

## Chrysophyllum cainito

L.

Sapotaceae

### LOCAL NAMES

Burmese (hnin-thagya); Cantonese (chicle durian); Creole (bon kaymit, kaymit fèy dò, kaymit fran, kaymit jaden, gran kaymit); English (golden leaf, West Indian star apple, caimito, star-apple, cainito); Filipino (kaimito); French (caïmitier à feuilles d'or, caïmitier, caïmite franche, caïmite des jardins, caïmite, bon caïmite, pomme surette, grand caïmite); Indonesian (sawo kadu, sawo ijo, sawo hejo); Italian (cainito); Javanese (ijo, sawo ijo, sawo); Lao (Sino-Tibetan) (nam<sup>2</sup> nom); Malay (sawu duren, hnin-thagya); Sinhala (chicle durian); Spanish (caimo, caimito, caimo morado, cainito, maduraverde); Thai (sata apoen); Vietnamese (c[aa]y v[us] s[uwx]a)

### BOTANIC DESCRIPTION

*Chrysophyllum cainito* is an evergreen tree that can grow up to a height of 15 m and trunk diameter of 60 cm. Bole usually straight, cylindrical, but often fluted or spurred at the base; buttresses small or absent; bark surface rough, irregularly fissured and brown; inner bark fibrous, orange-white mottled to yellow-white, exuding white latex. Young twigs reddish-brown and hairy.

Leaves alternate, distichous or spirally arranged, simple, oval or oblong, 7.6-12.7 cm long, 3.8-5.8 cm wide, deep green, hairless and glossy above, golden-brown with a sheen like that of satin beneath; exstipulate; apex mostly abruptly short pointed, short pointed at base, with untoothed edges and slightly thickened; tertiary veins often parallel to the secondaries and descending from the margin. Petiole 1.3-1.6 cm long, reddish-brown, hairy.

Inflorescences axillary, ramiflorous or cauliflorous. Flowers unisexual or bisexual, fasciculate or, rarely, solitary; small and inconspicuous, purplish-white, axillary. Calyx a single whorl of 4-6; usually 5 imbricate or quincuncial sepals, sometimes accrescent in fruit, frequently ciliate. Corolla 5-lobed, globose, campanulate or cylindrical; tube shorter than, equalling or exceeding the lobes, lobes (min. 4) 5 (max. 8), simple. Stalk slender, hairy, reddish-brown, 64-95 mm long. Stamens 4-8, usually fixed in the corolla tube; ovary superior, (min. 4) 5 (max. 12)-locular with 1 ovule per cell (axile placentation); style included; anthers extrorse in bud, hairy or glabrous. Staminodes rarely present, as small lanceolate or subulate structures in the corolla lobe sinuses, alternating with the stamens; disk absent.

Fruit is commonly round, sometimes oblate, and 5-10 cm in diameter. Rind thick, leathery, smooth surfaced, somewhat glossy, dull purple in some varieties, light green in others; has a gummy latex; flesh white and jellylike. On cutting the fruit transversely, it is found differentiated into 2 kinds of flesh; directly under the tenacious skin is a layer of soft, somewhat granular flesh, concolorous with the skin, and not very juicy; enclosed by this are 8 translucent, whitish segments in which the seeds are embedded. Normally there is 1 seed in each segment, but frequently several are aborted, leaving 3-5 in the fruit. Seeds ovate to elliptic in outline, laterally compressed, 2 cm long, hard, brown and glossy with an adaxial scar.

The generic name is based on Greek words for 'gold' and 'leaf' and refers to the leaves of some species that are often covered with golden hairs underneath. When the fruit is halved transversely, these cut segments present a star-like appearance, giving the tree the common name of 'star apple'. Two races are common, one green fruited and the other purple fruited; they are not known to differ in flavour or other characteristics except colour.

### BIOLOGY

*C. cainito* commences to bear fruit in its 3rd to 5th year and usually reaches its full production in its 6th to 7th year. Flowering occurs in the summer, and the fruits mature from late fall to summer. The fruit ripening season in the West Indies is April and May; it is reported that trees do not



Habit at Enchanting floral Gardens Maui, Hawaii (Forest & Kim Starr)



Haitian star apple leaves. Kula Ace Hardware and Nursery. Maui, Hawaii (Forest & Kim Starr)



Haitian star apple leaf. Kula Ace Hardware and Nursery. Maui, Hawaii (Forest & Kim Starr)

fruit in the Virgin Islands. Bats disperse the fruit.

**ECOLOGY**

C. cainito is tropical in its requirements and prefers a humid atmosphere with relatively high temperatures throughout the year. Throughout Southeast Asia it thrives in the lowlands and in areas with a distinct dry season.

**BIOPHYSICAL LIMITS**

Altitude: Up to 400 m

Soil type: C. cainito grows successfully on almost all types of soil; fertile, well-drained and slightly acidic soils are preferred. Grows well both on shallow sandy soils and on deep clayey loams.

**DOCUMENTED SPECIES DISTRIBUTION**

- Native:** Antigua and Barbuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Virgin Islands (US)
- Exotic:** Angola, Argentina, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Ecuador, Egypt, Equatorial Guinea, Eritrea, Ethiopia, French Guiana, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, India, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Paraguay, Peru, Philippines, Rwanda, Sao Tome et Principe, Seychelles, Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Surinam, Swaziland, Tanzania, Thailand, Togo, Uruguay, US, Venezuela, Zambia, Zimbabwe



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:** Its fruit is held in much the same estimation as Zapote. It is usually eaten fresh and may also be used as an ingredient of ice cream and sherbet. In Jamaica it is sometimes made into preserves. When unripe, the star apple contains a sticky, astringent, latex, but on ripening, a white translucent pulp with a sweet and pleasant flavour is formed around the dark seeds.

**Fibre:** Good quality paper can be obtained from *C. cainito* wood.

**Timber:** Sapwood and heartwood reddish-brown to dark brown, strong, hard but not durable, with fine to medium texture, fairly straight grain; specific gravity of 0.70. It is used for general indoor construction, such as planking, light framing, flooring, interior trim, lining, shelving, cladding, panelling and partitioning. It is also suitable for mouldings, light tool handles, inlaying, carving, joinery, furniture and cabinet making. Good-quality veneer and plywood can be obtained from it. The use of this wood is not expected to increase.

**Tannin or dyestuff:** Tannins are extracted from the bark.

**Medicine:** Undersides of leaves are grated and applied as a poltice to a wound; leaf decoction is taken orally for hypoglycaemia. Fruit is used in treating haemorrhage or is cooked and used for fever. The bark, latex and seeds also possess medicinal properties.

**SERVICES**

**Shade or shelter:** It is widely planted as a shade tree.

**Ornamental:** The foliage is bright blue-green above and coppery beneath, creating attractive contrast when stirred by the wind; for its ornamental value alone it merits cultivation. In Cuba, Jamaica and several other tropical American countries, *C. cainito* is a common garden tree.

**Other services:** Branches of trees are used as a medium for growing orchids.

**TREE MANAGEMENT**

Some trees yield heavy crops of fruit, others bear little. Young trees are sensitive to water stress in their 1st year, and growth during that time is slow. Once the tree is established, growth rate and development become more rapid. Deep mulching with straw or lawn clippings, application of fertilizer and frequent dry-season watering all seem necessary for success with this species.

**GERMPLASM MANAGEMENT**

Seed storage behaviour is intermediate, and seeds should not be dried before storage. Viability can be maintained for 6 months in moist storage at 20 deg. C.; 81% germination on desiccation to 4% mc (in equilibrium with 30% r.h.); 23% germination after 14 months of subsequent hermetic storage at 10 deg. C. for 1 seed lot. There are about 1100 seeds/kg.

**PESTS AND DISEASES**

Insect pests include twig borers, carpenter moth, mealy bugs, scales and fruit flies. The oriental fruit fly *Dacus dorsalis* is a serious pest of ripening fruit and renders the fruit unfit for human consumption. Wrapping young fruit and collecting and destroying the infested fruit may reduce the damage. Birds, bats and wild cats can also cause considerable damage.

The fungus *Lasiodiopodia theobromae* causes dry, sooty rot on fruits, which copper fungicides can controlled. In Queensland, Australia, *Fusarium solani* kills young trees and affects limbs of older trees. An unidentified fungal pathogen shrivels immature fruit in Florida.

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**SUGGESTED CITATION**

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