

# VARIATION IN THE FLOOD TOLERANCE OF THREE MIDWESTERN OAK SPECIES

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## ABSTRACT

Several studies on flood tolerance of hardwood seedlings have suggested ecotypes exist among seed sources related to past flooding history and soil hydrological properties of the collection site. Our study examined differences in seedling flood tolerance of white, bur, and swamp white oaks grown from acorns collected from upland sites and bottomland sites. Air-root pruned seedlings grown in a horticultural potting mix were subjected to partial inundation for 0, 4, and 8 weeks with stagnant water in 1200 L stock tanks in an open shade house covered with 50% shade fabric. Mortality was less than 2 percent for bur and swamp white oak. Mortality for white oak averaged less than 15 percent and increased as duration of flooding increased. Only 11, 15, and 37 percent of the white, bur, and swamp white oak produced one or more flushes after flood initiation. Of the seedlings that flushed, length of new growth on swamp white oak averaged 17 cm across all flood treatments. In contrast, height growth of bur and white oak seedlings decline with increasing flood duration. Highly significant differences in basal diameter growth existed for position with species and for family within position within species. With flooding, seedlings of all species produced hypertrophied lenticels with a concomitant swelling of basal stem, especially for bur and swamp white oak. Unlike white oak seedlings, bur and swamp white oak seedlings from bottomland seed sources showed greater basal diameter growth than from upland sources. Results suggest that for flood tolerant oak species, bottomland seed sources are better adapted for bottomland restorations than are upland seed sources.