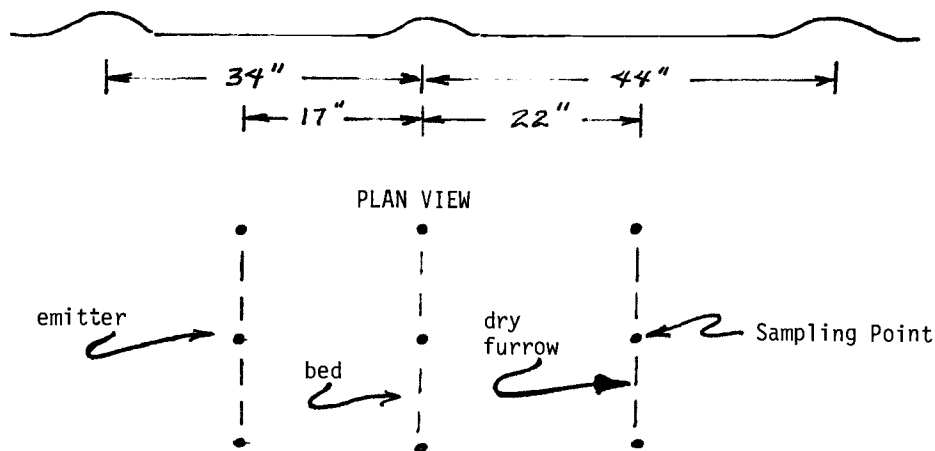


DISTRIBUTION OF SALINITY UNDER DRIP IRRIGATION
C. R. Farr

The distribution of salinity in a saline soil under drip irrigation was identified after one season of cotton production. Salinity of the water is approximately 3500 p.p.m. total soluble salts with a SAR value of 8.5 and an adjusted SAR of 23.2. Irrigation was begun April 23 on variable row spacing of 34"-44" and terminated October 3.

Three points each were sampled in the irrigated furrow, the bed, and the dry furrow with 19.6 inches between sampling points. The sampling points in the bed were 17 inches from the furrow line through the emitter and the line in the dry furrow was 22 inches from the bed line.

Electroconductivity values in the first foot were 2.77 times higher in the dry furrow than in the irrigated furrow. The ESP values in the dry furrow averaged 1.3 and 1.16 times higher than the irrigated furrow in the first and second foot of soil, respectively.



	Line A	Line B	Line C
Average Ec 0"-12"	1.62	2.13	4.5
Average ESP 9-12	9.37	9.00	12.20
Average Ec 12-24	3.81	5.67	9.73
Average ESP 12-24"	13.97	14.07	16.30

Drip Irrigated Cotton in Cochise County

B. B. Taylor, Larry Sullivan and Joel Malcuit

Summary

A drip irrigation system was installed on 9 acres of the Carl Barton farm in Pearce, Arizona. T-Tape irrigation lines were buried approximately 6 inches below each seed row. In each of five areas of the field two plots 14 feet long were established to compare productivity of plant populations of 6 plants versus 2 plants per foot. Variable discharge in some T-Tape lateral lines, was detected 12 weeks after planting and required replacement in August. As a result five plots received an estimated 20 percent less water than the other five plots. Blooms were tagged and counted each day from July 20 through August 30. In the fall bolls were hand-picked as they opened and separated according to the date on the tag, counted, and weighed. Values in Table 1 represent number of blooms produced, percent of blooms that developed into bolls, pounds of lint per acre produced and boll size. Also, yield results of machine harvesting are presented in Table 2. These results compare low water rows and high water rows. Figure 1 illustrates petiole nitrate levels in furrow irrigated vs. drip irrigated cotton on the Carl Barton farm.

Results of Table 1 show that proper plant spacing is important. A population of 6 plants/ft (82,000 per acre) produced a greater number of flowers and a higher total yield than 2 plants/ft (27,500 per acre). Water input was also important in that rows receiving the most water produced a greater number of flowers and a higher total yield than those receiving less water. Eighty one percent of all blooms that developed into bolls and seventy four percent of total yield was made from flowers that opened by August 9, thus stressing the importance of early season management. Plots with low water input cut out earlier than those with high water input. Yield results of machine harvested rows show a

greater difference between high water and low water rows than results of hand harvested plots. Petiole nitrate levels in drip irrigated cotton shows a more erratic behavior throughout growing season compared to furrow irrigated cotton. This may be due to the unique response of cotton to drip irrigation.

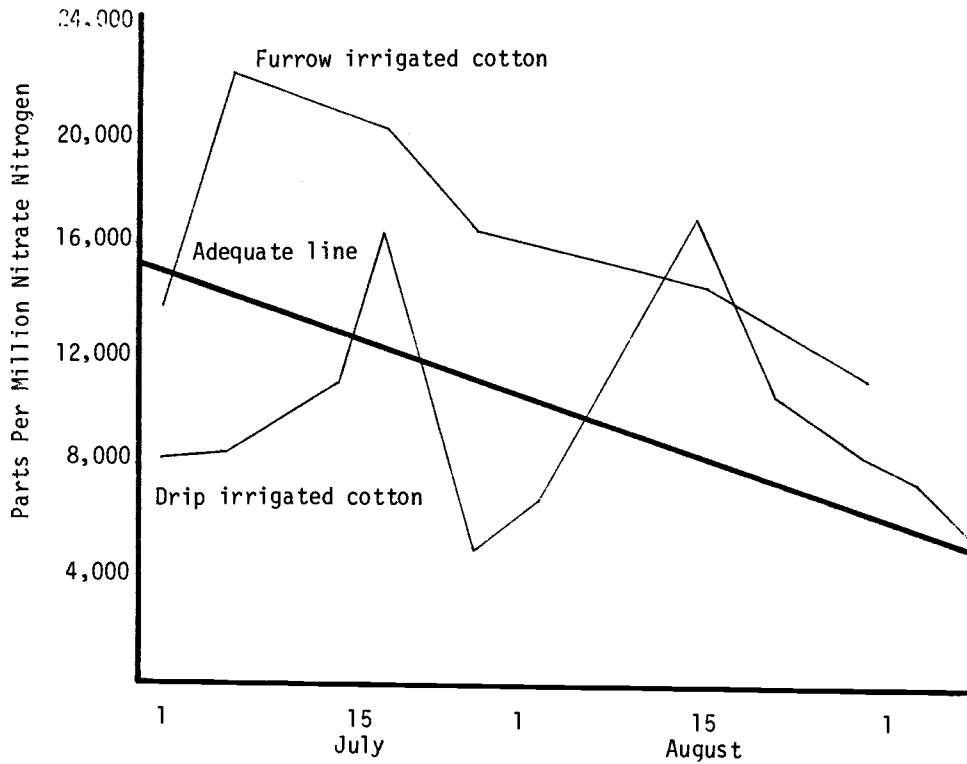


Figure 1. Petiole nitrate levels in furrow irrigated cotton vs. drip irrigated cotton on the Carl Barton Farm 1982. Compliments of Dr. Paul Eberhardt, Agricultural Consultant.

Table 1. Number of flowers, percentage of flowers that developed into bolls, boll size and yield of two plant populations and irrigation levels of drip irrigated cotton.

Treatment	Week Beginning						Total
	7/20	7/27	8/3	8/10	8/17	8/24	
<u>Number of flowers that bloomed each week during the growing season</u>							
High Water 6 plants/ft.	35	78	143	114	109	103	582
Low Water 6 plants/ft.	23	70	94	113	110	86	496
High Water 2 plants/ft.	20	42	87	95	97	106	447
Low Water 2 plants/ft.	21	54	101	97	93	70	436
<u>Percent blooms that developed into bolls</u>							
High Water 6 plants/ft.	78	79	50	19	20	5	\bar{x} 42
Low Water 6 plants/ft.	87	75	65	29	6	0	44
High Water 2 plants/ft.	89	91	68	31	36	7	54
Low Water 2 plants/ft.	86	87	54	16	9	2	43
<u>Boll size in grams</u>							
High Water 6 plants/ft.	5.4	5.3	4.8	4	3.2	2.8	\bar{x} 4.3
Low Water 6 plants/ft.	4.7	5.1	5.0	3.8	3.4	-	4.4
High Water 2 plants/ft.	5.7	5.4	4.8	4.4	3.7	2.4	4.4
Low Water 2 plants/ft.	5.5	5.4	4.6	4.4	3.6	2.1	4.3
<u>Weekly Yield Results Hand Harvested lbs Lint/Acre</u>							
High Water 6 plants/ft.	107.9	230.1	245.6	61.1	49.1	10.1	703.9
Low Water 6 plants/ft.	67.8	184.5	260.6	84.1	15.4	-	612.4
High Water 2 plants/ft.	68.5	148.4	201.6	93.9	85.6	12.5	610.5
Low Water 2 plants/ft.	72.5	183.4	200.0	56.1	25.6	3.0	540.6

Table 2. Total yield results machine harvested lbs lint/acre.

High Water 6 plants/ft	Low Water 6 plants/ft
744	419

CROP HISTORY

SOIL TYPE: Elfrida Silty Clay loam, (Ef)
PREVIOUS CROP: 1980 Lettuce. 1981 Fallow
TILLAGE: Disc, list, and bed shaped before planting.
PLANTING: May 15th with 19 lbs/A.
HERBICIDE: Treflan at 1 pint/A and double discing to incorporate to a depth of 3"-5".
FUNGICIDE: Tree aerial applications for rust.
FERTILIZER: Broadcast 10-52-0 at 225 lbs/A, preplant. Water run UN 32 for additional 82.8 lbs actual N
IRRIGATION: Started irrigating May 19th, finished 1st irrigation on May 25. Total water 11.88 acre inches.
RAINFALL: July (0.6 in.) - Aug. (4.3 in.) - Sept. (2.75 in) - Total = 7.65 in.
INSECTICIDE: None
AMENDMENTS: 10 gal. Sulpheric acid Aug. 5th for Algae

Variable discharge in some T-TAPE lateral lines required replacement of those lines on Aug. 11th.

First bloom July 16th, 54 days after planting.

Low-Pressure, Mechanically Moved Irrigation Systems for Cotton

D. D. Fangmeier, Agricultural Engineer, and S. Husman, Research Assistant

SUMMARY

Low-pressure, continuously moving, mechanical irrigation systems were used to irrigate cotton at the University of Arizona Marana Farm in 1982. Cotton yields ranged from 2.30 to 2.55 bales per acre. Water applied ranged from 28 to 30 inches during the season. These systems offer an efficient alternative for cotton irrigation.

Two continuously moving, mechanical irrigation systems were used to irrigate cotton at the University of Arizona Marana Farm during 1982. These systems were modified to operate at low pressures to minimize the energy requirement. A system with laterals 1300 feet long would require 20-25 psi with the low pressure design.

A 550 foot center pivot was used in the first field (E-1). Two sections, 20 rows wide, were irrigated using low pressure spray nozzles mounted about 5 feet above the soil surface on drop lines. The rest of the system was irrigated with furrow drop lines. These consisted of a flow control nozzle, and a plastic tube which delivered water directly to the bottom of every other furrow. Checks or small dams were mechanically placed 6-10 feet apart in every furrow. These hold the irrigation water so no runoff occurs and assures a uniform water distribution. Checks were installed four times. The checks were installed in every other furrow where furrow drop lines existed so that the main picker wheels travel where there are no checks.

The field was fertilized, listed and a pre-irrigation of about 8 inches applied between March 30 and April 7. Delta and Pine 55 was planted April 21. Wheel tracks for each irrigation system were elevated to avoid traction problems.

Additional fertilizer was applied once during the season when petiole samples indicated the need. Urea was applied in the irrigation water at a rate of 30 lbs N per acre in the furrow drop areas and 15 lbs N per acre in the spray area. Petiole samples showed 6,252 ppm of NO₃ on July 7, 6,225 ppm July 14, and 12,594 ppm July 30 in the furrow drop areas. The spray nozzle areas showed 6,252 ppm July 7, 14,360 ppm July 14, and 9,228 ppm July 30.

The total water applications and cotton yields are shown in Table 1. The cotton was picked on November 4 and December 20.