

COMPARING SYSTEMIC IMIDACLOPRID APPLICATION METHODS FOR CONTROLLING HEMLOCK WOOLLY ADELGID

Richard S. Cowles¹, Carole S.- J. Cheah¹ and Michael E. Montgomery²

¹Connecticut Agricultural Experiment Station, Valley Lab, P.O. Box 248, Windsor, CT 06095

²USDA Forest Service, Northeastern Center for Forest Health Research, 51 Mill Pond Rd., Hamden, CT 06514

Abstract

We compared imidacloprid application methods to measure their efficacy against hemlock woolly adelgid (HWA, *Adelges tsugae* [Annand]) in Connecticut forests. The methods compared were Kioritz soil injection with (1) placement near the trunk or (2) placement near the trunk and out to the drip line, (3) drench near the base of the trunk with Bayer Tree and Shrub Insect Control (all three soil application approaches applying 1 g active ingredient per 2.5 cm DBH), and trunk injection with the (4) Arborjet, (5) Wedgle, and (6) Mauget systems, giving 0.1, 0.09, and 0.15 g a.i. per inch DBH, respectively. Along with the untreated check, these treatments were part of a 7×2 factorial design, which included a comparison of fall vs. spring application timing. Six replicates were located at five sites for a total of 84 trees. Insecticides were applied between October 1-29, 2002 and between May 28 - June 6, 2003.

Cold temperatures resulted in 85 - 95% overwintering mortality at study sites, so mortality evaluation related

to insecticide treatments was delayed until July 7-15 when the following generation (progreddens) had developed. Mortality was also assessed in late November 2003. Site variability and natural mortality affected adelgid survival and obscured insecticide treatment effects in the July assessment. Adelgid mortality ranged from an average of 64% for the Wedgle-treated trees, 69% mortality in the untreated checks, and 80% for the Kioritz, near trunk imidacloprid placement. The November evaluations determined that soil applications of imidacloprid were more effective than trunk injections for long-term reductions in adelgid populations. The Kioritz near-trunk placement of Merit in the fall of 2002 resulted in undetectable adelgid populations measured more than a year later. Fall and spring application timing were not significantly different. The soil applications resulted in long-term moderate concentrations of imidacloprid in the sap and a reliable, highly effective suppression of HWA populations.