LOCAL NAMES
English (sesbania,rostrata)

BOTANIC DESCRIPTION
Sesbania rostrata is an erect, robust, softly woody, nonaculeata annual or short-lived perennial, 1-3 m tall. Stem pithy, sparsely pilose, glabrescent, with vertical rows of pustules usually evident above the leaf axils and producing warty outgrowths on older stems, submerged portions clothed with matted fibrous roots.

Leaves paripinnate, (4.5-)7-25 cm long; stipules linear-lanceolate, 5-10 mm long, reflexed, pilose, very persistent; petiole 3-8 mm long, pilose; rachis up to 19 cm long, sparsely pilose; stipels present at most petiolules; leaflets opposite, in (6-)12-24(-27) pairs, oblong, 0.9-3.5 cm x 2-10 mm, the basal pair usually smaller than the others, apex rounded to obtuse to slightly emarginate, margins entire, glabrous above, usually sparsely pilose on margins and midrib beneath.

Inflorescence an axillary raceme, shorter than subtending leaf, 1-6 cm long, (1-)3-12(-15)-flowered; rachis pilose; peduncle 4-15 mm long, pilose; pedicel 4-15(-19) mm long, sparsely pilose; bracts and bracteoles linear-lanceolate, 5-8 mm long, sparsely pilose, caducous; calyx campanulate, 5-7.5 mm x 4-5 mm, sparsely pilose, teeth 1-2 mm long, subulate, sparsely pilose; standard suborbicular, 12-16(-18) mm x 11-14(-15) mm, yellow or orange, speckled dark purple or reddish, apex emarginate, appendages with short, triangular, upward-pointing or slightly incurved, free tips, less than 1 mm long; wings 13-17 mm x 3.5-5 mm, yellow, a small triangular tooth and the upper margin of the basal half of the blade together characteristically inrolled; keel 12-17 mm x 6.5-9 mm, yellow to greenish, basal tooth short, triangular, slightly upward-pointing with small pocket below it on inside of the blade; stamens 10, vexillary stamen free, bent sharply near the base, staminal sheath longer than free parts of filaments, auricled; ovary sparsely pilose on upper margin or glabrous, style glabrous, stigma small.

Pod in outline falcate, 15-22 cm x 3.5-5 mm, beak slender, up to 3.5 cm long, thicker at the center than at the sutures, up to 50-seeded.

Seed subcylindrical, 3-3.5 mm x 2.5-3 mm x 2-2.5 mm, brown, greenish or dark reddish brown; hilum in a small, central, circular pit.

S. rostrata is one of the 3 taxa of Sesbaia Adanson that form stem nodules, the others being S. speciosa Taubert and S. sesban (L.) Merrill var. punctata (DC.) J.B. Gillett (synonym : S. punctata DC.).

BIOLOGY

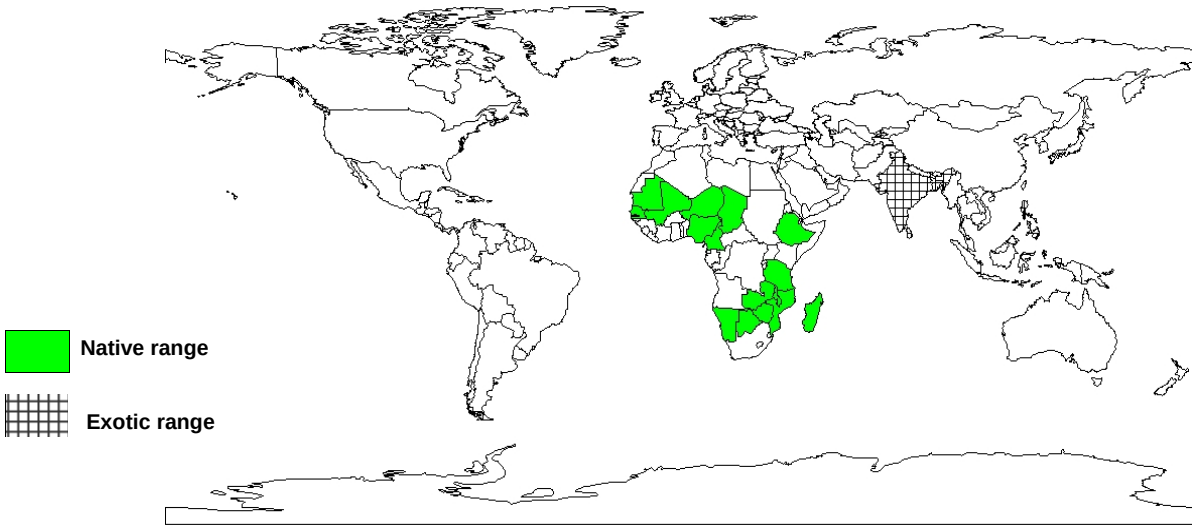
ECOLOGY
S. rostrata occurs naturally in marshes, floodplains, on muddy river banks and the edges of pools, but has also been recorded in open savanna. It tolerates waterlogged soils and flooding to over 1 m deep. In cultivation, S. rostrata is almost always associated with wet rice.

BIOPHYSICAL LIMITS
Altitude: Up to 1600 m.

DOCUMENTED SPECIES DISTRIBUTION

Native: Botswana, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Ethiopia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Senegal, Tanzania, Zambia, Zimbabwe

Exotic: Bangladesh, India, Philippines, Sri Lanka



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: The leaves are processed into leaf meal.

Fodder: It is suitable as a fodder for both ruminants and non-ruminants. The above-ground parts of 50 days old S. rostrata grown in northern India contained per 100 g dry matter : N 2.9 g, P 0.3 g, K 1.6 g, S 0.4 g.

Fuel: Dry stem are used as fuel e.g. in Madagascar.

SERVICES
Soil improver (paragraph 1): It is used as green manure in wetrice cultivation. Grown as a green manure crop S. rostrata is allowed to grow for 45-65 days depending on its growth rate. When it is left to grow longer than about 55 days, the lignin content increases which decreases the decomposition rate of plant biomass. During the short-day season, it may be left to grow longer as it starts flowering early, resulting in a lower growth rate. The green manure crop is ploughed in just before the rice crop is sown or transplanted. Initial decomposition is rapid, with 30-45% of the leaf material decomposing in 10 days after incorporation. Decomposition then slows down considerably, reaching 50% after 35 days, while the half-life of stems and root-stubble is about 110 days.

Soil improver (paragraph 2): When S. rostrata is grown for green manure, aplying P and K fertilizers at the rate normally given to rice may increase nitrogen fixation by 30% and improve the availability of N, P and K to the subsequent rice crop. At the International Rice Research Institute, Los Ba±os, the Philippines, the average rice grain yield was about 6 t/ha after incorporation of a S. rostrata crop grown for 45-60 days, which is the same as the yield obtained with urea applied at a rate of 50-60 kg/ha. Under favourable conditions the amount of N accumulated in the green manure crop is about 100 kg/ha in 50 days and 160 kg/ha in 60 days. The residual effect of Sesbania green manure application on soil organic matter and N levels seems limited.

Intercropping: It has shown potential for incorporation in alley-cropping system.

TREE MANAGEMENT
Under favourable conditions, S. rostrata grows very fast, reaching a height of 2 m in 60 days, accumulating 8-11 t above-ground dry matter per ha.

It is only necessary to apply a solution of an appropriate Rhizobium strain in locations where S. rostrata has not been grown before. Spontaneous inoculation in the field is generally adequate for a high rate of nitrogen fixation. Although Rhizobium strains to stem inoculation are highly specific, they are easly established in the soil, as they can be transferred via the seed-coat. They show a high rate of survival under flooded and dry conditions. Natural infection of stems probably occurs through wind, rain splash and insects.

S. rostrata nodulates with three groups of rhizobia. Stem nodules are formed following infection with strains of Azorhizobium caulinodans such as TCSR-1 and ORS-571. This symbiosis is highly spesific. A. caulinodans differs from Rhizobium and Bradyrhizobium strains in its ability to fix atmospheric nitrogen as a free-living organism and is closely related to Xanthobacter. A. caulinodans may infect many Sesbania species, but forms an effective symbiosis almost exclusively with S. rostrata. A second groups of rhizobia belongs to Rhizobium and forms root nodules only; it infects and fixes atmospheric nitrogen in symbiosis with many Sesbania species. The third group comprises a few strains of Rhizobium and forms effective stem and root nodules in S. rostrata and only root nodules in several Sesbania species. Information on the ability of S. rostrata to fix atmospheric nitrogen in the presence of soil nitogen is conflicting. Some studies indicate that nodule numbers and N-fixation rate are only slightly reduced by soil nitrogen and N-fertilizer applications of up to 100 kg/ha. Other studies have found a reduction in the number of stem nodules proportional to the N-fertilizer gift, and no formation of root nodules. Acetylene reduction assays have indicated that the rate of nitrogen fixation of stem nodules was reduced to only 10% of the unfertilized control by an N-fertilizer application of 30 kg/ha, and to even lower levels with higher applications up to 60 kg/ha. Plant height and fresh weight, however, were highest with 30 kg N-fertilizer per ha.

S. rostrata is a quantitative short-day plant, with a critical photoperiod of 12-12.5 hours.

It has been proposed to plant S. rostrata on field bunds. Prunings of these plants would provide cuttings for vegetative propagation, or be a source of readily available green manure. These plants could also be a source of seed.

GERMPLASM MANAGEMENT

PESTS AND DISEASES
Diseases: The most common diseases affecting S. rostrata are damping-off caused by Pythium spp. and Rhizoctonia spp., leaf spot caused by Cercospora spp., and viral leaf mosaic.

Pests: The root-knot nematode Meloidogyne attacks the root system. In dry condition of the West African Sahel, nematode attack may be so serious that it is impossible to grow S. rostrata.

FURTHER READNG

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SUGGESTED CITATION

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