European grapevine moth *Lobesia botrana*

This insect is a pest of grapes and other berry fruits; larvae feed on and pupate in berries. Invasion of this exotic moth may disrupt Michigan's grape and other fruit production and marketing.

Michigan risk maps for exotic plant pests.

Other common names

European grape moth, European vine moth, grape berry moth, vine moth

Systematic position

Insecta > Lepidoptera > Tortricidae > *Lobesia botrana* (Denis & Schiffermuller)

Global distribution

This insect occurs in Central and Southern Europe, Northern Africa, the Middle East, Central Asia, Japan and Thailand. The moth was recently found in Chile (Shiffler 2008).

Quarantine status

The European grapevine moth has been intercepted at U.S. ports of entry (including Port Huron and Detroit) 20 times between 1984 and 2003 (Venette et al. 2003). This insect is listed as an exotic organism of high invasive risk to the United States (USDA-APHIS 2008).

Plant hosts

The moth is best known as a pest of grapes (*Vitis vinifera*), though it is polyphagous and has a wide host range across 27 plant families. Other plant hosts include carnations, black berries, cherries, currants, lilacs, nectarines and plums. See Venette et al. (2003) for a more detailed host plant list.

Biology

The moth has two to four generations per year and is active from early spring to late summer. A female moth deposits one or a few eggs on or near buds, pedicels, flowers or fruits of host plants. Larvae spin silken webs to tie leaves, inflorescences or fruit clusters. The spring generation larvae feed on flower buds and pupate within webbed plant parts. The summer generation larvae feed on and pupate in berries, which predispose berries to molds and rots. The moth overwinters as a pupa at various locations such as under leaf litter, in the soil and under grapevine bark. Adults feed on nectar.

Adult. (Photo: R. Coutin / OPIE)

Larva on flower buds. (Photo: SANDOZ)

Identification

- **Adult**: 5-7 mm wingspan; forewings have cream-white color with gray, black and brown markings; hind wings are white (male) or dark gray (female).
- **Larva**: Up to 10 mm long; body yellowish-green to grayish-green; skin may be translucent leaving the gut visible; head and thoracic plate brownish-yellow; caterpillar is very agile when disturbed.
- **Pupa**: 5-6 mm long, brown.
- **Eggs**: Lentil-shaped, 1 mm long; color initially yellowish and later turns grey; eggs are found on stems and berries.

Signs of infestation

- Larva-fed grapes may turn brown, mold or rot.
- Webbed inflorescences, fruit clusters and leaves.
- Presence of larvae on flower buds, developing fruits and mature berries.

Management notes

Host plants may be visually inspected for eggs,

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Pupa under the grapevine bark. (Photo from INRA HYPPZ)

Damage on grapes. (Photo: J Voegel / INRA Antibes)

larvae, pupae, webbing and rolled leaves. Synthetic sex pheromones have been shown to effectively lure male moths (Louis and Schirra 2001, Louis et al. 2002, Venette et al. 2003).

Economic and environmental significance to Michigan

The European grapevine moth is an economic pest of viticulture in much of Europe and portions of Asia and Africa. When this moth occurs at high densities, 4-6 insecticide applications are recommended in southern France (Thiéry et al. 2006). Grapes are a major commodity in Michigan and invasion of this exotic moth may disrupt grape production and marketing. Venette et al. (2003) have forecasted that Michigan provides suitable habitats for the moth to establish based on its climate and host plant availability. As a generalist feeder, the moth may thrive on other cultivated and non-cultivated plant hosts found in Michigan (Thiéry and Moreau 2005), raising concerns over environmental impact on Michigan's ecosystems, economic impact on other berry crops and regulatory strategies.

Likely pathways of entry to Michigan

Imports of live plants and agricultural commodities (grapes and other berry and non-berry hosts) from Europe, Asia, and Africa.

If you find something suspicious on a susceptible host plant, please contact MSU Diagnostic Services (517-355-4536), your county extension office, or the Michigan Department of Agriculture (1-800-292-3939).

References

Alford, D. V. 2007. Pests of fruit crops. Academic Press, Boston.

Louis, F. and K. Schirra. 2001. Mating disruption of *Lobesia botrana* (Lepidoptera: Tortricidae) in vineyards with very high populations densities. IOBC/wprs Bulletin. 24(2): 75-79. (http://phero.net/iobc/hohenheim/bulletin/louis.pdf)

Louis, F., A. Schmidt-Tiedemann, and K. Schirra. 2002. Control of *Sparganothis pilleriana* Schiff. and *Lobesia botrana* Den. & Schiff. in German vineyards using sex pheromone-mediated mating disruption. IOBC/wprs Bulletin. 25. (http://phero.net/iobc/samos/bulletin/louis.pdf)

Russell IPM. Grape Moth / Vine Moth, *Lobesia botrana*. (http://www.russellipm-agriculture.com/insect.php?insect_id=56)

Shiffler, K. 2008. Exotic plague threatens Chile's table grape. The Santiago Times, 23 December 2008. (http://www.santiagotimes.cl/santiagotimes/index2.php?option=com_content&do_pdf=1&id=15388)

Thiéry, D. and J. Moreau. 2005. Relative performance of European grapevine moth (*Lobesia botrana*) on grapes and other hosts. Oecologia. 143: 548-557. (https://www.bordeaux.inra.fr/umrsv/documents/A-2005-EQUI2-Thiery-1194864475.pdf)

Thiéry, D., T. Yoshida, and M. Guisset. 2006. *Phytomyptera nigrina* (Meigen), a parasite of first generation European grapevine moth larvae in several vineyards in the Roussillon area. The Tachinid Times. Issue 19, February 2006. (http://www.nadsdiptera.org/Tach/TTimes/TT19.pdf)

USDA-APHIS. 2008. Pests of national concern for fiscal year 2009. (http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/downloads/survey/survey-2009/Appendix-G.pdf)

Venette, R. C., E. E. Davis, M. DaCosta, H. Heisler, and M. Larson. 2003. Mini risk assessment: grape berry moth, *Lobesia botrona* (Denis & Schiffermuller) [Lepidoptera: Tortricidae]. (http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/downloads/pra/lbotranapra.pdf)

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