

This test is further evidence that satisfactory yields can be obtained from broadcast planted cotton. In another 1967 experiment with growth regulators, several treatments showed increased yields over the check. Such chemicals could be a further aid for producing broadcast cotton economically. Further tests will be planned to try to refine some of the management practices needed for the production of broadcast planted cotton.

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PIMA IRRIGATION - SPACING - VARIETY TESTS

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Two Pima varieties, S-3 (high-altitude) and S-4 (low-altitude), were tested in irrigation tests at Phoenix and Safford. Time of irrigation was determined by soil sampling at Phoenix. The wet treatments were irrigated when approximately 50% of the moisture in the top 3 feet of soil was used. Medium was at 65% and dry was at 80%. Irrigation at Safford was on the human judgment basis. Wet treatments were not as wet as desired at either Phoenix or Safford and probably approximate normal irrigation on many farms. At both locations, irrigation treatments were split into subplots; at Safford there were 4 plant spacings, and at Phoenix, 2 plant spacings and 2 levels of nitrogen. Details of the treatments are given in the accompanying tables. All picking was by machine.

Yield of S-3 at Phoenix (Table 1) was significantly lower than S-4 from comparable treatments. Yield of S-3 was 80% of S-4 as compared to 74% in 1966. Top yield of each variety was from the wet treatment. In general, yields declined as amount of irrigation water was reduced. Treatments receiving alternate-row irrigation generally were lower in yield than every-row irrigation at the same level. However, this difference probably is due to less water being used for alternate-row irrigations rather than the effect of the irrigation method.

Some interesting, though inconsistent, results were obtained from varying dates of first irrigation. Treatment 9 received a light irrigation in alternate rows on May 8, which is generally considered too early for first irrigation, but it exceeded the yield of the wet treatment by 50 pounds of lint per acre. Delay of the first irrigation 13 days beyond normal (trt. 10) resulted in yield reduction, but delay of 31 days to June 26 gave increased yield for S-4 (trt. 11) and reduced yield for S-3 (trt. 8).

The wet treatment gave the best yield for both varieties at Safford (Table 2), with S-4 showing more response from the wet treatment than S-3. The difference between varieties over all treatments was only 10 pounds of lint per acre. The two narrowest spacings gave highest yields at Safford with S-4 favoring unthinned (3") and S-3 favoring the 9-inch spacing. Late planting (May 2) and pink bollworm damage contributed to low yields at Safford.

Table 1. Pima Cotton Irrigation Test, CRC, Phoenix, 1967

| Trt. No. | Inches water used | Irrig. level | Irrig. method | Variety | Date of first irrig. | Lint yield lb/A | | |
|----------|-------------------|--------------|---------------|---------|--------------------------|-----------------|------------------|---------|
| | | | | | | First pick 11/9 | Second pick 12/4 | Total |
| 9 | 37.2 | wet | every row | S-4 | 5/8 | 758 a | 67 abcd | 826 a |
| 12 | 36.8 | " | " | " | 5/26 | 718 ab | 58 abcdef | 776 ab |
| 11 | 29.0 | med. | " | " | 6/26 | 624 bc | 66 abcde | 690 bc |
| 2 | 33.0 | wet | alt. row | " | 5/26 | 609 cd | 65 abcde | 674 bc |
| 4 | 27.5 | med. | " | " | 5/26 | 568 cde | 48 cdef | 616 cd |
| 13 | 31.8 | " | every row | " | 5/26 | 562 cdef | 39 ef | 601 cde |
| 7 | 31.8 | " | " | " | 5/26 ^{stop} 9/2 | 535 cdefg | 36 f | 571 cde |
| 10 | 31.8 | " | " | " | 6/8 | 496 defg | 40 def | 536 de |
| 1 | 33.0 | wet | alt. row | S-3 | 5/26 | 451 fgh | 82 a | 533 de |
| 14 | 27.8 | dry | every row | S-4 | 5/26 | 455 efgh | 66 abcde | 522 de |
| 3 | 27.5 | med. | alt. row | S-3 | 5/26 | 433 gh | 69 abc | 502 de |
| 8 | 29.0 | " | every row | " | 6/26 | 392 hi | 84 a | 477 ef |
| 6 | 25.6 | dry | alt. row | S-4 | 5/26 | 317 i | 54 bcdef | 372 f |
| 5 | 25.6 | " | " | S-3 | 5/26 | 295 i | 77 ab | 372 f |

Varieties (means of comparable treatments)

| | | | |
|-----|-------|------|-------|
| S-3 | 393 b | 78 a | 471 b |
| S-4 | 529 a | 58 a | 588 a |

Irrigation C.V.

14% 26% 14%

Spacing

| | | | |
|---------------------------------|-------|----|----|
| Unthinned (3.5" between plants) | 528 a | -- | -- |
| Thinned (6.6" between plants) | 502 a | -- | -- |

Nitrogen

| | | | |
|---------------|-------|----|-----|
| 50 pounds/A. | 514 a | -- | -- |
| 150 pounds/A. | 517 a | -- | -- |
| Test mean | 515 | 61 | 576 |
| Test C.V. | 33% | -- | -- |

Lint yields within a group of means are not significantly different if followed by the same letter.

Table 2. Pima Cotton Irrigation Test, Safford, 1967 (picked 11/21/67).

| Irrigation treatment | Est. inches water used | Variety | | 2-Variety mean |
|----------------------|------------------------|---------|------------|----------------|
| | | S-3 | S-4 | |
| | | | Lint Yield | lb/A |
| Wet, alt. row | 30 | 554 a | 596 a | 575 a |
| Med., alt. row | 21 | 471 a | 442 b | 457 b |
| Dry, alt. row | 21 | 515 a | 493 b | 504 b |
| Med., every row | 25 | 521 a | 489 b | 505 b |
| <u>Spacing</u> | | | | |
| | <u>Planned</u> | | | |
| | <u>Actual</u> | | | |
| Unthinned | 3" | 535 ab | 596 a | 566 a |
| 6" | 9" | 560 a | 548 ab | 554 a |
| 12" | 14" | 518 ab | 459 bc | 488 b |
| 18" | 20" | 449 b | 418 c | 433 c |
| Mean | | 515 | 505 | 510 |
| C.V. = 11% | | | | |

Lint yields within a group of means are not significantly different if followed by the same letter.

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IRRIGATE TO SATISFY COTTON PLANT MOISTURE NEEDS

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The maximum production from a cotton plant, assuming other factors are not limiting, is obtained by timing irrigations to satisfy the plant's water requirements. In contrast to many crops where scheduling of irrigations is relatively simple because moisture demands deviate little from year to year, water management on cotton is more difficult because of the plant's sensitive response to water and because requirements vary from one year to the next. This difference in plant-moisture-needs (consumptive use) is mainly due to the yearly differences in temperature, humidity, wind and length of cotton growing season.

It is well-known that over- or underirrigation is detrimental to production. Underirrigation decreases yield by reducing plant size, number of

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