

Lychee

Economic Fact Sheet #12
February 1991

Department of Agricultural and Resource Economics
College of Tropical Agriculture and Human Resources
University of Hawaii

By
Kevin M. Yokoyama, Kulavit Wanitprapha,
Stuart T. Nakamoto, and C. L. Chia



CROP PROFILE

SPECIES AND CULTIVARS

- Lychee, *Litchi chinensis*, is a round-topped evergreen tree that belongs to the family Sapindaceae. Lychee is related to the longan and rambutan. It is a native of southern China and has been introduced to other regions of the world including Southeast Asia, Australia, South Africa, and the United States.
- Cultivar names have caused confusion; the same cultivar may have different names in different producing regions.
- There are over 100 lychee cultivars in China. 'Wai Chee' accounts for more than 50% of the plantings in Guangdong, the main producing province. 'Haak Yip' and 'Souey Tung' are the primary cultivars in Fujian province, the other main producing area.
- 'Haak Yip' accounts for most of the plantings in Taiwan. 'Sah Keng' is another popular cultivar there. In India, many cultivars have been developed from Chinese seedlings. Most of the lychee is planted in Bihar, where 'China', 'Rose Scented', and 'Shahi' are most important. The name 'Rose

Scented' describes the aroma of the particular cultivar's fruit.

- 'Tai So' is an important cultivar in subtropical Africa, Thailand, and Australia. In Australia, 'Tai So' and 'Bengal' are the main cultivars, but new plantings are primarily of other varieties including 'Wai Chee', 'Kwai May Pink', and 'Salathiel'.
- 'Kwai Mi' (considered by some sources to be 'Tai So'), 'Groff', and 'Kaimana' are cultivars recommended for Hawaii. The latter two are developed from a 'Haak Yip' seedling and bear somewhat regularly in Hawaii. 'Kwai Mi' can produce large crops and is the more established cultivar.

PRODUCTIVITY

- Lychee can be propagated through seeds, grafting, cuttings, and air layering. With air layering, the most widely used method, trees can bear fruits three to five years after planting. Seedlings generally do not bear until the eighth or ninth year if at all.
- Lychee trees can be grown on a wide range of soil types including heavy clay and 'a'a lava, and

Selected Producing Countries	Selected Cultivars	Marketing Season	Selected Export Markets for Fresh Lychee
Australia	Tai So, Bengal, Wai Chee, Kwai May Pink, Salathiel	Oct. to Mar.	Canada, Hong Kong, New Zealand, Singapore
China	Wai Chee, Haak Yip, Souey Tung	May to Aug.	Hong Kong, Singapore
India	Shahi, Rose Scented, China	May to Jun.	—
Subtropical Africa [†]	Tai So	Nov. to Mar.	Europe
Taiwan	Haak Yip, Sah Keng	May to Aug.	Hong Kong, Japan, Singapore,
Thailand	Tai So, Wai Chee, Haak Yip	Apr. to Jul.	Canada, Europe, Hong Kong, Singapore

[†]Subtropical Africa includes Madagascar, Mauritius, Reunion, and South Africa.

prefer a pH between 5.0 and 6.5. In Hawaii, trees are grown from sea level to around 2000 feet, suitable areas have rainfall of 60 to 140 inches per year unless irrigated, and wind protection is needed.

- The erratic bearing nature of the lychee tree is a major obstacle to lychee production. One year of heavy production can be followed by a year of low or no production. Girdling, which involves cutting a ring around the bark of a branch or trunk, is sometimes done to induce flowering. This technique must be used with care, however, as continual use may retard growth and damage trees.
- Trees should be spaced 30 to 40 feet apart in orchards. In Florida, some trees have been spaced 23 feet apart, but pruning or culling is required as the trees grow. Total production can be higher in the early years with closer spacing, but planting and establishment costs will also increase.
- Yields of lychee fruit can vary considerably by cultivar, tree spacing, age of tree, environmental conditions, and management practices. In well-managed orchards in a "good year," yields from 8900 to 40,000 lb/ac have been reported. In Guangdong, the average yield is around 1780 lb/ac. In southern Queensland, Australia, yields may range from 620 to 9960 lb/ac for 10-year-old trees.
- Different lychee cultivars may produce mature fruit several weeks apart in the same region. In Hawaii, for example, 'Kwai Mi' fruits mature from May to June, 'Kaimana' from mid-June to July, and 'Groff' from August to September. A range of cultivars may be planted to spread the picking workload.
- Desirable qualities for fresh lychees include a large proportion of flesh to seed, sweet crisp flesh, and red skin.
- Lychees should be picked after the skin becomes red. A few days after harvesting, the attractive appearance of the fruit changes as the skin turns brown. Browning is faster when the humidity is low. The skin color and fruit flavor can be preserved for two weeks if fruits are stored in plastic bags and refrigerated at 32 to 40°F.
- In Australia, clear PVC wrapping film is used to preserve the color of fruits without refrigeration for one week at temperatures between 68 and

86°F. Fruits are dipped in the fungicide benomyl to prevent postharvest disease and rot, and are packed and wrapped in strawberry punnets. (Note: U.S. pesticide use regulations [e.g., benomyl] need to be followed in the United States.)

- The average net return for a 25-ac lychee orchard in southern Queensland over a 20-year period was A\$810/ac/year. This is based on a gross revenue of A\$5480/ac, assuming a yield of 4060 lb/ac, a price of A\$1.35/lb, and an operating cost of A\$4670/ac. Harvesting labor costs and marketing costs (i.e., packaging, freight, commission, and levies) accounted for about 42% and 25% of the total cost, respectively.

PRODUCTS AND USES

- The size, shape, and skin color of lychees vary by the cultivar. The outer skin is leathery and bumpy. When ripe, it may be dull red, bright red, or dark red. Under the skin is the edible white semitranslucent flesh or pulp, which covers a glossy brown seed.
- Lychees can be eaten fresh or in preserved form; they can be dried, frozen, or canned with syrup. Dried fruits are sometimes called "litchi nuts." In Australia, a small amount of lychee is used to manufacture wine, ice cream, and yogurt. Taiwan exports lychee fruit juice and fruit drink.
- The lychee pulp is composed mainly of water (76 to 87% of the pulp weight) and is low in protein (0.8 to 0.9%) and fat (0.5 to 1.6%). It has appreciable amounts of sugar (11.8 to 20.6%) and is a good source of vitamin C. A 100-gm portion (3.5 oz) of lychee contains about 65 calories and between 40.2 and 90 mg of vitamin C, depending on the cultivar. This is a large amount compared to the 50.5 mg/100 gm in oranges.

WORLD SUPPLY AND DEMAND

WORLD SUPPLY

- Data on world lychee production are scarce. Many producing countries do not compile statistics on this crop, and the alternate bearing habit can cause considerable production differences from one year to the next. A recent estimate indicated that Taiwan (288.7 million lb), India (202.5 million lb), and China (136.3 million lb) are the world's major producers. Other producers include Australia, Hong Kong, Israel, Mada-

gascar, Mauritius, Reunion, South Africa, Thailand, the United States, and Vietnam.

- The cropping season for producing countries in the southern hemisphere occurs at a different time than for those in the northern hemisphere. This means fresh lychees from different hemispheres are not available in a specific market at the same time.

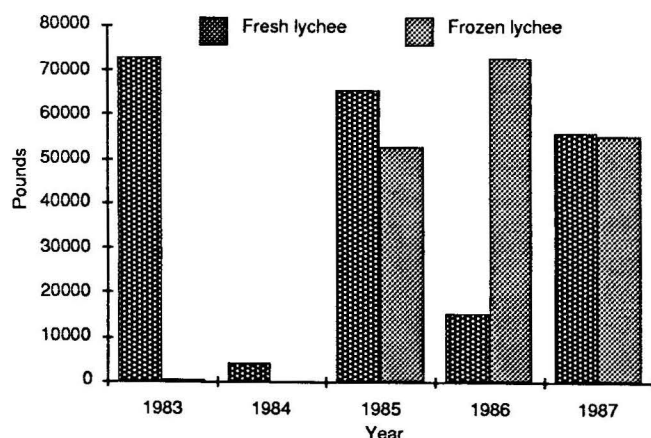
WORLD DEMAND

- Lychees are popular in many Asian countries. There is large domestic consumption in Taiwan, India, and China, the major producers.
- Hong Kong, Singapore, Malaysia, and Japan are the primary Asian importers of lychees. European and North American countries import relatively small quantities.
- Fresh lychees from a specific producing area are available for only a limited time. In markets where the fruit is relatively unknown, limited availability presents a marketing challenge because customers are not exposed to the product long enough to become accustomed to it.

SELECTED MARKETS

THE UNITED STATES

- Lychee is grown in Florida, Hawaii, and Southern California. Most of the planting in the United States is in Dade County, Florida, which had 145 acres in 1988.
- On the U.S. mainland, fresh lychees from Florida and Mexico are generally available from mid-June to mid-July. The fruit is considered an



U.S. imports of fresh and frozen lychee, 1983-87

exotic specialty item and is not well known in many areas.

- During fiscal 1987, the United States imported about 55,730 lb of fresh lychees from Mexico. The major port of entry was San Diego, which accounted for 61.1% of the imports, followed by New York (34.1%), Los Angeles (3.1%), and San Francisco (1.6%). Fresh lychees from Mexico are permitted entry to the United States because Mexico does not have fruit flies that are known to attack lychee.
- The United States also imported 54,960 lb of frozen lychees during fiscal 1987. Taiwan supplied 73.5% of the imports, with the rest from Thailand. The ports of entry for the frozen lychees were Los Angeles and San Francisco.
- U.S. import statistics on canned lychees are combined with those for longan under one tariff code. In 1989, the United States imported 5.1 million lb of canned lychees and longan, at a CIF (cost, insurance, and freight) value of \$4 million. The major suppliers were Thailand and Taiwan. Canned lychees are popular in Chinese restaurants as a dessert and have become more widely available in supermarkets.

EAST ASIA

- In 1989, Hong Kong imported more than 13.4 million lb of fresh lychees. Taiwan was the major supplier, accounting for 54.1% of the total quantity imported, followed by China (41.8%) and Thailand (3.9%). Nearly all of the fruit enters the country between May and August.
- Taiwan was also the major supplier of fresh lychees to Singapore. In 1989, Taiwan supplied 61.3% of the 6.2 million lb imported. Other suppliers were Thailand (34.8%), China (2.8%), and Malaysia (1%).
- Fresh lychees were unavailable in the Japanese market before 1980, when Taiwan obtained a special permit to export the fruit. Japanese plant quarantine officials certified lychees from Taiwan, which are treated with vapor heat to rid the fruit of insects. In 1988, Japan imported 2.5 million lb of fresh lychees from Taiwan.

WESTERN EUROPE

- In Europe, lychees were originally imported for ethnic minority populations, particularly the

Chinese. The fruit has since become more widely known and consumed by Europeans.

- As in the United States, canned lychees are popular in Chinese restaurants. There is an increasing preference for the fresh fruit offered in some supermarkets and street market stalls, however.
- Official trade statistics for the European Community (EC) are unavailable for fresh lychees, since they are combined with other fruits. One estimate for 1987 indicated that the EC imported lychees from South Africa (4.8 million lb), Madagascar (1.9 million lb), Mauritius (265,500 lb), and Reunion (213,800 lb).
- France, the United Kingdom, the Federal Republic of Germany, and the Netherlands are major importers. Lychees from subtropical Africa are generally available in Europe from early November to early March, with small quantities from Israel and Thailand available from April to September.
- Lychee prices vary considerably during the year. For example, 1988 average wholesale prices in the Federal Republic of Germany ranged from \$1.41/lb in February to \$4.23/lb in June, when supplies are more limited.
- Market studies foresee good growth potential in the European fresh lychee market. Major obstacles to development include the short selling season, freight costs, and handling difficulties.

1988 average wholesale prices of fresh lychee in France, United Kingdom, and Fed. Rep. of Germany (\$/lb)

	France	UK	Germany
January	\$1.64 ^r	\$1.77 ^r	\$1.67 ^r
February	1.73 ^r	1.38 ^r	1.41 ^r
March	1.32 ^r	1.62 ^r	1.49 ^r
April			4.14 ^r
May		3.30 ^r	3.45 ^r
June		3.56 ^r	4.23 ^r
July		1.82 ^r	3.97 ^r
August		3.85 ^r	4.09 ^r
September			
October			
November	3.34 ^r		2.19 ^r
December	1.60 ^r	2.43 ^r	2.23 ^r

^rfrom South Africa, ^rfrom Thailand, ^rfrom Israel, ^rfrom Madagascar

LYCHEE IN HAWAII

- Lychee was introduced to Hawaii in 1873 from southern China. There were an estimated 40 bearing acres of lychee in Hawaii during 1990, with an additional 18 nonbearing acres. The bearing acres are on Kauai (19 ac), Hawaii (12.5 ac), and Oahu (8 ac).
- Hawaii imports canned lychees and longan from Taiwan and Thailand. In 1989, imports from Taiwan amounted to 53,150 lb at a CIF value of \$45,600. Thailand's imports amounted to 49,220 lb and were valued at \$31,400. All or most of the imports from Thailand are believed to be canned longan.
- Hawaii supplied the U.S. mainland with 89,000 lb of fresh lychees in 1969 before fruit fly concerns halted shipments. Approaches are being explored to enable Hawaii to again export fresh lychees. In one treatment, fruits are placed in refrigerated shipping containers while in transit to the mainland, where they are free of infestation upon arrival. Frozen fruits can be sent to the mainland after inspection by plant quarantine officials in Hawaii.
- Potential markets for Hawaii's fresh lychees are countries that do not have fruit fly quarantine barriers, such as Canada. Exports to Japan and the EC are a problem due to quarantine regulations and transportation.
- In addition to fruit flies, the high cost of production, and a shortage of agricultural labor in Hawaii, lychee production is further constrained by lack of clearance for various pesticides. Florida's tropical fruit industry is pursuing chemical clearances for various crops. This can be advantageous for Hawaii since Florida's work could be replicated and adjusted to Hawaii's needs.
- The lychee commodity fact sheet published by CTAHR provides information on horticultural practices in Hawaii. Topics covered include important cultivars, environmental requirements, propagation and cultural practices, fertilization, and diseases and pests.

Reference to a company or product name does not imply approval or recommendation of the product by the College of Tropical Agriculture and Human Resources, University of Hawaii.

Hawaii Agricultural Experiment Station, HITAGR, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa. Noel P. Kefford, Director and Dean.

A list of references is available from the authors upon request.