Branching Out
IPM Newsletter For Trees & Shrubs

Beech Canker Disease Update

George Hudler, Department of Plant Pathology & Plant-Microbe Biology, Cornell University

It's been several years since we've updated you on our work with bleeding cankers on European beech, and with the project moving to closure (at least for us) this seems to be a good time to add a few more pieces to the puzzle.

History

Recall that our interest in bleeding cankers on European beech started with a somewhat serendipitous discovery that a species of *Phytophthora* was causing a slow-growing but eventually lethal girdling canker. Results of further laboratory and field research by our lab team over the next 5 years together with new lessons from colleagues in Europe, proved that there were several species of *Phytophthora* that could be the cause of the disease, and the occurrence of any one at any time was unpredictable. Isolation and lab characterization of the pathogen from each sample was the only way to make a reliable identification.

Pathogens Involved

At first, the most commonly isolated pathogen in the northeast U.S. was *P. citricola*—a longtime resident of North America with a history of causing root disease and stem cankers on a wide range of woody plants. The second most commonly isolated species was *P. cactorum*, another organism with a long history on North American soils. For us, this was all good news because it meant that at a time when a new species of *Phytophthora* was wreaking havoc with oaks in California (e.g. sudden oak death), we were likely not dealing with a newly introduced pathogen in the East.

Since then, we've learned that *P. citricola* is *not* the single species it was first thought to be by taxonomists in the field. So now, in addition to *P. citricola* we have some amount of disease caused by either one of two new species, formerly in the "citricola complex"; they are *P. plurivora* and *P. pini*. *P. plurivora* clearly has a European origin but is, so far, rare in North America. *P. pini* seems to be abundant in the soil around the root systems of many European beech in the Northeast and it seems to be the most frequent cause of bleeding cankers following some predisposing event that weakens trees' defenses.

Beech Study in Greenwood Cemetery

One feature about European beech culture in North America that makes experimental design frustrating is that the trees are scattered across the landscape with few uniform populations with common ownership or care. That problem was solved for us when we got cooperation from the staff at the 500 acre Greenwood Cemetery in Brooklyn. Historical records show that there were originally over 200 beech trees on the property and 177 grow there now. All are 125–175 years old, and at least several of those that have died as well as the ones still standing have (or did have) symptoms of bleeding cankers.

The disease is randomly scattered and does not occur in infection centers.

Our analysis of this somewhat unique population has shown us that the disease is randomly scattered throughout the cemetery and does not occur in infection centers even though there are several

The 500 acre Greenwood Cemetery in Brooklyn was the site for one of our experiments. The red dots on the photo are infected beech trees; the green dots are beech trees not showing any symptoms.

Bleeding cankers on a beech tree

discrete clusters of trees where such could occur. Soil sampling for the pathogens yields similar results; the microbes seem to be relatively uniformly distributed in the rhizospheres of symptomless as well as diseased trees. For the moment, we're left to conclude that the pathogens may be endemic to soils in the cemetery OR that they are at least endemic to the root systems of European beech. If the latter, then they could have readily been transferred to new sites with transplanted trees. What the organisms might be doing in the rhizosphere for the many years that they apparently lie "dormant" is anyone's guess but many of you have heard me wonder aloud whether they might have a beneficial role as killers of seedlings that could otherwise come up directly under the parent tree and eventually compete with it.

Most recently, we are bringing to closure a tree ring analysis study in Greenwood, comparing growth rates of diseased and healthy trees over the past 15–20 years. Clearly, those trees that are currently showing symptoms of bleeding cankers have experienced one or more events that have caused their growth to slow dramatically for up to 10 years past. What those "events" are is still open to question, but the fact that they occurred well before symptoms appeared is further evidence to our hypothesis that some amount of predisposition enables otherwise benign soil microbiota to become pathogens.

Some amount of predisposition enables otherwise benign soil microbiota to become pathogens.

Bleeding Canker Management

In the meantime, we are heartened to continue to hear excellent reports from readers like you about the effectiveness of phosphonate fungicides for bleeding canker therapy. Many of you are following the protocol we used in our early tests, applying Agri-Fos + Pentrabark as a trunk drench, and if that works there is no reason to change. Some of you are enthused about application of the phosphonate as a soil drench, asserting that control is equal to that of the bark drench but with less active ingredient and no Pentrabark. If you are so inclined, there is no good reason not to try that application method; the worst that could happen is that you would not get desired results and could then go to the bark drench as a fallback. The same is true for some other suggested remedies, including various forms of injection.

We continue to hear excellent reports about the effectiveness of phosphonate fungicides for bleeding canker therapy.

There are only so many experiments we can do in the time available to us, so continued dialogue with you is essential. Even though our research efforts on this topic are now winding down, we're still open to your comments and hope you'll feel free to send them.