

Sprinkler Versus Surface Irrigation of Cotton

(K. R. Frost)

A comparison test of two methods of irrigation was run on the Campbell Avenue Farm at Tucson. The plots for each treatment were in quadruplicate. To obtain equal stands all plots were germinated by surface irrigation. The surface plots were irrigated rapidly one at a time using two wells with a flow of 650 g.p.m. resulting in 4.5" per application and totaling seven irrigations plus rainfall.

Approximately 2.8" were applied each irrigation by a Sequa-matic sprinkler system. This system had five 1-inch laterals with 6 sprinklers per lateral and equipped with 1/8" nozzles spaced at 30' x 30'. One sprinkler per lateral operated automatically at one time. The pressure applied was about 60 psi. A total of 2.27 acre feet per acre was applied during the season by the sprinklers and 3.01 on the surface irrigated area. These totals include rainfall up to September and a 4" pre-plant irrigation. Yield of seed cotton per acre foot of water was 1120 pounds for the sprinkled area compared with 675 pounds for the surface irrigated.

Treatment	Appl. Rate	Border Area Sq. Ft.	Ac. Ft. per Ac.	Yield Seed-Cotton	lb. Seed- Cotton/Ac. ft.
Sprinkler	0.35 in/hr.	6000	2.27	2540	1120
Border	60 g.p.m. per foot of width	6000	3.01	2030	675

A Progress Report On Sprinkler Irrigation Of Cotton With Highly Saline Water

(C. D. Busch & F. Turner, Jr.)

A sprinkler irrigation system was installed on three acres of the Safford Experiment Station late in the Spring of 1964 to determine if cotton can be successfully sprinkler-irrigated with high salt-content water. The well, serving the sprinkler system, has an average salt content over 3,000 parts per million. At this concentration the water carries four to five tons of salt in each acre-foot.

Three comparisons were chosen for the effect they might have on crop tolerance to sprinkler-applied saline water. They were:

- a. day vs. night irrigation
- b. long staple (S-2) vs. short staple (1517D) cotton
- c. flat vs. bed planting.

In addition to the above comparisons, adjacent field areas provide opportunity for comparison with furrow irrigation.

Irrigations for both the sprinkler and surface plots were scheduled from tensiometer readings to insure that all plots received adequate, but not excessive moisture. Tensiometers were set at 12, 24, and 48 inch depths. The twelve inch depth with a tensiometer scale reading of 50 or higher was used to

indicate the need for irrigation. Neutron moisture readings were taken immediately before and after each irrigation for an indication of moisture distribution.

1964

Three irrigations, each applying about three inches of water, were required during the season. An application rate of 1/4 inch per hour was used throughout. Some salt burn, associated with spray drift, was noted when the plants were less than twelve inches tall. Water application including the 12 inch pre-irrigation totaled 22.8 and 21.0 inches for the night and day sprinkled plots respectively. An additional 6 inches of rainfall supplemented the irrigations.

Two noteworthy differences related to treatments were seen during this initial year. First, the method of irrigation and variety affected salt content in the cotton leaf. Second, the irrigation treatment markedly affected short staple cotton maturity. The following table presents the data, averaged for two replications:

Sodium Content of Washed Cottonleaf
Samples

(per cent of oven dry weight)

Variety	Irrigation		Method
	Day	Night	Surface Furrow
Short Staple (1517D)	.67	.32	.21
Long Staple (S-2)	.39	.13	.03
Maturity - % Short Staple Bolls Open by Mid-Oct.	10%	50%	80%

Irrigation and machine equipment problems delayed planting until May 26 and were responsible for spotty stands. Yield data are reported for portions of the plots where the stands were judged normal and comparable among the treatments. The following table presents the data, averaged for two replications:

Plot Yields

Lbs. of seed cotton for 50 ft. of row.

SURFACE TREATMENT	COTTON VARIETY	IRRIGATION		METHOD
		SPRINKLER DAY	NIGHT	SURFACE (FURROW)
BEDDED	Short Staple (1517D)	8.8	13.2	13.0
	Long Staple (S-2)	1.7	4.9	4.0
FLAT	Short Staple (1517D)	8.3	11.8	- -
	Long Staple (S-2)	1.2	2.5	- -