Researchers Getting to the 'Root' of Christmas Tree Problems

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(PhysOrg.com) -- As Christmas tree farmers prepare for their busiest season, researchers at North Carolina State University are studying how to combat a disease that has killed thousands of North Carolina Christmas trees in recent decades.

Current research results suggest that Christmas tree farmers might be able to overcome Phytophthora, a highly destructive plant pathogen that infects the roots of Fraser firs, by using organic mulches.

Researcher Dr. Kelly Ivors says that using mulched organic materials – such as hard wood trees, shrubs and other plant material – as a top application in Fraser fir farms allows microorganisms growing in the mulches to control Phytophthora. Ivors, an assistant professor and extension specialist in the Department of Plant Pathology, is performing the research with Dr. Michael Benson, professor of plant pathology, and graduate student Brantlee Richter.

With the rapid increase in Fraser fir plantings, growers are facing a number of production issues. Most notably, Phytophthora species pose a serious hazard to the U.S. Christmas tree market. Phytophthora root rot has been associated with significant damage to Fraser fir since the 1970s. In North Carolina, annual losses due to Phytophthora root rot are estimated at $6 to 7 million, leaving the long-term viability of the industry in doubt.

"Using chemical applications to treat Phytophthora root rot is very costly

– often resulting in farmers spending more money to treat the trees than they make by selling them," Ivors says. "By using alternative methods of controlling this disease, such as mulching, we are helping to fix the problem organically and in a more cost-effective manner."

NC State researchers are conducting tests using the mulching technique in five field sites in Avery, Watauga, Ashe and Mitchell counties. Trees were planted in replicated treatment plots at each site. Soil and mulches are being sampled and analyzed for chemical and biological properties, and rain gauges have been installed to track precipitation. Survival and disease progression will be monitored as long as there are surviving trees in the study sites.

Preliminary results show that average disease ratings are significantly lower in mulched compared to unmulched plots at three of the five sites, Ivors says. She cautions, however, that mulch alone will most likely not be able to provide adequate control of root rot. Development of Fraser fir root stock that resists Phytophthora will likely be needed in Fraser fir production. Current research is focused on understanding how these mulches help control the disease, and what other plant cultivation techniques may be used in combination with these mulches to achieve acceptable levels of Phytophthora root rot control.

"While growers struggle with ongoing problems like Phytophthora root rot on some of their land, they will still get a premium crop of Fraser fir Christmas trees to market this year. Nearly 6 million healthy Christmas trees will be shipped across the eastern United States from the North Carolina mountains," says Jeff Owen, area extension forestry specialist at NC State. "With adequate rain this fall and a good, hard cold snap, the trees will hold up great through the holiday season."

Provided by North Carolina State University