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Beech Bark Disease

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Introduction

The beech scale (*Cryptococcus fagisuga* Lind) is an exotic forest pest first introduced to the United States in the 1930s. Initial infestations were confined to northeastern states, however beech scales have spread southward to other states (Fig. 1), including the eastern half of Tennessee (Hale et al. 2006). Beech scales attack the bark of American beech trees (*Fagus grandifolia)*, weakening tree defenses and potentially allowing three species of fungi (*Nectria* spp.) to invade the tree (McCullough et al. 2005). These fungi can harm the tree, leading to what is known as beech bark disease. Beech bark disease is not present until *Nectria* fungi invade. The disease has killed large amounts of beech trees in the eastern United States, including as much as 50 percent of mature American beech trees in northern Pennsylvania (McCullough et al. 2005). Although not yet documented in Mississippi, the American beech is a fairly common tree in areas of our state so there is reason for concern.

The Beech Scale

Beech scales are small, yellowish oval-shaped insects approximately 1/16 of an inch long (Fig. 2) with a white waxy substance covering the body of adults (Fig. 3). Beech scales are parthenogenic, meaning they can reproduce without mating which allows populations to escalate quickly on suitable hosts (Hale et al. 2006). Rough areas of bark around the trunks of trees are the preferred feeding sites for beech scales where they feast on fluids underneath the bark. Mass feeding by beech scales weakens trees, but it is the *Nectria* fungi that leads to beech bark disease, which may appear as late as 3-6 years after initial beech scale infestations (McCullough et al. 2005).

Signs and Symptoms

The first sign of beech bark disease is the appearance of a white-wax like substance on the bark of trees (Fig. 4), which is secreted by the beech scales (Houston and O'Brien 1998). The *Nectria* fungi produce red fruiting bodies that are also sometimes visible on infected trees (McCullough et al. 2005). Symptoms of beech bark disease include reddish-brown dead spots or 'cankers' which may ooze fluid (Fig. 5), canopy thinning, limb die-back, and tree mortality. Mortality ultimately depends on the amount of tissue killed by the fungi (Hale et al. 2006). Some trees succumb quickly while others may live on for years. Trees that survive *Nectria* invasions are often weak, deformed and slower growing than non-infected trees. These surviving trees are also more susceptible to wind damage and damage from other forest insects and pathogens (Houston and O'Brien 1998).

Susceptibility and Treatment

Stands most susceptible to beech bark disease are those with a high percentage of beech in the overstory (50% or more). Large trees are also more susceptible to mortality than smaller trees (McCullough et al. 2005). Preventing the introduction of the beech scale into our state is the key in protecting our trees from beech bark disease. This can be accomplished by inspecting beech trees for scales before purchase or planting, and not transporting beech firewood from infected states. Insecticides can be used to control scales on ornamental trees, but trees already heavily infested or showing symptoms of the disease may not benefit from treatment. In forested stands, there is no economically feasible way to control beech scales or beech bark disease but salvage cuttings can help reduce the spread (Houston and O'Brien 1998).

Implications

American beech trees have a long lifespan, can reach large sizes (upwards of 120 feet tall) and provide aesthetic value to a variety of sites, both urban and non-urban. Many animals such as birds, bears, and deer rely on American beech trees for the hard mast they produce. Heavy mortality in beech dominant forest types could cause a shift in species composition, potentially degrading habitat (McCullough et al. 2005). It is important for us to do our part and try to prevent the spread of beech scales so beech bark disease does not devastate Mississippi's American beech trees which would lead to other major changes in our forests.

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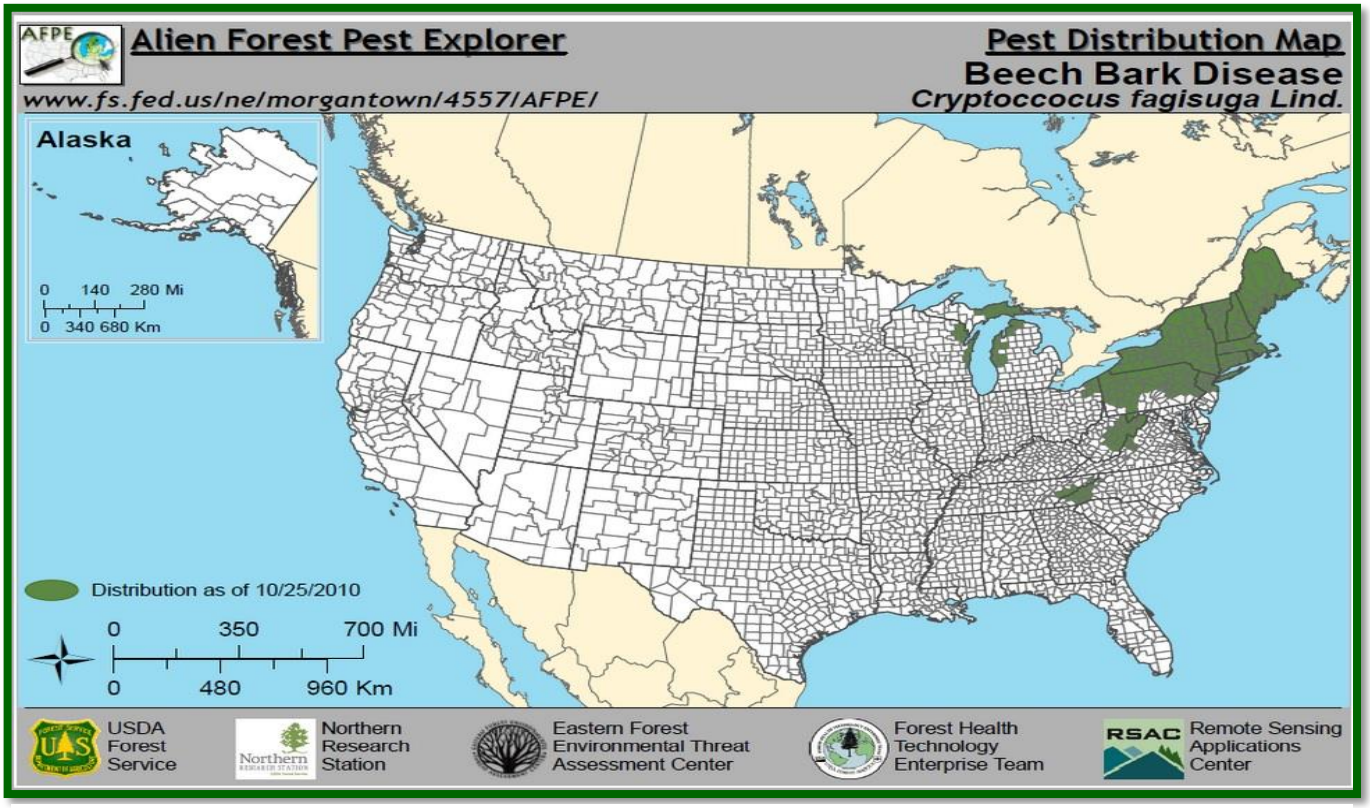

Figure 1: Beech bark disease distribution map. Map by: Alien Forest Pest Explorer, Andrew Liebhold and Laura Blackburn, www.fs.fed.us/ne/morgantown/4557/AFPE/.

Figure 2: Beech Scale (Cryptococcus fagisuga Lind) nymph. Photograph by: Joseph O'Brien, USDA Forest Service, www.forestryimages.org.

Figure 3: Beech Scale adult with waxy covering. Photograph by: Chris Malumphy, The Food and Environment Research Agency, www.forestryimages.org.

Figure 4: White wax on American beech bark, first sign of beech scale infestation. Photograph by: Joseph O'Brien, USDA Forest Service, www.forestryimages.org.

Figure 5: Cankers on stem of an American beech infected with beech bark disease. Photograph by: Linda Haugen, USDA Forest service, www.forestryimages.org.