# Petal Blight Disease of Azaleas

## control of fungus-caused disease of azaleas and closely related plants is essential to prevent its further spread

**Robert D. Raabe and Richard H. Sciaroni**

Healthy azalea flower—*upper left*. Remaining flowers show varying stages of collapse as a result of infection by the azalea petal blight fungus.

**A fungus disease** of azaleas—and closely related plants—is becoming widespread in nurseries of the San Francisco Bay region.

Known as flower blight, petal blight, and Ovulinia flower blight, the disease first appeared in the Los Angeles area in 1940 and has spread to other azalea-producing areas in the state. California's azalea industry—which approaches two million dollars in value—has seen a marked increase in the use of azaleas for greenhouse forcing and outdoor planting. Consequently there is great concern among nurserymen and gardeners that the disease will become established in private gardens, as well as in nurseries.

The petal-blight disease—most important on azaleas—is caused by a fungus which attacks only the flowers of azaleas and such closely related plants as rhododendrons. The disease first appears on the petals as small, round spots that rapidly enlarge to form irregular blotches until eventually the whole flower collapses. The spots on white-flowered varieties are rusty brown. The spots on the colored varieties are a faded tan. The infected tissues become soft and mushy and after the flowers collapse, they tend to cling to the twigs and leaves. Occasionally, a flower infected in the bud stage will collapse without opening, as shown in the photograph.

In the collapsed flowers, small black disc-shaped sclerotia—hardened fungus tissue—are formed. These sclerotia are the resting bodies of the fungus and carry it through the period when azaleas are not in flower.

The resting bodies fall to the ground with the infected flowers and remain in the soil until the azaleas begin to bloom the following season. At that time they germinate to produce small cup-shaped structures in which spores are produced. The spores are forcibly shot into the air and are carried by wind to the petals of the azalea blooms. There, in the presence of moisture, these spores germinate and infect the petals. As the fungus develops in the petals, it produces another type of spore which is important in the secondary spread of the disease. These spores may be carried by rain, splashing water, or certain insects—principally bumblebees—to other flowers where they will initiate new infections.

Cool, rainy conditions are favorable for disease development, especially on plants grown under lath where the flowers do not dry rapidly.

Control under such conditions is quite difficult and is made more so because of the rapid succession of bloom. Spraying the plants three times a week with Parzate or Dithane Z-78—zinc ethylene bis dithiocarbamate—at the rate of 12 ounces to 100 gallons of water plus one to two ounces of spreader-sticker, aids in holding the disease in check. Application of sprays during the cooler part of the day also helps to minimize injury. In addition, picking and destroying the infected flowers reduces the possibility of carry-over of sclerotia in the soil.

In addition to spraying plants and removing diseased blossoms, certain other measures will help to control the disease out-of-doors.

Recent tests have shown that ground sprays of Fermate—ferric dimethyl dithiocarbamate — at the rate of six pounds per 1,000 square feet of area have helped to prevent the formation of the shooting spore stage. This material — with a spreader-sticker — should be applied just before flowering time. Removing and replacing the old mulch or covering it with new mulching material will help to prevent the formation of the shooting spore stage.

Production of fungus resting bodies in diseased flowers. This flower became infected while still in the bud stage and failed to open.

Watering so that the flowers are not splashed is another precaution. Overhead watering must be avoided.

Even where the fungus is established, disease-free plants can be maintained—for selling—by a program that begins

Concluded on page 14

**Collapsed azalea flowers clinging to the leaves.**

## RANGE

Continued from preceding page

wild-rye were found in the measured areas. Purple stipa was entirely lacking.

On most ranges where there is a Klamath weed problem, both desirable and undesirable forage plants are present. Where a well-adapted forage grass, such as California oatgrass, is available, grazing use should be aimed toward encouraging this plant.

On most Klamath weed ranges of California, Medusa-head will thrive and provide serious competition to the more desirable forage plants. Range improvements can only be achieved where better annuals and perennials replace the undesirable plants.

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## GERANIUM

Continued from page 8

These rooted cuttings may be planted in ground beds or raised beds treated with chloropicrin or methyl bromide, as in the case of the mother-block beds.

Each plant in the increase-block should be identified by the numeral indicating its source mother-block plant.

In the event that virus symptoms appear on any of the plants in the increase-block, all plants of the same origin—including the mother-block plant—should be immediately rogued.

The increase-block should be kept free of insects in the same manner as the mother-block because it is designed to furnish cuttings for use in planting in the field.

When the cuttings in the increase-block are of sufficient size, they may be planted in the field. Field cuttings should never be used for replanting in the mother-block or the increase-block. If the field planting becomes diseased and is plowed up, or if diseased plants are rogued or plants are lost, replanting should be delayed—for at least three months—and then only cuttings from the increase-block should be used.

Cutting knives or clippers used on all cuttings in this system should be soaked in a 1:1000 mercuric chloride solution and wiped dry with a clean paper towl or toilet tissue between use on the plants. Two knives, or clippers, should be available; one set remaining in the disinfectant while the other is in use. Because there is danger of mercury poisoning by absorption through the skin, the operator should wear rubber gloves or use care that the solution does not come in contact with cuts or abrasions in the skin. Skill and careful work are required in the mother-block and in the increase-block, and only an operator with those qualities should work in blocks, performing all operations himself.

Overhead watering must not be used.

All flowers should be removed from the mother-block and the increase-block to reduce Botrytis gray mold.

A number of California growers have set up a procedure for developing disease-free cutting stock and have found a substantial increase in growth of plants and yield of cuttings per plant, as compared to their field-grown material. Also, by using this system, geraniums may be grown intensively on much smaller acreage and yield a much higher return per acre compared with present returns. Perhaps of greater importance is the fact that by selling healthy cuttings, the California producer will capture a much larger share of the market for geraniums in the country.

This system of propagating disease-free cutting stock was set up for geranium production but it may easily be adapted to many other crop plants which are vegetatively propagated.

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## AZALEAS

Continued from page 7

when the plants are taken into the greenhouse for forcing. The first step is to remove from the plants all flowers and buds beginning to show their natural color. Removal and replacement of the surface litter help eliminate the shooting spore stage.

The most important control in the greenhouse is to reduce the humidity. The spores responsible for the secondary spread are extremely susceptible to dryness, and merely lowering the humidity to only 80% or 85% is enough to give a sure control of the disease.

The best control is to prevent the entrance of the fungus into a planting. Because the fungus is found only on the flowers or as resting bodies in the soil, new plants should not be brought in when in flower or if there is any color in the buds. Bringing in only bare-rooted plants will eliminate the soil as a source of the fungus.

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## WALNUTS

Continued from page 6

Where the basic lead arsenate treatment is used, it should be applied at four pounds per 100 gallons—by air carrier-type or the conventional high pressure spray rig—at the rate of 800 gallons per acre.

Where DDT is applied by a conventional high pressure spray rig, only 1½ pounds of DDT 50% wettable powder per 100 gallons are necessary when the finished spray is applied at 800 gallons per acre—only one half of the amount of material—listed in the dosage table—is necessary for European red mite and aphid control.

**Dosage Table for Combination Codling Moth, European Red Mite, and Walnut Aphid Control. (With DDT applied by air carrier-type equipment only and the finished spray applied at the rate of 400 gallons per acre.)**

| Codling moth | European red mite | Walnut aphid |
|---|---|---|
| DDT 50% wettable powder 3 lbs/100 gals | Systox 21.2% emulsifiable 8–12 oz/100 gals<br>or<br>Ovotran 50% wettable powder 1½–2 lbs/100 gals<br>or<br>Aramite 15% wettable powder 3–4 lbs/100 gals | Not necessary if Systox is used for mite control<br>or<br>Parathion 25% wettable powder 1 to 1½ lbs/100 gals<br>or<br>Malathion 25% wettable powder 1 to 1½ lbs/100 gals<br>or<br>TEPP 20% 8 oz/100 gals<br>or<br>Nicotine sulphate 40% 8–12 oz/100 gals |

**WARNING**

**Parathion, systox and TEPP—like certain other organic phosphate insecticides—are extremely toxic to human beings. Precautionary recommendation on manufacturer's label must be followed without exception or modification.**

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## VALENCIA

Continued from page 10

The lack of a significant increase in the large-sized oranges in the moderately dry treatment as a result of the 2,4-D spray indicates that soil moisture is an important factor in obtaining consistent results with growth regulator sprays for increasing fruit size. While the results so far are impressive, they represent only one crop and should be considered as a progress report in this investigation.

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