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A RAPID WOODY PLANT BREEDING SYSTEM FOR ALTERNATIVE ORNAMENTALS:
ILEX GLABRA (L.) A. GARY (INKBERRY) AS AN EXAMPLE

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Woody plant breeding is a long-term commitment, which usually takes 10-30 years for successfully introducing a hybrid cultivar with market potentials. *Ilex glabra* is an evergreen shrub native from Florida to Maine (USA). It is an alternative for invasive barberry. Unfortunately, majority of its cultivars are not cold hardy in the northern landscapes. To improve its cold hardiness and other ornamental attributes, 48 inkberry taxa and two other cold hardy *Ilex* species (winterberry and meserve hybrid holly) were collected and grown at the University of Maine greenhouses and nurseries. Amplified Fragment Length Polymorphism (AFLP) data showed that the genetic variations were 0.01 to 34.9% among taxa. Further molecular analysis (AFLP and ISSR) will focus on the trait-associated markers and apply them for early seedling screening for targeted features. Cross pollination had been conducted using five inkberry cultivars (female) and two cold hardy species (male) in both field and greenhouses. The fruit sets varied from 1.68% to 72.3%. Among them, 7.5% to 54.2% fruits had viable seeds. Low pollen germination rate, abnormal pollen tube growth, and lack of fertilization contributed to the low seed sets. Both embryogenesis and seedling explants are in experiments to fast regenerate the siblings. Through the aid of molecular markers and rapid regeneration of embryogenesis, we will establish a model for the rapid woody plant breeding system as: conducting traditional hybridization, regenerating plants from embryos or seedlings from the tissue culture, and early detection with molecular markers. The system will improve our success by better selecting the targeted traits and significantly reducing the breeding time/cycle and work load!