

PROSPECTS FOR LONG-TERM ASH SURVIVAL IN THE CORE EMERALD ASH BORER MORTALITY ZONE

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ABSTRACT

Attacking all North American ash species (*Fraxinus* spp.), emerald ash borer (EAB) (*Agrilus planipennis* Fairmaire) has caused significant mortality within its introduced range. For other forest pests, host bark plays an important role in infestation density and oviposition behavior. The objectives of this study were to (1) locate live ash trees in the core EAB-induced mortality zone in southeastern Michigan, (2) examine differences in live and neighboring dead trees in terms of d.b.h. and bark roughness, and (3) develop a deployable and simple ash mortality probability model.

An aerial helicopter survey was conducted in southeastern Michigan to digitally sketchmap locations of live ash trees. Live ash trees were identified to species and tagged within polygons mapped. Distance and d.b.h. of closest dead ash tree and distance to closest live tree regardless of species were measured for each live ash. Digital bark images were taken for each live tree and the closest dead ash tree centered at breast height. Images were converted to binary black and white. The percentage of black pixels in each image was used as a measure of bark roughness.

In the five Metroparks surveyed, 203 live ash trees were found. The majority of these trees exhibited signs and/or symptoms of EAB infestation. D.b.h. did not differ between live trees and dead trees. In addition, the live and dead trees followed a similar pattern in size class distribution. Live trees had significantly smoother bark; dead trees had a greater roughness value. The logistic regression between roughness value and tree mortality resulted in a significant relationship with the probability of an ash tree being dead increasing with each increase in roughness. The behavior of female EAB to lay eggs in bark crevices has been previously illustrated; trees with rough bark tend to have substantially more larval galleries than trees with smooth bark. Those trees with smooth bark may have survived because they provide fewer oviposition locations for female EAB. Trees with rough bark provide more oviposition locations. Bark roughness may help natural resource managers predict which ash trees will likely succumb to EAB attack.