

Trapping and Identifying Mealybugs in Oregon Vineyards

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Mealybugs, a family of soft, oval-bodied pests (Homoptera: Pseudococcidae), are known vectors (carriers) of the grapevine leafroll associated viruses (GLRaVs) of grape.

Very often mealybug infestations can exist in vineyards without detection by growers for one or more years after initial infestation. It is difficult to visually see infestations of mealybugs because of their cryptic lifestyle where they often remain hidden within vine trunks, clusters, canopy, and roots.

Growers should use pheromone-baited traps to help follow possible infestation of mealybugs in their vineyard. This document gives details on how pheromone traps should be used to ensure optimal catches and early detection.

Mealybug Species

The following are three closely-related mealybug species found in Oregon:

1. Grape mealybug, *Pseudococcus maritimus* (Ehrhorn)
2. Obscure mealybug, *Pseudococcus viburni* (Signoret)
3. Longtailed mealybug, *Pseudococcus longispinus* (Targioni-Tozzeti)

Of these, the grape mealybug (see figure 1) has been found in vineyards throughout the state.

The vine mealybug, *Planococcus ficus* (Signoret) is one of the key insects that is noted to cause the spread of GLRaVs. The vine mealybug, an invasive species, currently is not known to be in Oregon, but continued monitoring for this pest is essential as it is virtually impossible to eradicate once established.



Figure 1.
Grape mealybug.
Photo by Amy J. Dreves, Oregon State University.

Pheromone Traps

Pheromone traps may be used as an early warning tool for grape growers to monitor mealybug activity and to detect the initial establishment of mealybug colonies.

The traps are baited with female mealybug aroma (pheromone) impregnated in a rubber lure. The traps are placed within the vine canopy to attract winged male mealybugs. When a mealybug population density is small, using a sex pheromone trap to attract winged males is far more efficient than trying to search vines over a large area for hidden females. The male mealybugs can fly about one-half mile, and it can be wind-blown much further.

At this point, only the pheromone lure for the vine mealybug is commercially available; however, three other pheromones of other mealybugs and a mixed lure made up of all four species are being tested for use.

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Trapping Guidelines

Assembly

- Obtain or purchase a red delta trap, preferably with a white sticky bottom panel for ease of viewing mealybugs (figures 2a–2d).
- Place the small rubber cap with pheromone (lure) inside the trap on top of the sticky bottom panel (figure 2a).
- Assemble the trap by securing the top with provided twist ties and pushing in the side tabs and folding in the edges (figures 2b–2c).
- Label the outer side of the trap with the following information: date of placement (DOP), vineyard and block name, row and vine number, and lure (L) type. When you remove the trap, write the date of removal (R). Use a permanent marker (figure 2d). For example:

Vineyard: NoPest Vineyard	Contact: J. Smith
Location: East Block, Row 3, Vine 6	
DOP : 08/17/09 L1	
R : 09/16/09 L1	
DOP : 09/16/09 L2	
R : 10/17/09 L2	(GMB = grape mealybug lure)

- Use a twist tie or wire hanger to adhere the trap to the grapevine trellis wire (a good attachment point) just above the fruit cluster level. Make sure leaves and shoots are not obstructing the entrance into the trap.

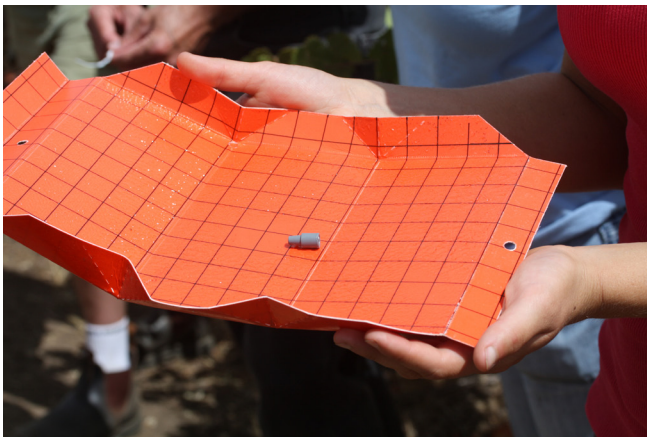


Figure 2a. Place pheromone lures in center of the sticky surface of the trap. Photo by Amy J. Dreves, Oregon State University.

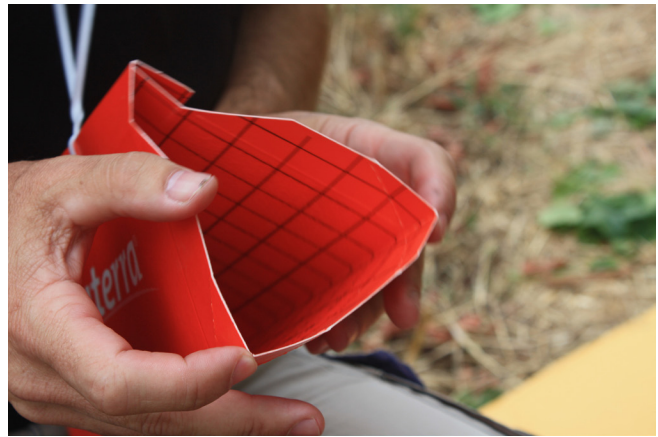


Figure 2b. Fold trap and secure the top with provided twist ties. Photo by Amy J. Dreves, Oregon State University.



Figure 2c. Fold ends of trap inward on indicated lines in order to prevent catches of other insects and reduce debris soiling. Photo by Amy J. Dreves, Oregon State University.



Figure 2d. Label the trap with lure type, location and block, and date on the outside surface of the trap. Use black sharpie marker. Photo by Amy J. Dreves, Oregon State University.

Placement

- Place one trap per 30 acres or one per smaller vineyard.
- Begin placement of traps in your vineyard in late March to June (depending on region) and continue trapping through October or until the first rain. The highest numbers of males are trapped in August and September. As more information is gathered the set up date may change to follow the seasonal activity more closely.
- Select the trap site near the center of a vineyard block in order to survey a large area.
- Place the trap at or above the cordon/cane and near the center of the vine, just above the fruit cluster level (figure 3). Do not hang it too low or too high in the canopy. Traps can be placed in the canopy to get some protection from wind and equipment, but the open ends should be clear of canopy/fruit and exposed so that male mealybugs can easily fly through the ends, rather than walk into the trap. This may require removing some leaves (figure 3).
- If additional traps are available, place a trap near the vineyard entry where incoming traffic of sprayers, tractors, trucks, fruit loads, and other potentially contaminated equipment occur, or on property borders where you suspect mealybugs may enter the vineyard.
- Check traps every two weeks for the presence of mealybugs on the sticky surface. Also ensure that the sticky surface is not soiled; replace if necessary.



Figure 3. Correct location of pheromone-baited traps. Ensure that the openings of traps are clear of canopy in order to allow flight of males into traps. Leaves and shoots may need to be removed, as shown above. Photo by Amy J. Dreves, Oregon State University.

Lure and Trap Replacement

- If the sticky panel gets dirty or soiled within the trap or is full of debris, replace so the trap is effective in catching winged male mealybugs.
- It is ideal to replace lure in one to two months after installation. The lure pheromone will decrease in intensity and may not be effective after one or two months.
- Traps need to be changed only when the sticky surface is soiled or when mealybug males are found and need to be counted in order to determine flight patterns and population fluctuations. If no male mealybugs are found, new pheromone lures can be placed into old traps. Don't forget to re-label new trap and note when new lures are placed in trap.

Mealybug Identification

- Use a stereomicroscope with 30X magnification to identify the tiny male mealybugs on sticky surface of traps (figure 4a). It is important to know the mealybugs from other small insects. Unfortunately males of mealybugs are not easily separated out to species. Most adult female species have been described in detail.
- It is difficult to see the features of the winged male mealybugs embedded in the sticky surface of the trap. They are very tiny (less than 1 mm long), brownish in color with one pair of clear inconspicuous wings. The antennae are beaded, and the trunk (thorax) is wider than the abdomen (figure 4b). Look for two long tail filaments (figure 4c). These filaments are not seen on grass

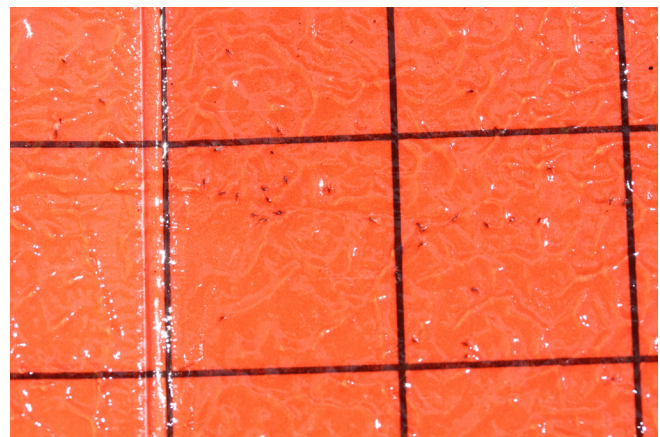


Figure 4a. Male mealybugs are small and resemble small flies when looking at traps with the naked eye. Photo by Amy J. Dreves, Oregon State University.

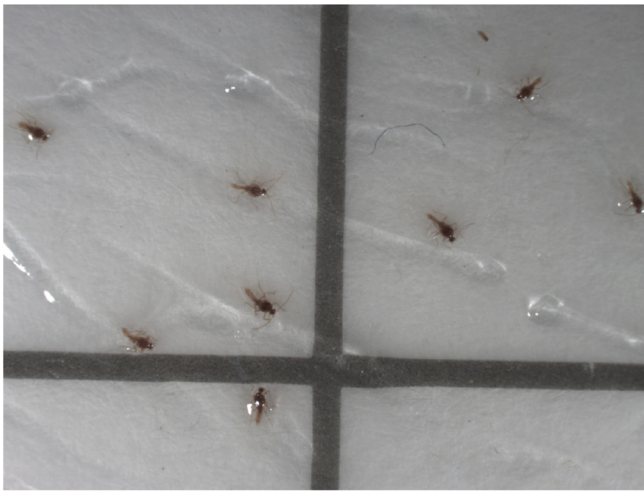


Figure 4b. Adult winged male mealybugs found on the sticky surface of a pheromone-baited trap. Photo by M. Reitmajer, Oregon State University.

mealybugs, a non-vector of GLRaVs; and grass mealybugs have longer legs and antennae.

- Do not mistake mealybugs for other small insects such as springtails, thrips, parasitic wasps, flies, and winged aphids that may be caught on the sticky surface of the trap. A good guide to help avoid such mistakes is available (Varela 2007).
- If male mealybugs are confirmed in your trap but the infestation has not been located or if there is a high risk that your vineyard will become infested, increase the trap density to one trap per 10 acres.
- If mealybugs are confirmed in your vineyard, notify neighbors, OSU Extension personnel, and the winery that buys from you and anyone that visits your vineyard about the infestation. This is vital to prevent spread.
- Encourage your neighbors to place traps to determine if infestations also occur on their property.
- If suspect mealybugs are located on vines, send them to the address under “Reporting and Confirmation” for formal identification.
- Rapid identification of mealybugs ensures a quick treatment response and a more effective control program.

Monitoring and Education

- If you have positive trap finds, perform scouting in the vineyard, doing visual counts on fruit clusters, being sure to be critical of clusters touching cordon or main trunk as these are



Figure 4c. Close-up pictures of grape mealybug males. Notice the two tail filaments (arrows), clear wings with virtually no venation, wide thorax, and beaded antennae. Photo by M. Reitmajer, Oregon State University.

usually the first to be infested with mealybugs (figure 5).

- Monitor vineyards frequently by visually examining vines for evidence of mealybugs such as wandering ants, cottony and waxy substances, honeydew (shiny, sticky leaves, and trunk) and black sooty mold (a fungus that grows on honeydew). Mealybugs can be located on top of and under the bark of the trunk, the head, cordons, canopy, and on clusters of the vine. If ants are present, watch them to determine if they are tending mealybugs (see Skinkis et al. 2009).
- Educate and train workers, crews, and vineyard personnel to recognize and report suspect mealybug and virus symptoms. Flag areas of concern for follow-up. Training of winery staff is also important as they visit sites for fruit quality analysis before harvest and also in monitoring fruit coming into the winery (see Walton et al. 2009).
- Be aware of mealybug risk when bringing in vineyard materials (e.g., equipment, tools, fruit loads) from other areas. Do not accidentally spread young crawlers within or among vineyards.
- Report suspect infestations to your local county extension agent, crop consultant, or OSU entomologists for positive identification as soon as possible.
- Be willing to make a quick and thorough eradication effort if the pest is found.



Figure 5. Follow-up positive trap counts with physical counts on fruit, especially look for clusters touching cordon or main trunk as these usually are the first to be infested. Photo: Amy J. Dreves, Oregon State University.

Reporting and Confirmation

- Collect 3–10 large mealybugs with a fine paintbrush and place in a vial of alcohol or gather samples into a dry container (e.g., plastic pill bottle) that will prevent squashing.
- Label specimens with date of collection, vineyard location, block and vine number, and contact information.
- Send/deliver trap finds or suspect mealybug specimens to Vaughn Walton, Department of Horticulture, Oregon State University, 4079 ALS Building, Corvallis, OR 97331; office phone 541-737-3485, cell phone 541-740-4149.

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For More Information

To identify male vine mealybugs in pheromone traps and reference examples of other small insects which may be caught in traps, see the following document: <http://ucce.ucdavis.edu/files/filelibrary/2161/27102.pdf>

To purchase delta traps and lures, see the following document: <http://cesonoma.ucdavis.edu/files/63363.pdf>