SEED LEAFLET

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Dalbergia sissoo Roxb. ex DC

Taxonomy and nomenclature

Family: Fabaceae (Papilionoideae)
Synonyms: *Amerimnon sissoo* (Roxb. ex DC.) Kuntze
Vernacular/common names: shisham, sissoo, sisu, tahli, Indian Rosewood.

Distribution and habitat

The area of natural distribution is the foothills of the Himalayas from eastern Afghanistan through Pakistan and India to Nepal. It is a primary coloniser of new alluvial soils along riverbanks and forms forest, either pure or mixed with other species. It often occurs in association with *Acacia catechu* (khair-sissoo forest).

It is primarily found below 900 m altitude but ranges naturally up to 1500 m. It tolerates temperatures from below 0°C to nearly 50°C. In its natural range the annual rainfall varies from 750 to 4500 mm concentrated in 4-5 months followed by a long dry season. It can survive with only 400 mm rain/year but best growth is achieved with 1000-1700 mm rain.

It does not tolerate heavy clays, shallow soils or waterlogging. It is sensitive to fire and even light fires will damage the trees. The natural populations of *D. sissoo* have been selectively logged for several hundred years which has led to a seriously depleted gene pool.

Foliage, flowers and fruits. Copyright: United States Department of Agriculture Forest Service Collection Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Uses

Sissoo is one of the most useful multipurpose trees of South Asia.

It is mainly grown for the timber which is among the finest for cabinets, furniture and veneer. The heartwood is golden to dark brown, with density of 0.7-0.8 g/cm^3 (at 12% mc), extremely durable and resistant to termites.

The wood is excellent for fuelwood and charcoal. The calorific value of the sapwood is about 4900 kcal/kg, heartwood about 5200 kcal/kg. The sapwood is also used for pulp.

Leaves, young shoots and green pods are an important source of fodder. The leaves contain up to 24% crude protein (dry weight basis) and dry matter digestibility is about 56%. The fodder value is highest in April and May when other sources of green fodder are scarce.

The species is nitrogen fixing and used in agroforestry systems with many crops. Although sissoo trees can negatively effect crop production due to competition for nutrients, moisture and light, studies have shown that the net value of intercropping sissoo and wheat is higher than wheat monocropping.

It provides shade and shelter and is used as such in mango, tea and coffee plantations. Its habit of developing root suckers and runners makes it useful for erosion control.

Apart from the above, sissoo provides other minor products (e.g. honey) of high economic importance. The ease of propagation by self-seeding, coppice, root suckers and stumps and the many environmental and socio-economic benefits makes it one of the most valued tree species by farmers in the region.

Botanical description

Medium to large deciduous tree, much-branched and slender, normally with crooked bole. It can grow up to 30 m tall but is usually smaller. Bark is pale grey, fairly rough with shallow fissures and peeling off readily.

Leaves normally about 15 cm long and compound; 3-5 leaflets increasing in size upwards, the terminal one up to 6 cm long.

Flowers bisexual, small, pale yellow, in 10-15 cm long panicles that are conspicuously hairy when young. Fruits hanging in dense clusters at the ends of the shoots.

Fruit and seed description

Fruit: the fruit is a light brown indehiscent pod, 5-9 cm long, 10-12 mm wide, thin and glabrous and with conspicuous veins. There are 1-5 seeds / pod.
Seed: kidney-shaped, 8-10 mm long, 4-5.5 mm wide, pale brown to almost black, flat and with thin testa. There are 40000-55000 seeds per kg.

Flowering and fruiting habit

Within the area of natural distribution the leaves are shed in November-December and new leaves appear in January-February. The first flowers appear together with the new leaves and in March-April the flowers open. By the end of April, young green pods appear and in October when the dry season sets in the fruits begin to ripen.

The flowers are pollinated by bees, thrips and other insects.

Seed production starts when the trees are 3-4 years old and normally a good crop is produced every year with yields of 1-3 kg per tree.

Although results have been conflicting, the most recent results point to the species being partial selfing and partial outcrossing, a type of breeding system often found in pioneer species. The rate of outcrossing has been estimated to 60-90%, it varies between populations and for the single population over time.

Harvest

Ripe fruits can be harvested from December to March. The fruits should be collected from the tree by climbing or by shaking the fruits onto a tarpaulin on the ground. It is not advisable to collect from the ground as the seeds are often infected. 1.25 kg pods contain about 1 kg seed.

Processing and handling

After collection the pods are dried in the sun and when dry, broken in segments each containing one seed. The segments are then cleaned by winnowing to remove empty pieces of pods.

Storage and viability

The seeds are orthodox and when properly dried and stored in airtight containers they will retain high viability for several years even at room temperature, longer if stored at 5°C.

The seeds can be infested by the pea beetle, *Bruchus pisorum*. Infestation is initiated in the field but breeding can continue during storage.

Dormancy and pretreatment

The seeds are not hardcoated and scarification is not necessary. Soaking for 24-48 hours in cold water before sowing improves germination.

Sowing and germination

The seeds (pod segments) are sown in March-April in lines in raised seed-beds and watered two times every day. Germination starts after about one week and is completed in about three weeks. The germination rate is typically 60-80%. When the seedlings are about 5 cm tall they are transplanted into containers. For production of stumps, 12-16 months are required in the nursery.

Selected readings

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27-year-old planting of *Dalbergia sissoo* in northern India. Photo: H. Keiding, DFSC.

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