EFFECTS OF PROLONGED IRRIGATION ON COTTON

Prolonged irrigation shows some promise as a method of ground water recharge. However, the effect of such over-irrigation on various crops could be a limiting factor. Experiments conducted by Hall et al.\(^2\) on the effect of replenishment irrigation on dormant alfalfa showed that plant mortality was not affected by alternate, week-long irrigations between December 15 and February 1. Stockton et al.\(^3\) found that weekly applications of water on cotton during the irrigation season had no significant effect on yield as compared with that of cotton irrigated at the first visible sign of moisture deficit.

This study is concerned with the effects of prolonged irrigations on the growth, maturity and yields of cotton planted in "solid-block" and "skip-row" (alternate strips of cropped and uncropped land of equal width). The study was conducted during 1960 in southwestern Fresno County, Calif. All experimental plots were part of a farmer's field on Panoche clay loam planted to Acala 4-42 cotton. Tillage, fertilizer application, and planting, along with all other farming operations were the same on the plots and in the adjacent field.

Skip-row Cotton

Design—The plots were strips of four 733-foot rows with a 40-inch row spacing, separated by an equal width of uncropped land. These strips were used to lay out a randomized block design of 12 plots with 3 treatments replicated 4 times. The 3 treatments were: 1-day, 4-day, and 8-day furrow irrigations. Water was applied to the 5 furrows associated with the 4 cotton rows.

Irrigation treatments began with the first post-emergence irrigation and succeeding prolonged irrigations were scheduled at the same time the farmer irrigated the field area adjacent to the plots. The 1-day treatment was a 24-hour "set" the same as practiced by the farmer. On the 4-day and 8-day plots water ran in the furrows continuously for those periods. Water was not allowed to pond over the beds. The crop was irrigated three times during the growing season in addition to the preirrigation. Water was metered on to the 8-day plots which gave an average intake rate of 0.475 ft./day (total depth of water applied/days of application).

Yield and quality—All four rows of each plot were harvested by mechanical pickers. The yields versus treatment for the two pickings are shown in Table 1. Statistically there was no significant difference in yields for the first picking. The second picking yields were based on a composite of the four plots for each treatment, therefore, the significance between the second picking yields, and between the total yields could not be tested.

Samples of ginned cotton from each plot were graded, and the results are shown in Table 2. Grade frequencies for the 1-day treatment were significantly lower than for the 4- and 8-day treatments. Standleths from 1-1/16 to 1-3/32 inches. Grades ranged from Middling to Strict Middling with all cotton planted in "solid-block" and "skip-row" (alternate strips of cropped and uncropped land of equal width). The study was conducted during 1960 in southwestern Fresno County, Calif. All experimental plots were part of a farmer's field on Panoche clay loam planted to Acala 4-42 cotton. Tillage, fertilizer application, and planting, along with all other farming operations were the same on the plots and in the adjacent field.

Solid-block Cotton

Design—The wetted area in solid-block cotton was 53y3 feet wide and 1256 feet long with a 40-inch row spacing. This strip of cotton within the field was flooding for a total of 38 days in addition to the 1-day treatment by the farmer. The prolonged irrigation schedule was as follows: no water after the preirrigation, irrigation and succeeding prolonged irrigations were scheduled at the same time the farmer irrigated the field area adjacent to the plots. The 1-day treatment was a 24-hour "set" the same as practiced by the farmer. On the 4-day and 8-day plots water ran in the furrows continuously for those periods. Water was not allowed to pond over the beds. The crop was irrigated three times during the growing season in addition to the preirrigation. Water was metered on to the 8-day plots which gave an average intake rate of 0.475 ft./day (total depth of water applied/days of application).

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Growth and maturity—During the early portion of the season plants on the 4- and 8-day plots had a more compact and had attained an average height of 52 and 53 inches, respectively. Figure 1 shows the contrast in growth between 1-day treatments of cotton 2 weeks before harvest. The maturity of the cotton receiving 1-day treatment is easily seen by the open bolls in Figure 1. The delay of the 4- and 8-day plots was reflected by a smaller amount of cotton harvested on the second picking of rank vegetative growth of the 8-day treated plants. Difficulty in defoliation prior to machine picking two sprayings by airplane, plants on the 4- and 8-day plots were not as well defoliated as the plants on the 1-day plots after one spraying.