

COMPARISON OF RESIDUE LEVELS IN GREEN ASH AND NORWAY MAPLE BETWEEN SIX TRUNK INJECTION SYSTEMS

Phillip A. Lewis, David M. Cowan, and John J. Molongowski

USDA-APHIS, Otis Plant Protection Laboratory, Bldg 1398, Otis ANGB, MA 02542-5008

Abstract

The objective of this research project is to develop an effective direct trunk injection technique for delivery of systemic insecticides for control of Asian longhorned beetle and emerald ash borer larvae. Comparative factors examined include injection method, ease of use of injection device, duration and pressure of injection, tree wounding and resultant pesticide residue levels in the injected trees. In September of 2002, the current method (Mauget capsules) was compared to five other injection systems in Norway maple and green ash. Several formulations of imidacloprid were also compared, using several of the injection systems: Imicide 10%, Imicide 25%, Pointer 10% and Imajet 5%. The wedge device injected Pointer 20 and 40%. Injection dose was varied in order that a similar amount of active ingredient was delivered to each tree.

Systems were partially evaluated based on ELISA readings of tree sap insecticide residue after 1 month and 1 year post-injection. Imicide 25% failed to increase imidacloprid residue levels in either tree species as compared to the 10% formulation when using the Sidewinder and Arborjet systems. The Pointer 10% formulation, used in four of the systems, consistently resulted in very low values that were not significantly different from the control trees. Residue levels for the Quik-Inject System were similar to Mauget in maple, but much less in ash. Both the Wedgle, USDA

tip and Sidewinder systems had significantly lower residue levels as compared to Mauget. The Arborjet injection method resulted in similar residue levels to the Mauget. Within an injection system, residue data were combined when they did not differ as a result of formulation injected. Due to the high variability between samples, no injection system differed significantly from one another, though some trends are apparent.

One year sampling was conducted in late August 2003. Three samples per tree were collected in order to reduce variability within treatments. Preliminary analysis of the results shows that residue levels have dropped off significantly from levels of the previous sampling. The Arborjet method resulted in significantly higher residue in ash with 10% Imicide and in maple with Pointer 10%. From these data, there is some indication that the Pointer formulations result in higher overall residue levels than other formulations after one year, though this is not consistent between treatments or tree species.

Damage to injection sites shows that Sidewinder and Arborjet injections cause significantly more vertical cracking in maple than the other systems. During injections the Wedgle method was observed to result in bark splitting and separation, though external damage is not evident.