As many of you know, for the past six years or so, my research team and I have been studying the biology and ecology of bleeding cankers of European beech caused by several species of *Phytophthora*. In the years since we first began to suspect that the pathogens were the precursors to eventual decline and death of mature trees, we have made a number of discoveries that we believe help us to understand the overall syndrome well enough to make sound management recommendations. However, we also have other questions that remain unanswered and we continue to give those attention. What follows is an updated list of what we think we’ve learned and what more we’d like to learn before we wrap the project up and move on to other things:

1. At least three taxa of *Phytophthora* can be readily isolated from bleeding cankers on beech. Two are currently called *P. citricola* ‘clade 1’ and ‘clade 2’ because they look similar but have slightly different growth habits in culture and have significant differences in selected DNA sequences. Someday they may be named different species but for now, the most important thing to us is that they seem to be about equal in their pathogenicity to beech trees. The third taxon is *P. cactorum*, a well known pathogen of fruit trees in the Northeast, occasionally causing disease on dogwoods and other ornamentals. *P. cactorum* is recovered from about a third of the trees with bleeding cankers and in greenhouse inoculations, seems to be a less aggressive pathogen.

2. On average, about 40 percent of the European beech trees in the northeast U.S. have one or more bleeding cankers. Frankly, we have been surprised to find the disease on quite so many trees. Many of the cankers are small enough (e.g. encompassing less than 25 percent of the circumference of the trees) that they don’t seem to pose an immediate threat to the health of the trees, but they do need to be monitored.

3. We frequently find cankers – some, quite large – that seem to have been walled off by host tree defenses without human intervention. This leads us to believe that although bleeding cankers are common, they pose the greatest threat to tree health when environmental factors weaken host defenses. We don’t know what all of those factors might be, but water stress is high on our list of suspects because of its well-known impact on other defense reactions in other plant species.

4. One factor that continues to puzzle us is how trees become infected. In the greenhouse, seedlings that are planted into infested soil will die relatively quickly (more so from *P. citricola* than from *P. cactorum*) and wounded leaves can be infected by carefully placed drops of spore suspensions. In fact, in the case of *P. citricola*, “successful” leaf infections often lead to stem cankers – so far only in seedling tests but possibly from basal sprouts in the field, as well.

5. Spread of the disease from tree to tree also remains a mystery to us. Are the pathogens such commonplace residents in the soil that any tree planted anywhere is likely to have its roots in some amount of *Phytophthora* from the outset or do the pathogens “find” the trees after they are established? This is one of our highest priority questions because the answer could have a significant effect on future management strategies.

6. Our previous, admittedly crude, field experiments with phosphonate fungicides (in our case, Agri-Fos with Pentra-bark applied as a bark drench) led us to believe that this class of materials showed the best promise for preventative and therapeutic treatments of trees. Our own greenhouse trials and several years of anecdotal reports from practitioners in the field now bear that out. We have not tested other formulations or application methods for the phosphonates, but some arborists are using alternative techniques with apparent success. In the aforementioned greenhouse tests on seedlings, paclobutrazol (Cambistat) didn’t provide any protection.

7. Occasionally, we find a mature European beech tree that is in an advanced stage of decline and does not have obvious basal cankers or obvious limitations with respect to root growth and development. One such tree is right on the Cornell campus, and we look forward to the opportunity to examine its roots in detail when the grounds maintenance folks give us the go-ahead. Stay tuned.
Some regional suppliers of AgriFos® in the Northeast are:

Tree Health Management, 135 Allen Blvd. Suite 1, Farmingdale, NY 11735 (516-781-6464)

Professional Tree Surgeon Supplies, 580 W. Hoffman Ave, Lindenhurst, NY 11757 (800-873-3203)

Midwest Arborist Supply, (800-423-3789)

PSP Enterprises, P.O. Box 24, Rosewood, OH 43070 (877-297-7532)

Phenology

Long Island: Flowering—Barberry, Cherry Laurel, Flowering Dogwood, Fothergilla, Jethead, Kerria, Korean Spicebush Viburnum, Kwanzan Cherry, Lilac, Redbud, Wisteria

Orange County: Flowering—Barberry, Flowering Dogwood, Korean Spicebush Viburnum, Kwanzan Cherry, Lilac, Redbud, Wisteria

Rockland County: Flowering—Barberry, Cherry Laurel, Flowering Dogwood, Hawthorn, Kerria, Kwansan Cherry, Leatherleaf Viburnum, Lilac, Redbud, Wisteria

Tompkins County: Flowering—Flowering Dogwood, Lilac, Redbud, Wild Cherry, Wisteria

Westchester County: Flowering—Flowering Dogwood, Lilac, Redbud, Wisteria

Growing Degree Days

As of May 12, 2009

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Things to Look For in the Upcoming Weeks:

Boxwood Leafminer (94)—Tom Kowalsick from Suffolk county CCE reports getting in a sample of boxwood leafminer in the pupal stage recently. The adults of this leafminer should be emerging soon. The adults resemble small, orange gnaw-like flies. Most cultivars of Buxus sempervirens and B. microphylla are susceptible. If populations are intolerable, a treatment can be made. An imidicloprid soil drench or injection in late summer might be the best IPM approach. The other management options are to spray for adults with a registered pesticide in the mid-May through early June (350-600GDD<sub>50</sub>) and/or make a foliar application for larvae in early to midsummer (1200-2400 GDD<sub>50</sub>.

Elongate Hemlock Scale (45)—The crawlers of this serious pest will soon be active. In addition to hemlock they also attack yew, spruce, pine, Douglas-fir and cedar. Treat heavily infested plants in late May through mid-June (360-700 GDD<sub>50</sub>.

Euonymus Scale (186)—Euonymus scale nymphs will soon be present. Hosts include euonymus, pachysandra, holly and bittersweet. If needed, treat during early June (533-820 GDD<sub>50</sub>) and mid-July (1150-1388 GDD<sub>50</sub>.

European Red Mite (228)—The adult and immature mites will soon begin feeding on flowering fruit trees and elms. If a miticide is needed, apply in late May through June (240-810 GDD<sub>50</sub>), and repeat as needed at 10 day intervals.

Native Holly Leafminer (95)—We had expected to find the adults of this leafminer on our recent scouting trip to Long Island but the leaves on the hollies hadn’t expanded yet. By the time you read this the adults should be active. Look for the small black flies (1/8 inch long) hovering around the young leaves. Examine young foliage of English and American holly for tiny green blisters. Because the parasites do not reduce the area mined and the resulting aesthetic damage, they can not be relied upon. Place a sticky trap on the terminals of American holly to detect the adults. To manage large adult populations, apply a registered insecticide in mid-May (192-298 GDD<sub>50</sub>). The young larvae can be controlled with a systemic insecticide application made in the first two weeks of July (1029-1266 GDD<sub>50</sub>.

Twospotted Spider Mite (229)—This mite causes stippling of foliage and can be a serious pest of roses, flowering fruits, azalea, and several other shrubs. Treat from late May through mid-June (363-618 GDD<sub>50</sub>). Monitor plants to check for resurgence of twospotted spider mites after treatment.

Our Financial Supporters

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- The Care of Trees
- New York State Arborists-ISA Chapter
- Joseph Dinardo
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Boxwood leafminer adult

Native holly leafminer adult