Beech Leaf Disease

Figure 1. American Beech leaves with Beech Leaf Disease symptoms. Photo: F. Graves.

Beech Leaf Disease (BLD) was found in southwestern Rhode Island in June 2020. First identified on American beech (*Fagus grandifolia*) in Ohio in 2012, it is now found in ten other US states and Ontario, Canada (Figure 2). The disease affects the leaves and, after several years, can be severe enough to cause tree decline and mortality.

The disease was recently confirmed as being caused by a nematode, *Litylenchus crenatae mccannii*. Currently, there is no defined treatment for control of BLD in the forested landscape. Research is underway to identify possible treatments for landscape trees.

BLD mainly affects American beech, however it has been found on European (*Fagus sylvatica*) and Oriental beech (*F. orientalis*), as well as Ohio nursery stock. All ages and size of beech are affected, although the rate of decline can vary based on tree size. In larger trees, disease progression is slower, beginning in the lower branches of the tree and moving upward. The disease also appears to spread faster between beech trees that are growing in clone clusters, possibly able to spread through their connected root systems. Most mortality occurs in saplings within 2-5 years. Where established, BLD mortality of sapling-sized trees can reach more than 90%.

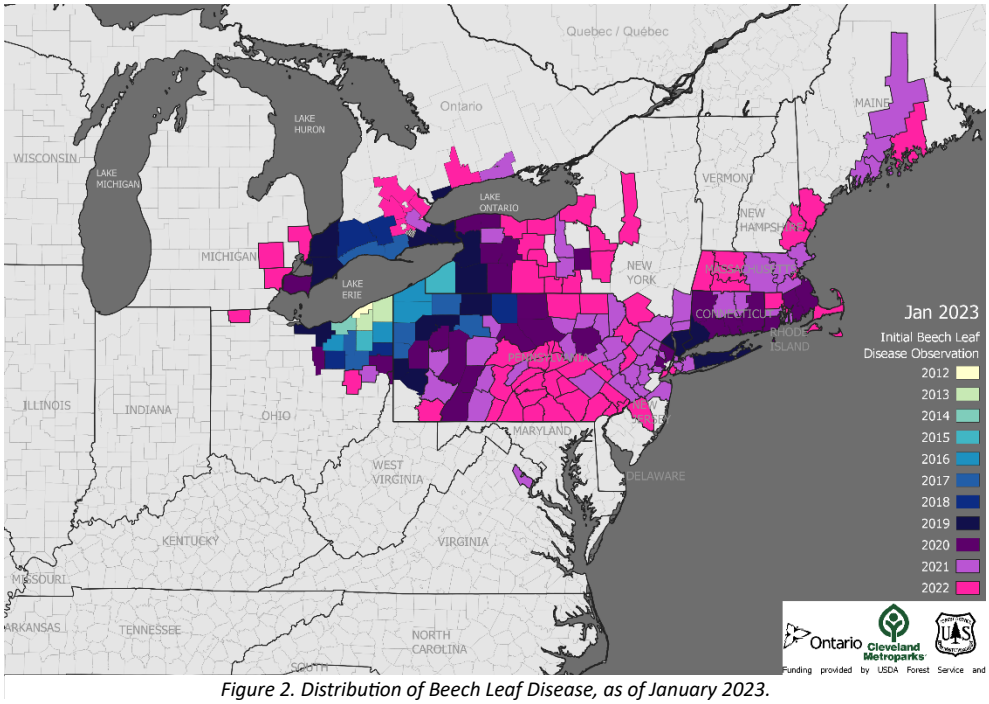

Figure 2. Distribution of Beech Leaf Disease, as of January 2023.

SYMPTOMS

Early BLD symptoms are dark striping on the leaves, parallel to the leaf veins, best seen by looking upward into the backlit canopy (Figure 3a). The striping is caused by thickening of the leaf. Lighter, chlorotic striping may also occur (Figure 3b). Both fully mature and very young “emerging” leaves show symptoms. Eventually the affected foliage withers, dries, and yellows (Figure 3c).

Figure 3. (a) dark striping of early symptomatic leaves, (b) chlorotic striping, (c) crinkled, withered leaves. Photos: A. Russell and F. Graves.

Drastic leaf loss occurs for heavily symptomatic leaves during the growing season (Figure 4), as early as June, but asymptomatic and mildly symptomatic leaves show no or minimal leaf loss. Bud and leaf production are also affected.

Figure 4. Thinned beech canopies caused by drastic leaf loss of heavily symptomatic leaves. Photos: H. Faubert.

WHAT YOU CAN DO

1. For landscape trees, reduce stress with deep **irrigation** of the root area. About 1" of water (irrigation or precipitation) per week over the entire root area is recommended (~2 times the diameter of the crown). A 3" layer of woodchip mulch can be applied around the base of the tree to reduce the amount of watering needed, keeping the roots cool and protected. Do not pile the mulch against the tree trunk.
2. Encouraging results have been demonstrated by researchers in Ohio and, preliminarily, in New England using a **phosphite fertilizer treatment** to stimulate beech tree defenses. The product is applied two times per year (between the months of May and August) and can be applied by homeowners.
   - Polyphosphite 30 (potassium fertilizer 0-0-27) applied as a soil drench or injected into the soil with soil injection equipment, based on the size of the tree: 2 oz of Polyphosphite 30 per 1-inch DBH (diameter at breast height) [Divide the circumference by 3.14 for diameter.]
   - Dilute the product in water: 14 oz of water for every 2 oz Polyphosphite 30 (e.g. a 6-inch diameter tree would receive 12 oz of product, diluted into 84 oz of water);
   - Apply 2x during the growing season (ex: June & July), one month apart
   - Dig a shallow trench into the soil around the base of the tree and pour the solution into the trench.
   - More information on this treatment method and products can be found in URI's 2023 BLD update.
3. Help prevent the spread of invasive pests, learn more at **Don't Move Firewood**.
4. While there is no restriction on planting beech trees, **do not dig beech trees from the forest** to plant elsewhere.

CURRENT RESEARCH STATUS IN 2023

Research is currently underway to determine effective treatment options to kill the nematode. Researchers are investigating the use of the fungicide fluopyram as a pesticide against the nematode. Preliminary results have demonstrated that fluopyram is very effective at killing high percentages of nematodes. Research is ongoing to best align the timing of this treatment with nematode life cycle.

Note: It is still unknown how the BLD-causing nematode is transported to uninfected beech trees (vectored). Until the vector is better understood, maintaining tree health and keeping stress to a minimum is the best defense. As research develops, management options may become available that are suited to landscape trees but may also require long-term, repeated treatments. The cost of such treatments may not be possible to deliver to forested environments.

LINKS

Ohio DNR:
https://ohiodnr.gov/discover-and-learn/safety-conservation/about-ODNR/forestry/forest-health/insects-diseases/Beech-leaf-disease
Connecticut Fact Sheet:
https://portal.ct.gov/-/media/CAES/DOCUMENTS/Publications/Fact_Sheets/Plant_Pathology_and_Ecology/2019/Beech-Leaf-Disease-v2.pdf?la=en
Don't Move Firewood:
www.dontmovefirewood.org/pest_pathogen/beech-leaf-disease/
BLD Look-alike diseases:
www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-pathogens/beech-leaf-disease/

CONTACT INFORMATION:

Forest Health Program
Division of Agriculture and Forestry
RI Department of Environmental Management
www.dem.ri.gov/programs/forestry/forest-health/index.php

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