

Eriobotrya japonica

loquat

Lindl.

Rosaceae

LOCAL NAMES

Amharic (woshmella); Cantonese (luküh, lukwat, pi-pa); Chinese (luju, biba); Creole (lokwat); English (loquat, Japan-plum, Japanese medlar, Japanese loquat, green loquat, stinking toe); French (bibassier du Japon, bibace, néflier du Japon); German (Loquate, japanische mispel, japanische Wollmispel); Hindi (lokat); Indonesian (papalaan, lokwat); Italian (nespola giapponese, nispolero); Japanese (bipa, biwa); Khmer (tôn leap); Malay (paginggong, lokwat); Portuguese (ameixa do Japao); Spanish (nespereira, níspero de Japón); Tamil (ilakotta, nokkotta); Thai (lokhwot, pipae); Trade name (loquat); Vietnamese (s[ow]n tr[af] nh[aa]jt b[ar]n, so'n trà nhat-ban, ti b[af] di[ee]jp, ti baf diêp, nhót tây)

BOTANIC DESCRIPTION

Eriobotrya japonica is an evergreen shrub or small tree 6-8 m high; bole usually rather short, 0.6-1 m long, surmounted by a dense, ovoid or globular crown; bark grey and shallowly fissured, on young branches it is pale brown and hairy.

Leaves are somewhat crowded towards the end of the stout, woolly branchlets, large, alternate, subsessile, stiff, coriaceous, elliptic, lanceolate to obovate, lanceolate in outline, 21-32 cm in length, with remotely toothed to sharply dentate margins; dark, glossy, green above and rusty-tomentose below; base green, obtuse or narrowed into a very short, stout, woolly, stipulate petiole.

Flowers fragrant, 1.2 cm broad, borne in woolly panicles, 10-20 cm long; calyx composed of 5 small, imbricate, acute teeth; corolla has 5 oblong, ovate-clawed petals, white in colour and delicate in texture; stamens 20; pistils 5, joined towards the base.

Fruits borne in clusters, commonly round, oval or pyriform, 2.5-8 cm in length, pale yellow to orange, somewhat downy on the surface; skin about as thick as that of a peach, but slightly tougher; flesh firm and fleshy in some varieties, melting in others, the colour ranging from almost white to deep orange, juicy and with subacid flavour; seeds 4-10, brownish, oblong, 1-2 cm long.

Many *E. japonica* cultivars exist. Based on origin, 2 groups are distinguished: the Chinese groups with large, pyriform, deep orange fruit, ripening mid-season to late, which can be kept for 1-2 weeks, and the Japanese group with small, slender, light-coloured fruit, maturing early and having a shorter shelf life.

The generic name is derived from the Greek words 'erion' (wool) and 'botrys' (cluster), from the woolly appearance of the spiked inflorescence; the specific epithet means 'of Japan'.

BIOLOGY

A hermaphroditic species, the self-incompatibility of *E. japonica* is gametophytic. Cloned trees flower readily within 1-2 years, but worthwhile fruit set takes a few more years. Honeybees are its pollen vectors. After fertilization, the fruit develops very rapidly. Birds and bats disperse the fruit.



Loquat (French B.)



Leaves and fruits. (Arnoldo Mondadori Editore SpA)



Close-up of flowers showing morphology characteristic of Rosaceae. Also shown: closed buds with typical furry appearance and half-opened bud showing unfurling pattern of petals. (Pavone P.)

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ECOLOGY

Originally from regions with a subtropical climate, *E. japonica* requires a mild climate with rainfall evenly spread throughout the year, without excessive heat, especially during fruit ripening. The most favourable conditions for productivity and quality are to be found near the sea. Once established, it is tolerant of drought and of slight frost. Temperatures lower than -5 deg. C damage the flowers, and those lower than -12 deg. C are fatal.

BIOPHYSICAL LIMITS

Altitude: 700-2400 m, Mean annual rainfall: 650-1000 mm

Soil type: Will grow on a great variety of soils, from sands to heavy clays; however, it prefers acid over alkaline soils. The best growth is found in light, well-drained, deep, moist, alluvial soils (gritty subsoil about 1.5 m deep).

DOCUMENTED SPECIES DISTRIBUTION

Native: China, Japan

Exotic: Albania, Algeria, Argentina, Australia, Brazil, Cambodia, Chile, Colombia, Cyprus, Ecuador, Egypt, Eritrea, Ethiopia, France, French Guiana, Germany, Greece, Guatemala, Guyana, Honduras, India, Indonesia, Italy, Kenya, Laos, Libyan Arab Jamahiriya, Madagascar, Malaysia, Malta, Mexico, Morocco, Myanmar, Nicaragua, Panama, Philippines, Portugal, South Africa, Spain, Surinam, Taiwan, Province of China, Tanzania, Thailand, Trinidad and Tobago, Turkey, Uganda, United Kingdom, United States of America, Venezuela, Vietnam



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.

PRODUCTS

Food: The fruit has a thick, tough peel surrounding the firm flesh, with a flavour reminiscent of a peach. It is rich in pro-vitamin A, having a very high carotene content. *E. japonica* is usually eaten fresh but may be stewed, served as a sauce, syrup or jam, or made into an excellent jelly. The fruit composition is 84-89% water, 0.32-0.35 % protein, 0.3-0.6% lipids, 9.89-12.79% sugar and starch, 0.3-0.37% cellulose, and 0.29-0.26% ash. The fruits are a good source of acid and pectin. The seeds, which have an almondlike taste, are used to flavour drinks and cakes.

Fodder: Tender branches are used as fodder in India and in East Africa.

Apiculture: Bees are easily attracted to the fragrant, white flowers. Honey is amber coloured with an agreeable flavour.

Fuel: The wood of *E. japonica* has market value as firewood.

Timber: *E. japonica* has a medium-weight to heavy heartwood with a density of 655-950 kg/cubic m at 15% mc. The heartwood is pale purple-brown with darker streaks, not clearly differentiated from the sapwood. The grain is straight with an attractive silvery look, and the texture is fine and even. The wood is occasionally slightly fragrant. The wood has very little tendency to split or check, is hard, and takes a good polish. It is suitable for poles and posts, carving and drawing materials such as rulers, and is in demand for making stringed musical instruments.

Alcohol: The fruit juice of *E. japonica* can be used to prepare an alcoholic drink.

Poison: The seeds are poisonous and should be removed before cooking the fruit. The flowers are used as an insect repellent.

Medicine: The fruits are considered a sedative and are used in allaying vomiting and thirst. The tanniferous leaves are astringent and antidiarrhoeic, and in China are used to treat wounds. The flowers are used as an expectorant and, extracted in oil, in cosmetics.

SERVICES

Shade or shelter: The fairly dense crown and a compact trunk make *E. japonica* useful for shade and as a windbreak.

Soil improver: The large leaves of *E. japonica* trees are suitable for mulch.

Ornamental: Because of its ornamental appearance alone, *E. japonica* is often planted in parks and gardens. It is also grown as an indoor pot plant.

Boundary or barrier or support: In the Kilimanjaro region of East Africa, the tree is commonly grown on the borders of home compounds.

TREE MANAGEMENT

E. japonica is a productive and regular bearer. Barring crop failure resulting from severe frosts at flowering time, the trees rarely fail to produce well every year. Their tendency is to overbear, with the result that the fruits are apt to be undersized. It has been profitable to thin the crop, since the increased size of the fruits remaining on the tree more than compensates for the fruits removed.

Planting spacing is either 3.5 x 7 m or 6 x 6 m. For good productivity, manuring and inter-planting with a nitrogen-fixing leguminous crop are recommended. Manuring should be carried out every 2 years at the rate of 40-50 kg/tree, or 12-40 t/ha. After planting out, the trees are pruned 60-75 cm above the ground level to promote the growth of 3-5 branches. They are also pruned immediately after harvesting to limit the number of fruits and even out production. Grafted trees, when available, remain smaller but make stronger growth and produce fruit faster. Where insolation is strong the fruit clusters are bagged to prevent sunburn. On the other hand, the fruit is sour without sunshine, as occurs in northern Tanzania.

GERMPLASM MANAGEMENT

The seed does not store well and should be sown when still fresh. Moist storage is recommended; 92% germination following 6 months moist storage at 5 deg. C; viability maintained for 8 days in moist storage at 5 deg. C. Seed storage behaviour of *E. japonica* has been provisionally classified as recalcitrant, since only moist storage has been recommended. But this does not necessarily mean that this species shows recalcitrant seed behaviour. There are about 600 seeds/kg.

PESTS AND DISEASES

The principle enemies of *E. japonica* in California are pear-blight (*Bacillus amylovorus*) and loquat scab (*Fusicladium dendriticum* var. *eribotrye*). In Florida, the flowers are blighted by the anthracnose fungus (*Colletotrichum gloesporioides*). In California, 4 insects usually attack the tree: the codling moth (*Cydia pomonella*), the green apple aphid (*Aphis pomi*), the San Jose scale (*Aspidiotus perniciosus*), and the Florida wax scale (*Ceroplastes floridensis*). In other countries, the fruit is sometimes attacked by the Mediterranean fruit fly (*Ceratitidis capitata*) and the Queensland fruit fly (*Bactrocera tryoni*). In India, the anar caterpillar (*Virachola isocrates*) bores into the fruit.

Black spot (*Spilorea eribotryae*) may be serious in some locations. Fire blight (*Erwinia amylovora*) is one of the most serious diseases of the tree, causing branches to die back. Scab (*Spilocaea eribotryae*) spoils the fruit.

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SUGGESTED CITATION

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