

## Bauhinia purpurea

khairwal, karar, kachan

### LOCAL NAMES

English (purple bauhinia, orchid tree, camel's foot tree, butterfly tree, geranium tree); Hindi (kota, raktakanchan, khairwal, karar, kanchan); Malay (tapak kuda); Nepali (tanki); Spanish (pie de cabra); Thai (sieowaan, sieo dok daeng); Trade name (kachan, karar, khairwal); Vietnamese (m[os]ng b[of] t[is]m)

### BOTANIC DESCRIPTION

*Bauhinia purpurea* is a small to medium-sized deciduous fast-growing shrub or tree with a round, symmetrical, moderate dense crown to 10 m tall, young branches becoming glabrous or nearly so (glabrescent). In dry forests, the size is much smaller. The bark is pale grey brown, fairly smooth to slightly fissured and scaly. The twigs are slender, light green, slightly hairy, and angled, becoming brownish grey. The heart-wood is brown, hard and durable.

Leaves simple, alternate, base rounded to shallow-cordate, up to 12 cm x 12 cm, deeply 2-lobed at apex up to 1/3-1/2, ca. 7-12 cm long, and equally wide, margin entire and the surfaces smooth and glabrous, and 9- or 11-nerved at base, the apex lobes rounded or obtuse to subacute, minute stipules 1-2 mm long, petioles puberulous to glabrous, 2.5-3.5 cm long; leaf blades 4.5-11 cm long.

Inflorescence a 6-10-flowered raceme in terminal panicles; flowers numerous, hypanthium, turbinate, purple to nearly white or at least purple-marked, the flower buds clavate (club-shaped), velvety, ca 3-4 cm long prior to anthesis; fertile stamens 3 or 4, the anthers ca 6 mm long, versatile; ovary superior; corolla of 5 narrow petals and constricted at base, oblanceolate, 3-5 cm long, claws 5-10 mm long, the banner purple-striate, ca 7 mm wide; calyx tubular, erupted by corolla along one side when flower fully expanding; calyx split into 2 valves with 5 teeth. In fall, before the leaves drop, Orchid-Tree is festooned with many showy and delightfully fragrant, five-inch-wide blossoms, the narrow purple, pink, and lavender petals arranged to closely resemble an orchid. These flowers appear on the trees from September through November and are a beautiful sight to see, creating a vivid splash of color in the autumn landscape. The flowers are followed by 12-inch-long, slender, brown, flat seed pods which usually persist on the tree throughout the winter.

Fruit brown, strap-shaped, not septate, elongated dehiscent pods, ca. 15-30 cm long, up to 1.5-2.5 cm wide, containing 10-15- shiny-brown, glabrous, dehiscent, rounded, flat seeds; twists as opens. Seed forms very rapidly and trees in flower may already show numerous green pods. While most pods will open in the drier winter weather some may persist through to the next flowering season. Fruit maturing in spring and summer. Fruit does not attract wildlife.

Seeds orbicular, 13-16 mm in diameter, 1-2 mm thick.

The generic name commemorates the Bauhin brothers Jean (1541-1613) and Gaspard (1560-1624), Swiss botanists. The two lobes of the leaf exemplify the two brothers. The specific name refers to the purple colour of the flowers.

There are about 300 species of this genus found in tropical regions. The genus includes trees, vines, and shrubs that are frequently planted for their showy flowers and ornamental foliage. There is a presence of stomata on the seeds and pods.

### BIOLOGY

In its natural habitat in Australia, China, India, Phillipines, the tree is deciduous. Flowering from September to November occurring when the plant is leafless. Tree starts flowering at a very early age of 2-3 years and yields viable seed. The seed ripens between February and May, with a tendency to be later in the West than in the East. The seeds disperse from the pods and germinate on sites with favourable light and moisture

L.

Fabaceae - Caesalpinioideae



fruit (David Lee, Professor and Chairperson. Department of Biological Sciences, Florida International Unive)



flowers (David Lee, Professor and Chairperson. Department of Biological Sciences, Florida International Unive)

## **Bauhinia purpurea**

khairwal, karar, kachan

L.

Fabaceae - Caesalpinioideae

---

conditions, while in unfavourable niches the radicle dries up or is destroyed by birds. The pods should be collected when they are brown before they dehisce. The seeds are extracted by drying the pods in the sun to release seeds).

## Bauhinia purpurea

L.

Fabaceae - Caesalpinioideae

khairwal, karar, kachan

### ECOLOGY

*B. purpurea* is a plant of tropical and subtropical climates usually found in most types of vegetation ranging from evergreen lowland rain forest to mountain forest and savanna, scrub and dry deciduous forest to swamp forest on various soils. It occurs at lower elevations especially frequent along the valleys in its native habitat. It demands plenty of light and requires good drainage. Severe frost kills the leaves of seedlings and saplings, but they recover during summer. The species is frost-hardy but least drought-hardy compared to other species of *Bauhinia*. The tree actually flowers best on dry soils.

### BIOPHYSICAL LIMITS

Altitude: 500 - 2000(-3000) m

Mean annual temperature: 12 - 21°C

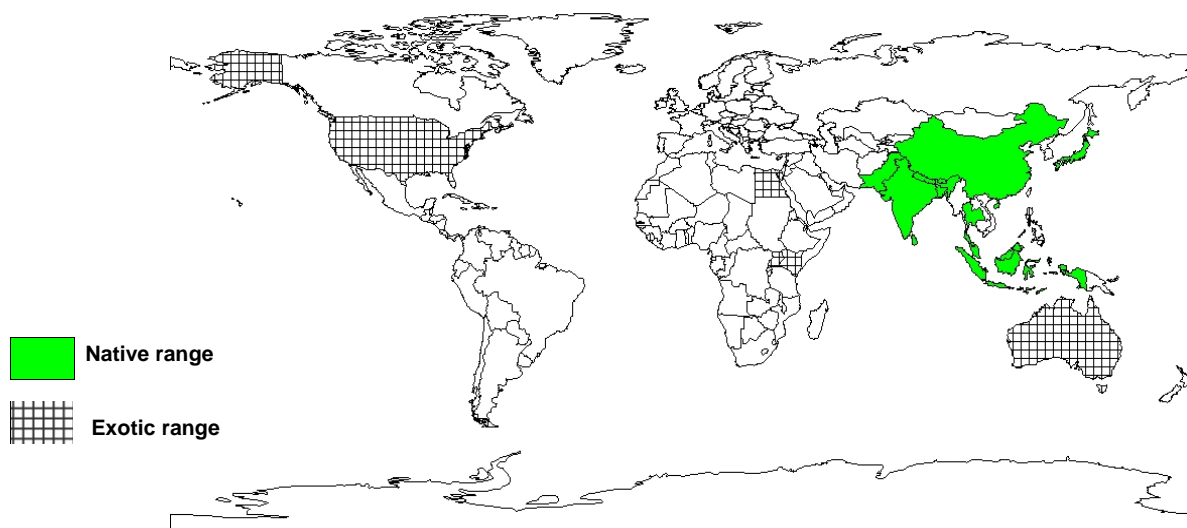
Mean annual rainfall: 1000 - 5000 mm

Soil type: Grow on a variety of sandy, loamy and gravelly soils in full sun in fertile, moisture-retentive but well-drained soils.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Bangladesh, Bhutan, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Province of China, Thailand

Exotic: Australia, Egypt, Kenya, Mauritius, Philippines, Puerto Rico, Sierra Leone, Uganda, United States  
Misc. Pacific Islands, US



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.

## Bauhinia purpurea

khairwal, karar, kachan

L.

Fabaceae - Caesalpinioideae

---

### PRODUCTS

**Food:** The young leaves and flowers of various Bauhinia species are eaten as a side dish with rice, or used to flavour meat and fish. Sometimes the seeds are edible.

**Fodder:** In an experiment in Nepal, B.purpurea was found increase milk production in lactating buffaloes. Leaves make good fodder and are greedily eaten by sheep, goats and cattle with protein content estimated at 12.6%.

**Fibre:** The bark of bauhinia is used to make rope and stems of smaller lianescent species are used for binding. Some bauhinia species are used for binding. Some bauhinia species reputed for their fibre application are used medicinally as well.

**Tannin or dyestuff:** The bark of various bauhinia species contains considerable amounts of tannin widely used in leather industry in India. Medicinal uses of bark can be largely attributed to the presence of these tannins. Flavonoids are a common feature of Bauhinia.

**Medicine:** Throughout South-East Asia various parts of numerous Bauhinia species are used in poulticing to reduce swelling and bruises, and to ripen ulcerations and boils. Decoctions of various plant parts are taken internally as a febrifugal, antidiarrhoeal and antidyenteric remedy and also it is used as an astringent. In India, the bark is extensively applied in glandular diseases and as a poison antidote while the leaves are administered as cough medicine. The flowers are said to be laxative and used in curries and pickles.

**Lipid:** The seeds contain high amounts of linolenic and oleic fatty acids (15% of a non-drying oil) and low amounts of myristic and linolenic fatty acids.

**Gum or resin:** The tree yield edible gum.

**Fuel:** Used as fuelwood; its calorific value is 4 800 kcal/kg.

**Timber:** The wood is used for agricultural implements.

**Other products:** B. purpurea apart from being an ornamental, is well known as the source of Bauhinia purpurea agglutinin (BPA), a lectin with an affinity to galactose and lactose, widely applied in biochemical, immunochemical and histochemical studies.

### SERVICES

**Erosion control:** Bauhinia purpurea with a deep root system and high root: shoot ratio may be a suitable species for slope stabilization.

**Ornamental:** B. purpurea is widely planted as an ornamental tree in parks, gardens and homesteads, and along avenues for its showy fragrant, purple flowers. The weak wood is susceptible to breakage in storms; the abundant seedlings, which may germinate in the landscape; and the litter problem, created by the falling leaves, flowers, and seedpods.

## **Bauhinia purpurea**

khairwal, karar, kachan

L.

Fabaceae - Caesalpinioideae

---

### **TREE MANAGEMENT**

*B. purpurea* should be grown in full sun on well-drained soil. For successful establishment of *Bauhinia*, protection from grazing or browsing for the first 2-3 years is necessary, because the young saplings are much relished by animals. In regular plantations, the trees should be kept adequately thinned as they grow. The tree may need occasional pruning to develop a uniform shape when it is young. Growth rate is relatively good in lower altitudes but above 1600m, growth is very slow and plantation scarcely justified. The tree coppices well and can stand heavy lopping fairly well. It has been cultivated sporadically, generally in and around cultivation and habitations, or in mixed forests or avenue plantations, no systematic block plantations have been established. Branches tend to develop low on the trunk and droop toward the ground forming a large bush if left unpruned. The species has a tendency to show nutritional deficiencies, especially potassium. Trees are frost- and drought-tolerant and flower best on dry soils. The species is reported weedy in gardens in Hawaii.

### **GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox; viability maintained for 3 years in hermetic storage at room temperature. There are 4000-5000 seeds/kg. About 600 to 1900 plants are raised per Kg of seed.

### **PESTS AND DISEASES**

Pests: The Borers, mites and larvae of several insects feed on the plant.

Diseases: Leaf spot and leaf scorch are the only diseases reported. The tree is said to be susceptible to two viruses namely Clitoria yellow vein tymovirus and Turnip rosette sobemovirus.

**FURTHER READNG**

- Abbiw D. 1990. Useful plants of Ghana. Intermediate Technology Publications and the Royal Botanical Gardens, Kew.
- Athaya CD. 1985. Ecological studies of some forest tree seeds: 2. Seed storage and viability. *Indian Journal of Forestry* 9(2): 137-140.
- Bahuguna VK and Dhawan VK. 1990. Growth performance of *Dalbergia sissoo*, *Eucalyptus grandis*, *Michelia champaca*, *Grevillea robusta*, *Bauhinia variegata* and *Bauhinia purpurea* for planting under social forestry program. *Indian Forester*. 116(8): 609-617.
- Balasubramaniam NK, Timm DE, et al. 1993. The lectin from *Bauhinia purpurea*: Effect of modification of lysine residues on conformation and biological properties. *Journal of Agricultural and Food Chemistry*. 41(11): 1844-1850.
- Balogum AM & Fetuga BL. 1985. Fatty acid composition of seed oils of some members of the leguminosae family. *Food Chemistry* 17 (3): 174-182.
- Bandyopadhyay S and Thothathri K. 1996. Stomata on seed of *Bauhinia purpurea* L. (Leguminosae: Caesalpinioideae). *Journal of the Bombay Natural History Society* 93(1): 115-116.
- Brandis D. 1984. *Indian trees*. BSMPS, Dehra, India.
- Corner E.J.H. 1988. *Wayside trees of Malaya*, 3rd Edition. 2 volumes. The Malayan Nature Society, Kuala Lumpur, Malaysia. 744p.
- El WSM, Wassel GM, et al. 1989. Effect of the alcoholic extract of *Bauhinia purpurea* seeds on plasma glucose and lipids of rats. *Journal of Drug Research*. 18(1-2): 53-62.
- Essien AI & Fetuga BL. 1989. Beta-carotene content and some characteristics of under-exploited seed oils of forest trees in Nigeria. *Food Chemistry* 32(2): 109-116 [Forestry Abstracts 50: 5676; 1989].
- Francis JK & Liogier HA. 1991. Naturalized exotic tree species in Puerto Rico. Gen. Tech. Rep. SO-82. New Orleans: USDA Forest Service, Southern Forest Experiment Station. 12 p.
- Gupta RK, Agarwal MC, Nirmal Kumar, Kumar N, 1996. Effect of lopping intensities on growth and biomass production of *Bauhinia purpurea* L. in north-west Himalaya low hill region. *Indian Forester*. 122(5): 396-403.
- Gupta RK. 1992. *Multipurpose trees for agroforestry and wasteland utilization*. Oxford & IBH Publishing Co. PVT. Ltd.
- Haines HH. 1984. *Descriptive list of trees, shrubs and economic herbs of the southern circle central province*. India. 384p.
- Hedberg I and Edwards S (eds.). 1989. *Flora of Ethiopia Volume 3: Pittosporaceae to Araliaceae*. The National Herbarium, Biology Department, Addis Ababa University and The Department of Systematic Botany, Uppsala University, Sweden.
- Hocking D. 1993. *Trees for Drylands*. Oxford & IBH Publishing Co. New Delhi.
- Jackson JK. 1994. *Manual of Afforestation in Nepal*. Forest Research and Survey Centre Kathmandu, Nepal. Vol 2.
- Jha PK, Dhakal LP, Kjaer ED, Lillesø J-P B. 2006. Improving productivity of *Bauhinia purpurea* for tree planting farmers in Nepal: *Agroforestry Systems*. 67:273-278.
- Kayastha BP. 1985. *Silvics of the trees of Nepal*. Community Forest Development Project, Kathmandu.
- Kumar A and Datta SK. 1985. Anatomy and pharmacognostic evaluation of bark of *Bauhinia purpurea*. *Journal Of Plant Anatomy and Morphology*. 2(1): 49-54.
- Kuo YH, Chu PH, et al. 1998. Chemical studies of the bark of *Bauhinia purpurea*. *Chemical and Pharmaceutical Bulletin Tokyo* 46(10): 1630-1631.
- Kuo YH, Yeh MH, et al. 1998. A novel 6-butyl-3-hydroxyflavanone from heartwood of *Bauhinia purpurea*. *Phytochemistry Oxford* 49(8): 2529-2530.
- Kusui K, Yamamoto K, Konami Y, and Osawa T. 1991. Complementary DNA cloning and expression of *Bauhinia purpurea* lectin. *Journal of Biochemistry*. 109(6): 899-903.
- Lemmens RH MJ and Bunyapraphatsara N. 2003. *Prosea 12 (3) Medicinal and poisonous plants 3*. Backhuys publishers, Leiden, the Netherlands. 664pp.
- Murkherjee, P.K., et al. 1998. Studies on the anti-diarrhoea profiles of *Bauhinia purpurea* Linn. Leaves (Fam. Caesalpinaceae) extract. *Natural product sciences* 4(4): 234-237.
- Noad T, Birnie A. 1989. *Trees of Kenya*. General Printers, Nairobi.

## Bauhinia purpurea

khairwal, karar, kachan

L.

Fabaceae - Caesalpinioideae

Panda S and Kar A. 1999. *Withania somnifera* and *Bauhinia purpurea* in the regulation of circulating thyroid hormone concentrations in female mice. *Journal of Ethnopharmacology*. Nov. 67(2): 233-239.

Perry LM. And Metzger J. 1980. *Medicinal plants of East and South East Asia: Attributed properties of uses*. MIT Press, Cambridge, Massachusetts, United States and London, UK. 620p.

Rajaram N and Janardhanan K. 1991. Chemical composition and nutritional potential of the tribal pulses *Bauhinia purpurea*, *Bauhinia racemosa* and *Bauhinia vahlii*. *Journal Of The Science Of Food And Agriculture* 55(3): 423-432.

Sarker AB, Akagi T, et al. 1994. *Bauhinia purpurea* (BPA) binding to normal and neoplastic thyroid glands. *Pathology Research and Practice* 190(11): 1005-1011.

Sarker AB, T Akagi, et al. 1993. *Bauhinia purpurea* lectin (BPA) binding spectra in hyperplastic human tonsil and in peripheral blood: immunohistochemical, immunoelectron microscopic, and flow cytometric analyses. *J. Histochem. Cytochem.* 41: 811 - 817.

Shrestha NP, Pakhin B.1989. Effect of different tree fodders on milk production in Buffaloes. PAC (Pakhribes Agricultural Center) Technical Report Paper 117. Kathmandu, Nepal.

Shue GL, Kawa S, et al. 1993. Expression of glycoconjugates in pancreatic, gastric and colonic tissue by *Bauhinia purpurea*, *Vicia villosa*, and peanut lectins. *Scandinavian Journal of Gastroenterology* 28(7): 599-604.

Singh RK, Narain P, Dhyani SK, Samra JS. 2000. The rooting behaviour of four agroforestry species in the western Himalayan valley region. *Journal of Tropical Forest Science*. 12(2): 207-220.

Staples GW, Herbst D and Imada CT. 2000. Survey of invasive or potentially invasive cultivated plants in Hawaii. *Bishop Museum Occasional Papers* No. 65. p. 21.

Troup RS. 1983. *Troup's Silviculture of Indian Trees*, vol. IV Leguminosae. Forest Research Institute and Colleges, Dehra Dun, India. pp 33-38.

Vijayakumari K, Siddhuraju P, et al. 1997. Chemical composition, amino acid content and protein quality of the little-known legume *Bauhinia purpurea* L. *Journal of the Science of Food and Agriculture* 73(3): 279-286.

Yadava RN and Tripathi P. 2000. A novel flavone glycoside from the stem of *Bauhinia purpurea*. *Fitoterapia* . Feb. 71(1): 88-90.

Yamamoto K, Konami Y, and Osawa T. 2000. A chimeric lectin formed from *Bauhinia purpurea* lectin and *Lens culinaris* lectin recognizes a unique carbohydrate structure. *Journal of Biochemistry*. 127(1): 129-135.

Yamamoto K, Konami Y, Osawa T, and Irimura T. 1992. Alteration of the carbohydrate-binding specificity of the *Bauhinia purpurea* lectin through the preparation of a chimeric lectin. *Journal of Biochemistry (Tokyo)*. 111(1): 87-90.

### SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. *Agroforestry Database:a tree reference and selection guide version 4.0* (<http://www.worldagroforestry.org/af/treedb/>)