

And from another quarter –

Eastern Hemlock: The Next American Chestnut?

By David Hayes

Most of us are too young to have any memory of the American chestnut (*Castanea dentata*) as a significant component of eastern forests. Once comprising 25 percent of total timber volume, it is now relegated to persistent stump sprouts that survive for a few years before succumbing to the cause of its decline, the introduced chestnut blight fungus (*Endothia parasitica*). A similar fate may await the eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*Tsuga caroliniana*) at the hands of yet another Asian invader: the **hemlock wooly adelgid**.

Hemlock wooly adelgid (*Adelges tsugae*) has no known predators or parasites. Within one to four years, most untreated hemlocks are dead. Highly desiccated, the dead trees break apart very rapidly; whole stands have been levelled in Connecticut in just a few years. Since the moisture content of hemlocks that have succumbed to the adelgid is greatly reduced, fire danger is intensified.

The most troubling aspect of this situation is the potential for large-scale loss of hemlocks from eastern forests. In southeastern New York and most of Connecticut this has already begun. *Tsuga canadensis* is often found in great numbers here, sometimes at canopy densities of 80 percent or higher. It is extremely shade-tolerant, and can persist as an understory species for decades; its longevity also allows it to reach the overstory when conditions permit. The shading it provides results in reduced sunlight transmission through the canopy, hence lower temperatures in streams, wetlands, and on the forest floor. It provides roosting sites for woodland birds, including barred owl (*Strix varia*), great horned owl (*Bubo virginianus*), and ruffed grouse (*Bonasa umbellus*).

Since there is no apparent ecological replacement for hemlock, its loss on a large scale will be significant. The cool, moist microhabitats it provides will be greatly reduced. The simultaneous loss of hemlocks growing in dense stands on steep ravine slopes will undoubtedly cause erosion. There is no practical way to control *A. tsugae* in areas not accessible to large hydraulic spray equipment; aerial applications are ineffective since 100 percent foliar coverage cannot be attained.



Most of the trees in this hemlock-dominated forest at Vanderbilt Mansion NHS are in their first year of infestation. (Photo by D. Hayes)

The northern front of the infestation is moving through New York State and New England. The Roosevelt-Vanderbilt National Historic Sites are near the current northern frontier of the adelgid's spread. *A. tsugae* has invaded the landscaped area at Vanderbilt Mansion NHS, and is being treated with horticultural oil. Landscaped areas in all units of the park, which total 48 ha (119 ac), will be rigorously monitored, and all infested trees will be treated. In the natural forest zones of the park (170 ha = 420 ac), permanent monitoring stations are being established to track changes in species composition of plants, invertebrates, herpetofauna, and birds. Streams and wetlands will also be monitored for changes in physical and chemical characteristics.

While these efforts will add to our understanding of the effects of hemlock population decline or local extirpation, they will be poor consolation for the loss of such an important species from forest ecosystems in the eastern U.S..

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Horticultural and resource management personnel from Roosevelt-Vanderbilt NHS attended an April 29, 1992 meeting at Mystery Point in Garrison NY, where site managers, foresters, landscapers, and researchers discussed strategies for dealing with *A. tsugae*. Mystery Point, a 19th Century estate now owned by the environmental organization Scenic Hudson, provided a dramatic setting, with dead and dying eastern hemlocks covering much of the estate's 136 acres.

Mark McClure of the Connecticut Agricultural Experiment Station briefed attendees on adelgid identification, life cycle, and control techniques. Dr. McClure left soon after an a two-month research trip to Japan, seeking natural predators of *A. tsugae* for potential introduction in the U.S.

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