

Lychee Growing in the Florida Home Landscape¹

Jonathan H. Crane, Carlos F. Balerdi, and Ian Maguire²



'Brewster' lychees. Fig. 1. 'Brewster' lychee fruit. Credits: Ian Maguire IFAS/TREC

Other common names: litchi, leechee, mamoncillo chino (Spanish), lichi

Scientific name: *Litchi chinensis* Sonn.

Family: Sapindaceae

Relatives: Spanish lime (mamoncillo, kinap; *Melicoccus bijugatus*), longan (*Dimocarpus longan* Lour.), akee (*Blighia sapida* Koenig.), and rambutan (*Nephelium lappaceum* L.)

Origin: Southern China and southeastern Asia

Distribution: Subtropical and tropical areas of the world. Reliable bearing and highest production occurs in subtropical and Mediterranean-type climates. Areas with significant altitude may also be productive.

Production: Lychee are grown commercially in many subtropical areas such as Australia, Brazil, southeast China, India, Indonesia, Israel, Madagascar, Malaysia, Mauritius, Mexico, Myanmar, Pakistan, South Africa, Taiwan, Thailand, Vietnam, and the U.S. (Florida, Hawaii, California).

Description

Tree: Trees may grow to 40 ft (12 m) in height and have a beautiful, dense, rounded, symmetrical canopy extending nearly to the ground. Trees are very attractive with dark green foliage and reddish-colored fruit. Typically major limbs of nontrained trees begin within 3 ft (0.9 m) of the ground.

Leaves: Leaves are compound with 2 to 8 leaflets. Leaves have a reddish color when young, becoming shiny and bright green when mature.

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2. J.H. Crane, Professor and Tropical Fruit Crops Specialist, TREC, Homestead; C.F. Balerdi, Professor and Multicounty Tropical Fruit Crop Extension Agent, Miami-Dade County, Homestead; Cooperative Extension Service; I. Maguire, Media Artist, TREC, Homestead; Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

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Figure 2.a Credits: Ian Maguire IFAS/TREC



Figure 4.a Credits: Ian Maguire IFAS/TREC



Figure 2.b Credits: Ian Maguire IFAS/TREC



Figure 4.b Credits: Ian Maguire IFAS/TREC

Lychee Tree. Fig. 2. Lychee tree and lychee tree in bloom.



Lychee leaves. Fig. 3. Upper and lower surfaces of the compound lychee leaf. Credits: Ian Maguire IFAS/TREC

Flowers: Flowers are small, greenish, and are borne on a large thyrse (a many-flowered



Figure 4.c

Lychee Flowers. Fig. 4. Lychee inflorescence in full bloom.

inflorescence) which emerges at the ends of branches anytime from late December to April (more commonly February and March) in Florida. There are three flower types: two male types (called M1 and M2) and one female (called F). In general, the M1 flowers open first, female flowers (F) open second, and M2 flowers open third.



Lychee Fruit. Fig. 4. 'Brewster' lychee fruit. Credits: Ian Maguire IFAS/TREC

Fruit: The fruit is a drupe and fruit are borne in loose clusters numbering from 3 to 50 fruits and are round to oval and 1.0 to 1.5 inches (25 to 38 mm) in diameter. The skin (pericarp) ranges from yellow to pinkish or red and is leathery, with small, short, conical or rounded protuberances. The edible portion of the fruit (pulp) is called an aril that is succulent, whitish, translucent, with excellent subacid flavor. Fruits contain one shiny, dark brown seed, usually relatively large, but it may be small and shriveled (called chicken tongues) in some varieties. Fruit must be ripened on the tree for best flavor.

Pollination: Lychee flowers are pollinated by bees and various fly species. Isolated or single lychee trees will usually set acceptable amounts of fruit. However, recent research has demonstrated that under some conditions, cross-pollination among different cultivars may increase fruit set. Therefore,



Figure 6.a Credits: Ian Maguire IFAS/TREC



Figure 6.b Credits: Ian Maguire IFAS/TREC

Lychee Pollination. Lychee flowers are pollinated by bees and wind.

in some cases there may be an advantage to planting more than one variety.

Season of bearing: Mid-May to early July in Florida, depending upon variety.

Varieties

'Mauritius' is the major commercial cultivar and bears more regularly than 'Brewster,' which is the second most grown cultivar (Table 1). Some other cultivars have been evaluated, and new introductions are under evaluation.

Climate

Lychee does not fruit satisfactorily at sea level in tropical climates and is best adapted to warm to cool



Figure 7.a Credits: Ian Maguire IFAS/TREC



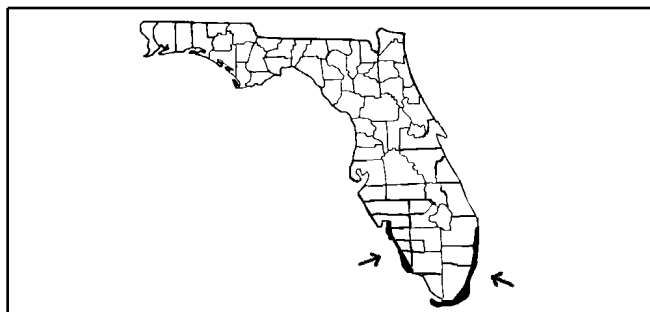
Figure 7.b Credits: Ian Maguire IFAS/TREC

Lychee Pollination. Lychee flowers are pollinated by bees and wind.

subtropical areas. The best climates for lychee production have a dry, cold (but nonfreezing) winter period lasting 3 to 5 months; a warm spring during the flowering period; a hot and humid summer during fruit growth, development, and maturation; and moderately warm temperatures during the fall. Periodic rainfall during spring and summer is ideal.

The lychee has more cold tolerance than mango but less than sweet orange, so plantings are limited to coastal areas in southern Florida (Figure 2). Young trees are damaged at temperatures of 28° to 32°F (-2° to 0°C), while temperatures down to 24° to 25°F (-3° to -4°C) cause extensive damage or death to large trees if exposed for several hours. Lychee trees do not acclimate to cold temperatures after exposure to cool, nonfreezing temperatures.

Symptoms of cold damage include leaf death, leaf drop, stem and limb dieback, bark splitting, and tree death.



(Figure 2).

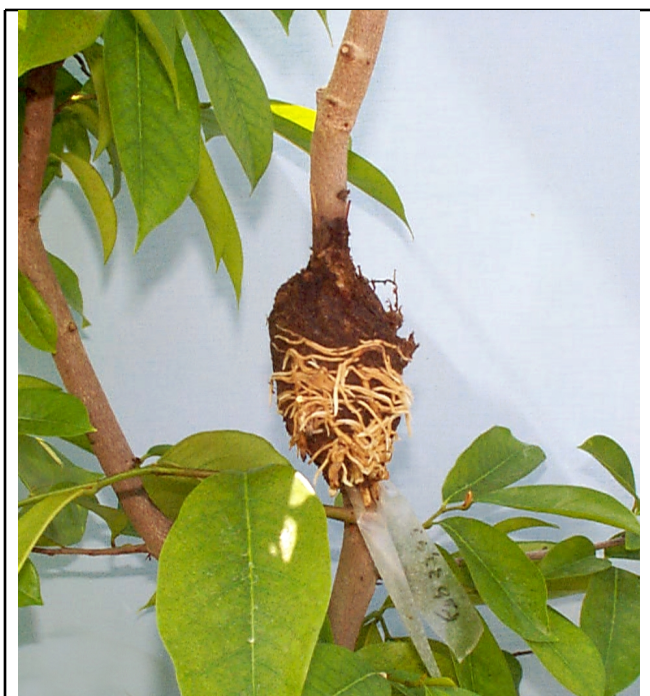
Water: Lychee trees are moderately drought tolerant. However, newly planted lychee trees should be irrigated regularly during establishment. In the home landscape, trees will perform well without supplemental irrigation after trees are established. For more consistent cropping of mature trees, withholding irrigation during the fall and winter until bloom may enhance the amount of flowering. Watering during fruit set through harvest may enhance fruit quality and yields.

Lychee may withstand short periods of flooding. However, their reaction to flooding is dependent upon flood duration, tree size, presence or absence of root diseases, and weather conditions. Planting trees on mounds or beds is recommended for areas prone to wet or flooded soil conditions.

Wind: Young lychee trees are sometimes difficult to establish in windy sites, and exposure to constant winds may result in tattered leaves, stunted shoot growth, and stem dieback. In the rocky soils of Miami-Dade County, the bark at the soil line of young trees may be damaged by continuous rubbing due to the movement caused by high winds. If possible, trees should be planted in wind-protected sites or protected from wind by surrounding trees with light shade cloth which has been attached to wire fencing.

Propagation

Lychee trees do not come true from seed, and seedling trees may take 10 or more years to bear fruit. Air layering is the most common method of propagation in Florida. In general, the larger the



Air layering on a lychee tree. Credits: Ian Maguire IFAS/TREC

limb, the easier it is to air layer. Grafting (usually cleft or veneer) and budding onto lychee seedlings or air layers is possible but is not as common as air layering alone; this may change as superior rootstocks are identified. Top working is possible although not common and may become more common as superior cultivars are recommended. Air-layered or grafted trees begin to bear fruit in 3 to 5 years.

Seedlings may be useful as rootstocks but are not generally recommended because of genetic variability and vary in their tolerance to different soil conditions (e.g., high-pH, calcareous soil).

Production (Crop Yields)

Unreliable bearing is the major constraint to lychee production. Cultivars vary greatly in their bearing habit. Mature 'Brewster' trees (15 to 20 ft tall; 4.6 to 6.1 m tall) may bear 200 to 300 lb (91 to 136 kg) of fruit in a good year; however, most trees bear a good crop only about 1 year out of 3 or 4. In contrast, well-cared-for, mature 'Mauritius' trees may bear every year, with good yields in alternating years. On average, yields range from less than 50 lbs to 125 lbs (23-58 kg) per tree per year over a period of years.



Figure 10.a Credits: Ian Maguire IFAS/TREC



Figure 10.b Credits: Ian Maguire IFAS/TREC

Lychee Harvest.

Spacing

Planting distances depend on soil type and fertility, current technology, and expertise of the homeowner. Lychee trees in the home landscape should be planted 25 to 30 feet or more (7.6 to 9.1 m) away from buildings, other trees, and electrical wires. Trees planted too close to other trees or structures

may not grow normally or produce much fruit due to shading.

Soils

Trees grow best in well-drained soils. Of the soils of southern Florida, lychee trees grow best in acid sands with moderate-organic-matter content. Trees grow well in the muck soils, but usually do not fruit well because of excessive vegetative (shoot and leaf) growth. Sandy soils with low-organic-matter content are suitable if sufficient fertilizers are supplied. Lychee may be grown on the rocky, calcareous soils of the southeast coast but require special care to prevent minor element deficiencies.

Planting a Lychee Tree

Site Selection

In general, lychee trees should be planted in full sun for best growth and fruit production. Select a part of the landscape away from other trees, buildings and structures, and power lines. Remember lychee trees can become very large if not pruned to contain their size. Select an area of the landscape that does not flood (or remain wet) after typical summer rainfall events

Planting in Sandy Soil

Many areas in Florida have sandy soil. Remove a 3 to 10 ft (0.9-3.1 m) diameter ring of grass sod. Dig a hole 3 to 4 times the diameter and 3 times a deep as the container the lychee tree came in. Making a large hole loosens the soil adjacent to the new tree making it easy for the roots to expand into the adjacent soil. It is not necessary to apply fertilizer, topsoil, or compost to the hole. In fact, placing topsoil or compost in the hole first and then planting on top of it is not desirable. If you wish to add topsoil or compost to the native soil, mix it with the soil excavated from making the hole in no more than a 50-50 ratio.

Backfill the hole with some of the native soil removed to make the hole. Remove the tree from the container and place it in the hole so that the top of the soil media in the container is level with or slightly above the surrounding soil level. Fill soil in around

the tree roots and tamp slightly to remove air pockets. Immediately water the soil around the tree and tree roots. Staking the tree with a wooden or bamboo stake is optional. However, do not use wire or nylon rope to tie the tree to the stake as they may eventually damage the tree trunk as it grows. Use a cotton or natural fiber string that will degrade slowly

Planting in Rockland Soil

Many areas in Miami-Dade County have a very shallow soil and several inches below the soil surface is a hard calcareous bedrock. Remove a 3 to 10 ft (0.9-3.1 m) diameter ring of grass sod. Make a hole 3 to 4 times the diameter and 3 times a deep as the container the lychee tree has come in. To dig a hole there are several options use a pick and digging bar to break up the rock or contract with a company that has augering equipment or a backhoe. Plant the tree as described in the previous section.

Planting on a Mound

Many areas in Florida are within 7 ft (2.1 m) or so of the water table and experience occasional flooding after heavy rainfall events. To improve plant survival consider planting fruit trees on a 2 to 3 ft (0.6-0.9 m) high by 4 to 10 ft (1.2-3.1 m) diameter mound of native soil.

In areas where the bedrock nearly comes to the surface (rockland soil) follow the recommendations for the previous section. In areas with sandy soil follow the recommendations from the section on planting in sandy soil.

Care of Lychee Trees in the Home Landscape

A calendar outlining the month-to-month cultural practices for lychee is shown in Table 2.

Fertilizer

Young trees (less than 4 years old) should be fertilized with 0.25 to 0.50 lbs (0.11 to 0.22 kg) of a complete fertilizer every 8 weeks (Table 3). Fertilizer mixtures containing 6 to 8% nitrogen, 2 to 4% available phosphorus, 6 to 8% potash, and 3 to 4% magnesium are satisfactory. Twenty to 50% of the nitrogen should be in organic form.

In acid to neutral-pH soils, micronutrients such as manganese, zinc, and iron may be applied in dry applications to the soil. However, foliar applications of manganese and zinc should be made to trees growing in high-pH, calcareous soils. Two to four applications of micronutrients should be made during the growing season (March to November).

Soil applications of iron sulfate may be effective in acid to neutral-pH soils. However, in high-pH, calcareous soils, chelated (Fe-EDDHA) iron in a soil drench should be applied. For young trees, mix 0.5 to 2.0 ounces (14 to 57 g) of iron chelate in sufficient water to move the material into the soil around the base of the tree. For mature trees mix 0.5 to 4.0 ounces (14 to 113 g) of iron chelate per tree per application. Iron should be applied 2 to 4 times during the growing season.

Once trees are 4 or more years old and begin fruit production, applications of nitrogen containing fertilizer from August until early spring (February-March) should be avoided. Nitrogen applications during this time may stimulate new vegetative growth (i.e., leaves and shoots) and reduce or eliminated the potential for flowering and fruit production.

Irrigation (Watering)

Young trees should be irrigated regularly to facilitate tree establishment and growth. Once trees begin to bear (3 to 4 years after planting), trees should be irrigated regularly from flowering through harvest. Research from other regions has suggested that mild drought stress during the fall (September or October) and early winter enhances flowering in late winter or early spring.

Insect Pests

The panicles (thyrses) and flowers of lychee are attacked by a number of moth pests. Periodically, plumose (*Morganella longispina*) and *Philephedra* (*Philephedra tuberculosa*) scales attack stems, and heavy infestations may cause stem dieback. Adult *Diaprepes* root weevils (*Diaprepes abbreviatus*) and citrus root weevils (*Pachnaeus litus*) feed on lychee leaves, and their larvae feed on the roots of lychee trees causing a loss of tree vigor. Several nematode

species (reniform, *Rotylenchulus reniformis*; and sheath nematode, *Hemicriconemoides mangiferae*) cause decline of young lychee trees.

Diseases

Anthracnose (*Colletotrichum gloeosporioides*) is the major disease attacking fruit. The fruit of some cultivars (e.g., 'Mauritius') are much more susceptible than others (e.g., 'Brewster'). Occasionally, mushroom root rot (*Clitocybe tabescens*) kills lychee trees, often in land where oaks (*Quercus virginiana*) were previously grown. A parasitic lichen may occasionally attack leaves. Red algae may attack lychee shoots and limbs; symptoms include grayish to rust-colored, irregularly-shaped patches on the bark and bark splitting. For more information and control measures, consult your county agricultural extension agent.

Lychee Trees and Lawn Care

Lychee trees in the home landscape are susceptible to trunk injury caused by lawn mowers and weed eaters. Maintain a grass-free area 2 to 5 or more away from the trunk of the tree. Never hit the tree trunk with lawn mowing equipment and never use a weed eater near the tree trunk. Mechanical damage to the trunk of the tree will result in weakening the tree and if severe enough can cause the tree to dieback or die.

Roots of mature lychee trees spread beyond the drip-line of the tree canopy and heavy fertilization of the lawn adjacent to lychee trees is not recommended and may reduce fruiting and or fruit quality. The use of lawn sprinkler systems on a timer may result in over watering and cause lychee trees to decline. This is because too much water, too often is being applied which results in root rot.

Mulch and Compost

Applying a thin layer of well cured compost from the drip-line to within 6 inches of the trunk may be beneficial for the fibrous roots of lychee trees. In addition, mulching lychee trees in the home landscape helps retain soil moisture, reduces weed problems adjacent to the tree trunk, and improves the soil near the surface. Mulch with a 2 to 6 inch (5-15

cm) layer of bark, wood chips, or similar mulch material. Keep mulch 8 to 12 inches (20-30 cm) from the trunk to prevent rotting of the base of the trunk.

Pruning

Generally training of young trees is not required. However, formative pruning during the first 2 years may be desirable to encourage lateral branching and growth. After several years of production it is desirable to cut back the tops of the trees to 10 to 15 feet (3.0 to 4.6 m). Selectively removing a few upper limbs back to their origin (crotches) each year will help prevent the loss of the lower tree canopy due to shading by the upper canopy. In addition, maintaining a smaller tree facilitates tree care and fruit harvest, makes it easier to spray the tree, and greatly reduces possible storm damage. Do not remove lower tree branches because they will help shade beneath the tree canopy and reduce weed growth and these branches may flower and fruit.

Pruning should be carried out immediately after harvest to allow regrowth and maturation of new shoots and leaves before the onset of cool/cold winter temperatures. Severe pruning is sometimes used to reduce tree height or width of very large trees. It does not injure lychee trees, but reduces fruit production for one to several seasons. Once lychee trees become 30 ft (9.1 m) or taller extreme caution should be used in pruning the trees. Climbing trees to prune them is dangerous and not recommended. Pruning of large lychee trees should be done by a professional arborist that is licensed and insured.

Harvesting



Figure 11.a Credits: Ian Maguire IFAS/TREC



Figure 11.b Credits: Ian Maguire IFAS/TREC



Figure 11.c Credits: Ian Maguire IFAS/TREC

Lychee Harvest Tools.

Fruit are harvested by cutting the main stem bearing the fruit clusters several inches behind the fruit clusters. Fruit may or may not be detached from the fruit clusters before storage. Ripe fruit are sweet, plump, and of the size and color characteristic of the cultivar (Table 1). Fruit picked while immature are not sweet and have poor flavor.

Uses and Nutritional Value

Lychee are an excellent fresh fruit and are best consumed as soon after harvest as possible. The fruit are low in calories and a good source of potassium, and are commonly eaten out of hand (Table 4). Fresh fruit may be stored in polyethylene bags in the refrigerator for 5 to 10 days and retain reasonable color and freshness. Fruit may be frozen whole (in the peel), canned (without the peel), and dried (in the peel) for later use. In the home landscape, lychee make beautiful specimen trees which provide fruit, aesthetics, and shade.

Table 1. Characteristics of selected lychee varieties in Florida.

Cultivar	Other Names	Tree			Fruit			Disease ⁷	Photo	Recom. ⁸
		Vigor ¹	Habit ²	Size ³	Color ⁴	Flavor ⁵	Fruit bh ⁶			
Bengal	Rose Scented	H	S	M-L	R	G	2	S	Photo	N/N
Bosworth 3	Kwai May Pink	L-M	U	S	P	F-G-E	1	S	Photo	Y/U
Brewster	Chen Zi, Chen Tzu	H	U-S	M	P-R	E	2-3	R	Photo	Y/Y
Early Large Red	--	H	S	M-L	P-R	G	3	S	Photo	U/U
Emperor*	--	L	S	M-L	R	G	2	U	Photo	Y/U
Groff*	--	M	U-S	S	R-P	F-G	2	R		M/N
Hak Ip	Black Leaf, Haak Yip, Hei Ye	M	U-S	M	Pu-R	G-E	1-2	R	Photo	Y/M
Kaimana	--	M-H	S	M-L	R	G	3	R	Photo	U/U
Kwai May Red	Kwai Mi	M	U-S	S	P-R	G	3	U	Photo	U/U
Mauritius	Da Zao, Tai So, Hong Huey	H	S	M-L	P-R	G	1	S	Photo	Y/Y
No Mai Chee	No Mai Chi, No Mi Ci, No Mai Tsz, No Mai Tsze	L	S	S-M	Y-R	E	2-3	U		M/U
Ohia	--	L	U-S	S	Y-R	G-E	U	U	Photo	U/U
Salathiel	--	L	S	S	P-R	G-E	U	U		U/U
Sweet Cliff*	Tim Naan, Tian Yan	M	U	S	P	F-G	2	U	Photo	Y/U
Wai Chee	Huai Zhi, Kim Cheng, Wai Chi	L	U-S	S	Y-R	G	2-3	U		U/U
Yellow Red	--	M	U-S	M	Y-R	G-E	3	R		M/N
Hanging Green	--	L-M	S	M	G-P	E	3	R	Photo	N/N
Amboina	--	L	S	S	P-R	P	2	U		N/N
Gee Kee	--	M	S	S	R	G	U	U	Photo	U/U

1, Tree vigor--H: high; M: moderate; L: low. 2, Growth habit--U: upright; S: spreading. 3, Fruit size--S: small; M: medium; L: large. 4, Fruit color--R: red; Pu: purple; P: pink; Y: yellow; G: green. 5, Fruit flavor--E: excellent; G: good; F: fair; P: poor. 6, Fruit bh (bearing habit)--1: regular; 2: irregular; 3: very irregular; U: under evaluation. 7, Fruit susceptibility to anthracnose--S: susceptible; R: resistant; U: under evaluation. 8, Recommendation--Y: yes; N: no; M: maybe; U: under evaluation. *, Cultivar does not grow well as air layers in calcareous, high-pH soil of Miami-Dade County.

Table 2. Cultural calendar for lychee production of mature (bearing) trees in the home landscape.

Operation	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
General ¹												
Nutritional sprays												
Iron soil drenches												
Watering												
Insect control ²	Monitor for lychee webworm. Monitor for bark scale.	Monitor for lychee webworm. Monitor for bark scale.	Monitor for lychee webworm. Monitor for bark scale.	Monitor for bark scale, leaf scales, and mealy bugs.	Monitor for bark scale, leaf scales, and mealy bugs.	Monitor for bark scale, leaf scales, and mealy bugs.	Monitor for bark scale, leaf scales, and mealy bugs.	Monitor for bark scale and leaf scales.	Monitor for bark scale and leaf scales.	Monitor for bark scale and leaf scales.	Monitor for bark scale and leaf scales.	Monitor for lychee webworm. Monitor for bark scale.
Disease control ³												
Pruning												

The period from late Feb./early March into August is generally the best time to apply granular mixes containing nitrogen-phosphate-potash- magnesium (N-P-K-Mg). Only 2 to 3 applications are necessary during this period. Do not apply nitrogen containing fertilizers beyond Aug. as this may promote vegetative growth and prevent flowering in the spring.

Apply 2 to 4 nutritional sprays to the leaves anytime from March through October. These sprays should include magnesium, manganese, zinc, molybdenum, and boron.

The period from April through Sept. is generally the best time to apply 2 to 4 soil drenches of chelated iron material. Dry granular applications of iron sulfate to trees growing in acidic sandy soil may substitute for drenches of chelated iron material. Chelated iron material should be applied to trees growing in high pH, calcareous soils (i.e., Miami-Dade Co.).

Water trees during dry periods of 5 or more days. Watering during the summer may be unnecessary unless drought conditions prevail. Stop watering trees by the end of Aug. and do not water trees unless there is extreme drought from Sept. until spring flowering.

A foliar copper spray may be made one time per month on 'Mauritius' lychee to control anthracnose. Anthracnose is generally not a major problem on other lychee varieties or during dry weather conditions.

Some pruning occurs during the harvest as fruit bunches are removed. However, additional selective pruning is necessary to reduce or maintain trees at 8 to 15 ft in height. Do not tip prune branches after Aug. as this will stimulate new vegetative growth and reduce the likelihood of flowering in the following spring.

Table 2. Cultural calendar for lychee production of mature (bearing) trees in the home landscape.

- 1, See the text for the makeup of nutritional sprays and iron soil drenches.
- 2, Symptoms of lychee webworm infestation are dead emerging panicles during the spring flowering period. Symptoms of bark scale infestation include leaf chlorosis (yellowing), stem dieback, and tree decline. Contact your local county Extension Agent for current control recommendations.
- 3, Fruit symptoms of anthracnose on fruit include dark brown circular spots that enlarge as fruit near maturity/ripening. Anthracnose is generally not a major problem on lychee fruit growing in the home landscape; anthracnose may be a problem on the variety Mauritius.

Table 3. Suggested fertilizer program for lychee in the Florida landscape.

Year	Times per year	Amount/tree/application (lbs) ¹	Total amount/tree/year ¹	Nutritional sprays (times/year) ²	Iron chelate drenches (oz/tree/year) ³
1	6	0.25-0.5	1.5-3.0	6	0.5-0.75
2	6	0.5-1.0	3.0-6.0	6	0.75-1.0
3	6	1.0-1.5	6.0-9.0	6	1.0-1.5
4	2-3	1.5-2.0	9.0-10.0	4	1.5-2.0
5	2-3	2.5-3.0	10.0-14.0	4	2-4
6	2-3	3.0-3.5	14.0-16.0	4	2-4
7	2-3	4.0-4.5	16.0-18.0	4	2-4
8+	2-3	4.5-5.0	18.0-20.0	4	2-4

1, Use 6-6-6-2, 8-3-8-3, 4-4-8-3 or similar materials.
 2, The nutritional spray should contain magnesium, zinc, manganese, molybdenum, and boron; it may also contain iron. Foliar sprays are most effective from April through September/October.
 3, Iron chelate soil drenches (iron plus water) will prevent iron deficiency; foliar iron sprays are generally not effective. Apply soil drenches from June through Sept. See the text under 'Fertilizer' for more information.

Table 4. Nutrient value of raw lychee fruit (3.5 oz or 100 g of fruit).¹

Constituent	Approximate value	Constituent	Approximate value	Constituent	Approximate value
Water content	82%	Carbohydrate	16.5 g	Phosphorus	31 mg
Calories	66 kcal	Total dietary fiber	1.3 g	Potassium	171 mg
Protein	0.83 g	Calcium	5 mg	Sodium	1 mg
Fat	0.44 g	Iron	0.3 mg	Vit. C	71.5 mg
Chloolesterol	0.0 g	Magnesium	10 mg	Niacin	0.6 mg

1, Data from the USDA National Nutrient Database for Standard Reference, <http://www.nal.usda.gov/fnic/foodcomp/search/>