Litchi chinensis

Sonn.

Sapindaceae

lychee, lichi

LOCAL NAMES
Bengali (lichi); Chinese (lizi,jingli,huoshan,danli); English (lychee nut,litchi,lychee); French (quenèpe chinois,quenepier chinois,litchi de chine,litchi,cerisier de la Chine); German (Chinesische Haselnuß,litchipflaume); Hindi (lici,licy,lichi); Indonesian (klengkeng,litsi,kalengkeng); Javanese (klengkeng); Khmer (kuléén); Lao (Sino-Tibetan) (ngèèw); Malay (laici,kelengkang); Spanish (leché); Trade name (lichi,lychee); Vietnamese (vai,cây vai,tu hú)

BOTANIC DESCRIPTION
Litchi chinensis is a handsome, dense, round-topped tree with a smooth, grey, trunk and limbs. Under ideal conditions it may reach 12 m high, but is usually much smaller.

Leaves leathery, pinnate, divided into 4-8 pairs of elliptic or lanceolate, acuminate, glabrous leaflets, 5-7 cm long, reddish when young, becoming shiny and bright green.

Inflorescence a many-branched panicle, 5-30 cm long, many flowered; flowers small, yellowish-white, functionally male or female; calyx tetramerous; corolla absent.

Fruit covered by a rough leathery rind or pericarp, pink to strawberry red. Fruit oval, heart shaped or nearly round, 2.5 cm or more in diameter. The edible portion or aril is white, translucent, firm and juicy. Flavour sweet, fragrant and delicious. Inside the aril is a seed that varies considerably in size. The most desirable varieties contain atrophied seeds called ‘chicken tongue’. These are very small, up to 1 cm in length. Larger seeds vary between 1 and 2 cm in length and are plumper than the chicken tongues. There is also a distinction between the lychee that leaks juice when the skin is broken and the ‘dry and clean’ varieties that are more desirable.

The specific name, ‘chinensis’, is Latin for ‘Chinese’.

BIOLOGY
L. chinensis requires seasonal temperature variations for best flowering and fruiting. Warm, humid summers are best for flowering and fruit development, and a certain amount of winter chilling is necessary for flower-bud development. Usually male flowers appear first, then the females and imperfect bisexual flowers. Pollination is effected by a number of insects including flies, ants and wasps, but bees are very effective.

Lychee in the market. Thanks to The Foundation of Agricultural Development and Education for permission to use this picture. (Tanaka Y.)

Litchi chinensis (Chongrak Wachrinrat)

Fruits (Dan Skean, Jr., July 1983)

Litchi chinensis

Sonn.

Sapindaceae

lychee, lichi

ECOLOGY
L. chinensis is one of the most environmentally sensitive of the tropical tree crops. It is adapted to the tropics and warm subtropics, producing best in regions with winters that are short, dry and cool but frost free, and summers that are long and hot with high rainfall. Good protection from wind is essential for cropping. Year-to-year variations in weather precipitate crop failures, for example, through untimely rain promoting flushing at the expense of floral development, or through poor fruit set following damp weather during bloom.

BIOPHYSICAL LIMITS
Mean annual temperature: 20-25 deg. C, Mean annual rainfall: 1500 mm

Soil type: The tree needs well-drained soil that is rich in organic matter. A soil pH between 5.5 and 7.5 is acceptable, but plants grow much better in soils with a pH at the low end of this range.

DOCUMENTED SPECIES DISTRIBUTION

Native: China, Malaysia, Vietnam

Exotic: Australia, Brazil, Honduras, Hong Kong, India, Israel, Madagascar, Mauritius, Mexico, Myanmar, New Zealand, Reunion, South Africa, Taiwan, Province of China, Thailand, United States of America, Zanzibar

The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

Litchi chinensis

Sonn.

Sapindaceae

lychee, lichi

PRODUCTS
Food: The juicy aril is the edible part of the lychee. It may be eaten fresh or juiced, preserved in syrup and canned, dried or frozen. Lychee nuts are fruit that has been dried, either artificially or in the sun. The food value of lychee lies in its sugar content, which ranges from 7 to 21%, depending on climate and cultivar. Fruit also contains about 0.7% protein, 0.3% fat, 0.7% minerals (particularly calcium and phosphorus) and is a reasonable source of vitamins C (64 mg/100 g pulp), A, B1 and B2. The strong appeal of lychee lies in the exquisite aroma of the fruit.

Apiculture: This tree is widely grown for instance in Singapore and Mauritius as a major honey source. The honey is of excellent quality and flavour.

Timber: The wood is said to be nearly indestructible, although it is brittle and has few uses.

Tannin or dyestuff: Bark contains tannin.

Alcohol: Lychee fruit can be processed into wine.

Medicine: The fruit, its peel and the seed are used in traditional medicine; decoctions of the root, bark and flowers are used as a gargle. Seeds are used as an anodyne in neuralgic disorders and orchitis.

SERVICES
Ornamental: L. chinensis trees are beautiful in spring, when they are covered with huge sprays of flowers; they are also an attractive sight when in full fruit. These characteristics make it a popular ornamental tree in parks and gardens.

TREE MANAGEMENT
L. chinensis needs full sun, but young trees must be protected from heat, frost and high winds. The trees need warmth and a frost-free environment but can often withstand light freezes with some kind of overhead protection. When plants are young, shelter can be provided by building a frame around them and covering it with straw or plastic sheeting. Electric light bulbs can also be used for added warmth.

The trees will not tolerate standing water but require very moist soil, so they should be watered regularly when growing actively. The trees are very sensitive to damage from salts in the soil or in water. The soil should be leached regularly in saline soil areas. Chelated iron and sulphur may be necessary in areas with alkaline soils. Young trees should receive only light applications of a complete fertilizer. Mature trees are heavier feeders and should be fertilized regularly.

Cincturing has been used commercially in China, Thailand, Australia, Florida and Hawaii to impose shoot rest and improve flowering and fruiting. Trees are cinctured after completion of the postharvest flush, if they are healthy and flushed actively. Young trees are pruned to establish a strong, permanent structure for easy harvest. After that, removing crossing or damaged branches is all that is necessary, although the trees can be pruned more heavily to control size; V-shaped crotches should be avoided because of the wood's brittle nature.

GERMPLASM MANAGEMENT
Seed storage behaviour is recalcitrant; storing seed in moist peat moss at 8 deg. C is recommended. Viability is reduced from 100% to less than 20% on desiccation to about 20% mc, and no seeds remain viable when mc is reduced below this value. There is complete loss in viability after 7 days of open storage at 30 deg. C; however, viability of seed stored moist at 5 deg. C was maintained for 60 and at 30 deg. C for 100 days. Germination rate was 92% after 7 weeks of moist storage at 8-10 deg. C with 100% rh and with 80% nitrous oxide plus 20% oxygen; 69% after 280 days moist storage at 15 deg. C in moist (20% mc) perlite, plus chlorthalonil. Excised embryonic axes tolerate desiccation to 30% mc. Seeds extracted from fruit harvested at 98 days after anthesis are more tolerant of desiccation than those from overripe or immature fruit.

PESTS AND DISEASES
Mites, scale insects and aphids occasionally infest L. chinensis. Both immature and ripe fruit attract birds, so it may be necessary to cover the plants with protective netting. Other pests include the macadamia-nut borer, macadamia-flower caterpillar, fruit fly, fruit bats and erisone mites. A parasitic alga (Cephaleuros spp.) occasionally attacks trees, causing loss of vigour. Diseases recorded include bark canker and brown leaf felting.

Litchi chinensis Sonn.

Sapindaceae

lychee, lichi

FURTHER READNG

Anon. 1986. The useful plants of India. Publications & Information Directorate, CSIR, New Delhi, India.

Crane E, Walker P. 1984. Pollination directory for world crops. International Bee Research Association, London, UK.

FAO. 1982. Fruit-bearing forest trees: technical notes. FAO-Forestry-Paper. No. 34. 177 pp.

Glenn T. 1987. Tropical fruit: an Australian guide to growing and using exotic fruits. Penguin Books Australia.

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.

International Board for Plant Genetic Resources (IBPGR). 1986. Genetic Resources of Tropical and sub-Tropical Fruits and Nuts.

Lanzara P. and Pizzetti M. 1978. Simon & Schuster's Guide to Trees. New York: Simon and Schuster

Lemmens RHMJ, Soerianegara I, Wong WC (eds.). 1995. Plant Resources of South-east Asia. No 5(2). Timber trees: minor commercial timbers. Backhuys Publishers, Leiden.

Luna RK. 1996. Plantation trees. International Book Distributors, Dehra Dun, India.

Nicholson B.E, Harrison S.G, Masefield G.B & Wallis M. 1969. The Oxford Book of Food Plants. Oxford University Press

Verheij EWM, Coronel RE (eds.). 1991. Plant Resources of South East Asia No 2. Edible fruits and nuts. Backhuys Publishers, Leiden.

Williams R.O & OBE. 1949. The useful and ornamental plants in Zanzibar and Pemba. Zanzibar Protectorate.

Young JA, Young CG. 1992. Seeds of woody plants in North America. Dioscorides Press, Oregon, USA.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R , Jamnadass R, S Anthony. 2009 Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp)