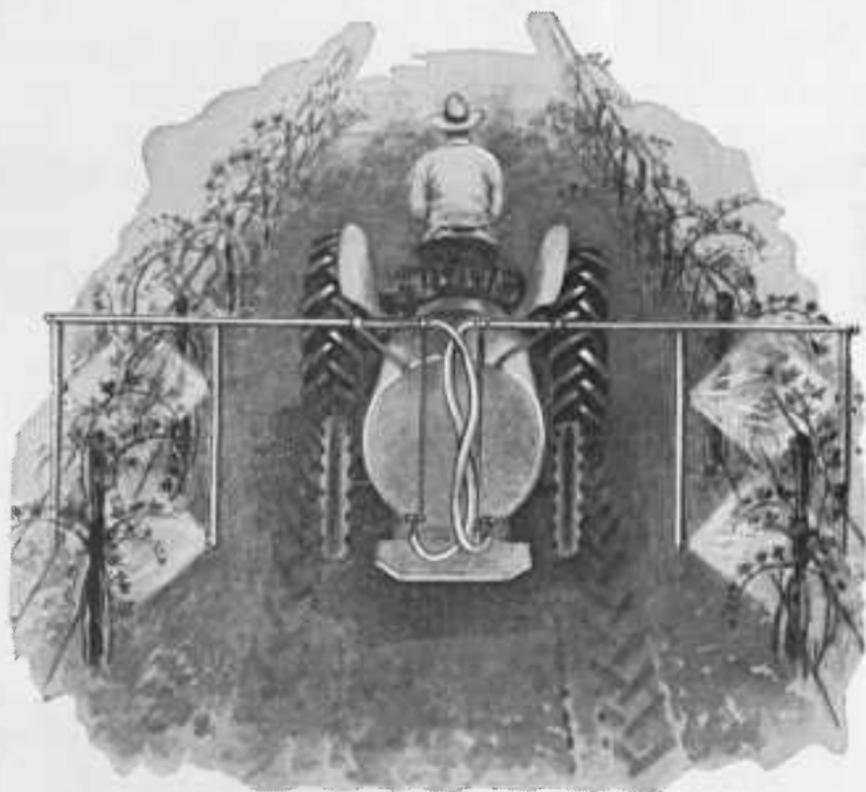


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Spray Schedule

for

Diseases and Insects of Cane Fruits



Cooperative Extension Service

Oregon State University • Corvallis

Extension Circular 609 • Revised February 1969

DISEASE AND INSECT CONTROL increases yield and improves quality of cane fruits. Oregon cane fruits are subject to insect and disease damage, most of which can be controlled with a good spray program.

INSECTS

Oblique-banded Leafroller

The active, green larvae with black heads web and feed on foliage and ripening fruit. Raspberry is the most susceptible to damage. Control with Guthion or Sevin. Do not apply Guthion within 14 days or Sevin within 7 days of harvest.

Orange Tortrix

The active, yellow-green larvae with brown heads web and feed on foliage and ripening berries of all cane fruits. Control with TDE, Guthion, or Sevin. Do not apply Sevin within 7 days or either TDE or Guthion within 14 days of harvest. A second application about 10 days after the first may be necessary, depending on the season and degree of infestation. There are two or three overlapping generations of the insect each year, and it is suggested that growers check their plantings to determine the need for treatments other than the early May application.

Strawberry Root Weevils (*Brachyrhinus spp.*)

All cane fruits are susceptible to injury, but red raspberries are the most seriously damaged. The white, legless larvae with tan heads feed on small roots and later on the cambium of large roots and crowns. Adult weevils sometimes get into picked fruit and create a contamination problem.

Larval control. New plantings can be protected for several years by pre-planting soil treatment using 4 pounds actual heptachlor or 10 pounds actual chlordane per acre. The insecticide should be incorporated thoroughly into the upper 6 inches of soil by plowing or discing prior to planting. Do not use heptachlor on areas to be planted to loganberries.

Adult control. To control adult weevils and prevent them from laying eggs or becoming a contamination problem, use malathion at the rate of 2 pounds actual malathion per acre. Adult root weevils usually begin to appear in late May and continue emergence through July. Several applications may be necessary if weevils are abundant. If adult weevils are present after harvest, 2 pounds actual chlordane per acre may be used. Use

chlordane only as a post-harvest treatment. Malathion may be applied within one day of harvest. Weevil bait may be used to control adult weevils if preferred.

Obscure Root Weevil

Adults of the obscure root weevil are active during harvest and may create a contamination problem. The adults may be controlled by using ½ pound actual Guthion per acre or 2 pounds actual malathion per acre. Do not apply Guthion within 14 days of harvest. Malathion may be used within one day of harvest. OSU Extension 738, "Control of Root Weevils on Ornamentals and in Homes," will aid in identifying this weevil.

Raspberry Cane Maggot

This is an occasional pest of red and black raspberries. The presence of the insect is indicated by canes which wilt and droop in "limberneck" fashion. Cut off wilted canes close to the ground and burn. Very little actual loss occurs from this insect even when 60 percent of the new canes are infested.

Spider Mites

These are small, eight-legged mites, about 1/50 inch long, and light tan or greenish in color. Their feeding reduces plant vigor and causes leaves to turn yellow and drop prematurely. They are found on the foliage of all cane fruits but do the most damage to red raspberries.

Strawberry Crown Moth

Black raspberries are most susceptible. Whitish larvae tunnel in crowns and larger roots. No control is recommended at present.

Raspberry Crown Borer

The larvae require nearly two years to complete their development. The overwintering first year larvae are about ¼ inch long. They begin to feed in early March on cane buds around the plant crown. As larvae mature, they are about 1 inch long and feed in cane bases and kill the canes attacked. Feeding in roots and crowns weakens blackcaps, boysenberries, loganberries, and blackberries and may kill raspberries. Guthion or diazinon at the rate of 2 pounds actual insecticide per acre applied as a crown drench during March 10-20 is effective. Guthion or diazinon at this rate should only be used as a spring drench treatment and should not be applied when fruit is present. See Oregon Agricultural Experiment Station Circular of Information 615, "The Raspberry Crown Borer," for full details.

Redberry Mite

This mite causes greatest damage to blackberries. The presence of this pest is indicated by berries which do not ripen normally and remain red and hard after harvest. Use a spring spray as suggested in the spray schedule. If the infestation is severe, use a similar spray after the old canes are removed.

DISEASES

Anthracnose (Black and Red Raspberry)

On canes, small, ⅛-inch or more, purplish sunken spots, later turn gray. Older spots are deeper with raised purplish margins.

Blackberry Rust

Small yellow, powdery spots appear on the undersides of leaves. Yellow pustules ⅛ to ⅜ inch long form on the canes. Chehalem and Evergreen blackberries are susceptible.

Cane Gall

Small, rough ridges of warty growth occur on fruiting canes. The red, black, and purple raspberry, Himalaya, boysenberry, loganberry, and youngberry are affected. Best control is by setting out disease-free plants from healthy plantings in soil free from the causal bacterium. Remove and burn severely diseased plants. Remove the contaminated soil about these plants and replace with clean soil. When the disease is not severe, cut out the affected canes and burn. Avoid injury to the plants. The causal bacterium will persist in soil after the susceptible plants are removed.

Crown Gall

Irregular, warty galls appear on the base of canes or on the roots. All cane fruits, as well as many woody shrubs and fruit trees, are affected. Control is the same as for cane gall.

Fruit Rot

The Botrytis fungus is a common cause of fruit rot. The rot may be more prevalent in fields under overhead-set irrigation systems or where the fruit is allowed to become ripe enough to be harvested by mechanical pickers. Fruit rot may be common in Marion and Evergreen blackberry plantings.

Leaf and Cane Spot (Trailing Berries)

Small, light to dark brown spots appear on both leaves and canes. Later, the spots have whitish centers and brownish borders. Loganberry, boysenberry, youngberry, Santiam, Chehalem, and the common wild trailing blackberry are severely affected. Where the disease is particularly severe, a fall spray of Bordeaux should be applied in addition to the dormant and spring sprays.

Mushroom Root Rot (All Cane Berries)

The plants decline and dieback and eventually are killed. In the autumn honey colored mushrooms appear in crowns of plants. White, felt-like masses of fungus grow between the bark and the wood in the plant crowns. Dark brown or black thread-like strands are often found on plants at ground level or just below. Remove and destroy the plants (small roots as well). Do not replant in affected spots. The fungus can live in the soil for many years.

Powdery Mildew (Raspberries and Some Blackberries)

The Puyallup red raspberry is very susceptible. Canby, Washington, and Willamette are much less susceptible. Whitish-gray powdery masses occur on leaves, fruit, young canes, fruit spurs, and buds. Spray with Karathane during the blossom period. (See the spray program.)

Verticillium Wilt (Most Cane Berries)

Yellowing and wilting of foliage occur. Bluish strips of infected tissue usually extend up the canes from ground level. Himalaya, Evergreen, and wild trailing blackberries seem to be highly resistant. Plant healthy stock from disease-free plantings. Roguing and rotations of nonsusceptible grasses and cereals help. Avoid planting where susceptible crops—potatoes, tomatoes, eggplants, peppers, strawberries, and peaches—have been grown previously.

Virus Diseases

To control virus diseases, use disease-free planting stock; rogue out and destroy suspicious or diseased plants. When more than 5 percent of the plants in the field are diseased, the value of roguing is doubtful.

Yellow Rust (Red Raspberry—Some Varieties)

Yellow pustules form on both surfaces of leaves and canes in spring and summer. Black pustules form on the underside of leaves in autumn. Two spring sprays of lime sulfur or ferbam usually obtain control. (See the spray program.)

Spray Program For Cane Fruits

Time of application	Insect and disease	Material—time and rate of application*
Spring	Anthracnose	New canes 10" to 12" high: Lime sulfur 2½ gallons per 100 gallons of water.
	Blackberry rust	Green tip stage: Spray with a fixed copper, 6 pounds per 100 gallons of water.
	Leaf and cane spot Redberry mite	March 10 to 15: Lime sulfur 10 gallons or a fixed copper 6 pounds in 100 gallons of water. Two weeks later: Fixed copper 6 pounds or 1½ pounds Captan 50% W. P. in 100 gallons of water. Add 2 ounces spreader sticker to all sprays. Residues: Captan—no limitations. To control redberry mite on blackberry, apply lime sulfur when new lateral shoots from canes on the wire are about 2 inches long, but reduce dosage to 8 gallons per 100 gallons of water.
	Yellow rust	Green tip stage: Lime sulfur 4 gallons. Two weeks later: Lime sulfur 2½ gallons or ferbam 1½ pounds. If weather continues humid, 1½ pounds ferbam just before blossoming. Do not apply ferbam within 40 days of harvest.
	Raspberry crown borer	About March 10-20: Apply a drench treatment of Diazinon or Guthion to the crowns of plants. See text for details.
summer		
Late spring and	Blackberry rust	Just before blossoming: Spray with a fixed copper at the rate of 6 pounds per 100 gallons of water.
	Fruit rot	Spray with Captan 50% W. P. or Botran 75% W. P. at 2 pounds per 100 gallons of water when 10% of blossoms are open and again 7 days later. A spray during harvest, if rain occurs, may be helpful. Captan may be applied up to and during harvest. Do not apply Botran later than 7 days before harvest.
	Oblique-banded leafroller	Use ½ pound actual Guthion, or 2 pounds actual Sevin per acre. Apply in early May just previous to the time boysenberries bloom. Removal and burning of old canes between November 1 and March 1 will destroy many overwintering larvae. Do not apply Guthion within 14 days, or Sevin within 7 days of harvest.
	Orange tortrix	Use 2 pounds actual TDE (Rhothane), or 2 pounds actual Sevin, or ½ pound actual Guthion per acre. Make application in early May when first boysenberry leaves are fully open. If bloom is present, use TDE and apply only in the evening or early morning when bees are not foraging.
	Powdery mildew (Raspberry)	Karathane (25% W. P.) ¾ pound. Apply at rate of 1½ pounds per acre in 200 gallons of water. Apply when first flowers open and thereafter at 7-day intervals until petal fall. Thoroughness of application very important. Do not apply within 7 days of harvest.
	Strawberry root weevils	Use pre-planting soil treatment to control larvae or chlordane, malathion, or bait to control adults.
	Obscure root weevil	Use ½ pound actual Guthion or 2 pounds actual malathion per acre. Do not apply Guthion within 14 days or malathion within 1 day of harvest.
	Spider mites	Treat soon after harvest if mites are present on 10% or more of the old leaves. Treat in early August if 20% or more of the old leaves are infested. Use 1.2 pounds actual Kelthane, or 2 pounds actual malathion, or 6 ounces actual parathion per acre. Do not use Kelthane within 2 days of harvest, malathion within 1 day of harvest, parathion with 15 days of harvest.**
Fall	Redberry mite	Use lime sulfur as suggested for spring treatment. Apply after old canes are removed. Needed only in case of severe "redberry" condition.
	Leaf and cane spot	Remove and burn affected canes after harvest. Bordeaux 8-8-100 about September 15.
Winter (dormant) ..	Rust, anthracnose powdery mildew, cane blights, leaf and cane spot	Lime sulfur 10 gallons.

* Amounts of spray chemicals recommended are to be mixed with sufficient water to make up 100 gallons of spray. Where dosage is given in amount of actual pesticide per acre, mix with sufficient water to give thorough coverage. If dust formulations are used, apply at the rate of 40 pounds per acre.

** Parathion is a hazardous material. Before using, read and follow all precautions appearing on the manufacturer's label.

Use Pesticides Safely

The first guide in the safe use of pesticides is to read the label on each pesticide container before each use and follow the directions given. If you are still in doubt after reading the label, contact some qualified person, such as your county Extension agent, fieldman, or chemical company representative, to help evaluate the hazard of the chemical. All pesticides should be handled with care; but even the most hazardous can be used with safety provided that recommended safety precautions are followed.

Parathion is a highly toxic organic phosphorus compound and the manufacturer's precautions appearing on the label should be followed closely.

Malathion, Guthion, and diazinon are also organic phosphorus insecticides but are less hazardous than parathion. However, these compounds should also be used with caution. Ingestion of any of these pesticides may be fatal.

Avoid Excess Residues

Excess residues of pesticides at time of harvest can be avoided if:

- They are applied at the rates suggested.
- The interval between application and harvest is followed.
- They are not permitted to drift onto other crops or pastures adjacent to the berry field.

Bees Are Necessary—Don't Kill Them

Bees are important for maximum quality and fruit set. Follow these suggestions:

- Avoid using insecticides during the bloom period.
- If bees are adjacent to fields that will be treated, advise the beekeeper who can move the hives or otherwise protect his bees.
- Sevin and Guthion are very toxic to honeybees. Do not use them on blooming crops.