UT Extension
SP503-H

Insects

Beech Scale, A Potential Threat in the Landscape

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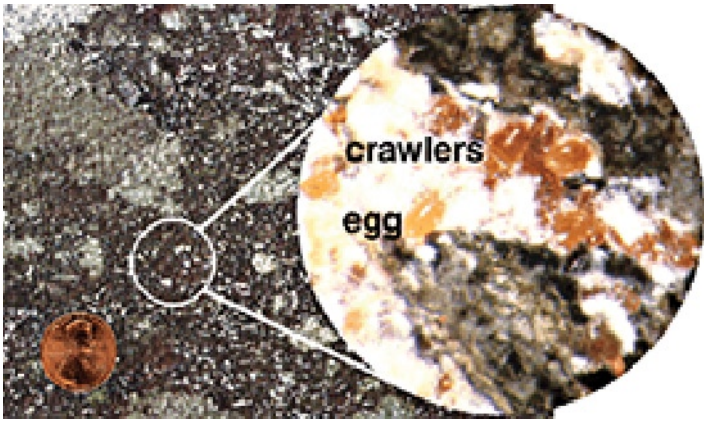
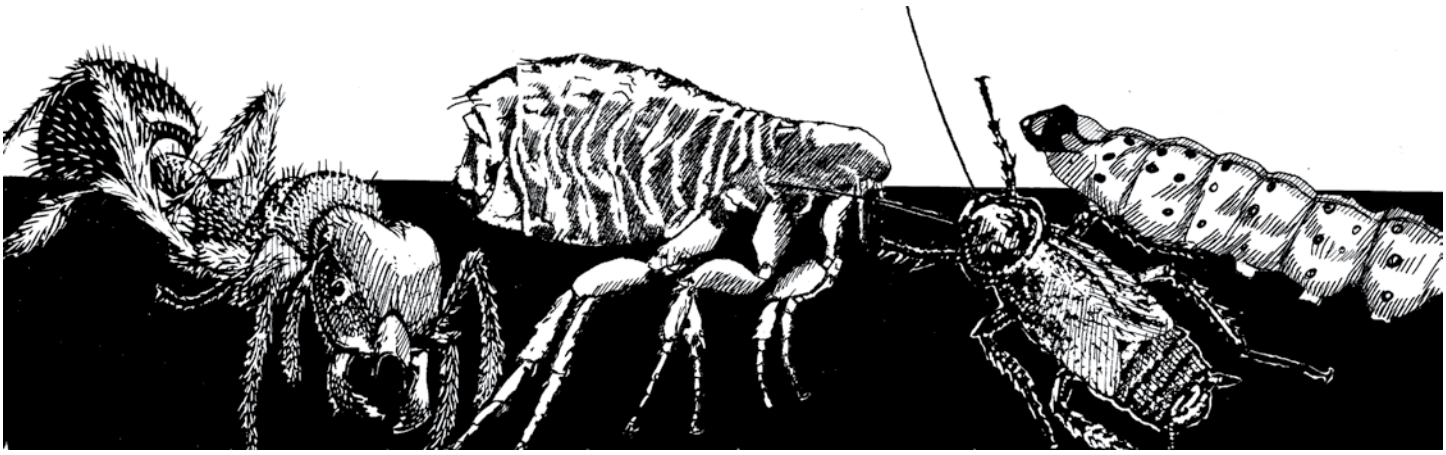
The beech scale *(Cryptococcus fagisuga Lindinger)* was first found in the U.S. in Massachusetts and Maine in the 1930s. This European insect feeds on American and European beech by inserting its long, needle-like, piercing-sucking mouthparts (or stylets) through the smooth bark, where the scale remains stationary throughout its life. This persistent feeding can stress the tree, especially during drought conditions, and reduce the overall vigor and quality of beech. However, it is this insect's association with two species of fungi, *Nectria galligena* (a native fungus) and *Nectria coccinea* var. *faginata* (an introduced European fungus), that can cause mortality of beech. As it feeds, the scale repeatedly removes and reinserts its mouthparts, wounding the tree and providing entry sites for the introduction of these two fungal pathogens.

The beech scale and the pathogens are the causal agents of ***beech bark disease***, which has killed large numbers of trees throughout eastern North America. Beech scale and beech bark disease have gradually spread southward and both were reported in 1993 in the Great Smoky Mountains National Park, where beech mortality has been documented. The current range of beech scale and beech bark disease in Tennessee is unclear, but it is probably found throughout areas along the border of Tennessee and North Carolina. In Tennessee, beech scale and beech bark disease had been documented in Blount, Carter, Cocke and Sevier counties (as of 2005).

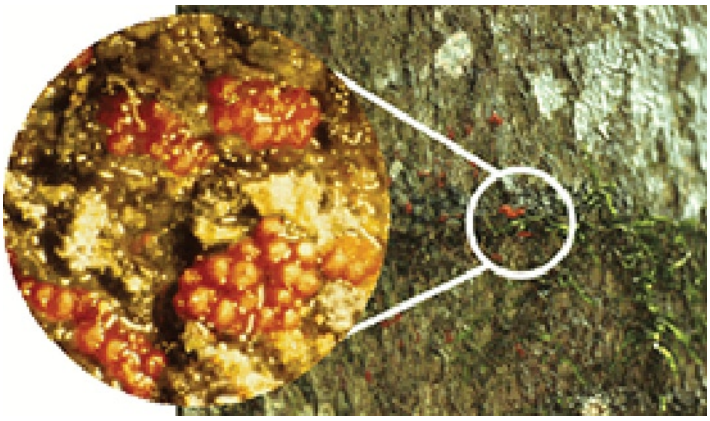
American and European beech can live as long as 400 years and reach heights up to 120 feet. Because of their long life spans, many stately beech trees can be found in the landscapes of old or historic homes and homesteads. While young beech trees are not often killed by beech bark disease, they often succumb once they reach maturity. Because the disease is so widespread throughout the forests of the eastern U.S., beech bark disease threatens beech in the landscape as well. The purpose of this publication is to describe the beech scale and discuss treatment options to reduce its numbers. Please note that the associated fungi are the debilitating agents of beech bark disease, ultimately leading to tree mortality. By reducing populations of scales, it is anticipated that the incidence of beech bark disease also would be reduced.



Beech scale eggs and crawlers on bark of beech.



Identification and Life History – Adult beech scales are small (1/16 inch), oval and yellow, but appear white because they are covered with a protective white, waxy "wool." Adult scales are wingless and parthenogenetic (no males are known). Females lay four to eight oval, yellow eggs underneath their protective wool from May through November in eastern Tennessee. The egg stage lasts at least 20 days; then the first instar, or crawler (1/32 inch), which is the only mobile stage of beech scale, emerges. The active crawlers search for suitable feeding sites and settle in cracks and crevices in the bark. Often crawlers are dispersed passively via wind currents, or possibly on animals, and infest other trees. Upon settling, crawlers feed and produce protective wool, underneath which they overwinter (late-season eggs also may overwinter). Short-lived second instars emerge in the spring and soon molt to adults.



Fruiting bodies of Nectria spp. on bark of beech.

Damage Symptoms – Beech scale infests tree bark, where it inserts its stylet (mouthpart) into the vascular tissue of the tree, and begins withdrawing fluids from the tissues. When several beech scales feed in relatively close proximity to each other, clusters of vascular cells in the tree collapse and cease functioning. This cell shrinkage causes fissures in the bark surface. The disease cycle begins when the fungal pathogens then infect these wounds, and, once established, hyphae of the fungus spread into and around the vascular tissues beneath the bark, eventually killing them. As these regions of infection expand and coalesce, enlarging the dead areas of bark, the tree is eventually girdled. The combination of dead vascular tissues and decreased photosynthetic activity of the diminishing crown eventually causes tree death. Although feeding by beech scale weakens the tree, it is the subsequent infection by the fungal pathogens that ultimately kills the tree. The main sign of infestation of beech scale is the presence of small white specks (adult beech scale) covering the bark surface, while the main signs of infection by the fungal pathogens are patches of small red fruiting bodies (perithecia) of the fungi and/or open, oozing wounds on the bark surface. The scales appear first; their populations initially increase, then gradually decline as the bark dies, fungal fruiting bodies appear and cankers develop. Typical symptoms of infestation and/or infection include canker formation, canopy thinning, limb dieback/breakage and/or tree death. Trees infected with beech bark disease usually succumb and die within five to 10 years after initial infestations of beech scale, depending on site quality and the level of other environmental stresses.

Control – *Because the beech scale weakens the tree and provides entry wounds, which the fungal pathogens use to infect the woody tissue, early detection of beech scale and prompt treatment are the most effective ways to protect beech trees in the landscape.* ***However, even early treatment for beech scale may not prevent trees from becoming infected with the fungus that causes beech bark disease***. Few area-wide control options are available for the insect or the disease in forest settings. In landscapes, chemical treatments should be restricted to beech trees of importance. Insecticidal soap and horticultural oil sprays should provide effective control of beech scale when crawlers are present (June to November). Relative to most other insecticides, insecticidal soaps and horticultural oils have fewer potential adverse effects to the user, with minimal harm to beneficial predators, parasitoids and the environment. Complete coverage is needed for effective control, so a high-pressure spray is necessary. Evaluation of the spray application effectiveness will determine if a second spray is needed. Two weeks after spraying, examine the scale using magnification (a hand lens or dissecting microscope) to determine the presence of live or dead scales. Lift the waxy covering from the small scale using a sharp pin or needle. Dead scale insects should be shriveled or flattened and darker than the live, plump scale. If many live scales are present, consider a second application.

Horticultural oil and insecticidal soap may occasionally cause some phytotoxicity (leaf burn) when applied during the growing season, especially during hot, dry weather or on tender new foliage. Horticultural oils also are labeled as dormant sprays and can be applied from November to March to reduce numbers of overwintering scales. You should avoid applications of horticultural oil or insecticidal soap when the temperature exceeds 90 degrees F or drops below 45 degrees. A clear, sunny day with low humidity is an optimum time for application. Horticultural oil or insecticidal soap does not provide a protective barrier from future infestations by beech scale. It is only effective if scales are already present at the time of application.

Systemic neonicotinoid insecticides (such as imidacloprid, thiamethoxam and dinotefuran) are effective as drenches, tree injections or topical applications against many scale species. However, little information on their efficacy against beech scale is available and warrants further investigation. Although they may be effective against some scales, insecticide treatments are not a direct control for beech bark disease and the associated fungal pathogens. *Please note that trees heavily infested with beech scale or showing signs of infection by the fungal pathogens may not benefit from any type of insecticide treatments.*

Several cultural practices can be implemented to help protect against beech scale. Preventing the introduction of this pest into new areas is the best management strategy. Inspect new landscape or nursery beech trees before planting or selling. Use care when moving plants, firewood and other outdoor items from

infested areas, especially from June to November when beech scale eggs and crawlers may be present.

Maintaining good growing conditions will enhance the survival of beech. Water trees during periods of drought. Although application of fertilizer may improve the growth and vigor of uninfested trees, it may enhance beech scale survival and reproduction, resulting in heavier infestations and more severely injured trees.

If certain infested trees cannot be treated, their removal will retard the establishment of new infestations. Because wind and rain can dislodge eggs and crawlers from the tree, washing trees (especially smaller ones) with a strong jet of water periodically from June to November also will reduce infestations of beech scale. Contact your county Extension agent for more information.

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