



BLUEBERRY GALL MIDGE

A POSSIBLE NEW PEST IN THE NORTHWEST

IDENTIFICATION, LIFE CYCLE, AND PLANT INJURY

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In the blueberry production regions of Florida, Georgia, and Mississippi, blueberry gall midge is a serious insect pest that affects rabbiteye and southern highbush blueberries, causing substantial yield loss by damaging flower buds. The midge is present from the southeastern to the northern United States, where it feeds on vegetative buds of blueberry and cranberry (*Vaccinium macrocarpon* Aiton).

The gall midge *Dasineura oxycoccana* (Johnson) (Diptera: Cecidomyiidae) was identified as a pest in rabbiteye blueberries (*Vaccinium ashei* Reade) in the southeastern United States in the early 1990s. In 2004, Dr. Blair Sampson of USDA confirmed that the blueberry gall midges collected in blueberry fields in Oregon and Washington were *D. oxycoccana*.

SYMPTOMS

Blueberry plants are damaged when blueberry gall midge larvae feed on flower buds and young shoot tips. In the southeastern United States, damage includes aborted flower buds and blackened young shoot tips. In the Northwest, blueberry gall midge seems to cause only aborted and/or blackened young shoot tips as well as distorted developing leaves (Figure 1). In heavily infested fields, a witches'-broom symptom may occur (Figure 2). Damage caused by blueberry gall midge in commercial blueberry fields might be confused with boron deficiency or even with the black tip stage of plant development.

DESCRIPTION AND BIOLOGY

Described by Gagné in 1989, the plant-feeding gall midge *Dasineura oxycoccana* (Johnson) is a tiny, fragile fly approximately 2 to 3 mm long. Newly hatched larvae are less than 1 mm long, white, and almost transparent. They then become reddish-orange second and third instar larvae, spending 2 to 4 days in each instar. Mature larvae are maggots about 1 mm long, 0.3 mm wide, legless, and yellow to red in color. Larvae cease feeding and form puparia in 7 to 10 days. The estimated time from first instar to adult fly is about 2 to 3 weeks at room temperature with 12 hours of daylight.

There are four or more generations in a growing season, and the final generation of pupae overwinters in the soil. The blueberry gall midge life cycle is illustrated in Figure 3.



Figure 1.—Shoot tip damage caused by blueberry gall midge.



Figure 2.—A witches'-broom symptom as a result of blueberry gall midge damage.

MONITORING

Sampling to determine percentage of shoot tip damage. Begin sampling at bloom. Randomly select and flag individual blueberry plants (10 to 15 plants per acre) throughout the field. From each selected plant, collect five young growing shoot tips with emerging leaves still rolled. Select shoot tips randomly from the top, sides, and bottom of the entire bush canopy. Repeat sampling from flagged plants every 2 weeks.

Determine the percentage of shoot tip damage by dividing the number of damaged shoot tips by the total number of shoot tips collected. To be certain that the damage was caused by the midge, use the following rearing method.

***In-situ* rearing.** The small size of the blueberry gall midge larvae and flies makes field detection difficult before damage occurs. A simple, easy, and effective identification technique involves rearing blueberry gall midge *in-situ*. Collect and store young growing shoot tips in a 1-gallon resealable bag. Place a piece of folded moist paper towel in one lower corner of the bag and the shoot tip samples in the other lower corner (Figure 4). Keep the plastic bags at room temperature.

If the shoot tips are infested with blueberry gall midge, larvae should emerge after 1 to 2 days and adult flies after 2 weeks. Rotting shoot tips

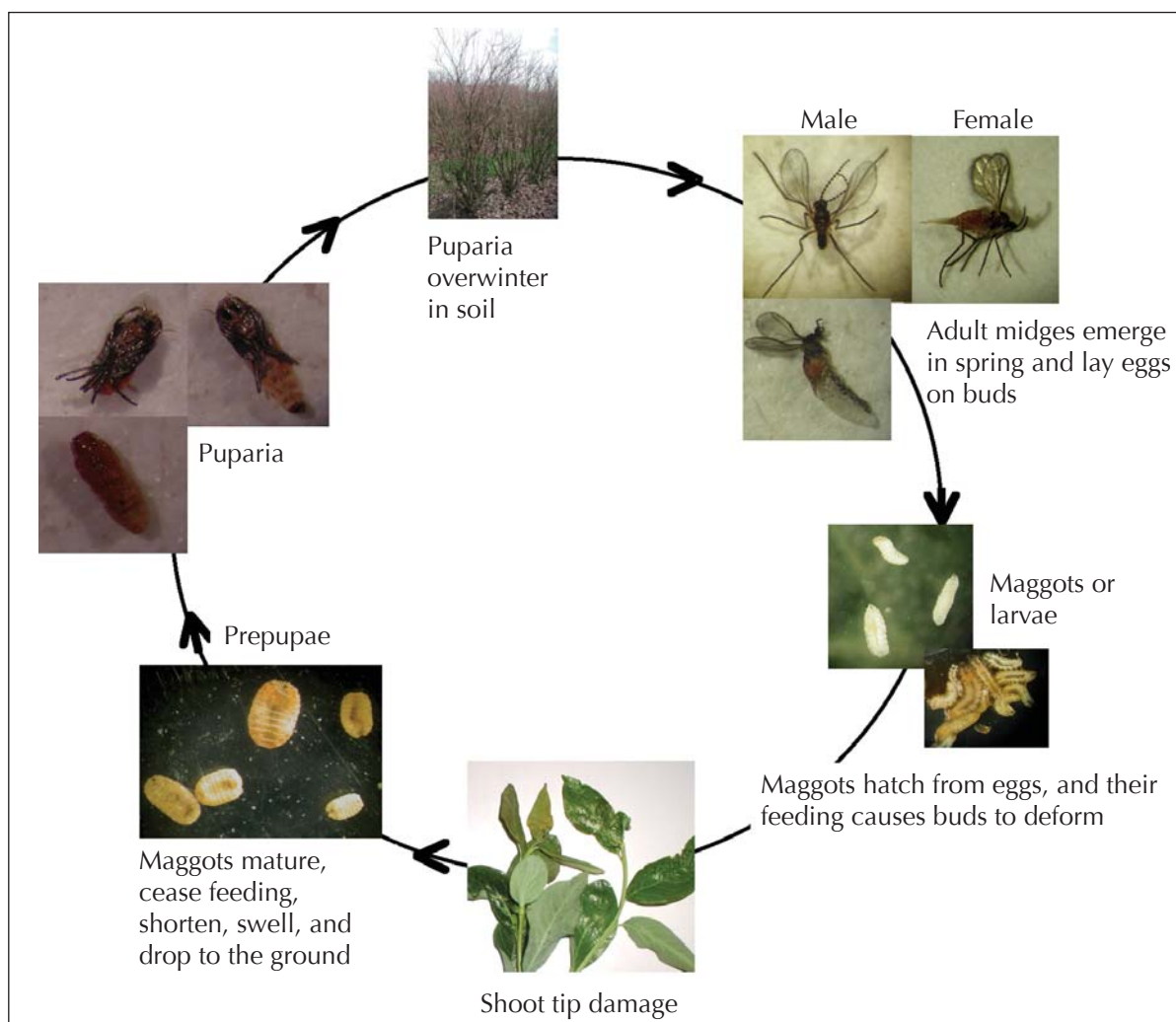


Figure 3.—Life cycle of the blueberry gall midge (*Dasineura oxycoccana*).

do not seem to affect rearing, as the midge larvae tend to move away from rotting plant tissues. The white and reddish-orange midge larvae can be seen against the clear plastic bag.

STATUS IN THE PACIFIC NORTHWEST

Blueberry gall midge is a relatively new pest in the Pacific Northwest. In a field survey conducted in the Willamette Valley, Oregon, and southwest Washington during the 2004 growing season, blueberry gall midge was found in all blueberry fields sampled. The percentage of shoot tips damaged ranged from light (0 to 25 percent) to heavy (more than 75 percent) at different plant development stages. Levels of infestation seemed to vary among highbush blueberry cultivars.

The survey results suggest that there are two main peaks of blueberry gall midge infestation during the growing season. One peak occurs prior to harvest and the other after harvest (Figure 5). There is a dramatic decrease in infestation during harvest, primarily due to the lack of newly developed shoot tips at that time.

Although the effect of blueberry gall midge on fruit yield is unknown, a witches'-broom symptom may appear on bushes in heavily infested fields. This symptom could result in decreased plant growth and poor bud set for the following growing season. Further studies are needed to determine the relationship between blueberry cultivar, infestation level of midge larvae, and yield/quality. Some growers may wish to control this pest chemically. Although



Figure 4.—Blueberry gall midge in-situ rearing technique.

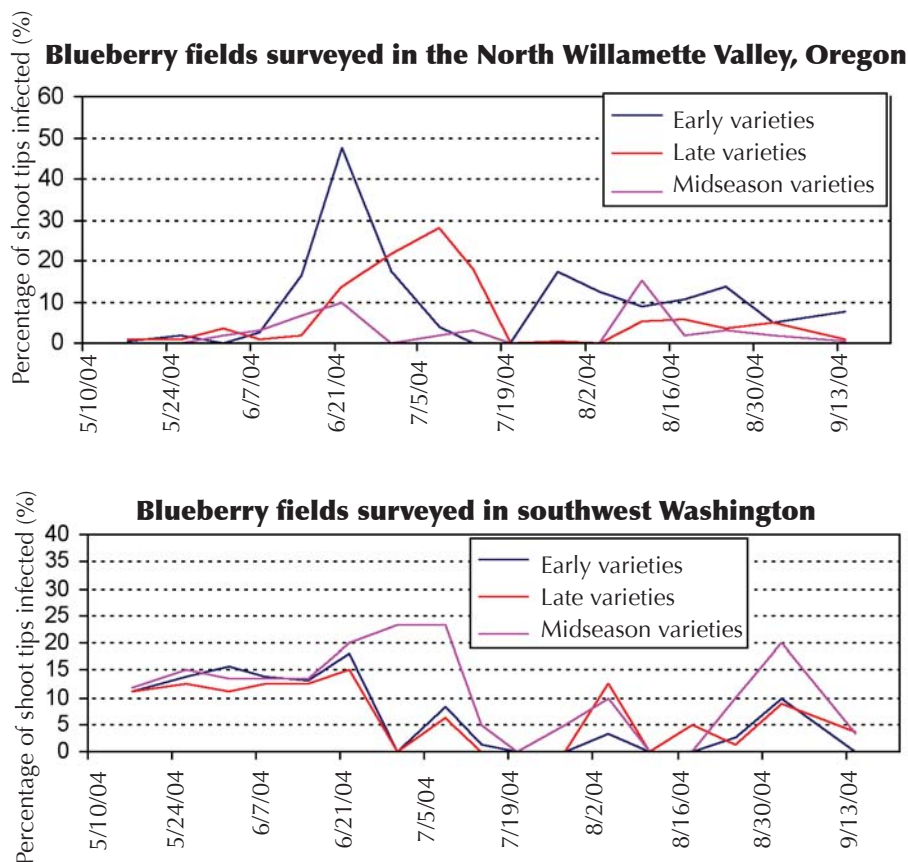


Figure 5.—Percentage of shoot tips infested in blueberry fields in Oregon and Washington.



Maggots



Prepupae



Puparia



Adult

insecticides are not labeled specifically for midge control on blueberries in the Pacific Northwest, refer to the section on “Blueberry Pests” in the current edition of the PNW Insect Management Handbook. This section lists those insecticides registered for control of other pests on blueberries that also have activity on blueberry gall midge.

FOR MORE INFORMATION

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- Blueberry Cultivars for Oregon*, EC 1308 (June 1989).
- Blueberry Economics*, EM 8526 (revised January 2005).
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