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Living with Pierce's disease

By Dave Caldwell

Dr. Turner Sutton plans a three-year effort aimed at learning how to manage Pierce's disease in wine grapes.
Photo by Daniel Kim

The first symptoms usually appear in mid-July to August, the hottest part of a North Carolina summer. The leaves of grapevines turn brown at the edges, as though scorched by the summer heat. Then clusters of grapes shrivel up. Eventually, the entire vine dies.

This is Pierce's disease, and it is the bane of North Carolina's growing viticulture industry. It is also the object of Dr. Turner Sutton's scrutiny. Sutton, a professor of plant pathology and Extension specialist in the College of Agriculture and Life Sciences, is looking for ways to allow North Carolina wine grape growers to live with Pierce's disease.

"Growers are concerned about it, and they should be concerned about it," says Sutton.

Pierce's disease, he says, "has the potential to limit the success of North Carolina vineyards."

Growing European-type vinifera wine grapes and making wine is a growing industry in North Carolina. The number of wineries in the state has doubled since 2002, according to the North Carolina Wine and Grape Council. North Carolina is home to more than 50 wineries, with five more expected to open this year. How successful Sutton is in determining how to deal with Pierce's disease will likely affect the success of this expanding industry.

Pierce's disease is caused by a bacterium, Xylella fastidiosa, which is spread from a variety of plants to grapevines by insects such as leafhoppers and spittlebugs, Sutton says. Among the reservoir plants on which the bacterium is found are oak trees, blackberries, wild grapes and Virginia creeper. When the bacterium infects a grapevine, it plugs the xylem, the water-conducting tissue of the plant, cutting off the vine's water supply.

Sutton has studied how the disease is spread and how it survives and plans to test methods of managing it.

If winter temperatures drop low enough, the bacterium that causes Pierce's disease can't survive, Sutton says. Sutton has looked at the effect of winter temperature on Pierce's disease in North Carolina. What he found is not particularly good news for grape growers.

Winters are warm enough throughout eastern North Carolina and the southern and eastern piedmont that the Pierce's disease bacterium can overwinter. As a result, Sutton describes the risk of the disease in these areas as "quite high." He describes disease risk as "somewhat less" in the north and central piedmont, where winters are a little cooler but still not cool enough to kill Xylella fastidiosa. Sutton points out that as a result of warmer winters in recent years, the risk of the disease has increased throughout the piedmont.

One of Sutton's students recently looked at the vectors of the bacterium, the insects that transmit the disease to grapevines. In 2004 and 2005, insect traps were placed in vineyards in the piedmont and coastal plain. Four species of leafhopper were identified as being most abundant in the vineyards, and three of the species tested positive for the bacterium. At least two of these leafhopper species are thought to be the primary vectors for Pierce's disease on grapes in North Carolina.

Sutton and Dr. George Kennedy, William Neal Reynolds Professor of Entomology, are now working with a $72,000 grant from the **N.C. Tobacco Trust Fund Commission** to look at methods of managing Pierce's disease. They are attacking the disease on three fronts.

The grant is being used to develop an insecticide spray program designed to control the leafhoppers thought to be primarily responsible for spreading the disease. At the same time, Sutton plans to work on more specifically identifying the reservoir plants that harbor the Pierce's disease bacterium. If growers know where the bacterium resides when it's not on grapevines, it may be possible to eliminate these plants from the vicinity of a vineyard and reduce the likelihood of the disease.

Sutton is going to experiment with pruning to remove infected parts of the vine. It may be possible to halt the disease before it spreads too far on the vine. Sutton explains that the bacterium moves from grapevine leaves to the vine's cordon, the part of the vine that is trained to grow horizontally along a trellis. The bacterium then moves to the vine trunk, which kills the vine. If a grower sees infected leaves in July, he may be able to save the vine by pruning the infected shoots.

"We don't have a lot of answers at this time," says Sutton, who hopes to "come up with a plan that allows us to live with the disease."