



Stone Fruit Commodity-Based Pest Survey

European Grapevine Moth

Lobesia botrana

Introduction

Although the European grapevine moth is primarily a pest found on grapevine flowers and fruit, it has been known to infest stone fruit trees as well. Surveying for this pest in stone fruit is particularly important in light of recent trade restrictions imposed on stone fruit from California.

Biology

The first flight of moths occurs in the spring, when the daily average air temperature is above 50 °F for 10 to 13 days. Adult moths are generally active at night from sunset to sunrise, flying mainly at dusk. Depending on altitude and climate, the European grapevine moth produces one to five generations per year.

This pest poses a serious agricultural threat due to its potential to become established anywhere grapes are cultivated. The moth is active 4 to 6 weeks before grape flowers are present. Because stone fruit trees generally flower before grapes, it is during this time that European grapevine moth may be most numerous on these crops. In its overwintering stage, the pupa can tolerate temperatures below 14 °F. This moth is generally active from early spring to midsummer.

Females can produce about 300 eggs and can lay up to 35 per day. The first generation lays its eggs on the blossoms, leaves, and tender twigs of its hosts. These larvae will spin webbing around themselves and their feeding area (glomerules) before entering the pupa stage inside the web or under a rolled leaf. Second-generation larvae enter the fruit and feed before moving to the pupa stage inside the grape. Third-generation larvae feed within the fruit and move under the bark or into dead leaves to overwinter in the pupa stage.

Symptoms

While documentation on the moth primarily relates to grape crops, it is known to cause damage to stone fruit flowers and fruit. The first generation of the year feeds on the flowers and developing buds of its hosts and spins a protective cocoon around its feeding area. This feeding may lower the fruit set of individual trees. Subsequent generations can directly affect yield as they feed on the developing fruit and tunnel through the fruit (Figures 1 and 2).

Various secondary pests can appear after a European grapevine moth infestation, including gray rot (*Botrytis* spp.) (Figure 2) and other fungi (*Alternaria*, *Aspergillus*, *Cladosporium*, *Penicillium*, and *Rhizopus*); acid rot has also been recorded as a result of the European grapevine moth's feeding on fruit. Partially eaten fruit also attracts other insect herbivores, such as ants.

Hosts

There are three primary hosts for European grapevine moth: grape (*Vitis* spp.), olive (*Olea europaea*), and plum (*Prunus domestica*). More than 40 cultivated and wild hosts have been recorded, including other stone fruits (*Prunus* spp.), currants



FIGURE 1. Top: Adult European grapevine moth. Photo courtesy of Jack Kelly Clark, courtesy UC IPM. Bottom: Larva inside grape fruit. Photo courtesy of Dr. Pedro del Estal Padillo, Universidad Politécnica de Madrid, CABI's Crop Protection Compendium.

and gooseberries (*Ribes* spp.), and pears (*Pyrus communis*). It should be noted that common tansy flowers (*Tanacetum vulgare*) do attract European grapevine moth, but the pest does not reproduce or develop on this invasive North American weed.

Plums, peaches, and nectarines are considered similar to grapes as suitable hosts for the development of European grapevine moth.

Larval development and the reproductive capacity of females found on the flowers and fruit of plum, peach, and nectarine trees are equal to the moths reared on the flowers and fruit of grapevines; however, sour cherries, apricots, and other stone fruits have not supported the same level of successful development of European grapevine moth, and therefore are only considered minor hosts.



FIGURE 2. Left: Larva on a grape leaf Photo courtesy of Jack Kelly Clark, courtesy UC IPM. Right: Pupation in bark. Photo courtesy of Jack Kelly Clark, courtesy UC IPM.

Distribution

Native to Europe, the European grapevine moth was recently discovered in a number of California counties. More broadly, the moth is present in Algeria, Armenia, Austria, Azerbaijan, Bulgaria, Chile, Cyprus, Czech Republic, Egypt, Eritrea, France, Georgia, Germany, Greece, Hungary, Iran, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Lebanon, Libya, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Morocco, Portugal, Romania,

Russia, Serbia, Slovakia, Slovenia, Switzerland, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Ukraine, and the United Kingdom.

Identification

Confirmation of European grapevine moth is done by examining the form and structure of the pest (morphological identification). Larvae can be identified using the keys provided in Gilligan's "Olethreutine Moths of the Midwestern United States. An Identification Guide" [Gilligan T.M., Wright, T.J., and Gibson, L. 2008. Olethreutine Moths of the Midwestern United States. An Identification Guide. *Bulletin of the Ohio Biological Survey*, Volume 16 (2)].

To aid in the identification of adults, which requires dissection of the male genitalia, it is recommended that surveyors and growers use Brown's Web-based reference from the Adult Lepidoptera Workshop [Brown, J. 2009. Adult Lepidoptera Workshop. Online: http://caps.ceris.purdue.edu/webfm_send/112.] or Passoa's "Screening Key for CAPS Target Tortricidae in the Eastern and Midwestern United States" [Passoa, S. 2009. Screening Key for CAPS Target Tortricidae in the Eastern and Midwestern United States (males). Online: *Lab Manual for the Lepidoptera Identification Workshop*. University of Maryland. http://caps.ceris.purdue.edu/webfm_send/100.]

Survey

A trap and lure combination is the common method used to survey for this pest. Details on trap type and lure compounds can be found at <http://pest.ceris.purdue.edu/services/napisquery/query.php?code=cam2012>.

What Can We Do?

If you find an insect that you suspect is the European grapevine moth, please contact your local extension office or State plant regulatory official to have the specimen properly identified. For contact information, visit www.aphis.usda.gov/StateOffices, www.nationalplantboard.org/member/index.html, or www.nifa.usda.gov/Extension/index.html.

References for the above information can be found on the Cooperative Agricultural Pest Survey (CAPS) Web site at <http://caps.ceris.purdue.edu/stonefruit/references>.

USDA is an equal opportunity provider and employer.
Issued September 2011



United States Department of Agriculture
Animal and Plant Health Inspection Service