CRANBERRY WEEVIL

Anthonomus musculus (Say)
Coleoptera: Curculionidae

University of Massachusetts/Amherst, Cranberry Experiment Station
Martha M. Sylvia and Anne L. Averill

The cranberry weevil is a major pest on Massachusetts bogs. Cranberry weevils are tiny reddish-brown beetles that are approximately 1.6-2.0 mm (1/16") long. The weevil has a slightly curved snout about a third as long as the rest of the body. Adult weevils are found on the bog throughout the growing season. It is often found at the same location (particularly coves and near wooded areas) year after year.

Distribution and Host Plants

Larvae successfully complete development within flower buds of cranberry and both wild and cultivated blueberry. As a result, it is also called the "blueberry blossom weevil." Early season host plants of weevil in Massachusetts are early low-bush blueberry, low sweet blueberry, and high-bush blueberry. Transitional species are black huckleberry, swamp sweetbells, and staggerbush. Mid-season species are cranberry, dangleberry, sheep laurel, and swamp honeysuckle. Late season species are wintergreen, maleberry, and sweet pepperbush. Some bogs in Massachusetts tend to have more significant problems with this species, perhaps owing to the conditions in the surrounding areas, such as the availability of alternate host plants and the extent, suitability, and proximity of overwintering sites.

This native North American beetle ranges from Ontario and New England to the Rocky Mountains and Florida, but is a major pest of cranberry only in Massachusetts.

Nature of Injury

Injury results from both adult and larval feeding. Adults feed on the new growth, terminal buds, and blossom buds in the spring and on fruits, foliage, and terminal buds in the summer. Using their chewing mouthparts that are located at the end the snout, they may drill multiple feeding holes into the same bud. Feeding injury appears as black holes on leaves, on terminal and blossom buds; and as tiny, black spots at the base of indentations in smaller-sized fruit.

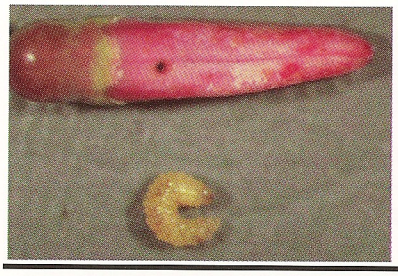
Larvae develop inside flower buds. Many of the larger egg-infested buds fall to the ground because the female severs the pedicel with her chewing mouthparts. Larvae consume the flower parts within flower buds, causing the color of buds to change from pink to a brownish-orange. Observation of uprights with empty pedicels are often a signal of weevil's presence. The beetles of the new generation appear while the berries are small.

Life History and Description

The insect passes the late summer, fall, winter, and spring as a beetle. The majority of beetles reportedly overwinter near to the bog under debris and fallen leaves in surrounding wooded areas. Adults become active at the end of April and may feed on upland blueberry prior to the new growth appearing on cranberry. The weevils move to the cranberry toward the end of May through early June where they climb to the top of the uprights and feed on the tender new growth, including blossom buds. They hide in trash under the vines or burrow a little in the sand on cold windy days, coming out only in warm sunny weather. When active, they are easily swept from the vines with an insect net. When disturbed they either drop to the ground and play possum or fly off a few feet.

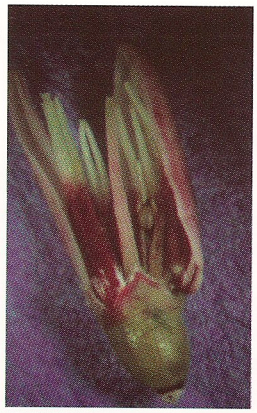
1) Females make a hole in flower buds into which an egg is inserted and the larva (shown here removed from a bud for the photo) feeds enclosed within the flower bud; 2) The adult cranberry weevil; 3) Flower bud cut open to reveal egg inside; 4) Flower bud cut open to reveal larva inside.

1

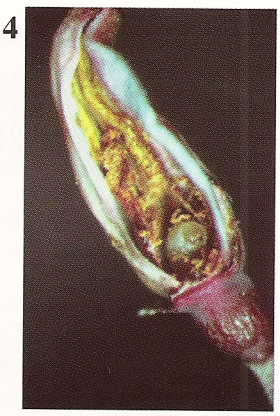


2

3



4



The early season weevils were observed mating on cranberry around the first of June by earlier researchers. The female beetle begins to lay eggs when the first flower buds show pink; the onset of first egglaying occurs before the flower buds have become advanced enough to droop over; this timing will vary with season. Mated females insert eggs into the developing blossom buds. The female first drills a hole with her mouthparts, then turns and locates the hole with her extended ovipositor and deposits an egg. Egglaying may continue for three weeks, depending on the development of the cranberry flower bud and weather conditions. Each female may deposit a total of 50 or more eggs, but usually only one egg is placed inside each blossom.

The egg is smooth, glistening, oblong-ovoid, pale yellowish, and nearly 0.5 mm (1/50") long. The egg hatches in three to nine days, based on temperature. The normal hatching period is the last half of June. A white, legless grub exits from each egg and consumes all internal flower parts. The larvae mature in ten to fourteen days. The mature larva is whitish and has a yellowish head but no legs. It is about 3 mm (1/9") long. After completing its feeding, the larva becomes a pupa and then an adult.

The adult beetle is about 1.6 - 2.0 mm (1/16+") long. For about 2 weeks, its color is light brown, with the head and snout deep reddish brown and the eyes black. Toward the end of July, weevil number on the bog fall sharply and weevils are rarely captured in sweeps through August. Research suggests that adults overwinter in nearby protected areas, away from the crop.

Management

Weevil activity should be assessed weekly starting in early to mid May on calm, sunny days. Carefully examine the contents of the sweep net and remember that weevil "play dead" when disturbed. When the number equals or exceeds the economic threshold, management strategies can be considered. Insecticide applications may be most effective when made in the morning of calm sunny days. Consult the current Cranberry Chart Book for economic thresholds and management recommendations.

Management of weevils is difficult because the weevils are apparently resistant to several insecticides. Weevils can invade over an extended period in May, even into June. If the action threshold is exceeded early in the season before flower pods form, it may be advisable to hold off on an application and continue sweeping to determine if weevil numbers continue to rise sharply. Additional weevils may move onto the bog. Such a delay may be very risky once flower buds have appeared, however. A key to successful weevil management is a compilation of sweep records over the years to gauge population trends over time.

Sanding and flooding are not known to be effective management practices. A tiny *Habrocytus* wasp attacks the immature stages of the weevil within blossom buds. A survey in Massachusetts showed that about 40 percent of the weevil population was parasitized on abandoned bogs, whereas less than 10 percent was parasitized on commercial bogs.

Adult feeding on pinhead (left) and blossom bud (right).

UMASS EXTENSION

Published by
Cranberry Experiment Station, University of MA
P.O. Box 569, E.Wareham, MA 02538. (508) 295-2212

Issued by UMass Extension, Robert G. Helgesen, Dean & Director, in furtherance of Acts of May 8 and June 30, 1914; University of Massachusetts, United States Department of Agriculture, and County Extension cooperating.

May 1999. UMass Extension Agroecology Program. Martha M. Sylvia is the technician in the Entomology Lab at the Cranberry Experiment Station in East Wareham, MA. Anne L. Averill is Associate Professor in the Entomology Department at the University of Massachusetts in Amherst, MA. Many of the photos were taken by James E. O'Donnell.

For more information, refer to A.L. Averill and M.M. Sylvia. 1998. **Cranberry Insects of the Northeast,** which is also available at the Cranberry Experiment Station.