sensorial rings, each ring formed by a double row of sensoria (Fig. 65); in flowers of jack-in-the-pulpit and green dragon. . . . *arisaemae*
Antennal segments III and IV narrower

- (segment III less than or not much greater than $1\frac{1}{2}$ times as wide as segment V at their greatest width), with smaller sensorial rings, each ring formed by a row or $1\frac{1}{2}$ rows of staggered sensoria; in other flowers. 5
5. Abdominal tergites, along lateral margins, with numerous, closely set microsetae, and with fringe of comb plates generally longer than length of base; on flowers of azalea azaleae
- Abdominal tergites, along lateral margins, with fewer microsetae, and with fringe of comb plates generally shorter than length of base (Fig. 93), on other flowers. 6
6. Abdominal tergites II-V with median group of posterior setae well developed, often fused at base; on male catkins of *Salix interior* salicis
- Abdominal tergites II-V with median group of posterior setae sparse, never fused at base; on flowers of buckeye aesculi
7. Fore wings entirely brown; abdominal tergite X long, basal portion to dorsal slit twice the length of the dorsal slit (Fig. 90); occurring on host in late summer auranticornis
- Fore wings off-white subbasally, brown in remaining portions; abdominal tergite X shorter, basal portion to dorsal slit hardly more than $1\frac{1}{2}$ times the length of the dorsal slit (Fig. 91); occurring on host in spring. 8
8. Abdominal tergites II-V with posterior lateral comb setae, especially extreme lateral ones, slightly fused at base to other setae; mesoscutal striations spaced well apart. quercicola
- Abdominal tergites II-V with all posterior lateral comb setae independent and never even slightly fused to other setae; mesoscutal striations spaced close together 9
9. Pronotal striae conspicuous, placed nearly as close together as striae of mesoscutum; on buds of wild grapes . . . vitis
- Pronotal striae weak, not placed as close together as striae of mesoscutum; on flowers of wild roses analis
10. Abdominal tergite IX with a pair of finger-like projections. 11
- Abdominal tergite IX without a pair of finger-like projections 12
11. Pronotal striae conspicuous, placed nearly as close together as striae of mesoscutum; on buds of wild grapes . . . vitis
- Pronotal striae weak, not placed as close together as striae of mesoscutum; on flowers of wild roses analis
12. Brachypterous; in flowers of several species of *Ariseama* ariseamae
- Macropterous 13
13. Abdominal sternites without glandular areas; on flowers of huckeye . . . aesculi
- Abdominal sternites III-VIII or IV-VIII each with a glandular area . . . 14
14. Abdominal glandular areas on sternites III-VIII 15
- Abdominal glandular areas on sternites IV-VIII only 17
15. Fore wings uniformly brown; abdominal tergites with all posterior lateral setae independent and not fused to other setae; occurring on host in late summer auranticornis
- Fore wings each with a subbasal off-white spot; intermediate abdominal tergites with posterior lateral setae fused at base to other setae; occurring on host in spring. 16
16. Intermediate abdominal tergites with middle patch of setae well developed and generally fused together at base; on willow catkins salicis



90



91

Fig. 90-91. —Abdominal terminalia, ♀, showing dorsal slit on tergite X of: 90, *Heterothrips auranticornis*; 91, *Heterothrips quercicola*.

- Intermediate abdominal tergites with setae of middle patch, when present, widely spaced and not fused at base; on azalea.....*azaleae*
17. Abdominal tergites II-V with a complete row of posterior fringe setae.....*limbatus*
- Abdominal tergites II-V with row of posterior fringe setae interrupted medially.....*quercicola*

***Heterothrips aesculi* Watson**
Buckeye Thrips

Heterothrips aesculi Watson (1915:50).
♀, ♂. Type-locality.—Gainesville, Florida.

FEMALE (macropterous).—Length distended nearly 1.5 mm. Color dark brown except antennal segment III and most of IV which are yellow to yellowish brown, apex of each fore tibia and all tarsi which are yellowish brown, and subbasal region of fore wings and all of hind wings (except longitudinal median streak) which are off-white.

Antennal segments III and IV each with a circumpolar sensory area composed of a staggered single row of small circular sensoria. Reticulations on prothorax weak, usually in the form of hexagonal designs. Posterior lateral margins of abdominal tergites I-VII with setae fused at base into comb plates; median area on abdominal tergites I-V bare except for a middle patch of setae, these setae separate and not fused; abdominal sternites III-VII with accessory setae in addition to the posterior setae; microsetae on abdominal segments I-VII sparse dorsally but numerous ventrally.

MALE (macropterous).—Length distended over 1 mm. Colored as in female. General structure as in female except with numerous microsetae on lateral regions of the abdominal tergites and usually without accessory setae on abdominal sternites III-VII. Abdominal sternites without glandular areas. Abdominal tergite IX without finger-like projections (Fig. 92).

Apparently the buckeye thrips is confined in its range to southeastern U.S.A. Its northern limit up the Mississippi River valley is reached in the southwestern tip of Illinois. In Illinois this thrips has never been taken outside the bottomlands of Alexander and

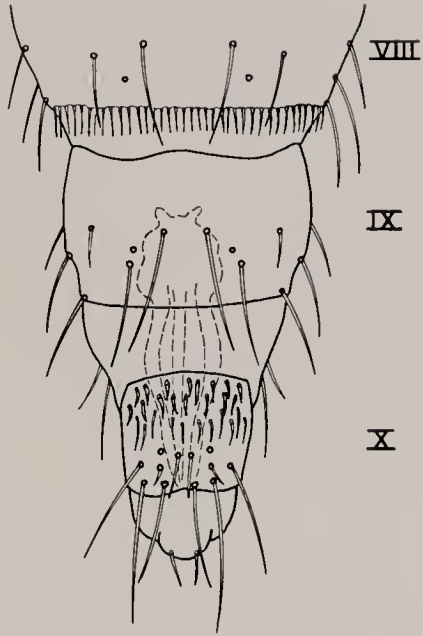


Fig. 92.—*Heterothrips aesculi*, ♂, abdominal terminalia.

Union counties. Within this area it is abundant on the flowers of several species of buckeye during the spring season.

Illinois records.—ALEXANDER COUNTY: Horseshoe Lake Refuge, April 8, 1954, Stannard, on *Aesculus pavia*, many females and males. UNION COUNTY: Wolf Lake, April 8, 1953, Stannard, on *Aesculus glabra*, many females and males; Wolf Lake, April 30, 1953, Stannard, on *Aesculus* species, 2 ♀; Jonesboro, May 12, 1932, Dozier, on *Aesculus pavia*, 12 ♀.

***Heterothrips analis* Hood**
Wild Rose Thrips

Heterothrips analis Hood (1915a:9).
♀, ♂. Type-locality.—Plum Point, Maryland.

FEMALE (macropterous).—Length distended slightly over 1.2 mm. Color dark brown except antennal segments III and IV which are yellow to yellowish brown, apex of each fore tibia and all tarsi which are yellow, and subbasal region of fore wings and, except for the longitudinal median streak, all of the hind wings which are off-white.

Antennal segments III and IV with a circumpolar ring composed of a single staggered row of small circular sensoria. Reticulations on prothorax weak, fairly closely spaced but not as close as those striae on mesoscutum. Posterior lateral margins of abdominal tergites I–VIII with setae separate, not fused to other setae at base; median areas on abdominal tergites I–V and often VI bare except for a middle patch of setae, these setae also separate, not fused; abdominal sternites usually with accessory setae in addition to the posterior setae; microsetae numerous and generally disposed over the abdomen except for the bare median dorsal region of segments I–VII.

MALE (macropterous).—Length distended less than 1 mm. Similar to female in color except for antennal segment IV which is nearly brown. Structure similar to female except dorsal posterior setal comb usually interrupted medially on abdominal segment VIII, and usually abdominal sternites with few to no accessory setae in addition to the posterior setae. Abdominal sternites without glandular areas. Abdominal tergite IX with two finger-like projections.

Like *vitis*, this species is comparatively small. It lives on the flowers of wild roses in eastern North America and is locally abundant in Illinois. The late Mr. Crawford once told me that in New Jersey he often had to search in many rose flowers before he would come across this thrips. In Illinois the same diligence on the part of the collector is sometimes necessary in order to locate the populations. Apparently this species has not yet dispersed to the area once covered by the Wisconsin ice sheets.

The Illinois specimens I have studied differ in many ways from the holotype collected in Maryland. Although our rose species may be conspecific with the type-series, it represents a distinctive strain. In general, in the Illinois form of *analisis*, antennal segment III is relatively short and wide, antennal segment V is mostly brown, and the fore wing is light near the scale. By contrast, in the Mary-

land form of *analisis*, antennal segment III is longer and narrower, antennal segment V is mostly yellow, and the fore wing is not as light in color near the scale.

Illinois records.—CLARK COUNTY: Clarksville (Rocky Branch), July 6, 1961, Stannard, wild rose flowers, 3 ♀. CUMBERLAND COUNTY: Woodbury, June 29, 1949, Smith, Stannard, wild rose flower, 1 ♀. GALLATIN COUNTY: Pounds Hollow Recreation Area, May 26, 1954, Smith, Moore, Stannard, wild rose flower, 1 ♂. HARDIN COUNTY: Rosiclare, May 26, 1954, Smith, Moore, Stannard, wild rose flowers, 6 ♀, 2 ♂. JACKSON COUNTY: Giant City State Park, May 25, 1954, Smith, Moore, Stannard, wild rose flowers, 10 ♀, 8 ♂. SANGAMON COUNTY: Riverton, June 7, 1949, Smith, Sanderson, Stannard, wild rose flower, 1 ♀. TAZEWELL COUNTY: Tremont, June 2, 1948, Stannard, wild rose flower, 1 ♂. WASHINGTON COUNTY: New Minden, June 4, 1957, Stannard, wild rose flowers, 3 ♀. WAYNE COUNTY: Zenith, June 1, 1966, Stannard, wild rose flowers, 2 ♀.

Heterothrips arisaemae Hood

Jack-in-the-pulpit Thrips

Heterothrips arisaemae Hood (1908c: 362). ♀, ♂. Type-locality.—Urbana, Illinois.

FEMALE (macropterous).—Length distended over 1.5 mm. Color dark brown (nearly black in life) except antennal segment III which is yellow to yellowish brown, apex and base of each anterior tibia and all tarsi which are yellow, and subbasal region of fore wings and all of hind wings (except longitudinal median streak) which are off-white.

Antennal segments III and IV each with a comparatively broad circumpolar sensory area composed of two full rows of small circular sensoria (Fig. 65). Reticulations on prothorax faint, spaced fairly far apart. Posterior lateral margins of abdominal tergites I–VII with setae fused at base into comb plates; median area on abdominal tergites I–V bare except for a

middle patch of setae, these setae separate, not fused; abdominal sternites usually without accessory setae in addition to the posterior setae; microsetae on abdominal segments I–VII sparse dorsally but numerous ventrally.

MALE (brachypterous).—Length distended slightly more than 1 mm. Similar in color and general structure to female except median patch of setae on abdominal tergites I–V often absent and comb on abdominal tergite VI incomplete. Fully winged males unknown. Abdominal sternites III–VIII each with a large anteromedian, oval, glandular area. Abdominal tergite IX without finger-like projections.

This species was the first known *Heterothrips*. It was discovered in the flowers of jack-in-the-pulpit growing in Brownfield Woods, formerly Augerville Woods, a 55-acre tract near Urbana which still exists in a near virgin state, preserved and protected by the University of Illinois. Descendants or relatives of the original type population of *arisaemae* continue to occur there.

Heterothrips arisaemae is a common species throughout Illinois and the eastern deciduous forest biome, living on flowers of several species of *Arisaema*. Bailey & Cott (1955) report that in the male the sensorial rings of antennal segments III and IV may be incomplete. Males taken in Illinois have complete antennal sensorial rings in every instance.

Illinois records.—Collected from late April to mid-June, from one to several localities in the following counties: ADAMS, ALEXANDER, BOND, BOONE, BUREAU, CARROLL, CHAMPAIGN, CLARK, CLINTON, COLES, COOK, CUMBERLAND, DE WITT, EDWARDS, EFFINGHAM, FAYETTE, FRANKLIN, FULTON, GALLATIN, HAMILTON, HANCOCK, HARDIN, HENRY, JACKSON, JASPER, JEFFERSON, JERSEY, JO DAVIESS, JOHNSON, KANKAKEE, LA SALLE, LAWRENCE, LEE, LOGAN, MCLEAN, McDONOUGH, MACON, MACOUPIN, MADISON, MARION, MARSHALL, MONROE, MONTGOMERY, MORGAN, MOULTRIE, PEORIA, PERRY, PIATT, POPE, PUTNAM, RANDOLPH,

RICHLAND, ROCK ISLAND, SALINE, ST. CLAIR, SCHUYLER, SHELBY, UNION, VERMILION, WASHINGTON, WAYNE, WHITE, WHITESIDE, and WILLIAMSON.

Heterothrips auranticornis Watson

Heterothrips auranticornis Watson (1922c:36). ♀, ♂. Type-locality.—Rabun County, Georgia.

FEMALE (macropterous).—Length not distended about 1.2 mm. Color generally dark brown except antennal segments III and IV which are yellowish brown, fore tibiae and all tarsi which are largely yellow, and hind wings (except median longitudinal streak) which are off-white. Fore wings uniformly dark brown.

Antennal segments III and IV each with a circumpolar ring composed of a double row of sensoria. Reticulations of prothorax fairly widely spaced, forming hexagonal designs. Abdominal segments with all posterior fringe setae separate, not fused. Abdominal tergites I–V bare medially except for a middle patch of setae, these setae separate and not fused. Abdominal tergite X as in Fig. 90.

MALE (macropterous).—Length 0.8 mm according to Watson (1922). Generally similar to female (Watson 1922c). Abdominal sternites III–VIII each with an anteromedian glandular area and abdominal tergite IX without finger-like projections (Bailey & Cott 1955).

This thrips was first found in Illinois in 1957 by Dr. John M. Kingsolver. Since then it has been taken in many places in Illinois, mostly the northern part, in late summer. It has extensive distributional limits from Georgia to Utah (Bailey & Cott 1955). Although not known in many of the intervening states its absence in collections may be due entirely to insufficient sampling.

Illinois records.—Collected in August and September, from one to several localities in the following counties: ADAMS, BOND, CHAMPAIGN, DE KALB, DE WITT, EDGAR, FORD, FRANKLIN, FULTON, GRUNDY, HANCOCK, HENDERSON, HENRY, IROQUOIS, JO

DAVIESS, KANKAKEE, KNOX, LA SALLE, LEE, LIVINGSTON, LOGAN, MCLEAN, MERCER, PIKE, PUTNAM, SANGAMON, STARK, TAZEWELL, WHITESIDE, and WILL.

Heterothrips azaleae Hood Azalea Thrips

Heterothrips azaleae Hood (1916d:110).
♀. Type-locality.—Beltsville, Maryland. Bailey & Cott (1955: 622). ♂.

FEMALE (macropterous).—Length distended over 1.5 mm. Color dark brown except antennal segment III which is yellow to yellowish brown, apex of each fore tibia and all tarsi which are yellowish brown, and sub-basal region of fore wings and all of hind wings (except longitudinal median streak) which are off-white.

Antennal segments III and IV each with a circumpolar sensory ring composed of two interlocking rows of staggered circular sensoria. Reticulations on prothorax weak, spaced fairly far apart. Posterior lateral margins of abdominal tergites II–VII with setae fused at base into comb plates; median area on abdominal tergites II–V bare except for a middle patch of setae, these setae separate and not fused; abdominal sternites II–VII with accessory setae in addition to the posterior setae; microsetae numerous on most of the dorsal, lateral, and entire ventral surfaces of the abdomen.

MALE (macropterous).—Length distended over 1 mm. Similar to female in color and general structure except posterior comb on abdominal tergite VI incomplete, abdominal sternites II–VIII often without accessory setae in addition to the posterior setae, and fusion of lateral abdominal tergal setae into combs less pronounced. Abdominal sternites III–VIII each with a narrow elliptical anteromedian glandular area. Abdominal tergite IX without finger-like projections.

Like its congener *aesculi*, *azaleae* is a thrips of the southeastern U.S.A. biota whose range barely extends into Illinois. Even though at the limits of its range, the azalea thrips is extremely

abundant in the few suitable Illinois habitats. Neither the thrips nor its host plant are just “hanging on” as fringe populations, but rather both plant and thrips flourish in isolated pockets in the Pine Hills in Union County. Other similar isolated thrips populations have been found to the west across the Mississippi River, in Missouri where azaleas also grow.

Illinois records.—UNION COUNTY: Wolf Lake (Pine Hills), from April 28 to May 10, 1947–1963, on *Azalea roseum*, many ♀, ♂.

Heterothrips limbatus Hood

Heterothrips limbatus Hood (1925a: 124). ♀, ♂. Type-locality.—Macedon, New York.

FEMALE (macropterous).—Length distended over 1.5 mm. Color dark brown except antennal segment III which is yellow, apex of each fore tibia and all tarsi which are yellow, and sub-basal region of fore wings and, except for the median longitudinal streak, all of the hind wings which are off-white.

Antennal segments III and IV each with a circumpolar ring composed of small circular sensoria so staggered as to form either one and one-half rows or sometimes two rows. Reticulations on prothorax distinct, placed fairly far apart, forming hexagonal designs. Entire posterior margins of abdominal segments I–VII, dorsally and ventrally, with setae fused to other setae at base except for the median setae on dorsum of segments VI and VII which are often separate from other setae.

MALE (macropterous).—Length given by Hood (1925a) as about 1 mm. General color and structure reported by Hood to be same as in female. Abdominal tergite IX without finger-like projections. Anteromedian glandular areas present on abdominal sternites IV–VIII only (Hood 1925a).

Although *limbatus* is known so far from only the New England states and vicinity, it is highly probable that the species may occur in Illinois, perhaps on the flowers of *Prunus* or dogwood. Despite repeated searches it has not been found in our state as yet.

Heterothrips quercicola

Crawford, J.C.

Oak Catkin Thrips

Heterothrips quercicola Crawford, J. C. (1942:140). ♀, ♂. Type-locality.—Babylon, Long Island, New York.

FEMALE (macropterous).—Length distended about 1.5 mm. Color dark brown except antennal segment III which is yellow to yellowish brown, apex of each fore tibia and all tarsi which are yellow, and subbasal region of each fore wing and, except for median longitudinal streak, all of hind wings which are off-white.

Antennal segments III and IV each with a circumpolar ring roughly composed of two rows of staggered circular sensoria. Reticulations of prothorax placed fairly far apart scarcely forming polygonal designs. Posterior lateral margins of abdominal tergites II–VII with setae often fused at base to form small comb plates; median areas on abdominal tergites I–V bare except for a middle patch of a few setae, these setae separate and not fused. Abdominal tergite X as in Fig. 91.

MALE (macropterous).—Length distended about 1 mm. Similar to female in color and structure except setae on posterior lateral margins of intermediate abdominal tergites less extensively fused, and posterior comb on abdominal tergite VI interrupted in the middle. Abdominal sternites IV–VIII each with an anteromedian glandular area. Abdominal tergite IX without finger-like projections.

This eastern North American species has been found twice in Illinois. Its host may be *Quercus marilandica*, the black jack oak, a common tree in certain regions of Illinois. Apparently this thrips feeds only on the oak catkins and not the leaves, and because of the short duration of the catkins it is easy to miss the thrips.

Bailey & Cott (1955) suspect that *quercicola* is a synonym of *vernus* Hood. The descriptions of the two "species" are, indeed, remarkably similar if individual variation is taken into account.

Dr. D. L. Wray found adults over-

wintering in the leaf mold of a forested area in North Carolina in late January.

Illinois records.—HARDIN COUNTY: Lamb, April 10, 1963, Stannard, 2 ♀. POPE COUNTY: Hayes Creek Canyon (Eddyville), May 10, 1961, Stannard, in woods, 1 ♀.

***Heterothrips salicis* Shull**

Willow Catkin Thrips

Heterothrips salicis Shull (1909:220). ♀, ♂. Type-locality.—Huron County, Michigan.

FEMALE (macropterous) (Fig. 93).—Length distended about 1.5 mm. Color dark brown except antennal segment III and middle of IV which are mostly yellow, apex of each fore tibia and all tarsi which are yellowish brown, and subbasal region of fore wings and all of hind wings (except longitudinal median brown streak) which are off-white.

Antennal segments III and IV each with a narrow circumpolar ring of sensoria roughly limited to a single row dorsally. Reticulations on prothorax fairly widely spaced. Posterior lateral margins of abdominal tergites I–VII with setae fused at base into comb plates; median area on abdominal tergites I–V bare except for a middle patch of setae on tergites II–V, these middle setae often fused at extreme base; abdominal sternites III–VII with accessory setae in addition to the posterior setae; microsetae on abdominal segments I–VII sparse dorsally and ventrally.

MALE (macropterous).—Length distended over 1 mm. Colored as in female. General structure as in female except abdominal tergite VI with posterior setal combs interrupted in the median region and with some more microsetae on the abdominal segments but fewer to no accessory setae on abdominal sternites III–VIII. Fairly large oval glandular areas present on the abdominal sternites, one each on the mid anterior region of sternites III–VIII. Abdominal tergite IX without finger-like projections.

According to Bailey & Cott (1955), *Heterothrips salicis* is a widespread species occurring from the Midwest to

California. In Illinois it is common on the male catkins of *Salix interior*. The original type material was collected by Shull in Michigan on the same willow although at the time *interior* was known by the now subordinated name *Salix fluviatilis*.

Illinois records.—Collected during

May, June, and July, from one to several localities in the following counties: ALEXANDER, CARROLL, CHAMPAIGN, CLARK, COLES, DE WITT, FORD, FRANKLIN, GRUNDY, HENDERSON, IROQUOIS, JASPER, KANKAKEE, LAKE, LOGAN, LEE, MCHENRY, WABASH, WHITESIDE and WILLIAMSON.

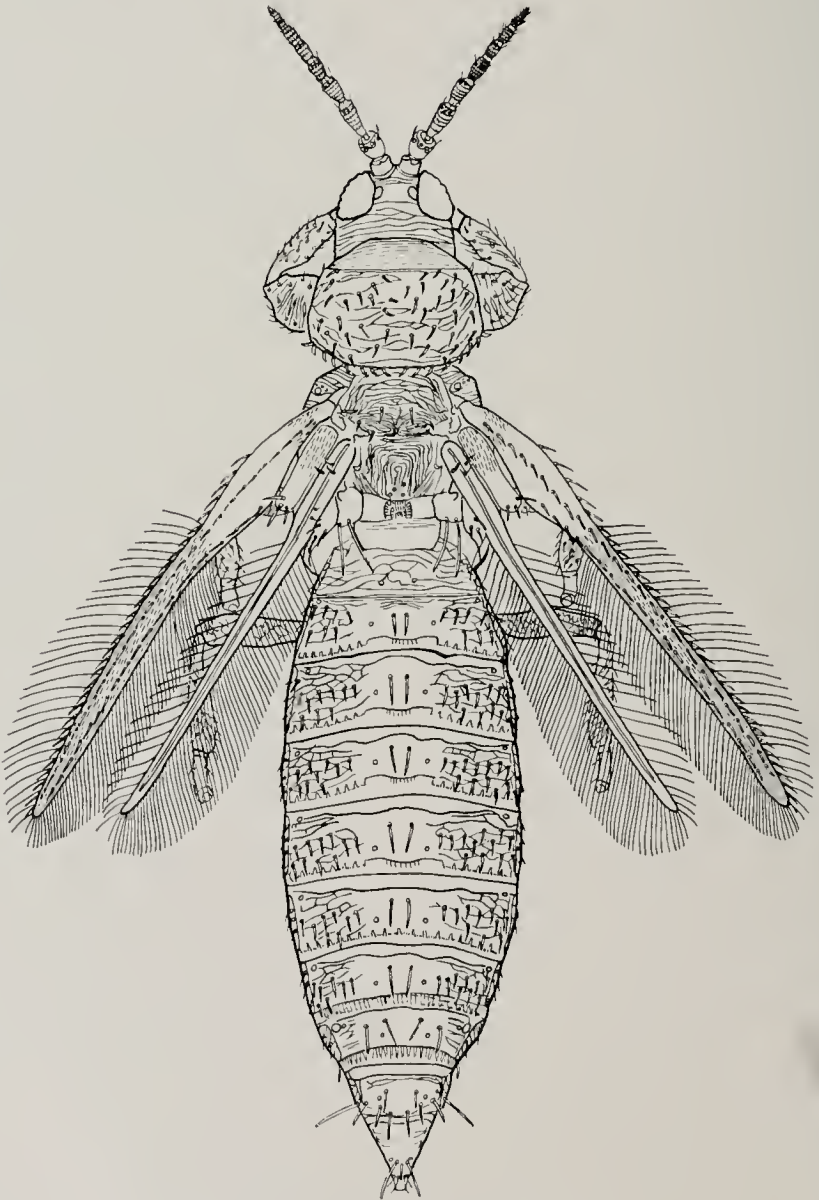


Fig. 93.—*Heterothrips salicis*, dorsal aspect.

Heterothrips vitis Hood
Grape-bud Thrips

Heterothrips vitis Hood (1916c:106).
♀, ♂. Type-locality.—Plummer's
Island, Maryland.
Heterothrips tiliæ Watson (1920:29).
♀, ♂. Type-locality.—Gainesville,
Florida. Synonymized by Bailey &
Cott (1955).

FEMALE (macropterous).—Length
distended about 1.2 mm. Color dark
brown except antennal segments III,
IV, and sometimes V which are yellow
to yellowish brown in the basal
three-fourths, apex of each tibia and
all tarsi which are yellow, and subbasal
region of fore wings and, except for
longitudinal median streak, all of hind
wings which are off-white.

Antennal segments III and IV each
with a circumpolar sensory ring com-
posed of a single staggered row of
small sensoria. Reticulations on pro-
thorax distinct, placed close together,
about as close as the striae on the meso-
scutum. Posterior lateral margins of
abdominal tergites I–VIII with setae
separate, not fused to other setae at
base; median areas on abdominal ter-
gites I–V and sometimes VI bare ex-
cept for a middle patch of setae, these
setae also separate, not fused; ab-
dominal sternites usually without ac-
cessory setae in addition to the poste-
rior setae; microsetae numerous and
generally disposed over the abdomen
except for the bare median region of
tergites I–VII.

MALE (macropterous).—Length
distended less than 1 mm. Similar in
color to female except antennal seg-
ments III–V darker, more nearly
brown. Similar in structure to female
except dorsal posterior setal comb
usually interrupted medially on ab-
dominal segments VI and VIII. Ab-
dominal sternites without glandular
areas. Abdominal tergite IX with two
finger-like projections.

This species is somewhat smaller
than most of its relatives in Illinois.
It was discovered in our state by Dr.
Milton W. Sanderson in Clark County
on June 14, 1950. Since then it has
been found in scattered places over the

state. Primarily it is a thrips of eastern
North America.

Illinois records.—Collected during
May and June on wild grape buds,
from one to several localities in the
following counties: ALEXANDER, CAR-
ROLL, CLARK, GALLATIN, HARDIN, JO
DAVISS, LAWRENCE, LOGAN, and
WASHINGTON.

MEROTHRIPIDAE Hood (1914d)

As represented by the extant species
in North America, this family may be
characterized by the combination of
the eight-segmented antennae, by the
large tympanum-like sensoria which
partially or nearly circle the apex of
antennal segments III and IV, and
often by the reduction of microsetae
on the wings of the macropterous
forms. Members of this family also
lack cocoon-breaking claws on the fore
tarsi.

Only the genus *Merothrips* occurs in
Illinois. The other known genera,
Praemerothrips (based on an amber
fossil), *Erotidothrips*, and *Damero-*
thrips have the antennae each nine
segmented.

The family Merothripidae probably
originated phylogenetically earlier
than the Thripidae (Fig. 26). *Mero-*
thrips, while specialized by degeneracy
in many respects, still retains the prim-
itive tympanum-like sensoria in the
antennae, and the hind vein of the fore
wing still retains its basal spur, basad
of the crossvein. Furthermore, the
other genera in the family have primi-
tive nine-segmented antennae. Mem-
bers of the Thripidae all have the an-
tennae reduced to basically eight seg-
ments. The sensoria of the antennae
are specialized into cones or projecting
forks, and the basal spur of the hind
vein of the fore wing is usually atro-
phied.

Merothrips Hood

Merothrips Hood (1912c:132). Type-
species by original designation.—
Merothrips morgani Hood.

Body elongate, slender (Fig. 94),
weakly sclerotized.

Head longer than wide to wider than long. Ocelli present in macropterous forms, absent in apterous forms. Interocellar bristles long. Eyes normal in macropterous forms, reduced (sometimes to four facets per eye) in the apterous forms. Antennae eight segmented, segments III and IV at each apex with a partially to nearly completely encircling tympanum-like sensorium (Fig. 64). Mouth cone broadly rounded. Maxillary palps two or three segmented, labial palps two segmented.

Pronotum usually elongate with lateral margins occurring well on the dorsal side, somewhat as in the manner of *Chirothrips*. Bristles well developed only on the posterior angles of the prothorax. Mesospinasternum fused to metasternum. Fore and hind femora enlarged. Apex of fore tibiae with a small to moderate-sized tooth, largest in males. Fore femora with an inner median spur in some males. Fore wings, when present, without microsetae, with two longitudinal veins, with hind vein continued basad to single crossvein. Both of these veins nearly uniformly set with bristles. Fringe setae straight to slightly wavy.

Abdomen with transverse striations. Pleural plates seemingly not well differentiated. Abdominal sternites usually with a transverse row of median setae (accessory setae) in addition to the posterior ones. Abdominal sternites without posterior combs of setae. Ovipositor in female weak and small. Males without abdominal sternal glands and without thornlike setae on abdominal tergite IX.

Members of this genus, while often found under bark and in insect burrows, occur more abundantly on polyporoid fungi or, as is the case of a Venezuelan species I have studied, on flowers—specifically the old male flowers of an oil palm.

The resemblance of the thorax of *Merothrips* to the thorax typical of *Chirothrips* may be considered to be a parallel evolutionary development, particularly in view of the fact that *Chirothrips*, a member of the higher Thripidae, has few other features sug-

gestive of close relationship to the primitive *Merothrips*.

The species of *Merothrips* often have heterogonously developed individuals, and, accordingly, they are difficult to differentiate when only one form is known. Two excellent keys to the species of the world are now available, one by Dr. Zur Strassen (1959b) and one by Professor Bailey (1960). Only the species *morgani* is found in Illinois.

Merothrips morgani Hood

Merothrips morgani Hood (1912c:132).
♀, ♂. Type-locality.—Homer, Illinois.

FEMALE (apterous) (Fig. 94).—Length distended nearly 1 mm. General color pale brownish yellow with base of head, antennal segment II, and legs yellow. Antennal segments III–VIII brown.

Head (Fig. 95a) longer than wide. Ocelli absent. Eyes each reduced to four facets. Antennae elongate, segments III and IV with apical sensoria barely extended onto ventral surfaces. Maxillary palps three segmented.

Pronotum (Fig. 95b) with a pair of depressed pits medially. Only one pair of posterior bristles well developed. All thoracic striations transverse. Fore tibiae each with a small apical inner tooth.

Abdominal sternites with accessory setae small and few in number.

FEMALE (macropterous).—Length distended nearly 1.2 mm. Similar to apterous female except eyes larger, ocelli present, wings fully developed, and metascutum longitudinally striate.

MALE (apterous).—Length distended about 0.9 mm. Similar to apterous female in color and general structure except surface of head largely granulated, pronotum with distinct striations, and fore tibiae often with a larger apical tooth. Males of this species lack an inner spur on the fore femur.

This, the type-species, is one of our smallest thrips. It can be found throughout the state under bark, especially in the fall and winter during the hibernation period, or in the sum-

mer on polyporoid fungi, such as *Polyporus gilvus*, which may be one of its larval hosts (Graves 1960).

Illinois records.—Collected every month of the year, from one to several localities in the following counties: ADAMS, BUREAU, CARROLL, CHAMPAIGN, CLARK, COOK, EFFINGHAM, HARDIN, HENDERSON, JACKSON, KANKAKEE, LAKE, PIATT, RICHLAND (Hood 1912c), VERMILION, and WOODFORD.

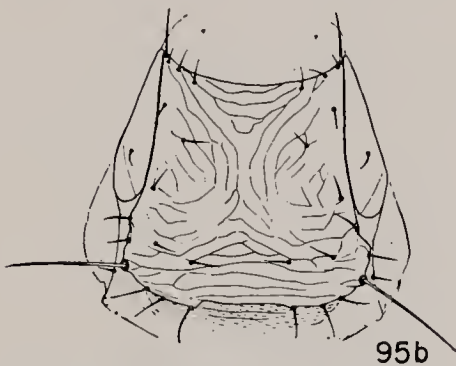
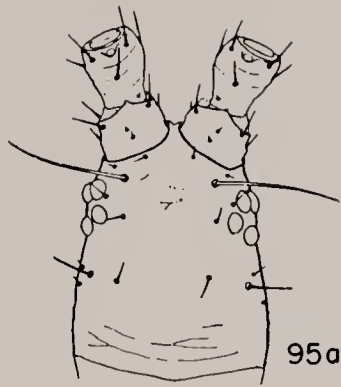


Fig. 95.—*Merothrips morgani*: a, head; b, prothorax. From zur Strassen (1959b).

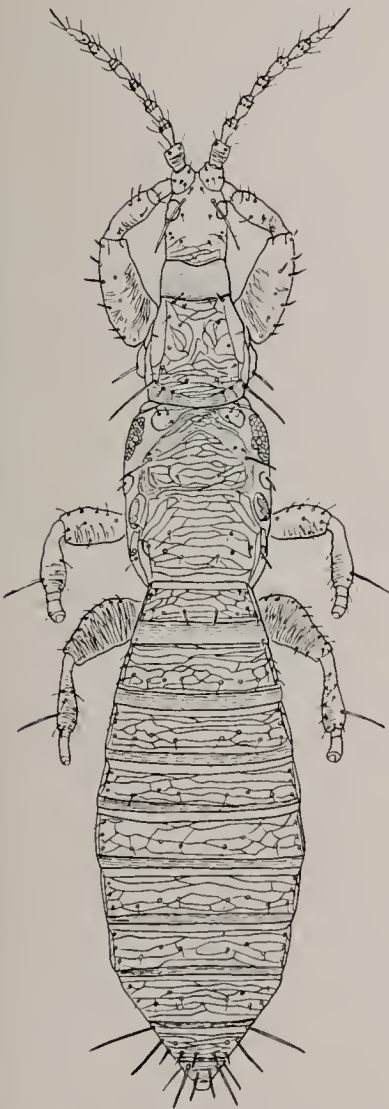


Fig. 94.—*Merothrips morgani*, apterous form, dorsal aspect.

THRIPIDAE Stephens (1829)

In an evolutionary scale these thrips are the most advanced members of the Terebrantia (Fig. 26). They may be distinguished in eastern North America by the combination of the following characteristics: 1) possession of projecting simple or forked sense cones on antennal segments III and IV, 2) downturned ovipositor in the female, and 3) the possession of microsetae on the wing surfaces of winged forms.

Most of the genera of the Terebrantia belong here. The family as represented in Illinois can be divided into two subfamilies, and, in the nominate subfamily into several tribes. For easy reference, however, the genera are listed herein in alphabetical sequence regardless of subfamily or tribal assignment.

Subfamily THRIPINAE Karny
(1921)

Body usually with transverse striations, occasionally with hexagonal reticulations. Head and prothorax without flanged margins. Ocelli usually not on raised areas. Antennae with segment II usually not enlarged, usually with intermediate segments not constricted and elongated appreciably at apexes, and with terminal segments often stylelike but rarely extremely slender. Maxillary palps two or three segmented. Mesospinasternum often separated from the metasternum by a wide suture. Fore wings each with fore vein separated from costa for its entire length. Abdominal tergites sometimes with microsetae. Abdominal sternites sometimes with accessory setae.

This subfamily retains the generalized condition of having the fore vein of the fore wing entirely free from and not fused with the costa. The bulk of the members of the Thripidae belong here.

Although several attempts have been made by authors to divide this subfamily into tribes, no completely satisfactory arrangements have been devised. Tentatively I recognize the following three tribes with the realization that the tribe Thripini, as herein defined, is composed of several diverse groups that should in the future receive further study and be reevaluated.

Tribe DENDROTHRIPINI Priesner
(1926b)

Head often sunken between eyes. Antennal segment II frequently enlarged. Maxillary palps usually two segmented. Mesospinasternum usually fused to metasternum. Metafurcae greatly enlarged. Fore wings with fringe cilia straight. Tarsi usually one segmented. Abdominal tergites either reticulate, transversely striate, or with microsetae-like lines at sides; middle pair of setae closely spaced.

Members of this tribe resemble those in the Sericothripini in general habitus. The great enlargement of the metafurcae is the principal feature of the Dendrothripini and this characteristic usually serves to distinguish

this group from the Sericothripini and others in the subfamily Thripinae. It is interesting to note that representatives in the genus *Selenothrips* of the subfamily Heliothripinae have enlarged metafurcae, which strengthens the hypothesis that the Dendrothripini might have arisen from an ancestor common to both.

Only one genus, *Leucothrips*, represents the tribe Dendrothripini natively in Illinois. Two other genera, *Dendrothrips* and *Pseudodendrothrips*, have been introduced into our state from Europe and Japan. Most of the other related genera occur in the tropics.

Tribe SERICOTHRIPINI Priesner
(1926b)

Head usually relatively short, seldom prolonged in front of eyes and usually not sunken. Antennal segment II not especially enlarged. Maxillary palps usually three segmented. Prothorax usually with characteristic sculpture and bare spots (Fig. 128). Mesospinasternum frequently separated from metasternum by a suture. Fore wings with fringe cilia wavy in species in Illinois, occasionally straight in exotic species, for example in *Psilothrips*. Tarsi two segmented. Abdomen usually with numerous microsetae, middle pair of tergal setae closely spaced.

In Illinois this tribe includes *Drepanothrips*, *Pseudothrips*, *Scirtothrips*, *Sericothrips*, *Zonothrips* and possibly *Echinothrips*. *Echinothrips* has been included in the Heliothripinae by most authors but I prefer to tentatively include this genus in the Sericothripini because the fore vein of the fore wing of *Echinothrips* does not seem to be actually fused to the costa. Furthermore, species of *Echinothrips* often bear numerous microsetae whereas those in the Heliothripinae almost never have more than a relatively few microsetae on the abdomen. The possession of many abdominal microsetae and the type of sculpture on the prothorax are the two chief features characterizing the Sericothripini. (In *Pseudothrips* the microsetae are greatly reduced in size.) Some members of the Sericothripini also have fairly large

metafurcae somewhat approaching those in the closely related tribe, Dendrothripini.

Tribe THRIPINI Priesner (1949)

Head various, sometimes prolonged in front of eyes. Antennal segment II occasionally enlarged. Maxillary palps two or three segmented. Metaspinasternum usually separated from metasternum by a suture. Metafurcae rarely enlarged. Fore wings with fringe cilia usually wavy. Tarsi usually two segmented except in some apterous forms. Abdomen without microsetae except occasionally at extreme sides, middle pair of setae usually far apart.

Most of the species in Illinois belonging to the Thripidae have been included in this tribe. I have not separated out *Chirothrips* and *Limothrips* as members of the tribe Chirothripini, as is often done, because there seems to be no easy way to categorize them.

The bulk of the species in the Thripini can be regarded as general types with few unique characteristics. In depicting their supposed evolutionary descent, the Thripini as a whole could be considered to be more advanced than those in the Heliothripinae, Dendrothripini, and Sericothripini. The main advancement of the Thripini is by degenerate specialization without many unusual elaborations.

Subfamily HELIOTHRIPINAE

Karny (1921)

Body often hexagonally reticulate. Head and prothorax sometimes with margins produced into flanges. Ocelli usually on raised area. Antennal segment II often enlarged, intermediate segments frequently vasiform, terminal antennal segments usually hastate. Maxillary palps usually two segmented. Mesospinasternum usually fused with metasternum. Metafurcae often greatly enlarged. Fore wings each with fore vein fused with costa beyond basal third. Abdominal tergites usually without microsetae. Abdominal sternites usually without accessory setae.

This subfamily is easily distinguished by the characteristic of the

partial fusion of the fore vein of the fore wing with the costa.

Most of the bizarre thrips belong here. The exotic *Aoratothrips* with its periscope-like ocelli, *Arachisothrips* with its balloon-shaped wings, and many of those genera with highly developed tubes are members.

In general the species in this group are tropical in distribution. Only one genus, *Caliothrips*, occurs natively in Illinois. Three other genera, *Heliothrips*, *Parthenothrips*, and *Hercinothrips*, which are tropical in origin, sometimes occur in our state in warm greenhouses and in heated homes.

KEY TO GENERA

(EASTERN NORTH AMERICA)

(The New York genus *Sericopsothrips* Hood (1936c) is known by a single specimen which is difficult to see and categorize. It keys to *Scirtothrips* herein.)

1. Fore vein, as indicated by setae, of fore wing fused to costa in apical two-thirds; antennal segments III and IV usually strongly vasiform and/or terminal segment of style extremely long HELIOTHRIPINAE 2
- Fore vein of fore wing not fused to costa, or wings reduced to pads or wingless; intermediate antennal segments not usually strongly vasiform; terminal segment of style usually shorter THRIPINAE 5
2. Fore wing with fringe cilia straight; median dorsal abdominal setae closely set *Heliothrips*
Fore wing with fringe cilia predominantly wavy; median dorsal setae placed fairly far apart 3
3. Antennae each seven segmented; fore wings broad *Parthenothrips*
Antennae each eight segmented; fore wings more narrowed 4
4. Tarsi each one segmented *Caliothrips*
Tarsi each two segmented *Hercinothrips*
5. Metafurcae greatly enlarged; tarsi each one segmented; fore wing fringe cilia always straight DENDROTHRIPINI 6
Metafurcae not as enlarged; tarsi each one or two segmented; fore wing fringe cilia straight or wavy 8
6. General color brown; prothorax lacking well-developed posterolateral setae *Dendrothrips*
General color nearly white; prothorax bearing one or two pairs of well-developed posterolateral setae 7
7. Antennae seven segmented; prothorax with two pairs of posterolateral setae *Leucothrips*
Antennae eight segmented; prothorax with one pair of posterolateral setae *Pseudodendrothrips*
8. Abdomen with numerous microsetae; median dorsal abdominal setae closely set;

- antennae never nine segmented.
 (in part) **SERICOTHRIPINI** 9
- Abdomen without numerous microsetae, or microsetae extremely short and difficult to see; median dorsal abdominal setae closely set or far apart.
 **THRIPINI**
 (except for *Pseudothrips*, which have antennae nine segmented) 13
9. Antennae each six or seven segmented 10
 Antennae each eight segmented 11
10. Antennae each six segmented; fore wings uniformly light grayish brown
 **Drepanothrips**
 Antennae each seven segmented; fore wings with two brown crossbands.
 **Zonothrips**
11. Sense cones on antennal segments III and IV simple. **Echinothrips**
 Sense cones on antennal segments III and IV forked 12
12. Fore vein of fore wings uniformly set with setae. **Sericothrips**
 Fore vein of fore wings with setae interrupted; (c.f. *Sericopsithrips*)
 **Scirtothrips**
13. Fore tibiae each with a clawlike process at apex (Fig. 78) **Odonthrips**
 Fore tibiae not usually prolonged at apex or if slightly prolonged never with clawlike processes (Fig. 79) 14
14. Antennal segment II or III greatly or slightly produced at outer apex; prothorax trapezoidal or females with thornlike setae on abdominal tergite X 15
 Antennal segments II and III never produced at outer apex; prothorax rarely trapezoidal and female never with thornlike setae on abdominal tergite X 16
15. Prothorax strongly trapezoidal (Fig. 106); legs often stout and stocky (Fig. 79); head small; antennal segment II produced at outer apex; female without thornlike setae on abdominal tergite X **Chirothrips**
 Prothorax not trapezoidal; legs never as stout and stocky; head normal in size; antennal segment II or III produced strongly or slightly at outer apex; female with thornlike setae on abdominal tergite X (Fig. 39) **Limothrips**
16. Prothorax with all major setae exceptionally long, including a long midlateral pair (Fig. 127) **Scolothrips**
 Prothorax either with shorter setae, or, if many major setae long, midlateral pair always short. 17
17. Antennae each six or seven segmented 18
 Antennae each eight or nine segmented (Fig. 69, 71, and 72) 22
18. Antennae each six segmented (Fig. 74)
 (in part) **Aptinothrips**
 Antennae each seven segmented (Fig. 70) 19
19. Prothorax with postlateral setae generally small; abdominal tergites with strong scallop-like projections along posterior margin **Microcephalothrips**
 Prothorax with two pairs of well-developed postlateral setae; abdominal tergites usually without strong scallop-like projections along posterior margin 20
20. Head prolonged in front of eyes (Fig. 121-123); ovipositor somewhat weakly developed. **Plesiothrips**
 Head not particularly prolonged in front of eyes; ovipositor well developed. 21
21. Maxillary palps each two segmented
 **Baliothrips**
 Maxillary palps each three segmented.
 **Thrips**
22. Abdominal tergite VIII with stippled area around spiracles extended up to anterior margin (Fig. 96) (sometimes difficult to see in balsam mounts) 23
 Abdominal tergite VIII without such large stippled areas. 24
23. Body not reticulate; macropterous
 **Chaetanaphothrips**
 Body reticulate; wingless; not yet found in Illinois. **Prosopothrips**
24. Abdomen with heavy hexagonal reticulations (Fig. 107) **Ctenothrips**
 Abdomen not strongly sculptured with hexagonal reticulations. 25
25. Antennae each nine segmented, or partially nine segmented (i.e., segment VI having a partial suture) 26
 Antennae each eight segmented 28
26. Median dorsal abdominal setae closely set. **Pseudothrips**
 Median dorsal abdominal setae placed fairly far apart. 27
27. Pronotum with one pair of well-developed epimeral setae (Fig. 119); abdominal tergite VIII without posterior comb of setae. (in part) **Oxythrips**
 Pronotum without well-developed setae; abdominal tergite VIII with complete posterior comb of setae.
 (in part) **Anaphothrips**
28. Antennal segment IV with simple sense cone 29
 Antennal segment IV with forked sense cone 31
29. Prothorax without any long setae; always apterous. (in part) **Aptinothrips**
 Prothorax with epimeral setae, at least, well developed; macropterous or brachypterous. 30
30. Abdominal segment X shorter than segment IX in female; male without glandular areas on abdominal sternites;

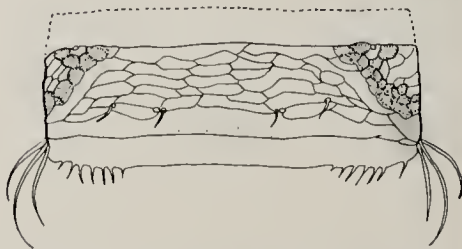


Fig. 96.—*Chaetanaphothrips orchidii*, abdominal tergite VIII, showing differentiated area anterior of each spiracle.

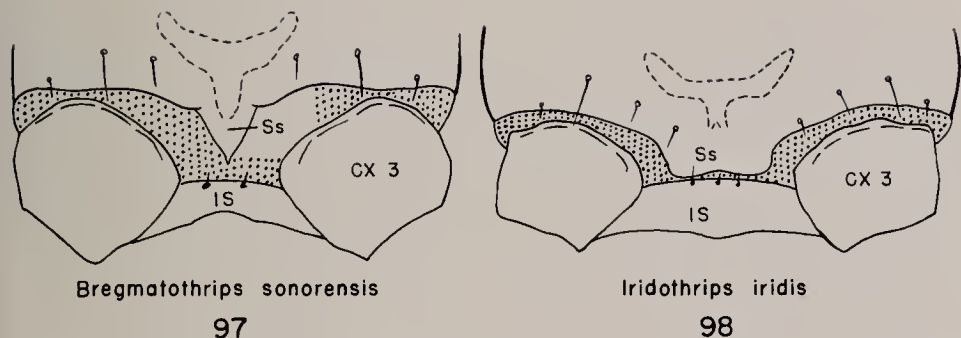


Fig. 97-98.—Differences in form of metaspinasternum between: 97, *Bregmatothrips* as typified by *sonorensis* from Arizona and California; 98, *Iridothrips iridis*. Ss—metaspinasternum, Cx3—hind coxa, IS—abdominal sternite I.

- metaspinasternum as in Fig. 97 *Bregmatothrips*
 Abdominal segment X longer than segment IX in female; male with glandular areas on abdominal sternites; metaspinasternum as in Fig. 98. *Iridothrips*
31. Prothorax without any long setae. (in part) *Anaphothrips*
 Prothorax with well-developed setae, either the epimeral setae long or both the epimeral and anteromarginal setae long. 32
32. Prothorax with the anteromarginal and epimeral setae long. *Frankliniella*
 Prothorax with only the epimeral setae long. 33
33. Prothorax with only one pair of epimeral setae well developed. 34
 Prothorax with two pairs of epimeral setae well developed. 35
34. Mouth cone heavy and long (Fig. 105). *Chilothrips*
 Mouth cone shorter. (in part) *Oxythrips*
35. Two-segmented style much longer (nearly twice as long) than antennal segment VI (Fig. 75); not yet found in Illinois. *Rhaphidothrips*
 Two-segmented style about equal to or shorter than antennal segment VI. 36
36. Abdominal tergite IX lacking pores; male with tergite IX bearing a pair of sigmoidal posterior processes. *Dorcadothrips*
 Abdominal tergite IX bearing pores; male with tergite IX entire, lacking posterior processes. *Taeniothrips*

Anaphothrips Uzel

Anaphothrips Uzel (1895:142). Type-species by subsequent designation by Hood (1914a).—*Anaphothrips virgo* Uzel (= *Thrips obscura* Müller). Valid designation according to International Commission of Zoological Nomenclature (1950 & 1961).

Type-species by subsequent designation by Moulton (1933a).—*Anaphothrips ferrugineus* Uzel. Invalid because of prior designation; refer to discussion following.

Neophysopus Schmutz (1913:1016). Type-species by monotypy.—*Neophysopus medioflavus* Schmutz (= *flavicinctus* Karny). Made a subgenus of *Anaphothrips* by Priesner (1926b).

Anaphothrips subgenus *Pseudoarticella* Shumsher (1942:123). Type-species by original designation.—*Thrips obscura* Müller. Elevated to full genus by Morison (1948). Synonymized by Priesner (1949).

Head about as long as wide. Ocelli present in macropterous and brachypterous forms, absent in apterous forms. Antennae eight or nine segmented, segment III with a forked or single sense cone, segment IV (in Illinois at least) always with a forked sense cone. Maxillary palps three segmented.

Prothorax without strong striations and without any long major setae (in Illinois). Mesospinasternum separated from metasternum by wide suture. Metascutum hexagonally reticulate. Fore legs not enlarged. All tarsi two segmented. Fore wings each with two veins, both veins with short weak setae, setae sparse or interrupted on fore vein, fringe cilia wavy. Macropterous, brachypterous, or apterous.

Abdomen with pleural plates. Tergites and sternites without dense microsetae. Abdominal sternites without

accessory setae in addition to posterior ones. Median pair of setae placed moderately far apart on the intermediate abdominal tergites. Abdominal tergite VIII with a complete posterior comb of setae (in Illinois). Females with median posterior setae of abdominal sternite VIII forward of hind margin. Males with median posterior setae of abdominal sternite VIII on hind margin. Males with U-shaped glandular areas on sternites III-VII (in Illinois) and with four thornlike setae on abdominal tergite IX (in Illinois).

Unfortunately the proper type-species of *Anaphothrips* has been subject to dispute among thysanopterists. Until 1950, when the International Commission of Zoological Nomenclature published the decisions reached in Paris in 1948, it was thought by some that Hood's subsequent designation of the type-species was unacceptable. It was unacceptable because Hood designated a subjective synonym, namely *Thrips obscura* Müller. The nominal species *obscura* Müller was not among the originally included species, but *virgo*, which Hood mentioned as one of the synonyms of *obscura*, was in Uzel's first list.

Moulton (1933a), in keeping with the popular interpretations of the rules of his times, redesignated *Anaphothrips ferrugineus* Uzel as the type-species. In a work on Indian Thysanoptera, Shumsher (1942) followed Moulton and not Hood in the selection of the type-species of *Anaphothrips*, and in this same paper Shumsher set up a new subgeneric name, *Pseudoarticulella*, for *obscurus*. Shumsher's proposals were upheld by Morison in 1948, but suppressed by Priesner in 1949.

The action taken by the International Commission of Zoological Nomenclature, (1950) and recently in the new code Article 67 (e) (1961), sets forth the provision that allows *Anaphothrips virgo* Uzel, not *Thrips obscura* Müller or *Anaphothrips ferrugineus* Uzel, to become the type-species of *Anaphothrips*. These rules validate the subsequent selection of a type-species if an originally included species is found to be a junior synonym of that subsequent selection.

In 1942 Shumsher unjustifiably sunk *Neophysopus* Schmutz under *Anaphothrips* s. str. At least, the reasons Shumsher gave for sinking *Neophysopus* were not justifiable. It was Shumsher's contention that because thysanopterists subsequently had placed certain species in *Neophysopus* and that because one of these species, *ferrugineus*, was supposedly the type-species of *Anaphothrips*, then *Neophysopus* automatically became a synonym of *Anaphothrips*. What Shumsher did not take into account was that *medioflavus* was the type-species of *Neophysopus* by monotypy and that the name *Neophysopus* depends solely upon the placement of its type-species, *medioflavus*, and not upon species later transferred to *Neophysopus*. Of course *Neophysopus* may be an outright synonym of *Anaphothrips* s. str. for zoological reasons not yet published or unknown to me, but it is not a synonymous name for nomenclatural reasons. At present *Neophysopus* is considered to be one of the subgenera of *Anaphothrips* (Priesner 1949).

The five Illinois species belong to the above-mentioned subgenera, *Anaphothrips* s. str. and *Neophysopus*. Representatives of other subgenera are exotic. The subgenus *Hemianaphothrips* Priesner is not generally recognized by American thysanopterists. It is a subgroup characterized by the complete division of antennal segment VI into two segments. For this report those species with segment VI either partially divided or completely divided are placed in *Anaphothrips* s. str.

KEY TO SPECIES

1. Antennae each eight segmented.
 -subgenus *Neophysopus* Schmutz 2
 - Antennae each nine segmented, that is, segment VI is secondarily completely or almost completely subdivided.
 -subgenus *Anaphothrips* s. str. 3
2. Apterous; with setae of posterior comb on abdominal tergite VIII often fused with each other at base.*nanus*
 Wings present; all setae of posterior comb on abdominal tergite VIII separate, not fused at base.*catawba*
3. Brachypterous.forms of *obscurus*
 Macropterous.4
4. Last two abdominal segments dark brown.*cameroni*
 Last two abdominal segments yellow.5

5. Body often with dark blotches; antennal segments III and IV brownish; posterior comb on abdominal tergite VIII usually short; extreme posterior edge of head with a dorsal dark line. Abdominal tergite IX with major posterior setae brown **obscurus**
 Body uniformly yellow; without dark blotches; antennal segments III and IV yellowish; head entirely yellow. Abdominal tergite IX with major posterior setae yellow **sandersoni**

Anaphothrips (Anaphothrips)
cameroni (Bagnall)

Euthrips cameroni Bagnall (1919:271).

♀, ♂. Type-locality.—Semans, Saskatchewan, Canada. Transferred to *Anaphothrips* by Watson (1924a).
Anaphothrips ripicola Hood (1940c: 553). ♀, ♂. Type-locality.—St. Lawrence County (near Wanakena), New York. New synonymy.

FEMALE (macropterous).—Length distended over 1.5 mm. Bicolored brown and bright yellow to almost entirely brown. Yellow to yellowish brown: anterior two-thirds of head, antennal segment I, segments III, IV, and sometimes V at extreme base; sides and median spots on thorax; inside of leg segments; and sometimes sides of abdominal segments II–VII. Rest of body brown, darkest brown in terminal antennal segments and in last two abdominal segments. Often abdomen entirely brown. Abdominal tergite VIII with lateral setae, and IX with major posterior setae, brown. Fore wings grayish yellow. Ocellar pigment red.

Head about as long as wide. Antennae nine segmented. Antennal segments III and IV each with forked sense cones. Mouth cone moderately long and pointed.

Posterior angles of prothorax without any long setae. Metanotum less hexagonally reticulate than in *obscurus*.

Abdominal tergite VIII with a complete comb of setae, these setae not fused with others at the base. Abdominal tergite IX with major setae longer than in *obscurus*. Abdominal tergite X completely split longitudinally.

MALE (macropterous).—Length

distended over 1.2 mm. Color and general structure as in female. Abdominal sternites III–VII each with glandular areas varying from circular to oval to crescent shaped. Abdominal tergite IX with the usual four spinelike setae (Fig. 43).

This dark or bicolored species is similar to *obscurus* in overall appearance but in *cameroni* the color is much darker, the major setae on abdominal tergite IX are longer, and the reticulations on the metathorax are less extensive.

So far, *cameroni* has been found only in the northern portions of Illinois. It is a boreal species occurring from Alaska to Saskatchewan, Minnesota, North Dakota, and upper New York State (INHS, University of Minnesota, University of North Dakota, and USNM records).

Illinois records.—KANKAKEE COUNTY: Wichert, July 25, 1947, English, Stannard, on prairie grasses, 1 ♀. LAKE COUNTY: Zion, August 30, 1955, Moore, Stannard, in sand prairie, 4 ♀, 1 ♂. LEE COUNTY: Amboy, May 31, 1933, Ross, Townsend, on grass, 2 ♀, 1 ♂.

Anaphothrips (Neophysopus)
catawba Hood

Anaphothrips catawba Hood (1938c: 348). ♀. Type-locality.—Rocky Point (Pender County), North Carolina.

FEMALE (macropterous).—Length distended about 1.5 mm. Color pale yellow except apical half of antennal segment IV, apical half of V, and all of VI–VIII which are brown, with IV lightest. Ocellar pigment orange-red.

Head about as wide as long. Ocelli present. Antennae eight segmented. Antennal segment VI without a trace of ventral suture. Antennal segments III and IV each with forked sense cones. Mouth cones moderately pointed.

Posterior angles of pronotum without any long setae.

Abdominal tergite VIII with complete posterior comb of setae, these setae long and not fused with others

at the base. bdoAminal tergite X completely split longitudinally.

MALE (macropterous).—Length distended nearly 1 mm. Colored as in female. Abdominal sternites III–VII each with a horseshoe-shaped glandular area (Fig. 50). Abdominal tergite VIII with a complete posterior comb of setae. Abdominal tergite IX with the usual four spinelike setae.

The horseshoe-like glandular areas of *catawba* also are found in males of several species of *Anaphothrips*. Morison (1930b) illustrated this structure in his figure of *Hemianaphothrips* (*Anaphothrips*) *tersus*.

Anaphothrips (N.) *catawba* is a southern species which extends up into central Illinois. It is found in the upland and sand prairies near forested areas on *Andropogon*.

Illinois records.—ADAMS COUNTY: Liberty, October 23, 1956, Stannard, on *Andropogon*, 3 ♀; Siloam Springs State Park, August 8, 1951, Richards, Stannard, on grass, 2 ♀. HARDIN COUNTY: Karbers Ridge (High Knob), August 18, 1950, Stannard, on *Andropogon*, 1 ♀. JACKSON COUNTY: Gorham (Fountain Bluff), August 16, 1950, Stannard, hilltop prairie, 4 ♀. JOHNSON COUNTY: Vienna, August 17, 1950, Stannard, prairie, 1 ♀. MASON COUNTY: Bath, October 2, 1951, Sanderson, Stannard, on *Andropogon*, 1 ♀; Forest City, September 11, 1953, Ross, Stannard, on *Andropogon*, 1 ♀. POPE COUNTY: Herod, August 17, 1951, Ross, Stannard, on *Andropogon*, 7 ♀, 7 ♂.

Anaphothrips (Neophysopus) nanus Hood

Anaphothrips (*Neophysopus*) *nanus* Hood (1941:141). ♀. Type-locality. —Ithaca, New York.

FEMALE (apterous).—Length distended about 1 mm. Color entirely yellow except apical antennal segments. Brown: apex of antennal segment V, apical half of segment VI, and all of VII and VIII. Setae pale.

Head about as long as wide. Ocelli absent. Antennae eight segmented. Antennal segment VI without a trace of a ventral suture. Antennal segment

III with a single sense cone, segment IV with a forked sense cone. Mouth cone short and broadly rounded.

Pronotum with striae faint. Pronotum without any well-developed setae. Pterothorax modified to the usual apterous, degenerative conditions.

Abdominal tergite VIII with complete posterior comb, the setae of which are short and frequently fused with other setae at the base. Abdominal tergite X completely split longitudinally.

MALE.—Unknown.

This species is the only completely apterous member of *Anaphothrips* in Illinois. It can be further distinguished by the unique condition of the posterior comb on abdominal tergite VIII in which many of the setae are fused with others at the base.

Originally described from New York, this tiny species has subsequently been found in Virginia (Dean Floyd Andre, Iowa State University, verbally) and now in Illinois.

Illinois record.—MASON COUNTY: Teheran, October 20, 1953, Smith, Stannard, on *Andropogon*, 1 ♀.

Anaphothrips (Anaphothrips) obscurus (Müller) Grass Thrips

Thrips obscura Müller, O. F. (1776: 96). ♀. Type-locality.—Denmark. Placed in *Anaphothrips* by Reuter, O. M. (1899).

Limothrips poaphagos Comstock (1875:120). *Nomen nudum*. Synonymized by Priesner (1926b).

Thrips striata Osborn (1883:155). ♀. Type-locality.—Ames, Iowa. Synonymized by Hood (1914a).

Anaphothrips virgo Uzel (1895:148). ♀. Type-locality.—Presumably Praha (Prague), Czechoslovakia. Synonymized by Hood (1914a).

FEMALE (macropterous).—Length distended nearly 1.5 mm. Color yellow (yellowish green in life) with some light brown spots. Brown to light brown: narrow band at posterior margin of head, antennal segments II–IX except lighter in the intermediate segments, tip of mouth cone, spots on the thorax, most of abdominal tergite I,

and large median spots covering much of the dorsum of abdominal segments II–VII. Fore wings greyish yellow. Abdominal tergite VIII with lateral setae yellow. Ocellar pigment red.

Head not as long as wide. Ocelli present. Antennae nine segmented (Fig. 72), although suture between segments VI and VII not quite complete. Antennal segments III and IV each with forked sense cones. Mouth cones moderately long and pointed.

Prothorax without any long setae at posterior angles.

Abdominal tergite VIII with a complete posterior comb of setae; these setae often short, none of which is fused with others at base. Abdominal tergite X almost completely split longitudinally.

FEMALE (brachypterous).—Length distended more than 1.5 mm, slightly larger than macropterous form. Similar to macropterous form except often many of the brown spots of the body absent, suture between antennal segments VI and VII often complete, and wings reduced to pads.

MALE.—Unknown to me.

As is usual with an insect that has been long known by entomologists and that ranges over the whole of Europe and North America and causes considerable economic damage, this thrips has had a checkered taxonomic history. Priesner (1926b) has given a full, long list of the different names that have been assigned to *obscurus* in the past. There is still a shadow of doubt that *Anaphothrips virgo* is the same species as Müller's type specimen of *obscurus*. However, it might be nomenclatorially prudent to ignore the *virgo-obscurus* problem and accept the longstanding concept of *obscurus* as employed by such European workers as Bagnall, Priesner, and Pélikan.

Shull (1909) described what he thought was the male of *obscurus* under the synonymous name *striatus*. The two specimens he described were from Huron County, Michigan. I have seen one of these males, deposited in the British Museum (Natural History), and it is the male of *sandersoni*, not *obscurus*. Hood (1938a) made reference to the male of *obscurus*, stating

that "the glandular areas on the abdominal sternum of the male (of *zizania*) are very different in form from those of *obscurus* . . ." I do not know of an article in which the male of *obscurus* is adequately described. Certainly the male of this species, if it exists in North America, is rare. It has not been found in Illinois as yet.

According to Hinds (1900) this species, the grass thrips, hibernates over the winter in the adult female stage. In the spring, when the bluegrass begins to grow again, the females lay their eggs in slits made in the grass leaves. Each female makes these slits by means of her sawlike ovipositor. As soon as the larvae hatch from these eggs they seek protected places in order to feed, usually down in the sheath or in the developing grass head. Often the feeding larvae girdle the grass, which results in the death of the top portion of the grass, a condition known as "silver top" (Fig. 99). Pupation takes place either where the larvae fed or under some of the older sheaths. Apparently there are several generations a year. The overwintering females are composed largely of brachypterous forms. Winged forms are more common in late spring and early summer.

Bluegrass, *Poa pratensis*, is one of the favorite hosts of this thrips. We received our bluegrass from Europe and there is every likelihood that neolithic man brought it to Europe from elsewhere. The original home of the bluegrass remains a mystery. So too does the provenience of *obscurus*, whose tie-up with bluegrass is close.

Anaphothrips obscurus also feeds on other grasses and on corn (*Zea mays*). In Illinois and elsewhere (Anonymous 1963b) this thrips can seriously stunt seedling corn, and even set back older plants. Many farmers occasionally have to use insecticides to combat this thrips. Hewitt (1912) has reported that *obscurus* also damages oats in some areas. Forbes (1892) recalled his early suspicions of 1883 that silver top of timothy in northern Illinois was undoubtedly caused by a species of thrips. Presumably that species was *obscurus*, also.

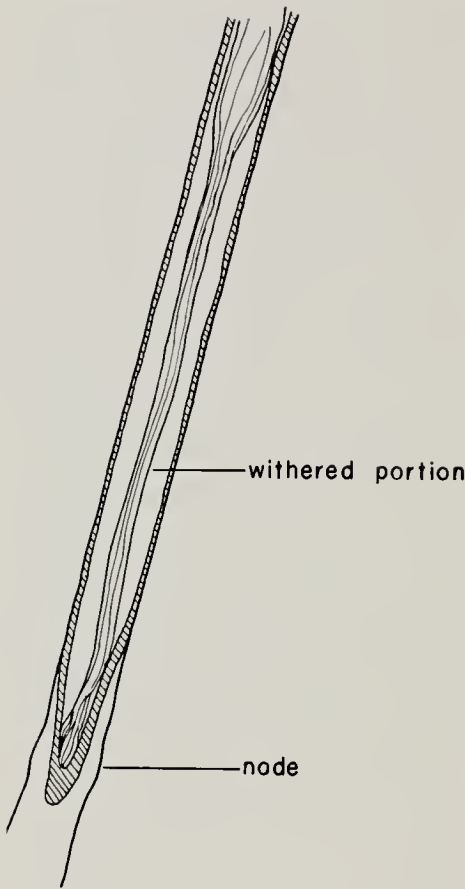


Fig. 99.—Cutaway showing “silver top” damage to blue grass (*Poa pratensis*) by larva of *Anaphothrips obscurus*. Larva, by sucking juices, produces a withered portion just above node that results in death to the terminal growth, which in turn fades into a silver gray color.

Illinois records.—Females and larvae only, collected from April through September, from one to several localities in the following counties: BROWN, BUREAU, CHAMPAIGN, CLAY, COOK, CRAWFORD, EDWARDS, EFFINGHAM, FAYETTE, GALLATIN, GREENE, GRUNDY, HANCOCK, HARDIN, HENDERSON, IROQUOIS, KANE, LAKE, LA SALLE, LIVINGSTON, LOGAN, MARION, MASON, MCHENRY, MORGAN, OGLE, PERRY, PIKE, POPE, PULASKI, ROCK ISLAND, SANGAMON, STEPHENSON, VERMILION, WABASH, WILL, and WINNEBAGO.

Anaphothrips (Anaphothrips) sandersoni Stannard

Anaphothrips (Anaphothrips) sandersoni Stannard (1957a:172). ♀, ♂.
Type-locality.—Kinmundy, Illinois.

FEMALE (macropterous) (frontispiece).—Length distended about 1.5 mm. Color yellow except for apex of antennal segment V, all of antennal segments VI–IX, and tip of mouth cone, which are brown. Fore wings grayish yellow. Ocellar crescents red.

Head about as long as wide. Ocelli present. Antennae nine segmented, antennal segments III and IV each with a forked sense cone. Mouth cone long and pointed.

Posterior angles of pronotum without any long setae.

Abdominal tergite VIII with a complete comb of setae, these setae long and not fused with each other at base. Abdominal tergite X completely split longitudinally.

MALE (macropterous).—Length distended over 1 mm. Similar to female in color and general structure. Abdominal sternites III–VII each with a horseshoe-shaped glandular area, the glandular area on segment VII often smaller and more crescent-shaped than horseshoe-shaped, none of the glandular areas as turned in posteriorly as those found in *catawba*. Abdominal tergite VIII with a complete posterior comb of setae. Abdominal tergite IX with four stout spinelike setae (Fig. 43).

This distinctive species is named for Dr. Milton W. Sanderson, our Survey's coleopterist, who took me to the prairie areas where these thrips were first found, who collected them later while on vacation in Kansas, and who has discovered many other new records of thrips in the states bordering the Mississippi valley.

Anaphothrips sandersoni may be distinguished from the other yellow-colored species with complete posterior combs on abdominal tergite VIII that occur in the eastern states by the possession of fully developed wings, the nine-segmented condition of each antenna, the long mouth cone, and the

coarser type of head and pronotal striations.

This species is apparently limited to the midwestern prairie regions. It is abundant on *Spartina*, which may have been its original, principal host. Part of Shull's description (1914) of the behavior of *Anaphothrips striatus* on *Spartina* undoubtedly pertains to *sandersoni* instead.

Illinois records.—Collected during spring and summer, from one to several localities in the following counties: BOND, CHAMPAIGN, CLINTON, COOK, DE WITT, DOUGLAS, DU PAGE, FAYETTE, FORD, FULTON, GRUNDY, HANCOCK, IROQUOIS, KANE, LEE, LIVINGSTON, LOGAN, MARION, MARSHALL, MASON, MERCER, PIATT, PIKE, STARK, STEPHENSON, and VERMILION.

Aptinothrips Haliday

Thrips subgenus *Aptinothrips* Haliday (1836:445). Type-species by subsequent designation by Westwood (1839).—*Thrips rufa* Gmelin. Raised to full generic rank by Lindeman (1887).

Uzeliella Bagnall (1908a:5). Type-species by monotypy.—*Uzeliella lubbocki* Bagnall. Synonymized by Priesner (1926b).

Head elongate, slightly prolonged in front of eyes. Ocelli absent. Antennae six or eight segmented, segments III and IV each with simple sense cones. Maxillary palps three segmented.

Prothorax moderately setose without any long marginal setae. Pterothorax partially divided into the mesothorax and metathorax by an incomplete suture. Mesospinasternum separated from metasternum by a suture. Legs stout, tarsi one or two segmented. Always apterous.

Abdomen slender, cylindrical. Abdominal tergites with many scattered small setae, with median pores widely separated and located near posterior margin. Abdominal tergite VIII without comb of setae on posterior margin. Abdominal sternites with accessory setae. Abdominal segment X strongly sclerotized with longitudinal furrows.

Females with long or short posterior median setae on abdominal tergite IX. Males without glandular areas on abdominal sternites, and with two pairs of stout median setae on abdominal tergite IX.

This genus resembles several other apterous genera such as *Prosopothrips* and *Prosopoanaphothrips*, neither of which occurs in Illinois. *Prosopothrips* differs in having fine setae-like combs on the posterior margins of the abdominal tergites, and *Prosopoanaphothrips* is distinctive by its heavy reticulations and cleft prolongation of the head.

Only one species of *Aptinothrips* occurs in our state. This species, *rufa*, has two forms, the nominate form and the "stylifer" form.

Aptinothrips rufus (Gmelin)

Thrips rufa Gmelin (1788:2224). ? ♀.

Type-locality.—? Germany. Transferred to *Aptinothrips* by Haliday (1836). Haliday (1852:1104). ♂.

Aptinothrips stylifera Trybom (1894:41). ? ♀. Type-locality.—? Sweden.

Synonymized by Uzel (1895).

Uzeliella lubbocki Bagnall (1908a:5).

♀. Type-locality.—Whitley Bay, Northumberland, England. Synonymized by Priesner (1926b).

Thrips (Aptinothrips) nitidula Haliday (1836:446). ♀. Type-locality.—England. Synonymized by Speyer (1935).

FEMALE, nominate form (apterous) (Fig. 100).—Length distended nearly 1.5 mm. General color yellow. Antennal segments IV and V, sides of tibiae, and sometimes sides of abdomen, shaded with brown; antennal segment VI and tip of abdomen becoming dark brown.

Head faintly reticulate in anterior two-thirds, transversely striate in posterior third. Antennae each six segmented (Fig. 74); segment II not with flanged sides; segment VI large, composed of morphological segments VI–VIII.

Tarsi each one segmented.

Abdominal tergite IX with median posterior setae short.

The "stylifer" form is found only in the northern half of Illinois and the nominate form occurs over the entire state (Fig. 101). Males are extremely rare and have not been found to date in Illinois.

Apparently *rufus* causes damage to grass and grains, but to what extent has not been ascertained for Illinois.

Illinois records. (Fig. 101).—Collected every month of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, BUREAU, CHAMPAIGN, CLARK, COLES, COOK, DE WITT, EDGAR, EFFINGHAM, GREENE, GRUNDY, IROQUOIS, JOHNSON, KANKAKEE, LAKE, LEE, MACON, MASON, MCLEAN, MCHENRY, MORGAN, OGLE, PEORIA, PIATT, PUTNAM, ROCK ISLAND, SANGAMON, STEPHENSON, TAZEWELL, UNION, VERMILION, WABASH, WHITESIDE, WINNEBAGO, and WOODFORD.

Baliothrips Uzel

Baliothrips Uzel (1895:204). Type-species by monotypy.—*Thrips dispar* Haliday.

Head moderate in size, slightly wider than long; area between eyes slightly rounded in front. Ocelli placed close together in a triangle. Interocular and postocular setae small. Antennae seven segmented, segments III and IV each with a forked sense cone. Mouth cone moderately developed, somewhat pointed at the tip. Maxillary palps two segmented.

Prothorax with the epimeral setae well developed, rest of setae much smaller. With three pairs of setae along posterior margin of prothorax between the epimeral pairs of setae. Mesospinasternum separated by a suture from metasternum. Metascutum longitudinally striate. Tarsi two segmented. Fore wings with two veins, hind vein evenly set with setae, fore vein with setae interrupted; fringe cilia wavy.

Abdominal sternites without accessory setae, with posterior pair of setae placed forward of margin in most sternites (in the species in Illinois). Median pair of setae placed far apart on intermediate tergite. Female with

well-developed ovipositor, and with abdominal tergite X partially split. Males with a glandular area on abdominal sternites III–VII, and without thornlike setae on abdominal tergite IX.

In Illinois, this genus most closely resembles the genus *Thrips* except in two features. *Baliothrips* bears a two-segmented maxillary palp and most of the abdominal sternites have the median pair of posterior setae placed forward of the margin. In the species of *Thrips*, the maxillary palps are each three segmented and, except for abdominal sternite VIII, the median pair of posterior setae are placed on the posterior margins of the sternites.

Only one species, *dispar*, is found in our state.

Baliothrips dispar Haliday

Thrips dispar Haliday (1836:449). ♀, ♂. Type-locality.—England. Transferred to *Baliothrips* by Uzel (1895).

Thrips brevicornis Haliday (1836:449). ♀. Type-locality.—England. Synonymized by Haliday (1852).

Baliothrips basilis Shull (1909:224). ♀, ♂. Type-locality.—Huron County, Michigan. Synonymized by Hood (1927c).

Bagnallia agnessae Bagnall (1911b:7). ♀. Type-locality.—Gibside, Durham County, England. Synonymized by Bagnall (1914).

Bagnallia halidayi Bagnall (1911b:8). ♂. Type-locality.—Epping Forest, near Chingford, England. Synonymized by Priesner (1925c).

FEMALE (macropterous).—Length distended about 1.4 mm. General color dark brown. Antennal segments III and IV, apices of tibiae, and all of tarsi yellow to yellow-brown. Fore wings pale at base, pale brown in middle, brown at tip, and brown basad to paler middle area. Ocellar pigment red.

Head moderate in size. Antennae short.

Prothorax almost entirely bare of setae in center.

Abdominal tergite VIII without a complete comb of setae on posterior margin.

MALE (macropterous).—Length

distended about 1 mm. Similar to female in color and structure except somewhat lighter. Abdominal glandular areas narrow and elongately transverse, one each on sternites III–VII.

Although reported to be in North America by Shull under the name *Baliothrips basilis* as early as 1909 and later reported from New York by Hood (1927c), this species has been rarely noted subsequently. Presumably it is a holarectic insect, but it is not nearly as common in our country as it is said to be in England.

We have taken this marsh-and grass-dwelling species once in Illinois. The short-wing forms found elsewhere were not present in this collection. I have studied other specimens from Czechoslovakia and from the Great Smokey Mountains National Park.

Illinois record.—MORGAN COUNTY: Concord, May, 1934, Frison, Ross, on grass around Lake Concord, 3 ♀, 2 ♂.

Bregmatothrips Hood

Bregmatothrips Hood (1912a:66).

Type-species by original designation.—*Bregmatothrips venustus* Hood.

Limocercyothrips Watson (1926b:9).

Type-species by original designation.—*Limocercyothrips bicolor* Watson. Synonymized by Priesner (1949).

Head about as long as wide to longer than wide, considerably bulged in front of eyes. Antennae eight segmented, antennal segments III and IV with simple sense cones. Ocelli present in macropterous forms; present, partially reduced, or absent in brachypterous forms. Mouth cones pointed. Maxillary palps three segmented, rarely reduced by fusion to the two-segmented condition.

Prothorax with setation similar to the Mediterranean genus *Collembolothrips*, that is, with two pairs of long epimeral setae; with one pair each of shorter anterolateral, midlateral and midposterior setae; and with the anterolateral setae set medially away from the anterolateral corner.

Mesospinasternum separated from

the metasternum by a suture. Metaspinasternum pointed (Fig. 97). Fore legs not enlarged. All tarsi two segmented. Fore wings with two veins; setae on fore vein interrupted, setae on hind vein evenly spaced; fringe cilia wavy. Females macropterous or brachypterous; males, as far as is known, always brachypterous.

Abdomen with pleural plates. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal sternites without accessory setae. Abdominal tergite VIII without a posterior comb. Abdominal segment X shorter than segment IX in female. Males without abdominal sternal glandular areas and without thornlike setae on abdominal segment IX.

Another characteristic of this genus is that of color phases. All macropterous forms are uniformly brown, whereas all brachypterous forms are bicolored brown and yellow. (See *Iridothrips* for a comparison of the features of the two genera.)

Species of *Bregmatothrips* live in grasslands, particularly in the South. Only one species occurs in Illinois, and it is more common in the southern half than in the northern half of the state.

Bregmatothrips venustus Hood

Bregmatothrips venustus Hood (1912a:67). ♀. Type-locality.—Brownsville, Texas.

FEMALE (macropterous).—Length distended over 1.5 mm. Body dark brown. Appendages brown and yellow. Brown: antennal segments I, II (except apex which is brownish yellow), VI (except base which is brownish yellow), VII and VIII, and femora (except apices which are brownish yellow). Yellow: antennal segments III–V, tibiae, and tarsi. Occasionally outer edge of mid and hind tarsi bordered by brown. Fore wings pale gray.

Head (Fig. 102) about as long as wide to longer than wide. Ocelli present. Prothorax usually with two or three (sometimes four) minor and one major pair of posterior setae between the epimeral setae. Abdominal seg-

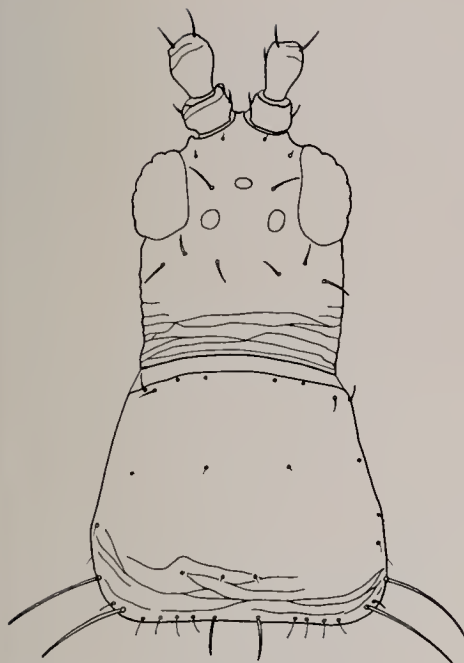


Fig. 102.—*Bregmatothrips venustus*, head and prothorax.

ment X without thornlike setae (Fig. 40).

FEMALE (brachypterous).—Length distended over 1.5 mm. Bicolored brown and yellow. Brown: head; antennal segments I, II (except apex), VI (except base), VII, and VIII; prothorax; and abdominal segments II–X. Rest of body yellow.

Structurally similar to macropterous female except ocelli often absent; according to Hood (1912a) if ocelli present, anterior one degenerate or absent.

MALE (brachypterous).—Length distended over 1 mm. Similar to brachypterous female in color and structure except prothorax yellow. Abdominal sternal glandular areas absent. Abdominal tergite IX without thornlike setae.

This native grassland thrips ranges throughout Illinois. It is a thrips of the midcontinent unless the entity called *gracilis* is merely the Floridian variant of *venustus* and not a distinct species. Moulton (1929a) recorded *venustus* from Cuba. (The specimens upon which this record was based are not

available to me.) Apparently in Mexico *venustus* may become a minor pest of corn. In Illinois it has not yet been listed among the economically important insects.

Another species, *sonorensis*, occurs in the western part of the United States (Stannard 1956b).

Besides the specimens taken in Illinois, we have collections from Lawrence, Kansas; Rogers and Mt. Magazine, Arkansas; and Jalostoc, Morelos, Mexico.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, CALHOUN, CHAMPAIGN, COOK, DOUGLAS, DU PAGE, EFFINGHAM, GALLATIN, GRUNDY, HANCOCK, IROQUOIS, JACKSON, JEFFERSON, JO DAVIESS, KANKAKEE, LAKE, LAWRENCE, LEE, MORGAN, PIKE, PUTNAM, RICHLAND, SALINE, and WILLIAMSON.

Caliothrips Daniel

Caliothrips Daniel (1904:296). Type-species by monotypy.—*Caliothrips woodworthi* Daniel.

Herciothrips Hood (1927d:233). Type-species by original designation.—*Heliothrips striatus* Hood. Synonymized by Priesner (1949).

Head without sharp necklike constrictions as in *Herciothrips*. Antennae eight segmented; segment III more globular than as in *Heliothrips*, *Herciothrips*, or *Echinothrips*; segment VIII 2–2½ times as long as segment VII. Antennal sense cones forked on segments III and IV. Maxillary palps two segmented but with indications of the fusion point between morphological segments II and III.

Prothorax hexagonally reticulate, not transversely striate as in the tropical genus *Selenothrips*, without distinctive long setae on the posterior angles as in *Echinothrips*. Metathorax without a V-shaped hump as in *Heliothrips*. Mesospinasternum almost completely fused to metasternum. Tarsi one segmented. Hind coxae closely spaced. Fore wings pointed at tip, with a row of stout setae and a row of slender setae along the leading edge.

Abdomen, laterally at least, with

fused comblike plates on the posterior margin of the dorsum of each segment. Males with a glandular area on the medial part of sternites III–VII.

Body reticulate, usually black or dark brown in color.

Although the type of *Caliothrips woodworthi* Daniel is not available and presumed lost, the name almost certainly applies to entities formerly placed in *Hercothrips*. As early as 1907, Moulton suppressed *woodworthi* as a synonym of *Heliothrips fasciatus* Pergande, but later the name *Hercothrips* came into general usage. Following Hood's personal confirmation, Priesner in 1949 recognized *Caliothrips* as the prior name and synonymized *Hercothrips* with it. Thysanopterists are now in agreement with Priesner's decision (Faure 1962).

Originally many of the species now in this genus were described in *Heliothrips*. Hood (1927d) created *Hercothrips* for entities thereupon removed from *Heliothrips*. Later (1932) Bagnall further separated off other species, placing them in *Hercinothrips*. All of these thrips as well as some in additional genera greatly resemble each other and form a closely knit, natural phyletic line in the Heliothripinae.

Hood (1927d) surmised that because of the close spacing of the hind coxae, species of *Caliothrips* might be good jumpers as is the case in several other genera similarly formed. Previously Russell (1912) reported that *Caliothrips fasciatus* leaps actively and for considerable distance.

If *Caliothrips fasciatus* (the bean thrips) is typical, thrips of this genus have two larval and two pupal stages. The mature larva drops to the ground and crawls into the soil where both pupal stages occur. No cocoon is spun. Later the adult emerges, provided the crack in which the larva entered the ground has not been closed meanwhile. According to Bailey (1933) the newly emerged adult is unable to dig its way out to the surface, but must come up by way of existing tunnels or fissures.

Three species of this genus are ordinarily found in Illinois. Another species, *fasciatus*, once was found as an

adventive in Urbana on naval oranges transported from California (Russell 1912). Possibly *phaseoli* might also occur on legumes, although it has not yet been found in our state.

Faure (1962) has presented an illustrated key to the species of the world.

KEY TO SPECIES

1. Sides of abdominal tergites more or less transversely striate.....2
Sides of abdominal tergites more or less hexagonally reticulate.....3
2. Fore wings each with two enlarged, dark setae at region of fork of veins; on *Liriodendron*.....*striatus* (Hood)
Fore wings lacking especially enlarged venal setae; on legumes.....*phaseoli* (Hood)
3. Fore wings with three dark crossbands in addition to dark basal spot.....*fasciapennis* (Hinds)
Fore wings with two dark crossbands in addition to dark basal spot.....4
4. Antennal segment III mostly pale with only a light cloud of brown; fore wings with hind vein usually bearing four or five major venal setae; males with small circular glandular areas on sternites of the abdomen.....*cinctipennis* (Hood)
Antennal segment III with apex dark brown; fore wings with hind vein usually bearing six major venal setae; males with wide, oblong glandular areas on sternites of the abdomen.....*fasciatus* (Pergande)

Caliothrips cinctipennis (Hood)

Heliothrips cinctipennis Hood (1912c: 137). ♀, ♂. Type-locality.—Not stated, but holotype labeled Makanda, Illinois. Transferred to *Hercothrips* by Hood (1927d). Transferred to *Caliothrips* by Faure (1962).

FEMALE (macropterous) (Fig. 103).—Length distended almost 1.2 mm. General color blackish brown with brown and white banded wings. Dark brown: most of insect. Yellow to nearly white: legs except middle of femora and tibiae, and antennal segments III–V except for a faint brown cloud in the middle or near apexes of these segments. Fore wings with two dark crossbands in addition to the dark spot at the base. Antennae as in Fig. 66. Sides of abdomen more or less hexagonally



Fig. 103.—*Caliothrips cinctipennis*, dorsal aspect. Photo by W. E. Clark.

reticulate. Posterior margin of abdominal segment VIII on dorsum with a nearly complete setal comb. Without heavy, stout, black spines in the middle of the fore wings.

MALE (macropterous).—Length distended less than 1 mm. Colored as in female. Comb on abdominal segment IX less extensive. Abdominal sternites III-VII each with a small, median, nearly circular, glandular area.

This eastern species is a grassland inhabitant. It is often found in prairie

remnants in parts of the central and all of the southern portions of Illinois. Besides the Illinois material, I have also examined specimens from Kentucky, Arkansas, and eastern Kansas.

This species is similar to the Western *fasciatus*. However, the two can be immediately and easily distinguished by color as well as by other features. In *fasciatus* the third antennal segment has a dark brown band, the band at the tip of the fore wing is more extensive, abdominal tergite VIII has the posterior comb more incomplete in

the female, and the glandular areas on the sternites of the male are oblong. By contrast *cinctipennis* has only a faint brown band on antennal segment III, the dark band at the tip of the fore wing is smaller, abdominal tergite VIII has the posterior comb more complete, and the glandular areas on the sternites of the males are small and oval. Hood (1912c) in his original description, allied *cinctipennis* to *fasciapennis*, but the latter species has three dark bands on the fore wing in addition to the spot at the base whereas *cinctipennis* and *fasciatus* have only two dark crossbands on the fore wings in addition to the spot at the base.

Illinois records.—Collected from April to late October, from one to several localities in the following counties: ADAMS, CARROLL, CHAMPAIGN, CLAY (Hood 1912c), COLES, HARDIN, HENDERSON, JACKSON, JOHNSON, LAWRENCE, MASON, MONROE, PIKE, POPE, SALINE, TAZEVELL, UNION, and VERMILION.

***Caliothrips fasciapennis* (Hinds)**

Heliothrips fasciapennis Hinds (1902: 171). ♀. Type-locality.—Amherst, Massachusetts. Transferred to *Hercothrips* by Hood (1927d). Transferred to *Caliothrips* by Faure (1962).

FEMALE (macropterous).—Length distended about 1.3 mm. General color blackish brown. Dark brown: most of insect. Yellow to nearly white: legs except middle of femora and tibiae, antennal segments III and IV and base of V. Fore wing with three crossbands in addition to the dark spot at the base of the wing. Sides of abdomen more or less hexagonally reticulate. Posterior margin of abdominal segment IX on dorsum with an incomplete comb somewhat as in *fasciatus*. Without heavy black spines in the middle of the fore wings.

MALE (macropterous).—Length distended about 0.9 mm. Colored as in female. Abdominal sternites III–VII each with a wide, transverse, oblong glandular area.

This species is widespread in the eastern half of the United States,

ranging from Massachusetts to eastern Kansas and south into Florida (USNM records) and Arkansas (INHS records). What is considered *fasciapennis* in the western states may be a different species or subspecies. In Illinois it does not extend as far north as does *cinctipennis*. As is the case in *cinctipennis*, *fasciapennis* lives in grasslands and sometimes both species occur together. Almost nothing is known of the life history of *fasciapennis*. Males are scarce, and the larvae and pupae have not been described as yet.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, CLARK, CLINTON, GALLATIN, JEFFERSON, JACKSON (USNM), JOHNSON, MARION, PIATT, PIKE, POPE, PULASKI (USNM), and UNION.

***Caliothrips fasciatus* (Pergande) Bean Thrips**

Heliothrips fasciata Pergande (1895: 391). ♀. Type-locality.—Marysville, Yuba County, California. Transferred to *Hercothrips* by Hood (1927d). Transferred to *Caliothrips* by Faure (1962).

Caliothrips woodworthi Daniel (1904: 297). ♂ (erroneously listed as ♀). Synonymized by Moulton (1907).

FEMALE (macropterous).—Length distended about 1.4 mm. Body dark brown. All of coxae, median portions of femora, and tibiae concolorous with body; all tarsi and extremities of the femora and tibiae light yellow. Antennal segments I, II, and VI–VIII dark brown; median portions of segments III and IV and apex of V brown. Rest of antennae light yellow. Wings pale gray with two dark crossbands, not dark at base. Body setae generally yellow.

Head wider than long, cheek outline slightly depressed in the middle; dorsal surface with hexagonal reticulations, each reticule subdivided by fine lines. Ocellar triangle located midway between eyes. Interocellar setae small; postocular setae fairly well developed, pale in color. Mouth cone long, blunt-

ly rounded. Maxillary palps each two segmented.

Antennal segments—I quadrate; II ovoid, pedicellate, widest; III and IV strongly vasiform, each with forked sense cones; V clavate; VI urn shaped; VII and VIII tubular, closely joined.

Prothorax wider than long, hexagonally reticulate, with each reticule subdivided by fine lines. Setae colorless. Mesoscutum and metascutum hexagonally reticulate, with each reticule subdivided by fine lines.

Fore wings without any especially enlarged venal setae.

Abdomen with most tergites bearing subdivided reticulate sculpture laterally. Tergite VIII with only lateral portions bearing toothlike projections. Abdominal tergite X split for nearly the entire length.

MALE (macropterous).—Length distended about 1.1 mm. Similar to female in color and structure. Abdominal sternites III–VII inclusive each with a small, elliptical, median glandular area. Abdominal tergite IX, on the median posterior portion, with two pairs of small, stout spines.

This species was found once in Illinois. Apparently it is an adventive species and has never become established here. Because it might be imported again, and even become a greenhouse pest in our state, it is included here and in the key.

In form and color *fasciatus* resembles *cinctipennis*. The two can be separated by the characteristics mentioned in the key and in the discussion of *cinctipennis*.

In the West this thrips lives on the leaves on many weeds and cultivated plants. Its preferred host appears to be wild lettuce (*Lactuca scariola*). Russell (1912) and Bailey (1933) have studied phases of its life history in detail. It is the only *Caliothrips* whose biology is reasonably well known.

Another unrelated species, *phaseoli*, which also damages beans, should not be confused with *fasciatus*. *Caliothrips phaseoli* seems to be limited in its range to the southern and southwestern states.

Illinois record.—CHAMPAIGN COUNTY: Urbana, March, 1907, Davis, on

California oranges, 1 ♀, 2 ♂. Reported by Russell (1912); slides in USNM.

Caliothrips phaseoli (Hood)

Heliothrips phaseoli Hood (1912b:113).

♀, ♂. Type-locality.—Brownsville, Texas. Transferred to *Hercothrips* by Hood (1927d). Transferred to *Caliothrips* by Faure (1962).

Heliothrips gossypii Moulton (1927a:32). ♀, ♂. Type-locality.—Phoenix, Arizona. Synonymized by Hood (1940b).

FEMALE (macropterous).—Length distended about 1.1 mm. General color brown. Head becoming yellowish brown to yellow anteriorly; legs brown except each of the femora at either extremity and all tarsi which are yellow. Antennal segments—I pale at base, brown apically; II and VI–VIII brown; III–V pale yellow basally, brown apically. Fore wings white with brown bands, brown at extreme base, a broad brown band in the middle and at the apex; setae in region of brown bands generally brown, those in white areas generally clear. All body setae yellow to colorless.

Head much wider than long, cheek outline slightly depressed in the middle; dorsal surface with transverse, elongate, hexagonal reticulations, with each reticule, except those in the posterior rows, subdivided by fine lines; ventral surface more or less smooth. Ocellar triangle midway between fore and hind margin of eyes. Interocellar and postocular setae fairly well developed, difficult to see because of pale color. Mouth cone long, about as long as dorsal length of head, bluntly rounded. Maxillary palps each two segmented, labial palps each seemingly one segmented.

Antennal segments—I quadrate; II ovoid, pedicellate, widest; III and IV vasiform, each with forked sense cones; V clavate; VI urn shaped; VII tubular; VIII long and slender.

Prothorax nearly as long as head; dorsal surface with transverse, elongate reticulations which are subdivided by fine lines, except for a few clear reticules on either side of the

middle; with a few scattered, moderately developed, clear setae.

Pterothorax ovoid in outline, broadest part of body. Metascutum hexagonally reticulate, with reticules, in the midregion, subdivided by fine lines.

Fore wings without any especially enlarged venal setae.

Legs moderately slender; tarsi one segmented.

Abdomen with most tergites bearing transverse lines at side, not hexagonally reticulate. Abdominal segment VIII with only extreme lateral portion bearing toothlike projections. Abdominal tergite X weakly split at or near extreme apex.

MALE.—None present in collections of Illinois Natural History Survey. Prologist reports length about 0.77 mm. Abdominal sternites III–VII each with a transverse glandular area. Abdominal tergite IX with two pairs of short, stout spines.

Caliothrips phaseoli is distinguishable from any congener likely to be present in Illinois by the characteristics mentioned in the accompanying key.

This thrips has been reported to be a pest of beans (Hood 1912*b*) and possibly cantaloupe (Bailey 1957). Until recently it was known by a few records from Tamaulipas (Mexico), Texas, Arizona, and California. A previously unrecorded specimen in the INHS collection from Monticello, Florida, collected on clover by Dr. G. C. Decker, February 23, 1956, indicates that this potentially injurious species is more widespread than previously thought. It may yet be found in Illinois.

Caliothrips striatus (Hood)

Heliothrips striatus Hood (1913*c*:309).

♀, ♂. Type-locality.—Chevy Chase Lake, Maryland. Transferred to *Hercothrips* by Hood (1927*d*). Transferred to *Caliothrips* by Faure (1962).

Heliothrips fasciatus Pergande (Morgan, in Russell 1912). Misidentification according to Hood (1917).

FEMALE (macropterous).—Length distended about 1.3 mm. General color

blackish brown. Legs pale yellow to yellow at the extremities of the tibiae and all of the tarsi, spot on either side of the ocelli paler yellow to yellow, antennal segments III and IV in the basal half and all of segment V pale gray. Fore wing with a dark crossband at the apex and another dark crossband occupying the middle portion. Head and prothorax as in Fig. 104. Sides of abdomen on the dorsum striate rather than hexagonally reticulate.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in general color and structure. Abdominal sternite VI with a small, circular glandular area; VII with a narrow, transverse, median glandular area (Hood, in 1913, stated that glandular areas were present on segments III–V as well, but none are visible on these segments on specimens I have observed from Illinois and Kentucky). Abdominal tergite IX with two pairs of short, stout spines.

This distinctive species can be dis-

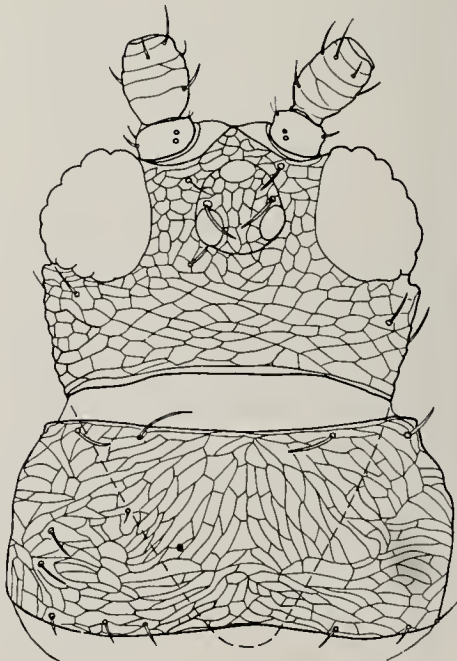


Fig. 104.—*Caliothrips striatus*, head and prothorax, wrinkles within reticules not shown.

tinguished easily from its Illinois congeners by the form of striations on the sides of the abdominal tergites which are arranged in parallel rather than in hexagonal designs, and by the presence of two heavy black setae in the middle of the fore wing.

Hood (1913c) reported this species from Parker, Illinois. The same author recorded it also from Maryland (1913) and from Virginia (1917). Morgan, *in* Russell (1912), recorded *striatus*, erroneously determined as *fasciatus*, from Tennessee, and I have examined a specimen from the Great Smoky Mountain National Park of Tennessee. Recently Wray (1950) listed this species from North Carolina. There are many specimens from Florida, also, in the U.S. National Museum. Apparently its preferred host is the tulip tree (*Liriodendron tulipifera*).

Illinois records (Fig. 22).—CLARK COUNTY: Clarksville (Rocky Branch), July 6, 1961, Stannard, on leaves of *Liriodendron*, 2 ♀. JACKSON COUNTY: Giant City State Park, June 25, 1958, Dybas, Stannard, 1 ♀; Gorham (Fountain Bluff), June 22, 1958, Dybas, Stannard, on leaves of *Liriodendron*, 2 ♀; Murphysboro (Little Grand Canyon), August 13, 1964, Faatz, Stannard, on leaves of *Liriodendron*, 1 ♀, 1 ♂. JOHNSON COUNTY: Parker, July 14, 1909, Hart, on leaf of *Liriodendron tulipifera*, 1 ♀ (USNM). MASSAC COUNTY: Brookport, May 25, 1967, Stannard, on leaf of *Liriodendron*, 2 ♀. POPE COUNTY: Bell Smith Springs Recreation Area, June 24, 1958, Dybas, Stannard, on leaf of *Liriodendron*, 1 ♀; Eddyville (Hays Creek Canyon), August 26, 1964, Faatz, Stannard, on leaves of *Liriodendron*, 2 ♀, 3 ♂. UNION COUNTY: Dongola, July 15, 1954, Ross, Stannard, on leaves of *Liriodendron*, 1 ♀, 1 ♂.

Chaetanaphothrips Priesner

Anaphothrips subgenus *Chaetanaphothrips* Priesner (1926b:204). Type-species by monotypy.—*Euthrips orchidii* Moulton. Raised to full generic rank by Bagnall (1926a).

Head broader than long, *Sericothrips*-like in appearance. Antennae

eight segmented; segments III and IV each with a long, forked sense cone; two segmented style, long and slender. Mouth cones short and broadly rounded. Maxillary palps three segmented.

Prothorax with one or two pairs of epimeral setae well developed, when two developed the inner pair is the larger. Midanterior prothoracic setae relatively small but larger than adjacent setae. Mesospinasternum separated from metasternum by a suture. Fore legs not enlarged. All tarsi two segmented. Wings narrow, the two principal veins sparsely setose; fringe cilia wavy.

Abdomen with median pair of setae placed far apart on intermediate tergites. Abdominal sternites without accessory setae in addition to posterior ones. Posterior margins of abdominal sternites with large, flat platelets. Abdominal tergite VIII with posterior comb of setae incomplete, limited to several setae on either side. Stippled area around spiracles on abdominal tergite VIII extended up to the anterior margin (Fig. 96). Females with or without elliptical glandular area on abdominal sternite VII. Males with abdominal sternites III-VII with elliptical glandular areas. Males with four thornlike setae on abdominal tergite IX.

This genus can be easily and immediately recognized by the large stipple-like areas on abdominal tergite VIII, a condition not found elsewhere in the Terebrantia except in *Prosopothrips*. Of the half dozen or so species currently assigned to *Chaetanaphothrips* only *orchidii* is found in Illinois.

Chaetanaphothrips orchidii (Moulton)

Euthrips orchidii Moulton (1907:52). ♀. Type-locality.—Fruitvale, Alameda County, California; in greenhouse. Provenience unknown. Placed in *Chaetanaphothrips* by Priesner (1926b).

FEMALE (macropterous).—Length distended about 1.3 mm. Color generally pale yellow, head and thorax brighter yellow. Brown: antennal seg-

ment IV at extreme apex, segment V in apical one-third, segment VI in apical half, and all of segments VII and VIII; base of fore and hind wings, a broad band in the middle of the fore wing, and a narrow band in the middle of the hind wing. Ocellar pigment red.

Head without setae close to fore ocellus.

Prothorax with two pairs of epimeral setae well developed, the inner pair the larger.

Abdominal sternite III without glandular area. Abdominal tergite VIII usually with lateral stipuled areas not as extended towards the meson along the base as in *signipennis* (Fig. 96).

MALE.—Unknown.

LARVA.—Described in the Czechoslovakian language and illustrated by Pelikán (1954).

This species has been the subject of controversy. Hood (1954*b*) sank the name *signipennis* under *orchidii* for the reason that both entities can be found on bananas. Hood explained away the morphological differences between the two entities on the presumption that one was a diploid and the other a haploid form, apparently without any cytological evidence (at least no such evidence was presented).

In my opinion *orchidii* is a new-world thrips. It is distinct from the old-world banana thrips, *signipennis*, in several morphological characteristics. The two species are now distributed throughout the tropics and subtropics and in northern greenhouses, probably by the agency of man. Out-of-door populations of the species *orchidii* extend into the temperate region in North America. I am unable to disprove or prove, at present, whether or not one is diploid and the other is haploid or whether one is a form of the other. By itself, the fact that both species have been found on bananas is not proof of anything.

The following characteristics distinguish *signipennis* from *orchidii*. *Chaetanaphothrips signipennis*.— 1) Fore ocellus with a pair of setae, one close to either side of this ocellus. 2) Abdominal sternite III of female with an elongate transverse glandular area.

3) Outer epimeral pair of setae minute. *Chaetanaphothrips orchidii*.— 1) Fore ocellus with no setae immediately close. 2) Abdominal sternites of female without a glandular area. 3) Outer epimeral pair of setae larger.

Pelikán (1954) has given an account of the life history of *orchidii*. I have not read this work as yet because it is written in Czech, a language not familiar to me. As usual, Dr. Pelikán's treatment is well illustrated and an English summary is included.

Although *orchidii* was formerly considered a tropical thrips confined to greenhouses in northern regions (Pelikán 1954), apparently natural populations of it occur out-of-doors in Illinois. Five collections have been taken in Illinois several miles from the nearest greenhouses. Elsewhere I have taken specimens from native herbs in Key West, Florida, and several localities in southern Mexico. This species also has been found out-of-doors in California and Louisiana (USNM records).

In the Far South these thrips have been reported to cause damage to mature grapefruit (Thompson 1939).

Illinois records.—CLINTON COUNTY: Carlyle, August 15, 1951, Ross, Stannard, on dead branch, 1 ♀. GREENE COUNTY: Eldred, June 7, 1949, Sanderson, Stannard, sweeping herbs in woodland, 1 ♀. HANCOCK COUNTY: Nauvoo, July 25, 1957, Evers, Stannard, forest, 1 ♀. HENDERSON COUNTY: Oquawka, September 8, 1947, Ross, Stannard, sweeping herbs in woodland, 3 ♀. MONROE COUNTY: Valmeyer, July 19, 1948, Smith, Stannard, sweeping herbs in woodland, 1 ♀.

Chilothrips Hood

Chilothrips Hood (1916*d*:119). Type-species by original designation.—*Chilothrips pini* Hood.

Head broad. Eyes proportionately small. Antennae eight segmented. Antennal segments III and IV with forked sense cones. Mouth cones greatly enlarged and drawn out (Fig. 105). Maxillary palps three segmented, labial palps two segmented.

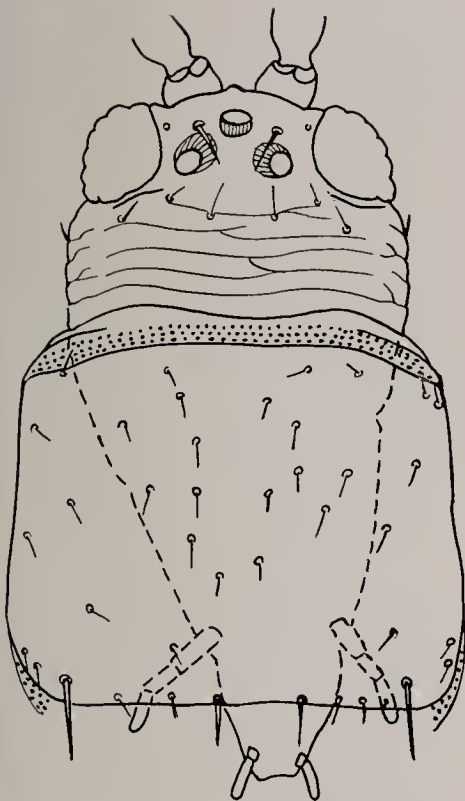


Fig. 105.—*Chilothrips pini*, head and prothorax.

Prothorax long, only one pair of epimeral setae well developed (Fig. 105). Mesospinasternum separated from metasternum by a suture. Fore legs not enlarged. All tarsi two segmented. Fore wings with two veins, setae on fore vein interrupted, setae on hind vein uniformly spaced; fringe cilia wavy.

Abdomen with pleural plates. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal tergite VIII without posterior comb of setae. Males unknown.

The sole species of this genus is *Oxythrips*-like in all respects except in the form of the mouth cone. In *Chilothrips* the mouth cone is heavy and long, whereas in *Oxythrips* the mouth cone is short—as short as that found in *Anaphothrips* or most other genera in the Thripidae.

Chilothrips pini Hood

Chilothrips pini Hood (1916d:120). ♀.
Type-locality.—Bladensburg, Maryland.

FEMALE (macropterous).—Length distended nearly 2 mm. Color almost uniformly light brown. Body with much orange-yellow subsintegumental pigment. Ocellar pigment red.

Head (Fig. 105) much wider than long. Antennal segment VI with an impression or line suggestive of a primigenial suture on ventral surface near apex.

Prothorax with three pairs of minor posterior setae between the well-developed epimeral pair. Fore tarsi each without apical claw.

Abdominal sternites with accessory setae in addition to posterior ones.

MALE.—Unknown.

This species has not as yet been taken in Illinois, but it may be present in southern Illinois on the few remaining yellow pines in the Wolf Lake region or in northern Illinois on white pines. Dr. W. Suter has found it near Friendship, Adams County, Wisconsin about 100 miles north of the Illinois border (INHS records).

In the INHS collection there are specimens taken in winter from the duff and needles under *Pinus virginiana* at Silver Springs, Maryland, about 5 miles in a direct line from Bladensburg, the type locality of the species. Fig. 105 was drawn from these specimens.

Chirothrips Haliday

Thrips subgenus *Chirothrips* Haliday (1836:444). Type-species by monotypy. *Thrips (Chirothrips) manicata* Haliday. Raised to full generic rank by Amyot and Serville (1843).

Head small, prolonged slightly to considerably beyond eyes. Eyes proportionately large. Ocelli always present in females, absent in males so far as is known, located on the posterior half of the head. Antennae eight segmented, segment I usually enlarged, segment II produced at outer apex, last two segments forming a style. An-

tennal segment III with sense cones simple, segment IV with cones simple or forked. Maxillary palps three segmented, labial palps two segmented.

Prothorax trapezoidal (Fig. 106). Epimeral setae usually well developed. Area forward of probasisternum triangular, composed of short, straight striae. Mesospinasternum separated from metascutum by a wide suture. Fore legs enlarged. All tarsi two segmented. Females macropterous, males apterous or brachypterous. Fore wings with two veins, setae on both veins interrupted; fringe cilia wavy.

Abdomen with pleural plates. Tergites and sternites without microsetae. Abdominal tergites without posterior combs of setae, abdominal sternites without accessory setae in addition to the posterior ones. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal tergite X of female with a full longitudinal split. Males with or without sternal glandular areas.

The trapezoidal shape of the thorax, the small head, the produced apex of antennal segment II, and the enlarged fore legs are in combination characteristics unique to the species in this genus.

More than a third of the eastern and southern species occur in Illinois. All feed primarily on grasses. Apparently some of the species are far-ranging in their distribution, as for example, *mexicanus*, which is found from Guadalajara, Mexico, to southern Illinois and as a vagrant into South America, Hawaii, and the Philippines, or as another example, *falsus*, which occurs from Mexico to Canada.

In 1939 both Hood and Andre wrote on *Chirothrips* and separately came to the same conclusions on the synonymy of several species. Andre gave a comprehensive treatment and included a key to all North American species. Hood dealt only with species that had synonymy. By coincidence both of these authors described the same species as new. Andre's names, *texanus* and *sensitivus*, have priority by several months over *auriventris* Hood and *talpoides* Hood.

An analysis and key of the Palearctic

species was given by Priesner (1949). A catalogue and key to all the known species was prepared by Zur Strassen (1960a).

KEY TO SPECIES

(UNITED STATES, KEY TO
ADULTS, EAST OF 100TH MERIDIAN)

(Females only, many males unknown, *lenape* Hood of New Jersey also not included)

1. Mesonotum and metanotum with numerous short, stout setae 2
Mesonotum and metanotum without numerous short, stout setae, with only the normally few pairs 4
2. Head with 15-18 pairs of short, stout setae on the vertex *vestis*
Head with more than 20 pairs of stout setae on vertex 3
3. Head with 24-27 pairs of short, stout setae on the vertex; as yet known only from Texas *dorsalis*
Head with 34-44 pairs of short, stout setae on the vertex; widespread *texanus*
4. Antennal segment I enlarged 5
Antennal segment I not enlarged 10
5. Head with five or more pairs of short, stout setae on the vertex 7
Head with three pairs of setae on vertex 6
6. Most abdominal tergites with a line of heavy scallops; abdominal sternites usually covered with heavy scallops *mexicanus*
Most abdominal tergites with a line of minute scallops; abdominal sternites transversely striate *crassus*
7. Head with five to six pairs of setae on vertex *crenulatus*
Head with seven or more pairs of setae on vertex 8
8. Head with seven to nine pairs of setae on vertex *spiniceps*
Head with 12 or more pairs of setae on vertex 9
9. Head with 12-14 pairs of setae on vertex; known only from Florida *sensitivus*
Head with 20-24 pairs of setae on vertex *fulvus*
10. Head with five or six pairs of setae on vertex; not yet found in Illinois *productus*
Head with three pairs of setae on vertex 11
11. Antennal segment II scarcely produced at apex 12
Antennal segment II well produced at apex 13
12. Interocellar setae placed far forward of fore ocellus, stout *falsus*
Interocellar setae placed just slightly in advance of fore ocellus, slender; known only from New York (Hood 1940c) and Maine (USNM records) *patruelis*
13. Antennal segment II with produced apex broadly rounded and with apical setae arising from concave area below the tip; from New York (Hood 1940c) and

- Minnesota (USNM records).....
*cuneiceps*
 Antennal segment II with produced apex
 more or less pointed14
 14. Antennal segment VI about equal in
 length to the combined length of seg-
 ments IV and V.....*insolitus*
 Antennal segment VI much shorter than
 the combined length of segments IV
 and V.....15
 15. Antennal segment II with a thickened
 ridge on inner side.....16
 Antennal segment II without a thickened
 ridge on inner side.....17
 16. Abdominal sternites with toothlike pro-
 jections laterally; from the Great
 Plains, not likely to be found in Illi-
 nois.....*alexandrae*
 Abdominal sternites without toothlike
 projections*praecularis*
 17. Head greatly prolonged, production about
 equal to cheek length; not yet found in
 Illinois.....*bradleyi*
 Head not as greatly prolonged.....*manicatus*

Chirothrips crassus Hinds

Chirothrips crassus Hinds (1902:136).
 ♀, ♂. Type-locality.—Amherst,
 Massachusetts.

Chirothrips obesus Hinds (1902:137).
 ♀. Type-locality.—Amherst, Mas-
 sachusetts. Synonymized by Hood
 (1939b).

Chirothrips obesus var. *hubbelli* Wat-
 son (1926a:58). ♀. Type-locality.—
 Dixie County, Florida. Synony-
 mized by Hood (1939b).

FEMALE (macropterous).—Length
 distended slightly over 1 mm. Bicol-
 ored brown and yellow. Brown: head,
 thorax, and abdominal segment I; an-
 tennal segments III–VIII, lightest in
 segment III; most of fore femora and
 sides of legs. Fore wings light brown
 except a nearly white band just be-
 yond scale. Rest of body yellow except
 sometimes abdomen yellowish brown.
 Body with yellow to red subintegu-
 mental pigment. Ocellar pigment
 bright red.

Head with three pairs of setae on
 vertex. Interocellar setae placed far
 forward of fore ocellus. Antennal seg-
 ment I enlarged, segment II greatly
 produced at apex, segment VI and
 style (segments VII and VIII) espe-
 cially long.

Thorax without stout notal setae.
 Pronotum with epimeral setae ex-
 tremely small. Prosternum without

setae. Mesoscutum with striae
 straight, only slightly suggestive of
 scallops. Anterior margin of meso-
 sternum with about 20 slender setae.

Most abdominal tergites with a line
 of minute scallops. Abdominal ster-
 nites with transverse striae.

MALE (apterous).—Length dis-
 tended about equal to female. Bicol-
 ored brown and yellow but differently
 than in female. Brown: head, antennal
 segments III–VIII (segments III and
 IV lightest), prothorax, much of the
 legs, abdominal segments V (light)
 and VI–X (dark).

Similar to female in general struc-
 ture. Ocelli lacking. Abdominal ster-
 nites III–VII each with an oval glan-
 dular area of moderate size.

As a short, stout member of *Chiro-
 thrips*, this species well deserves its
 now synonymous name, *obesus*.

Chirothrips crassus has been re-
 corded from Massachusetts to Florida
 westward to Tennessee, Illinois, and
 Iowa. In Illinois we have found that
 the species occurs, locally abundant,
 throughout the state. We have taken
crassus as far west as Rogers in north-
 western Arkansas.

ILLINOIS RECORDS.—Collected during
 every season of the year, from one to
 several localities in the following coun-
 ties: ADAMS, ALEXANDER, CHAM-
 PAIGN, CLARK, CLINTON, COOK, HEN-
 DERSON, JACKSON, LAWRENCE, MARI-
 ON, MASON, POPE, ROCK ISLAND, and
 WAYNE.

Chirothrips crenulatus Hood

Chirothrips crenulatus Hood (1927a:
 130). ♀. Type-locality.—Boulder,
 Colorado.

FEMALE (macropterous).—Length
 distended about 1.6 mm. General col-
 or brown, abdomen sometimes lighter
 brown than rest of body; apex of an-
 tennal segment II and all tarsi yellow.
 Fore wings grayish brown except for
 subbasal band which is pale gray.
 Body, especially in the abdomen, with
 orange to red subintegumental
 pigment.

Head moderately prolonged in front
 of eyes. Vertex with four to six pairs of
 stout setae. Interocellar setae placed
 nearly opposite fore ocellus. Antennal

segment I enlarged, segment II greatly produced at apex, segments III and IV with simple sense cones, segment VI much shorter than the combined length of segments IV and V.

Pronotum moderately setose, setae not as stout as those on vertex of head, with two pairs of moderate-sized posterolateral setae. Mesonotum with only the few normal setae, scalloped anteriorly and along extreme posterior margin. Prosternum without setae. Metanotum with only the few normal setae, with broken reticulations. Mesosternum and metasternum with many stout setae.

Abdominal tergites, except on terminal segments, with one to several lines of minute scallops subbasally. Abdominal sternites, except terminal ones, with large scallop-like markings. Abdominal segment X moderately short.

MALE (apterous).—Length distended about 1.2 mm. Lighter brown than female, pterothorax and abdominal segments I–VII yellowish brown to yellow. Structure similar to female except ocelli lacking, prothorax less setose, posterolateral pairs of setae much reduced, wings lacking except occasionally a minute pad. Abdominal sternites III–VII each with a median glandular area of moderate size.

This species is readily distinguished by the feature of five to six pairs of setae on the vertex of the head and by one to several lines of minute scallops on the anterior region of most of the abdominal tergites.

Although known only from Colorado, Nebraska, and Kansas, there is a possibility that *crenulatus* may be found eventually on some of the hill prairies or sand prairies in Illinois. Specimens have been taken as far east as Lincoln, Nebraska (Hood 1927a) and Junction City, Kansas (INHS records).

Chirothrips falsus Priesner

Chirothrips falsus Priesner (1925d: 312). ♀. Type-locality.—One of several localities in Mexico. Andre (1939:195). ♂.

Chirothrips falsus var. *adusta* Priesner (1925d:313). ♀. Type-locality.—One of several localities in Mexico. Synonymized by Hood (1939b).

Chirothrips simplex Hood (1927a:128). ♀. Type-locality.—Denver, Colorado. Synonymized by Andre (1939) and Hood (1939b).

FEMALE (macropterous).—Length distended about 1.5 mm. Color entirely dark brown. Thorax with orange subintegumental pigment. Ocellar pigment red. Fore wings brown.

Head hardly at all prolonged beyond eyes, with few dorsal setae, one pair of which is stout. Antennal segment I small; segment II slightly produced at outer angle, produced tip broadly rounded.

Thorax without stout setae. Pronotum with two pairs of prominent epimeral setae. Mesoscutum with striae not scalloped. Anterior margin of mesosternum with about 16 short, slender setae.

Abdominal tergites without scallops. Abdominal sternites with transverse striae.

MALE (brachypterous).—Length distended less than 1 mm. Similar to female in color but sometimes, possibly because of a teneral condition, abdominal segments II–VIII yellowish brown. Ocelli lacking. Similar to female in general structure. Abdominal sternites III–VIII each with small, circular, glandular area.

According to Hood (1927a) this species was first collected in Illinois by Charles Hart in 1908 from Havana, a sandy area which supports many western and southern relics. We have since taken *falsus* in Illinois on western hill prairies.

Illinois records.—MASON COUNTY: Forest City, September 11, 1953, Ross, Stannard, sand prairie, 1 ♂. PIKE COUNTY: Atlas, August 12, 1948, Sanderson, Stannard, sweeping grass on hill, 1 ♂; New Canton, August 13, 1948, Stannard, hilltop prairie, 4 ♀, 2 ♂. UNION COUNTY: Wolf Lake, April 9, 1953, Stannard, on *Panicum vergatum*, 1 ♀.

Chirothrips fulvus Moulton

Chirothrips fulvus Moulton (1936b: 182). ♀, ♂. Type-locality.—Pau-malu, Oahu, Hawaii.

FEMALE (macropterous).—Length distended about 1.6 mm. General color yellowish brown, darkest in the head. Antennal segments I–III brownish yellow, the remainder of the antennae light brown. All tarsi yellow. Fore wings light brown except for a sub-basal band which is nearly colorless. Ocellar pigment red.

Head considerably prolonged, distance from the anterior corner of the eye to the outer base of the antenna equal to the distance from the posterior margin of the head to the posterior corner of the eye. Vertex with 20–24 pairs of setae. Interocellar setae placed opposite fore ocellus. Antennal segment I enlarged, segment II greatly produced at apex, segments III and IV with simple sense cones, segment VI much shorter than the combined length of segments IV and V.

Prothorax moderately setose, setae not especially stout, with two pairs of posterolateral setae of moderate size. Mesonotum with only the few normal setae, with scallop-like sculpture. Metanotum with only the few normal setae, hexagonally reticulate. Mesosternum and metasternum with many setae. Fore legs greatly enlarged. Abdominal sternites and tergites with scallop-like sculpture. Abdominal segment X short.

MALE (brachypterous).—Length not distended about 1 mm. General color yellow except head, antennal segments III–VIII, and sides of abdominal segment IX, which are light brown. Similar to female in structure except head with vertex bearing 17–20 pairs of setae, ocelli lacking, wings reduced to tiny pads. Abdominal sternites III–VII each with a circular, median glandular area of moderate size.

Although described as having 15–17 pairs of head setae, the two paratypes of this species that I have examined had 20–22 pairs of vertex setae in the female specimen and 17–20 pairs in the

male specimen. A Tennessee specimen in the INHS collection bears 24 pairs of vertex setae.

In North America, *Chirothrips fulvus* stands between *vestis* and *dorsalis* in the number of head setae. The Russian *spinulosis*, however, bears the same number of vertex setae as does *fulvus*. From all of these aforementioned species, *fulvus* differs in lacking numerous stout setae on the mesothoracic and metathoracic nota.

Despite the fact that *fulvus* was first discovered in Hawaii, this species is most likely a native of North America. Hood (1939b) recorded it from Palacios, Texas, and there is in the INHS collection a specimen from Paris, Tennessee, a locality less than 60 miles south of the Illinois border. Almost certainly this species will be found eventually in Illinois.

Chirothrips insolitus Hood

Chirothrips insolitus Hood (1915a:11). ♀. Type-locality.—Four Mile Run, Virginia.

FEMALE (macropterous).—Length distended over 1.5 mm. Color almost entirely dark brown except tarsi yellowish brown. Fore wings light brown, lightest subbasally. Thorax with orange to red subintegumental pigment. Ocellar crescents deep red.

Head with few dorsal setae. Antennal segment I small, segment II only moderately produced at outer apical angle, segment VI and style (segments VII and VIII) unusually long.

Prothorax with slender, short setae; with two pairs of long epimeral setae. Anterior half of mesocutum with scallops. Anterior margin of mesosternum with about 16 slender setae.

Except segment I, abdominal tergites without a scalloped transverse line. Abdominal sternites with transverse striae becoming scalloped but not as definite as in *mexicanus*.

MALE.—Unknown.

This species is distinctive by the features of the small first antennal segment, the long sixth antennal segment, the lack of a transverse scalloped line

on any of the abdominal tergites except somewhat on segment I, and by the incipient scallops on the abdominal sternites. By certain combinations of characteristics, *insolitus* is intermediate between *manicatus* and *mexicanus*.

Apparently the southern fourth of Illinois constitutes the limit of the northward distribution of this species.

Illinois records.—GALLATIN COUNTY: Gibsonia, April 5, 1948, Burks, Stannard, grass, 1 ♀. HARDIN COUNTY: Karbers Ridge (High Knob), August 18, 1950, Stannard, *Andropogon*, 18 ♀. JACKSON COUNTY: Giant City State Park, June 25, 1958, Dybas, Stannard, grass, 1 ♀; Makanda, July 14, 1948, Sanderson, Stannard, grass, 1 ♀; Murphysboro, September 21, 1949, Smith, Stannard, hilltop prairie, 3 ♀. WASHINGTON COUNTY: New Minden, June 4, 1957, Stannard, on wild rose, 1 ♀.

***Chirothrips manicatus* Haliday**

Thrips (Chirothrips) manicata Haliday (1836:444). ♀. Type-locality.—England. Raised to full generic rank by Amyot and Serville (1843). Uzel (1895:83). ♂.

Thrips longipennis Burmeister (1838:413). ? ♀. Type-locality.—Probably Berlin, Germany. Synonymized by Uzel (1895).

Chirothrips antennatus Osborn (1883:154). ♀. Type-locality.—Manchester, Iowa. Synonymized by Uzel (1895).

Pezothrips (?) pedestris Karny (1910:55). ♂. Type-locality.—Neustift, Austria. Synonymized by Priesner (1926b). Recognized as a possible distinct species by Zur Strassen (1960a).

FEMALE (macropterous).—Length distended about 1.5 mm. Color almost entirely dark brown; antennal segment III, tarsi, and fore wings lighter brown. Hind wings pale gray except extreme base which is light brown. Ocellar crescents red. Body with red subintegumental pigment.

Head moderately prolonged beyond eyes, with few dorsal setae. Antennal segment I not greatly enlarged; seg-

ment II produced at outer angle, produced tip acute. Segment VI and style (segments VII and VIII) not unusually long.

Thorax without stout setae. Pronotum with two pairs of prominent epimeral setae. Mesoscutum with anterior striae scalloped. Anterior margin of mesosternum with about 16 short, slender setae.

Abdominal tergites without scallops. Abdominal sternites with transverse striae, except posterior line which is scalloped.

MALE (brachypterous).—Length distended nearly 1.2 mm. Similar to female in color but somewhat lighter. Antennal segments II and III and tarsi yellowish brown. Ocelli lacking. Wings reduced to tiny fore wing pads. Similar to female in general structure. Abdominal sternites III–VII each with an oval glandular area.

Presumably this species was introduced into eastern North America from Europe. Osborn was probably the first entomologist to observe it in America when in July 1882 he found *antennatus* (= *manicatus*) abundant in Iowa in heads of timothy grass.

Although most common in pastures, hayfields, and roadsides where the natural flora has been disturbed by man, *manicatus* also has successfully invaded native prairie habitat.

It has not been taken in the southern third of Illinois.

Illinois records. (Fig. 17).—Collected every season of the year, from one to several localities in the following counties: ADAMS, BUREAU, CARROLL, CHAMPAIGN, CLARK, COOK, DU PAGE, EDGAR, EFFINGHAM, FORD, HENDERSON, IROQUOIS, KANE, KENDALL, LAKE, LAWRENCE, LEE, MASON, MCHENRY, MCLEAN, MERCER, OGLE, PEORIA, PIATT, PIKE, PUTNAM, STARK, STEPHENSON, VERMILION, WARREN, WILL, and WINNEBAGO.

Chirothrips mexicanus

Crawford, D. L.

Chirothrips mexicanus Crawford, D. L. (1909:114). ♀. Type-locality.—Guadalajara, Mexico. Moulton (1928:106). ♂.

Chirothrips floridensis Watson (1920: 21). ♀. Type-locality.—Seabreeze, Florida. Synonymized by Andre (1939) and Hood (1939b).

Chirothrips floridensis var. *catchingsi* Watson (1924a:76). ♀. Type-locality.—New Orleans, Louisiana. Synonymized by Hood (1927b).

FEMALE (macropterous) (Fig. 106).—Length distended about 1.5 mm. Color generally dark brown, antennal segments II and III lighter brown, fore femora and all tarsi yellow to yellowish brown, fore wings light brown. Ocellar pigment bright red.

Head with three pairs of stout setae

on vertex. Antennal segment I greatly enlarged, segment II considerably produced at outer apical angle, segment VI and style (segments VII and VIII) not especially long.

Pronotum with slender, short setae; with two pairs of epimeral setae. Prosternum without setae. Anterior half of mesoscutum with scallops. Mesonotum and metanotum with only the few normal setae. Anterior margin of mesosternum with 50 or more stout setae.

Abdominal tergites I–VI with a transverse line of scallops. Abdominal sternites II–V with scallop-like striae.

MALE (?apterous).—Length given

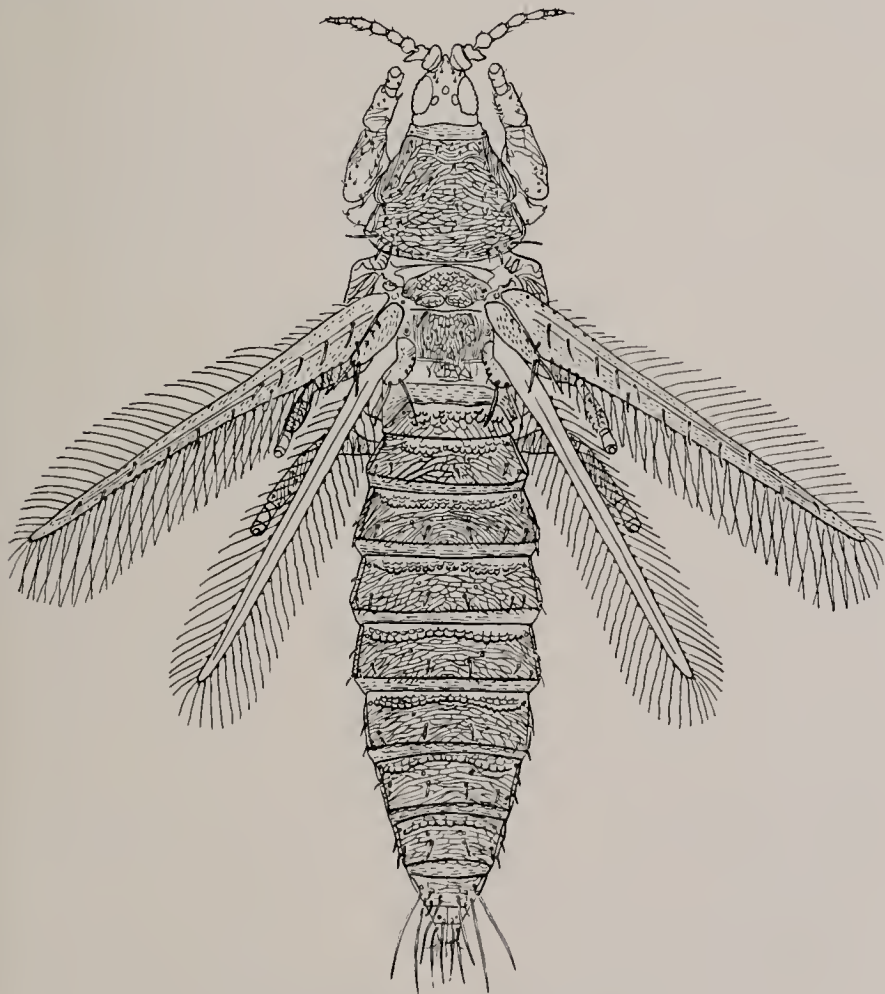


Fig. 106.—*Chirothrips mexicanus*, dorsal aspect.

by Moulton (1928) as 0.8 mm. According to Moulton, similar to female except lighter in color and ocelli lacking. Abdominal sternites II–VII with circular or subcircular glandular areas.

Both Andre and Hood, in 1939, first recognized *mexicanus* by its real characteristics. In their redefinition of the species they showed that D. L. Crawford in describing *mexicanus* and Watson in describing the synonym, *floridensis*, were in error as to the number of epimeral setae. Crawford was further in error on the number and arrangement of head setae present on the holotype of *mexicanus*. Hood (1939b) accounts for the way the original material was misdescribed.

This species is part of the southern biota and is a worldwide tramp. It extends a short distance into Illinois, into the extreme southern counties only. Hood first recorded this species as being in Illinois in 1939.

Illinois records.—ALEXANDER COUNTY: Olive Branch, February 3, 1954, Moore, 1 ♀; McClure, November 20, 1964, McCollum, Johnson grass, 1 ♀. GALLATIN COUNTY: Gibsonia, April 5, 1948, Burks, Stannard, sweeping grass, 1 ♀. PULASKI COUNTY: Mounds, August 26, 1953, Sander-son, Moore, sweeping grass, 1 ♀.

Chirothrips praeocularis Andre

Chirothrips praeocularis Andre (1941: 451). ♀. Type-locality.—Cambridge, Maryland.

Chirothrips bradleyi Hood (1941:142). ♀. Type-locality.—Northfield, New Jersey. New synonymy.

FEMALE (macropterous).—Length distended over 1.6 mm. General color dark brown. Inner base of femora, inner apex of tibiae, and all tarsi yellow. Wings yellow, lightly suffused with brown. Body with orange subintegumental pigment.

Head greatly prolonged in front of eyes, the distance of the vertex between the fore margin of the eyes and the base of the antennae greater than the cheek margin from the base of the eyes to the posterior margin of the head. Vertex with only three pairs of

setae. Ocelli present. Interocellar setae opposite fore ocellus. Antennal segment I not greatly enlarged; segment II drawn out to a sharply pointed apex with its seta placed just below the tip, and with outer margin seemingly ridged or more heavily sclerotized than remainder of segment; segment VI not longer than segments IV and V combined.

Prothorax moderately long; with transverse striae; only moderately setose, setae slender, and with two pairs of prominent posterolateral setae. Prosternum lacking setae. Mesonotum transversely striate. Mesonotum and metanotum without numerous stout setae, with only the normal few pairs. Fore wings well developed.

Abdominal tergites predominantly transversely striate, with few scallop-like markings. Abdominal sternites weakly scalloped except for strong line of scallops just before each posterior margin; posterior margins mostly straight, rarely with toothlike projections. Abdominal segment X pointed, slightly longer than abdominal segment IX.

MALE.—Unknown.

This species and *alexanderae* are unusual in having a thickened ridge along the outer margin of antennal segment II. From *alexanderae*, *praeocularis* may be distinguished by its lack of toothlike projections along the posterior margins of the abdominal sternites and by having antennal segment II more produced at the apex.

Because *praeocularis* is known to occur in Maryland and Louisiana (INHS records) it is possible that populations may also exist in parts of Illinois where the southern biota persists. As yet it has not been found in our state.

Chirothrips spiniceps Hood

Chirothrips spiniceps Hood (1915a:12).

♀. Type-locality.—Glendale-Phoenix region, Arizona. Andre (1939: 198). ♂.

Chirothrips sacchari Moulton (1936b: 181). ♀. Type-locality.—Kailua, Oahu, Hawaii. Synonymized by Hood (1939b).

FEMALE (macropterous).—Length distended more than 1.5 mm. Color generally brown. Yellow to yellow brown: apex of antennal segment II, all tarsi, and joints of fore femora. Fore wings brown except white subbasal band just beyond scale.

Head considerably prolonged beyond eyes, with seven to nine pairs of short, stout setae. Antennal segment I large, segment II greatly produced at outer angle.

Notum of thorax without numerous stout setae. Pronotum with but one pair of epimeral setae. Mesoscutum with scallop-like markings. Mesosternum almost entirely covered by small, stout setae.

Abdominal tergites without an anterior transverse scalloped line. Instead, anterior striae breaking up into light stipple-like areas. Abdominal sternites with weak transverse striae.

MALE (brachypterous).—Length 1.1 mm (Andre 1939). According to Andre, color lighter than in female, yellowish brown with terminal antennal and abdominal segments brown. Similar to female in general structure. Ocelli lacking. Abdominal sternites III–VII each with oval glandular areas.

This species was previously known to occur from California to Florida and northward to Massachusetts. It is recorded here for the first time from Illinois from the sand dune beaches of Lake Michigan.

Illinois record.—LAKE COUNTY: Winthrop Harbor, July 29, 1953, Stannard, on *Panicum virgatum*, 8 ♀.

***Chirothrips texanus* Andre**

Chirothrips texanus Andre (1939:200). ♀, ♂. Type-locality.—Denison, Texas.

Chirothrips auriventris Hood (1939b:469). ♀. Type-locality.—Palacios, Texas. Synonymized by Andre (*in* Bailey 1949a).

FEMALE (macropterous).—Length distended over 1.5 mm. Color predominantly brown, darkest in head and lightest in abdomen, with much yellow to orange or red subintegumental pigment. Apex of antennal seg-

ment II, base of femora, tarsi, and sometimes terminal abdominal segments yellow to yellow brown. Fore wings brown except subbasal regions, this area and hind wings off-white. Ocellar crescents bright red.

Entire body, exclusive of appendages, closely covered with short, stout setae.

Head with about 36 or more pairs of dorsal setae. Antennal segment I large, segment II greatly produced at outer apical angle, style (segments VII and VIII) shorter than segment VI.

Pronotum with many pairs of setae, with two pairs of prominent epimeral setae. Fore legs greatly enlarged (Fig. 79).

Abdominal setae, dorsally and ventrally, less numerous on the terminal segments.

MALE (brachypterous).—Not yet found in Illinois. According to Andre (1939) the male is smaller and paler in color than female. Ocelli absent. Abdominal sternites III–VII with small, circular glandular areas.

This large, spiny species has been collected several times in Illinois and may be statewide in distribution. It is known otherwise only from Texas. The INHS collection includes a series of specimens from Chiapas, Mexico, which are so similar to *texanus* that the two could easily be conspecific or at most be subspecies of each other. Apparently the Haitian *Chirothrips spinosus* Moulton and *C. dorsalis* Hood are the closest relatives of *texanus* at the full species level.

The habits, distribution, and even the variability of the characteristics of *texanus* are in want of further investigation.

Illinois records.—ALEXANDER COUNTY: Roth, July 15, 1954, Ross, Stannard, grass, 1 ♀. COOK COUNTY: West Chicago, August 5, 1949, Evers, Mockford, Stannard, on *Spartina*, 1 ♀. KANE COUNTY: Elgin, September 26, 1956, Ross, Stannard, prairie along railroad, 1 ♀. KENDALL COUNTY: Millington, May 30, 1953, Stannard, on *Andropogon gerardi*, 4 ♀. PULASKI COUNTY: Mounds, August 26, 1953, Sanderson, Moore, sweeping grass, 2 ♀.

Chirothrips vestis Hood

Chirothrips vestis Hood (1915a:15). ♀.

Type-locality.—Vienna, Virginia.

FEMALE (macropterous).—Length distended nearly 1.5 mm. Color yellow and light brown. Head and antennal segments IV–VIII brown. Thorax and legs light brown to yellowish brown. Fore wings clouded with yellowish brown. Ocellar pigment bright red. Body with much orange subintegumental pigment.

Head with about 15 dorsal pairs of short, stout setae. Antennal segment I large, segment II greatly produced at outer apical angle, style (segments VII and VIII) shorter than segment VI.

Thorax with many pairs of short, stout setae. Pronotum with one pair of small epimeral setae (in Kentucky specimens at least). Fore legs greatly enlarged.

Basal abdominal segments with several short, stout, accessory setae. Abdominal segments without strong sculptural designs, without scallops.

MALE.—Unknown.

So far *vestis* has not been discovered in Illinois. It does occur nearby in the Mammoth Cave region of Kentucky, inhabiting *Andropogon*.

This thrips is a smaller, slightly less spiny version of *texanus* Hood or *dorsalis* Hood.

Ctenothrips Franklin

Ctenothrips Franklin (1907:247).

Type-species by monotypy.—*Ctenothrips bridwelli* Franklin.

Head slightly longer than wide, conspicuously bulged half way between the eyes and the base. Ocelli large. Interocellar and postocular setae only moderately developed. Antennae eight segmented, segments III and IV with forked sense cones. Maxillary palps three segmented, labial palps two segmented.

Prothorax weakly striate to almost smooth. Major setae moderately developed with the posterior lateral pairs being the longest. Mesospinasternum not fused to metasternum. Metascutum hexagonally reticulate. All tarsi

two segmented. Fore wings with two veins each completely and regularly set with setae, fringe cilia wavy.

Abdominal tergites and sternites strongly hexagonally reticulate. Abdominal tergites without a pair of closely spaced median setae. Abdominal sternites without accessory setae. Posterior margin of abdominal tergite VIII with a complete comb of setae. Terminal setae of abdominal tergite X long and stout. Abdominal segment X stout, tubelike, completely split on dorsum. Females with well-developed ovipositors. Males with wide, subapical glandular areas, one on each of abdominal sternites III–VIII; without thornlike setae on abdominal tergite IX.

This genus is like *Taeniothrips* except for the tubelike abdominal segment X and the heavy hexagonal reticulations on the abdomen. In *Taeniothrips* abdominal segment X is not tubelike and the abdominal striations are weak. The bulged head of the type species of *Ctenothrips* is similar in appearance to the head of *Taeniothrips orionis*.

In past times four species were placed in this genus: *C. bridwelli* Franklin, *C. frosti* Moulton, *C. floridensis* (Watson), and *C. reticulatus* (D. L. Crawford). Lately the species *reticulatus* has been transferred to *Isochaetothrips* and *floridensis* is considered to be a synonym of *Echinothrips americanus*. Of the remaining two species, only *Ctenothrips bridwelli* occurs in Illinois.

Ctenothrips bridwelli Franklin

Ctenothrips bridwelli Franklin (1907:248). ♀. Type-locality.—Dover, New Hampshire.

FEMALE (macropterous) (Fig. 107).—Length distended about 2.2 mm. Color predominantly blackish brown except thorax, tarsi, and abdominal segment X somewhat lighter. Antennal segments I, II, and VI–VIII dark brown; segments III–V yellow except often segment V brown in apical half. Fore wings white at base, brown in the remaining portion. Posterior setae of abdominal segment IX pale yellow.

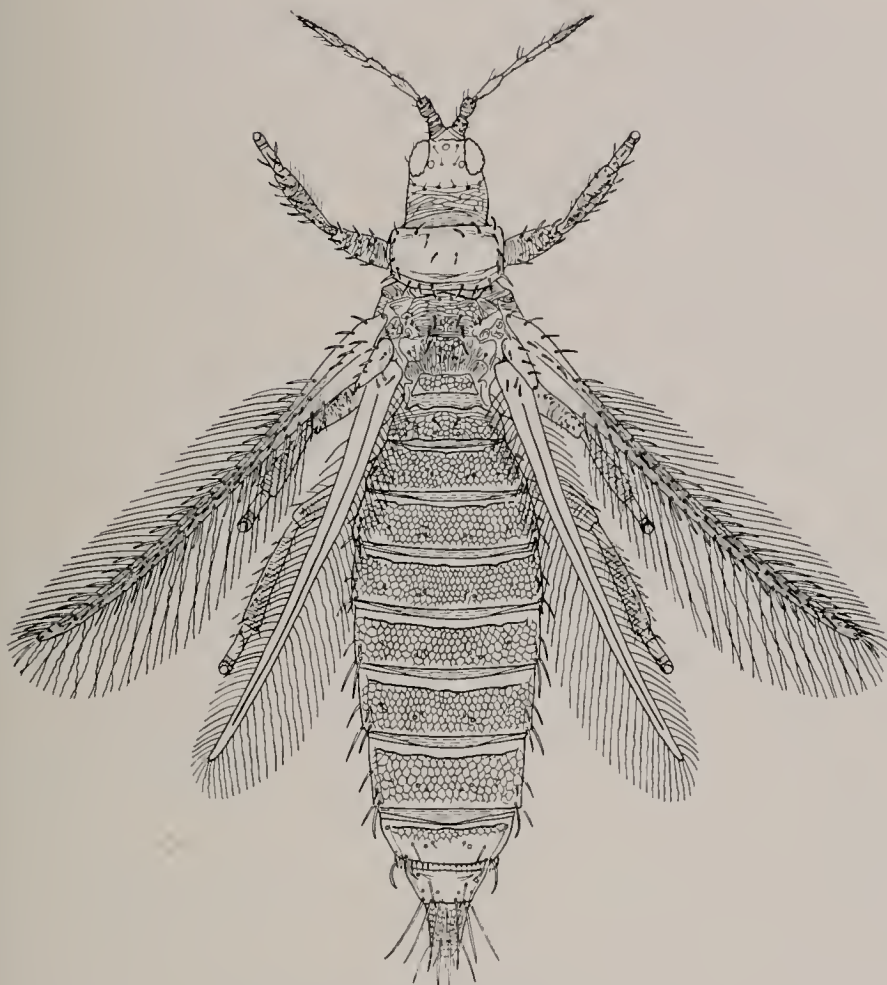


Fig. 107.—*Ctenothrips bridwelli*, dorsal aspect.

Head and prothorax as in Fig. 107. Posterior surface of dorsum of head transversely striate.

Abdomen with setae pointed.

MALE (macropterous).—Length distended about 1.7 mm. Similar to female in general structure and color. Glandular areas diminishing in size from the largest on abdominal sternite III to the smallest on abdominal sternite VIII.

This medium-sized, nearly black species is common throughout Illinois in rich woods. Although it occurs on many plants—such as skunk cabbage, American columbo (*Fraseria*), mayapple, *Smilax*, Solomon's seal, and others—one of its larval hosts appears to be

the green dragon (*Arisaema dracontium*).

In the northern part of Illinois individuals that have antennal segment V mostly brown are often found. Except for this color difference these specimens seem to be conspecific with more typical individuals. Moulton's species *frosti*, based on a single brachypterous female, has the intermediate antennal segments infused with brown similar to some of the material from northern Illinois. It may be that *frosti* is merely a color phase of *bridwelli*.

Illinois records.—Collected from late April to early October, from one to several localities in the following

counties: BOONE, CARROLL, CLARK, COLES, DE WITT, EDGAR, FAYETTE, GREENE, JO DAVIESS, KANE, LAKE, LA SALLE, LAWRENCE, MARION, MARSHALL, MASON, MCHENRY, MCLEAN, OGLE, PEORIA, PIATT, POPE, PULASKI, PUTNAM, RICHLAND, UNION, and VERMILION.

Dendrothrips Uzel

Dendrothrips Uzel (1895:159). Type-species by subsequent designation by Priesner (1925c).—*Dendrothrips ornatus* (Jablonowski) = *Dendrothrips tiliae* Uzel. Valid designation according to the International Code of Zoological Nomenclature, Article 69 (a) (iv) (1961).

Head much wider than long, with anterior margin inset between eyes. Eyes proportionately large. Ocelli widely spaced (Fig. 108). Antennae eight or nine segmented depending upon whether suture between segments VI and VII is incomplete or complete. Antennal segments III and IV seemingly with simple, not forked, sense cones. Maxillary and labial palps two segmented.

Prothorax striate, suggestive of *Scirtothrips* or *Sericothrips*, without major setae. Mesospinasternum fused to metasternum. Metascutum with reticulations tending to become longitudinal striations. Metathoracic furcae enormously enlarged. Tarsi one segmented, hind tarsi not exceptionally elongated. Fore wing slightly downturned at tip, fringe cilia straight.

Abdominal tergites predominantly granulated with hexagonal reticulations on the sides, with a pair of closely spaced setae on the anterior meson of each tergite except for tergites IX and X. Pleural plates present. Tergite VIII with a posterior comb of setae. Tergite X partially split at apex. Ovipositor well developed in female. Males apparently without abdominal sternal glands, and without thornlike setae on abdominal tergite IX.

This genus, composed of more than a dozen named species, is indigenous to the Eastern Hemisphere. It can be recognized by the characteristics of the straight fringe cilia of the fore wing,

the slightly curved appearance of the tip of the fore wing, and the absence of a midtransverse ridge on the prothorax.

Two subgenera, *Monochaetella* and *Dichaetella*, have been included in *Dendrothrips*. Although these categories have been raised to full generic rank by some authors, Priesner, who proposed them, elevated only *Dichaetella* to generic status (Priesner 1949). Another genus, *Dendrothripiella* Bagnall, also resembles *Dendrothrips* and conceivably could be regarded as an additional subgenus. Faure (1960) considered *Dendrothripiella* to be an outright synonym of *Dendrothrips*. Because none of these are present in North America, there is no need to consider them herein.

One species, *Dendrothrips ornatus*, has been introduced in Illinois where on occasions it causes severe damage to privet hedges and lilac bushes.

Dendrothrips ornatus (Jablonowski) Privet Thrips

Thrips ornata Jablonowski (1894:94). ♀, ♂. Type-locality.—Hungary. Placed in *Dendrothrips* by Bagnall (1914).

Dendrothrips tiliae Uzel (1895:160). ♀, ♂. Type-locality.—Czechoslovakia. Synonymized by Bagnall (1914).

FEMALE (macropterous).—Length distended about 1.2 mm. Bicolored brown and yellow. Brown: head except sometimes lighter in the middle; antennal segments I, II, and VI–IX; spots on prothorax; most of pterothorax; legs except tarsi and tips of hind tibiae; most of the base, two separated bands, and tips of fore wings; and most of the abdomen except the median parts of abdominal tergites II–VIII and lighter lateral spots on these same tergites. Rest of body yellow to nearly colorless. Red to orange subintegumental pigment distributed throughout the body and underlying the ocelli.

Head as in Fig. 108. Interocellar setae minute, postocular setae seemingly absent.

Prothoracic setae minute. Fore wings with each fore vein regularly set

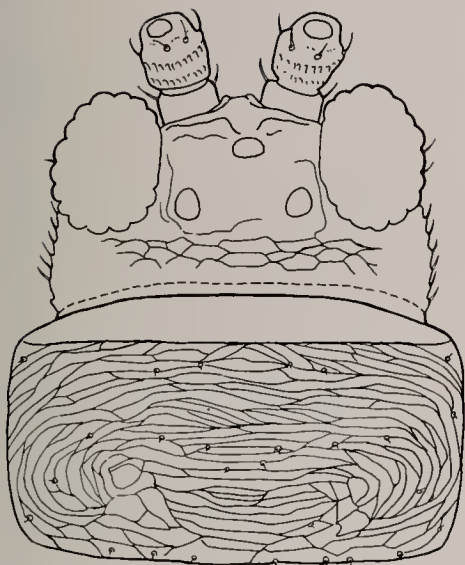


Fig. 108.—*Dendrothrips ornatus*, head and prothorax.

with closely spaced setae, hind veins with only a few setae.

Abdominal tergite VIII with posterior comb composed of minute setae at the sides and with larger setae at the middle.

MALE (macropterous).—Length distended about 0.7 mm. Similar to female in color and structure except generally lighter.

It is unfortunate that this pretty thrips is an economic pest; otherwise, *ornatus* could be looked upon favorably as a handsome addition to our fauna.

The privet thrips, as its common name implies, lives on privet and often on lilac and can cause damage to both hosts. It is common in the northern half of Illinois. So far it has not spread into the South or into the West. Introduced from Europe, it was first recorded in the United States from New Jersey in 1931 by the late Mr. Moulton. In 1936 it was reported from Ames, Iowa, by Moulton and Andre.

Dr. W. S. Brooks, who collected many of these thrips in Illinois in 1962, found that the adults occurred mostly on the upper side of the leaves.

Illinois records.—Collected from June to mid-October, from one to sev-

eral localities in the following counties: ADAMS, CARROLL, CHAMPAIGN, CHRISTIAN, CLARK, COOK, CRAWFORD, EDGAR, FAYETTE, FULTON, HENRY, JASPER, JO DAVIESS, KANKAKEE, LA SALLE, LAWRENCE, MCHEHENRY, MCLEAN, MARSHALL, MASON, MOULTRIE, OGLE, PEORIA, PIATT, PIKE, RANDOLPH, RICHLAND, SHELBY, STEPHENSON, TAZEWELL, WINNEBAGO, and WOODWARD.

Dorcadothrips Priesner

Dorcadothrips Priesner (1932:49).

Type-species by original designation.—*Dorcadothrips caespitis* Priesner.

Head wider than long, eyes strongly protruding, cheeks constricted behind eyes. Antennae eight segmented, segments VI–VIII elongate, segments III and IV with forked sense cones varying from U-shaped to Y-shaped. Mouth cone broadly rounded. Maxillary palps three segmented in the American species, described as being two segmented in the Egyptian type-species.

Prothorax with only the two pairs of epimeral setae well developed. Metafurcae not enlarged. Fore legs not enlarged. Macropterous, brachypterous, or apterous. All tarsi two segmented. Fore wings, when developed, narrow, with two veins; setae on fore veins broadly interrupted, setae on hind veins uniformly spaced; fringe cilia wavy.

Abdominal tergites without microsetae. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal sternites with accessory setae in addition to the posterior ones. Abdominal tergite VIII lacking posterior comb of setae. Abdominal tergite IX lacking pore areas. Female with abdominal tergite X entire, not split dorsally. Male with abdominal sternites III–VII each with a transverse, elliptical glandular area, abdominal tergite IX with a pair of sinuate dorsal processes (see Priesner 1932, page 50, Fig. 2).

Except for the lack of pores on abdominal tergite IX and for the slender, curved, linear processes arising from

the posterior border of tergite IX in the male, *Dorcadothrips* closely resembles *Taeniothrips*.

So far only one species, *walteri*, is known from North America. It has been taken in southern Illinois, Michigan, and New York.

***Dorcadothrips walteri* Crawford, J. C.,**
new generic assignment

Taeniothrips walteri Crawford, J. C.
(June, 1941b:142). ♀. Type-locality.—Kalamazoo, Michigan.

Dorcadothrips nevini Hood (July, 1941:145). ♀, ♂. Type-locality.—Ringwood, Tompkins County, New York. New synonymy.

FEMALE (macropterous).—Length distended about 1.5 mm. Color predominantly yellow with some gray-brown. Gray-brown: antennal segment II; apical half of antennal segments III, IV, most of V, and all of VI–VIII; dorso-lateral anterior portions of abdominal segments II–VI. Fore wings with a narrow subbasal brown crossband. Ocellar pigment orange-red.

Head slightly elongate, just barely bulged behind eyes. Interocellar setae long. Antennal segments elongate, segment VI exceptionally long and slender.

Prothorax with a few dorsal setae, with two pairs of posterior setae between the major epimeral setae. Fore tarsi without claws. Fore wings with one distal seta on fore vein.

Abdominal sternites III–VII with accessory setae in addition to the posterior ones. Abdominal tergite VIII without complete posterior comb of setae.

MALE (apterous).—Length 1 mm. Color and structure as in female. Abdominal sternites III–VII each with transverse, elliptical median glandular area, and tergite IX with a pair of curved posterior processes.

Dorcadothrips walteri is a grass inhabitant. It is rare in collections.

Illinois record.—JACKSON COUNTY: Gorham (Fountain Bluff), August 16, 1950, Stannard, *Andropogon* on hill prairie, 1 ♀.

Drepanothrips Uzel

Drepanothrips Uzel (1895:213). Type-species by monotypy.—*Drepanothrips reuteri* Uzel.

Head wider than long. Antennae six segmented, segments III and IV each with a forked sense cone, segment VI the longest. Head setae much as in *Sericothrips*. Maxillary palps three segmented.

Prothorax transversely striate, with several bare areas typical of those species belonging to the *Sericothripini*: with no setae strongly developed except several setae on the posterior margin slightly longer than the others. Mesospinasternum separated from metasternum by a suture. All tarsi two segmented. Fore wings with setae on both veins interrupted, fringe cilia wavy.

Abdominal tergites with median setae not as close together as in *Sericothrips*. Abdominal sternites without accessory setae. Sides of abdomen with numerous microsetae. Abdominal tergite VIII with a complete comb of setae along posterior margin. Female with well-developed ovipositor. Males with a pair of greatly enlarged setae arising from abdominal segment X.

This genus is easily distinguished from those others that possess many microsetae on the abdomen by the characteristic of the six-segmented antennae.

Drepanothrips is a monobasic genus containing only the type-species which is reported herein for the first time as an established species in Illinois.

Drepanothrips reuteri Uzel Grape Thrips

Drepanothrips reuteri Uzel (1895:213). ♀, ♂. Type-locality.—Czechoslovakia.

Thrips betulicola Reuter, O. M. (1899:59). ? ♀. Type-locality.—Pargas (Parainen), Turku-Pori, Finland. Synonymized by Priesner (1930).

Drepanothrips viticola Mokrzecki (1901:?). ♀. Type-locality.—? Ukraina (U.S.S.R.). Synonymized by Fulmek and Karny (1915).

FEMALE (macropterous).—Length distended about 0.9 mm. General color light yellow. Antennal segment I nearly colorless, segments II–VI each becoming progressively more brown than the preceding segments. Thorax with brown spots. Abdominal segments II–VII each with a brown basal band connected to brown patches at sides. Ocelli red. Fore wings uniformly grayish brown.

Head with mouth cone moderately long and somewhat pointed.

Mesosternum and metasternum with a median longitudinal ridge.

Abdominal sternites II–VII with major setae on the posterior margin of each segment.

MALE (macropterous).—Length distended about nearly 0.8 mm. Color and structure much as in female except lighter and without brown spots on the thorax and abdomen. Terminal, enlarged, sickle-shaped setae black except yellow at extreme base.

Abdominal sternites seemingly without glandular areas. Abdominal tergite IX without thornlike setae.

This European species, known to have been introduced to North America as early as 1926 (Moulton 1926*a*), has now been found in Illinois, in Urbana. It is reported in the literature to be a pest of grapes.

Bailey (1942) gave an account of the biology of this thrips and listed the important literature concerning it.

Illinois record.—CHAMPAIGN COUNTY: Urbana, July 25, 1947, Ross, from sparrow nest built in grape arbor, 2 ♀.

Echinothrips Moulton

Echinothrips Moulton (1911:37). Type-species by monotypy.—*Echinothrips mexicanus* Moulton.

Head about as long as wide, reticulate to transversely striate, in profile slightly constricted at side. Eyes large. Ocelli present on slightly raised area between eyes. Antennae eight segmented, antennal segment III constricted subbasally (Fig. 67), segment VI and style elongated and nonpedicellate. Sense cones on antennal segments III and IV single, not forked.

Maxillary palps seemingly two segmented, labial palps two segmented.

Prothorax reticulate, with or without wrinkle-like sculpture within the reticules; posterior angles each with two well-developed setae. Mesospinasternum fused to metasternum. Metascutum hexagonally reticulate. Fore femora each with an enlarged clublike seta at base on dorsum. Tarsi two segmented. Always macropterous. Fore wings with two rows of heavy, stout spines; many fringe cilia wavy.

Abdominal tergites with or without microsetae on sides, with a median pair of closely spaced setae on most tergites. Pleural plates fused to dorsum. Comb on abdominal tergite XIII complete. Abdominal tergite X not split. Abdominal sternites without accessory setae. Ovipositor well developed in female. Males with abdominal sternal glands, without thornlike setae on abdominal tergite IX.

This genus can be recognized in Illinois by the combination of the clublike setae at the base of the fore femora, the heavy fore wing setae, and the hexagonally reticulate pronotum which bears two pairs of well-developed posteroangular setae.

Of the two described species that occur in the United States only one, *Echinothrips americanus*, is native to Illinois. It is likely that the other species, *subflavus*, may be introduced, from time to time, into our state on imported hemlock trees. Additional species inhabit Central and South America and the West Indies.

KEY TO SPECIES
(OF NORTH AMERICA)

- 1. Abdominal tergites without microsetae; from Mexico and Honduras. *mexicanus*
Abdominal tergites with microsetae at the sides of segments II–VII. 2
- 2. Pronotal reticules with wrinkle-like sculpture. 3
Pronotal reticules without conspicuous wrinkle-like sculpture. 4
- 3. Fore wings dark brown just beyond scale, lighter in the middle; eastern North America on forest herbs. . . *americanus*
Fore wings, beyond scale, uniformly dark brown; southern Florida. . . *floridensis*
- 4. Body generally dark brown; major setae of wings dilated at tip; from the West Indies to Panama and Trinidad. *caribeanus*

Body generally yellow; major setae of wings pointed to nearly blunt; from eastern North America on hemlock. . . .
subflavus

Echinothrips americanus Morgan

Echinothrips americanus Morgan (1913:14). ♀, ♂. Type-locality.—Quincy, Florida.

FEMALE (macropterous).—Length distended about 1.6 mm. General body color dark brown with much red subintegumental pigment. Antennal segments I and II dark brown concolorous with head; segments III, IV and basal half of V light yellowish gray; remainder of antennae light brown. Base of femora, apex of tibia, and all of tarsi yellow. Fore wings pale gray at base, middle, and tip, and light brown in between these paler bands.

Head with wrinkles inside reticulations. Interocellar setae and postocular setae moderate in size. Antennae as in Fig. 67.

Prothorax with wrinkles inside reticulations. Major prothoracic setae blunt at tips. Wings with major bristles blunt to dilated at tips.

Abdominal tergites II–VII with microsetae on sides.

MALE (macropterous).—Length distended nearly 1.3 mm. Color and general structure as in female. Abdominal sternites III–VIII each with many closely scattered, small, oval or circular glandular areas (Fig. 47). Abdominal terminalia as in Fig. 44.

This common species has a range which extends from southern Quebec (INHS) to Florida, westward to at least central Iowa. It occurs mostly outside the Wisconsin drift area in Illinois (Fig. 23) on many forest plants and in particular on jewelweed, (*Impatiens*).

The other known species from eastern United States, *Echinothrips subflavus*, is host specific to hemlock, a tree that does not occur naturally in Illinois. Although hemlock is planted as an ornamental, its thrips does not seem to have become established here as yet. Among other characteristics, *subflavus* differs from *americanus* in being predominantly yellow and in

having the wing bristles pointed instead of blunt or dilated at the tips.

The species *floridensis*, described by Watson (1919), was synonymized by Hood (1927b) with *americanus*. In my opinion *floridensis* is a separate species distinguished by having dark-colored wings. I have studied the type from Miami and a specimen I collected from the Everglades.

Illinois records (Fig. 23).—Collected from June to October, from one to several localities in the following counties: ADAMS, ALEXANDER, CLARK, COLES, CRAWFORD, EFFINGHAM, FULTON, HAMILTON, HARDIN, HENDERSON, HENRY, JACKSON, JERSEY, JOHNSON, LAWRENCE, MACON, MACOUPIN, MONROE, OGLE, PIATT, PIKE, POPE, PUTNAM, SCHUYLER, SHELBY, SCOTT, and WABASH.

Echinothrips subflavus Hood

Echinothrips subflavus Hood (1927c: 213). ♀. Type-locality.—Little Valley, New York.

FEMALE (macropterous).—Length distended about 1.6 mm. General color yellow. Antennal segments I and II, base of III, apexes of IV and V, apical two-thirds of VI, and all of VII and VIII brown, with segment II the darkest. Northern specimens (Canada and New York) often with light brown shading at base of head, within prothorax, and on abdominal sternites II–VI; southern specimens (Kentucky and Tennessee) yellow except for brown on the antennae. Wings light yellow. All setae yellow. Ocellar pigment red.

Head (Fig. 109) with transverse reticulations which are without wrinkles. Interocellar and postocular setae moderate in size.

Prothorax reticulate with only very faint, degenerate traces of wrinkle-like sculpture inside the reticules. Major setae pointed to blunt at tip. Fore wing with major setae pointed to blunt at tip.

Abdominal tergites II–VII with microsetae on sides.

MALE (macropterous).—Length distended about 1.3 mm. Similar to fe-



Fig. 109. *Echinothrips subflavus*, head and prothorax. From Hood (1927c).

male in color and structure. Abdominal sternites III–VIII each with many closely scattered, small, oval or round glandular areas.

This species is the only one in the genus which is yellow rather than dark brown in color. It occurs on hemlock needles from Quebec to the Great Smoky Mountains in Tennessee. As yet it has not been found in the Midwest. Repeated attempts have been made to collect specimens from relict stands of hemlock in Indiana with no success.

Although hemlock is not native to Illinois, it is a tree which is often brought in and planted in our state as an ornamental. Possibly *subflavus* might come into Illinois in the future on nursery stock. Within its natural range, this species has not been reported to be of economic importance.

Frankliniella Karny

Frankliniella Karny (1910:46, footnote). Type-species by subsequent designation by Hood (1914a).

Thrips intonsa Trybom = *Physopus vulgarissima sensu* Uzel nec Haliday. (See explanation in discussion following.)

Head wider than long to slightly

longer than wide. Ocelli generally placed farther apart than in the species of *Thrips*, sometimes reduced or absent in brachypterous forms. Interocellar and postocular setae often well developed. Antennae eight segmented, antennal segments III and IV each with a forked sense cone. Mouth cone moderate in size, pointed to rounded at tip. Maxillary palps three segmented.

Prothorax in the Illinois species with major, well-developed setae on both the anterior and posterior angles. Mesospinasternum separated by a suture from the metasternum. Macrop-terous or brachypterous. Fore wings, when fully developed, with two veins both of which are regularly and uniformly set with setae; fringe cilia wavy. Tarsi two segmented.

Abdominal sternites without accessory setae. Median pair of sternal setae placed on the posterior margin of the sternites. Median pair of tergal setae placed far apart on the intermediate tergites. Abdominal tergite VIII with or without a complete comb of setae on posterior margin. Female with well-developed ovipositor, abdominal tergite X split. Males with a glandular area on each of sternites III–VII, abdominal tergite IX with shortened setae which may or may not be thornlike. Males often yellow.

The designation of the type-species of *Frankliniella* was validly made by Hood (1914a) according to the International Code of Zoological Nomenclature (1961). Because this designation is so involved an explanation seems worthwhile.

Originally Karny proposed *Frankliniella* without reference to any species that should be included in it. A year later Bagnall (1911b) listed seven species in *Frankliniella* and, according to the International Code of Zoological Nomenclature, Article 69 (a) (ii) (1961), these are the only species from which a type-species may be selected. One of the listed species was *vulgarissima* Haliday, which in Bagnall's time was the name for a species used in the sense of Uzel and not Haliday as pointed out by Karny (1912b). Later, in 1914, Hood designated the type-

species of *Frankliniella* as "*Thrips intonsa* Trybom = *Physopus vulgatissima*, Uzel, nec Haliday." Such designation is in accordance with Article 69 (a) (iv) of the Code (1961), which provides for the selection of a type-species when synonymizing that species with one of the first included species, and in accordance with Article 70 (b) of the Code, which provides that in the case of a name based on the wrong usage of a previous author, the type-species is to be interpreted as the one actually before the designator.

Frankliniella as a category grades into *Taeniothrips* as *Taeniothrips* grades into *Thrips*. No unique characteristics can be found to differentiate each of these genera when all of the described species are considered. Locally, in Illinois, the three genera can be readily distinguished because the intermediate species are not present here.

In Illinois all species that belong to *Frankliniella* have eight segments in each antenna, the anterolateral pair of major prothoracic setae are long, the midlateral prothoracic setae are short and the fore wings when present always have the two longitudinal veins evenly set with setae.

Seven species occur in our state. Of these, *tritici* causes considerable trouble to commercial rose growers by blasting parts of rose buds, and *tenuicornis* and *fusca* probably cause minor damage to field crops.

KEY TO SPECIES

1. Macropterous 2
Brachypterous 14
2. Pedicel of antennal segment III with a distinctly thickened middle ring which in profile appears as angulations *tritici*
Pedicel of antennal segment III straight or nearly straight along sides 3
3. Head distinctly prolonged in front of eyes 4
Head flattened in front, not prolonged forward of eyes 5
4. Abdominal tergites almost entirely dark brown or at least clouded with brownish gray patches *tenuicornis*
Abdominal tergites yellow *unicolor*
5. Females 6
Males 10
6. Abdomen yellow 7
Abdomen predominantly brown 8
7. Anteromarginal prothoracic setae shorter

- than or nearly equal to dorsal length of eye *runneri*
Anteromarginal prothoracic setae much longer than dorsal length of eye; not yet found in Illinois *williamsi*
8. Postocular setae stout, as stout as the interocellar pair *stylosa*
Postocular setae more slender than the interocellar pair 9
 9. Antennal segments III and IV predominantly brown (in part) *fusca*
Antennal segments III and IV largely yellow; not yet found in Illinois *hemerocallis*
 10. Setal comb on posterior margin of abdominal tergite VIII complete 11
Setal comb on posterior margin of abdominal tergite VIII interrupted 12
 11. Anteromarginal prothoracic setae shorter than or nearly equal to dorsal length of eye *runneri*
Anteromarginal prothoracic setae much longer than dorsal length of eye; not yet found in Illinois *williamsi*
 12. Predominantly brown; not yet found in Illinois *hemerocallis*
Predominantly yellow 13
 13. Postocular setae stout, as stout as the interocellar pair *stylosa*
Postocular setae much more slender than the interocellar pair (in part) *fusca*
 14. Postocular setae small and much more slender than the interocellar pair (in part) *fusca*
Postocular setae larger, as stout as the interocellar setae *andrei*

Frankliniella andrei Moulton

Frankliniella andrei Moulton (1936a: 63). ♀. Type-locality.—not definitely stated but either Waterville, Ottumwa, or McGregor, Iowa.

FEMALE (brachypterous).—No specimens available to me. According to Moulton (1936), generally dark brown except tips of tibiae and all tarsi which are yellowish brown. Postocular setae much longer than in *fusca*. Abdominal tergite VIII with an irregular comb of setae along posterior margin.

MALE (brachypterous).—Length distended about 1 mm. Generally dark brown in color except abdominal segments IX and X which are abruptly yellowish brown. Tips of tibiae and all of tarsi light brown to yellowish brown. Ocellar pigments red. Thorax with orange subintegumental pigment.

Head moderate in size, not prolonged forward in front of eyes. Postocular setae moderately long, as stout as interocellar setae. Ocelli fully de-

veloped. Antennal segment III with sides of pedicel straight.

Prothorax with major setae moderately long.

Abdominal tergites II–VIII with median pair of setae as well developed as lateral setae. Glandular areas elliptical, moderate in size, proportionately smaller than in *fusca* or *hemerocallis*, one each on sternites III–VII. Abdominal tergite VIII with an irregular but nearly complete comb of setae on posterior margin. Abdominal tergite IX with median setae shortened but not thornlike; lateral setae long.

This rare species is like *fusca* in the dark coloration of antennae and body. It differs from *fusca* most conspicuously by the larger postocular setae and by the darker coloration of the male.

So far *andrei* has only been taken from moss, which may be its principal host.

Illinois record.—LA SALLE COUNTY: Starved Rock State Park, July 18, 1953, Rhode, from moss, 1 ♂.

***Frankliniella fusca* (Hinds)**
Tobacco Thrips

Euthrips fuscus Hinds (1902:154). ♀.

Type-locality.—Massachusetts. Morgan (1913:11). ♂. Transferred to *Frankliniella* by Karny (1912b).

Euthrips nicotianae Hinds (1905:198).

♀. Type-locality.—Quincy, Florida.

Synonymized by Hood (1914a).

Scirtothrips owreyi Watson (1924b:51).

♀. Type-locality.—Jacksonville, Florida. Synonymized by Hood (1927b).

FEMALE (macropterous).—Length distended about 1.3 mm. Color generally dark brown (overwintering specimens) to lighter brown especially in the thorax and head (some summer specimens). Antennae concolorous with body, although basal segments sometimes slightly lighter. Legs, especially apical half of tibiae and all tarsi, lighter than body, fading to yellowish brown or yellow. Fore wings light grayish brown. Ocellar pigment red. Thorax and abdomen with orange subintegumental pigment.

Head moderate in size, not prolonged forward in front of eyes. Inter-

ocular setae moderately long, postocular setae small and more slender than the interocular setae. Antennal segment III with sides of pedicel straight.

Prothorax with major setae moderately long, inner anterior pair of major setae smaller than or nearly equal to dorsal length of eye. Metascutum with the median striations transverse.

Abdominal tergite VIII with comb of setae along posterior margin interrupted.

FEMALE (brachypterous).—Size about same as macropterous form but occasionally slightly smaller. Color as in fully winged female except thorax sometimes yellow to light yellowish brown.

Ocelli reduced in size. Wings reduced to pads.

Abdominal tergites with the median setae usually small as in the macropterous form but occasionally with these setae as strongly developed as the lateral setae. In the specimens which have these median setae developed, the ocelli are usually absent.

MALE (macropterous).—Length distended about 1.2 mm. Color generally yellow, clouded with light brown patches on thorax and abdominal segments I and II. Antennae often with areas of yellowish brown in basal segments.

Similar to macropterous female in structure. Abdominal glandular areas elongately transverse ellipses, one each on sternites III–VII. Abdominal tergite IX with median setae reduced but not thornlike, lateral setae long.

MALE (brachypterous).—Length distended about 1 mm. Structure and usually color similar to structure and color of macropterous male, except wings reduced to pads and ocelli reduced. Rarely darker in color, with head, antennae, thorax, legs, and abdominal segments I–IV brown (only one such dark male known to me).

This species is variable in structure in that it has a macropterous and a brachypterous form in both sexes with corresponding changes in the size of the ocelli and sometimes in the size of the median setae of the abdominal tergites, and it is variable in color in that it has a darker overwintering color as

contrasted to the lighter summer color. It differs from the closely related *hemerocallis* in that antennal segments III and IV are not abruptly yellow, and from *andrei* by the smaller size of the postocular setae and the complete absence of comb setae on the median part of the posterior margin of abdominal tergite VIII.

Frankliniella fusca is one of our most common thrips, occurring over the entire state in great numbers (Fig. 110). Usually it inhabits grasslands where it feeds on herbs. We have found this species feeding on the inside of sheaths of *Tradescantia* and sheaths of gladioli. In addition it has been taken from flowers and even from tree leaves. The brachypterous forms, at least, can leap for a distance of an inch or more.

According to Hinds (1905), Morgan (1913), and others, *fusca* damages to-

bacco, and Poos (1941) and Dogger (1956) reported that it causes damage to peanuts. In Illinois this species has not yet been reported to be a significant pest.

Illinois records (Fig. 110).—Collected every season of the year, from one to several localities in the following counties: ALEXANDER, BOND, CARROLL, CHAMPAIGN, CLINTON, COOK, DEWITT, EFFINGHAM, FAYETTE, FORD, FRANKLIN, FULTON, GALLATIN, GREENE, HANCOCK, HARDIN, HENDERSON, IROQUOIS, JACKSON, JOHNSON, KANE, KANKAKEE, LA SALLE, LEE, LOGAN, MACOUPIN, MARION, MASON, MASSAC, MCLEAN, MERCER, OGLE, PEORIA, PIATT, PIKE, POPE, RANDOLPH, SANGAMON, SCOTT, UNION, VERMILION, WHITESIDE, WILL, WINNEBAGO, and WOODFORD.

Frankliniella runneri (Morgan)

Euthrips runneri Morgan (1913:7). ♀.

Type-locality.—Clarksville, Tennessee. Transferred to *Frankliniella* by Hood (1914a).

Frankliniella gilmorei Morgan (1925b: 140). ♀. Type-locality.—Clarksville, Tennessee. New synonymy.

FEMALE (macropterous).—Length distended about 1.3 mm. General color yellow. Antennal segment I light yellow, segment II brown, segment III largely yellow but with tip of apex light brown, segments IV and V yellow in basal half and brown in apical half, segment VI mostly brown but base often yellowish brown, segments VII and VIII brown. Major body and wing setae brown. Ocellar pigment orange to red.

Head moderate in size, not prolonged forward of eye margin, with postocular setae much smaller than interocellar setae. Antennal segment III with sides of pedicel nearly straight.

Prothorax with major anterior setae smaller than major posterior pairs; inner pair of the major anterior setae shorter than or nearly equal to the dorsal length of the eye.

Abdominal tergite VIII with a complete comb of fairly long, light-colored setae along the posterior margin.

MALE (macropterous).—Length

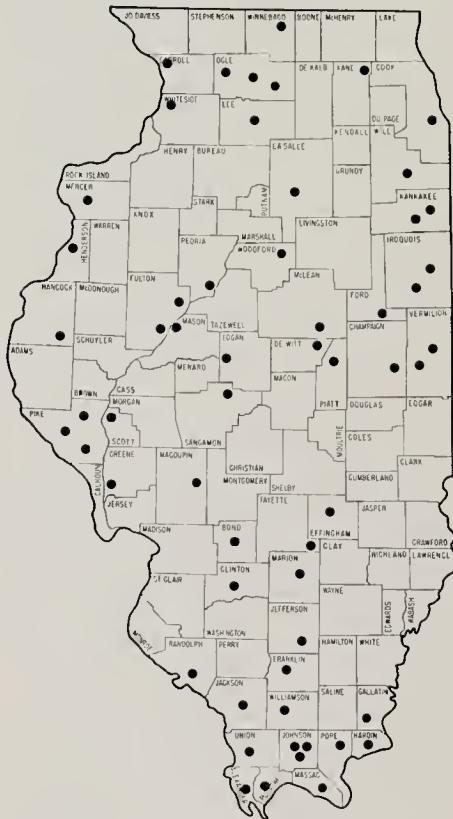


Fig. 110.—Distribution of *Frankliniella fusca* in Illinois.

distended about 0.9 mm. Similar to female except smaller and somewhat lighter in color. Abdominal glandular areas moderate in size, elliptical, one each on sternites III–VII. Abdominal tergite VIII with a complete comb of setae along posterior margin, as in female. Abdominal tergite IX with median pair of setae shortened and slightly thornlike but smaller in size than as in *williamsi*, lateral setae fairly long.

For the moment, at least, those Illinois specimens assigned here have been named *runneri*. It is possible that *gilmorei* is distinct, being host specific to *Monarda*, but until morphological or other characteristics can be found to separate *gilmorei* from *runneri*, I prefer to regard them as the same entity. According to Moulton (1948), *F. gilmorei* and *F. exigua* are names for the same species. If so, *exigua* could also be a synonym of *runneri*.

Close relatives of *runneri* occur in the South. The species *gossypiana* Hood is reported to be similar in appearance, and *williamsi* resembles *runneri* in many features. The southwestern species, *gossypiana*, is unknown to me. *Frankliniella williamsi*, a common pest of corn in Central America and other tropical regions, differs from *runneri* conspicuously by the longer third antennal segment, by its slightly larger size, and by the longer body setae.

Our specimens of *runneri* vary from light to dark yellow in color. They can be distinguished from the other Illinois species of the genus of the same color by the long, uninterrupted, comb of setae on the posterior margin of abdominal tergite VIII as exhibited by both sexes, by the absence of abrupt thickenings on the pedicel of antennal segment III, and by the flattened rather than protruding fore margin of the head.

This thrips has been found throughout the state on native as well as on cultivated plants. It is one of the thrips which attack and damage cotton (Anonymous 1962). It extends northward at least as far as southern Michigan (INHS records).

Illinois records.—Collected from June to early November, from one to

several localities in the following counties: CHAMPAIGN, JACKSON, JASPER, KANE, LOGAN, MASON, MCLEAN, OGLE, PIATT, PIKE, and RICHLAND.

Frankliniella stylosa Hood

Frankliniella stylosa Hood (1912c:134).

♀. Type-locality.—Plummer's Island, Maryland. Moulton (1948:98). ♂.

Euthrips floridensis Morgan (1913:5).

♀. Type-locality.—Quincy, Florida.

Synonymized by Hood (1917).

FEMALE (macropterous).—Length distended about 1.6 mm. Bicolored dark brown and light brown to yellow. Head, thorax and legs light brown to yellow, with the head and legs lightest; abdomen dark brown. Antennal segment I light brown, segment II dark brown, segments III–V brown at apex and yellow at base, segments VI–VIII brown. Fore wings grayish brown. Ocellar pigment orange to red. Body setae dark brown.

Head moderate in size, not prolonged forward of eye margin, with postocular and interocellar setae equally stout. Antennae as in Fig. 69, segment III with sides of pedicel nearly straight.

Prothorax with major setae long, all except the midposterior pair nearly equal in length and much longer than the dorsal length of the eye. Metascutum longitudinally striate.

Abdominal tergite VIII with a complete comb of setae on posterior margin, these setae small and fairly widely spaced.

MALE (macropterous).—Length distended about 1.2 mm. Color yellow. Antennae colored much as in female except lighter. Body setae brown. Abdominal glandular areas moderate in size, elliptical, one each on sternites III–VII. Abdominal tergite VIII with comb of setae interrupted. Abdominal tergite IX with median pair of setae shortened but not thornlike, lateral setae longer.

This species is easily distinguished by the characteristics given in the key. During spring and summer it is found in many woodland flowers throughout our state.

Illinois records.—Collected from April through September, from one to several localities in the following counties: CALHOUN, FULTON, GREENE, JEFFERSON, JO DAVIESS, LA SALLE, LEE, MONROE, POPE, UNION, and WINNEBAGO.

***Frankliniella tenuicornis* (Uzel)**

Physopus tenuicornis Uzel (1895:99). ♀, ♂. Type-locality.—Czechoslovakia. Transferred to *Frankliniella* by Bagnall (1911b).

Physopus nervosa Uzel (1895:102). ♀. Type-locality.—Czechoslovakia. Synonymized by Priesner (1926b).

Thrips (Euthrips) maidis Beach (1896:219). ♀. Type-locality.—Ames, Iowa. Synonymized under *nerosus* by Hinds (1902).

FEMALE (macropterous).—Length distended about 1.6 mm. Color generally dark brown. Antennal segments III and IV, tips of femora, all tibiae, and all tarsi yellow to yellowish brown. Wings light yellow. Ocellar pigment red. Pterothorax with orange subintegumental pigment.

Head not as long proportionately as in *unicolor*, prolonged forward in front of eyes. Interocellar setae long, postocular setae short. Antennal segment III with sides of pedicel straight.

Prothorax with most of the major setae long; inner pair of the major anterior setae shorter than or nearly equal to the dorsal length of the eye. Metascutum longitudinally striate.

Abdominal tergite VIII with comb of setae along posterior margin reduced to scallops or basal scales.

MALE.—Not as yet found in Illinois, no specimen available to me. According to Priesner (1926b) the male is smaller than the female and is generally yellow with the abdominal tergites clouded by brownish gray color.

This is the only species of *Frankliniella* in Illinois which has a prolonged head and is brown or with brownish abdominal coloration.

Seemingly *tenuicornis* is the Old World equivalent of *unicolor*. Evidently it was introduced into the Midwest many years ago, at least prior to 1896 when Miss Beach described it under

the name *maidis*. In Illinois it probably reproduces parthenogenetically.

Frankliniella tenuicornis is statewide in distribution and is often found under the sheaths of corn in great numbers. In Europe I have collected it under the sheaths of cattails. The extent of its damage to corn or other grasses has not been determined in Illinois.

Illinois records.—Collected every month of the year, from one to several localities in the following counties: ADAMS, BOND, CALHOUN, CHAMPAIGN, CLINTON, CRAWFORD, COOK, CUMBERLAND, DE WITT, DOUGLAS, EDGAR, FULTON, HANCOCK, IROQUOIS, JOHNSON, KANE, KANKAKEE, KNOX, LAKE, LOGAN, MACON, MARION, MASON, MCLEAN, MORGAN, OGLE, PIATT, PIKE, ROCK ISLAND, SALINE, SCOTT, STARK, TAZEWELL, VERMILION, WABASH, and WILL.

***Frankliniella tritici* (Fitch)**

Eastern Flower Thrips

Thrips tritici Fitch (1855a:385). ? ♀. Type-locality.—Geneva, Wisconsin. Osborn (1883:156). ♂. Transferred to *Frankliniella* by Karny (1912b).

Frankliniella varicorne Bagnall (1919:368). ♀, ♂. Type-locality.—Semans, Saskatchewan. Synonymized as a form of *tritici* by Blickenstaff (1946).

Frankliniella tritici f. *maculata* Priesner (1925b:17). ♀. Type-locality.—Canada. A varietal name for the intermediate color phase?

Frankliniella fulvus Moulton (1936a:61). ♀, ♂. Type-locality.—Fargo, North Dakota. Synonymized under *Frankliniella tritici* f. *varicorne* (misspelled *varicornis*) by Moulton (1948).

FEMALE (macropterous) (Fig. 38).—Length distended about 1.5 mm. Color generally yellow to dark brown. Head pale brown to dark brown. Thorax light yellow but with much orange subintegumental pigment. Abdomen either pale yellow with brown patches on the meson or entirely dark brown. Antennal segment I pale yellow, segment II dark brown, segment III brownish yellow except pale at base,

segment IV brown except pale at base, segment V yellow except brown at apex, segments VI–VIII dark brown. Ocellar pigment red.

Head flat anteriorly, not protruding in front of eyes. Pedicel of antennal segment III with sharp angulations in profile.

Posterior setal comb on abdominal tergite VIII incomplete.

MALE (macropterous).—Length distended about 1.2 mm. General color pale yellow, antennae colored as in female but sometimes lighter. Similar to female in general structure. Abdominal sternites III–VII each with a transverse elliptical glandular area, these areas pale and often difficult to see. Abdominal tergite IX with median setae shortened but not thornlike, lateral setae moderately long.

Frankliniella tritici is the common eastern flower thrips. Its biological equivalent is the western flower thrips, *F. occidentalis*, which is naturally found west of the Rocky Mountains, rarely by accidental importation in greenhouses in eastern states. Both cause considerable and similar damage to many kinds of flowers and newly formed small fruits. The species *tritici* may be distinguished from others in Illinois by the angular thickenings on the pedicel of antennal segment III.

In the Midwest *tritici* has two color phases, dark and light, with all degrees of coloration in between. The light phase is statewide in distribution in Illinois whereas dark specimens occur mostly in the northern counties. The darker phase, formerly called *varicorne*, does not appear in populations to the south or east of Illinois and Indiana; rather such specimens are found to the north in Wisconsin and Canada and to the west in Iowa, Nebraska, and the Dakotas. Our Illinois records of the dark phase are from Andres, Atlas, suburbs of Chicago, Elgin, and St. Anne.

No overwintering specimens of *tritici* have ever been found out-of-doors in Illinois. Possibly this species migrates north every spring. Through the cooperation of Dr. R. J. Dysart and Mr. R. Stimson it was noted in Urbana, during the spring of 1964,

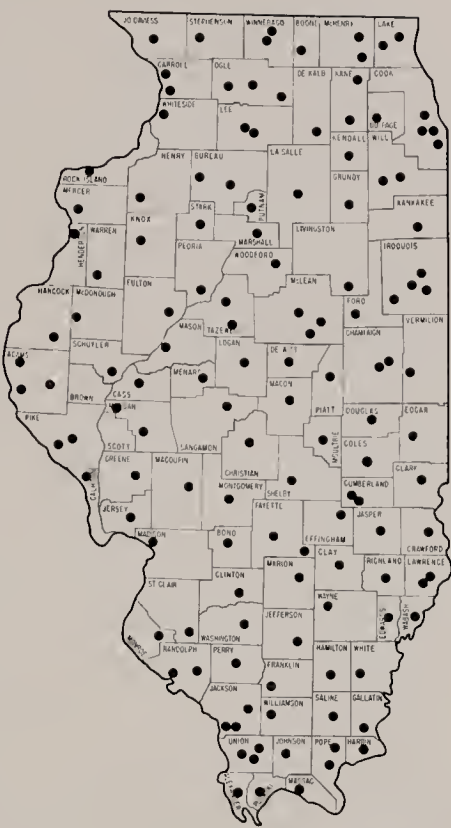


Fig. 111.—Distribution of *Frankliniella tritici* in Illinois.

that *Frankliniella tritici* suddenly appeared in wind traps at the same time the supposed southern migrant, *Empoasca fabae*, the potato leafhopper, was detected. Although *tritici* was present in relatively small numbers on lilac flowers in central Illinois by at least May 4, it wasn't until May 6, when there were sustained winds from the south averaging 40 miles an hour, that this thrips began to be recovered in the traps operating above the stadium on the University of Illinois campus. Both sexes of *tritici* and an occasional specimen of *Sericothrips variabilis* were taken with high numbers of *Empoasca fabae*, and they continued to be present in the traps until observations were terminated the following week.

Forbes (1892) described an experiment at Urbana in 1889 in which he

established that *Frankliniella tritici* by its feeding caused "buttoning" or blighting of strawberries, raspberries, and blackberries. In addition, ruinous scarring of roses, chrysanthemums, and other commercial cut flowers is often done by this flower thrips during feeding. Damage to row crops, beans, and cotton for example, is often attributed to *tritici* in agricultural reports.

Like some other thrips, *tritici* will bite man on occasions.

Illinois records (Fig. 111).—Collected from mid-April until mid-November in the north to early December in the extreme south, from one to several localities in every county in the state.

Frankliniella unicolor Morgan

Frankliniella unicolor Morgan (1925b: 141). ♀. Type-locality.—Clarksville, Tennessee.

Frankliniella andropogoni Moulton and Andre (1936:223). ♀. Type-locality.—Waukon, Iowa. Synonymized by Moulton (1948).

FEMALE (macropterous).—Length distended about 1.5 mm. Color almost entirely yellow except terminal antennal segments which become progressively darker brown. Ocellar pigment bright red.

Head elongate, prolonged forward in front of eyes. Interocellar setae long, postocular setae short. Antennal segment III with sides of pedicel straight.

Prothorax with most of the major setae long, inner pair of the major anterior setae shorter than or nearly equal to the dorsal length of the eye.

Abdominal tergite VIII with comb of setae along the posterior margin interrupted.

MALE (macropterous).—Length distended about 1.4 mm. Similar to female in color and structure. Abdominal glandular areas elongately transverse, elliptical, one each on sternites III–VII. Abdominal tergite IX with median setae shortened but not thorn-like (Fig. 45), lateral setae long.

From *tenuicornis*, the only other species of the genus in Illinois with the

fore part of the head prolonged, *unicolor* may be immediately distinguished by its nearly all-yellow coloration in the female. Males of *tenuicornis*, which are said to be yellow, have brownish gray color on the abdomen, whereas males of *unicolor* have a light yellow-colored abdomen.

Frankliniella unicolor is almost invariably found in clumps of *Andropogon gerardi* (big bluestem). At present it is limited in its distribution to patches where big bluestem grasses still exist, particularly along railroad right-of-ways and fence rows. Formerly this thrips might have been abundant throughout much of the state in original prairie wherein big bluestem was predominant.

Illinois records. Collected every season of the year, from one to several localities in the following counties: ADAMS, CALHOUN, CARROLL, CHAMPAIGN, COOK, DE WITT, DOUGLAS, HANCOCK, HENDERSON, IROQUOIS, KANE, KNOX, LAKE, LAWRENCE, LEE, MADISON, MASON, MORGAN, PIATT, PIKE, POPE, RICHLAND, SANGAMON, SCOTT, WHITE, and WILL.

Heliothrips Haliday

Heliothrips Haliday (1836:443). Type-species by monotypy.—*Heliothrips adonidum* Haliday.

Head (Fig. 112) reticulate, with a definite necklike constriction at base. Eyes large, protruding. Ocelli on slightly raised area between eyes. Antennae eight segmented, segment III elongate, last two segments forming a style, segment VIII about four times as long as segment VII; sense cones on segments III and IV simple, not forked. Mouth cone broadly rounded. Maxillary palps two segmented.

Prothorax reticulate, all setae small. Metathorax with a conspicuous V-shaped reticulate area medially. Mesospinasternum fused to metasternum. Tarsi one segmented. Always macropterous. Fore wings bulged at base, fore vein fused to costa in apical two-thirds, leading edge without bristle-like setae; fringe cilia straight.

Abdominal tergites hexagonally re-

ticulate along sides and limitedly on the meson, median pair of setae closely spaced. Abdominal sternites without accessory setae, marginal setae set anteriorly of posterior margin. Abdominal tergite VIII with a complete comb of posterior setae. Females with well-developed ovipositor; abdominal tergite X split and with major setae on extreme posterior margin. Males with transversely elongate glandular areas, one each on sternites III–VII; with four thornlike setae on tergite IX.

This genus is the sole member of the *Heliothripini* in our area which lacks stiff, bristle-like setae along the leading edge of the fore wing, bearing instead only fine setae. *Heliothrips* is also one of the few members of the *Heliothripini* in which the fore wing fringe cilia are straight rather than wavy, and in which the median setae on the abdominal tergites are placed close together.

The single representative of this genus in Illinois, *H. haemorrhoidalis*, occasionally occurred in greenhouses before the advent of the new insecticides. It has not been found in our state in recent years.

***Heliothrips haemorrhoidalis* (Bouché)**
Greenhouse Thrips

Thrips haemorrhoidalis Bouché (1833: 42). ♀, larvae. Type-locality.—Hothouses in Berlin, Germany. Crawford, J. C. (1940:90). ♂.

Heliothrips adonidum Haliday (1836: 443). ♀. Type-locality.—Hothouses in England. Synonymized by Burmeister (1838).

FEMALE (macropterous).—Length distended nearly 1.5 mm. General color dark brown. Legs, antennal segments III–V, base of VI, apex of VII, and all of VIII pale. Median portion of abdominal segment VIII, all of IX, and base of X yellowish brown to yellow. Fore wings pale gray to light tan, the posterior vein being the darkest. In teneral specimens almost all of the abdomen is bright yellow.

Head setae small (Fig. 112).

Abdominal tergite IX with four major setae on posterior margin, these setae nearly equal in length.

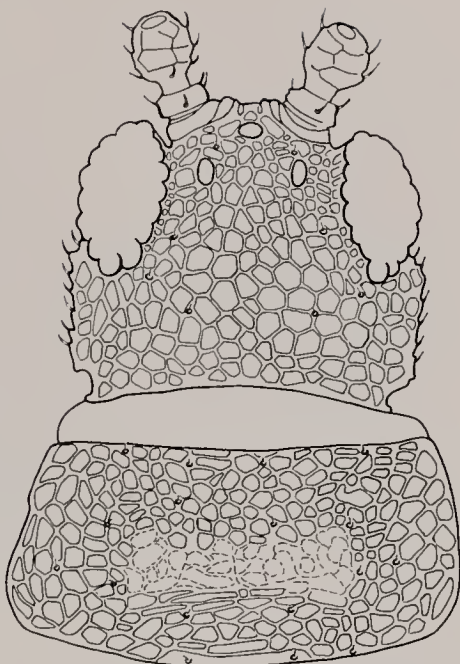


Fig. 112.—*Heliothrips haemorrhoidalis*, head and prothorax.

MALE (macropterous).—Length distended over 1.2 mm. Similar to female in color and structure with following exceptions. Antennal segments VI and VII with almost no trace of brown, abdominal tergite IX dark brown at sides and apex. Glandular areas on abdominal sternites moderately large, being largest on sternite III and decreasing in size to the smallest on sternite VII.

There appears to be considerable variation between the wild populations of the southern United States, Central America, and South America. Males from Honduras have smaller glandular areas than males from Venezuela or the West Indies. In South American populations, abdominal segment IX is more darkly colored in the female than is the case in populations from Honduras, Mexico, Florida, and California. Also there is less brown in antennal segment VI in the Honduras and Venezuela populations. Whether the abdomen is predominantly brown or yellow depends on the maturity of the adult. In teneral specimens the abdomen is invariably yellow.

Some students presume that *haemorrhoidalis* originated in tropical America and subsequently was distributed by man to other parts of the world. This seems to be a reasonable assumption in view of the presence of varied populations in the wild in the New World, and the fact that these thrips prefer many New World plants such as crotons and cacao. I have taken this species out-of-doors as far north as the Great Smoky Mountains National Park in Tennessee where they may be seasonably introduced by wind currents or other agents.

According to Russell (1909), in this species there are two larval and two pupal instars. Unlike species of *Caliothrips*, the pupal stages of *Heliothrips haemorrhoidalis* are spent on the leaves of the host plant, not underground. Males, although reportedly collected by Heeger prior to 1895 (Uzel 1895), were not described until 1940, by J. C. Crawford. Rivnay (1935) has studied the effects of various climatic factors on this thrips.

Illinois record.—LAKE COUNTY: Lake Forest, 1909, Davis, greenhouse, 4 ♀.

Hercinothrips Bagnall

Hercinothrips Bagnall (1932:506).

Type-species by original designation.—*Heliothrips bicinctus* Bagnall. Valid designation. Type-species by subsequent designation of Hood (1937).—*H. [ercinothrips] pattersoni* (Bagnall). Invalid because of prior designation.

Head strongly constricted near base. Antennae eight segmented, antennal segment III elongate, segment VIII about three times as long as segment VII. Sense cones on segments III and IV forked, although there seems to be a ventral cone on each of these segments which is simple. Maxillary palps two segmented. Prothorax hexagonally reticulate, metathorax without a raised V-shaped area, mesospinasternum fused to the metasternum. Tarsi two segmented. Hind coxae fairly close together, intermediate between the wide condition found in *Heliothrips* and the close condition

found in *Caliothrips*. Fore wing more or less pointed at tip, leading margin with a row of stout setae and a row of slender setae, both principle veins beyond fork with evenly spaced, stout setae. Abdomen hexagonally reticulate, especially along the sides. Male with three pairs of stout spines on abdominal tergite IX.

Although specialized in its own way, *Hercinothrips* may be considered the most generalized of the *Helio-Calio-Hercinothrips* group of the tribe Heliothripini. *Hercinothrips* is the only one of these three genera which still retains a two-segmented tarsus. The other two genera have the tarsal segments fused into one.

Originally the group was treated as but a part of *Heliothrips*. Later the species were transferred to *Herciothrips*, now *Caliothrips*. *Hercinothrips* was not separately categorized until 1932. Now, more than a half dozen species have been included. One of these, (*Hercinothrips femoralis*), occurs in Illinois in greenhouses where artificial tropical conditions permit it to exist. My concept of the genus is based solely on the Illinois species rather than on the type-species, but it is assumed the two are congeners and have similar basic features.

Hercinothrips femoralis

(O. M. Reuter)

Banded Greenhouse Thrips

Heliothrips femoralis O. M. Reuter (1891:166). ♀. Type-locality.—Helsinki (Helsingfors), Finland, in hothouses. White (1916:9). ♂. Transferred to *Hercinothrips* by Bagnall (1932).

Heliothrips cestri Pergande (1895:390) ♀. Type-locality.—Not stated, but possibly Washington, D. C., in greenhouse. Synonymized by Uzel (1895).

FEMALE (macropterous) (Fig. 113).—Length distended about 1.6 mm. General color dark brown. Head, thorax and terminal segments of abdomen lighter, in spots yellowish brown to yellow. Legs yellow, except mid and hind femora which are brown. Antennal segments I and II concolorous



Fig. 113.—*Hercinothrips femoralis*, dorsal aspect. From White (1916).

with head, segments III and IV and most of V except apex light yellow, apex of V and all of VI–VIII brown. Fore wing with a brown spot above scale, a broad median brown band, and subapical brown band; remainder of wing pale. Body setae pale yellow.

Head setae moderately developed but not long.

Metascutum hexagonally reticulate medially, longitudinally striate laterally.

Abdominal tergite VIII with posterior comb of setae interrupted medially, tergite IX split for nearly entire length along the median line.

MALE (macropterous).—None present in the collections of the Illinois Natural History Survey. White (1916) reported that the male is similar to the female in color and general structure. Characteristics of abdominal sternal glandular areas, if any, not known to me. Abdominal tergite IX with three pairs of stout spines (Fig. 42).

Superficially this species resembles *Heliothrips haemorrhoidalis*, but the two can be readily separated even with a hand lens by their color. *Hercinothrips femoralis* has darker legs and wings than *Heliothrips haemorrhoidalis*.

Unlike *Heliothrips haemorrhoidalis*, *femoralis* may have been introduced into the New World. Although it is often found out-of-doors in the warmer zones, it does not seem to occur regularly on native North American plants but rather stays on cultivated plants. It is especially fond of sugar beets. Originally the sugar beet came from the Mediterranean and eastward and the provenience of its thrips, *femoralis*, may be the same. I have never taken this thrips, as I have *haemorrhoidalis*, in natural woodlands on our continent.

Before modern insecticides became widely used, *femoralis* was frequently found in greenhouses in Illinois. Now it and the other greenhouse species are rare in this state.

White (1916) has studied the biology of this thrips. According to his reports, it pupates on the leaves, as does *Heliothrips haemorrhoidalis*, and not in cracks in the ground, as do species of *Caliothrips*.

ILLINOIS RECORDS.—CHAMPAIGN COUNTY: Urbana, September 2, 1932 to June 30, 1934, Compton, Farrar, on many plants in greenhouse, many ♀; Urbana, July 16, 1959, Stannard, in

greenhouse, many ♀, larvae. FULTON COUNTY: Canton, September 23, 1932, Compton, snapdragons in greenhouse, 2 ♀. JACKSON COUNTY: Murphysboro, April 12, 1932, Compton, snapdragons and zinnias in greenhouse, 2 ♀. MCLEAN COUNTY: Bloomington, January 13, 1928, Compton, calla lily, 2 ♀. STEPHENSON COUNTY: Freeport, September 13, 1933, Compton, on chrysanthemum, 14 ♀.

Iridothrips Priesner

Iridothrips Priesner (1940:403). Type-species by original designation.—*Bregmatothrips iridis* Watson.

Head bulged considerably in front of eyes. Antennae eight segmented. Antennal segments III and IV with simple sense cones. Ocelli always present. Mouth cone bluntly rounded. Maxillary palps three segmented, labial palps two segmented.

Prothorax with anterolateral pair and the two epimeral pairs of setae long, midanterior pair and midposterior pair not as long but well devel-

oped. All lateral pronotal setae small. Mesospinasternum separated from metasternum by suture. Metaspinasternum truncate (Fig. 98). Fore legs not enlarged. All tarsi two segmented. Macropterous or brachypterous. Fore wings with two veins, setae on both veins uniformly spaced; fringe cilia wavy.

Abdomen with pleural plates. Median pairs of setae placed far apart on the intermediate abdominal tergites. Abdominal sternites without accessory setae in addition to posterior ones. Abdominal segment X longer than segment IX. Males bearing elliptical glandular areas on abdominal sternites III–VII.

This genus is monobasic.

Seemingly *Iridothrips* is the biological equivalent of *Bregmatothrips*, but it is doubtful that they are closely related. Their superficial resemblance is probably due in part to parallel evolutionary development and in part to inheritance from a distant common ancestor. The differences between these genera are listed, in part, in the following tabulation:

Characteristic	Bregmatothrips	Iridothrips
OCELLI	Often absent in brachypterous forms	Always present in all forms known (Male not described)
MOUTH CONE	Pointed	Bluntly rounded
METASPINASTERNUM	Pointed (Fig. 97)	Truncate (Fig. 98)
MAJOR ANTERO-PROTHORACIC SETAE	Mesad of anterolateral corner	At anterolateral corner
FORE VEIN OF FORE WING	With interrupted row of setae	With evenly spaced row of setae
ABDOMINAL SEGMENT X	Shorter than segment IX	Longer than segment IX
♂ ABDOMINAL STERNAL GLANDS	Absent	Present

Iridothrips iridis* (Watson)*Iris Thrips**

Bregmatothrips iridis Watson (1924c: 253). ♀. Type-locality.—Bassenheim, Holland. Transferred to *Iridothrips* by Priesner (1940). Smith (1933:916). ♂.

FEMALE (macropterous).—Length distended over 2 mm. General color dark brown. Yellow: base of head, antennal segments III and IV, fore tibiae, and all tarsi. Brownish yellow: antennal segment V usually, and anterior and sides of prothorax. Body with orange-yellow subintegumental pigment. Wings pale yellow.

Head with interocellar setae moderately well developed, these setae almost as long as anterolateral prothoracic setae.

Pronotum with four or five minor and one major pair of setae on posterior margin between the epimeral setae. Metanotum with median pair of setae placed far behind anterior border.

Abdominal segment VIII with a posterior comb of tiny, toothlike setae, each of which is as broad at the base as it is long. Abdominal segment X almost entirely split along the length of the dorsum.

FEMALE (micropterous).—Not available to me; present in England (Morison 1948).

FEMALE (brachypterous).—Length distended nearly 2 mm. Colored as in macropterous forms except yellow areas often with some brown.

MALE (brachypterous).—Length distended about 1.2 mm. Color lighter than in female, antennal segment V generally yellow, prothorax predominantly yellowish brown. Similar to female in structure except wing pads almost entirely reduced, abdominal sternites III–VII with small median elliptical glandular areas, and abdominal tergite IX with two median pairs of stout setae, the middle pair being the shortest.

The differences between *Iridothrips iridis* and species in the morphologically similar genus *Bregmatothrips* are outlined in the generic diagnosis of *Iridothrips*.

By the setation of the prothorax, form of head, and close similarity of color, *I. iridis* superficially resembles *Frankliniella tenuicornis*. Use of several characteristics, however, permits the immediate separation of these two species. In *I. iridis* antennal segments III and IV bear simple sense cones, the median pair of setae on the metanotum are placed far posteriad of the anterior border, and the ocelli are always small. By contrast, in *F. tenuicornis* antennal segments III and IV bear forked sense cones, the median pair of metanotal setae are placed along the anterior border, and the ocelli are medium in size.

Originally this species was discovered in 1923 in quarantine at New York on iris sent from Holland and England. Later, in 1927, Moulton reported "the first finding of this species (out-of-doors) in the United States" based on two specimens collected at Urbana, Illinois. Since then no other specimens have been taken in Urbana or anywhere else in Illinois. Subsequently it has been found in New Hampshire, Massachusetts, New Jersey, Pennsylvania, Maryland, Virginia, Ohio, Washington, Oregon, and again in New York (Smith & Utter 1937). Apparently this thrips has become established on the eastern and western coasts of North America, but despite one, or possibly more, introductions it has not persisted in Illinois or other midcontinental states.

Smith & Utter (1937:6) advanced and supported the logical theory that the original home of the iris thrips was Europe, and its original host was the European yellow flag (*Iris pseudacorus*).

Illinois record.—CHAMPAIGN COUNTY: Urbana, (Moulton 1927b).

***Leucothrips* Reuter, O. M.**

Leucothrips Reuter, O. M., (1904:107).

Type-species by monotypy.—*Leucothrips nigripennis* Reuter, O. M.

Microthrips Morgan (1913:19). Type-species by original designation.—*Microthrips piercei* Morgan. Synonymized by Hood (1931b).

Head (Fig. 114) wider than long. Eyes protruding. Ocelli present, all nearly equal in size. Antennae seven segmented, segments III and IV with single sense cones. Maxillary palps two segmented, labial palps two segmented.

Pronotum with a transverse submedian ridge. Only posterior pronotal setae well developed, with the two epimeral setae the longest. Mesospi-nasternum fused to metasternum. Metafurcae enormously developed. All tarsi one segmented. Fore femora not enlarged. Fore wings slender, with but one longitudinal vein set with a few scattered setae, several at base and several near apex; fringe cilia straight, not wavy.

Abdomen without microsetae except on terminal segments. Pleural plates seemingly present but difficult to see. Abdominal sternites without accessory setae in addition to the posterior ones. Males without abdominal projections other than setae. Females with downturned ovipositor.

Hood (1931b) sank *Microthrips* under *Leucothrips* Reuter chiefly because both had but seven segments in each antenna and because both lacked microsetae (microtrichiae) on the abdominal tergites. At the same time this author noted that the type-species of *Leucothrips*, *nigripennis*, as well as several other species, could be characterized by the structure of the sense cones on antennal segments III and IV. In the *nigripennis* group these sense cones are forked, whereas in the type-species of *Microthrips*, *piercei*, these sense cones are single.

Inadvertently, Priesner in his monograph (1926b) recorded that *Leucothrips nigripennis*, a species not then available to him, bore eight segments (rather than seven) in each antenna. He corrected this statement in his *Genera Thysanopterorum* (1949). Meanwhile, however, Morison (1948) also erroneously characterized this genus as having eight segments in each antenna. One species, currently assigned to *Leucothrips*, *pictus* Hood from Brazil, does have eight-segmented antennae, but in the other

congeners, including the type-species *nigripennis*, there are only seven segments.

Bailey (1957) has presented a key to the five known species of the world. Probably all the species, even *nigripennis* which was originally found in a greenhouse in Finland, are of New World origin.

Leucothrips belongs to a complex of other similarly formed genera such as *Pseudodendrothrips*, *Halmathrips*, and *Graphidothrips*. All of these taxa need to be compared and redefined for a better understanding of the significant characteristics of each.

The sole representative of this genus in Illinois is *piercei*.

Leucothrips piercei (Morgan)

Microthrips piercei Morgan (1913:19).

♀. Type-locality.—Dallas, Texas.

Transferred to *Leucothrips* by Hood (1931b).

FEMALE (macropterous).—Length distended nearly 0.8 mm. Color almost entirely white with a faint underlying hue of yellowish gray, apices of apical antennal segments pale brown, ocellar crescents bright red.

Head and prothorax as in Fig. 114.

Pronotum evenly and closely transversely striate, metascutum evenly

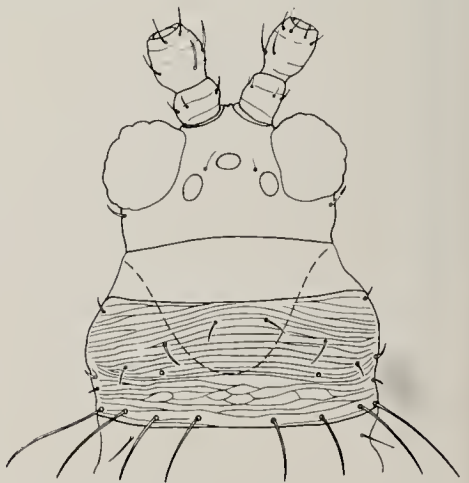


Fig. 114.—*Leucothrips piercei*, head and prothorax.

and closely longitudinally striate. Abdominal tergites VIII and IX each with a complete, uninterrupted posterior row of setae.

MALE (macropterous).—Length distended about 0.7 mm. Similar to female in color and structure. Apparently no abdominal sternal glandular areas present. Lateral regions of male genital capsule greatly enlarged.

Most Illinois specimens of this species have been taken from the undersides of leaves of redbud trees, which may be the thrips' principal hosts in our area. A female taken in late May was found to have a fully developed egg in her abdomen and a female taken in late June from a more northern locality had a partially developed egg. A series of associated larvae were found during the last week of May in southern Illinois. Obviously these thrips are active in the spring and not just in the late summer or early fall as has been implied by others. Adults overwinter in the litter of the forest floor.

I have examined specimens collected from Michigan to Chiapas, Mexico and Key West, Florida. As yet I have been unable to find any significant differences between the representatives of these widely spread populations, and, although it is very unusual, possibly these many specimens collected from the near tropics to the near Canadian zone belong to the same entity. Bailey (1957) also records *piercei* as being in California, South America, Hawaii, and elsewhere.

Illinois records (Fig. 24).—Collected during spring and summer, from one to several localities in the following counties: BOND, CALHOUN, CHAMPAIGN, CLARK, CLINTON, COLES, FRANKLIN, FULTON, GALLATIN, GREENE, HAMILTON, HARDIN, JACKSON, JASPER, JERSEY, JOHNSON, LAWRENCE, MACON, MCLEAN, MACOUPIN, MARION, MASSAC, MENARD, MONROE, MONTGOMERY, MOULTRIE, PERRY, PIATT, PIKE, PUTNAM, SALINE, SANGAMON, SCHUYLER, ST. CLAIR, UNION, VERMILION, WABASH, and WASHINGTON.

Limothrips Haliday

Thrips subgenus *Limothrips* Haliday (1836:444). Type-species by subsequent designation by Westwood (1839).—*Limothrips cerealium* Haliday. Valid. Type-species by subsequent designation by Morison (1949).—*Limothrips denticornis* Haliday. Invalid, prior designation by Westwood. Raised to full generic rank by Amyot and Serville (1843).

Head longer than wide (in Illinois), prolonged in front of eyes. Interocellar and postocular setae small. Ocelli present in macropterous forms, absent in apterous forms. Antennae eight segmented, segments II and III either not produced, slightly produced, or greatly produced. Sense cones on antennal segments III and IV simple or forked. Maxillary palps two segmented.

Prothorax with only one pair of well-developed epimeral setae, all other setae small. Mesospinasternum separated from metasternum by a wide suture. Tarsi two segmented. Females macropterous, males apterous. Fore wings with two longitudinal veins; fore vein with setae interrupted, hind vein more or less evenly set with setae; fringe cilia wavy.

Abdominal tergites with median setae set far apart. Abdominal sternites with accessory setae. Abdominal tergite VIII without a comb of posterior marginal setae. Abdominal segments VIII–X often with setae thickened or thornlike. Female with well-developed ovipositor, always with a pair of thornlike setae on abdominal tergite X. Males frequently with small, circular, glandular areas on abdominal sternites III–VII, with median and lateral setae on abdominal tergite IX reduced and thornlike, and abdominal segments IX and X forming a large semicircular unit.

This genus bears resemblance to *Bregmatothrips*, *Chirothrips*, *Iridothrips*, *Plesiothrips* and others. It can be distinguished from any of these and from any other genus in Illinois by the paired thornlike setae on abdominal tergite X as found in the female.

In 1942, Shumsher erected the genus

Pruthiella for *Limothrips angulicornis*. Because *angulicornis* is not an Illinois species, I have not as yet formed an opinion on Shumsher's proposal; however, *angulicornis* is arbitrarily included in the accompanying key to the North American *Limothrips*-like species.

Two species, *cerealium* and *denticornis*, occur in our state (Fig. 115).

KEY TO SPECIES (OF NORTH AMERICA)

1. Antennal segment II produced at outer apex; antennal segment III not at all produced, with forked sense cone; not found in Illinois. *angulicornis*
Antennal segment II not produced at apex; antennal segment III greatly produced or slightly produced at outer apex, with a simple sense cone. 2
2. Antennal segment III greatly produced at apex, sense cone not on angle of antennal projection. *denticornis*
Antennal segment III only slightly produced or not produced at apex. 3
3. Antennal segment III only slightly produced at apex, sense cone on angle of antennal projection. *cerealium*
Antennal segment III not produced; not found in Illinois; present in North Dakota. *consimilis*

Limothrips cerealium (Haliday) Grain Thrips, Oats Bug

Thrips (Limothrips) cerealium Haliday (1836:445). ♀, ♂. Type-locality.—England.

Limothrips avenae Hinds (1902:139). ♀, ♂. Type-locality.—Not given but either in Pennsylvania or Massachusetts. Synonymized by Baginall (1908c).

FEMALE (macropterous).—Length distended about 1.9 mm. General color dark brown. Intermediate antennal segments, especially segment III, light brown, sometimes becoming yellowish brown. Apex of each tibia and all tarsi yellowish brown to yellow. Fore wings brown except for white spot near base. Ocellar pigment red. Body with yellow subintegumental pigment.

Head not prolonged as far as in *denticornis* (Fig. 116). Antennal segment II not produced at apex, antennal segment III only slightly produced at apex. Sense cones on antennal segments III and IV simple, cone on segment III on tip of slight projection.

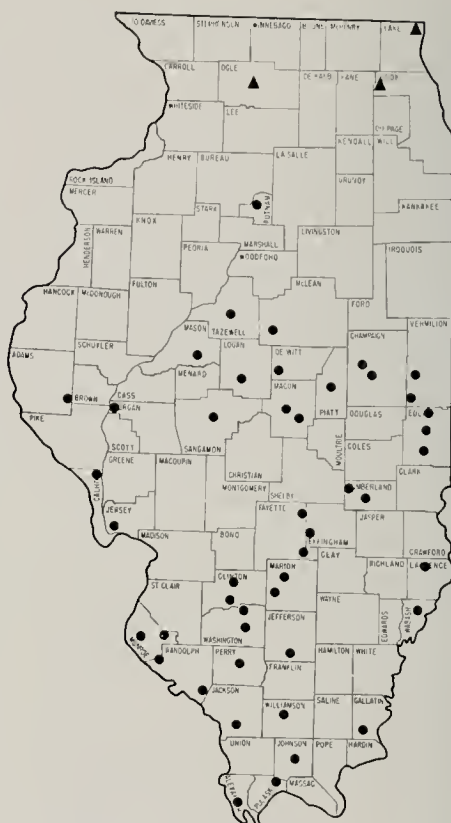


Fig. 115.—Distribution of species of *Limothrips* in Illinois: *Limothrips cerealium* (circular dots) and *Limothrips denticornis* (triangular marks).

Prothorax proportionately longer than in *denticornis*. Metascutum weakly sculptured.

Abdominal sternites with accessory setae arranged more or less in a single transverse row. Major setae on abdominal tergite IX slender, not shortened or spinelike.

MALE (apterous).—Length distended about 1.5 mm. Similar to female in color except intermediate antennal segments and legs more yellowish brown. Similar to female in structure with the following exceptions. Ocelli absent, thorax typical of apterous conditions, without wing sclerites and with notal areas simplified. Abdominal sternites III–VII each with a small, nearly circular, glandular area (Fig. 46). Abdominal tergite IX with each lateral spine socket produced to appear as a second spine, posterior

margin not as thickened as in *denticornis*.

This species differs markedly from *denticornis* in many features such as those mentioned in the key, and also in the extent of prolongation of the head, the arrangement of the accessory setae on the abdominal sternites, and the structure of abdominal tergite IX, particularly the setae. One characteristic, the small projection of antennal segment III, serves to distinguish *cerealium* immediately from *denticornis*, which, by contrast, bears a large projection on segment III.

Limothrips cerealium is undoubtedly an introduced species from Europe. It inhabits most of Illinois south of an imaginary line connecting Rock Island and Chicago. It causes damage to cereal grains, but in Illinois no special attempts are made to control its populations. In certain years, in late June or early July, enormous flights of these insects occur, at which time they cause annoyance by biting people and entering houses.

The life history of this thrips was described by Korting (1930).

Illinois records (Fig. 115).—Collected every season of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, CALHOUN, CHAMPAIGN, CLARK, CLINTON, CUMBERLAND, DE WITT, EDGAR, EFFINGHAM, FAYETTE, GALLATIN, JACKSON, JEFFERSON, JERSEY, JOHNSON, LAWRENCE, LOGAN, MACON, MARION, MASON, MCLEAN, MONROE, MORGAN, PERRY, PIATT, PULASKI, PUTNAM, RANDOLPH, ST. CLAIR, SANGAMON, TAZEWELL, VERMILION, WABASH, WASHINGTON, and WILLIAMSON.

***Limothrips denticornis* Haliday** The Barley Thrips

Thrips (Limothrips) denticornis Haliday (1836:445). ♀, ♂. Type-locality.—England.

Thrips kollari Heeger (1852:485). ♀. Type-locality.—Austria. Synonymized by Uzel (1895).

Thrips (Limothrips) bidens Reuter, O. M. (1878/79:218). ? ♀. Type-locality.—Pargass (Parainen), Tur-

ku-Pori, Finland. Synonymized by Uzel (1895).

Thrips secalina Lindeman (1887:302).

♀, ♂. Type-locality.—Not given but possibly Moscow, U.S.S.R. Synonymized by Uzel (1895).

FEMALE (macropterous).—Length distended over 2 mm. General color dark brown. Pedicel of antennal segment III, tip of each fore tibia, and all tarsi yellow. Fore wings brown becoming slightly lighter near base. Ocellar pigment red.

Head (Fig. 116) more prolonged in front of eyes than in *cerealium*. Antennal segment II not produced at apex. Antennal segment III greatly produced at apex. Sense cone on antennal segment IV forked; sense cone on segment III simple, not placed at tip of projection.

Prothorax (Fig. 116) proportionately shorter than in *cerealium*. Sculpture of metascutum moderately strong.

Abdominal sternites with accessory

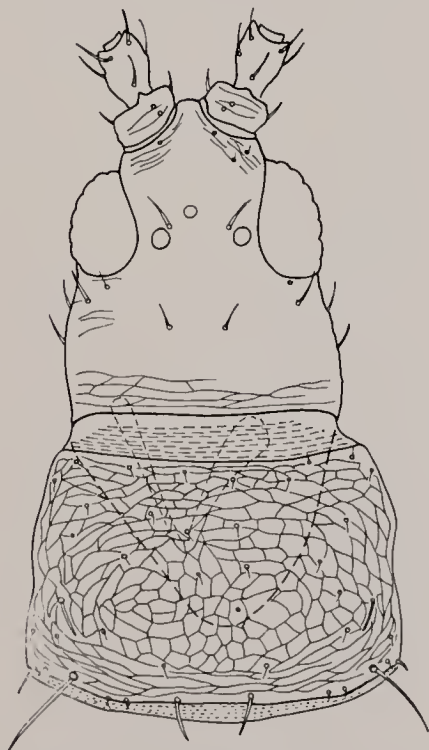


Fig. 116.—*Limothrips denticornis*, head and prothorax.

setae scattered across the segments. Major setae on abdominal tergite IX thickened, nearly spinelike, middle pair somewhat shortened.

MALE (apterous).—Length distended about 1.5 mm. Similar to female in color except antennal segment III yellow to nearly white. Similar to female in structure with the following exceptions. Ocelli absent. Thorax typical of apterous conditions, without wing sclerites, and with notal areas simplified. Abdominal sternites seemingly without glandular areas (in specimen available to me). Abdominal tergite IX with each lateral setal socket not produced to appear as a second spine, posterior margin thickened.

This species can be easily recognized by the large angular production of the outer apex of antennal segment III.

Limothrips denticornis occurs only in the northern counties of Illinois. Elsewhere it is found in many northern states, and in countries of the Holarctic Realm.

Bournier (1956a) has summarized the reports on the precocial mating behavior of this thrips. In North Dakota it does considerable damage to barley (Post 1959), where it is estimated populations reach up to 24 million thrips per acre on this crop (Post & Olson 1960).

Illinois records (Fig. 115).—**COOK COUNTY**: east of Elgin (Shoefactory Road hill prairie), October 10, 1952, Ross, Stannard, *Andropogon*, 1 ♀. **LAKE COUNTY**: unknown locality, October 23, 1949, Decker, sod of *Andropogon gerardi*, 2 ♀; Wauconda, March 16, 1933 and October 28, 1943, Ross, Frison, Mohr, Sanderson, litter in tamarack bog, 9 ♀. **OGLE COUNTY**: Castle Rock, December 9, 1932, Frison, Ross, ground cover, 1 ♀; White Pines State Park, December 9, 1932, Frison, Ross, under pines, 1 ♀.

Microcephalothrips Bagnall

Microcephalothrips Bagnall (July 1926b:113). Type-species by original designation.—*Thrips abdominalis* Crawford, D. L.
Stylothrips Karny (September 1926:

205). Type-species by monotypy.—*Stylothrips brevipalpus* Karny. Preoccupied by *Stylothrips* Bondar (1924). Synonymized by Priesner (1949).

Thrips subgenus *Ctenothripella* Priesner (1927:442). Name without an independent published description but validated by virtue of being recognized upon erection as a synonym of *Microcephalothrips*.

Paraphysopus Girault (1927:2). Type-species by original designation.—*Paraphysopus burnsi* Girault. Synonymized by Priesner (1949).

Head small, slightly wider than long. Eyes proportionately large. Ocelli placed fairly far apart. Interocellar and postocular setae small. Antennae seven segmented, segments III and IV each with a forked sense cone. Mouth cone moderately developed. Maxillary palps three segmented.

Prothorax with most setae small, inner epimeral pairs small but slightly longer than the others; with five or six pairs of setae along posterior margin of the prothorax between the epimeral pairs. Mesospinasternum separated from metasternum by a wide suture. Metascutum longitudinally striate. All tarsi two segmented. Fore wings bowed, with two longitudinal veins, hind vein uniformly set with setae, fore vein with setae interrupted, cilia wavy.

Abdomen with well-separated pleural plates. Abdominal sternites with accessory setae. Most abdominal tergites with strong scallop-like projections on each posterior margin. Median pair of setae placed far apart on the intermediate abdominal tergites. Female with well-developed ovipositor, with abdominal tergite X almost completely split. Males with a glandular area on abdominal sternites III–VII, without thornlike setae on abdominal tergite IX.

During the course of its taxonomic history, this genus has been occasionally placed as a subgenus of *Thrips*. Although close to *Thrips*, *Microcephalothrips* is distinctive by several features. Species of *Microcephalothrips* have the major posterior prothoracic setae greatly reduced in size, and be-

tween these setae there are at least five pairs of smaller setae. By contrast the species of *Thrips* have much longer major posterior prothoracic setae, and between these setae there are only two, three, or rarely four pairs of smaller setae. Also in *Microcephalothrips* the scallop-like projections are larger and occur along the posterior margins of most of the abdominal tergites. In the species of *Thrips* which possess scallop-like projections, the projections are much smaller and are much less prominent to absent on the anterior tergites.

The cosmopolite, *abdominalis*, is the only species present in Illinois.

Microcephalothrips abdominalis
(Crawford, D. L.)
Composite Thrips

Thrips abdominalis Crawford, D. L. (1910:157). ♀. Type-locality.—Guadalajara, Mexico. Moulton (1929b:236). ♀. Transferred to *Microcephalothrips* by Bagnall (1926b).

Thrips femoralis Jones (1912:4). ♀. Type-locality.—Barnesville, Georgia. Homonym of *Thrips femoralis* Blanchard (1851). Synonymized by Hood (1912a).

Thrips (Clenothripella) gillettei Moulton (1926b:126). ♀. Type-locality.—Fort Collins, Colorado. Synonymized by Moulton (1929b).

FEMALE (macropterous).—Length distended about 1.2 mm. General color brown. Intermediate antennal segment, apex of fore femora, and all tarsi lighter, becoming yellow brown to yellow. Fore wings nearly uniformly brown. Body with orange subintegumental pigment. Ocellar pigment red.

Head small (Fig. 117). Antennae short.

Prothorax elongate, moderately setose.

Abdominal tergite II with three setae on each lateral margin. Accessory setae of abdominal sternites arranged in several transverse rows. Abdominal tergite VIII with setae borne at the tips of the scallop-like projections.

MALE (macropterous).—Length distended about 1 mm. Except for head, which is brown, lighter in color



Fig. 117.—*Microcephalothrips abdominalis*, head and prothorax.

than female. Legs with much yellow. Abdomen with scallop-like projections along the margins of most of the sternites as well as the tergites. Abdominal sternites III–VII each with a small, circular, glandular area.

This species occurs throughout Illinois on many flowers, particularly composites. It may be a New World thrips with a natural range covering most of North America. It also occurs in such widely scattered places as Fiji, Hawaii, India, and elsewhere, possibly having been transported to these places by man. Its life history has been described by Bailey (1937) and Jagota (1961).

The names *Thrips crenatus* Watson and *Thrips oklahomae* Watson may apply to the species *abdominalis* or to closely related species.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, CARROLL, CASS,

CHAMPAIGN, CLARK, COLES, COOK, EDGAR, GALLATIN, JACKSON, JEFFERSON, JO DAVIESS, KANKAKEE, LAKE, LAWRENCE, MORGAN, PIATT, PIKE, POPE, PUTNUM, RICHLAND, UNION, VERMILION, and WILL.

Odontothrips Amyot and Serville

Odontothrips Amyot and Serville (1843:642). Type-species by subsequent designation by Karny (1907).—*Thrips phalerata* Haliday.

Head moderate in size, similar to the higher Thripidae such as *Frankliniella*, *Taeniothrips* and *Thrips*. Ocelli present. Antennae eight segmented with the last two segments forming a style. Antennal segments III and IV with forked sense cones, segment VI with base of sense cone small or greatly enlarged. Maxillary palps three segmented, labial palps two segmented.

Prothorax with only the two pairs of epimeral setae greatly elongated. Mesospinasternum separated from metasternum by a wide suture. Fore tibiae each with one or two clawlike processes at apex. All tarsi two segmented. Always macropterous. Fore wings with two veins, setae on fore vein interrupted subapically.

Abdomen with pleural plates. Tergites and sternites without microsetae. Abdominal tergites without posterior comb of setae except weakly and sparsely on tergite VIII. Abdominal sternites without accessory setae. Abdominal tergite X of female with an incomplete longitudinal split. Males without glandular areas and with or without a pair of thornlike setae on abdominal tergite IX.

These thrips are essentially like the species belonging to *Taeniothrips* but differ principally in the characteristic of the clawlike processes at the apex of each fore tibia. In the European species of *Odontothrips* the base of the sense cone on antennal segment VI is greatly enlarged, whereas in the native American species the base of this sense cone is small.

One indigenous species, *pictipennis*, is common throughout the state. An introduced species, *loti*, may also be found here eventually.

KEY TO SPECIES

(ILLINOIS AND NEIGHBORING STATES)

1. Base of sense cone on antennal segment VI small; fore wings with a light subapical band; apex of each fore tibia with two clawlike processes (Fig. 78).
.....*pictipennis* Hood
- Base of sense cone on antennal segment VI enlarged; fore wings uniformly brown in apical half; apex of each fore tibia with one clawlike process and one heavy seta; not yet found in Illinois.
.....*loti* (Haliday)

Odontothrips loti (Haliday)

Thrips loti Haliday (1852:1108). ♀. Type-locality.—England. Transferred to *Odontothrips* by Williams (1916).

Euthrips ulicis californicus Moulton (1907:56). ♀, ♂. Type-locality.—Wrights Station, Santa Clara County, California. Transferred to *Odontothrips* by Hood (1914a). Raised to full specific rank by Moulton (1927a). Synonymized by Moulton (1929b).

FEMALE (macropterous).—Length distended about 1.8 mm. Color dark brown except antennal segments III and IV, fore tibiae and all tarsi which are yellowish brown. Fore wings uniformly brown except for a nearly white subbasal band.

Head moderately wider than long, cheeks nearly straight, fore margin only slightly prolonged. Interocellar setae well developed and long. Base of antennal segment VI broad, barely pedicellate; base of sense cone on segment VI enlarged. Mouth cone long and pointed.

Prothorax sparsely setose on notum except around margins. Apex of each fore tibia with one clawlike process and one enlarged seta.

Abdominal segments generally smooth, weakly striate only on lateral margins.

MALE (macropterous).—Length distended about 1.3 mm. General color and structure as in female. Abdominal tergite IX with median pair of setae short but not abnormally thickened or thornlike.

Undoubtedly introduced from Europe, this species has been reported in California, Colorado, and Virginia

(Moulton 1929b). I have taken it at Aurelia, Iowa and likely it may be found eventually in Illinois. Males as well as females are in North America.

In Europe this species is found on a large number of herbs and trees (Priesner 1926b). An account of its life history has recently been given by Orbtel (1963).

***Odontothrips pictipennis* Hood**

Odontothrips pictipennis Hood (1916d: 117). ♀. Type-locality.—Great Falls, Virginia.

Odontothrips morgani Bagnall (1929b: 49). ♀. Type-locality.—Quincy, Florida, see Morgan (1913:1). New synonymy.

FEMALE (macropterous).—Length distended over 1.5 mm. Color dark brown except antennal segment III, base of antennal segment IV, fore tibiae, and all tarsi, which are yellowish brown. Fore wings pale subbasally and subapically with a brown margin at extreme base, brown band in the middle, and brown spot at the apex.

Head (Fig. 118) moderately wider than long, cheeks nearly straight, fore margin nearly straight. Interocellar setae well developed and long. Base of antennal segment VI broad, barely pedicellate; base of sense cone on segment VI small. Mouth cone moderately long and pointed.

Prothorax sparsely setose on the notum except around margins. Apex of each fore tibia with one large and one smaller clawlike process (Fig. 78).

Abdominal segments generally smooth, weakly striate only on the lateral margins.

MALE (macropterous).—Length distended about 1.2 mm. Color as in female except fore femora somewhat lighter. General structure as in female. Abdominal tergite IX with a median, widely spaced, pair of thornlike projections.

This species is found throughout the state in or near wooded areas. Mostly we have taken specimens on herbs such as violets and wild strawberries. Because we have found *pictipennis* only in the spring, it may be that this species has but a single early genera-

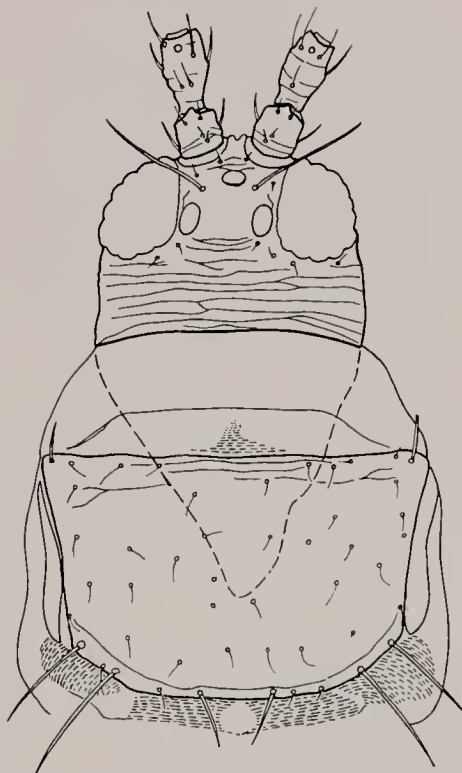


Fig. 118.—*Odontothrips pictipennis*, head and prothorax.

tion much like *Taeniothrips inconsequens*, and that like *T. inconsequens*, *pictipennis* pupates underground. By way of further speculation *pictipennis* may use its peculiar clawlike tibial processes to break out of a pupal case, if, indeed, it makes such a case.

Odontothrips morgani Bagnall is a synonym of *pictipennis*, a type specimen of which is in the U.S. National Museum. Morgan (1913) first described and illustrated this species, mistaking it for *Euthrips phalerata* Haliday. Later Bagnall (1929b), who recognized Morgan's misidentification, named it in his honor. Meanwhile, Hood (1916d) proposed *pictipennis* as the valid name.

Illinois records.—Collected from early April to mid-May, from one to several localities in the following counties: CARROLL, HARDIN, JACKSON, JOHNSON, PIATT, POPE, PUTNAM, and UNION.

Oxythrips Uzel

Oxythrips Uzel (1895:133). Type-species by subsequent designation by Hood (1916a).—*Oxythrips ajugae* Uzel.

Physothrips Karny (1912b:336). Type-species by original designation.—*Thrips ulmifoliorum* Haliday. Substituted name for *Physopus* which was emended by Uzel (1895) from *Physapus* Amyot and Serville (1843), preoccupied by *Physapus* Sultzter (1761). New synonymy.

Head wider than long to longer than wide. Antennae eight segmented, occasionally segment VI with a partial suture near apex. Antennal segments III and IV with forked sense cones. Mouth cone not greatly enlarged or extensively drawn out. Maxillary palps three segmented, labial palps two segmented.

Prothorax with one pair of epimeral setae well developed (in North America). Mesospinasternum separated from metasternum by suture. Fore legs not enlarged. All tarsi two segmented. Fore wings with two veins, setae on fore vein interrupted, setae on hind vein uniformly spaced, fringe cilia wavy.

Abdomen with pleural plates. Median pairs of setae placed far apart on the intermediate abdominal tergites. Abdominal tergite VIII without a posterior comb of setae. Abdominal segment X often elongated and pointed. In Illinois at least, males with sternal glandular areas and with two pairs of thornlike setae on abdominal tergite IX.

Physothrips Karny may be considered to be a synonym of *Oxythrips*, because the type-species of *Physothrips*, *Thrips ulmifoliorum* Haliday, is a true *Oxythrips* (Priesner 1920a). Unfortunately Karny originally thought that *ulmifoliorum* was *Taeniothrips*-like following Uzel's misidentification (Priesner 1926b), and some workers such as Prof. Dr. Priesner (1949), place *Physothrips* as a synonym of *Taeniothrips*. The problem in this case stems from the possible misidentification of a critical species. For disposition of this matter the Interna-

tional Commission of Zoological Nomenclature should be asked to decide. However, because *Physothrips* would be a synonymous name by any decision, it hardly seems worth the time and effort to probe deeper into the question and appeal to the Commission for a special ruling. I feel obliged to place *Physothrips* somewhere, and so I have placed it under *Oxythrips*.

Most of the thrips assigned to this genus are associated with pines.

These thrips are closely allied structurally to *Anaphothrips* and *Chilothrips*. In these genera antennal segment VI is often partially or completely subdivided by a secondary suture; the males usually have thornlike spines on abdominal tergite IX, and the wings have light, slender setae on the principal veins.

Another feature characteristic of *Oxythrips* is the small size of the median pair of setae on abdominal tergite IX. Most genera of the Thripidae, with the exception of wingless *Prosopothrips*, wingless *Anaphothrips*, and possibly a few others, have these setae long and well developed.

In Illinois *Oxythrips* may be distinguished from *Anaphothrips* by the chaetotaxy of the pronotum and abdominal tergite VIII. In *Oxythrips* s. str. the pronotum has one pair of well-developed epimeral setae and abdominal tergite VIII lacks a posterior comb of setae. By contrast, in *Anaphothrips* found in Illinois the prothorax lacks any well-developed setae and abdominal tergite VIII has a complete posterior comb of setae.

Specimens of *Chilothrips*, which also occur on pine, possess heavy mouth cones and by this characteristic they may be easily distinguished from representatives of *Oxythrips*.

Only one species, *Oxythrips divisus*, extends its range into Illinois.

Oxythrips divisus Hood

Oxythrips divisus Hood (1916a:39). ♀, ♂. Type-locality. — Branchville, Maryland.

FEMALE (macropterous).—Length distended nearly 1.5 mm. Color yellow except antennal segments II–VIII

and fore wings which are brown. Ocular pigment red.

Head (Fig. 119) slightly wider than long. Antennal segment VI with a partial ventral suture apically.

Prothorax with only one major pair of epimeral setae, these setae about as long as interocellar setae; with three pairs of minor setae between epimeral pair. Each fore tarsus with an apical claw similar to that found in *Taeniothrips inconsequens*. Fore wings with three setae on the apical portion of the fore vein.

Abdominal sternites with only a few scattered accessory setae in addition to the posterior ones. Abdominal tergite VIII without a posterior comb. Abdominal segment X about $1\frac{1}{2}$ times as long as segment IX.

MALE (macropterous).—Length distended over 1 mm. Similar to fe-

male in color and general structure. Abdominal sternites III–VI each with a small circular glandular area. Abdominal tergite IX with two median pairs of stout setae, the anterior pair being the stouter.

Hitherto known only from the eastern coastal states, this species is here reported for the first time from the Mississippi valley. It occurs on yellow pine in the southwestern tip of Illinois.

Illinois record.—UNION COUNTY: Pine Hills, April 8, 1953, Stannard, sweeping *Pinus echinata*, 3 ♀, 3 ♂.

Parthenothrips Uzel

Parthenothrips Uzel (1895:170). Type-species by monotypy.—*Heliothrips dracaenae* Heeger.

Head quadrate, distinctly narrowed at base, strongly reticulate dorsally. Eyes large, protruding. Ocelli in a close triangle, not raised. Antennae seven segmented, segments III–VII slender and elongate, terminal segment threadlike; sense cones on segments III and IV simple, not forked. Mouth cone moderate in size, broadly rounded. Maxillary palps two segmented.

Prothorax reticulate; setae broad and explanate, anteromarginal and posterolateral pairs the longest. Meso- and metascutum reticulate, metascutum without a raised V-shaped area. Mesospinasternum fused to metasternum. Tarsi one segmented. Hind coxae placed fairly close together. Macropterous; fore wings broad, indented at a region after the basal third, faintly reticulate; venal setae broad and explanate; bristle-like cilia lacking on the leading edge; fringe cilia wavy on the trailing edge.

Abdominal tergite I with a prominent median line as in Fig. 120b, suggestive of a precursor of the pelta as in the Tubulifera. Most tergites with weak hexagonal reticulations on the anteromedian and lateral regions. Abdominal tergite VIII with a lamellated posterior border, without comb of setae. Abdominal tergite X, in the female, nearly entirely split, with major setae terminal. Male with abdominal sternites IV–VII each bearing a round



Fig. 119.—*Oxythrips divisus*, head and prothorax.

to oval glandular area, according to Priesner (1926b).

Principally because of its reticulate wings, *Parthenothrips* seems most closely related to the Tertiary fossil *Geronthrips* and to the extant *Arachisothrips* and possibly *Retithrips*. By contrast *Geronthrips* had a much broader fore wing and *Arachisothrips* has a ballooned fore wing. The monotypic *Parthenothrips* is the only broad-winged heliothripine likely to be found in greenhouses in Illinois.

***Parthenothrips dracaenae* (Heeger)**

Heliothrips dracaenae Heeger (1854: 365). ♀, ♂. Type-locality.—Vienna, Austria, in greenhouse. Transferred to *Thrips* by Regel (1858). Transferred to *Parthenothrips* by Uzel (1895).

Parthenothrips dracaenae variety *concolor* Uzel (1895:172). ♀. Type-locality.—?Bohemia (Czechoslovakia). Priesner (1926b:134). ♂. New synonymy, undoubtedly *concolor* is the teneral phase of the species.

FEMALE (macropterous).—Length distended about 1.8 mm. Body color yellowish brown, darkest in abdominal segments II–VII, with abdominal segments I and VIII–X and parts of thorax lightest. Antennal segments I–V generally yellow, segments VI and VII brown. Fore legs nearly all yellow, mid and hind femora mostly brown, mid and hind tibiae and tarsi yellow. Fore wings pale except for brown spots at regions of wing constriction and a few spots and setae along the major veins in the apical third. Body setae pale yellow.

Head (Fig. 120a) with setae small, difficult to see.

Mesoscutum more or less reticulate medially, bearing striae laterally. Metascutum with reticulations very narrowly restricted to median region.

Abdominal tergite I with pelta as in Fig. 120b. Abdominal tergite VIII with explanate posterior border but without comb of setae. Abdominal tergite X nearly entirely split longitudinally along the median line.

MALE (macropterous).—None present in collections of the Illinois Nat-

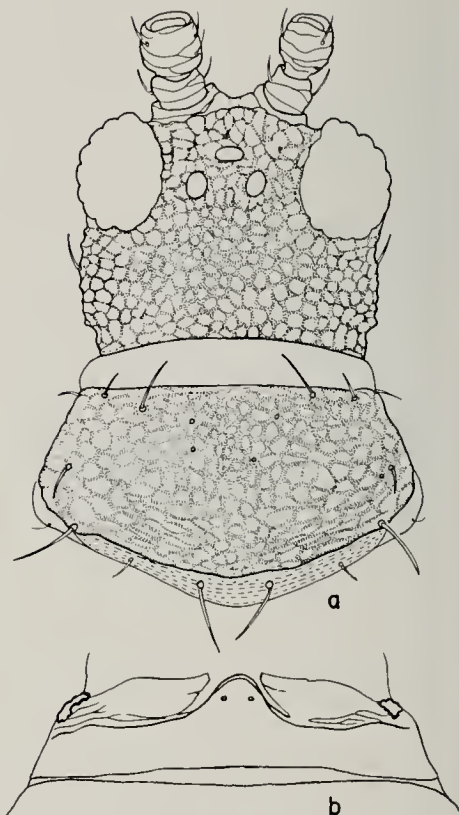


Fig. 120.—*Parthenothrips dracaenae*; a, head and prothorax; b, abdominal tergite I showing incipient pelta.

ural History Survey. Priesner (1926b) reports the male (var. *concolor*) as being smaller than the female, almost entirely yellow in color, and bearing a round-to-oblong glandular area on each of abdominal segments IV–VII.

The larvae and pupae have been described in part by Heeger (1854) and Priesner (1926b).

Possibly this thrips is indigenous to Africa, since some of its principal host plants are African, as for example *Dracaena*. As yet we have not taken it in Illinois, but since it occurs regularly in greenhouses in other states it is likely that our greenhouses may become similarly infested.

This thrips can be easily distinguished by the wide, reticulate fore wings. No other terebrantian known to be or expected to be in Illinois has such reticulations on its wings.

Plesiothrips Hood

Plesiothrips Hood (1915c:129). Type-species by original designation.—*Sericothrips* ? *perplexa* Beach.

Head about as long as wide to slightly longer than wide, prolonged in front of eyes. Antennae seven segmented (in Illinois), segment III small, segments III and IV each with a forked sense cone. Antennal segments IV–VI greatly elongated in males. Interocular setae well developed. Major postocular setae determinable only as the innermost setae varying in position from near the eyes to near the center of the head. Mouth cone moderately long, rounded at tip. Maxillary palps three segmented.

Prothorax nearly square in shape, with two pairs of epimeral setae. Mesospinasternum separated from metastutum by a wide suture. Fore legs not enlarged. All tarsi two segmented. Always macropterous. Fore wings each with two veins, setae on veins interrupted only on fore vein near apex, fringe cilia wavy.

Abdomen with pleural plates. Tergites and sternites without microsetae. Abdominal tergites without posterior combs of setae. Abdominal sternites without accessory setae in addition to posterior ones (in Illinois). Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal segment VIII of female with a red subintegumental spot. Abdominal tergite X of female with a full longitudinal split (in Illinois) (Fig. 41). Sawlike ovipositor degenerate. Abdominal sternites III and IV of males each with a pair of small, circular, glandular areas. Females (in Illinois) without abdominal sternal glandular areas. Abdominal tergite IX of males with a pair of thornlike projections on posterior margin.

The foregoing characterization of this genus pertains solely to the Nearctic species. In other regions additional characteristics may be definitive of the species involved. For instance, in parts of South America there are species with eight-segmented antennae, in Cuba and Brazil there is a species with numerous long setae on abdominal

sternites II–VII anterior to the usual posterior ones, and in Panama and Trinidad there is a species whose female bears male-like glandular areas on abdominal sternite III.

About a dozen species are now known from North and South America. Of these, three species occur in Illinois. One, *perplexus*, is an abundant, ubiquitous species of the eastern United States; the second, *andropogoni*, is a less common species being derived from the southeastern states; and the third, *ayarsi*, is the relatively rare, southwestern derivative whose relict populations are mostly confined to sand and hill prairies in our state.

A closely related genus, *Plesiopsothrips*, was described from Trinidad in 1956 by Hood.

KEY TO SPECIES

(OF THE NEARCTIC REGION)

Key based in part upon descriptions. *Plesiothrips panicus* (Moulton), which is possibly identical with *Plesiothrips perplexus* (Beach), according to Hood (1936b), and males of *Plesiothrips typhae* Hood are not included because characteristics used herein were not mentioned in the original descriptions, nor are they known to me.

- 1. Head (Fig. 121) and antennal segments I and II almost entirely yellow; southeastern United States..... females of *andropogoni*
Head and antennal segments I and II almost entirely dark brown.....2
- 2. Females (females of *williamsi* unknown).....3
Males (males of *andropogoni* and *setiventris* unknown).....6
- 3. Abdominal sternites II–VII with numerous long setae in addition to posterior ones; Cuba..... *setiventris*
Abdominal sternites II–VII without accessory setae in addition to posterior ones.....4
- 4. Femora dark brown; Florida..... *typhae*
Femora predominantly yellow, although sometimes fore femora darker.....5
- 5. Prothorax yellow, at most only lightly clouded with brown; inner postocular setae placed forward of other postocular setae (Fig. 122); midwestern United States and Mexico..... *ayarsi*
Prothorax brown; inner postocular setae placed medially back from or no farther forward than the other postocular setae (Fig. 123); eastern United States..... *perplexus*
- 6. Antennal segments IV and V without ring-joint at base; southern United States and Mexico..... *williamsi*
Antennal segments IV and V with ring-joint at base.....7

7. Inner postocular setae placed forward of other postocular setae. *ayarsi*
 Inner postocular setae placed medially back from or no farther forward than the other postocular setae. . . *perplexus*

***Plesiothrips andropogoni* Watts**

Plesiothrips andropogoni Watts (1934: 24). ♀. Type-locality.—Not given in the original description but either Clemson or Rocky Bottom, South Carolina.

Plesiothrips andropogonis [sic] *watsoni* Watts (1934:26). ♀. Type-locality.—Gainesville, Florida. New synonymy, not recognized here as either a variety or a subspecies.

FEMALE (macropterous).—Length distended about 1.2 mm. Color generally yellow, head deepest yellow. Brown: antennal segment III lightly in apical half, antennal segments IV–VII, and extreme sides of abdominal segment X. Fore wings clouded with gray. Ocellar pigment red.

Head, as in Fig. 121, longer than

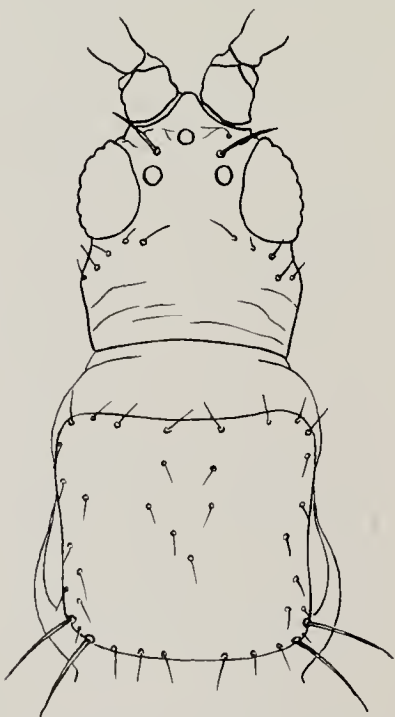


Fig. 121. *Plesiothrips andropogoni*, head and prothorax.

wide. Inner postocular setae near eyes and in line with the other postocular setae. Antennae seven segmented.

Prothorax with three pairs of posterior marginal setae between the epimeral pairs.

Abdominal sternite III without glandular areas. Abdominal tergite X completely split longitudinally.

MALE.—Unknown.

Plesiothrips andropogoni is easily recognized from its congeners in Illinois by the yellow body color and by the yellow color of antennal segments I and II.

This is a thrips of the broom sedge (*Andropogon virginicus*). Like its host, it is confined mainly to the southeastern United States. So far *andropogoni* has been found only in southeastern Illinois in the Wabash River drainage district. Elsewhere it is known from South Carolina and Florida, and in the collections of the Illinois Natural History Survey there are specimens from Mammoth Cave National Park, Kentucky and the Florida Everglades.

Illinois records.—**LAWRENCE COUNTY**: Red Hills State Park, April 30, 1950, Smith, Stannard, sod of *Andropogon*, 11 ♀. **WHITE COUNTY**: Gossett, August 17, 1951, Ross, Stannard, sod, 2 ♀.

Plesiothrips ayarsi

Plesiothrips ayarsi Stannard (1957a: 173). ♀, ♂. Type-locality.—Fountain Bluff (Gorham), Illinois.

FEMALE (macropterous).—Length distended about 1.3 mm. Bicolored, brown and yellow. Brown: head; antennal segment I, most of segment II except apex, segment IV in apical half, segment V except pedicel, and all of segments VI and VII; posterior half of abdominal segment IX; and all of abdominal segment X. Yellow: rest of body except prothorax which is faintly clouded with brown. Fore wings pale yellowish white but with some light gray tints. Ocellar pigment red. Body with red subintegumental pigment, extended throughout most of the thorax.

Head longer than wide (Fig. 122). Inner postocular setae placed near

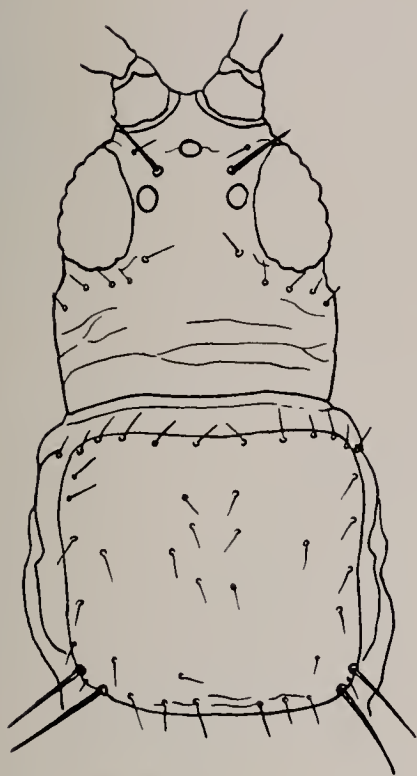


Fig. 122.—*Plesiothrips ayarsi*, head and prothorax.

eyes more anteriorly on head than are other postocular setae.

Prothorax with three pairs of posterior minor setae between the epimeral pairs.

Abdominal sternite III without glandular areas. Abdominal sternites without accessory setae in addition to posterior ones.

MALE (macropterous).—Length distended slightly over 1 mm. Darker colored than female. Almost entirely light brown with head, antennae, and terminal abdominal segments darkest and with apical portions of leg segments and anterior abdominal segments lightest.

Like the female in structure with the following exceptions. Antennal segments IV-VI enlarged as usual for males in this genus and segments IV and V each with a ring-joint. Abdominal sternites III and IV each with a pair of small, circular glandular areas. Abdominal tergite IX with the usual

two thornlike posterior marginal projections.

This species is a southwestern derivative; at least its range outside of Illinois is located entirely to the southwest. It was named for James S. Ayars, former technical editor for the Illinois Natural History Survey, who collected the only Texas specimen of this species.

From the closely related *perplexus*, *ayarsi* may be distinguished by the lighter color of the abdomen and thorax, and by the placement of the inner postocular setae. In *ayarsi* these setae are placed more forward on the head and nearer the eyes, whereas in *perplexus* they are placed farther back and more medially on the head.

In Illinois this thrips is mostly confined to sand or hill prairies. Its distribution is disjunct and suggestive of the distribution of a relict species.

Illinois records.—**COOK COUNTY:** east of Elgin (Shoefactory Road hill prairie), October 10, 1952, Ross, Stannard, prairie grasses, 1 ♀. **HARDIN COUNTY:** Karbers Ridge, August 18, 1950, Evers, Stannard, hill prairie, 1 ♀. **JACKSON COUNTY:** Gorham (Fountain Bluff), August 16, 1950, Evers, Stannard, hill prairie, 6 ♀, 2 ♂. **JOHNSON COUNTY:** Vienna, August 17, 1950, Evers, Stannard, hill prairie, 1 ♀. **MASON COUNTY:** Forest City, September 11, 1953, Ross, Stannard, sand prairie, 3 ♀. **PIATT COUNTY:** Monticello, October 3, 1939, Farrar, 1 ♀.

Plesiothrips perplexus (Beach)

Sericothrips ? *perplexa* Beach (1896: 216). ♀. Type-locality.—Ames, Iowa. Hood (1915c:130). ♀. Transferred to *Thrips* by Hinds (1902). Transferred to *Plesiothrips* by Hood (1915c).

FEMALE (macropterous) (Fig. 123).—Length distended about 1.3 mm. Colored brown with some yellow. Brown: head; antennal segment I, segment II except at extreme apex, segment V except extreme base, and all of segments VI and VII; thorax; all coxae; abdomen except for the margins of the intermediate segments. Rest of

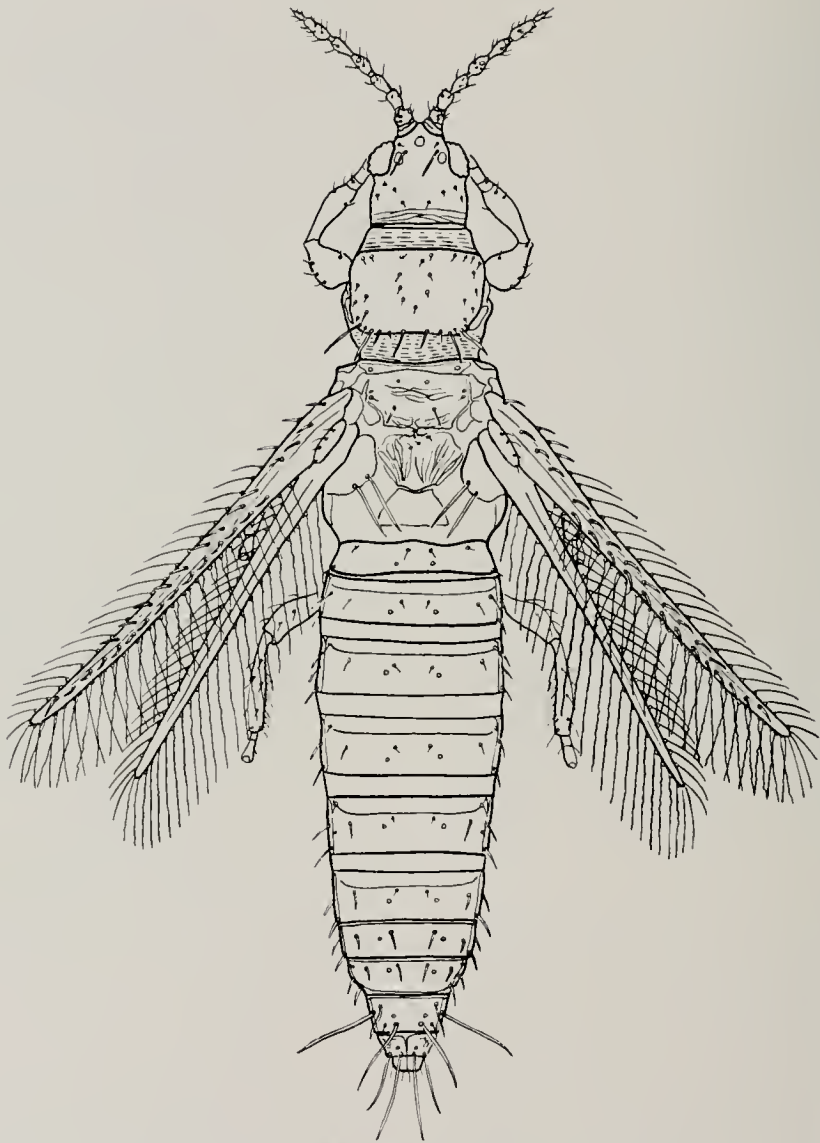


Fig. 123.—*Plesiothrips perplexus*, dorsal aspect.

body, legs, and antennae yellow. Ocular pigment red. Fore wings heavily clouded with brown. Body, especially thorax, with much bright orange-red subintegumental pigment.

Head about as long as wide. Inner postocular setae placed medially on the head and not farther forward than the other postocular setae.

Prothorax with three pairs of minor posterior setae between epimeral pairs.

Abdominal sternite III without

glandular areas. Abdominal sternites with accessory setae in addition to posterior ones.

MALE (macropterous).—Length distended over 1 mm. Darker in color than female; only base of antennal segment III, tarsi, and apexes of tibiae yellow. General structure as in female except antennae enlarged in segments IV–VI, segments IV and V each with a basal ring-joint; and abdominal sternites III and IV each

with a pair of small, circular glandular areas. Abdominal tergite IX with the usual pair of thornlike posterior processes.

This species differs from its nearest relative, *P. ayarsi*, in color and the placement of the inner postocular setae on the head.

Plesiothrips perplexus has been recognized for a long time, yet almost nothing is known of its habits or its distributional limits except that it occurs over most of the eastern states and is found in grasses. It is found throughout Illinois.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ALEXANDER, CALHOUN, CHAMPAIGN, CLARK, COOK, CUMBERLAND, DE WITT, DOUGLAS, EDGAR, GALLATIN, IROQUOIS, JACKSON, JOHNSON, LAKE, LAWRENCE, LEE, MARION, MASON, MERCER, MORGAN, PIATT, PIKE, and WINNEBAGO.

***Pseudodendrothrips* Schmutz**

Pseudodendrothrips Schmutz (1913: 998). Type-species by monotypy.—*Pseudodendrothrips ornatissima* Schmutz.

Head much wider than long, with anterior margin inset between eyes. Eyes bulged from sides of head. Ocellar triangle located between the posterior portions of the eyes. Antennae eight segmented (abnormally nine segmented), segment II widest, segments III and IV with forked sense cones. Mouth cone moderately long. Maxillary palps two segmented.

Prothorax with striae transverse, suggestive of *Sericothrips*, postero-lateral setae with one pair well developed. Mesospinasternum separated from metasternum by a suture. Metascutum longitudinally striate. Metathoracic furcae greatly enlarged. Tarsi one segmented, hind tarsi each exceptionally elongated. Fore wings with fringe cilia straight.

Abdominal tergites laterally sculptured with transverse striae which are interspersed with fine, closely spaced, crosslines; tergites II–VIII each with a median pair of closely spaced setae;

tergite VIII with a posterior comb of setae. Ovipositor well developed in female. Males apparently without abdominal sternal glands, and without thornlike setae on abdominal tergite IX.

This genus is very similar to *Leucothrips*. In our area, besides having eight segments in the antennae, instead of seven, *Pseudodendrothrips* further differs from *Leucothrips* by having a proportionately longer tarsus in each hind leg.

Of the half dozen known species, only the introduced *Pseudodendrothrips mori* occurs in Illinois.

***Pseudodendrothrips mori* (Niwa)**

Belothrips mori Niwa (1908:180). ? ♀.

Type-locality.—Japan. Transferred to *Pseudodendrothrips* by Priesner (1938).

FEMALE (macropterous).—Length distended about 1 mm. General color white, becoming yellowish white in the head and thorax. Anterior portion of head and antennae light gray; antennal segment I lightest. Fore wings pale yellowish gray. Ocellar pigment red. Body setae colorless.

Head (Fig. 124) about twice as wide as long, deeply depressed anteriorly

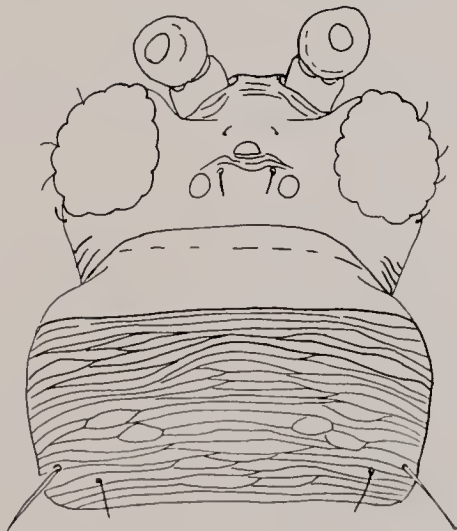


Fig. 124.—*Pseudodendrothrips mori*, head and prothorax.

between eyes. Frontal costa broad. Posterior dorsal area with broad post-occipital band. Ocellar triangle placed between the eyes. Ocellar and postocular setae minute. Mouth cone moderately long, broadly rounded. Maxillary palps each two segmented.

Antennal segments—I quadrate; II widest, globular, broadly pedicellate; III and IV each ovoid, with narrow pedicel, bearing forked sense cones; V and VI cylindrical, pedicellate; VII slender, elongate, occasionally partially subdivided; VIII slender, about half as long as VII.

Prothorax broader than long, sculptured with transverse, anastomosing striae, except for clear areas on either side of the middle, with sparsely scattered small setae; posterolateral angles each with a well-developed, pointed seta.

Pterothorax quadrate, slightly constricted between meso- and metathorax. Metascutum longitudinally striate medially, becoming somewhat hexagonally reticulate laterally. Metafurcae enlarged.

Legs slender, especially hind legs which are elongate. Tarsi each one segmented.

Fore wings with fore vein bearing about five small, major venal setae; fringe cilia straight.

Abdominal tergites II–VII laterally sculptured with transverse striae which are subdivided by fine lines; tergites II–VIII with each member of the median pair of setae placed closely together. Abdominal tergite VIII with comb complete. Abdominal tergite X seemingly entire, not split.

MALE (macropterous).—Length distended slightly over 0.6 mm. Color and structure much as in female. Abdominal tergite IX without any enlarged spinelike setae. Abdominal sternites seemingly without glandular areas.

As stated by Priesner (1938), this thrips probably originated in China or Japan, and has since been transported elsewhere. Our records bear out this contention; so far *mori* has been found only on oriental mulberries and not on our native species. J. C. Crawford first collected this thrips in the

United States in Carroll County, Maryland, in 1937. As far as I know it was not collected again until Drs. Dysart, Brooks, and Moll, then graduate students, found it abundant on *Morus alba* in and around Champaign County, Illinois in 1961. Other records have since been added in our state. According to Dr. Brooks these thrips are found most commonly on the undersides of newly formed leaves.

Illinois records.—Collected from July to late October, from one to several localities in the following counties: ADAMS, CALHOUN, CHAMPAIGN, COLES, DE WITT, DOUGLAS, FULTON, HANCOCK, IROQUOIS, JASPER, LAKE, LEE, LOGAN, MARION, MASON, McDONOUGH, MCLEAN, PIATT, PIKE, and SCHUYLER.

Pseudothrips Hinds

Pseudothrips Hinds (1902:146). Type-species by monotypy.—*Thrips inaequalis* Beach.

Head wider than long. Antennae nine segmented. Antennal segments III and IV with forked sense cones. Mouth cones not enlarged. Maxillary palps three segmented, labial palps two segmented.

Prothorax sculptured as in *Sericothrips*, with one pair of epimeral setae well developed. Mesospinasternum separated from metasternum by suture. Fore legs not enlarged. All tarsi two segmented. Fore wings with two veins, setae on fore and hind vein usually uniformly spaced, fringe cilia wavy.

Abdomen with pleural plates present but only weakly separated from the tergites. Median pair of setae on abdominal tergites I–V closely spaced. Abdominal tergite VIII with a complete comb of setae, the lateral setae of this comb frequently fused at base. Abdominal sternites without accessory setae in addition to posterior ones. Males with abdominal sternal glandular areas, thornlike setae present on abdominal tergite IX.

A characteristic of *Pseudothrips* of particular importance is the close pairing of the median abdominal setae

on the first five tergites. Priesner (1949:54) used this morphological feature as an identification aid in his key, and I believe that it can be used further as an aid in interpreting phylogenetical relationships.

It is this characteristic which permits the suggestion that *Pseudothrips* is linked to *Sericothrips*. It can be interpreted also that the presence of weakly developed microsetae on abdominal segments V–VIII in *Pseudothrips* is indicative of relationship with *Sericothrips* and that these microsetae are vestiges of the more developed condition found in *Sericothrips*.

For identification, the above-mentioned characteristic (close pairing of the median abdominal setae) allows the easy separation of *Pseudothrips* from *Psectrothrips*, a neotropical genus including *delostomae*, *beckeri*, and *spadix* (here transferred from *Pseudothrips*). *Psectrothrips* has the median abdominal setae widely spaced. In addition all the species of *Psectrothrips* have a complete or nearly complete comb of setae on the posterior margin of abdominal tergite VII whereas in *Pseudothrips* no comb is present on tergite VII.

The close pairing of the median abdominal setae is a feature which also separates *Pseudothrips* from other genera in the Thripidae, such as *Oxythrips* and *Anaphothrips*, that have nine segments in each antenna. Species in these other genera have the median abdominal setae widely spaced.

In my opinion *Pseudothrips* is a monobasic genus and all presently assigned species other than the type-species belong elsewhere or are synonyms of *inequalis* (Beach).

Pseudothrips inequalis (Beach)

Thrips inequalis Beach (1896:223). ♀. Type-locality.—Ames, Iowa. Transferred to *Pseudothrips* by Hinds (1902).

Anaphothrips (Proscirtothrips) monotropae Watson (1927b:29). ♀, ♂.

Type-locality.—Gainesville, Florida. Transferred to *Pseudothrips* by O'Neill (1955). New synonymy.

Anaphothrips crassicornis Moulton

(1929b:231). ♀, ♂. Type-locality.—Champaign County, Illinois. New synonymy.

FEMALE (macropterous).—Length distended about 1 mm. Color almost entirely pale yellow except apical parts of antennal segments III–V, most of VI, and all of VII–IX, which are brown. Ocellar crescents orange.

Head with interocellar setae small.

Posterior pronotal margin with three pairs of small setae between larger epimeral pair. Metascutum hexagonally reticulate.

Abdominal segments V–VIII, at least, with occasionally weak microsetae at extreme sides.

MALE (macropterous).—Length distended about 1 mm. Color and general structure similar to female. Abdominal sternite III with a small, oval, glandular area forward of the sclerotized portion of the segment. Abdominal tergite IX with two large and two small thornlike setae.

This eastern species is found throughout the state, often on willow or basswood leaves. Its larval hosts have not yet been determined positively, but *Salix* is suspected to be one.

Illinois records.—Collected during spring and summer, from one to several localities in the following counties: ADAMS, ALEXANDER, BOONE, CHAMPAIGN (Moulton 1929b), COOK, JACKSON, JOHNSON, KNOX, LA SALLE, MONROE, OGLE, PIKE, POPE, PUTNAM, TAZEWELL, UNION, VERMILION, and WOODFORD.

Rhaphidothrips Uzel

Rhaphidothrips Uzel (1895:131). Type-species by monotypy.—*Rhaphidothrips longistylota* Uzel.

Head about as wide as long, transversely striate. Cheeks bulged behind eyes. Ocelli present, often reduced in size in the brachypterous form. Antennae eight segmented, segments III and IV with forked sense cones, segments V and VI closely joined, segments VII and VIII forming a long, slender style which is much longer than segment VI. Maxillary palps three segmented, la-

bial palps two segmented. Mouth cone fairly long.

Prothorax with only the two pairs of epimeral setae well developed. Mesospinasternum separated from metasternum by a suture. All tarsi two segmented. Macropterous, micropterous, or brachypterous. Fore wings, when well developed, with the setae on each of the two principal veins irregularly and sparsely setose, fringe cilia wavy.

Abdominal tergites and sternites without microsetae. Median pair of dorsal setae placed fairly far apart. Abdominal sternites without accessory setae in addition to the posterior ones. Abdominal tergite VIII with a posterior comb. Males with sternal glandular areas, without thornlike setae on abdominal tergite IX.

This monobasic genus was created for a species which could have been assigned to *Taeniothrips* but which, because of the peculiar, long style of the antennae, deserved special recognition.

As yet *Rhaphidothrips* is not known to be represented in Illinois. The species *longistylus* occurs in several countries in northern Europe and in Massachusetts and Connecticut.

***Rhaphidothrips longistylus* Uzel**

Rhaphidothrips longistylus Uzel (1895:131). ♀, ♂. Type-locality.—Czechoslovakia.

Rhaphidothrips fuscipennis Hinds (1902:159). ♀. Type-locality.—Massachusetts. New synonymy.

FEMALE (micropterous).—Length distended about 1.5 mm. General color dark brown. Inner apex of fore tibia and all tarsi yellow. Antennal segments III, IV, and base of V yellow to yellowish brown; antennal segments VI and VII light brown. Fore wings grayish brown. Ocellar and subintegumental body pigments reddish orange.

Head about as wide as long, slightly bulged behind eyes (Fig. 125). Ocelli present, each much larger than an eye facet. Interocellar setae fairly well developed. Postocular setae well developed.

Prothorax with transverse striae, with three pairs of small setae along the posterior margin between the ma-



Fig. 125.—*Rhaphidothrips longistylus*, head and prothorax.

jor epimeral setae. Fore wings with both principal veins sparsely setose.

Abdominal tergites transversely striate. Abdominal sternites without accessory setae in addition to the posterior ones. Abdominal tergite VIII with complete comb of irregular-sized setae. Abdominal tergite X not split.

FEMALE (brachypterous).—Similar in most respects to micropterous female except ocelli reduced in size, each about as small as an eye facet, and wings reduced to pads.

MALE (brachypterous).—Length distended about 1.2 mm. Similar to brachypterous female with the following exceptions. Ocelli as large as in micropterous female. Abdominal sternites III–VII each with a median, transversely elliptical glandular area.

By the form of the antennae, with their long styles and the close union of segments V and VI, this species can be easily distinguished from the other species in eastern North America belonging to genera near the *Taeniothrips-Thrips* complex.

Almost certainly *longistylus* has been introduced from Europe to North America. Although known from Mas-

sachusetts as early as 1902, it apparently has not spread westward from the eastern coastal area. It may or may not disperse to or become established in Illinois.

I have examined specimens from Czechoslovakia and Connecticut, the latter being from soil samples taken in a five-year-old pine plantation growing in an old field.

Scirtothrips Shull

Scirtothrips Shull (1909:222). Type-species by monotypy.—*Scirtothrips ruthveni* Shull.

Sericothripoides Bagnall (1929a:69). Type-species by original designation.—*Dendrothrips bispinosus* Bagnall. Synonymized by Hood (1935).

Head wider than long, not at all prolonged in front of eyes. Ocelli present. All head setae relatively short. Antennae eight segmented, segments III and IV with forked sense cones, segment VI not pedicellate in Illinois species. Mouth cone moderate in size. Maxillary palps three segmented.

Prothorax with one pair of posterior setae longer than any of the other marginal setae. Pronotum closely and transversely striate, with blotch region present. Mesospinasternum separated from metasternum by suture. Fore wings narrow with two longitudinal veins, fore vein with setae interrupted, hind vein with several apical setae only, fringe cilia wavy. Tarsi two segmented.

Abdominal segments I-VIII with numerous microsetae on the sides. Abdominal sternites II-VII with major setae along posterior margin. Abdominal sternites without accessory setae except for microsetae. Abdominal tergites with median pair of setae fairly closely or closely spaced. Abdominal tergite VIII with a complete comb of posterior setae. Female with well-developed ovipositor. Males apparently without glandular areas on the abdominal sternites and without thorn-like setae on abdominal tergite IX.

This genus is one of the several genera in Illinois which have extensive areas of the abdomen covered by mi-

crosetae and which are not heavily reticulate. In both *Scirtothrips* and the related *Sericothrips* the antennae are eight segmented, whereas in the other close relative, *Zonothrips*, the antennae are only seven segmented. From *Sericothrips*, which has an even row of setae on the fore vein of the fore wing, *Scirtothrips* may be distinguished by its interrupted row of setae on the fore vein of the fore wing. Unlike *Sericothrips* and *Zonothrips*, *Scirtothrips* bears the major posterior setae of abdominal sternite VII along the posterior margin. These setae are borne far forward of the posterior margin (nearly in the middle of the segment) on abdominal sternite VII in *Sericothrips* and *Zonothrips*.

Three species, *brevipennis*, *niveus*, and *taxodii*, inhabit Illinois. The species *ruthveni*, although found in parts of the eastern United States, has not been recognized in our fauna. *Scirtothrips longipennis* (Bagnall) has been observed in a greenhouse in New York but, as yet, not in our state.

Priesner (1932) and Bailey (1964) have treated this genus taxonomically and presented keys.

KEY TO SPECIES

- 1. Antennal segment II decidedly brownish gray in color; on red cedar (*Juniperus*) *brevipennis*
Antennal segment II light gray, yellow, or nearly colorless. 2
- 2. Body green in life; length of hind tibia and tarsus combined only about twice the length of the prothorax; on cypress (*Taxodium*) *taxodii*
Body white to light yellow in life; length of hind tibia and tarsus combined about 2½ times the length of the prothorax; on dogwood (*Cornus*) *niveus*

Scirtothrips brevipennis Hood

Scirtothrips brevipennis Hood (1914d: 18). ♀. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended nearly 1 mm. General color yellow to light yellow. Antennal segment I white, segments II-VIII brownish gray. Prothorax and legs clouded with gray. Fore wings gray. Abdominal tergites each with a faint brown, anterior, transverse line.

Length of hind tibia and tarsus combined more than $2\frac{1}{2}$ times the length of the short prothorax. Fore wings shorter than in *niveus*.

Abdominal tergites with median setae very closely spaced.

MALE.—Unknown.

This species can be easily distinguished from other species in Illinois by the general yellow color and by the brownish gray color of antennal segment II.

It occurs, undoubtedly, on eastern red cedar (*Juniperus virginiana*) throughout the state wherever this tree grows naturally.

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 8, 1951, Richards, Stannard, on red cedar, 1 ♀. CALHOUN COUNTY: Batchtown, June 22, 1967, Evers, Stannard, on red cedar, 3 larvae. HARDIN COUNTY: Karbers Ridge (High Knob), August 18, 1950, Stannard, on red cedar, 1 ♀. JOHNSON COUNTY: Vienna, August 17, 1950, Stannard, on red cedar, 4 ♀. MCHENRY COUNTY: Harvard, July 28, 1960, Ross, Cunningham, on red cedar, 1 ♀. PUTNAM COUNTY: Magnolia, June 13, 1956, Glen, Selander, Stannard, on red cedar, 1 ♀.

Scirtothrips niveus Hood

Scirtothrips niveus Hood (1913b:161).
♀, ♂. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1 mm. General color nearly white to pale yellow. Antennal segment I white, segment II pale gray to almost white, segments III–VIII gray with bases of intermediate segments lighter. Fore wings pale gray, being darkest at base; occasionally wing veins tinged with red.

Length of hind tibia and tarsus combined about $2\frac{1}{2}$ times the length of the pronotum. Fore wings proportionately longer than in *niveus* and *brevipennis*.

Abdominal tergites with median setae slightly farther apart than in *brevipennis*.

MALE (macropterous).—Length distended about 0.8 mm. Similar in

color and structure to female. Abdominal sternal glandular areas apparently absent.

According to the published descriptions, *niveus* differs from the closely related *ruthveni* solely in color. Reportedly *ruthveni* is yellow, including the antennal segments. By contrast *niveus* is nearly white in the body, and antennal segments III–VIII are generally gray. Studies of the populations of both species should be made in the future to determine whether they are discrete species or merely represent color phases.

Scirtothrips niveus is found throughout the state on leaves of several species of dogwood (*Cornus*).

Illinois records.—Collected during spring and summer, from one to several localities in the following counties: CARROLL, CLARK, COOK, GREENE, JO DAVIESS, LA SALLE, ROCK ISLAND, and UNION.

Scirtothrips taxodii Hood

Scirtothrips taxodii Hood (1954a:277).
♀. Type-locality.—Reynoldsville, Georgia.

FEMALE (macropterous).—Length distended about 1 mm. Color in life generally light green. Color when preserved in alcohol generally light yellow to white. Antennal segment I white, segment II light gray, segments III–VIII gray becoming darker towards apex. Fore wings lightly clouded with gray. Ocellar pigment red.

Length of hind tibia and tarsus combined only about twice the length of the pronotum. Fore wings shorter than in *niveus*.

Abdominal tergites with median setae frequently more closely spaced than in *niveus* but not usually as closely spaced as in *brevipennis*.

MALE (macropterous).—Length distended about 0.9 mm. Similar in color and structure to female. Abdominal sternites without glandular areas. Abdominal tergite IX without thornlike setae.

This species has the shortest hind legs of the three members of the genus

in Illinois. Like *brevipennis*, *taxodii* has short wings as compared to those of *niveus*. In life, *taxodii* is green, as are most species of insects and spiders found associated with bald cypress.

Scirtothrips taxodii occurs in extreme southern Illinois on leaves of its host, bald cypress (*Taxodium distichum*).

Illinois records (Fig. 25).—ALEXANDER COUNTY: Horseshoe Lake, August 16, 1951, Ross, Stannard, on bald cypress, 11 ♀, 4 ♂, 4 larvae; Horseshoe Lake, July 17, 1947, Stannard, on bald cypress, 2 ♀. JOHNSON COUNTY: Vienna, June 14, 1934, DeLong, Ross, swept from bald cypress, 1 ♀. MASSAC COUNTY: Mermet, August 16, 1951, Ross, Stannard, on bald cypress, 2 ♀, 1 larva. POPE COUNTY: Waltersboro, August 17, 1951, Ross, Stannard, on bald cypress, 2 ♀. UNION COUNTY: Jonesboro, July 26, 1951, Sanderson, Richards, on bald cypress, 3 ♀.

Scolothrips Hinds

Scolothrips Hinds (1902:157). Type-species by monotypy.—*Thrips sexmaculata* Pergande.

Chaetothrips Schille (1910:5). Type-species by monotypy.—*Chaetothrips uzeli* Schille. Synonymized by Bag-nall (1914).

Head wider than long, slightly prolonged in front of eyes, this slight head production bearing two long setae. Ocelli on slightly raised area. Inter-ocellar setae extremely long. Antennae eight segmented, segments III and IV each with a forked sense cone. Maxillary palps three segmented.

Prothorax with all major setae, including midlateral pair, long. Mesospinasternum separated from metasternum by a suture. Tarsi two segmented. Macropterous in Illinois. Fore wings with two veins both of which are set with long setae, fringe cilia wavy.

Abdominal tergites with median setae set far apart. Abdominal sternites without accessory setae, posterior marginal setae long. Abdominal tergite VIII without complete comb of posterior marginal setae. Female with well-developed ovipositor. Males with

large, transverse, dumbbell-shaped glandular areas, one each on abdominal sternites III–VIII. No major setae on abdominal tergite IX reduced or thornlike.

This is the only genus of the family Thripidae in Illinois whose species always bear extremely long prothoracic setae, including long midlateral setae, and exhibit two brown spots or bands on each fore wing.

In 1939 Bailey reported on the biology of one of the species and in 1950 Priesner monographed the genus for the world. As far as is known these thrips are predacious and feed on spider mites.

The proper identity of the type-species, *sexmaculatus*, was more or less established by Priesner in 1950, based upon Pergande's original description in which the extent of the dark areas of the body and wings was stated. The placement and size of these areas are now known to be diagnostic. Because Pergande had a mixture of species before him, a darker species from California and a lighter species from Washington, D.C., and thought them to represent but one species, it would be expedient to fix the type from this series to conform to the protolog and to Priesner's treatment.

Through the kindness of Miss Kellie O'Neill, permission was gained to examine Pergande's handwritten notes in the U.S. Archives and the series of cotypes in the U.S. National Museum. Based on these inquiries the lectotype of *sexmaculatus* is designated herein to be the single female specimen on the slide labeled "Thrips 6-maculata Pergande, 120/22, 4363." On page 519, Volume 6, Notes Division of Entomology, the data given by Pergande for this specimen (120/22, 4363) are: "Los Angeles, California, October 27, 1888, D. W. Coquillett, found feeding upon the red spider." The type-species is, therefore, the darker western U.S. species, and some of the other lighter specimens in the cotype series collected from Washington, D.C. are *pallidus* (Beach).

Only two species, *hoodi* and *pallidus* occur in Illinois (Fig. 126).

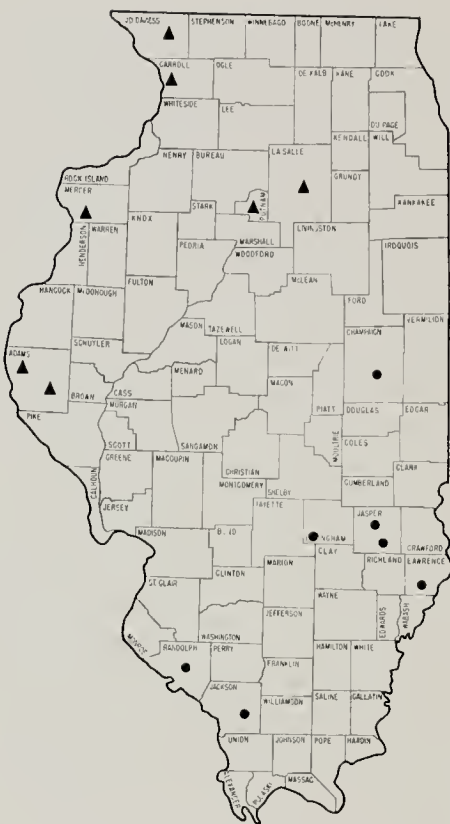


Fig. 126.—Distribution of species of *Scolothrips* in Illinois: *Scolothrips pallidus* (circular dots) and *Scolothrips hoodi* (triangular marks).

KEY TO SPECIES

(ILLINOIS, EXCEPT WHERE NOTED)

1. Body pale yellow without any brown markings on abdomen; basal wing band reduced to a small elliptical spot. *pallidus*
Body with brown markings especially on abdomen; basal wing band larger. 2
2. Prothorax, legs, head, and antennae largely grayish brown; prothoracic setae short, wing bands relatively small. *hoodi*
Prothorax with four brown spots; antennae, head, and legs lighter; prothoracic setae longer; wing bands smaller. This species, principally from the Southwest, has not yet been found in Illinois. *sexmaculatus*

Scolothrips hoodi Priesner

Scolothrips hoodi Priesner (1950:45).
Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1.5 mm. Color pale yellow with light brown markings. Most of head, antennal segments II–VIII, most of the posterior half of the prothorax, most of the pterothorax, legs, and all but the extreme sides of the abdominal tergites light brown with the antennae darkest. Fore wings with most of the scale, a broad band at the basal third, and a broad band at the apical third grayish brown. Most of the long fore wing setae brown.

Prothorax with major setae much smaller than the width of the head. Posterior part of prothorax with a pair of small median setae.

MALE.—Unknown.

This species differs from *pallidus* in the darker color and the shorter prothoracic setae.

It has been found in several localities in Illinois on certain conifers, eastern red cedar (*Juniperus virginiana*), and yew (*Taxus canadensis*).

Illinois records (Fig. 126).—ADAMS COUNTY: Lima, June 24, 1948, Stannard, on red cedar, 1 ♀; Siloam Springs State Park, June 25, 1948, Stannard, on red cedar, 1 ♀. CARROLL COUNTY: Palisades State Park, June 16, 1948, Stannard, on red cedar, 3 ♀. JO DAVIESS COUNTY: Apple River Canyon State Park, July 10, 1947, Sander-son, Stannard, on yew, 1 ♀. LA SALLE COUNTY: Utica (Clarks Run), September 16, 1958, Evers, Stannard, on red cedar, 1 ♀. MERCER COUNTY: Joy, June 18, 1948, Stannard, on red cedar, 5 ♀. PUTNAM COUNTY: Magnolia, June 13, 1956, Glen, Selander, Stannard, on red cedar, 2 ♀.

Scolothrips pallidus (Beach)

Thrips pallida Beach (1896:226). ♀, ♂. Type-locality.—Not given but either Ames or Belle Plaine, Iowa, or Barraboo, Wisconsin. Transferred to *Scolothrips* by Hinds (1902).

FEMALE (macropterous).—Length distended about 1.1 mm. General color nearly white to yellow. Antennal segments III–VIII faintly clouded with pale gray. Fore wings with basal half of scale, elliptical dot at the basal

third, and a small crossband at the apical third grayish brown. Setae arising from these fore wing markings brown.

Head as in Fig. 127.

Prothorax with major setae about as long as width of head. Posterior part of prothorax with a pair of small median setae.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in color and structure. Abdominal sternites III–VIII each with a large, dumbbell-shaped glandular area. Abdominal tergite IX with major setae arranged in a transverse row.

This species, which for nearly a half century had been considered to be a synonym of *sexmaculatus*, was resurrected and properly defined by Priesner (1950). It differs from the other Illinois species, *hoodi*, by having lighter coloration and longer prothoracic setae. The southwestern species, *sexmaculatus*, among other characteristics, has dark spots on the thorax and abdomen and can be easily distinguished from the uniformly pale *pallidus*.

Scolothrips pallidus undoubtedly occurs throughout Illinois and is at

times abundant on soybeans, roses, and other crops where it feeds on spider mites. Although this predacious thrips is beneficial in that it destroys plant-eating mites, it seems to be incapable of materially reducing large populations of these mites (Bailey 1939b). Its economic value as a natural controlling force in agriculture in Illinois is unknown.

Illinois records (Fig. 126).—CHAMPAIGN COUNTY: Urbana, July 30, 1954, Snetzinger, on rose leaf with 2-spotted spider mites, 1 ♂. EFFINGHAM COUNTY: Edgewood, July 14, 1954, Ross, Stannard, on *Baptisia* in burnt prairie, 1 ♀. JACKSON COUNTY: Carbondale, September 1, 1965, Meyer, on apple trees feeding on spider mites, many specimens. JASPER COUNTY: Falmouth, July 26, 1954, English, Stannard, on soybeans with spider mites, 11 ♀, many immatures; Newton, July 26, 1954, English, Stannard, on soybean plant with spider mites, 1 ♀. LAWRENCE COUNTY: Lawrenceville, August 7, 1953, Smith, Moore, Stannard, in prairie, 1 ♀. RANDOLPH COUNTY: Walsh, September 18, 1966, Meyer, on apple trees feeding on spider mites, many specimens.

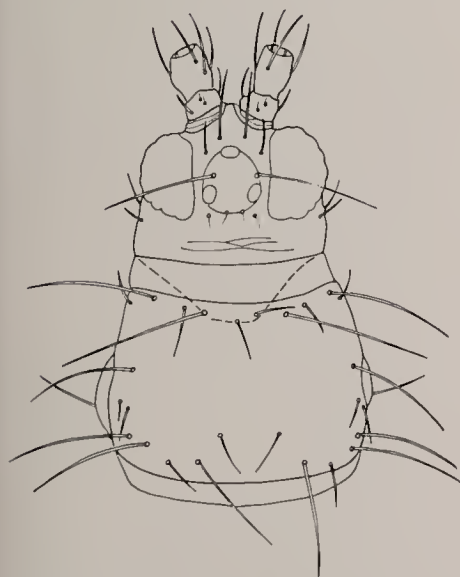


Fig. 127.—*Scolothrips pallidus*, head and prothorax.

Sericothrips Haliday

Sericothrips Haliday (1836:444). Type-species by monotypy.—*Sericothrips staphylinus* Haliday. (The name *staphylinus* corrected to *staphylinus* by Burmeister, 1838).

Rhytidothrips Karny (1910:49). Type-species by monotypy.—*Rhytidothrips bicornis* Karny. Synonymized by Priesner (1926b).

(?) *Hydatothrips* Karny (1913:281). Type-species by monotypy.—*Hydatothrips adolfi-friderici* Karny. (Name should be corrected to *adolphi-friedrichi*.) Questionably synonymized by Priesner (1949).

Head wider than long, not at all prolonged in front of eyes. Ocelli on slightly raised area. Interocellar setae relatively short. Antennae eight segmented, segments III and IV each with a forked sense cone, segment VI with or without a small pedicel. Mouth

cone pointed. Maxillary palps three segmented.

Prothorax with one pair of posterior setae moderately developed. All other setae relatively small. Pronotum sculptured with hexagonally reticulate lines or transverse striae, median part of pronotum (blotch) usually with closer spaced striae and often with dark markings. Meso- and metascutum sculptured. Mesospinasternum separated from metasternum by suture. Fore wings narrow with two longitudinal veins; fore vein evenly set with setae, hind vein with several or one or no setae at apex; fringe cilia wavy. Tarsi two segmented.

Abdominal segments I-VIII covered with microsetae except a median area which is often bare. Abdominal sternites II-VI with major setae along posterior margin, sternite VII with major setae much forward of posterior margin. Abdominal sternites without accessory setae except for microsetae, abdominal tergites with median setae closely spaced. Abdominal tergites VII and VIII and sometimes VI with a complete comb of posteriomarginal setae. Females with well-developed ovipositor. Males either with small, circular abdominal glandular areas, one each on sternites IV-VII, V-VII, or VII only, or glandular areas entirely absent. Males without thornlike setae on abdominal tergite IX.

This genus is similar to *Scirtothrips*. The differences between these genera and other genera in Illinois whose species bear many microsetae on the abdomen are discussed under *Scirtothrips*. In brief, *Sericothrips* can be distinguished from these genera by the characteristics of the eight-segmented antennae and/or the possession of a uniform row of setae on the fore vein of the fore wing.

Apparently the members of this genus are entirely leaf feeders. Some of them are closely associated with specific hosts, limited to one or two plant species. The habits of a few are unknown, and several common species may be taken on many hosts. The species seem to have unusual jumping powers and even the larvae are quick and active. Most, if not all, overwinter

in the adult stage in grass clumps, under fallen leaves, under bark, or in hollow plant stems.

Thirteen species occur in Illinois and all but two are present throughout the state. Those two, *pedicellatus* and *smithi*, are limited to the southern half of the state. None of them have been reported to cause damage of economic consequence in Illinois, although *Sericothrips variabilis* is often abundant on soybeans and alfalfa.

A key to the known species of *Sericothrips* of the world was presented by Hartwig (1952). Supplementary couplets were given by Faure (1958) to bring the Hartwig key up to date.

KEY TO SPECIES

(ILLINOIS, EXCEPT WHERE NOTED)

1. Brachypterous.....2
- Macropterous.....3
2. Abdominal segments II, III, and VII dark brown.....*smithi*
- Abdominal segments I-III, and VII-X dark brown.....*cingulatus*
3. Prothorax entirely dark brown or black.4
- Prothorax in part, or entirely, pale yellow or white.....6
4. Abdominal tergites closely and entirely covered by microsetae.....*cingulatus*
- Abdominal tergites devoid of microsetae on median portions of the intermediate segments.....5
5. Prothoracic sculpture closely and finely transversely striate; abdominal tergite VII with posterior setal comb interrupted in the middle; on water lily pads.....*langei*
- Prothoracic sculpture coarse, nearly hexagonally reticulate beyond the blotch; abdominal tergite VII with a complete posterior setal comb; on leaves of *Ptelea*.....*pulchellus*
6. Antennal segment VI pedicellate.....7
- Antennal segment VI not pedicellate, broadly joined to segment V; males with glandular area absent or on abdominal sternite VII only.....8
7. Intermediate abdominal tergites with lateral brown spots, no tergite completely and abruptly brown.....
-*pedicellatus*
- Intermediate abdominal tergites lacking lateral brown spots, tergites II, III, and VII completely and abruptly brown.....*desmodianus*
8. Abdomen entirely pale yellow to white in coloration.....9
- Several to many abdominal segments darkly colored with shades of brown; or dorsum of intermediate abdominal segments with a dark transverse line across the basal region, occasionally this band pale in the middle and not complete; or with at least lateral

- patches of brown on abdominal segment II.....10
9. Wings dark; on various plants.....*nubilipennis*
Wings pale; on *Tilia* (linden).....*tiliae*
10. Sculpture of pronotum widely separated in front of blotch (Fig. 128), subhexagonally reticulate rather than transversely striate.....11
Sculpture of pronotum occasionally slightly more widely separated in front of blotch but always more or less transversely striate.....12
11. Wings bicolored, white and gray-brown banded.....*annulipes*
Wings nearly uniformly dark gray; not yet found in Illinois.....*fraxinicola*
12. Pronotum pale without any definite brown markings, at most with a faint cloud of brown at the anterior margin of the blotch.....*sambuci*
Pronotum with brown markings within the blotch, or blotch entirely brown.....13
13. Pronotal blotch uniformly and completely brown; only slightly and evenly incised along the posterior margin.....*baptisiae*
Pronotal blotch with brown coloration, irregularly outlined or brown only in patches; if predominantly brown, posterior margin deeply incised by yellow.....14
14. Abdominal segment VII completely brown in sharp contrast to segment VI.....*variabilis*
No abdominal segment completely dark in color in sharp contrast to the other segments.....15
15. Fore wing with two additional setae at the apex behind the principal longitudinal vein; on hops.....*beachae*
Fore wing with only one or none of these additional setae.....16
16. Fore wing without setae behind the principal veins; on nettle; not yet found in Illinois.....*apicalis*
Fore wing with one seta behind the principal vein.....17
17. Antennal segment III gray.....*interruptus*
Antennal segment III light yellow at base.....18
18. Posterior setae of prothorax moderately long; on wild four-o'clock flowers.....*campestris*
Posterior setae of prothorax shorter; not yet found in Illinois.....*zebrae*

Sericothrips annulipes Hood

Sericothrips annulipes Hood (1927c: 211). ♀, ♂. Type-locality.—Ithaca, New York.

FEMALE (macropterous).—Length distended about 1.1 mm. Colored predominantly pale yellow with numerous brown markings. Brown: antennal segment III at apex, antennal segment IV in apical half, all of antennal seg-

ments V–VIII, ocellar area, median of the occiput, spots in the pronotal blotch, anterior half of the mesoscutum, most of the metascutum, sides of abdominal segment I, most of abdominal segment II, the anterior line and sides of abdominal segments III–VI, and all of abdominal segments VII and VIII. Fore wings with two dark crossbands neither of which is as sharply defined as in *variabilis*. Legs with spots of grayish brown on each of the segments except the tarsi.

Antennal segment VI not pedicellate. Anterior part of pronotum with widely spaced, nearly subreticulate, sculpture (Fig. 128). Median portion of intermediate abdominal tergites generally lacking microsetae. Posterior comb of setae complete on abdominal tergites VII and VIII, although comb on tergite VII sometimes weak in the middle.

MALE (macropterous).—Length distended about 1 mm. Similar to female in general structure and color patterns except slightly lighter in color. Usually abdominal segment VII pale yellow rather than abruptly brown. Abdominal sternite VII with a small, circular, median glandular area.

This species can be distinguished by the combination of the following characteristics: widely spaced, nearly subreticulate sculpture on the anterior portion of the prothorax; nonpedicellate sixth antennal segment; light colored thorax; and abrupt dark color of abdominal segment VII.

In general color and structure *annulipes* resembles *pedicellatus*. The two differ in the extent of brown color-

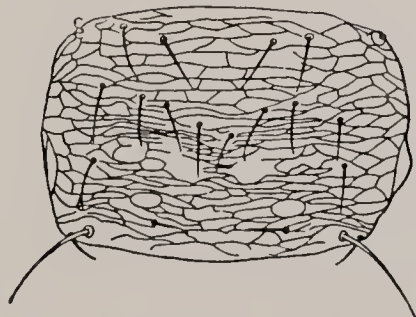


Fig. 128. Prothorax of *Sericothrips annulipes*. From Hood (1927c).

tion on the abdomen and in the form of antennal segment VI.

Often *annulipes* is found on leaves of locust trees, apparently its principal host. It is common throughout the state and probably is even more common than originally, owing to the extensive cultivation of locust trees, especially black locust, by European man in recent years.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, BOND, CHRISTIAN, CLAY, CLINTON, COLES, DE WITT, FULTON, GREENE, HARDIN, HENDERSON, JERSEY, JOHNSON, LA SALLE, MACOUPIN, MARSHALL, MASON, MERCER, MORGAN, PERRY, PIATT, PIKE, PULASKI, PUTNAM, SANGAMON, ST. CLAIR, STEPHENSON, UNION, VERMILION, and WINNEBAGO.

***Sericothrips baptisiae* Hood**

Sericothrips baptisiae Hood (1916d: 113). ♀, ♂. Type-locality.—Mount Vernon, Virginia.

FEMALE (macropterous).—Length distended about 1.2 mm. Bicolored brown and yellow. Brown: head, pronotal blotch, most of meso- and metathorax, abdominal segments I–III and VII–X, apical half of antennal segments IV and V and all of segments VI–VIII, coxae and mid portions of femora, two crossbands and extreme basal region of fore wing. Remainder of body and appendages yellow except sides of abdominal segments IV–VI which have light brown spots.

Pronotal striations in front of blotch fairly widely spaced, more transverse than reticulate. Median dorsal portions of intermediate abdominal segments generally lacking microsetae. Posterior setae combs present on abdominal segments VII and VIII but weak on the median of segment VII.

MALE (macropterous).—Length distended about 1 mm. Similar to female except abdominal segment X much lighter in color, nearly yellowish. Sternal glandular areas lacking on the abdomen.

In disagreement with Hood (1916d) *baptisiae* is seemingly more closely re-

lated to *variabilis* than to *cingulatus*. In my opinion *cingulatus* is one of the most distant relatives of *baptisiae* in North America. *Sericothrips baptisiae*, as does *variabilis*, belongs to that group of *Sericothrips* which lack microsetae over the entire dorsum of the abdomen, which lack a pedicel on antennal segment VI, which have two more or less distinct dark crossbands on the fore wings, and whose males lack abdominal sternal glandular areas. By contrast *cingulatus*, of the *staphylinus* complex (Stannard 1951), has the entire dorsum of the abdomen covered by microsetae, has a pedicel on antennal segment VI in macropterous forms at least, does not have two dark crossbands on the fore wings, and also differs in that its males have three abdominal sternal glandular areas.

Sericothrips baptisiae is darker in the body and lighter in its fore wing coloration than *variabilis*. The most noticeable distinguishing feature of the two species is in the extent of color of the pronotal blotch. In *baptisiae* this blotch is slightly incised by yellow posteriorly, whereas in *variabilis* the yellow color protrudes deeply into the blotch in the form of an upturned, solid U.

This species feeds, probably exclusively, on the leaves of false indigo (*Baptisia*). It occurs throughout the state wherever its host is found.

Illinois records.—Collected during summer and autumn until the middle of October, from one to several localities in the following counties: ADAMS, BOND, CARROLL, CLARK, COOK, GRUNDY, HARDIN, JASPER, JEFFERSON, JOHNSON, KANKAKEE, KNOX, MARION, McDONOUGH, PIATT, VERMILION, and WAYNE.

***Sericothrips beachae* Hood**

Sericothrips beachae Hood (1927a:133). ♀. Type-locality.—White Heath, Illinois.

FEMALE (macropterous).—Length distended about 1.2 mm. General color yellow with some gray and grayish brown markings. Grayish brown: antennal segment II at the sides, apical

half of segments III–V, and all of segments VI–VIII; several spots, more or less contiguous, on the pronotal blotch, being less extensive than in *campestris*; spots on the meso- and metanotum; spots on the sides of abdominal tergites I–VII; and the anterior margin of abdominal segments II–VII. Fore wings generally pale gray—lighter just beyond scale, in the middle, and at the tip, making each wing appear to have two faint crossbands.

Pronotum transversely striate but with fewer straight lines of sculpture than in *campestris*. Fore wings, in almost all cases, with two additional setae at the apex behind the longitudinal vein. Median portions of most of the abdominal segments on the dorsum more or less without microsetae. Abdominal tergites VII and VIII, as well as tergite VI usually, with posterior setal combs complete.

MALE (macropterous).—Length distended about 1 mm. Similar to female in general color and structure. Abdominal setal combs same as in female. Abdominal sternite VII with a small, circular, median glandular area.

This member of *Sericothrips* is a poorly understood species. It has been seldom collected in the past and even now it is known only from the Midwest on hops.

Because this species is seemingly confined to hops, and because it does not occur in Europe (I have personally made several attempts to collect it in England and Austria), it is reasonable to suppose that our hop vines in the Midwest also are a native rather than introduced species. Dr. E. L. Davis, formerly of the St. Louis Botanical Gardens, wrote me in 1956 that the midwestern hop appeared to be of a slightly different type than the European form. Until more is known, the host of *Sericothrips beachae* should be listed as the midwestern hop, whose scientific name and botanical status are still controversial.

In Illinois, *beachae* most closely resembles *campestris* and in some ways *interruptus*. From these two species *beachae* may be distinguished by having on each fore wing two apical setae on the hind vein. Both *campestris* and

interruptus have only one seta or, rarely, none in this area of the fore wing. Males of *beachae* have a complete posterior setal comb on abdominal segment VII, whereas males of *campestris* and *interruptus* have the setal comb on segment VII interrupted medially.

Before the wide use of weed killers, *beachae* could be found on the numerous hop vines growing on roadside fences. Now the hop plant and its thrips have become scarce in many areas, often being limited to uncultivated places in bottomlands.

Illinois records.—Collected in spring and summer, from one to several localities in the following counties: ADAMS, BOONE, CARROLL, CHAMPAIGN, CLARK, EDGAR, FULTON, GREENE, HANCOCK, HENDERSON, KNOX, LA SALLE, LIVINGSTON, LEE, LOGAN, MARSHALL, MCLEAN, PIATT, PIKE, PUTNAM, ROCK ISLAND, SANGAMON, STARK, TAZEWELL, VERMILION, and WINNEBAGO.

Sericothrips campestris Hood

Sericothrips campestris Hood (1939a: 556). ♀. Type-locality.—Palacios, Texas.

FEMALE (macropterous).—Length distended about 1.1 mm. Color in life, gray to the naked eye. Color when mounted in Hoyer's medium, predominantly light yellow with numerous gray-brown markings. Antennal segment II, apex of segment III, apical half of segments IV and V, and all of segments VI–VIII gray-brown. Gray-brown to gray: ocellar triangle, usually base of head, several contiguous spots covering much of the pronotal blotch, spots on the meso- and metanotum, lateral spots on abdominal tergites I–VIII, anterior margins of abdominal tergites II–VII, and edges of the coxae, especially the fore coxae. Fore wings with gray at the base above the scale, a gray spot again a short distance beyond the scale, and a faint gray cloud on the outer third of the wing but not extended to the tip.

Pronotum sculptured similarly to *beachae* except slightly more evenly

transverse. Fore wing with only one (rarely none, never two) seta just behind longitudinal vein near tip. Posterior setal combs complete on abdominal segments VII and VIII, never complete on segment VI.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in general color and structure. Posterior setal comb complete only on abdominal segment VIII (not complete on segments VI and VII). Abdominal sternite VII with a faint, median, circular, glandular area.

What I believe to be *campestris*, or at least a form of it, is commonly found in Illinois on wild four-o'clock (*Mirabilis nyctaginea*). This thrips is often abundant on the leaves and flowers of its host plant. In winter, *campestris* may be found hibernating in the dried hollow stems of this plant.

Our Illinois form appears to be lighter in color than the Texas holotype, according to the protolog, and is even lighter in color than Missouri specimens. For example, the northern populations have only faint evidence of wing bands in contrast to the Texas specimens, which, according to Hood's description, have distinctly marked crossbands.

In relationship, *campestris* is close to *beachae*. When compared alive, these two species are easily distinguished. To the naked eye *beachae* appears to be yellowish gray whereas *campestris* appears to be darker gray. Also these two species are easily distinguished by hosts—*beachae* prefers hops whereas *campestris* prefers wild four-o'clocks. Structurally the two differ but slightly. *S. campestris* almost always bears but one seta at the wing tip behind the principal longitudinal vein. *S. beachae*, except in rare cases, bears two setae behind the longitudinal vein.

The species *zebrae*, which seemingly prefers *Clematis*, is also similar to *campestris*. The two differ in pronotal setation. So far *zebrae* has been found only in the northeastern states (not in Illinois).

Sericothrips apicalis is also similar to light forms of *campestris*. Because I strongly suspect that the name *api-*

calis applies to a variant of *campestris* which lacks additional fore wing setae, *apicalis* is omitted from the Illinois report as an entity with full species rank in our fauna.

One other species, *Sericothrips interruptus*, might be confused with *campestris*. Both have but one additional seta behind the longitudinal vein and they are similar in general color. They differ in exact color, especially in the antennae, and slightly in the pronotal sculpture.

Wild four-o'clock and its thrips *S. campestris*, may or may not be native to Illinois. Opinions to the contrary notwithstanding, it seems a possibility that wild four-o'clock and *campestris* did originally occur in Illinois at least in the sand areas. Since then they have spread out along gravelly railroad embankments.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, BOND, CHAMPAIGN, CHRISTIAN, CLARK, DE WITT, EFFINGHAM, FORD, FULTON, HANCOCK, HENDERSON, IROQUOIS, JACKSON, JO DAVIESS, KNOX, LEE, LIVINGSTON, LOGAN, MACON, MCHENRY, MCLEAN, MARSHALL, MASON, MORGAN, PEORIA, PERRY, PIATT, PIKE, PUTNAM, ROCK ISLAND, STEPHENSON, WINNEBAGO, and WOODFORD.

Sericothrips cingulatus Hinds

Sericothrips cingulatus Hinds (1902: 141). ♀, ♂. Type-locality.—Amherst, Massachusetts.

FEMALE (macropterous).—Length distended about 1.2 mm. Bicolored brown and yellowish. Dark brown: head, most of thorax, abdominal segments I–III and VII–X. Yellowish: most of abdominal segments IV–VI. These middle abdominal segments become brownish on the meson with segment VI being the darkest. Antennal segments I and II yellowish, segment III yellowish brown, segments IV–VIII brown. Coxae, trochanters, and most of femora brown, rest of legs yellow. Extreme base and apical three-fourths of the fore wing brown, basal one-fourth nearly colorless.

Antennal segment VI pedicellate.

Pronotum with fairly close, transverse striations. Most of the abdominal tergites completely and uniformly covered with microsetae. Posterior setal combs complete on segments I–VIII.

FEMALE (brachypterous).—Similar to macropterous form except smaller (about 1 mm) and pedicel of antennal segment VI poorly differentiated, nearly absent.

MALE (brachypterous).—Length distended more than 0.9 mm. Similar in general structure and color to brachypterous female. Abdominal sternites I–VII each with a transverse glandular area. These glands become progressively more elongate posteriorly.

Although discovered more than 50 years ago and repeatedly collected since then, the life history and habits of this species still remain virtually unknown. Usually individuals are found in grasslands, especially in grass-sedge marshes. Some, at least, overwinter in clumps of prairie grasses.

Hinds' original material consisted of brachypterous forms. Later, in 1911, Moulton collected fully winged specimens from Nebraska. In Illinois we have taken brachypterous males and females and macropterous females. This species was first reported from Illinois by Hood (1917) and we have found many other specimens. Our records indicate that *cingulatus* has a statewide distribution.

In all forms, whether fully winged or short winged, *Sericothrips cingulatus* has the dorsum of the abdomen completely covered by microsetae. Only one other Illinois congener has the abdomen similarly clothed and that one, *S. smithi*, is always short winged, as far as is known, and is differently colored. *Sericothrips smithi* has abdominal segments II, III, and VII brown whereas *cingulatus* has abdominal segments I–III and VII–X brown.

Illinois records.—Collected from May to October, from one to several localities in the following counties: ADAMS, CLARK, FRANKLIN, JACKSON (USNM), JOHNSON, KNOX, MARION (USNM), MASON (USNM), MORGAN, PIKE, PULASKI (USNM), SANGAMON, and UNION (USNM).

***Sericothrips desmodianus* new species**

FEMALE (macropterous).—Length distended slightly more than 1 mm. General color yellowish with brown markings. Brown: head in region of ocelli, much of the pterothorax, abdominal segments II, III, and VII abruptly, abdominal segment I at sides, a thin median line along the anterior margins of abdominal segments IV–VI, and all coxae. Fore wings with a dark gray subbasal crossband. Antennal segment I yellowish, II grayish, III paler than II, IV and V yellowish at base, brown at apex, segments VI–VIII brown. Last three abdominal segments brighter yellow.

Antennal segment VI pedicellate. Mouth cone long. Pronotal striae fairly wide apart, transverse striae becoming nearly subreticulate. Median portion of intermediate abdominal tergites for the most part lacking microsetae. Abdominal tergites VII and VIII with posterior setae combs complete.

MALE (macropterous).—Similar to female except abdomen lighter in color. Abdominal sternites IV–VII each with a small, circular, median glandular area.

Holotype.—Female, Siloam Springs State Park, Adams County, Illinois, August 11, 1948, Sanderson, Stannard, on *Desmodium paniculatum*. **Allotype.**—Male, Harrisburg, Saline County, Illinois, June 23, 1950, M. W. Sanderson, Hilltop prairie. **Paratypes.**—6 ♀, Lawrenceville, Lawrence County, Illinois, August 7, 1953, Smith, Moore, Stannard, *Andropogon* prairie. 4 ♀, Bell Smith Springs Recreation Area, Pope County, Illinois, July 16, 1947, L. J. Stannard, on *Lespedeza*. 1 ♀, Closter, New Jersey, July 9, 1938, J. C. Crawford, on *Desmodium*. 1 ♂, Tenaflly, New Jersey, June 18, 1939, J. C. Crawford, on *Desmodium*.

Types deposited in the Illinois Natural History Survey and in the U.S. National Museum.

This species may be distinguished by the combination of the pedicellate form of antennal segment VI, the lack of microsetae on the central portion of many of the abdominal tergites, and

the lack of lateral spots on the intermediate abdominal tergites. It can be distinguished from *pedicellatus*, in particular, by the abrupt brown color of abdominal tergites II, III, and VII.

The late J. C. Crawford once told me he suspected that this species was new, although similar to *pedicellatus*. Recent comparisons of specimens of *desmodianus* with the holotype *pedicellatus*, have convinced me that Mr. Crawford's assumption was correct.

Apparently *desmodianus* is a southern species. In Illinois its range is outside the Wisconsin drift area and extends west and north to Adams County and east to Lawrence County. It seems to prefer legumes, especially *Desmodium*.

Sericothrips interruptus Hood

Sericothrips interruptus Hood (1927a: 136). ♀, ♂. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1.1 mm. General color yellowish with some brown markings. Brown: the ocellar triangle, several more or less contiguous spots on the pronotal blotch, the anterior and lateral portions of the mesoscutum, two spots on the metanotum, the anterior margins of abdominal segments II–VII, and spots on the side of abdominal segments II–VII. Wings and antennae grayish brown. Often wing veins reddish. Ocellar rings red.

Pronotal striations transverse. Median areas of most of the abdominal segments generally without microsetae. Posterior combs of abdominal segments VII and VIII complete.

MALE (macropterous).—Length distended about 0.9 mm. Generally similar to female. Abdominal sternite VII with a small, circular, median glandular area which is sometimes faint.

The species closely resembles *beachae* and *campestris*. All three are light in color with gray-brown patches on the thorax and abdomen. The most noticeable difference between *interruptus* and the other two is the color of the antennae. In *interruptus* most

of the antennal segments are grayish brown whereas in *beachae* and in *campestris* the intermediate antennal segments are yellow in the basal halves and brown in the apical halves. *S. interruptus*, in certain mounting media and under certain conditions, exhibits red coloration along the veins of the fore wing. Individuals of *beachae* or *campestris* never show such red coloration.

Apparently the leaves of ash, *Dirca*, and some other forest trees and shrubs are the preferred hosts of *interruptus*. Many specimens of this species have been collected from the major regions of Illinois.

A species described by Hood (1940c) as *S. fraxinicola* was taken on ash (*Fraxinus americana*) in Oswegatchie, New York. This species could not be confused with *interruptus*, which also occurs on ash, because of the form of the pronotal sculpture. In *interruptus* the sculpture is arranged as more or less parallel striae, whereas in *fraxinicola* the sculpture is subreticulate and coarser than illustrated by Hood (1927c) for *annulipes*.

Illinois records.—Collected from April through November, from one to several localities in the following counties: ADAMS, CHAMPAIGN, COLES, COOK, EDGAR, EFFINGHAM, HENDERSON, JACKSON, LA SALLE, LAWRENCE, MARION, MONROE, PUTNAM, RANDOLPH, VERMILION, and WILLIAMSON.

Sericothrips langei Moulton

Water Lily Thrips

Sericothrips langei Moulton (1929b: 230). ♀. Type-locality.—Fish Lake, Monroe County, Illinois.

FEMALE (macropterous).—Length distended slightly more than 1 mm. Body color brown to blackish brown, lighter in regions of the thorax. Antennal segment I, tip of segment V, and all of segments VI–VIII brown; other segments yellowish. Legs brown except apical half of tibiae and all of the tarsi yellowish. Fore wings with two dark crossbands, base of wings without additional brown streak.

Pronotum throughout with closely spaced transverse striae. Midregion of

the abdominal tergites, for the most part, without microsetae. Posterior setal combs complete only on abdominal segment VIII.

MALE (macropterous).—Length distended nearly 0.9 mm. General structure and color as in female. Abdominal sternite VII with a small, round, central glandular area.

The water lily thrips, *S. langei*, is similar in coloration to *pulchellus*; however, in the former species the brown color extends slightly farther on the antennae and legs. The two species are easily recognized by several features. *S. langei* is closely transversely striate on the anterior part of the pronotum, it lacks a complete posterior setal comb on abdominal tergite VII, and the base of the fore wing is colorless. By contrast *S. pulchellus* has widely spaced striae on the anterior part of the pronotum, has a complete posterior setal comb on abdominal tergite VII, and the base of the fore wing is brown.

Nearby oil wells have so contaminated the waters at the type locality in recent years that possibly the originally known population has been extirpated. Nevertheless, a few miles to the south near Burkesville many other populations can be found in the numerous sinkhole lakes. This species occurs solely on the leaves of *Nymphaea* water lilies and often is locally abundant. Our records indicate that the species is found as far north as Au Train, Michigan.

In 1937 Watson described another form, *Sericothrips langei* var. *tissoti*, from water lilies taken at Lochloosa Lake, Florida. This entity, although similar to *langei* from Illinois, differs decidedly in that each fore wing has only one dark band instead of two. Possibly *tissoti* deserves to be elevated to full specific rank.

Another similarly formed species seems to be *andrei*, a species which does not occur in Illinois or, at least, has not been found here as yet. These two differ from each other by the several characteristics enumerated by Crawford in 1943, page 41.

Illinois records.—CUMBERLAND COUNTY: Woodbury, June 29, 1949,

Smith, Stannard, leaf of *Nymphaea*, 1 ♀. JEFFERSON COUNTY: Bonnie, May 24, 1955, Kaiser, Stannard, leaf of *Nymphaea*, 1 ♀. LAKE COUNTY: Zion (Beach State Park), August 30, 1955, Moore, Stannard, leaves of *Nymphaea*, 5 larvae. MONROE COUNTY: Burkesville, June 29, 1949, Smith, Stannard, leaves of *Nymphaea*, 29 ♀, 3 ♂; Fish Lake (type locality), August 30, 1921, Lange, sweeping, 3 ♀. WILLIAMSON COUNTY: Crab Orchard Lake, May 25, 1954, Smith, Moore, Stannard, leaves of *Nymphaea*, 2 ♀.

Sericothrips nubilipennis Hood

Sericothrips nubilipennis Hood (1924: 312). ♀. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1.1 mm. General color pale yellow with the following areas brown: ocellar area, antennal segment II at side, antennal segments IV and V at tips, all of antennal segments VI–VIII, spots on the prothorax, mesothorax, and metathorax, scale of fore wing and part of the area above it, and most of the rest of the fore wing except the tip and area just beyond scale. Abdomen entirely pale yellow to white without any markings.

Pronotum closely, transversely striate. Midregion of the abdominal tergites, for the most part, without microsetae. Posterior setal combs complete on abdominal segments VII and VIII.

MALE (macropterous).—Length distended about 0.8 mm. Similar to female in general color and structure. No abdominal glandular areas discernible.

Although frequently observed on the leaves of many forest trees, this species eventually may be found to have one or several preferred hosts. One host may be hackberry, another may be dogwood. Larvae in association with adults were taken once from hackberry leaves at Oquawka, Illinois. Adults overwinter in woodland leaf mold.

Sericothrips nubilipennis can be distinguished from all of its Illinois congeners by the completely pale ab-

domen and by the predominantly dark brown wings. It occurs throughout the state.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, CHAMPAIGN, CLARK, COLES, COOK, EFFINGHAM, HARDIN, HENDERSON, KANE, KNOX, LA SALLE, LOGAN, MARSHALL, MASON, OGLE, PERRY, PIATT, POPE, PUTNAM, RICHLAND, and VERMILION.

Sericothrips pedicellatus Hood

Sericothrips pedicellatus Hood (1927a: 131). ♀. Type-locality.—Makanda, Illinois.

FEMALE (macropterous).—Length distended about 1 mm. General color yellow with brown markings. Brown: head between ocelli, several pairs of spots within blotch of pronotum, anterior margin of mesoscutum, metascutum, patches along side of pterothorax, all coxae, median outer spot on all femora, sides of abdominal tergite I, anterior half of abdominal tergite II, and entire anterior margin and sides of abdominal tergites III–VII becoming greater in extent posteriorly with tergite VII darkest, nearly as dark as II. Antennal segments I–III white to pale yellow, IV yellow in basal one-fourth with remainder brown, V brown except for yellow pedicel, VI–VIII brown. Fore wings with a light gray band subbasally.

Antennal segment VI pedicellate. Mouth cone long. Pronotal striae moderately far apart, transversely striate to nearly subreticulate. Median portion of intermediate abdominal tergites seemingly lacking microsetae. Abdominal tergites VII and VIII with posterior setae combs complete.

MALE.—Unknown.

This species is based solely on the holotype.

From its Illinois congeners which also have antennal segment VI pedicellate, the color of the abdominal segments will serve to distinguish it. Unlike *cingulatus* and *desmodianus*, *pedicellatus* does not have any anterior or posterior abdominal segments abruptly dark brown. In *pedicellatus*

no tergite is entirely brown as is the case in *smithi*. In addition, *pedicellatus* is unlike *desmodianus* in that the anterior marginal brown strip on the abdominal segments is expanded at the sides into distinct spots.

Despite repeated efforts specimens other than the holotype have not been collected, not even at the type locality.

Illinois record.—JACKSON COUNTY: Makanda, June 26, 1909, Hart, sweeping grass and weeds, 1 ♀.

Sericothrips pulchellus Hood

Sericothrips pulchellus Hood (1908c: 363). ♀, ♂. Type-locality.—Muncie, Illinois.

FEMALE (macropterous) (Fig. 129).—Length distended about 1 mm. Body color brown to blackish brown, lighter in regions of the thorax, and center and tip of abdomen. Antennae mostly yellow; segments I and II, apical half of VI, and all of VII and VIII brown. Coxae to femora brown, rest of legs yellow except mid and hind tibiae which are brown to blackish in the subbasal area. Fore wings with two dark crossbands in addition to the dark spot at the base and on the scale. Most of body with red subintegumental pigment.

Pronotum with widely spaced striations anterior to the blotch. Mid-region of the abdominal tergites, for the most part, without microsetae. Posterior setal combs complete on abdominal segments VII and VIII and sometimes on segment VI.

MALE (macropterous).—Length distended about 0.8 mm. General structure and color as in female. Abdominal sternite VII with a small, round, central glandular area.

This species and *S. langei* are the darkest colored *Sericothrips* in Illinois. Both are almost entirely dark brown, exclusive of the appendages. They may be easily distinguished from each other by the form of the striations on the pronotum—*pulchellus* has widely spaced, nearly hexagonal reticulations on the anterior part of the pronotum, whereas *langei* has closely spaced, transverse striations over the pronotum.

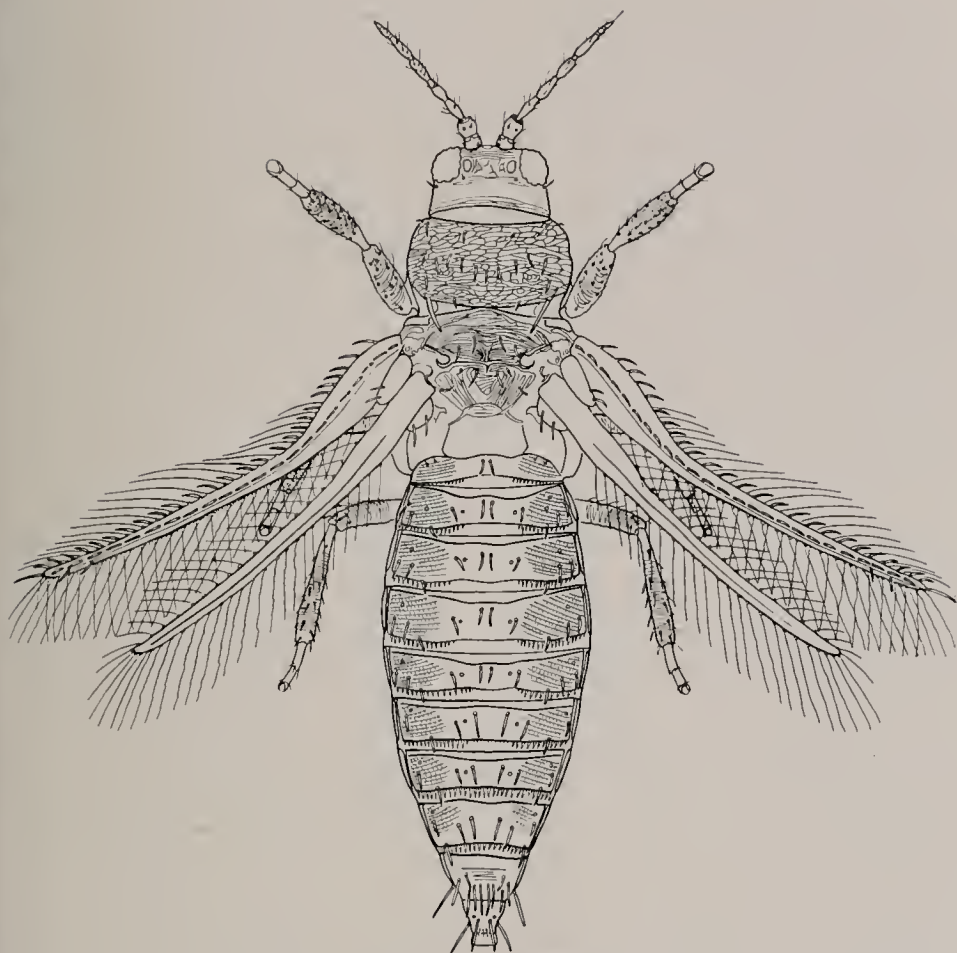


Fig. 129.—*Sericothrips pulchellus*, dorsal aspect.

During spring and summer *pulchellus* feeds on leaves of wafer ash (*Ptelea*), sometimes in great numbers. Adults and larvae feed together, often causing the foliage to become whitened by their feeding scars. At times of greatest abundance adults may scatter and be found resting on a variety of trees and shrubs. In early fall these thrips begin to leave their host plant and settle in debris on the forest floor where they hibernate.

Sericothrips pulchellus occurs in our state wherever wafer ash grows (Winterringer & Evers 1960).

Illinois records.—Collected from April through September, from one to several localities in the following counties: ADAMS, CALHOUN, CARROLL,

CHAMPAIGN, COOK, GRUNDY, HANCOCK, KANKAKEE, LA SALLE, LIVINGSTON, MACOUPIN, MADISON, MASON, OGLE, PEORIA, PIKE, PUTNAM, ROCK ISLAND, VERMILION, WAYNE, WHITESIDE, and WINNEBAGO.

Sericothrips sambuci Hood

Sericothrips sambuci Hood (1924:313).
♀. Type-locality.—Bladensburg, Maryland.

Sericothrips walteri Crawford, J. C. (1938:36). ♀, ♂. Type-locality.—Washington, D. C. New synonymy.

FEMALE (macropterous).—Length distended about 1.4 mm. General color pale whitish yellow. Antennal seg-

ments pale yellow except tip of segment III, apexes of IV and V, and all of VI–VIII, which are brown. Fore wing with a brown cloud at base of scale and with a brown, subbasal, incomplete crossband located predominantly on the trailing half of the wing. Mesothorax and metathorax each with a pair of brown spots. Abdominal segments II–VII each with a pair of lateral brown spots, the spots on segment II being the darkest and largest.

Pronotum throughout closely transversely striate. Midregion of the abdominal tergites, for the most part, without microsetae. Posterior setal combs complete on abdominal segments VII and VIII.

MALE (macropterous).—Length distended about 0.8 mm. Similar to female in general structure and color, but somewhat lighter in color. Brown spots on at least abdominal segment II present. No abdominal glandular areas could be distinguished on the limited specimens available to me.

This common light-colored species feeds exclusively on elderberry leaves. In winter it hibernates under the loose bark of the host plant. It may be distinguished from other species of Illinois *Sericothrips* by the pale, nearly colorless pronotum and by the several brown spots on the abdomen, a pair of which are always present even though sometimes faint, on the sides of segment II.

Sericothrips sambuci is statewide in its distribution.

Illinois records.—Collected during the summer and early fall, from one to several localities in the following counties: ADAMS, BUREAU, CALHOUN, CARROLL, CHAMPAIGN, CHRISTIAN, CLARK, COOK, FRANKLIN, JASPER, KANE, KANKAKEE, KENDALL, LAKE, LIVINGSTON, MACOUPIN, MCHENRY, MERCER, MONTGOMERY, OGLE, PERRY, PIKE, SCHUYLER, UNION, VERMILION, WARREN, and WHITESIDE.

Sericothrips smithi Stannard

Sericothrips smithi Stannard (1951: 129). ♀. Type-locality.—Greenup, Illinois.

FEMALE (brachypterous).—Length

distended, exclusive of antennae, about 0.9 mm. Similar to *desmodianus* in color.

Antennal segment VI pedicellate. Mouth cone long. Pronotal striations widely spaced but more transverse than striate. Abdominal segments I–VIII densely and evenly covered by microsetae. Posterior setal combs complete on abdominal segments I–VIII.

MALE.—Unknown.

For the present this species is considered herein to be distinct from *desmodianus*. It is possible, however, that *smithi* may be only the brachypterous form of *desmodianus*, a fully winged species. Their separation is maintained because *desmodianus* lacks microsetae on parts of the median portions of the intermediate abdominal segments, whereas *smithi* bears microsetae over the entire dorsum of the abdomen. Since such differences in setal pattern do not occur in the winged and wingless stages of *cingulatus* (both are densely covered by microsetae on the abdomen), it is reasonable to suppose that *smithi* and *desmodianus* could be full species, even though closely related.

Besides the type-locality, *smithi* has been taken once in North Carolina and once in South Carolina (INHS records). In all cases the specimens came from grassland habitats.

Illinois record.—CUMBERLAND COUNTY: Greenup, March 5, 1949, Smith, ground cover, 6 ♀.

Sericothrips tiliae Hood

Sericothrips tiliae Hood (1931b:151). ♀, ♂. Type-locality.—Morton, New York.

FEMALE (macropterous).—Length distended about 1.3 mm. General color white. Apex of antennal segment IV, apical half of segment V, and all of VI–VIII brown. Ocellar rings reddish to orange.

Pronotum closely and transversely striate. Mid portions of the dorsum of the intermediate abdominal segments generally without microsetae. Posterior setal combs complete on abdominal segments VII and VIII.

MALE (macropterous).—Length

distended about 0.9 mm. Similar to female in general color and structure. Abdominal sternites apparently without glandular areas.

This is the lightest colored species of *Sericothrips* in Illinois. It is entirely white except for the apical segments of the antennae. Since these insects are so pale, they are best collected on the leaves of linden, their host plant, where they show up to advantage against the green background.

Sericothrips tiliae occurs throughout the state, being most common in the northern part.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, BOONE, CARROLL, CHAMPAIGN, COOK, DE WITT, EFFINGHAM, HANCOCK, HENDERSON, JACKSON, JO DAVIESS, KANKAKEE, LAKE, LA SALLE, LEE, LIVINGSTON, MARSHALL, MCLEAN, MERCER, PUTNAM, SCHUYLER, VERMILION, WARREN, and WHITESIDE.

Sericothrips variabilis (Beach)

Thrips variabilis Beach (1896:220). ♀, ♂. Type-locality.—Ames, Iowa. Lectotype fixed by Hood (1927a: 132). Transferred to *Sericothrips* by Hinds (1902).

FEMALE (macropterous).—Length distended about 1 mm. Bicolored brown and yellow. Brown: head; antennal segment III at apex, apical half of segments IV and V, and all of VI–VIII; pronotal blotch except for a deeply incised, median, posterior area; most of the anterior three-fourths of the pterothorax; abdominal segment I at the sides, all of segments II, III, VII, and VIII, and an anterior line on segments IV–VI. Abdominal segments IV–VI, IX, and X light brown in spots over a yellowish background. Fore wings dark in scale and small area immediately above it and with two dark, sharply defined crossbands. Coxae and femora with spots of brown of various degrees of intensity. Ocellar rings red.

Pronotum transversely striate. Median areas of intermediate abdominal segments generally without microse-

tae dorsally. Posterior setal combs complete on abdominal segments VII and VIII.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in general color and structure. Abdominal sternites seemingly without glandular areas.

Not only is this the first known species of *Sericothrips* in North America but also it has the distinction of being one of the most common in the eastern half of our country. Despite this early and continued knowledge of *variabilis*, its life history is unknown except for a few general details. It seems to prefer the leaves of herbs, particularly legumes, for food. It is abundant on soybeans but the extent of possible damage is unknown.

Sericothrips variabilis may be distinguished from its Illinois congeners by the following combination of characteristics: fore wings each with two sharply defined crossbands, pronotum dark only in the area of the blotch and this dark area deeply incised in the posterior median region by yellow, striations of the anterior portion of the pronotum not exceptionally widely spaced, and several of the abdominal segments abruptly dark brown.

This species occurs throughout Illinois.

Illinois records.—Collected during spring and summer, from one to several localities in the following counties: ADAMS, BUREAU, CALHOUN, CARROLL, CHAMPAIGN, CLAY, CLINTON, COLES, CUMBERLAND, DOUGLAS, EDGAR, EFFINGHAM, FAYETTE, FORD, GREENE, HENDERSON, IROQUOIS, JACKSON, JASPER, JEFFERSON, JERSEY, JO DAVIESS, JOHNSON, KANKAKEE, LAKE, LIVINGSTON, MACOUPIN, MADISON, MARION, MARSHALL, MASON, MCHENRY, MONROE, PIKE, POPE, PULASKI (Hood 1927a), RANDOLPH, ST. CLAIR, VERMILION, WABASH, WASHINGTON, WAYNE, WHITESIDE, and WILLIAMSON.

Taeniothrips Amyot and Serville

Taeniothrips Amyot and Serville (1843:644). Type-species by subsequent designation of Karny (1912b). —*Thrips primulae* Haliday (= *picipes* Zetterstedt).

Head wider than long to as long as wide. Cheeks barely bulged to considerably bulged. Antennae eight segmented, abnormally seven segmented in North America but occasionally normally seven segmented elsewhere. Antennal segments III and IV with forked sense cones. Maxillary palps usually three segmented, labial palps two segmented.

Prothorax with only the two pairs of epimeral setae well developed. Mesospinasternum separated from metasternum by a suture. Fore legs not enlarged. All tarsi two segmented. Fore wings with two veins, setae on fore vein often interrupted, setae on hind vein uniformly spaced, fringe cilia wavy.

Abdomen with pleural plates. Tergites and sternites without microsetae. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal sternites with or without accessory setae in addition to the posterior ones. Abdominal tergite VIII with or without posterior comb. Males with or without sternal glandular areas.

The type of the genus, a European species, has an elongated head and greatly bulged cheeks, and lacks accessory abdominal sternal setae. Species of *Taeniothrips* which most closely resemble the type-genus in the characteristic of the head occur indigenously in western North America rather than in the East. In none of our native Illinois species is the head particularly bulged.

Crawford (1941*b*) and Speyer (1951), by introducing the characteristic of the abdominal sternal setae in the definition of the species, helped the taxonomy of the genus over an enormous hurdle. Their discovery that some species have accessory setae on the abdominal sternites whereas others do not permits the easy separation or regrouping of many hard-to-identify species. Mr. Speyer has pointed out to me that this characteristic should be further investigated and analyzed in certain species in the genus *Thrips* to obtain a better understanding of this genus and *Taeniothrips* and their relationships.

As indicated, *Taeniothrips* is closely related to the genus *Thrips* and when all of the species of the world are considered, the two genera nearly grade into each other. In Illinois, members of *Taeniothrips* always can be recognized by the eight-segmented antennae. By contrast, Illinois specimens of *Thrips* always have seven segments in each antenna.

The taxon *Rhoplandrothrips* was erected by Priesner in 1922 as a subgenus of *Taeniothrips* for those species whose males have antennal segment VI enlarged and heavily setose. The European *ulmifoliorum* var. *obscurus* Uzel, later synonymized with *consociatus* Targioni-Tozzette by Priesner (1926*b*), was subsequently designated to be the inferred type-species by Priesner (1949). Because the western United States species, *Rhoplandrothrips corni* Moulton resembles *Taeniothrips albidus*, newly described here, the latter species may or may not prove to be another member of *Rho-*

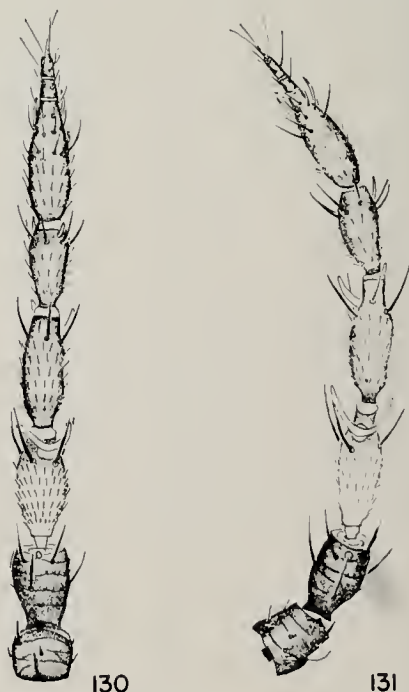


Fig. 130-131.—Right antenna: 130, *Taeniothrips simplex*; 131, *Taeniothrips vulgatissimus*. From O'Neill & Bigelow (1964).

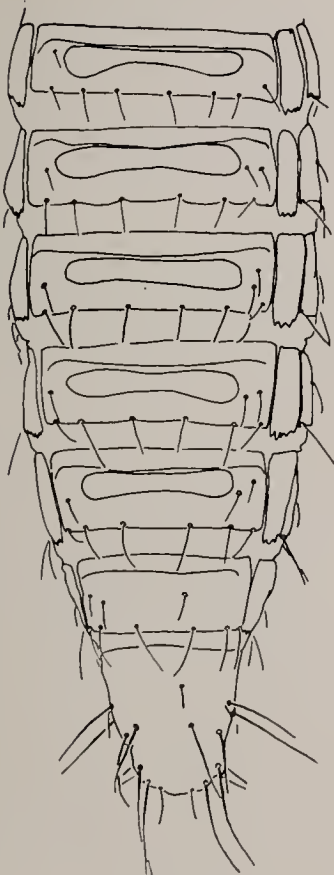
plandrothrips. Until the males of *albidus* are discovered there will not be the necessary evidence to include or exclude *Rhoplandrothrips* as a name applicable to the Illinois or eastern United States faunas.

O'Neill and Bigelow (1964) have treated the Canadian species.

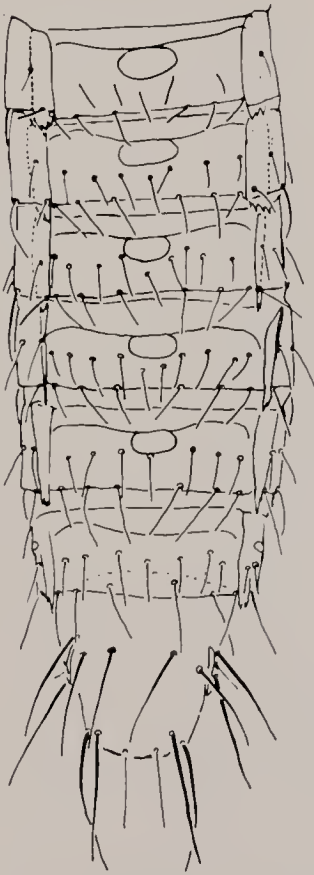
KEY TO SPECIES

- 1. Intermediate abdominal sternites with accessory setae in addition to posterior ones. 2
- Intermediate abdominal sternites without accessory setae in addition to posterior ones. 3
- 2. Distal half of the anterior vein of fore wing with five or more setae; antennal segment III moderately short (Fig. 130); male with abdominal sternal glandular areas strongly transversely elongate (Fig. 132); on *gladiolus*. *simplex*

- Distal half of the anterior vein of fore wing with three setae; antennal segment III longer (Fig. 131); male with abdominal sternal glandular areas smaller, not as elongate (Fig. 133); abundant on *Heracleum vulgatisissimus*. 3
- Abdominal tergite VIII with posterior comb incomplete to nearly absent. *vaccinophilus*
- Abdominal tergite VIII with posterior comb complete (Fig. 134 and 135). 4
- 4. Fore tarsus with apical tooth. *inconsequens*
- Fore tarsus without apical tooth. 5
- 5. Generally pale, nearly white in color; antennal segment II pale. *albidus* new species
- Bicolored brown and yellow or mostly brown; antennal segment III brown. *hetulae*

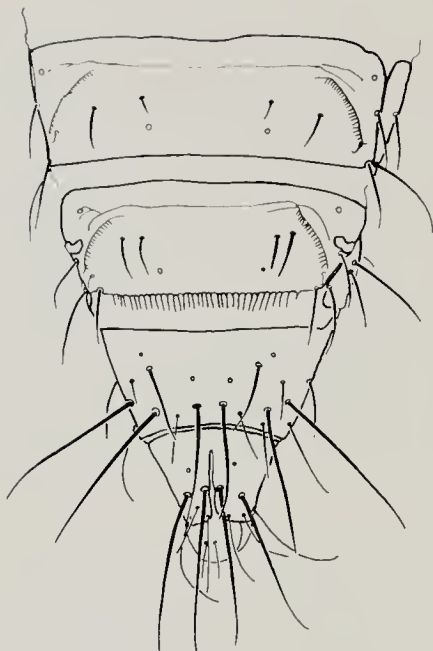


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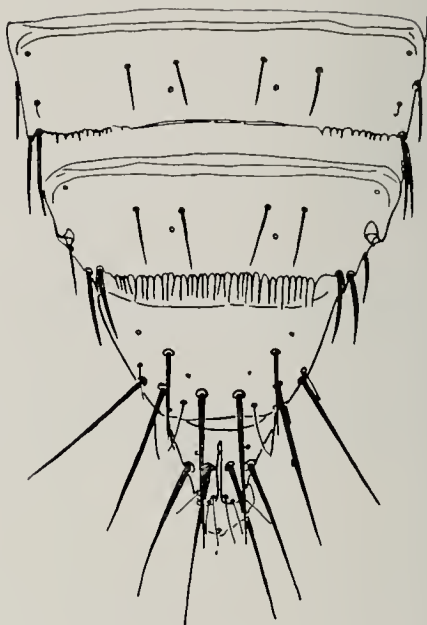


133

Fig. 132-133.—Glandular areas on abdominal sternites, ♂: 132, *Tactiothrips simplex*; 133, *Tactiothrips vulgatisissimus*. From O'Neill & Bigelow (1964).



134



135

Fig. 134-135.—Abdominal terminalia, ♀: 134, *Taeniothrips vulgatissimus*; 135, *Taeniothrips betulae*. From O'Neill & Bigelow (1964).

***Taeniothrips albidus* new species**

FEMALE (macropterous).—Length distended over 1.2 mm. Color almost entirely dusky white. Brown: antennal segment IV at apex, most of segment V, and all of segments VI–VIII. Ocular pigments red.

Head not elongate or bulged. Interocellar setae strongly developed. Antennal segment VI fairly broadly joined to segment V.

Prothorax with a few dorsal setae, with only two pairs of posterior setae between the major epimeral setae. Fore tarsi without teeth. Fore wings normally with only two distal setae on fore vein.

Abdominal sternites without accessory setae in addition to posterior ones. Abdominal tergite VIII with posterior comb complete.

MALE.—Unknown.

Holotype.—Female, Atlas, Pike County, Illinois, October 2, 1953, Smith, Stannard, hibernating in forest ground litter. **Paratypes**.—8 ♀, Ma-

homet, Champaign County, Illinois, November 21, 1948, Bonet, Sanderson, Stannard, hibernating under bark of white oak. 1 ♀, Urbana, Champaign County, Illinois, February 12, 1949, Stannard, under bark.

This species is the color equivalent of the European *albicornis* Knechtel and *latus* (Bagnall). The American *albus* (Moulton) of the West Coast is also light in color, but in this latter species the ocelli are described as absent whereas in *albidus* of Illinois the ocelli are well developed and ringed by red pigments. I have never seen any of the aforementioned supposed relatives of *albidus*, and therefore I cannot fully compare *albidus* with them.

Because *albidus* resembles *Rhoplandrothrips corni*, a western United States thrips, it may be that the two are related. Diagnostic characteristics for the taxon *Rhoplandrothrips* depend upon the form of the male antennae and no males of *albidus* are yet known, precluding precise placement of the species at this time.

Taeniothrips betulae Crawford, J. C.

Taeniothrips betulae Crawford, J. C. (1939:74). ♀, ♂. Type-locality.—Fort Lee, New Jersey.

FEMALE (macropterous).—Length distended about 1.5 mm. Bicolored brown and yellowish brown. Brown: antennal segment II, segments V–VIII, and all of abdomen. Yellowish brown: head, thorax, and legs, although sometimes these regions with much brown. Antennal segment I light brown, segment III nearly yellow, segment IV light brown except base which is yellowish brown. Fore wings yellowish brown. Ocellar pigment red. Body with yellow to orange subintegumental pigment.

Head not elongate or bulged (Fig. 136). Interocellar setae strongly developed. Antennal segments V and VI broadly joined.

Prothorax with a few dorsal setae, with only two pairs of posterior setae between the major epimeral setae. Fore tarsi without teeth. Fore wings normally with only two distal setae on fore vein.

Abdominal sternites without accessory setae in addition to posterior ones. Abdominal tergite VIII with posterior comb complete. Abdominal tergite X split for more than three-fourths its length (Fig. 135).

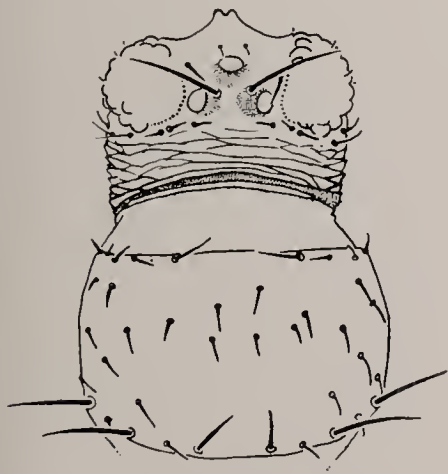


Fig. 136.—*Taeniothrips betulae*, head and prothorax. From O'Neill & Bigelow (1964).

MALE (macropterous).—Length distended about 1.2 mm. Almost entirely yellow to light yellow brown, except antennae which are colored as in female.

Similar to female in structure. Abdominal tergite VIII with a complete posterior comb. Abdominal sternal glandular areas apparently not present.

Similar to the European species, *salicis* (Reuter), *betulae* seemingly occurs on both *Salix* and *Betula*. According to Hood (1927c), J. J. Davis and C. A. Hart first collected it in Illinois in 1908, at which time it was assigned the name *salicis*.

Illinois records.—COOK COUNTY: Riverside, July 14, 1908, on willow (Hood 1927c); Thornton, July 30, 1957, Ross, Stannard, on willow, 1 ♀. KANE COUNTY: Aurora, July 8, 1908, on willow (Hood 1927c). LAKE COUNTY: Wauconda, October 28, 1943, Ross, Sanderson, ground cover, 1 ♀; Zion, July 8, 1947, Sanderson, Stannard, leaves of *Salix cordata*, 9 ♀; Zion, June 18, 1951, Ross, Richards, Stannard, leaves of willow, 5 ♀, 4 ♂. VERMILION COUNTY: Muncie, August 2, 1908, on willow (Hood 1927c).

Taeniothrips inconsequens (Uzel)
Pear Thrips

Physopus inconsequens Uzel (1895: 117). ♀. Type-locality.—Praha (Prague), Czechoslovakia. Bagnall (1909b:5). ♂. Placed in *Taeniothrips* by Bagnall (1916).

Euthrips pyri Daniel (1904:294). ♀. Type-locality.—San Leandro, California. Synonymized by Bagnall (1916) and Williams (1916).

FEMALE (macropterous).—Length distended over 1.5 mm. Color dark brown except antennal segment III and tarsi which are yellowish brown. Ocellar pigments red. Fore wings brown, hind wings pale. Body with much yellow to orange subintegumental pigment.

Head elongate for genus, bulged behind eyes. Interocellar setae well developed. Antennal segments V and VI broadly joined.

Prothorax with scattered dorsal setae, with only two pairs of posterior setae between the major epimeral setae. Fore tarsi each with an apical tooth. Fore wings with three, four, or five distal setae on fore vein.

Abdominal sternites without accessory setae in addition to posterior ones. Abdominal tergite VIII with posterior comb complete. Abdominal tergite X split for about one-half its length.

MALE.—Not in North America; present in Europe (Bagnall 1909*b*; Williams 1916).

To the good fortune of our orchardists, this pest has not yet reached Illinois. The pear thrips, a native of Europe, was introduced as early as 1904 to California and probably later on the East Coast. Either this thrips spreads extremely slowly or there is a biological barrier in the Midwest that prevents its entry here.

In America the pear thrips reproduces entirely by parthenogenesis, since only the female was imported. After a brief but destructive foray on the blossoms and young fruits, the larvae drop to the ground and form pupal cells in the soil. For the next 10 months the larvae, which later change to prepupal and pupal forms, remain hidden in the soil. Then in the spring the pupae transmute and the resultant adults emerge to lay eggs and start the cycle again.

***Taeniothrips simplex* (Morison)**
Gladiolus Thrips

Physothrips simplex Morison (1930*a*: 12). ♀. Type-locality.—Urrbrae, South Australia.

Taeniothrips gladioli Moulton and Steinweden (1931:20). ♀, ♂. Type-locality. Vineland Station, Ontario, Canada. Synonymized by Steele (1935).

FEMALE (macropterous).—Length distended over 1.5 mm. General color dark brown except antennal segment III and tarsi which are yellowish brown. Fore wings brown except basal portion which is white. Ocellar pigment red. Body with yellow to orange subintegumental pigment.

Head not elongate or especially bulged (Fig. 137). Interocellar setae short. Antennae as in Fig. 130.

Prothorax with a few dorsal setae, with three pairs of posterior setae between the major epimeral setae. Fore tarsi without teeth. Fore wings normally with five or more distal setae on fore vein.

Abdominal sternites III–VII with accessory setae in addition to the posterior ones. Abdominal tergite VIII with posterior comb complete. Abdominal tergite X split for about one-half its length.

MALE (macropterous).—Length distended over 1 mm. Similar to female in color and general structure. Abdominal tergite VIII without a complete posterior comb of setae. Fore wings often with a nearly full row of setae on fore vein. Abdominal sternites III–VIII with accessory setae in addition to posterior ones. Abdominal sternites III–VII each with an elongate sternal area that occupies most of the sclerite (Fig. 132).

Miss Kellie O'Neill of the U.S. National Museum once suggested to me



Fig. 137.—*Taeniothrips simplex*, head and prothorax.

that since *simplex* is so dependent upon gladioli, it is probable that this thrips originated from the same area as did its host, that is, from Africa. In Illinois this thrips is of major concern to growers of commercial gladioli as well as to home gardeners. None of these tropical thrips overwinter out-of-doors; the species survives on corms stored in warm buildings.

Speyer (1951) gave an excellent diagnosis of this species and illustrated many of the characteristics. Others have written detailed accounts of the life history of this thrips, among them are Steele (1935), Herr (1934), Smith & Nelson (1933), and Cohic (1953).

Illinois records.—Collected out-of-doors from May to September, as well as in greenhouse in winter, from one to several localities in the following counties: CHAMPAIGN, COOK, KANE, KANKAKEE, MERCER, OGLE, WHITESIDE, and WOODFORD.

Taeniothrips vaccinophilus Hood

Taeniothrips vaccinophilus Hood (1936a:1). ♀. Type-locality.—Candaigua Lake, New York.

FEMALE (macropterous).—Length distended about 1 mm. Color pale yellow. Antennal segments III–VIII and scale and subbasal crossband of fore wing grayish brown. Ocellar pigment red.

Head not elongate or bulged behind eyes. Interocellar setae small.

Prothorax with only a single pair of posterior setae between the major epimeral setae. Fore tarsi without teeth. Fore wings normally with three distal setae on fore vein, fringe cilia wavy (not straight as reported by O'Neill and Bigelow in 1964).

Abdominal sternites without accessory setae in addition to posterior ones. Abdominal tergite VIII without posterior comb. Abdominal tergite X not divided along median line.

MALE (macropterous).—Length distended about 0.7 mm. Similar to female in color and general structure. In the single specimen in our collection, from Connecticut, the left maxillary palp is two segmented whereas the

right maxillary palp is three segmented. Abdominal tergite VIII without posterior comb of setae. Abdominal sternal glandular areas apparently not present.

Although not yet known in Illinois, almost certainly this species will be found here eventually. This assumption is made because host plants of *vaccinophilus*, various species of *Vaccinium*, occur within the state. I have seen specimens from Connecticut, New York (including the holotype), and Washington, D.C.

Taeniothrips vulgatissimus (Haliday)

Thrips vulgatissima Haliday (1836: 447). ? ♀. Type-locality.—Britain. Placed in *Taeniothrips* by Priesner (1920a).

Physopus pallipennis Uzel (1895:110). ♀. Type-locality.—Either Bohemia (Czechoslovakia) or Helgoland (Germany). Synonymized by Priesner (1914a).

FEMALE (macropterous).—Length distended up to nearly 2 mm. Color nearly uniformly dark brown except antennal segment III and tarsi which are lighter brown. Fore wings brown except base which is dusky white. Ocellar pigment red. Body, especially thorax, with orange to red subintegumental pigment.

Head slightly elongate for genus, slightly bulged behind eyes (Fig. 138). Antennae as in Fig. 131. Interocellar setae moderately long.

Prothorax moderately setose, with three pairs of posterior setae between the major epimeral setae. Fore tarsi without teeth. Fore wings normally with three distal setae on fore vein.

Abdominal sternites with accessory setae in addition to posterior ones. Abdominal tergite VIII with posterior comb complete. Abdominal tergite X split for more than three-fourths its length (Fig. 134).

MALE (macropterous).—Length distended nearly 1.5 mm. Similar to female except somewhat lighter color in thorax. Abdominal sternites III–VIII with accessory setae in addition to posterior ones. Abdominal sternites III–

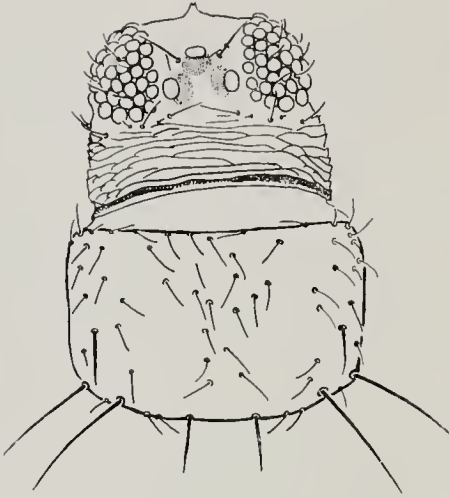


Fig. 138.—*Taeniothrips vulgatissimus*, head and prothorax. From O'Neill & Bigelow (1964).

VII with a small oval glandular area (Fig. 133). Abdominal tergite VIII without posterior comb of setae.

Seemingly this is a species with an enormous natural range. It has been found in northern, western, and middle Europe (Priesner 1926*b*) and in much of temperate North America. As might be expected in a species of extensive distribution throughout which it is subjected to varied ecological conditions, there are considerable interpopulation differences. In particular the lengths of certain setae and the size of the male glandular areas often vary between populations. Yet, it seems certain that all of these populations belong to *vulgatissimus*, perhaps in some cases as racial or even subspecific segregates.

In Illinois *vulgatissimus* becomes abundant solely on *Heracleum*, its principal host plant. In Europe, too, *Heracleum* is a favorite host. I have for comparison many specimens collected by Dr. H. H. Ross from *Heracleum* that was growing in an English garden. Both the English and the Illinois specimens appear to be the same species.

Illinois records.—COOK COUNTY: Golf (Harm's Woods), June 17, 1949, Ross, Tietz, Stannard, on *Heracleum*, many specimens; Western Springs

(Warren Harding Woods), June 16, 1949, Ross, Stannard, on *Heracleum*, 3 ♀. LAKE COUNTY: Waukegan, June 18, 1951, Ross, Richards, Stannard, on flowers of *Heracleum*, 6 ♀, 1 ♂. WINNEBAGO COUNTY: Shirland, July 29, 1953, Stannard, in woods, 1 ♀.

Thrips Linneaus

Thrips Linneaus (1758:457). Type-species by subsequent designation by Curtis (1839).—*Thrips physapus* Linneaus. Valid designation. Type-species by subsequent designation by Westwood (1839).—*Thrips physapus* Linneaus. Unnecessary designation, previously designated by Curtis.

Physapus DeGeer (1773:6).—Name used in subordination to *Thrips*.

Euthrips Targioni-Tozzetti (1881:132). Unnecessary substitute name for *Thrips* (Hood 1914*a*).

Parathrips Karny (1907:47). Type-species by monotypy.—*Parathrips uzeli* Karny. Synonymized by Priesner (1925*c*).

Achaetothrips Karny (1908:111). Type-species by monotypy.—*Achaetothrips loboptera* Karny. Synonymized by Priesner (1949).

Archaeothrips Field (1910:74). Misspelling of *Achaetothrips* Karny.

Paulus Solowiow (1924:25). Type-species by monotypy.—*Paulus gracilis*. Synonymized by Priesner (1949).

Priesneria Maltback (1928:2). Type-species said by Priesner (1949) to be *Priesneria mancosetosa* Maltback; reference unknown to me. Preoccupied by *Priesneria* Bagnall (1926*c*). Synonymized by Priesner (1949).

Head wider than long to as long as wide, at the most only slightly prolonged in front of eyes. Antennae seven segmented, segments III and IV each with a forked sense cone. Antennal segment VI sometimes slightly enlarged in male. Interocellar and postocular setae small. Mouth cone moderate in size. Ocelli, except when reduced in size, forming a fairly compact triangle. Maxillary palps three segmented.

Prothorax with two well-developed pairs of epimeral setae, all other setae much smaller by comparison, with two, three, or four pairs of setae on posterior margin between major pairs of epimeral setae. Mesospinasterum separated from metasternum by a wide suture. Metascutum longitudinally striate to hexagonally reticulate. Fore legs rarely with toothlike projections and always without long hairlike projections. All tarsi two segmented. Macropterous, micropterous, or brachypterous. Fore wings with two veins, setae on veins interrupted on fore vein only, fringe cilia wavy.

Abdomen with separated pleural plates. Abdominal tergite I weakly to strongly striate. Abdominal tergite II with three or four setae on each lateral margin. Median pair of setae placed far apart on the intermediate abdominal tergites. Abdominal tergites with or without small scallop-like projections along posterior margins. Abdominal sternites with or without accessory setae, median posterior pair of setae on margin except on sternite VII. Abdominal tergite VIII with or without a complete comb of marginal setae. Females with well-developed ovipositor, with abdominal tergite X partially split. Males with a glandular area on either abdominal sternites III and IV, III-V, or more usually III-VII; these glandular areas round to oval to transversely elongate. Males without thornlike setae on abdominal tergite IX.

This is the only genus Linneaus recognized in the group of insects that has since become known as the Thysanoptera.

From the closely related *Baliothrips*, the genus *Thrips* may be separated by the number of segments in the maxillary palps. *Baliothrips* is characterized by having the maxillary palps two segmented whereas in the species of *Thrips* the maxillary palps are three segmented. From *Microcephalothrips* the genus *Thrips* differs primarily in the number of setae on the posterior margin of the prothorax between the major pairs of epimeral setae. In *Microcephalothrips*, as found in Illinois, there are five pairs of setae between

the major epimeral setae. By contrast in the species of *Thrips*, as found in Illinois, there are only two, three, or rarely four pairs of setae between the major epimeral setae.

Thysanopterists are indebted to E. R. Speyer of England for his excellent analysis of the genus *Thrips* and in particular for his discovery of many useful diagnostic characteristics.

Thirteen species occur in Illinois. Of those whose habits are known six are host specific, that is, each of these species is confined for its existence to a single genus of plants.

KEY TO SPECIES

(THAT OCCUR OR MAY OCCUR IN ILLINOIS)

- 1. Females.....2
Males (not keyed: *helianthi* and *monotropae* which are unknown, and *nigropilosus* which is unknown to me)....19
- 2. Macropterous.....3
Brachypterous.....18
- 3. Abdominal sternites with accessory (middle row) setae.....*physapus*
Abdominal sternites without accessory setae.....4
- 4. Posterior margin of abdominal tergite VIII predominantly with non-setae-bearing, scalelike projections. *syllvanus*
Posterior margin of abdominal tergite VIII with setae (some of which may be borne on tiny scalelike projections) or posterior margin mostly bare.....5
- 5. Antennal segments I and II dark, nearly uniformly yellow in the remaining segments although segments VI and VII may be slightly shaded brown; legs entirely dark.....*pallicornis*
Antennae brown apically, especially segments VI and VII; legs dark, or tarsi and/or parts or all of tibiae yellow, or legs entirely pale yellow.....6
- 6. Fore wings brown in the middle, markedly pale basally and apically. *helianthi*
Fore wings uniformly brown or entirely pale gray, or pale gray at base, or just slightly paler at apex.....7
- 7. Apical half of anterior longitudinal vein of fore wing usually with four to six setae; basal setae short, hardly longer than distance between fore vein and leading edge of wing; prothorax with major setae short, much shorter than dorsal length of eye; ocellar pigments gray in life.....*tabaci*
Apical half of anterior longitudinal vein of fore wing usually with three or fewer setae; basal setae longer, when perpendicular considerably exceeding the leading edge of the wing; prothorax usually with major setae as long as or longer than dorsal length of eye; ocellar pigments some shade of red.....8
- 8. Light colored species, wings and abdomen

- yellow to light yellow-brown in spots, wing and abdomen never predominantly brown to black.9
 Dark colored species, at least most of abdomen and wings grayish brown to black.12
9. Head, prothorax and abdomen with light yellowish brown blotches *nigropilosus*
 Body almost entirely pale yellow.10
10. Abdominal tergite II with four setae on each lateral margin (not yet introduced into Illinois)*flavus*
 Abdominal tergite II with three setae on each lateral margin.11
11. Body and wing bristles dark brown.*winneமான*
 Body and wing bristles almost colorless.*quinciensis*
12. Bicolored; brownish yellow on head, thorax, abdominal segments I, IX, and X; abruptly dark brown on abdominal segments II-VIII.*tripartitus*
 Not abruptly paler in color on abdominal segments I, IX and X.13
13. Abdominal tergite II with four setae on each lateral margin.*fuscipennis*
 Abdominal tergite II with three setae on each lateral margin.14
14. Comb along posterior margin of abdominal tergite VIII interrupted in the middle.15
 Comb along posterior margin of abdominal tergite VIII complete.16
15. Interocellar setae much shorter than the length of antennal segment II.*varipes*
 Interocellar setae as long as or longer than the length of antennal segment II (not yet found in Illinois).*spinosus*
16. Antennal segments IV and V, at least, yellow to yellowish brown in basal two-thirds.*frosti*
 Antennal segments IV and V brown or brownish gray.17
17. Head pale brown beyond ocelli becoming yellow; abdominal segments IX and X brown; antennal segments III and IV relatively slender.*impar*
 Head brown forward of ocelli; abdominal segments IX and X brown to brownish yellow; antennal segments III and IV stouter.*monotropae*
18. Body pale, yellow with gray.*nigropilosus*
 Body bicolored yellow and black, abdominal segments II-VIII dark brown.*tripartitus*
19. Abdominal sternites with one or two pairs of accessory setae.*physapus*
 Abdominal sternites without accessory setae.20
20. Abdominal glandular areas only on sternites III and IV, or III-V.21
 Abdominal glandular areas on sternites III-VII.22
21. Abdominal glandular areas on sternites III and IV only.*pallicornis*
 Abdominal glandular areas on sternites III-V.*tabaci*
22. Abdominal tergite II with four setae on each lateral margin.23
 Abdominal tergite II with three setae on each lateral margin.24
23. Color yellow (not yet introduced into Illinois).*flavus*
 Color brown or brownish yellow.*fuscipennis*
24. Abdomen markedly bicolored; abdominal segments I, IX, and X yellowish brown; segments II-VIII abruptly brown.*tripartitus*
 Abdomen not markedly bicolored.25
25. Abdominal tergite IX with four anterior setae and two posterior setae.*varipes*
 Abdominal tergite IX with two anterior setae and four posterior setae.26
26. Antennal segment I brown.27
 Antennal segment I yellow to pale or pale gray.29
27. Interocellar setae much shorter than the length of antennal segment II.28
 Interocellar setae as long as or longer than antennal segment II (not yet found in Illinois).*spinosus*
28. Antennal segment V yellow in basal two-thirds; fore wings only slightly lighter in color at base; abdominal sternal glands relatively large.*frosti*
 Antennal segment V with more brown; abdominal sternal glands smaller; fore wings abruptly pale in color at base.*sylvanus*
29. Wings pale gray.*quinciensis*
 Wings predominantly brown or grayish brown.30
30. Prothorax and metascutum light brown.*impar*
 Thorax entirely yellow.*winneமான*.

Thrips frosti Moulton

Thrips frosti Moulton (1936c:107). ♀, ♂. Type-locality.—Sherborn, Massachusetts.

FEMALE (macropterous).—Length distended about 1.4 mm. General color dark brown. Antennal segment III yellowish brown, apical two-thirds of segments IV and V usually yellow, remainder of antennae predominantly dark brown. Apical half of tibiae and all tarsi yellowish brown to yellow. Fore wings dark brown becoming slightly lighter at base. Ocellar pigment red. Body with red subintegumental pigment.

Head moderate in size. Antennal segment III slender.

Prothorax moderately setose, with bare areas either side of center. Anteromarginal setae heavy and thickened. Inner posterior pair of major setae long, about $1\frac{1}{3}$ times as long as dorsal length of eye. Three pairs of setae on posterior margin of the prothorax between the major pairs of setae. Fore wings each with three (sometimes four) apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended about 1 mm. Colored dark brown much as in female, except slightly lighter in head.

Similar to female in structure. Abdominal sternal glands moderate in size, oval, one each present on sternites III–VII. Abdominal tergite VIII apparently without a complete comb of setae on posterior margin. Abdominal tergite IX with two anterior and four posterior median setae.

This species belongs to the *monotropae-impar* group of dark brown species possessing a complete comb of setae on the posterior margin of abdominal tergite VIII. It differs from both *monotropae* and *impar* by the lighter colored intermediate antennal segments. Possibly *frosti* is also related to *herricki*, but *herricki* is said to differ by having most of antennal segments IV and V brown, much as in *impar* and *monotropae*.

Since its description, *frosti* has not been reported again in the literature. In 1955 we were fortunate in finding several specimens of this species in the Quetico Provincial Park, a wilderness area in Ontario. Although almost certainly a northern thrips, *frosti* eventually might be found in the relict boreal areas of northern Illinois. So far no specimen has been collected in our state.

***Thrips fuscipennis* Haliday**

Thrips fuscipennis Haliday (1836: 448). *Nomen nudum*.

Thrips fuscipennis Haliday (1852: 1111). ♀, ♂. Type-locality.—Presumably England. First valid description.

Thrips salicaria Uzel (1895:182). ♀, ♂. Type-locality.—Czechoslovakia.

Synonymized by Priesner (1925c).
Thrips meledensis Karny (1908:110). ? ♀. Type-locality.—Prozor, Yugoslavia. Synonymized by Priesner (1925c).

FEMALE (macropterous).—Length distended about 1.4 mm. Body color

varying from light brown to dark brown. Antennae brown except intermediate segments which are sometimes yellowish brown. Tarsi yellowish brown. Fore wings nearly uniformly gray-brown becoming slightly paler at base. Ocellar pigment red. Thorax with orange subintegumental pigment.

Head moderate in size.

Prothorax moderately setose, with bare areas on either side of center. Inner posterior pair of major setae moderately long, about as long as dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings each with two or three apical setae on fore vein.

Abdominal tergite II usually with four setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII usually without a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended about 0.9 mm. General color yellowish brown. Head forward of ocelli and directly behind eyes, antennal segment I, and anterior margin of prothorax yellow. Thorax and abdomen sometimes predominantly more brown than yellowish brown. Similar to female in other coloration.

Similar to female, except more slender, in general structure. Abdominal sternites III–VII each with a fairly large, elliptical glandular area. Abdominal tergite IX with two anterior and four posterior median setae.

This variable and common European species is apparently also present in our fauna. Our specimens compare favorably with material I have studied from England and Germany. Possibly it was introduced by man, because according to Morison (1948) it is apparently limited by climatic factors to southern England and thus cold temperatures would have prevented it from becoming holarctic in natural distribution in recent times. *Thrips fuscipennis* was first reported in North America (New York) by Hood in 1927. In England it is called the "rose thrips" (Speyer 1934) although it is numerous on other flowers and trees as well (Morison 1948).

From other dark colored species of the genus *Thrips* that occur in Illinois, *fuscipennis* may be distinguished by the lack of accessory setae on the abdominal sternites, by the absence of a complete comb of setae on abdominal tergite VIII, and by the presence of four setae on each lateral margin of abdominal tergite II.

So far this species has been found only in northern Illinois. To my knowledge no males have been taken in North America.

Illinois records.—LAKE COUNTY: Volo Bog, October 18, 1952, McAlpine, 1 ♀. PUTNAM COUNTY: Magnolia, April 29, 1948, Stannard, on *Fraxinus* leaves, 4 ♀.

Thrips helianthi Morgan

Thrips helianthi Morgan (1913:23). ♀. Type-locality.—Clarksville, Tennessee.

Thrips walteri Crawford, J. C. (1938: 37). ♀. Type-locality.—Washington (Mount Hamilton), D. C. Synonymized by Bailey (1948).

FEMALE (macropterous).—Length distended about 1.4 mm. General color dark brown. Antennal segments I and II dark brown; segments III-V predominantly yellow, darkened apically; segment VI yellow at base, light brown in apical half; segment VII light brown. Apical half of tibiae and all tarsi yellow. Fore wings pale brown at base and apex, brown in the middle. Ocellar pigment red.

Head moderate in size. Antennal segment VI slightly longer than segment III.

Prothorax moderately setose with bare areas either side of center. Anterior margin of prothorax with one or two pairs of stouter setae. Inner posterior pair of major setae of prothorax moderately long, about as long as to slightly longer than dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings with two or three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal

tergite VIII with a complete comb of setae on posterior margin.

MALE.—Unknown.

From all other congeners known to occur in Illinois, this species may be distinguished by the color of the fore wings, which are brown in the middle and abruptly pale at the base and apex.

This rare thrips has been taken four times in our state.

Illinois records.—ADAMS COUNTY: Marblehead, June 24, 1948, Stannard, sweeping in woods, 1 ♀. MCHENRY COUNTY: Hebron, July 29, 1953, Stannard, edge of marsh, 1 ♀. TAZEVELL COUNTY: Hopedale, September 11, 1953, Ross, Stannard, herbs of floodplain forest, 1 ♀. VERMILION COUNTY: Danville, November 1, 1942, Ross, ground litter, 1 ♀.

Thrips impar Hood

Thrips impar Hood (1915a:25). ♀, ♂.

Type-locality.—Not stated but holotype labeled Plummer's Island, Maryland.

Thrips herricki var. *impatientis* Moulton (1936c:109). ♀. Type-locality.—Atwater, Illinois, New synonymy.

FEMALE (macropterous).—Length distended about 1.4 mm. General color brown. Antennae brown except pedicels of intermediate segments lighter. Head forward of ocelli yellow. Tibiae and tarsi yellowish brown to yellow. Fore wings nearly uniformly brownish gray, not particularly paler at base. Ocellar pigment red. Thorax with orange subintegumental pigment.

Head moderate in size. Antennal segment VI nearly equal to slightly longer than segment III, segments III and IV slender.

Prothorax moderately setose, with bare areas on either side of center. Inner posterior pair of major setae long, more than $1\frac{1}{4}$ times as long as dorsal length of eye. Two, occasionally three, pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings with two or three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites

without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended about 1.1 mm. Body and legs generally yellow clouded with pale brown blotches. Antennal segment I pale yellow, remainder of antennae brown. Fore wings nearly uniformly brownish gray similar to those of female.

Similar to female in structure except smaller and more slender. Antennal segment VI proportionately longer than in female. Abdominal sternal glands moderate in size, usually elliptical, one each present on sternites III–VII (Fig. 49). Abdominal tergite VIII usually without a complete comb of setae on posterior margin. Abdominal tergite IX with two anterior and four posterior median setae.

This species is similar to *monotropae* in many characteristics. In the female sex, the two species differ in color and in the shape of antennal segments III and IV, as noted in the key. Because the male of *monotropae* is unknown, a comparison of this sex cannot be made. An additional point of difference may be in the number of setae on the posterior margin of the prothorax between the major pairs. This difference may apply to both sexes. Usually in the species *impar* only two pairs of setae are present in this region, whereas in *monotropae* there are usually three pairs of setae.

Through the kindness of Dr. E. S. Ross I have been able to check a female paratype of Moulton's *Thrips herricki* var. *impatientis*. I found that this paratype is identical with material determined as *impar* by many American thysanopterists.

It has been long suspected that *Thrips herricki* Bagnall and its many synonyms, Hood (1931a), may be in turn a synonym of *impar*. Proof of this synonymy remains to be obtained.

Thrips impar is common throughout the state on jewelweed (*Impatiens*). It is recorded in the literature from Georgia, Maryland, New Jersey, New York, and Tennessee. I have taken it also in Arkansas, Indiana, and Ohio.

Illinois records.—Collected from

May through September, from one to several localities in the following counties: ADAMS, BROWN, BUREAU, CALHOUN, CARROLL, CHAMPAIGN, CHRISTIAN, CLARK, COOK, CUMBERLAND, DOUGLAS, EDGAR, EFFINGHAM, FULTON, HARDIN, HENDERSON, HENRY, JACKSON, JERSEY, JO DAVIESS, KENDALL, LAKE, LA SALLE, LEE, MACON, MACOUPIN, MASON, MASSAC, MERCER, MONROE, OGLE, PUTNAM, SCOTT, SHELBY, STEVENSON, TAZEWELL, VERMILION, WABASH, WARREN, WILL, and WILLIAMSON.

Thrips monotropae Hood

Thrips monotropae Hood (1927a:217).

♀. Type-locality.—Sodus Point, New York.

Thrips flavicauda Watson (1927b:43).

♀, ♂. Type-locality.—Gainesville, Florida. New synonymy.

FEMALE (macropterous).—Length distended about 1.5 mm. General color dark brown. Antennae almost entirely dark brown, the pedicels of the intermediate segments yellowish brown. Tibiae and tarsi yellowish brown to yellow. Abdominal segments IX and X brown to yellowish brown. Fore wings brown becoming gradually paler at base. Ocellar pigment red. Thorax with orange subintegumental pigment. Body setae brown.

Head (Fig. 139) moderate in size. Antennal segment VI nearly equal to or longer than segment III, segment III moderately stout.

Prothorax moderately setose, with bare areas either side of center posteriorly. Inner posterior pair of major setae long, nearly $1\frac{1}{2}$ times as long as dorsal length of eye. Three, occasionally two, pairs of setae on posterior margins of prothorax between the major pairs of setae. Fore wings with three apical setae on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

MALE.—Unknown.

This species has a darker head and stouter third and fourth antennal segments than does its close relative,



Fig. 139.—*Thrips monotropae*, head and prothorax. From Hood (1927c).

impar. Many Illinois specimens of *monotropae* have the last two abdominal segments light brown. In contrast eastern specimens often have abdominal segments IX and X yellowish brown.

As its name implies, *Thrips monotropae* occurs in the flowers of Indian pipe (*Monotropa uniflora* and *Monotropa hypopithys*). It has been found several times in Illinois but apparently it is only locally abundant. Repeated efforts to find *monotropae* in areas other than those listed below for our state have not been successful. In addition to the Illinois material there are specimens in our collection from Wheaton, Maryland and Mt. Carmel, Connecticut collected by Dr. K. M. Sommerman, and specimens from Chelsea, Quebec collected by Dr. R. S. Bigelow.

Although Watson (1927b) thought that *flavicauda* was different from *monotropae* he did not state the reasons for his belief. In my opinion the two are conspecific. I am here designating the lectotype of *flavicauda* to

be the dorsally mounted female specimen on the slide marked "Type" with the prefix "para" crossed off. This slide is labeled "In blossoms of Indian pipe under oaks, Lakeside Estate, Gainesville, Fla., 12-7-26, Watson & Tissot". Another female, mounted on its side, lies next to the lectotype on the same slide, which is deposited in the Watson collection.

Illinois records.—LA SALLE COUNTY: Starved Rock State Park, September 7, 1951, Mills, Ross, in flowers of *Monotropa uniflora*, 6 ♀, 1 larva; Starved Rock State Park, September 13, 1951, Richards, Stannard, in *Monotropa* flowers, 6 ♀. OGLE COUNTY: Oregon (Sinnissippi Forest), September 15, 1955, Ross, Stannard, in flowers of Indian pipe, 3 ♀.

***Thrips nigropilosus* Uzel** Chrysanthemum Thrips

Thrips nigropilosus Uzel (1895:198). ♀, ♂. Type-locality.—Czechoslovakia.

Thrips aureus Hood (1915a:27). ♀, ♂. Type-locality.—Alexandria, Virginia. New synonymy.

FEMALE (macropterous).—Length distended about 1.5 mm. Color yellow with light grayish brown blotches on the thorax and the basal abdominal tergites. Antennal segment I nearly white; remaining segments brown. Ocellar pigment red. Body setae dark brown. Fore wings pale gray.

Head moderate in size.

Prothorax moderately setose, setae fairly long, with a well-developed pair of anterior setae, with bare areas either side of center. Inner posterior pair of major setae proportionately long, nearly $1\frac{1}{2}$ times as long as dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs. Fore wings short with three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

FEMALE (brachypterous).—Color

and structure similar to macropterous form except wings shortened to pads.

MALE.—Not yet found in Illinois, nor represented in the collections of the Illinois Natural History Survey.

Thrips nigropilosus is a yellow thrips with light grayish brown blotches and red ocellar pigment. It is one of the few species of *Thrips* in Illinois that produces brachypterous forms.

Apparently introduced from Europe, this thrips prefers our roadsides which are composed primarily of introduced European plants. It is common locally in the northern part of Illinois where I have taken it in large numbers on burdock. Before the general use of the newer insecticides, *nigropilosus* was a pest in greenhouses, especially on chrysanthemums.

Illinois records.—CHAMPAIGN COUNTY: Urbana, February 18, 1937. Asterlund, (in greenhouse) on chrysanthemum, many specimens; Urbana, April 5, 1939, Ritcher, (in greenhouse) on chrysanthemum, 4 ♀; Urbana, June 23, 1933, Farrar, lettuce, 2 ♀. COOK COUNTY: Maywood, February 5, 1935, Compton, (in greenhouse) on *Matricaria parthenoides*, many specimens. DU PAGE COUNTY: Naperville, February 20, 1925, Compton, (in greenhouse) on chrysanthemum, many specimens. JACKSON COUNTY: Gorham (Fountain Bluff), April 30, 1953, Stannard, grass, 1 ♀. MCHENRY COUNTY: Chemung, June 19, 1951, Stannard, underside of leaves of burdock, many specimens. WABASH COUNTY: Mt. Carmel, June 15, 1948, Becker, grasses, 2 ♀.

Thrips pallicornis Hood

Thrips pallicornis Hood (1912c:138). ♀, ♂. Type-locality.—Parker, Johnson County, Illinois.

Thrips gilmorei Moulton (1929b:234). ♀, ♂. Type-locality.—Appomattox, Virginia. New synonymy.

FEMALE (macropterous).—Length distended over 1.5 mm. General color dark brown including legs. Antennal segments I and II dark brown, remaining segments yellow except apical half of segment VI and all of VII

faintly clouded with light brown. Fore wings brown, abruptly pale at base. Ocellar pigment red. Body with bright red subintegumental pigment.

Head elongate. Antennal segments III and IV slender.

Prothorax sparsely setose, the central area almost devoid of setae. Inner major pair of posterior setae of prothorax long, more than $1\frac{1}{4}$ times as long as dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings with three apical bristles on fore vein.

Abdominal tergite II usually with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII with a complete but weak comb of setae on posterior margin.

MALE (macropterous).—Length distended about 1.3 mm. Similar to female in color and general structure, except smaller and more slender. Abdominal sternal glandular areas large, elliptical, one each on sternites III and IV only (Fig. 48). Abdominal tergite VIII without a complete comb of setae on posterior margin.

The light-colored antennae contrasted to the dark-colored body and legs give *pallicornis* a distinctive appearance, although somewhat suggestive of *sylvanus*. The male of *pallicornis* is unusual in that it has only two sternal glandular areas on the abdomen.

This species occurs on hickory leaves in the west-central and southern parts of the state. So far it has not been found within the area formerly glaciated by the Wisconsin ice sheets.

Illinois records.—Collected during spring, summer and early fall, from one to several localities in the following counties: ADAMS, CALHOUN, CLAY, JACKSON, JOHNSON, MC-DONOUGH, PIKE, POPE, RICHLAND, WASHINGTON, and WILLIAMSON.

Thrips physapus Linnaeus Dandelion Thrips

Thrips physapus Linnaeus (1758:457).

♀. Type-locality.—Sweden.

Thrips fusca Müller (1776:96). ? ♀.

Type-locality.—Denmark or Norway. Synonymized by Priesner (1925c).

Thrips flavicornis Reuter, O. M. (1878-79:219). ? ♀. Type-locality.—Parigas (Parainen), Turku-Pori, Finland. Synonymized by Reuter (1899).

FEMALE (macropterous) (Fig. 140).

Length distended about 1.7 mm. General color dark brown. Antennal segments III–VII largely yellow, apex of segments IV–VI and all of VII brown. Fore tibiae, except at sides, and all tarsi yellow to yellow-brown. Fore wings nearly uniformly grayish

brown. Ocellar pigment red. Thorax with orange subintegumental pigment.

Head moderate in size, eyes large.

Prothorax setose but with bare areas either side of center posteriorly. Inner posterior pair of prothoracic setae short, less than dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings with three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites with accessory setae variously arranged, not in a single transverse row. Abdominal tergite VIII with a com-

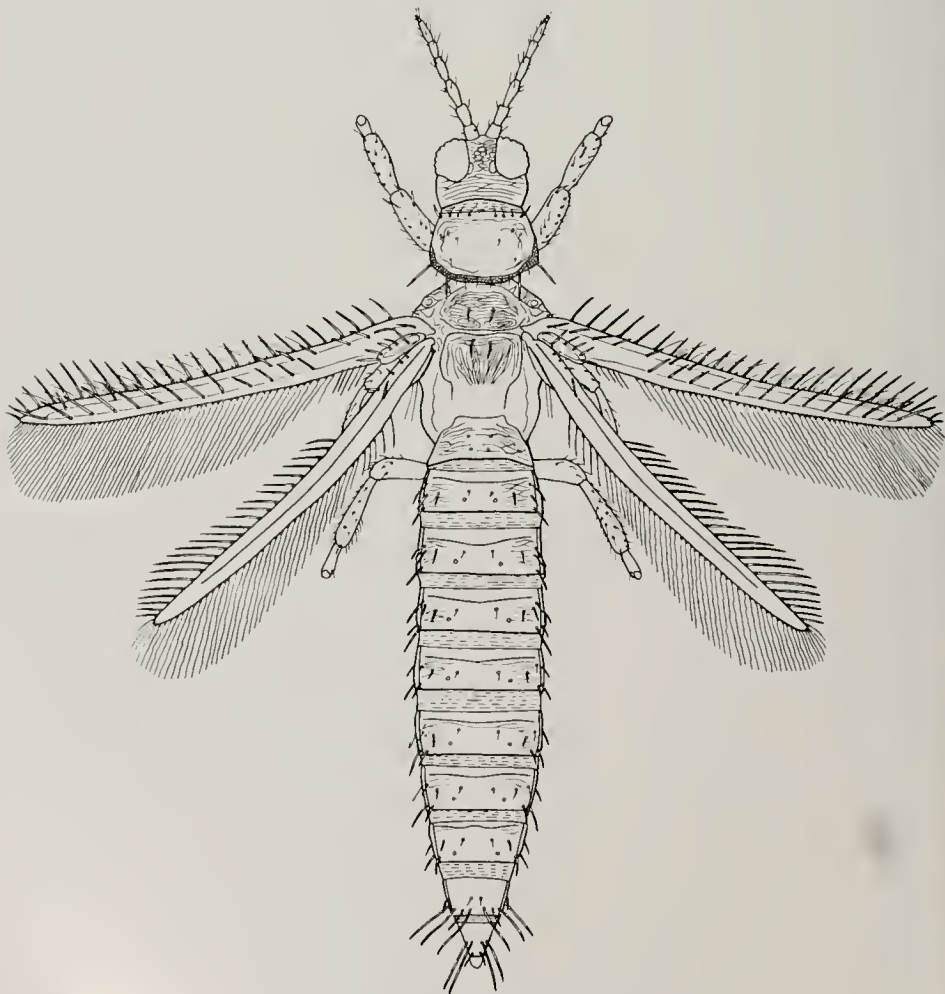


Fig. 140.—*Thrips physapus*, dorsal aspect.

plete comb of setae on posterior margin.

MALE (macropterous).—Length distended over 1.2 mm. Similar to female in color and structure except lighter colored and more slender. Abdominal sternites with fewer accessory setae (usually reduced to two or four setae) than in female. Abdominal sternites III–VII each with a moderate-sized, elliptical glandular area. Abdominal tergite VII without a complete comb of setae on posterior margin.

It is my opinion, based upon comparative studies of European specimens, that our species in Illinois is *Thrips physapus* as defined by Speyer and others. Presumably this thrips was introduced into North America from Europe along with its host plants. *Thrips trehernei* Priesner which was later made a variety of *Thrips hukkineni* Priesner (Priesner 1937) is probably not the proper name for our species.

Thrips physapus is the only species of the genus *Thrips* in Illinois with accessory setae on the abdominal sternites. Reported elsewhere in eastern North America, other species having accessory setae on the abdominal sternites differ in that either they possess a tooth on each fore tarsus (*Thrips calcaratus* Uzel) or the accessory setae are arranged in a single transverse row on each abdominal sternite (*Thrips thalictri* Hood).

Dandelion (*Taraxacum*), goatsbeard (*Tragopogon*), and wild lettuce (*Lactuca*) appear to be the favorite hosts of this common, statewide thrips.

Illinois records.—Collected during spring, summer, and autumn from one to several localities in every county in the state.

Thrips quinciensis Morgan

Thrips quinciensis Morgan (1913:21).

♀. Type-locality.—Quincy, Florida. ?*Thrips pectinatus* Hood (1932:38).

♀. Type-locality.—Plummer's Island, Maryland. ? new synonymy.

FEMALE (macropterous).—Length distended about 1.3 mm. Color almost entirely pale yellow becoming nearly

white in Hoyer's mounting medium, wings and body setae also pale. Antennae predominantly yellowish but terminal segments with much brown, segments II–IV with indications of brown at tip, segment V brown in the apical half, segment VI brown in the apical two-thirds, and segment VII brown. Ocellar pigment red.

Head moderate in size.

Prothorax moderately setose with bare areas either side of center. Inner posterior pair of major prothoracic setae long, nearly $1\frac{1}{2}$ times as long as dorsal length of eye. Two or three pairs of setae on posterior margin of prothorax between the major pairs. Fore wings with two or three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended about 1.1 mm. Similar to female in color and general structure. Abdominal tergite VIII usually with a complete comb of setae on posterior margin but these setae shorter and much weaker than in female. Abdominal sternal glandular areas on sternites III–VII inclusive, these glandular areas small, usually not as wide as the distance between the bases of the median pair of posterior sternal setae. Abdominal tergite IX with two anterior and four posterior setae.

Thrips quinciensis is a pale colored thrips with bright red ocellar pigment, with most of the basal segments of the antennae pale, and with the body setae pale to nearly colorless. By the combination of these characteristics it can be distinguished from any species of *Thrips* so far discovered in Illinois.

Like *winnemanae*, *quinciensis* was reported to have been collected more than 40 years ago and hardly again since. It may be a rare but locally common thrips; I have taken it in abundance in the Great Smoky Mountains National Park and we have records of it from hibernation in the forest leaf mold from Michigan and Wisconsin. It is known from one locality in

Illinois where larvae and adults were found feeding on the leaves of *Staphylea*.

The types of *quinciensis* do not show evidence of a complete comb of setae across the posterior margins of abdominal tergite VIII in the female. This absence of setae is presumed to be due to the poor mounts of the specimens. If, on the other hand, it is found that these setae are really lacking in *quinciensis*, then the Illinois populations should be referred to as *pectinatus*.

Illinois record.—PIKE COUNTY: Barry, September 9, 1954, Ross, Stannard, on leaves of *Staphylea*, 1 ♀, 6 larvae.

***Thrips spinosus* Morgan**

Thrips spinosus Morgan (1913:25).
♀, ♂. Type-locality.—Quincy, Florida.

FEMALE (macropterous).—Length distended about 1.6 mm. General color brown with abdominal segment X dark brown. Antennal segment III yellow to yellowish brown in basal half, segments IV and V yellow at extreme base. Apical half of tibiae and all of tarsi yellow. Fore wings nearly uniformly dusky brown. Ocellar pigment red.

Head (Fig. 141) moderate in size with moderately well-developed interocellar setae, these setae longer than antennal segment II.

Prothorax moderately setose with bare areas either side of center. Inner posterior pair of major setae moderately long, about as long as dorsal length of eye. Three or four pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings with three apical setae on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII without a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended at least 1.2 mm. Similar to female in color and structure. Abdominal sternites III-VII each with a very large, elliptical glandular area, these areas much larger than in *fusci-*

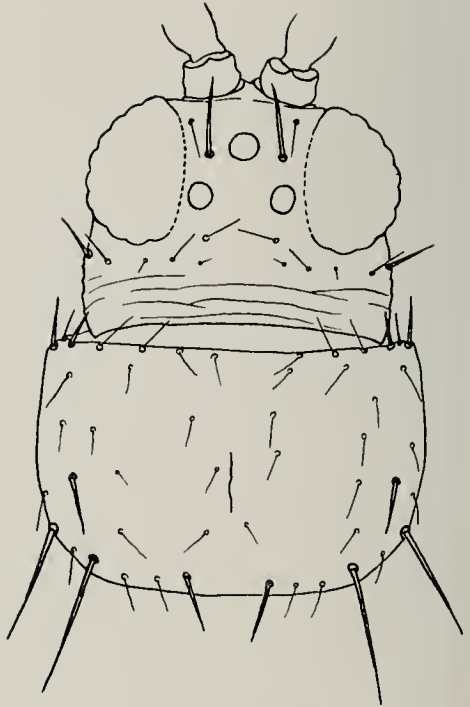


Fig. 141.—*Thrips spinosus*, ♂, head and prothorax.

pennis, about the size of those found in *varipes*. Abdominal tergite IX with two anterior and four posterior median setae.

This brown species may be distinguished from other similarly colored entities by the long interocellar setae.

Presumably *spinosus* is host specific to magnolias (Watson 1924a). Although it has not been found in our state as yet, it may be discovered eventually in southern Illinois on native and cultivated magnolias. It has been reported to be in Indiana (Blickenstaff 1946).

***Thrips sylvanus* Stannard**

Thrips sylvanus Stannard (1957a:174).
♀, ♂. Type-locality.—Great Smoky Mountains National Park, Tennessee.

FEMALE (macropterous).—Length distended about 1.4 mm. General color dark brown. Antennal segments I and II dark brown, remainder of antennae usually bright yellow but often fading

into brown in segments VI and VII, sometimes in segment V also. Apexes of tibiae and all of each tarsus yellow, the fore tibiae being the lightest. Fore wings abruptly pale at base, uniformly brown in the remainder of the wing. Ocellar pigment red.

Prothorax moderately setose with bare areas either side of center. Inner posterior pair of major setae short, much shorter than dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs. Fore wings with two apical setae on fore vein.

Abdominal tergite II with four (sometimes three) setae on each lateral margin. Sternites without accessory setae. Posterior margin of abdominal tergite VIII fringed with scalelike projections. Most of the other abdominal segments similarly fringed but with the scalelike projections weaker.

MALE (macropterous).—Length distended about 1 mm. Similar to female in general color and structure. Small abdominal glandular areas present, one each on sternites III–VII, gradually changing from elliptical on segment III to nearly circular on sternite VII. Abdominal tergite IX with two anterior and four posterior setae.

This species is easily distinguished by the presence of scalelike projections along the posterior margin of abdominal tergite VIII. In this respect, but to a lesser degree, *syllvanus* is similar to *Microcephalothrips abdominalis*.

So far *syllvanus* has been found in only three localities in Illinois. Its hosts (or host) have not been determined.

Illinois records.—CLARK COUNTY: Marshall, May 13, 1949, Ross, Gloyd, Stannard, 1 ♀. HARDIN COUNTY: Lamb (Blind Hollow), June 11, 1963, Evers, Stannard, on wild hydrangea, 2 ♀. MONROE COUNTY: Valmeyer, July 19, 1948, Smith, Stannard, sweep- ing in woods, 1 ♀.

***Thrips tabaci* Lindeman** Onion thrips

Thrips tabaci Lindeman (1888:61). ♀, ♂. Type-locality.—Bessarabia. U.S.S.R.

Thrips striatus Gillette (1893:13). ♀.

Type-locality.—Fort Collins, Colorado. Synonymized by Priesner (1925c).

Limothrips tritici Webster (1894:206). *Nomen nudum*. Synonymized by Priesner (1925c).

Thrips alii Sirrine and Lowe (1894: 680) *nec* Beach, *nec* Gillette. ♀, ? ♂. Type-locality.—Long Island, New York. Probably described from a series of mixed species, no types known to be in existence. Synonymized by Priesner (1925c).

Thrips communis Uzel (1895:176). ♀, ♂. Type-locality.—Probably Czechoslovakia. Synonymized by Priesner (1925c).

Parathrips uzei Karny (1907:48). ♀. Type-locality.—Kotor, Yugoslavia. Synonymized by Priesner (1925c).

Thrips bicolor Karny (1907:49). ? ♀. Type-locality.—Kotor, Yugoslavia. Synonymized by Priesner (1925c).

Thrips solanaceorum John (1921:10) *nec* Widgalm. ♀. Type-locality.—St. Petersburg (Leningrad), U.S.S.R. Valid name by reference to *Thrips communis* Uzel. Synonymized by Priesner (1925c).

FEMALE (macropterous).—Length distended about 1.2 mm. General color yellow except blotches on thorax and median portions of most of the abdominal tergites which are light brown or entirely yellowish brown to gray brown. Antennal segment I light brown, remainder of antennae brown except bases of segments III–V which are somewhat paler. Fore wings pale gray. Ocellar pigment gray to yellowish gray. Body setae brown.

Head moderate in size.

Prothorax heavily setose but with small bare areas on either side of center posteriorly. Anterior margin of prothorax with no setae longer or stouter than the others. Inner posterior pair of major setae short, much shorter than dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Fore wings usually with four or more apical bristles on fore vein, basal setae on fore vein short.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal

tergite VIII with a complete comb of long setae on posterior margin.

MALE (macropterous).—Not yet found in Illinois, nor represented in the collections of the Illinois Natural History Survey. According to Speyer (1934), male similar to female except smaller and lighter in color, and without a complete comb of setae on posterior margin of abdominal tergite VIII. Abdominal sternal glandular areas as a narrow transverse band on sternites III–V only.

This species is easily recognized by the gray or yellowish gray (instead of red) ocellar pigment, by the possession of four or more (instead of three or fewer) apical bristles on the fore vein of the fore wing, and by the limitation of the male glandular areas to segments III–V only.

Ghabn (1948) has given an excellent summary of the biology of *Thrips tabaci* as it occurs in Egypt and elsewhere. He quotes others as stating that the ratio of males to females is 1:3,000; one thysanopterist (see Sakimura) gives a ratio of 1:4. The low incidence of males in this species probably accounts for our failure to collect them in Illinois. Because, as Sakimura (1937) indicates, *Thrips tabaci* may succumb at temperatures below the freezing mark, it is possible that *tabaci* does not overwinter in Illinois out-of-doors. Rather it may be that this species survives the winter primarily on stored onion sets in our area.

Apparently onions are the preferred hosts of *tabaci*, although it may feed on other plants. Plant viruses are transmitted by *tabaci* (Sakimura 1940), and because this thrips is a vector of disease, it also can be an important pest on tomatoes, pineapples, and other crops.

In moderate numbers *tabaci* is of benefit to onion growers when its feeding causes the onion leaves to drop prematurely, thus speeding up the "hardening" of onion sets (W. H. Luckmann, Illinois Natural History Survey, personal communication, 1959).

Illinois records.—Collected out-doors in spring and summer (in greenhouse during late fall and winter),

from one to several localities in the following counties: CALHOUN, CARROLL, CHAMPAIGN, CLARK, COOK, HARDIN, IROQUOIS, JO DAVIESS, KANKAKEE, LAKE, LEE, MADISON, MC-HENRY, MCLEAN, PEORIA, POPE, PULASKI, PUTNAM, SANGAMON, and SCHUYLER.

Thrips tripartitus Hood

Thrips tripartitus Hood (1940c:562).

♀, ♂. Type-locality.—Oswegatchie, New York.

FEMALE (macropterous).—Not yet found in Illinois, nor present in the collections of the Illinois Natural History Survey. Originally described as being similar to brachypterous form except more robust and with fully developed wings. Fore wings light brown becoming paler apically, with two apical setae on fore vein.

FEMALE (brachypterous).—Length distended about 1.4 mm. Bicolored brownish yellow and dark brown. Brownish yellow: head, thorax, abdominal segments I, IX, and X. Dark brown: abdominal segments II–VIII. Antennal segment I pale yellow; segments II and III yellow; segments IV–VI yellow to brownish yellow at base, brown apically; segment VII brown. Legs yellow. Ocellar pigment red.

Head elongate.

Prothorax sparsely setose, most of central area except on middle line bare. Inner posterior pair of major setae on prothorax moderate in length, nearly equal to dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs of setae. Wings reduced to small pads.

Abdominal tergite II with three pairs of setae on each lateral margin. Sternites without accessory setae. Intermediate abdominal tergites with faint indications of scallops along posterior margins. Abdominal tergite VIII with a complete comb of small setae on posterior margin.

MALE.—Not yet found in Illinois. Originally described from the brachypterous form. Reported to be similar to female in color. Abdominal

sternites III-VII described as each having a small transverse glandular area.

This distinctive bicolored species is known only from Volo Bog (a tamarack bog in northern Illinois) and the type locality in New York.

Illinois records.—LAKE COUNTY: Volo Bog, September 14, 1950, Richards, 4 ♀; Volo Bog, October 9, 1952, Ross, Stannard, 7 ♀.

***Thrips varipes* Hood**

Thrips varipes Hood (1913b:161). ♀.

Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended over 1.5 mm. General color dark brown. Antennal segment III, apexes of tibiae, and all tarsi yellowish brown to yellow. Fore wings grayish brown, abruptly pale basally. Ocellar pigment red.

Head moderate in size. Antennal segment VI shorter than to as long as segment III (Fig. 68).

Prothorax moderately setose with bare areas either side of center. Inner posterior pair of major setae long, nearly $1\frac{1}{2}$ times as long as dorsal length of eye. Three pairs of setae on posterior margin of prothorax between the major pairs. Fore wings with three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Sternites without accessory setae. Abdominal tergite VIII without a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended nearly 1.2 mm. Similar to female in color except head, intermediate antennal segments, thorax, and legs lighter.

Similar to female in structure except more slender. Sternites III-VII each with a large elliptical glandular area. Abdominal tergite IX with four anterior and two posterior setae.

The preceding key should serve to distinguish this species from others in Illinois. In comparison with *fuscipennis*, *varipes* may be recognized by having only three setae on each side of abdominal tergite II, by having the

fore wings lighter at the base, by having, on the average, a proportionately shorter sixth antennal segment, and by its slightly longer posterior prothoracic setae. Our collection of the male sex is apparently the first.

This species inhabits *Clematis* flowers primarily. It may be widespread in the state, but so far it has been found mostly in our central counties.

Illinois records.—Collected during summer, from one to several localities in the following counties: CHAMPAIGN, FORD, IROQUOIS, LAWRENCE, LIVINGSTON, MACON, MASON, MERCER, PUTNAM, and VERMILION.

***Thrips winnemanæ* Hood**

Thrips winnemanæ Hood (1913b:166).

♀. Type-locality.—Plummer's Island, Maryland.

FEMALE (macropterous).—Length distended about 1.3 mm. Color almost entirely yellow, with no brown or gray spots. Antennal segment I pale, nearly white; segment II yellow; segments III-V yellow in basal half, brown in apical half; segments VI and VII predominantly brown. Fore wings light grayish brown. Ocellar pigment red. All major body setae dark brown.

Head moderate in size. Antennal segment III slender.

Prothorax moderately setose with bare areas either side of center. Anterior margin of prothorax with a pair of well-developed setae. Inner posterior pair of major setae long, more than $1\frac{1}{4}$ times as long as dorsal length of eye. Fore wings with three apical bristles on fore vein.

Abdominal tergite II with three setae on each lateral margin. Abdominal sternites without accessory setae. Abdominal tergite VIII with a complete comb of setae on posterior margin.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in general color and structure. Abdominal tergite VIII with posterior comb of setae weaker than in female and often a few setae missing. Abdominal sternites III-VII each with a large elliptical glandular area, these areas wider than in *pectinatus*,

decidedly wider than the distance between the bases of the median pair of posterior sternal setae. Abdominal tergite IX with two anterior and four posterior setae.

Morphologically *winnemanae* is the American equivalent of the European *flavus*. Both are similarly colored yellow and they are quite alike structurally. Should *flavus* be introduced into Illinois (it was reported from New York by Hood in 1927) it can be distinguished from *winnemanae* by the setal pattern of the prothorax. *Thrips flavus* has no anterior setae that are heavier and longer than neighboring setae and it bears four setae on the lateral margins of abdominal tergite II. By contrast *winnemanae* has a pair of heavier, longer setae on the anterior margin of the prothorax, and only three pairs of setae in the lateral margins of abdominal tergite II.

In Illinois the species *pectinatus* also resembles *winnemanae*. *Thrips pectinatus* is nearly white in color, not nearly as yellow as *winnemanae*; the body setae and wings of *pectinatus* are much lighter than in *winnemanae*; and the males of each species have distinctively shaped abdominal sternal glandular areas. The glandular areas found on *pectinatus* are much smaller than those on *winnemanae*. From the macropiterous form of *nigropilosus*, *winnemanae* may be distinguished by the lack of dark coloring on the metanotum. *Thrips winnemanae* is not known to produce brachypterous forms as does *nigropilosus*.

Although undoubtedly a common eastern North American thrips, *winnemanae* is scarce in collections and has not been mentioned in the literature from any region other than the type locality, Maryland. Our Illinois records are many and indicate that the species occurs most commonly in the central and southern parts of the state. In addition we have collected it from Tennessee, Kansas, and Arkansas. We have found that it is most abundant as adults and larvae on coralberry (*Symphoricarpos*) which may be its principal host. In winter adults of *winnemanae* hibernate in the leaf mold on the forest floor.

Illinois records.—Collected every season of the year, from one to several localities in the following counties: ADAMS, CALHOUN, CHAMPAIGN, CUMBERLAND, EFFINGHAM, HAMILTON, HARDIN, IROQUOIS, JOHNSON, KANE, MACON, MACOUPIN, MARION, PERRY, PIKE, UNION, WABASH, and WILLIAMSON.

Zonothrips Priesner

Zonothrips Priesner (1926b:260).

Type-species by original designation.—*Zonothrips karnyi* Priesner.

Head wider than long, not at all prolonged in front of eyes (Fig. 142). Ocelli on slightly raised area. Antennae seven segmented, segment VI pedicellate. Sense cones on antennal segments III and IV forked. Mouth cones bluntly pointed. Maxillary palps three segmented.

Prothorax with one pair of moderately developed posterior setae (Fig. 142). Prothorax sculptured as in *Sericothrips*, predominantly with fine, closely spaced, transverse striae, and with blotch area. Mesospinasternum separated from metasternum by a suture. Fore wings narrow except at base, with two longitudinal veins; fore vein evenly set with setae; hind vein with several setae at apex only; fringe cilia wavy. Tarsi two segmented.

Abdominal segments I–VIII covered with microsetae except median region on dorsum bare for the most part. Abdominal sternites II–VII with major setae forward of posterior margin, abdominal sternites without accessory setae except for microsetae. Abdominal tergites with median setae closely spaced. Abdominal tergites VI–VIII each with a complete comb of setae on posterior margin. Females with well-developed ovipositor. Males seemingly without abdominal sternal glandular areas, without thornlike setae.

This genus is like *Sericothrips* in all respects except in the number of antennal segments and the placement of the abdominal sternal setae. In *Zonothrips* each antenna is seven segmented and the major setae of abdominal

sternites II-VII are forward of the posterior margin. In *Sericothrips* each antenna is eight segmented and the major setae of abdominal sternites II-VI (not VII) are along the posterior margin, not forward of it. There are, therefore, definite characteristics that will allow the two genera to be kept as separate entities.

The sole New World species occurs in Illinois.

***Zonothrips osmundae* Crawford, J. C.**

Zonothrips osmundae Crawford, J. C. (1941a:105). ♀, ♂. Type-locality. —Tenaflly, New Jersey.

FEMALE (macropterous).—Length distended over 1 mm. General color light orange-yellow with brown markings. Antennal segment I nearly colorless; segments II and III yellow; segments IV and V yellow in basal half, brown in apical half; segments VI and VII brown. Metascutum brown. Abdominal tergites I-VII with brown patches at sides and with brown anterior marginal line, segment II the darkest. Fore wings with two brown crossbands and with scale brown. Ocellar pigment red.

Antennal segments not particularly elongate.

Pronotal striae moderately close together (Fig. 142).

MALE (macropterous).—Length distended over 0.9 mm. Similar to female in general structure and color except brown patches slightly lighter on abdomen. Posterior comb of setae sometimes interrupted on abdominal tergites VI and VII.

This species differs from *karnyi* of Java, the only other known species, in being lighter in color and in not having the antennal segments elongate.

Zonothrips osmundae is confined to the northern part of Illinois where it is found on and around cinnamon fern.

Illinois records.—LAKE COUNTY: Volo Bog, September 14, 1950, Richards, 6 ♀; Volo Bog, October 15, 1952, McAlpine, 2 ♀, 1 ♂; Volo Bog, September 12, 1951, Richards, Stannard, 3 ♀; Volo Bog, October 9, 1952, Ross, Stannard, 1 ♂.

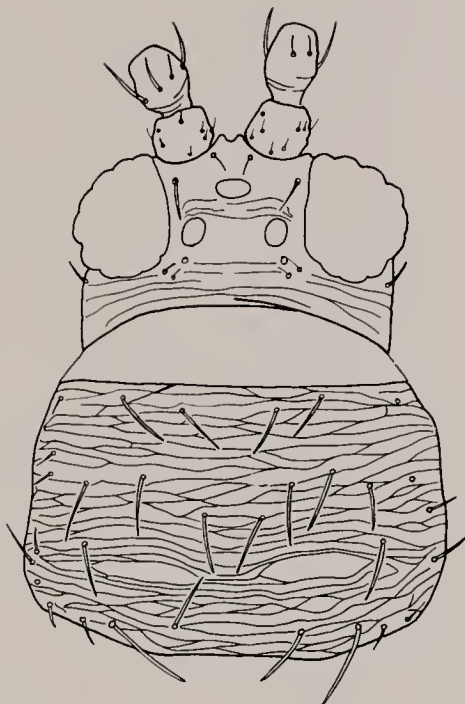


Fig. 142.—*Zonothrips osmundae*, head and prothorax.

Suborder TUBULIFERA

Antennae four to eight segmented, with sensoria, when present, setae-like on intermediate segments. Postocular setae usually well developed. Maxillary stylets (Fig. 143, s) often retracted well into the head, sometimes retracted up to the position of the eyes. Maxillary palps always two segmented although segment I sometimes minute.

Prothoracic notum ordinarily with epimeral sutures. Praepectal plates (Fig. 146, PP) frequently present. Mesopraesternum (Fig. 148) usually present. Mesospinasternum always fused to metasternum. Tarsi with each fore pair always one segmented (Fig. 183-185), each mid and hind pair one or two segmented. Wings, when developed, without longitudinal veins, without microsetae, with fringe cilia always straight, crossed when in repose over abdomen.

Abdominal tergite I with pelta (Fig. 150, PEL) usually closely joined

to tergite II, without stippled membranous posterior border. Abdominal segments without pleural plates, often with dorsal sigmoidal wing-holding se-

tae. Females with a fustis (Fig. 53, F), without sawlike ovipositor. Males often with sternal glandular-like area, tube incised at base on the sternum.

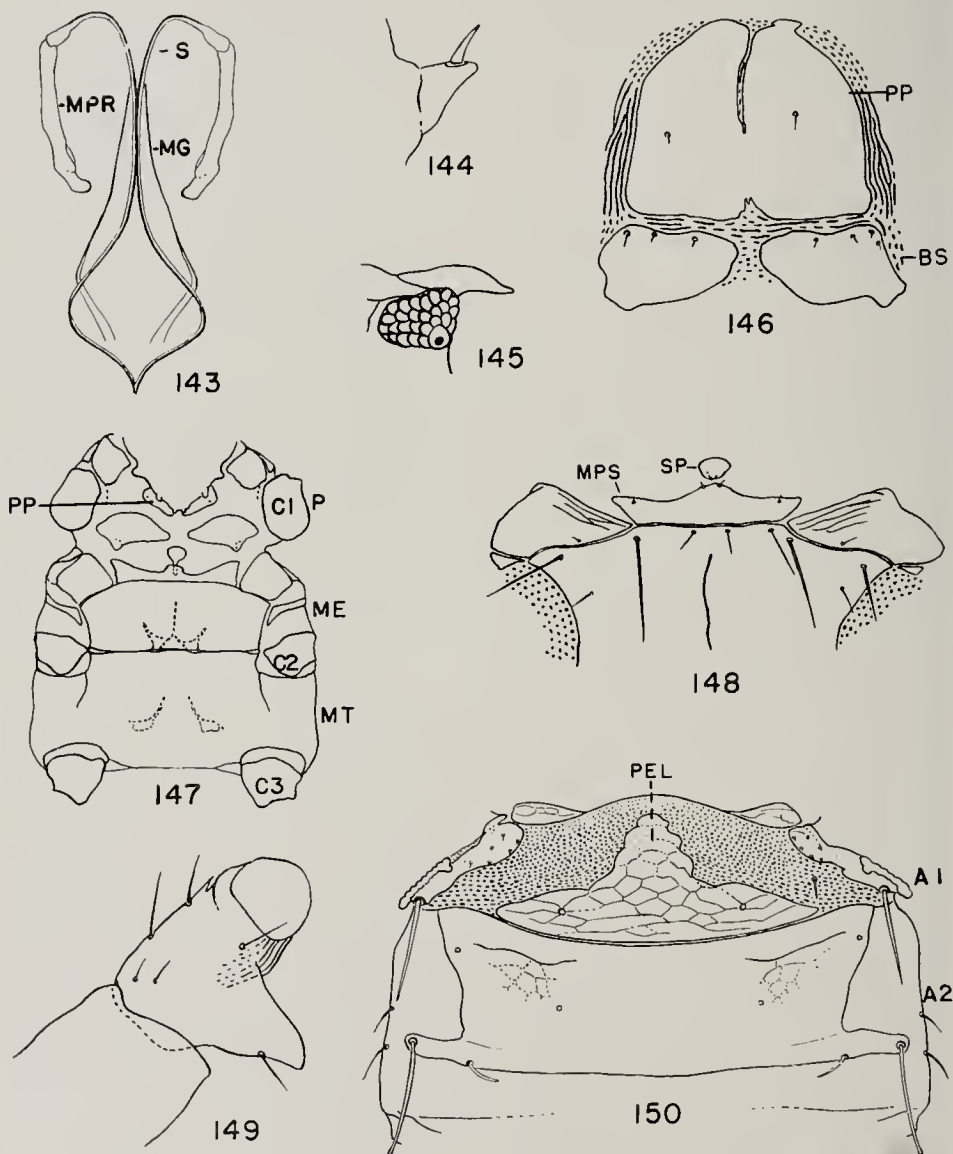


Fig. 143-150.—Characteristics of the Tubulifera: 143, typical maxillary stylets and guides, MPR—maxillary pillar, S—maxillary stylet, MG—maxillary guide; 144, seta-bearing cheek wart typical of some Phlaeothripidae; 145, spur anterior to mesothoracic spiracle of *Illinothrips rossi*, ♂; 146, median part of prosternum of *Podothrips semiflavus*, PP—praepectus, P—prosternum, ME—mesosternum, MT—metasternum, C—coxa; 148, ventral aspect of mesopraesternum of *Illinothrips rossi*, SP—prospinasternum, MPS—mesopraesternum; 149, fore tarsus of *Allothrips megacephalus* showing tooth-like projection; 150, orientation of pelta of *Plectrothrips antennatus*, PEL—pelta, A—abdominal tergite.

Abdominal tergite X tubular (Fig. 186-191). Major anal setae arising from sclerites separated from abdominal segment X.

Three pupal instars present in those species where life history is known.

Contains the single family Phlaeothripidae, which is divisible into two subfamilies, Phlaeothripinae and Megathripinae.

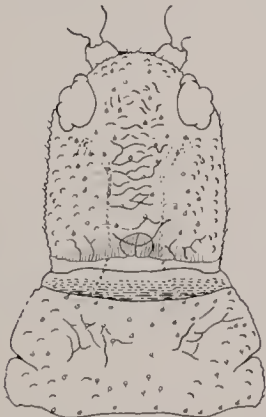
Apparently Bagnall (1908*b*) was the first to separate the Tubulifera into two groups, the Phlaeothripidae and the Idolothripidae. In many respects these divisions are the same as the Phlaeothripinae and Megathripinae used here. Further additions to and other subdivisions of the Tubulifera were made in the next few years following Bagnall's proposal. In 1915 Hood added Pygothripidae to the list which by then also included Hystriothripidae, Megathripidae, and Urothripidae. Simplification of the system came about in 1927 when Priesner reduced the main division to the Phlaeothripinae and Megathripinae. Except for occasional shifts of genera from one tribe to another as more information is discovered to warrant the transfer, these two divisions seem phylogenetically proper for the initial grouping of the genera of Tubulifera (Stannard 1957*b*). Priesner (1960) recognized the Urothripinae as the third subfamily in his system, an action not followed in this report.

PHLAEOTHIRIPIDAE Uzel (1895)

KEY TO GENERA
(ILLINOIS, EXCEPT WHERE NOTED)

- 1. Hind coxae spaced farther from each other than are the middle coxae.....2
- 2. Hind coxae closer together than are the middle coxae.....3
- 2. Head without prominent anterior setae (Fig. 151).....**Amphibolothrips** subgenus **Trachythrips**
Head with one, two, or three pairs of prominent setae along the anterior margin between the eyes (Fig. 152); not yet found in Illinois.....**Amphibolothrips** subgenus **Stephanothrips**
- 3. Prothorax with anteromarginal and anterolateral setae placed extremely close together (Fig. 277); antennal segment III small, goblet-shaped; antennal segment IV globular, largest segment; slender, tiny thrips.....**Preeriella**
Prothorax with anteromarginal and anterolateral setae placed farther apart; various sized thrips.....4
- 4. Maxillary stylets extremely long, each stylet looped several times within the head and mouth cone (Fig. 175); not yet found in Illinois.....**Docessissophothrips**
Maxillary stylets not as long; each stylet never looped more than once, if at all, within the head or mouth cone.....5
- 5. Prothorax with notum reduced to a well-defined, symmetrical, median shield bordered by minute sclerotized platelets (Fig. 266).....**Plectrothrips**
Prothorax with notum entire or, at the most, only slightly reduced laterally...6
- 6. Pterothorax narrowest portion of body; metanotum raised, generally with striae arranged as concentric, anastomosing rings; antlike in appearance (Fig. 305).....**Oedaleothrips**
Pterothorax rarely narrowest portion of

Fig. 151-152.—Head and prothorax: 151, *Amphibolothrips* (*Trachythrips*) *watsoni*; 152, *Amphibolothrips* (*Stephanothrips*) *bradleyi* cf. California and Mexico.



Amphibolothrips
(*Trachythrips*) *watsoni*
151



Amphibolothrips
(*Stephanothrips*) *bradleyi*
152

body, often wide; metanotum not particularly raised, with striae usually linear or hexagonal in form; not antlike in appearance.....7

7. Abdomen with wing-holding setae expanded, leaflike; cheeks expanded later-

ally much beyond eye margins (Fig. 263).....*Neurothrips*

Abdomen with wing-holding setae, when present, slender; cheeks at the most only slightly expanded.....8

8. Eyes touching or nearly touching on dor-

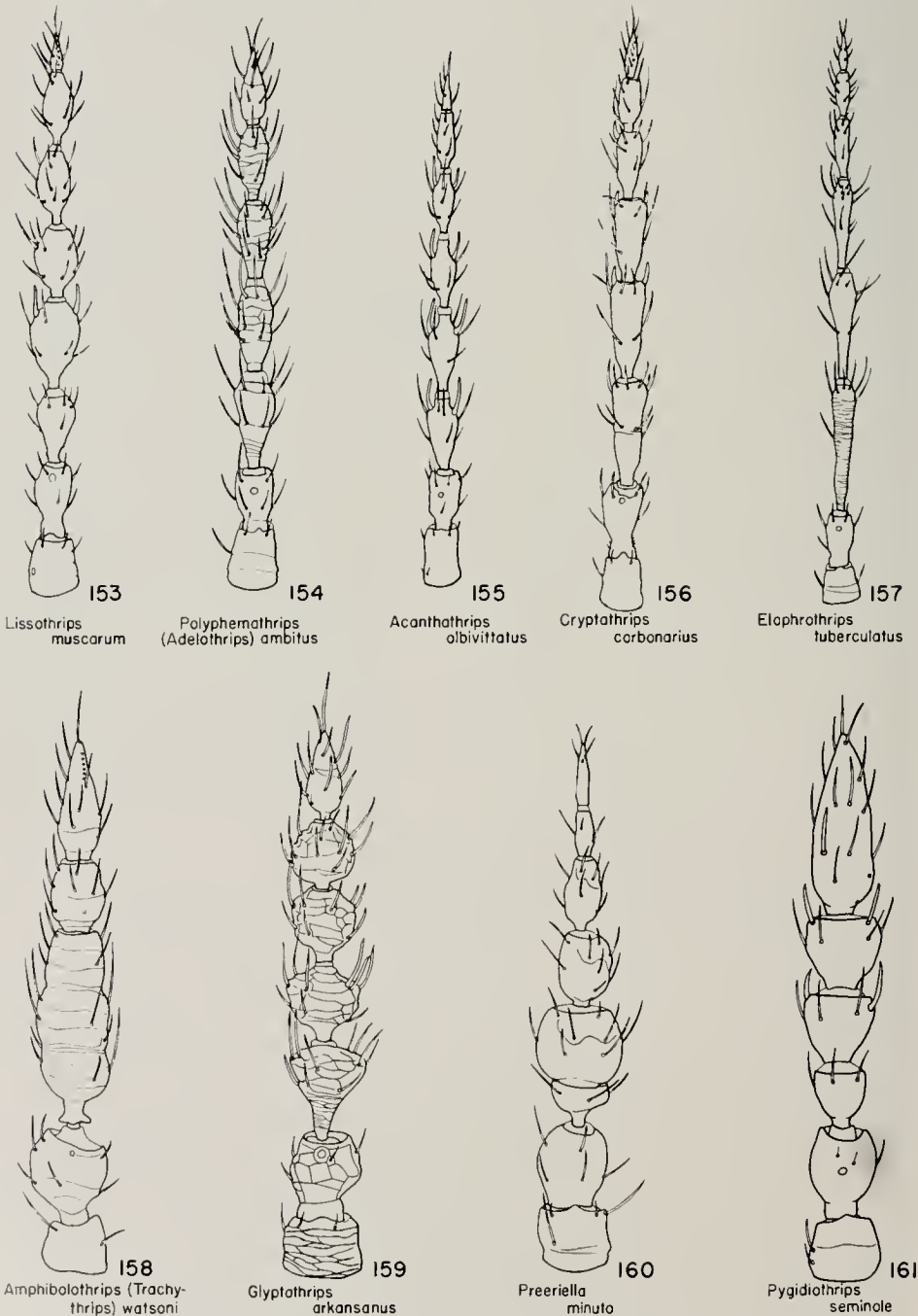


Fig. 153-161.—Right antenna of species indicated, representatives of the Phlaeothripidae.

- sum of head; not yet found in Illinois.
.....*Macrophthalmothrips*
Eyes not touching, placed farther apart
on dorsum of head.....9
9. Antennal segment I bearing an extremely
well-differentiated, long, dorsal seta
which is dilated at tip (Fig. 179);
known from Florida only. *Atractothrips*
Antennal segment I usually without any
single outstanding seta (Fig. 153-161),
usually pointed, if dilated then setae
short and several such setae present. 10
10. Posterior margin of abdominal sternite
VIII with several long finger-like pro-
jections (Fig. 162); not yet found in
Illinois.....*Chirothripoides*
Posterior margin of abdominal sternite
VIII straight.....11
11. Many of the body and wing setae in-
verted L-shaped (Fig. 2); morpholog-
ical segments III and IV of the antenna
often fused; not known north of south-
ern Florida.....*Hydriothrips*
Body and wing setae pointed, clubbed at
tip, or funnel-like, never inverted L-
shaped; morphological segments III
and IV of the antenna never fused. 12

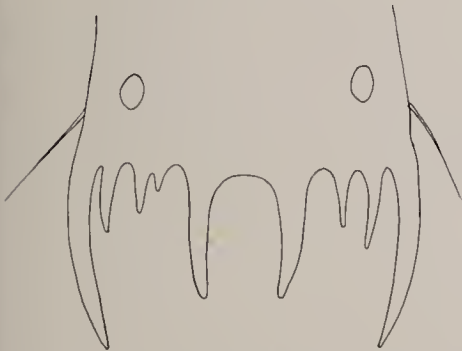
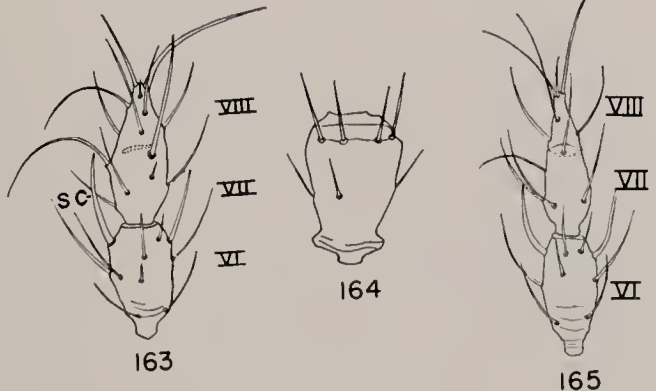
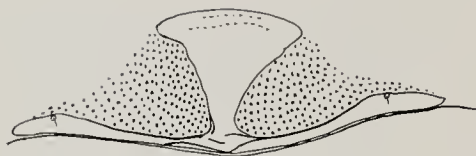


Fig. 162.—*Chirothripoides dendropogonus*, ♀, posterior margin of abdominal sternite VIII showing fingerlike projections. Redrawn from unpublished sketch made from holotype by Miss Kellie O'Neill.

Fig. 163-165.—Types of antennal segments: 163, terminal segments of *Polyphemothrips (Adelothrips) bradleyi*, showing partial fusion of segments VII and VIII, SC—sense cone; 164, antennal segment III of *Agrothrips tantillus* of Kansas, showing shelf-like rim near base; 165, terminal segments of *Polyphemothrips (Adelothrips) ambitus* showing close union of segments VII and VIII.



12. Antennae six segmented, terminal seg-
ment broad and long, formed by union
of morphological segments VI-VIII
(Fig. 161); known from southern Flori-
da to southeastern Texas.....*Pygidiothrips*
Antennae seven or eight segmented...13
13. Antennae seven segmented, that is, last
two morphological segments partially
or completely fused (Fig. 163).....14
Antennae eight segmented, last two mor-
phological segments completely sepa-
rated by a continuous broad or fine
suture, segment VIII often freely mov-
able.....24
14. Antennal segment II with dorsal sensori-
um placed near the middle of that seg-
ment; not yet found in Illinois.....*Williamsiella*
Antennal segment II with dorsal sensori-
um placed near the apex of that seg-
ment.....15
15. Antennal segment III decidedly smaller
than segments II and IV separately
.....North
American species of *Phthirothrips*
Antennal segment III subequal to or
longer than segments II and IV sepa-
rately.....16
16. Maxillary stylets when at rest just barely
retracted into the head capsule (Fig.
279 and 282).....17
Maxillary stylets when at rest retracted
far into the head capsule.....18
17. Pelta with posterior portion uniformly
sclerotized, not broken into tiny plate-
lets (Fig. 166 and 167).....(in part) *Sophiothrips*
Pelta with posterior portion fractured
into tiny sclerotized platelets (Fig. 168)
.....(in part) *Zaxenothrips*
18. Cheeks with a close series of strongly de-
veloped warts along margin; epimeral
setae and lateral setae of abdomen
greatly expanded at tip; similar in over-
all appearance to *Amphibolothrips* and
subgenera; not known north of south-
ern Florida.....*Idiothrips* subgenus *Strepterothrips*
Cheeks smooth or with marginal serra-
tions only moderately developed; epi-

*Sophiothrips bicolor*, macropterous

166

*Sophiothrips bicolor*, apterous

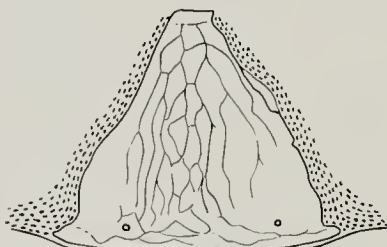
167

*Zoxenothrips peculiaris*

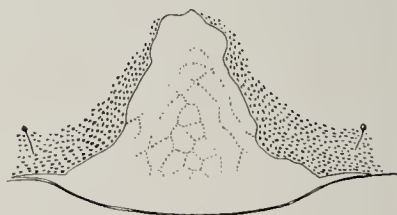
168

*Lispothrips crassipes*

169

*Hoplothrips (Leptothrips) mali*

170

*Polyphemothrips (Adelothrips) ombitus*

171

*Cryptothrips rectangularis*

172

*Illinothrips rossi*

173

Fig. 166-173.—Types of peltas of species indicated, representatives of the Phlaeothripidae.

- meral setae pointed or at most knobbed, not greatly expanded. 19
19. Eyes moruloid, strongly bulged from head (Fig. 226). (in part) **Glyptothrips**
Eyes not especially in the shape of a morula, and not particularly bulged from head. 20
20. Eyes reduced to four to six facets; pelta large, although sometimes degenerate. 21
Eyes larger, dorsally usually with 10 or more facets; pelta small or large; if eye with less than 10 facets, pelta always small. 22
21. Tube thick, ridged, longer than head. **Diopsothrips**
- Tube small, shorter than head. **Allothrips**
22. Epimeral sutures incomplete (Fig. 180). **Zaliothrips**
Epimeral sutures complete. 23
23. Abdominal tergites III–VIII each with a pair of black spots against the light background color of remainder of the abdomen; tube as in Fig. 189; not yet found in Illinois. **Symphiothrips**
Abdominal tergites without paired black spots against a light background. (in part) **Polyphemothrips**
24. Fore wings banded by four light brown streaks; epimeral sutures completely lacking; pelta divided into three parts;

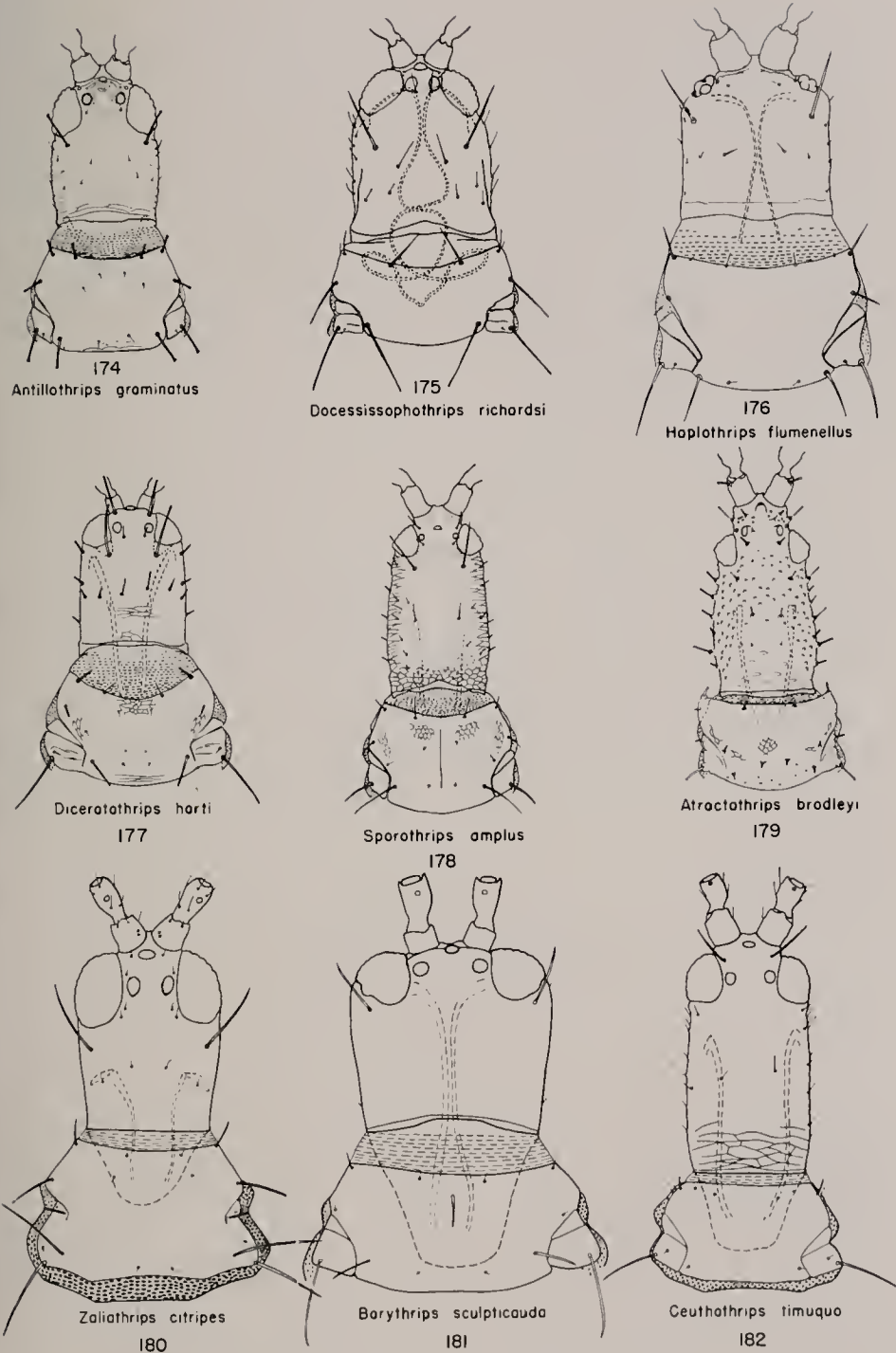
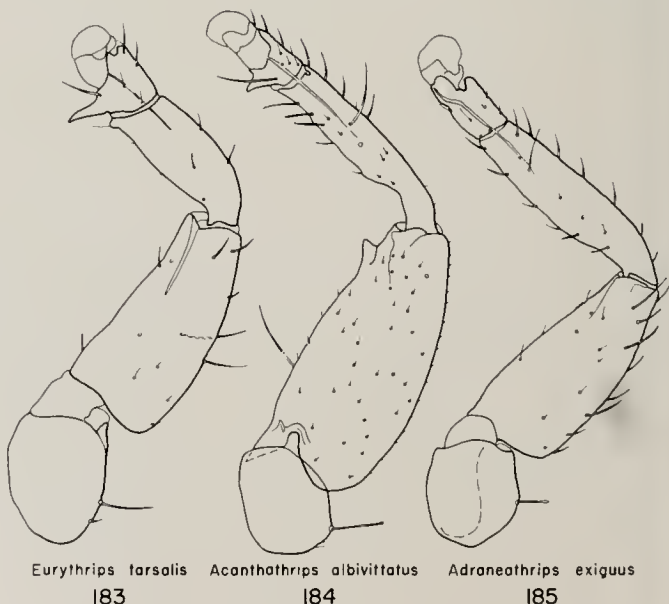


Fig. 174-182.—Head and prothorax of species indicated, representatives of the Phlaeothripidae.

- males with fore femora bearing a strong spur at the middle of the inner margin; not yet found in Illinois. **Aleurodothrips**
- Fore wings, when present, not banded by four streaks; epimeral sutures complete or incomplete; pelta often only a single shield; males with fore femora lacking inner, median spur, although spurs may be present apically or basally. 25
25. Maxillary stylets short, when at rest barely retracted into the head capsule (Fig. 174, 279, and 282). 26
- Maxillary stylets longer, when at rest retracted well into the head capsule. 28
26. Pelta with posterior portion fractured into tiny sclerotized platelets (Fig. 168). (in part) **Zaxenothrips**
- Pelta with posterior portion uniformly sclerotized, not broken into tiny platelets (Fig. 166 and 167). 27
27. Pelta much wider than long. (in part) **Sophiothrips**
- Pelta much longer than wide, more or less triangular in size; not known north of southern Florida. **Antillothrips**
28. Cheeks with enlarged, seta-bearing warts (Fig. 144). 29
- Cheek warts, if any, not bearing seta, usually of small size. 30
29. Antennal segments III and IV abruptly narrowed at apex, vase shaped (Fig. 155). most **Acanthothrips**
- Antennal segments III and IV gradually and slightly narrowed at apex; not yet found in Illinois. **Phlaeothrips**
30. Antennal segment III extremely small, decidedly smaller than either segment II or IV. **Lissothrips**
- Antennal segment III just slightly smaller, nearly equal to, or longer than segment IV. 31
31. Fore femora with subapical inner spurs (Fig. 184). 32
- Fore femora without subapical inner spurs, although spurs may be present in other positions. 34
32. Metanotum generally smooth or at most weakly sculptured; eyes smaller than length of antennal segments I and II combined. a few members of *flavicauda* group of **Hoplothrips**
- Metanotum strongly sculptured, usually with hexagonal reticulations; eyes usually as long as antennal segments I and II combined. 33
33. Head with a pair of proportionately larger setae near base of cheeks (Fig. 231). (in part) **Hoplandrothrips**
- Head without especially enlarged setae near base of cheeks (Fig. 205). some **Acanthothrips**
34. Lateral area adjacent to mesothoracic spiracle with spurlike process (Fig. 145). 35
- Lateral area adjacent to mesothoracic spiracle not produced into a process. 36
35. Head markedly elongate, eyes moruloid, bulged from side of head, not prolonged posteriorly on the venter of head. males of **Illinothrips**
- Head less elongate, eyes not particularly bulged, often prolonged posteriorly on the venter of head (Fig. 301). males of some **Nesothrips**
36. Prothoracic epimeral sclerites each bearing two strongly developed posterior setae. 37
- Prothoracic epimeral sclerites each bearing one well-developed and usually one minute seta. 39
37. Prothoracic epimeral sclerites each with three divisions. **Diphyothrips**

Fig. 183-185.—Right fore leg of species indicated, representatives of the Phlaeothripidae.



Eurythrips tarsalis

183

Acanthathrips albivittatus

184

Adraneathrips exiguus

185

- Prothoracic epimeral sclerites each consisting of the usual two divisions...38
38. Antennal segments I and II each produced on inner ventral apex making these segments asymmetrical; not yet found in Illinois.....*Acrosothrips*
Antennal segments I and II more or less symmetrical (Fig. 198).....
.....(in part) *Acanthothrips*
39. Tube hairy with relatively long setae (Fig. 191); large black thrips.....40
Tube not particularly hairy, setae relatively much shorter; thrips of various sizes and colors.....42
40. Maxillary stylets, when retracted, close together within head....*Megalothrips*
Maxillary stylets, when retracted, far apart within head.....41
41. Antennal segment III longer than the combined length of segments I and II.....*Megathrips*
Antennal segment III much shorter than

- the combined length of segments I and II; head and prothorax as in Fig. 182; known only from Florida. *Ceuthothrips*
42. Tube greatly swollen at base, parabolic in outline; not yet found in Illinois.....*Pygothrips*
Tube cylindrical; if somewhat swollen at base, not parabolic in outline.....43
43. Tube strongly hexagonally reticulate dorsally (Fig. 188); not yet found in Illinois.....*Eschaetothrips*
Tube with dorsum smooth or at the most weakly sculptured.....44
44. Fore wings with hexagonal reticulations on upper surface (Fig. 192b); not yet found in Illinois.....*Stictothrips*
Fore wings without hexagonal reticulations, occasionally marked with short linelike sculpture but not forming geometric designs, or without wings...45
45. Posterior margin of mesopraesternum not as wide as width of either anterior

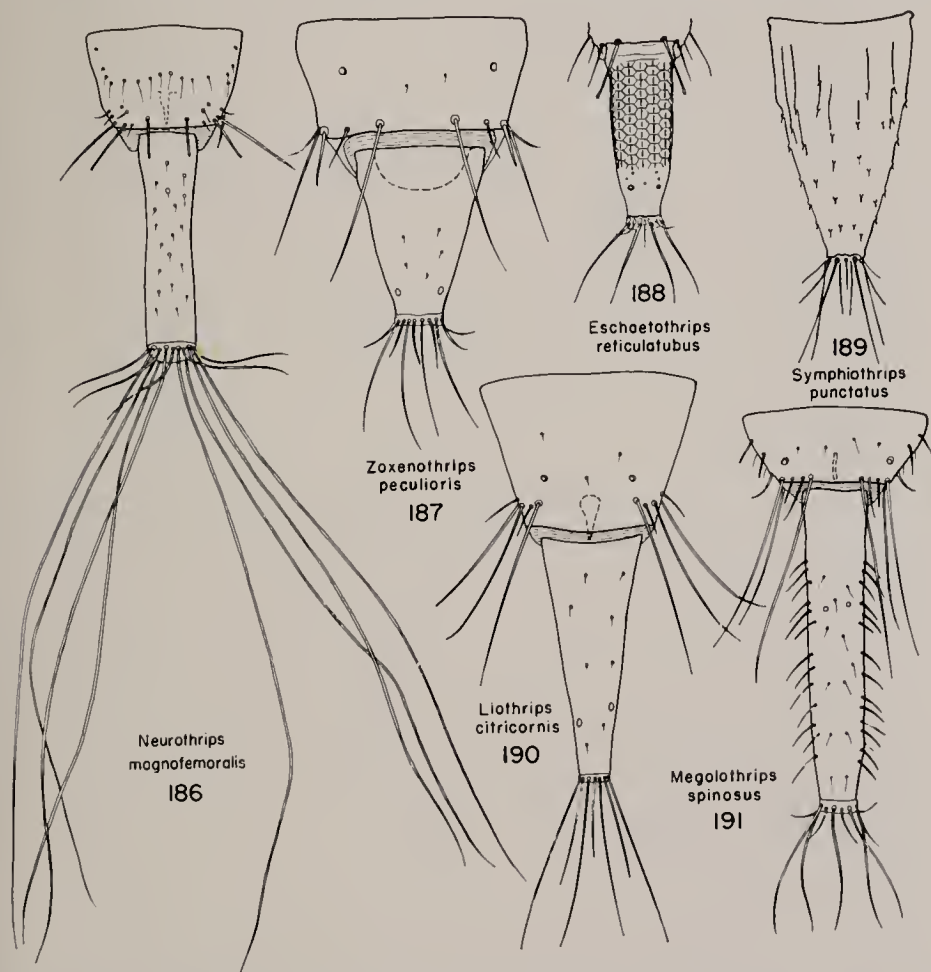


Fig. 186-191.—Abdominal terminalia of species indicated, representatives of the Phlaeothripidae showing types of tubes (abdominal segment X).

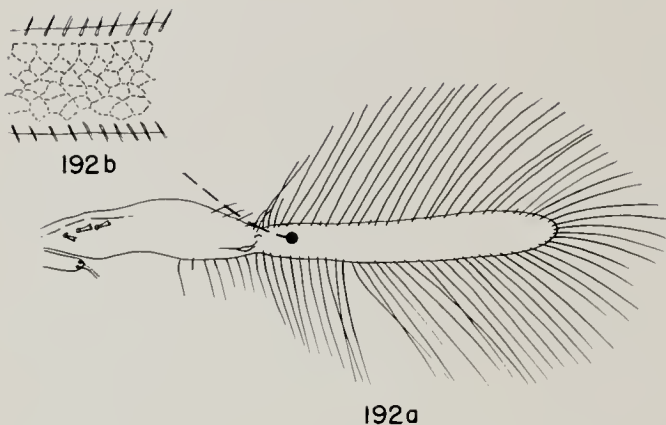


Fig. 192. Fore wing of *Stictothrips maculatus*: a, entire wing; b, enlargement of center portion showing reticulations.

lateral margin of the mesoeusternum (Fig. 193); large thrips. **Elaphrothrips**
Mesopraesternum wider than the width of either anterior lateral margin of mesoeusternum (Fig. 194), or degenerate; large or small thrips.46

46. Antennal segment III stocky, produced into a bulge or flange subbasally (Fig. 164).47

Antennal segment III stocky or elongated, without a distinct bulge or flange subbasally.48

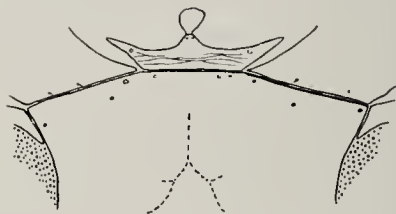
47. Maxillary stylets touching or nearly touching within the center of the head (based on an undescribed species).

(in part) **Neothrips**
Maxillary stylets placed V-shaped within the head (Fig. 209).**Agrothrips**

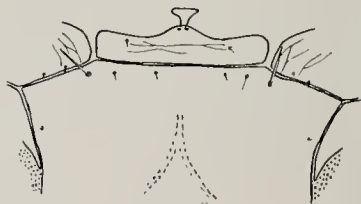
48. Mouth cone pointed, sometimes extremely long (Fig. 196).49

Mouth cone more or less bluntly rounded (Fig. 197).58

49. Maxillary stylets, when retracted, placed far apart within head.
(in part) **Haplothrips**

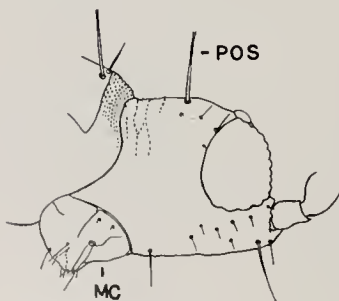


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194

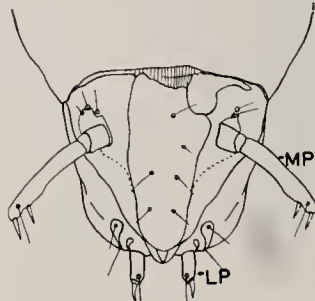
Fig. 193-194.—Mesopraesternum: 193, *Elaphrothrips flavipes*; 194, *Sporothrips amplax*.



195



196



197

Fig. 195-197.—Types of mouth cones: 195, position of mouth cone in *Preeriella minuta*, lateral view, POS—postocular seta, MC—mouth cone; 196, pointed type of *Hoplothrips angusticeps*; 197, broadly rounded type of *Polyphemothrips (Adelothrips) junctus*, MP—maxillary palps, LP—labial palps.

- Maxillary stylets, when retracted, placed fairly close together within head... 50
50. Eyes greatly reduced to a few dorsal facets (Fig. 237 and 262)..... 51
- Eyes normal in size (Fig. 267)..... 52
51. Antennal segments VII and VIII closely jointed forming a compact unit.....
- **Neothrips**
- Antennal segments VII and VIII well separated, each segment movable.....
- (in part) **Haplothrips**
52. Mouth cone extremely long, extended beyond the posterior margin of the prothorax; postocular setae minute; eyes fairly close together on dorsum; not yet found in Illinois..... **Poecilothrips**
- Mouth cone not as long, rarely extended to the posterior margin of the prothorax..... 53
53. Pelta large (Fig. 169)..... **Lispthrips**
- Pelta smaller, generally triangular (Fig. 170)..... 54
54. Fustis of female large.....
- (in part) **Haplothrips**
- Fustis of female small..... 55
55. Head transversely striate..... **Liothrips**
- Head smooth or with weak or strong hexagonal reticulations..... 56
56. Eyes smaller than combined length of antennal segments I and II (Fig. 237 and 238)..... (in part) **Hoplothrips**
- Eyes nearly equal to or larger than combined length of antennal segments I and II..... 57
57. Cheeks particularly indented behind eyes (Fig. 258)..... **Malacothrips**
- Cheeks not especially indented behind eyes (Fig. 230)..... **Hoplandrothrips**
58. Head on the dorsum entirely covered with strongly sculptured hexagonal reticulations..... 59
- Head smooth or transversely striate on the median portion of the dorsum... 61
59. Antennal segment VIII nonpedicellate, closely joined to VII..... **Glyptothrips**
- Antennal segment VIII pedicellate... 60
60. Praepectus absent; all setae on antennal segments III and IV pointed as in Fig. 193..... (in part) **Hoplandrothrips**
- Praepectus present; antennal segments III and IV each with setae which are dilated at tips (Fig. 199). **Erkosothrips**
61. Mesopraesternum degenerate, divided into parts; pronotum with anteromarginal and midlateral setae minute; fore wings broad, not indented in the middle; metanotum with fine, small reticulations medially; maxillary stylets slender; not yet found in Illinois..... **Treherniella**
- Characteristics not in this combination..... 62
62. Maxillary stylets, when retracted, touching or nearly touching within center of head..... 63
- Maxillary stylets, when retracted, well separated, often far apart..... 69
63. Pelta with median posterior region fractured into stipple-like platelets (Fig.

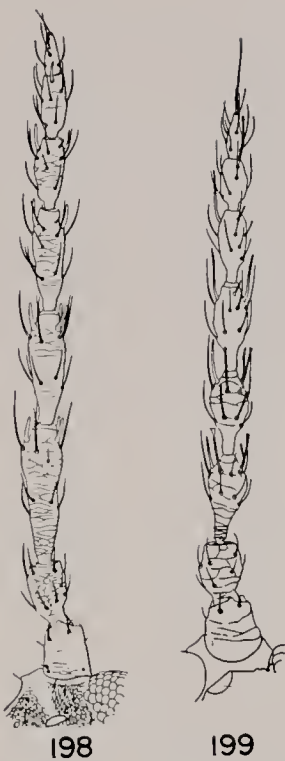
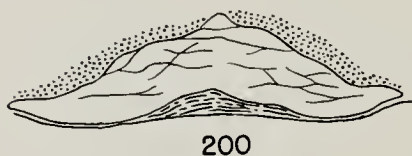


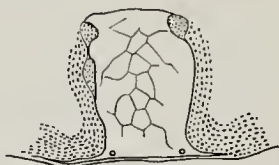
Fig. 198-199.—Right antenna: 198, *Acanthothrips vittatus*, from Hood (1933); 199, *Erkosothrips sculpturus*, from Hood (1936a).

- 200); head and prothorax as in Fig. 181; not yet found in Illinois.....
- **Barythrips**
- Pelta entire along posterior margin (Fig. 201)..... 64
64. Praepectus present; pelta wide; large, stout, black thrips..... **Cryptothrips**
- Praepectus present or absent; pelta more or less triangular, not wide; usually smaller, often light brown thrips... 65
65. Maxillary stylets somewhat thickened; maxillary palps large, dorsal reticulations at base of head slightly upturned towards the meson before becoming obscure (Fig. 269-272).....
- **Polyphemothrips**
- Maxillary stylets thinner; maxillary palps smaller; sculpture on dorsum of head either not reticulate or if reticulate, reticulations not noticeably upturned... 66
66. Pelta narrowed at base (Fig. 201) or divided into three parts.....
- (in part) **Adrancothrips**
- Pelta one unit, usually triangular to ovoid, not narrowed at base..... 67
67. Eyes nearly as long as antennal segments I and II combined..... **Gnophothrips**

- Eyes decidedly shorter than antennal segments I and II combined.....68
68. Praepectus present; epimeral sutures incomplete.....**Hindsiothrips**
Praepectus absent; epimeral sutures complete.....(in part) **Hoplothrips**
69. Praepectus very large, about three times as long as greatest length of probasisternum (Fig. 146); not yet found in Illinois.....**Podothrips**
Praepectus smaller, never more than twice as long as greatest length of probasisternum, or praepectus absent...70
70. Maxillary stylets broad, bandlike, nearly the width of the labial palps; pelta usually wide.....71
Maxillary stylets slender, apexes rarely as wide as one-half the width of the labial palps; pelta usually triangular....74



200



201

Fig. 200-201.—Pelta: 200, *Barythrips sculpticauda*; 201, *Adranciothrips alternatus*. Neither of these species found in Illinois.

71. Eyes relatively small, bulged from head.....**Illinothrips**
Eyes often larger, not bulged from head.....72
72. Head usually long, parallel sided (Fig. 177); eyes never prolonged ventrally more than dorsally....**Diceratothrips**
Head long or short, often slightly bulged along sides; eyes sometimes prolonged ventrally more than dorsally.....73
73. Eyes frequently prolonged ventrally more than dorsally; head not especially elongate (Fig. 301).....**Nesothrips**
Eyes never prolonged ventrally more than dorsally; head greatly elongate (Fig. 178); not yet found in Illinois.....**Sporothrips**
74. Eyes strongly bulged from head. (Compare also *Tylothrips* [Fig. 202]; not yet found in Illinois).....**Eurythrips**
Eyes not strongly bulged.....75
75. Eyes prolonged ventrally more than on dorsum.....76

- Eyes not prolonged ventrally more than on dorsum.....78
76. Antennal segment III elongate.....**Haplothrips (Leptothrips)**
Antennal segment III not particularly elongate.....77
77. Pelta moderately wide at base.....**Cephalothrips**
Pelta usually slightly constricted at base.....**Adraneothrips**
78. Prothorax with transverse sculpture forming several oval spots posteriorly; on *Ficus*.....**Gynaikothrips**
Prothorax with sculpture, if any, usually in the form of straight, transverse striae, or hexagonal reticulations...79

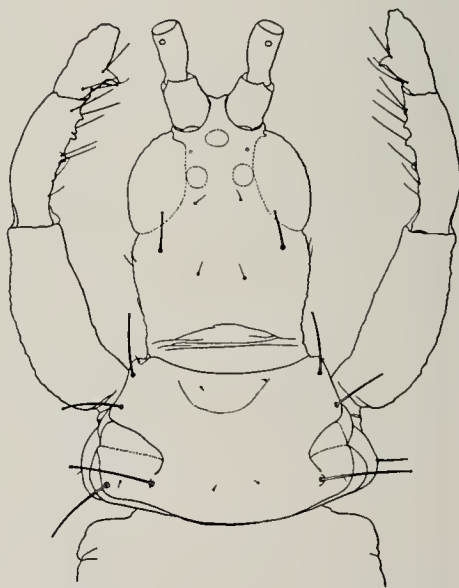


Fig. 202.—*Tylothrips bruesi*, head and prothorax. From Hood (1955).

79. Maxillary bridge strongly evident...80
Maxillary bridge apparently absent...82
80. Sculpture behind eyes often appearing somewhat as wrinkles; confined to under sheaths of *Yucca*.....**Bagnalliella**
Sculpture of head not usually appearing as wrinkles; not ordinarily on *Yucca*...81
81. Epimeral sutures complete..**Haplothrips**
Epimeral sutures incomplete.....(in part) **Hindsiothrips**
82. Eyes shorter than combined length of antennal segments I and II.....**Hoplothrips**
Eyes nearly equal to combined length of antennal segments I and II.....**Hoplandrothrips**

Subfamily PHLAEOTHIRIPINAE Karny 1921

This subfamily comprises those members of the Tubulifera that ordinarily have the maxillary stylets slender, whose males often have abdominal glandular areas, and whose males often have the lateral pair of major, posterior setae (setae II of authors) on abdominal tergite IX spine-like or shorter than in the female.

Acanthothrips Uzel

Acanthothrips Uzel (1895:259). Type-species by monotypy.—*Phloeothrips* [sic] *nodicornis* Reuter, O. M.

Notothrips Hood (1933:200). Type-species by original designation.—*Phlaeothrips vittatus* Hood. Synonymized by Stannard (1957b).

Head elongate, cheeks slightly expanded and often with prominent warts. Eyes large, bean shaped, not adjoining on the dorsum. Posterior cheek setae not proportionately larger than other cheek setae. Intermediate antennal segments vase shaped. Postocular setae well developed, rarely small. Mouth cone long and pointed. Slender maxillary stylets retracted far into head, touching within the center of the head.

Pronotum hexagonally reticulate or bearing small granules or stipple-like dots. Epimera each with one or two well-developed setae. Mesopraesternum well developed to slightly degenerate. Macropterous. Fore wings somewhat broadened, sometimes slightly indented in the middle, and with accessory fringe cilia present.

Abdomen generally reticulate. Pelta small, often trapezoidal. Abdominal tergites with two or three pairs of wing-holding setae, these setae not broad and flattened. Tube moderate in length, anal setae less than twice as long as tube.

This genus resembles *Neurothrips* and *Hoplandrothrips* in Illinois. Unlike *Acanthothrips* and *Hoplandrothrips*, *Neurothrips* has flat, enlarged, wing-holding setae and long anal setae

which are more than twice the length of the tube. *Hoplandrothrips*, in contrast to *Acanthothrips*, has a pair of prominent posterior cheek setae and by this characteristic these two usually may be distinguished. *Phlaeothrips*, which does not occur in Illinois, differs from *Acanthothrips* by lacking teeth on the fore femora or by having antennal segments III and IV each gradually (not abruptly) narrowed at the apex.

Only two species of *Acanthothrips* have been collected in Illinois to date.

KEY TO SPECIES (EASTERN UNITED STATES)

1. Head with large seta-bearing warts on cheeks; pronotum with only one pair of epimeral setae *nodicornis*
Head without large seta-bearing warts on cheeks; pronotum with two pairs of epimeral setae 2
2. Fore femora each armed with a subapical, inner spur; pronotum entirely granulate with stipple-like dots; major setae on posterior margin of abdominal tergite IX long and pointed
..... *albivittatus*
Fore femora each not armed with a spur; pronotum (Fig. 203) generally reticulate but with stipple-like dots superimposed; major setae on posterior margin of abdominal tergite IX relatively short and dilated at tips; not yet found in Illinois *vittatus*

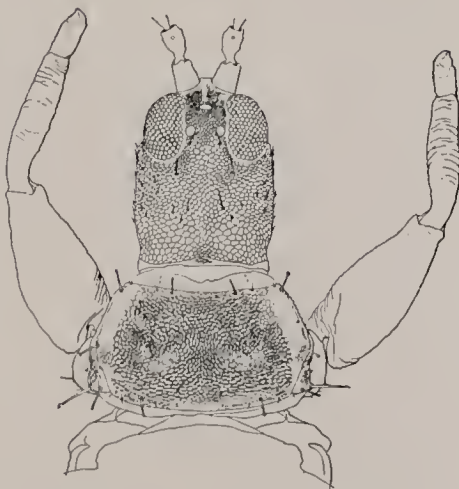


Fig. 203.—*Acanthothrips vittatus*, head and prothorax. From Hood (1933).

***Acanthothrips albivittatus* Hood**

Acanthothrips albivittatus Hood (1908c: 374). ♀. Type-locality.—Bloomington, Illinois.

FEMALE (macropterous).—Length distended nearly 3 mm. General color in life dark brown with a white strip on each lateral margin of the body extending from the posterior angle of the eyes to the anterior half of abdominal segment VIII but skipping abdominal segment I, and with a white half arc on the anterior part of the mesonotum. Body with much red subintegumental pigment.

Head reticulate, without enlarged cheek warts. Intermediate antennal segments vase shaped (Fig. 155). Postocular setae long and pointed.

Pronotum granulate, with many stipple-like dots. Epimera each with two well-developed setae which are dilated at tips. Meso- and metanotum with many stipple-like dots. Fore femora each enlarged and armed with an inner subapical spur. Fore tarsi each with a prominent tooth (Fig. 184). Fore wings with a light median streak.

Abdomen generally reticulate superimposed with stipple-like dots laterally. Pelta (Fig. 204) reticulate in the middle becoming granulate basally, bare laterally. Major posterior setae on abdominal tergite IX long and pointed.

MALE (macropterous).—Length distended about 2.7 mm. Similar to female in general color and structure. Abdominal sternite VIII with a narrow, median, transverse glandular area. Major posterior setae of abdominal tergite IX as in female, that is, all long and pointed.

Larvae.—Often with prominent head horns.

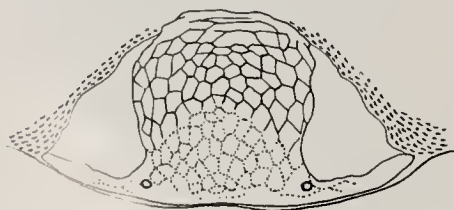


Fig. 204.—*Acanthothrips albivittatus*, pelta.

This striking species can be recognized in life by the white lateral body stripes which extend onto the head up to the eyes. It is also easily distinguished by the characteristic of stipple-like markings on the prothorax. No other species in Illinois is so colored or sculptured.

A. albivittatus probably occurs throughout Illinois, on or under bark of dead trees, and is sometimes found in colonies. All specimens of this species that I have seen have been from the eastern half of the United States.

Illinois records.—**HARDIN COUNTY:** Karbers Ridge, May 4, 1950, Sanderson, Stannard, dead branches, 1 ♀, 2 ♂, 1 larva; Experimental Forest, August 17, 1951, Ross, Stannard, dead branches, 1 ♀. **HENDERSON COUNTY:** Oquawka, June 25, 1963, Braasch, Smith, Stannard, dead branches, 1 ♀, 1 ♂. **KANE COUNTY:** Carpentersville, September 26, 1956, Ross, Stannard, on dead oak, 5 ♀, 3 ♂, several larvae. **MCLEAN COUNTY:** Bloomington, July 10, 1908, Glasgow, on Carolina poplar, 1 ♀ (Hood 1908c). **PIKE COUNTY:** Kinderhook, September 9, 1954, Ross, Stannard, dead branches, 12 ♀, 5 ♂, 1 larva.

Acanthothrips nodicornis

Reuter, O. M.

Phloeothrips [sic] *nodicornis* Reuter, O. M. (1885:16). ? ♀. Type-locality.—?Finland. Placed in *Acanthothrips* by Uzel (1895).

Acanthothrips doaneii Moulton (1907: 64). ♂. Type-locality.—Alum Rock Canyon, California. Synonymized by Cott (1956).

Acanthothrips americanus Bagnall (1933:123). ♀, ♂. Type-locality.—Baldwin, Michigan. Synonymized by Hood (1938b).

FEMALE (macropterous).—Length distended nearly 4 mm. Generally dark brown in color. Yellow to yellowish brown: bases of intermediate antennal segments, fore tibiae largely, base and apex of mid and hind tibiae, and all tarsi. White dots on the lateral anterior margin of abdominal segments III–VIII (best seen in life). Body with much red subintegumental pigment.

Head (Fig. 205) reticulate, with many enlarged cheek warts. Intermediate antennal segments vase shaped. Postocular setae moderate in size.

Pronotum reticulate. Epimera each with one well-developed seta. Meso- and metanotum reticulate. Fore femora enlarged and each armed with an inner subapical spur. Fore tarsi each with a prominent tooth. Fore wings evenly and moderately broad throughout.

Abdomen reticulate. Pelta completely reticulate. Major posterior setae on abdominal tergite IX moderate in size, slightly blunt at tips.

MALE (macropterous).—Length distended generally 2.5–3 mm. Similar to female in general color and structure. Abdominal sternite VIII with a narrow, median, transverse glandular area (Fig. 59).

Larvae.—Often with prominent head horns.

In Illinois this is the only species which has large cheek warts and white dots on the sides of the intermediate abdominal segments.

Acanthothrips nodicornis is widespread throughout Europe and northern North America. It may be native to Europe and introduced elsewhere. So far it has been found in Illinois only in the north, near Chicago. According to Yakhontov (1962) this species is apparently a predator.

Illinois records.—**COOK COUNTY:** Riverside, July, 1909, Hood, reared from pupae taken July 14, under bark on willow, became adult July 19, and reared from nymphs taken July 14, on willow bark, matured July 24, many ♀, ♂, (USNM-Hood collection); Western Springs, June 16, 1949, Ross, Stannard, on dead willow twigs, 3 ♀, 1 ♂, several larvae.

Acrosothrips Stannard

Acrosothrips Stannard (1963b:137).

Type-species by original designation.—*Trichothrips asymmetricus* Watson.

Head slightly longer than broad, nearly smooth. Eyes moderately small, shorter than the combined length of antennal segments I and II. Vertex broad at the apex between the antennae. Ocelli present, placed moderately far apart, fore ocellus not overhanging. Antennae eight segmented; segments I and II each produced on the inner ventral apex making these segments asymmetrical; segment III gradually tapered with one outer and no inner sense cone, segment IV with one inner and two outer sense cones, all of these cones short; intermediate segments moderately small; segment VIII slender, not broadly attached to segment VII. Postocular setae long. Maxillary stylets, when at rest position, retracted far into the head and placed fairly close together within the center of the head. Mouth cone moderately long, broadly rounded.

Prothorax not quite as long as head, nearly smooth. All major setae well developed, midlateral setae closer to epimeral setae than to anterolateral setae. Epimeral sutures complete. Each epimeron divided into two parts with two well-developed setae. Praepectus apparently absent. Metascutum faintly marked by longitudinal

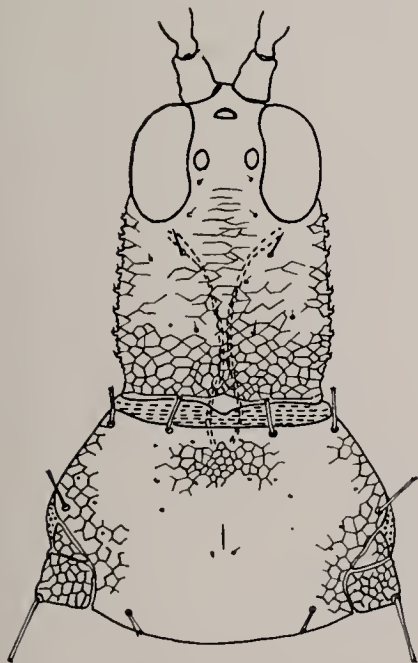


Fig. 205.—*Acanthothrips nodicornis*, head and prothorax.

striations, without extremely long setae. Mesopraesternum completely separated by a suture from the mesosternum. Fore femora enlarged. Fore wings of even width throughout, without accessory fringe cilia.

Pelta small, bell shaped. Wing-holding setae relatively slender, sigmoidal. Abdominal tergite II at the extreme sides fractured into small stipple-like platelets. Abdominal tergite IX with major posterior setae much longer than tube. Tube shorter than head, about as long as prothorax; terminal setae shorter than tube.

The asymmetrical form of antennal segments I and II is diagnostic.

Aside from the characteristics of the antennae, which may or may not be only of specific value, this genus differs from *Hoplothrips* by the features of the two pairs of well-developed epimeral setae and the presence of lightly marked, longitudinal striations on the metascutum. Members of *Hoplothrips* have only one pair of well-developed epimeral setae and the metascutum is almost entirely smooth.

Phrasterothrips, an American genus which frequently is distinguished by the presence of two pairs of epimeral setae, differs from *Acrosothrips* by having the epimeral sutures incomplete, having the midlateral setae nearer the anterolateral setae on the prothorax, and having accessory cilia on the fore wings.

***Acrosothrips asymmetricus* (Watson)**

Trichothrips asymmetricus Watson (1937a:8). ♀, ♂, larva. Type-locality.—Birmingham, Alabama. Transferred to *Acrosothrips* by Stannard (1963b).

FEMALE (macropterous).—Length about 2 mm. Color brown. Antennal segments I and II light brown becoming light yellow at apices. Inner surfaces of legs and all tarsi yellowish brown to yellow. All body setae pale yellow. Wings colorless except light brown at extreme base of each fore wing.

Head as in Fig. 206. Postocular setae long and blunt. Ocellar setae minute. Antennal segment I asym-

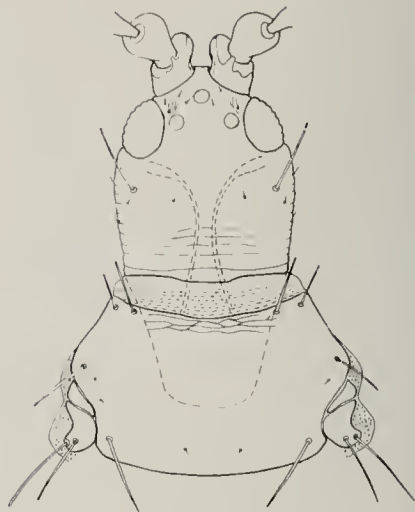


Fig. 206.—*Acrosothrips asymmetricus*, head and prothorax.

metrical, prolonged on the inner apical ventral portion; segment II asymmetrical, bulged on the inner apical portion; segment III gradually tapered from broad apex to narrow pedicel, with one outer sense cone which is about $19\ \mu$ long and with no inner sense cone; segment IV ovoid, pedicellate, with two outer sense cones of which the innermost one is $18\ \mu$ long, and the outermost one is $25\ \mu$ long, and with one inner sense cone which is about $23\ \mu$ long; segments V–VII moderate in size, pedicellate; segment VIII slender, parallel-sided basally, slightly tapered apically.

Prothorax (Fig. 206) with all major setae long and blunt at tips. Anteromarginal setae longer than anterolateral setae. Posteromarginal setae longest, just slightly longer than outer pair of epimeral setae, not as long as prothorax. Pterothorax with lateral-ventral setae pointed. Metascutum with posterior hexagonal reticulations oriented on a longitudinal axis occasionally forming anastomosing striae. Mesopraesternum entire. Fore tarsi unarmed.

Abdomen with pelta bell shaped, abruptly flanged near posterior margin. Lateral abdominal setae becoming progressively longer on each segment from II to IX, only lateral setae on

IX longer than tube. Abdominal tergite IX with all major setae pointed at tips.

This distinctive species, appropriately named by Watson in allusion to the asymmetrical form of antennal segments I and II, has not yet been found in Illinois. It is suspected to be in our state, however, because its supposed plant host, either *Ceanothus americanus* and/or *Tephrosia virginiana*, occurs in nearly every county.

Adraneothrips Hood

Adraneothrips Hood (1925d:54). Type-species by original designation.—*Haplothrips* (?) *tibialis* Hood.

Hypothrips Priesner (1933b:57). Type-species by original designation.—*Hypothrips desocellatus* Priesner. Synonymized by Stannard (1957b).

Head short to elongate, weakly sclerotized. Eyes prolonged (or not prolonged) posteriorly to form a pointed angle on the ventral surface of the head. Ocelli present in the macropterous form, absent in apterous form. Antennae eight segmented; segment VIII slender, conical. Mouth cone broadly rounded. Slender maxillary stylets retracted far into the head, either spaced fairly far apart and with a distinct maxillary bridge or nearly touching within the head and without a maxillary bridge.

Thorax weakly sclerotized. Pronotum usually with all major setae well developed. Epimeral sutures complete. Praepectus absent. Mesopraesternum degenerate. Fore wings, when present, indented in the middle, sparsely fringed and with or without a few accessory fringe cilia.

Pelta usually small in macropterous forms, somewhat larger in brachypterous and apterous forms. Anal setae usually much shorter than tube. Males usually with a glandular area on abdominal sternite VIII.

This genus is difficult to define when all of the species are considered. As represented by the single species, *exiguus*, in our state, *Adraneothrips* can be recognized by the nearly tripartite pelta (Fig. 208), the slender, conical shape of antennal segment

VIII, the absence of praepectal plates, and the sparse fringe cilia on the fore wings of the macropterous form. Some of these characteristics are not diagnostic when other faunas outside of Illinois are considered.

KEY TO SPECIES (EASTERN UNITED STATES)

1. Tube yellow; from Texas... *poecilnotus*
Tube brown.....2
2. Mouth cone long, more or less pointed, extended to or nearly to the posterior margin of the prothorax; from Florida..... *rostratus*
Mouth cone shorter and broadly rounded.....3
3. Apterous or brachypterous.....4
Macropterous.....6
4. Abdomen predominantly yellow; from Kansas..... *apalus*
Abdomen predominantly brown, or at least brown along the lateral margins 5
5. Abdomen mostly brown; eastern United States..... *exiguus*
Abdomen with median portions of tergites I–VI yellow to yellowish brown, lateral margins brown; from Florida..... *stenocephalus*
6. Prothorax predominantly yellow.....7
Prothorax predominantly brown.....9
7. Body yellow except tube and antennae; body margined with yellowish orange subintegumental pigment; from Florida..... *xanthosoma*
Body with brown on sides of head, at least; body margined with red subintegumental pigment.....8
8. Pterothorax and abdomen mostly yellow; male with abdominal sternite VIII bearing a harlike transverse glandular area; from Florida..... *pallidus*
Pterothorax and sides of abdominal tergites III and IV light brown; male with abdominal sternite VIII bearing glandular area which is separated medially; from Cuba and Florida, north to Georgia, west to Texas and Mexico .. *decorus*
9. Strongly bicolored.....10
Predominantly brown, not distinctly bicolored.....11
10. Head elongate, eye margin mostly on the anterior border of the head; from Florida..... *cinctiventris*
Head shorter, eye margin continuing well onto the cheeks; from Florida, Puerto Rico, Mexico..... *fuscollois*
11. Eyes not much, if any, prolonged ventrally more than dorsally; abdominal sternite VIII of male with a large, oval, glandular area.....12
Eyes decidedly prolonged ventrally more than dorsally, abdominal sternite VIII of male with glandular area either unknown or small and often nearly circular in form.....13
12. Pelta with median portion broad; eastern United States..... *exiguus*

- Pelta with median portion narrow; from Florida **pinicola**
13. Fore wings without accessory cilia; tibiae, especially mid and hind tibiae, with brown on outer margin; from Florida **bellus**
- Fore wings with four accessory cilia, tibiae strongly yellow in contrast to dark femora; from Florida, Cuba, Puerto Rico, Peru, Brazil **tibialis**

***Adraneothrips exiguus* Hood**

Cryptothrips exiguus Hood (1912c: 154). ♀. Type-locality.—Grand Tower, Illinois. Transferred to *Adraneothrips* by Hood (1950a).

FEMALE (apterous) (Fig. 207).—Length distended about 1.5 mm. Bicolored dark brown and yellow varying to nearly entirely brown. Head dark brown at sides, brown at base, and yellow to brown between the eyes. Antennae brown except segment III and base of IV which are often yellowish brown to yellow. Prothorax and abdominal segments II–X dark brown becoming lighter brown in the basal segments. Pterothorax and abdominal segment I varying from nearly yellow to almost entirely brown. Legs except coxae yellow to yellowish brown, sometimes with femora and tibiae entirely brown. Body with much red subintegumental pigment.

Head elongate with a pair of light spots medially in the center of the dorsum. Eyes small, not prolonged ventrally. Ocelli absent. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones. Maxillary stylets placed close together within head. Mouth cone moderate in size.

Prothorax with all major setae present, subequal in length, and each dilated at tip. Epimeral sutures complete. Fore leg unarmed (Fig. 185).

Pelta usually separated into three parts, pores apparently absent (Fig. 208). Wing-holding setae reduced.

FEMALE (macropterous).—Length distended about 1.4 mm. Similar to apterous form except for the following differences. Head sometimes slightly shorter. Ocelli present. Fore wings present, without accessory fringe cilia. Abdominal tergites each with two pairs of sigmoidal wing-holding setae.

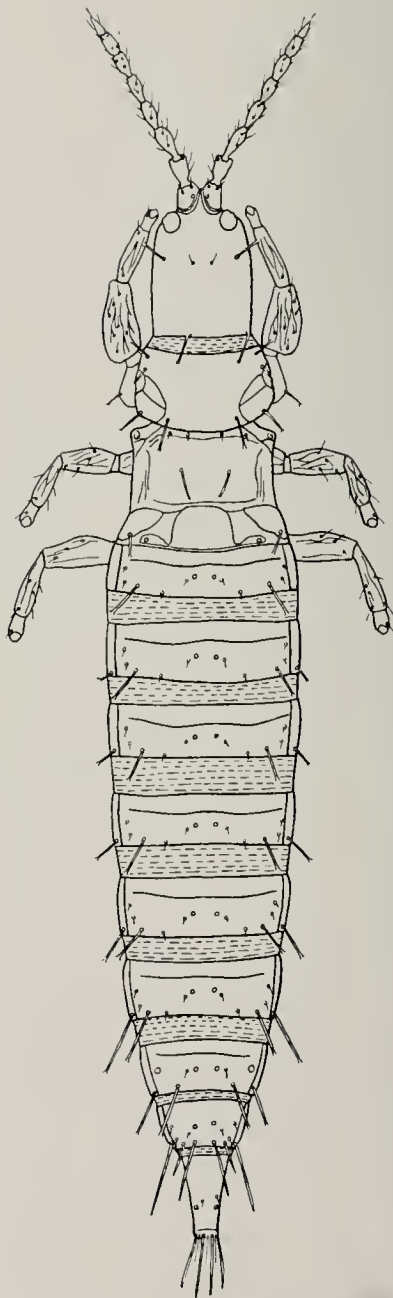


Fig. 207.—*Adraneothrips exiguus*, dorsal aspect.

MALE (apterous).—Length distended about 1.3 mm. Similar to apterous female except more slender. Abdominal sternite VIII with a medially placed oval glandular area (Fig. 58).



Fig. 208.—*Adraneothrips exiguus*, pelta.

The first concept of this species was based on a single macropterous female from southern Illinois. The illustration accompanying the original description (Hood 1912c) in which the prothorax is depicted as lacking the posteromarginal setae and having incomplete epimeral sutures is in error.

A close relative of *exiguus* appears to be the Floridian *stenocephalus*. *Adraneothrips stenocephalus* differs in having a slightly longer head, a slightly longer mouth cone, and by having two, instead of one, outer sense cones on antennal segment III. Also, in *stenocephalus*, the basal abdominal segments tend to be more yellow in color.

Adraneothrips exiguus, as determined here, occurs throughout Illinois, but in the north it may be confined to sand or gravel areas. Most of our specimens are of the light color phase. Specimens from Maryland, North Carolina, and Tennessee tend to be darker. Often this species is abundant in *Andropogon* clumps or in ground cover of pine plantations.

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 9, 1951, Richards, Stannard, sod of *Andropogon*, 8 ♀, 8 ♂. HENDERSON COUNTY: Oquawka, May 9, 1952, Mills, Stannard, sod of *Andropogon*, 1 ♀, 4 ♂. JACKSON COUNTY: Grand Tower, July 12, 1909, Hart, sweeping, 1 ♀ (Holotype). KANE COUNTY: Elgin, October 10, 1952, Ross, Stannard, sod of *Andropogon*, 1 ♀. LAWRENCE COUNTY: Red Hills State Park, April 30, 1950, Smith, Stannard, sod of *Andropogon*, 1 ♂. POPE COUNTY: Glendale, November 7, 1946, Ross, Burks, pine debris, 1 ♀, 2 ♂. RICHLAND COUNTY: Olney, November 9, 1953, Smith, Stannard, sod of *Andropogon*, 1 ♂. WAYNE COUNTY: Zenith, May 7, 1966, Felix-Williams, sod of *Andropogon*, 1 ♀. WILLIAMSON COUN-

TY: Johnston City, November 19, 1959, Stannard, sod of *Andropogon*, 11 ♀.

Agrothrips Jacot-Guillarmod

Agrothrips Jacot-Guillarmod (1939: 40). Type-species by original designation.—*Agrothrips priesneri* Jacot-Guillarmod.

Head much longer than wide, smooth, just slightly constricted behind the eyes (Fig. 209). Eyes moderate in size, not prolonged posteriorly on the ventral surface more than on the dorsal surface. Ocelli present in Illinois forms. Postocular setae moderately developed, pointed to dilated. Antennae eight segmented; segment III swollen near the base into a shelf-like ring (Fig. 164), sense cones difficult to see; segment VIII broadly attached to segment VII. Mouth cone short, broadly rounded. Maxillary stylets when retracted form a V within the head. Maxillary bridge broad.

Prothorax smooth; Illinois species with only anterolateral and major posterior setae well developed, blunt to dilated; anteromarginal and midlateral setae minute except in *tenebricosus* which is not a member of our fauna.

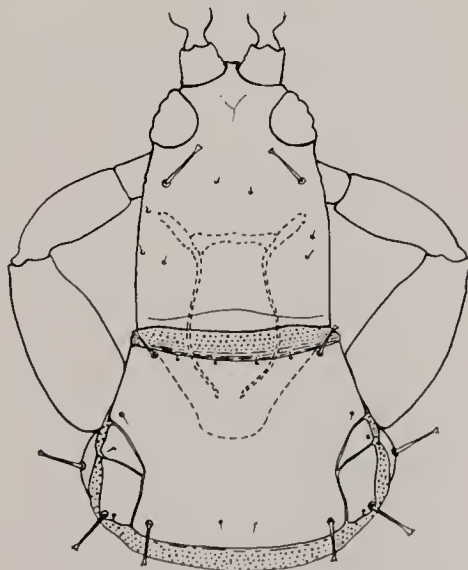


Fig. 209.—*Agrothrips tantillus* of Kansas, head and prothorax.

Epimeral sutures complete. Praepectal plates present. Meso- and metanotum not fused in the Illinois species. Macropterous, brachypterous, or apterous. Fore wings when present narrowed beyond middle, with accessory fringe cilia. Fore tarsi unarmed or each armed with a small tooth.

Pelta usually in the form of a broad triangle, smooth. Abdominal tergite IX with major median posterior setae shorter than or longer than the tube. In males, abdominal sternite VIII with or without a differentiated glandular area, abdominal tergite IX with major lateral posterior setae reduced in size. Tube much shorter than head, not thickened or ridged.

Although similar in most respects to *Haplothrips* subgenus *Karpyothrips*, *Agrothrips* can be distinguished at once by the characteristic of the shelf-like ring near the base of antennal segment III. I have reviewed this genus elsewhere (Stannard 1958b).

Only one species, *omani*, occurs in Illinois. It may have been introduced from the southwest. Other species occur on the grasslands of western United States and Mexico, and in South Africa.

KEY TO SPECIES (OF NORTH AMERICA)

1. Antennae completely dark brown; midlateral prothoracic setae well developed; from Distrito Federal, Mexico *tenebricosus*
Antennae with several segments yellow or yellowish brown; midlateral prothoracic setae minute 2
2. Abdomen primarily light brown 3
Abdomen generally yellow except most of tube which is brown 5
3. Antennal segments I–VI bright yellow, segments VII and VIII brown; abdominal sternite VIII of male lacking glandular area; from Kansas to Texas *dimidiatus*
Antennal segment II, at least, brown; abdominal sternite VIII of male with or without glandular area 4
4. Antennal segments I, II, VII, and VIII brown, segments III–VI bright yellow; head brown; abdominal sternite VIII of male lacking glandular area; from Illinois to Arizona *omani*
Antennal segments I and III yellow, remainder of antennae yellowish brown; head light yellowish brown; abdominal sternite VIII with a transverse glandular area; from Kansas to New Mexico *tantillus*

5. Antennal segments I–III bright yellow, segments IV–VIII yellowish brown; abdominal sternite VIII with a transverse glandular area which is forked at both lateral extremities; from Arizona *arenicola*

Antennal segments I–VI bright yellow, segments VII and VIII brown; abdominal sternite VIII of allotype male (because of differences in color with holotype female, whether the allotype is conspecific with the holotype should be further confirmed) with glandular area transverse linear, without forks; from Texas *pallidus*

Agrothrips omani (Crawford, J. C.)

Haplothrips (*Hadothrips*) *omani* Crawford, J. C. (1947:250). ♀. Type locality.—Tucson, Arizona.

FEMALE (apterous).—Length of Illinois specimens distended about 2.1 mm (slightly larger in specimens known from southwestern United States). General color dark brown. Yellow: antennal segments III–VI except for light brown cloud at apex of segments IV–VI, apical portions of tibiae, and all tarsi. Tube darkest brown. Body with much red subintegumental pigment.

Head longer than wide, generally smooth. Ocelli present. Postocular setae pointed to blunt. Antennal segments VI and VII with distinct pedicels. Maxillary bridge considerably forward of posterior margin of the head.

Prothorax with those major setae that are well developed blunt to slightly dilated. Metanotum nearly smooth. Wings and wing pads lacking; notum of thorax not degenerate as is typical of some apterous specimens in other species. Fore tarsi each armed with a small tooth.

Pelta broadly triangular. Wing-holding setae not differentiated. Abdominal tergite IX with major posterior setae shorter than tube, pointed. Tube much shorter than head.

MALE (apterous).—Length distended over 1.6 mm. Similar to female in general color and structure. Abdominal sternite VIII without a differentiated glandular area. Abdominal tergite IX with major lateral posterior setae reduced in size.

This is the only species of *Tubuli-*

fera in Illinois which has antennal segment III swollen into a shelflike ring at the base—a principal characteristic of the genus.

First described from Arizona, *omani* has since been found in southeastern Colorado and Nebraska (INHS records) and Illinois (Stannard 1958b). Our only Illinois specimens came from pastures around Sheldon in Iroquois County. That these Sheldon populations may have been from introduced stock can be presumed because they were so far out of the range expected of a species from the southwestern part of the United States and because they were apparently confined to a single pastureland area that contains few, if any, native plants.

Aleurodothrips Franklin

Aleurodothrips Franklin (1909:228).

Type-species by monotypy.—*Cryptothrips fasciapennis* Franklin.

Microcanthothrips Bagnall (1914:295).

Type-species by original designation.—*Cephalothrips spinosus* Bagnall. Synonymized by Priesner (1949).

Head quadrate, about as long as wide, weakly striate, not projecting much beyond anterior eye margin. Ocelli present, fairly widely spaced, fore ocellus about on line with anterior eye margin. Eyes moderately large, not prolonged ventrally. Postocular setae small, pointed. Antennae eight segmented, inserted at the anterior margin of the head; segment II with dorsal sensorium placed apically; segments III and IV with short sense cones; segment VIII separate but closely joined to segment VII. Mouth cone short, broadly rounded. Maxillary stylets, when at rest, extended up to eyes, widely spaced within head.

Pronotum shorter than head, smooth except for posterior margin. Only anterolateral and epimeral setae well developed, these dilated. No trace of epimeral sutures. Praepectus present. Probasisternal plates large. Macropterous. Metascutum smooth. Mesospinasternum fully formed. Females with fore legs unarmed; males bearing a large toothlike projection on each of

the fore femora, three or four seta-bearing warts on each of the fore tibiae, and a moderate-sized tooth on each fore tarsus. Mid and hind femora without differentiated setae. All tarsi seemingly one segmented. Fore wings slightly narrowed in the middle, lacking accessory cilia.

Pelta divided into three parts. Abdominal tergites II–IV more or less with anastomosing, transverse striae, tergites V–VII more or less hexagonally reticulate, tergites VIII and IX nearly smooth. Abdominal tergites II–VII each with one pair of sigmoidal wing-holding setae; lateral setae dilated. Males with abdominal sternite V with several pairs of differentiated median setae, abdominal sternite VIII with glandular area. Abdominal tergite IX with major dorsal, posterior setae shorter than tube, dilated; lateral pair in male as long as in female, not shorter as in males of many species in the Phlaeothripinae. Tube much shorter than head, terminal setae shorter than tube.

Aleurodothrips is distinctive by the combination of a) the lack of epimeral sutures on the pronotum and b) the division of the pelta into three parts. The armature of the fore femur of the male is also diagnostic.

Probably this genus is monobasic. According to my analysis *Chromatothrips* Schmutz is a good genus and not a synonym of *Aleurodothrips* as supposed by Bagnall (1915b).

Aleurodothrips fasciapennis (Franklin)

Cryptothrips fasciapennis Franklin (1908:727). ♀. Type-locality.—

Glendor, St. Michael, Barbados Islands. Franklin (1909:230). ♂. Transferred to *Aleurodothrips* by Franklin (1909).

Cephalothrips spinosus Bagnall (1909a:174). ♂. Type-locality.—Brussels Botanical Gardens, Belgium. Transferred to *Microcanthothrips* by Bagnall (1914). Synonymized by Priesner (1949).

FEMALE (macropterous) (Fig. 210).

Length distended about 1.8 mm. Bicolored brown and yellow. Brown:

head, except yellow anteriorly; prothorax, posterior line on mesoscutum; sides of abdominal tergite I, anterior lateral stripes on tergites II-IV, all of tergites V and VI (which are the darkest), most of VII except lighter posteriorly, basal two-thirds of tube; fore femora and inner apical portions

of mid and hind femora; antennal segments IV and V at extreme apex, VI except extreme base, and all of segments VII and VIII. Fore wings pale, banded with light brown at bulge near base, medially, and at apex. Major setae pale yellow.

Head slightly wider than long, dor-

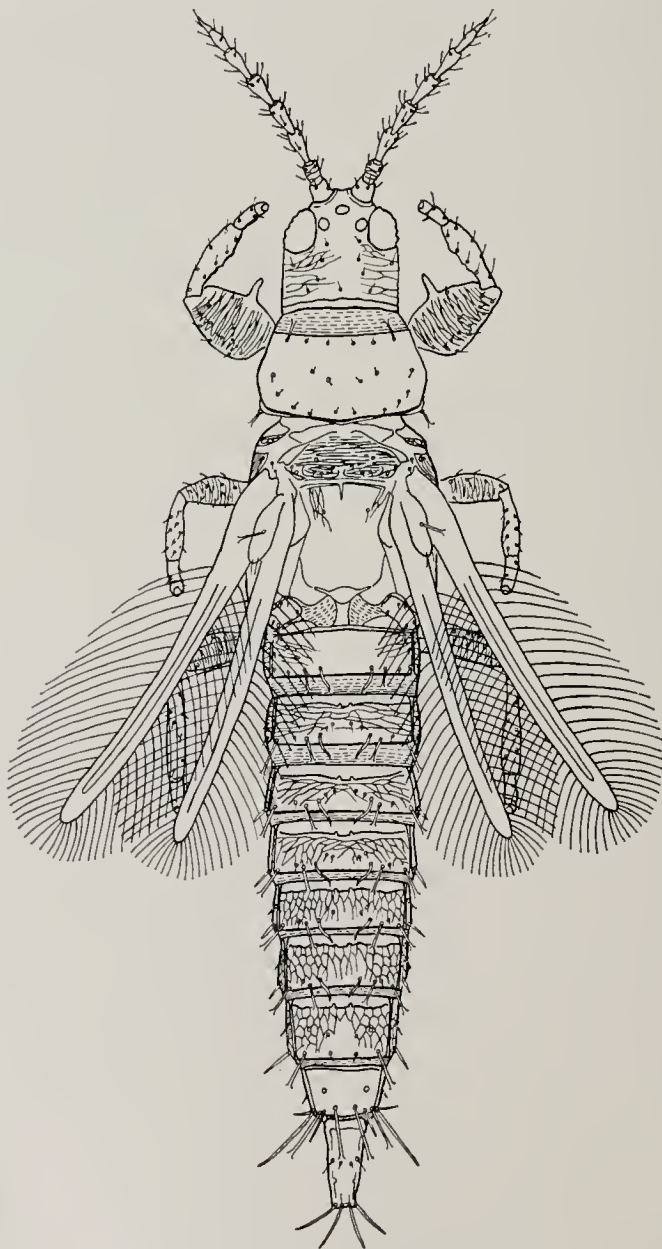


Fig. 210.—*Aleurodothrips fasciapennis*, dorsal aspect.

sal surface with several dozen small setae. Eyes not extended laterally more than cheeks. Postocular setae not distinguishable from other small setae. Vertex fairly wide. Mouth cone short, bluntly rounded. Maxillary stylets widely spaced. Maxillary bridge not discernible.

Antennal segments—I quadrate; II with broad pedicel, dorsal sensorium placed near apex; III subconical, pedicellate with no inner and one outer sense cone; IV subconical, with one inner and one outer sense cone; V and VI cylindrical, broadly pedicellate; VII cylindrical with a broadly flanged pedicel; VIII conical, not pedicellate.

Pronotum shorter than head, with only anterolateral and epimeral setae well developed, dilated. Epimeral sutures lacking. Praepectus present, closely placed under mouth cone.

Pterothorax longer and wider than pronotum. Metascutum smooth with small setae.

Legs with fore femora slightly enlarged, unarmed.

Fore wings outcurved at base, slightly constricted in middle, without accessory cilia.

Abdomen with pelta divided into three parts. All sternal setae slender. Tube weakly sculptured.

MALE (macropterous).—Length distended about 1.3 mm. Similar to female in color and structure except lighter yellow in abdomen, only segment VI dark brown; fore femora each with long inner, toothlike projection; fore tibiae each with several seta-bearing warts; fore tarsi each armed with a tooth; abdominal sternite V with three pairs of enlarged median setae; and lateroventral setae spinelike.

This species is easily distinguished by the characteristics of the genus. It is one of the few Tubulifera with brown-banded wings. Apparently it is a predacious thrips that feeds on scale insects, and presumably has become tropicopolitan through the agency of man.

Watson's description (1922a) of the male of *Karnyothrips weigeli* is based on a female of *Aleurodothrips fascica-*

pennis, the slide of which I examined in 1962 at the Watson Collection, Gainesville, Florida.

As yet this species has not been found in Illinois, but it might be expected in greenhouses, an artificial habitat where it is sometimes found in other states.

Amphibolothrips Buffa

This genus is represented in Illinois solely by the subgenus *Trachythrips*. The remaining subgenera were treated elsewhere (Stannard 1957b).

subgenus *Trachythrips* Hood

Trachythrips Hood (1929:317). Type-species by original designation.—*Trachythrips watsoni* Hood. Subordinated by Stannard (1952b).

Head longer than wide, entirely covered by warts, anterior of head without prominent setae. Eyes with a few large facets arranged in two short rows dorsally. Ocelli lacking. Postocular setae minute. Antennae five or six segmented. Mouth cone short, broadly rounded. Maxillary stylets retracted far into the head, parallel within the head.

Prothorax warty, with all setae minute. Epimeral sutures fused to pronotum. Praepectal plates present. Meso- and metanotum degenerate. Meso- and metasternum fused. All tarsi apparently one segmented. Hind coxae farther apart than are the middle coxae. Always apterous.

Pelta in the form of a continuous dorsal band (Fig. 213). Wing-holding setae not differentiated. Lateral abdominal setae short, thick, and blunt. Abdominal segment IX cylindrical, fustus extending the entire length of the segment. Tube long, with six extremely long terminal setae.

This taxon is distinct from all other genera in Illinois by the characteristics of the five-segmented antennae.

Only one species, *watsoni*, is known to be in our state. Other species occur in North and South America, particularly in the tropical regions.

**Amphibolothrips (Trachythrips)
watsoni Hood**

Trachythrips watsoni Hood (1929:317).
♀, ♂. Type-locality.—Villa Tasso,
Florida. Transferred to *Amphibolo-*
thrips by Stannard (1952b).

FEMALE (apterous) (Fig. 211).—Length distended about 1.4 mm. Bicolored brown and yellow. Head, prothorax, mesothorax, fore legs, and tip of tube dark brown. Abdominal tergites II–VIII each with a pair of light brown dots, one on either side. Remainder of body yellow except the terminal antennal segment which is often yellowish brown. Head and thorax with red subintegumental pigment; abdomen with white subintegumental pigment, especially along the sides.

Head broadly rounded in front, not emarginate medially (Fig. 151). Eyes each with at least two rows of dorsal facets. Ocelli absent. Postocular setae minute. Antennae five segmented (Fig. 158), morphological segments III–V and segments VII and VIII completely fused.

Prothorax with all setae small. Fore tarsi each with a recurved claw (Fig. 212).

Pelta as in Fig. 213. Abdominal tergite IX slightly shorter than tube, all major posterior setae minute. Tube slender, generally straight sided.

MALE (apterous).—Length distended about 1 mm. Similar to female in general color and structure. Abdominal sternite VIII without glandular area. Abdominal segment IX and tube nearly equal in length.

This handsome, tiny thrips can be recognized by the characteristics of the subgenus. In our state it is abundant south of the Shelbyville moraine. Collections made after my article on its distribution in Illinois (1952a) have shown that its range extends northward up the Illinois River to about Utica and northward up the Wabash River to Portland Arch, Fountain County, Indiana. Ordinarily it occurs in the leaf mold of forests or in *Andropogon* clumps at the edges of forests.

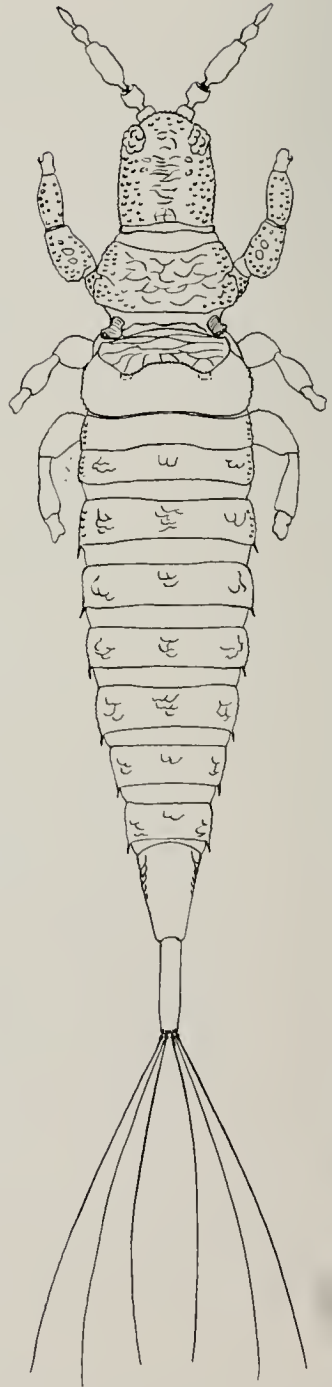


Fig. 211.—*Amphibolothrips (Trachythrips) watsoni*, dorsal aspect.

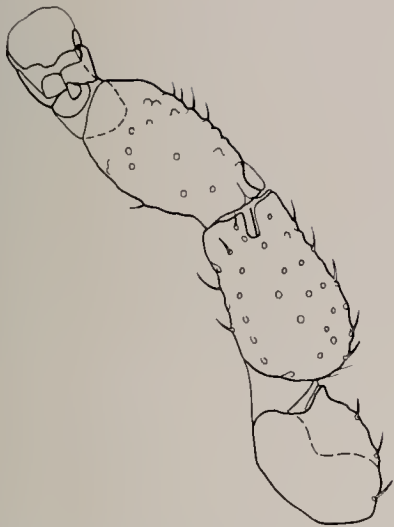


Fig. 212.—*Amphibolothrips* (*Trachythrips*) *watsoni*, fore leg.

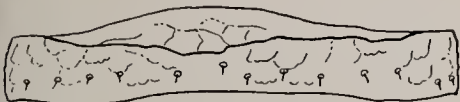


Fig. 213.—*Amphibolothrips* (*Trachythrips*) *watsoni*, pelta.

Illinois records (Fig. 20).—Taken every month of the year, from one or several localities in the following counties: ALEXANDER, CALHOUN, CLARK, CLAY, COLES, CRAWFORD, EFFINGHAM, FAYETTE, HARDIN, HENRY, JACKSON, JEFFERSON, JERSEY, JOHNSON, LA SALLE, LAWRENCE, MARION, MASON, PERRY, POPE, PULASKI, RANDOLPH, SHELBY, ST. CLAIR, VERMILION, WASHINGTON, and WAYNE.

Bagnalliella Karny

Bagnalliella Karny (1920:41). Type-species by original designation.—*Cephalothrips yuccae* Hinds.

Head moderate in size and somewhat broadened anteriorly, often with depressed lines or wrinkles behind eyes especially in brachypterous forms. Eyes normal. Ocelli present in

all forms. Postocular setae usually pointed. Antennae eight segmented, each segment fairly small, none enlarged. Maxillary stylets retracted far into the head, placed fairly close together. Maxillary bridge present, short. Mouth cone broadly rounded.

Prothorax with only anterolateral, epimeral, and lateral posterior marginal setae well developed, these setae usually blunt at their tips. Praepectus present. Epimeral sutures complete. Macropterous or brachypterous. Macropterous forms with fore wing slightly narrowed at the middle or entire apical half narrowed, accessory fringe cilia present. Fore tarsi armed in both sexes.

Pelta triangular (Fig. 214). Wing-holding setae slightly curved or slightly sigmoidal. Tube moderate-sized. Accessory setae on abdominal sternites minute. Males apparently without sternal glandular areas, and with lateral posterior setae on abdominal tergite IX reduced.

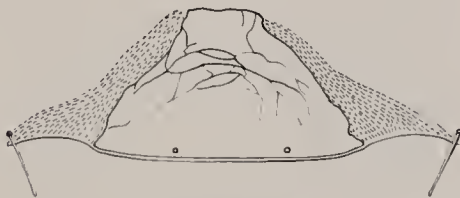


Fig. 214.—*Bagnalliella yuccae*, pelta.

This genus is similar to *Haplothrips*. From *Haplothrips*, *Bagnalliella* may be distinguished by the combination of the characteristics a) wrinkles behind eyes in the brachypterous form, b) reduction of both the anteromarginal and lateral prothoracic setae, and c) the appearance of the head outline which is slightly broadened anteriorly. In addition species of *Bagnalliella* are seemingly confined to *Yucca* plants and are rarely found on other vegetation.

Bagnalliella is represented in Illinois by the introduced species, *Bagnalliella yuccae*.

Bagnalliella yuccae (Hinds)

Cephalothrips yuccae Hinds (1902: 194). ♀, ♂. Type-locality.—Not given, but either Amherst, Massachusetts or Washington, D.C. Transferred to *Bagnalliella* by Karny (1920).

Haplothrips yuccae Savenko (1944: 1008). ♀, ♂. Type-locality.—Buknari, Kobuletsk, district of Adzharsk (Caucasus), U.S.S.R. New synonymy.

FEMALE (macropterous).—Length distended about 2.5 mm. General color light brown; sides and anterior of head, sides of thorax, and tube dark brown; abdomen sometimes yellowish brown mesally. Antennal segment I and most of II brown as in head, rest of antennae yellow except segments VII and VIII which are infused with brown. Legs predominantly brown except tarsi which are yellow. Wings colorless except extreme base light brown. Ocellar and subintegumental pigments red.

Head without strong wrinkles behind eyes. Antennal segment IV with two outer and two inner sense cones.

Major prothoracic setae moderately long. Fore tarsi each with a small tooth.

Tube moderate in size.

FEMALE (brachypterous).—Length distended over 2 mm. Color and structure almost identical to color and structure of macropterous form (color slightly darker). Evidence of some wrinkles or impressed lines behind eyes. Wings reduced to small pads.

MALE (brachypterous).—Length distended about 1.8 mm. Generally similar to brachypterous female. Abdominal sternite VIII without a glandular area.

This species is host specific to *Yucca filamentosa*, a commonly cultivated plant that originally was native to the eastern coastal plain from southern New Jersey to Georgia (Fernald 1950). *Yucca filamentosa* and its thrips *Bagnalliella yuccae* have been introduced into Illinois and many other states as well as Europe.

Savenko's species, *Haplothrips yuc-*

cae, described from the Caucasus and redescribed by Derbeneva (1959) from the Crimea, is undoubtedly the same as *Bagnalliella yuccae* Hinds. The provenience of the plant genus *Yucca* is the New World and the species most able to tolerate low winter temperatures under out-of-door cultivation in Europe are from the southeastern United States where *B. yuccae* is the sole associate. Although these Russian authors made no reference to the literature on *Bagnalliella*, their descriptions and illustrations are of a typical *Bagnalliella*.

Adults and larvae of *yuccae* may be found in the lower appressed parts of the sheaths of their host. According to my observations, winged females can fly at least one-half mile to start new colonies. Two years after I started a yucca plant from a root cutting in my garden, a colony of thrips became established on it. The nearest yucca was fully one-half mile distant from my plant.

Illinois records (Fig. 19).—State-wide, collected from April through October, from one or several localities in every county in the state.

Cephalothrips Uzel

Cephalothrips Uzel (1895:244). Type-species by monotypy.—*Phloeothrips monilicornis* Reuter.

Head decidedly longer than broad, hardly at all prolonged in front of eyes. Dorsal surface of head smooth to faintly transversely striate along the lateral margins and base, ventral surface smooth, cheeks barely serrate. Eyes moderately large, prolonged more posteriad ventrally than dorsally. Ocelli present in macropterous form, absent in apterous form. Postocular setae moderate in size. Antennae eight segmented, segment III not elongate, segments VII and VIII each with a broad pedicel. Mouth cone broadly rounded. Maxillary stylets, when at rest, extending far into the head and placed fairly close together but not touching within the center of the head.

Prothorax with only the epimeral setae well developed, these setae di-

lated at tip. Praepectus absent. Mesopraesternum degenerate, reduced to two lateral, triangular plates. Metanotum smooth medially, weakly longitudinally striate along sides of the median scutum. Macropterous or apterous. Fore wings in macropterous form without accessory setae. Fore legs each armed with a small tooth.

Pelta triangular, faintly reticulate. Wing-holding setae well formed or not differentiated. Tube moderate in size, terminal setae shorter than tube. Males unknown to me.

This genus resembles *Hoplandrothrips* and *Adraneothrips*; some students have even allied it to *Karnyothrips*, directly or indirectly. From *Karnyothrips*, *Cephalothrips* differs by lacking praepectal plates. From *Hoplandrothrips*, *Cephalothrips* differs by having the eyes prolonged posteriad more on the venter than on the dorsum. And from *Adraneothrips*, *Cephalothrips* differs by having antennal segment VII with a broad pedicel.

Cephalothrips is represented in northeastern North America by the holarctic species, *monilicornis*. As yet it has not been found in Illinois.

***Cephalothrips monilicornis* (Reuter)**

Phloeothrips monilicornis Reuter (1885: 21). ♀. Type-locality.—Finland. Transferred to *Cephalothrips* by Uzel (1895).

FEMALE (apterous).—Length distended about 2 mm. General color dark brown. Apexes of tibiae, all tarsi, and bases of antennal segments III–VI bright yellow. Body with red sub-integumental pigment.

Head elongate, smooth. Cheeks moderately serrate with several short, nearly colorless spines. Eyes moderate in size, prolonged ventrally toward the posterior into a point. Ocelli absent. Antennal segment III with one outer sense cone, antennal segment IV with one outer and one inner sense cone. Maxillary stylets, when at rest, extending far into the head and placed fairly close together but not touching within the center of the head. Mouth cone short, broadly rounded.

Prothorax with only the epimeral

setae well developed, these setae dilated at tips. Epimeral sutures complete. Pterothorax degenerate, typical of the apical condition. Fore tarsi each armed with a small tooth. Wings entirely lacking.

Pelta broadly triangular. Wing-holding setae not differentiated. Abdominal tergite IX with major posterior setae less than half as long as tube, slightly dilated at tips.

FEMALE (macropterous).—Similar in most respects to apterous female with the following exceptions. Ocelli present. Pterothorax not degenerate. Wings present. Fore wings without accessory fringe cilia. Abdomen with wing-holding setae well developed, sigmoidal.

MALE.—Known in Europe, unknown in North America.

This species can be distinguished from other long-headed, dark, slender species of the subfamily Phlaeothripinae in North America by the combination of the ventrally-produced eyes and the yellow coloring on the apexes of the fore tibiae, all of the tarsi, and the bases of antennal segments III–VI.

In North America, as in Europe, *Cephalothrips monilicornis* is confined to northern regions. It is distributed from British Columbia to New York. It is now a holarctic species, which, although not yet taken in Illinois, may be found in the future in our northern counties. I have collected this species as far south as Portage, Wisconsin. The absence of males in North America may indicate that a facultative parthenogenetic form of *monilicornis* was introduced to our continent by European man.

Diphyothrips Stannard

Diphyothrips Stannard (1963b:134).

Type-species by original designation.—*Diphyothrips morainensis* Stannard.

Head slightly longer than broad, with weak, transverse striae. Eyes moderately small, shorter than combined length of antennal segments I and II, not ventrally prolonged. Ocelli present, moderately far apart, fore

ocellus overhanging insertion of antennae. Antennae eight segmented; segment III with basal half abruptly narrowed; segment VIII only slightly narrowed basally, broadly attached to segment VII. Postocular setae long. Maxillary stylets, when fully at rest, extended far into the head, placed fairly close together within the center of the head. Mouth cone moderately long, broadly rounded.

Prothorax shorter than head, nearly smooth. All major setae well developed, midlateral setae closer to epimeral suture than to anterolateral setae. Epimeral suture complete. Each epimeron divided into three parts; with two well-developed setae. Praepectus apparently absent. Metascutum nearly smooth medially with weak, elongated reticulations that tend to become longitudinal striae laterally; without long setae. Mesopraesternum bandlike, completely separated by a suture from the mesosternum. Fore femora not particularly enlarged. Fore wings of even width throughout, with accessory fringe cilia.

Pelta small, triangular to bell shaped. Wing-holding setae relatively slender, curved to nearly sigmoidal. Abdominal tergite II at sides not especially fractured into small stipple-like platelets. Abdominal tergite IX with major posterior setae much longer than tube, in female at least. Tube slightly shorter than head, terminal setae shorter than tube.

MALE.—Unknown.

This monobasic genus may be immediately recognized by the thrice divided epimeral plate. As is the case of *Illinothrips*, the genus has not yet been found outside of Illinois.

***Diphyothrips morainensis* Stannard**

Diphyothrips morainensis Stannard (1963b:136). ♀. Type-locality.—Shoefactory Road hill prairie, Cook County, near Elgin, Illinois.

FEMALE (macropterous).—Length nearly 2 mm. Color dark brown. Antennal segment III, fore tibiae, and all tarsi yellowish brown. Subintegumental pigment red. All body setae pale yellow. Wings colorless except

light brown at base including scale of fore wing.

Head (Fig. 215). Postocular setae pointed. Ocellar setae minute. Antennal segment III with one outer sense cone and no inner sense cone, segment IV with one outer and one inner sense cone.

Prothorax with all major setae long and blunt at tips. Anteromarginal setae longer than anterolateral setae. Posteromarginal setae longest, longer than length of prothorax. Pterothorax with all ventrolateral setae pointed. Fore tarsi unarmed. Fore wings with 11–13 accessory fringe cilia.

Abdomen with pelta triangular to slightly bell shaped, not abruptly expanded near posterior margin. Lateral abdominal setae becoming progressively longer on segments II–IX, only lateral setae on segment IX longer than tube. Abdominal tergite IX with all long major setae pointed at tips.

MALE.—Unknown.

In many respects this species resembles certain species in *Liothrips*. The tripartite epimeral plates of *Diphyothrips morainensis* distinguish it from all other species in Illinois.

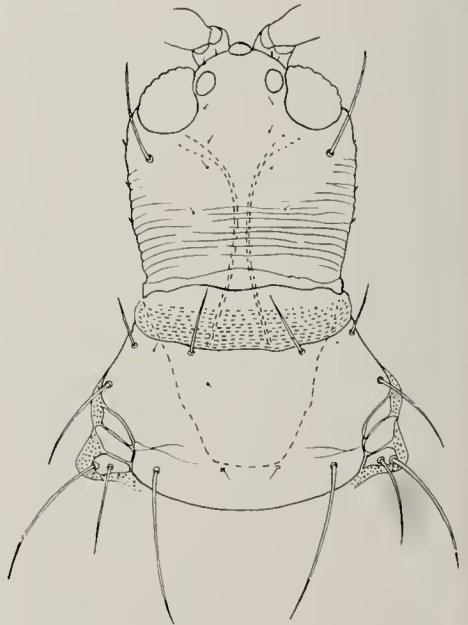


Fig. 215.—*Diphyothrips morainensis*, head and prothorax.

So far it is known only from two localities in our state.

Illinois records.—COOK COUNTY: near Elgin (Shoefactory Road hill prairie), July 28, 1953, September 21, 1961, Stannard, swept from grass, 2 ♀. LEE COUNTY: Amboy, September 13, 1951, Richards, Stannard, swept from grass, 1 ♀.

Erkosothrips Stannard

Erkosothrips Stannard (1955b:81).

Type-species by original designation.—*Erkosothrips interior* Stannard.

Head longer than wide, prolonged in front of eyes, completely hexagonally reticulate on the dorsum, cheeks slightly to considerably swollen and incised just behind eyes. Eyes moderately small, bulged. Ocelli present, somewhat reduced in brachypterous forms. Postocular setae short to very short, never longer than length of eye, always dilated. Antennae eight segmented (Fig. 199), antennal segments III and IV with several setae dilated and with slender sense cones, segment VIII pedicellate. Mouth cone short, broadly rounded. Maxillary stylets placed far apart in the form of a V within the head.

Prothorax with anteromarginal setae minute, remainder of major setae well developed but moderately short, dilated. Epimeral sutures complete or incomplete. Praepectus present. Metanotum with weak or strong hexagonal reticulations on the anterior part at least. Macropterous, brachypterous, or apterous. Fore wings when present not indented in the middle, without accessory fringe cilia. Fore tarsi each armed with a small tooth. Femora each with a differentiated outer seta which is dilated.

Abdomen hexagonally reticulate. Pelta elongate oval, rectangular, or in the form of an isosceles trapezoid. Wing-holding setae developed or not differentiated. Males with a glandular area on abdominal sternite VIII, either in the form of a narrow subbasal band or as a broad band occupying most of the segment. Abdominal tergite IX with major posterior setae shorter

than the tube, usually all dilated; in the male, the lateral setae reduced in size, pointed, blunt, or dilated. Tube shorter than head, not hexagonally reticulate, with terminal setae shorter than tube.

Members of this genus, which I have treated elsewhere (Stannard 1955b), can be characterized by the reticulate head, eight-segmented antennae in which segment VIII is pedicellate, minute anteromarginal setae, the presence of praepectal plates, and the nonhexagonally reticulate tube which is shorter than the head. The included species resemble those in *Eurythrips*, a genus characterized by not having the head entirely reticulate, as well as those in *Glyptothrips*, a genus defined as having morphological antennal segments VII and VIII fused or so closely adjoined that segment VIII is entirely without a pedicel.

Three species occur in Illinois. They may be found in grass clumps or in forest debris.

KEY TO SPECIES

1. Pterothorax with ventrolateral setae pointed *sculpturus*
Pterothorax with ventrolateral setae dilated 2
2. Abdomen largely deep yellow; abdominal sternite VIII of male with narrow, bandlike, subbasal glandular area *interior*
Abdomen largely brown; abdominal sternite VIII of male with a broad, transverse glandular area *claviger*

Erkosothrips claviger (Hood)

Eurythrips claviger Hood (1941:166). ♀, ♂. Type-locality.—Oswegatchie, New York. Transferred to *Erkosothrips* by Stannard (1955b).

FEMALE (brachypterous).—Length distended about 1.9 mm. General color brown and yellow. Most of head, legs, antennal segment I and sometimes pedicels of antennal segments III–V yellow to yellowish brown. Head at sides, thorax, and abdominal segment I darker yellowish brown to brown. Remainder of antennae and abdomen brown to dark brown. Body with red subintegumental pigment.

Head relatively long, cheeks de-

cidedly bulged, incised behind eyes. Eyes moderately small, bulged. Ocelli present. Postocular setae shorter than eye length, dilated. Antennal segment III with one inner and two outer slender sense cones; segment IV with two inner and two outer slender sense cones; segment VIII relatively long and slender, pedicellate. Mouth cone short, broadly rounded.

Prothorax very faintly reticulate anteriorly; with most of the major setae well developed and dilated, anteromarginal setae minute. Epimeral sutures incomplete. Pterothorax with ventrolateral setae dilated. Metanotum with reticulations grading into wartlike markings posteriorly. Wings reduced to small pads. Fore tarsi each armed with a small tooth. Femora each with an outer, differentiated, dilated seta.

Pelta roughly in the shape of an isosceles trapezoid (Fig. 216), with lateral setae placed outside of pelta. Wing-holding setae developed. Abdominal tergite IX with major posterior setae shorter than tube, dilated. Tube less than three-fourths as long as head.

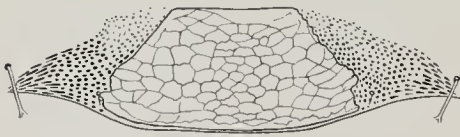


Fig. 216.—*Erkosothrips claviger*, pelta.

FEMALE (macropterous).—Unknown.

MALE (brachypterous).—Length distended about 1.4 mm. Similar to brachypterous female in color and structure except fore tarsal tooth sometimes slightly stouter. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with major lateral posterior setae shortened, pointed to blunt.

This fairly dark colored species is the only member of the genus in the Midwest whose male has the glandular area of abdominal sternite VIII in the form of a broad band that occupies most of the segment.

So far only one specimen of this species has been collected in Illinois. It was taken at Palisades State Park, Carroll County, in 1944 by Drs. M. W. Sanderson and R. Leighton, from forest debris. Most likely the range of *claviger* is continuous from Missouri to New York, across northern Illinois.

Erkosothrips interior Stannard

Erkosothrips interior Stannard (1955b: 84). ♀, ♂. Type-locality.—Monticello, Illinois.

FEMALE (brachypterous).—Length distended about 2 mm. General color deep yellow. Terminal segments of antennae shading into yellowish brown. Sides of mesothorax, abdominal tergites III–VIII, and most of tube brown to dark brown.

Head longer than broad, cheeks not especially swollen, cheeks incised behind eyes. Eyes relatively small, bulged. Ocelli present. Postocular setae about as long as dorsal eye length, dilated. Antennal segments III and IV strongly sculptured, each with one inner and one outer slender sense cone; segment VIII fairly slender, pedicellate. Mouth cone short, broadly rounded.

Prothorax so faintly marked as to appear nearly smooth, with most of the major setae well developed and dilated. Anteromarginal setae minute. Epimeral sutures incomplete. Metanotum faintly reticulate in anterior half. Pterothorax with ventrolateral setae dilated. Wings reduced to pads. Fore tarsi each armed with a small tooth. Femora each with an outer, differentiated, dilated seta.

Pelta elongate oval, with lateral setae placed outside (Fig. 217). Wing-holding setae not developed. Abdominal tergite IX with major posterior setae shorter than tube, dilated. Tube about three-fourths as long as head.



Fig. 217.—*Erkosothrips interior*, pelta.

FEMALE (macropterous).—Unknown.

MALE (brachypterous).—Length distended nearly 1.5 mm. Similar in color and structure to brachypterous female. Abdominal sternite VIII with a narrow subbasal glandular area (Fig. 57). Abdominal tergite IX with major lateral posterior setae reduced in size, dilated.

From its midwestern congeners, this species may be easily distinguished by its yellow color in combination with the presence of dilated ventrolateral pterothorax setae.

Most of the collections of *interior* have been from Illinois; elsewhere it has been found in southern Michigan and Missouri. All specimens have been taken from forest debris.

Illinois records.—CLARK COUNTY: Clarksville, May 13, 1949, Ross, Gloyd, Stannard, forest debris, 1 ♀. COOK COUNTY: Woodlawn, May 16, 1948, Stannard, forest debris, 1 ♀. DOUGLAS COUNTY: Arcola, October 12, 1949, Stannard, forest debris, 1 ♀. LA SALLE COUNTY: Serena, October 20, 1960, Evers, Stannard, forest debris, 1 ♀. LAWRENCE COUNTY: West Point, September 15, 1949, Ross, Stannard, 1 ♂. MARION COUNTY: Fairman, April 10, 1956, Stannard, forest debris, 1 ♀. MENARD COUNTY: New Salem State Park, April 3, 1956, Stannard, forest debris, 1 ♀, 2 ♂. PIATT COUNTY: Monticello, November 16, 1937, September 25, 28, 1938, April 14, 1942, Farrar, forest debris, 3 ♀, 7 ♂; Monticello, April 12, 1961, Moll, Stannard, forest debris, 1 ♀.

Erkosothrips sculpturus (Hood)

Eurythrips sculpturus Hood (1936a:5). ♀, ♂. Type-locality.—Tallulah, Louisiana. Transferred to *Erkosothrips* by Stannard (1955b).

FEMALE (brachypterous).—Length distended about 1.7 mm. General color brown and yellow. Head and legs bright yellow. Basal antennal segments, thorax, abdominal tergite I, and sometimes abdominal tergite IX predominantly yellowish brown. Apical antennal segments and remainder of abdomen brown. Abdominal ter-

gites III–VIII with median interior blotch and tube often dark brown. Body with red subintegumental pigment.

Head about $1\frac{1}{3}$ times as long as wide, cheeks slightly swollen, incised sharply behind eyes (Fig. 218). Eyes relatively small, bulged. Small ocelli present. Postocular setae short, usually placed well inside a line tangent to the lateral eye margin, dilated. Antennal segments III and IV each with one inner and one outer slender sense cone, segment VIII with a moderately broad pedicel. Mouth cone short, broadly rounded.

Prothorax with faint hexagonal reticulations anteriorly, with most of the major setae well developed and dilated, anteromarginal setae minute. Epimeral sutures complete or nearly complete. Pterothorax with ventrolateral setae pointed. Wings reduced to tiny pads. Fore tarsi each armed with a small tooth. Femora each with an outer, differentiated, dilated seta.

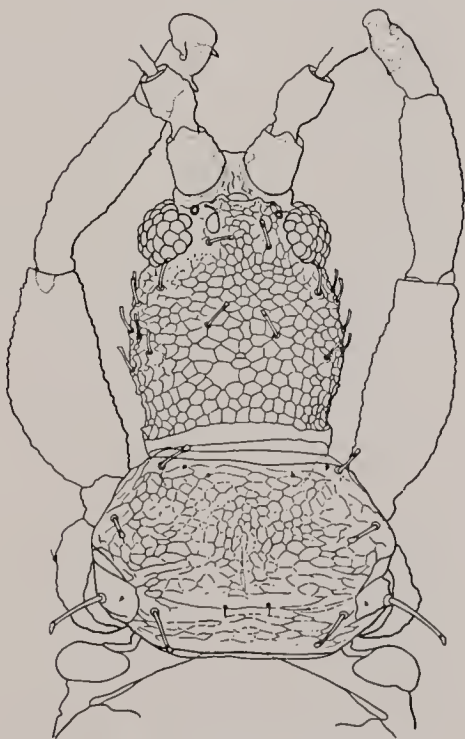


Fig. 218.—*Erkosothrips sculpturus*, head and prothorax. From Hood (1936a).

Pelta elongate oval, with lateral setae usually placed on pelta (Fig. 219). Wing-holding setae not developed. Abdominal tergite IX with major posterior setae shorter than tube, dilated. Tube slightly more than three-fourths as long as head.

FEMALE (macropterous) (specimen from North Carolina).—Length not distended about 1.3 mm. Similar to brachypterous female. Wings fully developed, fore wing uniformly light brown, without accessory fringe cilia. Wing-holding setae well developed.

MALE (brachypterous).—Length distended about 1.3 mm. Color and structure similar to brachypterous female. Abdominal sternite VIII with a narrow, subbasal, bandlike glandular area. Abdominal tergite IX with major lateral posterior setae reduced in size, pointed to dilated.

In the Illinois fauna, *sculpturus* is the only species in the genus with pointed ventrolateral pterothoracic setae.

The status of this species is still uncertain. In 1955 I supported the view that *sculpturus* and *silvarum* were distinct. Now, with more material at hand, it appears that there is little if any distinction between them. Two characteristics, the extent of the swollen cheeks and the placement of the postocular setae, have proved to be so variable that they can no longer be used as criteria for the separation of these forms. It may be that *silvarum* is but the apterous form of *sculpturus*. For the present, I prefer to use the name *sculpturus* for specimens in Illinois. No decision on *silvarum* is necessary in considering our fauna because no specimens assignable to *silvarum* have yet been found in our state.

The very similar-appearing type-specimen of *Erkosothrips reticulatus* (Watson) from Florida has a yellow (rather than brown) tube and the posterior setae of abdominal tergite IX are blunt to pointed, not dilated. Apparently, *reticulatus* may be distinguished from *sculpturus* by these two characteristics. The lectotype of *reticulatus*, described by Watson under *Glyptothrips* in 1934, is herein design-



Fig. 219.—*Erkosothrips sculpturus*, pelta.

nated to be the single female specimen, probably brachypterous, mounted ventral side up on the slide deposited in the Watson collection, Florida Agricultural Experiment Station, Gainesville, marked "TYPE ♀" and labeled "damp leaves along stream in Catocala Glen, Gainesville, Florida, separated in Berlese funnel, 1.12.26, D. M. Bates coll."

Erkosothrips sculpturus has been collected from the central and southern parts of Illinois in grass clumps and forest debris.

Illinois records.—BOND COUNTY: Smithboro, October 28, 1956, Ross, Smith, Stannard, forest debris, 2 ♀, 1 ♂. DOUGLAS COUNTY: Arcola, October 12, 1949, Stannard, sod of *Andropogon*, 3 ♀, 3 ♂. JACKSON COUNTY: Murphysboro, September 20, 1949, Smith, Stannard, ground cover, 2 ♀, 1 ♂. JOHNSON COUNTY: Grantsburg, August 31, 1951, Ross, Richards, from grass and leaves, 5 ♀, 8 ♂; Sanburn, September 20, 1949, Smith, Stannard, forest debris, 2 ♀, 1 ♂. MARION COUNTY: Fairman, April 10, 1956, Stannard, forest debris, 1 ♂. PIATT COUNTY: Monticello, October 17, 1938, December 11, 1939, April 5, 1940, Farrar, sod of *Andropogon* and woodland debris, 5 ♀, 1 ♂. POPE COUNTY: Herod, May 5, 1950, Sander-son, Stannard, forest and grass debris, 4 ♀, 2 ♂. RANDOLPH COUNTY: Prairie du Rocher, July 18, 1948, Smith, Stannard, forest and grass debris, 1 ♀.

Eschatothrips Stannard

Eschatothrips Stannard (1955b:88).

Type-species by original designation.—*Eurythrips reticulotubus* Stannard.

Head longer than wide, slightly prolonged anterior of eyes, dorsum entirely sculptured by hexagonal reticu-

lations, cheeks decidedly incised just behind eyes. Eyes bulged, keglike. Ocelli present in all forms known. Postocellar setae minute. Postocular setae small. Antennae eight segmented; segments III and IV each with two dorsal setae that are knobbed or blunt, sense cones long and slender; segment VIII with narrow pedicel. Mouth cone short, broadly rounded. Maxillary stylets placed far apart within head, extending anteriorly to region of postocular setae.

Prothorax short, faintly reticulate. Anteromarginal setae minute; anterolateral, midlateral, and posterior marginal setae moderate in size, pointed to blunt; epimeral pair of setae largest, thickened and expanded at tips. Epimeral sutures complete. Praepectal plates extremely large. Mesopraesternum well developed. Macropterous or micropterous; fore wings, when fully developed, without accessory fringe cilia.

Abdominal tergites hexagonally reticulate except for medioanterior region where they are transversely striate. Pelta rectangular. Tergites III–VI each with two pairs of sigmoidal wing-holding setae, even in micropterous form. Lateral posterior setae thickened, blunt at tips. Abdominal sternite VIII in male with glandular area. Abdominal tergite IX of female with midposterior setae blunt, lateral setae long and pointed; in male, lateral setae greatly reduced, spinelike. Tube moderate in size, hexagonally reticulate except at tip (Fig. 188); anal setae shorter than tube.

In the eastern United States, other similar-appearing genera in the Phlaeothripinae differ from *Eschatothrips* by several characteristics among which are the following: in *Eurythrips* the head is never completely reticulate, in *Glyptothrips* the antennae are either each seven segmented or segment VIII is nonpedicellate, and in *Erkosothrips* the tube is not reticulate.

Although the genus has not yet been found in Illinois, specimens of *Eschatothrips barythripoides* have been taken in the Cumberland Mountains of Kentucky. Therefore, as is the case with some other insects of possible similar

distribution, it is likely that populations also exist nearer to or actually in our state.

Eschatothrips barythripoides Watson

Glyptothrips barythripoides Watson (1935:55). ♀, ♂. Type-locality.—Petersburg, Virginia; see remarks concerning lectotype below. Transferred to *Eschatothrips* by Stannard (1955b).

FEMALE (micropterous).—Length distended about 1.8 mm. Color predominantly yellow. Antennal segments IV–VI, except for pedicels, and all of segments VII and VIII brown. Abdominal tergites II–VII each with a median anterior brown spot, tube orange yellow except grayish brown at apex. Setae yellow. Body with some red subintegumental pigment.

Head completely reticulate dorsally. Eyes small, bulged. Antennal segment III with one ventral sense cone, segment IV with one inner and one outer sense cone. Mouth cone proportionately small.

Prothorax with sculpture faint. Praepectus present. Pterothorax without well-developed ventrolateral setae. Metascutum strongly hexagonally reticulate. Wings short, extending only to abdominal segment I or II, nearly brachypterous. Fore tarsi unarmed.

Pelta hexagonally reticulate. Abdominal tergite IX with major posterior lateral setae more than half as long as tube. Tube slightly longer than head.

FEMALE (macropterous).—Similar in size, color, and structure to micropterous female. Fore wings lacking accessory fringe cilia.

MALE (micropterous).—Length distended about 1.6 mm. Similar to micropterous female in color and structure. Abdominal sternite VIII with a bandlike glandular area in the antero-median portion. Abdominal tergite IX with major lateral posterior setae (II) small and spinelike. Tube decidedly shorter than head.

This is the only species of the genus in the temperate eastern United States, occurring from Florida to New

Jersey and Mississippi to Kentucky. It has not yet been discovered in Illinois.

The lectotype of *barythripoides*, described by Watson under *Glyptothrips* in 1935, is here designated to be the male specimen encircled with black ink on the slide marked "type ♂" in which the designation "para" preceded "type" but was subsequently marked out by Professor Watson or another person and further labeled "Petersburg, Virginia, IX.3.33, J. W. Kea, dead oak leaves." This male is mounted ventral side up and is micropterous with the wing pads reaching to abdominal segment II. None of those in the type series in the Watson collection, Florida Agricultural Experiment Station, Gainesville, is "apart," *lapsus calami* by Watson for "apterous," as far as can be determined. Also on the lectotype slide is a specimen of *Hoplothrips pergandei*.

Although Watson indicated in the original description that the type was a female, only slides which are or once were labeled "paratypes" remain in the Watson collection. It seems reasonable to presume that Watson crossed out the phrase "para" and deliberately selected the male as type but failed to change the designation in his manuscript. At any rate the lectotype selected here is clearly a representative of the species Watson had in mind when he wrote his description.

Eurythrips Hinds

Eurythrips Hinds (1902:202). Type-species by original designation.—

Eurythrips ampliventralis Hinds.

Zuluella Jacot-Guillarmod (1939:37).

Type-species by original designation.—*Zuluella distincta* Jacot-Guillarmod. New synonymy.

Head moderate in size to elongated, sometimes considerably prolonged forward of eyes; surface of head never completely reticulate, usually smooth on the median of the dorsum or with faint warts, smooth on venter or with transverse striae; usually incised behind eyes. Eyes often bulged, kegelike. Ocelli present in macropterous and

some brachypterous forms, reduced or absent in some brachypterous and apterous forms. Postocellar setae usually small (long in *tarsalis*). Postocular setae well developed, dilated or pointed. Antennae eight segmented, segment III with one inner and one or two outer sense cones, segments VII and VIII with narrow or broad pedicels, usually setae on all segments pointed (except in *virginianus*). Mouth cone generally broadly rounded. Maxillary stylets placed far apart within head.

Prothorax with most major setae well developed, dilated or pointed; anteromarginal setae small. Epimeral sutures often incomplete. Praepectal plates always present. Fore wings brown when fully developed, without accessory fringe cilia in the North American species. Ventrolateral metathoracic setae usually small and pointed (except in *setiger*). Fore legs each usually with a tarsal tooth, mid and hind legs usually without any large, differentiated setae (except in *setiger*).

Pelta moderate in size. Wing-holding setae often present even in brachypterous forms. Males with glandular area on abdominal sternite VIII either in the form of a broad or narrow band or, as in *batesi*, divided into two parts (Fig. 56), and with posterior lateral setae on abdominal tergite IX shorter than in female.

In Illinois this genus resembles *Erksothrips* and *Glyptothrips*. The latter two genera have the head completely covered by hexagonal reticulations, whereas in *Eurythrips* the dorsal median part of the head is either smooth or with only faint warts. Also *Eurythrips* resembles *Haplothrips* in many features. However, in *Eurythrips* the maxillary stylets are always placed far apart within the head, almost next to the sides of the head, and usually the eyes are more bulged than in *Haplothrips*.

At least 12 species of *Eurythrips* occur in Illinois. Many are found in grass clumps, particularly *Andropogon*, and a few are found in forest litter. They are not known to be of economic importance.

KEY TO SPECIES

(ILLINOIS, EXCEPT WHERE NOTED)

- 1. Postocellar setae long *tarsalis*
Postocellar setae short (Fig. 220 and 221) 2
- 2. Mid and hind femora each with a large dorsal seta which is dilated; ventro-lateral metathoracic setae prominent and dilated *setiger*
Mid and hind femora without any differentiated setae; ventrolateral metathoracic setae small and pointed 3
- 3. Abdominal segments I, II, and sides of III abruptly yellow in contrast to remainder of abdomen which is brown; head faintly warty on dorsum; pelta as in Fig. 222 *pettiti*
Abdomen variously colored but not abruptly yellow in two or more basal segments in contrast to remainder of abdomen; head usually smooth on median part of dorsum; peltae variously formed 4
- 4. Epimeral sutures complete 5
Epimeral sutures incomplete 6
- 5. Tube dark brown *dissimilis*
Tube light yellow; from Alabama and Virginia (USNM), not yet found in Illinois *forticornis*
- 6. Males 7
Females 14
- 7. Abdominal sternite VIII with glandular

- area divided into two parts (Fig. 56) *batesi*
Abdominal sternite VIII with glandular area complete, bandlike 8
- 8. Glandular area thin 9
Glandular area broad to moderately broad 11
- 9. Glandular area occupying central portion of abdominal sternite VIII . *constrictus*
Glandular area occupying anterior portion of abdominal sternite VIII . . . 10
- 10. Predominantly yellow; dorsal setae on antennal segment III all pointed . *watsoni*
Abdomen with much brown, particularly tergites II and III and sides of posterior segments; two dorsal setae on antennal segments III blunt or dilated *virginianus*
- 11. Abdominal tergite IX with median pair of posterior setae extending beyond the tube 12
Abdominal tergite IX with median pair of posterior setae not extending beyond the tube 13
- 12. Antennal segments III and IV short and decidedly angular in profile; major prothoracic setae long, pointed; tube usually orange-brown at base *hindsii*
Antennal segments III and IV slightly longer and not as angular in profile; major prothoracic setae blunt or dilated; tube usually brown at base *osborni*
- 13. Antennal segment VII relatively long and pedicel relatively narrow

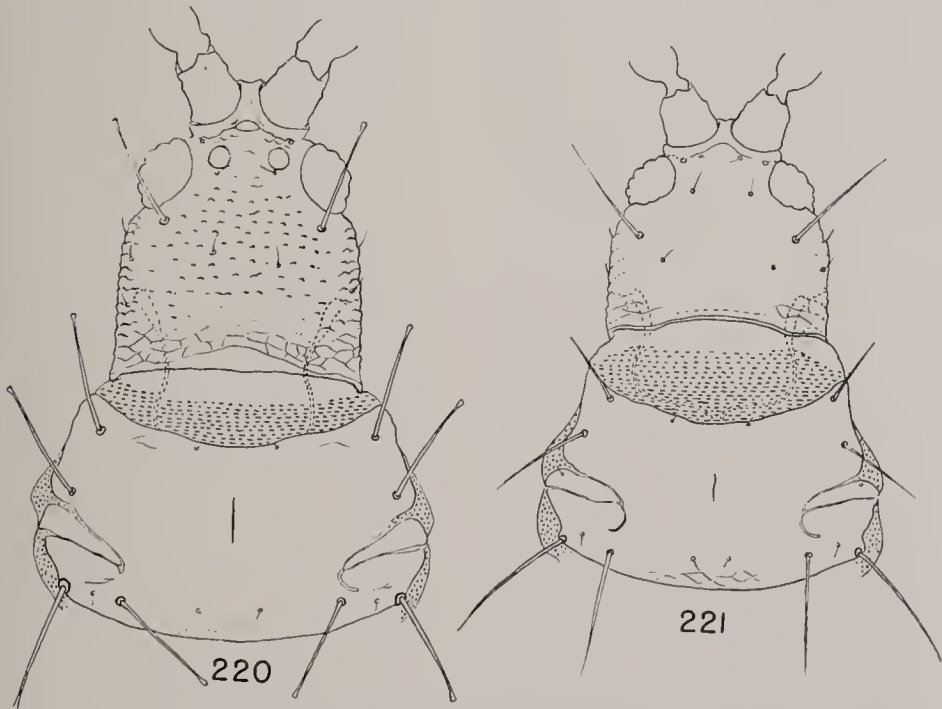


Fig. 220-221.—Head and prothorax: 220, *Eurythrips pettiti*; 221, *Eurythrips hindsii*.

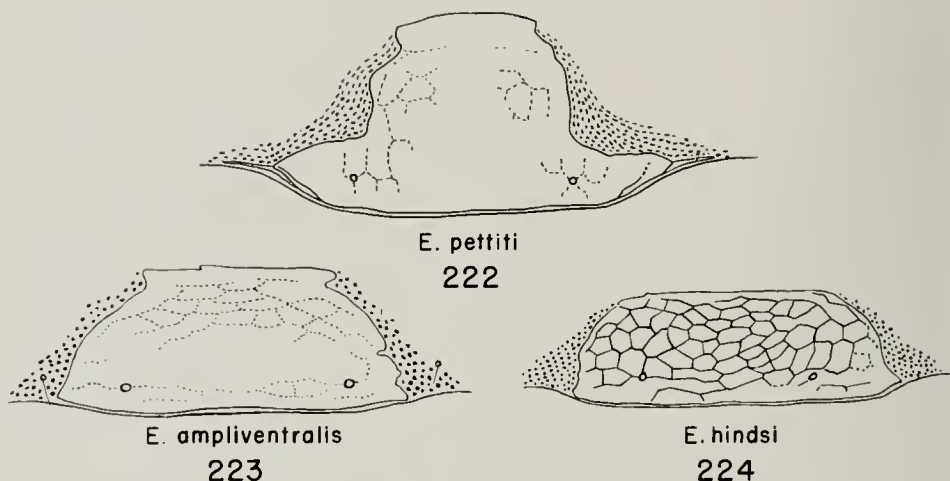


Fig. 222-224.—Peltas of indicated species of *Eurythrips*.

- *ampliventralis*
 Antennal segment VII shorter and pedicel broad..... *connatus*
 14. Abdominal tergite IX with major posterior setae dilated.....15
 Abdominal tergite IX with major posterior setae pointed.....17
 15. Head with most of ventral surface covered with transverse striations..... *batesi*
 Head with ventral surface transversely striated only on anterior portion.....16
 16. Abdomen predominantly yellow; antennal segment III with all dorsal setae pointed..... *watsoni*
 Abdomen with much brown particularly at sides; antennal segment III with two dorsal setae dilated or blunt..... *virginianus*
 17. Abdominal tergite IX with median pair of posterior setae extending beyond the tube.....18
 Abdominal tergite IX with median pair of posterior setae not extending beyond the tube.....19
 18. Antennal segments III and IV short and decidedly angular in profile; major prothoracic setae long and pointed, rarely blunt; tube usually orange-brown at base..... *hindsii*
 Antennal segments III and IV slightly longer and not as angular in profile; major prothoracic setae dilated; tube brown at base..... *osborni*
 19. Antennal segment III with two outer sense cones..... *ampliventralis*
 Antennal segment III with one outer sense cone.....20
 20. Maxillary stylets, when at rest, usually extended anteriorly to the halfway mark between the base of the eyes and the base of the head..... *constrictus*
 Maxillary stylets, when at rest, basad of the halfway mark between the base of the eyes and the base of the head..... *connatus*

Eurythrips ampliventralis Hinds

Eurythrips ampliventralis Hinds (1902: 202). ♀. Type-locality.—Amherst, Massachusetts.

FEMALE (brachypterous).—Length distended over 2 mm. General color brown and yellow, being predominantly yellow in the head, becoming yellowish brown to brown in the thorax, and becoming dark brown in the abdomen. Antennal segments I and II yellow to yellowish brown, segment III yellowish brown to brown, remainder of antennae brown. Legs yellow to yellowish brown. Body with red subintegumental pigment.

Head elongate, smooth dorsally and ventrally except for sides and base, constricted behind eyes, with a small toothlike projection behind eyes. Eyes bulged. Ocelli absent. Postocular setae well developed, dilated. Antennal segments III and IV each with one inner and two outer sense cones, segment VII longer than in *connatus* and with pedicel narrow to moderately broad but never as broad as in *connatus*, segment VIII with a broad pedicel. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Epimeral sutures incomplete. Major prothoracic setae well developed, dilated. Ventrolateral metathoracic setae small and pointed.

Fore tarsi each with a minute tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which usually bear three dilated setae.

Pelta broad (Fig. 223). Wing-holding setae reduced. Major posterior setae on abdominal tergite IX not exceeding the tube, pointed.

FEMALE (macropterous) (Fig. 51).—Length distended over 2 mm. Similar to brachypterous female except for the following differences. Color darker, generally brown, including the head; legs and antennal segments I and II yellowish brown to brown. Eyes more bulged from head. Ocelli present. Wings fully developed. Wing-holding setae sigmoidal, one major and one minor pair on abdominal tergites III–VII.

MALE (brachypterous).—Length distended about 1.6 mm. Similar to brachypterous female except for the following. Abdominal sternite VIII with a broad, wide, bandlike glandular area (Fig. 54). Abdominal tergite IX with lateral setae reduced in size.

This, the type of the genus, exhibits considerable variation in structure and color. The pedicel of antennal segment VIII is always broad, whereas, in contrast, the pedicel of segment VII varies from narrow to moderately broad. Even so *ampliventralis*, in extreme cases, does not have as broad a pedicel on antennal segment VII as does *connatus*. The presence of two outer sense cones on antennal segment III and the more yellow color of the head help separate brachypterous forms of *ampliventralis* from *connatus*, a species having only one outer sense cone on antennal segment III and whose head is usually darker in color.

Eurythrips ampliventralis is common throughout Illinois in *Andropogon* sod.

Illinois records. Taken every month of the year, from one or several localities in the following counties: ADAMS, ALEXANDER, CALHOUN, CASS, CHAMPAIGN, CLARK, CLAY, COLES, COOK, DE WITT, DOUGLAS, IROQUOIS, JACKSON, JERSEY, JOHNSON, KNOX, LAKE, MONTGOMERY, PIATT, PIKE, POPE, RICHLAND, SCOTT, VERMILION, and WAYNE.

Eurythrips batesi (Watson)

Glyptothrips batesi Watson (1935:56). ♀, ♂. Type-locality.—Devil's Mill Hopper, Alachua County, Florida. Transferred to *Eurythrips* by Hood (1941).

FEMALE (brachypterous).—Length distended over 1.7 mm. General color as in *ampliventralis*. Head yellow, thorax yellowish brown to light brown, abdomen brown becoming dark brown in terminal segments. Antennae yellowish brown to yellow in basal segments becoming dark brown in apical segments. Legs yellow. Body with red subintegumental pigment.

Head moderate in size, usually smooth on the median of the dorsum, strongly transversely striate on the venter, constricted behind eyes, with a small toothlike projection behind eyes. Eyes bulged. Ocelli absent or if present greatly reduced. Postocular setae well developed, dilated. Antennal segment III with one inner and one outer sense cone and with all dorsal setae pointed, segment IV with one inner and two outer sense cones, segments VII and VIII with narrow pedicels. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Major prothoracic setae well developed, dilated. Epimeral sutures incomplete. Ventrolateral meta-thoracic setae small and pointed. Fore tarsi each with a moderate-sized tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which usually bear two dilated setae.

Pelta rectangular, usually hexagonally reticulate. Wing-holding setae greatly reduced. Major posterior setae on abdominal tergite IX not extending beyond the tube, dilated.

FEMALE (macropterous).—Unknown to me.

MALE (brachypterous).—Length distended about 1.3 mm. Similar to brachypterous female except for the following. Abdominal sternite VIII with two rectangular glandular areas (Fig. 56), these areas sometimes partially connected in what appear to be abnormal conditions. Abdominal ter-

gite IX with lateral setae reduced in size and pointed. This species is unique on the basis of the form of the male glandular area, which is usually divided into two parts, and by the strong, transverse striations on the ventral surface of the head.

Eurythrips batesi is a southern species occurring in Florida, the southern half of Illinois, Kentucky, Tennessee, Maryland, Mississippi, Missouri, North Carolina, South Carolina, and Texas (INHS records). A similar species, if not a variant of the same species, occurs in New Mexico, Mexico, and Jamaica. These populations have brown coloring in part or most of the head, and the antennae are somewhat elongate. Otherwise they are like the typical form of the populations in the southern states.

Hood (1941) designated the lectotype, a female, by marking with a diamond-pointed pencil the words "HOLOTYPE (upper specimen)" on the slide containing a mixed series of thrips from Devil's Mill Hopper, Alachua County, Florida. The present location of this slide is unknown to me. In the Watson collection there is another slide marked "Wing ♀, type, north of Ormond, Florida, June 28, 1936, dead leaves of Palmetto, Oak." This specimen cannot be considered part of the type-series, as it was collected after the original description was published. According to Watson, *batesi* was named after Marston Bates who first collected the species at Gainesville, Florida. Presumably Watson was referring to a specimen labeled "Type ♂, Gainesville, Florida, damp leaves along stream in a Catocala Glen, separated in a Berlese funnel, 1-12-26, D. M. Bates coll." Unfortunately, this thrips is not a *Eurythrips* but rather an *Erkosothrips*. This appears to be an incongruous situation in which the species honoring Dr. Bates is one he did not collect.

My concept of the species *batesi* is based on a specimen in the Watson collection labeled "Type ♂, leaves under live oak 90 feet out of Sugarfoot Hammock, Gainesville, Florida, 1-19-36 B.F., J.R.W." It has the glandular

area on abdominal sternite VIII divided in the middle.

Illinois records.—FAYETTE COUNTY: Ramsey, April 18, 1954, Smith, Stannard, forest litter, 1 ♀. HARDIN COUNTY: Karbers Ridge, May 4, 1950, Sanderson, Stannard, forest debris, 2 ♀. JACKSON COUNTY: Gorham (Fountain Bluff), September 6, 1956, Smith, Stannard, forest debris, 2 ♀, 1 ♂. JOHNSON COUNTY: Buncombe, "Cedar Bluff," March 15, 1961, Evers, Stannard, forest debris, 1 ♂. POPE COUNTY: Dixon Springs, August 30, 1951, Ross, Stannard, forest debris, 2 ♀, 1 ♂; Herod, May 5, 1950, Sanderson, Stannard, forest debris, 2 ♀.

Eurythrips connatus Hood

Eurythrips connatus Hood (1938c:378).
♀. Type-locality.—Clearwater, Florida.

FEMALE (brachypterous).—Length distended about 1.7 mm. Color: head and thorax yellowish brown, abdomen brown becoming dark brown in posterior segments, legs yellow to light yellowish brown, antennae yellowish brown in basal segments, brown in terminal segments. Body with much red subintegumental pigment.

Head moderate in size, slightly longer than in *hindsii* but not as long as in *ampliventralis*, smooth dorsally and ventrally except extreme sides and base, slightly constricted behind eyes, usually with a toothlike projection behind eyes. Eyes bulged. Ocelli absent. Postocular setae well developed, slightly shorter than in *ampliventralis*, blunt to dilated at tips. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones, segment VII shorter and with pedicel broader than in *ampliventralis*, segment VIII with a broad pedicel. Mouth cone longer and heavier than in *ampliventralis*. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Epimeral sutures incomplete. Major prothoracic setae well developed, dilated. Ventrolateral met-

athoracic setae small and pointed. Fore tarsi each with a minute tooth, or tooth seemingly absent. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which bear two or sometimes three dilated setae.

Pelta broad, much as in *ampliventralis*. Wing-holding setae reduced. Major posterior setae on abdominal tergite IX not extending beyond the tube, pointed.

MALE (brachypterous).—Length distended about 1.3 mm. Color much as in female except head sometimes more yellow than yellowish brown. Abdominal sternite VIII with a wide glandular area which is slightly narrower than in *ampliventralis*. Abdominal tergite IX with lateral setae reduced in size.

This is the only species of *Eurythrips* in Illinois with antennal segment VII having exceptionally widened pedicels. In this feature, *connatus* is similar to the tropical *amplus* and *conjunctus*, but the latter two species differ in having two, instead of one, outer sense cones on antennal segment III.

At first glance *connatus* might be mistaken for *ampliventralis*. The two can be recognized by several characteristics which are best appreciated by reference to actual specimens. Besides the condition of a slightly more narrowed pedicel on antennal segment VII, *ampliventralis* differs in having a longer head which is usually predominantly yellow instead of yellowish brown in the brachypterous form and, in the males, the glandular area on abdominal sternite VIII is broader than in *connatus*. In addition, *connatus* resembles *constrictus* but the two may be easily distinguished by the form of the male glandular area and less easily by the width of the seventh antennal segment.

I have based my concept of *connatus* on specimens from two Illinois localities and from the Everglades National Park, Florida.

Illinois records.—HENDERSON COUNTY: Oquawka, May 9, 1952, Mills, Stannard, grass sod, 3 ♀, 1 ♂.

LAKE COUNTY: October 23, 1949, Decker, sod of *Andropogon*, 1 ♀.

Eurythrips constrictus Stannard

Eurythrips constrictus Stannard (1958a:272). ♀, ♂. Type-locality. —Mammoth Cave National Park, Kentucky.

FEMALE (brachypterous).—Length distended about 1.7 mm. General color brown, head and thorax lighter becoming yellowish brown especially at base and apex of head, posterior segments of abdomen becoming dark brown. Legs and antennal segments I and II yellowish brown. Body with red subintegumental pigment.

Head moderate in size, about as in *connatus*, smooth dorsally and ventrally except at extreme sides and base, constricted under the posterior facet of the eyes, and at this point usually with a toothlike projection. Eyes bulged. Ocelli absent. Postocular setae well developed, dilated. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones, segment VII intermediate in size with pedicel moderately thickened varying from the condition in *ampliventralis* to almost the broad condition in *connatus*, segment VIII with a broad pedicel. Maxillary stylets usually retracted into head well beyond the midway point between the base of the eye and the base of the head.

Prothorax with anteromarginal setae minute, remainder of major prothoracic setae well developed, dilated. Epimeral sutures incomplete. Ventrolateral metathoracic setae small and pointed. Fore tarsi each with a minute tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which bear one or two dilated setae.

Pelta broad, much as in *ampliventralis*. Wing-holding setae reduced. Major posterior setae on abdominal tergite IX not extending beyond the tube, pointed.

MALE (brachypterous).—Length distended about 1.3 mm. Color and

structure much as in brachypterous female. Abdominal sternite VIII with a narrow, median transverse glandular area. Abdominal tergite IX with lateral setae reduced in size.

The name of this species refers to the constricted, narrow, glandular band of the male which is a principal feature for its differentiation. In one characteristic, the moderately thickened pedicel of antennal segment VII, *constrictus* stands intermediate between *ampliventralis* and *connatus*. Usually females of *constrictus* can be distinguished from *ampliventralis* and *connatus* by the position of the maxillary stylets. In *constrictus* these stylets extend well beyond the half-way mark between the base of the eyes and the base of the head whereas in the other two species these stylets are placed more basally in the head.

The species *genarum* Hood (1957) is apparently very similar to *constrictus*, but *constrictus* bears only one outer sense cone on antennal segment III in contrast to *genarum* which is described as having two outer sense cones, and by these characteristics the two may be separated. Males of both these species have narrow glandular areas.

Illinois record.—LAWRENCE COUNTY: Red Hills State Park, April 30, 1950, Stannard, sod of *Andropogon*, 21 ♀, 15 ♂.

Eurythrips dissimilis Hood

Eurythrips dissimilis Hood (1938a: 365). ♀. Type-locality. Sebring, Florida.

FEMALE (brachypterous).—Length distended about 1.9 mm. General color brown becoming blackish brown in the terminal segments of the abdomen. Anterior part of head yellowish brown to nearly yellow. Antennae yellow in segment I becoming gradually darker brown in the apical segments. Legs yellowish brown. Body with red sub-integumental pigment.

Head moderate in size, smooth dorsally and ventrally except for transverse sculpture at base and extreme sides. Eyes bulged from head. Ocelli

present but slightly reduced in size. Postocular setae relatively small, pointed to blunt, placed close to eyes. Antennal segment IV globose but not angulate, segment VIII broadly attached to segment VII. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones. Maxillary stylets placed fairly far apart within head.

Prothorax with anteromarginal setae minute. Epimeral sutures complete. Major prothoracic setae relatively short, pointed to blunt at tips. Ventrolateral metathoracic setae small, pointed. Fore tarsi each with a strong tooth. Mid and hind femora without any long, unusual, differentiated setae. Wings reduced to pads.

Pelta roughly triangular. Wing-holding setae minute. Major posterior setae on abdominal tergite IX slightly shorter than tube, pointed. Tube nearly $1\frac{3}{4}$ times the length of abdominal tergite IX.

FEMALE (macropterous).—Unknown.

MALE (brachypterous).—Length distended over 1.6 mm. Similar in general color to brachypterous female. Abdominal sternite VIII not visible in the material that I have studied. Abdominal tergite IX with lateral setae reduced in size.

This species is not typical of the genus *Eurythrips*. Because of its features of bulged eyes and lack of a maxillary bridge it is best placed in *Eurythrips* rather than in a complex or subgenus of *Haplothrips*.

Like *setiger*, *dissimilis* has the prothoracic epimeral sutures complete. From *setiger*, it can be distinguished by the short, pointed or nearly pointed postocular setae, the large fore tarsal teeth, and the lack of a long seta on each of the mid and hind femora.

Eurythrips dissimilis has been taken three times in Illinois. In the collections of the Illinois Natural History Survey there are additional specimens from Iowa and Florida.

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 9, 1951, Richards, Stannard, grasses, 1 ♂. FAYETTE COUNTY: La Clede, July

7, 1950, Ross, Stannard, prairie, 1 ♀. HENDERSON COUNTY: Oquawka, May 9, 1952, Mills, Stannard, grass sod, 1 ♀, 2 ♂.

Eurythrips hindsii Morgan

Eurythrips hindsii Morgan (1913:27).

♀. Type-locality.—Clarksville, Tennessee.

FEMALE (brachypterous).—Length distended about 1.9 mm. General color brown. Fore part of head tending to become yellowish brown. Antennal segments I–V yellow to yellowish brown to almost entirely brown. Legs, except coxae, yellow to yellowish brown. Tube usually orange-brown at base. Body with red subintegumental pigment.

Head moderate in size, smooth dorsally and ventrally except at extreme sides (Fig. 221). Eyes slightly bulged from head (moruloid). Ocelli absent. Postocular setae long and pointed at tips. Antennal segments III and IV short and decidedly angular in profile, segment VIII with a short pedicel that is usually slightly more slender than in *ampliventralis*. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Epimeral sutures incomplete. Major prothoracic setae long, pointed at tips. Ventrolateral metathoracic setae pointed. Fore tarsi without teeth in addition to the usual pair of terminal claws. Mid and hind femora without any unusual, differentiated setae. Wings reduced to tiny pads.

Pelta (Fig. 224) smaller than in *ampliventralis*, not as expanded anteriorly as in *osborni*. Wing-holding setae reduced. Major posterior setae on abdominal tergite IX much longer than tube, pointed. Tube about twice the length of abdominal tergite IX.

FEMALE (macropterous).—Length distended about 1.5 mm. Similar to brachypterous female except for the following. Eyes more bulged from head. Ocelli present. Wings fully developed. Wing-holding setae sigmoid-

al, one pair each on abdominal tergites III–VII.

MALE (brachypterous).—Length distended about 1.7 mm. Similar to brachypterous female except for the following. Abdominal sternite VIII with a broad, bandlike glandular area. Abdominal tergite IX with lateral setae reduced in size.

This species can be distinguished, sometimes with difficulty, from *osborni* by the shape of antennal segments III and IV and by the form of the major head and prothoracic setae as mentioned in the key. Populations nearly intermediate between typical *hindsii* and typical *osborni* occur in east-central Illinois.

Eurythrips hindsii is common throughout Illinois. It inhabits *Andropogon* clumps.

Illinois records.—Taken almost every month of the year, from one to several localities in the following counties: ADAMS, CHAMPAIGN, CLARK, COLES, CUMBERLAND, HANCOCK, IROQUOIS, LAKE, LAWRENCE, POPE, and VERMILION.

Eurythrips osborni Hinds

Eurythrips osborni Hinds (1902:203).

♀, ♂. Type-locality.—Amherst, Massachusetts.

FEMALE (brachypterous to nearly apterous).—Length distended about 1.4 mm. General color brown. Head yellow to yellowish brown to brown. Basal antennal segments yellowish brown to brown. Legs yellow to yellowish brown, femora sometimes brown. Terminal abdominal segments dark brown. Body with red subintegumental pigment.

Head moderate in size, smooth dorsally and ventrally except at sides. Eyes slightly bulged from head. Ocelli absent. Postocular setae long, slightly dilated. Antennal segments III and IV slightly longer than in *hindsii* and not as angular in profile, segment VIII with a pedicel that is more slender than in *ampliventralis*. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Epimeral sutures incomplete. Major prothoracic setae blunt to slightly dilated. Ventrolateral prothoracic setae seemingly pointed. Fore tarsi each with a minute tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to tiny pads, or entirely absent.

Pelta moderately small, expanded at anterior margin. Wing-holding setae reduced. Major posterior setae on abdominal tergite IX much longer than tube, pointed. Tube about twice the length of abdominal tergite IX.

FEMALE (macropterous).—Not yet found in Illinois, unknown to me.

MALE (brachypterous).—Length distended about 1.2 mm. Similar to brachypterous female except lighter in color. Head, basal antennal segments, and legs usually entirely yellow.

Abdominal sternite VIII with a broad, bandlike glandular area. Abdominal tergite IX with lateral setae reduced in size.

Unlike its close relative, *hindsii*, *osborni* has dilated head and prothoracic setae and by these characteristics the two may be distinguished.

So far *osborni*, in its typical form, has been taken three times in Illinois. It occurs in *Andropogon* clumps as does the more common *hindsii*.

Illinois records.—ALEXANDER COUNTY: Olive Branch, February 3, 1954, Moore, 2 ♀. CLARK COUNTY: Marshall, May 13, 1949, Ross, Gloyd, Stannard, sod of *Andropogon*, 1 ♂. PIATT COUNTY: May 7, 1940, Farrar, on *Andropogon*, 3 ♀.

***Eurythrips pettiti* Hood**

Eurythrips pettiti Hood (1941:203).
♀, ♂. Type-locality. New Market, Virginia.

FEMALE (brachypterous).—Length distended about 1.8 mm. Head, thorax, and anterior portion of pelta yellowish brown to light brown, sides of pterothorax becoming dark brown; abdominal segment I except for anterior of pelta, all of abdominal segment II, sides of abdominal segment III, and

legs yellow; remainder of abdomen dark brown. Antennae dark brown except pedicel of segment III which is yellow.

Head moderate in size (Fig. 220), median surface with small, faint gray warts, ventral surface wrinkled in anterior half and smooth in posterior half, not constricted or only slightly constricted behind eyes. Eyes just slightly bulged. Ocelli present. Postocular setae well developed, dilated. Antennal segment III with one inner and one outer sense cone, segment IV with one inner and two outer sense cones, segments VII and VIII each with moderately narrow pedicel.

Prothorax with major setae long, dilated. Epimeral sutures incomplete. Fore tarsi each with a small tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which bear two dilated setae.

Pelta derby shaped (Fig. 222). Wing-holding setae present but greatly reduced. Major posterior setae on abdominal tergite IX not extending beyond the tube, dilated.

FEMALE (macropterous).—Length distended about 2 mm. Color and structure similar to brachypterous female with the following exceptions. Eyes and ocelli larger. Wings fully developed. Wing-holding setae larger, sigmoidal, with two pairs each on abdominal tergites III–VII.

MALE (brachypterous).—Length distended nearly 1.4 mm. Similar to brachypterous female except for the following. Fore legs sometimes enlarged, tarsal tooth larger, sometimes greatly enlarged. Abdominal sternite VIII with a broad, bandlike glandular area. Abdominal tergite IX with lateral setae reduced in size, pointed.

This is a distinctive species which can be differentiated from others in Illinois by the yellow band across the basal two or three segments of the abdomen, the numerous faint gray warts on the dorsum of the head, and the shape of the pelta.

Seemingly *pettiti* is locally common in the southern two-thirds of the state. The collections of the Illinois Natural History Survey contain additional

specimens from Arkansas, Michigan, Missouri, North Carolina, and Pennsylvania.

Illinois records.—HAMILTON COUNTY: McLeansboro, November 29, 1957, Bouseman, forest litter, 1 ♀. JACKSON COUNTY: Murphysboro, November 5, 1942, Ross, Sanderson, ground litter, 2 ♀, 1 ♂; Gorham (Fountain Bluff), September 6, 1956, Smith, Stannard, forest debris, 1 ♀. JERSEY COUNTY: Pere Marquette State Park, November 20, 1958, Stannard, forest debris, 1 ♀. MARION COUNTY: Kinmundy, November 10, 1958, Evers, Clark, Stannard, forest debris, 5 ♀. MASON COUNTY: Havana, December 10, 1932, Frison, Ross, forested sand area, 1 ♀. POPE COUNTY: Herod, November 6, 1942, Ross, Sanderson, ground litter, 5 ♀, 1 ♂. VERMILION COUNTY: Danville, November 1, 1942, Ross, ground litter, 3 ♀. WOODFORD COUNTY: Goodfield, May 17, 1961, Stannard, forest debris, 4 ♀, 1 ♂.

Eurythrips setiger Stannard

Eurythrips setiger Stannard (1958a: 271). ♀. Type-locality.—Dixon Springs, Illinois.

FEMALE (macropterous).—Length distended nearly 2 mm. General color dark brown, being darkest in apical segments of antennae, thorax, and posterior segments of abdomen. Pedicel of antennal segment III yellow to yellowish brown. Legs yellowish brown, darkest in the femora. Body with red subintegumental pigment.

Head moderate in size, smooth dorsally and ventrally except at extreme sides and base. Eyes bulged from head, with a pronounced groove behind eyes. Ocelli present. Postocular setae long and dilated. Antennal segments III and IV moderate in size, not shortened; segment III with one inner and one outer sense cone; segment IV with one inner and two outer sense cones; segments VII and VIII each with a distinct pedicel. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute, other major setae well developed, dilated. Epimeral sutures complete. Major prothoracic setae di-

lated at tips. Ventrolateral metathoracic setae dilated. Fore tarsi each with a small tooth. Each femur with an unusual, differentiated, dilated seta. Fore wings fully developed.

Pelta roughly triangular, hexagonally reticulate to nearly smooth. Abdominal tergites III–VIII each with two pairs of sigmoidal wing-holding setae. Major posterior setae on abdominal tergite IX about as long as tube, pointed. Tube about twice the length of abdominal tergite IX.

FEMALE (brachypterous).—Length distended about 1.7 mm. Similar to cropterous female except head and legs slightly lighter in color. Ocelli present. Wings reduced to pads. Wing-holding setae present on abdominal tergites but slightly reduced in size.

MALE.—Unknown.

This species is separable from all others in the genus by the characteristic of the unusual, differentiated setae on each femur. It is also distinctive as being one of the few species of *Eurythrips* in which the prothoracic epimeral sutures are complete. Outside of Illinois, *setiger* is known from Arkansas and Florida (Stannard 1958a).

Illinois records.—CHAMPAIGN COUNTY: Rantoul, July 21, 1953, Evers, Stannard, prairie, 1 ♀. MONROE COUNTY: Renault, October 18, 1962, Ross, grass, 1 ♀. POPE COUNTY: Dixon Springs, August 30, 1951, Ross, Richards, sweeping vegetation, 1 ♀.

Eurythrips tarsalis Hood

Eurythrips tarsalis Hood (1925c:220). ♀. Type-locality.—East Falls Church, Virginia.

Plectrothrips montanus Watson (1933b: 16). ♀, ♂. Type-locality.—Gatlinburg, Tennessee. Synonymized by Stannard (1957b).

FEMALE (apterous).—Length distended over 2 mm. General color brown to dark brown. Legs and pedicel of antennal segment III yellow to yellowish brown. Body with yellow to orange subintegumental pigment.

Head elongate, considerably prolonged beyond eyes, constricted behind eyes, smooth dorsally and ventrally. Eyes bulged. Ocelli absent or if

present greatly reduced. Postocellar and postocular setae long, pointed. Antennal segments III and IV each with one inner and two outer sense cones, segment VII with a moderately narrow pedicel, base of segment VIII broad. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Major prothoracic setae well developed, pointed to nearly pointed. Epimeral sutures incomplete. Ventrolateral metathoracic setae small, pointed. Fore legs enlarged, fore tarsi each with a well-developed tooth (Fig. 183), fore tibiae each usually with a strongly developed setal socket which protrudes at the inner apex. Mid and hind femora without any unusual, differentiated dorsal setae. Wing pads seemingly absent.

Pelta roughly triangular. Wing-holding setae reduced. Major posterior setae on abdominal tergite IX extending beyond the short tube, pointed.

FEMALE (macropterous).—Length distended over 2 mm. Similar to apterous female except legs darker (femora and basal half of tarsi brown). Ocelli present. Fore legs not greatly enlarged. Wings fully developed. Wing-holding setae small and only slightly sigmoidal, one pair each on abdominal tergites III–VII.

MALE (apterous).—Length distended about 1.8 mm. Similar to apterous female, with the following exceptions. Lighter in color, thorax yellowish brown. Abdominal sternite VIII with a moderately broad, transverse, bandlike glandular area (Fig. 55). Abdominal tergite IX with lateral setae reduced in size.

Eurythrips tarsalis is a distinctive species and may be recognized by the long head, the long postocellar setae, and the usually enlarged fore legs, each of which bears a well-developed tooth.

It occurs throughout Illinois. Besides the Illinois material, there are in the collections of the Illinois Natural History Survey specimens from Arkansas, Kentucky, Maryland, Mississippi, New York, North Carolina, Tennessee, and Virginia.

Illinois records.—Collected from April to November, from one to several localities in the following counties: CHAMPAIGN, CLARK, COOK, HENDERSON, LAWRENCE, MARION, POPE, WAYNE, WHITE, WILLIAMSON, and WOODFORD.

Eurythrips virginianus Hood

Eurythrips virginianus Hood (1952b: 77). ♀, ♂. Type-locality.—New Market, Virginia.

FEMALE (brachypterous).—Length distended over 2 mm. Color yellow to yellowish brown in head, thorax, and abdominal segment I; predominantly brown in abdominal segments II and III; yellowish brown in remainder of abdomen except sides and tube which are largely dark brown. Antennae generally yellowish brown to brown, being lightest in intermediate segments. Body with red subintegumental pigment.

Head moderate in size, smooth on the center of the dorsum and posterior part of the venter, constricted behind eyes, with a small toothlike projection behind eyes. Eyes bulged. Ocelli present. Postocular setae shorter than in *watsoni*, dilated. Antennal segment III with one inner and one outer sense cone and with two dorsal setae which are dilated or blunt, segment IV with one inner and two outer sense cones, segments VII and VIII each with a narrow pedicel. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute. Major prothoracic setae shorter than in *watsoni*, dilated. Epimeral sutures incomplete. Ventrolateral metathoracic setae small and pointed. Fore tarsi each with a small tooth. Mid and hind femora without any unusual, differentiated setae. Wings reduced to pads which usually bear two dilated setae.

Pelta broad, usually reticulate. Wing-holding setae frequently sigmoidal but reduced. Major posterior setae on abdominal tergite IX dilated.

FEMALE (macropterous).—Unknown.

MALE (brachypterous).—Length

distended about 1.5 mm. Similar to brachypterous female except for the following differences. Abdominal sternite VIII with a narrow, bandlike, subbasal glandular area. Abdominal tergite IX with lateral setae reduced in size, pointed.

Eurythrips virginianus is similar to *watsoni* in most respects. The two may be separated by the form of the dorsal setae on antennal segment III. In *virginianus* two of these dorsal setae are dilated or blunt; in *watsoni* all of these setae are pointed.

In Illinois this species is seemingly rare, but it is probably widely distributed in the state, at least along the eastern border. I also have seen specimens from Connecticut and the mountains of Tennessee. The type was collected in the Appalachians of Virginia.

Illinois records.—CLARK COUNTY: Clarksville (Rocky Branch), January 5, 1933, Frison, Ross, moss, 1 ♂. LAKE COUNTY: Volo Bog, September 2, 1951, Richards, Stannard, ground cover, and September 30, 1953, Mills, Evers, ground cover, several specimens. POPE COUNTY: Glendale, November 7, 1946, Ross, Burks, debris in pine plantation, 1 ♀.

Eurythrips watsoni Hood

Eurythrips watsoni Hood (1941:161). ♀, ♂. Type-locality.—Trenton, Florida.

FEMALE (brachypterous).—Length distended about 1.9 mm. General color yellow. Basal antennal segments yellowish brown, terminal antennal segments and tube brown. Intermediate abdominal segments usually with a brown median spot, segment IX usually brown at sides.

Head moderate in size, smooth medially on the dorsum and the venter, constricted behind eyes, with a small toothlike projection behind eyes. Eyes bulged. Ocelli present. Postocular setae long, dilated. Antennal segment III with one inner and one outer sense cone and with all setae pointed, segment IV with one inner and two outer sense cones, segments VII and VIII each with narrow pedicel. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae small. Major prothoracic setae long, dilated. Epimeral sutures incomplete. Ventrolateral metathoracic setae small and pointed. Fore tarsi each with a small tooth. Mid and hind tarsi without any unusual, differentiated setae. Wings reduced to pads which usually bear two dilated setae.

Pelta somewhat bell shaped. Wing-holding setae usually sigmoidal but reduced in size. Major posterior setae on abdominal tergite IX not extending beyond the tube, dilated.

MALE (brachypterous).—Length distended about 1.4 mm. Similar to brachypterous female except for the following. Abdominal sternite VIII with a narrow, bandlike, subbasal glandular area. Abdominal tergite IX with lateral setae reduced in size and pointed.

Unlike *virginianus*, *Eurythrips watsoni* is predominantly yellow and all of the dorsal setae on antennal segment III are pointed. Males of both these species have narrow subbasal glandular areas on abdominal sternite VIII, thereby differing from their congeners.

Originally described from Florida, *watsoni* has since been collected in North Carolina, Virginia, Kentucky, Pennsylvania, and the southern half of Illinois.

Illinois records.—FAYETTE COUNTY: Ramsey, April 7, 1954, Smith, Stannard, forest debris, 2 ♀. JOHNSON COUNTY: Buncombe, March 15, 1961, Evers, Stannard, forest debris, 1 ♀; Sanburn, September 20, 1949, Smith, Stannard, forest debris, 3 ♀, 2 ♂.

Glyptothrips Hood

Glyptothrips Hood (1912b:116). Type-species by original designation.

Glyptothrips flavescens Hood.

Head slightly longer than wide, slightly prolonged in front of eyes, completely reticulate dorsally; cheeks incised just behind eyes and without strong lateral setae. Eyes relatively small, bulged. Ocelli present in winged forms, absent in apterous forms. Postocular setae fairly short, at the most

about as long as the dorsal eye length, blunt to dilated. Antennae seven segmented to nearly eight segmented, in which case morphological segments VII and VIII partially divided by an incomplete suture; intermediate segments swollen at apex and with an abruptly narrowed pedicel; sense cones slender. Mouth cone short, broadly rounded. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae lacking or minute, remainder of major setae developed but small, with only one pair of epimeral setae. Epimeral sutures complete. Metanotum reticulate, area within reticules granulate. Praepectus present. Mesopraesternum well developed in macropterous forms known to me, degenerate in apterous forms. Macropterous, micropterous, or apterous. Fore wings when completely developed slightly outcurved beyond middle, without accessory fringe cilia. Fore tarsi armed or unarmed.

Abdomen reticulate. Pelta elongate oval or derby shaped, reticulate. Abdominal tergites with two median, longitudinal, light-colored lines. Wing-holding setae when present not expanded or leaflike. Males with a thin transverse glandular area on abdominal sternite VIII, with lateral setae on abdominal tergite IX reduced. Tube moderate in size, smooth or nearly so.

Members of this genus can be distinguished in Illinois by the bulged eyes, reticulate head, and the seven-segmented or incomplete eight-segmented antennae. I have treated *Glyptothrips* elsewhere (Stannard 1955b, 1957b).

Both of the two known species in the genus occur in our state.

KEY TO SPECIES

1. Prothoracic anterolateral setae displaced toward the meson; fore tarsi each armed with a small tooth; antennal segments VII and VIII completely fused *flavescens*
Prothoracic anterolateral setae not displaced much toward the meson; fore tarsi unarmed; antennal segments VII and VIII partially divided by an incomplete suture (Fig. 159) *arkansanus*

Glyptothrips arkansanus Hood

Glyptothrips arkansanus Hood (1957: 59). ♀, ♂. Type-locality.—Stillwater, Arkansas.

FEMALE (macropterous).—Length distended about 1.6 mm. General color yellowish brown. Antennae, legs, and two median longitudinal lines on the abdominal tergites yellow. Wings pale gray, somewhat lighter in basal half.

Head hexagonally reticulate, with cheeks incised just behind eyes. Eyes small, bulged. Ocelli present. Postocular setae fully as long as eye length, blunt. Antennae incompletely eight segmented (Fig. 159), that is, morphological segments VII and VIII partially separated by an incomplete, fine suture; intermediate segments subglobose apically, each with an abruptly narrowed pedicel; sense cones slender. Mouth cone short, broadly rounded. Maxillary stylets placed far apart within the head.

Prothorax with anteromarginal setae lacking; anterolateral setae placed near the lateral angles, midlateral and posterior setae well developed, all these setae slightly longer than in *flavescens*, blunt. Epimeral sutures complete. Praepectus present. Mesopraesternum well developed. Metanotum hexagonally reticulate. Wings fully developed; fore wings slightly outcurved beyond middle, without accessory fringe cilia. Fore tarsi apparently unarmed.

Pelta derby shaped (Fig. 225). Abdomen reticulate, often with the posterior tips of the reticules drawn out into a spicule. Wing-holding setae developed, sigmoidal. Abdominal tergite IX with median setae blunt, lateral setae shorter than in *flavescens*, pointed. Tube moderate in size, nearly smooth.

MALE (micropterous).—Length distended about 1.4 mm. General color



Fig. 225.—*Glyptothrips arkansanus*, ♀ macropterous, pelta.

and structure similar to macropterous female except for the following. Wing pads extending to the second abdominal segment. Abdominal sternite VIII with a thin, median, transverse glandular area. Abdominal tergite IX with major lateral setae reduced in size.

This species has been known to me for many years prior to its formal description. Although I listed its characteristics in 1955, I hesitated to name it then because I was unable to compare all its features with those of the macropterous form of *flavescens*. According to Hood (1957), the characteristics mentioned in the foregoing key will separate the two species, irrespective of the form.

As is *flavescens*, *arkansanus* is probably statewide in distribution, and the two are frequently found together in grass clumps, particularly *Andropogon*.

Illinois records.—CHAMPAIGN COUNTY: Seymour, February 28, 1936, Farrar, under rye grass, 4 ♀. COLES COUNTY: Mattoon, May 14, 1933, Mohr, grass sod, 1 ♀, 1 ♂. COOK COUNTY: near Elgin, Shoefactory Road prairie, October 10, 1952, Ross, Stannard, sod of *Andropogon*, 5 ♂. DE WITT COUNTY: Farmer City, November 6, 1953, Smith, Stannard, sod of *Andropogon*, 2 ♀. IROQUOIS COUNTY: Milford, October 21-25, 1962, McCollum, Roberts, sod of *Andropogon*, 3 ♂. PIATT COUNTY: Mansfield, February 28, 1936, Farrar, sod of *Andropogon*, 2 ♀; Monticello, December 2, 1937, September 22, 1938, March 17, 1939, January 12, 1939, January 23, 1942, Farrar, sod of *Andropogon*, 5 ♀, ♂.

Glyptothrips flavescens Hood

Glyptothrips flavescens Hood (1912b: 116). ♀. Type-locality.—Grand Tower, Illinois.

FEMALE (apterous) (Fig. 226).—Length distended about 2 mm. General color yellowish brown with head, antennal segments I and II and pedicels of remaining segments, two mesal longitudinal lines on the abdominal tergites, and the terminal abdominal segments grading into yellow. Antennal segments III to morphological seg-

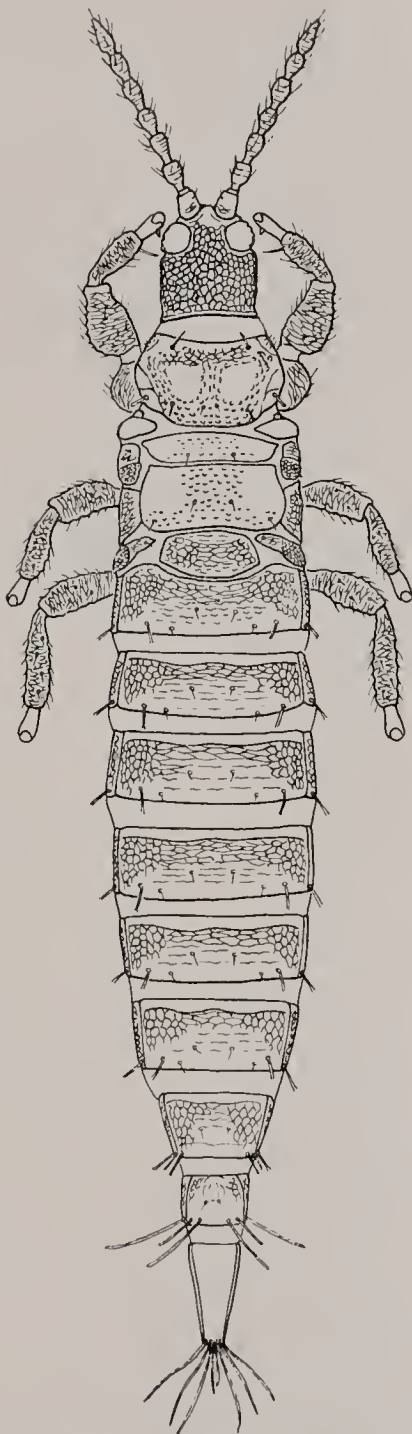


Fig. 226.—*Glyptothrips flavescens*, dorsal aspect.

ments VII and VIII, except pedicels, brown. Body with orange-red subintegumental pigment.

Head hexagonally reticulate, with cheeks incised just behind eyes. Ocelli absent. Postocular setae small, much smaller than eye length, dilated. Antennae seven segmented, morphological segments VII and VIII completely fused, intermediate segments subglobose apically, each with abruptly narrowed pedicel; sense cones slender, almost setae-like. Mouth cone short, broadly rounded. Maxillary stylets placed far apart within head.

Prothorax with anteromarginal setae minute or lacking; anterolateral setae displaced slightly towards the meson, midlateral and posterior setae developed, all these setae short and blunt to dilated. Epimeral sutures complete. Praepectus present. Mesopraesternum degenerate. Metanotum hexagonally reticulate. Wings entirely absent. Fore tarsi each armed with a small tooth.

Pelta rectangular to elongate oval, reticulate (Fig. 227). Abdomen reticulate, often with the posterior tips of the reticules drawn out into a spicule. Wing-holding setae not developed. Abdominal tergite IX with median setae dilated, lateral setae longer than in *arkansanus*, pointed. Tube moderately long, smooth.

FEMALE (macropterous).—Described by Hood (1912*b*) as lacking accessory fringe cilia on fore wings and possessing ocelli; in many other features similar to apterous female. Descriptions of pelta, mesopraesternum, and praepectus not given by the protologist.

MALE (apterous).—Length distended about 1.6 mm. Similar in general color and structure to apterous female. Abdominal sternite VIII with a thin, median, transverse glandular area. Abdominal tergite IX with major lateral setae reduced in size.

This species differs from *arkansanus* by the characteristics mentioned in the foregoing key. In addition the apterous form, at least, differs from the winged form of *arkansanus* by the shape of the pelta.

Apparently *flavescens* occurs



Fig. 227.—*Glyptothrips flavescens*, ♀ apterous, pelta.

throughout Illinois in grasslands, particularly in *Andropogon* clumps.

Illinois records.—ALEXANDER COUNTY: east of Cape Girardeau, January 12, 1965, McCollum, Shaw, Stannard, in Johnson grass, 10 specimens. DE WITT COUNTY: Farmer City, November 6, 1953, Smith, Stannard, sod of *Andropogon*, 2 ♀, 2 ♂. DOUGLAS COUNTY: Arcola, October 12, 1949, Stannard, grass sod, 5 ♂. JACKSON COUNTY: Grand Tower (Hood 1912). MARSHALL COUNTY: Lacon, June 5, 1933, Mohr, grass, 1 ♀. PIATT COUNTY: Monticello, December 2, 1937, February 21, 1938, May 3, 1938, March 17, 1939, Farrar, on *Andropogon*, 7 ♀, 5 ♂. PULASKI COUNTY: Pulaski (Hood 1912). STEPHENSON COUNTY: Freeport, June 3, 1933, Ross, Townsend, grass sod, 1 ♀.

Gnophothrips Hood and Williams

Gnophothrips Hood and Williams (1915:133). Type-species by original designation.—*Gnophothrips megaceps* Hood and Williams.

Head longer than wide, slightly arched medially, with anastomosing transverse striae, cheeks nearly straight without strong bristles, vertex slightly produced. Ocelli present, somewhat reduced in micropterous forms. Eyes moderate in size. Postocular setae shorter than eye length, blunt. Antennae eight segmented, inserted just under fore margin of head, segments III and IV with short sense cones, segment VIII nonpedicellate, fairly closely joined to segment VII. Mouth cone broadly rounded. Maxillary stylets, when at rest, extended far into the head, up to the region of the eyes.

Pronotum shorter than head, with weak transverse striations laterally. All major prothoracic setae present

but relatively short, blunt to dilated. Epimeral sutures complete. Praepectus absent. Macropterous or micropterous. Fore wings short, only about $2\frac{1}{2}$ times as long as head, lacking accessory fringe cilia; wing stubs in micropterous form nearly equal in length to head. Fore legs unarmed.

Abdominal tergites weakly sculptured with anastomosing, transverse striae. Pelta more or less triangular, blunt anteriorly. Abdominal tergites II–VII each with two pairs of wing-holding setae. Abdominal sternite VIII of male apparently without glandular area. Abdominal tergite IX with major posterior setae shorter than tube, pointed; lateral pair in male reduced and spinelike. Tube over half as long as head; anal setae just slightly shorter than tube.

This genus resembles *Liothrips* subgenus *Rhynchothrips*. It differs from *Rhynchothrips* in having a proportionately longer head, in the absence of accessory fringe cilia on the fore wings of the macropterous form, and in the characteristic of the relatively long wing pads in the flightless form.

Although three specific names have been proposed, two are synonyms and the genus remains monobasic.

Gnophothrips fuscus Morgan

Trichothrips fuscus Morgan (1913:30).

♀. Type-locality.—Quincy, Florida. Transferred to *Liothrips* by Hood (1918). Transferred to *Gnophothrips* by O'Neill (1965).

Gnophothrips megaceps Hood and Williams (1915:133). ♀. Type-locality.—Emeralda, Florida. New synonymy.

Gnophothrips piniphilus J. C. Crawford (1938:39). ♀, ♂. Type-locality.—Patchague, Long Island, New York. Synonymized by O'Neill (1965).

FEMALE (macropterous).—Length distended nearly 2.3 mm. General color dark brown with antennal segment III yellow, segments IV–VI yellow basally and yellowish brown apically, segment VII yellow in the pedicel, remainder of antennae yellowish brown.

Head nearly $1\frac{1}{2}$ times as long as wide. Anterior ocellus projecting beyond anterior eye margin. Eyes not bulged. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones, segment VIII nonpedicellate, distinctly narrower at base than apex of segment VII.

Prothorax about two-thirds as long as head. All major prothoracic setae present, short, dilated. Metanotum with well-marked longitudinal striae. Fore wings not narrowed in middle, with three short basal setae which are blunt to dilated. Fore legs unarmed.

Abdomen with segments relatively short and wide. Pelta more or less triangular. Anterior wing-holding setae C-shaped; posterior wing-holding setae sigmoidal. Tube nearly two-thirds as long as head; anal setae almost as long as head.

FEMALE (micropterous).—Length distended nearly 2.2 mm. Similar in structure and color to macropterous form.

MALE (micropterous).—Length distended nearly 1.8 mm. Similar in color and structure to female. Abdominal tergite IX with major lateral setae shortened and spinelike, light brown in color.

When Crawford described *piniphilus*, the holotype of *megaceps* was not available to him for comparison. Seemingly from the literature alone, *piniphilus* was distinct in having a longer head and darker antennae, in having antennal segment VIII not as broadly joined to VII, and in a few other minor features. Now, after studying all the types, it is apparent to me that *piniphilus*, *megaceps*, and *fuscus* represent the same species, and purported differences lie well within the range of expected intraspecific variation. From the arrangement of the slides in the Hood collection, it would seem that Hood knew of or suspected this synonymy, and that when C. Jacot-Guillarmod noticed this arrangement in examining the Hood collection in 1963, he also became cognizant of the synonyms involved (see O'Neill 1965).

The species *fuscus* feeds on introduced as well as native pines (Lind-

quist and Harnden 1957), causing economic damage in some cases. So far this species has not been found outside the eastern seaboard states. It might be found in Illinois in the future on imported nursery stock.

Haplothrips Amyot and Serville

Based on the representatives of this genus known to me from Illinois and elsewhere, the segregation of subgenera is not only difficult but also of doubtful value. The extremes of each of these segregates are sufficiently distinct to warrant their assignment to full genera, but between them are intermediates which so closely bind the subgenera together that no clear-cut division can be made. There is on the one hand the slender, degenerate *Karnyothrips* which intergrades into the generalized *Haplothrips* s. str. and on the other hand the specialized, long-headed *malifloris* complex and *Leptothrips* which also intergrade back into the nominate subgenus. Because of custom, however, and not because of any special need, the following intergrading subgenera are diagnosed separately. For convenience the species are keyed in the same key and are placed one after the other alphabetically regardless of their subgeneric grouping to help avoid the confusion that always arises when superspecific categories cannot be defined precisely.

Eleven species of this polymorphic genus occur in our state.

Haplothrips Amyot and Serville s. str.

Haplothrips Amyot and Serville (1843: 640). Type-species by monotypy.—*Phloeothrips albipennis* Burmeister (= *Thrips aculeata* Fabricius).

Anthothrips Uzel (1895:237). Type-species by subsequent designation by Priesner (1949).—*Thrips aculeata* Fabricius. Synonymized by Karny (1912b).

Zygothrips Uzel (1895:243). Type-species by monotypy.—*Zygothrips minuta* Uzel. Synonymized by Priesner (1949).

Anthemothrips Karny (1907:51). Type-species by monotypy.—*Anthemo-*

thrips reuteri Karny. Synonymized by Priesner (1949).

Hindsiana Karny (1910:51). Type-species by monotypy.—*Hindsiana flavicincta* Karny. Synonymized by Priesner (1949).

Porphyrothrips Vuillet (1913:78). Type-species by original designation.—*Porphyrothrips cottei* Vuillet. Synonymized by Priesner (1949).

Haplothrips Bagnall (1934:495). Type-species by original designation.—*Haplothrips globiceps* Bagnall. Synonymized by Priesner (1949).

Head about as long as wide to longer than wide, surface of head weakly transversely striate. Eyes moderate in size, never prolonged ventrally more than dorsally. Ocelli present, fore ocelli often protruding anteriorly of head. Postocular setae minute to moderate in size, usually pointed. Cheeks relatively smooth without strong lateral setae. Antennae eight segmented; segment III usually asymmetrical, generally smaller than segment IV, with none, one, or two apical sense cones; segment IV with four apical sense cones; segment VIII usually nonpedicellate, broadly attached to segment VII. Mouth cone short and broad to longer and pointed or nearly pointed. Maxillary stylets retracted far into the head, frequently widely spread within the center of the head. Maxillary bridge conspicuous, ordinarily wide.

Thorax more robust than in the subgenus *Karnyothrips*. Prothorax at the most weakly sculptured; with major anterior setae usually much shorter than major posterior setae, frequently anteromarginal and lateral setae small to minute, in Illinois all of these setae pointed to blunt. Epimeral sutures complete. Praepectal plates usually present. Metanotum, in Illinois species, weakly sculptured so as to appear almost smooth. All species in Illinois macropterous. Fore wings usually slightly constricted in the middle, with or without accessory setae. Fore femora and tibiae unarmed, fore tarsi each always with an inner tooth in species of our local fauna.

Pelta triangular, sometimes strongly sculptured. Wing-holding setae well developed, sigmoidal. Major posterior setae on abdominal tergite IX pointed, in males the lateral pair being much reduced in size. Males apparently without a distinct glandular area on abdominal sternite VIII. Females with a small or large internal rod (fustis) in abdominal segment IX. Tube moderate to relatively short in size; terminal setae not greatly elongated.

Members of this, the nominate subgenus, are distinguishable in Illinois from the subgenus *Leptothrips* by not having the eyes prolonged ventrally more than dorsally and not having strong longitudinal striae on the metanotum, from the subgenus *Karnyothrips* by being more robust and often by not having the major prothoracic setae dilated, and from the subgenus *Neoheegeria* by having shorter setae on the head and pronotum.

So far, six species have been found in Illinois. Two of these are probably introduced: *leucanthemi* from Europe, supposedly having come here in pioneer times, and *malifloris* from western United States, supposedly having come here since the advent of the railroad, when many plants and some insects swept eastward via the well-drained cinder ballast.

Haplothrips subgenus *Karnyothrips* (Watson)

Dolichothrips Watson (1920:21). Type-species by original designation.—*Cephalothrips elongata* Watson. Preoccupied by *Dolichothrips* Karny (1912c).

Karynia [sic] Watson (1922a:6). Type-species by original designation.—*Karynia weigeli* Watson (= *Anthothrips flavipes* Jones). Misspelling for *Karnyia*; preoccupied by *Karnyia* Shelford (1909).

Watsoniella Karny (1923:367). New name for *Dolichothrips* Watson; preoccupied by *Watsoniella* Berg.

Karnyothrips Watson (1924a:23). New name for *Karnyia* Watson; subordinated to *Haplothrips* by Stannard (1957b).

Haplothrips subgenus *Xylaplothrips* Priesner (1928:572). Type-species by monotypy.—*Cryptothrips fuliginosus* Schille. Synonymized by Stannard (1957b).

In reference to the Illinois fauna only, the members of this subgenus are similar to those in the nominate subgenus except for the following characteristics. Generally more slenderly formed than *Haplothrips* s. str. Head with surface so weakly striate as to appear smooth or nearly smooth. Ocelli small, sometimes absent in the brachypterous form. Postocular setae always moderate in size, blunt to dilated, never pointed. Antennal segment III usually symmetrical, with one or two apical sense cones. Prothorax not as wide as in *Haplothrips* s. str. Major prothoracic setae, particularly posterior pairs, usually distinctly dilated. Macropterous or brachypterous. Fore tarsi unarmed or each armed with a small tooth.

Abdomen with wing-holding setae well developed or not differentiated. Males with or without a distinct glandular area on abdominal sternite VIII. Female always with a small internal rod (fustis) in abdominal segment IX. Terminal setae of tube always considerably elongate.

As is obvious from the synonymy, much difficulty was encountered in choosing an acceptable name for this taxon. Three of the names proposed were later found to be preoccupied, one being a substitute for a previously preoccupied name. *Zygothrips*, with *minutus* as the type, was used for many years until 1939 when Priesner concluded that *minutus* was a true *Haplothrips* belonging to the *subtilissimus* group. At the suggestion of Hood (1949) *Watsoniella* was favored over *Karnyothrips* for a brief period until 1951 at which time Cott (personal communication) discovered that it too was unavailable and once again *Karnyothrips* became the proper name.

Because this subgenus so closely resembles *Haplothrips* s. str. the species of the two subgenera are included together in the key.

Three species have been taken in

Illinois. Two of them, *harti* and *longiceps*, live in grasslands, and *americus* lives in forests.

Haplothrips subgenus *Leptothrips* Hood

Leptothrips Hood (1909b:249). Type-species by original designation.—*Cryptothrips aspersus* Hinds (= *Phloeothrips mali* Fitch). Also proposed in 1909 by Bagnall but attributed to Hood, the precise date of publication of either paper unknown to me. Subordinated to *Haplothrips* by Stannard (1957b).

The members of this subgenus are similar to the *mali* complex of the nominate subgenus except, in Illinois and sometimes elsewhere, for the following characteristics. Generally dark purple in life. Eyes in the female prolonged posteriorly on the ventral surface of the head more than on the dorsal surface. Maxillary stylets placed fairly far apart when retracted within the head. Prothorax with major lateral setae minute. Metanotum strongly longitudinally striate, a condition also found in species of other complexes occurring outside of Illinois. Fore tarsi unarmed. Fore wings with accessory fringe cilia present, as also sometimes is the case in out-of-state species of other complexes. Abdominal segment IX of female with internal rod (*fustis*) not enlarged.

Although there may be little need to keep *Leptothrips* as a separate entity, it has been done so here for the sake of custom and tradition. According to Cott (1956) no member of *Leptothrips* in North America has the fore tarsi armed with teeth, whereas all members of the nominate subgenus in our continent do have such teeth. The great number of similarities between these two entities, however, reduced the significance of the presence or absence of fore tarsal teeth. Because *Leptothrips* is a taxon of such closely related species it is in essence hardly more than a species group of the *mali* complex.

The single species which occurs in Illinois, *mali*, is keyed with all the other members of *Haplothrips*.

Haplothrips subgenus *Neoheegeria* Schmutz

Neoheegeria Schmutz (1909b:344). Type-species by monotypy.—*Neoheegeria dalmatica* Schmutz. Subordinated to *Haplothrips* by Stannard (1957b).

As represented in Illinois, this subgenus is very similar to those in the nominate subgenus, differing only by a combination of specific characteristics and not by any one or several major points. In the Old World some species of *Neoheegeria* have the fore wings expanded apically more than is typical of *Haplothrips* s. str. In general, species of *Neoheegeria* have the head and prothoracic setae extremely long although occasionally similar conditions appear in exotic species of true *Haplothrips* and, as a consequence, the retention of the segregate, *Neoheegeria*, is unnecessary except to conform to convention.

Only the introduced species, *verbasci*, is present in the fauna of Illinois.

KEY TO SPECIES (ILLINOIS, EXCEPT WHERE NOTED)

1. Eyes prolonged posteriorly on the ventral surface of the head more than on the dorsal surface (Fig. 228); metanotum strongly longitudinally striate; generally dark purple in life. *Haplothrips (Leptothrips) mali*
Eyes not prolonged posteriorly on the ventral surface of the head more than on the dorsal surface; metanotum weakly sculptured to smooth; generally dark brown to nearly black in life. 2
2. Postocular and prothoracic setae extremely long. *Haplothrips (Neoheegeria) verbasci*
Postocular and prothoracic setae shorter 3
3. Tibiae yellow. *Haplothrips (Karyothrips) longiceps*
Tibiae, at least mid and hind pairs, predominantly dark brown. 4
4. All tarsi yellow; antennal segment III apparently without sense cones; on *Spartina*. *Haplothrips (Haplothrips) shackelfordae*
Mid and hind tarsi, at least, light or dark brown; antennal segment III always with an outer sense cone, sometimes also with an inner sense cone; on other hosts. 5
5. Fore wings without accessory fringe cilia 6
Fore wings with three to eight accessory fringe cilia, or brachypterous. 7

6. Maxillary stylets placed fairly close together within head; females with fustis (internal rod of abdominal segment IX) large.
 Haplothrips (Haplothrips) malifloris
 Maxillary stylets placed fairly far apart; females with fustis short.
 Haplothrips (Karnyothrips) harti
7. Anteromarginal setae of prothorax well developed; macropterous or brachypterous; under bark.
 Haplothrips (Karnyothrips) americanus
 Anteromarginal setae of prothorax minute; always macropterous; on flowers, grasses or sedges, trees or shrubs. 8
8. Antennal segment III with one inner and one outer sense cone; segment VII with pedicel just slightly wider than pedicel of segment VI; postocular setae minute; on flowers of yarrow, daisy, and red clover.
 Haplothrips (Haplothrips) leucanthemi
 Antennal segment III with one outer sense cone only; segment VII with pedicel nearly equal to or much wider than pedicel of segment VI; postocular setae, if small, not minute; on other hosts. 9
9. Abdominal tergite IX with major posterior setae very long, exceeding tube; on *Vaccinium*; not yet found in Illinois.
 Haplothrips (Haplothrips) rectipennis
 Abdominal tergite IX with major posterior setae shorter, not extending beyond tube. 10
10. Antennal segments III-VI yellow to yellowish brown.
 Haplothrips (Haplothrips) subtilissimus
 Antennal segments (except III) mostly brown. 11
11. Pores on pelta usually closer to each other than either is from lateral margin of pelta; body setae relatively short; on *Scirpus*.
 Haplothrips (Haplothrips) ha'ophilus
 Pores on pelta usually spaced farther from each other than either is from lateral margin of pelta; body setae longer; host unknown.
 Haplothrips (Haplothrips) graminis

Haplothrips (Karnyothrips) americanus (Hood)

Zygothrips americanus Hood (1912b: 114). ♀, ♂. Type-locality.—Urbana, Illinois.
Cephalothrips elegans Moulton (1929b: 236). ♀. Type-locality.—Clarks-ville, Tennessee. Synonymized by Hood (1957).

FEMALE (brachypterous).—Length distended about 1.8 mm. Color dark brown except antennal segment III and all tarsi which are light brown to yellowish brown. Body with red sub-integumental pigment.

Head slightly longer than wide, nearly smooth. Eyes moderately small. Fore ocellus often absent, hind ocelli present but small. Postocular setae moderate in size, blunt to dilated. Antennal segment III with one outer and one inner sense cone; segment VIII nonpedicellate, broadly attached to segment VII. Mouth cone moderate in size, broadly rounded. Maxillary stylets placed fairly far apart within head; maxillary bridge broad.

Prothorax with anteromarginal and lateral setae well developed, as stout as and as long as or longer than anterolateral setae; major posterior setae longer than the rest and more dilated. Praepectus present. Metanotum smooth. Fore tarsi each armed with a minute tooth. Wings reduced to pads.

Pelta roughly triangular, broad at base and short, pores placed far apart. Abdominal tergite II nearly smooth. Abdominal tergites often with sublateral setae blunt. Wing-holding setae not differentiated. Abdominal tergite IX with major posterior setae extremely long, pointed. Fustis short. Tube moderately short, with long terminal setae.

FEMALE (macropterous).—Length distended about 1.8 mm. Similar in most respects to brachypterous female with following exceptions. Body setae, especially postocular setae and major setae of prothorax, longer. Fore ocellus always present. Wings well developed, clouded with light brown; fore wings slightly constricted in the middle, with three to five accessory fringe cilia. Wing-holding setae on abdomen well developed, sigmoidal.

MALE (brachypterous).—Length distended about 1.2 mm. In general similar to brachypterous female with the following exceptions. Apical half of tibiae and all tarsi tending to be more yellowish brown. Abdominal tergite IX with major lateral setae greatly reduced. Abdominal sternite VIII without a distinguishable glandular area.

This species is closely related to the western *sonorensis* which does not occur in our fauna. In Illinois *americanus* may be separated from *harti*, which it resembles superficially, by

the characteristics enumerated in the key and in the discussion of *harti*.

Throughout our state, *americanus* is common on branches of trees and shrubs, particularly around fungi on dead branches. Possibly it preys on larvae mites (Snetzinger 1960).

Illinois records.—Present every month of year, collected from one to several localities in the following counties: ADAMS, ALEXANDER, CHAMPAIGN, CLARK, COOK, CUMBERLAND, DE WITT, EDGAR, EFFINGHAM, FULTON, HARDIN, HENRY, JACKSON, JEFFERSON, JOHNSON, KANKAKEE, LAKE, LA SALLE, MACON, MACOUPIN, MENARD, MONROE, OGLE, PIATT, POPE, PULASKI, PUTNAM, RANDOLPH, SCHUYLER, TAZEWELL, UNION, VERMILION, WASHINGTON, and WHITE.

Haplothrips (Haplothrips) graminis Hood

Haplothrips graminis Hood (1912a: 69). ♀, ♂. Type-locality.—Brownsville, Texas.

Anthothrips floridensis Watson (1916: 128). ♀. Type-locality.—Gainesville, Florida. Synonymized by Watson (1920).

Haplothrips querci Watson (1920:28). ♀, ♂. Type-locality.—Daytona Beach, Florida. Synonymized by Hood (1927b).

Haplothrips rabuni Watson (1922c:37). ♀. Type-locality.—Clayton, Rabun County, Georgia. Synonymized by Hood (1927b).

Haplothrips angusticeps Watson (1922c:38). ♂ (see explanation in the following discussion). Type-locality.—Clayton, Rabun County, Georgia. New synonymy.

FEMALE (macropterous).—Length distended about 2.3 mm. Color dark brown except apex of each of the fore tibiae, fore tarsi, and basal half of antennal segment III, which are yellowish brown. Wings colorless except for light brown bases of fore wings. Body with red subintegumental pigment.

Head longer than wide, anterior area not particularly prolonged, dorsal surface weakly transversely striate. Eyes moderate in size, not prolonged ventrally more than dorsally. Ocelli

present. Postocular setae moderate in size, pointed. Antennal segment III with one outer sense cone, segment IV with two outer and two inner sense cones, segment VII with a broad pedicel, segment VIII nonpedicellate. Mouth cone relatively short, broadly rounded. Maxillary stylets placed fairly far apart within the head, maxillary bridge broad.

Prothorax with anteromarginal setae minute, lateral setae small, anterolateral setae longer than in *halophilus*, all pointed to blunt. Praepectus present. Metanotum weakly sculptured. Fore tarsi each armed with a short tooth. Fore wings slightly constricted in the middle; setae on basal vein spur nearly equal in length, moderately small, basal two blunt, apical setae pointed; each with eight accessory cilia.

Pelta triangular but not as slender as in *halophilus*, with distinct sculpture in the form of elongate hexagonal reticulations; pores usually farther apart than either is from the lateral margin. Abdominal tergite IX with major posterior setae moderately long, pointed. Abdominal segment IX with internal rod (fustis) short. Tube moderately short.

MALES.—Not yet taken in Illinois. Reported to be similar to female except fore tarsal tooth larger, abdominal tergite IX with major lateral posterior setae reduced, pointed. Abdominal sternite VIII apparently without any definite glandular area.

This species is very similar to *halophilus* but differs in having longer body setae and having the pores on the pelta placed farther apart from each other than both are from the lateral margins of the pelta. I have seen specimens from Arkansas which show some intergradation with *halophilus* in the characteristics mentioned, and because of this it would be advisable to re-examine the two species when sufficient material is collected to determine their exact status.

Because the holotypes of the synonyms are either missing or there may be some question as to their identity, the following designations and comments seem to be required.

Anthothrips floridensis.—After the protolog, Watson stated that the holotype was deposited in the American Museum of Natural History and that the paratypes were retained in the Watson collection. I have been unable to find this holotype. There are, however, in the Watson collection five slides labelled "types, thrips on corn, Sta. farms, April 22, 1914." These are probably the paratypes kept by Watson. All have the characteristics of *graminis*.

Haplothrips querci.—In the Watson collection there are two slides in the type series from "Daytona Beach, August 30, 1919, J. R. W., on scrub oak." The specimens involved are males despite the label "♀" on one slide. Neither slide is marked "holotype." Because Watson wrote that he was describing a female in the protolog and because Hood (1927b) indicated that he had examined the holotype, there is a possibility that a holotype female did or does exist elsewhere. The males in the type series still present in the Watson collection have the characteristics of *graminis*.

Haplothrips rabuni.—Only one slide remains in the type trays of the Watson collection. It is marked "type, Clayton, Georgia, September 2, 1922, J. R. W. Coll., on grass along stream." Previously the phrase "para" had preceded "type" but now the former phrase is crossed out. This slide contains a well-mounted macropterous female with typical characteristics of *graminis*. Hood (1927b) indicated that he had seen the "holotype" which presumably could have been this specimen. To erase any uncertainty of the identity of *rabuni* the afore-mentioned specimen is here designated as the lectotype.

Haplothrips angusticeps.—There are two slides labeled as this species in the type trays of the Watson collection. Both are males, not females as stated by Watson in the protolog. To avoid confusion, a lectotype is here designated to be the slide marked "type ♂, Clayton, Georgia, Aug. 29, '22, J. R. W., swale grass & smartweed." The specimen is mounted venter side up and has the characteristics of *graminis*.

Haplothrips graminis is found in the southeastern part of the United States and extends into Illinois only in the extreme south. Except that it is an inhabitant of grasslands, nothing is known of its life history.

Illinois records.—ALEXANDER COUNTY: Roth, July 15, 1954, Ross, Stannard, grass, 1 ♀; east of Cape Girardeau, January 12, 1965, McCollum, Shaw, Stannard, Johnson grass, 1 ♀. JOHNSON COUNTY: Goreville, June 21, 1950, Sanderson, prairie, 1 ♀. PULASKI COUNTY: Mounds, August 26, 1953, Sanderson, Moore, sweeping grass, 3 ♀. SALINE COUNTY: Texas City, July 17, 1962, Evers, Stannard, Johnson grass, 5 ♀, 1 ♂.

Haplothrips (Haplothrips) halophilus Hood

Haplothrips halophilus Hood (1915a: 29). ♀, ♂. Type-locality.—Bountiful, Utah.

FEMALE (macropterous).—Length distended about 2.3 mm. General color dark brown except apex of each of the fore tibiae, fore tarsi, and basal half of antennal segment III which are yellowish brown. Wings colorless except for bases of fore wings which are light brown. Body with red subintegumental pigment.

Head longer than wide, anterior area not particularly prolonged, dorsal surface weakly transversely striate. Eyes moderate in size, not prolonged ventrally more than dorsally. Ocelli present. Postocular setae moderately short but not minute as in *leucanthemi*, pointed. Antennal segment III with one outer sense cone, segment IV with two outer and two inner sense cones, segment VII with a broad pedicel, segment VIII nonpedicellate. Mouth cone relatively short, broadly rounded. Maxillary stylets placed fairly far apart within the head, maxillary bridge broad.

Prothorax with anteromarginal and lateral setae minute, anterolateral setae small, major posterior setae larger and blunt at tips. Praepectus present. Metanotum weakly reticulate. Fore tarsi each armed with a short, stout tooth. Fore wings slightly constricted

in the middle; setae on basal vein spur nearly equal in length, small, basal two blunt, apical setae pointed; each with seven or eight accessory setae.

Pelta triangular with distinct sculpture in the form of elongate hexagonal reticulations; pores usually closer to each other than either is from lateral margin. Abdominal tergite IX with major posterior setae moderate in size, pointed. Abdominal segment IX with internal rod (fustis) moderate in size. Tube moderately short.

MALE (macropterous).—Length distended about 1.8 mm. Similar to female in color and structure with the following exceptions. Fore legs sometimes slightly enlarged, fore tarsal tooth larger. Abdominal tergite IX with major lateral posterior setae reduced in size. Abdominal sternite VIII apparently without any definite glandular area.

Haplothrips halophilus is most similar to *graminis*, differing principally in the characteristics mentioned in the key. It hardly seems to be closely related to *fasciculatus* (= *jonesii*) as contended by Hood (1915a) and Cott (1956). The species *fasciculatus* belongs to the group containing *malifloris* whose members bear a large rod or fustis and usually lack praepectal plates and accessory fore wing fringe cilia.

This species has a wide range, being found in the West from Washington to Utah south to California, New Mexico, Arizona, and Texas, thence east to North Dakota and Illinois. Our Illinois records are solely from Lake County.

Illinois records.—LAKE COUNTY: Antioch, September 13, 1951, Richards, Stannard, on *Scirpus*, 2 ♀, 3 ♂; Zion (Beach State Park), August 30, 1955, Moore, Stannard, on *Juncus* 1 ♀.

Haplothrips* (*Karnyothrips*) *harti (Hood)

Zygothrips harti Hood (1913b, June: 162). ♀, ♂. Type-locality.—Loma, Texas. Transferred to *Haplothrips* by Stannard (1957b).

Zygothrips femoralis Morgan (1913, August: 40). ♀. Type-locality.—

Clarksville, Tennessee. Synonymized by Hood (1917).

Haplothrips gracilis Watson (1920:18). ♀. Type-locality.—Gainesville, Florida. New synonymy.

FEMALE (macropterous).—Length distended about 1.6 mm. Color dark brown except antennal segment III, apex of each of the fore tibiae, and all tarsi which are light brown to yellowish brown. Wings colorless except for a light brown cloud at extreme base of fore wings. Body with much red sub-integumental pigment.

Head slightly longer than wide, smooth. Eyes moderate in size. Ocelli present. Postocular setae moderate in size, blunt to dilated. Antennal segment III with one outer and one inner sense cone; segment VIII slightly narrowed at base, not as broadly attached to segment VII as in *americanus*. Mouth cone moderate in size, broadly rounded. Maxillary stylets placed far apart within head, maxillary bridge broad.

Prothorax with anteromarginal and lateral setae minute, slender; anterolateral setae relatively small, blunt; major posterior setae moderately long, slightly dilated. Praepectus present. Metanotum nearly smooth. Fore tarsi apparently unarmed. Fore wings narrow, hardly at all constricted in the middle, without accessory fringe cilia.

Pelta triangular, more narrowed than in *americanus*; pores placed far apart. Abdominal tergite II with faint scallop-like markings. Abdominal tergites often with sublateral setae dilated. Wing-holding setae well developed, sigmoidal. Abdominal tergite IX with major posterior setae moderately long, mid pair blunt to dilated, lateral setae pointed. Fustis short. Tube moderately small, with long terminal setae.

MALE (macropterous).—Length distended usually less than 1.4 mm. Similar to female in general color and structure with the following exceptions. Abdominal sternite VIII with a broad, transverse glandular area. Abdominal tergite IX with major lateral posterior setae reduced.

In general appearance, this species resembles *americanus*, but the two

may be easily distinguished on the basis of a number of characteristics. For example, *americanus* possesses well-developed anteromarginal setae and accessory fringe cilia on the fore wings and lacks a definite glandular area in the male. By contrast *harti* has the anteromarginal setae greatly reduced, lacks accessory fringe cilia on the fore wings, and possesses a large, distinct glandular area in the male.

Although not frequently encountered, *harti* has been taken throughout our state on herbs and grasses, especially in or near open fields. It occurs in many eastern states, particularly those in the southeast, and west to Texas and Arkansas (INHS records).

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 8, 1951, Richards, Stannard, grass, 1 ♀, 1 ♂. CLARK COUNTY: Marshall, May 13, 1949, Ross, Stannard, Gloyd, sweeping vegetation, 1 ♂. JACKSON COUNTY: Makanda, July 14, 1948, Sanderson, Stannard, sweeping vegetation in woods, 1 ♀; Vergennes, August 15, 1951, Ross, Stannard, 1 ♂. LAWRENCE COUNTY: Lawrenceville, August 7, 1953, Smith, Moore, Stannard, on *Andropogon*, 1 ♂. OGLE COUNTY: Oregon, September 15, 1955, Ross, Stannard, on *Andropogon*, 1 ♀. PIKE COUNTY: Kinderhook, August 9, 1951, Richards, Stannard, on willow, 1 ♂. POPE COUNTY: Eddyville (Lusk Creek Canyon), July 18, 1962, Evers, Stannard, hill prairie, 1 ♀. WAYNE COUNTY: Mt. Erie, August 26, 1964, Faatz, Stannard, sweeping grass, 1 ♀.

**Haplothrips (Haplothrips)
leucanthemi** (Schrank)

Thrips leucanthemi Schrank (1781: 298). ? ♀. Type-locality.—?Austria. Transferred to *Haplothrips* by Priesner (1920a).
? *Phloeothrips nigra* Osborn (1883:154). ? ♀. Type-locality.—Ames, Iowa. Synonymized by Watson (1924a). Possibly this is a distinct species, however.
Zygothrips wyomingensis Watson (1924a:82). ♀. Type-locality.—Dayton, Wyoming. Synonymized by Hood (1927b).

FEMALE (macropterous).—Length distended about 2 mm. Color dark brown except apex of each of the fore tibiae, fore tarsi, and basal half of antennal segment III which are yellowish brown. Body with red subintegumental pigment.

Head slightly longer than broad, anterior area bearing fore ocellus not particularly prolonged, surface of head with weak transverse striae. Eyes moderate in size, not prolonged ventrally more than dorsally. Ocelli present. Postocular setae minute, usually not much larger than the diameter of an ocellus, pointed. Antennal segment III with one inner and one outer sense cone; segment IV with two outer and two inner sense cones; segment VII with pedicel almost as narrow as in segment VI; segment VIII nonpedicellate, broadly joined to segment VII. Mouth cone relatively short, broadly rounded. Maxillary stylets placed fairly far apart within head, maxillary bridge broad.

Pronotum with most major setae developed although relatively short, pointed; anteromarginal setae minute. Praepectus present. Metanotum so weakly sculptured as to appear nearly smooth. Fore tarsi each armed with a small tooth. Fore wings slightly constricted in the middle; setae on basal vein spur nearly equal in size, small, pointed; each with six to eight accessory fringe cilia.

Pelta narrowly triangular with several pronounced longitudinal striae. Abdominal tergite IX with major posterior setae relatively short, pointed. Abdominal segment IX with internal rod (fustis) short. Tube moderate in size.

MALE.—Not known to be in Illinois and possibly not in North America.

Haplothrips leucanthemi is undoubtedly a Palearctic species which may have been introduced to North America and parts of the Orient and Australia in colonial times. It is either a composite of species or, as interpreted here, a single species with variable populations and individuals. Several names are available for all these variants or entities, as the case may be, and thysanopterists differ on the taxonomy involved. Some European stu-

dents believe that three or more species should be segregated; some North American students believe that at least the name *niger* should be suppressed, others that only *niger* should be used. Until the status of the species or several species is better understood, I prefer to lump all the specimens I have seen from this continent under the name *leucanthemi*, the type slide of which is apparently lost.

This species can be distinguished from all others in Illinois by the combination of the minute postocular setae, the narrow pedicel of antennal segment VII, and the presence of an inner sense cone on antennal segment III.

Haplothrips leucanthemi occurs commonly in the northern half of the state in flowers of daisy, yarrow, and possibly red clover. These host plants are also introduced from the Palearctic region. An excellent account of the life history of this thrips was given by Loan (1955) under the name of *Haplothrips niger*. Seemingly Pergande (1882) thought it may be predacious.

Illinois records.—Collected from spring to autumn, from one to several localities in the following counties: COOK, DU PAGE, LAKE, LIVINGSTON, McHENRY, OGLE, PIKE, STEPHENSON, and WILL.

Haplothrips (Karnyothrips) longiceps (Hood)

Zygothrips longiceps Hood (1908c:364).

♀. Type-locality.—Carbondale, Illinois.

FEMALE (brachypterous).—Length distended about 1.8 mm. Color dark brown except antennal segment III, which is yellow in pedicel and yellowish brown to yellow in apical half (inner margin and area just above pedicel sometimes light brown), and all tibiae and tarsi which are bright yellow. Body with red subintegumental pigment.

Head much longer than wide, nearly smooth. Eyes moderate in size. Ocelli small, fore ocellus smallest. Postocular setae moderate in size, dilated. Antennal segment III with one outer and no inner sense cone; segment VIII non-

pedicellate, broadly attached to segment VII. Mouth cone relatively short, broadly rounded. Maxillary stylets placed far apart within head, maxillary bridge broad.

Prothorax with major setae well developed and dilated except anteromarginal setae which are minute, posterior setae slightly longer than anterolateral and lateral setae. Praepectus present. Metanotum smooth. Fore tarsi each armed with a small tooth. Wings reduced to minute, nearly colorless pads.

Pelta roughly triangular, pores placed far apart. Abdominal tergite II nearly smooth. Abdominal tergites with most lateral and sublateral setae dilated. Wing-holding setae at most only slightly developed. Abdominal tergite IX with major posterior setae long, middle pair shorter and dilated, lateral setae pointed. Fustis short. Tube moderately small, with moderately long terminal setae.

FEMALE (macropterous).—Unknown.

MALE.—Unknown.

This species has been and is the subject of controversy. Hood (1949) stated that the name *errans*, western entity, is synonymous with *longiceps*. Cott (1956) and others suspect that *longiceps* and/or *errans* may be but the brachypterous form of *flavipes*. It is my opinion that *longiceps* is distinct from *flavipes* (*longiceps* always has the tibiae clear yellow whereas *flavipes* has the tibiae yellowish brown), and that *errans* is the brachypterous form of *flavipes*. As so defined *flavipes* is a cosmopolitan tramp of unknown origin, occurring from California to the gulf coast of Florida and other warm parts of the world—Hawaii, Egypt, India, the East Indies, etc. By contrast *longiceps* is a native species whose distribution apparently does not extend outside North America and which is rare west of Iowa.

Of the 150 or more specimens I have seen from Illinois, none are males and none are macropterous. Apparently *longiceps* is common throughout Illinois in native prairie grasses, especially *Andropogon*.

Illinois records.—Found every

month of the year, in one to several localities in the following counties: ADAMS, ALEXANDER, CHAMPAIGN, CLARK, COOK, CRAWFORD, DE WITT, DOUGLAS, HANCOCK, IROQUOIS, JACKSON, JERSEY, KNOX, LAKE, LAWRENCE, LEE, MADISON, MARION, MASON, MENARD, PIATT, PIKE, POPE, WAYNE, WHITE, WILL, and VERMILION.

Haplothrips (*Leptothrips*) mali
(Fitch)

The Black Hunter

Phloeothrips mali Fitch (1856:104).
? ♀. Type-locality.—State of New York. Transferred to *Haplothrips* by Stannard (1957b).

Cryptothrips aspersus Hinds (1902:205). ♀, ♂. Type-locality.—Amherst, Massachusetts. Synonymized by Hood (1914b).

Leptothrips aspersus macro-ocellatus Watson (1913:148). ? ♀. Type-locality.—Gainesville, Florida. Synonymized by Hood (1914b).

Cryptothrips adirondacks Watson (1921:83). ♀, ♂. Type-locality.—Cranberry Lake, New York. Synonymized by Hood (1927b).

Zygothrips floridensis Watson (1922b:22). ♂, see explanation herein. Type-locality.—Elpers, Florida. New synonymy.

FEMALE (macropterous).—Length distended about 2.5 mm. General color dark brown (in life blackish purple) except intermediate antennal segments. Segment III, basal half of segment IV, and pedicel of V yellow; sometimes all of segment IV, basal half of V, and pedicel of VI yellow. Wings colorless except for brown spot at base just above scale, apical fringe cilia of fore wings usually brown but occasionally white. Body with much purple subintegumental pigment.

Head (Fig. 228) elongate, much longer than wide, anterior area which bears fore ocellus considerably prolonged. Surface of head weakly marked with transverse striations. Eyes considerably more prolonged posteriorly on the ventral surface than on the dorsal surface of the head. Ocelli present. Postocular setae moderate in size,

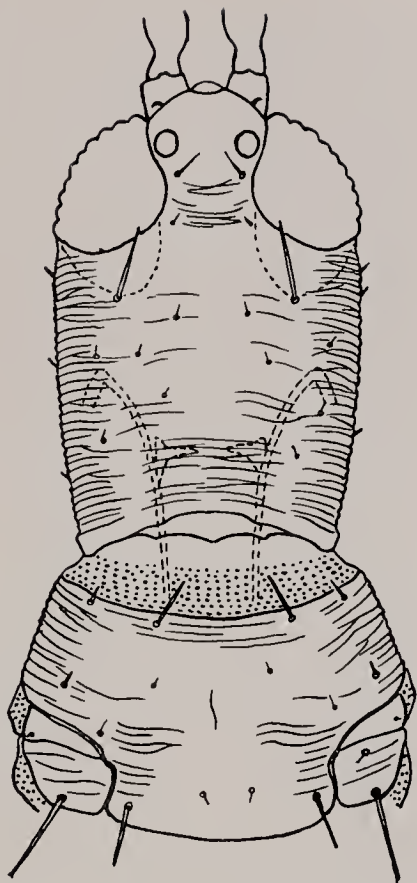


Fig. 228. — *Haplothrips* (*Leptothrips*) *mali*, head and prothorax.

blunt. Antennal segment III somewhat elongate, much longer than II, with no inner sense cone and one outer sense cone; segment IV elongate, with two outer and two inner sense cones; segment VIII nonpedicellate, broadly joined to segment VII. Mouth cone moderately long, nearly pointed. Maxillary stylets retracted about half way into head, placed fairly far apart within the head; maxillary bridge broad.

Prothorax (Fig. 228) generally transversely striate but with several smooth oval spots; with some major setae developed, anterolateral and lateral setae minute, posterior setae moderate in size, blunt. Praepectus present. Metanotum with distinct, closely spaced longitudinal striae. Fore tarsi unarmed. Fore wings slightly indented

in the middle, each with 3-10 accessory fringe cilia.

Pelta triangular (Fig. 170). Wing-holding setae well developed, sigmoidal. Abdominal tergites with lateral setae blunt. Abdominal tergite IX with major posterior setae long, pointed. Fustis short. Tube moderate in size.

MALE (macropterous).—Length distended about 2.2 mm. Similar to female in color and structure with the following exceptions. Eyes only slightly prolonged ventrally. Abdominal tergite IX with lateral posterior setae greatly reduced, spinelike. Abdominal sternite VIII without a differentiated glandular area.

This is the only species of the subgenus *Leptothrips* found in Illinois. It can be easily distinguished from all other *Haplothrips* by the strong longitudinal striae on the metanotum.

Two additional eastern species of *Leptothrips* are found in Florida. Both were described by Watson and both had been unjustly sunk under *mali* by Hood (1927b). One of these species, *pini*, differs from *mali* in having only two (not three or four) sense cones on antennal segment IV (O'Neill 1965), and the other species *cassiae*, has antennal segment III darker and shorter than in *mali*, nearly equal in length to segment V.

Two color forms of *mali* occur in our state. The light-colored form has the intermediate antennal segments predominantly yellow with antennal segment IV bearing only three sense cones and the apical fringe cilia of the fore wings appearing decidedly pale in color. By contrast the dark form, i.e., the normal color phase, has only antennal segment III entirely yellow, antennal segment IV bearing four sense cones, and the apical fringe cilia of the fore wings only slightly lighter brown than the adjacent cilia. Both forms often occur together, except in the Wisconsin drift area where only the dark form is present.

The single specimen of *Zygothrips floridensis*, labeled "Type" in the Watson collection, Gainesville, Florida, is a male, not a female as stated by Watson in his original description. In form and color it is like the dark form

of *mali* found in Illinois and may be considered an outright synonym of *mali*.

The type slide of *Leptothrips aspersus macro-ocellatus* was not present in the Watson collection when I studied it in 1961. Other slides available carried the label of this species but lacked data. These slides contain specimens similar to, if not the same as, *Leptothrips mali*, and accordingly I suspect this subspecies is also synonymous with *mali*.

Two slides of *Cryptothrips adironacks* are in the Watson collection, and although neither is marked holotype, one qualifies as such. To better fix this name, the lectotype is here designated to be the slide that bears a broken female and is labeled "Cranberry Lake, N. Y., July 5, 1920, on willow, C. J. Drake coll." The other slide labeled with the same locality but from *Viburnum alnifolium* contains a larva. These specimens have the characteristics of *mali*.

Other names have been sunk under *mali* in the past. Among these, *californicus* Daniel and *mcconnelli* Crawford are not synonyms but, in my opinion, separate species.

It has been said frequently in the literature that *mali* is predacious, a habit shared by *Haplothrips subtilissimus* and others. From our numerous records, it appears that *mali* may occur in every woodland throughout the state.

Illinois records.—Found every month of the year, in one to several localities in the following counties: ADAMS, ALEXANDER, BOND, BROWN, BUREAU, CALHOUN, CARROLL, CHAMPAIGN, CLARK, CLAY, COLES, COOK, CRAWFORD, CUMBERLAND, DE WITT, EDGAR, EFFINGHAM, FAYETTE, FORD, FULTON, GALLATIN, GREENE, GRUNDY, HAMILTON, HANCOCK, HARDIN, HENDERSON, IROQUOIS, JACKSON, JASPER, JEFFERSON, JERSEY, JO DAVIESS, JOHNSON, KANE, KANKAKEE, KENDALL, KNOX, LAKE, LA SALLE, LAWRENCE, LIVINGSTON, LOGAN, MACON, MADISON, MARION, MARSHALL, MASON, MASSAC, MCLEAN, MERCER, MONROE, MORGAN, OGLE, PIATT, PIKE, POPE, PULASKI,

PUTNAM, RANDOLPH, RICHLAND, ROCK ISLAND, SANGAMON, SCHUYLER, SCOTT, STEPHENSON, TAZEWEILL, UNION, VERMILION, WASHINGTON, WILL, WILLIAMSON, WINNEBAGO, and WOODFORD.

**Haplothrips (Haplothrips)
malifloris Hood**

Haplothrips malifloris Hood (1916d: 121). ♀, ♂. Type-locality. Roswell, New Mexico.

FEMALE (macropterous).—Length distended about 2.4 mm. General color dark brown. Antennal segment III with a slight yellowish tinge underlying the brown. Fore tarsi and apex of each of the fore tibiae yellowish brown. Wings clear except light brown at extreme base; fringe cilia brown with no white apical cilia. Body with orange-yellow subintegumental pigment.

Head distinctly longer than broad, anterior area which bears fore ocellus considerably prolonged. Surface of head weakly marked with transverse striations. Eyes not particularly prolonged ventrally more than dorsally. Ocelli present. Postocular setae moderate in size, pointed to blunt. Antennal segment III nearly equal to segment II in size, with no inner sense cone and one outer sense cone; segment IV with two inner and two outer sense cones; segment VIII broadly joined to segment VII. Mouth cone moderately long, pointed. Maxillary stylets retracted far into the head, placed fairly close together within the head; maxillary bridge short.

Prothorax with major setae developed but moderately small, antero-marginal and lateral setae smallest. Praepectus seemingly absent or greatly reduced. Metanotum with faint remnants of hexagonal reticulations. Fore tarsi each with a small inner median tooth. Fore wings slightly constricted in the middle, without accessory fringe cilia.

Pelta triangular, almost smooth. Wing-holding setae well developed, sigmoidal. Abdominal tergite IX with major posterior setae moderate in

size, shorter than tube, pointed. Abdominal segment IX with internal rod (fustis) greatly elongated. Tube relatively short.

MALE (macropterous).—Length distended over 1.8 mm. Similar in most respects to female with the following exceptions. Fore tarsal tooth usually slightly larger. Abdominal tergite IX with lateral posterior setae greatly reduced, spinelike. Abdominal sternite VIII apparently without glandular area. Only minor forms so far discovered in Illinois.

Haplothrips malifloris belongs to the *fasciculatus* complex, all females of which possess an extremely enlarged internal rod (fustis). This complex is transitional between *Haplothrips s. str.* and *Haplothrips* subgenus *Leptothrips*. Because they possess fore tarsal teeth, it seems advisable to include the species of this complex with the nominate subgenus.

The discovery of *malifloris* in Illinois came as a surprise. Heretofore, *malifloris* was considered to be a species of the southwestern states (Texas, New Mexico, and California). Its original collectors, Drs. M. W. Sanderson and T. E. Moore, found a large colony on *Froelichia campestris* growing on a dry railroad embankment in southwestern Illinois. Since then additional collections have been made from sand areas in Mason County. It might be that *malifloris* was transported to Illinois in recent times by the agency of man.

Illinois records.—JACKSON COUNTY: Murphysboro, August 25, 1953, Moore, Sanderson, on *Froelichia campestris*, 4 ♀, 3 ♂. MASON COUNTY: Mason State Forest, May 18, 1957, Kingsolver, Mockford, 1 ♀; Forest City, September 8, 1958, Ross, Stannard, sweeping herbs, 2 ♀.

**Haplothrips (Haplothrips)
shacklefordae Moulton**

Haplothrips shacklefordi Moulton (1927b:197). ♀, ♂. Type-locality.

—Probably near Seymour, Champaign County, Illinois.

FEMALE (macropterous).—Length distended about 2.3 mm. General color

dark brown. Yellow: antennal segments III–VI (segment VII yellowish brown), apical half of fore tibiae, all tarsi, major setae of prothorax, and lateral setae of abdomen. Body with red subintegumental pigment. Wings colorless except for a light brown cloud in region of scale of fore wing.

Head (Fig. 229) longer than wide, anterior area not particularly prolonged, very weakly transversely striate. Eyes moderate in size, not prolonged ventrally more than dorsally. Ocelli present. Postocular setae small, pointed. Antennal segment III apparently without sense cones; segment IV with two outer and two inner sense cones; segment VII with a broad pedicel; segment VIII nonpedicellate, broadly joined to segment VII. Mouth cone relatively short, broadly rounded. Maxillary stylets placed far apart within head, forming a V; maxillary bridge broad.

Prothorax with anteromarginal and midlateral setae small to minute; major posterior setae moderate in size; all pointed. Praepectus present. Metanotum weakly sculptured so as to appear nearly smooth. Fore tarsi each armed with a short tooth. Fore wings slightly constricted in the middle; setae on basal vein spur subequal in size, small, pointed; each with about five accessory fringe cilia.

Pelta triangular with elongate hexagonal reticulations. Abdominal tergite IX with major posterior setae moderate in size, pointed. Abdominal segment IX with internal rod (fustis) short. Tube short.

MALE (macropterous).—Length distended about 1.7 mm. Similar in color and structure to female with the following exceptions. Abdominal tergite IX with major lateral posterior setae reduced in size. Abdominal sternite VIII apparently without any definite glandular area.

This species can be easily distinguished from its congeners in the Illinois fauna because it lacks sense cones on antennal segment III and has all tarsi yellow. It resembles *subtilissimus* in many ways but differs particularly in the absence of sense cones on antennal segment III and in having nondi-

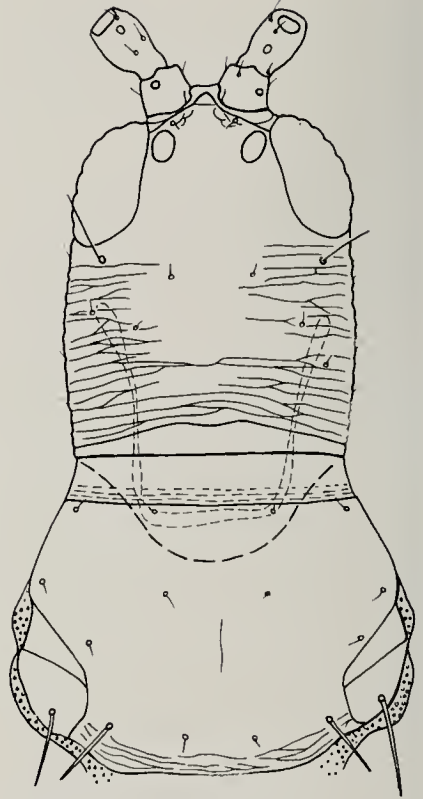


Fig. 229.—*Haplothrips* (*Haplothrips*) *shacklefordae*, head and prothorax.

lated body setae. From *fuliginosus* and the very similar, if not the same species, *nubilipennis*, *shacklefordae* differs by having the pores on the pelta closer together and lacking brown color in the fore wings near the mid constriction. The New York state species *xanthocrepis* also has the tarsi bright yellow but it differs from *shacklefordae* in having sense cones on antennal segment III and longer anterolateral and midlateral prothoracic setae.

Originally this species was collected by Miss Martha Shackleford, presumably in her study area of wet prairie near Seymour, Illinois. Properly, therefore, the patronym should have been spelled to end in *ae* as emended here. According to our observations, this insect is abundant on *Spartina* particularly in the northern and central parts of Illinois. It occurs westward into Iowa, Kansas, and Nebraska and eastward into Indiana

(INHS records). As yet its total distribution, which may include most of eastern United States, has not been determined.

Illinois records.—Collected in winter, spring, and summer, from one to several localities in the following counties: BOND, CHAMPAIGN, CHRISTIAN, CLINTON, DOUGLAS, DE WITT, DU PAGE, FULTON, HANCOCK, IROQUOIS, KANKAKEE, LIVINGSTON, MADISON, MARION, MARSHALL, MASON, MERCER, PIATT, ROCK ISLAND, SANGAMON, TAZEWEILL, and WHITESIDE.

Haplothrips (Haplothrips) subtilissimus Haliday

Phloeothrips subtilissimus Haliday (1852:1100). ? ♀. Type-locality.—England. Transferred to *Haplothrips* by Karny (1912b).

Haplothrips faurei Hood (1914b:157). ♀. Type-locality.—Ithaca, New York. New synonymy.

FEMALE (macropterous).—Length distended slightly over 2 mm. General color dark brown. Fore tibiae and all tarsi lighter brown to yellowish brown. Antennal segments I and II dark brown, segments III–VI yellow, segments VII and VIII light brown. Anterior body setae brown, posterior setae, except anal setae, yellow. Wings colorless except for light brown spot at base of each fore wing. Body with red subintegumental pigment.

Head slightly longer than wide, anterior area not particularly prolonged, weakly transversely striate. Eyes moderately large, not extended posteriorly on the ventral side as on the dorsal side. Ocelli present. Postocular setae moderate in size, slightly dilated. Antennal segment III with no inner and one outer sense cone; segment IV with two inner and two outer sense cones; segment VIII nonpedicellate, broadly joined to segment VII. Mouth cone short, broadly rounded. Maxillary stylets placed far apart within head; maxillary bridge broad.

Prothorax with anteromarginal setae minute; all major setae dilated. Praepectus present. Metanotum weakly sculptured, nearly smooth. Fore tarsi each armed with a short tooth.

Fore wings constricted in the middle, each with seven or eight accessory fringe cilia.

Pelta triangular, with weak longitudinally elongate reticulations. Abdominal segments II–VII with two pairs of sigmoidal wing-holding setae. Abdominal tergite IX with major posterior setae pointed at tips. Fustis moderate in size. Tube short.

MALE.—Unknown.

Although similar to *shacklefordae* in the color of the antennae and general form, *subtilissimus* can be distinguished by the characteristics of the darker tibiae, an outer sense cone on antennal segment III, and dilated postocular and prothoracic setae.

Long known as a predator on mites, *subtilissimus* is a holarctic species that in North America is generally confined to Canada and our most northern states. Its range barely extends down to Illinois. Priesner (1928) has listed the major synonyms of this species.

Illinois records.—JO DAVIESS COUNTY: East Dubuque, August 7, 1963, Smith, Braasch, Stannard, on willow, 5 ♀.

Haplothrips (Neoheegeria) verbasci (Osborn)

Mullein Thrips

Phloeothrips verbasci Osborn (1896:228). ♀, ♂. Type-locality.—Probably Iowa. Transferred to *Haplothrips* by Karny (1912b), and placed in *Neoheegeria* by Priesner (1920a). *Trichothrips femoralis* Moulton (1907:61). ♀, ♂. Type-locality.—Newcastle, California. Synonymized by Hood (1918).

FEMALE (macropterous).—Length distended about 2.4 mm. General color dark brown. Antennal segments III–VI abruptly yellow. Apical half of fore tibiae and all of fore tarsi yellow. Mid and hind tarsi yellowish brown. Wings colorless except for brown spot at base. Major head and prothoracic setae brown. Body with red subintegumental pigment.

Head slightly longer than wide, anterior area not particularly prolonged, dorsal surface weakly transversely

striate. Eyes moderate in size, not prolonged ventrally more than dorsally. Ocelli present. Postocular setae long, blunt. Antennal segment III with one inner and one outer sense cone; segment IV with two outer and two inner sense cones; segment VIII elongate, slender, nonpedicellate. Mouth cone moderate in size, pointed. Maxillary stylets placed moderately far apart, maxillary bridge moderately broad.

Prothorax with all major setae well developed and long, the posterior pairs being the longest, all blunt. Praepectus present. Metanotum weakly hexagonally sculptured. Fore tarsi each armed with a short subapical tooth. Fore wings constricted in the middle, each with about 10 accessory cilia.

Pelta triangular, pores just slightly farther apart than either is from the lateral margin. Wing-holding setae well developed, sigmoidal. Lateral setae mostly blunt. Abdominal tergite IX with major posterior setae moderately long, mid pair blunt, lateral pair pointed. Abdominal segment IX with fustis short. Tube moderately long.

MALE (macropterous).—Length distended nearly 2 mm. Similar to female except for the following. Fore tarsal tooth larger. Abdominal tergite IX with major lateral posterior setae reduced, spinelike. Abdominal sternite VIII apparently without any definite glandular area.

By the combination of the pointed mouth cone, the long head and prothoracic setae which are brown and blunt, and the abrupt yellow color of the intermediate antennal segments, this species may be easily distinguished from its congeners in Illinois.

Despite the fact that the type locality of *verbasci* is in North America, its provenience is probably Europe, whence it was introduced probably during the colonial times. It lives mostly between the leaves of European mullein and is common throughout Illinois. Bailey (1939c) has made observations on the life cycle of this thrips in California.

Illinois records (Fig. 18).—Collected every season of the year, from every county in the state.

Hindsiothrips Stannard

Boloplothrips Titschack (1957:409).

Nomen nudum, see explanation under discussion.

Hindsiothrips Stannard (1958a:273).

Type-species.—*Hindsiana pullata* Hood.

Head longer than wide, surface smooth except at extreme base. Eyes relatively small, as in *Haplothrips* subgenus *Karnyothrips*, never prolonged ventrally more than dorsally, not keg-like as in *Eurythrips*. Ocelli present in macropterous forms, absent in apterous forms. Postocular setae moderate in size to fairly long, pointed or dilated. Cheeks smooth without strong lateral setae. Antennae eight segmented; segment III nearly equal in length to segment IV, with at least one inner and one outer sense cone; segment IV with one inner and two outer sense cones; segment VIII decidedly lanceolate. Mouth cone short and broadly rounded. Maxillary stylets retracted far into the head, placed fairly close together within the center of the head. Maxillary bridge not discernible.

Thorax nearly smooth, without strong sculpture. Prothorax with anteromarginal setae short or long, anteroangular setae well developed; midlateral setae always short, posterior pairs of setae well developed; these setae pointed, blunt, or dilated. Epimeral sutures incomplete. Praepectus present. Mesopraesternum degenerate to nearly absent. Macropterous or apterous; fore wings, when present, of nearly even width throughout (not indented in the middle), without accessory fringe cilia near the apex of the trailing edge. Fore legs each armed with a small tooth.

Pelta nearly rectangular to trapezoidal, weakly sculptured. Wing-holding setae limited to one pair on each of abdominal tergites III–VII in the macropterous form, not differentiated in the apterous form. Abdominal tergite IX with major posterior setae longer than tube, always pointed; in males the lateral pair much reduced in size. Males apparently without a

distinct glandular area on abdominal sternite VIII. Females with a short internal rod (fustis) in abdominal segment IX. Tube relatively short; terminal setae not greatly elongate as is typical of *Haplothrips* subgenus *Karnyothrips*.

During my visit with Prof. Dr. Herman Priesner in 1960 at Linz, it was discovered that the name *Hindsiothrips* published in 1958 was synonymous with his yet unpublished *Boloplothrips*, to be based on *Trichothrips oettingeni* Priesner. Accordingly Priesner changed his manuscript name to *Hindsiothrips* and subsequently published articles using this latter name (Priesner 1960, 1961). Previously, however, he had advised Herr E. Titschack that the species *Watsoniella bonessi* Titschack was indeed a true "*Boloplothrips*," and thereupon Titschack in 1957, in a publication, re-assigned *bonessi* to *Boloplothrips* with the remark that this was a new genus being described by Priesner.

The International Code of Zoological Nomenclature (1961), Article 13, a, states: "a name published after 1930 must be either (i) accompanied by a statement that purports to give characters differentiating the taxon; or (ii) accompanied by a definite bibliographic reference to such a statement; . . ."

Titschack (1957) did not give direct diagnostic characteristics for the entity "*Boloplothrips*" and his bibliographic reference was to an unpublished manuscript. According to a strict interpretation of Article 13, a, "*Boloplothrips*" might be considered to be a *nomen nudum* as I have done here.

The first attempt to honor Dr. W. E. Hinds, an early and influential North American thysanopterist, by giving him a generic patronym (*Hindsiana*) failed because of synonymy. I hope that in this second attempt, the name *Hindsiothrips* is not also declared a synonym, merely because of the premature mention of a manuscript name.

Hindsiothrips can be recognized in Illinois by the incomplete epimeral sutures and the lanceolate form of antennal segment VIII. From *Eurythrips*,

a genus to which one species was originally assigned, the members of *Hindsiothrips* can be distinguished by the close spacing of the maxillary stylets within the head and by the nonbulged (not kegelike) eyes.

Two species, *pullatus* and *robustisetis*, occur in Illinois. Both are scarce in collections.

KEY TO SPECIES

1. Tarsi generally brown; postocular setae pointed *pullatus*
- Tarsi generally yellow; postocular setae dilated *robustisetis*

Hindsiothrips pullatus (Hood)

Hindsiana pullata Hood (1925b:27).

♀. Type locality.—Macedon, New York. Transferred to *Hindsiothrips* by Stannard (1958a).

FEMALE (apterous).—Length distended nearly 1.5 mm. Almost entirely dark brown. Inner apical angles of femora and pedicel of antennal segment III yellow to colorless. Body with red subintegumental pigment.

Eyes relatively small. Ocelli absent. Postocular setae moderately long, pointed.

Prothorax smooth, with anteromarginal and midlateral setae short, anterolateral setae moderate in size, and posterior pairs somewhat longer; the smallest prothoracic setae blunt, the longer setae blunt to nearly dilated. Epimeral sutures incomplete. Fore tarsi each armed with a minute tooth.

Pelta nearly rectangular. Tube short.

FEMALE (macropterous).—Length distended about 1.6 mm. Similar to apterous female except for the following. Eyes slightly larger. Ocelli present. Wings fully developed, nearly uniformly light gray. Pelta in the form of an isosceles trapezoid. Wing-holding setae sigmoidal.

MALE (apterous).—Length distended about 1.5 mm. Similar to female in color and structure except for secondary sexual characteristics. Abdominal tergite IX with major lateral posterior setae reduced in size. Presence or absence of glandular area on abdominal sternite VIII not deter-

mined from single specimen available to me.

This species differs from *robustisetis* in color and by the form of the major head and prothoracic setae as mentioned in the key and the descriptions.

Although rare, in Illinois *pullatus* is probably statewide in distribution, occurring on dead branches. Besides those from Illinois, collections have been taken in New York and Arkansas (Stannard 1958a).

Illinois records.—HARDIN COUNTY: Karbers Ridge, May 4, 1950, Sanderson, Stannard, and August 17, 1951, Ross, Stannard, all on dead branches, 4 ♀. LAKE COUNTY: Wauconda, October 28, 1953, Ross, Stannard, bird's nest in tamarack bog, 1 ♂. MACON COUNTY: Decatur, Spitler Woods State Park, September 8, 1955, Stannard, dead branches, 1 ♀, 1 ♂. POPE COUNTY: Bell Smith Springs State Park, May 5, 1950, Sanderson, Stannard, beating oak leaves, 1 ♀.

Hindsiothrips robustisetis

(Watson and Preer)

Eurythrips robustisetis Watson and Preer (1939:3). ♀, ♂. Type-locality. —Swan Lake, Putnam County, Florida. Transferred to *Hindsiothrips* by Stannard (1958a).

FEMALE (apterous).—Length distended about 1.8 mm. General color yellowish brown. Antennal segments III–VIII, at least, median and lateral portions of the terminal abdominal segments, and tube brown. Anterior of head, pedicel of antennal segment III, inner apical angle of femora, apex of each of the tibiae, and all tarsi yellow. Body with red subintegumental pigment.

Eyes relatively small. Ocelli absent. Postocular setae moderate in size, dilated.

Prothorax with anterior and posterior setae all well developed, dilated; midlateral setae minute. Epimeral sutures incomplete.

Pelta rectangular. Tube short but slightly longer than in *pullatus*.

FEMALE (macropterous).—Unknown.

MALE (apterous).—Similar to fe-

male but smaller. Abdominal tergite IX with lateral major posterior setae slightly shorter than in female. No abdominal glandular area discernible.

This species differs from *pullatus* principally by the characteristics mentioned in the key. The holotype slide, deposited in the Watson collection, contains a female collected on June 22, 1936, by J. R. Watson from dead fallen oak and pine leaves, and has the name and the word "holotype" crossed off in pencil for no good reason known to me. I accept this slide as the authentic holotype.

It has been found infrequently over our state in ground litter of forest or prairies.

Illinois records.—CHAMPAIGN COUNTY: Seymour, February 28, 1936, Farrar, under ryegrass, 1 ♀. COOK COUNTY: east of Elgin, Shoeactory Road hill prairie, October 10, 1952, Ross, Stannard, *Andropogon*, 4 ♀; Palos Park, December 14, 1932, Frison, Ross, from soil cover, 2 ♀. HANCOCK COUNTY: Nauvoo, July 25, 1959, Evers, Stannard, forest debris, 2 ♀, 2 ♂. POPE COUNTY: Eddyville, Hayes Creek Canyon, October 23, 1959, Sanderson, forest debris, 3 ♀.

Hoplandrothrips Hood

Phloeothrips subgenus *Hoplandrothrips* Hood (1912c:145). Type-species by original designation.—*Phloeothrips* (*Hoplandrothrips*) *xanthopus* Hood (= *jenei* Hood). Raised to full generic rank by Hood (1915e).

Phloeobiothrips Hood (1925a:127). Type-species by original designation.—*Phloeobiothrips tumiceps* Hood. Synonymized by Stannard (1957b).

Head moderate in size and not particularly arched to elongate and considerably arched on dorsum, surface of head weakly reticulate. Eyes usually moderate in size, somewhat bean-shaped, occasionally shorter but often longer than the combined length of antennal segments I and II. Ocelli present in macropterous and brachypterous forms. Postocular setae usually well developed, usually dilated at tips; males with postocular setae longer

than in female. Basal pair of cheek setae often stouter than the rest. Antennae eight segmented, segment III often asymmetrical in profile with one inner and one or two outer slender sense cones, segment VIII pedicellate or nonpedicellate. Mouth cone pointed or more or less pointed. Maxillary stylets retracted far into the head, usually touching within the center of the head.

Prothorax at the most weakly sculptured, with most major setae well developed, usually dilated at tips. Males, especially major forms, with anterolateral prothoracic setae longer, and anteromarginal setae shorter, than in female. Epimeral sutures complete. Praepectal plates absent. Metanotum strongly sculptured either with hexagonal reticulations or longitudinal striations, sometimes weakly marked at base. Macropterous or brachypterous. Fore wings when present often slightly constricted in the middle and with a slight bulge on the surface at the middle, always with several accessory fringe cilia. Fore legs each usually with a tarsal tooth (absent in females and some males of those placed in the subgenus *Phloeobiothrips*) which is usually enlarged in the male, with two inner subapical fore femoral spurs and one inner subbasal fore tibial spur in most males and some females—these spurs and fore tarsal teeth greatly enlarged in many major males.

Pelta small, bellshaped to nearly triangular, often hexagonally reticulate. Wing-holding setae well developed, usually sigmoidal. Major posterior setae on abdominal tergite IX pointed, blunt, or dilated, lateral pair in males reduced and always pointed. Males usually with a weak, small, circular glandular area on abdominal sternite VIII, occasionally this glandular area broad and occupying much of sternite VIII. Tube moderate in size, sometimes somewhat elongate.

Larvae without head horns.

This genus is, at times, difficult to separate from a number of other genera. In Illinois *Hoplandrothrips* may be distinguished from *Acanthothrips* either by the lack of numerous large cheek warts or by having only one pair of prominent prothoracic epim-

eral setae, from *Hoplothrips* by always having the metanotum strongly sculptured, and from *Malacothrips* by not having bulged eyes.

In the Oriental and Australian regions, *Ecacanthothrips* resembles *Hoplandrothrips* and both are seemingly derived from a common ancestor if not one from the other. *Ecacanthothrips* differs mainly in having four or more sense cones on antennal segment III (instead of two or three as in *Hoplandrothrips*) and these sense cones are greatly thickened.

The eight species that occur in Illinois may be divided into two subgenera, *Hoplandrothrips* s. str. and *Phloeobiothrips*, on the basis of whether the female bears a fore tarsal tooth. At present I do not feel it is necessary to give these divisions subgeneric rank. However, for convenient reference to the older literature, I have mentioned the subgenera in the key and in the name of each species, following the system used in *Anaphothrips* in the preceding suborder.

Priesner (1923) presented a key to the then-known species of this group.

KEY TO SPECIES

(Males, which have not been satisfactorily analyzed, are included only in part.)

1. Antennal segment III with one outer sense cone 2
Antennal segment III with two outer sense cones 3
2. Head greatly elongate; female without fore tarsal tooth *tumiceps*
Head not as elongate; female with fore tarsal tooth *microps*
3. Metanotum with closely spaced longitudinal striations *juniperinus*
Metanotal sculpture in the form of hexagonal reticulations; if reticulations elongate, sculpture never extremely closely spaced 4
4. Females without fore tarsal tooth; head greatly elongate 5
Females with fore tarsal tooth; head only moderately long 6
5. Tibiae brown *tumiceps*
Tibiae yellow or yellowish brown *insolens*
6. Middle pair of major posterior setae on abdominal tergite IX pointed *uzeli*
Middle pair of major posterior setae on abdominal tergite IX dilated 7
7. Tibiae yellow or yellowish brown; antennal segment III elongate *jennei*
Tibiae largely brown; antennal segment III shorter *pergandeii*

**Hoplandrothrips (Phloeobiothrips)
insolens Hood**

Phloeothrips (Hoplandrothrips) insolens
Hood (1912c:152). ♀. Type-
locality.—Dubois, Illinois.

FEMALE (macropterous).—Length distended over 2.6 mm. General color dark brown. Tibiae yellow to yellowish brown. Tarsi, basal two-thirds of antennal segment III, bases of antennal segments IV and V, and pedicel of antennal segment VI yellow. Fore wings pale yellow. Body with much red subintegumental pigment.

Head (Fig. 230) greatly elongate, considerably arched dorsally. Cheeks with four or five spines. Eyes relatively small. Postocular setae slightly longer than length of the eyes, dilated. Antennal segment III moderately elongate, with two outer sense cones; segment VIII with a broad pedicel.

Pronotal setae dilated. Metanotum hexagonally reticulate. Fore femora, tibiae, and tarsi unarmed.

Pelta bellshaped. Major posterior setae on abdominal tergite IX slightly

dilated to blunt. Tube moderately long.

MALE (macropterous).—Length distended, minor forms about 1.9 mm, major forms about 2.2 mm. Similar to female in general color and structure except for the following. Both forms with a small tooth on each of the fore tarsi, postocular and anterolateral setae longer, anteromarginal prothoracic setae shorter, and the lateral pair of the major posterior setae on abdominal tergite IX reduced and pointed. Major forms only with two pairs of subapical spurs on the inner surface of each of the fore femora and with a slight subbasal bump on the inner surface of each of the fore tibiae. Glandular area, if present on abdominal sternite VIII, not discernible in specimens I have seen.

This species is closely related to *tumiceps*. *Hoplandrothrips insolens* has the tibiae and tarsi yellow to yellowish brown, has more yellow color in antennal segment III, is macropterous, and has a longer metanotum, whereas *tumiceps* has the tibiae and tarsi brown, has more brown color in antennal segment III, is brachypterous as far as is known, and has a shorter metanotum. The shape of the pelta can also be used to distinguish these species.

Possibly *insolens* occurs throughout the state although the only northern records are from the Chicago region. It has been collected primarily from dead branches.

Illinois records.—CHAMPAIGN COUNTY: Homer (Hood 1925). COOK COUNTY: Orland Park, May 12, 1950, Stannard, dead willow and cottonwood, 1 ♀, 10 larvae. FULTON COUNTY: Anderson Lake Recreation Area, September 8, 1954, Ross, Stannard, dead willow, 1 ♀. JEFFERSON COUNTY: Mt. Vernon, May 9, 1951, Sanderson, Stannard, dead oak branches, 1 ♀, 1 ♂. LAWRENCE COUNTY: West Port, September 15, 1949, Ross, Stannard, willow branches, 1 ♀. MARSHALL COUNTY: Lacon, March 26, 1949, Evers, Stannard, under soft maple bark, 2 ♀. MASON COUNTY: Havana, November 9, 1943, Ross, Sanderson, ground cover, 1 ♂. PERRY

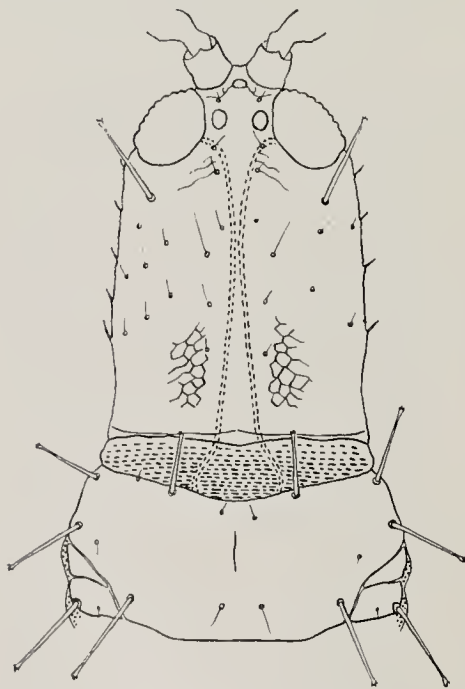


Fig. 230.—*Hoplandrothrips (Phloeobiothrips) insolens*, head and prothorax.

COUNTY: Pyatts, October 28, 1964, Stannard, forest litter, 1 ♀. WASHINGTON COUNTY: Dubois (Hood 1912).

Hoplandrothrips (Hoplandrothrips) jennei (Jones)

Phloeothrips jennei Jones, P. R. (1912: 21). ♀. Type-locality.—Barnesville, Georgia. Transferred to *Hoplandrothrips* by Priesner (1923).

Phloeothrips (*Hoplandrothrips*) *xanthopus* Hood (1912c:145). ♀. Type-locality.—Pulaski, Illinois. New synonymy.

Phloeothrips floridensis Watson (1913: 147). ♀, ♂. Type-locality.—Gainesville, Florida. Synonymized by Hood (1927b).

Hoplandrothrips lateralis Stannard (1963b:137). ♀. Type-locality.—Seymour, Illinois. New synonymy.

FEMALE (macropterous).—Length distended about 2.5 mm. General color dark brown. Tibiae and median streak on abdominal tergites II–VIII yellowish to brown. Tibiae often in part yellow. Tarsi yellow. Antennal segment III except apical third, and segments IV–VII basally, yellow. Fore wings pale yellow. Body with much red subintegumental pigment.

Head (Fig. 231) moderately long. Cheeks with several spines, usually the basal pair being slightly thicker than the others. Postocular setae long, dilated. Antennal segment III elongate, with two outer sense cones; segment VIII broadly attached to segment VII, with a slight indication of a pedicel.

Major prothoracic setae dilated. Metanotum with hexagonal reticulations. Fore femora and tibiae not armed. Fore tarsi each with a moderate-sized tooth.

Major posterior setae on abdominal tergite IX with mid pair dilated, lateral pair long, pointed.

MALE (macropterous).—Length of major form distended about 2.5 mm, minor forms about 1.7 mm. General color and structure as in female with the following exceptions. Postocular and anterolateral prothoracic setae relatively long, anteromarginal prothoracic setae short. Major forms

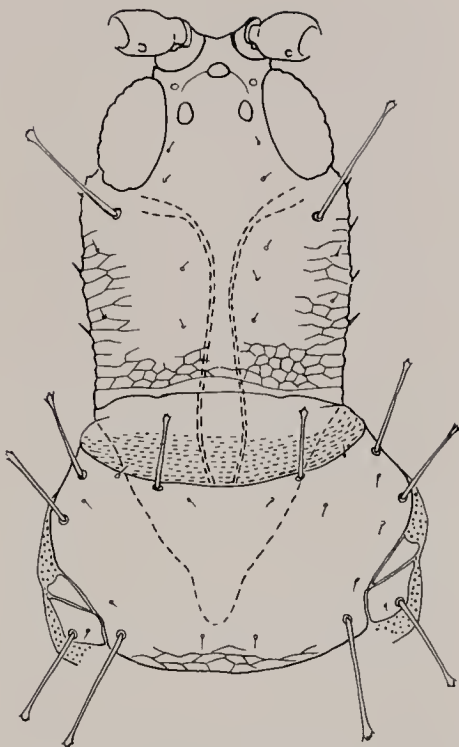


Fig. 231.—*Hoplandrothrips* (*Hoplandrothrips*) *jennei*, head and prothorax.

with fore legs enlarged, fore femora with two subapical spurs on inner surface, fore tibiae with a subbasal spur on inner surface, fore tarsi each with a greatly enlarged tooth. Minor forms with fore legs unarmed similar to female. Abdominal sternite VIII with a circular glandular area. Abdominal tergite IX with lateral setae reduced in size.

From *scutellaris* of New York state, *jennei* differs in not having all the major posterior setae of abdominal tergite IX decidedly dilated.

Phloeothrips floridensis Watson was sunk under *jennei* by Hood (1927b). Although the types are missing from the Watson collection and verification of this supposed synonymy is not possible, it seems expedient to accept Hood's decision.

My species *lateralis* was described before it was possible to see the Jones type which was kept in the then-forbidden Hood collection and before additional specimens were available.

I had separated *lateralis* from *xanthopus* on the basis of differences in the female sex, including the slightly longer head of *lateralis* and the fact that the major lateral posterior setae on abdominal tergite IX are pointed, not blunt, as in specimens of *xanthopus* in the collections of the Illinois Natural History Survey. After studies of more specimens it appears that the condition of these setae grade from pointed to blunt, and that even the leg color varies somewhat. As I later learned, Hood had his collection arranged to indicate that he also thought *xanthopus* was similar to, if not the same as, *jennei*.

In specimens of *jennei* from Texas, collected by Hood, the postocular setae are slightly shorter than in specimens from Illinois.

Illinois records.—Found every season of the year from grass, herbs, or branches, from one to several localities in the following counties: CHAMPAIGN, CLARK, CLINTON, COOK, DOUGLAS, EDGAR, HARDIN, IROQUOIS, JACKSON, KANE, MASON, MASSAC, MONROE, OGLE, PIATT, POPE, PULASKI, SANGAMON, and VERMILION.

Hoplandrothrips (Hoplandrothrips) juniperinus Hood

Phloeothrips (Hoplandrothrips) juniperinus Hood (1912c:146). ♀, ♂. Type-locality.—Plummer's Island, Maryland.

Hoplandrothrips proximus Hood (1927c:230). ♀, ♂. Type-locality.—Macedon, New York. New synonymy.

FEMALE (macropterous).—Length distended about 2.8 mm. General color dark brown. Antennal segment III except apex, basal third of segment IV, and pedicel of segment V yellow. Fore wings colorless. Body with much red subintegumental pigment.

Head moderate in size. Cheeks roughened by presence of many small wartlike tubercules. Basal cheek spines not particularly larger than the others. Postocular setae slightly shorter than length of eyes, dilated. Eyes moderate in size. Antennal segment III elongate, with two outer sense cones; seg-

ment VIII with a short, very broad pedicel.

Major prothoracic setae dilated. Metanotum with closely spaced longitudinal striations. Fore femora and tibiae unarmed. Fore tarsi each with a moderate-sized tooth.

Major posterior setae on abdominal tergite IX dilated. Tube moderately long.

MALE (macropterous).—Length distended about 2.4 mm. Similar to female in general color and structure with the following exceptions. Postocular and anterolateral prothoracic setae longer, anteromarginal setae somewhat shorter. Fore femora with two small subapical spurs on inner surface, fore tibiae each with a small subbasal spur, fore tarsal teeth larger. Abdominal tergite IX with major lateral setae reduced, pointed. Glandular area, if present, not discernible on abdominal sternite VIII. All males known to me intermediate between minor and major forms.

This species may be recognized by the nearly uniform dark color, elongated third antennal segment, and closely spaced longitudinal striations on the metanotum.

So far *juniperinus* has been found only in the northern half of Illinois. It occurs on dead branches, including those of eastern red cedar (*Juniperus*).

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 6, 1952, Richards, Stannard, on red cedar, 1 ♀, 4 larvae. CARROLL COUNTY: Palisades State Park, August 7, 1959, Stannard, dead branches, 2 ♂. CLARK COUNTY: Clarksville (Rocky Branch), September 14, 1949, Ross, Stannard, dead branches, 1 ♀. COOK COUNTY: Che-Che-Pinqua Woods, September 8, 1949, Ross, Stannard, dead twigs, 1 ♀, 2 larvae; Western Springs, June 16, 1949, Ross, Stannard, dead willow twigs, 3 ♀, 4 ♂. EDGAR COUNTY: Paris (Foley's Woods), June 14, 1950, Sanderson, Stannard, dead branches, 1 ♀, 1 ♂. JO DAVIESS COUNTY: Apple River Canyon State Park, August 25, 1949, Smith, Stannard, red cedar, 2 ♀, 2 larvae; May 10, 1955, Evers, Stannard, dead branches, 1 ♀. JOHNSON

COUNTY: Fern Cliff State Park, August 27, 1952, Ross, Stannard, dead branch, 1 ♀.

Hoplandrothrips (Hoplandrothrips) microps Hood

Phlaeothrips (Hoplandrothrips) microps Hood (1912c:150). ♀, ♂. Type-locality.—Marion, Illinois.

FEMALE (macropterous).—Length distended about 2.6 mm. Color dark brown except base of antennal segment III and pedicels of segments IV and V which are yellow to yellowish brown.

Head (Fig. 232) moderately elongate, slightly arched dorsally. Cheeks with four to six spines, the basal one just slightly larger than the rest. Eyes small, shorter than the combined length of antennal segments I and II. Postocular setae nearly equal to length of the eyes, dilated. Antennal segment

III elongate, with one outer sense cone; segment VIII broadly attached to segment VII and without a pedicel.

Major pronotal setae dilated. Metanotum with hexagonal reticulations. Fore femora and tibiae not armed. Fore tarsi each with a moderate-sized tooth.

Pelta triangular. Major posterior setae on abdominal tergite IX with mid pair dilated and lateral pair pointed.

FEMALE (brachypterous).—Similar to macropterous female except wings reduced to pads.

MALE (brachypterous).—Length distended, minor forms 1.6 mm, major forms nearly 2 mm. Similar to female with the following exceptions. Postocular setae much longer, anterolateral prothoracic setae longer, anteromarginal prothoracic setae slightly shorter. Tibiae and tarsi yellowish brown to yellow, fore femora with two subapical spurs on inner surface, fore tibiae with a subbasal and subapical spur, fore tarsal tooth longer. Major forms with spurs on fore legs larger than in minor forms. Abdominal sternite VIII with glandular area, if present, not discernible in specimens I have seen. Major posterior setae on abdominal tergite IX pointed, lateral pair reduced.

This is the only species of the genus in Illinois which has but one outer sense cone on antennal segment III and in which the female bears a fore tarsal tooth. It bridges the gap nicely between those which have the head moderate in size and a slight dorsal arch, as for example *jenneti*, and those such as *insolens* which have the head greatly elongated and considerably arched.

Hoplandrothrips microps has been taken throughout the state on dead branches and under bark.

Illinois records.—Collected from middle spring to middle autumn from one to several localities in the following counties: ADAMS, COOK (Hood 1912c), CRAWFORD, JACKSON, JOHNSON, MARION, MASSAC, MORGAN, PIKE, POPE, PULASKI, RANDOLPH, WASHINGTON (Hood 1912c), WILLIAMSON (Hood 1912c), and WINNEBAGO (Hood 1912c).

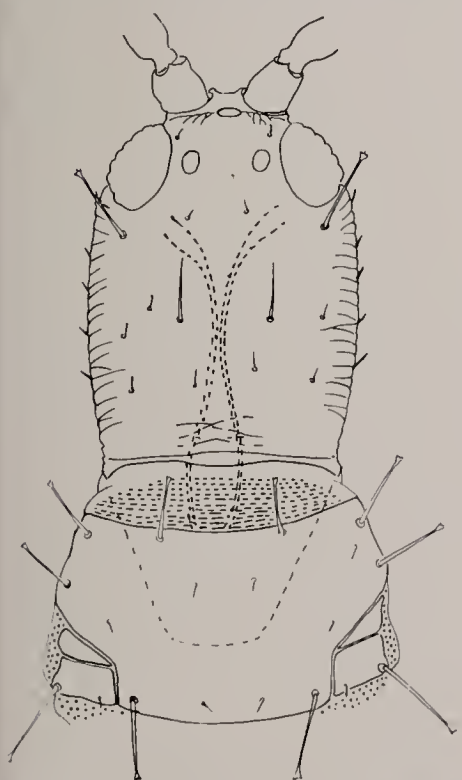


Fig. 232.—*Hoplandrothrips (Hoplandrothrips) microps*, head and prothorax.

**Hoplandrothrips (Hoplandrothrips)
pergandei (Hinds)**

Phloeothrips pergandei Hinds (1902: 197). ♀. Type-locality.—Amherst, Massachusetts. Transferred to *Hoplandrothrips* and redescribed by Hood (1942).

Phloeothrips (Hoplandrothrips) funebris Hood (1912c:148). ♀, ♂. Type-locality.—Carbondale, Illinois. New synonymy.

FEMALE (macropterous).—Length distended about 2.3 mm. General color dark brown. Tarsi and tip of each of the tibiae yellowish brown. Antennae varying from nearly entirely brown to brown with bases of segments III–VI yellow, sometimes margins of segment III and even IV yellow. Fore wings colorless. Body with much red subintegumental pigment.

Head (Fig. 233) moderate in size. Cheeks with a pair of strong basal spines. Eyes moderate in size. Post-

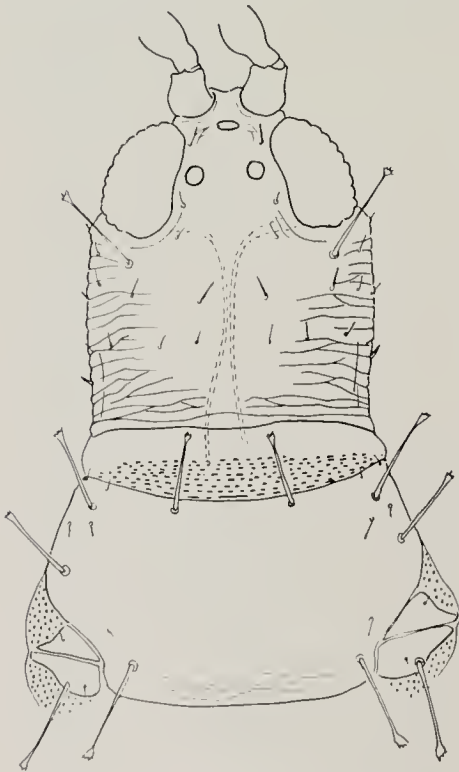


Fig. 233.—*Hoplandrothrips (Hoplandrothrips) pergandei*, head and prothorax.

ocular setae dilated, nearly equal to the length of the eyes. Antennal segment III relatively short with two outer sense cones, segment VIII broadly attached to segment VII and without a pedicel.

Major pronotal setae dilated. Metanotum with hexagonal reticulations elongate but not to the point of becoming longitudinally striate as in *juniperinus*. Fore femora and tibiae not armed. Fore tarsi each with a small tooth.

Pelta as in Fig. 234. Major posterior setae on abdominal tergite IX dilated at tip. Major tube setae long.

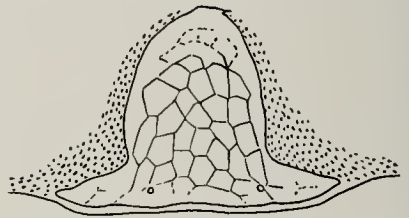


Fig. 234.—*Hoplandrothrips (Hoplandrothrips) pergandei*, pelta.

MALE (macropterous).—Length distended about 2 mm. Minor form similar to female except with two small subapical spurs on the inner side of each of the femora, with anterolateral prothoracic setae enlarged, and with anteromarginal setae reduced. Major forms with fore legs slightly more enlarged, with subapical fore femoral spurs larger, with evidence of a small subbasal spur on the inner surface of the fore tibiae, and with larger fore tarsal teeth. Abdominal sternite VIII with a small circular glandular area. Abdominal tergite IX with lateral setae reduced in size and pointed.

This species may be distinguished by the dark color of the legs, the non-pedicellate antennal segment VIII, the compact form of antennal segment III, and the dilated form of the tips of all major setae on abdominal tergite VIII.

According to Hood (1912c), *funebris*, here considered a synonym, generally has antennal segment III brown. Certain populations have since been found, however, in which the

specimens consistently have much yellow in antennal segment III as well as in other segments. All degrees of gradation of color of antennal segment III have been noted in our collections and presumably all representatives are conspecific. The type of *pergandei* has the intermediate antennal segments yellow at the bases. It would seem, therefore, that Hinds described the northern, stockier phase with lighter antennae whereas Hood in naming *funnebris* described the southern, smaller phase with darker antennae.

Hoplandrothrips pergandei occurs throughout the state on dead branches.

Illinois records.—Collected from May to October, from one to several localities in the following counties: ADAMS, CALHOUN, CARROLL, CLARK, CLINTON, COLES, COOK, CRAWFORD, CUMBERLAND, EDGAR, HARDIN, JACKSON, JASPER, KANE, LAWRENCE, LEE, MASON, MONROE, PIATT (Hood 1912c), PIKE, POPE, PULASKI, RANDOLPH, SCHUYLER, UNION, and VERMILION.

Hoplandrothrips (Phloeobiothrips) tumiceps Hood

Phloeobiothrips tumiceps Hood (1925a: 127). ♀, ♂. Type-locality.—Macedon, New York.

FEMALE (brachypterous).—Length distended about 2.4 mm. Almost entirely dark brown. Tarsi lighter brown. Basal half of antennal segment III and pedicels of segments IV–VI yellow to yellowish brown. Body with much red subintegumental pigment.

Head greatly elongate, considerably arched dorsally. Cheeks with three to six spineferous tubercules. Eyes relatively small. Postocular setae longer than the length of the eyes, dilated. Antennal segment III moderately elongate, with one outer sense cone (Hood, 1925, reported two outer sense cones); segment VIII with a broad pedicel.

Pronotal setae dilated. Metanotum weakly hexagonally reticulate, shorter than in *insolens*. Fore femora, tibiae, and tarsi unarmed.

Pelta nearly triangular. Major pos-

terior setae on abdominal tergite IX blunt. Tube moderately long.

MALE (brachypterous).—Unknown to me. According to Hood (1925a), similar to female in color and structure; fore tarsi each either armed with a short, blunt tooth, or unarmed.

Points of difference between this species and the closely related *insolens* are mentioned in the discussion of *insolens* and in the key.

Apparently *tumiceps* is a northern species, whereas its biological equivalent, *insolens*, occurs in more southern areas. So far *Hoplandrothrips tumiceps* has been taken three times in Illinois. It is also known from New York (Hood 1925a) and from the Quetico Provincial Park in Ontario (INHS).

Illinois records.—LAKE COUNTY: Volo Bog, October 8, 1953, Evers, Stannard, dead poison sumac leaf, 1 ♀; Wauconda Bog, September 22, 1961, Stannard, dead branch, 1 ♀. LA SALLE COUNTY: Streator, August 26, 1949, Smith, Stannard, dead willow branch, 1 ♀.

Hoplandrothrips (Hoplandrothrips) uzeli (Hinds)

Phloeothrips uzeli Hinds (1902:196). ♀, ♂. Type-locality.—Amherst, Massachusetts. Transferred to *Hoplandrothrips* by Hood (1912c).

FEMALE (macropterous).—Length distended about 2.5 mm. General color brown, being darkest in head, thorax, and terminal segments of abdomen, becoming yellowish brown to nearly yellow in basal abdominal segments except for median anterior spots which are always brown. Antennae brown except basal half of segment III and pedicels of IV and V which are yellow. Tibiae and tarsi yellow. Wings colorless. Body with much red subintegumental pigment.

Head moderate in size. Cheeks with a prominent basal spine on each side. Eyes small, much shorter than the combined length of antennal segments I and II. Postocular setae long, dilated. Antennal segment III shorter than in *jennetii*, with two outer sense cones; segment VIII with a slender pedicel.

Prothorax with most major setae long, dilated; anteromarginal setae small. Metanotum smooth basally, weakly hexagonally reticulate posteriorly. Fore femora and tibiae unarmed. Fore tarsi each with moderate-sized tooth. Major posterior setae on abdominal tergite IX pointed. Tube moderately long.

MALE (macropterous).—Length distended, major forms about 2.4 mm, minor forms about 1.8 mm. Similar to female in general color and structure. Minor forms with at most a pair of small inner apical teeth on each of the fore femora, and a slight wartlike tooth on the inner basal angle of each of the fore tibiae. Major forms tend to have the basal segments of the abdomen darker; head, prothorax, and fore legs enlarged; two prominent inner apical teeth on each of the fore femora; a prominent subbasal fore tibial tooth; and the major head and prothoracic setae elongated. Abdominal sternite VIII seemingly with a small, circular glandular area. Abdominal tergite IX in all males with the lateral posterior setae reduced.

By the characteristics of the small eyes, the well-defined narrow pedicel on antennal segment VIII, and the pointed major setae on abdominal tergite IX in the female, this species may be easily distinguished from others in the Illinois fauna.

So far specimens of *uzeli* have been found only once in our state. The species occurs in grasses, particularly *Andropogon*.

Illinois records.—WAYNE COUNTY: Fairfield, August 17, 1951, Ross, Stannard, sod of *Andropogon*, 6 ♀, 11 ♂, 16 immatures.

Hoplothrips Amyot and Serville

Phlaeothrips Haliday (1836:441).

Type-species designation by Blanchard (1845).—*Thrips ulmi* Fabricius. Considered valid by Stannard (1957b) misidentification notwithstanding. Suppression of this designation requested by Mound (1966) to the International Commission on Zoological Nomenclature.

Hoplothrips Amyot and Serville (1843: 640). Type-species by subsequent

designation by Karny (1912b).—*Thrips corticis* DeGeer. Synonymized by Stannard (1957b). Placement of this name on the Official List of Generic Names in Zoology requested by Mound (1966) to the International Commission on Zoological Nomenclature.

Trichothrips Uzel (1895:246). Type-species by subsequent designation by Hood (1915e).—*Phlaeothrips pedicularia* Haliday. Synonymized by Stannard (1957b).

Dolerothrips Bagnall (1910b:682). Type-species by original designation.—*Dolerothrips flavipes* Bagnall. Synonymized by Stannard (1957b).

Pygmaeothrips Karny (1920:40). Type-species by monotypy.—*Pygmaeothrips columniceps* Karny. Synonymized by Stannard (1957b).

Neoeurhynchothrips Watson (1924a: 77). Type-species by original designation.—*Neoeurhynchothrips cubensis* Watson. Synonymized by Stannard (1957b).

Polyporotheus Watson (1927a:61). Type-species by original designation.—*Polyporotheus longipilosus* Watson. Synonymized by Stannard (1957b).

Head as broad as long to longer than broad, sometimes slightly arched on dorsum. Surface of head smooth to weakly reticulate, rarely warty. Eyes small to moderate in size, usually not much longer than length of antennal segment I, sometimes reduced to a few dorsal facets. Ocelli present in macropterous forms; present, reduced, or absent in brachypterous forms; absent in apterous forms. Postocular setae well developed, dilated to pointed. Basal cheek setae usually stouter than the rest, especially in major forms. Antennae eight segmented; segment III longer than II, with one inner and one or two outer sense cones; segment IV with two to four apical sense cones; segment VIII pedicellate, often lanceolate, or without pedicel and closely joined to segment VII. Mouth cone broadly rounded (Fig. 197) to pointed (Fig. 196). Maxillary stylets slender, often sigmoidal and nearly touching within center of head (Fig. 176).

Prothorax smooth to weakly sculptured, with most major setae well developed, pointed or dilated. Anteromarginal setae often minute, anterolateral setae longer in major forms than in minor forms. Epimeral sutures complete. Praepectus usually absent, present in one species in Illinois (*flavicauda*). Metanotum never strongly sculptured. Macropterous, brachypterous, or apterous. Fore wings when present usually not constricted in the middle, always with accessory fringe cilia. Fore legs not enlarged in minor forms, greatly enlarged in major forms, with or without fore tarsal teeth, sometimes fore tibiae and femora armed in major males much in the manner of *Hoplandrothrips*.

Pelta normally small and roughly triangular, especially in winged forms, occasionally fairly large in apterous forms. Wing-holding setae present in macropterous forms but not always strongly developed, often absent in brachypterous forms, always absent in apterous forms. Lateral abdominal setae pointed or dilated. Major posterior setae on abdominal tergite IX usually pointed, lateral pair in males reduced and pointed. Males usually with glandular area on abdominal sternite VIII, circular to oval to transversely band-like. Tube short to moderately long.

This genus is difficult to characterize because of the presence of so many forms. Additional complications arise because the extremes of the genus nearly grade into species in other genera.

In general, species of *Hoplothrips* lack strong reticulations, especially metanotal reticulations, which immediately separates them from *Hoplandrothrips* and from many *Liothrips*; each lacks a definite maxillary bridge, which usually separates them from *Haplothrips*; and each has slender maxillary stylets, which separates them from *Polyphemothrips*. Other characteristics, mentioned in the key to the genera and in the descriptions which follow, distinguish these species from the remainder of the family when the Illinois fauna only is considered.

Eleven species have so far been found in our state. Several of these,

smithi, *fumiceps*, and *terminalis* are rare, but some, such as *pergandei* and *beachae*, are often abundant. In fact, *pergandei* is one of the most common thrips in the forest litter of the Carolinian and Austroriparian faunal zones of eastern North America.

KEY TO SPECIES

- 1. Antennal segment IV greatly enlarged, with many minute sense cones on ventral surface...macropterous ♀ *fieldsi*
Antennal segment IV not greatly enlarged and without numerous minute sense cones on ventral surface.....2
- 2. Antennal segment VIII closely joined to segment VII, without discernible pedicel.....3
Antennal segment VIII pedicellate or lanceolate, with a broad or narrow pedicel.....4
- 3. Antennal segments IV-VIII, usually, pedicels of IV and V, and apical three-fourths of tube dark brown....*fieldsi*
Antennal segments mostly yellow although last two segments yellowish brown to brown; tube yellowish brown to yellowish orange.....*anomocerus*
- 4. Maxillary stylets, when retracted, forming a V within head.....*smithi*
Maxillary stylets, when retracted, closely placed within center of head.....5
- 5. Fore femora each with two inner subapical teeth and fore tibiae each with one subbasal tooth.....
.....major males of *flavicauda*
Fore femora and tibiae unarmed.....6
- 6. Praepectus present... (in part) *flavicauda*
Praepectus absent.....7
- 7. Prothorax with anteromarginal setae well developed, as long or nearly as long as anterolateral setae (Fig. 237).....8
Prothorax with anteromarginal setae small to minute, much smaller than anterolateral setae (Fig. 245).....10
- 8. Abdomen with most lateral setae dilated; head usually proportionately very long.....*angusticeps*
Abdomen with most lateral setae pointed; head usually not as long.....9
- 9. Antennal segment IV with two inner and two outer sense cones.....*terminalis*
Antennal segment IV with one inner and two outer sense cones.....*americanus*
- 10. Tube predominantly orange-yellow...11
Tube predominantly brown.....12
- 11. Antennal segment VII with apical sense cone placed dorsally.....*pergandei*
Antennal segment VII with apical sense cone placed on lateral angle...*fumiceps*
- 12. Eyes set in from cheek margins; all tibiae and tarsi usually sharply contrastingly yellow.....*corticis*
Eyes not particularly set in from cheek margins; mid and hind tibiae brown...
.....*beachae*

Hoplothrips americanus (Hood),
generic reassignment

Trichothrips americanus Hood (1908c: 366). ♀, ♂. Type-locality.—Not stated but holotype labeled Urbana, Illinois. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended about 1.8 mm. General color brown and yellow. Yellow: head, pedicel of antennal segment III, legs, and abdominal segments VIII–X, except tip of tube (X) which is gray. Yellowish brown: antennal segments I and II and most of pterothorax and abdominal tergite I. Brown: antennal segments III–VIII except pedicel of segment III, prothorax, and abdominal segments II–VII. Sometimes individuals darker, with head, most of abdomen except tube, and femora yellowish brown to brown. Body with much red subintegumental pigment.

Head about as long as wide to slightly longer than wide. Eyes small, varying from a few to about a dozen dorsal facets. Ocelli absent. Postocular setae long, pointed, blunt or dilated. Antennal segments III–VIII each with a sharply narrowed pedicel, segment III with one inner and two outer sense cones, segment IV with one inner and two outer sense cones, segment VIII decidedly lanceolate. Mouth cone moderately long, rounded to almost pointed.

Prothorax with major setae well developed; anteromarginal setae often longer than the anterolateral setae, these setae pointed, blunt or dilated. Fore legs enlarged, each fore tarsus armed with a small to minute tooth. Wings reduced to pads.

Pelta (Fig. 235) in the shape of a broad transverse oval. Abdominal tergites without differentiated wing-

holding setae. Most lateral setae on abdominal tergites pointed to slightly blunt. Abdominal tergite IX with major setae long and pointed. Tube moderate in size.

FEMALE (macropterous).—Length distended about 2.1 mm. Similar in color to most brachypterous females, or darker. Darker individuals with body and femora generally brown, antennal segments I and II brown to yellowish brown, remainder of antennae dark brown. Tibiae and tarsi yellow. Wings light brown.

Similar to brachypterous female in structure with the following exceptions. Eyes much larger. Ocelli present. Mouth cone shorter. Wings fully developed, fore wings without accessory fringe cilia. Pelta more nearly triangular. Abdominal tergites with sigmoidal wing-holding setae.

MALE (brachypterous).—Length distended about 1.7 mm. Similar in color to brachypterous female including darker phase. Similar in structure to brachypterous female except for the following. Fore tarsi each armed with a slightly larger tooth. Anteromarginal setae of prothorax slightly smaller than anterolateral setae. Abdominal sternite VIII (Fig. 60) with a narrow, transverse, median glandular area. Abdominal tergite IX with major lateral posterior setae reduced in size.

This species belongs to that group of *Hoplothrips* of fairly light color that have the anteromarginal setae of the prothorax well developed. From *angusticeps*, which it resembles, *americanus* may be distinguished by the pointed, not dilated lateral abdominal setae.

Hoplothrips americanus is common under bark of rotting logs and stumps and forest leaf litter throughout Illinois.

Illinois records.—Found every month of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, BOND, CALHOUN, CHAMPAIGN, COOK, CUMBERLAND, EFFINGHAM, JACKSON (Hood 1908c), JEFFERSON, JOHNSON, KANE, LA SALLE, MASON, MCLEAN, PERRY, PIATT, POPE, PUTNAM, RICHLAND, ST. CLAIR, VERMILION, and WOODFORD.

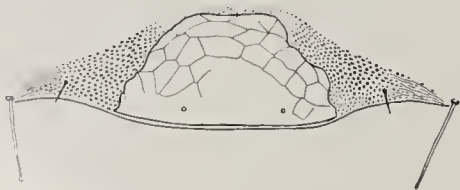


Fig. 235.—*Hoplothrips americanus*, ♀ macropterous, pelta.

Hoplothrips angusticeps (Hood),
generic reassignment

Trichothrips angusticeps Hood (1908c: 367). ♀, ♂. Type-locality.—Not given, but holotype labeled St. Joseph, Illinois. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (brachypterous) (Fig. 236).—Length distended about 1.7 mm. General color brownish yellow. Head, prothorax, basal margins of most abdominal tergites, and posterior margin

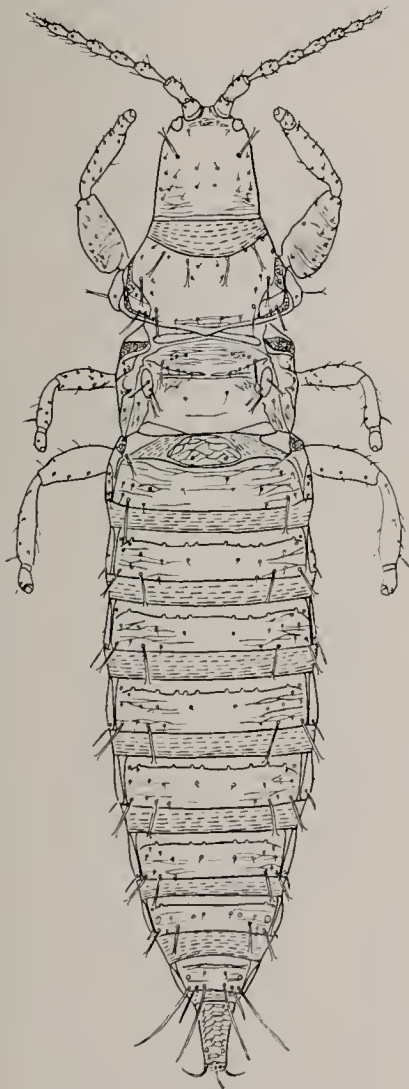


Fig. 236.—*Hoplothrips angusticeps*, dorsal aspect.

of abdominal tergite IX often brown; legs usually, and head sometimes, yellow. Tube usually yellow at base and tipped with gray. Antennal segments I, II, and base of III yellowish brown, remainder of antennae dark brown. Body with subintegumental pigment which appears dark gray by transmitted light.

Head (Fig. 237) usually much longer than wide and slightly arched. Eyes small with only a few dorsal facets. Ocelli absent. Postocular setae long, dilated. Antennal segments III–VIII each with a sharply narrowed pedicel, segment III with one inner and two outer sense cones, segment VIII decidedly lanceolate. Mouth cone (Fig. 196) moderately long, pointed.

Prothorax with major setae well developed, dilated; anteromarginal setae fully as long as anterolateral setae. Fore tarsi each with a small to minute tooth. Wings reduced to pads.

Pelta (Fig. 239) roughly triangular. Abdominal tergites without differentiated wing-holding setae. Most lateral setae on abdominal tergites usually greatly dilated (rarely blunt). Abdominal tergite IX with major posterior setae long and pointed. Tube short.

FEMALE (macropterous).—Length distended about 2.2 mm. Color brown except tibiae and tarsi which are yellow, head usually darkest. Wings light brown. Body with red subintegumental pigment.

Similar in structure to brachypterous female with the following exceptions. Eyes much larger, composed of many dorsal facets (Fig. 238). Ocelli present. Intermediate antennal segments usually more elongate. Wings fully developed, fore wings with accessory fringe cilia. Abdominal tergites with sigmoidal wing-holding setae.

♂ MALE (brachypterous).—Length distended over 1.5 mm—minor forms slightly smaller than major forms. Similar to brachypterous female in color and structure with the following exceptions. Major forms tend to be slightly darker in color. Rudiment of fore ocellus present. Fore legs somewhat enlarged in minor forms, greatly enlarged in major forms. Fore tarsi

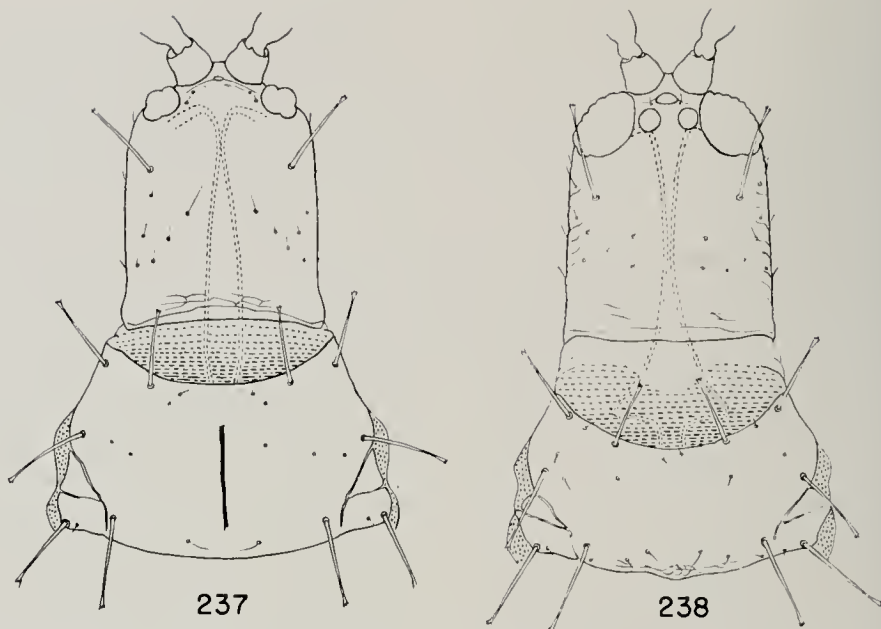


Fig. 237-238.—Head and prothorax; 237, *Hoplothrips angusticeps*, brachypterous; 238, *Hoplothrips angusticeps*, macropterous.

each with a large tooth. Anteromarginal setae of prothorax slightly smaller than anterolateral setae. Abdominal sternite VIII with a median elliptical glandular area. Abdominal tergite IX with major lateral posterior setae reduced in size.

This species is one of the group of moderately light-colored *Hoplothrips* which have the anteromarginal posterior setae about as long as the anterolateral setae. Its color, head size, and size of antennal segments are subject to some variation but the extent and distributions of these variants have not been analyzed yet in the populations. *Hoplothrips angusticeps* differs from its relative *americanus* in having most of the lateral setae of the abdomen dilated, usually in having a

longer head, and often in having a less contrasting, darker abdomen. According to the literature, the species *leibyi* (Hood) resembles *angusticeps* closely but I do not know *leibyi* and therefore, cannot differentiate the two at present.

Throughout Illinois this species is common under dead bark. Dr. R. C. Graves has taken specimens at Des Plaines, Illinois, from the fungus *Polyporus gilvus*. Apparently it (or very close relatives which have not yet been differentiated) ranges from Michigan to Costa Rica. Additional specimens from Micronesia in the collections of several American museums may also be members of this species as may *feracous* (formerly placed in *Pygmaeothrips*) from Sumatra.

Illinois records.—Found every month of the year, from one to several localities in the following counties: ADAMS, CHAMPAIGN, CLARK, COLES, COOK, FAYETTE, JACKSON, POPE, PULASKI, PUTNAM, RANDOLPH, RICHLAND, UNION, VERMILION, and WOODFORD.



Fig. 239.—*Hoplothrips angusticeps*, pelta.

Hoplothrips anomocerus (Hood).
generic reassignment

Trichothrips anomocerus Hood (1912d: 137). ♀, ♂. Type-locality.—Plummer's Island, Maryland. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended about 2 mm. General color nearly entirely yellow to predominantly yellowish brown. Tips of antennae often yellowish brown to brown, tube usually yellowish yellowish brown to yellowish orange. Darker specimens with head, thorax, and anterior margin of abdominal tergites II–VIII yellowish brown to brown. Body with much purple subintegumental pigment.

Head moderate in size with cheeks straight. Eyes reduced to several dorsal and several ventral facets. Ocelli absent. Postocular setae moderately long and pointed. Antennal segment III with pedicel weakly striate, with one inner and one outer sense cone (occasionally or abnormally with two outer sense cones); segments VII and VIII compactly united. Maxillary stylets slender, retracted far into head and touching in the middle of the head. Mouth cone moderately long, rounded to almost pointed.

Pronotum with most major setae well developed, pointed; anteromarginal setae small. Mesospinasternum absent. Fore legs somewhat enlarged; fore tarsi each armed with a tooth. Fore wings reduced to tiny pads, hind wings apparently entirely absent.

Pelta roughly triangular. Abdominal tergites without differentiated wing-holding setae. Abdominal tergite II fractured into tiny platelets at sides. Abdominal tergite IX with major posterior setae moderately long and pointed. Tube short and stout.

FEMALE (macropterous).—Length distended over 2.2 mm. Similar in color to dark-colored brachypterous female. Similar in structure to brachypterous female with the following exceptions. Eyes much larger with many dorsal facets. Ocelli present and fully developed. Wings fully developed

but partially destroyed in the single specimen I have studied. Abdominal tergite II seemingly nearly complete at sides. Wing-holding setae sigmoidal.

MALE (brachypterous).—Length distended about 1.8 mm. Color generally yellow except antennal segments VII and VIII yellowish brown and tube yellowish orange. Similar to brachypterous female with the following exceptions. Fore tarsal teeth slightly enlarged. Prothorax larger. Abdominal tergite IX with lateral posterior setae shorter and thicker. Abdominal sternite VIII, near the posterior border, with a narrow transverse glandular area which is separated in the middle and divided into two parts.

This distinctive species was originally related to *Polyphemothrips ambitus* on the basis of the similarity of the compactly united terminal antennal segments. The two can be easily separated by the following features. *Polyphemothrips ambitus* has thicker maxillary stylets, a longer head, differently colored antennae, and has the tube tipped with black. The compact form of antennal segments VII and VIII and the lack of strong serrations on the pedicel of antennal segment III distinguish *anomocerus* from other species of *Hoplothrips* in Illinois.

In collections, *anomocerus* is scarce and little is known of its habits. Hood (1917) records specimens from the bark of sycamore and grape. Watson (1945) considers this species to be common in forest ground litter. We have taken it in scattered places throughout Illinois, mostly in forest litter.

Illinois records.—ALEXANDER COUNTY: Olive Branch, March 15, 1960, Stannard, forest debris, 1 ♀. BOND COUNTY: Greenville, October 26, 1956, Ross, Smith, Stannard, woodland debris, 2 ♀. CHAMPAIGN COUNTY: Urbana (Busey's Woods), October 12, 1955, Kingsolver, forest debris, 1 ♀. COOK COUNTY: Oakland, October 19, 1947, Stannard, ground cover, 2 ♀, 1 ♂. HAMILTON COUNTY: Broughton, May 2, 1956, Stannard, dead branch, 1 ♀. LAKE COUNTY:

Wauconda, March 16, 1933, Frison, Mohr, tamarack bog, 1 ♀. PERRY COUNTY: Pyatts, November 12, 1964, Stannard, forest debris, 5 ♀, 4 ♂. RICHLAND COUNTY: Olney, November 9, 1953, Smith, Stannard, forest debris, 1 ♀.

Hoplothrips beachae (Hinds),
emended spelling and generic
reassignment

Trichothrips beachi Hinds (1902:192).
♀. Type-locality.—Amherst, Massachusetts. Transferred to *Phlaeothrips* by Stannard (1957b).

Trichothrips karnyi Hood (1914d:20).
♀, ♂. Type-locality.—Plummer's Island, Maryland, stated by Hood (1917). New synonymy.

Trichothrips karnyi major Hood (1914b:153). ♀. Type-locality.—Newton, Pennsylvania. Raised to full specific rank by Hood (1927b). New synonymy.

Trichothrips drakei Watson (1921:78).
♀. Type-locality.—Syracuse, New York. Synonymized under *Trichothrips major* by Hood (1927b).

FEMALE (macropterous).—Length distended from 2.2 mm (minor forms) to over 3.5 mm (major forms). General color dark brown. Yellow to yellowish brown: most of antennal segment III, bases of antennal segments IV–VI, bases and apexes of tibiae (occasionally fore tibiae entirely yellow), and all tarsi. Base and tip of tube light brown. Wings washed with pale yellowish brown. Body with red or purplish red subintegumental pigment.

Head nearly as wide as long (minor forms) to much longer than wide (major forms). Eyes moderately large, just slightly shorter than the combined lengths of antennal segments I and II. Ocelli present. Cheeks usually extended nearly evenly up to eyes, with two or three pairs of stout bristles which are particularly pronounced in major forms, sometimes small in minor forms. Postocular setae long, pointed. Antennal segment III with one inner and two outer sense cones, these cones relatively longer in minor forms, relatively shorter in major forms; antennal segment VIII with a short, broad ped-

icel. Mouth cones moderately long, rounded to almost pointed.

Pronotum with most major setae well developed; midmarginal setae minute, midlateral setae small in minor forms, moderate to long in major forms. Fore tarsi armed, tooth small in minor forms, large in major forms. Fore wings with accessory fringe cilia.

Pelta (Fig. 240) roughly triangular with basal angles sometimes extended slightly. Wing-holding setae well developed, sigmoidal. Abdominal tergite IX with major posterior setae moderately long and pointed. Tube moderately long.

FEMALE (brachypterous).—Length distended 2.5 mm (minor forms) to 4.5 mm (major forms). Similar in all respects to macropterous female except wings reduced to pads and eyes slightly smaller. Extreme minor forms not known to be present as is the case in the macropterous stage.

MALE (macropterous).—Length distended 2 mm (minor forms) to over 3 mm (major forms). Similar in most respects to macropterous female with the following exceptions. Major forms have fore legs greatly enlarged, and each fore tarsus bears a stouter tooth. Abdominal sternite VIII usually with a median transverse, bandlike glandular area, this area varying from moderately broad to narrow; in one case (possibly a freak) this glandular area reduced to an ellipse. Abdominal tergite IX with major lateral setae reduced in size, shortest in major forms, longest in minor forms.

MALE (brachypterous).—In size and structure similar to macropterous male except wings reduced to pads and eyes slightly smaller.

This is an extremely variable species, composed of major, minor, and intermediate forms, in which certain structures—i.e. head proportions, antennal sense cones, prothoracic antero-

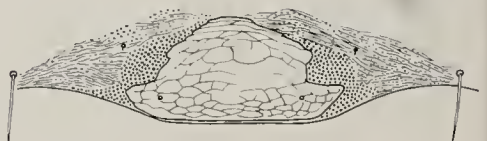


Fig. 240.—*Hoplothrips beachae*, pelta.

lateral setae, and fore tarsal teeth—are proportionately longer or shorter according to form. In addition, the shape of the male glandular area varies from a narrow transverse band to a broad transverse band. Some thysanopterists believe that several of the variants or forms represent separate species, but if this is so, no characteristics have yet been discovered or proposed which would allow absolute separation of one from the others. Because the differences noted intergrade almost imperceptibly from one extreme to another, I prefer to regard these forms as one species. In fact, our North American representatives may be but racial segregates of a wide-ranging holarctic species which also occurs in Europe and Asia under other names, *Hoplothrips ulmi* and *fungi*, etc. Because it was named in honor of Miss Alice Beach, it should take the feminine *ae* ending.

From *corticis*, which it resembles, *beachae* may be distinguished by the form of the cheeks which are not particularly extended laterally from the eye margin.

Throughout Illinois, this species is common on dead branches and dead stumps. Often it lives in large aggregations with adults, larvae, and pupae closely massed together.

Illinois records.—Collected from late March to late November, in one to several localities in the following counties: ADAMS, CALHOUN, CHAMPAIGN, CLARK, COOK, EDGAR, EFFINGHAM, FULTON, HARDIN, HENRY, IROQUOIS, JACKSON, JOHNSON, KANE, KANKAKEE, LAKE, LA SALLE, LAWRENCE, MASON, MASSAC, McDONOUGH, MCHENRY, OGLE, PEORIA, PIKE, POPE, PULASKI, ROCK ISLAND, and WABASH.

Hoplothrips corticis (DeGeer), generic reassignment

Thrips corticis DeGeer (1773:11). ? ♀.

Type-locality.—Sweden. Transferred to *Phlaeothrips* by Morison (1949). Generic reassignment requested of the International Commission on Zoological Nomenclature (Mound 1966).

Trichothrips copiosa Uzel (1895:252). ♀, ♂. Type-locality.—Bohemia (Czechoslovakia) or Lapland. Synonymized by Hood (1915e).

FEMALE (brachypterous—specimens from Illinois).—Length distended 2.5–3 mm. General color yellowish brown to brown. Intermediate antennal segments somewhat lighter yellowish brown (in European and Pennsylvanian specimens segment III, sometimes segment IV, and bases of IV–VI definitely yellow). All tibiae and tarsi yellow, although outer mid portion of mid and hind tibiae sometimes clouded with light brown. Tube brown.

Head about as wide as long. Eyes smaller than length of antennal segments I and II combined. Ocelli present but slightly reduced in size. Postocular setae long, pointed. Cheeks more extended laterally from eyes than in *beachae*. Antennal segment III with one inner and two outer sense cones; segment VIII with a short, broad pedicel. Mouth cone moderately long, bluntly rounded to nearly pointed.

Prothorax with most major setae developed, pointed; anteromarginal setae minute; anterolateral setae small in minor forms, longer in major forms (Pennsylvanian specimens). Fore tarsi each armed with a well-developed tooth. Wings reduced to pads.

Pelta roughly triangular. Abdominal tergites with wing-holding setae developed but small. Abdominal tergite IX with major setae long and pointed. Tube moderately long.

FEMALE (macropterous—specimen from Denmark).—Length distended over 2.5 mm. Similar to brachypterous female in color and structure with the following exceptions. Eyes and ocelli slightly larger. Wings clouded with yellowish brown, fore wings with accessory fringe cilia. Abdominal tergites with wing-holding setae well developed.

MALE (brachypterous—specimens from Pennsylvania).—Length distended about 2.1 mm (minor forms) to 3 mm (major forms). Similar in color and structure to brachypterous

female with the following exceptions. Major forms with prothorax and legs greatly enlarged. Abdominal sternite VIII with a median transverse band-like glandular area. Abdominal tergite IX with major lateral posterior setae reduced in size.

MALE (macropterous).—Unknown to me.

In Illinois this species closely resembles *Hoplothrips beachae* in appearance and in habitat. Because *beachae* usually has the mid and hind tibiae largely brown and the eyes not particularly set in from the outer cheek margin, whereas *corticis* usually has all tibiae yellow and the eyes more set in from the outer cheek margin, the two species can be fairly readily distinguished.

Specimens I have seen from Illinois and North Carolina have darker colored antennae than specimens from Pennsylvania and Europe. A specimen that I collected from the wilderness area in the Quetico Provincial Park, Canada, can also be assigned to this species.

Whether this species is a native representative of a holarctic species or whether it is an immigrant to the New World as a stowaway with European man cannot be positively ascertained on the evidence available. At any rate, it has been known from Illinois since 1909 (Hood 1914b) and apparently it is established in Urbana, at least. It occurs under dead tree bark.

Illinois records.—CHAMPAIGN COUNTY: Urbana, 1909 (Hood 1914); Urbana (Trelease Woods), July 14, 1955, Webb, 2 ♀.

Hoplothrips fieldsi (Crawford, J. C.)

Hoplothrips (Trichothrips) fieldsi Crawford, J. C. (1939:77). ♀, ♂. Type-locality.—Olive Bridge, Ulster County, New York. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (brachypterous). Length distended about 2.5 mm. General color yellow with brown markings. Dark brown: apical two-thirds of antennal segments IV and V, all of antennal segments VI–VIII, and apical three-

fourths of tube except sometimes slightly lighter near apex. Light brown: prothorax and sides of pterothorax, coxae, and anterior pair of blotches on abdominal tergites II–VIII.

Head slightly indented just before eyes. Eyes reduced with only a few dorsal facets. Ocelli absent. Antennal segment III deeply scalloped in pedicel, with one inner and one outer sense cone; segment IV not enlarged, with few if any ventral minute sense cones; segments VII and VIII closely joined but not as compact as in *anomocerus*. Postocular setae well developed and pointed. Mouth cone fairly short, rounded to nearly pointed.

Pronotum with most major setae moderately long and pointed to blunt; anteromarginal setae minute. Mesopinasternum greatly reduced. Mesoscutum fractured into tiny platelets along anterior margin. Fore legs enlarged, fore tarsi each with a slender, sharp tooth. Fore wings reduced to extremely minute pads, hind wings entirely absent.

Pelta trapezoidal. Abdominal tergites without differentiated wing-holding setae. Abdominal tergite IX with major posterior setae short, pointed. Tube relatively short but not as stout as in *anomocerus*.

FEMALE (macropterous).—Length distended about 2.7 mm. Body generally brown. Antennal segments II and III, all tibiae and tarsi, and posterior and median portions of most of the abdominal tergites yellow. Antennal segments IV–VIII and most of tube dark brown.

Similar in structure to brachypterous female with the following exceptions. Eyes large with many dorsal facets. Ocelli present. Antennal segment IV greatly enlarged, segments IV and V with many minute sense cones on ventral surface. Mesospinasternum degenerate but not as reduced as in the brachypterous form. Wings fully developed, fore wings with accessory fringe cilia. Pelta more nearly triangular. Wing-holding setae sigmoidal.

MALE (brachypterous).—Length distended about 1.6 mm (minor

forms) and about 2.1 mm (major forms). Similar to brachypterous female in color and structure with the following exceptions. Major form with fore legs, fore tarsal tooth, and prothorax greatly enlarged. Abdominal sternite VIII with a broad transverse glandular area (Fig. 61), largest in the major form. Abdominal tergite IX with major lateral posterior setae reduced.

According to J. C. Crawford (1939) this species is closely related to the European species *semicaecus* Uzel because both have numerous minute sense cones on antennal segments IV and V. On the same basis *fieldsi* is also related to the European *amabilis* Bagnall. If *semicaecus* and *fieldsi* are different species, it may be that Hood's record (1914b) of *semicaecus* from Bennings, Washington, D. C. may prove to be *fieldsi* instead, and *semicaecus* should be stricken from the list of American species. Apparently in Illinois *fieldsi* is the only species which, in the macropterous form, has antennal segment IV enlarged and which has these minute sense cones on several antennal segments.

So far our collections of this species have been limited to the southern half of the state, under dead bark.

Illinois records.—CLINTON COUNTY: Carlyle, August 15, 1951, Ross, Stannard, dead branch, 1 ♂. HARDIN COUNTY: Karbers Ridge (High Knob), August 18, 1950, Stannard, dead plum, 2 ♀. LAWRENCE COUNTY: Westport, September 15, 1949, Ross, Stannard, willow branch, 1 ♀. PULASKI COUNTY: Mounds, August 16, 1951, Ross, Stannard, dead beech, 3 ♀, 1 ♂.

Hoplothrips flavicauda (Morgan), generic reassignment

Trichothrips flavicauda Morgan (1913: 28). ♀, ♂. Type-locality.—Corbin, Kentucky. Transferred to *Phlaeothrips* by Stannard (1957b).

Hoplothrips (*Trichothrips*) *myceticola* Crawford, J. C. (1939:75). Type-locality.—Cresskill, New Jersey. Synonymized by Hood (1954a).

FEMALE (apterous).—Length dis-

tended about 1.5 mm. General color brown. Head sometimes yellow in the entire median portion or in the median part of the dorsolateral margins, sometimes entirely brown. Antennal segments I and II, apical half of fore femora usually, fore tibiae, and fore tarsi yellow. Basal portions of intermediate antennal segments, legs at joints, and abdominal segment IX yellowish brown. Tube yellow, tipped with gray.

Head about as broad as long. Eyes small with about 10 dorsal facets, decidedly set in from lateral cheek margin. Ocelli absent. Postocular setae moderate in size, pointed. Antennal segments III and IV each with one inner and one outer sense cone, antennal segment VIII lanceolate. Mouth cone broadly rounded; maxillary stylets retracted far into head, nearly touching in the central portion of the head.

Prothorax with all major setae developed, moderate in size, blunt; anteromarginal setae small but not minute, at least three-fourths the size of anterolateral setae. Praepectus usually present. Pterothorax typical of extreme apterous condition and without trace of wing pads. Fore tibiae unarmed.

Pelta large, extending over more area of abdominal segment I than is typical for the genus. Wing-holding setae not developed. Abdominal tergite IX with major posterior setae moderate in size, pointed. Tube relatively short.

FEMALE (brachypterous or dealated macropterous).—Length distended about 1.5 mm. Similar to apterous female with the following exceptions. Sometimes darker and usually abdominal tergite IX brown. Eyes much larger, extended nearly to cheek margin. Ocelli present. Antennal segments III and IV each with two outer sense cones. Prothorax (Fig. 241) with anteromarginal setae reduced, minute. Pelta reduced in size, roughly triangular. Wing-holding setae on abdominal tergites only slightly more developed than in apterous form.

MALE (apterous).—Length distended about 1.2 mm (minor forms) to

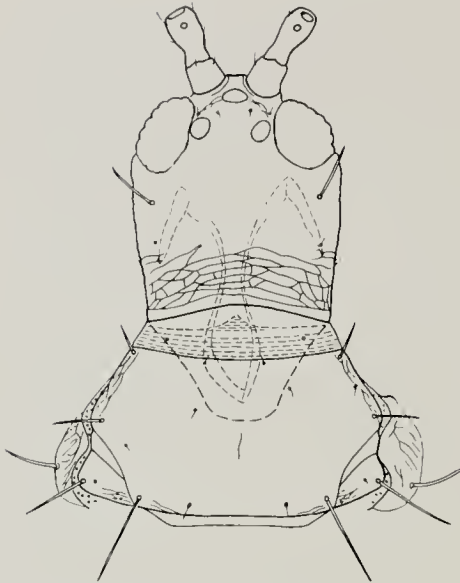


Fig. 241.—*Hoplothrips flavicauda*, ♀ macropterous, head and prothorax.

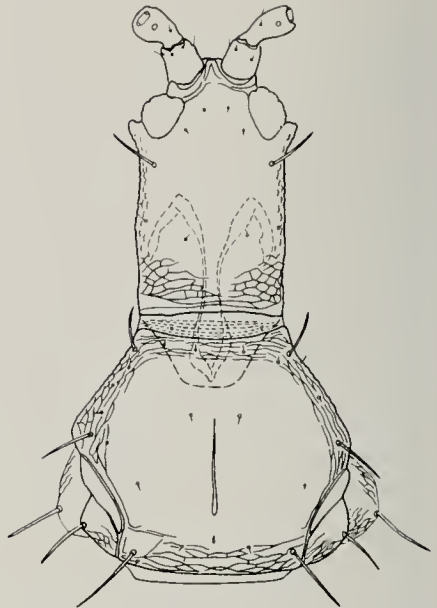


Fig. 242.—*Hoplothrips flavicauda*, ♂ major form, head and prothorax.

1.4 mm (major forms). Similar to apterous female with the following exceptions. Major forms, particularly extreme major forms, with head (Fig. 242) minutely warty, cheeks produced laterally just behind eyes, fore legs and prothorax greatly enlarged, a large tooth on each fore tarsus, fore femora bearing two subapical inner spurs, and fore tibiae bearing one subbasal inner spur much as in *Hoplandrothrips* or *Neurothrips*. Minor forms more robust than apterous female, but without fore femoral and fore tibial spurs, and cheeks not especially produced behind eyes. In all males the anteromarginal setae are minute and the posterior lateral setae of abdominal tergite IX are reduced. Seemingly no glandular area is present on abdominal sternite VIII.

MALE (macropterous, dealated).—Length distended over 1.5 mm. Similar to macropterous female with the following exceptions. Fore tarsi each with a large tooth. Abdominal tergite IX with posterior lateral setae reduced. Apparently no glandular area on abdominal sternite VIII.

This species and its close allies (*fungosus* of the Pacific islands for ex-

ample) are not typical of the genus because of the presence of praepectal plates. Between the apterous stage and the fully winged stage, and between the sexes, they exhibit great points of difference which include the presence or absence of teeth on the fore tarsi, the enlargement or reduction of the fore legs, cheek projections, shape of the pelta, and the presence of one or two outer sense cones on antennal segments III and IV.

In some respects *flavicauda* resembles *Lissothrips muscorum* but in *flavicauda* antennal segment III is not reduced in size and by this characteristic the two may be easily distinguished. From *smithi*, *flavicauda* may be recognized by the close placement of the maxillary stylets within the head, usually by the presence of praepectal plates, by the eyes which are set in from the cheek margins, and by the absence of teeth on the fore tibiae in the female sex.

Hoplothrips flavicauda is found throughout Illinois on dead branches, particularly branches which bear small bracket fungi. So far it has not been found much in the area formerly covered by the Wisconsin ice sheet.

Illinois records.—Collected from May through September, from one to several localities in the following counties: ADAMS, CARROLL, CLARK, COLES, EDGAR, HARDIN, JERSEY, JOHNSON, KANE, MASSAC, OGLE, PUTNAM, ROCK ISLAND, and WHITESIDE.

***Hoplothrips fumiceps* (Hood),
generic reassignment**

Trichothrips fumiceps Hood (1925b: 29). ♀, ♂. Type-locality.—Potter, New York. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (apterous).—Length distended over 2.5 mm. Color light brownish yellow with head and terminal antennal segments brown. Antennal segment I, prothorax, sides of pterothorax, and usually abdominal segments VIII and IX light brown. Legs and antennal segments II and III yellow. Tube orange-brown tipped with gray.

Head (Fig. 243) slightly broader than long. Eyes small but with at least 10 dorsal facets, set in from outer cheek margins. Only fore ocellus present. Postocular setae moderately long and pointed. Antennal segment III with one inner and two outer sense

cones, segment VII with apical sense cone on outer lateral angle, segment VIII lanceolate. Mouth cone rounded to nearly pointed.

Prothorax with most major setae well developed, pointed; anteromarginal setae minute. Fore tarsi each with a well-developed, sharply pointed tooth. Wings completely reduced but with some axillary sclerites remaining.

Pelta roughly triangular. Abdominal tergites without especially developed wing-holding setae. Lateral abdominal setae extremely long, pointed. Abdominal tergite IX with major posterior setae long and pointed. Tube moderate in size.

MALE (brachypterous).—Unknown to me. Glandular area of abdominal sternite VIII, if present, not mentioned in original description.

Hoplothrips fumiceps can be distinguished by the orange-brown tube, the reduction of the anteromarginal setae on the prothorax, the possession of two outer sense cones on antennal segment III, and particularly by the lateral placement of the apical sense cone on antennal segment VII. Although *fumiceps* resembles *pergandei* in some respects, a comparison of the forms of the heads of the species (Fig. 243, 245, and 246) demonstrates their distinctiveness.

This species seems to be the northern equivalent of the southern *marginalis*. In contrast to *fumiceps*, *marginalis* has a predominantly brown tube and the sense cone on antennal segment VII is placed dorsally at the apex.

So far specimens have been taken only in the northern half of the state. Most were collected from dead branches.

Illinois records.—COOK COUNTY: Western Springs, June 21, 1949, Ross, Stannard, on dead willow, 1 ♀. PEORIA COUNTY: Mapleton, June 2, 1949, Stannard, dead willow branch, 1 ♀. VERMILION COUNTY: Danville, September 14, 1961, Smith, Moll, Stannard, dead branch, 1 ♀; Muncie, October 16, 1949, Sanderson, beating, 1 ♀.

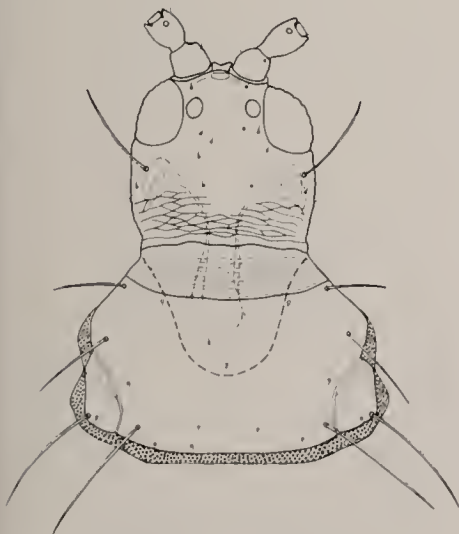


Fig. 243.—*Hoplothrips fumiceps*, head and prothorax.

Hoplothrips pergandei (Hood),
generic reassignment

Trichothrips pergandei Hood (1927c: 115). ♀, ♂. Type-locality.—Washington, D. C. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (brachypterous) (Fig. 244).
—Length distended about 2 mm. Col-

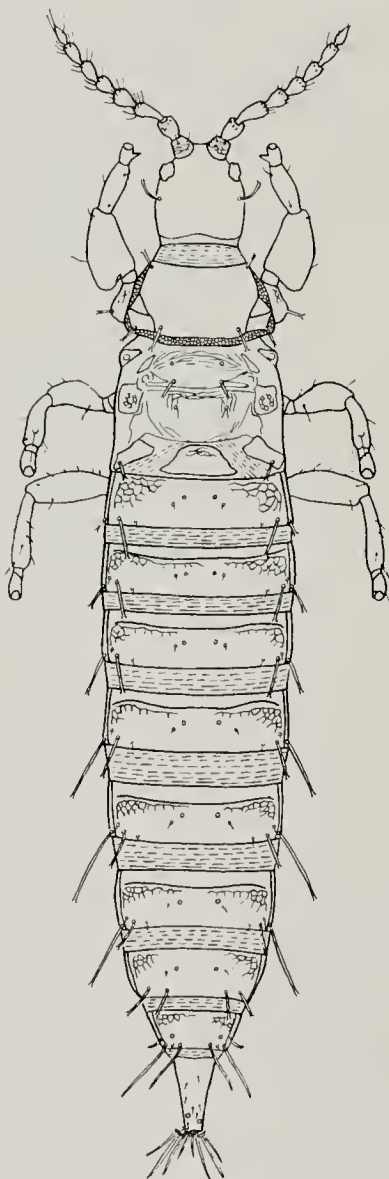


Fig. 244.—*Hoplothrips pergandei*, ♀ brachypterous, dorsal aspect.

or generally yellow to light brownish orange, tube always orange-yellow in basal half. Dark-phase individuals with brown on head in region of eyes, on mesothorax, and on sides of abdominal tergite II. Body with yellow subintegumental pigment which may appear dark gray by transmitted light.

Head (Fig. 245) about as wide as long. Eyes small with only a few dorsal facets, very much bulged from head. Ocelli absent. Postocular setae moderately long, usually dilated but occasionally seen as blunt or pointed. Antennal segments III–VIII each with a sharply narrowed pedicel, segment III with one inner and one outer sense cone, segment VII with apical sense cone placed dorsally, segment VIII decidedly lanceolate. Mouth cone relatively short and broadly rounded.

Prothorax with most major setae moderately developed, dilated; anteromarginal setae minute. Fore tarsi each with a strong, sharp tooth. Wings reduced to pads.

Pelta oval to roughly triangular.

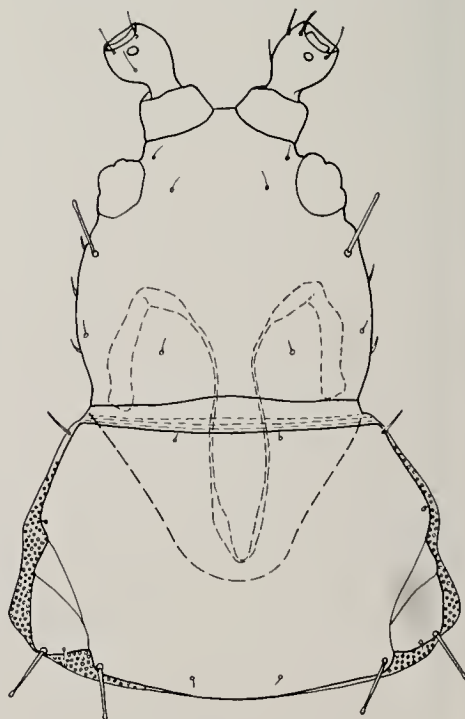


Fig. 245.—*Hoplothrips pergandei*, ♀ brachypterous, head and prothorax.

Abdominal tergites without differentiated wing-holding setae. Most lateral setae on abdominal tergites dilated (rarely blunt or pointed). Abdominal tergite IX (Fig. 53) with major setae not as long as tube, pointed. Tube relatively long, stout at base.

FEMALE (macropterous).—Length distended about 2.2 mm. Color orange-yellow with brown areas somewhat like dark phase of brachypterous female. Brown: much of head especially in region of eyes, mesothorax, sides of abdominal tergite II, and sometimes terminal antennal segments. Wings light brown.

Similar in structure to brachypterous female with the following exceptions. Eyes (Fig. 246) slightly larger but also with less than a dozen dorsal facets. Ocelli present. Wings fully developed, fore wings without accessory fringe cilia. Abdominal tergites with wing-holding setae developed, curved or slightly sigmoidal.

MALE (brachypterous).—Length distended about 1.6 mm. Similar in

color and structure to brachypterous female with the following exceptions. Usually light in color but occasionally with brown on sides of abdominal tergite II. Most males appear to be major forms having the fore legs and prothorax enlarged. Fore tarsi each with a broad, stout tooth. Abdominal sternite VIII with a median glandular area which varies from a small circle to oval to transversely elongate even in a single population. Abdominal tergite IX (Fig. 52) with major lateral posterior setae reduced in size.

This distinctive species may be separated from its congeners in Illinois by the small, bulged eyes, the lanceolate form of antennal segment VIII, the reduction of the prothoracic anteromarginal setae, and by color. According to Hood (1927*e*) the type specimens were apterous, but all of the more than 500 specimens in our collection from Illinois and other states are either macropterous or brachypterous.

Hoplothrips pergandei is common in forest leaf litter. It is found throughout Illinois except for the northernmost counties.

Illinois records.—Collected every month of the year, in one to several localities in the following counties: ADAMS, CLARK, COOK, DE KALB, DE WITT, EFFINGHAM, FAYETTE, FORD, HAMILTON, HANCOCK, HARDIN, HENDERSON, JACKSON, JEFFERSON, JERSEY, JOHNSON, KENDALL, LOGAN, MARION, MARSHALL, MASON, MONROE, MORGAN, PERRY, PIATT, POPE, PULASKI, RANDOLPH, RICHLAND, ROCK ISLAND, UNION, WASHINGTON, WAYNE, and WOODFORD.

***Hoplothrips smithi* (Hood),
generic reassignment**

Trichothrips smithi Hood (1909*a*:29).

♀. Type-locality.—Bosky Dell, Jackson County, Illinois. Transferred to *Phlaothrips* by Stannard (1957*b*).

FEMALE (apterous) (Fig. 247).—Length distended about 1.4 mm. General color brown. Antennal segments I and II, base of segment III, and tarsi yellowish brown. Tube yellow,

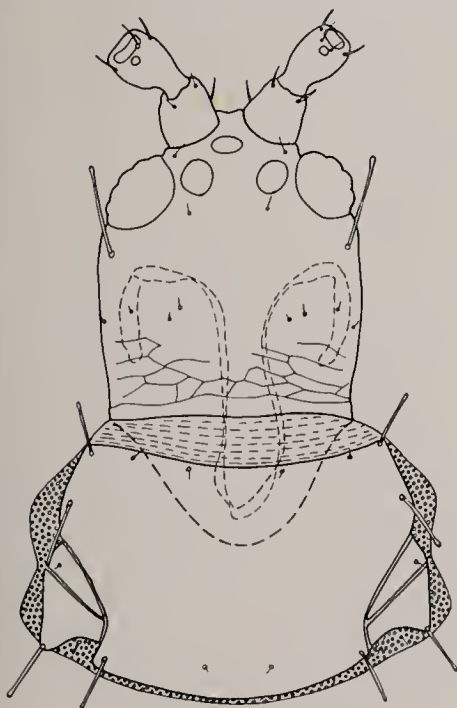


Fig. 246.—*Hoplothrips pergandei*, ♀ macropterous, head and prothorax.



Fig. 247.—*Hoplothrips smithi*, dorsal aspect.
Photo by W. E. Clark.

tipped with gray. Body with red sub-integumental pigment.

Head as broad as long. Eyes small, composed of about 10 dorsal facets, slightly bulging, not inset from outer cheek margin. Ocelli absent. Postocular setae moderate in size, pointed. Antennal segments III and IV each with one outer and one inner sense cone, antennal segment VIII lanceolate. Mouth cone broadly rounded; maxillary stylets placed V-shaped within head.

Prothorax with all major setae developed but only moderate in size, blunt; anteromarginal setae small although not minute. Praepectus absent. Pterothorax without trace of wings or auxiliary sclerites. Fore tarsi each with a small tooth.

Pelta moderately developed but not as large as in apterous forms of *flavicauda*. Wing-holding setae not differentiated. Abdominal tergite IX with major lateral setae moderate in size, pointed. Tube relatively short.

MALE (apterous—minor form).—Length distended about 1.1 mm. Similar to apterous female except for following. Prothorax with anteromarginal setae minute. Fore tarsal tooth slightly longer. Abdominal tergite IX with major lateral setae reduced in size. Abdominal sternite VIII without glandular area.

This rare species is known only by a few apterous specimens, all from Illinois. It resembles *flavicauda* in many respects. Unlike *flavicauda*, *smithi* lacks praepectal plates, the maxillary stylets are placed V-shaped within the head, and the eyes are situated close to the outer cheek margins.

In a closely related, undescribed species from Costa Rica which is in our collection, major males have the fore femora and tibiae armed similarly to some males of *flavicauda*. It could be predicted, therefore, that major male forms of *smithi*, when found, may also be so armed.

This species occurs in the southern half of Illinois on dead branches.

Illinois records.—COLES COUNTY:

Fox Ridge State Park, May 18, 1950, Sanderson, Stannard, beating *Hydnaceae* fungi on hickory branch, 1 ♀. JACKSON COUNTY: Bosky Dell, October 20, 1908, Smith, hard maple, 2 ♀ (Hood 1909). PIKE COUNTY: Kinderhook, August 9, 1951, Richards, Stannard, dead branches, 1 ♀, 1 ♂.

***Hoplothrips terminalis* (Hood and Williams), generic reassignment**

Trichothrips terminalis Hood and Williams (1915:130). ♀, ♂. Type-locality.—Orlando, Florida. Transferred to *Phlaeothrips* by Stannard (1957b).

FEMALE (macropterous).—Length distended about 2.8 mm. Head light brownish yellow, thorax and basal segments of abdomen brown, remainder of abdomen becoming yellow, tube yellow with a subbasal orange ring. Antennae brown at base and apex, segment III yellow, remainder of intermediate segments becoming progressively more brown. Legs yellow except base of femora.

Head about as broad as long. Eyes moderate in size, not particularly indented from outer cheek margin. Ocelli present. Postocular setae moderately long, pointed. Antennal segment III with one inner and two outer sense cones, segment IV with two inner and two outer sense cones, segment VII with apical sense cone placed dorsally, segment VIII with a narrow pedicel. Mouth cone broadly rounded.

Prothorax with all major setae well developed, pointed; anteromarginal setae nearly as long as anterolateral setae. Fore tarsi each with a well-developed, sharp tooth. Wings broken off in only specimen I have studied.

Pelta roughly triangular. Abdominal tergites with wing-holding setae only slightly developed, usually slightly curved but not particularly sigmoidal. Abdominal tergite IX with major posterior setae moderately long and pointed. Tube moderate in size.

FEMALE (brachypterous).—Described as similar to macropterous female except head more nearly yellow and eyes smaller.

MALE (brachypterous).—Similar to female. Presence or absence of abdominal sternal glandular areas not stated in protolog.

This species is another of those entities which have the anteromarginal setae of the prothorax well developed. It resembles *americanus* in many ways. In *terminalis* antennal segment IV has two inner and two outer sense cones, whereas in *americanus* antennal segment IV bears two outer sense cones but only one inner sense cone, and by this characteristic the two may be readily distinguished.

Hoplothrips terminalis was collected once from extreme southern Illinois. The sole specimen known from our state, a macropterous female, was used as the basis for my interpretation of the species. Further study of this species is especially desirable from the standpoint of its exact relationship to *americanus*.

Illinois record.—POPE COUNTY: Bell Smith Springs, July 16, 1948, Mills, Ross, 1 ♀.

***Liothrips* Uzel**

Liothrips Uzel (1895:261). Type-species by subsequent designation by Hood (1918).—*Phloeothrips setinodis* Reuter.

Phyllothrips Hood (1908a:305). Type-species by original designation.—*Phyllothrips citricornis* Hood. Synonymized by Hood (1909b).

Hoodia Karny (1910:41). Type-species by monotypy.—*Hoodia austriaca* Karny. Synonymized by Priesner (1928).

Rhynchothrips Hood (1912c:141). Type-species by original designation.—*Rhynchothrips pruni* Hood. Synonymized by Stannard (1957b).

Head elongate to about as long as wide. Surface of head transversely striate (usually hexagonally reticulate only in region of ocelli). Eyes moderate in size to fairly large. Ocelli present although fore ocellus sometimes reduced in brachypterous forms; area bearing ocellus often prolonged to

overhang base of antennae. Postocular setae of moderate length to long, dilated, blunt or pointed. Cheeks without any strong basal setae. Antennae eight segmented; intermediate segments generally slightly elongate; segment III never with an inner sense cone, always with but one outer sense cone; segment IV elongate but subglobose in several species, always with one inner and one or two outer sense cones; segment VIII usually nonpedicellate. Mouth cone usually long, pointed to broadly rounded. Maxillary stylets retracted far into the head, nearly touching in center of head.

Prothorax weakly sculptured to nearly smooth; with major setae well developed although anterior setae smaller than posterior setae, pointed to blunt to dilated. Epimeral sutures complete. Praepectus absent. Metanotum longitudinally striate or hexagonally reticulate to weakly marked especially in the median area. Macropterous or brachypterous. Fore wings when present not indented in the middle, always with accessory fringe cilia, sometimes with considerable brown color in the basal half. Fore legs never with a tarsal tooth in species of the Illinois fauna.

Pelta small, bell shaped to triangular. Wing-holding setae sometimes weakly developed in brachypterous forms, well developed in macropterous forms. Major posterior setae on abdominal tergite IX pointed to blunt, lateral pair in males reduced and always pointed. Males usually with a broad glandular area on abdominal sternite VIII. Tube conical or slender, short to moderately long.

Although a troublesome genus, hard to define and with species difficult to distinguish, *Liothrips* in Illinois usually can be recognized by the combination of the following characteristics: lack of praepectal plates, transverse striations on head, long mouth cone, lack of an inner sense cone on antennal segment III, unarmed fore tarsi, the presence of accessory fringe cilia on the fore wings, and often by the well-marked longitudinal or elongate hexagonal sculpture of the metanotum.

In the past, the species *longitubus*

has been placed in *Hoplothrips* but this species should be transferred to *Liothrips*. It resembles *vaneckeai* very closely and *vaneckeai* is generally considered by all students to be a true, although not typical, *Liothrips*.

In Illinois, 13 species of this genus have been discovered so far. Most live on living leaf tissues, juices, or galls, and some may feed on juices of the cambium layer of trees. The exotic species, *vaneckeai*, may be looked for on imported lily bulbs. Seemingly all of our native species inhabit woodlands only.

KEY TO SPECIES

Because the macropterous form of *pruni* and *buffae* are unknown but possibly do exist, because some species known only by the macropterous form may be found to have brachypterous forms, and because the species are extremely similar, identification by means of the following key should be made with reference to a named collection.

1. Tarsi and at least apical half of all tibiae predominantly yellow; mouth cone broadly rounded; epimeral setae extremely long 2
Tarsi and tibiae predominantly brown; mouth cone pointed; epimeral setae never as long 3
2. Prothoracic bristles dark brown *vaneckeai*
Prothoracic bristles light yellow *longitubus*
3. Antennal segments III–VIII yellow, although segment VIII sometimes lightly shaded with brown, and metanotum strongly longitudinally striate *citricornis*
Antennae usually with at least segments VII and VIII dark brown; if these segments yellowish brown (probably teneral individuals), then metanotum not closely longitudinally striate; otherwise metanotum longitudinally striate, somewhat hexagonally reticulate, or fairly weakly marked 4
4. Fore wings with a fairly extensive streak or area of brown in basal half 5
Fore wings clear except sometimes immediately above scale; or brachypterous 8
5. Fore wings with basal half almost entirely brown 6
Fore wings with only a narrow median streak of brown 7
6. Fore ocellus protruding and overhanging base of antennae *umbripennis*
Fore ocellus not especially protruding and not overhanging base of antennae *usitatus*
7. Epimeral setae usually just slightly longer than dorsal eye length; antennal seg-

- ment IV predominantly yellow.....*castaneae*
 Epimeral setae generally much longer than dorsal eye length; antennal segment IV with much brown....*sambuci*
 8. Macropterous.....9
 Brachypterous.....13
 9. Fore ocellus not overhanging insertion of antennae.....10
 Fore ocellus overhanging insertion of antennae.....11
 10. Metanotum with longitudinal striations closely spaced medially.....*caryae*
 Metanotum with striations not as closely spaced medially.....*russelli*
 11. Metanotum with elongate hexagonal reticulations.....*brevicornis*
 Metanotum with longitudinal striations.....12
 12. Antennal segment III largely yellow.....*ocellatus*
 Antennal segment III predominantly brown.....*tridentatus*
 13. Antennal segment IV predominantly brown although usually with some yellow at base; subglobose.....14
 Antennal segment IV usually predominantly yellow or yellowish brown, although occasionally with some brown at base; more elongate.....15
 14. Median length of prothorax about equal to length of head; under cherry bark.....*pruni*
 Median length of prothorax decidedly less than length of head; rare, too few observations made to date to ascertain habitat.....*buffae*
 15. Epimeral setae just slightly longer than dorsal eye length; on virginia creeper.....*russelli*
 Epimeral setae much longer than dorsal length of eye; on *Rhus copallina*.....*usitatus*

Liothrips brevicornis Hood

Liothrips brevicornis Hood (1913b: 164). ♀. Type-locality.—Vienna, Virginia.

FEMALE (macropterous).—Length distended nearly 3 mm. General color dark brown. Antennal segment III yellow, segment IV light brown at base. Fore wings colorless except for a small brown streak in region of scale. Body bristles mostly brown except extreme lateral bristles in the posterior half of the abdomen and the major posterior setae of abdominal tegite IX which are yellow.

Head longer than wide, anterior area bearing fore ocellus prolonged. Postocular setae long, blunt to nearly pointed. Antennal segment III with no inner and one outer sense cone,

segment IV with one inner and two outer sense cones. Mouth cone relatively long and pointed.

Prothorax with all major setae well developed, the posterior pairs extremely long, much longer than the dorsal eye length; all of these setae blunt. Metanotum with sculpture almost entirely in the form of elongate hexagonal reticulations. Fore tarsi unarmed. Fore wings each with about 20 accessory fringe cilia in Illinois specimens known to date.

Pelta roughly triangular. Abdominal tergite IX with major posterior setae long, as in *citricornis* and *caryae*. Tube relatively long, just slightly shorter than head.

MALE.—Unknown.

This species is easily distinguished from the Illinois fauna by the sculpture of the metanotum, which is more nearly hexagonally reticulate than longitudinally striate.

So far this species has been taken only once in our state. The type material came from *Sassafras* which may be the preferred host.

Illinois record.—POPE COUNTY: Bell Smith Springs Recreation Area, April 29, 1949, Sanderson, Stannard, sweeping woods, 1 ♀.

Liothrips buffae (Hood)

Trichothrips buffae Hood (1908c:369). ♀, ♂. Type-locality.—Not stated but holotype labeled Decatur, Illinois. Transferred to *Liothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended over 2 mm. General color dark brown. Pedicel of antennal segment III yellow. Apex of antennal segment II and extreme bases of all tibiae yellowish brown. Body bristles light brown.

Head about as wide as long, anterior area bearing fore ocellus scarcely prolonged. Postocular setae long, barely blunt to pointed. Antennal segment III with no inner and one outer sense cone; segment IV subglobose, with one inner and one outer sense cone. Mouth cone extremely long and pointed.

Prothorax with length along the

meson shorter than head; with major setae well developed, the posterior pairs moderately long; all these setae barely blunt to pointed. Metanotum weakly marked, predominantly with elongate hexagonal reticulations. Fore tarsi unarmed. Wings reduced to pads.

Pelta roughly bell shaped. Abdominal tergite IX with major posterior setae moderate in size, much shorter than tube, pointed. Tube slightly shorter than head.

MALE (brachypterous).—Unknown to me. In the protolog (Hood 1908) described as similar to female but no remarks were given on form of abdominal glandular areas, if any.

This species is very similar to *pruni* but differs in the relative size of the prothorax as mentioned in the key.

Although *buffae* has been known for at least 50 years, very few specimens have been collected. Only one specimen has been taken in Illinois since the year of its original discovery and the macropterous form has not been found. Besides Illinois, it has been recorded from New Jersey, New York, and Minnesota, and I have examined a male specimen from Dunn County, North Dakota, through the courtesy of Mr. G. Thomasson.

Illinois records.—CHAMPAIGN COUNTY: (Hood 1908). IROQUOIS COUNTY: Milford, September 18, 1962, Smith, Braasch, Stannard, beaten from dead branch, 1 ♀. MACON COUNTY: Decatur, February 22, 1908, Zetek, Gates, under bark on soft maple tree, 1 ♀ paratype.

***Liothrips caryae* (Fitch)**

Phloeothrips caryae Fitch (1856:445). ? ♀. Type-locality.—State of New York. Transferred to *Liothrips* by Hood (1914b).

Liothrips caryae floridensis Watson (1916:130). ♀, ♂. Type-locality.—Gainesville, Florida. New synonymy.

Liothrips dendropogonis Watson (1938:14). ♀. Type-locality.—Gainesville, Florida. New synonymy.

FEMALE (macropterous).—Length distended about 3 mm. General color dark brown. Antennal segment III yel-

low, often lightly clouded with brown at apex. Bases of antennal segments IV–VI and tarsi sometimes lighter brown to yellowish brown. Setae of head, thorax, and anterior part of abdomen light brown; lateral setae of posterior part of abdomen and posterior setae of abdominal tergite IX yellow. Fore wings clear except for a minute, brown median streak in region of scale. Body with much red subintegumental pigment.

Head just slightly longer than wide, anterior area bearing fore ocellus not prolonged or just slightly prolonged. Postocular setae moderately long, blunt to nearly pointed. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone moderately long and pointed.

Prothorax with all major setae well developed, long, the posterior pairs longest, nearly twice as long as the dorsal eye length, all blunt to nearly pointed. Metanotum with median portion longitudinally striate and with lateral portion elongate, hexagonally reticulate. Fore tarsi unarmed. Fore wings each with 20–24 accessory fringe cilia.

Pelta narrowly triangular. Abdominal tergite IX with major posterior setae long and pointed. Tube relatively long, just slightly shorter than head.

MALE (macropterous).—Length distended about 2.7 mm. Similar to female except for the following. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with the major lateral setae short.

This species differs from *brevicornis*, which it resembles, by having the anterior area of the head not much prolonged, the central portion of the metanotum longitudinally striate instead of elongate and hexagonally reticulate, and the pelta more narrowed. The lack of a projecting fore ocellus makes *caryae* appear similar to many species of the subgenus *Rhynchothrips*.

So far this species has been found in the western, central, and southern parts of our state.

Illinois records.—CLARK COUNTY: Clarksville (Rocky Branch Natural Area), June 14, 1950, Sanderson, Stan-

nard, 1 ♀. DOUGLAS COUNTY: Arcola, October 12, 1949, Stannard, ground cover, 2 ♂. GALLATIN COUNTY: Gibsonia (Pounds Hollow), April 24, 1963, Stannard, 1 ♀; Saline Mines, May 7, 1959, Sanderson, *Carya*, 4 ♀. HENDERSON COUNTY: Oquawka, May 9, 1959, Stannard, on *Carya* leaves, 3 ♀, 3 ♂. JACKSON COUNTY: Giant City State Park, April 27, 1949, Sanderson, Stannard, on *Rhus* bud, 1 ♀. JOHN-SON COUNTY: Bell Smith Springs Recreation Area, May 5, 1950, Sanderson, Stannard, sweeping grass, 1 ♀; Ozark, May 5, 1950, Sanderson, Stannard, sweeping grass, 1 ♂. MASON COUNTY: Mason State Forest, May 21, 1953, Moore, on *Quercus stellata*, 1 ♀. PIATT COUNTY: Monticello, March 28, 1938, Farrar, woodland debris, 1 ♀, 1 ♂. POPE COUNTY: Herod, May 4, 1950, Sanderson, Stannard, *Cornus* leaves, 2 ♀, 2 ♂; Rock, May 6, 1950, Sanderson, Stannard, dead *Salix*, 1 ♀. WHITE COUNTY: Enfield, October 12, 1933, Frison, Ross, log in woods, 1 ♂.

Liothrips castaneae Hood

Liothrips castaneae Hood (1915d:76).
♀, ♂. Type-locality.—Bluemont, Virginia.

FEMALE (macropterous).—Length distended about 2.2 mm. General color dark brown. Antennal segments III, IV (except sides at apex which are sometimes lightly shaded with brown), and pedicel of V yellow. Body bristles brown. Fore wings clear except for a brown, narrow, median streak in basal half. Body with red subintegumental pigment.

Head longer than broad, anterior area bearing fore ocellus prolonged, overhanging base of antennae. Post-ocular setae moderately long, blunt. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone relatively long and pointed.

Prothorax nearly smooth, striations not as strongly marked as in *ocellatus*; with all major setae well developed, moderate in size (epimeral setae just slightly longer than dorsal eye length),

all blunt. Metanotum with closely spaced longitudinal striae, not forming elongate hexagonal reticulations even at sides. Fore tarsi unarmed. Fore wings each with 10–12 and possibly 14 accessory fringe cilia.

Pelta triangular. Abdominal tergite IX with major posterior setae much shorter than tube, blunt. Tube moderately long, three-fourths as long as head.

MALE (macropterous).—Length distended about 2.1 mm. Similar to female except for the following. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with major lateral setae much shorter.

This species can be distinguished by the characteristics given in the key. From *sambuci*, which it resembles, *castaneae* can be recognized by antennal segment IV, which is usually predominantly yellow, not predominantly brown; by the shorter epimeral setae; by the metanotum, which has the striae more closely spaced; and by the fore wing streak which is shorter and weaker.

Although presumed by Hood (1915d) to be “an exclusive feeder on chestnut,” this species (adults as well as larvae) is found on oak leaves, particularly *Quercus macrocarpa*, in Illinois. Besides specimens from our state, I have seen a male from Arvilla, North Dakota, indicating that *castaneae* has a wide range from the East Coast to a few degrees east of the 100th meridian.

ILLINOIS RECORDS.—CHAMPAIGN COUNTY: St. Joseph, May 20, 1948, Sanderson, Becker, Stannard, sweeping *Quercus*, 2 ♀, 2 ♂, 3 larvae. KANKAKEE COUNTY: Kankakee, July 28, 1949, Ross, Stannard, on *Quercus macrocarpa*, 7 ♀, 5 ♂. LA SALLE COUNTY: Starved Rock State Park, November 8, 1943, Ross, Sanderson, old log, 1 ♂; July 9, 1952, Smith, Stannard, dead branches, 1 ♀. OGLE COUNTY: Brookville, June 22, 1948, Stannard, *Quercus* leaves, 1 ♂, 1 larva. PIATT COUNTY: Monticello, August 20, 1948, Ross, Stannard, on *Quercus macrocarpa*, 6 ♀, 7 ♂, 3 larvae. VERMILION COUNTY: Kickapoo State Park, October 3, 1948, Ross, *Quercus macrocarpa*, 1 ♀.

***Liothrips citricornis* (Hood)**

Phyllothrips citricornis Hood (1908a: 305). ♀. Type-locality.—Not stated, but holotype labeled Dubois, Illinois. Transferred to *Liothrips* by Hood (1909b).

Liothrips flavoantennis Watson (1916:

129). ♀. Type-locality.—Gainesville, Florida. Synonymized by Hood (1927b); see also discussion here.

FEMALE (macropterous) (Fig. 248).—Length distended nearly 3 mm. General color dark brown. Antennal

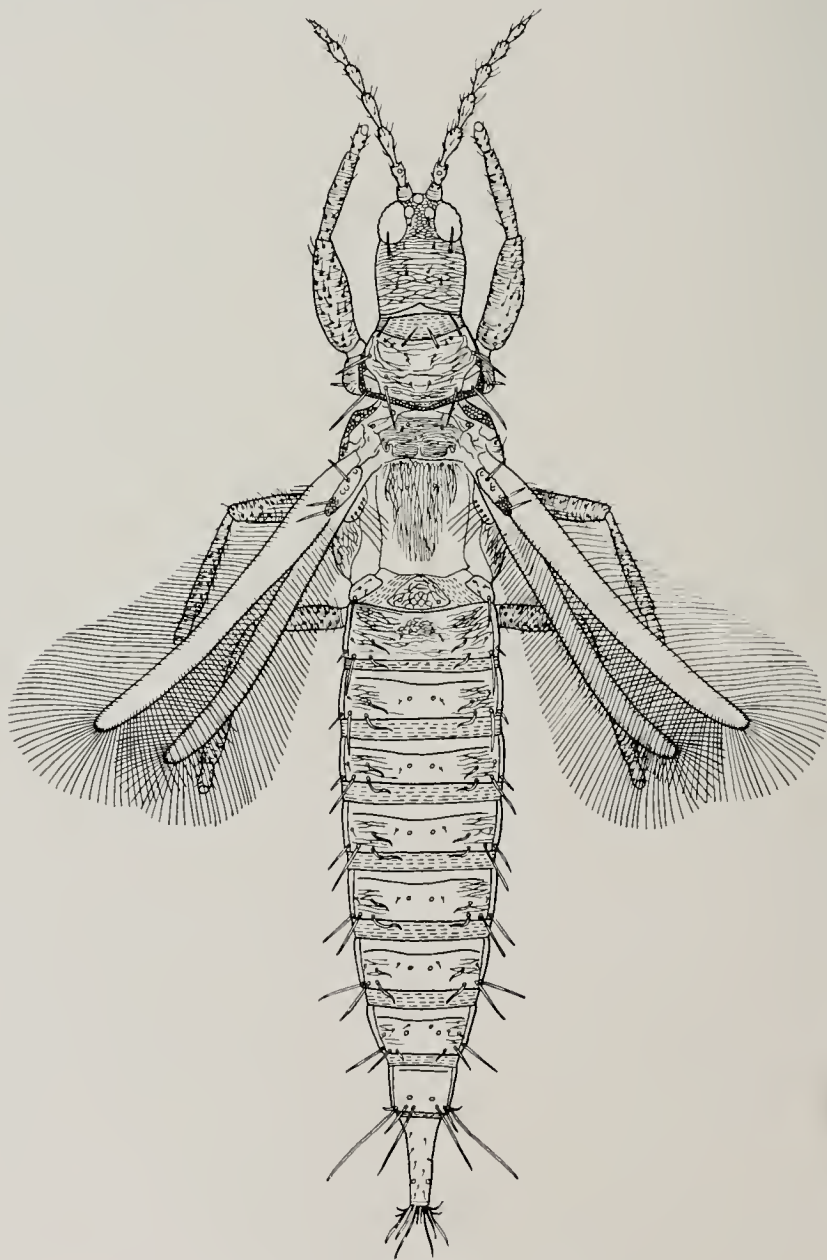


Fig. 248.—*Liothrips citricornis*, dorsal aspect.

segments III–VIII bright yellow except sometimes VII and VIII lightly shaded with brown. Tarsi often lighter brown. Fore wings clear except for a small, brown, median streak in region of scale. Body bristles brown to brownish yellow except extreme lateral setae of posterior half of abdomen and major setae of abdominal tergite IX which are yellow.

Head (Fig. 249) longer than wide, anterior area bearing fore ocellus prolonged. Postocular setae long, blunt to dilated. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone relatively long and pointed.

Prothorax with all major setae well developed, fairly long (epimeral setae the longest, much longer than the dorsal eye length), all blunt to dilated. Metanotum with closely spaced longitudinal striae, hardly forming elongate hexagonal reticulations even at sides. Fore tarsi unarmed. Fore wings each with 10–14 accessory fringe cilia.

Pelta (Fig. 250) triangular to bell shaped. Abdominal tergite IX with major posterior setae long and pointed. Tube (Fig. 190) moderately long.

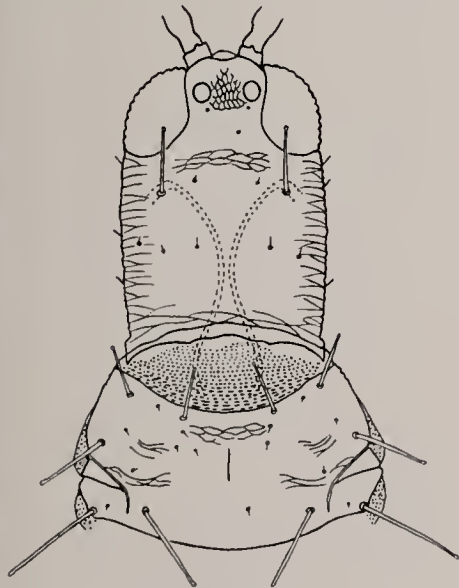


Fig. 249.—*Liothrips citricornis*, head and prothorax.

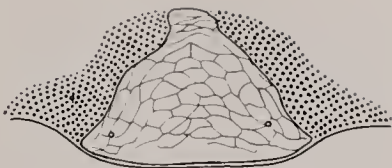


Fig. 250.—*Liothrips citricornis*, pelta.

MALE (macropterous).—Length distended about 2.2 mm. Similar to female except for the following. Abdominal sternite VIII with an extremely broad glandular area almost covering the entire ventral surface. Abdominal tergite IX with the major lateral setae shorter.

This is the only species in Illinois in which the legs are dark and antennal segments III–VIII are predominantly yellow.

In 1927 Hood sank *flavoantennis* Watson under *citricornis* on the basis of a male, not of the type series (being collected four years after appearance of the original description), which is now deposited in the U. S. National Museum. Although this specimen is assignable to *citricornis*, a female paratype of *flavoantennis*, also at the USNM, is seemingly better assigned to *floridensis*, the camphor thrips. The holotype of *flavoantennis* was to have been deposited in the USNM, but no such marked slide is there at present. A specimen in the Watson collection at Gainesville, Florida, from the type series, is designated here to be the lectotype. The specimen involved is a female in the center of the slide and is a true *citricornis*. The lectotype slide is labeled "Gainesville, Fla., on grape, 4-22-'14." The word "*flavoantennis*" is marked in crayon on the glass and "*citricornis*" is marked on the paper label. Watson published the date as April 23, not 22, but probably either the date on the slide or the published number is an inadvertent error.

Liothrips citricornis is found mostly on hickory and grape but sometimes also on other plants. It is common throughout most of Illinois as well as in most of the eastern states.

Illinois records.—Collected every month of the year (in winter in hibernation in the forest leaf mold), from

one to several localities in the following counties: ADAMS, ALEXANDER, CARROLL, CLARK, CLAY, CLINTON, COLES, CUMBERLAND, DE WITT, EFFINGHAM, HARDIN, HENDERSON, HENRY, JACKSON, JEFFERSON, JERSEY, JO DAVIESS, JOHNSON, MADISON, MARI-ON, MASON, McDONOUGH, MONROE, MOULTRIE, OGLE PERRY, PIATT, POPE, PULASKI, PUTNAM, RANDOLPH, ST. CLAIR, UNION, VERMILION, WASHINGTON, WAYNE, and WINNEBAGO.

***Liothrips longitubus* (Hood)**

Trichothrips longitubus Hood (1908c: 368). ♀, ♂. Type-locality.—Carbondale, Illinois. New combination.

FEMALE (macropterous).—Length distended about 2.1 mm. General color dark brown. Tibiae yellowish brown becoming yellow at apex. All tarsi and antennal segments III–VI yellow. Body setae light yellow. Fore wings clear except for a light brown cloud in region of basal setae.

Head just slightly longer than broad, anterior area bearing fore ocellus slightly prolonged. Postocular setae extremely long, blunt. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone long, broadly rounded.

Prothorax with all major setae well developed, lateral and posterior setae extremely long, epimeral setae about three times as long as dorsal eye length, anterior setae blunt, posterior setae pointed. Metanotum weakly marked with elongate hexagonal reticulations, median portion bare. Fore tarsi unarmed. Fore wings each with 9–11 accessory fringe cilia.

Pelta triangular. Abdominal tergite IX with major setae extremely long, much longer than tube, pointed. Tube long, about as long as head.

MALE (macropterous).—Unknown to me. In the protolog it was stated that the male was similar to the female, but no remarks were given on the condition of the abdominal glandular area if present.

Point by point *longitubus* is remarkably similar to *vaneckeii*. Both have

light-colored legs, long body setae, broadly rounded mouth cones, similarly marked metanota, and long tubes. In some of these characteristics, these two species are transitional between *Liothrips* and *Gynaikothrips*. Unlike *vaneckeii*, *longitubus* has light yellow prothoracic setae and longer postocular setae. By these features the two can be easily distinguished.

This rare species was originally collected by Charles A. Hart at Carbondale, Illinois. We have taken several more specimens since. Apparently these records are the only ones known in this state or elsewhere.

Its biology is unknown.

Illinois records.—CLARK COUNTY: Clarksville (Rocky Branch Natural Area), June 8, 1954, Evers, Stannard, on Virginia creeper, 1 ♀. JACKSON COUNTY: Carbondale, May 19, 1908, Hart, sweepings along railroad track, 10 ♀, 1 ♂ (Hood 1908). PUTNAM COUNTY: June 13, 1956, Glenn, Selander, Stannard, beating dead branch in bottom woods, 1 ♀.

***Liothrips ocellatus* Hood**

Liothrips (?) *ocellatus* Hood (1908c: 375). ♀. Type-locality.—Hillery, Vermilion County, Illinois.

FEMALE (macropterous).—Length distended about 2 mm. General color dark brown. Antennal segments III, IV, and basal half of V yellow. Body bristles brown becoming light brown to yellow in those on abdominal tergite IX. Fore wings clear except for brown spot at extreme base in region of scale. Body with red subintegumental pigment.

Head slightly longer than wide, anterior area bearing fore ocellus prolonged and overhanging base of antennae. Postocular setae moderate in size, blunt to dilated. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone relatively long, pointed.

Prothorax fairly well marked by anastomosing striations; with all major setae well developed, moderate in size, the posterior pairs being slightly longer than the others, about the same

as the dorsal eye length; all these setae blunt to dilated. Metanotum almost entirely with closely spaced longitudinal striations. Fore tarsi unarmed. Fore wings each with 10-14 accessory fringe cilia.

Pelta triangular, reticulate. Abdominal tergite IX with major setae moderate in size, dilated. Tube more than three-fourths as long as head.

MALE (macropterous).—Length distended about 2 mm. Similar in form and color to female. Fore tarsi unarmed. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with major lateral setae shorter, spinelike, pointed.

Except for the absence of a long, basal, brown streak on the fore wing, *ocellatus* closely resembles *castaneae*. In *ocellatus*, however, antennal segments IV and V are more yellow and the pronotal striations are more conspicuously marked than as in *castaneae*.

Although only limited data are available, it may be surmised that this species is another of those that have barely entered the area covered by the Wisconsin ice sheet in Illinois. Its habits are unknown.

Illinois records.—COOK COUNTY: Orland Park, April 2, 1959, Suter, black oak tree crotch, 1 ♀. HARDIN COUNTY: Karbers Ridge (Kaskaskia Experimental Forest), August 28, 1952, Richards, Stannard, 1 ♀. HENDERSON COUNTY: Oquawka, May 9, 1952, Stannard, sweeping, 1 ♂. JOHNSON COUNTY: Ferne Clyffe State Park, August 27, 1952, Stannard, jewel weed, 1 ♀; Sandburn, September 20, 1949, Smith, Stannard, ground cover, 1 ♂. UNION COUNTY: Alto Pass, January 10, 1945, Ross, Burks, ground cover, 1 ♀. VERMILION COUNTY: Hilery (Hood 1908c).

***Liothrips pruni* (Hood)**

Rhynchothrips pruni Hood (1912c: 142).—♀, ♂. Type-locality.—Not stated but holotype labeled Urbana, Illinois. Transferred to *Liothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended about 1.7 mm. General color dark brown. Basal antennal segments,

base of tibiae, and all tarsi yellow to yellowish brown. Body with red sub-integumental pigment.

Head about as wide as long, anterior area bearing fore ocellus not prolonged. Ocelli present but fore ocellus reduced. Postocular setae moderately long, pointed. Antennal segment III with no inner and one outer sense cone; segment IV subglobose, with one inner and one outer sense cone. Mouth cone extremely long and pointed.

Prothorax with median length fully as long as length of head; with major setae developed, the epimeral setae moderately long, all pointed. Metanotum short, weakly marked with elongate hexagonal reticulations. Fore tarsi unarmed. Wings reduced to pads.

Pelta broadly triangular. Wing-holding setae weakly developed. Abdominal tergite IX with major setae moderately long, pointed. Tube moderate in size, slightly shorter than head.

MALE (brachypterous).—Length distended about 1.5 mm. Similar to female except for the following. Abdominal sternite VIII seemingly with a broad glandular area. Abdominal tergite IX with the major lateral setae shorter.

This species is much like *buffae* in most respects. The two can be differentiated principally by the relative size of the prothorax, as stated in the key.

The majority of the known specimens of *pruni* have been collected from under cherry bark. Few have been found in Illinois, but presumably this species is common and statewide in distribution. It is difficult and tedious to collect.

Illinois records.—CHAMPAIGN COUNTY: Urbana (Hood 1912c). COOK COUNTY: Riverside (Hood 1912c). HARDIN COUNTY: Eichorn, August 17, 1951, Ross, Stannard, under cherry bark, 1 ♀. JACKSON COUNTY: Carbondale (Hood 1912c). LEE COUNTY: Maytown, Stannard, under cherry bark, several specimens. MCLEAN COUNTY: Lake Bloomington, August 26, 1949, Smith, Stannard, under cherry bark, 3 ♀. PULASKI COUNTY:

Pulaski (Hood 1912c). PUTNAM COUNTY: Mark, April 29, 1948, Stannard, under cherry bark, 3 ♂. VERMILION COUNTY: Oakwood, April 18, 1948, Burks, Stannard, under cherry bark, 1 ♀, 1 ♂.

Liothrips russelli (Hood)

Rhynchothrips russelli Hood (1925b: 31). ♀, ♂. Type-locality.—Beltsville, Maryland. Transferred to *Liothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended over 2.1 mm. General color dark brown. Antennal segments light brown to yellowish brown. Legs with apices of all femora, apices of fore tibiae, and all tarsi yellow to yellowish brown, the fore tarsi being almost completely yellow.

Head (Fig. 251) slightly longer than wide, anterior area bearing fore ocellus not prolonged. Ocelli present but fore ocellus often greatly reduced. Postocular setae moderate in size, blunt. Antennal segment III with no inner and one outer sense cone; segment IV not subglobose, with one inner and one outer sense cone. Mouth cone moderately long, pointed to nearly blunt.

Prothorax (Fig. 251) with median

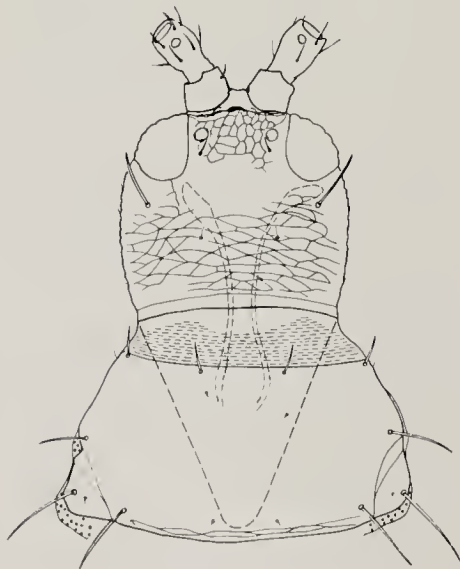


Fig. 251.—*Liothrips russelli*, head and prothorax.

length shorter than head; with major setae well developed, the epimeral setae just slightly longer than dorsal eye length, all blunt to barely pointed. Metanotum short, weakly marked with elongate hexagonal reticulations. Fore tarsi unarmed. Wings reduced to pads.

Pelta roughly triangular. Wing-holding setae weakly developed. Abdominal tergite IX with major posterior setae moderate in size, much shorter than tube, pointed. Tube shorter than head.

FEMALE (macropterous).—Length distended about 2.4 mm. Similar to brachypterous female with the following exceptions. Ocelli always fully developed. Metanotum longer. Fore wings fully developed, clear except for area above scale at extreme base which is brown, with 8–10 accessory fringe cilia. Wing-holding setae well developed.

MALE (brachypterous).—Length distended about 1.7 mm. Similar to female with the following exceptions. Abdominal tergite IX with the major lateral setae shorter. Abdominal sternite VIII with condition of glandular area not determinable in specimens available to me.

This species is extremely close to *usitatus*, differing principally in the characteristics mentioned in the key. In particular, the fore wings of *russelli* are clear except for a small area at the extreme base, whereas in *usitatus* the fore wings are largely brown in the basal half.

Apparently *russelli* occurs throughout Illinois on the underside of leaves of Virginia creeper (*Parthenocissus quinquefolia*) (Fig. 35).

Illinois records.—Collected in summer, from one to several localities in the following counties: HENDERSON, HENRY, JACKSON, KNOX, MERCER, POPE, UNION, VERMILION, and WABASH.

Liothrips sambuci Hood

Liothrips sambuci Hood (1913b:163). ♀. Type-locality.—Laurel, Maryland.

FEMALE (macropterous).—Length

distended about 2.8 mm. General color dark brown. Antennal segment III yellow, segment IV more brown than in *castaneae* but yellow in pedicel becoming yellowish brown in basal third to brown in the apex. Fore wings clear with a long, brown median streak in the basal half, wider than the streak found in *castaneae*. Body bristles, including the lateral setae on the posterior part of the abdomen, brown. Body with red subintegumental pigment.

Head longer than wide, anterior area bearing fore ocellus produced, overhanging base of antennae. Postocular setae long, blunt. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone moderately long, pointed.

Prothorax with major anterior setae relatively short, lateral and posterior setae long, the epimeral pair being much longer than the dorsal eye length, all of these setae blunt to nearly pointed. Metanotum longitudinally striate becoming hexagonally reticulate along sides. Fore tarsi unarmed. Fore wings each with about 12 accessory fringe cilia.

Pelta triangular. Abdominal tergite IX with major posterior setae relatively short, shorter than in *citricornis* and *caryae*, blunt to nearly pointed. Tube moderately long, about three-fourths as long as head.

MALE (macropterous).—Length distended about 2.1 mm. Similar to female except for the following. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with major lateral setae shorter, pointed.

The broader brown streak in the fore wings, the darker color of antennal segment IV, and the longer epimeral setae of the prothorax of *sambuci* should permit easy separation of this species from *castaneae*.

Contrary to its name, this species has been found only on dogwood (*Cornus*), not *Sambucus*, in Illinois.

Illinois records.—ADAMS COUNTY: Lima, June 24, 1948, Stannard, from *Cornus*, 6 ♀, 5 ♂, 2 larvae. FULTON COUNTY: Banner, June 2, 1949, Stannard, from *Cornus drummondii*, 3 larvae.

Liothrips tridentatus (Shull)

Trichothrips tridentatus Shull (1909: 226). ♀. Type-locality.—Huron County, Michigan. Transferred to *Liothrips* by Stannard (1957b).

Liothrips leucogonis Hood (1915d:78). ♀, ♂. Type-locality.—Plummer's Island, Maryland. New synonymy.

FEMALE (macropterous).—Length distended about 2.1 mm. Color generally dark brown. Apex or apical half of antennal segment II and inner apical angle of all femora light yellow. Antennal segments III and IV sometimes with light brown areas especially apically. Fore wings clear except shaded brown at extreme base. Body with red subintegumental pigment.

Head about as long as broad, anterior area bearing fore ocellus just slightly prolonged. Eyes relatively small compared to those of others originally assigned to *Liothrips*. Postocular setae moderate in size, blunt. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone extremely long and pointed.

Prothorax with all major setae well developed, moderate in size, the posterior pairs the longest, all blunt to nearly dilated. Metanotum predominantly longitudinally striate. Fore tarsi unarmed. Fore wings each with 8-12 accessory fringe cilia.

Pelta triangular. Abdominal tergite IX with major posterior setae moderate in size, blunt. Tube short compared to those of other species in this subgenus, but in a relative sense long, being slightly less than three-fourths as long as the head.

MALE (macropterous).—Length distended about 1.9 mm. Similar to female with following exceptions. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with the major lateral setae shorter and pointed.

The dark color of antennal segment III and the extremely long mouth cone are characteristics which easily distinguish this species from others in the old concept of the genus. By contrast, however, the long mouth cone and other features show that *tridentatus*

tus is close to those that were placed in *Rhynchothrips*, and could well be placed with them just as reasonably. I have assigned *tridentatus* to the typical *Liothrips* subgroup principally because it bears longitudinal metanotal striations similar to those of *citricornis*, *ocellatus*, etc.

This species is most common in the northern half of the state.

Illinois records.—Collected from late April to September, mostly on leaves of *Quercus macrocarpa*, from one to several localities in the following counties: BUREAU, CHAMPAIGN, COOK, DE WITT, GALLATIN, KANKAKEE, LEE, MONROE, RANDOLPH, SANGAMON, and WHITESIDE.

Liothrips umbripennis (Hood)

Phyllothrips umbripennis Hood (1909a:30). ♀, ♂. Type-locality.—Carbondale, Illinois. Transferred to *Liothrips* by Stannard (1957b).

FEMALE (macropterous).—Length distended about 2.5 mm. General color dark brown. Antennal segment III yellow, segment IV yellow in basal half clouded with brown at apex, segment V yellow in basal third. Fore wings with a broad brown band in basal half, clear in the remaining portions. All body bristles dark brown. Body with red subintegumental pigment.

Head longer than wide, anterior area bearing fore ocellus prolonged. Postocular setae moderate in size, blunt. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone relatively long, pointed.

Prothorax with all major setae well developed, moderate in size, the posterior pairs being the longest, just slightly longer than dorsal eye length; all of these setae blunt. Metanotum predominantly longitudinally striate. Fore tarsi unarmed. Fore wings each with about 14 accessory fringe cilia.

Pelta triangular, broad at base. Abdominal tergite IX with major posterior setae moderate in size, blunt. Tube moderate in size, about two-thirds the length of the head.

MALE (macropterous).—Length

distended about 2.3 mm. Similar to female except for the following. Abdominal sternite VIII with a broad glandular area. Abdominal tergite IX with major lateral setae shorter and pointed.

This species is distinctive in having a broad basal brown band in the fore wing and a strongly protruding fore ocellus.

So far *umbripennis* has been found in Illinois only in the central and southern parts, possibly as a feeder on leaves of the white oak group.

Illinois records.—CALHOUN COUNTY: Beecreek, August 10, 1951, Richards, Stannard, dead branch, 1 ♀. CUMBERLAND COUNTY: Neoga, September 2, 1955, Ross, Smith, Stannard, on *Symphoricarpos*, 1 ♀. HARDIN COUNTY: Elizabethtown, May 4, 1950, Sanderson, Stannard, dead branch, 1 ♀. POPE COUNTY: Rock, May 6, 1950, Sanderson, Stannard, white oak leaves, 6 ♀, 3 ♂; Bell Smith Springs Recreation Area, March 14, 1961, Evers, Stannard, forest edge, 1 ♀. SANGAMON COUNTY: Springfield, September 8, 1955, Stannard, dead branch, 1 ♀. UNION COUNTY: Ware, Atwood Ridge, October 24, 1957, Sanderson, forest leaf litter, 1 ♀. WHITE COUNTY: Norris City, March 30, 1957, Mockford, forest leaf litter, 1 ♀.

Liothrips usitatus (Hood)

Rhynchothrips usitatus Hood (1927e:113). ♀, ♂. Type-locality.—Rock Creek Park, Washington, D. C. Transferred to *Liothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended about 2.1 mm. General color dark brown. Antennal segments yellow to yellowish brown becoming dark brown in segments VII and VIII. Inner apical angle of femora and all tarsi yellow to yellowish brown. Body with red subintegumental pigment.

Head wider than long, anterior area bearing fore ocellus not prolonged. Postocular setae slightly longer than as in *russelli*, blunt. Antennal segment III with no inner and one outer sense cone; segment IV not subglobose,

with one inner and two outer sense cones. Mouth cone long and pointed.

Prothorax with median length shorter than head; with major setae well developed, the epimeral setae much longer than dorsal eye length, all blunt. Metanotum faintly marked with elongate hexagonal reticulations. Fore tarsi unarmed. Wings reduced to pads.

Pelta (Fig. 252) roughly triangular. Wing-holding setae moderately developed. Abdominal tergite IX with major posterior setae moderate in size, slightly shorter than tube, pointed. Tube short.

FEMALE (macropterous).—Length distended about 2.2 mm. Similar to brachypterous female with following exceptions. Metanotum longer. Fore wings fully developed, brown in the basal two-thirds, each with 8–10 accessory fringe cilia. Wing-holding setae well developed.

MALE (brachypterous).—Length distended about 1.7 mm. Similar to brachypterous female except for the following. Abdominal sternite VIII seemingly with a broad glandular area. Abdominal tergite IX with major lateral setae shorter.

MALE (macropterous).—Length distended about 1.8 mm. Similar to macropterous female except for the secondary sexual characteristics mentioned under the brachypterous male.

This species resembles *russelli* but differs in the characteristics mentioned in the key. In the dark color of the basal two-thirds of the fore wings, *usitatus* is closest to *debilis*, a species not known to occur in the Midwest.

Apparently *usitatus* is host specific to *Rhus copallina* and both host and insect are confined to the southern half of the state except for an area south and east of Chicago into Iroquois County where *Rhus copallina* grows and where its thrips may be eventually found.

Illinois records.—JACKSON COUNTY: Giant City State Park, April 27, 1949, Sanderson, Stannard, on opening buds of *Rhus copallina*, 15 ♀, 2 ♂; Makanda, July 14, 1948, Sanderson, Stannard, sweeping, 1 ♂. MONROE COUNTY: Burksville, June 29, 1949, Smith, Stannard, on *Rhus copal-*

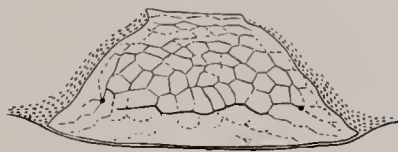


Fig. 252. —*Liothrips usitatus*, pelta.

lina, 6 ♀, 5 ♂. POPE COUNTY: Herod, May 4, 1950, Sanderson, Stannard, on *Rhus copallina*, 7 ♀. WAYNE COUNTY: Zenith, May 17, 1966, Stannard, on *Rhus copallina*, 2 ♀.

***Liothrips vaneeckei* Priesner** Lily Bulb Thrips

Liothrips vaneeckei Priesner (1920b: 211). ♀, ♂. Type-locality.—Alphen, Netherlands.

FEMALE (macropterous).—Length distended about 2.5 mm. General color dark brown. Antennal segment III yellow, segments IV–VI yellowish in base, clouded with brown in the apical one-half, two-thirds, and three-fourths, respectively. Fore tibiae, apical half of mid and hind tibiae, and all tarsi yellow. Fore wings generally clear except for base, including scale, and a faintly marked, long median streak, which are brown. Body bristles brown except for major setae on posterior of abdominal tergite IX which are yellow to colorless.

Head much longer than broad, anterior area bearing fore ocellus slightly prolonged. Postocular setae moderately long, nearly pointed. Antennal segment III with no inner and one outer sense cone, segment IV with one inner and two outer sense cones. Mouth cone moderately long, bluntly rounded.

Prothorax with major setae well developed, lateral and posterior setae extremely long, epimeral setae more than twice as long as dorsal eye length; all these setae pointed or nearly pointed. Metanotum weakly marked with more or less longitudinal striations. Fore tarsi unarmed. Fore wings each with about nine accessory fringe cilia.

Pelta triangular, slightly emarginate medially on the posterior. Abdominal tergite IX with major setae

extremely long and pointed. Tube moderately long, over three-fourths as long as head.

MALE (macropterous).—Length distended about 2.3 mm. Similar to female except for the following. Abdominal sternite VIII with a broad bandlike area. Abdominal tergite IX with major lateral setae reduced.

The lily bulb thrips, an immigrant of unknown origin (Bailey 1939a), is easily recognized by the yellow color of the legs, the broadly rounded mouth cone, and the dark prothoracic bristles. Bailey (1939a) has given an account of the life history and distribution of this economic pest.

Possibly *vaneeckei* may be introduced into our state in shipments of lily bulbs. It was once reported from Indiana (Bailey 1940). To my knowledge it has not yet been found in Illinois.

Lispothrips O. M. Reuter

Lispothrips O. M. Reuter (1899:17, 26). Type-species by monotypy.—*Lispothrips wasastjernae* [sic] O. M. Reuter.

Head slightly longer than wide, transversely striate with anastomosing striae. Cheeks roughly serrate with several pairs of small, stout setae. Eyes moderate in size to somewhat reduced, slightly bulged. Ocelli present or absent. Postocular setae moderately developed. Antennae eight segmented; segment III small, subequal to IV, lacking sense cones; segment IV with at least one inner and one outer sense cone; segment VIII elongate, slender, nonpedicellate. Mouth cone long, blunt to pointed. Maxillary stylets slender, extended far into head when in repose, spaced close to moderately apart within the center of the head. Maxillary bridge small or well developed.

Thorax smooth to weakly sculptured. Prothorax with epimeral sutures incomplete to complete, praepectus absent, prospinasterum sometimes greatly reduced. Mesospinasterum lacking. Usually brachypterous, rarely macropterous. Fore wings,

when developed, without accessory cilia.

Abdomen with pelta (Fig. 169) fairly broad, with transverse, anastomosing striae, larger in wingless forms than in winged forms. Wing-holding setae weakly developed in macropterous forms, not developed in brachypterous forms. Lateral abdominal setae fairly short, pointed to dilated. Abdominal tergite IX with major posterior setae short, lateral pair reduced in male more than in female. Tube moderate in size, nearly equal to head.

This holarctic genus is difficult to define and recognize, as witness the questionable assignment by Hood of one species to *Rhynchothrips* and the description by Shull of another in *Trichothrips*. The small size of antennal segment III, the lack of sense cones on that segment, the rough serrate cheeks, the brachypterous form, and the lack of praepectal plates are a combination of characteristics that help distinguish this genus in the eastern half of the United States.

In the northeastern states, *brevicruralis*, which closely resembles *crassipes*, has been recorded. In the East and South, *salicarius* has been collected from possibly four states. It is expected that at least *salicarius* may be found in Illinois with continued search.

Lispothrips salicarius Hood

Rhynchothrips (?) *salicarius* Hood (1913b:164). ♀. Type-locality.—Plummer's Island, Maryland. Transferred to *Lispothrips* by Stannard (1957b).

Lispothrips varicornis Moulton (1929b:240). ♀. Type-locality.—Menard, Texas. New synonymy.

FEMALE (brachypterous).—Length distended slightly over 2 mm. General color dark, nearly blackish brown. Antennal segment II, pedicel and often base of segment III, and extreme inner apexes of fore tibiae yellow to yellowish brown. Body setae hyaline.

Head as in Fig. 253. Eyes decidedly shorter ventrally than dorsally. Ocelli absent. Postocular setae dilated. Max-

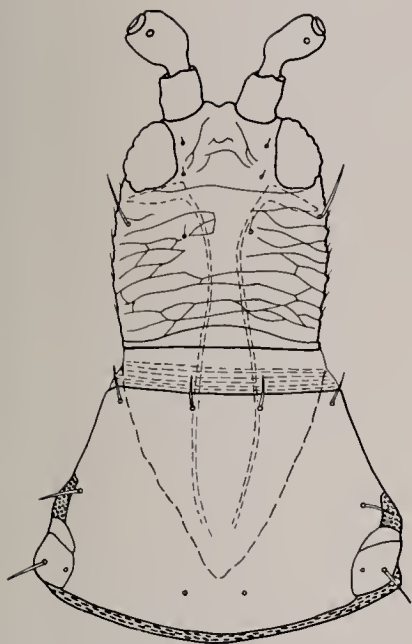


Fig. 253.—*Lissothrips salicarius*, head and prothorax.

illary stylets nearly touching medially within head. Mouth cone pointed.

Prothorax with all major setae fairly well developed, blunt to dilated. Epimeral sutures complete or almost complete. Fore wings reduced to minute pads, hind wings apparently absent. Fore tarsi unarmed. Mid and hind tibiae each with a long, outer apical seta which is blunt; this seta nearly equal in length to the tarsal segments.

Pelta wide, extending laterally to a position over the outer margins of the hind coxae. Abdomen broad. Abdominal tergite VIII with major posterior setae pointed. Tube nearly equal to head; anal setae two-thirds as long as tube.

MALE (brachypterous).—Length distended about 1.6 mm. Similar to female in general color and structure. Fore tarsi unarmed. Abdominal sternite VIII lacking a glandular area. Abdominal tergite IX with major lateral setae reduced, spinelike.

This species differs from *crassipes*, and *brevicruralis*, which may be a synonym, by the long subterminal setae on the mid and hind tibiae,

(in *crassipes* and *brevicruralis* these setae are minute), by the mouth cone which is pointed (not broadly rounded), and by the wider pelta.

Although not yet found in Illinois, I have taken *salicarius* on willow in the nearby state of Arkansas at Rogers and there are specimens at the U.S. National Museum from Clarksville, Tennessee. Eventually this thrips may be found in our state also.

Lissothrips Hood

Lissothrips Hood (1908c:365). Type-species by monotypy.—*Lissothrips muscorum* Hood.

Head wider than long to longer than wide, surface smooth. Eyes moderate in size to relatively small. Ocelli present or absent. Postocular setae well developed, pointed to dilated. Cheeks smooth, without any strong bristles. Antennae eight segmented; segment III (Fig. 153) usually smaller than either segment II or segment IV, with no or one sense cone; segment IV with one inner and one or two outer sense cones; segment VIII varying from lanceolate to nonpedicellate and closely joined to segment VII. Mouth cone long, pointed. Maxillary stylets retracted far into the head, spaced moderately far apart within the center of the head. Maxillary bridge not discernible.

Thorax smooth. Prothorax with all major setae well developed, epimeral setae often especially long, these setae dilated to pointed. Epimeral sutures usually incomplete, occasionally complete. Praepectus present. Mesopraepectum degenerate. Meso- and metafurcae touching in apterous forms, separate in winged forms. Macropterous, brachypterous, or apterous. Fore wings when fully developed not indented in the middle, with or without accessory setae. Fore legs unarmed.

Pelta oval to nearly square, not subdivided into three parts, adjoined to the anterior margin of abdominal tergite II. Wing-holding setae not differentiated in apterous forms, differentiated in winged forms. Lateral abdominal setae usually long. Abdominal tergite IX with major posterior

setae often long, pointed in species in Illinois; lateral setae reduced in males. Abdominal sternite VIII with or without glandular area in males. Tube short to relatively moderate in length.

This genus is represented in Illinois by the single species *muscorum* which can be distinguished from all other species in our area with maxillary stylets placed well into the head proper by the small size of antennal segment III.

Other species occur in Florida, Texas, Mexico, the West Indies, Trinidad, Brazil, and possibly even in other parts of the world, according to the literature.

Lissothrips muscorum Hood

Lissothrips muscorum Hood (1908c: 365). ♀. Type-locality.—Not stated, but holotype labeled Urbana, Illinois.

FEMALE (apterous).—Length distended about 1.4 mm. General color dark brown. Pedicel of antennal segment III and legs, especially the tarsi, lighter brown to nearly yellowish brown. Body with red subintegumental pigment. In life often with dark greenish internal fluids.

Head slightly wider than long, surface smooth. Eyes moderately small. Ocelli absent. Postocular setae long, dilated. Antenna as in Fig. 153; segment III small, without sense cones; segment IV longer with one inner and one outer sense cone; segment VIII slightly narrowed at base but broadly attached to segment VII. Mouth cone moderately long, pointed. Maxillary stylets retracted far into head, spaced moderately far apart within the head.

Prothorax smooth; major setae long and dilated, except epimeral setae which are pointed. Epimeral sutures incomplete to nearly complete. Wings entirely absent. Metanotum smooth, short, degenerate. Fore legs unarmed.

Pelta (Fig. 254) broadly oval. Wing-holding setae not differentiated. Abdominal tergite IX with major setae long, longer than tube, pointed. Tube moderate in size.

FEMALE (macropterous).—Length distended about 1.5 mm. Similar to

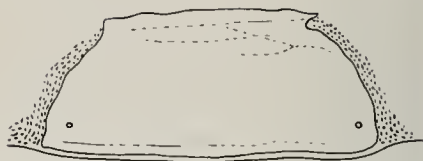


Fig. 254.—*Lissothrips muscorum*, pelta.

apterous female with following exceptions. Eyes larger. Ocelli present. Antennal segment III with one outer sense cone. Epimeral sutures incomplete. Epimeral setae much longer. Pterothorax well developed. Wings fully developed; fore wings light gray, without accessory fringe cilia. Pelta slightly smaller. Abdominal tergites III–VII each with one pair of sigmoidal wing-holding setae.

MALE (apterous).—Length distended about 1.1 mm. Similar to apterous female with the following exceptions. Epimeral sutures incomplete. Epimeral setae longer. Abdominal tergite IX with major lateral posterior setae greatly reduced in size. Abdominal sternite VIII apparently without a distinct glandular area.

By the reduced size of antennal segment III, this species is easily distinguished from other tubuliferous thrips in Illinois except *Phthirotithrips*, a genus easily recognized by short maxillary stylets that barely enter the head proper.

Lissothrips muscorum, as its name implies, inhabits mosses and occurs throughout the state in wooded areas.

Illinois records.—Collected every month of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, CALHOUN, CHAMPAIGN, CLARK, CUMBERLAND, DOUGLAS (Hood 1908c), HARDIN, JACKSON, JERSEY, LAKE, LA SALLE, MCHENRY, MONROE, PIATT, POPE, PULASKI, UNION, VERMILION, WASHINGTON (Hood 1908c), and WILLIAMSON (Hood 1908c).

Malacothrips Hinds

Malacothrips Hinds (1902:200).

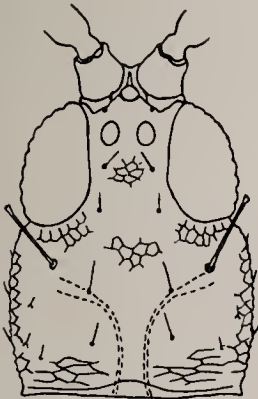
Type-species by monotypy.—

Malacothrips zonatus Hinds.

The following description applies principally to the fauna of Illinois.

Head (Figs. 255, 258, and 259) longer than wide, slightly prolonged forward of the eyes; surface weakly hexagonally reticulate; cheeks incised immediately behind the eyes. Eyes moderate in size, slightly bulged. Ocelli present, fore ocellus slightly pro-

longed. Postocular setae long, dilated. Antennae eight segmented, segment III similar in form to that found in some *Hoplandrothrips*, segments III and IV each with one inner and two outer sense cones, segment VIII pedicellate as in Fig. 256 (nonpedicellate



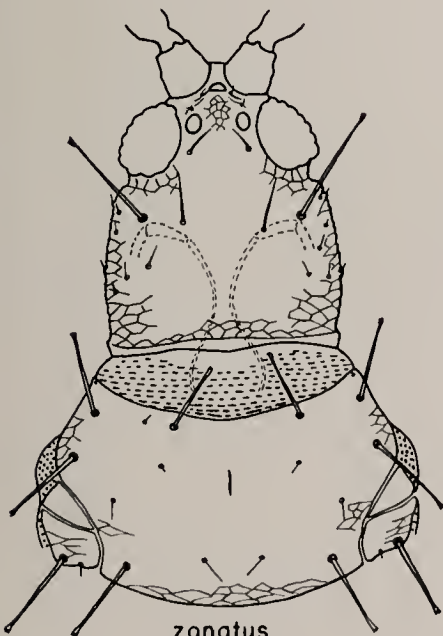
adranes
255



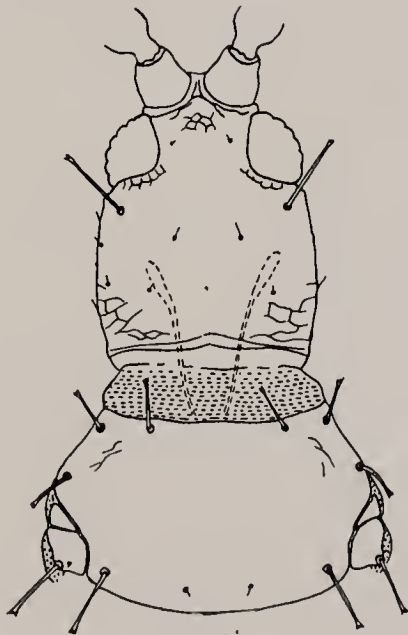
adranes
256



roycei
257



zonatus
258



roycei
259

Fig. 255-259.—Characteristics of species of *Malacothrips*: 255, head of *M. adranes*; 256, terminal antennal segments of *M. adranes*; 257, terminal antennal segments of *M. roycei*; 258, head and prothorax of *M. zonatus*; 259, head and prothorax of *M. roycei*.

in the eastern costal entity, *roycei* as in Fig. 257). Mouth cone pointed (broadly rounded in some species known out of state). Maxillary stylets retracted about halfway into the head, placed fairly close together within the head.

Prothorax smooth; all major setae well developed, dilated; with one pair of epimeral setae. Epimeral sutures complete. Praepectus absent. Metanotum only faintly sculptured. Macropterous or brachypterous. Fore wings when fully developed slightly indented in the middle, with accessory fringe cilia. Fore tarsi armed in both sexes.

Pelta triangular. Wing-holding setae moderately developed, slightly sigmoidal. Abdominal sternite VIII in males with a narrow transverse glandular area. Abdominal tergite IX in males with lateral posterior setae reduced in size. Tube moderate in size.

Although closely related to *Hoplandrothrips*, this genus superficially resembles *Eurythrips* on the basis of the notched cheeks and bulged eyes. *Malacothrips* in Illinois can be recognized by the characteristics of *zonatus*, the only species known to occur in our state.

Malacothrips zonatus Hinds

Malacothrips zonatus Hinds (1902: 200). ♀. Type-locality.—Amherst, Massachusetts.

FEMALE (brachypterous) (Fig. 260).—Length distended about 2.7 mm. Bicolored brown and yellow. Brown: head, most of antennae except segment III and basal half of segment IV, posterior margin of pelta, most of abdominal segment II, lateral areas of abdominal segments VI and VII, most of abdominal segment VIII, and all of abdominal segments IX and X. Remainder of insect pale bright yellow. Body with red subintegumental pigment.

Head (Fig. 258) longer than wide, prolonged in front of eyes; surface weakly hexagonally reticulate; cheeks incised just behind eyes somewhat as in some species of *Eurythrips*. Eyes

large, slightly bulged. Ocelli present. Postocular setae long, dilated. Antennae eight segmented, segment III formed as in some species of *Hoplandrothrips* with one inner and two outer sense cones, segment IV with one inner and two outer sense cones, segment VIII strongly pedicellate. Mouth cone moderate in size, pointed. Maxillary stylets retracted halfway into the head, fairly closely spaced but not touching within the head.

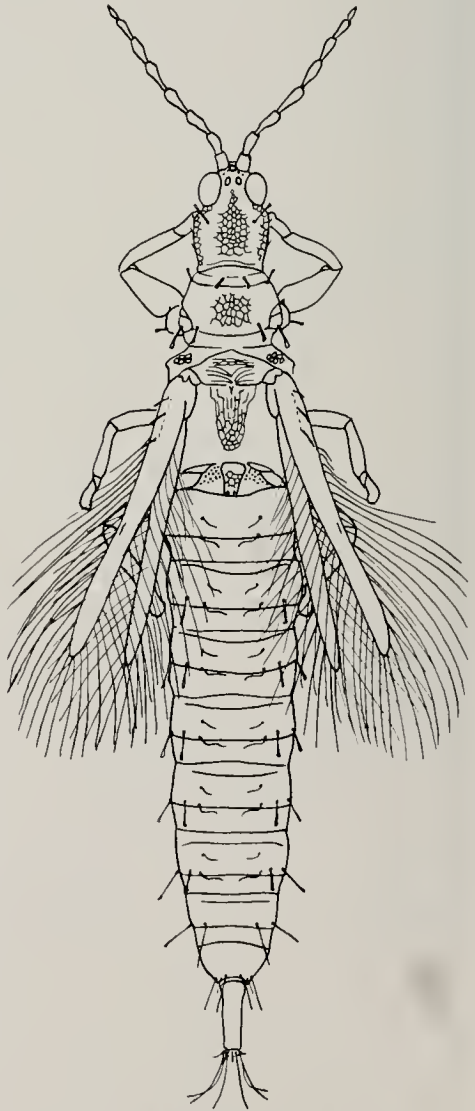


Fig. 260.—*Malacothrips zonatus*, dorsal aspect.

Prothorax smooth, with all major setae well developed and dilated. Metanotum only faintly sculptured. Wings reduced to pads. Fore tarsi each with a small tooth.

Pelta (Fig. 261) nearly triangular. Wing-holding setae moderately developed. Abdominal tergite IX with major posterior setae long, longer than tube, and pointed. Tube moderately long.



Fig. 261.—*Malacothrips zonatus*, pelta.

FEMALE (macropterous).—Length distended slightly less than 3 mm. Similar in color and structure to brachypterous female with the following exceptions. Wings fully developed, light gray except for a pale middle crossband. Fore wings slightly indented in the middle, each with six accessory fringe cilia.

MALE (brachypterous).—Length distended about 2 mm. Similar to brachypterous female with the following exceptions. Abdominal sternite VIII with a thin, transverse, linelike glandular area in the middle. Abdominal tergite IX with the lateral posterior setae greatly reduced in size.

This species can be distinguished from those assigned to *Eurythrips* by the absence of praepectal plates and from those assigned to *Hoplandrothrips* by coloration, the lack of strong reticulations on the metanotum, and by the incised outline of the cheeks just behind the eyes.

Apparently *zonatus* is statewide in distribution, occurring mostly in prairie grasses. It has an extensive range, being known at present from Massachusetts to eastern Kansas, western Iowa, and eastern North Dakota, and south at least to Arkansas.

Illinois records.—Found every month of the year, from one to several

localities in the following counties: ADAMS, ALEXANDER, CHAMPAIGN, CLAY, DOUGLAS, HANCOCK, IROQUOIS, JASPER, JERSEY, KNOX, LAKE, LEE, MASON, MCLEAN, MONROE, MONTGOMERY, PIATT, RICHLAND, SCOTT, and WILL.

Neothrips Hood

Neothrips Hood (1908c:371). Type-species by monotypy.—*Neothrips corticis* Hood.

Head longer than wide, prolonged in front of eyes, smooth. Eyes small, composed of a few large dorsal facets, in placement not extending beyond the cheek margins. Ocelli absent in brachypterous forms. Postocular setae well developed. Antennae eight segmented; segment III longer than IV; segments VII and VIII separated by a fine suture, but so closely joined as to form a pseudosegment. Mouth cone long and pointed. Maxillary stylets retracted far into the head, when retracted touching or nearly touching in the center of the head.

Prothorax long, slightly degenerate especially around margins where patches are broken into tiny platelets; smooth; all major setae well developed. Epimeral sutures complete. Praepectus absent. Mesopraesternum absent. Mesonotum fractured into stipple-like platelets anteriorly. Only brachypterous forms known. Legs short. Fore tarsi armed in both sexes.

Males without glandular area on abdominal sternite VIII. Abdominal tergite IX with major posterior setae long and pointed, of equal length in both sexes. Tube short and stout, fairly heavily sclerotized.

This genus resembles the *angusticeps* complex in *Hoplothrips*. It is not at all closely related to *Allothrips* or *Plectrothrips* as suggested by Hood (1908c), see Stannard (1957b). Its diagnostic characteristics, in the Illinois fauna, are those given under the species *corticis*. I have seen a new, second species in the private collections of Andre and of Post, from Wisconsin and North Dakota, respectively, taken from the bark of ash trees.

***Neothrips corticis* Hood**

Neothrips corticis Hood (1808c:372).
 ♀, ♂. Type-locality.—Not stated,
 but holotype labeled Urbana,
 Illinois.

FEMALE (brachypterous) (Fig. 262).
 —Length distended nearly 2 mm.
 General color yellowish brown to light
 brown. Apexes of tibiae, all tarsi, and
 pedicel of antennal segment III yel-
 low. Tube orange-brown. Body setae
 pale.

Head much longer than wide,
 smooth. Eyes small, composed of
 three or four large dorsal facets. Ocelli
 absent. Postocular setae moderately
 long, dilated. Antennal segment III
 with no inner and one outer sense
 cone; segment IV with one outer and
 one inner sense cone; segment VIII
 closely joined to segment VII, sepa-
 rated only by a fine suture. Mouth
 cone long and pointed. Maxillary sty-
 lets retracted far into the head, nearly
 touching in the middle of the head.

Prothorax with the margins ragged,
 becoming degenerated into stipple-
 like platelets; all major setae well de-
 veloped, dilated. Epimeral sutures
 complete. Praepectus absent. Meso-
 praesternum absent. Metanotum
 smooth. Wings reduced to small pads,
 each of which has a single dilated seta.
 Fore tarsi each armed with a small
 tooth.

Pelta broadly triangular. Wing-
 holding setae not differentiated. Ab-
 dominal tergite IX with major poste-
 rior setae slightly longer than tube,
 pointed. Tube short and stout, fairly
 heavily sclerotized.

FEMALE (macropterous).—Un-
 known.

MALE (brachypterous).—Length
 distended about 1.2 mm. Similar to
 female in general color and structure.
 Abdominal sternite VIII without a
 glandular area. Abdominal tergite IX
 with major lateral posterior setae not
 reduced, exactly as in female.

This rare species is at once recog-
 nizable in the fauna of Illinois by the
 compact form of antennal segments
 VII and VIII, the long and pointed
 mouth cone, the placement of the
 eyes, and the stout orange-brown tube.

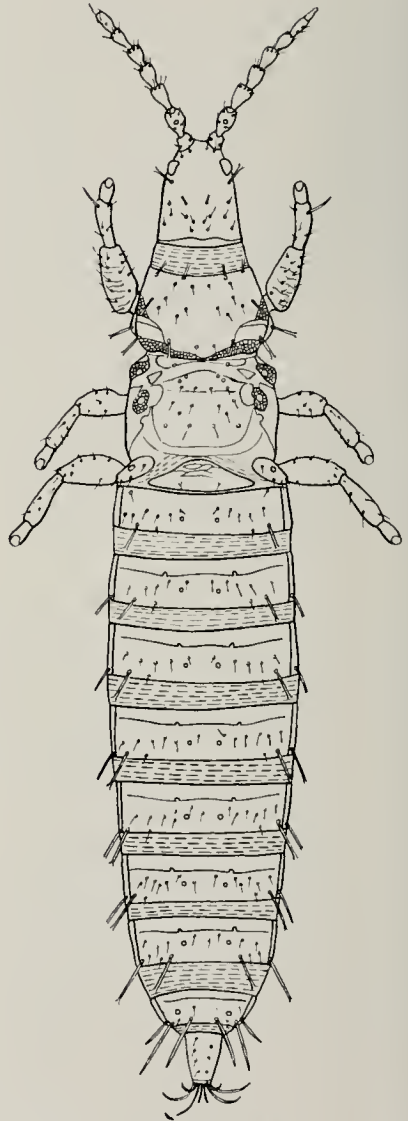


Fig. 262.—*Neothrips corticis*, dorsal aspect.

It is one of the few species in our area
 belonging to the Phlaeothripinae
 which, in the male, does not have the
 major lateral posterior setae on ab-
 dominal tergite IX reduced.

Although infrequently met with,
corticis has been taken throughout the
 state from under bark of live or dead
 branches.

Illinois records.—CHAMPAIGN
 COUNTY: Urbana, January 19, 1908,
 Hood, under soft maple bark, 1 ♂;

Urbana, March 13, 1949, Stannard, under soft maple bark, 1 ♀. KANKAKEE COUNTY: Bourbonnais (Rock Creek Canyon), May 13, 1950, Ross, Stannard, under cherry bark, 3 ♀, 1 ♂. PULASKI COUNTY: Mounds, August 16, 1951, Ross, Stannard, from dead beech branch, 1 ♀. VERMILION COUNTY: Hillery (Hood 1908c).

Neurothrips Hood

Neurothrips Hood (1924:315). Type-species by original designation.—*Acanthothrips magnafemoralis* Hinds.

Body with extensive hexagonal reticulations, generally intricately patterned with brown and yellow and colorless spots.

Head about as wide as long to longer than wide. Cheeks well expanded laterally with many seta-bearing warts. Eyes large, bean shaped, often about the width of an eye apart. Ocelli placed in a small triangle located midway between the anterior and posterior margins of the eye. Postocular setae placed on the median third of the head, small, thickened, dilated. Antennae eight segmented, intermediate antennal segments vasiform, sense cones fairly long. Mouth cone pointed. Maxillary stylets retracted far into the head, touching to nearly touching within the center of the head.

Thorax with major setae small, thickened, dilated. Prothorax with but one pair of well-developed epimeral setae. Epimeral sutures complete. Praepectus absent. Mesopraesternum well developed. Macropterous. Fore wings bent at base, narrowed beyond, without surface reticulations, with or without accessory fringe cilia. In species of Illinois, fore femora each with inner subapical tooth, fore tarsi each armed with a tooth.

Pelta often as in Fig. 264. Many abdominal tergites with expanded, leaf-like, wing-retaining setae (Fig. 1) placed near the meson and with thickened lateral posterior setae placed on projecting flanges of the tergites. Abdominal sternite VIII in males usually with a thin, transverse, median glandular area. Tube long and

slender (Fig. 186), terminal setae long, about four times the length of the tube.

This genus resembles *Acanthothrips* but differs primarily in the wide cheeks which extend much beyond the eye margin and in the broad, leaflike, wing-retaining setae on the abdomen.

Only one species, *magnafemoralis*, occurs in Illinois. It is one of the most spectacularly adorned and colored thrips in our state.

Neurothrips magnafemoralis (Hinds)

Acanthothrips magnafemoralis Hinds (1902:199). ♂. Type-locality.—Miami, Florida. Transferred to *Neurothrips* by Hood (1924).

FEMALE (macropterous).—Length distended over 3.2 mm. Color various shades of brown and yellow to nearly colorless in reflected light. Brown: head, most of thorax, most of abdominal segments I–VII, fore femora, apical half of mid and hind femora, median band on tibiae, antennal segments I and II, middle band of antennal segments III–V, and almost all of segments VII and VIII. Yellow to nearly colorless: antennal segments III–V in the basal and apical portions, all of segment VI and pedicel of segment VII, basal half of mid and hind femora, basal and apical portions of tibiae, all tarsi, all of abdominal segment VIII (which is yellow), and all of segment IX and basal one-third of tube (which are nearly colorless). Tube nearly black in apical two-thirds. Much of the brown area on the thorax and abdomen shading to yellowish brown, with occasional lateral spots becoming colorless. Fore wings generally colorless with a brown spot on leading margin at the region of the first basal fringe cilium and with a long, brown median streak. Setae colorless except bases of terminal setae which are brown. Body with red sub-integumental pigment; red around region of ocelli.

Head as in Fig. 263, reticulate, slightly longer than wide, cheeks expanded with seta-bearing warts. Eyes large, bean shaped. Ocelli present. Postocular setae small, dilated, lo-

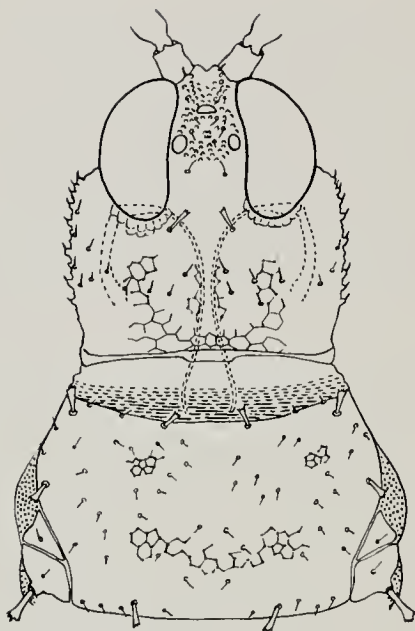


Fig. 263.—*Neurothrips magnafemoralis*, head and prothorax.

cated on the median third of the head. Antennal segments III–V vasiform, segments III and IV each with one inner and two outer sense cones subapically (segment IV with an additional small outer apical sense cone), segment VIII broadly attached to segment VII. Mouth cone pointed. Maxillary stylets retracted far into the head, touching to nearly touching within the center of the head.

Thorax reticulate. Prothorax (Fig. 263) with all major setae developed but small, dilated. Epimeral sutures complete. Fore wings without accessory fringe cilia. Fore femora each with a strongly developed inner subapical tooth, fore tarsi each armed with a large tooth.

Abdomen reticulate. Pelta as in Fig. 264. Abdominal tergites II–VII each with three pairs of leaflike, wing-holding setae (Fig. 1) along the meson; tergite VIII without these setae. Abdominal tergite IX with major posterior setae short, blunt to dilated. Tube long, terminal setae extremely long, suggestive of the condition found in *Amphibolothrips* and its subgenera.

MALE (macropterous).—Length

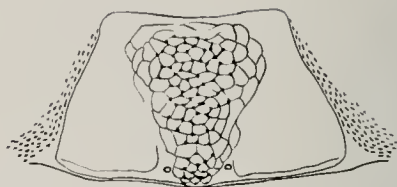


Fig. 264.—*Neurothrips magnafemoralis*, pelta.

distended about 2.6 mm. Similar to female in color and structure with the following exceptions. Fore tarsal teeth slightly smaller. Abdominal sternite VIII with a median, narrow, transverse glandular area, slightly upturned at each lateral end. Abdominal tergite IX with major lateral setae as in female, not reduced more than in female.

This distinctive, intricately colored species can be immediately distinguished from others in the Illinois fauna by the large, bean-shaped eyes, by the expanded head cheeks outlined by seta-bearing warts, and by the long terminal setae. In life *magnafemoralis* appears to be predominantly gray with a black tube that almost seems to be detached, so nearly colorless is abdominal segment IX.

Although found throughout the state, *magnafemoralis* is generally confined to large woodlands where it lives under bark, on branches, or in dead leaves.

Illinois records.—Collected from April to September (overwintering habits unknown), from one to several localities in the following counties: ADAMS, ALEXANDER, CALHOUN, CARROLL, CLARK, CLINTON, COOK, CRAWFORD, CUMBERLAND, DE WITT, EDGAR, FULTON, HARDIN, HENDERSON, HENRY, JACKSON, JASPER, JEFFERSON, JERSEY, JOHNSON, KANE, MACON, MARION, McDONOUGH, McLEAN, MONROE, OGLE, PEORIA, PULASKI, TAZEWELL, UNION, and VERMILION.

Phthirothrips Priesner

Phthirothrips Priesner (1933a:154).

Type-species by original designation.—*Phthirothrips pediculus* Priesner.

Head about as long as broad, cheeks nearly straight, dorsal surface mostly

smooth. Ocelli absent in apterous forms, present in macropterous forms. Eyes relatively small, slightly bulged. Postocular setae usually well developed. Antennae seven or eight segmented; when eight segmented, segments VII and VIII closely joined but separated by a fine suture; segment I inserted just forward of eye margin; segment II with dorsal sensoria apically placed; segment III smallest, pedicellate, with or without sense cones. Mouth cone broadly rounded. Maxillary stylets when at rest hardly retracted into head proper.

Pronotum proportionately large, smooth; major anterior setae minute or well developed, posterior pairs the largest. Epimeral sutures incomplete. Praepectus seemingly present, though weakly developed. Macropterous or apterous. Fore wings when present not indented in middle, accessory fringe cilia lacking. Fore legs slightly to moderately enlarged, unarmed.

Abdomen broadest part of body. Pelta broad, smooth. All tergites smooth, with well-developed lateral setae, wing-holding setae not differentiated in apterous forms. Abdominal sternite VIII with glandular area in male. Abdominal tergite IX with major lateral posterior setae (setae II of authors) reduced and spinelike in male. Tube short; anal setae slightly longer than tube.

The characteristics of the extremely small size of antennal segment III, the complete fusion of antennal segments VII and VIII, and the short maxillary stylets that hardly enter into the head proper readily distinguish this genus in Illinois. Only one species, *morgani*, occurs in the southeastern part of the United States including southern Illinois; its congeners are from Brazil and Liberia (West Africa).

In this genus, several species including *morgani* apparently inhabit and feed on mosses. Similarly, *Lissothrips muscorum*, which also has a small third antennal segment, frequents mosses within the range of *Phthirotirps*. Their separation for identification is based on the number of freely moveable antennal segments and placement of the maxillary stylets

well into or barely into the head proper; their ecological separation in the moss environment is not yet known.

Phthirotirps morgani Hood

Phthirotirps morgani Hood (1941: 206). ♀, ♂. Type-locality.—Gainesville, Florida.

FEMALE (apterous).—Length distended about 1 mm. Color medium brown, with dark green subintegumental pigment often in much of the abdomen. Apex of antennal segment II and pedicel of segment III yellow.

Head (Fig. 265) smooth. Eyes moderate in size, protruding slightly beyond cheeks. Ocelli absent. Postocular setae long, pointed. Antennae seven segmented; segment II with dorsal sensoria near apex; segment III smallest, pedicellate, without sense cones; segment IV with one inner and one outer sense cone; morphological segments VII and VIII completely fused without trace of suture between them. Mouth cone broadly rounded. Maxillary stylets barely penetrating into head proper.

Prothorax (Fig. 265) with major setae well developed, the posterior

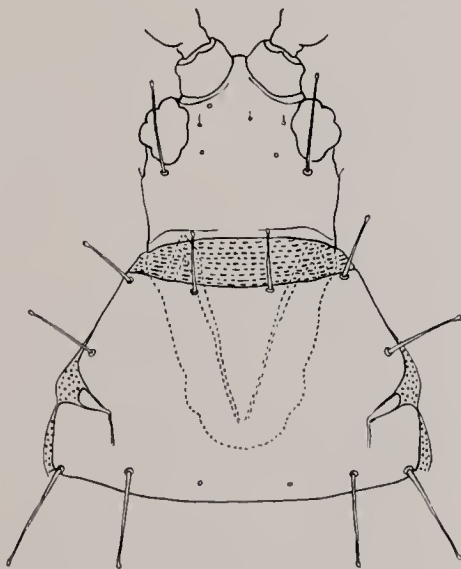


Fig. 265.—*Phthirotirps morgani*, head and prothorax.

setae being the longest, all blunt. Epimeral sutures incomplete. Praepectus seemingly absent. Pterothorax degenerate, smooth. Fore legs slightly enlarged, unarmed. Wings and basal sclerites lacking.

Abdomen broadest part of body, devoid of sculpture. Pelta broad. Major lateral pairs of setae well developed, pointed. Wing-holding setae lacking. Abdominal tergite IX with major posterior setae longer than tube, pointed. Tube short; anal setae just slightly longer than tube.

MALE (apterous).—Length distended about 0.8 mm. Similar in color and structure to female with the following exceptions. Postocular setae minute. Prothorax with major setae shorter than in female. Fore legs moderately enlarged. Abdominal sternite VIII with a narrow, transverse glandular area across middle. Abdominal tergite IX with lateral pair of major, posterior setae shortened, spinelike.

This is the only species of the genus in the United States east of the 100th meridian, as far as is known, and therefore its recognition can be made in our fauna on the basis of the generic characteristics.

The types are in the U.S. National Museum. Other specimens from the type locality, and Chiefland, and Earlton, Florida are in the Watson collection, University of Florida, Gainesville. Hood's claim (1941) that *morgani* is "apparently a common enough species in the south" is possibly true although unsubstantiated by records in the literature. The two specimens from Florida mentioned by the protologist, the specimens from Florida in the Watson collection, and the Illinois specimen mentioned herein (and a single female from Whitewater Falls, Jackson County, North Carolina, collected from the fungus, *Polyporus pargamensis* Fr., June 26, 1962, by R. C. Graves, deposited in the Illinois Natural History Survey) are the only records yet made known in print.

Besides the manuscript name *Eulisothrips antennatus* circulated by A. C. Morgan, the manuscript name *Eulisothrips brevis* occurs on slides in the

Watson collection. Neither is a valid name and both apply to *P. morgani*.

Illinois records.—HARDIN COUNTY: Gibsonia (Pounds Hollow Recreation Area), April 25, 1963, Evers, Stannard, forest litter, 1 ♂.

Plectrothrips Hood

Plectrothrips Hood (1908c:370). Type-species by monotypy.—*Plectrothrips antennatus* Hood.

Head about as long as wide, smooth; fore margin nearly straight across and even with anterior portion of eyes. Ocelli present, widely spaced. Eyes moderately large. Postocular setae long. Antennae eight segmented, inserted ventrally beneath region of ocelli; segment II with dorsal sensorium placed basally; segment VIII long and slender. Antennal sense cones stout. Mouth cone short, rounded. Maxillary stylets, when at rest, retracted well into the head.

Pronotum reduced to a shield which is longitudinally divided by a ridge, with only epimeral setae well developed. Praepectus absent in Illinois species. Prosternum with many large stipple-like areas. Macropterous. Fore wings not indented in the middle, with accessory fringe cilia. Fore tarsi each armed with a stout tooth. Mid and hind tibiae with strongly developed apical spurs.

Pelta (Fig. 150) broad. Abdominal segment II degenerate at sides, stipple-like. Wing-holding setae differentiated. Males apparently without glandular area and without major lateral posterior setae of abdominal tergite IX shortened. Tube short, usually fairly heavily sclerotized, terminal setae long.

Larva, in the second instar at least, with abdominal tergite IX with four toothlike projections on posterior margin.

The distinctive form of the prothorax of this genus is diagnostic in the Illinois fauna. Only one species, *antennatus*, occurs in our state. Other representatives are found throughout the world.

Plectrothrips antennatus Hood

Plectrothrips antennatus Hood (1908c: 370). ♀, ♂. Type-locality.—Urbana, Illinois.

FEMALE (macropterous).—Length distended about 2.1 mm. Color dark brown in head, most antennal segments, thorax, and femora; light brown to brown in abdomen and base of antennal segment III; tibiae and tube yellow to yellowish brown; tarsi yellow. Wings nearly colorless. Body with red subintegumental pigment.

Head (Fig. 266) smooth. Eyes moderately large. Ocelli present. Postocular setae long, pointed, placed quite far behind eyes. Antennae eight segmented; segment II with dorsal sensorium placed basally; segment III fairly small with one inner and two outer, stout, sense cones; segment VIII long and slender. Mouth cone narrowly rounded. Maxillary stylets when retracted placed fairly close together within the head.

Prothorax (Fig. 266) with only

epimeral setae well developed, these pointed to nearly blunt. All other setae minute. Praepectus absent. Metanotum faintly longitudinally striate. Fore wings not narrowed in the middle, each with about eight accessory fringe cilia. Fore tibiae each with a small apical wart or tooth. Mid and hind tibiae with a pair of well-developed apical spurs. Fore tarsi each armed with a large tooth.

Pelta (Fig. 150) large. Abdominal segment II (Fig. 150) fractured laterally into tiny platelets. Wing-holding setae slightly sigmoidal. Abdominal tergite IX with major posterior setae shorter than tube, pointed. Tube short and fairly heavily sclerotized; terminal setae long.

MALE (macropterous).—Length distended about 1.4 mm. Similar to female in general color and structure. Abdominal sternite VIII apparently without glandular area. Abdominal tergite IX with major lateral posterior setae apparently not more reduced than in female.

The form of the pronotum is diagnostic in the Illinois fauna.

This rare species has been collected several times in Illinois. Some specimens have been associated with dead wood.

Illinois records.—CHAMPAIGN COUNTY: Urbana, June 23, 1908, Hood, on inside of woodshed window, 1 ♂ (paratype). FULTON COUNTY: Astoria, July 25, 1957, Stannard, dead branch, 1 ♀. JO DAVIESS COUNTY: Galena, June 21, 1948, Stannard, sweeping in forest, 1 ♀.

Poecilothrips Uzel

Poecilothrips Uzel (1895:264). Type-species by monotypy.—*Poecilothrips albopicta* Uzel.

Head longer than wide, weakly transversely striate, with many scattered, small, fine setae. Ocelli present in all forms, fore ocellus placed behind anterior eye margin. Eyes moderately large. Postocular setae minute. Antennae eight segmented, inserted at anterior eye margin and slightly ventrally; segment II with dorsal sen-

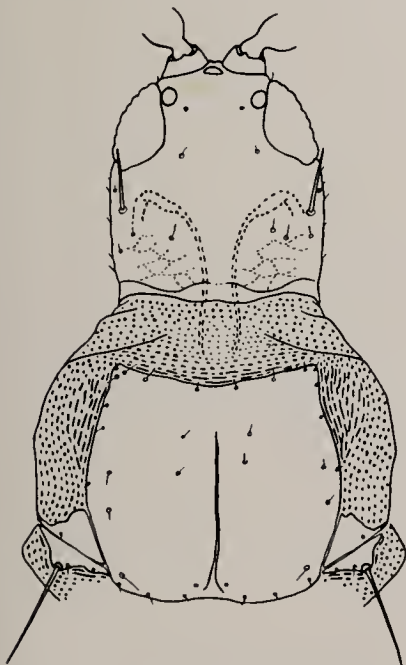


Fig. 266.—*Plectrothrips antennatus*, head and prothorax.

sorium placed about in the middle; segment VIII lanceolate. Mouth cone pointed, extremely long. Maxillary stylets slender, retracted far into the head, touching in the middle of the head.

Pronotum shorter than head, weakly sculptured, with all major setae well developed, stout, dilated; with only a single pair of epimeral setae. Epimeral sutures complete although weak. Praepectus absent. Mesosternum incised medially, surface fractured at this point into tiny platelets. Macropterous or brachypterous. Fore wings straight sided, accessory cilia present. Fore tarsi unarmed in both sexes.

Abdomen with pelta triangular. Abdominal tergites II-VII with differentiated wing-holding setae in all forms. Tube shorter than head with terminal setae only slightly longer than tube.

General color dark brown spotted with chalk white.

Superficially *Poecilothrips* resembles *Hoplandrothrips*. The lack of well-developed postocular setae and the degeneration of the middle of the anterior margin of the mesosternum are characteristics that, combined, serve to distinguish *Poecilothrips*.

Possibly this might be a monobasic genus containing only *albopictus*. Another presently remaining name associated with this genus, *harrisoni* Bagnall, is of uncertain status and might be a synonym of *albopictus* (Pelikán, 1950). Faure (1955) assigned his South African species, *nubilus*, to *Poecilothrips*, but that species differs in many ways from the European type, and, reasonably, could be separated to a subgenus or full genus of its own.

Poecilothrips albopictus Uzel

Poecilothrips albopicta Uzel (1895: 264). ♀. Type-locality.—Bohemia (Czechoslovakia). Pelikán (1950). ♂.

Phloeothrips ornatus Hood (1913b: 165). ♀. Type-locality.—Washington, D. C. Transferred to *Poecilothrips* by Hood (1927c). Synonymized by Pelikán (1950).

Poecilothrips lupini Moulton (1929c: 133). ♀. Type-locality.—Mountain View, California. Suggested as synonym by Bailey (1949b).

FEMALE (macropterous).—Length distended about 2.4 mm. General color dark brown, marked with white on the posterior angles of the prothorax and on the lateral angles of abdominal tergites I-VIII. Variations of the white color pattern have been illustrated by Pelikán (1950). Antennal segments I and II dark brown; segments III-VI brown apically, pale yellow basally; segments VII and VIII brown. Legs brown except tibiae, at either end, and all tarsi yellowish brown. Fore wings pale, lightly clouded with gray at the base and in the middle. Subintegumental pigment bright red. Major body setae pale.

Head (Fig. 267) longer than wide; dorsal surface weakly striate; bearing many small, fine setae; interocellar area longitudinally striate. Eyes large, each longer than combined lengths of antennal segments I and II, and placed fairly close together. Ocellar area closely confined between eyes, fore ocellus placed posterior to anterior eye margin. Postocular setae minute. Maxillary stylets, when at rest, retracted to a position forward of posterior eye margin, touching within center of head. Mouth cone pointed, extremely long, extending posteriorly beyond the prothorax.

Antennal segment I quadrate; II cylindrical, pedicellate, dorsal sensorium placed in about the middle; III-V subvasiform, III with one inner and one outer sense cone, IV with two inner and two outer sense cones; VI cylindrical, narrowly pedicellate; VII cylindrical, more broadly pedicellate; VIII lanceolate, broadly pedicellate.

Prothorax shorter than head, weakly sculptured, with all major setae well developed, stout, dilated. Epimeral sutures complete. Praepectus absent.

Pterothorax widest part of body. Metascutum with closely spaced longitudinal striations.

Legs slender, unarmed.

Fore wings more or less straight

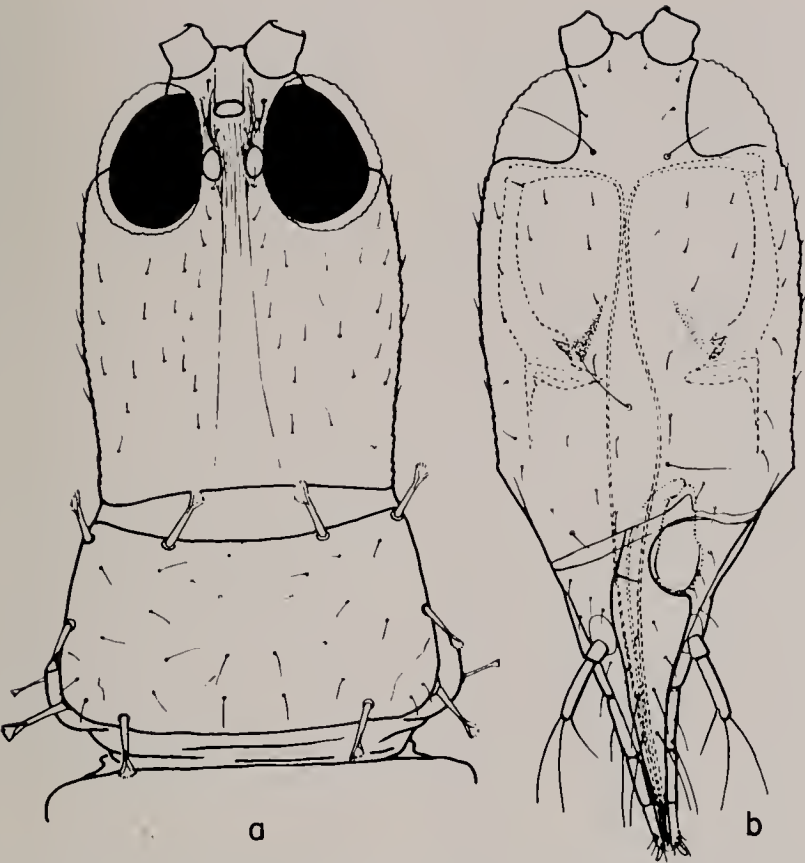


Fig. 267.—*Poecilothrips albipictus* from Europe and east and west coasts of the U.S.A.: a, head and prothorax, dorsal aspect; b, head, ventral aspect. From Pelikán (1950).

sided, each with 12 accessory fringe cilia; major three basal setae dilated.

Abdominal tergite I with pelta triangular (Fig. 268). Abdominal tergites II–VII each with two pairs of wing-holding setae, the anterior pair weak, the posterior pair strongly developed, sigmoidal; lateral setae dilated. Abdominal tergite IX with posterior setae shorter than tube, dilated. Abdominal segment X (tube) much shorter than head, terminal setae slightly longer than tube.

FEMALE (brachypterous).—Similar in all respects to macropterous form except wings reduced to small pads, and both pairs of wing-holding setae on abdominal tergites II–VII greatly reduced.

MALE (macropterous).—Described by Pelikán (1950). Legs unarmed.

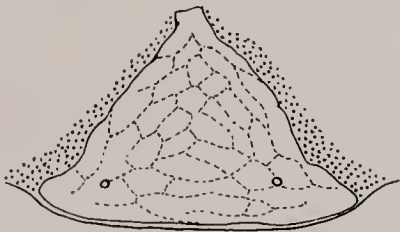


Fig. 268.—*Poecilothrips albipictus*, pelta.

Presence or absence of abdominal sternal glandular areas not mentioned in description. This sex known only in Europe.

According to Bailey (1931) and Pelikán (1950) *albopictus* lives in colonies, adults and larvae together, on the surface of dead or dying bark, particularly smooth oak or willow

bark. Presumably there are several generations a year.

This distinctive, white-dotted species probably came to America through the agency of modern man. It occurs in New York state as far west as Rochester and in Pennsylvania, New Jersey, Washington, D. C., and also in Washington and California (Cott 1956). Despite much searching, it has not been found in Illinois, but its presence in our state is likely.

Polyphemothrips Schmutz

Polyphemothrips Schmutz (1909a: 276). Type-species by monotypy.—*Pholyphemothrips braziliensis* Schmutz.

Members of this genus are principally found in the tropics, particularly Central and South America. Only one group of *Polyphemothrips*, the subgenus *Adelothrips*, has representatives occurring as far north as Illinois.

In general, species of the typical subgenus *Polyphemothrips* are moderately large in size, have decidedly swollen cheek pouches, and have the fore ocellus overhanging the bases of the antennae. In other respects, they are similar to those placed in the subgenus *Adelothrips* whose characteristics are described herein.

Polyphemothrips, its subgenera, and allied genera are peculiar in that the maxillary stylets are thicker than those ordinarily found in the Phlaeothripinae. These closely related genera can be placed together in the *Docessis-sophothrips* phyletic line (Stannard 1957b).

Subgenus *Adelothrips* Hood

Adelothrips Hood (1938c:380). Type-species by original designation.—*Adelothrips xanthopus* Hood.

The following description pertains solely to the fauna of Illinois.

Head longer than wide, somewhat arched on the dorsum of the posterior region of the head so that the faint reticulations appear to be upturned in slide-mounted specimens, cheek pouches absent. Eyes moderate in size

to small. Ocelli well developed in macropterous forms, somewhat reduced or absent in brachypterous forms, not overhanging insertions of antennae. Postocular setae fairly long, dilated or pointed. Antennae seven or eight segmented, the division between morphological segments VII and VIII either complete with a fine suture (Fig. 154) or incomplete with a partial ventral suture. Antennal sense cones usually long and slender. Mouth cone broadly rounded to nearly pointed. Maxillary palps large. Maxillary stylets thicker than usual for most other members of the Phlaeothripinae, retracted far into the head, nearly touching in the center of the head when fully retracted.

Prothorax with all major setae well developed. Epimeral sutures complete. Praepectus absent. Mesopraesternum usually well developed in macropterous forms, degenerate in brachypterous forms. Metanotum usually smooth. Macropterous or brachypterous. Fore wings when fully developed not indented in the middle, with or possibly without accessory fringe cilia. Fore tarsi each armed, in both sexes, with a strong tooth.

Pelta usually triangular. Wing-holding setae well developed in macropterous forms, less developed in brachypterous forms. Males apparently without glandular areas on abdominal sternite VIII, with major lateral posterior setae on abdominal tergite IX greatly reduced. Females with major posterior setae on abdominal tergite long and pointed. Tube shorter than head, often colored with shades of orange or yellow and tipped with grayish brown.

In Illinois this genus can be easily recognized by the slightly thickened maxillary stylets, the close union of morphological segments VII and VIII of the antennae, the large maxillary palps, and the upturned reticulations (sometimes faint) on the posterior portion of the dorsum of the head.

Recognition of *Adelothrips* as an entity rather than as an outright synonym of *Polyphemothrips* was made here to conform to custom and because *Adelothrips*, while not absolute-

ly separable from *Polyphemothrips*, is a category of some usefulness, especially in our region. At least, *Adelothrips* stands for a certain section of species in *Polyphemothrips*, and in areas where there are no intergrading species the designation of that section can be made without the possibility of confusion.

Four species occur in Illinois. Presumably all live on fungus spores and are found in forest ground cover or on dead branches.

KEY TO SPECIES

- 1. Mouth cone pointed to nearly pointed because maxillary palps protrude posteriorly; antennal segments VII and VIII nearly to completely divided by a fine suture.....*ambitus*
Mouth cone broadly rounded (Fig. 197), maxillary palps not protruded to any great extent posteriorly; antennal segments VII and VIII only partially divided.....2
- 2. Color predominantly yellow; in forest debris.....*bratleyi*
Color predominantly brown; on dead branches.....3
- 3. Postocular setae pointed; base of tube usually orange-brown.....*acutus*
Postocular setae dilated; base of tube always dark brown.....*junctus*

Polyphemothrips (Adelothrips)
***acutus* (Stannard)**

Adelothrips acutus Stannard (1956c: 108). ♀, ♂. Type-locality.—Mapleton, Illinois. Transferred to *Polyphemothrips* by Stannard (1957b).

FEMALE (brachypterous).—Length distended 2.8–3 mm. General color dark brown. Antennal segments I and II, pedicel of segment III, and all tarsi yellowish brown. Tube orange-yellow to orange-brown, tipped with grayish brown. Body with red subintegumental pigment.

Head (Fig. 271) longer than wide. Eyes somewhat reduced in size. Ocelli present. Postocular setae long and pointed. Antennal segment III with one inner and two outer sense cones, segment IV with two inner and two outer sense cones, segments VII and VIII fused although with an incomplete ventral suture. Mouth cone

broadly rounded, labial palps not protruding posteriorly.

Prothorax with all major setae well developed, usually blunt or slightly dilated. Epimeral sutures complete. Mesospinasternum degenerate, almost entirely reduced or absent. Metanotum smooth. Wings reduced to small pads. Fore tarsi each armed with a strong tooth.

Pelta triangular. Wing-holding setae weakly developed. Abdominal tergite IX with major posterior setae long and pointed. Tube slightly more than one-half as long as head.

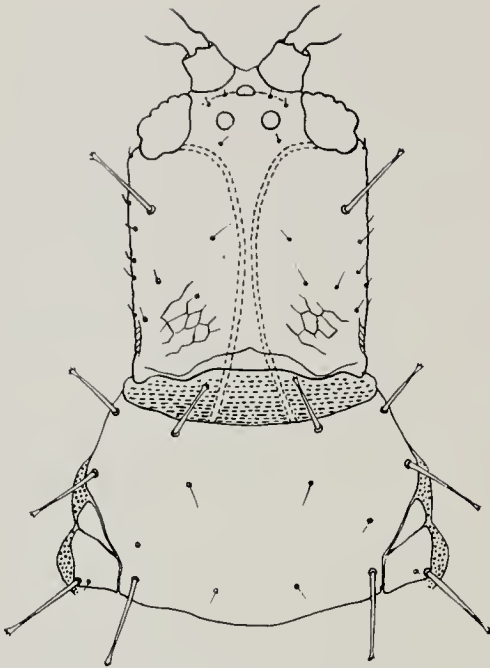
FEMALE (macropterous).—Length distended slightly less than 3 mm. Similar to brachypterous female in general structure and color with the following differences. Eyes slightly larger. Fore wings fully developed, lightly washed with brown, each with about six accessory fringe cilia. Wing-holding setae more fully developed, although not as large as in *ambitus*.

MALE (brachypterous).—Length distended about 2 mm. Similar to brachypterous female in general color and structure. Major form (the only form so far known) with fore legs slightly enlarged, fore tarsal tooth stouter than in female, prothorax (Fig. 273) with a median longitudinal ridge. Abdominal sternite VIII without a glandular area. Abdominal tergite IX with major lateral posterior setae greatly reduced in size.

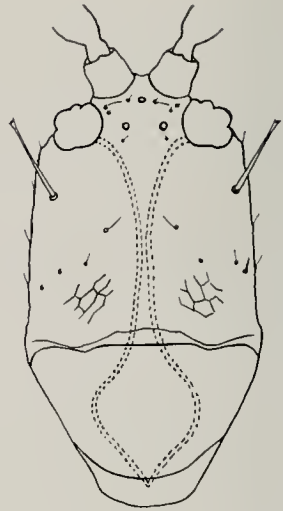
This species is extremely close to *junctus* and could be, in fact, only a form of *junctus*. From *junctus*, *acutus* may be distinguished by the postocular setae which are pointed at the tip, not dilated as in *junctus*, and usually by the color of the tube which is predominantly orange-yellow to orange-brown, not brown as in *junctus*.

So far this species has been found in only a few localities in Illinois. Its range lies within the range of *junctus*.

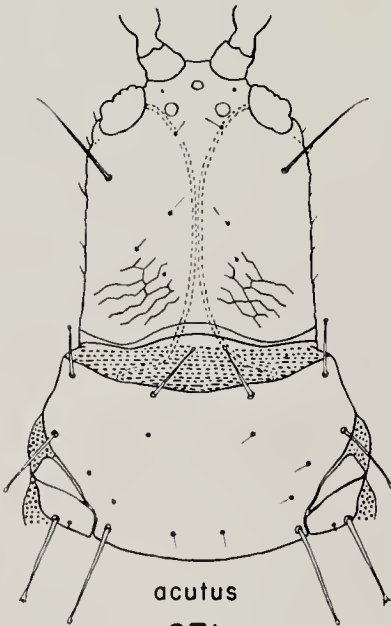
Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 8, 1951, Richards, Stannard, on willow, 2 ♀. CUMBERLAND COUNTY: Toledo, May 18, 1950, Sanderson, Stannard, beating dead elm branch, 1 ♀. FULTON COUNTY: Anderson Lake Conservation Area, September 8, 1954, Ross,



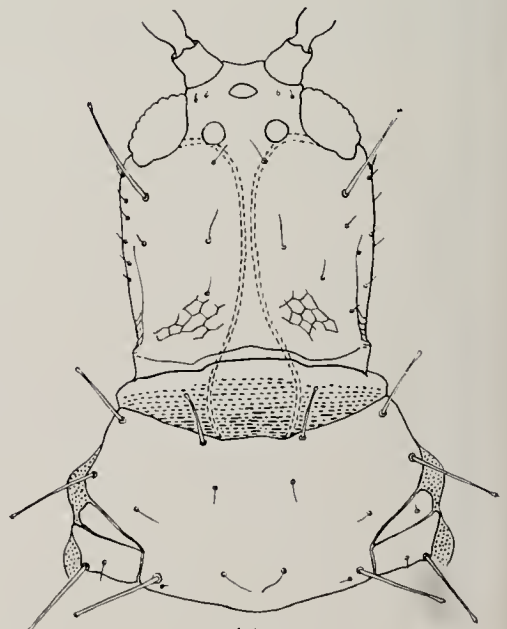
bratleyi, macropterous
269



bratleyi, brachypterous
270



acutus
271



ambitus
272

Fig. 269-272.—Head and prothorax of species of *Polyphemothrips* subgenus *Adelothrips* as indicated.

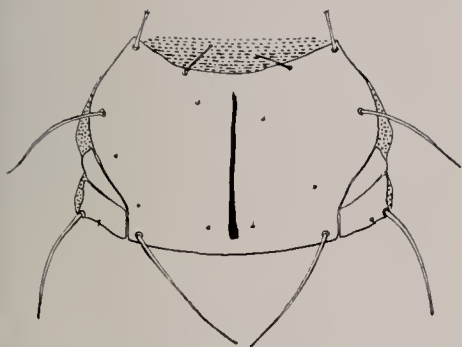


Fig. 273.—*Polyphemothrips* (*Adelothrips*) *acutus*, ♂, prothorax.

Stannard, on dead willow, 1 ♀, 3 ♂. GALLATIN COUNTY: Gibsonia (Pounds Hollow Recreation Area), April 24, 1963, Stannard, dead branch, 1 ♀. JACKSON COUNTY: Giant City State Park, April 28, 1949, Sanderson, Stannard, beating dead *Crataegus*, 1 ♀. PEORIA COUNTY: Mapleton, June 2, 1949, Stannard, from dead willow branch, 1 ♀.

***Polyphemothrips* (*Adelothrips*) *ambitus* (Hinds)**

Trichothrips ambitus Hinds (1902: 191). ♀. Type-locality.—Amherst, Massachusetts. Hood (1914b). ♀. Transferred to *Polyphemothrips* by Stannard (1957b).

FEMALE (macropterous) (Fig. 274).—Length distended about 3.4 mm. General color yellow with brown areas ranging from individuals which are largely yellow to individuals which have extensive areas of brown. Brown: always anterior portion of head; terminal segments of antennae (apical half of antennal segment IV, apical three-fourths of V, and all of VI–VIII); occasionally prothorax (although in most specimens prothorax yellow); always mesothorax; sometimes anterior portions of metathorax; mid and hind femora; fore wings at extreme base and an area basal of the middle; sometimes sides of abdominal segments II–VI, always sides of abdominal segments VII and VIII, and tip of tube. Remainder of body

yellow except tibiae and tarsi of the mid and hind legs and at least the apical half of the fore wings, which are nearly colorless. Tube in basal four-fifths yellowish orange to orange to orange-brown, being darkest in those individuals with the prothorax brown. Body with red subintegumental pigment.

Head (Fig. 272) longer than wide, widest just behind eyes. Eyes moderate in size. Ocelli present. Postocular setae fairly long and slightly dilated. Antennal segment III with one inner and two outer sense cones, segment IV with two inner and two outer sense cones; segments VII and VIII (Fig. 165) forming a compact mass completely divided, or nearly so, by a thin suture. Mouth cone bluntly rounded but appearing nearly pointed because the labial palps are protruded posteriorly.

Prothorax with all major setae well developed, dilated. Epimeral sutures complete. Mesospinasternum well developed. Fore wings not indented in the middle, each with 10–12 accessory fringe cilia. Fore tarsi each armed with a strongly developed tooth.

Pelta triangular (Fig. 171). Wing-holding setae well developed, sigmoidal. Abdominal tergite IX with major posterior setae long and pointed (a specimen in our collection from Rock, Pope County, Illinois has one of the mid pair of these setae blunt; the other is normal and pointed). Tube shorter than head length.

MALE (macropterous).—Length distended about 2.9 mm. Similar in general color and structure to female. Abdominal sternite VIII without a distinct glandular area. Abdominal tergite IX with major lateral setae greatly reduced in size.

This species resembles the Floridian *xanthopus* in color and structure. It differs from *xanthopus*, and from its congeners in Illinois as well, by the position of the labial palps. In *ambitus*, the labial palps protrude posteriorly completely beyond the mouth cone proper, making the mouth cone appear to be pointed. As in the Brazilian species, *palmarum* Hood, *ambitus* has

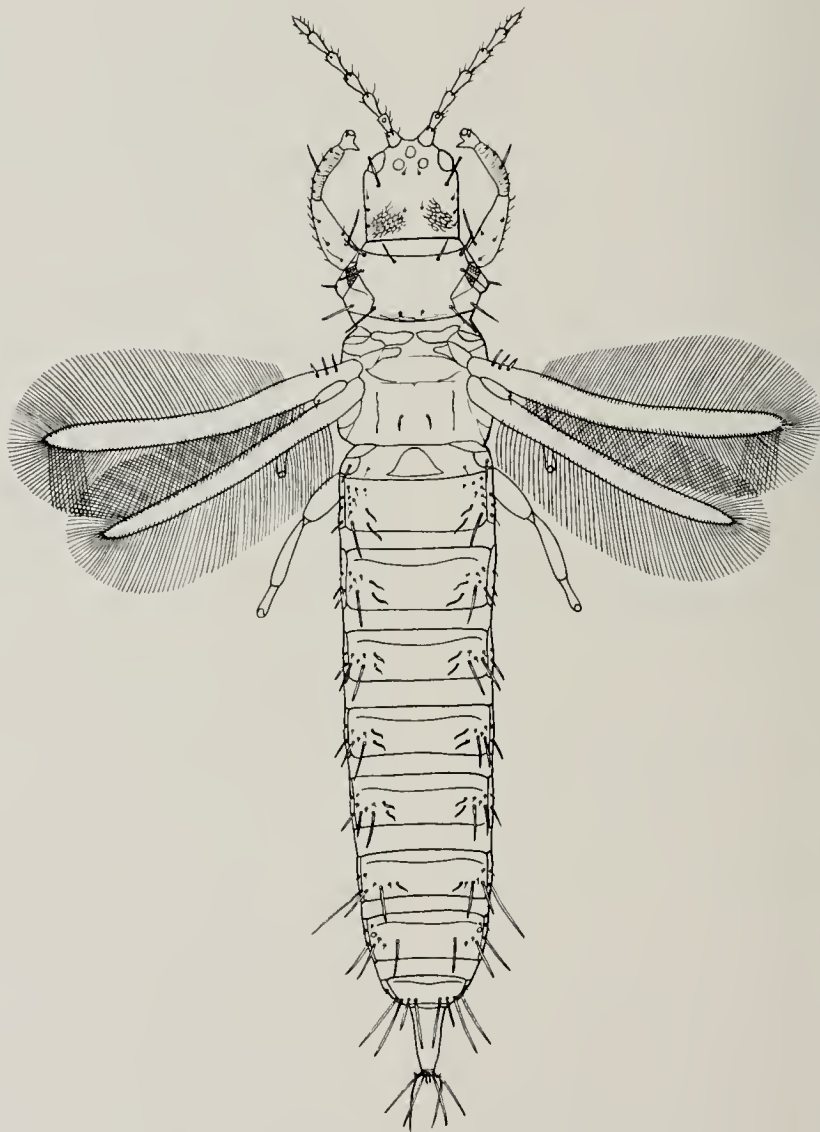


Fig. 274.—*Polyphemothrips (Adelothrips) ambitus*, dorsal aspect.

antennal segments VII and VIII completely separated.

Although nowhere known to be common, *ambitus* occurs throughout our state. We have taken it from under bark of dead branches, particularly of sycamore, locust, and willow.

Illinois records.—ADAMS COUNTY: Siloam Springs State Park, August 9, 1951, Richards, Stannard, dead willow, 1 ♀, 1 ♂. CALHOUN COUNTY: Beecreek, August 10, 1951, Richards,

Stannard, dead branch, 1 ♀. COOK COUNTY: Des Plaines, April 17, 1954, Graves, on fungus, 1 ♀. DE KALB COUNTY: Sycamore, September 15, 1955, Ross, Stannard, dead willow, 1 ♀. HARDIN COUNTY: Cave-in-Rock, May 2, 1956, Stannard, dead locust tree, 1 ♀. JACKSON COUNTY: Makanda, July 14, 1948, Sanderson, Stannard, sycamore branch, 1 ♀. LAKE COUNTY: Antioch, August 31, 1955, Moore, Stannard, dead branch, 1 ♀.

POPE COUNTY: Rock, May 6, 1950, Sanderson, Stannard, beating dead willow, 1 ♀. UNION COUNTY: Alto Pass, May 10, 1951, Sanderson, Stannard, dead apple branch, 1 ♀, 1 ♂; Jonesboro, August 15, 1951, Ross, Stannard, dead branch, 1 ♀. VERMILION COUNTY: Danville, October 17, 1950, Ross, Stannard, beating sycamore branch, 1 ♀.

**Polyphemothrips (Adelothrips)
bratleyi (Watson)**

Trichothrips bratleyi Watson (1935: 61; 1937b:12). ♀, ♂. Type-locality.—Quincy, Florida, see explanation below. Transferred to *Polyphemothrips* by Stannard (1957b).

Hoplothrips flavus Moulton and Andre (1936:225). ♀, ♂. Type-locality.—Ottumwa, Iowa. Synonymized by Hood (1952a).

FEMALE (brachypterous) (Fig. 275).—Length distended about 2.5 mm. General body color yellow. Antennal segment IV at apex, segment V in apical half, segment VI in apical two-thirds, and all of segments VII and VIII brown. Tube deep orange at base fading to yellow, tip grayish brown. Body with red subintegumental pigment.

Head (Fig. 270) long, about $1\frac{1}{3}$ times as long as wide. Eyes small, reduced to about a half dozen fairly large facets. Ocelli present but reduced in size. Postocular setae well developed, dilated. Antennal segment III with one inner and two outer sense cones, segment IV with two inner and two outer sense cones, segments VII and VIII (Fig. 163) fused except for a partial ventral suture that is occasionally reduced to a dot. Mouth cone broadly rounded, labial palps not protruding posteriorly.

Prothorax with all major setae well developed, dilated; anteromarginal setae smaller than the anterolateral pair, the anterolateral setae nearly equal to the midlateral pair. Epimeral sutures complete. Mesospinasternum somewhat degenerate. Metanotum smooth, not reticulate. Wings reduced

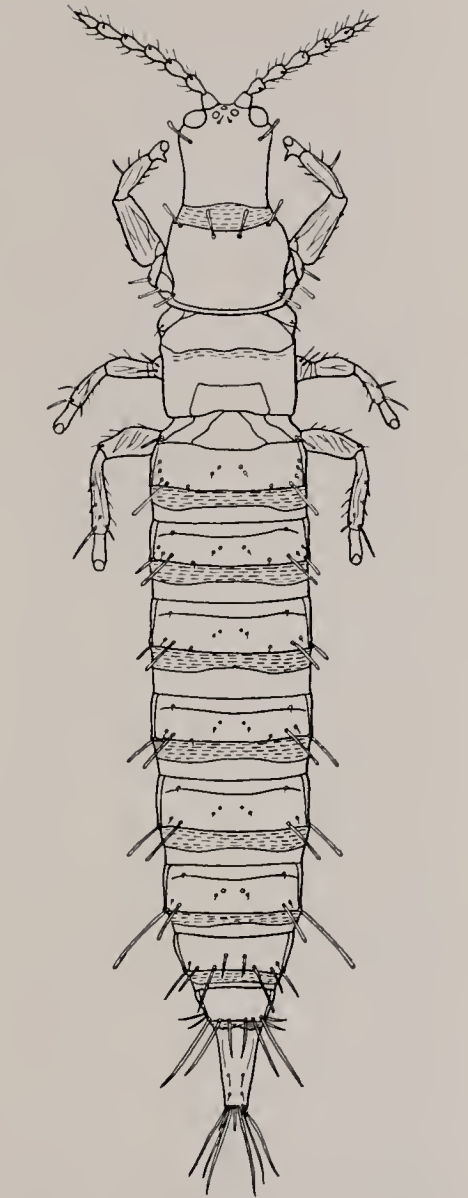


Fig. 275.—*Polyphemothrips (Adelothrips) bratleyi*, ♀ brachypterous, dorsal aspect.

to small pads. Fore tarsi each armed with a strong tooth.

Pelta roughly triangular to trapezoid. Wing-holding setae weakly developed. Abdominal tergite IX with major posterior setae long and pointed. Tube two-thirds as long as head.

FEMALE (macropterous).—Length distended over 2.5 mm. Similar to

brachypterous female except for the following modifications. Eyes (Fig. 269) larger with many more dorsal facets, which anteriorly are smaller than those in the brachypterous form. Ocelli larger. Wings fully developed, seemingly without accessory fringe cilia. Wing-holding setae well developed.

MALE (brachypterous).—Length distended about 1.6 mm (minor form) to 2.2 mm (major form). Similar to brachypterous female in general color and structure with the following exceptions. Ocelli slightly reduced (major forms) to sometimes absent (minor forms). In major forms fore legs enlarged and prothorax with a median longitudinal ridge. Abdominal sternite VIII without a glandular area. Abdominal tergite IX with major lateral setae greatly reduced in size.

MALE (macropterous).—Unknown.

In Illinois, *bratleyi* is the only species which is primarily yellow in color and is frequently brachypterous.

Throughout the southeastern part of the United States this species is locally abundant in woodland leaf mold, although occasionally it has been taken in *Andropogon* clumps near forest edges.

Both major and minor forms occur in the two sexes with the greatest enlargements of parts in the major male. The major form exhibits a thicker and blunter fore tarsal tooth, a more swollen fore femur, and a larger prothorax with a median thickened longitudinal ridge as in Fig. 273. This ridge is absent or only faintly present in minor individuals.

Of the three dozen or so specimens that I have studied, only one out-of-the-ordinary variation of the characteristics listed here was noted. That one exception occurred in a brachypterous female from Illinois which had the dorsal median pair of posterior setae of abdominal tergite IX dilated at the tip instead of having the usual pointed condition; yet in all other characteristics this specimen was conspecific. The dilation of similar setae was found to be one of several specific characteristics for the Brazilian *palmarum* (Hood 1952a).

Watson's original description of *bratleyi* was continued over several years. The first part, the description of the female, appeared in 1935, and while it was not complete according to the general pattern of descriptions followed by most taxonomists I have accepted Watson's name as the valid one. In 1937 Watson finished the description started in 1935. He described the male, gave locality data for the two sexes, and finally compared the species to an allied species. Meanwhile Moulton and Andre (1936) named this species *Hoplothrips flavus*. I think Moulton and Andre hold the unusual record of having published the description of a species "between" the publication of another name for the same species by another author. From the literature no one could have surmised that the two names stood for the same species.

Actually Watson's description is quite different from the foregoing. In stating the color, in declaring that antennal segments VII and VIII were completely separated by a suture, and in calling the supposed brachypterous specimen an apterous individual, he was seemingly inaccurate. The lectotype selected here is the brachypterous female on the slide in the Watson collection labeled "Type ♀, Quincy, Fla., Oct. 16, 1930, Watson & Bradley, fr. dead Spanish moss, on ground in hammock." Other slides in this collection also marked "type" contain males.

Illinois records.—Collected every month of the year in the eastern United States and from one to several localities in the following Illinois counties: ADAMS, ALEXANDER, CLAY, COLES, CUMBERLAND, LAKE, LAWRENCE, MONTGOMERY, POPE, PULASKI, WASHINGTON, and WHITE.

Polyphemothrips (Adelothrips) junctus (Hood)

Cryptothrips junctus Hood (1912c: 139). ♀, ♂. Type-locality.—Baldwin, Michigan. Transferred to *Adelothrips* by Hood (1952a). Transferred to *Polyphemothrips* by Stannard (1957b).

Hoplothrips quercus Moulton and Andre (1936:225). ♀, ♂. Type-locality.—Boone, Iowa. Synonymized by Hood (1952a).

FEMALE (brachypterous, major form).—Length fully distended nearly 3 mm. General color dark brown, being lighter on the dorsum of the median abdominal segments. Antennal segment III in pedicel and tarsi yellowish brown. Setae, except anal setae, yellow. Body with much red subintegumental pigment.

Head longer than wide, slightly bulged at angles of eyes. Eyes somewhat reduced in size, entirely on the anterior border of the head. All ocelli present, somewhat reduced in size. Postocular setae well developed, dilated at tips. Antennal segment III with one inner and two outer sense cones, segment IV with two inner and two outer sense cones, segments VII and VIII fused although with a partial ventral suture. Mouth cone (Fig. 197) broadly rounded.

Prothorax shorter than head, with all major setae dilated. Mesospinasterum degenerate. Metanotum smooth. Wings reduced to small pads. Fore legs not as enlarged as in major males. Teeth well developed but slender.

Pelta broadly triangular. Wing-holding setae weakly developed. Abdominal tergite IX with major terminal setae nearly equal to length of tube, pointed. Tube slightly more than one-half as long as head, anal setae longer than tube.

FEMALE (macropterous).—Similar to brachypterous female except wings fully developed, uniformly brown, and with five or six accessory fringe cilia on each fore wing. Tube and antennal segments I and II brown. Postocular setae dilated, as in brachypterous form.

MALE (brachypterous, major form).—Length distended over 2 mm. Similar to female in general color and structure. Ocelli reduced in size, sometimes fore ocellus absent. Prothorax with a median longitudinal ridge. Fore legs enlarged, fore tarsi (Fig. 276) each armed with a strong, stout tooth. Abdominal sternite VIII without a glan-



Fig. 276.—Fore tarsus of *Polyphemothrips* (*Adelothrips*) *junctus*, ♂, showing tooth-like projection.

dular area. Abdominal tergite IX with median pair of major posterior setae long and pointed, lateral pair greatly reduced in size.

The darker color of the antennae and the dilated postocular setae distinguish *junctus* from *acutus*, although in other respects the two are similar. As yet neither *junctus* nor *acutus* have been collected in sufficient numbers to permit any conclusions on the possible range of variability. Perhaps *pericles* (Hood) is also conspecific.

According to Hood (1912c), pupae occur under loose scales of bark in August and by the end of August adults appear, with males emerging earlier than females. It is not known whether there is more than one generation a year.

Illinois records.—CHAMPAIGN COUNTY: Mahomet, April 17, 1908, Ewing, under bark, 1 ♀, (Hood 1912c). CLARK COUNTY: Clarksville (Rocky Branch), July 2, 1958, Ross, Stannard, dead branch, 1 ♂. JACKSON COUNTY: Murphysboro (Hood 1912c). OGLE COUNTY: Oregon, September 27, 1956, Ross, Stannard, dead branch, 1 ♀.

Preeriella Hood

Preeriella Hood (1939a:612). Type-species by original designation. — *Chirothripoides minutus* Watson.

Body cylindrical, not dorso-ventrally compressed.

Head longer than wide, surface smooth except for a few transverse striae at base of head. Ocelli present. Postocular ? setae (affinities not certain) long and dilated to blunt. Antennae (Fig. 160) inserted in front of eyes on slight, forward protrusion of head; seven or eight segmented; morphological segment III cup shaped, broadly attached to segment IV or completely fused to IV as in one South American species. Mouth cone (Fig. 195) broadly rounded. Maxillary stylets when at rest retracted well into the head.

Prothorax smooth, with a median transverse ridge. Anterolateral and major posterior setae well developed, anteromarginal setae closely placed near anterolateral setae and moderately short to small, midlateral setae minute. Epimeral sutures incomplete. Praepectus not discernible. Probasi-sternal plates seemingly very large. Metanotum with a few median striations. Meso- and metasternum with a continuous longitudinal ridge connecting the furcae. Macropterous, wings extremely narrow, fore wings with cilia widely spaced, without accessory fringe cilia. All tarsi apparently one segmented.

Pelta (in the type-species at least) divided into three parts. Wing-holding setae well developed, sigmoidal in shape. Males seemingly without glandular areas, major lateral setae on the posterior margin of abdominal tergite IX not reduced more than in female. Tube short, slender in some species, stout in others.

Body setae pointed, blunt, or moderately dilated.

This genus is represented in our state by the type-species, *minuta*, which is the smallest tubuliferan in our fauna.

Preeriella most closely resembles *Hydiorhipis*, a neotropical genus that does not occur north of Mexico and southern Florida as far as is known.

The diagnostic characteristics of *minuta* should suffice for the recognition of the genus in the biota of Illinois.

Preeriella minuta (Watson)

Chirothripoides minutus Watson (1937b:13). ♂. Type-locality.—Gainesville, Florida.

FEMALE (macropterous).—Length distended slightly less than 1 mm. General color pale yellow with light brown markings. Light brown: head in region of ocelli; antennal segments IV–VIII, being lightest brown in segment IV; a transverse middle band across the prothorax especially at the sides; anterior angles of pterothorax; and basal region of the fore wings. Ocellar pigment red.

Head (Fig. 277) much longer than wide, striate only at extreme base, with a pair of long, dilated setae (? postocular) midway on the dorsum be-

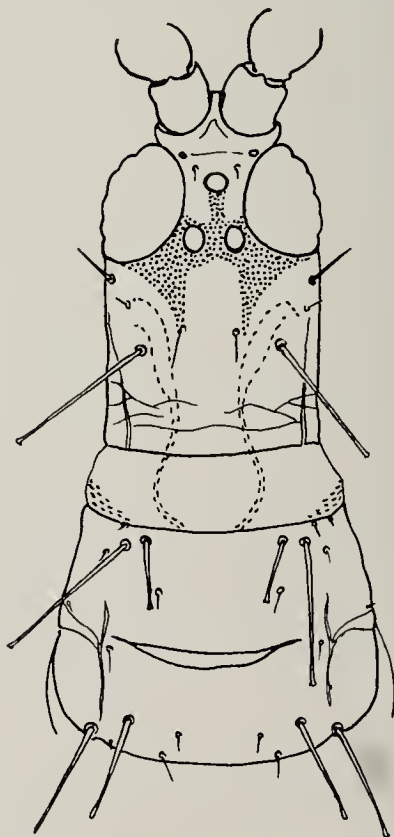


Fig. 277.—*Preeriella minuta*, head and prothorax.

tween the eyes and the base of the head. Antennae (Fig. 160) eight segmented. Maxillary stylets retracted far into the head, nearly parallel within the head.

Prothorax with anterolateral and major posterior setae long and dilated, anteromarginal setae well developed but only slightly more than one-half as long as anterolateral setae, midlateral setae minute. Metanotum faintly but definitely longitudinally striate medially. Fore legs unarmed.

Pelta divided into three parts (Fig. 278). Only one pair of wing-holding setae on each of abdominal tergites III-VII. Abdominal tergite IX with major posterior setae long, the middle pair dilated, the lateral pair pointed. Tube relatively short and slender.

MALE (macropterous).—Length distended about 0.9 mm. Similar to female in general color and structure. Abdominal sternite VIII apparently without a differentiated glandular area. Abdominal tergite IX as in female, major lateral posterior setae not shortened.

Of the two specimens in the type series in the Watson collection, the one selected here to be the lectotype is labeled "Type ♂, Gainesville, Fla., III-28-37, J. R. W., Sp. moss, S. W. Station Woods." The other slide marked "Type ♀" is actually a male collected according to the label "2-14-37," not "April 4, 1937" as stated in the protolog.

Preeriella minuta is one of the most distinctive thrips in Illinois. It can be easily recognized by the characteristics of its small size, the cup-shaped form of antennal segment III, and its

thin, threadlike wings. It is the only member of the genus in the United States. Another form (or undescribed species), with a darker head, has been taken in Vera Cruz, Mexico (INHS collections). The remainder of the species in *Preeriella* occur in South America.

First known from Florida, *minuta* has since been found in Alabama, Arkansas, Oklahoma, Texas, Missouri, and Illinois (INHS). In Illinois it has been collected mostly in the southern half of the state, always outside the terrain once covered by the Wisconsin glacier, usually in moist woodlands under fallen leaves.

Illinois records.—Collected during every season of the year, from one to several localities in the following counties: ALEXANDER, CALHOUN, CHRISTIAN, EFFINGHAM, HANCOCK, HARDIN, JACKSON, PERRY, PIKE, and POPE.

Sophiothrips Hood

Sophiothrips Hood (1934:425). Type-species by original designation.—

Sophiothrips squamosus Hood.

Nanothrips Faure (1938:3). Type-species by original designation.—

Nanothrips breviceps Faure. Synonymized by Hood (1954a).

Head (Fig. 279) wider than long, slightly prolonged in front of eyes; surface smooth or roughly hexagonally reticulate. Ocelli, when present, with fore ocellus projecting slightly beyond anterior margin of eyes. Interocellar setae prominent. Eyes moderate in size or number of facets greatly reduced, according to form. Postocular setae well developed, pointed. Antennae eight segmented, segment III as long as II, segment VI longest, segments VII and VIII closely joined but completely separated by a suture. Major males with a ventral hornlike projection between the bases of the antennae, much as in *Zarenothrips*. Mouth cone moderate in size, rounded. Maxillary stylets not retracted into the head proper.

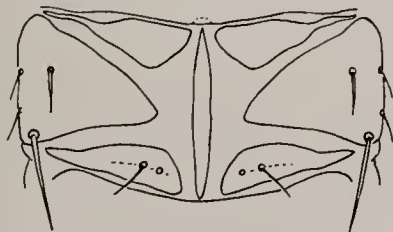


Fig. 278.—*Preeriella minuta*, pelta.

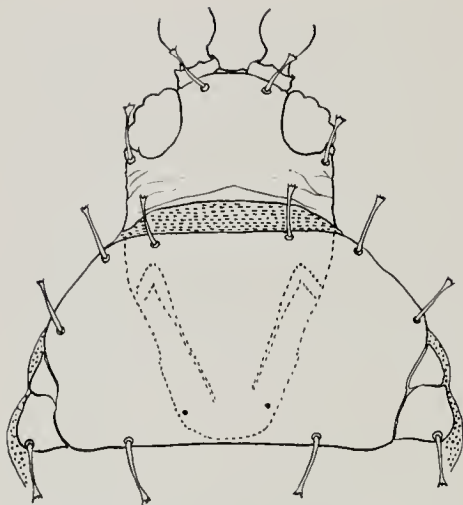


Fig. 279.—*Sophiothrips bicolor*, head and prothorax.

Prothorax enlarged, often longer than pterothorax, sometimes hexagonally reticulate. Frequently a single pair of epimeral setae the only setae well developed. Epimeral sutures complete. Praepectus (Fig. 147) present. Macropterous, brachypterous, and apterous. Mesopraesternum degenerate. Metafurcae well separated from or close to mesofurcae depending on form. Fore wings with sides parallel, not indented in the middle, without accessory cilia.

Pelta (Fig. 166 and 167) broad, never with posterior margin fractured into platelets. Abdominal tergites with or without wing-holding setae. In apterous male and female lateral major posterior setae on abdominal tergite IX shortened; in macropterous females, at least, these lateral setae much larger. Tube frequently longer than head, terminal setae shorter than tube.

Sophiothrips may be distinguished from those entities in which the maxillary stylets are confined to the mouth cone and rarely enter the head by the combination of the eight-segmented antennae in which segment III is as long as II and segment VI is the longest, the enlarged prothorax, and the entire pelta which is not fractured into platelets posteriorly as in *Zaxenothrips* and *Williamsiella*.

So far representatives of this genus have not been found in Illinois. Four species, some collected only once, are known from the United States around the gulf coast region. If any of these species do occur in Illinois, most likely they would be in the southern cypress and yellow pine section of our state.

KEY TO SPECIES (OF UNITED STATES, AS BASED ON LITERATURE)

1. Tube longer than head; one collection from northern Florida... *spadix* Hood
Tube shorter than head.....2
2. Femora entirely dark brown; one collection from southern Florida.....
..... *vorticoides* Hood
Femora dark brown tipped with yellow 3
3. Prothoracic and many other setae dilated; half dozen collections from northern Florida.....
..... *bicolor* Watson & Preer
Prothoracic and most other setae pointed; several collections from southeastern Texas..... *unicolor* Hood

Williamsiella Hood

Williamsiella Hood (1925d:60).

Type-species by original designation.—*Williamsiella bicoloripes* Hood.

Head much broader than long, cheeks straight, dorsal surface smooth anteriorly, with weak anastomosing transverse striae posteriorly. Ocelli absent in apterous forms at least. Eyes small, with only six facets. Postocular setae long. Antennae seven segmented, segment II with dorsal sensoria located near middle of segment, segment III shorter and narrower than segments beyond it, morphological segments VII and VIII completely fused. Mouth cone heavy, broadly rounded at tip. Maxillary stylets when at rest retracted into head proper only a relatively short distance.

Pronotum broader than long, smooth with major anterior and lateral setae minute, posterior setae well developed. Epimeral sutures incomplete. Praepectus seemingly absent. Apterous only, so far as is known. Pterothorax degenerate, smooth. Fore tarsi one segmented, unarmed; mid and hind tarsi two segmented.

Abdomen broadest part of body.

Pelta broad with a large stipple-like area posteriorly. Wing-holding setae not differentiated. Lateral setae well developed, pointed. Abdominal tergite IX with major posterior setae longer than tube, pointed. Tube short, anal setae much shorter than tube.

This genus resembles some species of *Phthirotrips* and *Lissothrips* in the apterous form by being small and degenerate and having antennal segment III short. *Williamsiella* is distinguishable, however, in that the dorsal sensorium of antennal segment II is placed in a middle position rather than at the apex of the segment.

Only the type-species is known. As yet it has not been taken in Illinois. Because it is small and easily overlooked and because it occurs only 400 miles south of the Illinois border, *Williamsiella* is included as a remotely possible element of our fauna.

Williamsiella bicoloripes Hood

Williamsiella bicoloripes Hood (1925d: 60). ♀, ♂. Type-locality.—Trinidad.

FEMALE (apterous).—Length distended about 1.4 mm. Color dark brown, being darkest in abdominal segments VI–VIII and tube. Antennal segment I and most of the femora yellowish brown. Antennal segment II and inner apices of femora yellow. Setae brown becoming pale at tips. Body with much red subintegumental pigment.

Head as in Fig. 280. Eyes with four dorsal facets and two ventral facets. Ocelli absent. Postocular setae long, pointed. Antennal segment III nearly equal in length to segment II, pedicellate, without sense cones; segment IV with one inner and one outer sense cone.

Prothorax with anterior setae minute, midlateral setae slightly larger but still relatively small, epimeral setae longest, longer than prothorax.

Pterothorax with no wing sclerites differentiated. Mesospinasternum degenerate. Meso- and metafurcae joined.

Abdomen without sculpture. Pelta

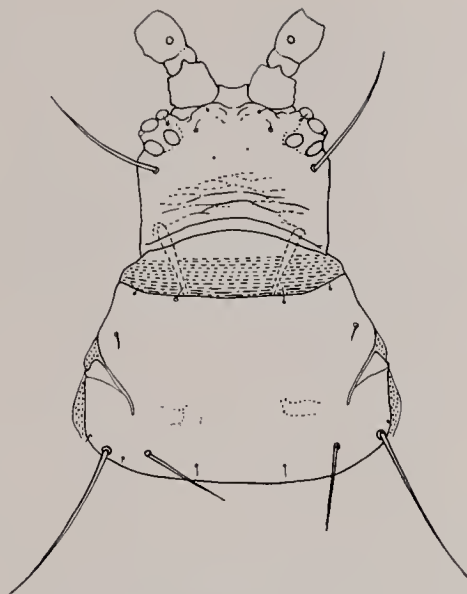


Fig. 280.—*Williamsiella bicoloripes*, head and prothorax.

as in Fig. 281. Abdominal segment X (tube) shorter than head, stout.

MALE.—Unknown to me. Described by the protologist as being "apterous . . . like female in all essential respects but smaller." The size of the lateral setae on abdominal tergite IX and whether abdominal glandular areas are present or absent have not been mentioned in the literature.

This monotypic species was discovered in Trinidad by C. B. Williams, then a young thysanopterist, on fag-gots. Watson subsequently collected a specimen, record not published, from Turkey Grove, Citra, Florida, March 3, 1922, on lichen on the trunk of an orange tree. Dr. H. H. Ross and I took another specimen from the leaf mold of an oak forest near Weston, Georgia, December 18, 1949. A year later, in a remote part of Chiapas, Mexico, at Finca Monte Libano and at Finca el Real, areas several days horseride from Ocosingo, I found a small series of specimens on dead citrus branches.



Fig. 281.—*Williamsiella bicoloripes*, pelta.

All of these specimens seemingly are true *bicoloripes*.

Possibly *bicoloripes* is a tropical or subtropical thrips able to extend into the temperate region about as far as citrus trees grow. Although there is little chance that this species may be found in Illinois, it is included here for reference as a member of our neighboring southeastern fauna, many other members of which extend into the extreme tip of southern Illinois.

Zaxenothrips Crawford, J. C.

Zaxenothrips Crawford, J. C. (1943: 221). Type-species by original designation.—*Zaxenothrips peculiaris* Crawford, J. C.

Head wider than long to about as wide as long, generally smooth except for faint subreticulate sculpture anteriorly. Major males with a ventral head horn between the insertions of the antennae and a ventral horn just anterior to the mouth cone. Cheeks often with a blunt toothlike projection behind eyes. Eyes small with about a dozen dorsal facets. Ocelli absent in apterous forms, present in macropterous forms. Interocellar setae developed. Postocular setae developed, pointed; in apterous major males a second pair of postocular setae developed. Antennae eight segmented, segment III longer than IV, segment VI the largest, segment VIII nonpedicellate, closely joined to segment VII. Mouth cone moderate in size, very broadly rounded. Maxillary stylets short, not retracted into the head proper.

Prothorax with major setae developed but anterior pairs small. Epimeral sutures complete. Praepectus absent in most forms, present in greatly developed major males. Fore legs enlarged, fore tarsi each armed with a tooth. Mid and hind femora, in males at least, with differentiated outer setae. Macropterous or apterous. Fore wings without accessory fringe cilia.

Pelta small, degenerate, posterior portion broken into small, stipple-like platelets. Wing-holding setae present in macropterous forms. In males, abdominal sternite VIII apparently

without glandular areas; abdominal tergite IX with major lateral setae reduced in size. Tube shorter than head, terminal setae shorter than tube.

Hood (1954a) sank *Zaxenothrips* under *Sophiothrips*. Although such action seems justifiable, I prefer to maintain *Zaxenothrips* as a separate entity until *Sophiothrips* is better known. It would seem from the literature that considerable differences separate some of the species assigned to *Sophiothrips* and, therefore, a reanalysis of the species and forms should be made to determine the exact limits of the genera involved.

Zaxenothrips may be recognized by the characteristics of *peculiaris*, the only species that occurs in Illinois. No species of *Sophiothrips* s. str. has been found in our region as yet.

Zaxenothrips peculiaris Crawford, J. C.

Zaxenothrips peculiaris Crawford, J. C. (1943:224). ♀, ♂. Type-locality.—Bethesda, Maryland.

MALE (apterous, greater major form).—Length distended about 1.5 mm. General color dark brown. Inner apical angle of femora yellow. Antennal segments III–VI each pale yellow to nearly white in basal half, brown in apical half. Tube orange-brown except for gray-brown tip.

Head (Fig. 282) slightly wider than long, with hornlike processes on the ventral surface between the insertions of the antennae and at the base of the head anterior to the mouth cone. Eyes small with a dozen or fewer facets dorsally. Ocelli absent. One pair of interocellar and two pairs of postocular setae moderately stout and pointed. Antennal segment III with no inner and one short outer sense cone. Mouth cone moderate in size, broadly rounded.

Prothorax greatly enlarged. All major setae developed, the anterior pairs fairly short, the posterior pairs moderately long, all of these setae pointed. Praepectal plates present, but small. Completely apterous. Pterothorax degenerate. Mesopraesternum lacking. Meso- and metafurcae fused. Fore legs enormously enlarged; fore tarsi each

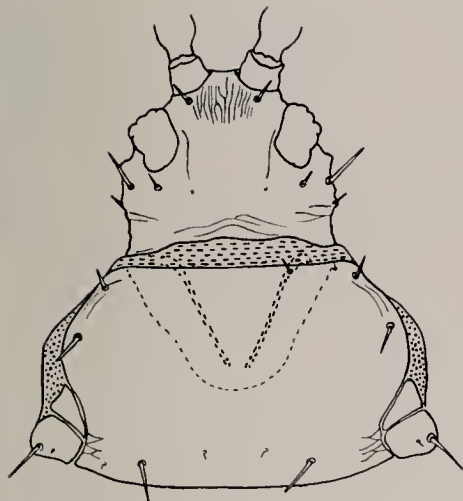


Fig. 282.—*Zarenothrips peculiaris*, head and prothorax.

with a long, stout tooth; mid and hind femora each with a differentiated, stout, pointed, outer seta.

Pelta, as in Fig. 168, with an extensive stippled area posteriad of pelta plate. Wing-holding setae not differentiated. Lateral setae heavy and pointed. Abdominal sternite VIII apparently without a glandular area. Abdominal tergite IX with major lateral setae much shorter than mid setae. Tube (Fig. 187) shorter than head.

MALE (apterous, lesser major form).—Length distended about 1.2 mm. Similar to the greater major male except for the following. Ventral head horns greatly reduced in size. Prothorax somewhat smaller, with major setae slightly reduced in size. Praepectal plates absent. Fore legs less enlarged. Lateral setae of abdomen shorter.

FEMALE (macropterous).—Not known to me.

FEMALE (apterous).—Length distended about 1.3 mm. Similar to lesser major male except only one pair of postocular setae developed, fore legs only slightly enlarged, fore tarsi each with major posterior setae equal in size, tube mostly brown without orange.

This is one of the two species known to be in Illinois which do not have the maxillary stylets, when at rest, much,

if at all, retracted into the head proper. It is distinctive by its head shape and by the color and form of the antennae.

Our Illinois records constitute the total localities so far known outside the type locality in Maryland. The specimens collected in our state were obtained by beating dead branches.

Illinois records.—COLES COUNTY: Fox Ridge State Park, September 18, 1957, O'Neill, Stannard, dead hickory branches, 1 ♀, 1 ♂. EFFINGHAM COUNTY: Mason, September 2, 1955, Ross, Smith, Stannard, dead branch, 1 ♀.

Subfamily MEGATHRIPINAE Karny 1921

This subfamily comprises those members of the Tubulifera that have the maxillary stylets broad and band-like, whose males always lack abdominal glandular areas and never have the lateral pair of major, posterior setae (setae II of authors) on abdominal tergite IX spinelike or shorter than in the female.

Allothrips Hood

Allothrips Hood (1908c:372). Type-species by monotypy.—*Allothrips megacephalus* Hood.

Bryothrips Priesner (1925a:6). Type-species by original designation.—*Bryothrips pillichellus* Priesner. Synonymized by Stannard (1957b).

Head moderate in size, about as long as broad to longer than broad, prolonged moderately in front of eyes, dorsum smooth except for extreme anterior and base of head which are faintly hexagonally reticulate. Eyes in apterous form with less than a half hozen dorsal facets and in brachypterous form with less than a dozen dorsal facets. Ocelli absent in apterous form, present in brachypterous form. Interocellar, postocular, and middorsal setae well developed and dilated. Cheek setae pointed or dilated. Antennae seven segmented, morphological segments VII and VIII completely fused, all segments small, segments V and VI slightly prolonged ventrally at apex. Mouth cone broadly

rounded. Maxillary stylets in species from Illinois usually placed far apart and parallel when retracted into the head.

Prothorax with all major setae well developed and all about the same size, dilated, midposterior setae dilated in species from Illinois. Praepectus present. Mesopraesternum degenerate. Epimeral sutures complete or nearly so. Apterous or brachypterous. Thorax degenerate in apterous form. Fore legs unarmed in female, armed in male. Fore femora enlarged in major males. Mid and hind tarsi each two segmented.

Pelta fairly broad, as in Fig. 285. Wing-holding setae pointed, present only in brachypterous form. Tube short.

The seven-segmented antennae and the form of the head, especially in the characteristics of the small eyes, dilated head setae, and small tube distinguish this genus from all others in the Megathripinae in Illinois. Elsewhere I have reviewed the North American species and discussed their affinities (Stannard 1955a, 1957b). The genus *Diopsothrips* can be added as another allied entity.

Two species occur in our area. One, *megacephalus*, is statewide in distribution and is arboreal; the other *nubillicauda*, is restricted to the southern half of the state and is terrestrial.

KEY TO ADULTS

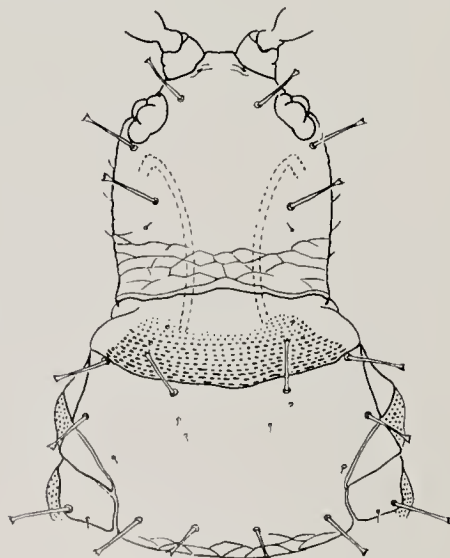
1. Predominantly brown; head (Fig. 283) with cheek setae small and pointed. *megacephalus*
- Predominantly yellow; head (Fig. 284) with cheek setae fairly prominent and dilated. *nubillicauda*

Allothrips megacephalus Hood

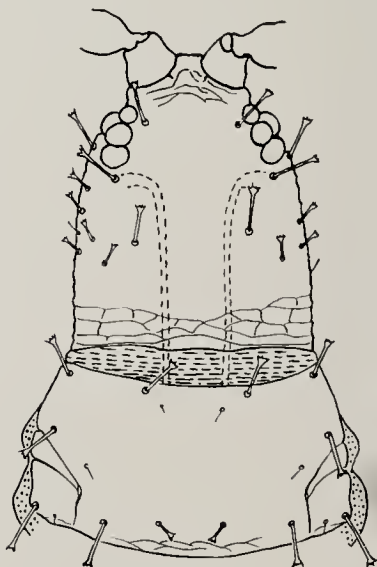
Allothrips megacephalus Hood (1908c: 373). ♀. Type-locality.—Not stated but holotype labeled Urbana, Illinois. Shull (1909:228). ♂.

FEMALE (apterous).—Length distended about 1.6 mm. General color dark brown. Tarsi and apex of antennal segment II yellow to yellowish brown. Setae nearly colorless.

Head (Fig. 283) about as wide as long. Postocellar, postocular, and mid-dorsal setae well developed, dilated. Cheek setae small and pointed. Eyes reduced to a few facets. Ocelli absent.



283



284

Fig. 283-284.—Head and prothorax: 283, *Allothrips megacephalus*; 284, *Allothrips nubillicauda*.

Thorax smooth, not sculptured, degenerate as is typical of apterous forms. Prothorax with all major setae well developed, all about the same size, all dilated. Fore tarsi unarmed.

Pelta as in Fig. 285. Wing-holding setae not differentiated, dorsal abdominal setae, except terminal tube setae and minor setae, usually dilated. Tube short.



Fig. 285.—*Allothrips megacephalus*, pelta.

FEMALE (brachypterous?).—Length distended over 1.6 mm. Similar to apterous female with the following exceptions. Eyes larger. Ocelli present. Pterothorax not degenerate. (Wings or wing pads apparently removed in the single specimen in our collection.) Wing-holding setae well developed.

MALE (apterous).—Length distended about 1.1 mm. Similar to female except not as dark brown, often antennal segments I and II yellowish brown. Fore tarsi (Fig. 149) each armed with a strong tooth. Fore femora often enlarged.

This dark brown species can be easily distinguished from *nubillicauda* by the characteristics of the cheek setae as indicated in the foregoing key.

Allothrips megacephalus has been found in all parts of the state under dead bark, especially of oak trees.

Illinois records.—Collected from early April to the middle of November, from one to several localities in the following counties: ADAMS, CALHOUN, CHAMPAIGN, CRAWFORD, CUMBERLAND, EDGAR, FULTON, GRUNDY, HARDIN, JEFFERSON, KANKAKEE, LA SALLE, LAKE, MASON, MORGAN, PERRY, RANDOLPH, ROCK ISLAND, SANGAMON, UNION, VERMILION, and WHITESIDE.

Allothrips nubillicauda Watson

Allothrips nubillicauda Watson (1935: 60). ♀, ♂. Type-locality.—Gainesville, Florida.

Allothrips flavus Watson (1945:35). *Nomen nudum*. Referred to *Allothrips nubillicauda* by Stannard (1955a).

FEMALE (apterous) (Fig. 286).—Length distended 1.6–2 mm. General

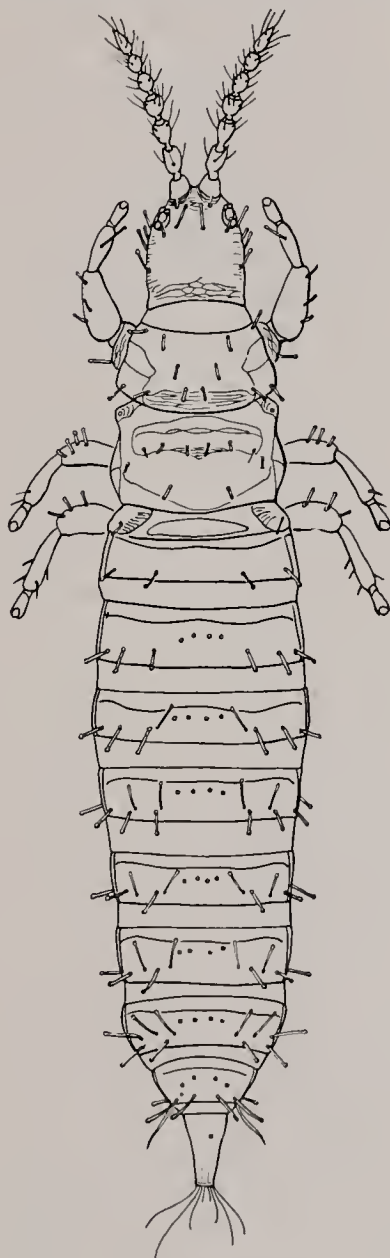


Fig. 286.—*Allothrips nubillicauda*, dorsal aspect.

color golden yellow with some brown. Brown overlying yellow: anterior of head; antennal segments I and III; anterior portions of abdominal tergites II-VI, most of VII and VIII, and posterior portions of I and IX. Brown: last four antennal segments and apex of tube. Eyes with red sub-integumental pigment.

Head (Fig. 284) longer than wide. Postocellar, postocular, and middorsal setae well developed, dilated. Cheek setae well developed, usually smaller than postocular setae, dilated.

Thorax generally smooth, only faintly sculptured with hexagonal reticulations, degenerate as is typical of apterous forms. Fore tarsi unarmed.

Pelta about as in Fig. 285. Wing-holding setae not differentiated, dorsal abdominal setae, except terminal tube setae and minor setae, strongly dilated. Tube slightly longer proportionately than in *megacephalus*.

MALE (apterous).—Length distended over 1 mm. Similar to female with the following exceptions. Head and abdomen with much less brown, often with brown coloration limited to the terminal antennal segments and apex of tube. Fore tarsi each armed with a strong tooth.

In North America this species is unique in having the strong, dilated cheek setae.

The lectotype from the Watson collection designated here is on the slide labeled in pencil "Type ♀ d" and in ink "Gainesville, Fla., 1-8-33, J.R.W., dead leaves, Bay, Holly, Carpinus, etc." Originally this slide was marked "*megacephalus*" but that name has been crossed off.

After intensive search, specimens have so far been taken almost exclusively in the southern half of Illinois outside the area covered by the Wisconsin ice sheet (Fig. 21). They have been found principally in forest ground litter.

Illinois records (Fig. 21).—Collected every month of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, BOND, CLAY, HAMILTON, HANCOCK, JACKSON, MACOUPIN, MARION, MAISON, MONROE, MONTGOMERY, MOR-

GAN, PERRY, PIKE, POPE, WASHINGTON, and WHITE.

Cryptothrips Uzel

Cryptothrips Uzel (1895:228). Type-species by subsequent designation of Hood (1916b).—*Cryptothrips lata* Uzel.

Head rectangular, elongate, much longer than wide, area bearing antennae not prolonged in front of eyes, dorsum smooth except for faint hexagonal reticulations at extreme sides and base of head. Eyes proportionately small. Postocellar setae minute or long. Postocular setae long, pointed. Ocelli present, reduced in size in brachypterous forms. Antennae (Fig. 156) eight segmented, segments IV-VII only moderately elongate and produced ventrally at apex, segment VIII slightly pedicellate. Mouth cone short and broadly rounded. Maxillary stylets, when retracted, touching within the center of the head.

Prothorax with major setae well developed, anterior pairs smaller than the posterior ones, all setae pointed to blunt. Epimeral sutures complete. Praepectus developed but often small. Anterior margin of mesosternum broad. Metanotum nearly smooth. Fore legs unarmed in female, armed in male. Macropterous or brachypterous. Fore wings, when fully developed, broad and with accessory fringe cilia.

Pelta moderate in size, usually hexagonally reticulate. Wing-holding setae present. Tube relatively long although shorter than the head, without long lateral setae.

These thrips, which are usually blackish brown, can be distinguished from *Diceratothrips*, a close relative in North America, by the placement of the maxillary stylets within the head. In *Cryptothrips* these stylets touch within the center of the head whereas in *Diceratothrips* they are placed V shaped within the head and never touch.

The only other blackish brown, rectangular-headed thrips of the Megathripinae likely to be encountered in

Illinois are species of *Megathrips* and *Megalothrips*. These species have hairy tubes, and by this characteristic *Megathrips* and *Megalothrips* can be separated from *Cryptothrips*, even with a hand lens.

Two species of *Cryptothrips* occur in Illinois. Both live under bark of dead branches where presumably they feed on fungus spores.

KEY TO SPECIES
(ILLINOIS, EXCEPT WHERE NOTED)

1. Postocellar setae long, nearly as long as postocular setae.....*carbonarius*
Postocellar setae short, much shorter than postocular setae.....2
2. Antennal segment III almost entirely bright yellow; from Europe and possibly western U.S.A.....*latus*
Antennal segment III yellowish brown or yellow heavily clouded with brown; from eastern U.S.A.....*rectangularis*

Cryptothrips carbonarius Hood

Cryptothrips carbonarius Hood (1908c: 376). ♂. Type-locality.—Pulaski, Illinois.

Cryptothrips longiceps Hood (1912c: 153). ♀, ♂. Type-locality.—Carbondale, Illinois. Tentative synonymy by Stannard (1957b) confirmed.

FEMALE (macropterous).—Length distended about 3.7 mm. Color dark blackish brown except pedicel of antennal segment III which is yellow to yellowish brown. Wings colorless.

Head (Fig. 287) elongate, proportionately longer than in *rectangularis*, reticulate in basal half of dorsum. Postocellar setae long, as in Fig. 287. Postocular setae long and pointed. Ocelli present.

Prothorax in median length shorter than sclerotized portion of metanotum. All major prothoracic setae well developed, pointed, anterior pairs slightly longer than in *rectangularis*. Fore wings each with 18–22 accessory fringe cilia.

Abdominal tergite I with pelta similar to that illustrated in Fig. 172. Wing-holding setae strongly developed. Abdominal tergite IX with major posterior setae longer than tube.

FEMALE (brachypterous) (Fig. 288).

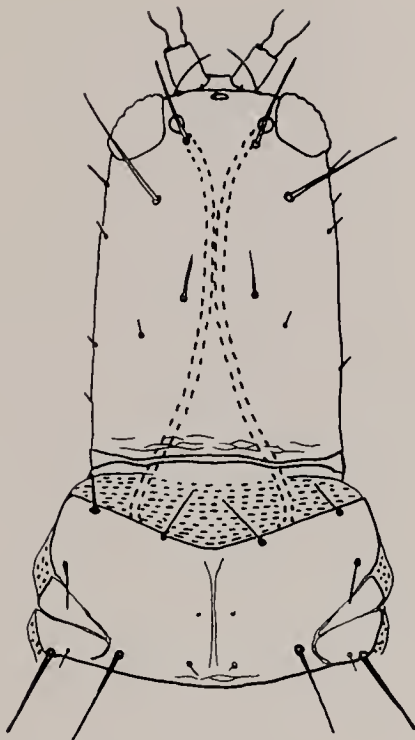


Fig. 287.—*Cryptothrips carbonarius*, head and prothorax.

—Length distended about 3.4 mm. Similar to macropterous female in general color and structure except ocelli reduced in size, prothorax in median length longer than sclerotized portion of metanotum, and wing-holding setae reduced in size.

MALE (macropterous).—Length distended about 2.7 mm. Similar in color and structure to macropterous female except that each fore tarsus is armed with a small or median-sized tooth and the fore wings each have 15–17 accessory fringe cilia.

MALE (brachypterous).—Unknown to me.

This species can be easily distinguished from *rectangularis* by the size of the postocellar setae. In *carbonarius* these setae are nearly as long as the postocular setae. In *rectangularis* the postocellar setae are hardly ever twice as long as the diameter of a posterior ocellus.

Because the length of the fore legs varies proportionately to the head

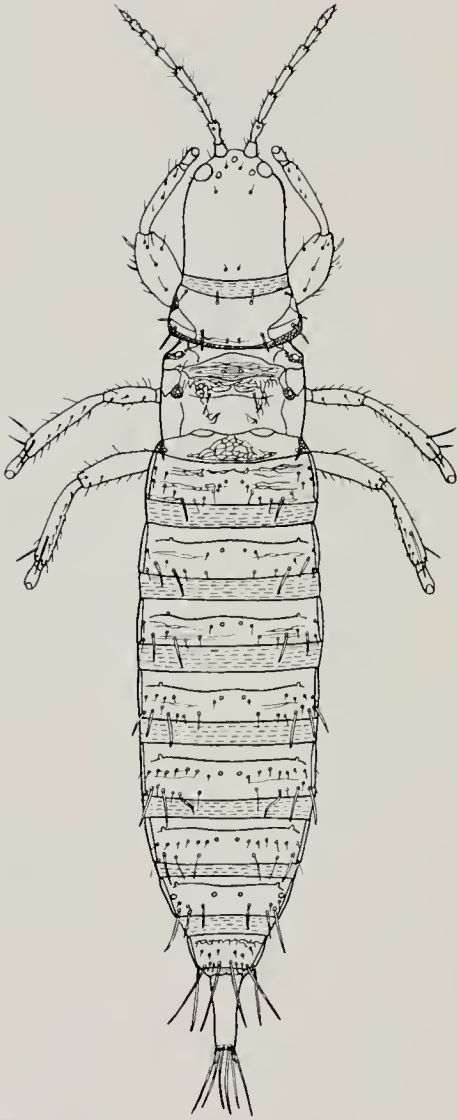


Fig. 288.—*Cryptothrips carbonarius*, ♀ brachypterous, dorsal aspect.

length, it was my conclusion that the form called *longiceps* was probably the representative of one extreme (Stannard 1957b). Accordingly I tentatively sunk *longiceps* under *carbonarius* even though at the time I had not seen the types. Since then I have studied the types and topotypical material from Pulaski, Illinois, and have satisfied myself that *longiceps* is an outright synonym of *carbonarius*.

Cryptothrips carbonarius has been taken only in the southern half of the state. It is most frequently found under bark of dead branches.

Illinois records.—Collected from May to October, from one to several localities in the following counties: ADAMS, HARDIN, JACKSON, JOHNSON, MASON, MORGAN, PIKE, PULASKI, and UNION.

Cryptothrips rectangularis Hood

Cryptothrips rectangularis Hood (1908a:307). ♀, ♂. Type-locality. —Urbana, Illinois (Hood 1927c).

Trichothrips salicis Watson (1921:80). ♂. Type-locality. —Cranberry Lake, New York. Synonymized by Hood (1927c).

FEMALE (macropterous).—Length distended slightly over 3 mm. Color dark blackish brown except pedicel of antennal segment III. Wings colorless.

Head faintly reticulate at sides and at base. Postocellar setae small, hardly larger than diameter of hind ocelli. Postocular setae well developed, pointed. Ocelli present.

Prothorax in median length shorter than sclerotized portion of metanotum. All major prothoracic setae well developed, pointed to blunt, anterior pairs smaller than in *carbonarius*. Fore wings each with about 18 accessory fringe cilia.

Abdominal tergite I with pelta as in Fig. 172. Wing-holding setae strongly developed. Abdominal tergite IX with major posterior setae shorter than tube.

FEMALE (brachypterous).—Length distended about 3 mm. Color dark brown except antennal segment III which is heavily clouded with brown over a yellow background. Similar in structure to macropterous female except ocelli greatly reduced, prothorax in median length longer than sclerotized portion of metanotum, and wing-holding setae reduced in size.

MALE (macropterous).—Length distended over 2.7 mm. Similar in color and structure to macropterous female except antennal segment III tending to be yellowish brown basally, fore

tarsi each armed with a strong tooth, and fore wings each with about 12 accessory fringe cilia.

MALE (brachypterous).—Length distended about 2.3 mm. Similar in color and structure to macropterous male except ocelli greatly reduced, prothorax in median length longer than sclerotized portion of metanotum, and wing-holding setae reduced in size.

In Illinois this species is easily distinguished from its only other congener by the short postocellar setae.

The exact status of *rectangularis* is not yet understood. According to Hood (1927c) *rectangularis* is so closely related to *latus*, a species originally described from Europe, that the former might be considered to be a subspecies of *latus*. Regardless of the taxonomic rank, almost certainly two entities are involved. In the West, it would seem that *rectangularis* is replaced by *latus*. Quite possibly the Californian specimens Cott (1956) relegated to *rectangularis* are instead *latus*. The bright yellow color of antennal segment III is a characteristic of *latus* and the western specimens described by Cott. Specimens of *rectangularis* from Illinois, on the other hand, have antennal segment III brown, or yellow heavily clouded with brown. Until these entities can be studied in series from many places, I prefer to limit the name *rectangularis* to those specimens with the darker antennae, which, presumably, are all eastern in distribution, and, as suggested by Hood in 1927, to retain *rectangularis* as a full species separate from *latus*.

Cryptothrips rectangularis occurs throughout Illinois under bark of dead branches.

Illinois records.—Collected from May to September inclusive, from one to several localities in the following counties: CARROLL, CHAMPAIGN (Hood 1908a), COOK, DE KALB, FAYETTE, HARDIN, HENDERSON, JACKSON, KANE, KANKAKEE, LAKE, LAWRENCE, LOGAN, MARION, MASON, MONTGOMERY, OGLE, PIKE, POPE, SANGAMON, VERMILION, WILL, and WHITESIDE.

Diopsothrips Hood

Diopsothrips Hood (1934:422). Type-species by original designation.—*Diopsothrips flavus* Hood.

Head slightly longer than wide, surface smooth. Eyes reduced in size to about six dorsal facets, the posterior facets being the largest. Ocelli present in macropterous forms, only fore ocellus present in brachypterous or apterous forms. Interocellar setae thickened. Postocular setae well developed. Antennae seven segmented, without a trace of a suture between morphological segments VII and VIII, segments III and IV with long sense cones. Mouth cone long, broadly rounded. Maxillary stylets thick, retracted far into the head, forming a wide V.

Prothorax mostly smooth, with all major setae well developed. Epimeral sutures incomplete. Metascutum weakly hexagonally reticulate. Macropterous, brachypterous, or apterous. Fore wings, when present, lacking accessory cilia. Fore tarsi armed in both sexes, mid and hind tarsi each two segmented.

Pelta degenerate in United States species at least, only posterior portion developed. Abdomen with lateral setae well developed, posteriorly becoming longer than the segments from which they arise. Abdominal tergite IX with major posterior setae long, some longer than tube. Tube longer than head, thickened, longitudinally ridged, sharply constricted at apex; anal setae much shorter than tube.

My previous supposition (1957b), based on the literature, that *Diopsothrips* was a synonym of *Polyphemothrips* is incorrect. Upon examination of authentic material I now find that *Diopsothrips* is not at all allied to *Symphyothrips*, as Hood implied in 1934, but instead is very close in structure to *Allothrips* and *Parallothrips*. Unlike these two genera, *Diopsothrips* has species bearing thick, long tubes. Possession of a broadly rounded mouth cone and thickened interocellar setae does not distinguish *Diopsothrips* from *Allothrips*, Hood's

statement (1934) to the contrary notwithstanding.

This genus is represented in the United States by one species, *louisianae*. It has not yet been found in Illinois.

***Diopsothrips louisianae* Hood**

Diopsothrips louisianae Hood (1936c: 98). ♀. Type-locality.—Tallulah, Louisiana.

FEMALE (apterous).—Length distended about 1.5 mm. General color brown. Head (except anterior region), median portions of pterothorax, apexes of femora, and all of tibiae and tarsi yellow. Antennal segment I light brown, segment II and pedicel of III yellow, remainder of antennae brown becoming darkest apically. Tube, except tip, orange. Body setae hyaline. Subintegumental pigment red.

Head as in Fig. 289, with cheeks smooth. Interocellar and postocular setae pointed. Antennal segment III moderate in size, longer than IV, with one inner and one outer sense cone;

segment IV with two inner and two outer sense cones.

Prothorax with all major setae pointed. Praepectus, if present, not discernible in the specimens I have seen. Metascutum with faint hexagonal reticulations. Wing pads entirely lacking. Fore tarsi with a moderate-sized tooth.

Pelta degenerate, anterior portion lacking, posterior portion hexagonally reticulate. Wing-holding setae present, slightly sigmoidal in form. All abdominal setae pointed. Tube longer than head, thick, ridged.

FEMALE (macropterous).—Unknown.

MALE.—Unknown.

This species has an *Allothrips*-like body, but is distinct in having a long, thick, orange tube.

To date it has been collected in Louisiana and Texas (USNM records) from humus and dead branches. Because many other Gulf coastal species extend up to the southwestern tip of Illinois via the Mississippi river valley, *louisianae* is included here as a possible Illinois inhabitant. Despite repeated searches, however, it has not been taken in our state as yet.

***Elaphrothrips* Buffa**

Elaphrothrips Buffa (1909:162). Type-species by subsequent designation of Moulton (1933b).—*Thrips schotti* Heeger. Invalid; *schotti* not in original list of *Elaphrothrips*. Type-species by subsequent designation of Andre (April 27, 1940).—*Idolothrips coniferarum* Pergande. Valid. Type-species by subsequent designation of Hood (October 18, 1940a).—*Idolothrips flavipes* Hood. Invalid; prior designation by Andre.

Dicaiothrips Buffa (1909:169). Type-species by subsequent designation of Bagnall (1910a).—*Thrips schotti* Heeger. Synonymized by Hood (1927c).

Head much wider than long, area bearing antennae prolonged in front of eyes, dorsal surface finely, transversely striate. Eyes moderate in size, occasionally produced posteriorly more on the venter than on the dorsum. Interocellar setae nearly as large

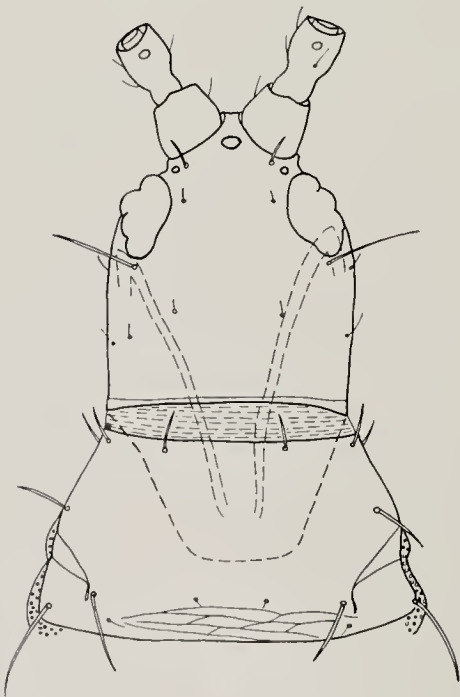


Fig. 289.—*Diopsothrips louisianae*, head and prothorax.

as or larger than postocular setae, these setae always pointed. Ocelli present, fore ocellus often far forward. Cheeks with several pairs of setae which are often developed into strong spines. Antennae (Fig. 157) eight segmented, intermediate segments elongate, segment VIII usually with base constricted and more or less pedicellate. Mouth cone short, broadly rounded. Maxillary stylets placed V-shaped within head.

Prothorax with major setae well developed, anterior pairs smaller and not as prominent as the other setae, all setae pointed to blunt. Epimeral sutures complete. Praepectus well developed. Anterior margin of mesoepisternum short (Fig. 193). Mesonotum with many small, hexagonal reticulations. Fore legs usually armed, in males fore femora each often with a curved stout seta at apex. Macropterous, micropterous, or brachypterous. Fore wings, when fully developed, broad; fringe cilia numerous and closely spaced, each fore wing with 20-40 or more accessory fringe cilia.

Pelta broad, hexagonally reticulate, with lateral portions well differentiated from median portion. Remainder of abdominal tergites, except tube, predominantly sculptured with transverse striations, some of which grade into hexagonal reticulations. Abdominal segment IX in females with three pairs of long, pointed posterior setae; in males with an additional strong but shortened pair of ventral setae. Tube relatively long.

Because of Andre's revision (1940), the species from the eastern United States are well resolved as to their taxonomic status. By contrast representatives of *Elaphrothrips* in Central America are badly in need of critical treatment.

In Illinois the genus can be recognized by the large, prolonged head and by the narrow margin of the midanterior portion of the mesosternum.

Only four species occur in our state. Apparently they all feed on fungus spores growing in dead leaves. One of the species, *tuberculatus*, a dead oak leaves inhabitator (Fig. 37), is the largest thrips in Illinois.

KEY TO ADULTS

1. Tibiae and tarsi abruptly yellow; eyes prolonged ventrally more than dorsally **flavipes**
Tibiae, at least, dark brown to black ... 2
2. Pelta with lateral portions nearly separate from median portion; on conifers **coniferarum**
Pelta with lateral portions completely connected to the median portion in the posterior half 3
3. Fore ocellus overhanging; cheeks without many large spines; fore wings with a brown streak in the basal half. **armatus**
Fore ocellus not overhanging; cheeks with three or four pairs of large spines; fore wings with a brown streak at the extreme base only **tuberculatus**

Elaphrothrips armatus (Hood)

Idolothrips armatus Hood (1908b:285).
♀, ♂. Type-locality.—Not stated but holotype labeled Carbondale, Illinois. Transferred to *Elaphrothrips* by Hood (1927c).

FEMALE (micropterous) (Fig. 290).
—Length distended nearly 4.3 mm. General color blackish brown to black. Antennal segment III, except apex, and segments IV and V each in basal half yellow. Tarsi medium brown. Fore wings each with a dark brown median streak, basally.

Head (Fig. 291) proportionately longer and more slender than in *tuberculatus*, fore ocellus overhanging bases of antennae. Eyes not prolonged ventrally more than dorsally. Cheeks not bearing many large spines. Postocular setae long.

Fore femora without inner warts. Fore tarsi each armed with a small tooth. Fore wings short, degenerate, not reaching posteriad of abdominal segment III; accessory fringe cilia seemingly absent.

Abdominal tergite I with pelta having lateral portion broadly attached to median portion. Wing-holding setae well developed. Tube relatively long and slender.

FEMALE (macropterous).—Length distended about 5 mm. Similar to micropterous female except wings fully developed. Fore wings with brown median streak occupying all of basal half except extreme base; in speci-

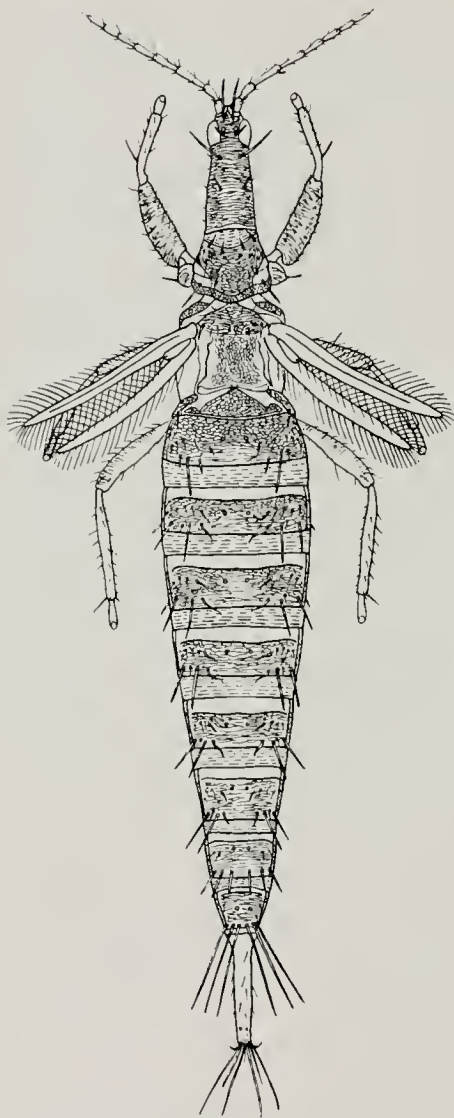


Fig. 290.—*Elaphrothrips armatus*, dorsal aspect.

mens from Lake City, Florida, each with 21 accessory fringe cilia.

MALE (macropterous).—Length distended more than 4.2 mm. Similar in color and structure to macropterous female with the following exceptions. Fore tarsi yellow, fore tarsal tooth larger and broader. Fore femora often enlarged and with many lateral spines well developed. Fore wings each with 17-22 accessory fringe cilia (Illinois specimens).

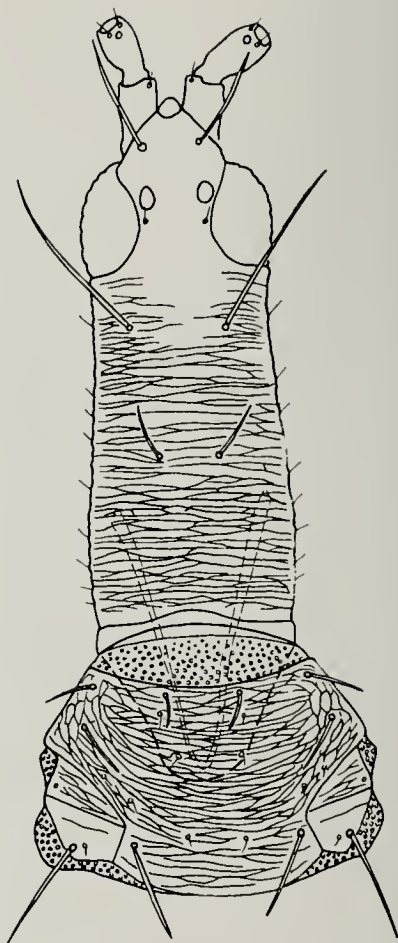


Fig. 291.—*Elaphrothrips armatus*, head and prothorax.

This long-headed species may be distinguished from *coniferarum*, which also has a brown median basal streak in each fore wing, by the form of the pelta. In *coniferarum* the lateral parts of the pelta are nearly separated from the median part; in *armatus* the lateral parts of the pelta are broadly joined to the median part. The species *tuberculatus*, which lacks a brown median streak in the fore wing, is also distinct from *armatus* by possessing warts on the fore femora in the female and by the proportionately shorter and broader head.

Ordinarily the females of *armatus* are more often micropterous than macropterous and the males are usually, if not always, macropterous.

During the cold months *armatus* may be found in the forest leaf litter or in hollow stems of herbs such as *Solidago*. In the warm months it can be found on herbs where the forests and prairies meet or in grassy glades within the forest. This thrips occurs throughout the state.

Illinois records.—Collected every month of the year, from one to several localities in the following counties: ADAMS, ALEXANDER, BOND, CHAMPAIGN, CLARK, CUMBERLAND, GREENE, GRUNDY, IROQUOIS, JACKSON, JEFFERSON, KANKAKEE, LAWRENCE, LEE, LOGAN, MASON, MONROE, MORGAN, PIATT, POPE, PULASKI, UNION, VERMILION, and WASHINGTON.

***Elaphrothrips coniferarum* (Pergande)**

Idolothrips coniferarum Pergande (1896:63). ♀, ♂. Type-locality.—Washington, D. C. Transferred to *Elaphrothrips* by Buffa (1909).

FEMALE (macropterous).—Length distended over 5.5 mm. General color blackish brown. Antennal segment III in basal two-thirds, segment IV in basal half, segment V in basal one-third, and segment VI in pedicel yellow. Fore wings in basal half with median brown streak.

Head (Fig. 292) moderately long and broad. Fore ocellus overhanging bases of antennae. Cheeks bearing three or four pairs of fairly stout setae. Eyes not prolonged ventrally more than dorsally. Postocular setae long in specimens from southern Illinois, shorter in specimens from northern Illinois.

Fore femora without inner warts. Fore tarsi each with a small tooth. Fore wings well developed, each with 32–42 accessory fringe cilia.

Abdominal tergite I with pelta having lateral portions nearly separate from median portion. Wing-holding setae well developed, sigmoidal. Tube relatively long and slender.

MALE (macropterous).—Length distended slightly over 5 mm. Similar to female in color and structure except fore tarsal tooth well developed and fore femora often enlarged.

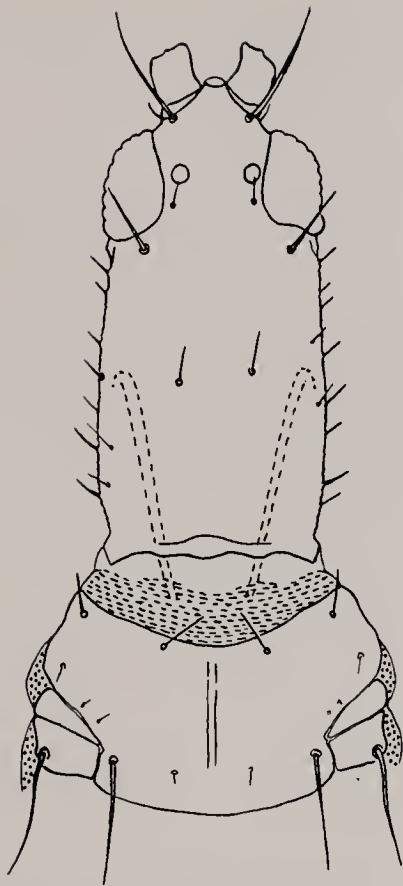


Fig. 292.—*Elaphrothrips coniferarum*, head and prothorax.

This species is easily distinguished from its congeners in Illinois by the form of the pelta in which the lateral portions are nearly separated from the median portions. No other species has the lateral portions so separated. Like *armatus*, *coniferarum* bears a brown median streak in the basal half of each fore wing.

Specimens from northern Illinois and the Atlantic states bear much shorter postocular setae than do specimens from southern Illinois.

As implied by its name, *coniferarum* inhabits conifers—in Illinois, white pine and red cedar.

Illinois records.—JOHNSON COUNTY: Vienna, August 17, 1950, Stannard, dead red cedar needles, 6 ♀, 2 ♂, 3 larvae. OGLE COUNTY:

White Pines State Park, July 13, 1944, Frison, Sanderson, white pine needles, 4 ♀, 2 ♂, 1 larva.

***Elaphrothrips flavipes* (Hood)**

Idolothrips flavipes Hood (1908c:377). ♀, ♂. Type-locality.—Not stated but holotype labeled Dubois, Illinois. Transferred to *Elaphrothrips* by Buffa (1909).

FEMALE (brachypterous).—Length distended over 4.5 mm. General color dark brown. Antennal segments III, IV, basal three-fourths of V, basal half of VI, tibiae, and tarsi bright yellow.

Head moderately long and broad. Fore ocellus overhanging bases of antennae. Cheeks bearing three or four pairs of fairly stout setae. Eyes prolonged ventrally more than dorsally. Postocular setae long.

Fore femora without inner warts. Fore tarsi each with a small tooth. Wing pads membranous, sometimes extending posteriorly to abdominal segment II.

Abdominal tergite I with pelta as in Fig. 293. Wing-holding setae slightly reduced in size. Tube moderately long and slender.

FEMALE (macropterous).—Length distended over 4.5 mm. Similar to brachypterous female except wings fully developed. Fore wings without basal brown streak, each with about 26 accessory fringe cilia.

MALE (brachypterous).—Length distended slightly less than 4.5 mm. Similar in color and structure to brachypterous female except fore tarsal tooth larger and sometimes fore legs greatly enlarged.

Elaphrothrips flavipes may be immediately recognized by the yellow color of the tibiae and the ventrally prolonged eyes. It occurs mostly in the southern half of our state in forest

debris or in low grasses and herbs at the edge of the forest.

Illinois records.—ALEXANDER COUNTY: Gale, November 18, 1959, Stannard, forest debris, 4 specimens; Olive Branch, March 15, 1960, Stannard, forest debris, 1 ♀, 1 ♂. CHAMPAIGN COUNTY: Homer (Hood 1908); Urbana, October 30, 1933, Farrar, soil and leaves, 1 ♀. CUMBERLAND COUNTY: Greenup, March 5, 1949, Smith, forest debris, 1 ♀. GALLATIN COUNTY: Shawneetown, June 23, 1950, Sanderson, sweeping vegetation, 1 ♀. PERRY COUNTY: Pyatts, April 11, 1956, October 28, 1964, November 12, 1964, Stannard, woodland debris, many specimens. POPE COUNTY: Herod, May 4, 1950, Sanderson, Stannard, sweeping grasses, 2 ♀. WASHINGTON COUNTY: Dubois, April 28, 1908, Hart, Smith, dead oak leaf, 1 ♂. WAYNE COUNTY: Zenith, April 22, 1966, Stannard, woodland leaf mold, 3 ♀.

***Elaphrothrips tuberculatus* (Hood)**

Idolothrips tuberculatus Hood (1908b: 287). ♀, ♂. Type-locality.—Not stated but holotype labeled White Heath, Illinois. Transferred to *Elaphrothrips* by Hood (1927c).

FEMALE (macropterous).—Length distended nearly 5.8 mm. General color dark brown to black. Antennal segment III in basal two-thirds, segments IV and V each in basal half, and VI in basal third yellow. Tarsi lighter brown than body. Fore wings clear except for a brown streak at extreme base.

Head moderately long and broad, fore ocellus not overhanging bases of antennae. Cheeks with three or four very strongly developed, stout spines. Eyes not projecting posteriorly more on the venter than on the dorsum. Postocular setae long.

Fore femora each with an inner subapical wart (Fig. 294). Fore tarsi each with a small, anteriorly directed tooth. Fore wings each with about 40 accessory fringe cilia.

Abdominal tergites with wing-holding setae well developed. Tube long and slender.

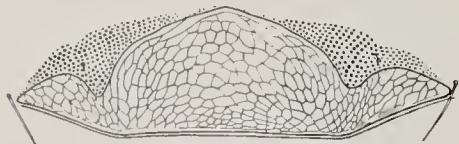


Fig. 293.—*Elaphrothrips flavipes*, pelta.



Fig. 294.—Fore leg of *Elaphrothrips tuberculatus*, ♀ showing wartlike process on femur.

MALE (macropterous).—Length distended nearly 5.5 mm. Similar to female in color and structure except for the following. Cheek spines larger. Fore tarsal tooth greatly enlarged and directed laterally. Fore femora without inner warts, or warts greatly reduced.

This is our largest thrips. The female is distinctive by the possession of a wart on the inner surface of each of the fore femora, and the male by the heavy spines on the cheeks. *Elaphrothrips tuberculatus* does not have an extensive brown basal streak in the fore wing.

This species occurs in dead hanging oak leaves (Fig. 37) throughout our state.

Illinois records.—Collected from May through November, from one to several localities in the following counties: ALEXANDER, CARROLL, CLARK, CLAY, COOK, EDGAR, HARDIN, JACKSON, JEFFERSON, JOHNSON, LA SALLE, MACON, MCLEAN, MONROE, OGLE, PIATT, POPE, UNION, and VERMILION.

Illinothrips Stannard

Illinothrips Stannard (1954:193).

Type-species by original description.—*Illinothrips rossi* Stannard.

Head longer than wide, prolonged in front of eyes, constricted behind

eyes. Eyes bulged in the manner of some *Eurythrips*. Ocelli absent in apterous forms. Cheeks without strong setae. Postocular setae well developed. Antennae eight segmented, intermediate segments not particularly elongated, segment VIII slender and well separated from segment VII. Mouth cone broadly rounded. Maxillary stylets when retracted placed in a V shape within the head.

Prothorax with all major setae well developed. Epimeral sutures often incomplete. Praepectus present. Mesopraesternum as in Fig. 148. Pterothorax in apterous form degenerate. Males with a pair of spinelike processes anterior to the mesospiracles. Only apterous forms known. Fore tarsi unarmed in female, armed in male.

Pelta as in Fig. 173. Abdomen only faintly sculptured. Wing-holding setae not differentiated in apterous form. Abdominal tergite IX with posterior setae shorter than tube. Tube shorter than head.

As concerns the Illinois fauna, *Illinothrips* resembles *Allothrips* most closely. The two are easily separated, however, by the form of the antennae—in *Illinothrips* the antennae are eight segmented whereas in *Allothrips* they are seven segmented. Relatives even closer to *Illinothrips* occur to the south and include *Pseudocryptothrips* and *Goetothrips*. None of the latter relatives have eyes bulged in the manner of *Illinothrips* nor are they sympatric with *Illinothrips* as far as is known.

The single species, *rossi*, has been collected in several localities in Illinois.

Illinothrips rossi Stannard

Illinothrips rossi Stannard (1954:195).

♀, ♂. Type-locality.—Elgin, Illinois.

FEMALE (apterous).—Length distended 2.3–2.5 mm. Color brown and yellow. Head, legs except outer basal edge of tibiae, tip of antennal segment II, and base of segment III yellowish. Pterothorax yellowish brown. Rest of body dark brown except abdominal segment IX which is often slightly

lighter. Body setae pale yellow to colorless.

Head as in Fig. 295, dorsal surface reticulate at base, striate at sides, and nearly smooth medially. Postocular setae blunt. Antennal segment III with one outer sense cone.

Prothorax with major setae blunt. Fore tarsi unarmed.

Abdominal segments without extremely long setae laterally. Tube nearly two-thirds as long as dorsal length of head.

MALE (apterous).—Length distended 1.6–1.8 mm. Similar to female with the following exceptions. Much lighter in color, most of body yellow except antennal segments I and IV–VIII (being darkest in the terminal segments), abdominal segments VII and VIII in the posterior margin, and abdominal segments IX and X (tube) in the posterior half. Thorax with each anterior margin of the mesospiracle

bearing a spinelike process (Fig. 145). Fore tarsi each armed with a sharp tooth.

This distinctive species, easily recognized by the generic characteristics, has been found only in Illinois and then in but a few scattered localities. It has been collected from clumps of *Andropogon scoparius*.

Illinois records.—COOK COUNTY: east of Elgin (Shoefactory Road hill prairie), August 1, 1944, Ross, Sommerman, 1 ♀; east of Elgin (Shoefactory Road hill prairie), October 10, 1952, Ross, Stannard, on *Andropogon scoparius*, 1 ♀, 1 ♂. MASON COUNTY: Bath, October 2, 1951, Sanderson, Stannard, on *Andropogon scoparius*, 7 ♀, 3 ♂, 3 immatures; Teheran, October 20, 1953, Smith, Stannard, on *Andropogon*, 1 ♀, 2 ♂.

Megalothrips Uzel

Megalothrips Uzel (1895:224). Type-species by subsequent designation of Priesner (1949).—*Megalothrips bonannii* Uzel.

Head elongate, much longer than wide and relatively more slender than in *Megathrips*, highly arched dorsally, with transverse striae, area beyond eyes only slightly projecting beyond anterior eye margin. Eyes moderate in size although proportionately small when compared to head size. Ocelli present. Interocellar, postocellar, and postocular setae well developed. Cheeks with several pairs of spines. Antennae eight segmented, segments VI and VII ventrally produced at apex, segment VIII lanceolate. Mouth cone short and broadly rounded. Maxillary stylets long, when at rest retracted to the eyes, touching within the center of the head.

Prothorax short, much shorter than in *Megathrips*, all major setae well developed, the posterior pairs being the longest, the anterolateral pair being closer to the anterior margin than in *Megathrips*. Epimeral sutures incomplete. Praepectus present. Mesopraesternum broad. Fore tarsi unarmed or each armed at the most with a tiny tooth. Only the macropterous form

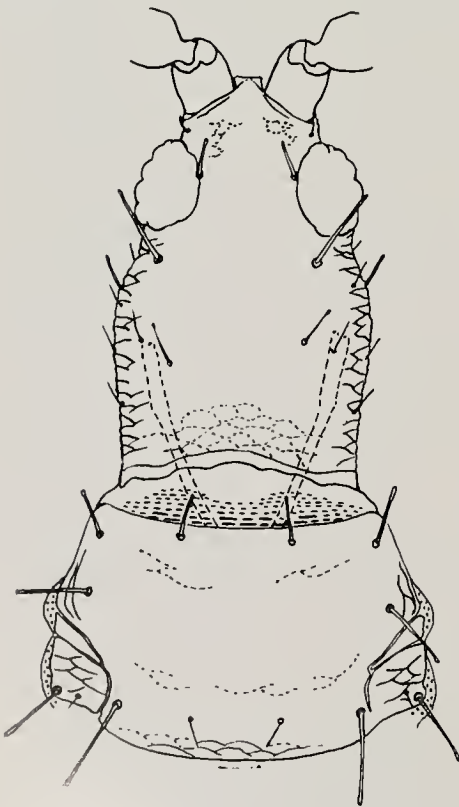


Fig. 295.—*Illinothrips rossi*, head and prothorax.

found in Illinois. Fore wings broad with accessory fringe cilia.

Pelta with a median portion and two lateral portions that are either separated or connected by a slender bridge. Abdominal tergites with anterior halves hexagonally reticulate, posterior halves transversely striate. Wing-holding setae well developed. Abdominal tergite VI in male with a pair of long, tubular lateral processes. Tube long, bowed, and hairy; longer in female, shorter in male; with dorsal warts in the male, at least in the species from Illinois.

This genus is easily recognized in Illinois by the black color, large size, arched head, closely spaced maxillary stylets, and hairy tube. It resembles *Megathrips*, which occurs only in the northern part of our state, as well as many genera in the Old World tropics, such as *Caudothrips* and *Bacillothrips*.

One species, *Megalothrips spinosus*, is found in Illinois.

Megalothrips spinosus Hood

Megalothrips(?) *spinosus* Hood (1908a: 306). ♀. Type-locality.—Harrisburg, Pennsylvania.

FEMALE (macropterous).—Length distended about 5 mm. Color almost entirely blackish brown. Wings colorless.

Head (Fig. 296) elongate, arched dorsally, with transverse striae. Interocellar setae long, as long as postocular setae; postocellar setae well developed but smaller than postocular pair; these head setae pointed. Antennal segment III with one inner and one outer sense cone.

Prothorax brokenly transversely striate, with major setae pointed to blunt, the anterior pairs shorter than the posterior pairs. Mesopraesternum broad. Metanotum transversely striate to somewhat reticulate. Fore tarsi each usually armed with a tiny, blunt tooth at the inner apex. Fore wings each with 26-36 accessory fringe cilia.

Pelta as in Fig. 297. Wing-holding setae strongly developed. Abdominal tergite IX with major posterior setae shorter than the tube, yellowish brown

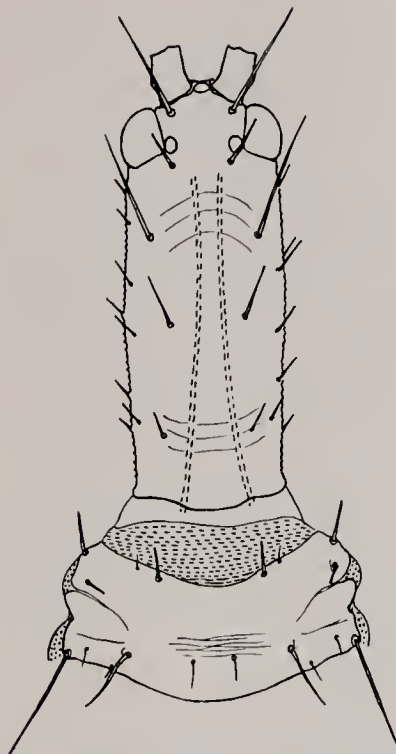


Fig. 296.—*Megalothrips spinosus*, head and prothorax.



Fig. 297.—*Megalothrips spinosus*, pelta.

to yellow in color. Tube long, bowed, and hairy (Fig. 191).

MALE (macropterous).—Length distended over 4 mm. Similar to female in color and structure except for the following. Fore tarsi seemingly not armed. Abdominal tergite IV with a pair of lateral tubelike processes (in life these tubes are directed nearly straight upwards; when specimens are mounted and under the pressure of the cover glass they are directed posteriad and nearly on the plane of the body). Abdominal tergite VIII with the anterior wall of each spiracle projected slightly as a toothlike process. Tube proportionately shorter and thicker than in female, with four or more middorsal lateral warts.

Because there are no other congeners in Illinois, this species can be determined by the generic characteristics. The three North American species were keyed by J. C. Crawford in 1947.

Megalothrips spinosus is found throughout most of the state on dead branches.

Illinois records. Found in all seasons of the year, from one to several localities in the following counties: ALEXANDER, CHAMPAIGN, CLARK, CLAY, COOK, JACKSON, LAKE, LAWRENCE, MACON, MASSAC, McDONOUGH, PIKE, POPE, PULASKI, RANDOLPH, WABASH, and WASHINGTON.

Megathrips Targioni-Tozzetti

Megathrips Targioni-Tozzetti (1881: 120). Type-species by monotypy.—*Megathrips piccioli* Targioni-Tozzetti (= *Phloeothrips lativentris* Heeger).

Head elongate, but shorter and broader than in *Megalothrips*, not strongly arched, with transverse striae, area beyond eyes moderately projecting. Eyes moderately sized. Ocelli present, reduced in size in brachypterous forms. Interocellar, post-ocellar, postocular, and middorsal head setae well developed; interocellar setae often longest. Cheeks with several pairs of capitate spines. Antennae eight segmented, segment III elongate, segment VIII lanceolate. Mouth cone broadly rounded. Maxillary stylets fairly long, when at rest retracted to the middle of the head, spaced fairly wide apart, not touching in the center of the head.

Prothorax not as short as in *Megalothrips*, all major setae well developed, the posterior pairs the longest, anterolateral setae displaced from anterior margin toward the midlateral setae. Epimeral sutures incomplete in brachypterous forms, complete or nearly complete in macropterous forms. Praepectus present. Mesopraesternum broad. Fore tarsi unarmed in the female, at the most each with a minute tooth in the male. Macropterous or brachypterous. Fore wings broad with accessory setae.

Pelta with a broad median portion, narrowly connected laterally to two small portions. Abdominal tergites with wing-holding setae well developed. Abdominal tergite VI in the male with a pair of long, tubular lateral processes. Abdominal tergite VIII in the male with lateral spines borne on produced areas. Abdominal tergite IX with major posterior setae less than one-third as long as tube. Tube moderately long, conspicuously hairy, constricted near the middle in the male. Anal setae much shorter than tube.

This genus resembles *Megalothrips* in name, in possessing hairy tubes, and in being large and dark in color. *Megathrips* may be distinguished by the close placement of the anterolateral setae to the midlateral setae and by the widely spaced maxillary stylets.

A single species, the holarctic *lativentris*, occurs in Illinois.

Megathrips lativentris (Heeger)

Phloeothrips lativentris Heeger (1852: 479). ♂. Type-locality.—Austria. Transferred to *Megalothrips* by Uzel (1895). Transferred to *Megathrips* by Priesner (1920a).

Phloeothrips longispina Reuter (1879: 214). ♂. Type-locality.—Finland. Synonymized by Uzel (1895).

Phloeothrips tibialis Reuter (1879: 215). ? ♀. Type-locality.—Finland. Synonymized by Uzel (1895).

Megathrips piccioli Targioni-Tozzetti (1881:120). ? ♀. Type-locality.—Italy. Synonymized by Priesner (1928).

Megalothrips niger Schmutz (1909b: 346). ? ♀. Type-locality.—Romania. Synonymized by Priesner (1928).

Bacillothrips padewiethi Karny (1919: 114). ♂. Type-locality.—Croatia (Yugoslavia). Synonymized by Priesner (1928).

FEMALE (brachypterous).—Length distended nearly 4 mm. General color blackish brown. Base and apex of femora, all of the tibiae and tarsi, antennal segment III except at apex, antennal segments IV and V in basal half, and antennal segment VI in pedi-

cel yellow. Body setae yellow. Wings colorless.

Head sharply constricted posteriorly, widest at eyes and middle of head. Ocelli small. Interocellar setae longest. Antennal segment III with one inner and one outer sense cone.

Prothorax weakly sculptured, major setae blunt to dilated. Metanotum smooth medially. Fore tarsi unarmed. Wings reduced to small pads.

Pelta as in Fig. 298, weakly sculptured. Abdominal tergites hexagonally reticulate anteriorly, more or less smooth posteriorly. Wing-holding setae reduced in size. Tube moderately long, not indented in the middle.

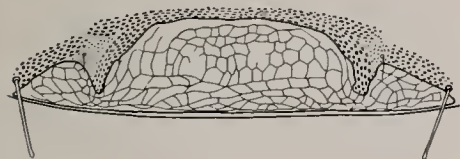


Fig. 298.—*Megathrips lativentris*, pelta.

FEMALE (macropterous).—Not available to me. Each fore wing reported to bear 25 accessory setae.

MALE (brachypterous).—Length distended about 3.5 mm. Similar to female in color and general structure. Fore tarsi each possibly with a minute tooth. Abdominal tergite VI with lateral finger-like process. Abdominal tergite VIII with lateral warts. Tube decidedly constricted in middle.

The generic characteristics should serve to distinguish the sole species in our area.

So far only one female specimen of *lativentris* has been taken in Illinois. Generally it is a northern species, occurring in the whole of Europe, in eastern Canada, New England, and south and west to Colorado, Minnesota, and northern Illinois.

Illinois record.—LAKE COUNTY: Barrington, September 21, 1961, Holmes, Stannard, forest debris, 1 ♀.

Nesothrips Kirkaldy

Nesothrips Kirkaldy (1907:103). Type-species by monotypy.—*Nesothrips oahuensis* Kirkaldy.

For more than 35 years, from the time of its origin until about a decade ago, *Nesothrips* remained an unrecognizable name. In 1944 Bianchi redescribed the type-species and made the genus known. According to my later interpretations (1957b), *Nesothrips* was actually no more than a complex in a genus which contained *Bolothrips* and *Gastrothrips*. Because *Nesothrips* is the older name, it is employed here, and *Bolothrips* and *Gastrothrips* are considered subgenera. No member of *Nesothrips* s. str. occurs in eastern North America.

Many species of *Nesothrips* bear close resemblance to some species in *Cryptothrips*. Species of *Nesothrips* can be distinguished easily by the V-shaped placement of the maxillary stylets when the stylets are retracted within the head. By contrast, in *Cryptothrips* these stylets lie parallel and close together within the head.

Nesothrips subgenus *Bolothrips* Priesner

Bolothrips Priesner (1926b:90). Type-species by original designation.—*Phloeothrips bicolor* Heeger. Subordinated under *Nesothrips* by Stannard (1957b).

Bolothrips subgenus *Botanothrips* Hood (1939a:605). Type-species by original designation.—*Bolothrips* (*Botanothrips*) *pratensis* Hood. Synonymized by Stannard (1957b).

As pertains to the Illinois fauna:

Head more or less oval to oblong, usually longer than broad, often slightly protruding anterior of eyes. Cheeks without strong setae. Eyes often protruding slightly, ventral surface often extended posteriad more than on dorsal surface. Ocelli present or absent, usually greatly reduced even in macropterous specimens. Postocular setae well developed and pointed. Postocellar setae small or moderately large. Antennae eight segmented, intermediate segments only slightly elongate, segment VIII well separated from segment VII. Mouth cone short and broadly rounded. Maxillary stylets placed V shaped within the head.

Prothorax with all major setae well developed except anteromarginal pair which are relatively small. Epimeral sutures complete. Praepectus well developed. Fore legs unarmed in female, usually armed in male, always armed in major male. Females either macropterous or apterous, males only apterous as far as is known. Fore wings, when fully developed, broad, each with about 10 accessory fringe cilia.

Abdomen usually smooth or only faintly sculptured. Pelta formed as in Fig. 303, with posterior half bearing weak striations. Abdominal segment IX in female with three pairs of moderately long, pointed posterior setae; in males with an additional fairly long pair of ventral setae. Tube moderate in size, more than half as long to nearly as long as head, usually not abruptly constricted near apex (Fig. 299).

This subgenus contains two groups, those with eyes greatly prolonged ventrally (for example, *bicolor*) and those

with eyes hardly at all prolonged ventrally (for example, *icarus*). Names have been applied to these groups as indicated in the synonymy. Unfortunately, when species from all over the world are considered, these categories break down. In other regions there are species which range from those with the eyes just slightly prolonged ventrally to various degrees of prolongation. It does not seem practical, therefore, to recognize these subdivisions as groups with legal names.

In the eastern United States and Canada, exclusive of Florida, this subgenus may be distinguished from the others in the subfamily Megathripinae by the relatively short head, the V-shaped position of the maxillary stylets when retracted within the head, the form of the pelta, and the cylindrical, nonridged black tube.

So far only two species, *bicolor* and *dentipes*, have been found in Illinois. Three more species have been taken in eastern states.

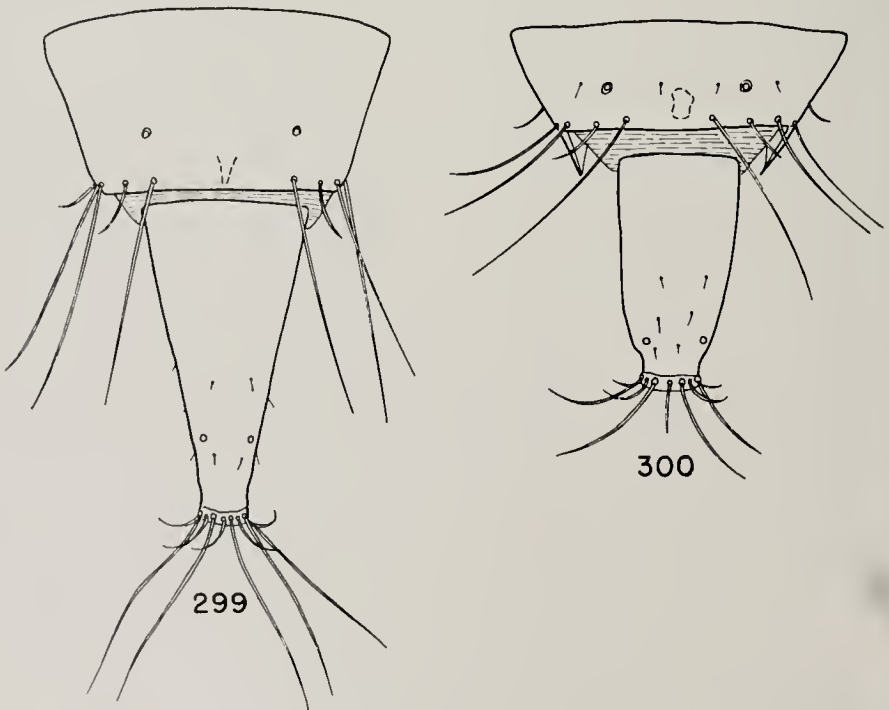


Fig. 299-300.—Abdominal tergites IX and X: 299, *Nesothrips (Bolothrips) bicolor*; 300, *Nesothrips (Gastrathrips) ruficauda*.

KEY TO SPECIES

(OF EASTERN UNITED STATES, EXCLUSIVE OF FLORIDA, BASED IN PART ON LITERATURE)

- 1. Ventral surface of eyes with large portion narrowed and extending posteriad beyond the posterior margin of the dorsal part of the eye (Fig. 301). 2
Ventral surface of eyes, for the most part, similar to dorsal aspect in shape or only extending posteriad beyond the dorsal part of the eye by one or two facets. . . 5
- 2. Prothorax yellow or orange-yellow. 3
Prothorax brown, occasionally yellowish brown. 4
- 3. Antennal segment I largely brown; antennal segment III with an inner sense cone. *bicolor*
Antennal segment I orange-yellow; antennal segment III lacking an inner sense cone; not yet found in Illinois. *gilvipes*
- 4. Antennal segment III yellow except for apex. *dentipes*
Antennal segment III yellow in pedicel, brown medially, and yellowish brown apically; not yet found in Illinois. *litoreus*
- 5. Antennal segment I largely yellow; postocellar setae small; not yet found in Illinois. *pratensis*
Antennal segment I largely brown; postocellar setae moderate in size. . . *icarus*

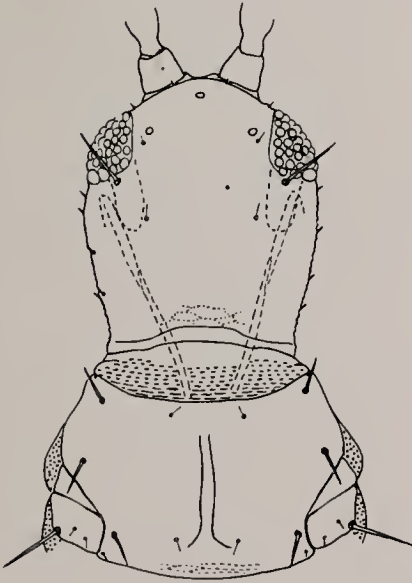
Nesothrips (Bolothrips) bicolor (Heeger)

Phloeothrips bicolor Heeger (1852:477). ? ♀. Type-locality.—Vienna, Austria. Transferred to *Cryptothrips* by Uzel (1895). Transferred to *Bolothrips* by Priesner (1926a). Transferred to *Nesothrips* by Stannard (1957b).

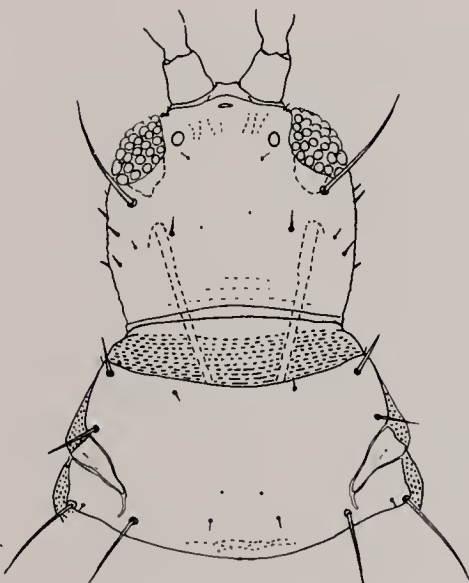
Oedaleothrips andrei Watson (1933a: 49). ♀, ♂. Type-locality.—Ames, Iowa. Synonymized by Hood (1936b).

FEMALE (apterous).—Length distended about 2.8 mm. Bicolored yellow and dark brown. Antennal segment II except at extreme base, segments III and IV, segment V except at apex, and segment VI in pedicel yellow to yellowish brown; segment I and most of VI medium brown. Prothorax and legs bright yellow. Head, remainder of antennae, pterothorax, and abdomen blackish brown, being darkest in head and tube.

Head (Fig. 301) slightly longer than wide, greatest width across eyes. Eyes



301



302

Fig. 301-302.—Head and prothorax: 301, *Nesothrips (Bolothrips) bicolor*; 302, *Nesothrips (Gastrothrips) ruficauda*.

prolonged ventrally. Ocelli present but reduced in size. Postocellar setae small; postocular setae well developed, pointed. Antennal segment III with one inner and one outer sense cone; segment VIII well separated from segment VII, slightly pedicellate.

Prothorax with all setae pointed; anteromarginal setae small, the remainder of the major setae well developed (Fig. 301). Pteronotum with sclerotized portion reduced, typical of apterous forms, without trace of basal wing sclerites. Metanotum smooth. Fore tarsi each unarmed.

Pelta as in Fig. 303. Wing-holding setae not differentiated. Tube (Fig. 299) about seven-tenths as long as head.

FEMALE (macropterous).—Length distended about 2.8 mm. Similar in general color and structure to apterous female. Pterothorax somewhat reduced, metanotum smooth. Wings fully developed, fore wings colorless except for scale and region just above scale, which are light gray. Fore wings broad with fringe cilia fairly close together, with 6–10 accessory fringe cilia.

MALE (apterous).—Length distended about 2.6 mm. Similar in color and structure to apterous female. Major form with fore legs and prothorax enlarged, fore tarsi each with a large well-developed tooth, fore tibiae each with a small inner apical tooth. Tube slightly more than half as long as head.

This species is easily distinguished by the bright yellow prothorax and legs in contrast to the black head, pterothorax, and abdomen. According to Dr. H. B. Mills (orally) this thrips, because of its striking color and attractive appearance, influenced Dean Floyd Andre, then a student at Ames, Iowa, to take up the study of Thysanoptera.

Hood (1914b) recorded *bicolor*, under *Cryptothrips*, as being introduced from Europe to North America as early as 1913. It was first discovered here by Dr. J. C. Faure, then also a student, at Canastota, New York. Since then it has been found scattered throughout the northern part of North



Fig. 303.—*Nesothrips bicolor*, pelta.

America. Its occurrence in Illinois is limited to the northern half of the state where it is found on native and naturalized grasses.

In the United States the macropterous form is very rare.

Illinois records (Fig. 16).—Collected every month of the year, from one to several localities in the following counties: CARROLL, CHAMPAIGN, DOUGLAS, HENDERSON, HENRY, IROQUOIS, JO DAVIESS, KANE, KENDALL, KNOX, LAKE, LA SALLE, LEE, MASON, MCLEAN, MCHENRY, OGLE, PIATT, ROCK ISLAND, STEPHENSON, WHITESIDE, WILL, WINNEBAGO, and WOODFORD.

***Nesothrips (Bolothrips) dentipes* (Reuter)**

Phloeothrips dentipes Reuter (1885: 12). ♀. Type-locality.—Finland. Transferred to *Bolothrips* by Priesner (1928). Transferred to *Nesothrips* by Stannard (1957b).

FEMALE (apterous) (Fig. 304).—Length distended about 3.5 mm. Color generally dark brown. Antennal segment III in basal two-thirds, extreme base and apex of femora, inside of fore tibiae, and tarsi yellow to yellowish brown.

Head longer than broad, greatest width through eyes. Eyes prolonged ventrally. Ocelli present but reduced in size. Postocellar setae relatively small. Postocular setae well developed, long and pointed. Antennal segment III with one inner ventral sense cone and one outer sense cone, segment VIII well separated from segment VII but without a constricted pedicel.

Prothorax with all setae pointed; anterolateral, midlateral, and posteromarginal setae longer than in *gilvipes*; compare Hood (1914, plate V, Fig. 4) with Fig. 304. Pteronotum with scler-

rites reduced, typical of apterous condition, a few basal wing sclerites present; metanotum smooth. Fore tarsi unarmed.

Pelta about as in Fig. 303. Wing-

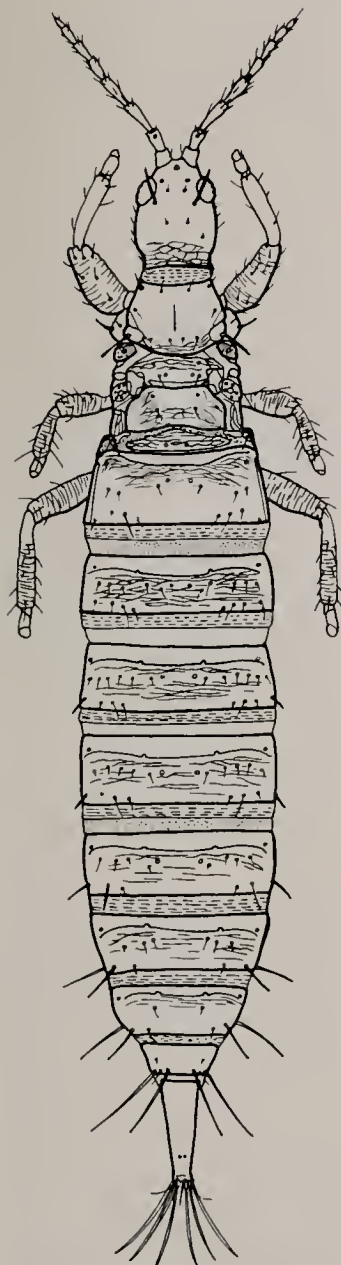


Fig. 304.—*Nesothrips dentipes*, dorsal aspect.

holding setae not differentiated. Tube long, about nine-tenths as long as head.

MALE (apterous).—Length distended about 3 mm. General color and structure similar to female. Major forms with fore legs greatly enlarged, fore tarsi each with a strongly developed tooth, fore tibiae at each inner apex with a small tooth. Tube about three-fourths as long as head.

This entity appears to be very similar to *litoreus* Hood. Aside from a few minor differences in color, i.e. color of antennal segment III and base of head, *dentipes* differs from *litoreus* mostly in being slightly longer and in having a slightly longer tube.

So far this species has been found only in marshy areas. In Illinois it has never been taken outside of Lake County.

Illinois records.—LAKE COUNTY: Beach St. Park, Zion, July 27, 1960, Smith, Ross, Cunningham, on *Carex*, 1 ♀; Wauconda, October 28, 1943, Ross, Sanderson, in tamarack bog, 1 ♂; Fox Lake, June 7, 1950, Sanderson, Benjamin, sweeping, 1 ♀; Fish Lake, September 12, 1951, Richards, Stannard, sweeping along shore, 1 ♀; Antioch, October 15, 1942, Ross, Sanderson, in mammal's nest by tamarack bog, 1 ♀.

***Nesothrips (Bolothrips) icarus* (Uzel),
new combination**

Cryptothrips Icarus [sic] Uzel (1895: 232). ♀, ♂. Type-locality.—Bohemia (Czechoslovakia). Transferred to *Bolothrips* by Priesner (1938).

FEMALE (apterous).—Length distended about 2.3 mm. General color dark brown. Joints of legs and tarsi yellow. Antennal segment I at base, segment II at apex, segment IV in basal half, and pedicel of segment V yellowish brown; segment III yellow; remainder of antennae brown. Brown portions of legs generally in lighter shades.

Head much longer than wide. Eyes slightly bulged from head, hardly at all prolonged ventrally. Fore ocellus

present, hind ocelli absent. Postocellar setae moderately developed. Postocular setae well developed, pointed. Antennal segment III with one inner and one outer sense cone; segment VIII well separated from segment VII, slightly pedicellate.

Prothorax with all setae pointed to blunt, anterior setae small, the remainder of the major setae well developed. Pterothorax reduced; metanotum smooth. Fore tarsi unarmed.

Pelta similar to Fig. 303. Wing-holding setae not differentiated. Tube nearly three-fifths as long as head.

MALE (apterous).—Length distended about 2 mm. Similar to female in general color and structure except legs usually entirely bright yellow. Fore ocellus present, posterior ocelli lacking in specimens from Michigan, present in specimen I have seen from Czechoslovakia. Major forms with fore legs greatly enlarged, fore tarsi each armed with a large tooth, fore tibiae with a small tooth at inner apical angle.

This species is recorded here for the first time in North America. The specimens examined came from the George Reserve near Pinckney, Michigan. They were collected in 1956 by R. B. Root from nests of vesper and field sparrows.

So far *icarus* has not been found in Illinois but its presence is expected.

Nesothrips subgenus *Gastrothrips* Hood

Gastrothrips Hood (1912c:156). Type-species by original designation.—*Gastrothrips ruficauda* Hood. Subordinated under *Nesothrips* by Stannard (1957b).

As pertains to the Illinois fauna:

Head more or less oval, at the most only slightly prolonged anteriorly of the eyes. Cheeks without strong setae. Eyes relatively small, ventral surface slightly extended posteriad more than on dorsal surface. Ocelli present, reduced in size. Postocellar setae small. Postocular setae well developed, pointed. Antennae eight segmented,

intermediate segments only slightly elongate, segment VIII well separated from segment VII. Mouth cone broadly rounded. Maxillary stylets, when retracted, placed V-shaped within the head.

Prothorax with all major setae well developed except anteromarginal pair which are relatively small. Epimeral sutures usually complete or nearly so (incomplete in specimens I have seen of an undetermined species from Florida). Praepectus well developed. Fore legs unarmed in female, usually armed in male. Males with a toothlike projection anterior to each mesothoracic spiracle. Macropterous or apterous. Fore wings when present with or without accessory fringe cilia.

Abdominal segment I with a fairly broad pelta, usually reticulate. Tube (Fig. 300) moderate in size to small, often slightly thickened, usually slightly constricted at apex.

In Illinois, but not in some other parts of the world, species of the subgenus *Gastrothrips* are easily distinguished from those in the subgenus *Bolothrips*. The orange color of the tube of the single Illinois species of *Gastrothrips*, *ruficauda*, will differentiate this entity from *Bolothrips*. In addition, in *Gastrothrips* body projections, such as toothlike spines on various parts of the thorax, often appear on males. No such tendency to bear thoracic spines has been observed in *Bolothrips*.

Nesothrips (*Gastrothrips*) *ruficauda* Hood

Gastrothrips ruficauda Hood (1912c:156). ♀. Type-locality.—Not stated, but holotype labeled Grand Tower, Illinois. Transferred to *Nesothrips* by Stannard (1957b).

FEMALE (apterous).—Length distended about 2 mm. General color dark brown. Inner apical angles of all femora, tibiae, apex of antennal segment II, and pedicel of segment III yellowish brown to yellow. Tube orange-brown except at extreme base and apex which are dark brown. Setae

generally brown, epimeral setae sometimes brown at base and white at tip.

Head (Fig. 302) slightly wider than long, generally smooth. Eyes small, prolonged on the venter slightly more than on the dorsum. Ocelli present, but reduced in size. Postocellar setae small. Postocular setae long, pointed. Antennal segment III with no inner and one outer sense cone; segment VIII with base narrowed, not closely joined to segment VII.

Prothorax with all major setae except the anteromarginal setae well developed and pointed, the epimeral setae being the largest. Epimeral sutures complete. Pterothorax reduced. Metanotum smooth. Fore legs unarmed.

Pelta broad. Wing-holding setae not differentiated. Abdominal segment IX with major posterior setae slightly shorter than length of tube. Tube (Fig. 300) short, slightly thickened, abruptly constricted at apex, with short terminal setae.

FEMALE (macropterous).—Unknown.

MALE (apterous).—Length distended about 1.6 mm. Similar to female in general color. Fore legs usually slightly enlarged, fore tarsi each with a strongly developed tooth. Lateral angles of mesonotum, just above spiracles, each with a toothlike projection.

This species can be easily recognized by the slightly thickened, nearly orange tube. Like *Illinothrips rossi*, the male of *ruficauda* bears a toothlike projection anterior of each mesothoracic spiracle.

So far *ruficauda* has been found only in the southern half of the state. Mostly it has been collected from dead willow twigs although many other tree twigs have been found to harbor specimens. Once I jarred a series of females from Hydraceae fungi growing on dead hickory branches.

Illinois records.—Collected from April through October, from one to several localities in the following counties; COLES, CRAWFORD, CUMBERLAND, EFFINGHAM, GALLATIN, HAMILTON, JACKSON (Hood 1912c), MARION, POPE, PULASKI (Hood 1912c), UNION, and WABASH.

Oedaleothrips Hood

Oedaleothrips Hood (1916b:64). Type-species by original designation.—*Oedaleothrips hookeri* Hood.

Myrmecothrips Watson (1920:20). Type-species by original designation.—*Myrmecothrips querci* Watson. Synonymized by Watson (1924a).

Myrmecothrips Priesner (1925e:485). Type-species by original designation.—*Myrmecothrips dampfi* Priesner. Preoccupied by *Myrmecothrips* Watson, synonymized by Hood (1936b).

Formicothrips Priesner (1927:479). New name for *Myrmecothrips* Priesner.

Head longer than wide, swollen except for base which is abruptly narrowed. Eyes on the venter ordinarily prolonged posteriorly more than on the dorsum. Ocelli absent. Postocular setae well developed. Antennae eight segmented, segment III moderately elongate, segments V and VI prolonged ventrally at apex. Mouth cone broadly rounded. Maxillary stylets when retracted into the head placed far apart, often V shaped.

Prothorax small relative to the head, pterothorax exceptionally small compared to head and abdomen. All major prothoracic setae well developed. Metanotum (Fig. 305) raised (similar to the scale of the petiole of an ant), often concentrically striate (Fig. 306). Praepectus present. Mesopraesternum well developed, extremely narrow. Apterous in North America. Fore tarsi armed in both sexes.

Pelta broad. Abdominal tergite II long, often strongly sculptured. Wing-holding setae not differentiated. Tube moderate in size.

This genus is easily recognized in North America by the characteristics of the swollen head and the small size of the pterothorax which in profile resembles the scale of the petiole of an ant.

Only one species, *hookeri*, occurs in our state.



Fig. 305.—*Oedaleothrips* species, lateral aspect, showing ant-mimicing form.

Oedaleothrips hookeri Hood

Oedaleothrips hookeri (1916b:64). ♀.

Type-locality.—Dallas, Texas.

Oedaleothrips campestris Hood (1941: 190). ♀, ♂. Type-locality.—El Campo, Texas. New synonymy.

FEMALE (apterous).—Length distended nearly 3 mm. Color predominantly dark blackish brown. Antennal segments I and II light yellow becoming yellowish brown in segment III. Tube yellow to yellowish tan except tip which is brown. Anterior of pelta, an anterior spot on each side of abdominal segment II, and a spot on each side of abdominal segment V white. Body setae colorless.

Head bulged, sharply constricted at neck, hexagonally reticulate at base. Eyes prolonged ventrally much as in *Nesothrips* (*Bolothrips*) *bicolor*. Post-ocular setae dilated. Antennal segment III with one inner and one outer sense cone, segment VIII constricted at base, pedicellate.

Prothorax with longitudinal striations confined to the lateral margins, major setae dilated. Metanotum (Fig. 306) with some concentric rings completely encircling the raised median portion. Fore tarsi each armed with a small tooth.

Abdominal tergite IX with posterior setae dilated, the lateral pair nearly as long as tube. Tube constricted at apex.

MALE (apterous).—Unknown to

me. Probably similar to female in most respects.

All the specimens I have seen—which are from Illinois, Oklahoma, and Arkansas—could be assigned to either *hookeri* or to *campestris*, being intermediate to the two. Considering that some color variation might well occur in a wide-ranging species, I believe it is reasonable to sink *campestris* under *hookeri*. Certainly Hood did not present much evidence that the two were different species. He stated that they “may be separated by certain details of coloration and by the form of the tube.” The holotype of *hookeri* is a broken specimen with a partially telescoped abdomen. It differs only slightly from the holotype of *campestris* as far as can be seen.

Specimens from Illinois are known



Fig. 306.—*Oedaleothrips hookeri*, part of metathorax showing striations. Photo by J. D. Maddox.

only from the Ozark regions in the southwestern tip of our state up to Pere Marquette State Park. They have been taken from hill prairies. Probably they feed on fungus spores (Fig. 307).

(Pine Hills), April 9, 1953, Stannard, hill prairie, 7 ♀.

Pygidiothrips Hood

Pygidiothrips Hood (1938c:389).

Type-species by original designation.—*Pygidiothrips seminole* Hood.

Body minute, generally degenerate, stout.

Head small, about as broad as long, widest at cheeks just behind eyes, surface smooth. Eyes relatively small with about a dozen dorsal facets and less than a half dozen ventral facets. Ocelli absent in apterous forms. Post-ocular setae well developed, dilated. Antennae (Fig. 161) six segmented, segment III smallest, segment VI largest, being composed of fused morphological segments VI–VIII. Mouth cone broadly rounded, nearly equal in length to dorsal length of head. Maxillary stylets broad, retracted into the head to the region of the eyes, widely spaced within the head.

Prothorax smooth, anteromarginal and midlateral setae minute, anterolateral and posterior setae well developed, dilated. Praepectus seemingly absent. Meso- and metanotum smooth, degenerate, reduced to simple transverse plates. Apterous in specimens so far collected. Thoracic sternites much reduced. Metafurca placed anteriorly touching mesofurca. Legs short, mid and hind tarsi two segmented, each segment separated by a weak suture.

Pelta almost lost, mostly broken into tiny stipple-like platelets. Wing-holding setae absent, major abdominal setae dilated. Abdominal tergite IX with four pairs of stout, thornlike setae in addition to regular setae. Abdominal segment X (tube) short, stout, ridged, and sharply constricted at apex. Anal setae small, shorter than tube length.

This monobasic genus resembles *Allothrips* and its allies. It is one of the smallest representatives of the Megathripinae and can be easily recognized by the short, stout, ridged tube and ring of thornlike setae on abdominal tergite IX.



Fig. 307.—*Oedaleothrips* species, larva showing gut filled with fungus spores. Photo by Wilmer Zehr.

Illinois records.—JACKSON COUNTY: Murphysboro (Little Grand Canyon Area), September 23, 1953, Ross, Evers, hill prairie, 1 ♀. JERSEY COUNTY: Pere Marquette State Park, November 20, 1958, Stannard, hill prairie, 1 ♀. UNION COUNTY: Wolf Lake

***Pygidiothrips seminole* Hood**

Pygidiothrips seminole Hood (1938c: 390). ♀. Type-locality.—Homestead, Florida.

FEMALE (apterous).—Length distended about 0.9 mm. General color brown with antennal segment I and intermediate abdominal segments lightest, and abdominal segments VIII and IX darkest. Antennal segment II pale yellowish white. Tube brown at base and apex, bright yellow medially. Subintegumental pigment bright red. Body setae colorless, ringlet of thornlike setae on abdominal tergite IX brown.

Head as in Fig. 308 with cheeks smooth. Antennal segment III extremely short and without sense cones, segment IV with one inner and one outer sense cone.

Prothorax smooth. Anterior and posterior margins degenerate, becoming largely fractured into stipple-like platelets. Epimeral sutures incomplete. Meso- and metanotum smooth. Fore legs unarmed.

Pelta mostly stippled, with only traces of smooth, evenly sclerotized sections. Abdominal sternites seemingly without median setae in addi-

tion to posterior pairs. Abdominal tergite IX with major posterior setae longer than tube, blunt to dilated; thornlike setae short, all nearly equal in size. Tube strongly ridged at base.

MALE.—Unknown.

This is the only species in the genus. From the other species in the eastern United States which have antennal segment III exceptionally small, *seminole* can be distinguished by the shape of the tube, the six-segmented antennae, and the ringlet of thornlike setae on abdominal tergite IX.

Pygidiothrips seminole occurs from Homestead, Florida to Brownsville, Texas (USNM records), being found so far on dead branches. The possibility of this species inhabiting Illinois is somewhat remote.

***Sporothrips* Hood**

Sporothrips Hood (1938c:410). Type-species by original designation.—*Adiaphorothrips amplus* Hood.

Head much longer than broad, widest in basal one-third region, slightly prolonged anteriorly in front of eyes, sharply incised just before base. Eyes relatively small, length less than combined length of antennal segments I and II. Ocelli present. Postocellar setae not greatly enlarged. Postocular setae well developed. Middle pair of dorsal head setae small. Antennae eight segmented, segment III more than twice as long as II, segment VIII nonpedicellate, sense cones short. Mouth cone broadly rounded. Maxillary stylets broad, retracted about one-half way into the head, spaced fairly far apart within the head.

Prothorax moderately long in female, longer in male, with major anterior setae shorter than the better-developed major posterior setae. Praepectus present. Prothoracic epimeral sutures complete. Mesopraesternum (Fig. 194) well developed and wide. Macropterous. Fore wings broad, with many accessory fringe cilia. Fore legs not enlarged in female, enlarged in male, armed in both sexes. Fore tibiae in male each with an inner apical tooth in addition to the tarsal tooth.

Abdomen fairly broad. Pelta wide.

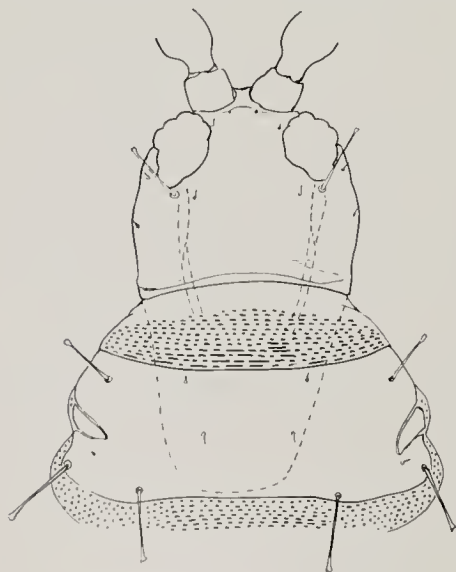


Fig. 308.—*Pygidiothrips seminole*, head and prothorax.

Wing-holding setae usually straight, not sigmoidal. Abdominal tergite IX with major posterior setae long in both sexes. Abdominal segment X (tube) long, about three-fourths as long as head; anal setae shorter than tube.

All major body setae pointed.

This monobasic genus can be recognized by the form of the head, in which the eyes are relatively small and the cheeks swollen in the basal third followed immediately by a sharply incised subbasal region, as well as by the armature of the fore legs of the male.

So far the representative of this genus, *amplus*, has been collected only in southern Florida and may never be found in Illinois.

Sporothrips amplus (Hood)

Adiaphorothrips amplus Hood (1925c: 221). ♀. Type-locality.—Bradenton, Florida. Transferred to *Sporothrips* by Hood (1938c).

FEMALE (macropterous).—Length distended about 4 mm. General color brown, being darkest in abdomen. Base of tibiae and all tarsi light brown to yellowish brown. Antennal segment III mostly, and bases of segments IV and V yellow. Body setae yellow. Wings colorless.

Head as in Fig. 178, with sides transversely striate, base hexagonally reticulate, cheek setae small. Antennal segment III with one outer and one inner sense cone, segment IV with two outer and two inner sense cones.

Prothorax weakly hexagonally reticulate, bare medially. Metascutum hexagonally reticulate. Fore tibiae without inner apical tooth, fore tarsi each armed with a moderate-sized tooth. Fore wings broad, with more than 30 accessory fringe cilia.

Pelta (Fig. 309) wide, predominantly hexagonally reticulate. Abdominal sternites with a median row of small setae in addition to posterior pairs.



Fig. 309.—*Sporothrips amplus*, pelta.

Abdominal tergite IX with major posterior setae not as long as tube. Abdominal segment X (tube) very faintly hexagonally reticulate except at apex.

MALE (macropterous).—Length distended about 3.5 mm. Similar in general color and structure to female with the following exceptions. Antennal segment VI often yellow basally. Prothorax enlarged. Fore femora greatly enlarged. Fore tibiae each with inner apical tooth. Fore tarsi (Fig. 310) each with a very large tooth that is about twice as long as width of tarsus that bears it.

This species, the sole representative of the genus, is allied to the *Nesothrips-Diceratothrips* complexes. From thrips in the North American fauna, it can be distinguished by the characteristics of the shape of the head and the armature of the fore legs of the male.

As is implied in its generic name, great quantities of fungus spores are ordinarily found in its intestinal tract.

Specimens have been taken from dead branches and dead leaves of palms where black fungus growths are frequently found. The few collections known are from southern Florida, including Big Pine Key (INHS records).



Fig. 310.—*Sporothrips amplus*, ♂, right fore leg showing claws.

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FOR 11 SPECIES OF FISH IN LAKE CHAUTAUQUA

S U P P L E M E N T A R Y T A B L E S

FOR

A BIOLOGICAL INVESTIGATION OF THE

FISHES OF LAKE CHAUTAUQUA, ILLINOIS

by William C. Starrett and Arnold W. Fritz

ILLINOIS NATURAL HISTORY SURVEY BULLETIN

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These tables are referred to on page 7 in the section entitled "Calculations."

Supplementary Table 1.--Average and range of calculated weights (at various lengths) of 2,651 bluegills taken at Lake Chautauqua, Illinois (fall months, 1950-1959).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
5.0	0.10	0.08 to 0.11
5.5	0.14	0.11 to 0.16
6.0	0.18	0.16 to 0.21
6.5	0.24	0.21 to 0.27
7.0	0.31	0.27 to 0.34
7.5	0.38	0.34 to 0.43
8.0	0.48	0.42 to 0.54
8.5	0.58	0.52 to 0.61
9.0	0.70	0.70 to 0.75

* Average calculated $\log W = -1.31249 + 3.31026 (\log L)$.

Supplementary Table 2.--Average and range of calculated weights (at various lengths) of 7,739 white crappies taken at Lake Chautauqua, Illinois (September and early October, 1950-1959).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
6.0	0.10	0.09 to 0.11
6.5	0.13	0.11 to 0.14
7.0	0.17	0.15 to 0.19
7.5	0.21	0.19 to 0.24
8.0	0.26	0.24 to 0.29
8.5	0.32	0.30 to 0.35
9.0	0.39	0.36 to 0.42
9.5	0.46	0.44 to 0.50
10.0	0.55	0.52 to 0.60
10.5	0.64	0.61 to 0.71
11.0	0.75	0.71 to 0.83
11.5	0.86	0.82 to 0.96
12.0	0.99	0.94 to 1.01

* Average calculated $\log W = -1.53658 + 3.27432 (\log L)$.

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Supplementary Table 3.--Average and range of calculated weights (at various lengths) of 3,985 black crappies taken at Lake Chautauqua, Illinois (September and early October, 1950-1959).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
5.5	0.09	0.08 to 0.09
6.0	0.12	0.10 to 0.13
6.5	0.15	0.13 to 0.16
7.0	0.19	0.17 to 0.22
7.5	0.24	0.22 to 0.27
8.0	0.29	0.27 to 0.32
8.5	0.36	0.34 to 0.39
9.0	0.43	0.41 to 0.46
9.5	0.51	0.49 to 0.55
10.0	0.60	0.57 to 0.65
10.5	0.70	0.67 to 0.76
11.0	0.81	0.78 to 0.88
11.5	0.94	0.85 to 0.96

*Average calculated $\log W = -1.42138 + 3.19958 (\log L)$.

Supplementary Table 4.--Average and range of calculated weights (at various lengths) of 2,091 yellow bass taken at Lake Chautauqua, Illinois (spring months 1950-1954 and 1957-1959).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
6.5	0.14	0.11 to 0.16
7.0	0.17	0.14 to 0.20
7.5	0.21	0.18 to 0.24
8.0	0.26	0.23 to 0.29
8.5	0.32	0.29 to 0.35
9.0	0.38	0.35 to 0.41
9.5	0.45	0.41 to 0.48
10.0	0.53	0.48 to 0.56
10.5	0.62	0.56 to 0.65
11.0	0.71	0.65 to 0.75
11.5	0.82	0.74 to 0.85

*Average calculated $\log W = -2.42004 + 3.14296 (\log L)$.

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Supplementary Table 5.--Calculated weights (at various lengths) of 582 largemouth bass taken in the spring and fall months at Lake Chautauqua, Illinois (1950-1959).

Total Length in Inches	Calculated Weight in Pounds*	Number of Fish
6.0	0.11	4
6.5	0.14	13
7.0	0.18	8
7.5	0.22	17
8.0	0.27	22
8.5	0.32	34
9.0	0.38	40
9.5	0.45	47
10.0	0.53	61
10.5	0.62	38
11.0	0.71	55
11.5	0.81	32
12.0	0.93	42
12.5	1.05	20
13.0	1.19	26
13.5	1.33	34
14.0	1.49	17
14.5	1.66	19
15.0	1.84	12
15.5	2.04	6
16.0	2.25	7
16.5	2.47	5
17.0	2.71	8
17.5	2.96	3
18.0	3.23	5
18.5	3.51	3
19.0	3.81	2
19.5	4.12	1
20.0	4.46	1

*Average calculated $\log W = -2.34869 + 3.07281 (\log L)$.

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Supplementary Table 6.--Calculated weights (at various lengths) of 1,094 white bass taken in the spring and fall months at Lake Chautauqua, Illinois (1950-1959).

Total Length in Inches	Calculated Weight in Pounds*	Number of Fish
4.5	0.03	1
5.0	0.05	18
5.5	0.07	90
6.0	0.09	89
6.5	0.11	42
7.0	0.15	33
7.5	0.18	24
8.0	0.23	39
8.5	0.28	21
9.0	0.34	4
9.5	0.41	1
10.0	0.48	14
10.5	0.57	51
11.0	0.66	99
11.5	0.77	136
12.0	0.88	118
12.5	1.01	68
13.0	1.15	70
13.5	1.31	59
14.0	1.48	48
14.5	1.66	36
15.0	1.86	17
15.5	2.07	9
16.0	2.30	7

*Average calculated $\log W = -2.34869 + 3.07281 (\log L)$.

Supplementary Table 7.--Average and range of calculated weights (at various lengths) of 2,882 freshwater drum taken at Lake Chautauqua, Illinois (September, 1951-1958).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
9.0	0.34	0.31 to 0.36
9.5	0.40	0.36 to 0.43
10.0	0.47	0.42 to 0.50
10.5	0.54	0.49 to 0.59
11.0	0.63	0.56 to 0.68
11.5	0.72	0.64 to 0.78
12.0	0.82	0.73 to 0.88
12.5	0.92	0.82 to 1.00
13.0	1.04	0.92 to 1.13
13.5	1.17	1.03 to 1.26
14.0	1.30	1.15 to 1.41
14.5	1.45	1.28 to 1.58
15.0	1.60	1.41 to 1.75
15.5	1.77	1.55 to 1.94
16.0	1.95	1.69 to 2.14
16.5	2.14	1.84 to 2.35
17.0	2.34	1.99 to 2.57
17.5	2.56	2.16 to 2.82
18.0	2.79	2.79 to 3.00

*Average calculated $\log W = -2.36175 + 2.98633 (\log L)$.

Supplementary Table 8.--Average and range of calculated weights (at various lengths) of 2,471 bigmouth buffalo taken at Lake Chautauqua, Illinois (September 1951-1952).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
16.0	2.46	2.39 to 2.57
16.5	2.72	2.65 to 2.84
17.0	3.00	2.92 to 3.12
17.5	3.29	3.20 to 3.48 ³
18.0	3.61	3.51 to 3.75
18.5	3.94	3.84 to 4.10
19.0	4.30	4.19 to 4.47
19.5	4.68	4.56 to 4.86
20.0	5.08	4.96 to 5.27
20.5	5.51	5.36 to 5.71
21.0	5.96	5.78 to 6.17
21.5	6.43	6.22 to 6.66
22.0	6.93	6.69 to 7.18
22.5	7.45	7.18 to 7.72
23.0	8.00	7.69 to 8.28
23.5	8.58	8.23 to 8.88
24.0	9.19	8.79 to 9.50
24.5	9.83	9.38 to 10.16
25.0	10.50	9.99 to 10.84
25.5	11.20	10.64 to 11.59
26.0	11.92	11.31 to 12.31

*Average calculated $\log W = -3.52421 + 3.25141 (\log L)$.

Supplementary Table 9.--Average and range of calculated weights (at various lengths) of 2,481 channel catfish taken at Lake Chautauqua, Illinois (September, 1951-1958).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calculated Weights in Pounds
12.0	0.49	0.47 to 0.50
12.5	0.57	0.55 to 0.60
13.0	0.65	0.63 to 0.68
13.5	0.74	0.71 to 0.77
14.0	0.84	0.81 to 0.87
14.5	0.95	0.92 to 1.00
15.0	1.07	1.03 to 1.14
15.5	1.19	1.16 to 1.25
16.0	1.33	1.29 to 1.38
16.5	1.48	1.44 to 1.53
17.0	1.64	1.60 to 1.69
17.5	1.81	1.77 to 1.87
18.0	1.99	1.95 to 2.06
18.5	2.19	2.13 to 2.27
19.0	2.40	2.33 to 2.49
19.5	2.63	2.54 to 2.72
20.0	2.87	2.77 to 2.97
20.5	3.12	3.01 to 3.24
21.0	3.39	3.26 to 3.53
21.5	3.68	3.53 to 3.82
22.0	3.98	3.81 to 4.15
22.5	4.30	4.10 to 4.49
23.0	4.64	4.42 to 4.85
23.5	4.99	4.75 to 5.23
24.0	5.37	5.09 to 5.68
24.5	5.76	5.46 to 6.05
25.0	6.18	5.84 to 6.50
25.5	6.61	6.31 to 6.96
26.0	7.07	6.73 to 7.45
26.5	7.56	7.18 to 7.99
27.0	8.05	7.62 to 8.51
27.5	8.57	8.10 to 9.07
28.0	9.12	8.60 to 9.66

* Average calculated $\log W = -3.01994 + 3.44126 (\log L)$.

Supplementary Table 10.--Average and range of calculated weights (at various lengths) of 2,479 carp taken at Lake Chautauqua, Illinois (September, 1951-1958).

Total Length in Inches	Calculated Average Weight in Pounds*	Range of Annual Calcu- lated Weights in Pounds
15.0	1.67	1.57 to 1.74
15.5	1.84	1.73 to 1.92
16.0	2.03	1.91 to 2.11
16.5	2.23	2.05 to 2.34
17.0	2.44	2.29 to 2.57
17.5	2.67	2.50 to 2.82
18.0	2.91	2.73 to 3.09
18.5	3.16	2.96 to 3.37
19.0	3.43	3.21 to 3.67
19.5	3.71	3.47 to 3.99
20.0	4.01	3.75 to 4.32
20.5	4.33	4.04 to 4.68
21.0	4.66	4.35 to 5.06
21.5	5.00	4.67 to 5.45
22.0	5.37	5.00 to 5.87
22.5	5.75	5.35 to 6.31
23.0	6.14	5.72 to 6.77
23.5	6.56	6.11 to 7.25
24.0	7.00	6.50 to 7.75
24.5	7.45	6.90 to 8.28
25.0	7.92	7.31 to 8.84
25.5	8.42	7.74 to 9.42
26.0	8.93	8.18 to 10.02
26.5	9.47	8.64 to 10.65
27.0	10.02	9.12 to 11.31
27.5	10.60	9.62 to 11.99
28.0	11.19	10.13 to 12.71

* Average calculated $\log W = -3.36498 + 3.05012 (\log L)$.