SEMIOCHEMICALS PROVIDE A DETERRENT TO THE BLACK TWIG BORER, *XYLOSANDRUS COMPACTUS* (COLEOPTERA: CURCULIONIDAE, SCOLYTINAE)

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ABSTRACT

The black twig borer (*Xylosandrus compactus*) (BTB) is a serious pest of agriculture, forestry, and native Hawaiian plants. The BTB is a typical ambrosia beetle that bores into the host and inoculates the galleries with an ambrosia fungus *(Fusarium solani*) known to cause cankers, root rot, and wilt. The host list for this beetle is extensive and contains several Hawaiian plant species listed as threatened and endangered. Our approach focused on reforestation of koa plantations, one of the most important of these host species in terms of cultural and economic values, to evaluate attractants and repellants to help monitor, control, or prevent BTB damage.

We had earlier demonstrated that ethanol-baited Japanese beetle traps were an effective means of trapping BTB, so we used that trap/bait combination as the positive control. This system also effectively trapped two nontarget scolytid pest species, the Asian ambrosia beetle (*Xylosandrus crassiusculus*) and the fruit-tree pinhole borer (*Xyleborinus saxeseni*).

We challenged the attraction of the ethanol trapping system using both verbenone and limonene as effective repellents. The study was located in a 6-year-old *Acacia koa* forest restoration stand, in Maunawili Valley on the windward side of the island of Oahu, with high BTB populations and considerable BTB-caused mortality. Treatments, each replicated six times, consisted of ethanol-baited control traps, ethanol and verbenone, and ethanol and limonene. Eighteen traps were placed in a grid at 15 m intervals and were suspended 1.5 m above the ground. Traps were monitored for 4 weeks, with collections made on a weekly basis. Trap counts were analyzed with generalized linear models for over-dispersed Poisson-distributed responses. Multiple comparisons were based on the maximum likelihood ratio.

Verbenone significantly reduced trap catch of all three beetle species. Limonene significantly reduced trap catch for only the Asian ambrosia beetle. Future work will utilize a higher release system for verbenone. Positive results will be applied to other tree species, with particular emphasis on restoration of endangered species in the state of Hawaii.