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WHEN TO REPLANT

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The 1988 planting season was adverse and resulted in a high percentage of fields being replanted. Most growers were hard pressed to make a decision on solid data, and were forced to make it based upon their experience and best guess. We have been collecting long term production information on how yield is affected. This is being built into CALEX cotton, a computer expert system for SJV cotton production. Four factors influence yield potential when considering replanting: (1) average plant density; (2) amount and type of skips; (3) amount of chilling injury; and (4) loss of yield potential due to late replanting.

Plant Density. Optimum plant density is between 30 and 40,000 plants per acre from our studies with Acala cotton. Assuming uniform spacing, reduced average plant density would have the following effect on percent of yield at 40,000 plants/A. As long as the stand is uniform, acceptable yields can be obtained from very low plant densities, demonstrating the cotton plant's ability to compensate for space.

Plants/acre (1000's)	Percent Yield	Plants/acre (1000's)	Percent Yield
40	100	20	97
35	100	16	96
30	99	13	94
25	98	10	92

Skips in Plant Stands. When low plant density occurs, there is seldom uniform spacing within the row. Research has indicated Acala cottons are able to tolerate skips up to three feet without a noticeable yield loss. Normal row spacing work in

the 1950's indicated 2 x 1 skip row cotton yielded an average of 87 percent of solid plantings. Thus, as skip where adjacent rows both had plants would only result in a 13 percent loss of yield potential for that portion of the field with such types of skips.

A minimum of 50 feet of row should be evaluated from at least four locations in the field where you are considering replanting. Determine the percentage of total row length in the sample area with the three types of skips described in the accompanying table. Add up the yield losses from all three types of skips if present.

Types of Skips	Factor to multiply by the % of row with skips ¹
Plants on both sides	0.13
Plants on one side	0.63
Skips on both sides	1.00

Chilling Injury Losses. Chilling injury estimated losses have been reviewed again in this issue of the CA Cotton Review as well as in previous issues. If less than 24 heat units were available the day of planting and the next four days, there will be an effect on yield. Note that heat units above 20 have greater than 100 percent yield potential. Determine the yield impact of heat units after planting on vigor of seedlings from the following table.

Heat Units 5-days after planting	Percent Yield	Heat Units 5-days after planting	Percent Yield
24	104	12	94
20	100	8	90
16	97	4	86

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Delayed Planting – Replanting. As the planting season is delayed, the yield potential declines. Therefore, as the season progresses a grower is obliged to accept a poorer or less vigorous stand because the loss of potential due to replanting may be greater. The following table summarizes the loss of yield due to late planting.

Replant Date	Percent Yield	Replant Date	Percent Yield
April 10	98	May 10	83
April 15	96	May 15	79
April 20	94	May 20	75
April 25	92	May 25	70
April 30	89	May 30	65
May 5	86		

An Example. A field has an average density of 20 thousand plants. Skips greater than 3 feet break down into the following three groups:

- q 4 percent where both adjacent rows have plants
- q 2 percent with only one adjacent row that has plants; and
- q 1 percent where both adjacent rows have skips

Heat units the first 5 days after planting were 12. Add up the losses in yield potential as follows:

- q plant density results in an estimated 3 percent yield loss
- q skips (as percent of sample area with skips)
 - 4 (0.13) = 0.52
 - 2 (0.63) = 1.26
 - 1 (1.0) = 1.00
 - total estimated yield losses from skips = 1.00 + 1.26 + 0.52 = 2.78
- q Chilling injury estimate based on heat units 5 days after planting represents a 6 % loss

Summary from example case. Total estimated yield losses are 3.0 percent (from reduced plant density), plus 2.8 percent (from skips) plus 6 percent (chilling injury losses), for a total of 12 percent when rounded off. That would be 88

percent of normal expected yields. This is the yield potential we could expect for a May 2nd planting date (shown in table on page 1).

There are some costs associated with replanting, and no guarantee that replanted stands will be ideal. For this reason, we suggest growers not replant unless there is an expected 4 percent benefit to do so.

In this example that would be 88 percent (estimated yield calculated based on plant density, skips and chilling exposure for this example) plus 4 percent for a total of 92 percent yield. That yield is expected with an April 25th planting. Unless replanting could be accomplished before this date, it would be best to keep the existing stand.