Citrus reticulata

Blanco.

Rutaceae

LOCAL NAMES
Chinese (tangelo,chu Sha Chu,kan,tran Bi); English (mandarin,mandarine orange,Clementine,dancy tangerine,tangerine,satsuma Mandarin,unshu orange); French (mandarinier); Hawaian (ÿAlani Pake); Indonesian (jeruk maseh,jeruk jepun,jeruk keprok); Lao (Sino-Tibetan) (som hot,som lot,liou); Malay (limau langkat,limau kupas,limau wangkang); Thai (som khieo waan,somsaengthong,ma bang); Vietnamese (cam sành,cây quit)

BOTANIC DESCRIPTION
Citrus reticulata is a small, evergreen, sometimes spiny, tree with slender branches and shapely, symmetrical, rather open, rounded crown. With great age, it may reach a height of 7.5 m with a greater spread and the spines can be up to 5 cm long and are very rigid and sharp.

Leaves broad-or slender-trifoliate, shiny evergreen, having minute, rounded teeth, and narrowly-winged petioles and range in size from 5 - 9.5 cm long and half as wide.
Flowers white and very fragrant, usually attracting hoards of honey bees, borne singly or in small clusters in the leaf axils.

Fruit a depressed globose or subglobose berry, with thin, loose peel, easily separating from the segments, bright orange or scarlet-orange when fully ripe, juicy and sweet. They are 5.1-10.2 cm in diameter and have easily divided sections.

Seeds are small, with a slippery bumpy texture, pointed at one end, with green embryo inside, not edible, located in each tangerine segment numbering between 10-20 seeds per fruit, and dispersed uniformly throughout the fruit.

BIOLOGY
Bloom time in the United States is late winter/early spring. The scented flowers are hermaphrodite with apomictic pollination - reproduce by seeds formed without sexual fusion. Insects, especially honeybees are the best pollinators - its pretty colors and pungent smell easily attracts the pollinator. The plant is self-fertile. Since the stamens are adjacent to the stigma, self-pollination is what most often occurs naturally.

Reproductive life cycle is from October through April and peaks November through January in Hawaii. In Thailand the harvest is some 10 months after bloom, whereas outside South-East Asia 7-8 months is more usual.



Habit at Makawao, Maui, Hawaii (Forest & Kim Starr)



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ECOLOGY
The species usually grow in the warm, humid, and subtropical to tropical areas. It gets better fruit color and internal qualities in areas with warmer nights, higher soil temperature and higher humidity. The tangerines are some of the most cold-tolerant members of the citrus clan.

BIOPHYSICAL LIMITS
Altitude: between 600-1300 m

Temperature: not below 7°c. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun.

Rainfall: Plants are intolerant of water logging. Mandarins are drought-resistant and are able to survive long dry periods.

Soil type: Prefers a moderately heavy loam with a generous amount of compost and sand and well drained moist soil. Prefers a pH between 5-6 but can tolerate a pH range of 4.3-8.3.

DOCUMENTED SPECIES DISTRIBUTION

Native: Philippines
Exotic:



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 mandarin fruit can be eaten raw or cooked in puddings, cakes, confectionery etc. It is sweet and delicious. Juice of the tangerine is a great natural sweetener for the grapefruit. The dried rind of the fruit has a sweet spicy flavour and is often used as flavouring in cakes etc.

Medicine: Citrus species contain a wide range of active ingredients and research is still underway to find uses for them. They are rich in vitamin C, flavonoids and acids. The fruit is antiemetic, aphrodisiac, astringent, laxative and tonic. The pericarp is analgesic, antiasthmatic, anticholesterolemic, anti-inflammatory, antiscorbutic, antiseptic, antitussive, carminative, expectorant, stomachic. The flowers are stimulant. It is used in the treatment of dyspepsia, gastro-intestinal distension, and cough with profuse phlegm, hiccup and vomiting. The unripened green exocarp is carminative and stomachic. It is used in the treatment of pain in the chest and hypochondrium, gastro-intestinal distension, swelling of the liver and spleen and cirrhosis of the liver. The seed is analgesic and carminative. It is used in the treatment of hernia, lumbago, mastitis and pain or swellings of the testes.

Essential oils: Pectin and essential oils are derived from the rind, which in Indonesia is used in salads. An essential oil from the peel is used as food flavouring. Citrus species also contain coumarins such as bergapten which sensitizes the skin to sunlight. Bergapten is sometimes added to tanning preparations since it promotes skin pigmentation, though it can cause dermatitis or allergic responses in some people. Oil from the peel is also used in perfume manufacturing, produced mostly in Italy, Sicily and Algeria. More recent applications are as sources of anti-oxidants and chemical exfoliants in specialized cosmetics.

SERVICES
More than 30 virus and virus-like diseases of citrus are known of which Citrus tristeza virus (CTV) is the most destructive. Others are tatter leaf, and the virus-like citrus greening ("huanglongbin"). The greening disease does most damage to citrus orchards. Transmission is through infected planting materials, and by the vector, the Asian citrus psyllid. Citrus tristeza virus is generally the second most important disease problem. It is transmitted by several species of vector aphids. Fortunately, most of the methods used to control citrus greening are also effective against tristeza and other viruses.

Tree losses due to root rot (Phytophthora spp.) are reportedly common in Thailand. Other citrus pests include fruit flies in the genera Anastrepha and Ceratitis, citrus canker bacterium (Xanthomonas axonopodis pv. citri), citrus black spot fungus (Guignardia citricarpa) and sweet orange scab fungus (Elisinoë australis).

TREE MANAGEMENT
Mandarin plants dislike root disturbance and so should be placed into their permanent positions when young. If grown in pots, great care must be taken when potting them on into larger containers. When grown in pots, compost comprising equal quantities of loam and leaf mound and a little charcoal produces good results. Manure should not be used.

For most mandarins, each tree requires an area of between 15 - 25 m² for orchard planting hence a spacing of 5 m x 3 m or 6 m x 4 m suffices for most mandarins, but in South-East Asia trees are usually spaced further apart, in Indonesia and Philippines often 5 m x 6 m or 6 m x 6 m. In the typical Thai orchards on converted paddy fields, the spacing is 8 m x 4 m, a single row of trees being planted on a raised bed flanked by ditches.

Husbandry varies greatly in different growing areas. In Thailand, in spite of the controlled water table, the tree rows are watered regularly during the dry season, but excessively wet conditions should be avoided as this may lead to increased disease. Little pruning is necessary since the crop can be quite heavy, the slender branches need support by bamboo stakes. Windbreaks should be planted to protect crops from high winds.

Biennial bearing is common in mandarin, lowering the average yield. To suppress biennial bearing, as much as 75% of the fruit may be thinned in an 'on' year.

Fruits should be allowed to ripen on the tree (the longer it is allowed to ripen, the sweeter and less acidic it is). Fruit should preferably be clipped with scissors, since simple hand-picking often results in a plug of peel being left behind on the tree, particularly in loose-skinned cultivars. In South-East Asia consumers prefer sweet fruit, which means late harvesting.

GERMPLASM MANAGEMENT
The seed is best sown in a greenhouse as soon as it is ripe after thoroughly rinsing it. Drying seeds results in very low viability (desiccation to 4.6% mc can reduce viability by 50%). Complete loss in viability can occur after 7 months subsequent hermitic storage at -20°C. Germination is usually within 2 - 3 weeks at 13°C. Seedlings are susceptible to damping off so they must be watered with care and kept well ventilated. The seed is usually polyembryonic, two or more seedlings arise from each seed and they are genetically identical to the parent but they do not usually carry any virus that might be present in the parent plant. When large enough to handle, the seedlings should be pricked out into individual pots and grown in the greenhouse for at least three growing seasons before trying them outdoors. Seedlings should be planted out in the summer and given some protection from the cold for their first few winters outdoors.

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SUGGESTED CITATION

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