

PLANTING DEPTH EFFECTS AND WATER POTENTIAL EFFECTS ON
OAK SEEDLING EMERGENCE AND ACORN GERMINATION

Wayne A. Smiles and Jeffrey O. Dawson¹

Abstract: The effects of four planting depths (0, 3, 7, 11 cm) and acorn size on the percentage seedling emergence of red, pin, and black oak were determined. In a complimentary study, the effects of five water potential treatments (0, -.2, -.4, -.6, -1.0 MPa) on the percentage germination of red, pin, and black oak acorns were measured.

Percentage seedling emergence was greatest at 3 and 7 cm planting depths for all species. It was least at both the 0 cm planting depth for all species and the 11 cm planting depth for red and black oak. Percentage emergence was greater for larger acorns within a species, but pin oak, which had the smallest acorns, had the greatest percentage emergence among the three oak species studied. The number of days after planting to time of emergence was negatively correlated with acorn size and positively correlated with planting depth for a species.

Total percentage germination after 60 days in polyethylene glycol osmoticum treatments was greatest for pin oak and least for black oak at all levels. Total percentage germination decreased with decreasing water potentials for all species, with levels of -0.6 and -1.0 MPa virtually arresting germination.

These results indicate that a 3-7 cm planting depth was optimal for these oak species under our experimental conditions. Larger acorns of a given species had a higher percentage emergence than smaller acorns. The germination rate of acorns after exposure to osmotic stress did not coincide with the relative drought hardiness of the parent oak species.

¹Department of Forestry, University of Illinois - Urbana, W-503 Turner Hall, Urbana, IL 61801.