

# EFFICACY OF BASAL SOIL INJECTION AT DIFFERENT WATER VOLUMES AND LANDSCAPE SETTINGS FOR ASIAN LONGHORN BEETLE CONTROL

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## ABSTRACT

The Asian longhorn beetle eradication program currently treats at-risk trees by soil injection with a high volume solution of pesticide placed in concentric rings expanding out from the trunk to the dripline of the tree. Using this method in wooded habitats has previously resulted in no detectable residue in treated trees. Basal soil injection (BSI) uses a high concentrate solution of imidacloprid injected close to the base of a treatment tree. The BSI method was tested on trees in an open environment (park setting and street-side trees) at two water volume rates and on trees growing in a woodland environment (with extensive undergrowth of weeds and ivy and competing roots from neighboring untreated trees).

## Methods, Materials & Results

Woodlot. Understory maple trees (2 to 22 inches DBH) growing near large non-host trees (10 to 24 inches DBH) were selected to create intense root competition for the imidacloprid treatment. The maple trees were given one cup of a maximum labeled rate solution per inch of tree diameter, delivered as a basal injection. All applications were made with a modified pump-up sprayer at 30 psi with a 6-inch soil injection probe placed within 6 inches of the base of the tree. After 3 months, maple trees under intense root competition had similar residue levels to trees growing in more open environments. Some of the non-host trees were as close as 6 inches to the small diameter trees, but in fact tree diameter was the only significant factor in differences between residue levels (levels

decrease with increasing tree DBH; ANOVA  $P < 0.02$ ).

Street-side Trees. Thirty Norway maple and 30 London plane trees were treated with either ½ cup or 1 cup of a maximum labeled rate of imidacloprid per inch of tree diameter to determine an effective minimum treatment volume. Imidacloprid applied by BSI at the maximum labeled rate in ½ cup of pesticide mix per inch of tree DBH achieved similar residue levels to trees exposed to the more dilute mix.

Sample collection and analysis. Foliage samples were collected for 3 months post-treatment and assessed for residue levels using a commercially available ELISA assay. Composite leaf samples are superior to collections of xylem sap when seeking to determine an average pesticide residue value for a treated tree.

## Conclusions

(1) The basal soil injection method can be effectively used to treat trees in woodland habitats where intense root competition from neighboring, non-treated trees is encountered.

(2) An increase in tree diameter results in lower levels of pesticide residue, but all trees were well above the target level of 1.9 ppm (ALB LC50) at 2 and 3 months post-injection.

(3) Reducing the water volume to ½ cup per inch of tree diameter resulted in similar residue values as trees treated with higher volume mixes.