SOMATIC EMBRYOGENESIS FOR ASH CONSERVATION AND RESTORATION

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All North American ash (*Fraxinus*) species are under threat of extirpation from their native ranges by the emerald ash borer (EAB; *Agrilus planipennis*), an exotic wood-boring beetle that has already destroyed millions of ash trees in 15 U.S. states and Canada. Conventional breeding approaches to generate EAB-resistant ash trees could be enhanced and/or complimented by the availability of a system for in vitro propagation of the best EAB-resistant material, which could be used for both propagation of conventionally bred material and for testing candidate genes that might confer resistance or tolerance to EAB. We conducted a preliminary experiment to initiate embryogenic cultures from seeds of green ash (*F. pennsylvanica*). Seeds with embryos at various stages of development were collected from three local Athens, GA green ash trees and cultured on two different basal media with different combinations of plant growth regulators (PGRs). A very low percentage of seed explants at an early stage of development from all three source trees produced proembryogenic masses (PEMs) when cultured on a modified Woody Plant Medium with 2,4-dichlorophenoxyacetic acid and benzyladenine. Transfer of PEMs to PGR-free medium resulted in high-frequency production of somatic embryos. We believe that the apparent similarity of the ash embryogenic cultures to those of other hardwood species we have cultured gives them the potential to be scaled up via suspension culture and perhaps bioreactor culture for mass propagation and gene transfer purposes. The ability to produce embryogenic cultures also gives us the ability to conserve ash germplasm indefinitely by cryostoring the embryogenic cultures. We believe that eventually somatic embryogenesis will prove to be an invaluable tool to aid with reforestation efforts for these valuable tree species.