

UNDERGROUND IRRIGATION AND SOIL AERATION

Jack Mauney and David Kittock

A system of plastic pipe with orifices distributed every 18 inches was installed 18 inches below each row. The crop was irrigated with this system. Air was pumped into the soil between irrigations to discover the effect of soil aeration on plant performance.

No significant difference was observed between yield on the plots irrigated with the underground system compared to surface irrigation. No difference in yield was observed due to the aeration treatment. However, there was some question as to how much air penetrated into the soil from the piping system.

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COTTON YIELD BY VARIETY AND IRRIGATION PRACTICE UNIVERSITY FARM, MARANA - 1971

Jim Armstrong, Pima County Agri. Agent

| <u>Variety</u> | <u>Preirrigated</u> ^{2/} Lint lbs./Acre | <u>Irrigated-Up</u> ^{1/} Lint lbs./Acre ^{2/} |
|----------------|---|---|
| Stoneville 7A | 910 | 885 |
| DPL-16 | 830 | 885 |
| Arizona 6401 | 690 | 695 |

| | |
|--|---------------------------------|
| Planting Date - April 14 | Seeding Rate - 16 lbs/Acre |
| Fertilizer - 285# of 21-0-0 Preplant | Harvested - Nov. 9 (Center four |
| Water Applied - On preirrigated - 36.8" | rows of each eight row repli- |
| Water Applied - On irrigated-up - 12.8" | cation) |
| Rainfall - April 14 thru Nov. 9 - 15.11" | Soil Type - Silty Loam |
| | Previous Crop - Cotton |

^{1/} Irrigated-Up replanted on May 5 (see explanation below)

^{2/} Average of three replications

This test was originally designed to compare conventional preirrigation to irrigating-up at the same planting date and measure the differences in water needed.

The whole field was planted on April 14. One-half the field had been preirrigated with approximately two AF and the other half received no water prior to planting.

The one half field receiving no previous water was irrigated-up on April 15 immediately following planting, with four inches of water. An untimely rain fell that evening which left the ground with a very hard crust upon drying. The soil was too wet to employ any mechanical loosening of the soil and the stand was very inadequate. It was abandoned and replanted on May 5 without the need of additional moisture to assure a satisfactory stand.

From that point on the water applications were the same for the whole field. It is interesting to note that the cotton on the half field irrigated-up only required 12.8 inches of water as opposed to 36.8 for that preirrigated. It should also be noted that the preirrigation requirement was high as an additional application was made to "melt-down" large clods in the field to facilitate planting.

Actually the difference in yields under the two methods is not significantly different. Slightly less on the lower water use for 7A and slightly higher for DPL-16 and Arizona 6401.

The unusual high rainfall during July, August, September and October eliminated the need for any water application after July 22. This would tend to distort water use to quite some degree. However, the results show that two AF less water was needed under the low use practice. This advantage means more than \$20 per acre in the Marana area.

It does not appear realistic to use the same planting date for both practices employed in this test. A later, early May, would be more desirable when irrigating-up.

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PHOSPHORUS FERTILIZER TRIAL

M.D. Openshaw and C.G. Page

A fertility trial was designed for Cochise County (Bowie) to determine the need to add phosphorus for cotton production. Three levels of phosphorus as 0-45-0 were injected on each side of the bed after planting. There were three replications and each plot was 1200 feet long. Variety Stoneville 213.

| <u>Phosphorus</u> <u>lb. P₂O₅/Ac</u> | <u>Plot Yield</u> <u>lb</u> | <u>Yield</u> <u>lb lint/Ac</u> |
|---|--------------------------------|-----------------------------------|
| 0 | 877 | 1407 |
| 150 | 850 | 1364 |
| 300 | 858 | 1377 |

The yields indicate that additions of phosphorus (up to 300 lb. of P₂O₅ per acre) under these conditions did not increase yields. Yield responses to fertilizer phosphorus usually occur when the soil test levels are below five ppm phosphate.

CROP HISTORY: PLANTING DATE: 5/20/71. ROW SPACING: 2 rows - skip 1, 38" beds. PLANTING RATE: 20-25 lbs/Acre. PREVIOUS CROP: fallow. CROP ROTATION: Milo, cotton, fallow, cotton. FERTILIZER APPLICATION: 150 lbs urea preplant (5/2/71) 200 lbs urea sidedress (7/10/71) Phosphorus - 5/28/71. IRRIGATION: every 10 to 14 days. HERBICIDE: 1 1/2 pint Treflan broadcasted and disced - in preplant. INSECTICIDE: none. DEFOLIATION: none. HARVESTED: 1/10/72. INITIAL SOIL PHOSPHORUS LEVEL: 7.5 ppm. SOIL CLASS: Sandy loam.