CALIFORNIA
PD/GWSS BOARD
Partnership for Winegrape Pest Solutions

2023 – ISSUE 4

bulletin

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Strengthens Defenses as Spotted Lanternfly Continues to Spread in Eastern States

As a federal action plan is activated to slow the spread of the invasive spotted lanternfly (SLF), California's 2023 statewide survey hasn't uncovered any populations of the grapevine-loving pest in the state.

Inspectors with the California Department of Food and Agriculture attended spotted lanternfly trainings in Pennsylvania.

Annual surveying of high-risk areas is part of the California Department of Food and Agriculture's defenses against SLF, rounded out with a statewide exterior quarantine, research, public outreach, and an action plan should any of the invasive pests be found.

The pest has spread to 14 eastern states in the past eight years. These states are carrying out surveying, treatment, control, and research activities in collaboration with the United States Department of Agriculture. See a map of confirmed SLF locations at stopslf.org. The insect has many host plants but strongly prefers tree-of-heaven and grapevines. Infestations can severely weaken plants and eventually kill them due to the loss of carbohydrates caused by insect feeding and decreased photosynthesis resulting from sooty mold. The economic impact on vineyards includes yield loss and vine death, higher operating costs due to increased pesticide usage and quarantine compliance, and decreased tourism.

As SLF is likely to have significant economic and environmental impacts if it were to become established in California, the CDFA has assigned it an "A" pest rating and instituted a state exterior quarantine (bit.ly/SLFquarantine). The most likely pathway for the long-distance spread of SLF is from the transport of egg masses on nursery plants, movable storage containers, and conveyances, such as cars, trucks, and trains.

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SLF sometimes travel from infested areas to California in airplane cargo shipments in late summer and early fall, but most arrive dead. Over the past few years, multiple dead SLF life stages and a few live adults have been found at airports, and both dead adults and a nymph, and several live egg masses have been found at border stations.

Since 2020, state and county surveyors have searched over 2,000 sites across the state, including ports, railyards, highway rest areas, and fairgrounds for the presence of SLF. During 2023, CDFA visited 300 high-risk sites in 31 counties between August and December. In addition to CDFA's survey efforts, several counties are also conducting their own SLF surveys. Should SLF be found in the state, the CDFA's action plan (bit.ly/3rkhv51) includes detection, delimitation, treatment, and quarantine procedures.

The public can also play a role in keeping an eye out for the pests. See what the pest looks like in its various life stages and get free materials, including a poster, flyer, brochure, and images, to use on websites, social media, and in newsletters, at cdfa.ca.gov/pdcp/slf. To request printed material or digital files for professional printing, email pdcpinfo@cdfa.ca.gov or call (916) 900-5024.

The USDA has released its Spotted Lanternfly Five-Year Strategy (bit.ly/3PRkcV3) to limit the SLF's spread while researchers develop tools and pest management options. The plan was developed by the USDA's Spotted Lanternfly Strategic Planning Working Group, made up of representatives from federal and state governments, including California, and the National Plant Board.

The strategic plan prioritizes three goals:

- ***Operations and Implementation:*** Limit the advancement of SLF and efficiently respond to its introduction to new areas.
- ***Research Support:*** Support continued scientific research toward practical management and risk mitigation.
- ***Outreach and Communication:*** Establish consistent national and state-level outreach messages and an educational campaign.

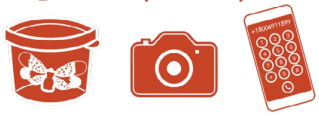
The USDA also funds an interdisciplinary research group to study various aspects of the SLF, including flight behavior, where it might spread, ideal conditions to thrive, feeding preferences, disruptions to its reproductive cycle, and the effectiveness of biological control agents.

Some key new research findings include:

- SLF populations fluctuate yearly due to natural predators and parasites, people's efforts to reduce populations, the natural ebb and flow of insect populations, and lack of food.
- SLF feeding damages grapevines by reducing the plant's ability to make energy through photosynthesis and starving it of starch stored in roots for survival through winter. Most vines may be able to survive lighter infestations, but not heavy infestations especially in successive years.
- Commercial nurseries in infested areas are facing increased costs and work due to increased pre-shipment inspections.
- SLF is not immune to controls and insecticides, including less harsh products, such as insecticidal soap, are effective in curbing populations.
- Several beneficial natural predators have been identified, including praying mantis, spiders, wheel bugs, and birds.

SPOT THE SPOTTED LANTERNFLY?
CDFA Pest Hotline: 1-800-491-1899
Report online: cdfa.ca.gov/plant/reportapest/
Learn more: cdfa.ca.gov/pdcp/slf

Snag it. Snap it. Report it.



Emelie Swackhamer, Penn State University; Richard Gardner; Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

on the RESEARCH FRONT

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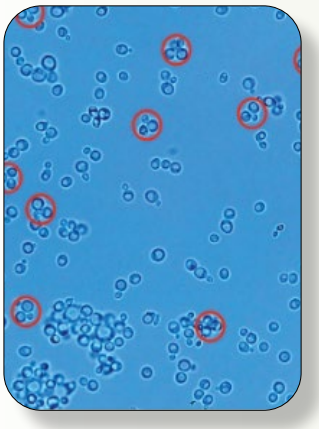

Microscopic slide showing yeast mating and screening procedure to identify potential host factors

Identification of Grapevine Host Factors with Pro-Viral Activity to Target for Resistance Against Red Blotch Virus Through CRISPR Gene Editing

Project leaders: Laurent Deluc and Satyanarayana Gouthu, Oregon State University

CRISPR gene editing technology has not been attempted for grapevine red blotch virus (GRBV) resistance because of the lack of knowledge on grapevine genes that act as pro-viral host factors during viral infection. The team is profiling the host factors interacting with GRBV replication proteins, which are the most critical viral proteins during the initial infection phase. They will also characterize the host factors by generating CRISPR knockouts and examining the viral replication in the mutant plants. This knowledge of host factor genes, without which GRBV cannot replicate in grapevine, will lead to developing non-transgenic grapevine lines with durable genetic resistance against GRBV.

Biology and Role of Treehoppers in Grapevine Red Blotch Disease with Emphasis on *Tortistilus albidosparsus*

Project leaders: Frank Zalom and Mysore Sudarshana, University of California, Davis

The team expects to confirm that the treehopper *Tortistilus albidosparsus* is a vector of grapevine red blotch virus (GRBV) and to help improve the timing of GRBV controls and treatments based on the insect's biology and transmission timing. They are taking field samples of GRBV-infected vineyard blocks and nearby vegetation where the insect has been found in abundance to determine its seasonal cycle and when GRBV transmission is most likely to occur. Variables relevant to GRBV acquisition and transmission for both *T. albidosparsus* and three-cornered alfalfa hopper will be studied in greater detail using an artificial transmission system and salivary gland dissections.

Tortistilus albidosparsus **feeding on a grapevine**

A grapevine showing symptoms of Pierce's disease

Using the Native Grapevine Immune System to Generate Pierce's Disease-Resistant Grapevines

Project leader: Caroline Roper, University of California, Riverside

The team has demonstrated that early stimulation of certain sectors of the grapevine immune system leads to significantly less bacterial colonization and less disease in grapevines inoculated with *Xylella fastidiosa*. They studied this at the genetic level and determined which genes control this disease suppression in grapevines. The team is now investigating if modulating the expression of these native grapevine genes can generate *Vitis vinifera* vines that are resistant to Pierce's disease.

The CDFA PD/GWSS Board partners with other organizations to leverage funding for research and outreach projects. Funding partners include the American Vineyard Foundation, the Consolidated Central Valley Table Grape Pest and Disease Control District, the USDA Agricultural Research Service, and other organizations.

Accelerating Research on Grapevine Viruses

To drive progress in finding sustainable, effective control strategies for grapevine viruses, the PD/GWSS Board is partnering with the National Academies of Sciences to review and provide recommendations on the Board's virus research portfolio.

The guidance will help direct future funding of projects that address knowledge and management gaps, minimizing the spread of and economic losses due to grapevine red blotch virus and grapevine leafroll-associated virus type 3.

"We know a lot about the epidemiology of grapevine viruses, but as an industry, we're still struggling with effective control strategies," said Dr. Kristin Lowe, PD/GWSS Board research coordinator. "It'll be very helpful to concretely identify knowledge gaps so we can think about how to tackle them from a scientific research perspective, be it soliciting specific proposals from specific scientists, funding a large collaborative project, or prioritizing some types of studies over others."

The first phase of the project was examining the Board's annual research funding process earlier this year, with the committee validating the high quality of the review and selection process. The committee also offered suggestions on how the Board could refine its procedures and promote collaborative, multi-disciplinary approaches to future virus projects. They also discussed expectations for the project's next phase with the Board.

Mapping grapevines with grapevine red blotch disease in a vineyard.

"The National Academies of Science's recommendations have helped us improve our request for proposal process, selection process, and outreach to ensure we are getting the best research and the best use of grower dollars to fund that research," said Matt Kaiser, with the California Department of Food and Agriculture's Pierce's Disease Control Program.

The committee is now reviewing current knowledge on grapevine viruses to identify research outcomes and gaps and recommend the best approach for future research. A final report is expected in summer 2024. Learn more about the project at bit.ly/46AVvSr.

$1.35
(per $1,000 crop value) average grower assessment rate since 2001

$55 MILLION
invested in research & outreach since 2001

9
PESTS & DISEASES
eligibile for research & outreach funding