Casimiroa edulis

Llave & Lex.

Rutaceae

LOCAL NAMES
English (white zapote,white sapote,mexican sapote,Mexican apple,casimiroa); Spanish (zapote blanco,matasano,chapote)

BOTANIC DESCRIPTION
Casimiroa edulis is an evergreen tree to 18 m tall, with spreading, often drooping branches and a broad leafy crown. Bark light-grey, thick and warty.

Leaves palmately compound, alternate, digitate; stipules absent; petiole 5-9.5 cm, finely pubescent; leaflets sessile or subsessile, 3-7, elliptic, ovate or broadly ovate, 4.5-12 cm long, 1-5 cm wide, apex acuminate, retuse or occasionally rounded, base cuneate, margins subserrate, bright green, glabrous or with scattered pubescence on the veins, vennation pinnate, anastomising at the margins.

Inflorescence paniculate; flowers odourless, small, regular, unisexual, 5-merous, hermaphrodite or occasionally unisexual because of aborted stigmas. Sepals lacinate, hirsute; petals greenish-yellow, 3-7 mm long; stamens 5, filaments subulate, thickening at the base; ovary superior, 5-celled, stigma sessile, lobate.

Fruit yellowish-green, spherical or ovoid drupe, irregular and knobby, with rough, pitted skin, often with gritty particles in the flesh, 6-10 cm in diameter, smooth, pulp sweet.

Seeds oval and wedged, usually 1-6/fruit, 18-23 mm long.

The woolly-leaved white sapote, often called C. tetrameria may be only a variant of C. edulis. It usually has 5 leaflets, larger and thicker than those of C. edulis and velvety-white on the underside, and all the parts of the flowers are in 4's.

A number of varieties are described some of these may actually be chance hybrids. Some have been named and propagated: 'Blumenthal', 'Chapman', 'Coleman', 'Dade', 'Flournoy', 'Galloway', 'Gillespie', 'Golden' or 'Max Golden', 'Johnston's Golden', 'Harvey', 'Lenz', 'Lomita', 'Maechtlen', 'Maltby' or 'Nancy Maltby', 'Nies', 'Page', 'Parroquia', 'Pike', 'Sarah Jones', 'Suebelle', or 'Hubbell', 'Walton', 'Whatley', 'Wilson', 'Wood', 'Yellow'.

BIOLOGY
The white sapote fruits from June-August. In the Bahamas, the fruits ripen from late May through August. In Mexico, flowering occurs in January and February and the fruits mature from June to October. In Florida there is usually just a spring-summer crop. In California, 'Pike' and 'Yellow' varieties bloom in the spring and again in late summer and fall, the fruits from late blooms maturing gradually over the winter. 'Suebelle' blooms for 6 to 8 weeks in spring and again in midsummer and fruits ripen in September and October. C. edulis is hermaphroditic, occasionally unisexual due to aborted stigmas.

There is a great variation in the amount of pollen produced by seedlings and grafted cultivars. Some flowers bear no pollen grains; others have an abundance. Sterile pollen or lack of cross-pollination are suggested causes of aborted seeds and heavy shedding of immature fruits.

Casimiroa edulis specimen at the Nairobi Arboretum, Kenya. (AFT team)

Fruit cluster (Trade winds fruit)

Near-ripe fruit cluster (Trade winds fruit)

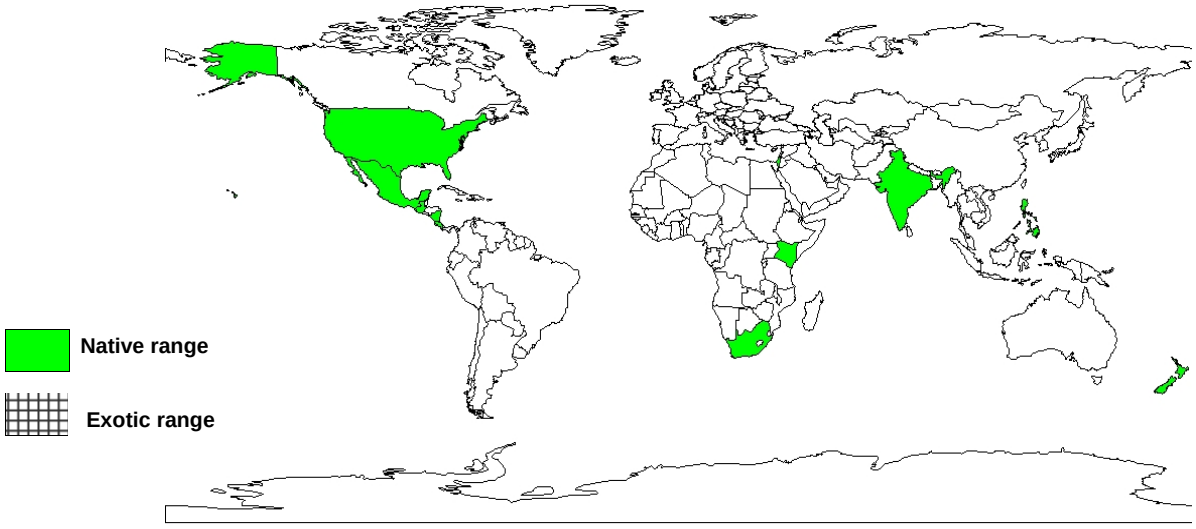
ECOLOGY
The white sapote occurs in subtropical deciduous woodlands and low forests. It occurs both wild and cultivated in central Mexico but is planted in Guatemala, El Salvador, Costa Rica, South America, the Bahamas, the West Indies, parts of the Mediterranean region, India, Philippines. It is fairly drought tolerant.

BIOPHYSICAL LIMITS
Altitude: 1 200-2 400 m
Mean annual temperature: 18 deg C
Soil type: Well drained sandy loam or even on clay, decomposed granite soil, oolitic limestone.

DOCUMENTED SPECIES DISTRIBUTION

Native: Bahamas, Costa Rica, Guatemala, India, Israel, Kenya, Mexico, New Zealand, Nicaragua, Philippines, South Africa, US

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 fruit is edible and is used in Mexico and El Salvador as dessert. The flavour is sweet with a hint or more of bitterness and sometimes distinctly resinous.

Timber: The wood is yellow, fine-grained, compact, moderately dense and heavy, medium strong and resistant, but not durable for long. It is occasionally employed in carpentry and for domestic furniture in Central America.

Poison: The seed is said to be fatally toxic if eaten raw by humans or animals. Extractions from the kernels are an attractive and lethal bait for American cockroaches, having the advantage of killing on the spot rather than at some distance after ingestion of the poison.

Medicine: For many years, extracts from the leaves, bark, and especially the seeds have been employed in Mexico as sedatives, soporifics and tranquilizers. The fruit is considered medicinal, the ancient Nahuatl name for the fruits "cochiztzapotl" is translated "sleepy sapote" or "sleep-producing sapote". Eating the fruit produces drowsiness and it is widely claimed in Mexico and Central America that consumption of the fruit relieves the pains of arthritis and rheumatism. The fruit is also reportedly vermifugal. The narcotic property of the seeds was first identified as an alkaloid by Dr. Jesus Sanchez of Mexico in his thesis, 'Breve estudio sobre la almendra del zapote blanco' in 1893 many years later the alkaloidal glycoside casimirin was related with the soporific activity. Since then a number of other substances especially alkaloids have been identified e.g. casimiroine, casimiroedine, the main seed alkaloid, casimiroedine, represents 0.143% content. Crushed and roasted seeds are effective in healing putrid sores. In Costa Rica, the leaf decoction is taken as a treatment for diabetes. Vasodepressive activity of the white sapote is attributed to Na-dimethy-1-histamine, formerly found in nature only in the sponge, Geodia gigas.

Other products: Also present are coumarins, flavonoids, and limonoids, including zapoterin, zapotin, zapotinin, casimirolid, deacetylnomilin, and 7-a-obacunol. Leaves and twigs yield isoplimpinellin (diuretic) and n-hentriacontane.

SERVICES
Shade or shelter: They are planted as shade for coffee plantations in Central America.

Ornamental: White sapote trees often are grown strictly as ornamentals in California.

TREE MANAGEMENT
In California, the young trees are cut back to 0.9 m when planted out, in order to encourage low-branching. As the branches elongate, some pruning is done to induce lateral growth. Fertilizer formulas should vary with the nature of the soil, but, in general, procedures suitable for citrus trees apply to the white sapote. Many white sapote trees have received little or no care and yet have been long-lived. White sapote are fairly drought-resistant. The fruits must be handled with care even when unripe as they bruise so easily and any bruised skin will blacken and the flesh beneath turns bitter. Mature fruits must be clipped from the branches leaving a short piece of stem attached. This stub will fall off naturally when the fruits become eating-ripe. If plucked by hand, the fruits will separate from the stem if given a slight twist but they will soon show a soft bruised spot at the stem-end which quickly spreads over much of the fruit, becoming watery and decayed. If picked just a few days before fully ripe and ready to fall, the fruits turn soft quickly but they can be picked several weeks in advance of the falling stage and most will develop full flavor. 'Pike', however, if picked a month early, will take 2 weeks to ripen and will be substandard in flavor. Fruits that have ripened on hand will keep in good condition in the home refrigerator for at least 2 weeks. Fruits from commercial orchards are wrapped individually to retard full ripening, packed in wooden boxes, and well-padded for transportation under refrigeration.

FURTHER READNG

FAO. 1986. Some medicinal plants of Africa and Latin America. FAO Forestry Paper. 67. Rome.

http://www. purdue newcrop index site

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)