USE OF UNWOUNDED ASH TREES FOR THE DETECTION OF EMERALD ASH BORER ADULTS: EAB LANDING BEHAVIOR

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ABSTRACT

Incorporation of multiple trapping techniques and sites within a survey program is essential to adequately identify the range of emerald ash borer (EAB) (*Agrilus planipennis* Fairmaire) infestation. Within natural forests, EAB lands on stick band traps wrapped around girdled ash trees at a rate similar to that on unwounded ash trees. The objective of this study was to identify characteristics of ash trees that allow for prediction of EAB landing behavior.

Ash trees were wrapped with plastic wrap traps in Burt Lake and Harrisville State Parks, MI, in 2008, and Farnsworth and Providence Metroparks, OH, in 2009. These data were used to create two separate multiple regression models for EAB/m^2 using the categorical variables crown light exposure and tree vigor. Two datasets from 2009 at Deford and Shiawassee State Game Areas, MI, were used to validate the 2008 and 2009 models and gauge the efficacy of each model to predict EAB/m^2. Paired t-tests were used to test for differences in the observed and predicted values at Shiawassee and Deford from the 2008 and 2009 models.

The 2008 model predicted the EAB/m^2 at Deford well: the predicted values did not differ from the observed values in a paired t-test. However, the 2008 model underpredicted EAB/m^2 at Shiawassee, resulting in a significant paired t-test. In contrast, the 2009 model overpredicted EAB/m^2 at Deford, but was successful at predicting EAB/m^2 at Shiawassee. When used to predict the EAB/m^2 values at sites with comparable EAB population size, each model performed well, predicting values that did not differ from the observed. Plotted as three-dimensional surfaces, the two models exhibited similar visual anomalies, which, although producing vastly different EAB/m^2 values, illustrate the overall similarities in EAB landing behavior. EAB population size variability makes it difficult to model the actual captures of EAB/m^2. While the models cannot effectively predict the actual capture abilities of a single tree, they did produce visually similar models that can be used to effectively select a tree that has the greatest probability of capturing EAB. A tree with a CLE of 4 and a vigor rating of 4 will most likely be effective at detecting EAB. Some natural resource managers and private landowners decline the request to girdle ash trees for trapping and detecting EAB. Because unwounded ash trees are just as effective in adult captures and have larval densities similar to girdled ash trees, unwounded trees may be a less expensive alternative to other trapping techniques and a simpler alternative to girdled trap trees.