

SUBTROPICAL FRUITS IN SOUTHERN CALIFORNIA

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The culture of subtropical fruits in California goes back to 1769, the year in which the Franciscan padres under the leadership of Fra Junipero Serra founded the mission at San Diego. It is known that the Franciscans in establishing missions in Alta California depended almost entirely upon the missions of Baja California for their supplies of seeds, plants, and domestic animals. By the time they left the missions in Baja California many kinds of fruit plants had been tried there, and as early as 1739, Francisco Xavier Clavijero wrote, "Not all of the plants and fruit trees taken to California from various parts of Mexico have grown. In a few places where water is sufficient and the soil suitable for their respective cultivations the following have prevailed: olive, lemon, orange, peach, pomegranate, fig, apple, guava, yellow sapote, watermelon, pumpkin (also squash), date palms, wheat, corn, rice, and various kinds of vegetables."

In 1793, Capt. George Vancouver visited the mission at Ventura while on his voyage of discovery in the Pacific. In his journal, which was published in 1798, he wrote, "Yet the garden of Buena Ventura far exceeded anything of that description I had before met with in these regions, both in respect of the quality, quantity, and variety of its excellent productions, not only indigenous to the country but appertaining to the temperate as well as torrid zone; not one species having yet been seen or planted that had not flourished, and yielded its fruit in abundance and of excellent quality. These have principally consisted of apples, plums, figs, oranges, grapes, peaches, and pomegranates, together with the plantain, banana, cocoanut, sugar cane, indigo, and a great variety of kitchen herbs, plants, and roots. Here also grew great quantities of the Indian fig, or prickly pear, but whether cultivated for its fruit only or for the cochineal I was not able to make myself thoroughly acquainted."

Clavijero's and Vancouver's accounts attest to the early introduction and cultivation of a number of subtropical fruits which are now a familiar part of southern California's horticulture.

A period of expanding agriculture began in 1848 as a result of increased American and foreign immigration following the Treaty of Guadalupe Hidalgo which made the Mexican province of Alta California a part of the United States. Agricultural expansion was given added impetus soon thereafter by the discovery of gold which attracted prospectors, and all sorts of other persons as well, from every part of the world. Many of the newcomers soon realized that real wealth was to be produced on the soil rather than taken from the mines, and settled down to farm. New varieties of fruits were imported

from both the temperate and tropical regions of the world, and there was widespread experimentation to learn what could be grown successfully. By the end of the nineteenth century virtually every one of the world's known 200-odd species of tropical and subtropical fruit plants had been tried somewhere by someone in California. For reasons which seem obvious today, many failed to establish, but a large number, possibly as many as one hundred, have become an integral part of the exotic flora. A number, such as the orange, lemon, date, fig, and avocado, developed into important commercial fruit crops with thousands of acres of land devoted to their culture. Others, such as the oriental persimmon, pomegranate, cherimoya, loquat, and guava, developed as relatively minor crops which are produced on small acreages for limited clientele. The great majority, however, survive only as single specimens or, at most, as a few plants together, in favorable situations in home gardens, botanical gardens, and public parks.

Excepting occasional introduction of a new previously untried species, reintroduction of a species which failed when it seems it should have succeeded, and introduction of new improved varieties of established species, the matter of introducing and testing of subtropical fruits simply to determine their adaptation to various environments which the southern California climate provides is largely a thing of the past.

Over the long years, there has been a gradual shift in interest from growing subtropical fruits mostly for nostalgic reasons or as horticultural curiosities to exploring their possibilities as crops which might be produced profitably on a commercial basis. The orange got off to a relatively early start with the planting, in 1841, of the first grove for the avowed purpose of producing fruit for sale. Other citrus fruits and the olive soon followed. Toward the end of the nineteenth century, the fig and the date were established as commercial crops. The avocado is a relative late-comer. Its development as a commercial crop is generally said to have begun around 1910. It is the newest of the numerous subtropical fruits which have been exploited to achieve a fairly high degree of commercial importance.

Interest in subtropical crops which might have commercial possibilities has intensified in recent years. This interest is perhaps greatest among avocado growers who have lost, are losing, or face loss of their orchards to the scourge of root rot. Also interested, however, are persons who own parcels of land which may be suitable for the culture of an orchard crop but which for one reason or another are unsuitable for the production of avocados, citrus fruits, and other crops with established markets. Investigations into crops which might meet the needs of these persons are continuing.

In order to have any chance of developing into a commercial crop, a fruit must meet certain requirements.

First, it must be well adapted to the area in which one proposes to grow it. This immediately rules out a large number of fruits, among them some of the most delicious in the world, which are uncompromisingly tropical in their natural requirements.

Second, it must have ready consumer acceptance. This means it must be highly palatable either fresh or in processed form, or can fill a niche not fully preempted by some other product. Americans tend to be extremely conservative in their food habits. They do not take kindly to new exotic flavors and odors, and are inclined to stay with those things with which they are thoroughly familiar. Furthermore, many fruits which the

peoples of other lands regard as delicious taste strange and often decidedly unpleasant to Americans at first experience. Consequently, first impressions are enough, and they want no more of them. Many of our tastes are acquired, however, and markets sometimes can be developed and expanded by means of effective consumer education and promotion. Certainly this has been done to a high degree in the marketing of avocados and processed green olives, not to mention other foods such as caviar and various kinds of cheeses, for few persons admit to having liked these at first taste. It might almost be said that Americans, and particularly Californians, suffer from such a plethora of good old familiar standbys throughout the year, such as apples, berries, grapes, plums, peaches, oranges, pears, imported bananas, etc., etc., that they feel little compulsion to venture something new and strange without a certain amount of prodding.

Third, it must lend itself to marketing as a high quality product either fresh or in processed form. Many subtropical fruits are so highly perishable that they can be marketed in the fresh state only in the immediate vicinity of the area in which they are produced. The acreage that can be given to them, therefore, is limited by the absorptive capacity of the local market. Some of these fruits can be processed into highly palatable products, others cannot. Processing investigations are in progress in a number of countries where wholly acceptable but highly perishable fruits can be produced cheaply and abundantly, as well as in California.

Fourth, it must be producible with reasonable profit to the grower in competition with other domestic and foreign products. Since it is commercial development of subtropical fruits in which we are interested, we might say that this is the most important requirement.

Of the large number of fruit plants under consideration and continual observation, the macadamia presently seems to be the one which comes closest to meeting all requirements. Apparently, it is well adapted to the climatic areas in which avocados are grown. Furthermore, it is highly resistant, if not entirely immune, to avocado root rot, and generally thrives on soils which are too shallow or too poorly drained to support avocado culture. Its water requirement is no greater than that of the avocado, and its fertilizer requirement is less.

The macadamia nut is highly palatable to most persons either as raw air-cured kernels or in the roasted, salted, vacuum-packed form. Confectioners regard it as a high quality product at least equal to the blanched almond. These same confectioners assert that there would be a large potential market for the nut for a long time to come, especially if the present high retail price could be brought into line with the prices of almonds, pecans, walnuts, and other first quality confectionary nuts.

At present, commercial production of macadamia nuts is confined to the Hawaiian Islands where there are close to 3000 acres planted to orchards of all ages. Production, which is now about 300,000 pounds of kernels a year, is expected to rise to 2,000,000 pounds of kernels by 1970 as newly planted orchards come into full bearing. How successful macadamia production may be in California may well depend, first, upon the absorptive capacity of the market, and, second, upon whether the nuts can be produced and marketed at no greater cost than those of Hawaii. Yields and nut quality of California grown trees compare favorably with those of Hawaii grown trees, so the

question may be primarily one of production and harvesting costs.

Another crop which seems to have considerable promise is the carob. Here is a tree which is well adapted to all of southern California, yet carob pods and carob gum are imported into the United States to the extent of about \$2,000,000 worth a year from countries bordering the Mediterranean Sea. In these countries, the carob is a highly prized crop with many uses.

An appraisal of carob culture, particularly as a dry farm crop, is being conducted by Dr. J. Eliot Coit on an experimental farm near Vista. The planting contains many of the best varieties of various Mediterranean countries together with selections made among thousands of seedling trees growing in California. This planting should be followed with interest, for it should provide a wealth of information on varieties, culture, yields, quality of crop, and economics of production.

No other relatively untried crop approaches the macadamia and carob as far as developmental prospects presently are concerned. Subtropicals which are grown with success in other countries and in other states have been found wanting in one respect or another in California. Among such subtropicals can be listed the lychee, guava, passion fruit, tree tomato, Chinese gooseberry, and West Indian cherry. Of these, the lychee, which finds wide acceptance as a fresh fruit, is the most desirable. It is now being produced in several hundreds of acres of orchards in Florida, but, unfortunately, it is difficult to establish in the open in California. Well grown trees in the greenhouse or lath house tend to decline upon planting in the field. There are, however, a number of well established, thrifty, productive trees in southern California which suggests that we may be able to grow it on a larger scale once we have learned how to bring it through the critical stage from greenhouse to field. The remainder of the fruits mentioned are too limited in appeal to warrant cultivation on any but a very small scale at this time.

The fact that a species of subtropical fruit plant is presently relegated to ornamental status or cultivation on a limited scale does not mean that it should be left completely out of consideration as a potential crop plant. Some species, now unimportant, may emerge as important crop plants through introduction of new and better varieties, through discovery of new uses, or through promotion by dedicated, cooperative growers. One need only to be reminded that the avocado was known in California for over 30 years before concerted attempts were made to develop it into a commercial crop. The macadamia was known in Hawaii for 40 years, and the lychee in Florida for a like period of time before they were brought into commercial cultivation in those places. Fifteen years ago few horticulturists who knew the acerola, or West Indian cherry, would have considered it a likely prospect for growing commercially. In 1946, however, it was reported as being an unusually good natural source of vitamin C, its juice containing up to 50 times as much as an equal amount of orange juice. For this reason alone, it is now being developed commercially in Puerto Rico, Hawaii, and southern Florida, and is being investigated in southern California. Thus, it may transpire that, while we are devoting time and effort to those crops which today seem to hold the greatest promise for development, something new, something utterly ignored, or something long since dropped from further consideration may emerge as just the thing we have been looking for all along.