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Hardwoods Respond to Irrigation

Abstract. Radial growth of several southern hardwood species was significantly increased by irrigation.

To learn if irrigation during the growing season would increase radial growth, small dikes were built in 1956 around two ¼-acre areas in well-stocked natural stands of 40-year-old hardwoods near Stoneville, Miss. For comparison, two equivalent areas were selected adjacent to the diked plots. Principal species in the stands are sweetgum, Nuttall oak, green ash, hackberry, persimmon, and overcup oak. The soil is Sharkey clay.

During six consecutive summers, well water was applied directly on the ground surface of the diked areas whenever soil moisture fell below 50 percent of available water capacity.

Normal rainfall during the 6-month growing season is 21 inches, with monthly distribution ranging from about 4.7 inches in April to 2.4 inches in September. During the study, however, precipitation was above normal in most years but unevenly distributed. Thus, while the growing seasons of 1957 and 1958 were wet, with 37 and 50 inches of rainfall, soil moisture was below half the available water capacity for several days in August and September. Least total rainfall, 19 inches, was in 1960, but the most days of irrigation, 24, were in 1959.

At the end of the 1962 season, radial growth at breast height was determined for each tree by extracting two increment cores at right angles and averaging the growth for the 6 years.

Radial growth for irrigated sweetgum averaged 0.91 inch, as compared with 0.56 inch for nonirrigated (Table 1). For all other hardwoods the increase was 0.28 inch. The sweetgum sample was large enough to permit division into crown classes. For dominants and codominants irrigation increased the radial growth from 0.62 to 1.00 inch. For intermediate and suppressed trees it increased growth from 0.25 to 0.58 inch.

These increases were obtained in normal to wet years. Future considerations in timber management therefore should include the possibility of irrigation, especially in dry years when diameter growth is greatly reduced.

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TABLE 1.—HOW IRRIGATION AFFECTED 6 YEARS' RADIAL GROWTH OF SWEETGUM AND OTHER MIXED HARDWOODS

Species and crown class	Irrigated			Nonirrigated			Mean difference and significance
	Samples	Radial growth	Standard deviation	Samples	Radial growth	Standard deviation	
	Number	*Inches*		*Number*	*Inches*		
Sweetgum							
Dominant	22	1.16	0.23	24	0.70	0.17	0.46**
Codominant	20	.81	.20	22	.53	.18	.28**
Intermediate and suppressed	11	.58	.22	8	.25	.08	.33**
Dominant and codominant	42	1.00	.28	46	.62	.19	.38**
All classes	53	.91	.32	54	.56	.22	.35**
Other hardwoods[1]	22	.84	.25	34	.56	.31	.28**

**Highly significant ($P.<0.01$).

[1]Nuttall oak, green ash, hackberry, persimmon, and overcup oak.