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Oroxylum indicum (L.) Benth. ex Kurz

Taxonomy and Nomenclature

Species name:*Oroxylum indicum* (L.) Benth. ex Kurz

Family name: Bignoniaceae

Synonyms: *Arthrophyllum ceylanicum* Miq.*, Bignonia indica* L., *Calosanthes indica* (L.) Blume, *Hippoxylon indica* (L.)Raf., *Oroxylum flavum* Rehder*, Spathodea indica* (L.) Pers.

Vernacular (common name): Indian trumpet tree, Shyonaka, Sonpatha, Broken bones tree

Distribution and habitat

The tree is native to Southeast Asia including southern China, Taiwan, India, Nepal, Bhutan, Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Indonesia, Philippines, and Sri Lanka. In India it is distributed throughout the tropical forests of north-eastern, central and southern zones. It is more frequent in mix-deciduous forests, ascending to 1200 m altitude and naturally found in the ravine and moist areas of the forests, rare in the dry climate of western India. The plant prefers areas that receive well-distributed rainfall between 850 mm and 1300 mm per annum. Sandy-loam fertile soil is best suited for the growth and development of the species, though it can also grow well in medium to deep black soils to sandy loam soils. It prefers a sunny position or light shade. It is a fast-growing species with a mean annual girth increment of 4-6.4cm.

Use

The tree is valued for its medicinal properties. Many secondary metabolites like flavonoids, glycosides, alkaloids, tannins, terpenoids, etc., have been reported from this tree. Extract from the bark of the root has been used in traditional Indian Ayurvedic formulation “DASAMOOLA” which is used as an anti-inflammatory, appetizing, digestive, carminative, antipyretic, tonic, and anthelmintic. It is also used to treat bile problems, vomiting, cough, fever, bronchitis, diarrhea, dysentery, asthma, leucoderma, diaphoretic, rheumatism, and anal troubles. Leaves are used for the treatment of ulcers and headaches. Tender fruits are beneficial for treating cough, bronchitis, indigestion ailments, and leucoderma. Mature fruits are useful in the treatment of intestinal worms, bronchitis, and piles. The seeds are purgative. Young leaves, buds, flowers, pods, and seeds are edible. Bark and fruits are used as a mordant in tanning and dyeing. The wood is yellowish-white and soft and used for fuel and making matchboxes. With its long fibers, it is suitable for paper pulp. Bark paste is applied to the wounds of animals to kill maggots. The young shoots, leaves, unripe fruits, and flowers are consumed as vegetables and used as fodder. In Vietnam used as support tree for pepper.

Destructive harvesting such as uprooting for medicinal purposes, coupled with low regeneration and habitat destruction have posed a serious threat to the tree.

Botanical description

It is a fast-growing, medium-sized, soft-wooded, ever-green, or partly deciduous tree with an open irregular crown, attaining a height of up to 30 m.; bark 5-6 mm thick, surface brownish-grey, often with corky lenticels; blaze yellowish-green; bole smooth. Leaves quadri-pinnately compound (four orders of branching up to 1 meter long: 1st order, rachis; 2nd order: 2-4 opposite petioles; 3rd order: 5-9 opposite petioles; 4th order: 3-5 opposite leaflets. Rachis very stout, cylindrical, swollen at the junction of branches, glabrous. Petiolule 3-20 mm, glabrous, slender; lamina very large, ovate or

Oroxylum indicum (L.) Benth. ex Kurz.

elliptic, 7.5-17 x 4-9 cm; base cordate, oblique or truncate; acute to acuminate leaf tip, margin entire, glabrous; lateral nerves 4-6 pairs, reticulate. Glands are present and scattered on the underside of young and some mature leaves, near the veins axils. When the

large leaf stalks wither and fall off the tree and collect near the base of the trunk, they appear to look like a pile of broken limb bones (cf. vernacular name).

Inflorescence is generally situated at the apices of branches and its length is about 30 cm or more. Flowers are bisexual, in large, erect terminal racemes, fleshy, reddish-purple outside and pale, pinkish-yellow within, and emit a strong, stinky odor to attract bats for pollination. Calyx and corolla are about 2.5 cm, campanulate, coriaceous, glabrous, limb truncate or obscurely toothed; corolla 10 cm long, large, fleshy, campanulate, lobes 3 cm long. Stamens are slightly exerted and the base of filaments is wooly; ovary superior, ovule many; style slender; stigma 2-lobed.

Fruit and seed description

Fruits are woody capsules or pods, sword-shaped, 45–120 cm long and 6–10 cm wide, purple-brown, 2-valved, compressed, tapering at both ends, and pendulous. The pod turns black when ripe. Seeds flat, round, 5–9 cm long and 2.5–4 cm wide, with thin hyaline papery wings all around except at the base. Each pod contains 500-600 compactly arranged seeds in two layers.

Flowering and fruiting habit

Flowering takes place from June to August. Flowers and fruits may be found on the same tree as each branch can bloom independently on the others. Fruits reach their mature size from December to March, and seed dispersal takes place from April to May. The tree is a night-bloomer and flowers are adapted to pollination by bats. The calyx persists and turns woody after shedding the flower. It starts flowering and fruiting after three years and forms viable seeds even in first fruiting. Seeds are adapted to wind dispersal.

Seed collection

Pods should be collected before splitting during February–March. They can be collected as early as when the pericarp of the seeds turns light green, and the seeds turn white. The seed moisture content at this stage reaches 27-32%. Seeds are collected by plucking the pods with a hooked pole. A tarpaulin sheet spread under the tree eases collection.

Processing and handling

After drying, pods are split by pressing a knife along the sutures and seeds are collected in trays and dried in shade with proper aeration.

Dormancy and pretreatment

Seeds are not dormant. The seed germination percentage is 80%–90% without any pretreatment. However, pre-soaking in cold water for 12 hours before sowing accelerates germination.

Storage and viability

Oroxylum indicum seeds are orthodox in nature, as they tolerate drying to 4-5% mc and freezing temperature. Seeds can maintain their viability for about two years at ambient temperature (15-35^{o}C) with a moisture content of up to 7-8%. Long-term storage can be done by storing seeds at low temperatures (0°C to -20°C) and 4-5% moisture content. Wings should be removed before storage to avoid an increase in the moisture content of seeds during storage.

Sowing and germination

Seed is the best propagation material. Seeds are sown in a lightly shaded position in a nursery seedbed or individual containers during the second half of March. The polybags should be filled with sandy-loam soil and Farm Yard Manure in a ratio of 2:1. Sprouting appears in 19-25 days. Moderate shade is necessary in the early stages. After the emergence of the seedlings, the plants are watered regularly.

Pest and Diseases

Septobasidium bogoriense is responsible for velvet blight in *O. indicum*. Leaf-eating caterpillars like Bihar hairy caterpillar (*Diacrisia obliqua*) and grasshoppers damage leaves during the rainy season. Besides, termite attack causes serious damage to root bark in crops grown on drier lands. These insects can be controlled by applying Endosulphan 30 EC spray 0.03% in water solution twice at 15-day intervals as soon as the termites attack the plants.

Selected readings

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