Dispersal of Emerald Ash Borer at Outlier Sites: Three Case Studies

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ABSTRACT

We worked with cooperators from several state and federal agencies in 2003 and 2004 to assess dispersal of emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, from known source points in three outlier sites. In February 2003, we felled and sampled more than 200 ash trees at an outlier site near Tipton, Michigan, where one generation of adult beetles had emerged from firewood stacked near a drainage ditch in 2002. At least 70 percent of the EAB galleries occurred on trees growing along the ditch within 100 m of the firewood pile. Galleries were occasionally found on trees that were up to 750 m north from the firewood pile, but all infested trees were growing along the ditch. More than 80 woodlot trees that were roughly 400 m east of the ditch were sampled, but no galleries were found on any of these trees. The distribution of the infested trees suggested that the drainage ditch may have facilitated directional dispersal, perhaps extending the dispersal distance. The need to collect similar data at additional sites was noted.

In February 2004, we evaluated EAB dispersal at an outlier site near Shields, Michigan that resulted when a single generation of EAB adults emerged in 2003 from ten infested nursery trees. Cooperators from the Michigan Department of Agriculture randomly selected and marked one ash tree in each $^1/_{16}$-mile grid cell in a $^1/_2$-mile radius surrounding the point source of the infestation. Trees were felled and bark windows, each a minimum of 1,000 cm^2, were excavated on the upper surface of each tree. Number of bark windows sampled was based on the size of individual trees; four windows were evenly spaced from the base of the lower canopy to the upper canopy for each stem or major branch. The number of bark windows sampled ranged

from 4 to 24 windows per tree. The number and stage of EAB larvae and extent of feeding were recorded for each window. We sampled 147 ash trees and found 57 EAB larvae or galleries in eight trees. No infested tree was more than 0.38 miles from the point source. More than half of the EAB larvae were on a single declining tree.

We conducted a similar project in April 2004 at an outlier site in St. Joseph, Michigan, where two to three generations of EAB had emerged from infested nursery trees. One to two ash trees were felled and sampled per $^{1}/_{16}$-mile grid cell using methods developed at the Shields site. More than 200 trees were sampled and one or more infested trees were found in at least 14 grid cells. Trees with exit holes occurred in five grid cells, all within roughly 200 m of the point source. Trees with larvae or prepupae but no exit holes occurred in nine grid cells, located 200 to 600 m from the point source. Analysis of data from all three sites is continuing.