CRANBERRY FRUITWORM

Common Name: Cranberry fruitworm
Scientific Name: *Acrobasis vaccinii*
Order: Lepidoptera (butterflies and moths)
Family: Pyralidae (pyralid, grass, wax and snout moths)

Cranberry fruitworm is one of the most serious pests of Wisconsin cranberry production. The larvae feed only internally within fruit. Each larva can destroy 5-8 fruit. If left uncontrolled, significant crop loss can occur.

Biology and Damage

Host Plants:
Cranberry, *Vaccinium macrocarpon*.
Southern highbush blueberry, *Vaccinium australe*.
Highbush blueberry, *Vaccinium corymbosum*.
Various other species in *Vaccinium* and *Gaylussacia* (huckleberry and relatives).

Description and Diagnosis:
The egg is usually laid singly under a calyx lobe at the blossom end of the fruit. The egg conforms to the shape of the space available, but generally is flat, circular, about 0.4 mm in diameter, and initially opaque but turns light brown close to hatch. The larvae are typical caterpillar-like, with a distinct head and several pairs of distinct legs. Larvae have six instars and ultimately reach a length of about 1/2". The head is yellow to light brown. The body color is reddish-yellow on the top and green below. A very few short, fine, and indistinct hairs are scattered over the body. The pupa is about 1/3" long and is located in a silken cocoon covered with sand and debris on the bog floor. The head and body of the adult moth are covered with golden-yellow scales. The front wings are brown with patches of white scales. The wing spread is about 3/4".

Larva in fruit.

Adult moth.

Economic Importance:
Since the cranberry fruitworm feeds exclusively on the fruit, it is one of the most damaging insects on cranberry. Chemical and non-chemical techniques help suppress the population but the methods must be well timed with the newly emerged larvae. If left untreated, bogs in Massachusetts have reported more than a 50% crop loss directly due to this insect.

Life Cycle:
Cranberry fruitworm overwinters in the prepupal stage in the soil. Pupation occurs in early spring with the adults emerging from mid-June through the end of July. Peak flight occurs near blossom time. The adults are nocturnal and remain among the vines during the day. Egg laying begins as the berries start to grow with the larvae emerging in five days. First instar larvae bore a small hole directly into the berry. They consume the seeds and pulp before emerging and move to a different berry to repeat the process. The larvae then drop to the ground to construct a silken cocoon at the end of August for overwintering. There is only one generation per year.

Environmental Factors:
Once the larvae enter the berry, they spin a protective silken window over the hole so they are protected from natural enemies, insecticides, and adverse weather. Since they enter the berry almost immediately after egg hatch, this leaves a narrow window when they are vulnerable to control methods. Control of the adults is limited because they are active during the same time frame as honey bees and other pollinating insects are on the beds.

Damage/Symptoms:
Soon after feeding begins, the injured berries become reddish prematurely. The fruit shrivels due to the loss of pulp and dries out. However, this occurs after the larvae have already entered the berry and began feeding on the seeds. Once all the seeds and pulp is consumed, the larva exits, leaving behind a frass-filled, hollowed out fruit. Such dried berries are sometimes called “raisins”. Each larva can consume three to six berries during its life.

Premature coloration.

“Raisin berry” with exit hole.

Opened fruit with internal feeding.

Monitoring and Controls

Scouting Procedure/Economic Threshold:
Researchers in Massachusetts have developed an elaborate method for sampling and determining the economic injury level of cranberry fruitworm. Massachusetts recommendations are based on the assumption that a given property MUST be sprayed for CFW, based upon the past history of infestation. Because the significance of CFW injury varies substantially in Wisconsin, the following recommendation is a modification of the Massachusetts method.

Sampling is based on the number of eggs found on the berries. The start of sampling is based upon flower phenology; sampling should begin 5-6 days after half the blossoms have lost their petals (or become fruits). A minimum of 200 berries should be checked for up to 4 acres, plus an additional 50 berries checked for each additional acre. The economic injury level is set at 1 egg per 100 berries checked.

Sampling should continue every 3-4 days until the end of CFW moth flight, about the middle of August. Sprays should be applied as soon as the egg counts reach threshold.

When sampling berries, they should be picked randomly from throughout the bed. The fruit should be examined under magnification to find the eggs under the calyx lobes at the flower end of the fruit.

Adult moths can be monitored using pheromone traps. Use at least one trap per 20 acres, and a minimum of two traps for isolated areas less than 20 acres. Traps should be checked at least weekly.

Natural Control:
Some natural egg and larval parasitism occurs, but often not enough to provide adequate control.

Cultural Control:
In Massachusetts, late water (a 30 day reflood before the end of dormancy) has been shown to greatly reduce fruitworm activity. This is not practiced in Wisconsin.

Biological Control:
None currently available. Some *Bacillus thuringiensis* products are registered, but efficacy is minimal and multiple applications are needed.

Chemical Control:
Several broad spectrum insecticides are registered against cranberry fruitworm and are effective. The Insect Growth Regulator tebufenozide is also registered for cranberry fruitworm control; refer to the label for specific usage information. Applications should be timed for the egg stage (see Scouting Procedure, above). Applications time for control of larvae within the fruit provide minimal benefit.

References:

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This information was prepared by Daniel L. Mahr, Professor and Extension Fruit Crops Entomologist, University of Wisconsin – Madison. It is revised and modified from the Pest Profiles section of University of Wisconsin Cranberry Crop Management software (CCM). November, 2005.

Photo credits. Adult moth by S. L. Roberts while IPM Specialist at University of Massachusetts Cranberry Experiment Station. Photo of larva in berry by Tim Dittl while UW Entomology Research Assistant. All other photos by D. Mahr, UW Entomology.