

CHAPTER 16

LAVULU

Pouteria campechiana (Kunth) Baehni.

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INTRODUCTION

Lavulu (*Pouteria campechiana* (Kunth) Baehni), an underutilized but economically important fruit tree species of the family Sapotaceae, is native to the Central American region. In Sri Lanka and other south Asian countries, the species is grown in homegardens. The ripe Lavulu is consumed as a dessert fruit. A number of processed food items, such as dessert, jam, marmalade, pancakes and flour are made from the ripe fruit. As a fairly slow-growing, long-lived species, Lavulu is also valued as an ornamental tree and used in tropical landscapes due to its compact crown and glossy leaves (Plate 16.1). The high nutritional value of the fruit may attract more interest and promote its wider cultivation in the future.

TAXONOMY

The nomenclature of Lavulu is as follows:

Kingdom:	Plantae (plants)
Sub kingdom:	Tracheobionta (vascular plants)
Super division:	Spermatophyta (seed plants)
Division:	Magnoliophyta (flowering plants)
Class:	Magnoliopsida (dicotyledanae)
Sub class:	Dilleniidae
Order:	Ebenales
Family:	Sapotaceae
Genus:	<i>Pouteria</i> Aubl.
Species	<i>Pouteria campechiana</i> (Kunth) Baehni

Source: <http://plants.usda.gov/>



Plate 16.1: Lavulu Plant with Leaves and Fruits.

Synonyms

Pouteria campechiana has been the subject of much botanical confusion as evidenced by its many synonyms: *Lucuma campechiana* Kunth, *L. laeteviridis* Pittier, *L. multiflora* Millsp., *L. nervosa* A. DC., *L. salicifolia* Kunth, *L. campechiana* HBK, *L. heyderi* Standl., *L. palmeri* Fernald, *L. rivicola* Gaertn., *L. rivicola* var. *angustifolia* Miq., *L. salicifolia* HBK, *Pouteria campechiana* var. *nervosa* Baehni,

P. campechiana var. *palmeri* Baehni, *P. campechiana* var. *salicifolia* Baehni, *Richardella salicifolia* Pierre, *Sideroxylon campestre* T.S. Brandeg, *Vitellaria campechiana* Engl. and *V. salicifolia* Engl.

Sources: Morton (1987; 1992); Verdcourt and Meijer (1995).

Vernacular names

Lavulu is known by a number of vernacular/common names (Table 16.1).

No systematic cytogenetic studies have been carried out for Lavulu.

BOTANICAL DESCRIPTION

Lavulu tree has been described by Karunanayake (1992); Morton (1987; 1992); Troup (1986); Verdcourt and Meijer (1995); Watt (1972); Wealth of India (1985).

Plant: Lavulu is a medium sized, evergreen tree, 12-20 m tall and a 25-60 cm diameter trunk. The dark grey bark is finely ribbed and 4-5 mm thick. It is rich in white gummy latex in every part of the tree. The branches are mainly horizontal. *

Leaves: The leaves alternate, but mostly grouped as whorls at the tips of the branches, obovate-elliptic, 6-28×2.5-8 cm in size, glossy, bright green, and bluntly pointed at the apex, more sharply tapered at the base. The petioles are 5-25 cm long (Figure 16.1).

Flowers and sexual system: Lavulu flowers are bisexual, fragrant, solitary, or in small clusters, borne in the leaf axils, or at leafless nodes on slender pedicels, which are 5-12 cm long. They are 5- or 6-lobed, cream-colored, silky-hairy, about 8-11 mm long. The sexual system is hermaphrodite.

Fruits: The fruits are a variable shaped (round, ovoid, obovoid, subglobose, spindle) berry, often with pointed apex (Figure 16.1). Unripe, fruit is green-skinned, hard and gummy internally. On ripening, the skin turns lemon-yellow, golden-yellow, or pale orange-yellow, very smooth and glossy. The calyxes 5-pointed at the base,

which may be rounded, or with a distinct depression. Immediately beneath the skin, the yellow flesh is relatively firm and mealy with a few fine fibres. Toward the centre of the fruit, it is softer and pastier. The flavour is sweet, more or less musky. There may be 1 to 4 hard, freestone seeds, 2-5.3 cm long and 1.3-3.2 cm wide, near-oval or oblong-oval, glossy and chestnut-brown, except for the straight or curved ventral side which is dull light-brown, tan or greyish-white. Both ends of seeds are sharp-tipped.

Table 16.1: Common/Vernacular Names of Lavulu.

Country/ Language	Common / Vernacular Name
Bahamas	Mammee sapota, Egg fruit, Ti-es
Belize	Mamey cerera, Mamey cerilla, Mamee ciruela, Kanizte
Colombia	Costiczapotl, Custiczapotl fruta de huevo, Zapote Amarillo
Costa Rica	Canistel, Siguapa, Zapotillo
Cuba, Hawaii, Jamaica, Puerto Rico, Florida	Egg-fruit, Canistel, Ti-es, Yellow sapote
El Salvador	Guaicume, Guicume, Zapotillo, Zapotillo Amarillo
English	Canistel, Egg-fruit, Yellow sapote, Star apple
French	Canistel, Jaune d'oeuf
Guatemala	Cakixo, Canizte, Kanis, Kaniste, Hantzé, Kantez, Limoncillo, Mamee ciruela, Zapotillo de montana
Mexico	Zapote mante, Zubul
Nicaragua	Zapote Amarillo
Philippines	Boracho, Toesa, Canistel
Puerto Rico, Venezuela	Huevo vegetal
Sinhala	Lavulu
Spanish	Cucuma, Custiczapotl, Fruta de huevo, Mamey de campechi, Mammee sapota, Zapote amarillo, Zapote mante
Tamil	Mansal palam
Thailand	Lamut khamen, Khe maa, To maa

Sources: Morton (1987; 1992); Verdcourt, and Meijer (1995).

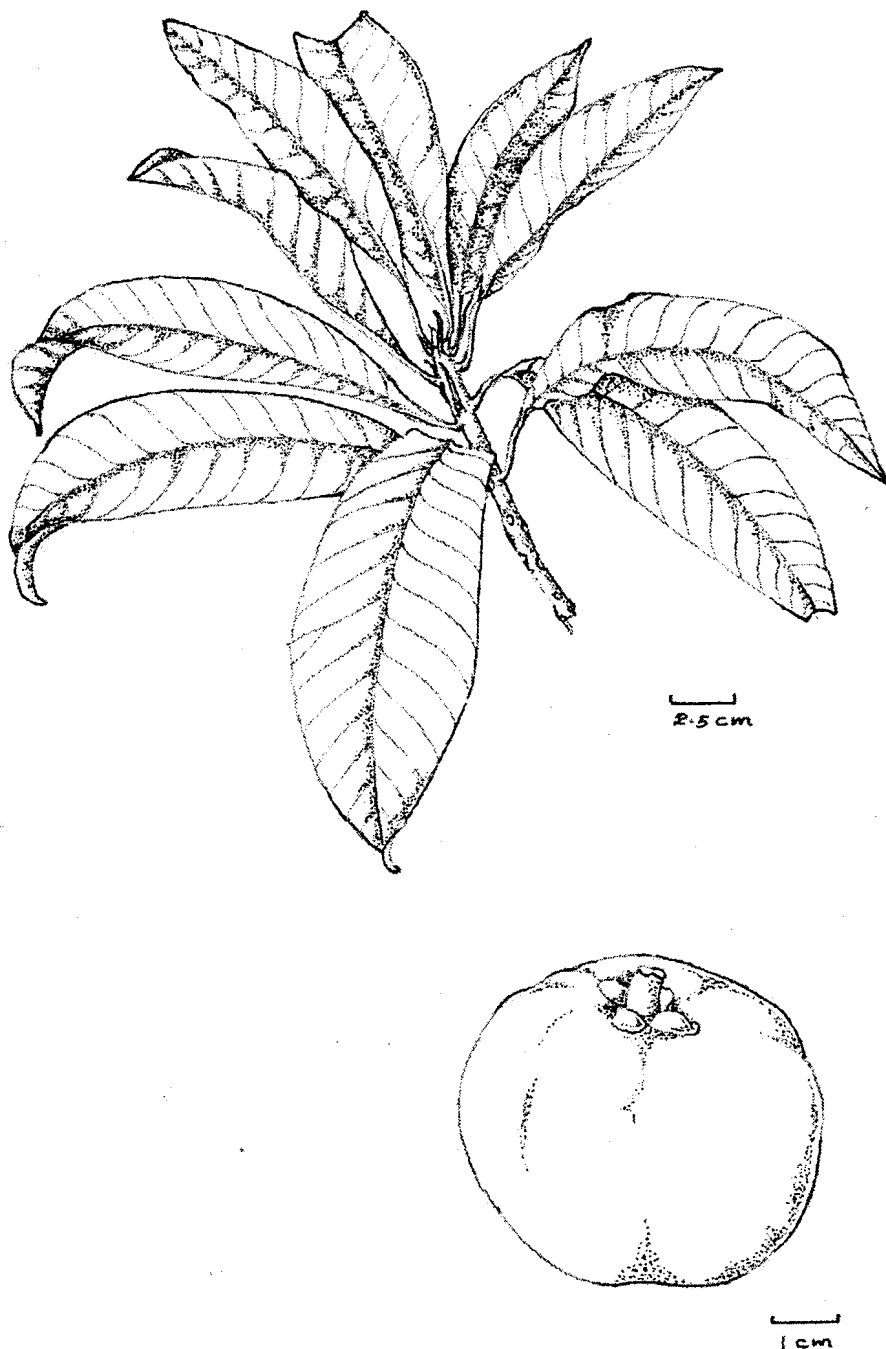


Figure 16.1: Branch, Leaves and Fruit of Lavulu.

Flowering and fruiting phenology: There is considerable variation as to the time of flowering and fruiting among seedling trees. Flowering under tropical climate extends from January to June, though some trees flower throughout the year. Fruits ripen 5-6 months after flowering. The fruits generally mature from September to February. Some trees produce more or less continuously throughout the year.

ORIGIN AND GEOGRAPHICAL DISTRIBUTION

Lavulu is native to Central American region, particularly to southern Mexico (including Yucatan), Belize, Guatemala, Bahamas and El Salvador. It is cultivated in these countries and in Costa Rica (where it has never been found wild); Nicaragua, Panama, Puerto Rico, Jamaica and Cuba (where it is most popular and commercialized in Pinar del Rio); southern Florida, Colombia, Honduras, Kenya, Myanmar, Indonesia, Philippines, Sri Lanka, Seychelles, India, Tanzania and Uganda (Morton, 1992).

Potential Production Areas

The major potential area for production of Lavulu in Sri Lanka is in its wet and intermediate zones. It is a subsistence fruit tree, mostly meeting the local demand, though some of it is exported. Though this has a high potential, for generating incomes, the species has not reached the level of commercially exploited.

PROPERTIES OF THE SPECIES

The fruit pulp constitutes 70% of the ripe fruit. The composition of the fruit pulp is given in Table 16.2. Lavulu is rich in energy, calcium, niacin, carotene (pro-vitamin A) and has a fair level of ascorbic acid.

USES AND PRODUCTS

Food uses: The fruit is edible, but not highly regarded as it is not crispy and juicy like other fruits. After removing the skin and seeds, the fruit can be eaten as a sweet fruit, or as a vegetable with salt and pepper, lemon juice or mayonnaise, either fresh or after light baking. It can be blended with milk and nutmeg to make a highly nutritious cold beverage. It may be added to custard and to ice-cream before freezing. The flesh can be dehydrated, powdered and used as a rich food additive. A rich milkshake, or "eggfruit nog" is made by combining ripe Lavulu pulp, milk, sugar, vanilla, nutmeg, or other seasoning in a blender. Mock-pumpkin pie can be made with 1 1/2 cups mashed Lavulu pulp, 2/3 cup brown sugar, 1/2 teaspoon salt, 1/4

teaspoon nutmeg, 1 teaspoon lime juice, 2 beaten eggs, and 2 cups evaporated milk, or light cream. The mixture is poured into one crust and baked for 1 hour at 121 °C. Unripe mature fruits are cooked and eaten.

Table 16.2: Average Composition of Lavulu Fruit.

Constituent	Amount (per 100 g)
Energy value (kJ)	580-630
Water (g)	57.2-60.6
Protein (g)	1.7-2.5
Fat (g)	0.1-0.6
Carbohydrates (g)	36.7-39.1
Fibre (g)	0.1-7.5
Ash (g)	0.6-0.9
Calcium (mg)	26.5-40
Phosphorus (mg)	30-37.3
Iron (mg)	0.9-1.1
Carotene (mg)	0.32
Thiamin (mg)	0.02-0.17
Riboflavin (mg)	0.01-0.03
Niacin (mg)	2.5-3.7
Vitamin C (mg)	43-58

Source: Morton (1992).

Lavulu can be used to produce other food products, such as pancakes, cupcakes, jam, jelly, syrups and marmalade. Lavulu butter can be made into a bread spread by beating the ripe pulp in an electric blender, adding sugar, and cooking to a paste, with or without lemon juice, and used as a spread on toast. The fruit could also be dehydrated and reduced to a nutritious powder and used in pudding mixes.

Medicinal uses: A decoction of the astringent bark is taken as a febrifuge in Mexico, and is applied on skin eruptions in Cuba. A preparation from the seeds has been used as a remedy for ulcers.

Other uses: Lavulu is used in agroforestry systems in Asia due to its multiple uses. It is a suitable species for homegardens in wet and intermediate zones of Sri Lanka. Latex extracted from the tree has

been used to adulterate chicle in Central America. Timber is fine-grained, compact, strong, moderately to very heavy, hard, and is valued, especially for planks and rafters in the construction. The heartwood is greyish-brown to reddish-brown and blends into the sapwood, which is somewhat lighter in colour.

ECOLOGICAL REQUIREMENTS

Climate: Lavulu requires no more than moderate precipitation for its growth. It grows below 1,400 m amsl.

Soil: Lavulu is tolerant to a variety of soil conditions, including calcareous, lateritic, acid-sandy, and heavy clay soils. It has best vegetative growth in deep, fertile, well-drained soil, but is said to be more fruitful on shallow soil. It can be cultivated on soils considered too thin and poor for most other fruit trees.

AGRONOMY

Propagation

Lavulu is commonly propagated from seeds. The seeds lose viability quickly and should be germinated within a few days after removal from the fruit. If decorticated, seeds germinate within 2 weeks; otherwise there may be a delay of 3-5 months before they sprout. Seedlings are ready for planting one year after germination. Seedlings grow fast and may produce fruits in 3-4 years. Vegetative propagation is preferred to hasten bearing and to reproduce the best selections. Outstanding trees may be propagated by air layering, or cleft grafting mature terminal shoots on one year old seedlings. Cuttings take a long time to root. Vegetatively propagated plants bear fruits in 2-3 years.

Cultural Practices

Trees require little attention apart from early pruning to improve the tree form. Mulching is beneficial in the early years. A balanced fertilizer applied at the time of planting and during periods of rapid growth is advisable, though the tree does not demand special care.

Spreading branches should be pruned to avoid wind damage and to shape the crown.

Pests and Diseases

The tree is usually vigorous and healthy. Few pests and diseases, reported for Lavulu are; *Acrotelium lucumae* (rust), *Colletotrichum gloeosporioides* (fruit spot), *Elsinoë lepagei* (leaf spot and scab), and *Gloeosporium* (leaf necrosis).

Harvesting

The mature, but still firm fruits should be clipped to avoid tearing the skin. When left to ripen on the tree, the fruits split at the stem end and fall. If kept at room temperature, the fruits will ripen and soften to eat in 3 to 10 days. They should not be allowed to become too soft and mushy before eating. Ripe fruits can be kept in good condition in the vegetable tray of a home refrigerator for several days.

GENETIC RESOURCES AND IMPROVEMENT

In Lavulu, a considerable variation exists with respect to characteristics of fruits and pattern of bearing. Collections of genetic resources have been carried out in Florida and in the Philippines. However, no systematic cytogenetic studies have been carried out for Lavulu. There are apparently no named cultivars, or varieties, but outstanding selections through vegetative propagation have been made for earliness in the season, mildness of aroma, moistness of flesh and least muskiness in flavour.

RESEARCH NEEDS

There is hardly any research and development undertaken on Lavulu, especially in the areas of management practices, rapid and reliable propagation methods, assessment of floral biology, genetic resources, postharvest handling and varietal improvement. Promotion of Lavulu should be based on its high food value and research on how to use the fruits in processed form is needed for future development.

CONCLUSIONS AND FUTURE IMPACT

Laulu is an important underutilized fruit tree introduced to Sri Lanka. It is grown for food, medicine and aesthetic value. As a fruit tree grown in homegardens, it is helpful in providing a variety for fruit basket for growers. It is a nutritious fruit with high level of vitamin C and other medicinal properties. Fruit can be processed into pickles and exported.

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