

IRRIGATION EFFECTS IN A COTTONWOOD PLANTATION IN THE LOWER MISSISSIPPI RIVER ALLUVIAL VALLEY

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Eastern cottonwood (*Populus deltoides* Bartr.) may have potential as a short-rotation alternate crop on marginal farmlands in the U.S. South to meet increasing biomass demands for pulp and bioenergy applications. This 10-year study, installed in the Delta region of Arkansas, investigated the effects of irrigation on the growth of nine cottonwood clones (five Stoneville clones, two Texas clones, and two hybrid clones). Survival, height, diameter, and biomass production of the cottonwoods were compared between the irrigated-bedded treatment and the unirrigated-subsoiled treatment, and among the nine clones. Poor initial survival caused the replanting of several clones the second year and the separate analysis of the two groups of clones. Survival for some clones dropped off greatly after 5 years. The irrigated-bedding treatment increased volume growth (biomass production) over the unirrigated-subsoiled treatment, and for some clones, irrigation more than doubled volume growth. Lower survival resulted in more growing space and greater volume growth for some clones. Overall, irrigation increased height, diameter, and volume growth of all clones except one. The best clonal biomass production was 2.1 dry tons/acre/year in the unirrigated treatment and 4.3 dry tons/acre/year in the irrigated treatment, both less than expected. Some clones produced more biomass during the first 5 years than the second 5 years. Economic considerations require the additional investigation of growing selected clones in the Delta under various spacing, rotation length, and cultural treatment regimes to determine if cottonwood can be a competitive woody crop in this region.

KEY WORDS: biomass production, eastern cottonwood, plantation, clones

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