Status of Beech Bark Disease Establishment and Research in Michigan

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Abstract

Beech bark disease was first discovered in Michigan in spring 2000 in Ludington State Park on the shore of Lake Michigan in the lower peninsula. Soon thereafter it was found in the upper peninsula of Michigan in the Bass Lake campground. Since then surveys have found it in six counties in Michigan. Beech bark disease involves two exotic organisms: the beech bark scale (Cryptococcus fagisuga Lind.; Eriococcidae) and fungal pathogens in the genus Nectria. Both the sap-feeding scale insect and the fungus are thought to have originated from Europe and were accidentally introduced into Nova Scotia on ornamental beech imported from Europe in 1890. Since then the scale and the disease have slowly spread through the New England states, Pennsylvania, West Virginia, Virginia, North Carolina, Tennessee, Ohio, Quebec and Ontario.

The beech scale is parthenogenic and has one generation a year. Eggs are laid in midsummer and hatch by early fall. The first stage crawlers are mobile and feed on sap in the tree’s inner bark through the fall. They overwinter as second stage crawlers which are legless, immobile, and secrete wax. In the spring they resume feeding and become immobile adults in late spring. When trees are heavily infested they appear to be covered by white wool. The minute feeding wounds caused by the scale insects enable Nectria fungi (both native species and European species) to enter the tree. The European Nectria species kills areas of woody tissues, sometimes causing cankers on the tree stem and large branches. If enough tissue is killed, the tree becomes girdled and will die. Trees may become chlorotic with thin ragged leaves. Branches and trunks of some infected trees break off in heavy winds resulting in “beech snap.”

Beech bark disease will likely continue to spread throughout Michigan killing up to 50% of the large beech trees in Michigan during the first wave of the disease. Another 25% may become infected but survive as weak, defective trees. Some beech trees escape infection and may be at least partially resistant to beech scale. Research is underway to determine the mechanisms and genetics of potentially resistant trees.

Several techniques were evaluated for controlling the beech scale on high value trees including scrubbing scales off of trees, spraying horticultural oil on the trunks of infested trees and treating infested trees with systemic insecticides. The systemic insecticides tested included trunk injection with imidachloprid (Imicide, J.J. Mauget Co.), a combination of imidachloprid and fungisol (Imisol, J.J. Mauget Col), azadirachtin (Ornazin, Cleary Chemical Corp.), and soil injection with imidachloprid (Merit, Bayer). Initial results one month after application of treatments indicate that trees that were scrubbed remained free of scales, and spraying with horticultural oil resulted in approximately 50% mortality of scales present on the trees. Efficacy of the injected insecticides was evaluated in early fall when first stage crawlers began actively feeding. Scale density remained very low on the scrubbred trees and was significantly lower than on untreated trees. Scale densities were also greatly reduced on trees injected with imidachloprid (Imicide, Imisol and Merit) but were not significantly different from untreated trees. Further evaluations will be conducted to determine long term efficacy of treatments.