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# 1984 Insect Pest Management Guide

## HOME, YARD, and GARDEN

MUCH HAS BEEN SAID ABOUT THE EFFECTS of pesticides, particularly insecticides, on the health and well-being of the American people. However, as you are also aware, you are constantly faced with a horde of insects, intent upon destroying your property or making your life uncomfortable. Destruction of crop residues, varietal selection, hand-picking, fertilization, tree pruning, irrigation, screening, and other practices may reduce the number of insects with which you must contend. Occasionally, you can avoid or at least reduce the destruction caused by some pests without using an insecticide. For most insects, though, you must rely on an insecticide to provide the satisfactory management you want.

By using insecticides and other pest-management tools carefully, you can enjoy reasonable freedom from insects without endangering yourself, your family, or your pets. You must recognize, however, that insecticides are designed to destroy one group of animals — insects — and can be harmful to other animals, including man himself, if used without regard for normal safety precautions. It is up to each insecticide user to handle, apply, and store insecticides safely in order to reap their benefits without suffering from their dangers.

This publication lists certain insecticides with which to control insect pests of food, fabrics, structures, man and animals, lawns, shrubs, trees, flowers, and vegetables. We have tried to suggest only the safest materials. Many people prefer to employ the services of a professional exterminator or custom applicator rather than to become involved in the selection and application of insecticides.

The names used in the tables are the common, coined chemical names, not the trade names, and as such may not be familiar to you. For instance, the common name for *Cygon* is *dimethoate*. If there is no coined chemical name, the trade name is used but is capitalized.

Requested label clearances for a few uses of some insecticides, carriers, and solvents are uncertain for 1984, since many requests have not yet been officially cleared.

Consequently, labels may be cancelled and the product removed from the market at any time. Anticipating this, we took a conservative attitude a few years ago and began modifying these suggested uses. We have attempted to anticipate any further label changes in 1984, but there still may be an occasional use cancelled. Check with your local county Extension adviser if you are not sure about the insecticide you plan to use. We will make announcements about label changes through the news media and newsletters in an attempt to keep you up to date.

Insecticides are being classified for *general use* or *restricted use* by the U.S. Environmental Protection Agency. Only a few insecticides have been classified for restricted use at this time. No insecticides listed in this circular have a restricted-use classification. A person wishing to use an insecticide classified for restricted use must be certified as a private or commercial pesticide applicator by the State of Illinois. Contact your county Extension adviser in agriculture for details about that program.

Suggestions for the use of insecticides, effective from a practical standpoint, are based on available data. Many factors affect efficiency of control. Please report details of control failures to us.

In using these tables, always read the footnotes before using the insecticides. The footnotes list precautions and other pertinent information.

The suggestions given in this circular are subject to change without notification during the year.

Leaflets describing the life history, habits, and damage of specific insects and nonchemical methods of control can be obtained from your county Extension adviser or by writing to Entomology Extension, 172 Natural Resources Building, 607 E. Peabody Drive, Champaign, Illinois 61820. These leaflets are indicated by an NHE number in the tables.

This circular was prepared by entomologists of the University of Illinois College of Agriculture and the Illinois Natural History Survey.

## VEGETABLE INSECTS

Insects	Crop	Insecticide	Suggestions
Aphids (NHE-47) Mites (NHE-58) Thrips	Most garden crops	malathion or diazinon	Apply on foliage to control the insects. Aphids and leafhoppers transmit plant diseases; early control is important. Mites web on the underside of leaves; apply insecticide to underside of leaves early before extensive webbing occurs.
Blister beetles (NHE-72) Cutworms (NHE-77) Flea beetles (NHE-36) Grasshoppers (NHE-74) Leafhoppers (NHE-22) Picnic beetles (NHE-40)	Most garden crops	carbaryl	For cutworms, attach collars of paper, aluminum foil, or metal at planting for small numbers of plants, or apply insecticide to base of plants at first sign of cutting. Control grasshoppers in garden borders when hoppers are small. For picnic beetles, pick and destroy overripe or damaged vegetables.
All cabbage worms (NHE-45)	Cabbage and related crops, salad crops, and leafy vegetables	<i>Bacillus thuringiensis</i> <sup>1</sup>	Presence of white butterflies signals start of infestation. Control worms when small. It is almost impossible to raise cole crops in Illinois without controlling these pests.
Hornworms (NHE-130) Fruitworms	Tomatoes	carbaryl <i>Bacillus thuringiensis</i> <sup>1</sup>	Handpicking usually provides satisfactory control.
Earworms (NHE-33)	Tomatoes and sweet corn	carbaryl	Apply to late-maturing tomatoes 3 to 4 times at 5- to 10-day intervals from small-fruit stage. Apply at fresh-silk stage to early and late corn every 2 days 4 to 5 times.
Colorado potato beetles	Eggplant, potatoes, tomatoes	carbaryl	Apply as needed. Insects usually present only in late May and June.
Potato leafhoppers (NHE-22)	Potatoes, beans	carbaryl or malathion	Apply 3 to 4 times at weekly intervals starting in late May or early June. Late potatoes and beans require additional treatments. Most serious pest of potatoes and beans in Illinois.
Bean leaf beetles (NHE-67)	Beans	carbaryl	Leaves are riddled in early plantings. Apply once or twice as needed.
Mexican bean beetles	Beans	carbaryl	Except for southern Illinois, only a pest of late beans. Apply insecticide to underside of leaves.
Cucumber beetles (NHE-46)	Vine crops	carbaryl	Apply as soon as beetles appear in spring. When blossoming begins, apply insecticide late in the day so as not to interfere with pollination by bees.
Squash vine borers (NHE-8)	Squash	carbaryl	Make weekly applications to crowns and runners when plants begin to vine. Apply late in day.
Corn borers	Sweet corn	carbaryl	Apply 4 times every 3 days to whorl and ear zone of early corn when feeding appears on whorl leaves.
Soil insects (including grubs, wireworms, root maggots)	All crops	diazinon	Mix 6 fluid ounces of 25% diazinon emulsion in enough water to cover 1,000 sq. ft., usually 2 to 3 gallons. Rake into soil.

### Days Between Application and Harvest

	Collards, kale, and other leafy crops	Beans	Lettuce	Cabbage and related crops	Sweet corn	Onions	Vine crops <sup>2</sup>	Tomatoes	Pumpkin	Eggplant	Peas	Potatoes
carbaryl	14	0	14	3	0	..	0	0	0	0	0	0
diazinon	..	7	..	7	2	..	7	3	..	..	0	..
malathion	7	1	14	7	5	3	1	1	3	3	3	0

### Amount of Insecticide for Volume of Spray for Vegetable Insects

	1 gal.	6 gal.	100 gal.	Commercial dust
carbaryl (Sevin) 50% W.P.	2 tbl.	¾ cup	2 lb.	5%
diazinon 25% E.C.	2 tsp.	4 tbl.	1 qt.	4%
malathion 50-57% E.C.	2 tsp.	4 tbl.	1 qt.	4%

E.C. = emulsion concentrate; W.P. = wettable powder. An emulsion concentrate is a chemical pesticide dissolved in a solvent to which an emulsifier has been added. It can then be mixed with water to the desired strength before being used.

<sup>1</sup> No time limitations. Sold as Dipel, Thuricide, Bactur, SOK-BT, and others. <sup>2</sup> Apply insecticides late in the day after blossoms have closed to avoid bee kill.

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 COP.5 FLOWER INSECTS

Insect	Insecticide <sup>1</sup>	Dosage	Suggestions
Ants, soil-nesting wasps, and sowbugs (NHE-17, 79, 93, 111) White grubs	diazinon 25% E.C.	1 cup per 1,000 sq. ft.	Drench into soil.
Aphids, mealybugs, spittlebugs, lacebugs, scales (NHE-7, 114)	malathion 50-57% E.C. acephate 15.6% E.C.	2 tsp. per gal. water 4 tsp. per gal. water	Spray foliage thoroughly. Repeat treatments may be needed.
Blister beetles (NHE-72)	carbaryl 50% W.P.	2 tbl. per gal. water	Spray foliage. Repeat treatments may be needed.
Cutworms (NHE-77)	diazinon 25% E.C. diazinon 2% granules	6 oz. per 2-3 gal. water 5 lb. per 1,000 sq. ft.	Spray 1,000 sq. ft. soil at base of plants. Do not spray on plant foliage. Small numbers of plants can be protected with collars of paper, aluminum foil, or metal.
Grasshoppers (NHE-74)	carbaryl 50% W.P. malathion 50-57% E.C.	2 tbl. per gal. water 2 tsp. per gal. water	Spray foliage and also adjacent grassy or weedy areas.
Iris borers	dimethoate (Cygon 2E)	4 tsp. per gal. water	Apply when irises are in bloom, but not on blooms and make only one application. Add a small amount of liquid detergent to spray mix to improve coverage on leaves.
Leaf-feeding beetles	carbaryl 50% W.P. acephate 15.6% E.C.	2 tbl. per gal. water 4 tbl. per gal. water	Spray foliage. Repeat treatments if needed.
Leaf-feeding caterpillars	Same as for leaf-feeding beetles		
Plant bugs and leafhoppers	Same as for leaf-feeding beetles		
Slugs (NHE-84)	metaldehyde bait Mesurool 2% bait		Apply as a bait to soil. Remove old leaves, stalks, poles, boards, and other debris where slugs like to hide and lay eggs.
Spider mites (NHE-58)	dicofol 18.5% E.C.	2 tsp. per gal. water	Pay particular attention to underside of leaves when spraying. Apply 2 or 3 times at weekly intervals.
Springtails (NHE-70)	malathion 50-57% E.C. malathion 4% dust	2 tsp. per gal. water	Spray foliage and soil. Apply to soil at base of plants.
Stalk borers (NHE-24)	Same as for leaf-feeding beetles		
Thrips	Same as for leaf-feeding beetles		
White flies (NHE-136)	pyrethrin 0.1% resmethrin	aerosol spray	Spray foliage thoroughly. Repeat in 5 days.

E.C. = emulsion concentrate; W.P. = wettable powder.

<sup>1</sup> Use only one insecticide from those listed. Do not use oil-base sprays on plants. Do not use malathion on African violets. Do not use carbaryl on Boston ivy. Do not use diazinon on ferns. Repeated use of carbaryl foliage sprays may cause mite or aphid infestations to increase and to become damaging. Do not use insecticides during full bloom. Do not use dimethoate on chrysanthemums.

#### FOR YOUR PROTECTION

1. Store insecticides out of reach of children, irresponsible persons, or animals; store preferably in a locked cabinet.

2. If you use a bait around or in the home, place it after the children have retired and pick it up in the morning before they get up. Furthermore, place it out of their reach. At present we do not encourage the use of baits for insect control.

3. Avoid breathing insecticide sprays and dusts over an extended period. This is particularly true in enclosed areas such as crawl spaces, closets, basements, and attics.

4. Wash with soap and water exposed parts of body and clothes contaminated with insecticide.

5. Wear rubber gloves when handling insecticide concentrates.

6. Do not smoke while handling or using insecticides.

7. Leave unused insecticides in their original containers with the labels on them and in locked cabinets.

8. Triple-rinse empty pesticide containers. Wrap each container in several layers of paper. Dispose of the containers one at a time through the municipal solid-waste-disposal system.

9. Do not leave puddles of spray on impervious surfaces.

10. Do not apply insecticides to fish ponds.

11. Do not apply insecticides near dug wells or cisterns.

12. Observe all precautions listed by the manufacturer on the label.

TREE AND SHRUB INSECTS

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Aphids (NHE-7)	acephate diazinon malathion	Spray foliage thoroughly with force. Repeat as needed.
Bagworms (NHE-6)	acephate carbaryl malathion <i>Bacillus thuringiensis</i> <sup>3</sup>	Spray foliage thoroughly. Apply June 15. Later sprays are less effective. For late spraying, use <i>Bacillus thuringiensis</i> .
Borers Bronze birch (NHE-143)	dimethoate	Spray trunk and limbs thoroughly in late May and early June. Repeat in 3 weeks. See leaf miner recommendations on insecticide label.
Ash (NHE-145) Lilac (NHE-145) Peach tree	chlorpyrifos	Spray trunk and limbs in mid-June and repeat 4 weeks later.
Cankerworms (NHE-95)	acephate carbaryl malathion <i>Bacillus thuringiensis</i> <sup>3</sup>	Spray foliage when feeding or worms are first noticed in spring.
Eastern tent caterpillars	Same as for cankerworms	Spray when nests are first noticed.
Elm leaf beetles (NHE-82)	acephate carbaryl	Spray as soon as damage is noticed.
European pine shoot moths and Nantucket pine moths (NHE-83)	dimethoate	Spray ends of branches thoroughly in late June for European species and in mid-May for Nantucket species.
Fall webworms	acephate carbaryl diazinon malathion <i>Bacillus thuringiensis</i> <sup>3</sup>	Spray when first webs appear; clip off and destroy infested branches or burn out webs.
Galls (NHE-80, 81) Elm cockscomb Hickory Maple bladder	diazinon malathion	Spray foliage thoroughly when buds are unfolding. Sprays after galls form on leaves are ineffective.
Hackberry blister	acephate diazinon malathion	Spray foliage thoroughly in late May. Kills psyllids in galls. Sprays after galls form on leaves are ineffective.
Cooley spruce Eastern spruce	diazinon malathion	Apply in late September or October or early spring just before buds swell.
Green-striped mapleworms	Same as for cankerworms	Spray as soon as damage is noticed.
Leaf miners Boxwood Hawthorn Oak	diazinon malathion acephate	Spray foliage thoroughly when miners first appear. Repeat treatment in 10 to 12 days. Use acephate only on oak.
Birch Holly	dimethoate	Repeat treatment in 3 weeks.
Mealybugs	acephate malathion	Spray foliage thoroughly and with force. Repeat in two weeks.
Mimosa webworms (NHE-109)	acephate carbaryl malathion <i>Bacillus thuringiensis</i> <sup>3</sup>	Spray foliage thoroughly when first nests appear (June, July). A repeat treatment may be needed.
Mites (NHE-58)	dicofol	Pay particular attention to underside of leaves. Apply 2 or 3 times at weekly intervals.
Oak kermes	malathion	Spray foliage thoroughly about July 1 to kill the crawlers.
Periodical cicadas (NHE-113)	carbaryl	Spray all branches thoroughly when adults appear. Repeat in 7 to 10 days.
Sawflies	carbaryl	Spray as soon as worms or damage is evident.
Scales (NHE-100, 114, 146)	diazinon malathion acephate	Spray foliage thoroughly in early April for <i>Fletcher</i> and <i>European elm scale</i> ; in late May for <i>pine needle</i> and <i>sweet gum scale</i> ; in early June for <i>scurfy</i> , <i>oystershell</i> , and <i>euonymous scales</i> ; in early July for <i>cottony maple</i> , <i>Juniper</i> , and <i>dogwood scales</i> ; in mid-July for <i>spruce bud scale</i> ; and again in August for <i>oystershell scale</i> .

<sup>1</sup> Use only one insecticide of those listed. <sup>2</sup> Treatment dates listed are for central Illinois. In southern Illinois, apply 2 weeks earlier; in northern Illinois, 2 weeks later. <sup>3</sup> Trade names: Dipel, Thuricide, Bactur, SOK-BT, and others.



**TREE AND SHRUB INSECTS (continued)**

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Scales (cont.) Cottony maple (NHE-144), Putnam, San Jose, Tulip tree	dormant oil diluted according to label	Apply when plants are still dormant in late winter. Do not use on evergreens. For tulip tree scale, a malathion spray in late September or in early spring is also effective.
Sycamore lace bugs Plant bugs	acephate carbaryl malathion	Spray when nymphs appear, usually in late May.
Thrips	Same as for aphids	Mainly on privet. Spray foliage thoroughly.
Yellow-necked caterpillars	acephate carbaryl malathion	Spray foliage when worms are small.
Zimmerman pine moths (NHE-83)	chlorpyrifos dimethoate	Spray in mid-April or mid-August.

<sup>1</sup> Use only one insecticide from those listed. <sup>2</sup> Treatment dates listed are for central Illinois. In southern Illinois, apply 2 weeks earlier; in northern Illinois, 2 weeks later.

**Amount of Insecticide Needed for Volume of Spray for Tree and Shrub Insects**

	1 gal.	6 gal.	100 gal.		1 gal.	6 gal.	100 gal.
acephate (Orthene) 15.6% E.C. <sup>1</sup>	4 tsp.	1 cup	2 qt.	dicofol (Kelthane) 18.5 % E.C.	2 tsp.	4 tbl.	1 qt.
carbaryl (Sevin) 50% W.P. <sup>2</sup>	2 tbl.	¾ cup	2 lb.	dimethoate (Cygon 2E) <sup>3</sup>	2 tsp.	4 tbl.	1 qt.
chlorpyrifos (Dursban 2E.)	2 tsp.	4 tbl.	1 qt.	malathion 50-57% E.C. <sup>5</sup>	2 tsp.	4 tbl.	1 qt.
diazinon 25% E.C. <sup>4</sup>	2 tsp.	4 tbl.	1 qt.				

E or E.C. = emulsion concentrate; W.P. = wettable powder.

<sup>1</sup> Do not use on flowering crab, sugar maple, redbud, American elm, Lombardy poplar, or cottonwood. <sup>2</sup> Do not use on Boston ivy. <sup>3</sup> Do not use on chrysanthemums. <sup>4</sup> Do not use on ferns or hibiscus. <sup>5</sup> Do not use on canaert red cedar.

**LAWN INSECTS**

Insects	Insecticide <sup>1</sup>	Dosage per 1,000 sq. ft. <sup>2</sup>	Suggestions
White grubs (NHE-104,147)	diazinon 25% E.C. 5% G. Oftanol 1.5% G.	1 cup 2½ lb. 3 lb.	Apply as spray or granules to small area and then water in thoroughly before treating another small area. Grub damage will usually occur in late August and in September.
Ants (NHE-111) Cicada killer and other soil-nesting wasps (NHE-79, 150)	diazinon 25% E.C. 5% G. chlorpyrifos 5 or 6% E.C.	¾ cup 2 lb. 1 cup	Apply as spray or granules and water in thoroughly. For individual nests pour 1% diazinon in nest and cover with soil.
Sod webworms (NHE-115)	carbaryl 50% W.P. diazinon 25% E.C. 5% G. chlorpyrifos 5 or 6% E.C. Aspon 13% E.C.	½ lb. ¾ cup 2 lb. 8 fl. oz. (1 cup) 1½ cups	As sprays, use at least 2.5 gal. of water per 1,000 sq. ft. Do not water for 72 hours after treatment. As granules, apply from fertilizer spreader. Webworms usually damage lawns in late July and in August.
Millipedes and sowbugs (NHE-93)	carbaryl 50% W.P. diazinon 25% E.C. chlorpyrifos 5 or 6% E.C.	½ lb. ¾ cup 1 cup	Spray around home where millipedes or sowbugs are crawling. If numerous, treat entire lawn.
Armyworms Cutworms	carbaryl 50% W.P. chlorpyrifos 5 or 6% E.C.	2 oz. 1 cup	Apply as sprays or granules. Use 5 to 10 gal. of water per 1,000 sq. ft.
Chinch bugs	chlorpyrifos 5 or 6% E.C. diazinon 25% E.C. 5% G. Aspon 13% E.C.	1 cup ¾ cup 2 lb. 2½ cups	Spray infested areas where chinch bugs are present.
Aphids (NHE-148)	acephate 15.6% E.C. malathion 50-57% E.C. pirimicarb 50% W.P.	4½ fl. oz. 1 tbl. ½ oz.	Spray grass thoroughly.
Chiggers	diazinon 25% E.C.	1 tbl.	Spray grass thoroughly.
Slugs (NHE-84)	Mesurool 2% bait		Apply where slugs are numerous. Scatter in grass. For use only in flower gardens and shrubbery beds.

E.C. = emulsion concentrate; W.P. = wettable powder; G. = granules.

<sup>1</sup> Use only one insecticide from those listed. <sup>2</sup> To determine lawn size in square feet, multiply length times width of lawn and subtract non-lawn areas including house, driveway, garden, etc. Do not allow people or pets on the lawn until the spray has dried.

## HOUSEHOLD INSECTS

Insects	Insecticide <sup>1</sup>	Dosage	Suggestions
Ants (NHE-111)	diazinon 25% E.C. chlorpyrifos	Dilute to 0.5% with water 0.5% R.T.U.	Use diazinon E.C. to spray completely around outside foundation and the adjacent 1 ft. of soil. Apply an R.T.U. spray to baseboards, cracks, and door thresholds.
Crickets (NHE-137)	diazinon propoxur	0.5% R.T.U. 0.5% R.T.U.	
Spiders (NHE-17, 116)			
Bed bugs	malathion 50-57% E.C. malathion 1% dust	Dilute to 1% with water R.T.U.	Thoroughly spray slats, springs, and bed frame. Apply a light dust to seams, tufts, and folds of mattresses. Use clean bedding.
Boxelder bugs (NHE-9)	diazinon 25% E.C. carbaryl 50% W.P.	Dilute to 0.5% with water Dilute to 0.25% with water	Spray boxelder bugs on tree trunks, foundation walls (diazinon only), under eaves, and other areas where they gather. <i>Indoors</i> : Remove with vacuum.
Carpenter ants (NHE-10)	diazinon 25% E.C. diazinon propoxur	Dilute to 0.5% with water 0.5% R.T.U. 0.5% R.T.U.	Spray nest entrances and runways. Use outside foundation spray as recommended for ants. Treat nests directly for best results. Do not use diazinon E.C. inside.
Carpet beetles, clothes moths (NHE-87)	chlorpyrifos diazinon	0.5% R.T.U. 0.5% R.T.U.	Spray storage areas, edges of carpeting, baseboards, etc. Prevent lint and dust from accumulating. Dry cleaning kills these pests. Store cleaned or washed woolens in insect-free chests and plastic bags.
Centipedes, millipedes, sowbugs (NHE-93)	diazinon 25% E.C. chlorpyrifos diazinon propoxur	Dilute to 0.5% with water 0.5% R.T.U. 0.5% R.T.U. 0.5% R.T.U.	Apply diazinon E.C. as an outside foundation spray. If millipedes are abundant, treat entire lawn according to label. Remove debris from around foundation. <i>Indoors</i> : Collect insects with vacuum or use R.T.U. spray according to label.
Chiggers (NHE-127)	diazinon 25% E.C.	Dilute to 0.5% with water	Treat lawns, roadsides, and areas not mowed. For personal protection, a repellent such as DEET will prevent attack. Take a warm, soapy shower or bath immediately after returning from an infested area.
Clover mites (NHE-2)	dicofol 18.5% E.C. pyrethrin	Dilute to 0.03% with water 0.1% R.T.U.	Spray outside of house from ground up to windows and adjacent 10 ft. of lawn. Repeat spray in 7-10 days if necessary. Eliminate grass and weeds from 18-inch strip next to foundation. <i>Indoors</i> : Remove with vacuum, or spray with pyrethrin.
Cluster flies (NHE-1)	dichlorvos 20% resin strip <sup>2</sup> pyrethrin	1 strip per 1,000 cu. ft. 0.1% R.T.U.	Place resin strips in attic or other rooms. Fog lightly in rooms with pyrethrin. Repeat spray as needed. Seal cracks around windows, eaves, and siding to prevent entry.
Cockroaches: German (NHE-3) Brown-banded (NHE-4) American, Oriental (NHE-5)	chlorpyrifos diazinon propoxur	0.5% R.T.U. 0.5% R.T.U. 0.5% R.T.U.	Spray roach runways and hiding places. Treat under sink, refrigerator, cabinets, on baseboards, etc. Treatment throughout home may be needed to control brown-banded roaches. May be supplemented with boric acid applied into out-of-sight and out-of-reach voids under cabinets and appliances.
Drain flies (NHE-91)	dichlorvos 20% resin strip <sup>2</sup> pyrethrin	1 strip per 1,000 cu. ft. 0.1% R.T.U.	Use chemicals only after solving sanitation problems. Clean out overflow drains, drain traps, and cellar drains. Pour boiling water or rubbing alcohol into overflow drain to eliminate maggots.
Earwigs (NHE-142)	diazinon 25% E.C. propoxur	Dilute to 0.5% with water 0.5% R.T.U.	Spray completely with diazinon E.C. around the outside foundation wall and the adjacent strip of soil. <i>Indoors</i> : Apply R.T.U. spray to baseboards, cracks, and door thresholds.
Elm leaf beetles (NHE-82)	carbaryl 50% W.P. pyrethrin	Dilute to 0.25% with water 0.1% R.T.U.	<i>Outdoors</i> : Spray with carbaryl on nearby Chinese elm trees to control elm leaf beetle larvae and adults. Seal cracks around windows to prevent entry. <i>Indoors</i> : Remove with vacuum, or spray with pyrethrin.
Fleas (NHE-107)	dichlorvos or naled	flea collars	Replace flea collars on pets about every 3 months. Some pets are allergic.
	carbaryl malathion tetrachlorvinphos	5% dust 4% dust 3% dust	Dust pets directly as needed. Dust areas inside and outside the home where pets rest. Vacuum pets and inside areas after 30 minutes.

E.C. = emulsion concentrate; W.P. = wettable powder; R.T.U. = ready to use; G. = granules. (SEE THE PESTICIDE DILUTION TABLE ON PAGE 8)

<sup>1</sup> Use only one insecticide from those listed. <sup>2</sup> To determine lawn size in square feet, multiply length times width of lawn and subtract non-lawn areas including house, driveway, garden, etc. Do not allow people or pets on the lawn until the spray has dried.

**HOUSEHOLD INSECTS (continued)**

Insects	Insecticide <sup>1</sup>	Dosage	Suggestions
Fleas (NHE-107) (cont.)	pyrethrin	0.1% R.T.U.	For infestations in the home spray baseboards, rugs, and floors where fleas are observed according to label directions. Vacuum rugs and upholstered furniture thoroughly.
	diazinon 25% E.C. diazinon 5% G.	¾ cup per 1,000 sq. ft. 2 lb.	Apply to lawn.
Houseflies (NHE-16) Gnats Midges Mosquitoes (NHE-94, 132) Punkies	<i>Outdoors:</i> malathion 50-57% E.C.	Dilute to 1% with water	Spray tall grass and around doorways, refuse containers, and other resting sites. Dispose of refuse twice each week. Eliminate standing water in eave troughs, tires, toys, tin cans, children's swimming pools, etc. Use a repellent like DEET when entering mosquito-infested areas.
	<i>Indoors:</i> pyrethrin dichlorvos 20% resin strips <sup>2</sup>	0.1% R.T.U. 1 strip per 1,000 cu. ft.	Apply fine mist or fog of pyrethrin. Use screening and keep repaired. Dichlorvos resin strips give good control in tight, enclosed areas for about 3 months. Fly swatters are also effective.
Lice, human (NHE-105)	malathion 1% dust carbaryl 5% dust	1 oz. per adult person	Dust lightly over body hair, and wash clothing and bedding. Repeat in 2 weeks if needed. Do not get in eyes.
Mites, human Human scabies (NHE-135)	Kwell 1% lotion available only by a doctor's prescription		See your physician.
Pantry and cereal insects (NHE-11) Saw-toothed grain beetles, cigarette beetles, etc.	diazinon	0.5% R.T.U.	Discard infested packages. Scrub or vacuum food cabinets and shelves. Force spray into cracks and crevices; allow to dry; cover shelves with clean, fresh paper. Do not contaminate food or utensils with insecticide.
	propoxur	0.5% R.T.U.	
	pyrethrin	0.1% R.T.U.	
Powder-post beetles (NHE-85)	chlorpyrifos 42%	Dilute to 1% with water	Paint or spray infested unfinished wood. Follow label directions. Painting or varnishing wood to seal pores will prevent egg laying and reinfestation.
Silverfish (NHE-86)	diazinon propoxur	0.5% R.T.U. 0.5% R.T.U.	Spray runways, baseboards, closets, and places where pipes go through the walls. Repeat treatments in 2 weeks if needed. Keep books and papers in dry places.
Springtails (NHE-70)	diazinon 25% E.C.	Dilute to 0.5% with water	<i>Outdoors:</i> Spray soil next to the house, especially grassy moist areas. Eliminate low moist spots around the house. <i>Indoors:</i> Use vacuum. Allow soil to dry in potted plants or planter boxes.
Swimming pool insects (NHE-103)	<i>Do not add insecticides to pool water</i>		Remove insects from the pool with dip nets. Clean the pool regularly.
Termites (NHE-57)	chlordane 45 or 72% E.C. chlorpyrifos 42% E.C. (Dursban T.C.)	Dilute to 1% with water or oil	For soil injection along the building foundation and under footings, use 1 gal. per 2 cu. ft. of soil. Remove termite mud tubes connecting wood to the soil. Eliminate wood-to-soil contacts. Ventilate to keep unexcavated areas dry. Use only chlorpyrifos on slab-on-ground structures with ducts in floor.
Ticks (NHE-56): Brown dog tick, wood tick	tetrachlorvinphos 50% W.P.	Dilute to 0.5% with water	Apply spray to lawns, fence rows, roadsides, and areas not regularly mowed.
	malathion 50-57% E.C. carbaryl 50% W.P.	Dilute to 2.5% with water 4 tbl. per 100 sq. ft.	
	carbaryl	5% dust	Dust pets directly as needed, according to label instructions. Dust baseboards, cracks, and crevices around pet bedding.
	malathion tetrachlorvinphos	4% dust 3% dust	
Wasps (NHE-141) Hornets Bees	carbaryl	5% dust	Hang dichlorvos resin strips in attic to prevent infestations. For nests below ground, apply diazinon according to label and seal opening with soil. Spray above-ground wasp and hornet nests with pyrethrin or dichlorvos. Treat bee nests in partitions with carbaryl. Drill holes through siding to inject insecticide, if necessary. Remove nests and honey and destroy them. Treat nests at dusk or dawn.
	diazinon	5% G.	
	dichlorvos dichlorvos 20% resin strip <sup>2</sup>	0.5% R.T.U. 1 strip per 1,000 cu. ft.	
	pyrethrin	0.1% R.T.U.	

E.C. = emulsion concentrate; W.P. = wettable powder; R.T.U. = ready to use; G. = granules. (SEE THE PESTICIDE DILUTION TABLE ON PAGE 8)

<sup>1</sup> Whenever possible purchase specially prepared ready-to-use forms of insecticides for indoor use. *Use only one insecticide from those listed.* When preparing a quantity of 1 gallon or more of a spray of a desired percentage, use the dilution table on page 8. You need to know only the formulation of the insecticide when using the dilution table. <sup>2</sup> Do not use in pet shops or if tropical fish are present. Do not use in kitchens, restaurants, or areas where food is present. Do not use in nurseries or rooms where infants, individuals who are ill, or aged persons are confined. Do not use in hospitals or medical clinics.

### Pesticide Dilution Table for Household Insects

**HOW TO USE:** When preparing a spray of a desired percentage you need to know only the formulation of the particular product (examples: Kelthane 18.5% wettable powder; Kelthane 18.5% emulsion concentrate). For instance, if you were preparing a 0.5% diazinon solution for spraying the foundation of the home, you would mix 5 tablespoons of diazinon 25% E.C. into each gallon of water. The formulations of insecticides in the table may be purchased from hardware stores, pest control establishments, lawn and garden centers, and other sources. For some jobs, such as spraying outdoors to control flies or mosquitoes, a gallon or more of properly diluted spray is required. To obtain the percent concentration suggested for controlling a particular insect, add the amount of pesticide suggested in the table to one

gallon of water. For control of household insects. *Do not* use this table for vegetable, flower, tree, shrub, or lawn insects.

Pesticide formulation	Amt. of insecticide needed per gal. of spray				
	Desired concentration				
	0.03%	0.25%	0.5%	1.0%	2.5%
carbaryl (Sevin) 50% W.P.	..	2 tbsp.	4 tbsp.	8 tbsp.	..
chlordane 45% E.C.	..	..	8 tsp.	5 tbsp.	..
chlordane 72% E.C.	..	..	4 tsp.	8 tsp.	..
diazinon (Spectracide) 25% E.C.	..	..	5 tbsp.	10 tbsp.	..
dicofol (Kelthane) 18.5% E.C.	1½ tsp.	..	..	..	..
malathion 50-57% E.C.	..	..	7 tsp.	4½ tbsp.	10 tbsp.
tetrachlorvinphos 50% W.P.	..	..	4 tbsp.	..	..

(tbsp. = tablespoon; tsp. = teaspoon)

### CONVERSION TABLE FOR SMALL QUANTITIES

1 level tablespoon = 3 level teaspoons	1 pint = 2 cups
1 fluid ounce = 2 tablespoons	1 quart = 2 pints or 32 fluid ounces
1 cup = 8 fluid ounces or 16 tablespoons	1 gallon = 4 quarts or 128 fluid ounces

### NAMES OF INSECTICIDES

Below is a list of the common names of insecticides used in the preceding tables, followed by the commercial trade name and the chemical name. Some products may be available under a variety of trade names not listed below. Be sure to read the label. The label on the container always lists these products by the common name or chemical name.

Common name	Trade name	Chemical name
acephate	Orthene	O, S-dimethyl acetylphosphoramidothioate
<i>Bacillus thuringiensis</i>	Dipel, Thuricide, Bactur, SOK-BT	
carbaryl	Sevin	1-naphthyl methylcarbamate
chlorpyrifos	Dursban	O, O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate
DEET	Off, Kik	N, N-diethyl-m-toluamide
diazinon	Spectracide	O, O-diethyl O-(2-isopropyl-4-methyl-6-pyrimidyl) phosphorothioate
dichlorvos	Vapona, DDVP	2,2-dichlorovinyl dimethyl phosphate
dicofol	Kelthane	4,4'-dichloro-a-(tri = chloromethyl) benzhydrol
dimethoate	Cygon	O, O-dimethyl S-(N-methyl carbamoyl methyl) phosphorodithioate
ethyl hexanediol	6-12, Rutgers 612	2-ethyl-1, 3-hexanediol
isofenphos	Oftanol	1-methylethyl 2-[[ethoxy [(1-methylethyl) amino] phosphin-othioyl] oxy] benzoate
malathion	Cythion	diethyl mercaptosuccinate, S-ester with O, O-dimethyl phosphorothioate
pirimicarb	Pirimor	2-(dimethylamino)-5,6-dimethyl-4-pyrimidinyl dimethyl carbamate
propoxur	Baygon	O-isopropoxyphenyl methyl carbamate
propyl thiopyrophosphate	Aspon	0,0,0-tetrapropyl dithiopyrophosphate
pyrethrin		principally from plant species <i>Chrysanthemum cinariaefolium</i>
resmethrin	Chryson, SBP-1382	(5-benzyl-3-furyl) methyl 2,2 dimethyl-3-(2-methylprophenyl) cyclopropanecarboxylate
tetrachlorvinphos	Rabon	2-chloro-1-(2,4,5-trichlorophenyl) vinyl dimethyl phosphate







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