

# NATURALLY OCCURRING ADELGID RESISTANCE IN EASTERN HEMLOCKS

Laura Ingwell, Brian Maynard, Richard Casagrande, and Evan Preisser

Departments of Plant and Biological Sciences  
University of Rhode Island, Kingston RI 02881

## ABSTRACT

As hemlock woolly adelgid (HWA), *Adelges tsugae*, has spread throughout the eastern United States, there has been massive mortality within stands of eastern hemlock, *Tsuga canadensis*, following HWA infestation. Occasionally, however, a few healthy-looking eastern hemlock trees persist. The University of Rhode has begun an initiative to locate, propagate, and experimentally evaluate the level of resistance in these rare individuals. Rooted cuttings from 18 individuals fitting our criteria for potential resistance are currently being grown in a greenhouse at East Farm on the University of Rhode Island-Kingston campus in preparation for testing their level of HWA resistance (following procedures in Caswell, in prep.). Eastern hemlocks that show increased resistance to HWA will be used in landscape management and reforestation.

Recent examination of HWA-resistant *Tsuga* spp. reveal a number of characteristics that may underlie their resistance. First, Lagalante and Montgomery (2003) analyzed seven different *Tsuga* spp. and identified significant between-species differences in their terpenoid profiles. Second, McClure (1991) recognized that increases in foliar nitrogen are capable of stimulating HWA population growth. Finally, Pontius et al. (2006) examined foliar chemistry among susceptible and resistant *Tsuga* spp. and identified calcium (Ca), phosphorus (P), potassium (K), and nitrogen (N) as key cations whose concentrations differed significantly between the two groups. We are examining carbon-to-nitrogen (C:N) ratios, Ca, P, and K concentrations as well as the terpenoid profiles of eight of the 18 trees in addition to testing for HWA resistance. Should these trees prove resistant to HWA attack, our analyses should help reveal the basis for this highly-desirable trait.

## KEYWORDS

*Adelges tsugae*, *Tsuga canadensis*, host-plant resistance

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