Sesbania sesban (L.) Merr.

Fabaceae - Papilionoideae

LOCAL NAMES
Afrikaans (rivierboontjie); Amharic (girangire); Arabic (sesaban); Bengali (jainti,jayant); Burmese (yay-tha-kyee,yethugyi); English (common sesban,Egyptian rattle pod,frother,sesbania,sesban,river bean); Filipino (katuray,katodai); Hindi (jait,jainti,rawasan); Indonesian (janti,puri,jayanti); Javanese (janti); Khmer (snaô kôôk); Lao (Sino-Tibetan) (sapao lom); Luganda (muzimbandeya,mubimba); Sanskrit (jayantika,jayanti); Spanish (Añil francés,tamarindillo); Tamil (karunchembai,chithagathi,champai); Thai (sami,saphaolom); Vietnamese (dien-dien); Zulu (umQambuqweqwe,umsokosoko)


S. sesban flowers (Anthony Simons)


S. sesban Mesoplatys beetle attack. (Anthony Simons)

S. sesban pods. (Anthony Simons)

BOTANIC DESCRIPTION
Sesbania sesban is a narrow-crowned, deep-rooting single or multi stemmed shrub or small tree, 1-7 m tall. The trees usually have a main stem but may develop many side branches if widely spaced. The many branches give the tree a shrubby appearance, often tending towards a spreading habit due to its wide branching angle (45-60 deg. Mostly).

Leaves paripinnate, long, narrow; leaflets in many pairs, rounded or oblong, usually asymmetric at the base, often glaucous; stipules minute or absent.

Flowers attractive, yellow, red, purplish, variegated or streaked, seldom white, large or small on slender pedicels, solitary or paired in short axillary racemes, usually unpleasantly scented; all petals long clawed, standard orbicular or obovate.

Pods pale yellow, linear, usually 10-20 cm long, cylindrical or compressed, rarely oblong; up to 40 seeds are found in a pod; seeds oblong or subquadrate, brown or dark green mottled with black.

Two subspecies are recognized within S. sesban, namely ssp. punctata (restricted to northern portions of sub-Saharan Africa) and ssp. sesban.

BIOLOGY
S. sesban is assumed to be largely out-crossing, however interspecific hybridization is reported with S. goetzei; the carpenter bee is its main pollinator. Flowering starts shortly after the onset of the rains (in areas where there are 2 rainy seasons, it flowers and sets fruit twice). Pods are indehiscent and do not shed their seeds until well after pod maturity.

ECOLOGY
S. sesban grows well in the subtropics and is significant in extending the nitrogen-fixing forage trees into cooler, higher elevation regions of the tropics. It has outstanding ability to withstand waterlogging and is ideally suited to seasonally flooded environments. When flooded, it initiates floating, adventitious roots and protects its stems, roots and nodules with spongy, aerenchyma tissue. It is common along streams, swamp banks and moist and inundated bottomlands. S.sesban shows some tolerance to moisture stress and tolerates soil alkalinity and salinity to a considerable degree.

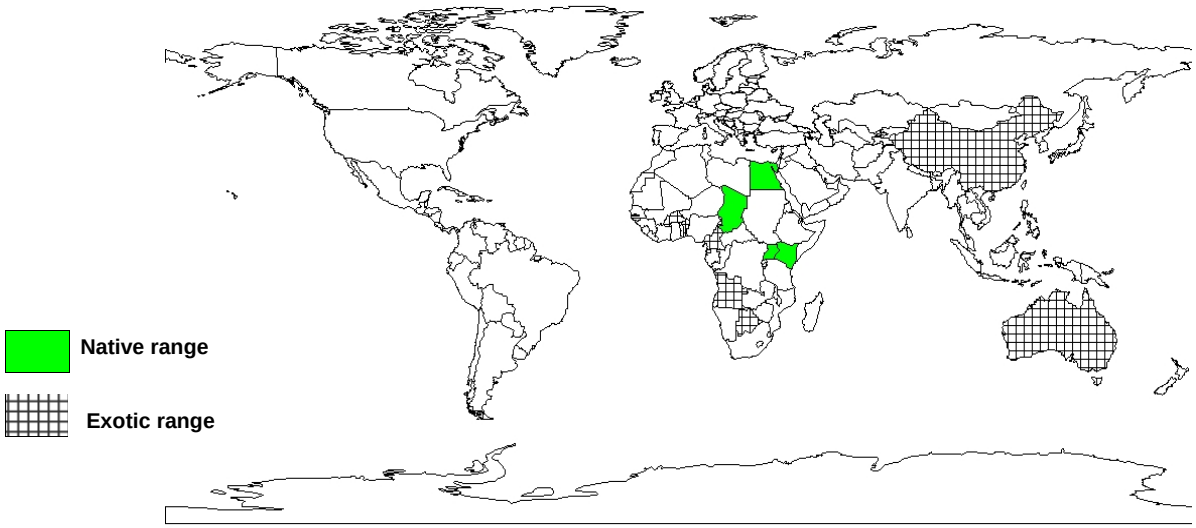
BIOPHYSICAL LIMITS
Altitude: 100-2300 m, Mean annual temperature: (10 min.) 18-23 (45 max.) deg. C, Mean annual rainfall: 500-2000 mm

Soil type: Tolerates seasonal or permanently waterlogged soils as well as saline, acidic and alkaline soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Chad, Egypt, Kenya, Uganda

Exotic: Angola, Australia, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, China, Congo, Cook Islands, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, India, Indonesia, Iraq, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Marshall Islands, Mauritania, Mozambique, Myanmar, Namibia, New Caledonia, Niger, Nigeria, Norfolk Island, Pakistan, Papua New Guinea, Philippines, Rwanda, Samoa, Sao Tome et Principe, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Africa, Sudan, Swaziland, Tanzania, Thailand, Togo, Tonga, US, Vanuatu, Vietnam, Zambia, Zimbabwe



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: S. sesban flowers are edible and are included perhaps as a decorative or festive ingredient in foods such as omelettes.

Fodder: The tree has a high percentage of foliage nitrogen and is an excellent supplement to protein-poor roughage in ruminant diets. Ruminants readily eat leaves and young branches. The crude protein content of the foliage is generally greater than 20% and often above 25%. In vitro dry-matter digestibility is 75%. Nylon-bag dry-matter digestibility of dried leaf of S. sesban is 90.7% and nitrogen digestibility is 96.7%. These characteristics, together with the generally low crude fibre content and high phosphorous levels, indicate the potential of the species as a high-quality forage source.

When grazed, the brittle tree may break too easily and expose the tree to fungal attack. It has been successfully fed as a sole diet to goats and as a supplement to low-quality forage for sheep.

Fuel: S. sesban is popular for firewood and charcoal because it produces a high woody biomass in a short time, which, although soft, is relatively smokeless, quick kindling and hot burning. The calorific yield for a 3-year-old tree is approximately 4350 kcal/kg.

Fibre: S. sesban is used for making ropes and fishnet and has potential for pulpwood production.

Gum or resin: S. sesban seeds and bark produce gum.

Poison: The saponin, stigmasta-galactopyranoside, which is isolated from the seeds, has glucuronide derivatives of oleanolic acid, which has molluscicidal activity against Biophalaria glabrata, one of the known snail vectors of schistosomiasis. The saponin also shows spermicidal and haemolytic activity. Using S. sesban leaf meal in poultry diets (as 10% of the diet) is fatal to young chicks, and the provision of either cholesterol or sitosterol with the diet significantly improves chick survival.

Medicine: Fresh S. sesban roots and leaves are used to treat scorpion stings, boils and abscesses. The Hausa of Ghana use decoctions of leaves as a drench for cattle to repel tsetse fly. Among the Haya people of Tanzania, it is used to treat sore throat, gonorrhoea, syphilis, spasmodic fits in children and jaundice during pregnancy. The leaves are used in some countries as a tea and are considered to have antibiotic, anthelmintic, antitumour and contraceptive properties. Oil from the seeds is accorded special properties in ayurvedic medicine and is reported to have bactericidal, cardiac depressant and hypoglycaemic actions.

SERVICES
Shade or shelter: S. sesban has been used to shade coffee, tea and cocoa. It has also been used as a windbreak for bananas, citrus and coffee.

Soil improver: S. sesban will increase soil nitrogen through symbiotic interaction with bacteria, has the ability to stabilize soil, and in Asia has been used as green manure for rice. Its branches have been used as mulch and leaves as a green manure. S. sesban improves soil fertility in a short-term rotation fallow and is useful in combating striga weed (Striga hermonthica). Some studies indicate that in 1 year a S. sesban fallow can increase maize yields from 2 to 4 t/ha without application of nitrogen fertilizer.

Intercropping: S. sesban is a promising shrub for alley cropping because it is easy to establish, it grows rapidly, coppices readily and provides mulch of high nutrient content (particularly N). In some climates, such as in the highlands of Kenya, it may have a sparse canopy, and weed competition can be a problem. This characteristic makes S. sesban a good intercrop.

Boundary or barrier or support: Suitable for use as live trellises for pepper.

TREE MANAGEMENT
One of the major advantages of sesbania over other forage trees and shrubs is its rapid early growth rate, which can be exploited by intercropping it with other slower establishing species for earlier yields. In India, it has been reported to attain a height of 4-5 m in 6 months. S. sesban thrives under repeated cuttings and coppices readily, with many branches arising from the main stem below cutting height. Cutting frequencies are generally 3-4 cuts/annum, but up to 8 cuts are made in some areas. Yields have ranged from 4 to 12 t/ha dry matter per year, depending on location. Cutting height can also influence yield, with cutting heights of 50-76 cm favouring plant survival and productivity.

The rhizobium requirements of S. sesban vary. There is a host-strain interaction, and different accessions of S. sesban require different strains of bacteria.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox. Viability can be maintained for 2 years in open storage at room temperature. There are 85 000-100 000 seeds/kg.

PESTS AND DISEASES
S. sesban is attacked by nematodes, insects, fungi and viruses. The leaf-eating beetle Mesoplatys ochroptera can completely defoliate S. sesban, leading to mortality. Caterpillars, Hymenoptera, and stem borers are normally associated with S. sesban. Some potentially destructive root-knot nematodes have been recorded in India as associated with S. sesban.

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SUGGESTED CITATION

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