

## **SURVEY FOR TOLERANCE TO EMERALD ASH BORER WITHIN NORTH AMERICAN ASH SPECIES**

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Since the discovery of the emerald ash borer (EAB) near Detroit, MI, in 2002, more than 40 million ash trees have been killed and another 7.5 billion are at risk in the United States. When the EAB outbreak was initially discovered, our native ash species appeared to have no resistance to the pest. Variation in the response of native ash species to EAB may have gone unnoticed in the Detroit area and surrounding suburbs, where ash was a popular street tree. Because the vast majority of street trees are vegetatively propagated horticulture selections, it is likely only a limited number of genotypes were represented. The establishment of “ash-free” zones may have delayed observations of ash trees with any tolerance to EAB in some areas. As the beetle spread away from urban areas into more genetically diverse native stands and woodlots, plots were established to monitor the impact of EAB. The health of more than 3,000 ash trees in infested forests in Michigan and Ohio has been monitored yearly using a canopy health index. In these areas EAB has been present for several years, and almost all of the ash trees are dead. However, our yearly inventory has identified a small number of trees that have persisted. Approximately 1.0 percent

of the ash trees have remained alive and 0.1 percent have retained a healthy crown appearance. To date, we have identified and grafted 18 select “lingering ash”: 15 *Fraxinus pennsylvanica*, 2 *F. americana*, and 1 *F. nigra*. These trees were selected from the main canopy layer and did not include seedlings or saplings. Initial feeding and landing studies have been performed on a subset of these trees, and preliminary results indicate that some of the lingering ash selections are less preferred by the beetle. We are ramping up propagation of each selection for the establishment of field test plots and further analysis using insect bioassays to distinguish trees that are “escapes” from those that may be tolerant or even resistant to EAB. Those selections that display tolerance/resistance to EAB will be further analyzed using molecular and biochemical methods to identify the underlying mechanisms. Although some of these trees still may succumb to EAB infestation, the mechanisms that allow them to “linger” longer than their counterparts may be further enhanced through breeding. Conceivably, under lower insect pressure, the trees that can survive longer may be capable of co-existing with EAB.