

**EFFECT OF PLANTING DATE AND DENSITY
ON SAN JOAQUIN VALLEY COTTON**
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Introduction

The objectives of these tests were to determine best time of planting and the optimum plant densities. Prior to 1996 the first legal planting date had been March 20. In some years because of cold weather, hail damage, or too dry or too wet soil conditions, growers are unable to plant early and plant as late as May. The main factors influencing yield potential when considering replanting are: average plant density, amount of skips, amount of chilling injury, seedling disease, weed pressure, and loss of yield potential due to late replanting. Replant decisions are difficult because one must consider the loss in time and the additional replanting cost of approximately \$50 per acre. The unpredictability of weather conditions compounds this decision. Information was required to determine what plant density was needed to give optimum yields for different planting dates and also to determine when it was too late to make it profitable to plant cotton.

Methods and Materials

In 1996 and 1997 Acala Maxxa was planted at six different dates from March 20 through May 30. Cotton was planted at 80,000 plants per acre and then thinned to different densities. Within each planting date densities of 20,000, 40,000, 60,000, and 80,000 plants per acre were maintained. Plant map data was collected. Lint yield and quality data was collected. In general later planted cotton resulted in almost no bolls.

Studies were conducted in a complete factorial design with four different densities. Plot size was four, 40-inch rows by 75 feet at the West Side Research and Extension Center and Shafter Field Station. The two center rows were machine harvested. A 30-inch study was also conducted in Merced County. Plot size was four rows by 50 feet, replicated four times. Two 10-foot sections from the center rows were hand harvested. In addition a density study was conducted in Tulare County in 1996 on 30-inch Acala Maxxa and in Kern County in 1997 on Pima S-7 on 30-inch rows. In season and final plant monitoring data including height, number of nodes, vegetative nodes, percent bolls at position 1, 2, and 3 and greater, 95 percent fruiting zone, percent retention of first five fruiting branches and number of nodes per plant were evaluated. Yield data and small 6-pound samples were

collected. Samples were ginned at Shafter to determine gin turnout and lint percent. Fiber samples were sent to the Textile Research Center in Texas for HVI quality analysis.

Standard grower practices were implemented to manage the field with the exception of not applying Pix growth regulator. Temik was applied as a sidedress to control lygus, mites, and aphids. Glyphosate was applied as a harvest aid in 1997 at the West Side Research & Extension Center to control regrowth at 8 NACB and Def + Prep as a defoliant on individual treatments as they matured.

Results and Discussion

There was a clear advantage of not planting much after April 15 on both the 30 and 40-inch sites and not increasing plant population above 40,000 plants per acre on the 40-inch sites. Higher plant population, > 40,000, on the 40-inch sites increased management, increased plant height, lowered retention and lowered lint yield. A 20,000 plants per acre uniformly planted stand is a keeper on 30-inch or 40-inch cotton versus replanting.

The 30-inch results were somewhat viable with the 40,000-60,000 plants per acre resulting in the highest yield. At the 30-inch sites in Merced County the 1996 planting date and density test indicated that higher plant populations (60,000 and 80,000) were justified when the planting date was early (March 20) or late (May 15). April 1, April 15, and May 1 plantings yielded best at populations of 40,000 to 60,000 plants per acre.

At the Pima 30-inch site there were fewer fruiting branches at the higher densities. There were no differences in the number of vegetative nodes or plant height or height node ratio. The 20,000 plants per acre treatment had by far the lowest retention of first position bolls. There were no differences in distribution of bolls in positions two or three. The two lower plant densities had far greater retention of the bottom five fruiting branches. The 20,000 plants per acre treatment had 95 percent of crop over a greater number of fruiting branches than did all other densities. The two lower plant density treatments had greater retention of bolls in their 95 percent zones. There were no differences in yield; however, the 40,000 and the 60,000 densities yielded more than the other densities.

Table 1. 40-Inch Planting Date by Plant Density, WSREC, 1996-97.

Plants/A	20,000		40,000	
<u>Planting Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	1003	1557	929	1553
April 1	1067	1628	998	1566
April 15	948	1526	895	1419
May 1	726	1233	670	1147
May 15	353	707	309	689
May 30	349	----	265	----

Plants/A	60,000	80,000		
<u>Planting Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	950	1503	978	1391
April 1	930	1386	850	1371
April 15	870	1134	780	1195
May 1	670	926	656	847
May 15	257	617	293	428
May 30	252	----	213	----

Table 2. 40-Inch Planting Date by Plant Density, Shafter, 1996-97.

Plants/A	20,000		40,000	
<u>Planting Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	----	1858	----	1571
April 1	1191.3	1588	1158.2	1775
April 15	1116.7	1561	1158.7	1726
May 1	868.3	1114	928.7	1152
May 15	762.8	984	801	1004
May 30	449.8	----	475.3	----

Plants/A	60,000	80,000		
<u>Planting Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	----	1863	----	1669
April 1	1168.2	1564	1161.8	1538
April 15	1114	1757	1123.1	1609
May 1	925.4	963	872.6	1202
May 15	812.8	1009	808.3	909
May 30	563	----	487.2	----

Table 3. Planting Date by Plant Density, WSREC & Shafter, 1997.

Plants/A	20,000	40,000	60,000	80,000
<u>Planting Date</u>				
April 1	1125	1066	1036	979
April 15	1013	1014	978	940
May 1	762	767	765	733
May 15	550	554	542	538
May 30	368	333	367	330

Table 4. 30-Inch Planting Date by Plant Density, Merced Co., 1996-97.

Plants/A	20,000		40,000	
<u>Planting Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	1226	1619.3	1322	1601.7
April 4	1338	1336.6	1490	1371.7
April 15	1386	1329.8	1420	1554.8
May 1	1413	1040.9	1402	1062.1
May 15	896	----	874	----

Plant/A	60,000	80,000		
<u>Plant Date</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>	<u>1997</u>
March 20	1338	1550.4	1192	1859.2
April 4	1408	1510.5	1432	1464.6
April 15	1337	1413.5	1392	1418.3
May 1	1400	1157.2	1139	953.9
May 15	940	----	949	----

Table 5. 30-Inch Plant Density, Tulare County, 1996, Planted 4/20.

Plants/A	20,000	30,000	40,000	50,000	60,000
Yield (lbs/Lint A)	1764	1808	1597	1592	1485

Table 6. 30-Inch Pima Plant Density Trail, Kern Co., 1997, Planted 4/10.

Plants/A	20,000	40,000	60,000	80,000
Yield (lbs/Lint A)	710	809	781	741