Manilkara zapota (L.) P. Royen

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SAPOTACEAE (SAPODILLA FAMILY)

No synonyms

Chakya, chicle, chico, chicozapote, chictsápotl, mispel, mispu, naseberry, níspero, sak-ya, sapodilla, sapote, sapote blanco, sapote colorado, sapote chico, sapotí, xicontsapotl, ya', zapote, zapotillo

Manilkara zapota is native to America. It is distributed naturally from Mexico, through Central America, to southern Costa Rica, sometimes forming extensive groupings. The plant is an important component of the hot-humid and subhumid tropical forests. The species has been introduced in different tropical and subtropical regions of the New and Old Worlds.

Manilkara zapota is an evergreen tree that can reach 40 m in height and 150 cm d.b.h. The trunk is straight, cylindrical, and grooved in the lower part. The low, irregular, and dense crown is made up of numerous thick and horizontal branches with shiny green foliage. The leaves are simple, gathered at the tips of the branches, elliptic to oblong, 5.5 to 18 cm long, and 2 to 7 cm wide. In the Yucatan Peninsula, the tree grows in calcareous soils with outcropping rocks, forming part of the tropical forest. The regions where the tree is found have an average annual temperature of 26 °C, with a maximum temperature of 36.7 °C and a minimum temperature of 14.9 °C. The maximum temperatures correspond to the months of April and May, the minimum temperatures to the months of December and January. Average annual precipitation is approximately 1288 mm, ranging between 900 and 1800 mm. The tree grows from sea level to 900 m.

Very important in the development of the Mayan culture, *M. zapota* has multiple uses. It is cultivated primarily for its edible fruits, which are considered one of the tastiest fruits of the tropical regions. The coagulated latex that the tree produces is called chicle, a substance the Mayans chewed to quench thirst. For many years, this substance was the raw material for the manufacture of chewing gum, and the tree was intensely exploited in its natural habitat. Because the wood is very hard, heavy (specific gravity is 0.86), and quite durable under adverse environmental conditions, it is used in rural construction and for railroad ties and handles for tools. It has also been used in the manufacture of furniture and as parts of carriages such as wheels for carts. The tree is cultivated extensively in backyards that have hot soils. It is also appreciated as an ornamental in streets, parks, and gardens. The bark contains tannin, and it is used to tan hides. The flowers are honey-bearing (Aguilar 1966, Barrera 1981, Cabrera and others 1982, Chavelas and González 1985, Flores 1993, Hoyos 1979, Little and others 1967, Miranda 1975, Rico-Gray and others 1991, Schubert 1979, von Carlowitz 1991).

The tree begins to yield flowers and fruits between 4 and 5 years of age. Because its geographical distribution is extensive, *M. zapota* blooms at different times but especially June through October, and it fruits from January through April (Pennington and Sarukhan 1968). In southeastern Mexico, the plant blooms May through September and fruits December through April (Juárez and others 1989). The flowers are white, shaped like a goblet or bell, and isolated. The fruits are produced at an annual rate of three to four thousand fruits per tree (Flores 1983). The fruits are rounded, ovoid to globose berries that are brown when ripe, up to 10 cm long, pulpy, sweet, and juicy with milky sap. The pulp is yellowish brown. Each fruit contains one to five seeds (Cabrera and others 1982, Little and others 1967, Pennington and Sarukhan 1968). The seeds are elliptic to obovate, laterally flattened, 16 to 24 mm long, 8 to 16 mm wide, and 4 to 6 mm thick. The seedcoat ranges from light brown to blackish, smooth, shiny, and crustaceous and has a ventral, oblong-linear hilum scar. The hilum scar is narrow, white to yellowish cream in color, 9 to 17 mm long, and 2 mm wide.

Ripe fruits are collected in March and April either from the ground or by climbing the tree and using poles with metal hooks. The pulp is removed from the fruits by hand inside a bucket of water. Resulting impurities float and are gathered

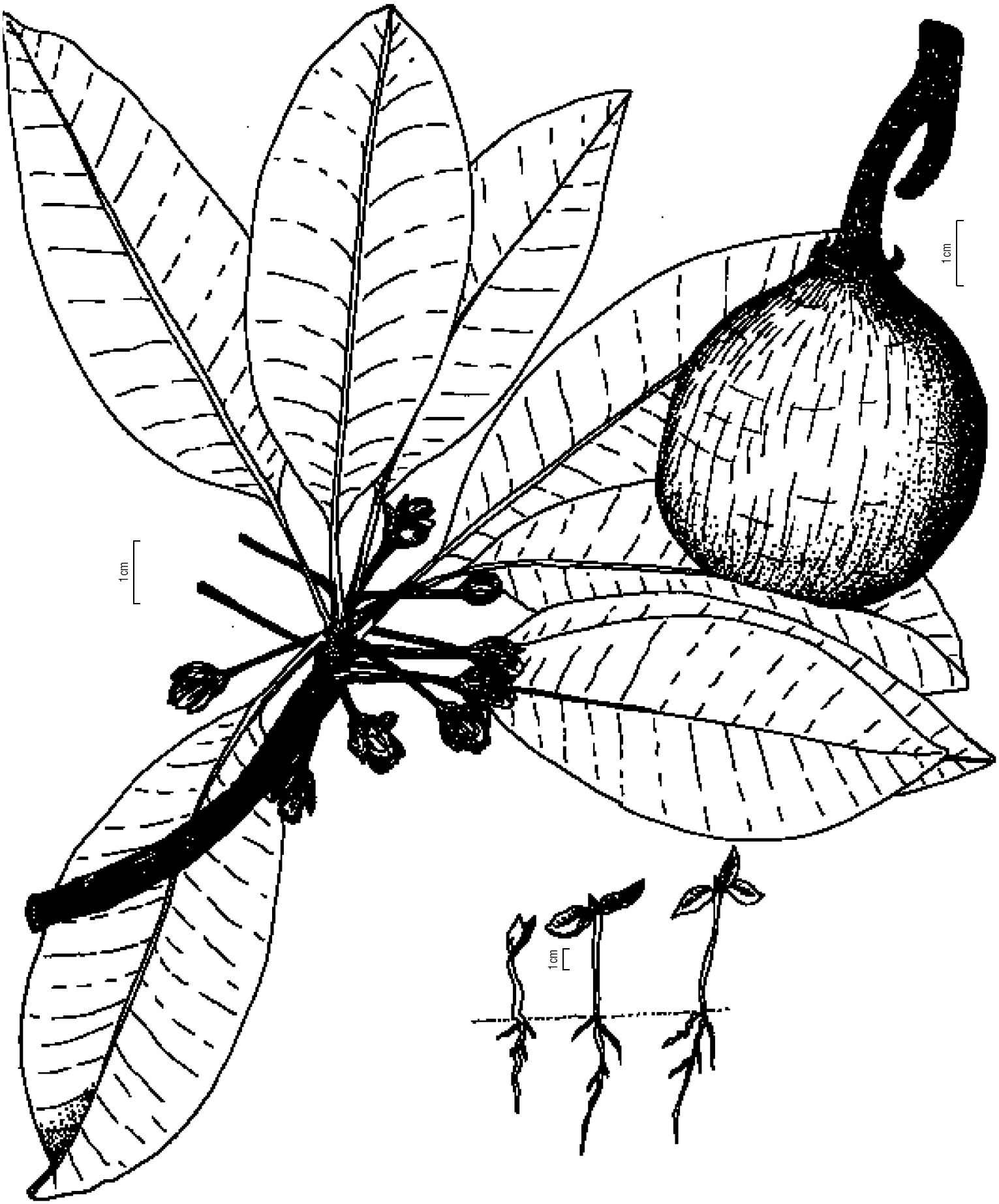
with a strainer. Good seeds sink. Subsequently, the seeds are dried in the sun in ventilated places for 1 or 2 hours depending on light conditions. Seeds average 2,400 to 7,890 per kg (Patiño and Villagómez 1976). Seeds remain viable for approximately 7 months when stored under ambient conditions (24 to 30 °C). With longer storage their viability quickly diminishes (Vega and others 1981).

Under humid conditions the fresh seeds germinate at 11 percent without pretreatment. A heterogeneous sample of seeds germinated 12 days to 5 weeks after sowing (Kennard and Winters 1960, Vega and others 1981).

Manilkara zapota propagates naturally by seeds. However, the species is commercially propagated by aerial shoots, stem cutting, or grafts (von Carlowitz 1991). Models sprouted from seeds are used in grafting (Food and Agriculture Organization 1982).

ADDITIONAL INFORMATION

The hilum is subbasal. The micropyle is indiscernible. The endosperm is abundant, pulpy, whole, and whitish, and surrounds the body of the embryo. The embryo has a straight axis and is asymmetrical, spatulate, and white. There are two expanded, ovate, thin and foliaceous, independent cotyledons, with latex. The plumule is undifferentiated. The radicle is short, obtuse, cylindrical, and well developed (Blackwell 1968, Cronquist 1946, Eyma 1966, Guil 1967, Pennington and Sarukhan 1968, Pilz 1981, Reitz 1968, Standley and Williams 1967, Wood and Channel 1960).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