

## Update on EAB-Resistance Breeding Programs

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The invasion of emerald ash borer (EAB, *Agrilus planipennis*) threatens the survival of ash trees (*Fraxinus*) in the United States, where it is a common hardwood species especially in riparian and wetland forests. Ash is also used extensively for soil conservation (including wind breaks) and in urban green spaces and streets. “Lingering” ash trees, defined as surviving mature ash trees in natural forests long infested by EAB that maintain healthy canopies for at least two years after all other large ash trees have died, were first identified as a result of annual monitoring of plots. EAB egg bioassay experiments on grafted ramets of lingering green and white ash selections confirmed that these trees possess an increased level of resistance due to several types of defense responses, including mortality of early instar larvae, larvae with significantly lower weights, and larvae with delayed development. Controlled cross pollinations have been used to produce full-sibling progeny from varied combinations of lingering ash parents. Bioassay data indicate an increased frequency of resistance (measured as the proportion of larvae killed by a host defense response) in these families. The level of resistance measured in some of the 2-year-old progeny was greater than either parent, suggesting a tree-improvement program is likely to be successful in producing EAB resistant seed. A pilot study screened unselected, open-pollinated families of blue ash and found that the level and frequency of EAB-resistance in these families was similar to full-sibling families of select lingering green ash. This indicates that screening open-pollinated blue ash seed may be an effective approach for resistance breeding. Longer term goals include combining the best performing progeny from many families into second-generation seed orchards, to produce seed appropriate for restoration plantings and evaluation of the best performing genotypes for cultivar development.