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## The survivors: population dynamics of lingering ash and resistance to emerald ash borer

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Natural resistance or tolerance to exotic pests and pathogens has been found in many tree species, usually occurring in rare individual trees or populations. After emerald ash borer (*Agrilus planipennis*) (EAB) has swept through natural populations of ash (*Fraxinus* spp.), it is possible that some lingering (surviving after initial mortality wave) ash trees may exhibit resistance or tolerance to this exotic beetle. Monitoring data from forests across Ohio shows that >99% mortality of mature ash trees is typical in forest stands. However, we have identified a few populations of lingering ash trees that we are monitoring to understand survival and propagating to test for EAB resistance. Field-based monitoring of surviving ash trees >10 cm DBH at one site in northwest Ohio has identified factors including canopy health and woodpecker activity that predict survival over a six year time period. Trees with good canopy health and no evidence of woodpecker feeding after the other trees in the area experienced >95% mortality were the most likely to survive. 21 surviving lingering ash trees from this site have been propagated and tested as part of the EAB Resistance Breeding Program. Results from EAB egg bioassays on potted trees show that many of these lingering ash kill a larger proportion of developing larvae relative to control susceptible trees and the surviving larvae weigh less, an indication of poor fitness. Preliminary results from progeny of lingering ash trees indicate that resistance can be further enriched through breeding.

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