Indiana and Ohio. Between eight and ten potential survey tools (treatments) were tested at each site. Treatments included ash trap trees girdled in the lower 1.5m of the bole with either a clear sticky band or a purple sticky band wrapped above the wound, ungirdled ash trap trees, ash trap trees girdled at 3m above the ground, ungirdled ash trap trees baited with Manuka oil release devices at 3m above the ground, purple prism traps baited with Manuka oil, and non-ash ungirdled trap trees. Where available, ash trap trees girdled in the lower 1.5m of the bole in 2004 and 2005 with a clear sticky band around them were used. Sites used represented locations with high or low ash density and high, low, or very low emerald ash borer density. Traps were established in late spring (May-June) 2006 and were monitored for adult EAB throughout the summer flight season. In the fall, trap trees were cut and peeled at each site to evaluate EAB larva density in the ash trap tree treatments.

Preliminary analyses of the numbers of adult beetles caught on the traps suggest that the effectiveness of different trap designs varies according to the density of ash at a site and the density of EAB. This study will be continued during the 2007 field season.

EVALUATION OF A MULTICOMPONENT TRAP FOR EMERALD ASH BORER INCORPORATING COLOR, SILHOUETTE, HEIGHT, TEXTURE, AND ASH LEAF AND BARK VOLATILES

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ABSTRACT

Since the 2002 discovery of emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), in southeastern Michigan and Windsor, Ontario, there have been considerable efforts to develop improved means to monitor and detect infestations. Studies have found that EAB is attracted to girdled ash trees (Poland et al. 2004, 2005; McCullough et al. 2006), the color purple (Francese et al. 2005), and purple panel traps baited with various blends of host volatiles, including certain ash leaf blends (Poland et al. 2004, 2005) and manuka oil, a steam distillate from the New Zealand tea tree that contains similar volatile compounds as ash bark and wood (Crook et al. 2006). In addition, EAB attack densities appear to be consistently higher on rough-barked trees (Anulewicz et al. 2006) and on open-grown or edge trees, compared to trees in a closed canopy (Poland et al. 2005, McCullough et al. 2006).

We developed a multi-component trap, incorporating all of the known attractive stimuli for EAB, and tested it at six field sites with varying EAB density in southern Michigan. Each multi-component trap consisted of a 10 ft tall polyvinyl chloride (PCVC) pipe (4 inches in diameter) that was painted purple. The height of the PVC pipe was intended to produce a "silhouette" similar to the tree bole of an open-grown tree that would be readily discovered by EAB adults. A three-sided panel trap constructed from purple, corrugated plastic, roughly 24 inches long by 15 inches wide on each side, was attached to the top of the PVC pipe, creating a broad trapping surface and silhouette similar to the tree crown of a small (4 inch dbh) ash tree. A second three-sided trap was attached to the pipe roughly 2 feet below the top trap. Both purple panel traps were coated with clear Pestick. The PVC pipe between the two traps was wrapped with plastic wrap and coated with Pestick. Traps were installed by sliding the PVC pipe over a T-post that had been set into the ground to provide support.

Factors that we evaluated included (A) a blend of ash foliar volatile compounds (*cis*-3-hexenol, *trans*-2-hexenol, *trans*-2-hexenal, and hexanal); (B) manuka oil; and (C) texture on the panel traps. The texture was achieved by mixing kitty litter with purple paint and applying it to the panels. The traps were set out in randomized complete blocks at six sites located in Ingham, Livingston, Washtenaw, Isabella, and Genessee counties. Each block was comprised of four traps. One trap in each block included the foliar lure attached to the top panel, vials of manuka oil on the lower panel, and texture on both panels. A second trap in each block included the foliar lure and the manuka oil, but texture was not applied to the panels. The remaining traps in each block had textured panels plus either the foliar blend or the manuka oil but not both. We installed four to six blocks of traps (16 to 24 traps) at each site on 15 and 16 June 2006. Traps were checked weekly until no EAB were captured for two weeks in a row (early September).

Overall, we captured 4,060 EAB on the 140 traps. The pattern of responses to the different treatments was similar at all trapping sites, but differences between treatments were not significant at every site. Therefore, results from all sites were pooled and summarized. For all sites combined, traps baited with both the leaf blend and manuka oil but without texture captured the most EAB. Traps baited with the manuka oil alone and coated with the texture caught significantly fewer EAB than traps baited with both manuka oil and the leaf blend without texture. Traps coated with texture and baited with either the leaf blend alone or the leaf blend and manuka oil caught an intermediate number of EAB. The combined effect of omitting the leaf blend and including texture significantly reduced attraction compared to traps with both the leaf blend and manuka oil but no texture. Therefore, it appears that leaf volatiles are an important factor in EAB attraction. The texture that was applied to the traps may have interfered with EAB capture, due to reduced adhesion of the beetles to the rough surface, which was difficult to coat with Pestick. Thus, bark roughness is probably not an important factor in long range attraction of EAB, but is more likely involved in post-landing acceptance of oviposition sites.

At all sites and for all treatments, the peak number of EAB captured occurred during the week of 26 June 2006. The number of beetles captured increased from Week 1 (20 June) to Week 2 (27 June) and then tapered off. A similar number of beetles were captured on the upper and lower panels during the first two weeks; however, more beetles were captured on the lower panels compared to the upper panels during the three subsequent weeks (6, 12, and

19 July), after which the number of EAB captured decreased rapidly. The relative increase in EAB captured on lower compared to upper panels in later weeks may reflect a preference of beetles for bark volatiles and lower portions of the tree later in the season. When EAB adults first emerge, they must feed for 5-7 days before mating begins, and females feed for an additional 5-7 days before beginning to lay eggs (Bauer et al. 2004). Thus beetles may be more attracted to leaf volatiles and upper canopy positions initially during the time that they complete maturation feeding and begin mating. Later, as they become sexually mature, beetles may prefer bark volatiles and lower portions of trees as they seek out sites for oviposition.

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