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NEWS BACKGROUNDER: SICK CALIFORNIA GRAPEVINES MAY HAVE VIRUSES

Plant viruses probably are the culprits responsible for sick, dead or dying grapevines in many young or newly replanted California vineyards, according to a U.S. Department of Agriculture researcher.

This preliminary diagnosis was made in 15 vineyards inspected by Dr. Deborah A. Golino of USDA's Agricultural Research Service, Davis, Calif. The vineyards are in Napa, Sonoma, Solano and San Joaquin counties. Golino also has examined diseased vines that growers at 25 other vineyards sent to her laboratory.

The extent of the problem in young California vineyards is not known, she says. In some of the 15 vineyards she inspected, as many as one-third of the young vines were dead and the rest were dying. Not every infected vine will die. But those that don't may produce fewer harvestable grapes, lowering growers' profits.

Last fall, growers began reporting uncommon damage in newly replanted vineyards, including some in the Napa and Sonoma valleys--the state's best-known wine-producing regions. Widespread replanting, Golino explains, was triggered by an earlier problem--infestations of a new type of grape phylloxera, a root-eating louse.

Golino, a plant pathologist, specializes in grape virus diseases in studies at the ARS Crops Pathology and Genetics Research Unit in Davis.

The diseased vines, she says, generally have been grown from virus-infected scionwood (the upper, fruit-bearing part of the vine). Scionwood usually becomes infected when it is grafted to rootstock (the rooted base of the vine) that is carrying virus. Infected vines may appear healthy, so growers would have difficulty detecting infection of scionwood or rootstock.

Some growers already have taken one important precaution. They planted only rootstock that was tested and certified as virus-free. But this addresses only the bottom part of the plant. They may have overlooked the importance of grafting only virus-free scionwood onto virus-free rootstock. If scionwood is infected, the entire vine can become infected, including once-healthy rootstock.

The best measure growers can take now, she says, is to replant only certified virus-free rootstock, and graft only certified virus-free scionwood. The outbreaks are motivating more growers to take this approach, which Golino says will lead to healthier vineyards and help avert similar problems in the future.

What's causing some newly planted grapevines to weaken and die?

Golino suspects some of the new vines are succumbing to one or more virus diseases, such as leafroll, corky bark and rupestris stem pitting viruses. Vines may also be afflicted by several virus-like organisms such as shoot necrosis and vein mosaic. Her preliminary laboratory tests show that the suspect viruses are present in some samples.

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Symptoms include severe stunting, leaf discoloration, leaf rolling (curled along edges) and abnormal dormancy. In addition, affected vines almost always have abnormalities at the graft union, that is, the site where scionwood joins rootstock. These abnormalities are easily seen by peeling the bark from the base of a sick vine and looking at the wood adjacent to the graft union. There may be dead tissue, or severe pitting and grooving (what is known as a girdling disorder). Often the scionwood looks normal but the rootstock is discolored, especially where it contacts the scionwood. Golino believes this is because the scionwood has infected the young rootstock with a virus to which the rootstock is especially sensitive.

Why are the new vineyards susceptible?

The most commonly used rootstock in California for many years was AXR-1, thought to be resistant to the phylloxera louse. About 8 years ago, however, researchers at the University of California at Davis identified a new Type B strain or biotype of phylloxera that can kill AXR-1 rootstocks.

Pesticides aren't satisfactory for controlling phylloxera. So, where phylloxera damage was severe, growers had little choice but to uproot AXR-1 vines and replant alternative rootstocks obtained from nurseries. They chose these alternatives for resistance to the Type B phylloxera biotype. However, some if not all of them are susceptible to leafroll or other viruses.

"In fact," Golino says, "plant pathologists use several of the rootstocks people chose for replanting--Kober 5BB, Riparia Gloire, and St. George--to detect and identify several key viruses. These rootstocks are useful for commercial vineyards but extra care needs to be taken about the health of scionwood grafted to them."

Another reason for AXR-1's popularity was its resistance to many of the viruses today playing havoc in some vineyards, says Golino. But, she notes, many AXR-1 vines likely had low-grade, or latent, virus infections with no obvious symptoms. Grafts were successful, vines looked healthy and grape quality and quantity weren't noticeably affected. Trouble arose when growers grafted scionwood from vines with these latent infections onto the alternative rootstocks.

How might this new problem affect consumers and growers?

Many California wineries are already struggling with the expense of ripping out and replanting phylloxera-damaged vineyards. The small wineries are likely to be hurt most by new virus outbreaks. If their newly planted vines become infected, production will likely decline and they may not be able to afford a second round of replanting. Replanting costs an estimated $10,000 to $30,000 an acre. Adding loss of production and lost wine sales, the total could reach $75,000 an acre. About 22,000 acres in Napa Valley are planted with AXR-1.

"Small wineries typically carve a niche in the market by experimenting with new winemaking styles to produce distinctive wines," says Golino. "If those entrepreneurs go out of business, we can expect to see less diversity in California wines."

As the phylloxera louse spreads, growers in other states could face the same problem. The louse has already struck in Oregon and Washington.

Growers elsewhere in California and in other grape-producing regions such as upstate New York may see virus problems if they choose the same alternative rootstocks when replanting.

For example, vineyards in the San Joaquin Valley--the heart of the state's fresh market and raisin grape production--largely escaped phylloxera damage. There, soil and climate are less hospitable to the louse, which prefers the cool, moist winegrape-growing regions. But these growers may need to replant for a variety of other reasons: to replace aging, less-productive vines; accommodate changes in market demand for certain grape varieties or counter damage by microscopic worms called nematodes.

Why don't growers only use "certified virus free" material?

Over the years, California growers have relied on judgment and experience in deciding whether to use certified virus-free rootstock or scionwood. No law requires it, and growers have practical reasons for not doing it. For instance, certified materials are costlier, and the most popular ones are not always available.

In addition, some growers prefer the convenience and economy of using scionwood from their own favorite grapevines, growing on areas of the vineyard not destroyed by the louse. Others buy non-certified scionwood from respected vineyards known for their fine wines.

What are the knowledge gaps?

Golino says the problem may be caused by factors other than--or in addition to--viruses, though she believes this is unlikely. Other possibilities include growers' inexperience with the alternative rootstocks, or a biological incompatibility between rootstocks and scionwood.

Relative tolerance to viruses has not been established for the some of the major alternative rootstocks being planted. Tolerance tests typically take about 2 years. Among the rootstocks most widely used for replanting in California are Freedom, Couderc 3309, Harmony, Kober 5BB, 420A, Millardet 101-14, Paulsen 1103, Richter 110, Ruggeri 140, St. George, Salt Creek, Teleki 5C, 039-16 and SO4.

Finally, detecting viruses in rootstocks and scionwood is time-consuming by current methods. Tools of biotechnology, such as antibody assays and DNA probes, could speed detection. That could help growers make informed choices when planting new vineyards, according to Golino.

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