DETECTION AND MONITORING OF EMERALD ASH BORER POPULATIONS: TRAP TREES AND THE FACTORS THAT MAY INFLUENCE THEIR EFFECTIVENESS

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ABSTRACT

The exotic emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, was first identified in Michigan in 2002, though it had likely been established there for a number of years prior to detection. A key to management of EAB populations is the ability to detect this insect in order to accurately describe its distribution and to locate new outlier populations. A number of detection tools have been tested, and the mostly widely implemented to date has been the use of trap trees. Trap trees consist of ash trees which have been intentionally girdled with the goal of making them more attractive to EAB. Adult EAB may be trapped on a sticky surface on the tree, or larvae may be detected by peeling the tree after possible exposure to adults. In this presentation we provide an overview of the reasons that trap trees are used, what influences their success in detecting EAB, and the surveys that utilize this technique. We summarize the findings of experiments conducted from 2003 to 2005.

EAB lands more frequently on unwounded ash trees than on unwounded trees of other species in a stand, though some landing does occur on other species. Girdling ash trees generally makes them more attractive than ungirdled trees, passive flight traps or flight traps baited with host material in the form of crushed leaves or scorched branches. However, there are some inconsistencies in results from different studies comparing girdled and ungirdled trees.

Trap trees are apparently effective as a result of the stress and potentially associated stress volatiles induced by girdling the tree rather than a result of the wound itself or host volatiles associated with the wound. Studies have investigated the attractiveness of trap trees related to stress induction method, year of girdling, season of girdling, position of the girdled tree in the forest canopy, position of the trapping surface relative to the girdling wound and position of the girdling wound on the tree. Results of these experiments are variable, and may be related to the population density of the insect at the sites where the tests were carried out.

In both 2004 and 2005, the Michigan Department of Agriculture utilized more than 10,000 girdled trap trees throughout Michigan to detect outlier populations of EAB. All of these trees were cut at the end of the flight season and peeled to look for developing larvae. Risk-based trap tree EAB detection surveys were conducted in 2004 and 2005 by Michigan Technological University in collaboration with the USDA Forest Service and Michigan Department of Natural Resources. These surveys focused on areas into which firewood was likely to have been moved and included 116 sites in 2004 and 161 sites in 2005 in Michigan and northern Wisconsin. A subset of these trees was peeled at the end of the season, with the remainder left standing in order to be reused the subsequent year. In 2005, at some sites in the latter survey, trees that were girdled in 2004 and left standing were more effective as traps than tress girdled in 2005 at the start of the trapping season. Both surveys resulted in detection of outlier populations of EAB.

There is clearly a need for improved understanding of trap tree efficacy and EAB population levels they are able to detect. Further integration of trap tree technologies with other trapping and detection techniques is needed. In the meantime, trap trees remain one of the most effective tools for detecting EAB.