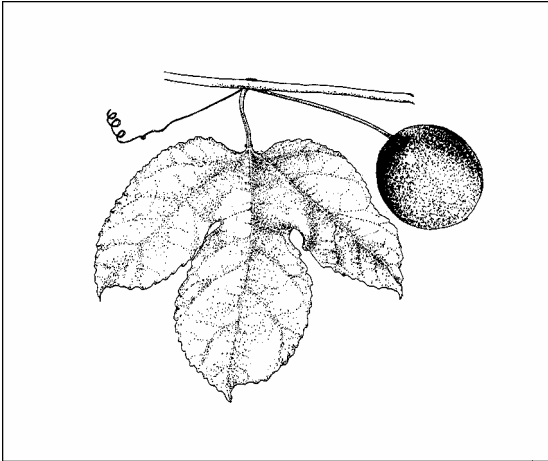


Passiflora edulis Sims
PASSIFLORACEAE

passionfruit

Synonyms: none



General Description.—Passionfruit is also known as parcha, granadilla, maracuyá, ceibey, lilikoi, and linmangkon (Morton 1987). The English prefix “passion” derives from the passion of Christ suggested by the prominent four-branched style that appears in a few of the flowers. Passionfruit is a woody, perennial vine that bears a delicious fruit and occurs in purple- and yellow-fruited forms (*Passiflora edulis* Sims f. *edulis* and *P. edulis* f. *flavicarpa*) known as purple and yellow passionfruits. The plants have a weak taproot and extensive ivory-colored lateral roots. The stem is usually solitary, up to 7 cm in basal diameter, extends 5 to 10 m or more into the crowns of trees, and is covered by a thin, flaky, light brown bark. The stemwood is light and brittle. The twigs are yellow-green, turning brown, and support themselves on vegetation by means of tendrils that arise at the leaf axils. The leaves are alternate, green to yellow-green, three-lobed (on mature plants) with serrate edges. The petioles are 3 to 6 cm long and the blades are 5 to 11 cm long by 4 to 10 cm broad. Solitary flowers arise at the leaf axils. The flowers measure 5 to 7 cm across with five greenish-white sepals and five white petals topped with a fringe-like corona of straight purple and white rays. There are five stamens with large anthers and a triple-branched style. The fruit is globose or ovoid, purple or yellow and 4 to 7 cm in diameter. Inside a thick rind are many dark-brown to black seeds enveloped in small sacs filled with aromatic yellow or orange juice. The fruits of the purple passion fruit are smaller but more

aromatic than those of the yellow form (Acevedo-Rodríguez 1985, Liogier 1994, Morton 1987).

Range.—The purple passionfruit is a native of southern Brazil through Paraguay to northern Argentina. The yellow form of passionfruit is probably native of the Amazon region of Brazil (Morton 1987). Passionfruit is cultivated today throughout the tropics and subtropics and has naturalized and escaped in many areas including Florida, Puerto Rico, U.S. Virgin Islands, Hawaii, Guam, and Western Samoa (Acevedo-Rodríguez 1985, Morton 1987, Pacific Island Ecosystems at Risk 2002).

Ecology.—Altitude and latitude do not appear to be a constraint other than through the temperatures associated with them. Purple passionfruit grows best in a subtropical climate, and the yellow passionfruit prefers a tropical climate with full-season warm days and nights. However, even yellow passionfruit can survive temperatures down to -5°C (Sentelhas and other 1996). Generally, annual rainfall should be at least 900 mm. Rainfall in Indian areas that grow passionfruit ranges from 1000 to 2500 mm/year (Morton 1987). The species is shallow-rooted but withstands drought by defoliating. Passionfruit tolerates a wide variety of soils and grows best on well-drained sandy loams with pH's of 6.5 to 7.5 (Morton 1987). Passionfruit is moderately intolerant of shade, requires trees, brush, or fences for support, and benefits from but does not require soil disturbance for reproduction. Wild plants are found in broken forests, stream-bottom galleries, fencerows, abandoned farms, and neglected city lots. Young plants are eaten by livestock, so passionfruit is almost never found in moderate to heavily grazed areas. A large number of insects, nematodes, fungi, and viruses attack the species (Morton 1987).

Reproduction.—The purple passionfruit blooms in spring and early summer and again for a shorter period in fall and early winter (Morton 1987). Yellow passionfruit in Puerto Rico flower from April to September and yield fruits from June to October (Acevedo-Rodríguez 1985). In some areas, plants fruit twice each year (Popenoe 1920). Plants usually begin blooming and fruiting in their

second year. Yellow passionfruit flowers have both male and female parts but are self-sterile. They rely mainly on carpenter bees (*Xylocopa* spp.) for pollination. Other insects and hummingbirds also visit the flowers. The flowers of purple passionfruit can self-pollinate (Morton 1987). Fruits of the naturalized yellow-fruited form range from about 45 to 120 g in Puerto Rico. There is a large variation between plants in size and shape of fruits. Small fruits are sometimes completely devoid of seeds, and large fruits may have over 200 seeds. A collection of seeds from naturalized plants in Puerto Rico averaged 0.0251 ± 0.0004 g/seed or 40,000 seeds/kg. Passionfruit is usually propagated from seeds but can be started from cuttings, layers, and grafts (Morton 1987). Seeds germinate best if allowed to ferment for a few days in the fruit pulp before cleaning and are lightly scarified by clipping or sandpapering (Morton 1987). A group of seeds in Puerto Rico were sown without pretreatment in commercial potting mix and began germinating in 14 days and completed germination in 24 days with 61 percent germinated. Plants are grown in beds or pots and transplanted when they reach about 25 cm in height. The seedlings are heavily watered after outplanting (Morton 1987). Seeds are disbursed in the wild by humans, animals especially pigs, and birds, and by vine extension.

Growth and Management.—Plants in fertile soil extend their stems about 3 m per year. Each year during the annual dry season, the leaves fall off and the twigs die, leaving the main stem and a few important branches alive to rebuild the crown after the rains begin. Because fruiting takes place on new wood, light pruning does not reduce yield. Plants live from 3 to 8 years and do not resprout. Commercial stands are managed in vineyards, somewhat like grapes. They are planted in trellised rows 4.5 m apart and spaced 4.5 m apart within rows. The orchards are replanted every 4 to 6 years (Bailey 1941). Alternately, vineyards may be established using small trees or bamboo as standards (Heenkenda and Punchikumarhami 1991). Fruiting plants can even be grown in pots under glass (Anonymous. 2001). Fruits fall after ripening on the vines and are picked up from the ground at least twice per week. The roots normally form mycorrhizal associations and benefit from inoculation with superior strains of fungi (Cavalcante and others 2001). Wild plants are usually scattered and attempts at management have not been reported.

Benefits.—By far the greatest benefit of

passionfruit to humankind is its fruit and the delicious juice made from it. In addition to being collected by local people in the forests, the fruit is now grown in vineyards in dozens of countries. It is condensed, frozen, and shipped worldwide. The fruit pulp contains 2.2 percent protein, 0.7 percent fat, and 21.2 percent carbohydrates. In addition, the seeds contain 23 percent oil similar to sunflower or soybean oil, and the rind residue is used for cattle feed (Morton 1987). The fruits of native and naturalized stands furnish food for numerous species of wild mammals and birds. The whole plant, especially the leaves, contains alkaloids and a number of other phytoactive chemicals. Among these is passiflorine, a known sedative and tranquilizer (Morton 1987). Extracts of the leaves have been used for centuries as sedatives by native Brazilians. They prepare a drink from the flower to treat asthma, bronchitis, and whooping cough. The plant is also used as a diuretic to treat urinary infections (Rain-tree 2002).

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