DEVELOPING ATTRACTANTS AND TRAPPING TECHNIQUES FOR THE EMERALD ASH BORER

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Abstract

Shortly after the 2002 discovery of emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), in southeastern Michigan and Windsor, Ontario, quarantines regulating the movement of ash logs, firewood, and nursery stock were established to reduce the risk of human-assisted spread of this exotic forest insect pest. Accurate delimitation of the infested area is critical to establish the quarantine boundaries and implement control measures. Potentially infested trees are identified by survey crews using signs and symptoms such as adult exit holes, bark splits over galleries, epicormic shoots and canopy dieback. However, it is extremely difficult to detect newly infested trees at the leading edge of the infestation because they typically demonstrate no external symptoms. Methods to attract and trap adult beetles would substantially increase our ability to determine the extent of the EAB distribution.

We collected volatiles from ash leaves using solid phase micro-extraction (SPME) and prepared ash extracts by crushing host tissues in hexane. Host compounds were identified by gas chromatography (GC) and mass spectrometry (MS). Antennal responses by adult EABs were determined using coupled gas chromatographic electro-antennal detection (GC-EAD). Compounds that elicited antennal responses were tested in a walking olfactometer bioassay and those with the highest percentage of positive responders were then selected for field-testing.

Three types of field experiments were conducted to compare different trapping techniques for EAB. The first experiment used a single lure comprised of a blend of the most active ash volatiles. The lure was tested in four different types of traps: multiple funnel traps, Intercept panel traps, Japanese beetle traps, and yellow sticky traps. Of the trap types tested, the multiple funnel traps caught significantly more EABs than the panel traps or yellow sticky traps. Japanese beetle trap catches were intermediate. Multiple funnel traps also captured more EABs when raised in the tree canopy as opposed to being placed at ground level. The second field experiment used only multiple funnel traps and compared different combinations of ash volatiles. There were no significant differences in the number of EABs captured with the different types of lures. The third field experiment compared the number of EABs captured on sticky bands on trap trees (healthy, girdled, or herbicide-treated green ash trees) or vertically placed trap logs (2 m-long logs cut from healthy green, white, or black ash trees). The girdled trees captured significantly more EABs than the other types of trap trees or trap logs. We plan to analyze volatiles from girdled trees and from EABs to identify other potential attractants. Compounds will be tested in the laboratory in a vertical wind tunnel and then in the field using several different trap designs.