

Improving Survey Methodology for Emerald Ash Borer through Host-based Risk Assessment

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Summary

The purpose of this ongoing research is to improve survey methodologies for detecting emerald ash borer (EAB) and establish baseline data for estimating risk of spread and establishment across Michigan. Research is currently focused on ground-based forest surveys enhanced through spatial analysis and digital mapping (GIS). Field surveys are currently underway to sample forests in most of southern Lower Michigan, to more accurately characterize variability in the size, abundance and spatial distribution of ash trees. This information will be used to improve the efficiency of EAB survey methodologies by estimating the optimum allocation of resources to find EAB. This information will also be useful for modeling spatial risk. Little is known regarding the rate of spread of EAB populations, but rate and direction of spread is likely to be correlated with the spatial distribution and status of the ash tree host. It should be possible to use information regarding the distribution and abundance of ash populations to increase the efficiency of survey methodologies and map potential risk.

Initial Findings

Preliminary analysis of statewide (USFS FIA) data suggest that ash trees make up a substantial component of many natural forest types and, in Michigan, the total number of live ash trees in forests is on the rise in all size classes. Thus, it is possible that EAB could already be widely established in natural forests at low (beetle) population densities in southern Lower Michigan and surveys would have to be extensive as well as intensive to detect EAB. However, due to site and soil preferences and large tracts of agricultural lands, ash is not expected to be everywhere, and is expected to make up a much higher component of forests in some areas. Thus, survey methodologies can be substantially improved to concentrate resources in areas of high risk. Currently, much of the damage caused by EAB has occurred in urban-suburban areas, which are often stressful to trees and are also common launch points for exotic species. Ash trees are popular street tree and were widely planted to replace elms killed by Dutch elm disease, particularly green ash (*Fraxinus pennsylvanica*). Data abstracted from a 1994 study of the demography and health of trees in Michigan cities revealed that several cities that are currently within the core zone of EAB infestation have substantial components of white and green ash trees on their streets. If Michigan cities are representative of the urban forest resource in other parts of the country, then the combined abundance and low genetic diversity of ash should enhance the risk of damage of EAB in urban ecosystems nationwide. A preliminary characterization of potential host range, ash species and abundance relative to risk is available in the MSU research report entitled "Characteristics and Distribution of Potential Ash Tree Hosts for Emerald Ash Borer" (MacFarlane and Meyer 2003). For more information contact Dr. David W. MacFarlane at macfar24@msu.edu.