Fabric Insects
—How to Combat Them in the Home
## CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARPET BEETLES</td>
<td>3</td>
</tr>
<tr>
<td>CLOTHES MOTHS</td>
<td>5</td>
</tr>
<tr>
<td>CIGARETTE BEETLE</td>
<td>6</td>
</tr>
<tr>
<td>HOW TO PREVENT INJURY</td>
<td>7</td>
</tr>
<tr>
<td>WAYS OF DESTROYING FABRIC INSECTS</td>
<td>9</td>
</tr>
</tbody>
</table>

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CARPET BEETLES, clothes moths, and cigarette beetles are responsible for about 99 percent of the insect damage to fabrics and animal products used for clothing and for house furnishings. All kinds of woolen goods, felt, furs, feathers, and hair products are fed upon by these insects. To a lesser extent articles made of bone and certain kinds of leather goods are subject to their attack.

Cotton may occasionally be injured by insects, usually by silverfish, house crickets, or roaches.

CARPET BEETLES

Damage by carpet beetles may not be so great as that caused by clothes moths, yet these insects are probably found in Illinois houses more frequently than are clothes moths. This is true because carpet beetles are able to survive under more adverse conditions than are clothes moths, have more diversified feeding habits, and because the adults move about more readily.

At least four species of carpet beetles² occur commonly in Illinois and several other species occasionally cause annoyance.

Appearance and type of injury. The young, or larvae, of the carpet beetles are very hairy, brownish or blackish creatures, from $\frac{1}{16}$ to $\frac{1}{8}$ inch in length. They are blunt at the head end and taper toward the tail and are relatively slow moving. Infested material will frequently have around it a great many shed skins which closely resemble the insects in appearance, thus making the insects seem more abundant than they really are. These young insects, or larvae, are found in many places about the house—behind baseboards, around cold air ducts, in cracks in drawers, and in clothes hampers.

The adults, which are small beetles, some black, some gray or brown-spotted (the color varying with the species), occur commonly
on flowers out of doors and may be brought into the house with such flowers. These insects, however, do not have to be brought in to gain access to the house, as the adults are strong fliers and frequently work their way in around screens, thru doors, or other openings.

The injury is caused by the larvae. They eat small, ragged-edged holes in fabrics; on materials with nap or piling, they slough or eat off the nap leaving the foundation bare. Webs are never constructed over

![Black carpet beetle, young and full-grown stages](Enlarged about four times)

the infested materials. They feed not only on the fabrics and animal products already mentioned but also on food products, especially those high in protein, such as flour, casein powder, nut and chocolate candies, egg powder, prepared custards, and many of the cereals. They occur commonly out of doors, where they feed on the dead bodies of other insects or on the dried bodies of small animals. They may also damage cereal products in elevators, grain bins, mills, and storage houses.

**Life history.** During the winter months only the larval, or growing, stage of the black carpet beetle\(^1\) can be found in Illinois. Early in the spring these brown, tapering worms change to a brownish-white resting, or pupal, stage which lasts about two weeks. From the pupa comes the hard-shelled black beetle about \(\frac{3}{4}\) inch long. These beetles may occur as early as March 1 but they are much more common in May and June. They will often be found congregating on window sills.

The eggs are white and very small, but visible to the naked eye.

\(^1\) *Attagenus piceus* Oliv.
Each adult female lays from 50 to 100 eggs scattered about in places suited to larval development. The eggs hatch in about 10 days (8 to 14 being the extremes) and the tiny, pale-brown larvae emerge and commence feeding. The larvae require from less than one year to more than three years to develop. Usually there is one generation each year. During the growing period the larvae molt or shed their skins from five to thirteen times.

CLOTHES MOTHS

Clothes moths\(^1\) are present throughout Illinois in a large percentage of houses. They spread from place to place in infested materials. Once established in a house they spread to all parts of it by the flight of the adults, or "millers."

**Appearance and type of injury.** The adult moths are about \(\frac{1}{4}\) inch long with greyish-brown wings or wings slightly mottled with darker patches, the color varying with the species. The moths are seldom seen, as they remain in hiding during the daylight hours. Sometimes upon opening a dark closet or upon turning on bright lights at night, they are observed flitting about. *These moths are never seen hovering near lights as are many other insects.*

The young are rather transparent, whitish worms, very soft and frail in appearance. Some of the young feed inside silk-lined tubes or from within silken cases which they carry about with them. These cases are usually covered with lint from the materials upon which the young are feeding, and as a result they assume various colors.

The worms or larvae are capable of living for long periods on lint or on some of the materials used in buildings for insulating purposes. They attack woolens, silks, felts, and furs. Rarely do they infest animal products such as are commonly attacked by carpet beetles.

**Life history.** Clothes moths may be found in any life stage at any time during the year. The adult moths are rather short-lived and probably take no food of any sort. The female moth lays from 100 to 150 eggs on products or articles on which the larvae can feed. The eggs are seldom seen with the naked eye, as they usually occur singly. The larvae which hatch from the eggs are white with brown heads and vary from \(\frac{1}{16}\) to a little over \(\frac{1}{4}\) inch in length. Their period of development may vary from two months to four years, depending upon the food supply and other conditions affecting growth.

The larva when full-grown adds to the case in which it has been

\(^1\) *Tinea pellionella* L., *Tineola biselliella* L. and *Trichophaga tapetzella* L.
feeding and changes therein to a white resting stage, or pupa, about \( \frac{1}{6} \) inch long. The pupa later turns brown and, if conditions are favorable, the adult emerges after 3 or 4 weeks. Altho adult moths may be found throughout the year in heated buildings, they are usually more abundant during the summer months.

**CIGARETTE BEETLE**

The cigarette beetle, sometimes referred to as the "tow bug," is primarily a pest of tobacco. It is almost universally found in tobacco storages and in factories where tobacco is processed.

**Appearance and type of injury.** The adult is a very small beetle, about twice the size of a pinhead. The young, or larvae, are tiny white, curled, grublike creatures covered sparsely with brownish hairs. The larvae, in addition to chewing on tobacco, also feed on upholstered furniture, chiefly on the material used for stuffing, and are particularly fond of silk. Large numbers are sometimes found in upholstered furniture and occasionally in other places in the house.

**Life history.** The cigarette beetle thrives best where the tem-

\(^1\text{Lasioderma serricorne (Fab.)}\)
temperature and humidity are high and in substances protected from rapid evaporation. It lives in its food substance during all stages of its existence. If conditions are favorable, breeding is continuous; there may be five or six generations a year. One complete life cycle requires about 50 days (45 to 75 being the extremes). Eggs are laid in the food substance and hatch in 6 to 12 days. The larval period is from 30 to 50 days and under usual conditions the adults live for 3 to 6 weeks. Under Illinois conditions the cigarette beetle, when exposed to the outdoor temperatures, usually passes the winter in the larval stage.

**HOW TO PREVENT INJURY**

If properly executed, the methods described will result in protection from all three groups of insects—clothes moths, carpet beetles, and cigarette beetles. Altho some special precautions can be taken to prevent damage by each, control measures are in general the same for all three.

**Mechanical prevention.** Preventing damage by mechanical means is a matter of routine in many homes, but it is mentioned here to stress its importance.

First, and most important of all, **thoroughly clean out** all closets, drawers, chests, boxes, air registers, or other places where food for these insects may occur, keeping in mind that cracks filled with dust and lint form excellent breeding places. A good crackfiller, placed in cracks in floors, boxes, and other storage places will prove helpful. Any paint store can supply such a filler.

Clothing and household furnishings subject to attack should be brushed well once a year and hung out of doors for a few hours in bright sunshine when the temperature is high. It is important that
unused articles on which these insects might feed be stored in mothproof containers (as nearly air tight as possible) and very carefully examined at least once a year. If the articles are taken out of storage, the storage space, whether it be a closet, drawer, or trunk, should be thoroly cleaned, and if possible washed in strong soapsuds. Remember that lint and like materials left in cracks or openings in the container serve as food for the young of both clothes moths and carpet beetles.

Since an infestation of carpet beetles may be started from adults which have entered the house, it is well to screen tightly against them and to exercise precaution against bringing them in on flowers from the garden. If the flowers are shaken out of doors, these beetles will fall out of them.

Chemical prevention. Chemicals may be used in two distinctly different ways in controlling clothes moths, carpet beetles, and cigarette beetles. (1) Chemicals, such as naphthalene and paradichlorobenzene, may be placed in the storage container with the materials to be protected; or (2) fabrics may be impregnated with chemicals to prevent attack by these insects, as in mothproofing.

Naphthalene or paradichlorobenzene (hereafter referred to as P.D.B.) in generous quantities will protect stored articles from clothes moths and carpet beetles. Naphthalene is somewhat cheaper than P.D.B. and can be purchased from many department and ten-cent stores for 15 to 25 cents a pound. In larger quantities it can be purchased for less. P.D.B. can usually be purchased from orchard supply companies for 25 to 35 cents a pound, or from the manufacturers at about the same figure if a considerable quantity is needed. The volatile nature of this chemical causes it to evaporate quite readily, so that retailers carrying it in 1-pound cans charge a higher price. The odor of P.D.B. is less offensive to most people than that of naphthalene and does not persist so long on an article after it is removed from storage.

To be effective, either naphthalene or P.D.B. should be used at the rate of 1 pound for each 15 to 20 cubic feet of space. At this rate either material will give complete protection if applied according to directions. To protect articles stored in tight chests or trunks, the chemical should be applied at least once a year. For closets which are frequently opened, two applications a year may be needed. It is important that re-treatment be made before the entire amount of chemical has disappeared. In a closet where P.D.B. has been applied each spring at the rate of 1 pound to 20 cubic feet of space, no insect damage has occurred to stored woolen or fur articles over a period of ten years.
To insure protection in a closet it is always well to apply a layer of the chemical over the floors and behind baseboards before putting any articles in the closet. It is very important to remember that either of these chemicals is useless as an insect preventive when used in small quantities, for the mere odor will not repel insects. To get an effective kill use the amounts suggested.

*Mothproofing* is an example of *impregnating fabrics with chemicals*, the second method mentioned of preventing attack by clothes moths, carpet beetles, and cigarette beetles. At the present time a number of patented mothproofing materials are being sold. Some of these have been thoroly tested and can be depended upon to be effective for a considerable time. Few of them, however, will last more than a year or will withstand one or two dry cleanings. They must be taken on the guarantee of the company selling them. The purchaser should, in so far as possible, select materials known to be made by dependable concerns and should insist on a written guarantee of their claims. The directions of the manufacturer should be carefully followed.

A cheap and effective mothproofing solution can be made at home as follows: To 1 gallon of warm soft water add 2 teaspoonfuls of "Dreft" or similar wetting agent and 1 tablespoonful of sodium fluosilicate. Stir the mixture until practically all the materials have gone into solution. The articles to be treated should be saturated with the solution and allowed to dry without squeezing or wringing. Such treatment is effective only so long as the treated articles are not cleaned or washed. This solution should not be used on articles which cannot withstand the effects of water.

There are a number of dependable house-insect control companies that mothproof furniture and fabrics.

**WAYS OF DESTROYING FABRIC INSECTS**

When fabric insects are known to be present, it is often necessary to use a combination of methods to effect a satisfactory cleanup. These methods include: (1) the use of high (125°F.) or low (−20°F.) temperatures, (2) home use of suitable chemicals, (3) use of chemicals which require special equipment and which can be employed only by experienced fumigators or exterminators.

*Use of high and low temperatures.* Infested clothing and other articles may be freed from fabric insects by a thoro brushing and exposure to the direct rays of the sun when the outdoor temperature is high. The disturbance of the insects by brushing and subsequent high temperatures will keep down their numbers.
During the winter months infested articles may be rendered practically free of insect life by first warming them for a few hours or days to insure insect activity and then exposing them for several hours out of doors to temperatures below zero. The sudden drop in temperature will kill most of the insects.

A temperature of 135° F. for 6 hours will kill all fabric insects, and this treatment may sometimes be used in the home. The articles to be treated should be placed in a tight room (preferably a room easily heated) during a period when the outside temperature is high. The heating plant of the house should then be used to raise the temperature to 125°-135° F., but never over 150° F. Ten to 15 hours are often necessary to raise the interior of the upholstery on heavily padded furniture to 135° F. After the articles being treated have reached this temperature, they should be subjected to it for at least 5 or 6 hours.

Infested articles which will withstand hot water may be rendered free of insects by submerging the articles in hot water (heated to 150° F. or over) for at least 10 minutes. The temperature of the water must be maintained at or above 150° F. during the entire period of submergence.

**Home use of suitable chemicals.** Overstuffed furniture and other infested articles may be cleared of clothes moths, carpet beetles, and cigarette beetles by careful home use of suitable chemicals.

Place the articles to be treated in a garage or shelter where there is no danger of fire. Then thoroly soak them with uncolored, high-test gasoline (not ethyl or any other gasoline that contains lead). The effectiveness of this treatment depends upon its thoroness. Three to 5 gallons of gasoline are required to treat an upholstered davenport or two chairs. After treating, keep the articles where they will air for 48 hours or longer. Do not use them until the odor has nearly disappeared.

This treatment is effective and cheap and can often be used to advantage, *altho because of the inflammability of the gasoline considerable fire hazard is involved. Consequently every precaution must be taken to prevent heat or flame from coming in contact with the treated articles.*

Dry cleaning should completely rid garments of fabric pests. Infested articles may be cleaned at home or sent to a commercial cleaner with equal certainty of insect destruction.

*P.D.B. or naphthalene* will not only prevent insect infestation, as previously mentioned, but may be used to fumigate articles already infested. To be effective, fumigation with these materials must be done inside a tight enclosure, such as a box, trunk, chest, or closet.
For a thorough fumigation, pile the articles loosely on top of a layer of the chemical. Then apply another layer of the chemical, then another layer of clothing, and so on, alternating the chemical with the articles to be fumigated. In fumigating a closet, separate the articles so that they will not hang tightly together, and have more chemical above the clothing in sacks of cheesecloth or other porous cloth.

Use either P.D.B. or naphthalene at the rate of 1 pound for every 20 cubic feet of space. It is important that the temperature be maintained above 70°F. during the fumigation. The enclosure should be tightly sealed and remain so for a week. If possible, allow the clothing to remain in the closet or other enclosure after it is opened, taking out articles only as they are needed and airing them before they are used.

P.D.B. can also be used very effectively for fumigating piano felts infested with clothes moths or carpet beetles. Hang the P.D.B. in a hammocklike, porous cloth bag inside the top of the piano. At least 1½ pounds of P.D.B. will be necessary to treat an ordinary upright piano. Close the piano and keep it covered with blankets or a tarpaulin for about one week. At the end of this period the piano can be opened, the P.D.B. removed, and the piano thoroughly aired out. If one is leaving for a time, the treatment can be applied and the piano left closed for the entire period, even tho it is more than one week. This treatment will result in a thorough cleanup of any infestation in the felts.

Spraying infested articles with any of the better-class household sprays is effective in killing any moths, carpet beetles, or cigarette beetles actually wet with the spray. The spraying must be thorough and heavy to be effective.

Use of chemicals requiring special equipment. Only experienced fumigators or exterminators should use the chemicals mentioned below, as they require special equipment and technic for safe and satisfactory use.

Hydrocyanic acid gas is the most satisfactory fumigant for clearing houses infested with clothes moths, carpet beetles, or cigarette beetles. It is, however, very dangerous to use, and the person using it must wear a gas mask. Hydrocyanic acid gas fumigation should never be used in any part of a building when human occupants are present, and adequate time (at least 6 hours) should be allowed for the fumigated quarters to be cleared of the gas before reoccupation. Under adverse weather conditions the clearing of the gas is very slow and may require 12 hours or more.

A mixture of one part tetrachlorid and three parts of ethylenedi-
chlorid also shows promise for household fumigation. It should be used only by a trained operator.

The practice of having a single piece of infested furniture treated is not very satisfactory, as reinfection is likely to occur from insects present in other furniture or furnishings in the room or in cracks in the floor. It is better to have the entire room fumigated, thereby destroying all the insects. Furthermore, treatment of an entire room by fumigation is usually cheaper than having a single piece of infested furniture taken out and treated by a professional exterminator.

If a house is thoroughly infested with clothes moths, carpet beetles, or cigarette beetles, the most satisfactory procedure is to have the entire house fumigated by a trained, bonded exterminator who can guarantee a complete cleanup of all insects present.

Prevention of damage to HOUSEHOLD WOOLENS, WOOLEN CLOTHING, FURS, FELT, FEATHERS, AND HAIR PRODUCTS, by clothes moths and carpet beetles, is a year-round problem in most homes.

CONSTANT VIGILANCE and the use of simple, inexpensive, methods of protection, as directed herein, will take care of minor infestations of these annoying and destructive pests, and prevent major trouble.