EMERALD ASH BORER: STUDIES ON FIREWOOD, HOST RANGE, DISPERSAL, AND OCCURRENCE IN CHINA

Robert A. Haack[1,2], Toby R. Petrice[1], Leah S. Bauer[1,2], Deborah L. Miller[1] and Houping Liu[2]

[1]USDA Forest Service, North Central Research Station, 1407 S. Harrison Road, E. Lansing, MI 48823
[2]Michigan State University, Department of Entomology, E. Lansing, MI 48824

Abstract

Highlights of our 2002-2003 research projects on the emerald ash borer (EAB; *Agrilus planipennis*) were presented. With respect to firewood, we found that EAB were able to develop and emerge from firewood cut at various times from July to October. Nevertheless, EAB survival was significantly lower in firewood cut during July and August vs. September and October. Similarly, EAB survival was lower in firewood stored in direct sunlight vs. shade. Overall, cutting infested trees early during larval development and placing the logs in full sunlight dramatically lowered EAB survival, but did not kill all larvae. A larger study was initiated in 2003, which incorporated the following treatments: different months of felling, sun vs. shade, split vs. whole bolts, and tarped vs. not tarped.

Although ash (*Fraxinus*) is the only known host of EAB in North America, the Japanese and Korean literature also reports species of elm (*Ulmus*), walnut (*Juglans*) and wingnut (*Pterocarya*) as hosts. In 2003, we evaluated foliage of several trees and shrubs as food for EAB adults in Michigan, in a series of no-choice and choice tests that were conducted in the laboratory. We tested members of the olive family (Oleaceae: *Chionanthus, Forestiera, Forsythia, Fraxinus, Ligustrum, Syringa*), elm family (Ulmaceae: *Celtis, Ulmus*), and walnut family (Juglandaceae: *Carya, Juglans*). Overall, EAB adults fed readily on ash, although blue ash (*F. quadrangulata*) was the least preferred of the ash species tested. EAB adults did a small amount of feeding on shrubs in the ash family, including forsythia, fringe tree, lilac, privet, and swamp privet. There was almost no feeding on elm, hackberry, hickory, or walnut.

Using computer-monitored flight mills and tethered EAB adults, we measured flight distance over 24 hours. For the first 28 adults tested (flying without food or water during the test period), half flew less than 50 m while half flew more than 50 m. Of those flying over 50 m, their flight distances were 53, 71, 281, 649, 674, 716, 804, 814, 1110, 1216, 1418, 1653, 2426, and 4258 m.

In autumn 2003, two of the authors (H. Liu and T.R. Petrice) visited 29 field sites in Heilongjiang, Jilin, Liaoning, Hebei, Tianjin, and Shandong Provinces in northeastern China. The field sites included natural forests, nurseries, plantations, city parks, and streets. The ash species included *Fraxinus chinensis* subsp. *chinensis*, and *F. chinensis* subsp. *rhynchophylla*, and *F. mandshurica*. In addition, the North American species *F. pennsylvanica* (green ash) and *F. velutina* (velvet ash) have been planted in eastern China and are both readily infested by EAB. Active EAB infestations were found in five of the six provinces (all but Shandong) and in 20 of the 29 field sites. EAB commonly attacked ash trees in open areas and along forest edges. Evidence of larval parasitism was common.