Host range and preference of the emerald ash borer in North America: Preliminary results

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Previous literature on the emerald ash borer (EAB) indicated that, in its native range, this beetle was recovered from several Asian species including *Ulmus* sp., *Juglans* sp., and *Pterocarya* sp., in addition to Asian ash tree (*Fraxinus* sp.). If EAB can complete development on alternate hosts, impacts of this nonindigenous pest in North America would increase dramatically.

Our objectives are to: 1) determine if EAB can oviposit and develop on potential alternate host species and 2) evaluate preference among four North American species of ash. In 2003 and 2004, we monitored adult landing rates and evaluated early instar development on logs of ash and potential alternate host species places out in the field and used in no-choice laboratory bioassays. We studied four ash species common in Michigan: green ash (*F. pennsylvanica*), white ash (*F. americana*), black ash (*F. nigra*), and blue ash (*F. quadrangulata*). Potential alternate host species that we evaluated included American elm (*U. americana*), black walnut (*J. nigra*), hackberry (*Celtis occidentalis*), Japanese tree lilac (*Syringa reticulata*), hickory (*Carya* sp.), and privet (*Ligustrum sp.*). We also assessed host preference with two-choice leaf-feeding bioassays in the laboratory and at field site with multiple species of ash growing in close proximity.

In the no-choice laboratory bioassay, female EAB laid eggs on all species. There was larval feeding under the bark on all species except hickory. Larval feeding and development on the ash species appeared normal, while development on the non-ash species was highly impaired when feeding was attempted.

Logs (ca 1 m x 150 cm diam) of green ash, white ash, elm, walnut, hickory, and hackberry were attached to t-posts at four sites in the core zone. Similarly-size sections of black drain pipe served as a control. Half of the logs were wrapped in Tangle-foot® to monitor landing rates. Landing rates were similar for all species, although significantly fewer beetles landed on the "control" pipe than on green ash when data from all sites were combined. Logs were dissected to count galleries. Green ash and white ash had 14 and 36 galleries per m^2, respectively, while elm, hackberry and hickory had zero. Black walnut had seven galleries per m^2, but all were impaired.

In a field study in 2003, logs of green ash, walnut, and elm were attached to the main stem of infested green ash trees, 5 to 7 meters above ground. We repeated this study in 2004; white ash and blue ash logs were included and logs were attached to infested white ash trees. Logs were dissected in autumn. In both studies, less than four galleries were found on walnut and none were found on elm. Nearly 200 galleries per m^2 were found on green ash in 2003 and on white as in 2004.

Host preference was evaluated in 2003 and 2004 at three sites in the core zone that had both green and white ash street trees growing in close proximity. At all sites, there were more exit holes per m^2 in the green ash trees than in the white ash trees. The level of canopy dieback was also visually estimated for each tree at these sites. In both 2003 and 2004, the green ash trees showed significantly more canopy dieback than the white ash trees. These results and other observations indicate that EAB prefer green ash over white ash when the two species occur together. Studies that are still in progress include a no-choice oviposition bioassay using live trees (green ash, white ash, black walnut, and Japanese tree lilac), a two-choice leaf-feeding bioassay, and evaluation of host preference at two woodlots containing white and blue ash trees.