

EVIDENCE FOR HOST TREE RESISTANCE AGAINST THE ASIAN LONGHORNED BEETLE

W.D. Morewood¹, K. Hoover¹, P.R. Neiner², J.R. McNeil¹ and J.C. Sellmer²

Departments of ¹Entomology and ²Horticulture, Pennsylvania State University, University Park, PA 16802

Abstract

We have been screening hardwood tree species for susceptibility to / resistance against the Asian longhorned beetle [*Anoplophora glabripennis* (Motschulsky) (Coleoptera: Cerambycidae)] and have discovered evidence for three different forms of resistance in three different tree species.

1) Antixenosis: When offered a choice of gray birch (*Betula populifolia*), cockspur hawthorn (*Crataegus crus-galli*), littleleaf linden (*Tilia cordata*), and honeylocust (*Gleditsia triacanthos*) trees, honeylocust was avoided. Beetles were rarely seen, almost no feeding damage was found, and no sign of oviposition was found on honeylocust. We interpret these results as indicating possible antixenosis (lack of cues required for recognition as a potential host) in honeylocust for the Asian longhorned beetle. We plan to further investigate this possibility with a no-choice test for adults and possibly also with artificial insertion of larvae into honeylocust trees.

2) Physical antibiosis: When offered a choice of golden-rain tree (*Koelreuteria paniculata*), river birch (*Betula nigra*), London planetree (*Platanus x acerifolia*), and callery pear (*Pyrus calleryana*), adults showed a strong preference for golden-rain tree for feeding and oviposition; however, larvae showed slow growth and many larvae were found drowned in sap. Given a choice

between sugar maple (*Acer saccharum*) and golden-rain trees, adults were seen more frequently on sugar maple, but fed on the two different tree species with equal frequency and actually laid more eggs into golden-rain tree than into sugar maple. We plan to determine whether the Asian longhorned beetle can complete development in golden-rain tree. If not, this tree species might be used as a “trap tree” to attract adults and prevent their successful reproduction.

3) Chemical antibiosis: During the choice test outlined in 2 above, there was unexpectedly high mortality of adults, and a subsequent twig-feeding experiment pointed to callery pear as the most likely cause. Further, viable eggs were laid into callery pear trees but the resulting larvae established only very small galleries and none survived beyond their first stadium. Both longevity and fecundity were reduced in beetles placed on callery pear trees after maturation feeding on sugar maple twigs, compared to beetles placed on sugar maple trees, while beetles that had callery pear as their only source of food showed a further reduction in longevity and failed to produce any eggs. Larval insertion and artificial diet experiments confirmed resistance against larval establishment and also indicated a constitutive phytochemical basis for this resistance. We are currently planning chemical extractions and further bioassays to isolate and identify the active phytochemical(s) in callery pear.