blossoms, and weight per boll, and by retarding boll set. Overirrigation may cause excessive growth at the expense of fruiting, boll rot, late maturity, and excessive shedding. Because of the year-to-year differences in the consumptive use requirements for cotton, intelligent scheduling of irrigation must be made each year to prevent over- or underirrigating.

A study was conducted at the Cotton Research Center comparing the water use and yields of several new and old varieties of cotton. The consumptive use in 1966 was about 37 inches and in 1967 about 34 inches, necessitating one less irrigation. The lower and upper extremes in water use occurred in 1959, when plants used less than 30 inches of water and maximum production was attained with 3 irrigations, and in 1954, when 7 irrigations were needed and plants used nearly 50 inches of water for maximum production.

The mean consumptive use for cotton during an 8-year period -- 1954 through 1962 -- was 41.2 inches, which could be supplied with 6 irrigations following a preplanting irrigation. Though 6 irrigations properly timed usually will be adequate to prevent reductions in yield associated with moisture extremes, the irrigation date should be decided upon by close observations of plant stress symptoms such as dark bluish-green leaves, lack of new growth, redness near terminal bud, and afternoon wilt. Plants should not be stressed for water to the point where lower leaves are shed.

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COTTON PRODUCTION EFFICIENCY THROUGH TIMELY TERMINATION OF IRRIGATION

E. B. Jackson, Associate Agronomist
F. M. Carasso, Research Assistant in Agronomy

This is a progress report on the second year of a study begun in 1966. Results of the first year's work were reported under the same title in Cotton, a University of Arizona, College of Agriculcure Report, Series P-5, February 1967.

The objectives of these experiments are: (1) to determine the earliest date on which irrigation can be terminated and still leave just enough water in the soil to mature all the bolls set before "cut-out", and (2) to measure the efficiency of water use at different irrigation termination dates.

Procedure: The soil of the experimental area used in 1967 was a silt loam 20 inches deep, underlain with hard clay to 31 inches, very hard clay to 54 inches, loamy sand to 81 inches, and coarse sand to the water table at 102 inches.

Acala 4-42 and Deltapine Smooth Leaf were planted in moist soil on March 20, 1967. The experimental design was a split plot randomized block with eight replications. Whole plots were irrigation treatments and subplots were varieties. A subplot was four rows 35 feet long with the two center rows picked for yield. All plots were sidedressed with ammonium nitrate at the

rate of 100 pounds N per acre on June 21. All plots were uniformly irrigated until the first irrigation termination date, July 10. Irrigation of the other treatments was continued until the specified date shown in the table.

Results: The experimental results reported here most likely reflect the influence of two modifying environmental factors: (1) a late, cold spring which slowed plant growth and delayed fruiting at least ten days, and (2) a build-up of pink bollworms which reached a peak about August 15.

Flowering, fruiting, cut-out and harvest dates for both varieties were as follows:

First flowers	June 16
First open boll	August 2
Start of cut-out	August 6
Resumption of growth	September 5
First crop bolls 95% open	September 14
First machine picking	November 14
Second picking	December 4

Plants in treatments 1 and 2 which received their last irrigations July 10 and 26 did not resume growth after "cut-out." Some regrowth occurred in plots terminated August 14, while vigorous regrowth and increased lodging occurred in those irrigated until September 8 or 25.

Moisture stress symptoms were first observed in treatments 1 and 2 on August 2 and 8, respectively. Although the plants ceased to grow, they did not wilt. Apparently, they obtained enough subsoil moisture to sustain them. In an excavation in treatment 1, fine roots were found at a depth of 81 inches in moist sand, which was apparently receiving water by capillary rise from the water table below (102 in.).

As shown in the table, defoliation was progressively more successful in the treatments with earlier irrigation termination dates.

Effect of Irrigation Cut-off Date on Yield of Cotton and Efficiency of Water Use, Yuma Valley Experiment Station, 1967[1]

Treatment No.	Final Irrigation	Yield of Seed Cotton Lb./A	Lodging Index[2]	Estimated Percent Defoliation[3]	Irrigations		Pounds of Seed Cotton per Inch of Water
					Number	Inches of Water Applied[4]	
		Acala 4-42					
1	July 10	1885	1	82	5	19	99.2
2	July 26	1956	2	76	6	23	85.0
3	Aug. 14	2036	3	71	7	27	75.4
4	Sept. 8	2150	3	49	8	31	69.4
5	Sept. 25	2011	4	46	9	35	57.5
		Deltapine Smooth Leaf					
1	July 10	2107	2	86	5	19	110.9
2	July 26	2457	4	79	6	23	106.8
3	Aug. 14	2484	5	75	7	27	92.0
4	Sept. 8	2588	6	46	8	31	83.5
5	Sept. 25	2299	7	45	9	35	65.7

[1] Data are averages of 8 replications.

[2] Numerical scale: 0 = all plants erect, 10 = all plants prostrate.

[3] Defoliation October 30, 1967. One qt. "Def" and 0.5 pt. "Paraquat" per acre, plus 5% by volume surfactant.

[4] Includes the preplanting irrigation.