ABSTRACT

THESIS : Radial growth-climate associations of white ash (*Fraxinus americana* L.) in Indiana, U.S.A.

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White ash is an ecologically and economically important species in North America, but information on growth-climate relationships of white ash is virtually non-existent within the U.S. The spread and mortality rate of the current emerald ash borer outbreak is creating a limited time frame to acquire this type of information for white ash. Having this information will be important to forest managers if reintroduction of white ash is necessary. This type of data may also be important for simplifying forest simulation models by characterizing white ash as part of a larger "functional group" (temperate zone species with hardwood, ring-porous biology). This study identified and described the growth-climate associations for white ash on five sites in Indiana, U.S.A. This study also tested the hypothesis that white ash is part of a larger functional group by comparing the growth-climate associations observed in white ash to those documented for white oak.

Correlations between white ash radial growth and climate variables in the month of June were the strongest and most consistent across sites. Seasonal climate variables were also strongly correlated with white ash radial growth during the early growing season. Growth-climate correlations for white ash total ring width were virtually identical to those observed for latewood across sites. Climate variables during the prior year growing season were weakly correlated with white ash earlywood, but this was not consistent across sites. Growth-climate associations observed in white ash were very similar to those observed in white oak. This pattern was consistent across study sites and supports the hypothesis that white ash responds to variation in climate similarly to other temperate zone, hardwood, ring-porous species. These results support the hypothesis that temperate zone ring-porous hardwood species can be combined into a functional group to simplify forest simulation models.