Morinda citrifolia L.

Rubiaceae

LOCAL NAMES
Burmese (al); English (Indian mulberry,great morinda,cheesefruit); Filipino (bangkuro); French (morinde); Indonesian (bengkudu); Lao (Sino-Tibetan) (nhoo baanz); Malay (mengkudu jantan); Thai (yo ban); Vietnamese (nhau)

BOTANIC DESCRIPTION
Morinda citrifolia is an evergreen shrub or small crooked tree with a conical crown, 3-8(-10) m tall, with a deep taproot; bark greyish or yellowish-brown, shallowly fissured, glabrous; branchlets quandrangular.

Leaves opposite and simple, elliptic-lanceolate, (10-)15-50 cm x 5-17 cm, entire, acute to shortly acuminate at apex, cuneate at base, pinnately nerved, glabrous; petioles 0.5-2.5 cm long; stipules variable in size and shape, broadly triangular.

Inflorescences globose heads, 1-4 cm long peeduncled, in axils of stipules opposite normally developed leaves; flowers bisexual, fragrant; corolla funnel-shaped, up to 1.5 cm long, white; stamens inserted on the mouth of the corolla; stigma bilobed.

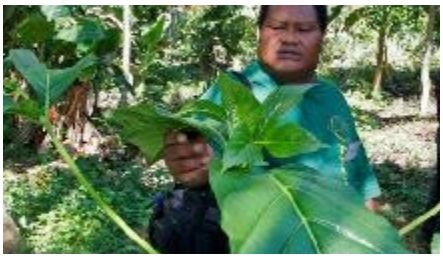
Fruit an ovoid syncarp of red-brown, pyramidal, 2-seeded drupes, 3-10 cm x 2-3 cm, yellow-white.

M. citrifolia is sometimes subdivided into two varieties: var. citrifolia and var. bracteata (Roxb.) Hook.f. The latter has calyx-limbs with 12 leaflike, linear-lanceolate lobes ca. 1-1.5 cm long; the stem is straighter and the leaves are smaller than var. citrifolia.

BIOLOGY
Flowering and fruiting start in the third year and continue throughout the year. The ability of the seeds to float explains its wide distribution and occurence on many seashores. Inland distribution of the seeds agents are fruit-eating bats and birds.

Flowers and fruits at Lahaina, Maui, Hawaii (Forest and Kim Starr)

Habit at Lahaina, Maui, Hawaii (Forest and Kim Starr)



fruit and foliage (J.S. Peterson @ USDA-NRCS PLANTS Database)

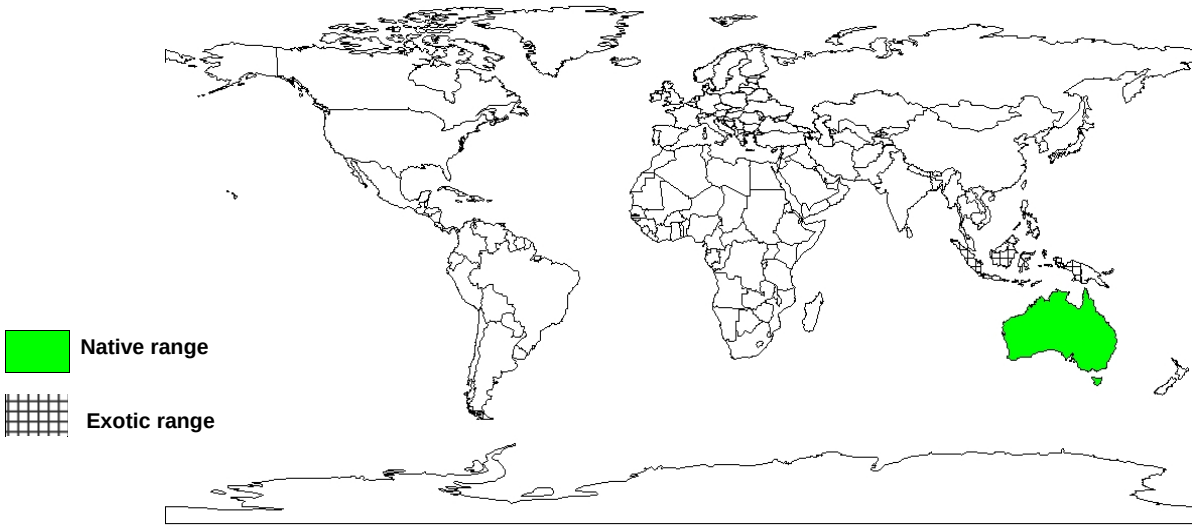
ECOLOGY
Indian mulberry is commonly found up to altitudes of 1500 m in humid and seasonal climates of the region, with an estimated annual rainfall of 1500-3000 mm or more. The species occurs in evergreen, (semi-)deciduous to more or less xerophyt formations, often typically littoral vegetations. It also occurs in pioneer and secondary vegetation after cultivation and bush fires (Cambodia), deforestation or volcanic activity (Krakatau). It is persistent and very tolerant.

BIOPHYSICAL LIMITS
Altitude: 1500 m
Annual rainfall: 1500-3000 mm.

Soil type: In areas where the plant is cultivated, the soil is usually well structured and of volcanic origin (Java), but it may be poor and ferralitic (Cambodia). In the wild the plant also appears on infertile, degenerated soils, sometimes badly drained or with a very low water-retention capacity and a deep water table.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia
Exotic: Indonesia, Seychelles



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: Despite the smell of putrid cheese when ripe, the fruits are eaten raw or prepared, as are the leaves. The nutritional value of the fruit and leaves is considerable. The leaves are a rich source of vitamin A.

Timber: The wood splits excessively in drying and its uses are restricted to fuel and poles.

Tannin or dyestuff: Before the introduction of synthetic dyes (e.g. alizarin) the red dye from the rootbark of Indian mulberry was important. In the late 19th Century, there were plantations in coastal areas of northern Java and adjoining islands. Cultivation for the dye is restricted to areas where traditional textile dyeing is still important, e.g. in the production of high quality batik on Java.

The basis of the morindone dyeing matter, called Turkish red, is the hydrolysed (red) form of the glycoside morindin. This is the most abundant anthraquinone which is mainly found in the rootbark which reaches a concentration of 0.25-0.55% in fresh bark in 3-5 years. It is similar to that found in Rubia tinctorum L. and to synthetic alizarin.

Medicine: Nowadays, single trees are encouranged or cultivated in gardens mainly for medicinal purposes. Most parts of the tree have been widely used medicinally since ancient times. In Vietnam roots serve to treat stiffness and tetanus and have been proven to combat arterial tension. Elsewhere they are used as febrifuge, tonic and antiseptic. The fruits are used as a diuretic, a laxative, an emollient and as an emmenagogue, for asthma and other respiratory problems, as a treatment for arthritic and comparable inflammations, in cases of leucorrhoea and sapraemia and for maladies of inner organs. Roots, leaves and fruits may have anthelmintic properties. In traditional medicine the parts used are administered raw or as juices and infusions or in ointments and poultices.

The curative properties of the plant parts are ascribed to the presence of medicinally active anthraquinone derivates. The fruit contains rancid smelling capric acid and unpleasant tasting caprylic acid. It is thought that antibiotically active compounds are present.

Other products: The fruit pulp can be used to cleanse hair, iron and steel.

SERVICES
Other services: In Malaysia and Thailand the tree is used as a support for pepper plants.

Intercropping: Intercropping with cereals and perennials is possible (e.g. shade in cofffee).

TREE MANAGEMENT
Husbandry: Weeding is carried out at least twice and starts about 1 month after transplanting. No maintenance is needed after first year. High-yielding bark may be expected after 3-5 years. The roots are dug out, cleaned in water, and the bark removed. Yield of bark is reported to be 500-1000 kg/ha, containing about 0.25% morindin.

GERMPLASM MANAGEMENT

PESTS AND DISEASES

FURTHER READNG

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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/)