

# Grape Berry Moth, *Paralobesia viteana* (Clemens)

## Description and Life Cycle

This is the major insect pest of grape berries in the eastern United States and Canada. When vineyards are left unmanaged up to 90 percent of the fruit may be destroyed by the grape berry moth larvae and bunch rot diseases associated with the damage to the fruit. Infestations vary greatly from vineyard to vineyard, from year to year, and within a vineyard. However, vineyards bordering wooded areas are most vulnerable. The adult is a mottled-brown-colored moth with some bluish-gray on the inner halves of the front wings (Figure 1). The larvae of this small moth are active, greenish to purplish caterpillars about 3/8 inches long when fully grown. Grape berry moths overwinter in cocoons within folded leaves in debris on the vineyard floor and within adjacent woodlots (Figure 2).



Figure 1. Grape berry moth adult

Figure 2. Cocoon in folded leaf edge

Overwintering adults emerge in the spring to mate and females lay eggs on or near flowers or berry clusters. These eggs hatch in June and make up the first generation of grape berry moth. The first generation larvae feed upon grape flowers and young fruit clusters and mature from mid to late-July or August. These adults then emerge and mate, and give rise to the second generation of grape berry moth. These females lay eggs directly on developing berries. After hatching, the larvae feed internally until they mature in August or September. The second generation larvae form cocoons in which they overwinter. A third generation occurs commonly in the southern range of the pest and occasionally in the northern tier of states.

## Damage Symptoms

First-generation larvae web small flower buds or berries together in early June and feed externally on them or on tender stems. Larvae that attack grape bunches during this time are difficult to see. Second generation eggs are commonly laid directly on the green berries to feed internally. Conspicuous reddish spots develop on the berries at the point of larval entry. Berries affected in this manner are known as "stung"



Figure 3. "Stung" berries

berries (Figure 3). The second generation is potentially more damaging than the first. A single larva may destroy 2 to 6 berries in a cluster, depending on berry size, and several larvae frequently inhabit a single cluster. At harvest, severely infested bunches may contain several larvae, and many of the berries may be completely hollowed. In many cases bunches are covered with bunch rot fungi, infested with fruit flies, and have an unhealthy appearance (Figure 4).



*Figure 4. Grape berry moth damaged berries*

## **Management**

Corrective measures are usually suggested if more than 5% of the clusters are injured. To determine the percentage of clusters damaged you should randomly inspect 100 clusters along the perimeter of the vineyard and 100 clusters toward the center of the vineyard. This method will tell you if treatment of the entire vineyard is necessary. Treatment of perimeter rows maybe all that is necessary to control this pest. Control of maturing larvae in mid- to late-July is particularly important. Cultural controls can be used to kill the overwintering pupae in leaves. Leaves can be gathered and destroyed in the fall, or leaves can be buried within the soil in the spring, 2 weeks before bloom, by roto-tilling or cultivating.

Pheromone traps should be utilized in vineyards with a history of grape berry moth problems. Trapping of adult male moths indicates the beginning of flight activity. Mating and egg laying will occur over a 2 to 3 week period following the first detection of flight activity. Early season control of this pest may prevent it from becoming well established within the vineyard, and may eliminate the need for control later in the season. It should be noted that the second flight activity period occurring in late July and August is the most important. These adult moths in late summer produce the eggs which hatch into larvae capable of causing major damage to the maturing fruit. One should not solely depend upon a pheromone trap for detecting this late season threat. Scouting should be implemented on a weekly basis after bloom. If berry cluster damage reaches 6% in grapes used for processing or 3% in those grown for fresh market, a protective cover spray should be applied. A biological insecticidal alternative would be *Bacillus thuringiensis*. *Bacillus thuringiensis* (Bt) is useful in controlling berry moth larvae, however careful timing must be observed to effectively kill the larvae before they have a chance to feed internally on grape clusters. Two applications of Bt should be applied during the egg-laying period.

## **Monitoring Male Moths**

Pheromone traps are available to monitor the emergence of male grape berry moths during the season. A minimum of 3 traps for monitoring a single block of approximately 10 to 15 acres is recommended. Traps hung from the top wire of the trellis should be placed around the perimeter of the vineyard before bloom and should be at least 100 feet apart. Sticky trap bottoms should be checked weekly for male moths, and pheromone caps should be changed monthly to obtain accurate flight information. Every vineyard location is unique, and growers should not rely on pheromone trap data from other vineyards.