

THE FROZEN STRAWBERRY INDUSTRY IN MEXICO

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Within the last 20 years a new business has been rapidly growing in Mexico—the freezing of strawberries and their exportation to the United States. The venture has been so successful that growers have increased their production from 3.5 million pounds in 1949 to 110 million pounds in 1966. Acreages also have been greatly expanded, and in 1966 they were approximately 10 times greater than in 1948 (table I).

The business had its beginning in 1948, when a plant to freeze berries began operation in Irapuato in the State of Guanajuato. Since that time other plants have begun operation, and in 1966 there were 17 freezing plants processing berries. Most have been exported to the United States, and small quantities have been shipped to Canada.

TABLE I
ACREAGE AND PRODUCTION OF STRAWBERRIES
IN MEXICO

Year	Acreage	Production (short tons)
1961	4,400	22,100
1962	4,900	25,400
1963	5,100	28,100
1964	5,300	30,500
1965	7,000	42,000
1966	11,000	55,000

Source: Foreign Agricultural Service, United States Department of Agriculture.

PRODUCTION AREAS

More than half of the states in Mexico grow strawberries; yet practically all commercial production for freezing is in the States of Guanajuato and Michoacan. The vicinity of Irapuato, in the State of Guanajuato, is the greatest source for berries. The district centered around Irapuato is known as the Bajío. In some years it accounted for 75% of all the strawberries grown and 97% of those exported. It lies on a plateau ranging in altitude from 5,700 to 8,000 feet above sea level. Strawberries are grown in small valleys on the lower elevations of the plateau. A wide variety of soils are used ranging from sandy loam to heavy black clay. Temperatures range from a low of 24F to as high as 100F; the January average is 58 and the May average is 74. The district averages 17 frosts a year but is frost-free April through October.

The other district producing berries for freezing and export is in Michoacan, west of Morelia, where production increasing greatly in recent years is concen-

trated around Zamora. Here the elevation ranges from 5,000 to 6,300 ft. above sea level, and temperatures are similar to those of the Bajío.

PRODUCTION PRACTICES

The planting season for strawberries may begin as early as April and extend through November, with heaviest plantings from July to October. The land is usually plowed by tractors and then laid out in raised beds measuring three feet from center to center. The plants are set by hand 8 to 12 inches apart in a staggered double row. Many growers take plants from fields being abandoned, and others purchase from local nurseries; the best growers buy virus-free plants from the United States.

Production practices vary widely. Under the best management, strawberries are kept on the land only one year; then the land is used for crops such as wheat or alfalfa for three to five years. These first-year plants produce higher yields and larger berries than subsequent-year plants.

There is a wide divergence in views on fertilizer applications, inasmuch as there is no experimental basis for determining fertilizer requirements for the area. The better growers use about 800 pounds of fertilizer per acre, usually ammonium sulphate and superphosphate. In Irapuato growers often use 250 to 300 pounds of sulfur per acre to combat salt accumulations, whereas others apply gypsum prior to planting. Fertilizer prices usually range from \$40 to \$60 per ton, and ammonium sulfate generally is the most expensive.

The cultivation and weeding of the strawberries are usually done by hand; spraying by a knapsack sprayer. In recent years a few of the freezing companies are furnishing power sprayers.

Many different varieties of berries are grown. The high-yielding Florida-90, Solano and Fresno are replacing the lower-yielding Klondike that American buyers earlier specified. Yields averaged 5.6 tons per acre for the 1964-1966 period.

The harvesting of berries begins in November; March and April are the peak months for delivery to the freezing plants. The picking is done by hand and mostly by women. The pickers receive about 15 cents for filling a crate with approximately 16 pounds of berries.

PROCESSING STRAWBERRIES

The first strawberry-freezing plant in Mexico began operating in 1948. In 1966 there were 17 firms freez-

ing berries with a total annual capacity in excess of 100 million pounds. This increase in processors has given rise to considerable competition, and today the freezing firms finance much of the cash cost of strawberry production in an effort to assure a supply of berries.

The freezers can be operated 24 hours a day. These full-day operations create problems of obtaining a sufficient supply of trained personnel. In addition, most of the plants have a limited storage volume for the berries after they are frozen. Thus there is a limit to the length of time a freezing plant can operate at full capacity. In most cases the limit of capacity operation is 50 to 70 days. Late frost might delay the peak of freezing berries to mid-March. The rainy season usually begins in June but sometimes in May, so that the combination of late frost and the early rainy season reduces the supply of berries to be frozen.

In 1966 the average price for berries with caps delivered to the freezer was seven cents a pound. After the berries are weighed and sampled for quality, women decap them by hand at an average cost of one cent per pound. The berries are then water-flumed to a washer. After washing, the berries are rinsed and sized automatically. They are divided into three sizes: large— $\frac{3}{8}$ inch and over in diameter; medium— $\frac{1}{2}$ inch to $\frac{3}{8}$ inch in diameter; and small—less than $\frac{1}{2}$ inch in diameter. The large and medium berries are frozen as whole or sliced; the small size is crushed and frozen as puree. On the average about 45% of the berries are large, 40% are medium and 15% are small. The large and medium berries are usually frozen in a 4:1 sugar ration by weight; the small berries are packed 27 parts berries to one part sugar. Some of the plants select special large berries for individual quick frozen (IQF). These are frozen without sugar and usually packed in 50-pound drums.

All freezing plants have deep wells for their own water supply and laboratories for checking mold count and other quality factors. Also, a number of United States buyers have quality-control personnel checking

during the processing season. The berries are checked according to U.S.D.A. standards, with the majority being Grade B, some A, and a few C. Most of the frozen berries are shipped by truck to the United States, where they are inspected by the U.S.D.A. at border crossings. Laredo, Texas, is the major port of entry for the berries into the United States.

In 1948 only 340,000 pounds of frozen berries were imported from Mexico. Six years later, 8 million pounds valued at 1 million dollars entered the United States; in 1966 there were 83 million pounds crossing the border (table II) valued in excess of 10 million dollars.

TABLE II
UNITED STATES IMPORTS OF FROZEN MEXICAN
STRAWBERRIES

Year	Average 1959-61	1962	1963	1964	1965	1966
Millions of pounds	23.0	32.3	34.6	39.7	51.8	82.8

Source: Foreign Agricultural Service, United States Department of Agriculture.

The upward trend of frozen berries into the United States is expected to continue. However, the improved transportation situation tends to bring a rise in the imports of fresh berries. Mexican berries are much less costly at the freezer for processing than United States berries; this lower cost plus lower priced labor of \$1.56 a day in 1966 for plant workers, coupled with the government-controlled sugar price, gives Mexican firms a strong competitive edge over United States freezers. This edge plus two new freezers now under construction (1967) should keep the flow of frozen berries imported into the United States near or above their high level of the mid-sixties. If recent price levels of frozen strawberries in the United States continue, the Mexican industry will continue its expansion in the future.

EIGHTEENTH ANNUAL SPRING WILDFLOWER PILGRIMAGE

APRIL 25, 26, 27, 1968, GATLINBURG, TENNESSEE

Each year the Wildflower Pilgrimage in the nation's most visited national park has grown in popularity. The Botany Department of The University of Tennessee, the Great Smoky Mountains National Park, and the Gatlinburg Garden Club join forces to prepare and conduct this program which is sponsored by The Gatlinburg Chamber of Commerce. Those wishing to participate in the Wildflower Pilgrimage are urged to register in order to make arrangements for various pilgrimage trips and tours. Registration opens 9 a.m. Thursday, April 25, 1968, in the Gatlinburg Civic Auditorium. Registration fee is \$2 (Students free). No advance registrations are accepted. If you wish a copy of the current Gatlinburg Accommodations Directory or other specific information, address Dept. W. P., Box 527.