A Possible Preventive for Phylloxera

When an aphidlike insect known as the grape phylloxera louse punctures grapevine roots to suck nutritious juices, it creates a handy hole that grape disease organisms can enter. The combined effects of phylloxera's feeding and the diseases caused by the microbes that sneak in through the punctures may eventually kill infested vines.

Known to scientists as *Daktulosphaira vitifoliae*, phylloxera is one of the world's most destructive vineyard pests. In greenhouse and outdoor tests, ARS research horticulturist David W. Ramming at Fresno, California, is scrutinizing the phylloxera resistance of popular grapevines. And he is investigating experimental grapevines that have already shown promise in tests of other critical traits, such as resistance to wormlike, soil-dwelling pests called nematodes. In addition, his team is raising seedlings from the parent grapevines of the best performing offspring, in an effort to unlock secrets about inheritance of phylloxera resistance.

On another front of the phylloxera battle, ARS-funded studies at the University of California at Davis have produced a convenient, practical test for estimating a plant's phylloxera susceptibility in only 8 weeks. Grape plantlets and the surface of phylloxera eggs are first sterilized to kill any fungi and bacteria that might skew test results, then are placed inside small, clear-plastic boxes equipped with a bed of nutrient-rich gel. Insects and plantlets then grow in tandem inside the boxes, which are housed in a temperature-controlled growth chamber—something like a walk-in refrigerator.

The technique is an improvement on earlier approaches in which egg surfaces were not sterilized. M. Andrew Walker and colleagues at UC Davis determined how to do it without killing the phylloxera embryos. The team has already produced new phylloxera-resistance estimates for some 40 different plantlets—most grown from samples from the ARS grape genebank at Davis.

Researchers can also snip off bits of plantlet roots, right after hungry phylloxera attack, to see if resistant grapevines form natural chemicals that repel the tiny pests. These compounds may be a key to phylloxera resistance. If so, scientists might be able to trace the chemicals back to the grapevine genes that control them and, after that, perhaps rebuild the genes to boost their effectiveness. Or the scientists might transfer the genes into phylloxera-susceptible vines.—By **Marcia Wood,** ARS.

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A Currant Treat for All Seasons

Your holiday wines and juices may already contain black currants. But if growers and researchers are successful, American consumers will see a lot more jams, juices, and pastries made with tart-sweet currants and their cousins, the gooseberries.

Currants are black, red, or white berries native to North America and Europe. They are unrelated to the raisinlike Zante currants, made from grapes.

"Many people in North America are interested in the fruits, which are already popular in Europe," says Kim Hummer, curator for the National Clonal Germplasm Repository in Corvallis, Oregon. Operated by the Agricultural Research Service, the repository preserves and evaluates germplasm of currants, gooseberries, other temperate fruits, hazelnuts, hops, and mint.

The U.S. currant and gooseberry industry all but disappeared in the early part of the century, when federal legislation called for eradicating these plants in an attempt to protect pine trees. At that time, a disease called white pine blister rust had been brought into the country. The life cycle for this rust requires both pines and plants in the genus *Ribes,* including currants and gooseberries. It can kill white pines but normally doesn't hurt *Ribes.* Breezes carry the rust spores between the plants.

Disease-resistant currants and gooseberries are breathing new life into the industry. The federal law prohibiting *Ribes* was repealed in 1966, but 17 states still have some restrictions. Some of these states are considering changing their laws to allow the cultivation of rust-resistant *Ribes.*

In 1996, ARS, in collaboration with Agriculture and Agri-Food Canada, released Jahn's Prairie, a rust-resistant gooseberry. Growers have been propagating Jahn's Prairie plants for retail sales. Now Hummer is investigating rust resistance in currants.

"Several currant cultivars on trial at Corvallis show no signs of white pine blister rust under natural conditions," says Hummer. This fall, she'll intentionally inoculate the plants with the disease to make sure that they are resistant and haven't just avoided the rust.

Currants and gooseberries grow best in the northern United States. They can withstand temperatures as low as -40°F in winter but do not grow well where summer temperatures are very hot.—By **Kathryn Barry Stelljes**, ARS.

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