

# 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.

**S**AFFLOWER 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 in-

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, leveling, 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 33 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

AVERAGE 3-YEAR PRODUCTION DATA FOR SAFFLOWER VARIETIES GROWING UNDER MINIMUM AND MAXIMUM TILLAGE AT THE IMPERIAL VALLEY FIELD STATION IN 1968, 1969, AND 1971.

Variety	Days from planting to flowering		Lodging		Height		Weight		Yield		Ave.
	Min.	Max.	1971	1968	Min.	Max.	Min.	Max.	Min.	Max.	
	No.		%		inches		lbs/bu.		lbs./acre		
Gila	114	111	35	25	38	42	42.0	43.1	3612	3667	3640
Rio	119	115	12	0	41	45	39.2	40.2	3606	3386	3496
Frio	119	103	25	0	42	44	39.9	40.6	3508	3302	3405
UC-1	112	109	50	48	39	43	42.4	41.6	3398	3379	3369
Dart	120	116	0	0	42	45	39.2	39.7	3294	3188	3241
Leed*	124	123	50	—	40	45	40.8	41.4	3623	3648	3636
US-10*	113	111	0	75†	46	48	40.5	40.7	3394	3166	3280
Ute*	120	112	—	78†	37	43	41.8	42.5	3295	3457	3371
Average									3484	3384	3434

\* 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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Safflower growing at Imperial Valley Field Station under minimum tillage conditions (photo above) produced as well as plants under maximum tillage (photo below.)

