SAFFLOWER EXPANDING RAPIDLY AS OILSEED CROP

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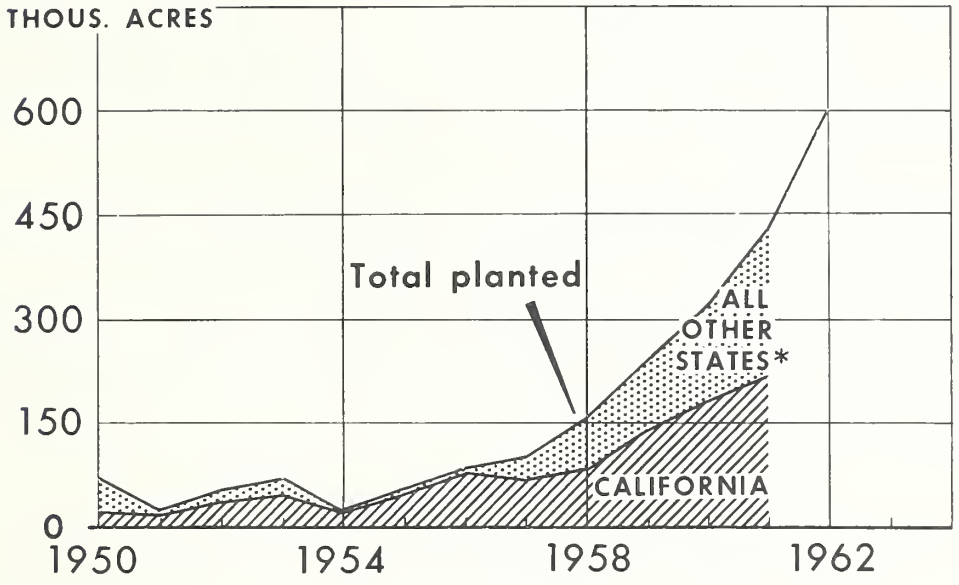
SAFFLOWER SEED ACREAGE IN THE U. S.



*CHIEFLY MONTANA, NEBRASKA, AND NORTH DAKOTA. 1962 PRELIMINARY ESTIMATE.

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Acreage planted to safflower seed in the United States has increased sharply since 1957, with a large part of the expansion occurring in the Great Plains area. According to trade estimates, 420,000 acres were planted to this oilseed crop in 1961, and preliminary estimates place the 1962 acreage at around 600,000.

In recent years, safflower has come into the limelight as an edible vegetable oil mainly because it contains a higher percentage of polyunsaturated fatty acids than other fats and oils. The food oil market appears to offer the greatest potential for the future development of safflower in this country. (See page 33.)

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SAFFLOWER EXPANDING RAPIDLY AS OILSEED CROP

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Safflower, a relatively new cash oilseed crop in the United States, is becoming increasingly important in our fats and oils economy. Its phenomenal growth is due to the unique characteristics of the oil extracted from its seed. This oil is a rich source of polyunsaturated fatty acid for human diets. In addition, safflower oil is low in linolenic acid, giving it more superior performance than some other drying oils and alkyds used in white and some pastel shades of paints.

The crop has been known for centuries in India, the Middle East, and North Africa, where it is the source of a dye and an edible oil. Safflower was introduced experimentally as an oil crop in the United States in 1925. American farmers began growing safflower near the end of World War II. The crop is adapted to Western wheat and barley areas that have a dry atmosphere in the latter part of the growing season. Safflower is now a well-established and profitable crop in many areas of the West, particularly the Sacramento Valley of California. 1/

Research Important in Safflower's Growth

In about 15 years that safflower has been grown commercially in this country, research has made possible improvements in varieties. These improvements are higher yields, increased oil content, and more disease resistance. Farmers also are using improved methods of growing safflower.

Present commercial varieties produce seed that is 32 to 40 percent oil and varieties with greater oil content are being developed. In slightly over a decade (1942-1958), oil yields from seed crushed have jumped from 27 percent to 37 percent, and yields over 40 percent are now anticipated.

Since World War II, average yields of seed per acre have increased from about 200 to 700 pounds under dryland culture and from 1,000 to 1,700 pounds under irrigation. Because of improved varieties, future yields may be around 1,200 pounds per acre on dryland and as high as 4,000 pounds per acre on irrigated cropland.

Acreage planted to safflower trended slowly upward from about 10,000 in 1948 to about 100,000 in 1957. Most of the increase occurred in California. Since then, however, acreage has shot up rapidly, spurred by increased export demand for safflower seed, rising industrial demand domestically for the oil and, more recently, to increased usage of it as an edible oil. A large part of

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1/ The Pacific Vegetable Oil Corporation, San Francisco, Calif., pioneered in the development of safflower as a cash oilseed crop in the West. Most of the statistics used in this article were provided by "PVO", for which the author expresses appreciation. Only fragmentary data on safflower seed and oil are currently available from regular reports of the Census Bureau and USDA.

this acreage expansion occurred in the Great Plains area. According to trade estimates, 420,000 acres were planted to safflower in 1961. This yielded 180,000 tons of seed (table 21). Outside of California's Sacramento Valley, the chief acreage is in Montana, Nebraska, and North Dakota.

Safflower Usually Grown Under Contract

Safflower generally is grown and sold under floor-ceiling contracts with crushers, who usually pay the market price at harvest or guarantee the growers a fixed price per ton. For the 1961 crop, safflower seed brought growers an average price of $86 per ton (pure basis) in California compared with $78 per ton for the 1960 crop and $75 in 1959. At the present time, crushing mills are located on the West Coast, at Sidney, Nebr., and Culbertson, Mont. In addition, some cottonseed crushers in the Southwest and Far West are planning to process safflower, in anticipation of larger supplies of this oilseed crop.

Safflower oil can be extracted by using conventional oilseed processing equipment (expeller or prepress solvent extraction techniques). The seed is cleaned, cracked, cooked, and conditioned before extraction of the oil. It is refined by conventional techniques similar to those used on other vegetable oils. The oil-free seed cake is ground into meal and is used as a protein supplement for cattle, sheep, and poultry. Meal from whole seed is 18 to 24 percent protein; meal from dehulled seed is 28 to 50 percent protein.

Increased Crushings Reduce Seed Exports

The volume of safflower seed crushed increased rather slowly from less than 10,000 tons in the early 1950's to about 50,000 tons in 1959 and 1960. Output of seed was considerably greater than this, and large quantities moved into export. Japan is a primary market for U. S. safflower seed. Exports to that country were over 100,000 tons in 1960 (two-thirds of the U. S. crop) and over 70,000 tons in 1961 (40 percent of the U. S. crop). In 1961, crushings rose to 107,000 tons, about double the previous year, reflecting steady industrial demand and increased demand for the food oil. Future increases in domestic oil demand indicate that smaller quantities of seed will be available for export.

Safflower oil production rose from around 5 million pounds in the early 1950's to 37 million in 1960. Virtually all of this oil was used industrially as a dryer in paints and varnishes. In 1961, oil output jumped to 75 million pounds, spurred by increased demand by food processors and consumers. Of particular significance, 45 million pounds were produced for edible market outlets compared with only 2 million the year before (table 22).

Safflower oil is light-colored and easily clarified. It is used in paints and varnishes, because it is nonyellowing. In this use, it competes mainly with linseed oil, dehydrated castor oil, tung oil, and processed soybean oil. In recent years, safflower has come into the limelight as an edible vegetable oil mainly because it contains a higher percentage of polyunsaturated fatty

Table 21.--Safflower Seed: Estimated acreage, production, and price to growers, 1946-61

Year beginning August 1	Acreage planted			Yield per acre planted			Production			Average price to growers 2/
	California	Other States 1/	United States	California	Other States 1/	United States	California	Other States 1/	United States	
	1,000 acres	1,000 acres	1,000 acres	Lb.	Lb.	Lb.	1,000 tons	1,000 tons	1,000 tons	Dol. per ton
1946	---	2	2	---	500	500	---	.5	.5	---
1947	---	6	6	---	500	500	---	1.5	1.5	---
1948	---	10	10	---	500	500	---	2.5	2.5	---
1949	3/	40	40	---	400	400	---	8.0	8.0	---
1950	4/23	50	73	4/610	400	465	4/7.0	10.0	17.0	---
1951	17	10	27	885	500	740	7.5	2.5	10.0	---
1952	42	15	57	1,120	335	915	23.5	2.5	26.0	---
1953	45	5/20	65	1,155	5/200	865	26.0	5/2.0	28.0	---
1954	25	---	25	1,170	---	1,170	14.6	---	14.6	---
1955	53	5	58	1,365	1,000	1,335	36.2	2.5	38.7	74
1956	84	5	89	1,690	640	1,630	71.0	1.6	72.5	74
1957	74	24	98	1,540	560	1,300	57.0	6.7	63.7	76
1958	84	69	153	1,405	380	945	59.0	13.0	72.0	75
1959	140	100	240	1,515	360	1,035	106.0	18.0	124.0	75
1960	180	140	320	1,420	500	1,015	127.5	35.0	162.5	78
1961	210	210	420	1,380	335	860	145.0	35.0	180.0	86
1962 6/			600							

1/ Includes Montana, North Dakota, Nebraska, Colorado, Idaho, Utah, Washington, Texas, Arizona, and Kansas. Detail data not available. 2/ Contract price for California only. Price data from other areas not available. 3/ 500 acres or less. 4/ A large part of the California crop was lost due to improper irrigational practices and a severe freeze. 5/ A large part of the crop was not harvested in southeastern Colorado and southwestern Kansas due to extreme drought. 6/ Preliminary estimate.
Source of data: The Pacific Vegetable Oil Corporation.

Table 22.--Safflower Seed: Estimated supply, disposition, oil production and price, 1946-61

Year beginning August 1	Seed			Oil				
	U. S. production	Disposition		Oil production			Oil prices (New York)	
		Crushings	Exports 1/	Total	Edible use	Inedible use	Tanks	Drums
	1,000 tons	1,000 tons	1,000 tons	Mil. lbs.	Mil. lbs.	Mil. lbs.	Cents per lb.	Cents per lb.
1946	.5	.5	---	.3	---	.3		
1947	1.5	---	1.5	---	---	---		
1948	2.5	---	2.5	---	---	---		
1949	8.0	3.5	4.5	2.2	---	2.2		
1950	17.0	8.0	9.0	5.1	---	5.1	15.4	18.4
1951	10.0	7.5	2.5	4.8	---	4.8	---	19.3
1952	26.0	22.5	3.5	14.4	---	14.4	15.8	16.9
1953	28.0	19.5	8.5	12.4	---	12.4	15.2	16.7
1954	14.6	---	---	---	---	---	16.8	18.3
1955	38.7	20.7	18.0	13.2	.2	13.0	17.1	18.6
1956	72.5	42.3	30.2	27.1	.6	26.5	16.1	17.8
1957	63.7	36.6	27.1	23.4	.7	22.7	15.9	17.9
1958	72.0	34.0	34.0	22.0	.8	21.2	16.0	18.0
1959	124.0	50.0	74.0	32.0	1.5	30.5	15.9	17.9
1960	162.5	53.0	109	37	2.0	35.0	15.5	17.5
1961	180.0	107.0	73	75	45.0	30.0	17.2	19.1
1962								

1/ Mainly to Japan.
Source of data: The Pacific Vegetable Oil Corporation.

Table 23.--Fatty Acid Composition of Edible Fats and Oils 1/

Fat or Oil Source	The Poly-Unsaturates			Mono-Unsaturated	Saturates
	Linoleic	Linolenic	Arachidonic	Oleic	
	Percent	Percent	Percent	Percent	Percent
Safflower	74-79	---	---	11-15	9-12
Corn	50-56	0.1-0.7	---	25-37	9-15
Cottonseed	44-55	0-0.6	---	17-37	17-31
Soybean	39-53	4-9	---	16-47	5-24
Peanut	21-37	0-0.5	---	30-58	16-26
Olive	8-15	0.5-0.7	---	62-83	9-22
Lard	7-13	0.2-1.4	0.2-0.4	47-83	29-37
Coco Butter	3-3.5	0.1-0.2	---	34-38	57-61
Milk (all dairy product)	1-2.5	0.2-0.5	0.2-0.4	30-32	63-68
Coconut	1-4	0-0.1	---	6-9	86-91
Beef	0.5-3	0.2-0.6	0.05-0.2	35-45	45-58

1/ Source of data: Pacific Vegetable Oil Corporation.

acids than other fats and oils. The food oil market appears to offer the greatest potential for the future development of safflower in the United States. Edible-grade refined safflower oil can be used as a cooking and salad oil, in frozen desserts, and in the manufacture of mayonnaise, salad dressings, margarine, and shortening. In these uses, it competes mainly with soybean, cottonseed, corn and peanut oils.

Safflower Oil Prices Advance

Monthly average prices for safflower oil (tanks, New York) have increased rather steadily from 15.2 cents per pound in October 1960 to 19.7 cents last July. This is the highest price level since records began in April 1950. Prior to the present uptrend, safflower oil prices were relatively stable. Before the uptrend, the oil was used primarily in industrial products. Current strong prices reflect increased demand for it in edible uses, along with the steady industrial demand from paint and varnish producers. This has resulted in a tight supply situation, which will not be alleviated until 1962 crop oil becomes available in volume--probably in September.

The U. S. drying oils industry is a declining market outlet for domestically produced fats and oils. Increasing use of synthetic resins in water thinned emulsion paints is causing a steady decline in the consumption of all drying oils.

Despite safflower oil's unique property (negligible linolenic acid content), it must compete with synthetics and share in the not-so-promising outlook for such drying oils.

As mentioned earlier, safflower oil's greatest potential is as an edible vegetable oil. Safflower oil offers the highest ratio of unsaturation (ratio of polyunsaturates to saturates, sometimes referred to as the P/S ratio) among the various edible fats and oils (see table 23). For example, it is about 9 to 1 in this respect, compared to 5.3 to 1 for corn oil, 3.5 to 1 for soybean oil, and 2 to 1 for cottonseed oil. The debate over the relative health values of polyunsaturated oils and saturated oils is still far from settled. Nevertheless, food processors are offering consumers more and more products (mainly margarines and salad and cooking oils) with high ratios of polyunsaturation. And the industry has conducted vigorous merchandising and promotional campaigns for these products. This could result in safflower oil being a "price leader," rather than a "price follower" of other food oils, as an important source of polyunsaturates.

Safflower oil is distinct in that it is grown as a direct source of oil. Competing corn oil, cottonseed oil, and peanut oil are byproducts of the corn--products industry, the cotton fiber industry, and the edible peanut industry, respectively. The byproduct nature of these oils results in an inelastic supply situation--output would not be readily altered in response to changes in demand. On the other hand, the production of safflower oil is more vulnerable to price declines than other food oils because it is a primary product. This means that safflower oil price declines are more likely to be passed back to the growers.

In the case of the soybean producer, changes in prices of soybean oil affect him less than changes in safflower oil prices affect the safflower grower, because soybean oil contributes a relatively smaller share to the total value of soybean products. The oil content of safflower is almost double that of soybeans. Based on current prices, soybean oil accounts for about one-third of the product value of soybeans, whereas safflower oil represents roughly about four-fifths of the product value of safflower. Soybean producers are more concerned about meal and whole bean market activities than they are about soybean oil price movements.

Safflower meal, a byproduct of the crushing operation, is a source of protein for dairy and beef cattle. Prices of safflower meal, 20 percent protein content, solvent extracted (bulk, San Francisco, f.o.b. Richmond plant) so far this year have been stable, averaging $30 per ton. Decortication of the seed prior to or after oil removal is now possible, and this yields a 40 percent protein meal suitable for laying-hen rations. Used thus, it must compete with other oilseed meals, meatscrap products, and fish meals. Feed mixers often are reluctant to use new ingredients without assured supplies and stable prices.

Outlook for Safflower

According to trade sources, there will be a considerable expansion in safflower acreage, production, and edible oil usage in 1962-63. The 1962 planted acreage is preliminarily estimated at about 600,000, roughly a 50 percent increase over the 420,000 acres planted in 1961. Use of safflower as a food oil in 1962-63 is expected to be 50-75 million pounds compared with 45 million last year. Only part of this is attributed to increased production; a major portion is expected from sharply reduced seed exports. This prospective supply situation coupled with the rapidly increasing demand for the edible oil points to a relatively high price level for it in the 1962-63 marketing year. Safflower oil's premium over corn, cottonseed, and soybean oil prices likely will continue wide.

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The 40th Annual National Agricultural Outlook Conference is to be held November 13-16, 1962 in the USDA at Washington, D.C. The Fats, Oils, and Peanut session is scheduled for the afternoon of Thursday, November 15.