

PIMA COTTON IRRIGATION-SPACING-VARIETY TESTS

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Two Pima varieties of different adaptation, S-3 (high altitude) and S-4 (low altitude), were included in irrigation tests at Tempe and Safford. Wet, medium and dry treatments at Tempe were irrigated at 7, 14 and 21 day intervals, respectively. Some lengthening of intervals occurred early in the season and again late in the season. At Safford the irrigations were applied at roughly 10, 17 and 21 day intervals for wet, medium and dry treatments, respectively.

Irrigation treatments were split into four plant population sub-plots at each location. Plant populations were planned as unthinned, 6, 12, and 18 inch spacing in rows. Unthinned generally averages 2 to 3 inches between plants. All plots were machine picked.

Yields at Tempe were drastically reduced by boll rot. Boll rot was obviously the result of pink bollworm exit holes in most cases. The high incidence of pink bollworm infestation, in turn, was the result of an inadequate early season insecticide program which was related to an insecticide research program in the same field. We checked 4 to 6 plants per plot on the week of November 17-21 and found an average of 49 percent of the bolls (rotten bolls ;plusopen bolls) were rotted (Table 1). There were no significant differences in percent of boll rot due to irrigation treatments, varieties, or plant populations. We checked further into the pink bollworm situation and found that 94 percent of the rotten bolls had evidence of pink bollworm activity. The other 6 percent rotten bolls were bolls in direct contact with the soil. Twelve percent of the open bolls had pink bollworm damage and 3 percent of the green bolls had pink bollworms. We have calculated that 46 percent of the bolls in this test were infested by pink bollworms and a lint yield reduction of 40 percent resulted from the infestation.

Since there was no significant difference in percent of boll rot among the several treatments in this test, we can assume that the relationships among treatments in actual yield obtained are valid. Pima S-3 yielded 67 percent of Pima S-4 (Table 1). In previous years this ratio was 99, 80 and 74 percent in the Phoenix area. The wet irrigation treatment had significantly lower yield for first pick and total yield than did the other four treatments. The medium irrigation treatment with the last irrigation withheld had significantly higher yield than the other irrigation treatments at first pick. The advantage approached significance for total yield. The advantage for this treatment seemed to be caused by earlier flowering of the top crop.

The average results from plant spacing are about what we would expect, with 12 inch and 18 inch spacing producing lower yield than unthinned and 6 inch spacing. There was a significant difference between varieties in plant population response. Highest yield for S-4 was from unthinned plots, while for S-3 it was the 6 inch spacing. The wider spacings, 12 and 18 inch, caused less yield reduction for S-3 as compared to S-4.

At Safford no significant differences were found for irrigation treatments (Table 2). The 4-year average also shows little difference between treatments. The variety S-4 outyielded S-3 in 1969. They were approximately equal the previous three years. Results for plant spacing were essentially the same as for previous years with unthinned giving highest yield.

Table 1. Pima Cotton Irrigation-Variety-Plant Population Test, ASU Farm, Tempe, 1969.

Treatment			Estimated inches of H ₂ O applied ^{1/2}	Lint yield in lbs./A.			% rotten bolls 11/17-21	Lint yield in lbs./A.		
Irrig. level	Special treatments	Number of irrig.		1st pick 11/24	2nd pick 12/15	Total		Calculated loss from pink bollworm ^{3/}	Total yield including pink bollworm loss	
Wet		13	57	281 c ^{2/}	91 a	371 c	49.1 a	235	606	
Medium		7	40	354 b	90 a	445 ab	49.7 a	296	741	
Dry		5	29	341 b	104 a	445 ab	50.0 a	285	730	
Medium	Last irrig. 8/12	6	33	386 a	90 a	476 a	47.8 a	322	798	
Medium	Alt. row	7	40	350 b	92 a	443 b	48.5 a	292	735	
			rainfall 4.5							
<u>Varieties</u>										
				S-3	261 b	88 b	349 b	48.1 a	218	567
				S-4	424 a	99 a	522 a	50.0 a	354	876
<u>Plant spacing</u>										
				Unthinned	372 a	95 a	467 a	47.3	311	778
				6"	371 a	96 a	468 a	50.0	310	778
				12"	328 b	92 a	420 b	50.7	274	694
				18"	298 c	90 a	389 c	48.0	249	638
Mean				342	94	436	49.0	286	722	
Test C.V.				15%	21%	5%	17%			

1/ Estimated water used does not include a preplant irrigation of about 12 surface inches.

2/ Lint yields within a group of means are not significantly different at the .05 level if followed by the same letter.

3/ Most of the boll rot (94%) was the result of pink bollworm exit holes. This plus a short time lag gave a calculated 45.5% loss of lint for the first pick.

Table 2. Lint Yield per Acre in Pima Cotton Irrigation-Variety-Plant Population Test, Safford, 1969.

Irrigation treatment	No. irrigations	Est. inches water applied	Lint yield in lbs./A.	
			1969 12-1-69	4 year mean
Wet	10	30	712 a ^{1/}	640
Medium	8	24	773 a	620
Dry	5	15	739 a	597
rainfall 6.5				
<u>Variety</u>				
S-3			679 b	616
S-4			804 a	621
<u>Plant Spacing</u>				
			808 a	691
			776 ab	663
			747 ab	601
			635 b	517
Mean			741	618
C.V.			12%	

^{1/} Lint yields within a group of means are not significantly different at the .05 level if followed by the same letter.