MONITORING GUIDE

GRAPE BERRY MOTH

Endopiza viteana

Grape Berry Moth

Suggested Traps

Delta 2 Trap

Product No. 2050202

Diamond Trap

Product No. 2050204

GENERAL INFORMATION

Insect monitoring traps are used to identify not only the presence or absence of a certain insect species, but also to establish the extent of their activity in a particular location. This information can be used to determine which stage of the insect life cycle is occurring at any time, allowing for more accurate and timely applications of control methods. Basic knowledge of the insect's life cycle is necessary, since the monitoring traps are only effective on the adult stage of the insect.

Regular recording of the trap catch is essential and over the years will provide a reliable blueprint with which the grower can properly manage the pest. In addition to collecting trap-catch information, it is also vital to assess the amount of insect damage that occurs in every generation of the insect, as a measure of the effectiveness of the control treatments.

LIFE HISTORY

Grape Berry Moth (GBM) is the major insect pest of grapes in Southern Ontario, accounting for at least 5% and often significantly higher crop damage. In the Niagara region, the insect emerges from it's over wintering pupal stage around the 6th–12th May each year and because there is still very little foliage protection in the vineyard at this time, it seeks shelter in adjacent hedgerows and other sheltered areas. Female GBM's begin releasing their pheromones towards the end of the month, signalling the beginning of mating activity and the commencement of the first of three consecutive generations of this insect. Mated females immediately start depositing their eggs on the flower clusters of the developing grapes. These eggs hatch into larvae about 4–5 days later and the larvae start feeding on the flower clusters for the next 3–4 weeks. During this time of feeding activity, the larvae continue to grow and change colour from near transparent, to white, to greenish and then finally to a brownish colour. The flower cluster will be covered in fine white webbing that easily identifies where this damage is occurring.

Once the larvae reach maturity, they roll themselves up in a segment of the grape leaf and drop to the ground - this is known as the pupal stage. About 4-5 days later a new adult moth emerges from this pupa, thus completing the first generation and launching into the second generation.

In the Niagara region, the adult moths emerge in late-May, early July and mid-August, and in the second and third generations the eggs are laid on the berry clusters. The eggs laid on the berry clusters hatch out into larvae after 2–5 days, and these larvae remain on the surface of a berry for 1-2 days, before eating their way into the flesh of the berry, often eating the pit before moving into the next berry. When inspecting for larval damage, the tiny entrance tunnel into the berry is easy to see, along with the resulting purplish discolouration. After 3–4 weeks of feeding, the larva pupates and falls to the ground.

Some grape varieties produce secondary grape clusters that are immature at harvest and may remain on the vine. These green clusters are often full of larvae, and should be destroyed or removed from the vineyard to prevent insect carry-over to the next year.

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TRAP PLACEMENT

Every vineyard is different, so there is no exact application rate for monitoring traps, however, in the early stages of gathering information about a vineyard a larger number of traps are often used. On fields of 2–4 hectares at least 6 traps are recommended. These should be evenly spaced, with at least 4 of the traps placed 10 metres in from the edge of the crop and the other 2 traps placed more centrally. If there is adjoining scrub, woodland or buildings that would offer protection to the insects, traps should be put in those areas too. If there are known areas that have shown higher damage these should also be trapped.

The traps themselves are easy to assemble and should be hung on a middle trellis wire, with a marker ribbon at the end of each row that a trap is hung in. Put the traps out in the first week of May and place the lure on the sticky floor of the trap. Number the trap and record the date that it was set up.

CHECKING THE TRAPS

This is the most important part of monitoring. Plan to check traps on a regular basis from May to harvest, at least once but ideally twice a week, otherwise the resulting information can be very misleading. Each time that you inspect a trap, count and scrape out the GBM caught on the trap. Average out the catch for the vineyard and **plot it** on a graph.

WHAT DOES A GRAPH TELL YOU?

As the adult GBM mating activity increases, so does the trapcatch. The numbers will peak and then quickly fall off, indicating that mating is complete and the females are no longer releasing their sex pheromone but are now laying eggs. Some egg laying will also have occurred by the time the graph peaks, which means that any spray application should be made as soon as you recognize the peak, since at this point some of the first laid eggs will be hatching into larvae. And they will be most vulnerable before they bore into the grapes.

For the next 3–4 weeks you cannot expect to see any catch in the traps, since the insect will either be in the larval stage or have died off. At this point you should try to establish a threshold for determining whether or not to spray, but this is not easy to do before you have accumulated some vineyard history. As a suggestion, you could decide to spray only if the average trapcatch for the vineyard at the peak is greater than 2 insects per trap otherwise a “border” spray is probably adequate. Towards the end of each larval period, and before the next generation of adult moths emerges, replace the lure in the trap with a new one (it may not be necessary to change the trap).

SAMPLING FOR LARVAL DAMAGE

If you have decided to spray, check the success of the chemical application by sampling for berry damage after the safe re-entry period. For the first generation, there will be no berries, therefore a count should be made of the percentage of clusters that show webbing damage. Remember that the majority of damage will be in the outside 15 metres of the crop and that there will be pockets of damage known from previous years. For this reason biased sampling is preferable to totally random sampling, so long as large areas of the vineyard are not ignored.

At the same time that you would normally check your traps (which will now be catching nothing) select one or two sampling blocks, each made up of 3 vines x 3 rows. Inspect 10 clusters on each vine by looking for the holes and the purplish discolouration. Record the number of berries that you find damaged in those 90 clusters. (**This is a visual non-destructive count, so you will leave the clusters intact on the vine)**

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CALCULATING THE DAMAGE

Since different varieties of grape will have different sized clusters, you will need to establish an average number of berries per cluster for the variety in that vineyard. You can do this at the onset of sampling by counting a number of bunches.

For Example: If you find 72 damaged berries in your sample block of 90 clusters vines (10clusters on 9 vines), and the average number of berries per cluster for that variety is 80, you can calculate the percentage damage as follows:

$$\frac{\text{Number of Damaged Berries/Block}}{\text{Avg.\# of Berries/Cluster x \# of Clusters Sampled}} = \text{\% Damage}$$

$$\frac{72}{80 \times 90} = 10\% \text{ damage}$$

In Ontario there is no official threshold figure set for damage, but Vinifera growers should aim for a damage level less than 0.5% (the New York standard for Labrusca varieties is 2%). If on the first larval inspection the damage level exceeds 5%, check your application equipment and rates. It is possible that an immediate re-spray could still be effective, however as the larvae burrow deeper into the grapes they become less vulnerable to the spray treatment, so speed is important

SUMMARY

Over time you will build up a blueprint for GBM activity in each of your vineyards, but be prepared for differences from other vineyards, even though they may be in the same general area. What you will see is a repetition of the same pattern of insect activity every year (not necessarily at the same intensity), but it will enable you to stay on top of the problem by reminding you when and where you should look for problems. In due course it is possible that you will decide to change to a biological control system rather than a chemical one. If this happens, the monitoring information that you have established will be vital in making that successful.

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