

## Few Easy Options for Dealing with Beech Stand Decline

By Maxwell McCormack

American beech (*Fagus grandifolia* Ehrh.), including one variety in Mexico, is the only native species of the genus growing in North America. Sometimes we see references to European beech (*F. sylvatica* L.) that is

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a similar tree, but typically larger than our beech and free of beech bark disease. Our beech ranges across the northeast from Cape Breton to the Great Lakes states and south to the Gulf Coast. In Maine, it is typically associated with sugar maple, yellow birch, red maple, oaks, hemlock, red spruce and eastern white pine. It has been a common component of our mixed hardwood stands and, of course, is the characteristic feature of what Mainers refer to as “beech ridges.”

Beech persists in very dense shade, but grows best under moderate shade. It tends to grow more slowly than associated hardwoods when exposed to full sunlight. Consequently, clearcutting on short rotations can tend to reduce beech. Light, partial cuttings favor the species. It is a reproductive dynamo originating from seed (beechnuts) and by prolific sprouting from stumps and roots, especially after disturbance. It has an advantage over many of its associates in that deer do not browse its shoots.

A curse from across the sea has damaged beech and disrupted its growth patterns, transforming it into a curse for forest landowners as well. European beech material was imported in Halifax, Nova Scotia in the 1800s. By the late 1920s American beech in forests around Halifax were dying of an unknown cause, a disease we now know as beech bark disease (BBD).

BBD is caused by a complex of a scale insect and a bark-killing fungus that results in distinct cankers and distortion of affected tree stems (see photo). The spread of BBD has advanced across Nova Scotia, through New Brunswick, into eastern Maine and moving westward as far as the Great Lakes. Trees with BBD lose vigor and eventually succumb, but prolific, infected root sprouts form thickets, occupying significant areas of otherwise productive hardwood sites. Beech stands across Maine have become increasingly defective, with slowing



A beech showing bark diseased stems (left and center) contrasts with the smooth bark of an apparently resistant tree (right); range pole shows one-foot increments.

growth. It is a widespread problem. I don't believe there is a realistic, practical solution at the present time unless herbicide technologies are employed in a timely manner and, on many good hardwood sites, the best time to apply that approach has already gone by.

The mast crop, important to wildlife such as bears, deer, and turkeys, offers additional concerns about production of beechnuts by BBD-affected trees. It appears that diseased trees do not produce nuts on a par with healthy trees. Even if they did, regeneration from nuts of diseased trees could enhance production of diseased seedlings.

One thing is certain. Whatever is undertaken through partial cutting and stand manipulation, the focus should be on retaining beech trees with smooth bark, and reducing quantities of diseased trees. Trees with smooth bark (likely immune or highly resistant) are not plentiful. A recent MFS survey that examined 5,000 beeches across Maine identified only 27 trees, and a few of those were in groups that could have been clonal.

Where harvesting is done as selection of individual trees, small groups, or as patches, it's possible to establish a trend toward improved stand composition. However, one must be aware of beech interactions with various levels of shade and full sunlight. Smooth-bark standing trees, if exposed to full sunlight, are susceptible to sunscald. And beech root systems will sprout vigorously after disturbance. These partial-cut procedures require prescribed standards with guaranteed long-term continuity. In woodlots, this means a commitment from several generations of ownership.

Another approach that relates to harvesting and mechanical cleaning of stands is application of the principle that stems cut at the time foliage reaches full leaf have low levels of root system food reserves and, consequently, will have reduced sprouting. This is likely so. But a beech stump that might have had 15 sprouts after being cut in the spring might have only 8 to 10 sprouts when cut in late summer. This is not an effective gain toward solving the problem. Applying this principle would require many cycles of treatment carried out with precise timing, and has no guarantee of long-term stand improvement.

Herbicide technology, especially using glyphosate, is effective for suppressing beech. Timing and methods of application; foliar, injection, or cut stem treatments; will be addressed in next month's newsletter.

(Information for this summary was contributed by Dr. William Ostrofsky, MFS Forest Pathologist, and William Leak, Research Forester, USDA-Forest Service, Durham, N.H.)

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A late summer American beech branch with beechnuts.

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