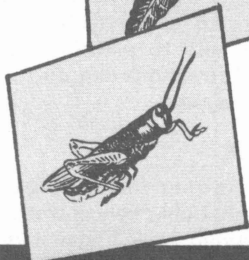
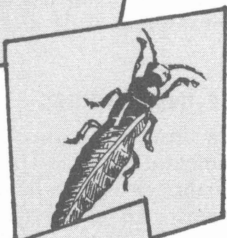
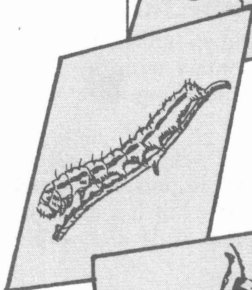
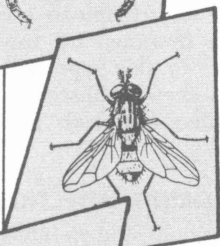
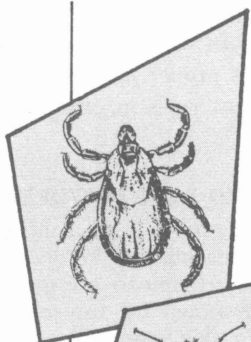


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TEXAS GUIDE for CONTROLLING INSECTS



on
Ornamental
Plants



THE AGRICULTURAL AND MECHANICAL
COLLEGE OF TEXAS
TEXAS AGRICULTURAL EXTENSION SERVICE
J. E. HUTCHISON, DIRECTOR, COLLEGE STATION, TEXAS

TEXAS GUIDE FOR CONTROLLING INSECTS ON ORNAMENTAL PLANTS

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ORNAMENTAL PLANTS frequently are attacked by various species of insects and in many instances the use of insecticides is the only means of control. In other cases, cultural practices, such as proper pruning, fertilizing and watering, play important roles in preventing or suppressing insect infestation.

COMBINATION SPRAY AND DUST MIXTURES

Combination spray or dust mixtures are sold under various trade names. All brands contain a mixture of two or more insecticides. These chemicals are packaged in small containers and are designed for use on plants around the home. Mixtures of this type will control a wide variety of sucking and chewing insects. Directions for mixing and applying these materials are stated on the label of the container.

HANDLING AND STORING INSECTICIDES

All insecticides are poisonous and should be handled with care. If insecticides come in contact with the skin, remove the residue immediately by washing with soap and water.

Insecticides should be stored in a safe place out of reach of small children and irresponsible persons. Keep the materials in their original, properly labeled containers, away from human food or animal stuff and where there is no fire hazard.

PHYTOTOXICITY OF INSECTICIDES

In some instances, certain insecticide formulations may injure certain tender ornamental plants. The manufacturer generally includes precautions on the label when possible phytotoxicity may occur. To avoid damaging valuable plants, apply the material only to plants specified on the label. *Mix according to directions and do not apply more than the recommended dosage.*

FORMULATIONS

Most insecticides are available in four forms: dusts, wettable powders, granules and emulsifiable concentrates. DUSTS are made by mixing the ground insecticides with a "filler or carrier," such as talc, clay, gypsum, Fuller's

*The authors gratefully acknowledge the assistance of C. F. Garner, former Extension entomologist, in the preparation of this manuscript.

earth and others. Dusts are applied directly to plants and cannot be used as a spray.

WETTABLE POWDER SPRAYS are made by mixing insecticidal materials, manufactured in the form of powder, with water.

GRANULAR MATERIALS are made by incorporating the insecticide into small particles of an inert granular material. This formulation is used in soil or surface treatments only, generally for the control of soil inhabiting insects.

EMULSIFIABLE CONCENTRATE SPRAYS are made by mixing insecticidal materials, manufactured into a liquid emulsifiable concentrate, with water. Emulsifiers serve to keep ingredients well mixed within a spray and help to spread and stick the insecticides to foliage, fruits and stems of plants.

GALL-FORMING INSECTS

Many species of insects and mites are responsible for the formation of abnormal growths or galls on ornamentals and shade trees. The attack of each species results in a distinctive deformity which develops on the leaves, twigs or stems of the plant. In many instances, depending on the type of gall formed, immature stages of the pest can be found within the developing gall. Some of the more important gall-forming pests are mites, plant lice (aphids and phylloxera), midges (tiny flies), Cynipids (tiny wasps) and Psyllids (jumping plant-lice).

Very little is known of the life history and control of gall insects; therefore, it is difficult to outline a completely satisfactory control program. During the growing season, usually before the leaves are fully developed, eggs are laid in the tissues of the leaf, stem or twig. The egg laying and hatching stimulates the plant to form an abnormal growth at the point of attack, inside which the immature pests develop. Control of the gall or the pest cannot be accomplished after the galls have begun to form since the immature pest is inside the gall, away from insecticidal contact.

Most ornamental plants and shade trees can tolerate a great number of galls with no apparent injury. However, under certain conditions, gall insects can build up in sufficient numbers to damage the plants. Unhealthy trees are damaged more by galls than trees which are in a vigorous state of growth. Shade trees should be fertilized and watered as needed to keep them in a healthy condition. These practices also will minimize damage from wood-boring insects.

Preventive spray treatments early in the growing season may lessen gall infestations. Applications of DDT plus malathion, beginning at the time new growth starts in the spring and continuing at weekly intervals until the

leaves are fully developed, will be of some benefit. Many of the common gall-forming pests are active during this period and can be eliminated before they deposit their eggs. Use a mixture of 2 quarts of 25 percent DDT emulsifiable concentrate plus 1 quart of 50 percent malathion emulsifiable concentrate per 100 gallons of water. This is a rather expensive spray program and would be practical only on the more valuable shade trees.

The above spray program should not be expected to eliminate completely all gall problems, but it will check many gall-forming pests before they can deposit their eggs. Also, it will contribute to the reduction of other pests which commonly occur during the same period.

REMEMBER: *After the galls have begun to form, insecticide applications are of little or no value in eliminating the galls or the pests responsible.*

DILUTION CHART FOR MIXING SPRAYS

Insecticides	Amounts needed to make spray of:		
	100 Gal.	5 Gal.	1 Gal.
Chlordane, 40% E.C. ¹	1 qt.	1 1/2 oz.	2 tsp.
Chlordane, 40% W.P. ²	2 lb.	1 1/2 oz.	2 tsp.
Chlorobenzilate, 25% E.C.	1 1/2 pt.	1 1/2 oz.	2 tsp.
DDT, 25% E.C.	2 qt.	3 oz.	4 tsp.
DDT, 50% W.P.	2 lb.	1 1/2 oz.	2 tsp.
Diazinon, 25% E.C.	1 qt.	1 1/2 oz.	2 tsp.
Dieldrin, 20% E.C.	1 pt.	1 oz.	1 tsp.
Dieldrin, 25% W.P.	1 lb.	1 oz.	1 tsp.
Dimethoate (Cygon), 43.5% E.C.	Use only according to manufacturer's directions.		
Ethion, 25% E.C.	1 1/2 pt.	1 1/2 oz.	2 tsp.
Ethion, 25% W.P.	1 1/2 lb.	1 1/2 oz.	2 tbl.
Kelthane, 18.5% E.C.	1 qt.	2 1/2 oz.	1 tbl.
Lead arsenate	3 lb.	2 1/2 oz.	2 tbl.
Lindane, 25% E.C.	1 pt.	1 oz.	2 tsp.
Lindane, 25% W.P.	1 lb.	1 oz.	2 tsp.
Malathion, 50% E.C.	1 pt.	1 oz.	1 tbl.
Malathion, 25% W.P.	2 lb.	1 1/2 oz.	2 tbl.
Miscible oils (3 1/2%, for dormant sprays)	3 1/2 gal.	1 1/2 pt.	9 tbl.
Miscible oils (1 1/2%, for summer sprays)	1 1/2 gal.	1/2 pt.	3 tbl.
Nicotine sulphate	1 pt.	1 oz.	1 tsp.
Sevin, 50% W.P.	1 1/2 lb.	1 1/2 oz.	2 tbl.
Tedion, 10% E.C.	1 qt.	2 1/2 oz.	1 tbl.
Trithion, 37% E.C.	1 qt.	2 oz.	4 tsp.
Toxaphene, 40% W.P.	5 lb.	4 oz.	2 tbl.
Toxaphene, 60% E. C.	3 pt.	2 1/2 oz.	1 tbl.

¹E.C. = Emulsifiable concentrate

²W.P. = Wettable powder

2 pints (pt.) = 1 quart (qt.)

4 quarts (qt.) = 1 gallon (gal.)

1 gallon = 128 fluid ounces (oz.)

16 fluid ounces = 1 pint (pt.)

1 fluid ounce = 2 tablespoons (tbl.)

3 teaspoons (tsp.) = 1 tablespoon (tbl.)

LAWN INSECTS

Insects	Description and type of damage	Treatment (Listed alphabetically) (See dilution chart for mixing sprays)		Remarks
White grubs (larvae of May beetles)	White with brown head and 6 legs. One to 1½ in. long. Grubs feed upon roots and underground tender parts of plants.	Dusts: Wettable powders— 6 oz. 25% Aldrin; or 10 oz. 40% Chlordane; or 4 oz. 25% Dieldrin; or 5 oz. 25% Heptachlor per 1,000 sq. ft.	Sprays: A. Aldrin B. Chlordane C. Dieldrin D. Heptachlor	Apply dust on lawn and sprinkle with water to soak into soil. Apply spray directly onto soil at rate of 25 gal. per 1,000 sq. ft.
Pillbugs or sowbugs	These animals are not insects but often cause damage to tender plants. Light-gray to slate-colored and about ½ in. long. Roll up in shape of pill when disturbed.	Commercially prepared baits may be used. Dusts: A. 5% Chlordane B. 5% DDT C. 2% Lindane D. 5% Sevin	Sprays: A. Sevin	Apply dusts and spray directly to feeding area. Broadcast baits in early morning or late evening.
Snails and slugs	Grayish to grayish-brown, legless, slimy and soft-bodied slugs, ½ in. to 4 in. long. Snails are made up of spirally coiled, conical shells about 1 in. long.	Use commercially prepared baits containing metaldehyde. Dusts: A. 5% Sevin	Sprays: A. Sevin	Broadcast bait in late evening or early morning.
Termites	Small trees sometimes are attacked by termites. They burrow into roots and crowns of plants. Worker termites are wingless, soft-bodied and white with dark jaws.	Dusts: A. 10% Chlordane B. 10% DDT C. 2½% Dieldrin	Sprays: A. Chlordane B. DDT C. Dieldrin	Also, dust soil surface around plant with wettable powder. Water plant to soak insecticide into soil.
Chiggers (Redbugs)	The young chigger, known as a larva, is a very small, pale yellow, six-legged mite which attaches itself to the skin of man or other animals. The preferred feeding locations on man are parts of the body where clothing fits tightly. They insert their mouthparts in the skin and inject a fluid that causes painful swelling and itching. They become engorged in about 4 days, drop off, change to nymphs and finally adults, neither of which is parasitic.	Dusts: A. 10% Chlordane B. 1% Lindane C. Sulfur D. 10% Toxaphene	Sprays: A. Dieldrin B. Lindane C. Toxaphene	Apply dusts or sprays of wettable powders or emulsifiable concentrates to grass and ground litter where chiggers are present. Sprays generally are more effective. Follow manufacturer's directions for mixing sprays. For small areas, use a compressed-air or knapsack sprayer and apply 2½ to 3 qt. per 1,000 sq. ft. If dusts are used, apply 10% chlordane or 10% toxaphene or 1% lindane at 20 to 25 lb. per acre (approximately 1 to 1¼ lb. per 1,000 sq. ft.) Apply sulfur at rate of 10 lb. per 1,000 sq. ft.
Ants	Several species may become pestiferous in home lawns. Size of ants varies according to species—fire ants may be as small as ⅛ in. long; agricultural (red) ants, as large as ¼ in. long.	Dusts: A. 5% Chlordane B. 2½% Dieldrin C. 2½% Heptachlor	Sprays: A. Chlordane B. Dieldrin C. Heptachlor	These materials also are available in granular formulations. Use all formulations according to directions on manufacturer's label.
Fall armyworm, Sod webworm	Damage lawns by feeding on leaves and stems of grass. Fall armyworm has distinct, inverted white Y on front of head. Damage first appears as whitish patches in lawn where leaves have been skeletonized. The sod webworm is a dingy white larvae about 1 in. long when grown and is marked with prominent black spots. Silk-lined tunnels of earth near the soil surface are indications of the presence of this pest.	Dusts: A. 5% Chlordane B. 2½% Dieldrin C. 5% Sevin D. 10% Toxaphene	Sprays: A. Chlordane B. Dieldrin C. Sevin D. Toxaphene	Repeat application if new infestation develops.

Ants	Several species may become pestiferous in home lawns. Size of ants varies according to species—fire ants may be as small as $\frac{1}{8}$ in. long; agricultural (red) ants, as large as $\frac{1}{2}$ in. long.	Dusts: A. 5% Chlordane B. 2½% Dieldrin C. 2½% Heptachlor	Sprays: A. Chlordane B. Dieldrin C. Heptachlor	These materials also are available in granular formulations. Use all formulations according to directions on manufacturer's label.
Fall armyworm, Sod webworm	Damage lawns by feeding on leaves and stems of grass. Fall armyworm has distinct, inverted white Y on front of head. Damage first appears as whitish patches in lawn where leaves have been skeletonized. The sod webworm is a dingy white larvae about 1 in. long when grown and is marked with prominent black spots. Silk-lined tunnels of earth near the soil surface are indications of the presence of this pest.	Dusts: A. 5% Chlordane B. 2½% Dieldrin C. 5% Sevin D. 10% Toxaphene	Sprays: A. Chlordane B. Dieldrin C. Sevin D. Toxaphene	Repeat application if new infestation develops.
Chinch bug	Primarily a pest of San Augustine lawns in eastern half of Texas. Adult is $\frac{1}{6}$ to $\frac{1}{5}$ in. long with black body, reddish-yellow legs and fully developed wings. Each front wing is mostly white, but is marked with an irregular black patch at the middle of the outer margin. Newly hatched nymph is bright red and has a whitish band across the back. Adults and nymphs suck the plant juices, resulting in browned areas in the lawn. Injured areas frequently are first noted along edges of the lawn.		Sprays: A. Diazinon B. Ethion C. Trithion	Irrigate lawn before spraying to aid in penetration of spray through the grass mat. Granular materials may also be used. It is not necessary to wet lawn before applying granules. Several commercial combination sprays are effective. Follow directions on the label. Repeat application as necessary when re-infestations appear. Use 15-25 gallons of spray mixture per 1,000 sq. ft. of lawn area.
Bermudagrass mites	These tiny, eight-legged pests have caused considerable damage to bermudagrass lawns in West and Northwest Texas during the last few years. Stunted internodes are characteristic symptoms of injury. Lawn develops a generally unhealthy appearance and makes slow growth. Individual mites are difficult to see without magnification.	Dusts: A. Sulfur (10 lb./1000 sq. ft.)	Sprays: A. Diazinon B. Ethion C. Trithion	Two applications 10-14 days apart may be necessary for most effective control. Use 5 gallons of spray mixture per 1,000 sq. ft. of lawn area.

Caution: Allow lawn area to dry thoroughly after spraying before allowing children or pets to play on the grass.

FOLIAGE-EATING INSECTS

Insects	Description and type of damage	Treatment (listed alphabetically) (See dilution chart for mixing sprays)	Remarks	
Bagworms	Larvae feed on foliage after hatching in late spring or early summer. Young worm spins silken sac and attaches bits of leaves as it feeds. The worm carries bag wherever it goes. Full-grown worm has bag 1½ to 2½ in. long. Wingless female crawls out and dies after laying eggs inside bag.	Dusts: A. 4% Malathion B. 5% Sevin C. 10% Toxaphene	Sprays: A. Lead arsenate B. Malathion C. Sevin D. Toxaphene	Apply insecticides early while worms are small. Chemical controls are ineffective when worms are full grown. Hand pick and burn bags, because the winter is passed in egg stage within bag.
Caterpillars eating foliage: Webworms Tent caterpillars Walnut & pecan caterpillars	Generally feed by eating leaves, sometimes in concentrated areas. Some web within, or build "web-tent" in crotches of limbs, or feed together in large groups without making web. Caterpillars vary from 1 to 2 in. long. Also vary in color but usually striped, multi-colored and hairy.		Sprays: A. Chlordane B. DDT C. Lead arsenate D. Malathion E. Sevin F. Toxaphene	If webbed branches are present, small infestations may be destroyed by cutting out and burning webs or by other mechanical means. There are 1 to 3 generations per year. Some pass winter as eggs in clusters on limbs; others hibernate as pupae in the ground.
Grasshoppers and crickets	Several species of grasshoppers and crickets are general feeders upon plants. Crickets often migrate into homes and other buildings during mid- and late-summer and fall. Check nearby grassy areas in spring for signs of small grasshoppers.	Dusts: A. 10% Chlordane B. 2½% Dieldrin C. 3% Lindane D. 5% Sevin E. 20% Toxaphene	Sprays: A. Chlordane B. Dieldrin C. Lindane D. Sevin E. Toxaphene	Apply controls when insects are small. Controlling infestations of grasshoppers and crickets will prevent their laying eggs in the ground which may result in large populations the following year.
Other leaf-eating insects: May beetles, Climbing cutworms, Armyworms, Leaf beetles, Pine tip moth, Leaf rollers, and others.	Damage varies but generally is caused by worms or beetles eating the leaves of many plants. Observe plants at frequent intervals during the growing season. Apply controls when damage or insects are first noted.	Dusts: A. 5-10% Chlordane B. 5 or 10% DDT C. 2½% Dieldrin D. 5% Sevin E. 10% Toxaphene	Sprays: A. Chlordane B. DDT C. Dieldrin D. Lead arsenate E. Sevin F. Toxaphene	Apply insecticides early to prevent damage. Young worms are easier to kill than older ones. For pine tip moth, make first application in early spring. Apply 3 or more treatments at monthly intervals.

Combination sprays or dusts are effective in controlling all of the above pests except grasshoppers and crickets. Mix and apply the combination materials according to the manufacturer's directions. In most instances, sprays are preferred over dusts.

SUCKING INSECTS

Insects	Description and type of damage	Treatment (listed alphabetically) (See dilution chart for mixing sprays)		Remarks
Thrips	Minute insects, 1/40 to 1/10 inch long. Several species vary from yellow to dark brown or nearly black. Very slender bodies and fringed wings. Their feeding causes tops of leaves to wither, curl up and die, and failure of buds to open normally.	Dusts: A. 5% DDT B. 2½% Dieldrin C. 1% Lindane D. 4% Malathion E. 5% Sevin F. 10% Toxaphene	Sprays: A. DDT B. Dieldrin C. Dimethoate (Cygon)* D. Lindane E. Malathion F. Sevin	Injured buds and flowers of plants should be removed and burned. Re-infestation of thrips is common on flowering plants. Repeat applications of insecticides as often as necessary.
Aphids or plant lice	Soft-bodied, pear-shaped sucking insects, 1/8 to 1/5 in. long which causes leaves to curl. Varying colors; yellow, green, bluish-green, reddish-brown and near black.	Dusts: A. 4% Diazinon B. 1% Lindane C. 4% Malathion D. 2% Nicotine sulphate	Sprays: A. Diazinon B. Dimethoate (Cygon)* C. Lindane D. Malathion E. Nicotine sulphate	Aphids secrete honeydew which attracts large numbers of flies to trees and shrubs. Increased dosages of nicotine dusts and sprays may burn tender plants.
Lace bugs	Tiny, mottled, brownish to black and gray insects about 1/8 in. long with lace-like wings. Suck sap from underside of leaves causing leaves to become gray or brownish spotted.	Dusts: A. 4% Diazinon B. 2% Lindane C. 4% Malathion D. 2% Nicotine sulphate E. 5% Sevin	Sprays: A. Diazinon B. Dimethoate (Cygon)* C. Lindane D. Malathion E. Nicotine sulphate F. Sevin	Underside of leaves discolored by a black or brown varnish-like excrement. Repeat applications as necessary to control this pest.
Spider mites	Small, about 1/60 in., yellowish or reddish animal which sucks juices from undersides of leaves. Causes pale blotches on upper and lower surfaces of foliage. Webbing often present. Plants gradually lose vigor and die.		Sprays: A. Chlorobenzilate B. Diazinon C. Dimethoate (Cygon)* D. Kelthane E. Malathion F. Tedion G. Ethion	Usually a second application 7 days later is necessary to obtain control.
Scales: San Jose, Oyster shell, Pine-needle, Obscure, Euonymus, Soft brown, mealy bugs et al.	Suck sap. Small, attached insects covered with shell or armor. Most of them lay eggs that hatch into active crawlers. Infestations build up primarily during growing season. Inconspicuous; usually go unnoticed until plant is severely damaged.		Sprays: A. Diazinon B. Dimethoate (Cygon)* C. Dormant oil D. Malathion	Scales spread from plant to plant in crawler stage on birds, insects and other animals, and by wind. Two or more applications should be made at 2-week intervals. Dormant oil may be used on trees and woody shrubs after the plants have gone into complete dormancy.

<p>Scales: San Jose, Oyster shell, Pine-needle, Obscure, Euonymus, Soft brown, mealy bugs et al.</p>	<p>Suck sap. Small, attached insects covered with shell or armor. Most of them lay eggs that hatch into active crawlers. Infestations build up primarily during growing season. Inconspicuous; usually go unnoticed until plant is severely damaged.</p>	<p>Sprays: A. Diazinon B. Dimethoate (Cygon)* C. Dormant oil D. Malathion</p>	<p>Scales spread from plant to plant in crawler stage on birds, insects and other animals, and by wind. Two or more applications should be made at 2-week intervals. Dormant oil may be used on trees and woody shrubs after the plants have gone into complete dormancy.</p>
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<p>Whiteflies</p>	<p>Adults small, snow-white, four-winged flies, nymphs small, oval, flat, palegreen or yellow; less than 1/30 in. long. Suck sap from plants causing them to wilt, turn yellow and die.</p>	<p>Sprays: A. Diazinon B. Dimethoate (Cygon)* C. Lindane D. Malathion E. Nicotine sulfate</p>	<p>Two or more applications at weekly intervals may be necessary to eliminate the flies. Frequently a pest on gardenia.</p>
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Combination sprays or dusts are effective for controlling the above pests. Mix and apply according to the manufacturer's directions.

*Dimethoate (Cygon) is a relatively new material which has been approved for use on several plants. It is generally effective against scales, thrips, leaf miners, aphids, leafhoppers, spider mites and other pests. Apply only according to directions on manufacturer's label. *Do not apply more material than is recommended. Use only on ornamental plants listed on the label.*

BARK AND WOOD BORING INSECTS

Insects	Remarks
Shade tree borers	<p data-bbox="314 138 1663 232"><i>Discussion:</i> Several species of borers attack shade trees. The most important species are known as roundheaded and flatheaded borers. There is a wide variation in the life cycle or developmental stages. Some species may emerge as adults in early spring and begin laying eggs while others may emerge and deposit eggs during the summer months. Some species have more than one generation a year while it may require one or more years for certain species to complete a life cycle.</p> <p data-bbox="314 242 1663 336">The larvae of <i>roundheaded borers</i> make galleries beneath the bark and also tunnel into heartwood. Entrance holes can be detected by the presence of frass pushed out of the hole by the feeding larvae. The larvae of <i>flatheaded borers</i> tunnel beneath the bark making long, shallow, winding galleries packed with frass. These borers usually are found beneath the bark and have no exit holes to the outside.</p> <p data-bbox="314 345 1663 392">With few exceptions, most wood borers attack only above-ground portions of the tree and generally feed in the trunk and larger limbs.</p> <p data-bbox="380 402 1529 419">Several other insects, such as shot-hole borers, bark beetles and larvae of moths, attack a large variety of trees.</p> <p data-bbox="314 429 1663 476">In most cases, borers attack devitalized, diseased or transplanted trees. Proper tree care is important in promoting healthy, vigorous, growing trees.</p> <p data-bbox="380 485 1307 503">A few management practices to follow in protecting the tree against borer attacks follow:</p> <ol data-bbox="380 512 1663 600" style="list-style-type: none">1. Wrap trunks of young or transplanted trees with nursery wrapping paper to prevent egg laying by adult borers. Wrapping also may prevent sun scald. These areas are subject to borer attack.2. Stimulate vigorous growth by properly fertilizing and watering the tree.3. Prune out all dead or dying branches of the trees and paint the wounds with an approved tree paint. <p data-bbox="314 610 1663 675"><i>Suggested control:</i> Observations during past years indicate that the spraying of trees with a mixture of DDT and malathion will prevent borers from becoming established in the tree. It is necessary to apply the spray before the young borers gain access to the tree.</p> <p data-bbox="314 684 1663 802">As a suggested amount to use, mix 2 gallons of 50% malathion emulsifiable concentrate with 1 gallon of 25% DDT emulsifiable concentrate in 100 gallons of water. To prepare 1 gallon of spray, use 8 tablespoons of malathion and 4 tablespoons of DDT in the necessary amount of water. Spray on the trunk and limbs. Make first application in early spring, soon after the leaves appear. Make two additional applications at 3-week intervals. This treatment is suggested as a preventive measure and will not control borers already feeding inside the tree at the time of spraying.</p> <p data-bbox="314 811 1663 882">If only a few trees are involved, borers such as the roundheaded species can be controlled successfully by using hand methods. Carbon disulphide or an approved commercial borer chemical may be injected into the holes to kill the larvae. After the material has been applied the hole should be plugged with mud, putty or any similar material.</p>
Shot-hole borers Bark beetles	<p data-bbox="314 894 1663 965"><i>Discussion:</i> Both adult beetles and larvae bore into the trunk, branches or twigs. Adults are about 1/10 inch and larvae are about 1/8 inch long. These insects prefer weakened or unhealthy trees and make holes about the size of "BB" shot. There may be several generations per year.</p> <p data-bbox="314 974 1663 1044"><i>Suggested control:</i> Keep trees growing vigorously through proper management practices. These pests are rarely the primary cause of death of the tree but act as secondary invaders after the tree has been weakened otherwise. Preventive treatments, as suggested for shade tree borer control, can be used if the tree is susceptible to injury.</p>