

INFLUENCE OF MUNICIPAL WASTEWATER ON THE GROWTH AND YIELD OF COTTON¹

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Experiments were conducted in the field to study the influence of municipal wastewater on the growth and yield of cotton near Buckeye, Arizona, in 1974 and 1975. The soil type was a Gilman loam. Conventional culture for growing cotton on 38-inch beds was used. The crop was planted in April and harvested in November each year. Approximately 4 acre-feet of irrigation water were required to produce a cotton crop. Two sources of irrigation water were used: (1) pump water from local wells (control treatment) and (2) municipal wastewater plus pump water in a 50:50 mixture. The pump water contained approximately 4600, 21, and 0 ppm of total soluble salts, nitrate nitrogen, and elemental phosphorus, respectively. The wastewater plus pump water mixture contained about 2200, 6, and 37 ppm of total soluble salts, nitrate nitrogen, and elemental phosphorus, respectively. Fifty pounds per acre of nitrogen were applied before planting to the cotton that was irrigated with pump water. No nitrogen was applied to the cotton that was irrigated with the wastewater plus pump water mixture. The experimental design was a Modified Randomized Complete Block with four replications.

Plant growth and yield data for cotton grown with the two sources of irrigation water are presented in Table 1. Cotton irrigated with the wastewater plus pump water mixture produced taller plants that contained more vegetative growth than did cotton that was irrigated with pump water alone. When cotton was irrigated with the wastewater plus pump water mixture the yields of seed cotton and lint cotton were equal to or higher than the yields of seed cotton and lint cotton from plants irrigated with pump water.

Municipal wastewater can be used effectively as a source of irrigation water and plant nutrients in the commercial production of cotton in Arizona and, possibly, in similar environments throughout the world. When municipal wastewater is mixed with pump water that is high in total soluble salts, the salt content of the mixture is lowered and the quality of the irrigation water is improved.

¹The work upon which this paper is based was supported by funds provided by the United States Department of Interior, Office of Water Research and Technology, as authorized under the Water Resources Act of 1964 and by the State of Arizona.

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TABLE 1

Average plant height, seed cotton yields, and lint cotton yields for Deltapine 61 Cotton grown with two irrigation treatments near Buckeye, Arizona in 1974 and 1975.

Irrigation treatment	Year	Plant height (inches)	Seed cotton yield		Lint cotton yield	
			Pounds per acre	% of pump water	Pounds per acre	% of pump water
Pump water (control)	1974	35	3,885	100	1,558	100
	1975	36	3,413	100	1,263	100
	1974-75 avg.	36	3,649	100	1,411	100
Wastewater & pump water	1974	47	4,463	115	1,647	106
	1975	47	3,632	106	1,344	106
	1974-75 avg.	47	4,048	111	1,496	106

Comments

1. Planted in April.
2. Harvested in November.
3. Soil type = Gilman loam.