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# Averrhoaceae

#### LOCAL NAMES

Creole (blinblin long,ziblinn long,karambola,kònichon peyi); English (foreign peach,carambola,five corners,star pickle,star fruit); Filipino (balimbing); French (cornichon du pays,blinblin

longue,carambolier,Carambolier vrai); German (Karambolaßaum); Hindi (kamrakh,kamranga); Indonesian (belimbing manis); Khmer (spö); Lao (Sino-Tibetan) (füang); Malay (belimbing manis); Mandarin (yongt'o); Spanish (carambole,Carambolo,carambold,jalea,carambola); Swahili (mbirimbi wa kizungu); Thai (ma fueang); Vietnamese (khê)

### BOTANIC DESCRIPTION

Averrhoa carambola is a small, evergreen, multistemmed tree 3-5 m high or rarely 10 m high, attaining 15 cm diameter at the base; bark light brown, smooth or finely fissured.

Leaves alternate, pinnate, 15-25 cm long, disposed more or less in a horizontal plane, shortly petiolate with 7-9 pendant leaflets; leaves have the peculiarity of being sensitive to touch in the same way as certain Mimosa species.

Inflorescence in panicles 2-5 cm long in the axils of old leaves; flowers pentamerous, with a calyx of 5 pink sepals surrounding the purple corolla; androecium contains 5 fertile stamens and 5 staminoids; gynoecium bears 5 slender united styles.

Fruit a large, indehiscent berry, 5-8 cm long; with a characteristic shape in cross-section resembling a 5-pointed star; yellowish-green, becoming orange-yellow when ripe. Each cell of the fruit contains 5 arillate seeds.

The generic name is after Averrhoes (1126-98), the widely known Arab Philosopher. The specific name, 'carambola', is said to have come from Malabar and was adopted early by the Portuguese.

### BIOLOGY

Heterostyly and self-incompatibility occur in A. carambola. Pollen grains are elongated or spherical; a suitable pollen viability test would be in vitro pollen germination. A. carambola is insect pollinated, the pollinators being honeybees and Diptera species. Flowering continues throughout the year and fruit is available most of the year. Seedling varieties should crop in 3-8 years, selected grafted varieties in only 1-2 years.



Star fruits in the market. Thanks to The Foundation of Agricultural Development and Education for permission to use this picture (Tanaka Y.)



Habit at State nursery Kahului, Maui, Hawaii (Forest and Kim Starr)



Leaves at State nursery Kahului, Maui, Hawaii (Forest and Kim Starr)

#### ECOLOGY

Grows best in the hot, humid tropics but will tolerate some cool weather. Young plants may be killed or badly damaged by frost, while mature specimens can withstand temperatures as low as -3 deg. C for short periods, with some damage to branches and leaves. They can also tolerate dry periods and some wind if it is not too cold.

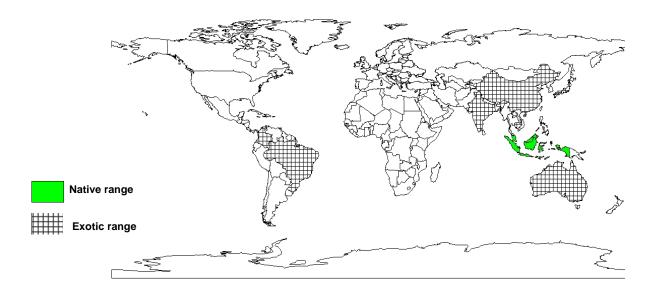
BIOPHYSICAL LIMITS Altitude: 0-900 m Temperature: 20-35 deg. C Rainfall: annual 1800 mm

Soil type: Prefers deep, well-drained clay loams but can grow successfully on sandy soils and heavy clays.

## DOCUMENTED SPECIES DISTRIBUTION

Native: Indonesia, Malaysia

Exotic: Australia, Brazil, Cambodia, China, Colombia, Dominican Republic, India, Israel, Japan, Laos, Myanmar, Philippines, Singapore, Taiwan, Province of China, Thailand, Trinidad and Tobago, Uganda, US, Vietnam



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.

## Averrhoaceae

### PRODUCTS

Food: Fruits are refreshing eaten fresh, mixed with other fruits, in salads, or processed into drinks. They are also stewed, pickled or used for chutney and jam. The fruit flavour is enhanced by peeling off the 'wing' edges, which removes most of the oxalic acid. Because the fruit is extremely perishable it must be consumed locally. Some Brazilian cultivars have a very high content of vitamin C as well as an applicable amount of provitamin A.

Fuel: The wood is a suitable candidate for firewood.

Timber: The soft, whitish wood is sometimes used for timber.

Tannin/dyestuff: Unripe fruit of A. carambola contains potassium oxalate, which is used in dyeing.

Medicine: Fruit can be a laxative on account of the oxalic acid it contains. It is also used in traditional medicine for skin disorders and fevers.

Other products: In some countries, the fruit juice is used to remove stains, for example iron rust from linen cloth.

#### SERVICES

Ornamental: With its delicate, light-green foliage, small, pink flowers and prolific golden-yellow fruits, A. carambola is popular in homegardens and parks.

## Averrhoaceae

#### TREE MANAGEMENT

When young, A. carambola is delicate and requires careful attention. Because it is a fast-growing tree, it requires pruning and thinning of excess fruit at an early stage. Good crops are harvested from grafted varieties when they are 2-3 years old. Yields of up to 900 kg/year are common for 10-year-old trees.

#### GERMPLASM MANAGEMENT

Seed storage behaviour is intermediate. The lowest safe mc is 12.3%; further desiccation reduces viability. Cool temperatures damage the seeds. Viability can be maintained for 6 months with partially dried seeds at 5 deg. C. There are approximately 15 000 seeds/kg.

#### PESTS AND DISEASES

Caterpillars (Diacotrichia, Pingasa and Pseudoterpna) attack the flowers and young leaves. A. carambola fruit suffers from fruit fly maggots, particularly Dacus dorsalis (Southeast Asia), and fruit-piercing moth (Othreis spp., Australia); bagging prevents infestation. Leaf spot (Cercospora averrhoa) and pink diseases (Corticium) affect the tree in Southeast Asia, but postharvest rots are more serious: the slightest blemish invites infection by Ceratocystis, Colletotrichum, Dothoriella and Phomopsis fungi.

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## Averrhoaceae

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#### SUGGESTED CITATION

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