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# 1978 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, you are also aware that 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 numbers of insects with which you must contend. Occasionally you can even avoid or at least reduce the destruction by some pests without using an insecticide, but for most insects you must rely on an insecticide to provide the satisfactory management that you want.

By careful use of insecticides and other pest management tools, you can enjoy reasonable freedom from insects without endangering either 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 with disregard of normal safety precautions. It is up to each insecticide user to handle, apply, and store insecticides safely to reap their benefits without suffering from their dangers.

This publication lists certain insecticides 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 with selection and application of an insecticide.

The names used in these 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 1978,

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 1978, but there still may be an occasional use cancelled. Be sure to check with your local county extension adviser if you are not sure about the insecticide you plan to use. We will make announcements of label changes through the news media 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. There are no insecticides listed in this circular that 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 on this program.

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

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

These suggestions 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 offices of county extension advisers or by writing to Entomology Extension, 169 Natural Resources Building, Urbana, Illinois 61801. These 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)	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 beetle	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	Squash	carbaryl	Make weekly applications to crowns and runners when plants begin to vine. Apply late in day.
Corn borer	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 to Wait 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

	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. <sup>2</sup> Only apply insecticide late in the day after blossoms have closed to avoid bee kill.

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### 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.	2 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.	6 oz. per 2-3 gal. water	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.
	diazinon 2% granules	5 lb. per 1,000 sq. ft.	
Grasshoppers (NHE-74)	carbaryl 50% W.P.	2 tbl. per gal. water	Spray foliage and also adjacent grassy or weedy areas.
	malathion 50-57% E.C.	2 tsp. per gal. water	
Iris borer	dimethoate (Cygon, DeFend) 23.4% E.C. or 25% W.P.	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.	2 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 Mesuroil 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		Spray foliage thoroughly and frequently.
Thrips	Same as for leaf-feeding beetles		Spray foliage carefully.
White flies (NHE-136)	pyrethrin 0.1%	aerosol spray	Spray foliage thoroughly. Repeat in 5 days.

<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 become damaging. Do not use insecticides during full bloom. Do not use dimethoate on chrysanthemums.

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

#### 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 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 and wrap in several layers of paper and dispose of 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 on the label.

**TREE AND SHRUB INSECTS**

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Aphids (NHE-7)	diazinon malathion	Spray foliage thoroughly with force. Repeat as needed.
Bagworms (NHE-6)	carbaryl malathion <i>Bacillus thuringiensis</i>	Spray foliage thoroughly. Apply June 15. Later sprays are less effective. For late spraying, use <i>Bacillus thuringiensis</i> .
Borers (NHE-8)	dimethoate	Spray trunk and limbs thoroughly in late May and early June. Repeat in 3 weeks. See leaf miner recommendations on insecticide label.
Bronze birch		
Ash	chlorpyrifos	Spray trunk and limbs in mid-June and repeat 4 weeks later.
Lilac		
Peach tree		
Cankerworms (NHE-95)	carbaryl malathion <i>Bacillus thuringiensis</i>	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 beetle (NHE-82)	carbaryl	Spray as soon as damage is noticed.
European pine shoot moths and Nantucket pine moth (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>	Spray when first webs appear; clip off and destroy infested branches or burn out webs.
Galls (NHE-80, 81)		
Elm cockscomb	diazinon	Spray foliage thoroughly when buds are unfolding. Sprays after galls form on leaves are ineffective.
Hickory	malathion	
Maple bladder		
Hackberry blister	diazinon malathion	Spray foliage thoroughly in late May. Kills psyllids in galls. Sprays after galls form on leaves are ineffective.
Cooley spruce	diazinon	Apply in late September or October or early spring just before buds swell.
Eastern spruce	malathion	
Green-striped mapleworms	Same as for cankerworms	Spray as soon as damage is noticed.
Leaf miners		
Boxwood	diazinon	Spray foliage thoroughly when miners first appear. Repeat treatment in 10 to 12 days.
Hawthorn	malathion	
Oak		
Birch	dimethoate	Repeat treatment in 3 weeks.
Holly		
Mealybugs	malathion	Spray foliage thoroughly and with force. Repeat in two weeks.
Mimosa webworms (NHE-109)	acephate carbaryl malathion <i>Bacillus thuringiensis</i>	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	Same as for fall webworms	Spray as soon as worms or damage is evident.
Scale (NHE-100, 114)	diazinon malathion	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 scale</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 early August for <i>oystershell scale</i> .
Cottony maple		
Putnam	dormant oil diluted	Apply when plants are still dormant in late winter. Do not use on evergreens.
San Jose	according to label	For tulip tree scale, a malathion spray in late September or in early spring is also effective.
Tulip tree		

<sup>1</sup> Use only one insecticide from those listed.

<sup>2</sup> Treatment dates are listed for central Illinois. In southern Illinois apply 2 weeks earlier and in northern Illinois 2 weeks later.



### TREE AND SHRUB INSECTS (continued)

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Sycamore lace 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	dimethoate	Spray in mid-August and again two weeks later.

<sup>1</sup> Use only one insecticide from those listed.

<sup>2</sup> Treatment dates are listed for central Illinois. In southern Illinois apply 2 weeks earlier and in northern Illinois 2 weeks later.

### Amount of Insecticide Needed for Volume of Spray

	1 gal.	6 gal.	100 gal.		1 gal.	6 gal.	100 gal.
carbaryl (Sevin) 50% W.P. <sup>1</sup>	2 tbl.	¾ cup	2 lb.	dicofol (Kelthane) 18.5% E.C.	2 tsp.	4 tbl.	1 qt.
chlorpyrifos (Dursban) 2E.	2 tsp.	4 tbl.	1 qt.	dimethoate (Cygon, DeFend)	2 tsp.	4 tbl.	1 qt.
diazinon 25% E.C. <sup>2</sup>	2 tsp.	4 tbl.	1 qt.	23.4% E.C., 25% W.P. <sup>3</sup>			
malathion 50-57% E.C. <sup>4</sup>	2 tsp.	4 tbl.	1 qt.	acephate (Orthene) 15.6% E.C. <sup>5</sup>	4 tsp.	1 cup	2 qt.

<sup>1</sup> Do not use on Boston ivy. <sup>2</sup> Do not use on ferns or hibiscus. <sup>3</sup> Do not use on chrysanthemums. <sup>4</sup> Do not use on canaert red cedar.

<sup>5</sup> Do not use on flowering crab, sugar maple, or redbud.

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

### LAWN INSECTS

Insects	Insecticide <sup>1</sup>	Dosage per 1,000 sq. ft. <sup>2</sup>	Suggestions
White grubs	diazinon 25% E.C.	1 cup	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)	5% G.	2½ lb.	
Ants (NHE-111)	diazinon 25% E.C.	¾ cup	Apply as spray or granules and water in thoroughly. For individual nests pour 1% diazinon in nest. Seal in with dirt.
Cicada killer and other soiling-nesting wasps (NHE-57, 79)	5% G.	2 lb.	
Sod webworms (NHE-115)	carbaryl 50% W.P.	½ lb.	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.
	5% G.	4 lb.	
	diazinon 25% E.C.	¾ cup	
	5% G.	2 lb.	
	chlorpyrifos 2 E.C.	1½ fl. oz.	
Millipedes and sowbugs (NHE-93)	0.5% G.	5 lb.	Spray around home where millipedes or sowbugs are crawling. If numerous, treat entire lawn.
	Aspon 13% E.C.	1½ cups	
	carbaryl 50% W.P.	½ lb.	
Armyworms	diazinon 25% E.C.	¾ cup	Apply as sprays or granules. Use 5 to 10 gal. of water per 1,000 sq. ft.
Cutworms	5% G.	1 lb.	
Chinch bugs	chlorpyrifos 2 E.C.	1½ fl. oz.	Spray infested areas where chinch bugs are present.
	0.5% G.	5 lb.	
Aphids	Aspon 13% E.C.	2⅔ cups	Spray grass thoroughly.
	malathion 50-57% E.C.	1 tbl.	
Chiggers	diazinon	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.

<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 nonlawn areas including house, driveway, garden, etc. Do not allow people or pets on lawn until the spray has dried.

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

## ANIMAL AND NUISANCE INSECTS

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Ants (NHE-111) Crickets Spiders (NHE-116, 17) Centipedes (NHE-93)	diazinon 0.5% spray diazinon 0.5% R.T.U. propoxur 0.5% R.T.U. chlorpyrifos 0.5% R.T.U.	<i>Outdoors:</i> Use a water-base spray of diazinon. Spray on outside of foundation of house	To prevent insect migrations into house, spray completely around outside foundation wall and adjacent strip of soil. <i>Indoors:</i> Use R.T.U. oil-base sprays according to pesticide label. Apply to baseboards, cracks, and door thresholds.
Bed bugs	malathion 1% spray malathion 1% dust	Spray slats, springs, and bed frame thoroughly.	Apply a light dust to seams, tufts, and folds of mattresses. Use clean bedding.
Boxelder bugs (NHE-9)	diazinon 0.5% spray carbaryl 0.25% spray	<i>Outdoors:</i> Spray trunks of infested boxelder trees during late summer when bugs are present.	<i>Outdoors:</i> Spray the clusters of boxelder bugs on trunks of trees, foundation walls (diazinon only), under eaves, and other areas where they gather. Removal of seed-bearing boxelder trees is also helpful. <i>Indoors:</i> Remove with vacuum or broom.
Chiggers (NHE-127)	diazinon 1 oz. per 3 gal. of water per 125 sq. ft.	<i>Outdoors:</i> 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.
Wood ticks (NHE-56)	stirifos 4 oz. per 3 gal. of water malathion 2.5%	<i>Outdoors:</i> Treat lawns, fence rows, roadsides, and areas not regularly mowed. Do not spray animals.	For personal protection a repellent such as DEET will help prevent attack.
Clover mites (NHE-2)	dicofol 0.03% spray	Purchase E.C. and dilute with water. Spray outside of house from ground up to windows and adjacent 10 ft. of lawn.	Repeat spray in 7-10 days if necessary. Remove grass and weeds from 18-inch strip next to foundation. <i>Indoors:</i> Remove with vacuum, or spray with 0.1% R.T.U. pyrethrin in house.
Cluster flies (NHE-1)	dichlorvos 20% resin strip <sup>2</sup> pyrethrin 0.1% R.T.U.	1 strip per 1,000 cu. ft. in attic or room. Fog lightly in room.	Repeat spray with pyrethrin as needed. Seal cracks around windows, eaves, and siding to prevent entry.
Drain flies (NHE-91)	pyrethrin 0.1% R.T.U., or 20% dichlorvos resin strips <sup>2</sup>	Use fine mist or fog of pyrethrin or 1 resin strip per 1,000 cu. ft.	<i>Indoors:</i> 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.
Elm leaf beetles (NHE-82)	pyrethrin 0.1% R.T.U. carbaryl 0.25% spray	<i>Indoors:</i> Use vacuum.	<i>Outdoors:</i> Spray with carbaryl on nearby Chinese elm trees for control of elm leaf beetle larvae and adults. Seal cracks around windows to prevent entry.
Fleas (NHE-107) Brown dog tick (NHE-56)	carbaryl 5% dust malathion 4% dust	Dust areas inside and outside the home where the pet rests. Dust pets directly as needed.	<i>Indoors:</i> For heavy infestations of ticks or fleas mist with 0.1% R.T.U. pyrethrin in infested rooms at frequent intervals. Vacuum rugs and upholstered furniture thoroughly. (Do not use carbaryl on kittens less than 4 weeks old.)
House flies (NHE-16) Gnats Midges Mosquitoes (NHE-94, 132) Punkies	<i>Outdoors:</i> malathion 1% spray      <i>Indoors:</i> pyrethrin 0.1% R.T.U. space spray; or dichlorvos 20% resin strips <sup>2</sup>	Purchase E.C. and dilute with water. Spray tall grass and around doorways, refuse containers, and other resting sites.      Use fine mist or fog of pyrethrin or use one 20% dichlorvos resin strip per 1,000 cu. ft.	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.      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	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.
Millipedes, sowbugs (NHE-93)	diazinon 0.5% spray	Spray outside foundation and at least 3 ft. of adjacent soil.	If abundant, treat entire lawn according to pesticide label. Remove debris from ground along foundation. <i>Indoors:</i> Collect with vacuum.

<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, ill, or aged persons are confined. Do not use in hospitals or medical clinics.

E.C. = emulsion concentrate; W.P. = wettable powder; R.T.U. = ready to use; O. = oil solution (usually in pressurized spray can).

(SEE PESTICIDE DILUTION TABLE ON PAGE 8)

### ANIMAL AND NUISANCE INSECTS (continued)

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Springtails (NHE-70)	diazinon 0.5% spray	<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.
Wasps (NHE-79) Hornets (NHE-17) Bees	carbaryl 5% dust; diazinon 5% G, dichlorvos 0.5% R.T.U. dichlorvos 20% resin strip <sup>2</sup>	Hanging dichlorvos resin strips in attic will help prevent infestations. For quick kill use dichlorvos 0.5%.	For nests below ground, apply diazinon according to label and seal opening with soil. Spray above-ground wasp and hornet nests with dichlorvos. For bees, treat nests in partitions with carbaryl. Drill holes through siding to inject insecticide, if necessary. Nests and honey should be removed and destroyed. Treat nests after dark.
Earwigs	diazinon 0.5% spray propoxur 0.5% R.T.U.	<i>Outdoors:</i> Use a water-base spray of diazinon. Spray on outside foundation of the house. Treat entire lawn according to pesticide label if pests are abundant.	To prevent migration into house, spray completely around outside foundation wall and adjacent strip of soil. <i>Indoors:</i> Use propoxur oil-base spray in R.T.U. cans. Apply to baseboards, cracks, and door thresholds.

### FOOD, FABRIC, AND STRUCTURAL INSECTS

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Carpenter ants (NHE-10)	diazinon 0.5% R.T.U. propoxur 0.5% R.T.U. chlordane 2% O. or 5% dust <sup>3</sup>	Spray or dust nest entrances and runways.	Use foundation spray as recommended for ants. Treat nests directly for best results.
Carpet beetles (NHE-87) Clothes moths (NHE-87)	diazinon 0.5% R.T.U.	Spray storage areas and infested places like the back and edge of carpeting, baseboards, beneath drawers, etc.	Prevent lint and dust from accumulating. Clean hot air registers and cold air shafts. Dry cleaning kills these pests. Store cleaned or washed woolens in insect-free chests and plastic bags.
Larder beetles	None		Remove source such as dead animal carcasses.
Cockroaches: German (NHE-3) Brown-banded (NHE-4) American (NHE-5) Oriental (NHE-5)	diazinon 0.5% R.T.U. propoxur 0.5% R.T.U. chlorpyrifos 0.5% R.T.U.	Spray runways and hiding places. Repeat treatments may be needed in 2 or 3 weeks.	Treat under sink, refrigerator, cabinets, on baseboards, etc. Complete treatment throughout home may be needed for successful control of brown-banded roach.
Pantry and cereal insects Saw-toothed grain beetles (NHE-11) Cigarette beetles	propoxur 0.5% R.T.U. pyrethrin 0.1% R.T.U. <sup>4</sup>	Spray inside of food cabinets very lightly and only after shelves are empty and cleaned.	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.
Powder-post beetles (NHE-85)	chlordane 2% O. <sup>3</sup> Pentachlorophenol 5% O.	Paint, spray, or dip to saturate infested unfinished wood.	Pentachlorophenol is a wood preservative also, but it has a strong persistent odor. Follow label directions.
Silverfish (NHE-86)	diazinon 0.5% R.T.U. propoxur 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.
Termites (NHE-57)	chlordane 1% Purchase E.C. and dilute 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 soil. Eliminate wood-to-soil contacts. Ventilate to keep unexcavated areas dry.

<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, ill, or aged persons are confined. Do not use in hospitals or medical clinics.

<sup>3</sup> While supplies last.

<sup>4</sup> Lasts for a few hours to a day or two.

E.C. = emulsion concentrate; W.P. = wettable powder; R.T.U. = ready to use; O. = oil solution (usually in pressurized spray can); G. = granules.

(SEE PESTICIDE DILUTION TABLE ON PAGE 8)

## PESTICIDE DILUTION TABLE

**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 animal, nuisance, food, fabric, and structural insects. *Do not* use this table for vegetable, flower, tree, shrub, or lawn insects.)

Pesticide formulation	Amt. insecticide needed per gal. 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% W.P.	2 tsp.	..	..	..	..
dicofol (Kelthane) 18.5% E.C.	1½ tsp.	..	..	..	..
Dursban 2E.	..	..	..	3 tbsp.	..
malathion 50-57% E.C.	..	..	7 tsp.	4½ tbsp.	10 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
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	DeFend, Cygon	O, O-dimethyl S-(N-Methyl carbamoyl methyl) phosphorodithioate
ethyl hexanediol	6-12, Rutgers 612	2-ethyl-1, 3-hexanediol
malathion	Cythion	diethyl mercaptosuccinate, S-ester with O, O-dimethyl phosphorothioate
propoxur	Baygon	O-isopropoxyphenyl methyl carbamate
pyrethrin		principally from plant species <i>Chrysanthemum cinariaefolium</i>
stirifos	Rabon	2-chloro-1-(2,4,5-trichlorophenyl) vinyl dimethyl phosphate

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