SAFFLOWER PRODUCTION UNDER MINIMUM AND MAXIMUM SOIL PRE
in Imperial Valley

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Yields of safflower (following cotton) produced under minimum tillage (at substantially reduced costs) remained as high as when the crop was produced under maximum tillage practices, according to the three-year study reported here.

Safflower may be planted in Imperial Valley from December 15 to January 15, which makes it a crop suitable to follow cotton. However, lower production costs are necessary if safflower is to be competitive with wheat and barley.

Eight varieties of safflower were compared in this three-year study, under maximum tillage following sorghum, and under minimum tillage following cotton, in 1968, 1969, and 1971 at the Imperial Valley Field Station.

In all years, minimum and maximum tillage plots were in adjacent areas. Maximum tillage operations after sorghum involved two discings, bordering up for one irrigation, pre-irrigation, knocking down borders, two discings, leveling, broadcast application of ammonium nitrate, listing beds, shaping beds, planting (30 lbs seed per acre) in two rows per 40-inch bed, and irrigating up. These operations took 40 to 50 days.

Minimum tillage operations after shredding the cotton included plowing and two discings or two discings, levelling, broadcast application of ammonium nitrate, planting (50 lbs per acre) seed flat with grain drill (6- or 7-inch center), listing on 40 inch centers (shallow furrows), and irrigating up. This took 10 to 20 days.

Safflower was planted on January 18, 1968; January 24, 1969; and January 13, 1971. Germination and early seedling growth were slower under minimum tillage. The delay presumably reflected a greater seeding depth caused by seed dropping between the larger clods—and deeper covering of the seed on top of the bed by the furrowing operation. After five or six weeks, however, plants under minimum and maximum tillage differed little in appearance. Maximum and minimum tillage treatments were irrigated in the same manner.

Under maximum tillage, where two rows were grown on beds running east and west, the row on the north side of the bed grew much more slowly (presumably an effect of temperature). The average height of four varieties 36 days after planting was 3 cm on the south row and 24 cm on the north row. This difference disappeared by May 6, and was not evident at flowering time. If possible, the beds should run north and south to eliminate the cooler temperatures associated with the north row. This difference was not noticed on the minimum-tillage beds.

All the varieties flowered earlier under maximum tillage. The average number of days from planting to flowering was 118

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\begin{array}{|c|c|c|c|c|c|c|c|c|c|c|}
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\text{Variety} & \text{Lodging} & \text{Height} & \text{Weight} & \text{Yield} \\
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& \text{Min.} & \text{Max.} & \text{Min.} & \text{Max.} & \text{Min.} & \text{Max.} & \text{Min.} & \text{Max.} & \text{Ave.} \\
\hline
\text{Gila} & 114 & 111 & 35 & 25 & 38 & 42 & 42.0 & 43.1 & 3612 & 3657 & 3640 \\
\text{Rio} & 119 & 115 & 12 & 0 & 41 & 45 & 39.2 & 40.2 & 3606 & 3386 & 3496 \\
\text{Frio} & 119 & 103 & 25 & 0 & 42 & 44 & 39.9 & 40.6 & 3508 & 3302 & 3405 \\
\text{UC-1} & 112 & 109 & 50 & 48 & 39 & 43 & 42.4 & 41.6 & 3398 & 3379 & 3369 \\
\text{Dart†} & 120 & 116 & 0 & 0 & 42 & 45 & 39.2 & 39.7 & 3394 & 3188 & 3241 \\
\text{Lead*} & 124 & 123 & 50 & 40 & 40 & 44 & 40.8 & 42.5 & 3503 & 3549 & 3566 \\
\text{US-10*} & 112 & 111 & 0 & 70† & 46 & 48 & 40.2 & 40.7 & 3394 & 3166 & 3280 \\
\text{Ute*} & 120 & 112 & 70† & 37 & 43 & 41.8 & 42.5 & 3395 & 3457 & 3371 \\
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\text{Average} & & & & & 34.84 & 33.84 & 34.34 & \\
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* Average of two years.
† Lodging in minimum tillage treatment.
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for minimum tillage and 114 days for maximum tillage.

There was very little difference between years in number of days to flowering, except that in 1968 all varieties were six to nine days earlier under maximum tillage. The varieties differed, with UC-1 the earliest, and Leed the latest.

Some varieties (especially Gila and UC-1) lodged severely under maximum tillage in 1968, and under minimum tillage in 1971. Lodging occurred after flowering and seemed to have little effect on yield, however. The heavy seeding rates of 50 lbs per acre contributed to the lodging of the minimum-tillage plantings. It is recommended that 30 lbs per acre be used, the same as with two rows on a bed. Height of the plants, bushel weight, and oil content of the seed were not affected by the tillage treatment.

Weeds were not a problem following a summer crop of cotton, but they could be a problem following a fall or early-winter crop such as lettuce. If such a problem is likely, a preplant herbicide treatment should be used, because cultivation is not possible under a minimum-tillage operation. Growers should obtain weed-control recommendations from their county extension office.

Average annual production of all varieties for the three years was 3,484 lbs per acre under minimum tillage and 3,384 lbs per acre under maximum tillage. Production varied between varieties, with Gila averaging 3,640 lbs per acre, followed closely by Rio and Frio.

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