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 14 other US states and Ontario, Canada (Figure 2). The disease affects the leaves and, after repeated years, can be severe enough to cause tree decline and mortality.

The disease is caused by the nematode *Litylenchus crenatae mccannii*. Currently, there is no defined treatment for control of BLD in the forested landscape. Research is underway to identify the most feasible treatments for landscape trees.

BLD affects American, European (*F. sylvatica*) and Oriental beech (*F. orientalis*), and symptoms appear to be most apparent on American beech. All ages and sizes of beech are affected, although the rate of decline can vary based on tree size. In Ohio, disease progression in larger trees was noted to be slower than in saplings. Most mortality occurred in saplings within 6-10 years. Where established, BLD mortality of sapling-sized trees reached more than 90%. In the Northeast, disease progression and decline has occurred much more rapidly, with some large trees within monitoring plots succumbing after four years of disease detection. Early research suggests that the prevalence of beech bark disease in New England may influence the rate of decline of trees also infected with BLD.

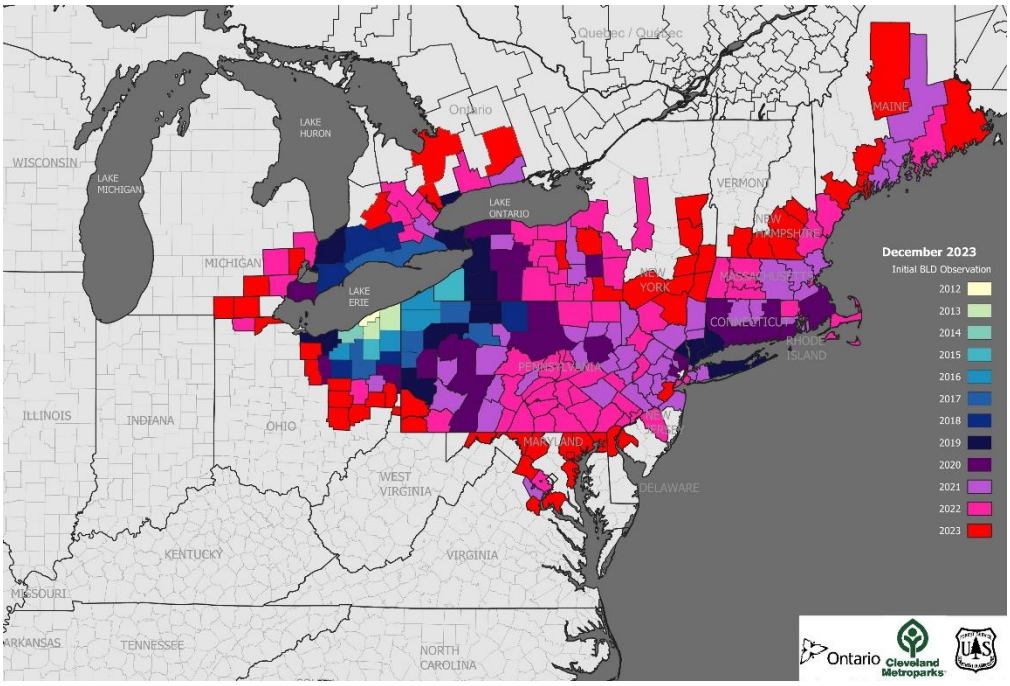

Figure 3. Distribution of Beech Leaf Disease, as of December 2023.

SYMPTOMS

Early BLD symptoms present as 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 tissue. Lighter, chlorotic striping may also occur (Figure 3b). Eventually the affected foliage yellows, withers, and dries (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 (Figure 4), after initial leaf emergence in May. Following leaf loss, some trees may compensate by producing new leaves from newly produced buds. These new leaves do not show symptoms of BLD because of a mismatch with the life cycle of the nematodes; the nematodes do not enter these replacement buds in the springtime. However, even in the presence of asymptomatic replacement leaves, the tree will remain infected. These new leaves are pale and thinner than healthy leaves. Highly infected trees may also experience overwintering bud mortality.

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

MANAGEMENT FOR LANDSCAPE TREES

Researchers are working diligently to develop management solutions for BLD. There are a few treatments available for landscape and high-value trees. Currently, there is no cost-effective strategy for treatments in forested environments. See URI's BLD update at for further details on treatment options.

Phosphite products: Phosphite products are known to stimulate plant defenses and can be found as potassium fertilizers (such as PolyPhosphite 30) and fungicides (such as Agri-FOS, Fosphite, Reliant, Fungi-Phite, and Prophyt). These products are safe for homeowners to apply, following the label. Ohio researchers using Polyphosphite 30 found improvements in tree vigor, although this may take several years of regular treatments to see results.

Foliar fungicide/nematicide: The pesticide fluopyram has been shown to be very effective at killing the BLD nematodes and is something that landowners would need to hire a pesticide applicator to apply to their beech trees. Fluopyram is the active ingredient in the fungicide Broadform (labeled for ornamentals) and is administered as a foliar spray. Research is still ongoing towards the optimal timing and number of applications needed for effective nematode control. Researchers caution again pesticide resistance with the use of repeated applications. Proximity to water bodies and ability to reach tall parts of large tree crowns are limiting factors in the use of fluopyram.

Systemic nematicide injections (Arbotect 20-S): The fungicide Arbotect 20-S with the active ingredient thiabendazole was given a 24(c) special local needs label in RI, MA, CT, ME, NY, NJ, OH, PA, and VA for the treatment of BLD. Thiabendazole is a chemical compound that has been used as an effective active ingredient in fungicides for the control of Dutch elm disease and sycamore anthracnose. Recently it has been found that it also has nematicidal properties. Recent research from Bartlett Tree Experts has demonstrated significant improvement of beech leaf disease symptoms in treated trees by reducing numbers of BLD nematodes within buds, with two seasons of protection. A licensed pesticide applicator experienced in this type of treatment should be hired by homeowners. This treatment may be a more appropriate tool for large trees or trees in proximity to water bodies where foliage treatments with fluopyram are impractical. Trees smaller than 5" DBH or trees with serious decay, girdling roots, or other conditions that may interfere with uptake may not be candidates for injections.

WHAT YOU CAN DO

1. Consider treatment options (above) for landscape and high-value trees.
2. 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.
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.

LINKS

URI BLD update:
https://web.uri.edu/coopext/wp-content/uploads/sites/2042/2024-BLD-update_9.23.24-1.pdf

UMass Extension:
https://ag.umass.edu/landscape/fact-sheets/beech-leaf-disease

Connecticut Fact Sheet:
https://portal.ct.gov/-/media/caes/documents/publications/fact_sheets/valley_laboratory/beech-leaf-disease-management-options.pdf

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

Updated September 2024