

## Butea monosperma

palas, dhak

(Lam.) Taub.

Fabaceae - Papilionoideae

### LOCAL NAMES

Bengali (palas, kinaka, peras, polashi); Burmese (pouk-pen); Cantonese (muthuga); English (flame-of-the-forest, bastard teak); French (arbre à laque); Gujarati (khakra, phullas, kakria); Hindi (chichra tesu, polak, tella moduga, dhak, palas, desuka jhad, khankrei, chalcha); Indonesian (plasa, palasa); Javanese (plasa); Khmer (chaa); Lao (Sino-Tibetan) (chaan); Nepali (paras, dhak, palans); Sanskrit (brahmopadapa, lakshataru, palasha); Sinhala (kela); Tamil (kattumurukhua, parasa, parasu, porasum); Thai (tong thammachaat, tong kwaao); Trade name (dhak, palas); Urdu (palash, papra)

### BOTANIC DESCRIPTION

*Butea monosperma* is a small to medium-sized deciduous tree, 5-15 (max. 20) m tall, up to 43 cm dbh; trunk usually crooked and tortuous, with rough greyish-brown, fibrous bark showing a reddish exudate; branchlets densely pubescent.

Leaves trifoliate; petiole 7.5-20 cm long with small stipules; leaflets more or less leathery, lateral ones obliquely ovate, terminal one rhomboid-obovate, 12-27 x 10-26 cm, obtuse, rounded or emarginate at apex, rounded to cuneate at base, with 7-8 pairs of lateral veins, stipellate.

Flowers in racemes, 5-40 cm long, near the top on usually leafless branchlets; calyx with campanulate tube and 4 short lobes; corolla 5-7 cm long, standard, wings and keel recurved, all about the same length, bright orange-red, more rarely yellow, very densely pubescent.

Fruit an indehiscent pod, (min. 9) 17-24 x (min. 3) 4-6 cm, stalked, covered with short brown hairs, pale yellowish-brown or grey when ripe, in the lower part flat, with a single seed near the apex. Seed ellipsoid, flattened, about 3 cm long.

### BIOLOGY

Leaves are shed during the dry season. At the beginning of the rainy season, the leafless tree flowers abundantly and is very conspicuous in the forest. At the end of the flowering period, new leaves develop, which are initially a pale bronze-tinged green. Birds are the chief pollinators.



Flowers (Plant Creations)



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*Butea monosperma* in flower (Uma Shankar)

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### ECOLOGY

*B. monosperma* is a tree of tropical and subtropical climate. Found throughout the drier parts of India, often gregarious in forests, open grasslands and wastelands. It is a characteristic tree of the plains, often forming pure patches in grazing grounds and other open places, escaping extermination owing to its resistance to browsing and its ability to reproduce from seed and root suckers. In its native habitat, most of the rain is received during the monsoon season, while the autumn and summer months are generally dry. The tree is very drought resistant and frost hardy, although the leaves turn white and fall off.

### BIOPHYSICAL LIMITS

Altitude: Up to 1 500 m, Mean annual temperature: -4 -49 deg. C, Mean annual rainfall: 450-4500 mm

Soil type: It grows on a wide variety of soils including shallow, gravelly sites, black cotton soil, clay loams, and even saline or waterlogged soils. Seedlings thrive best on a rich loamy soil with pH 6-7 under high temperature and relative humidity.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Cambodia, India, Indonesia, Japan, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam

Exotic: China, Papua New Guinea



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.

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### **PRODUCTS**

**Fodder:** In India, young leaves are good fodder, eaten mainly by buffaloes. Though the leaves are fairly rich in nutrients, digestibility values are low, comparable only to those of straws.

**Fuel:** Wood makes a fuel of moderate quality. Leaves are sometimes used as a fuel. The wood is burnt for gunpowder charcoal.

**Fibre:** A coarse fibrous material obtained from the inner bark is used for cordage, caulking the seams of boats and making paper.

**Timber:** The soft and not durable wood is light, about 570 kg/m<sup>3</sup> air dry, white or yellowish-brown when fresh, but often turning greyish because of susceptibility to sap stain. It is not of great value but is sometimes used for utensils.

**Gum or resin:** A red exudate is obtained from the bark, hardening into a gum known as 'butea gum' or 'Bengal kino'. It can be used as a dye and as tannin.

**Tannin or dyestuff:** A bright yellow to deep orange-red dye, known as butein, prepared from the flowers is used especially for dyeing silk and sometimes for cotton. This dye is used by Hindus to mark the forehead. The bark is used for tanning.

**Lipids:** The seeds yield a clear oil.

**Poison:** Seeds show bactericidal and fungicidal activities.

**Medicine:** The flowers are useful in the treatment of liver disorders and seeds act as an anthelmintic. An astringent gum oozing from the cut stem has medicinal properties as a powerful astringent and is applied in cases of diarrhoea.

**Other products:** In India, the tree is an important host for the lac insect (*Laccifer lacca*), which produces shellac. Of all the lac trees, it yields the most lac stick per hectare.

### **SERVICES**

**Erosion control:** In India, farmers frequently use *B. monosperma* to stabilize field bunds.

**Ornamental:** *B. monosperma* is planted as an ornamental because it flowers with a profusion of bright orange, rarely sulphur-coloured flowers.

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### **TREE MANAGEMENT**

*B. monosperma* is moderate in its demand for light. Although it can withstand some shade, dense shade suppresses its growth. The trees pollard and coppice well and produce root suckers freely. They can also withstand heavy annual lopping. Well suited for silvopasture at wide spacing (10-15 m) in extensive tracts of grassland (for example, in central and western India, where it is managed by repeated coppicing on a roughly 5-year rotation). Coppice shoots are also cropped in intermediate years for the larger leaves. Under dryland conditions and in its natural habitat, coppice management yields roughly 100 kg/tree of air-dry fuelwood every 5 years. If allowed to grow, trees attain a height of 3-5 m and dbh of 15-20 cm in 10 years. Plantations can be established on irrigated as well as rainfed land.

### **GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox; no loss in viability during 2 years of hermetic storage at room temperature. There are approximately 500-1500 seeds/kg.

### **PESTS AND DISEASES**

Seedlings and saplings are browsed and damaged by cattle. Rats and porcupines feed on fleshy roots, killing the sapling.

Insect pests attack different parts of the tree. Several defoliators belonging to the families Arctiidae, Eucosmidae, Lasiocampidae, Lymantriidae, Noctuidae, Notodontidae, Pieridae, and Sphingidae have been recorded. Insects of the family Coccidae feed on the sap. The larvae of some insects of the family Lycaenidae feed on the flowers.

*Xanthomonas buteae* causes black leaf spots, which in severe infection cover the entire leaf surface and cause premature defoliation. *Phomopsis buteae* and *Pseudodiplodia buteae* have also been recorded on the leaves.

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### **FURTHER READING**

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### **SUGGESTED CITATION**

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