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SONOMA COUNTY VITICULTURE NEWSLETTER

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Glassy-Winged Sharpshooters will Increase the Threat of Pierce's Disease

The glassy-winged sharpshooter (Homoladisca coagulata) is a recently introduced insect that can devastate California's winegrape industry as well as other major crops grown in the state. This insect is responsible for spreading Pierce's disease (PD), a bacterial infection of grapevines that within the last three years has infected an estimated 50% of the 3,000 acres of winegrapes grown in Temecula Valley in Riverside County. Many of those infected vines are dead or will be soon because there is no cure for Pierce's disease.

Experts believe that the unchecked movement of plant material through the state will be responsible for the spread of the Glassy-Winged Sharpshooter (GWSS) and the diseases it can vector. Researchers from the University of Florida have studied this insect and PD for several years. Their experience indicates that the GWSS could become established in many areas of California including the North Coast unless measures are taken to slow its spread. When this occurs, many more vineyards – not just those adjacent to riparian areas – are at risk from PD.

The movement of GWSS is directly related to the movement of plant materials – an integral part of the container plant nursery industry. It will most likely be moved as egg masses or immature insects (nymphs) on ornamental plants that originate in the counties that currently have breeding populations. This insect feeds on many, perhaps hundreds, of plant species and it will lay eggs in many of these plants. As a result GWSS can establish itself in urban areas, community separators, agricultural districts and certain native ecosystems. The full extent of the range of plants the GWSS can utilize as *feeding hosts* and egg laying *(oviposition) hosts* will only be learned as we continue to observe it over time. That is one of the reasons why we must take action now to slow its introduction into new areas in the state, because once it is established, there is no way to eradicate it.

Before the end of the month, county or statewide restrictions on plant movement from counties that are known to be infested with GWSS will likely be established. The brunt of the detection activities and insecticide treatments will be borne by nurseries located in infested counties due to the inherent nature of that industry. The diversity of potential hosts present in ornamental, crop and even native plant nurseries and the regular movement of those plants to other nurseries and end users is the key reason why regulators are focusing most, but not all, of their attention on nursery plant shipments. North Coast grape growers can also play a crucial role in early detection of GWSS by placing yellow sticky traps in the interface of the vineyard and different vegetation types. Although some growers have used these traps to monitor the edge of their vineyards for blue-green sharpshooters (BGSS), many more growers ought to consider using traps for detecting GWSS.

How GWSS will Change PD in California

GWSS is a PD vector with characteristics that will dramatically change how this disease is spread in California. It has the potential to move the bacteria to counties that currently do not have the disease as well as spread the bacteria throughout vineyards in the North Coast and San Joaquin Valley that are currently not infected. When compared to the BGSS, the GWSS has far more *feeding hosts* and *oviposition hosts*, is a stronger flyer, can be present in far greater numbers during the year and can feed on canes in addition to the veins of leaves. All of these factors can increase the spread of PD.

Unlike the BGSS, the GWSS can exist in a wide range of habitats – not just riparian – and adult GWSS are reported to feed on 73 plant species in 35 families in the southeastern US. This insect is known for shifting among several *feeding host plants* during the course of a single day in order to satisfy its nutritional requirements. It is also more than twice as large as the BGSS and must feed more to maintain its body mass.

The GWSS is capable of flying further than the BGSS, therefore it can potentially spread deeper into a vineyard that is adjacent to its initial source. It also has two generations a year whereas the BGSS has only one, thus more eggs are laid each year. Once the GWSS becomes established in a grape growing region, it will move throughout entire vineyard blocks and not be confined to the edges of vineyards adjacent to riparian vegetation.

In grapevines, GWSS can feed on shoots and woody canes throughout the year. It can feed at the base of the current season's growth inoculating bacteria into the wood in an area of the vine that is more likely to be retained during winter pruning. This means the vine can become chronically infected at any time during the growing season. Infections caused by the BGSS only become persistent and thus cause PD if they occur prior to June because the

bacteria have time to reproduce and move into the permanent woody parts of the vine. GWSS can infect a vine in fall and the infection will persist. A GWSS can first acquire the bacteria from a diseased vine in summer, proceed to inoculate many vines by feeding for several weeks and, unlike the BGSS, those vines will become diseased. This vine-to-vine spread of PD is exponential and has not occurred in California before now.

Increased Potential for Spread of New Diseases

The presence of GWSS in California has put not only grape growers on alert, but also almond and alfalfa growers. The strain of the bacterium that causes PD can also cause almond leaf scorch and alfalfa dwarf. These two diseases have occurred intermittently in the Central Valley in the past because we have not had consistent nor high populations of the insect vectors that move the bacterium from grapes into these crops – until now. GWSS *feeding hosts* are just about everywhere people cultivate crops or landscape their yards, therefore they are more likely to be present than other vectors.

To make a bad situation even worse, since GWSS is now established in part of California, it has the potential to vector plant diseases that up until now, have not occurred in the state. An example of this would be oleander leaf scorch. Pest Control Advisers and UC personnel first noticed GWSS – before it was identified as such - in 1990 and four years later, after the insect was well established in some Southern California counties, oleanders in the Palm Springs-Indio area of Riverside County started to die of disease. It was eventually learned that these plants were infected with a new strain of Xylella fastidiosa. Oleander leaf scorch was not found in California until GWSS appeared.

The concern is that if plants that are infected with these various strains of Xylella fastidiosa are unknowingly brought into the state, then a well established GWSS population will proceed to spread these strains to similar plants. California does not currently have phony peach disease or plum leaf scald, two diseases of agricultural crops that are vectored by the GWSS in the Southeast US. We also do not have citrus variegated chlorosis that is caused by yet another strain of Xylella fastidiosa and has resulted in huge losses in the Brazilian citrus industry over the last 13 years.

Early Detection of GWSS by Grape Growers

Yellow sticky traps. These can be used to detect the presence of GWSS in the field. These are the same types of traps used to monitor BGSS populations. BGSS are strongly attracted to yellow, therefore nearly any size yellow trap will suffice. However, since GWSS are stronger insects, they may be able to free themselves from traps that are not sticky enough or large enough. Because of this, UC researchers who have conducted field trials involving

GWSS prefer larger traps such as the 5.5" x 9" AM panel traps that contain a thick layer of "stickem".

Phil Phillips, UC Cooperative Extension Area IPM Advisor has extensive experience in monitoring GWSS in citrus and grape in Ventura, Orange and Riverside Counties. He reports that if not disturbed, GWSS will remain on a tree continuing to feed even when a yellow trap is nearby because they are not strongly attracted to yellow. As a result, in a highly desirable *feeding* and *oviposition host* such as citrus, insects tend to stay put and do not move through the orchard. However, in a diverse landscape such as a nursery they frequently move among different plant types and thus the slight attraction they do have for yellow will cause them to more readily fly toward a yellow sticky trap.

Place traps on vineyard edges that are adjacent to habitats that contain a diversity of plant types. This would include riparian habitats, commercial nurseries and landscaped areas found near wineries, houses, urban boundaries, schools, etc. Traps should be hung or attached to a stake at the height of the plant canopy. A roll of yellow sticky tape is very good for detection purposes because of the increased area it can cover; however it usually looses its stickiness before card traps do. All traps must be replaced when they are no longer sticky.

If possible, check traps and tapes weekly, just as you would as if monitoring for BGSS. If you find a suspicious insect in a trap, fold the trap with the sticky sides in (but don't let the two sticky surfaces touch) secure it with a rubber band and bring it to the County Agricultural Commissioner's office or the UC Cooperative Extension office. If you want to bring in an insect that you find on a sticky tape, carefully cut out a small part of the tape that contains the insect.

Call my office to receive "Retail Sources of Yellow Sticky Traps", a list of local and supplier sources for traps.

Beat sampling. By checking your traps early in the morning while it is still cool, you can also shake plants that are known *feeding* or *oviposition hosts* and any GWSS present will drop to the ground. GWSS cannot fly well until the temperature reaches about 68°F. Even at that temperature, they can just begin to walk and take short hops. When temperatures are in the 50's and low 60's, GWSS adults and nymphs will drop to the ground and remain stationary until it warms up enough for them to move. White sheets or boards can be purchased for this purpose or you can carry your own. By spreading the sheet under the plant and then rattling the plant or knocking it with a stick or piece of PVC, you can quickly see insects that fall on the sheet.

Sweep net sampling. This is a good sampling method for nymphs. It has to be cool to capture adults with a net when they move slowly, otherwise adults are very quick and may fly off ahead of the net. (When populations are high, sweep net sampling is easy at any time of the day.) Turn the sweep net inside out into a large plastic bag to see what you collected. If you find insects that you feel may be GWSS nymphs or adults, don't drive to Santa Rosa with live insects. Put the bag into the freezer to slow or kill the insects then dump them into a jar of alcohol.

Visual inspection. To detect egg masses, this is the only method that will work. Learn to recognize what a fresh egg mass looks like (see enclosed flyer or web sites listed below). Egg masses will be located on the underside of a leaf blade of an *oviposition host*. Leaves should be backlit against a sunny sky to see the egg masses either before or after they hatch.

Preventing the Spread of GWSS

Absolute prevention of the movement of GWSS out of the areas in Southern California where it is now established is thought to be impossible; however the main goal is to slow it down. We hope to "buy time" so that researchers can develop long term solutions to a complex problem that includes PD and related diseases that are spread by the GWSS. To accomplish this goal, the California Department of Food and Agriculture (CDFA), the county agriculture commissioners and representatives from affected commodities are working together to devise a means to contain this pest in the area where it is now located. To date, the counties that are considered to have established breeding populations of the GWSS are San Diego, Riverside, San Bernardino, Ventura, Los Angeles and Orange. In 1998 significant populations were found in the southern parts of Santa Barbara and Kern Counties. There will be no efforts to eradicate this insect in those eight counties.

Some North Coast (including Sonoma) and San Joaquin Valley County Agricultural Commissioners have informed the CDFA of their intention to require the eight counties to "Blue Tag" plant shipments from wholesale and retail nurseries that are destined for their counties. The tag instructs nurseries to hold those incoming shipments and notify the Agricultural Commissioner's office who will send personnel to inspect the shipments. **Blue Tags will also accompany grapevine shipments from nurseries in infested counties and growers are expected to comply.**

Additionally, the Sonoma County Agricultural Commissioner's staff will conduct systematic surveys to detect GWSS in rural and urban settings that are likely sources of introduction. Survey crews will use the detection methods that are described in this newsletter and will have hundreds of sites to sample and resample throughout the county.

GWSS Host Plant List

The list of *feeding hosts* and *oviposition hosts* will only grow, as these insects encounter ornamental, native and crop plants in Southern California that are not present in the southeastern states. It is important to realize that a GWSS host plant list is not a list of plants that should be removed. CDFA will soon have a web site with a host plant list that is continuously updated. When it is in operation, you can access it from the UC Berkeley site listed below. For further information, please visit the following web sites:

www.CNR.Berkeley.edu/xylella/

http://danrcs.ucdavis.edu

http://ucceventura.xlrn.ucsb.edu

PARTIAL LIST OF FEEDING HOSTS AND OVIPOSITION (*) HOSTS OF GWSS

Visit the web sites or call my office for a complete list of known hosts

Woody Ornamental Plants

Ash*, Avocado*, Birch, Bottlebrush*, Boxwood, Camellia, Chinese elm, Citrus*, Crape myrtle*, Elderberry*, Eucalyptus*, Fig, Grape*, Laurel sumac*, Loquat*, Macadamia*, Magnolia*, Mulberry*, Oak*, Oleander, Olive*, Peach, Pear, Philodendron, Photinia*, Pine, Pittosporum, Plum (cultivated), Privet*, Redbud*, Sassafras, Silk tree, Sumac*, Sweetgum, Sycamore*, Tristania*, Trumpet flower*, Umbrella tree*, Walnut, Wisteria Viburnum*, Yaupon, Yucca, ……

Herbaceous Plants

Asparagus, Cheeseweed, Cocklebur, Coffeeweed*, Corn, Cotton, Cowpea, Dogfennel, Evening-primrose, Gladiolus, Goldenrod, Hibiscus*, Hollyhock*, Horseweed, Johnsongrass*, Lambsquarter*, Milkweed, Okra*, Pigweed, Pokeweed, Ragweed, Sowthistle, …….

TESTING VINEYARD THERMOMETERS PRIOR TO FROST SEASON

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Examine thermometers for problems:

- There can be a very small crack near the top where it is attached to the frame. This is usually too small to see. Look for a noticeably lower temperature reading out of the ice water as well as in. If this happens, toss it.
- The minimum temperature stick is stuck at the top due to poor storage. Try to dislodge it by heating the thermometer in hot water and causing the alcohol to rise to the top. Hold the thermometer vertically, bulb end down, and tap the bottom of the frame on a hard surface. BE CAREFUL! THE HOT ALCOHOL COULD CAUSE THE GLASS TO EXPLODE!
- The temperature markings have been rubbed off. This means they were painted on and not etched into the glass. Return for a refund.
- The alcohol column has separated. Grab the top of the thermometer and sharply sling your arm downward a few times. If that doesn't work, heat the thermometer in hot water to cause the alcohol to rise and hopefully reconnect the segmented alcohol. BE CAREFUL! Re-check after it cools down.

Ice-water container used to test thermometers:

If you have up to 20 thermometers, use a five-gallon bucket. Otherwise, find a container that is as deep as half the length of the thermometer. Crushed ice works best but ice cubes are OK. Colder ice is best, but barely frozen ice will work if testing is done quickly. Fill the container with enough ice to immerse at least the bottom third of the thermometer. Add only enough water to reach the top of the ice - it's OK if some ice floats. Just make sure the lower third of the thermometer is submerged in the ice-water solution.

Gently immerse the thermometer - bulb end down - down through the ice-water mixture until the metal frame is touching the bottom of the container. If your thermometer is not attached to a protective metal frame, then do not allow the bulb to touch the container bottom since this may produce a warmer reading. When dealing with several thermometers, use your hand to temporarily shove the ice aside to get them into the bucket without breaking them.

Reading the temperature:

After 5 to 10 minutes, they should have reached exactly 32 degrees F. For those that don't, note on a tag "add 1 degree " or "subtract 1/2 degree " etc. The person reading it out in the field should follow the instructions on the tag in order to read the correct air temperature. Attach the tag to the top - high temperature end - of the frame.

Mounting and storing the thermometers:

Mount them in the vineyard in a slightly tilted position so that the high temperature end is up and the bulb end down. This will help prevent the alcohol column from separating. This is also true during a rough truck ride out to the vineyard. Examine the alcohol column before you mount it in the field. Store thermometers in the off-season standing up in a container so that the high temperature end is up.

Sonoma County Viticulture Newsletter – March 2000

- Detecting the Glassy Winged Sharpshooter
- Testing Vineyard Thermometers Prior to Frost Season

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