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**Treating the FIRST GENERATION of
Lobesia botrana (EGVM) in a quarantine area**

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If your Sonoma County vineyard is within a State Interior Quarantine for European Grapevine Moth (*Lobesia botrana*) and you are notified that your parcel is within 1000 meters (0.6 miles) from the location(s) that trapped moths, then you should consider making an insecticide application to the vineyard in that parcel to control this pest. An application should be directed toward first generation larvae. **On May 5 2010, egg hatch was first observed in unsprayed vines in Rutherford, California.**

Background

Lobesia botrana was verified in Napa County in September 2009. It is the first observation of this Lepidopteran pest in North America. It is the principle “worm” pest in most of Europe where infested vineyards require annual treatment(s). Three generations of EGVM will occur in the North Coast. EGVM is unlike other tortricid vineyard pests found in California; its unique biology allows it to cause significant damage to clusters and reduce yields. Eggs are laid singly and almost exclusively inside grapevine clusters and larvae feed **on and inside** developing flowers and berries. Several worms can develop in a single cluster. In the first generation, egg laying began when clusters were about one-inch in length. These eggs were laid by adult female moths that emerged from pupae that overwintered on trunks under the bark.

EGVM is currently targeted for eradication by the California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture – Animal Plant Health Inspection Service (USDA-APHIS).

Pheromone traps that attract male adult moths are deployed and monitored by the Sonoma County Agricultural Commissioner at a density of 16 traps per square mile vineyard land. If two or more adult male moths are caught in traps placed no further than 3 miles apart, then a quarantine is established by CDFA. A quarantine is also triggered if more than one adult moth is caught in a single trap. The quarantine encompasses a 5 mile radius from the trap(s) that caught moths. Trapping density increases to 25 traps per square mile vineyard land inside a quarantine area. Traps are serviced every two weeks.

Sonoma County Agricultural Commissioner

The Sonoma County Agricultural Commissioner’s office (Sonoma CAC) will phone all growers with vineyards located in parcels within 1000 meters (0.6 miles) from a pheromone trap that caught adult EGVM. All suspect moths located in traps are confirmed by CDFA prior to notification. The property on which the trap was located is not identified.

Based on observations and experience with the EGVM eradication program in Chile, UC researchers consider this notification critical to the efforts to eradicate this pest. A vineyard located within 1000 meters of a confirmed find is most likely infested with EGVM. Male moths are caught in traps as they search for females so that mating and egg deposition can occur. Female moths are reported to fly distances of 80-100 meters in search of oviposition (egg-laying) sites; males can fly further in search of females.

It is important to realize that different larvae can be found in clusters. As previously stated, if your vineyard is within 1000 m of the site that trapped EGVM adult moths, then *Lobesia botrana* are more than likely to be present in some of your vines. However if you or your PCA are scouting that block or blocks further from the find, other larvae are likely to be discovered in clusters. The color document [“Tortricid Moths in California Vineyards”](#) can help you identify a larva; however you ought to have it verified by UC Cooperative Extension or the county Agricultural Commissioner’s office.

Egg Monitoring in Napa County

Egg development is monitored in Napa County which has a “core area” of infestation in Oakville and Rutherford. Thousands of moths have been trapped in that area and in April, many growers applied insecticides targeting eggs. In May, those growers had to apply a second application targeting larvae.

Monitoring for eggs in Sonoma County is not feasible due to the low numbers of adults trapped as compared to Napa County. However growers here have the advantage of strategically timing an insecticide application based on egg development and hatch observed in Napa County. It is possible that a single, well timed application of a long residual insecticide will kill the majority of larvae emerging from eggs laid by overwintering moths. In this manner, a second application targeting the first generation larvae may not be needed. **Timing is critical; egg hatch and first instar (stage) larvae were observed in Rutherford on May 5.**

Chemical Control of First Generation Larvae

The “window” of timing to achieve optimal control of EGVM is during the larval stage. EGVM have 5 instars and the literature indicates larval development is completed in 25-30 days. After that time, larvae will pupate and the literature indicates adult moths emerge 6-14 days after pupae form. Sprays must target larvae and they are most effective when targeting the younger stages.

Second instar larvae were observed in Rutherford on May 12. Two weeks later on May 26, third instars were found and a few fourths. Larger larvae are more difficult to control than smaller larvae. Ideally, an insecticide application should be made prior to the fifth instar is present.

At this time, we are encouraging conventional growers to apply Intrepid® 2F (methoxyfenozide) for the first generation. It is both ovicidal and larvicidal thus it has activity against eggs and larvae. For the first generation Intrepid® is best timed against the first and

second instar larvae. At the higher rates, it will have about a 21 day residual. For organic growers, the available materials do not have as long residual and would require multiple applications to control larvae. These include Entrust® (spinosad) and “Bt” (*Bacillus thuringiensis*) products.

With good spray coverage and timing, one application of Intrepid® has been shown to be extremely effective with nearly 100% control in Napa County trials.

Although it is not expected, it is possible that EGVM larvae will be missed by a single application of a conventional material for a few reasons. First, the application may have gone on late and larger worms are difficult to kill; second, spray coverage on clusters was poor. If larvae are found in clusters 2 to 3 weeks after you made an application, **and they are confirmed to be EGVM**, you will have to apply a second application using a different material. The following materials are options: Success®, Auvant®, Delegate® and a Bt product. These four materials are in different chemical classes than Intrepid® and by rotating chemistries, the development of insecticide resistance is reduced.

It is assumed that growers who use Bt or Entrust® will have to make at least three applications in the first generation.

An insecticide may be added to a powdery mildew fungicide spray application made during the larval development period. If sulfur dust is exclusively used for mildew control, then a separate insecticide application would be needed. Spray coverage of the clusters is essential.

All of the products included in the online document [“Insecticides for *Lobesia botrana* on grape”](#) are effective on this pest; however materials in the following three groups are highly disruptive to natural enemies – pyrethroids, carbamates and organophosphates. Specifically, natural enemies of grape mealybug and spider mites will be killed and you will see damage caused by these pests.

Placing traps in your own vineyards

Sonoma County growers may place their own pheromone traps for EGVM. In this manner you can check traps at one week or tighter intervals for the presence of adult moths. Do not place traps within 30 meters of any other EGVM trap on your property. Traps and lures are available for sale at local agricultural product suppliers. UC Cooperative Extension has trained many Sonoma County PCAs how to recognize adult *Lobesia botrana* moths in a sticky trap, thus independent PCAs, PCAs with agricultural product suppliers, and UCCE can identify “suspects” on your traps. Growers will have to bring traps with a suspect moth to the Sonoma CAC office for verification.

If a moth in a trap is confirmed to be EGVM, then the property on which that trap was placed is infested.

First generation moth flight

Beginning in mid-February, adult moths emerged from pupae that overwintered under loose bark on infested vines. The peak flight was determined to be the week of April 19. The last week of May, a total of fewer than 10 moths in 40 traps were trapped in one UC trial located in Napa County; down from a high of over 170 per trap per week.

When to expect the second generation flight

In Sonoma County, traps placed by growers and the Sonoma CAC will most likely stop catching first generation male moths in early June. Lucia Varela and Monica Cooper (UCCE Napa) are validating degree-day predictive models by observing larvae weekly in Napa County. When the first pupa is seen, the timing of the second flight can be more closely predicted. Currently, they do not expect the second flight until after June 15. After that time, moths caught in traps will be second generation male adults. **When that occurs, the application of an ovicide can be made within 3 to 5 days of the first male found in the trap.** UC is advising growers to consider the use of Altacor® (chlorantraniliprole). It is a highly effective ovicide – especially if applied prior to oviposition.

A Note on Mating Disruption

In Napa County, the use of mating disruption dispensers is permitted because of the high populations of male moths trapped in that county in the first generation flight (over 90,000 in Napa County as compared to 24 moths in Sonoma County). Mating disruption (MD) is a form of pest control that prevents male moths from locating females thus mating is reduced and fewer eggs are laid. However, MD also prevents pheromone traps from functioning because the same pheromone used in the MD dispensers is used in the lures that are placed inside sticky traps. **To learn the locations of EGVM infested vineyards in Sonoma County, the Sonoma CAC is strongly urging county growers NOT to deploy MD dispensers at this time.**