

larvae will mature and emerging moths will lay eggs even when first year larvae are killed. For this reason, infested fields should be treated for at least two successive years. Need for further treatment can be determined most easily by searching for young larvae in early spring. General indications of field infestation are premature reddish color of leaves and wilting of canes. Old infestations are indicated by round holes about 1/4 inch in diameter in cane stubs.

Drenches suggested for control of the raspberry crown borer are more concentrated than sprays generally used to control other insect pests susceptible to these insecticides. More than ordinary care should be given to handling the materials. Applicators should follow the manufacturer's safety precautions appearing on the label. Of the two materials, Guthion is the more toxic to humans. If undue exposure to Guthion spray mist is anticipated, applicators should use a respirator designed to protect their lungs.

Home Gardens

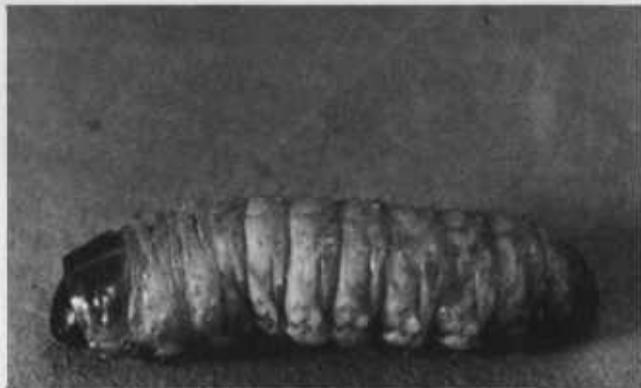
Home gardeners can use this same type of treatment to protect their cane berries.

Diazinon is suggested, since it is readily available in small packages. Home garden emulsion concentrate formulations of Diazinon usually contain 12½ percent active ingredient. This formulation should be used at a rate of 2½ tablespoons per gallon of water and 2½ to 3 pints of drench per plant should be applied.

Application can be made with a sprinkling can or other suitable device, if agitation is provided.



Larval feeding in the crown of plants may girdle and kill new canes.



Full-grown larva of the raspberry crown borer may be 1 1/2 inches long. The larvae actively feed during two growing seasons.

The Raspberry Crown Borer ... and Its Control



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Oregon State University, Corvallis

The Raspberry Crown Borer

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R. G. Rosenstiel

Emeritus Associate Professor of Entomology

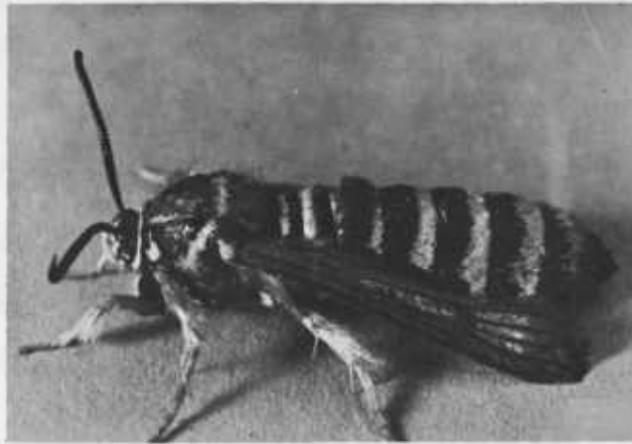
The raspberry crown borer, *Bembecia marginata*, is a serious pest of red and black raspberries, boysenberries, loganberries, blackberries, and related varieties of cane fruits. This insect, first found in Oregon about 1899 in the Portland vicinity, now occurs throughout Oregon and other states. Borers feeding in the larger roots, crown, and at the base of canes reduce fruit production and quality. Control is complicated by their two-year life cycle. Leaves of injured young canes of the current season's growth die or have a reddish color in late summer.

Description

The adult moth has the general appearance of a yellow jacket wasp. It has transparent wings and a fuzzy, black body with narrow, yellow rings around the abdomen. Eggs are oval in outline and brown in color. They are nearly 1/16 inch long. When full grown, the larva is about an inch in length, with a white body and brown head. Each larva has six short legs on the thorax and a series of small, paired, hooked appendages on abdominal segments three, four, five, and six. These tiny hooks form a pair of oval areas on each of the segments mentioned above. The tenth abdominal segment does not bear these hooks. On the larva of the strawberry crown moth, a closely related insect, these hooks are present on the tenth abdominal segment. Mature raspberry crown borer larvae change into cigar-shaped brown pupa about an inch long in late summer.

Life History

Adults emerge during August and September from pupae in the base of old canes. Eggs are laid singly on the under side of leaves, near the edge, during October and early November. It usually requires about 30 to 60 days for the eggs to hatch; the majority of them hatch during late October, November, and early December. Young larvae hatching from these eggs crawl down the canes to the base or crown of the plant. Occasionally larvae hasten their descent by lowering themselves to the ground on a silken thread spun from their mouths. Larvae which



Adult raspberry crown borer emerges from pupa in August and September. It is about 3/4 inch long.

successfully reach the crown of the plant work their way just below the surface of the soil and tunnel just under the bark. Here they form a round, shallow cell, or hibernacula, which appears as a slightly raised blister under the bark of the crown. During their first year the larvae pass the cold winter weather in these cells.

When plant growth begins in the spring, the small larvae become active and leave their over-wintering cells to feed in buds of new canes. They usually girdle the short new canes near the base. A few may enter new growth at the tip. A single larva may injure or kill as many as three or four new canes. In early March close inspection of the new cane growth just below the soil surface will give growers an indication of the degree of new infestation in their plantings. Older, second year larvae resume feeding in the crowns or cane bases as the soil warms up.

By mid-May, most of the young larvae have bored through harder portions of new canes. Then they feed downward through the pith toward the crown. This injury, plus that caused by the feeding of older larvae, seriously weakens the plant, particularly if several larvae are present, which is usual in infested fields.

The following spring, the original small larvae, which have grown from 1/8 inch to about 1/2 inch in length, continue to feed in the crown area until late summer of their second year of life. The full grown larvae, now about 1 to 1 1/2 inches long, move upwards into the lower part of mature canes or old cane stubs. Here they prepare emergence holes and change into brownish, cigar-shaped pupae.

Control

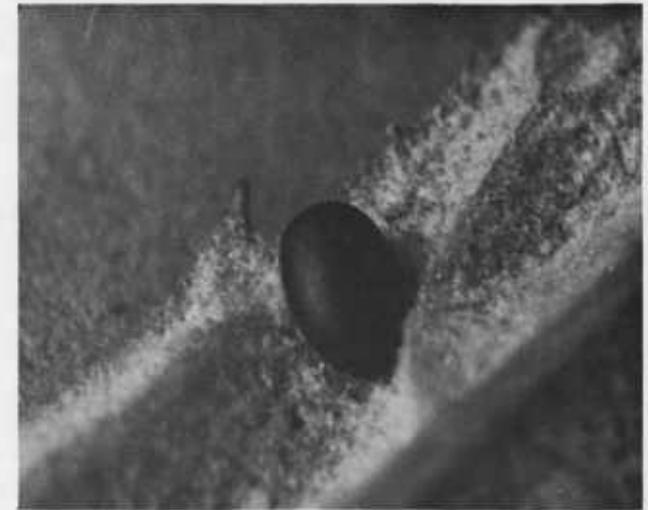
A properly timed, thorough application of insecticide will enable growers to obtain good control of young larvae of this important pest. Guthion or Diazinon, at a rate of 2 pounds actual insecticide per acre applied as a drench to the crowns of plants, is suggested. Experimental work has shown that this treatment requires at least 200 gallons of drench per acre to obtain good control. The drench may be applied by removing the disc from a spray nozzle, or by using any type of nozzle that will deliver a high volume of liquid and maintain agitation.

Diazinon and Guthion may be purchased as wettable powder formulations. Either of these insecticides should be used at the rate of 2 pounds of active insecticide in 200 gallons of water per acre.

These insecticides may also be purchased as emulsion concentrates. The emulsible formulations should also be used at the rate of 2 pounds active insecticide in 200 gallons of drench per acre.

Time of spray application is extremely important. Best results will be obtained if sprays are applied in the spring between March 10 and March 20. Because this application is a crown drench, rain at the time of treatment does not interfere with effectiveness. Experimental applications made while it was raining were just as effective as those made during dry periods.

Drenches are effective only against small larvae. Older



Brown eggs about 1/16 inch long are deposited on the undersides of leaves in October and early November.