

RESULTS OF SOIL MOISTURE MEASUREMENT
TEST DEMONSTRATION

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During the latter part of the 1967 production season, a soil moisture measurement test demonstration was established by Mr. Farr on cotton at the Morrison Brothers Ranch near Higley. The demonstration was planned as a part of the Farm Roundup sponsored by the Maricopa County Agricultural Extension Service.

Morrison Brothers provided land, water, labor and the necessary production operations and materials. The "normal" irrigation treatment was that followed under the usual cotton production system.

Gene Franzoy, Agriculture Division, Salt River Valley Water User's Association, was in charge of timing of irrigation for the "wet" and "dry" treatments. Soil sampling and gravimetric analyses for moisture were provided by the Agriculture Division. Special action of the Salt River Project Board of Directors permitted Mr. Franzoy to participate although the site is outside the boundaries of the Project. Growers within the Project are able to call on the Agriculture Division for specialized assistance with irrigation problems. The objective of the test demonstration was to show that instruments and techniques are available which would be useful to growers outside the Project and to further assess the practicability of these instruments for general field use.

Soil moisture observations were made by three methods: gravimetric, tensiometers, and electrical resistance blocks. Results of the test indicate that both tensiometers and electrical resistance blocks can provide useful soil moisture information to growers. The two instruments are complementary; the tensiometer serves well in relatively moist soil; the range and response of the blocks extend to drier soil moisture conditions.

Treatments were irrigated as shown in Table 1.

	<u>Wet</u>	<u>Normal</u>	<u>Dry</u>
Preirrigate	Feb. 1	Feb. 1	Feb. 1
	May 6	May 6	May 6
	June 10	June 10	June 19
	July 1	July 1	July 8
	July 24**	July 26	Aug. 4
	July 27	Aug. 15	Aug. 19
	Aug. 11	Aug. 31	
	Aug. 26		
	Sept. 11		

Table 1. Irrigation Dates

**On the "wet" plots, the July 24 irrigation did not penetrate deeply enough and was rewatered on July 27.

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Significant rainfall included the following: June 13, 0.25 inches; July 10, 1.6 inches; and July 21, 0.8 inches.

Each plot consisted of 4 rows, one-half mile long. Treatments were replicated 3 times making a total of 9 plots. Final yield results in pounds of seed cotton per acre, are shown in Table 2.

Replication	<u>"Wet"</u>	<u>"Normal"</u>	<u>"Dry"</u>
1	3020	2777	2885
2	3083	2714	2885
3	3203	3001	2831
Mean	3102	2831	2867

Table 2. Pounds of seed cotton per acre.

Statistical analysis of the data indicate the "Wet" treatment was significantly greater than either the "Normal" or "Dry." There is no apparent difference between the latter two treatments.

Since the August 31 irrigation did not increase yield of the "Normal" over the "Dry" treatment, it is doubtful that later irrigations explain the increased yield of the "Wet" treatment. Possible explanations include the following:

1. Irrigation timing on the "Wet" plot may have resulted in a more favorable relationship between the balance of soil water and air and the plant fruiting pattern.
2. Rewatering the "Wet" plots on July 27 may have provided water needed by the plant at that time and which may have been lacking on the other treatments.
3. Response to the more frequent irrigations is probably related to the particular conditions -- short plants, good boll load, and limited root system.

Additional information is needed regarding the yield response of cotton to soil, air and water conditions and the significance of the plant fruiting pattern.

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CONTROL OF RESIDUAL SOIL MOISTURE AND NITROGEN

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Irrigation and nitrogen tests are reported to show general need for better identification of soil moisture and nitrogen. To assure adequate supply, growers sometimes make over-applications unknowingly to cause adverse plant