

The Strawberry Crown Moth

A Pest of Strawberries and Caneberries

The strawberry crown moth, *Synanthedon bibionipennis* (Biosduval), is a serious pest of strawberries, raspberries, and loganberries in Oregon. This insect is native to the Pacific Northwest and occurs south from British Columbia to California and east to the Rocky Mountains.

The larvae of this moth destroy the crown and root tissues of strawberry plants by feeding in these areas. The feeding process wounds the plant and allows the entry of root diseases.

Injured plants appear stunted, produce poor fruit yields, and readily separate from the root at the crown line when pulled on. This last symptom distinguishes crown moth damage from root weevil damage.

The strawberry crown moth has been most damaging in the north Willamette Valley and in the Silverton Hills area. Recently, it has caused localized damage to strawberries in the Eugene-Springfield area.

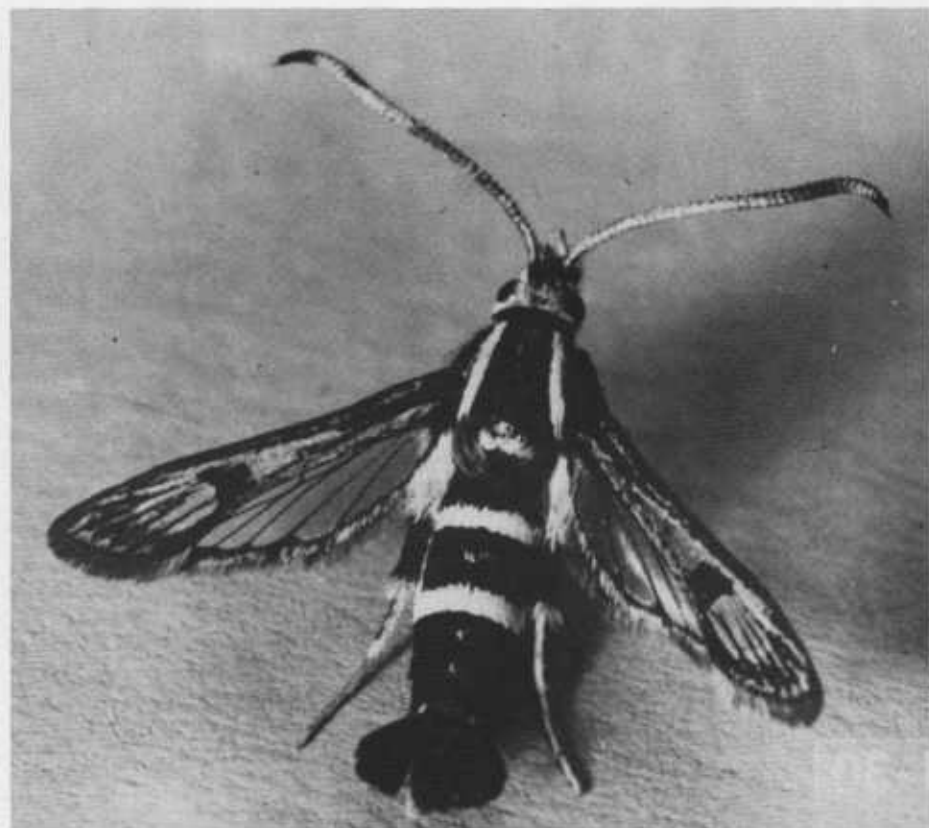


Figure 1.—A strawberry crown moth adult

Description

The general color and flight pattern of the strawberry crown moth adult resemble that of a yellow jacket. In fact, strawberry pickers often mistake the adults for wasps or hornets.

The adult moth, about 1/2 inch (12 mm) in length, has a black body with two or three yellow marks on the thorax, the part of the body where the legs are attached (figure 1).

Unlike most moths, the strawberry crown moth has hind wings that are transparent and forewings that contain two transparent patches.

The eggs of the strawberry crown moth are brown, oval-shaped, and approximately 1/50 of an inch (.53 mm) long. The eggs are sculptured on the surface and distinctly cupped on the sides (figure 2).

The larva, only 1/16 inch (1.15 mm) when first hatched, grows to a length of approximately 4/5 inch (20 mm) at maturity (figure 3).

The larva has a white body and a dark brown head. The abdomen, however, may take on a pinkish or brown color from the food inside.

The larva has three pairs of wiry, brownish legs on the thorax and five pairs of prolegs (fleshy swellings) on the abdomen.

In caneberries, the larva of the strawberry crown moth is likely to be

Extension Circular 1175 / July 1984



OREGON STATE UNIVERSITY EXTENSION SERVICE



Figure 2.—Eggs of the strawberry crown, moth on strawberry leaves



Figure 3.—Strawberry crown moth larva in strawberry root



Figure 4.—Strawberry crown moth pupa

confused with that of the raspberry crown borer, *Bembecia marginata*.

These two species can be distinguished by the last row of prolegs on the abdomen—the strawberry crown moth has a row of brown hooks (crochets) and the raspberry crown borer does not. A hand-held magnifying glass of at least 10-power is needed to see these hooks clearly.

Raspberry crown borer larvae have a 2-year life cycle and are much larger than crown moth larvae at maturity. Also, the crown borer larvae tunnel into the crown near the base of the canes, while the strawberry crown moth larvae girdle the roots and lower crown of the plant with superficial tunnels that do not penetrate.

In caneberries, the tunnels of the strawberry crown moth are exposed to the soil surface. The crown moth pupa is about 1/2 to 5/8 inch (12 to 15 mm) long and brown (figure 4).

Life history

The strawberry crown moth overwinters as a nearly mature larva in the crown of the strawberry. When temperatures increase in the spring, the larvae feed for a 2- to 6-week period. The larva pupates during May and June within a frass-covered silk cocoon.

The pupal stage lasts approximately 3 weeks. Just before emergence, the pupa forces itself out of the cocoon with the help of rows of spines on its abdomen. The pupa then wiggles out of a hole previously eaten in the strawberry crown by the larva.

The moth emerges from the pupal case, leaving the case among the old stems near the crown of the plant. Adults appear from late May through July.

Peak emergence varies from season to season but usually occurs during the last of the strawberry harvest in late June or early July.

Females begin to attract males the day of emergence, and mating and egg deposition commence within 1 or 2 days. A female depositing eggs flies very low over the tops of the strawberry plants.

After landing on a plant, the moth usually crawls to the dead leaves and stems at the base of the plant and gets as close to the crown as possible. Eggs usually are deposited on dead leaves or on the crown. Occasionally, the eggs are placed on the undersides of green leaves.

It usually takes from 10 to 14 days for the eggs to hatch. Most of the eggs hatch between late June and mid-August.

The newly hatched larva feeds in and on the strawberry crown and roots, just under the epidermis. Also, the larva may travel down the crown and feed on the bases of small rootlets or, temporarily, within a rootlet.

As the larva grows older, it burrows deeper into the pith of the crown and continues to feed and grow until late fall. In October or November the larva spins a silken cell and passes the winter in diapause (hibernation).

Management practices

The larvae can't be controlled with insecticides once they're in the crown or root system of strawberries. The use of insecticides is, therefore, designed to prevent larval entry to these areas.

Plan your cultural and chemical controls so they'll work together to achieve this prevention.

Insecticides can effectively reduce larval entry into crowns—but only if you use the correct ones at appropriate rates and apply them at the correct times. Their effectiveness is increased if you follow the cultural practices discussed below.

Insecticide control

Insecticides are used to control the adult strawberry crown moths. More importantly, they're timed to place chemical residues on the strawberry plants' leaves and crowns to control newly hatched larvae, which must walk on and chew through this insecticide barrier.

Because the strawberry crown moth flies and deposits eggs during and after harvest, the first of two, and possibly three, insecticide applications *must* be made during harvest.

Correct timing is from 9 to 12 days after the first consistent adult emergence or flight within a field. This application (and later ones) should be made by ground, using 150 gallons of water per acre with a high-pressure sprayer, to thoroughly penetrate the plant canopy and saturate the crown area.

This initial application should usually occur in mid- to late June (figure 5). It is timed to control the first newly hatched larvae before they penetrate the crown or root tissue, and to leave

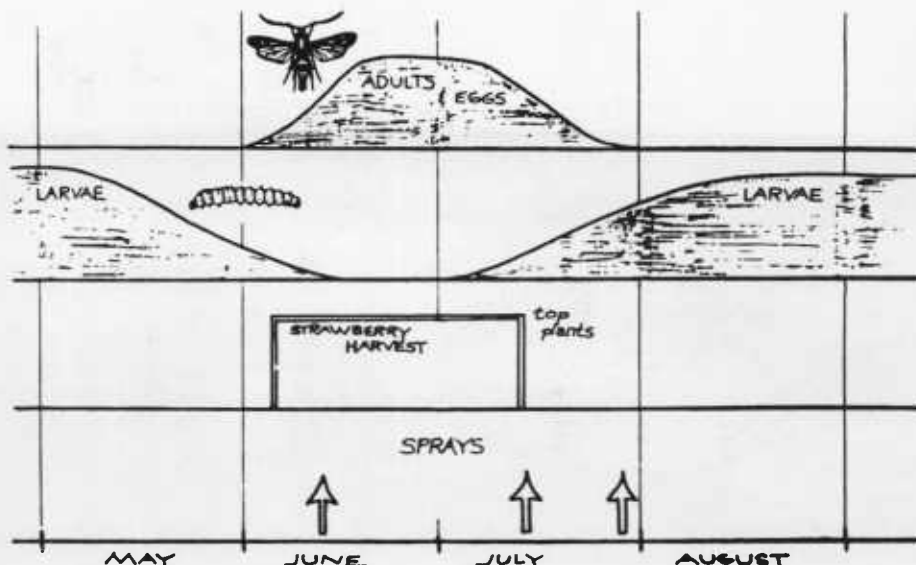


Figure 5.—Strawberry crown moth control strategy (arrows indicate the approximate time to apply insecticides)

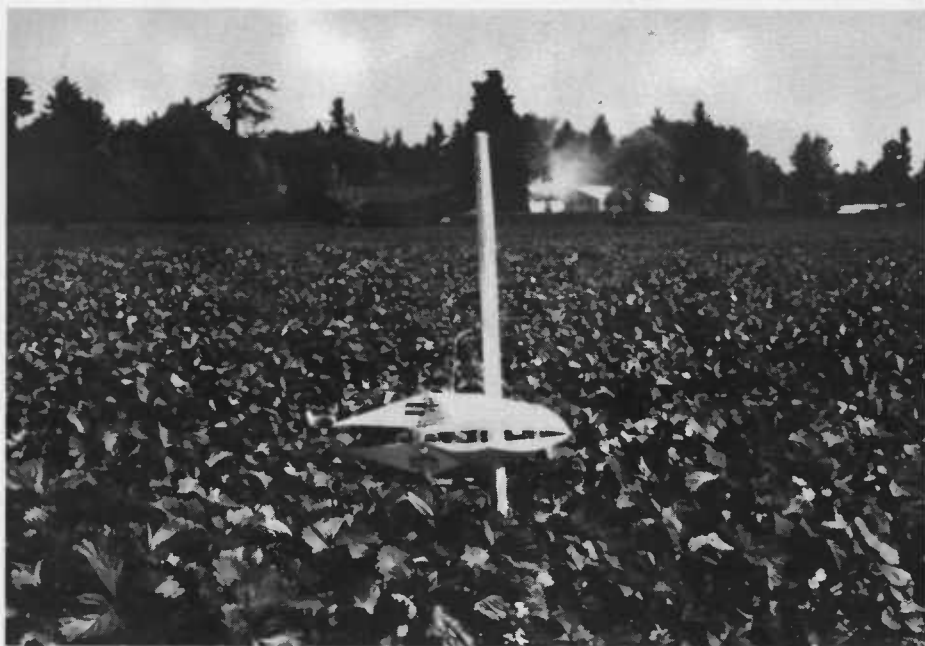


Figure 6.—A strawberry crown moth pheromone trap, placed at canopy height on the daytime upwind side of the field

residual insecticide to control larvae hatching 1 to 2 weeks afterward.

Because of the pest's relatively long flight period, and the short residual effect of the insecticides that you can safely use during harvest, a second application may be needed in from 2 to 2½ weeks after the first. Make this application, too, with high pressure and volume of spray.

Pheromone traps can be used to correctly time the first application, which you should make from 9 to 12 days after 3 or 4 moths are caught per trap per day (figure 6).

Use 1 trap for every 5 acres. Place one near the upwind margin of the field (daytime wind). If temperatures remain warm, spray in about 9 days from first consistent adult trap catch.

If you experience cool, rainy days, apply insecticides in about 12 days.

Use Guthion 50W (1 lb/acre) or Thiodan 50W (2 lb/acre) during harvest. Guthion has a 5-day, and Thiodan a 4-day, limitation from application to harvest.

Peak flight usually occurs within 4 to 5 days of July 1. If your trap catches are high at this time, you need

another insecticide spray. You have two choices:

Option 1. If your field will be harvested for another week or two, apply Guthion 50W.

Option 2. If your harvest is complete, top your plants (but leave a few rows *untopped*, to attract egg-laying moths). Treat with either Lorsban 4E (1 qt/acre) or Furadan 4F (1 qt/acre). Don't water in. The toxicant must remain on and about the crown area to kill newly hatched larvae.

Note: Treat and top only those fields that will remain in production for another year or more. You don't need to treat or top fields that you expect to remove from production—they'll provide a trap crop to attract egg-laying moths.

Then you can plow under these old fields about September 1. Don't plow out earlier—because the moths will seek other strawberry or caneberry fields to lay eggs in.

Don't wait till the following spring to plow these fields under. Many larvae can complete development in root and crown residue—and produce more moths from these fields.

Be sure to treat new plantings and fields that will remain in production for another year or more and are within ¼ mile of old infested fields that you expect to remove from production.

Make a third insecticide application (preferably Lorsban) in mid-July if flight activity remains high. Apply it to topped plants in a minimum of 150 gallons of water.

Cultural control

Certain cultural practices may help in reducing infestations of the strawberry crown moth.

- Minimize light infestations by removing infested plants and either replanting or allowing runners to fill the area.
- Following harvest, leave a couple of rows of untopped plants to attract the ovipositing females. In late seasons, the females may concentrate their egg laying on these untopped plants. (Disk these rows under in September). This practice, however, may not be effective in early seasons, as a large number of eggs have been laid prior to topping.

- Wait until September to disk under infested fields. This will help to concentrate egg laying in these fields and minimize dispersal of adult moths to other fields.

This practice will be most effective if the infested field is separated from other fields by a grainfield, wooded area, or a distance of 1/4 mile.

Spring cultivation of fields is less effective because the larvae that have not been injured will be able to complete development in the dead plant material.

Plowing to a depth of 10 inches will help to bury the larvae deep enough to prevent adult emergence.

- Avoid planting new strawberry fields adjacent to infested ones. If you must establish new plantings next to infested ones, plant a fall or spring grain crop between them to confine most of the moths to the old field. Because the moths are low fliers, they are somewhat restricted by objects more than 3 feet tall, such as a field of grain.
- Treat newly planted fields with endosulfan (Thiodan), Lorsban, or Azinphosmethyl (Guthion) during

June and July. Similar treatments on producing fields should also be effective.

Be sure to observe interval between last application and harvest. Systemic insecticides are not effective on strawberry crown moth.

Caneberries

Treat raspberries, loganberries, boysenberries, and Marion berries growing adjacent to an infested strawberry field with an insecticide drench in the fall or spring.

This will protect the caneberries from strawberry crown moth damage and reduce migration of the moth from the caneberries to the strawberries. Azinphosmethyl (Guthion) or diazinon, when applied as a crown drench to control the raspberry crown borer, will also control the strawberry crown moth.

Note: This technique does not work on strawberries because the larvae are completely enclosed in the crown and root tissues—where the insecticide can't reach them. On caneberries, the larvae are exposed to the soil surface and are readily controlled by the drenching method.

The Oregon State University Extension Service provides education and information based on timely research to help Oregonians solve problems and develop skills related to youth, family, community, farm, forest, energy, and marine resources.

Extension's agricultural program provides education, training, and technical assistance to people with agriculturally related needs and interests. Major program emphases include food and fiber production, farm business management, marketing and processing of agricultural products, and resource use and conservation.

This publication was prepared by Glenn C. Fisher, Extension entomologist, and W. A. Sheets, Extension agent, Washington County, Oregon State University. It revises and replaces Fact Sheet 244, with the same title. Trade-name products are cited as illustrations only; their mention does not constitute endorsement of these products by the Oregon State University Extension Service. Funding for this research was provided by the Oregon Strawberry Commission.

Extension Service, Oregon State University, Corvallis, O. E. Smith, director. This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties.

Oregon State University Extension Service offers educational programs, activities, and materials without regard to race, color, national origin, or sex as required by Title VI of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972. Oregon State University Extension Service is an Equal Opportunity Employer.
