

## CHEMICAL ECOLOGY AND BEHAVIORAL STUDIES ON THE EMERALD ASH BORER: AN UPDATE

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### ABSTRACT

In 2006, we tested host selection and feeding preference of the emerald ash borer (EAB) on four species of ash species (green, black, white, and blue ash) that are native to North America but exotic to the beetle. For comparison, we also included Manchurian ash (which is native to the beetle) and European ash (which is exotic to the beetle) in the test. Beetles were given a choice among the six species of foliage.

Leaves were placed in screen cages and 30 beetles (males and females separately) were released in the middle of the cage. We counted the number of beetles that landed on each ash species and measured the amount of foliage they consumed. Males landed in highest numbers on green ash, followed by black ash and then white ash. Blue, European, and Manchurian ash foliage attracted fewer male beetles equally. For females, there was no significant difference in landing among green, black, and white ash foliage. Female landing on blue ash results were not significantly different from green, white, European, or Manchurian ash; however, there were significantly fewer landings on European and Manchurian compared to green, black and white.

When feeding, males did not discriminate among green, black, and white ash foliage, or among black, blue, European, or Manchurian ash foliage. Females fed almost equally on green, black, white, and European ash foliage but significantly less on blue and Manchurian ash foliage.

In 2007, following up on these results, we tested beetle feeding behavior on green ash compared to Manchurian ash. Beetles consumed foliage from both species, but they consumed significantly more green ash foliage than Manchurian ash foliage. One possible explanation is that Manchurian ash foliage might have higher nutritive value than green ash foliage, and so beetles might require lower consumption to achieve similar fitness. Alternatively, Manchurian ash might contain compounds that limit beetle consumption. If the alternate hypothesis is true, and if larval feeding responsible for tree mortality follows a similar pattern as adult

feeding, then it may partly explain why Manchurian ash in the beetle's native range is not as extensively damaged by herbivory as North American ash species.

Having established that EAB prefer North American ashes to Chinese ash, the next question was what would happen if the two were hybridised. Koch et al. (this volume) crossed white ash (the pollen donor) with Chinese ash (the flower) to obtain two putative hybrids, 'chiam 1' and 'chiam 2', which are siblings. We had four tree genotypes in these hybrids, and we tested beetle landing and feeding on all four of them. We also compared the profiles of volatiles the hybrids emitted to those of their parent species.

There was no statistical difference among the number of beetles that landed on the four genotypes nor among the amounts of foliage they consumed. With respect to amounts consumed, it appears that the hybrids have taken on some characteristics of the American parent. In their volatile profiles, the two hybrids were similar to each other but different from both parents; volatile composition may be a trait that is not directly inherited.