



*Control  
Insects of  
Flowers, Shrubs  
and Shade Trees*

*Circular 199*

Agricultural Extension Service  
University of Arizona, Tucson

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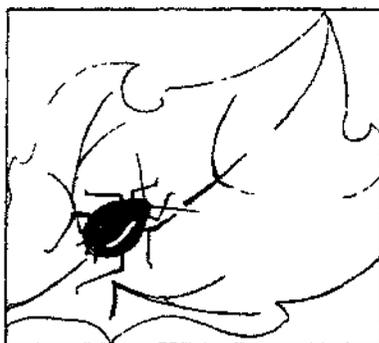
# *Control Insects of Flowers, Shrubs And Shade Trees*

By J. N. Roney, Extension Entomologist

## **Aphids or Plant Lice**

Aphids or plant lice are small, globular shaped, soft-bodied bugs of about every color of the rainbow. The aphid sticks its beak into the stems or leaves and sucks out the sap of such plants as arborvitae, oleander, elms, ash, privet, photinia, and almost all annual-blooming flowers such as stocks, marigolds, calendulas, snapdragons, etc. The plant may be killed if the insects are not controlled.

Sometimes aphids are controlled by predators (lady bugs, lace wing



**Aphid**  
(7X NORMAL SIZE)

flies, syrphus flies) and parasites (small minute wasps). The latter turn the aphids brown and show an exit hole for the parasite.

The winged forms of aphids are developed when aphids become crowded, thus giving the winged female a chance to fly to another leaf or plant and start a new colony.

## Control

Aphids are killed only by the insecticide coming in contact with the insect. Best controls are secured with nicotine sulphate, usually of a 40 percent strength.

Use  $1\frac{1}{4}$  to  $1\frac{1}{2}$  teaspoonfuls of nicotine sulphate and the same amount of household ammonia to 1 gallon of water. If your water is hard, add 1 teaspoonful of some good soap flakes.

Pyrethrum and Rotenone combination sprays are also good. Follow directions on the bottle.

**Parathion is not recommended to be used by the home gardener in Arizona, nor is it recommended for sale in small packages. The use of DDT, Chlordane or Toxaphene for control of aphids is not recommended.** Benzene hexachloride may be used at times according to directions on the container.

## Caterpillars or Worms

Tent caterpillars, leaf rollers, bagworms, webworms, woolly worms (salt marsh caterpillars), large hornworms and other insects may be classed together. These insects have chewing mouth parts and destroy the portion of the plants that they feed upon.

Some of these worms feed only on the lower surfaces of the leaves. Others feed within a web. Still others are leaf "miners." Some of these worms form the pupal stage on the plant. Others crawl into the soil for pupation. These insects are the larval stage of a moth or butterfly.

## Control

Control measures of caterpillars vary considerably since there is no one insecticide that will control all

species. Generally speaking, these insects are not controlled in the adult moth or butterfly stages, but as worms or larvae. Either a spray or a dust is applied to the plants and the caterpillar or worm in turn feeds upon the plant tissues and gets the poison into its stomach.

A 60 percent Cryolite dust, 5 and 10 percent DDT dust, 5 percent chlordane dust, arsenical dust, and 10 percent toxaphene and rotenone dust are some of the combinations of insecticides needed to control caterpillars. Salt marsh caterpillars are controlled only by a combination dust of 5 percent DDT, 15 percent toxaphene and 40 percent sulphur. For sprays, be certain to use the same amount of technical material as is used in the dusts.

In control of many caterpillars and worms, you may use a combination of rotenone and pyrethrum dusts or sprays. Some worms may feed only on the undersides of the leaves, so thorough applications of

the insecticides will be necessary.

The dilution chart on page 12 will show how to mix small amounts of sprays. Follow directions at all times.

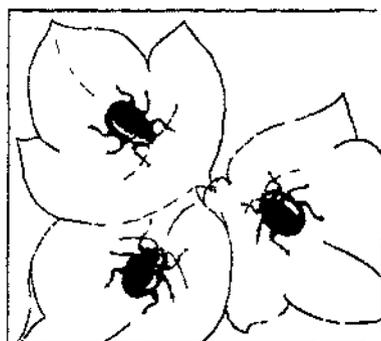
## Beetles

Generally speaking, beetles cause injury in both adults and larval or grub stages. The adults and larvae or grubs may feed on the leaves, stems or roots, or as borers in the limbs and trunk. In many cases only the adults are involved in causing the injury to the tops of the plants. In other cases, both the adults and larvae feed on the leaves and stems.

All of these insects may be controlled by dusting or spraying the insecticide on the plants upon which they are feeding. In this group are flea beetles, three species of cucumber beetles, elm leaf beetles, bark beetles, rose chafers, and June beetles. The larval stage of the elm leaf beetle feeds on the leaves the same as do the adults.

### Control

Since some beetles cause injury in both the adult and larval stage, there are two chances of control. Generally speaking, spray or dust an insecticide like DDT, chlordane, arsenicals, lindane, rotenone, fluorine and pyrethrum on the plants so the beetles get the poison by feeding on the treated leaves and stems.



**Flea Beetle**  
(8X NORMAL SIZE)

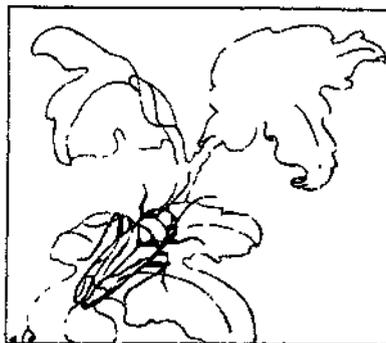
In some instances the adult beetle and larvae feed on the roots. Control this type by working chlordane, lindane, DDT or arsenicals into the soil.

Most dusts of DDT and chlordane come in 5 or 10 percent strength ready to be dusted on the plants or worked into the soil. Some emulsions come ready for dilution according to directions or by using the dilution table on page 12 of this publication.

Many beetles and beetle larvae feed only on the undersides of the leaves, so the insecticide must be applied thoroughly.

# Leafhoppers

Leafhoppers are a sucking type of insect that cause considerable damage to many flowers, shrubs and shade trees. These small, varied colored insects fold their wings in a triangular shape on their back. They suck juices from the plants and in many instances are vectors of several virus diseases. Aster yellows, curly top of sugar beets and other diseases are spread by these little leafhoppers.



**Leafhopper**  
(4X NORMAL SIZE)

## Control

Leafhoppers, which have a sucking type of mouth in the form of a hair-like beak, are controlled with contact insecticides. Dusting sulphur, DDT, chlordane, lindane, toxaphene, rotenone and pyrethrum dust are very effective for their control.

A 5 percent DDT-dusting sulphur dust may be used. A 5 percent

chlordane dust also is effective.

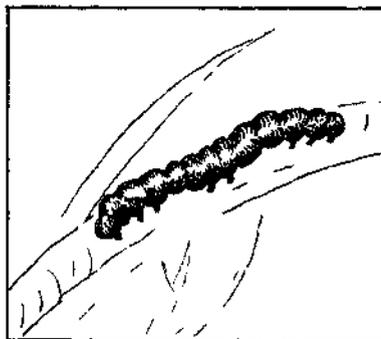
In sprays, a combination spray of pyrethrum-rotenone is very effective. Follow directions on the package. Toxaphene and lindane also are used by following directions on the container.

# Cutworms and Crickets

Cutworms and crickets cause serious loss to transplanted annuals and many bed plants and flowers. They are chewing insects that feed on the small, tender plants, usually at night. They can be easily controlled with baits of various kinds, as well as some insecticides.

## Control

Control of cutworms and crickets has been accomplished in the past by use of poisoned baits. However, recent work shows that DDT, tox-



**Cutworm**  
(ACTUAL SIZE)

aphene and chlordane dusts are very effective. Use 5 or 10 percent DDT dust, 5 percent chlordane dust or 10 percent toxaphene dust around and on the plants to control the cutworms.

You also may use cardboard collars. Secure a piece of cardboard about 2 inches wide and 3 or 4 inches long. Place the cardboard

around the stem with about 1½ inches above the soil and the balance beneath the soil. Leave this around the plant until the plant has taken root, then remove.

Poison baits may be secured from seed and insecticide stores and give desired results. However, the dusts are cheaper.

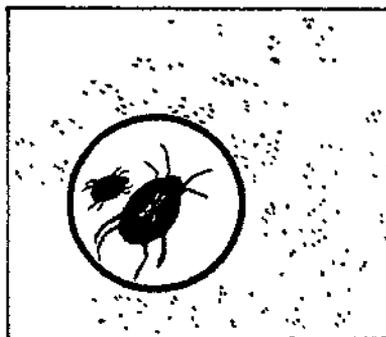
## Spider Mites or Red Spiders

Spider mites or red spiders are serious pests of many shrubs, flowers and shade trees in Arizona. Mites are very small—practically microscopic in size—and make a web when in great numbers. They are of many colors.

These mites are not true insects, but cause serious injury to the foliage of arborvitaes, junipers, ash trees, elm trees, privets, zinnias, calendulas, pansies, violets, snapdragons, stocks and almost all other annual flowers. If not controlled, they can destroy many of your shrubs, trees or flowers.

### Control

Spider mites or red spiders can be controlled on most shrubs, trees and flowers with straight dusting sulphur. On some larger trees and



Spider Mite or Red Spider  
(14X NORMAL SIZE)

where plants are susceptible to sulphur, you may use one of the organic insecticides.

For information on the use of the new miticides, contact your County Agricultural Agent.

## Grasshoppers

Arizona has several species of grasshoppers that infest shrubs, small trees and flowers. They are

chewing insects that feed on the foliage in either the young or adult stage.

## Control

Grasshoppers now are controlled by sprays or dusts, and very little poisoned bait is used. Recent research has found that chlordane and toxaphene sprays or dusts are very effective.

Aldrin in the spray form is often the cheapest and best to use to control grasshoppers. It comes in an emulsion form. On large areas use

½ pint per 3 to 10 gallons of water per acre. See the chart on page 12 of this circular for smaller dilutions. The material, when sprayed on the plants, will give good control of the grasshoppers.

If aldrin is not available, one may use a 5 percent chlordane or 10 percent toxaphene dust or an emulsion of each material according to directions.

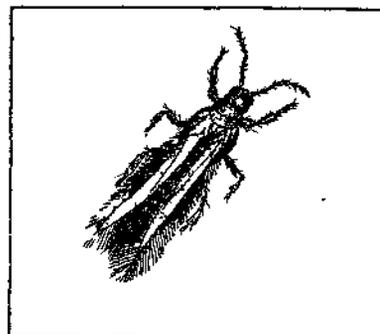
## Thrips

Thrips are common on many Arizona shrubs and flowers. Thrips are very small, slender insects which attack the blooms of many flowers and also feed on gladiola bulbs and other bulbs. They have rasping mouth parts and can be very injurious if not controlled.

### Control

Thrips are controlled with several of the new insecticides. Best results have been secured with 10 percent DDT, 5 percent chlordane or 10 percent toxaphene dusts.

Emulsion sprays, used according to directions, also give good results.



**Thrip**  
(10X NORMAL SIZE)

Several applications may be necessary.

## Snails and Sowbugs

Snails or slugs and sowbugs or pill bugs are not true insects. Yet they are often confused with crickets and cutworms since their injury resembles that of the cricket and

cutworm.

These two pests cause their worst injury in shady and overplanted beds. The snail is easily recognized, while the sowbug or pill bug is

grayish in color and rolls up into a "pill" when disturbed.

### Control

Control of snails or slugs and sowbugs or pill bugs may be se-

cured with poisoned baits. These may be secured at seed or feed stores or places where insecticides are sold. Recent work also has shown that 10 percent DDT dust and 5 percent chlordane will do a fair job of controlling these pests.

## Box Elder Bugs

Box Elder bugs are very pretty true bugs about ½ inch long and slate black with three red lines on the back. As indicated by the name, they feed on box elder trees. They also like to crawl into the house and annoy homemakers. Some years they are very prevalent in the higher elevations.

### Control

Control for box elder bugs has been accomplished with chlordane emulsion sprays. In some instances 5 percent chlordane dust has given good results. Since these insects are sucking insects, the insecticide must come in contact with the insects if results are secured.

## Cottony Cushion Scale

This soft bodied scale insect feeds on ornamental oranges, Cape jasmine, pittosporum and like plants. It covers its abdomen with a cotton sack with which it protects the young crawlers. This sack protects the insects from insecticides.

### Control

There is no control by insecticide. The only control is with the Vedalia lady bug. These may be secured from the Arizona Agricultural and Horticultural Commission.

## Elm Scale

This scale insect has become very prevalent in Yavapai and Coconino counties on shade elm trees. In some instances the scale has practically killed the tree. The mature scale can be rather pretty when in

great numbers, yet it can kill the tree.

Scale insects are sucking insects. When grown, they usually develop a cover called a scale as protection.

The adult female gives birth to the young, which are called craw-

lers, since they are equipped with legs. They crawl around for awhile, stick their beak in the limb or twig and start feeding. They also lose their legs and form a scale covering.

## Control

Control of elm leaf scale and scale insects of this kind is accomplished by dormant and summer-

spray oils. Best results are secured with a good dormant oil spray. In some instances nicotine sulphate is added to the spray mixture.

New Mexico has found that a spray of 3 tablespoonfuls of white-oil emulsion, 2 teaspoonfuls of 40 percent nicotine sulphate to 1 gallon of water is very effective for small trees. This mixture should be applied in the late spring.

## Insecticides

Some insecticides are very poisonous to warm-blooded animals, while others are not so toxic. Always follow directions for use and you should not have failures. Be certain to use the correct insecticide for the insect being controlled.

Some of the more common insecticides are discussed below.

**DDT** is well known to gardeners today. It comes in a 5 percent or 10 percent strength, or it may come in an emulsion form or a wettable powder. Any form is well to use if you are prepared to correctly apply the material to the plants. In the dust form, you may use it in combination with dusting sulphur or an inert material.

**Pyrethrum** is an insecticide made from the flowers of a plant of the chrysanthemum family. The active ingredients are pyrethrins. It is non-poisonous to humans, yet very effective on many garden insects, especially in combination with rotenone and DDT. It is strictly a contact poison and has no residual effect on the insects.

**Rotenone** is an insecticide made from the roots of cube and derris. It comes in both dust and spray forms. You will usually find it in a 1 or 2 percent dust for control of various insects. It also may be combined with pyrethrum as both a spray and dust. The combination is very effective against many insects of flowers and shrubs.

**Nicotine sulphate** is one of the best insecticides for control of aphids around the home. It is usually purchased in a 40 percent strength and used as a spray. Dusts must be mixed fresh and are too difficult to mix by an amateur.

Use  $1\frac{1}{4}$  teaspoonful of 40 percent nicotine sulphate,  $1\frac{1}{4}$  teaspoonful of household ammonia to a gallon of water. If your water is very hard, you may add a teaspoonful of soap flakes to each gallon.

Nicotine sulphate is a contact insecticide and must come in contact with the insects if good controls are desired.

**Sulphur**, in the form of a dusting sulphur may be used for control

of spider mites and leafhoppers. It is also a good carrier or diluent for DDT, pyrethrum, rotenone and other insecticides.

**Cryolite** is a fluorine compound. It comes as a by-product of the manufacture of aluminum and is also mined in its natural state. Either one is effective as a dust for many chewing insects.

**Aldrin** is a new organic insecticide that is very effective for the control of grasshoppers. It is used in the form of an emulsion. You may use  $\frac{1}{2}$  pint of the aldrin emulsion in 2 to 3 gallons of water per acre. It can then be sprayed on the foliage being attacked.

**Chlordane**, another organic insecticide, comes in both the dust and spray form. It may be used as a 5 percent dust for grasshoppers,

crickets and cutworms. Sprays of emulsions may be used if one follows directions. Wettable powders are also available.

**Toxaphene** is another organic insecticide that may be used as a dust or spray for control of several of our insects. The 10 percent dust or the emulsion spray, used according to directions, will control crickets, cutworms and grasshoppers.

**Poisoned baits** may be purchased for control of slugs or snails and sowbugs. There are specially prepared baits that are much cheaper to purchase than to make at home.

**Piperonyl Cyclonene** is a synergist or activator for pyrethrins. It is not considered poisonous and seems to increase the killing power of pyrethrum many times.

## Dusters and Sprayers

If emulsion materials are used, the ordinary 3 gallon compressed air sprayer will be satisfactory. Some of the attachments on the garden hose also do a fair job. However, it is a little difficult at times to regulate the amount of insecticide to use.

If dusts are used, always apply with a plunger-type, puff-type, or bellows-type duster. Don't apply with a shaker or cloth if you desire good results. On very small plants,

cover with cloth for a few moments after applying dust.

When using a wettable powder, be certain to keep the contents of the sprayer well agitated since the materials are insoluble in water. However, if they are agitated, they will stay in suspension until applied.

Remember that if you are to control the insects, you must apply the insecticides thoroughly and not in a haphazard way.

# Dilution Spray Charts

## Liquid Measure

100 gallons	5 gallons	1 gallon
¼ pint.....	1 1/5 teaspoonfuls.....	¼ teaspoonful
1 pint.....	1 3/5 tablespoonfuls.....	1 teaspoonful
1 quart.....	3 1/6 tablespoonfuls.....	2 teaspoonfuls
½ gallon.....	6 1/3 tablespoonfuls.....	4 teaspoonfuls
1 gallon.....	2/5 pint.....	2½ tablespoonfuls
2 gallons.....	4/5 pint.....	5 tablespoonfuls
4 gallons.....	1 3/5 pint.....	1/3 pint
10 gallons.....	4 pints.....	4/5 pint

## Dry Weight Wettable Powders

100 gallons	5 gallons	1 gallon
1 pound.....	3/4 ounce.....	1/6 ounce
2 pounds.....	1 3/5 ounces.....	1/3 ounce
3 pounds.....	2 2/5 ounces.....	1/2 ounce
4 pounds.....	3 1/5 ounces.....	2/3 ounce
5 pounds.....	4 ounces.....	4/5 ounce
10 pounds.....	8 ounces.....	1 3/5 ounces
20 pounds.....	16 ounces.....	3 1/5 ounces