Senna siamea (Lam.) H.S. Irwin & Barneby

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FABACEAE (BEAN FAMILY)

No synonyms

Bombay black-wood, casia amarilla, casia de Siam, casia siamea, johar, juar, kassod, kassod-tree, minjri, mjohoro, msunobari, mti, muong, sheku, siamese cassia, taray ulaya, vakai, wa, yellow casia

Senna siamea is native to Southeast Asia from India, Sri Lanka, and Thailand to Indonesia, Burma, and Malaysia and forms part of the warm and wet tropical forests. The species has been introduced in Africa and America.

Senna siamea is an evergreen tree that is fast-growing and short-lived. Under optimal conditions, it can reach 30 m in height and 30 cm d.b.h. The tree has a straight trunk and a rounded or irregular and spreading, multibranched crown with dense foliage. The leaves are pinnate, 23 to 33 cm long, and made up of 5 to 14 pairs of lanceolate, oblong or ovate-elliptic leaflets, 3 to 7 cm long and 12 to 20 mm wide. The species requires soils that are deep, well-drained, and rich in organic matter for good development. Average annual precipitation is 1137 mm with a minimum precipitation of 500 mm and a maximum of 2800 mm. Average annual temperature is 24.2 °C, with a minimum of 19.9 °C and a maximum of 27.7 °C and a dry season that lasts 4 to 6 months and rain in the summer. The tree grows naturally from sea level to 600 m. It endures seasonal flooding, salinity, and continuous exposure to wind and shade. However, it is not very resistant to cold and drought (Nair 1984, von Carlowitz 1991).

Senna siamea has multiple uses. In its native habitat it is used to establish windbreaks and to provide shade to coffee plantations. It has also been planted to recover degraded soils. *Senna siamea* is customarily planted in lanes with corn and cotton because the foliage is rich in organic matter and serves as green manure. Because it grows fast, the species is planted in wet tropical regions to produce firewood (National Academy of Sciences 1980). Good-quality plantations yield approximately 175 m^3 per ha of high calorific power (Food and Agriculture Organization 1957). The wood is also used for poles, turned articles, furniture, and pulp for paper and in rural construction. The bark contains tannin and is used to tan hides. The flowers, rich in nectar, are honey bearing. The foliage, fruits, and seeds are fatal to pigs, but cattle and sheep are not affected by their toxicity (Hoyos 1979, Nair 1993, Parrotta and Francis 1990).

In its native habitat, *S. siamea* blooms precociously and abundantly from June to January. Outside its area of natural distribution, the tree blooms and fruits at different times of the year, depending upon the environment. The flowers have yellow petals and are arranged in racemes or panicles. *Senna siamea* begins to fruit at 5 years. The fruits are hanging, linear, plano-compressed legumes, 5 to 30 cm long, 12 to 20 mm wide, bicarinate, coriaceous or subwoody, and dark brown and dehiscent when ripe. Each fruit contains approximately 25 seeds (Holdridge and Poveda 1975, Irwin and Barneby 1982, Little 1983). The seeds range in shape from circular to obovate and in some cases are vaguely elliptic and laterally flattened. Seed size ranges from 6.5 to 8 or 9 mm long, 5.5 to 6.0 mm wide, and 0.8 to 1.0 mm thick. The seedcoat is dark brown, smooth, shiny, and cartaceous, and 3.3 to 4.5 mm long by 0.9 to 1.2 mm wide, with a closed, oblong-elliptic pleurogram on each of its lateral surfaces.

Fruits are collected before they ripen and release their seeds. Collectors climb the trees and use poles with metal hooks to remove fruit. Fruits are placed in boxes in the sun to dry and open. Fruits are fragile, and the extraction of seeds is done by grinding the fruits by hand. Impurities are removed using sieves or a vertical column blower. Seeds average 30,000 to 45,000 per kg. They remain viable for several years when stored under ambient conditions (24 to 30 °C) (Parrotta and Francis 1990). According to some studies developed in the International Centre for Research in Agroforestry (Interna-

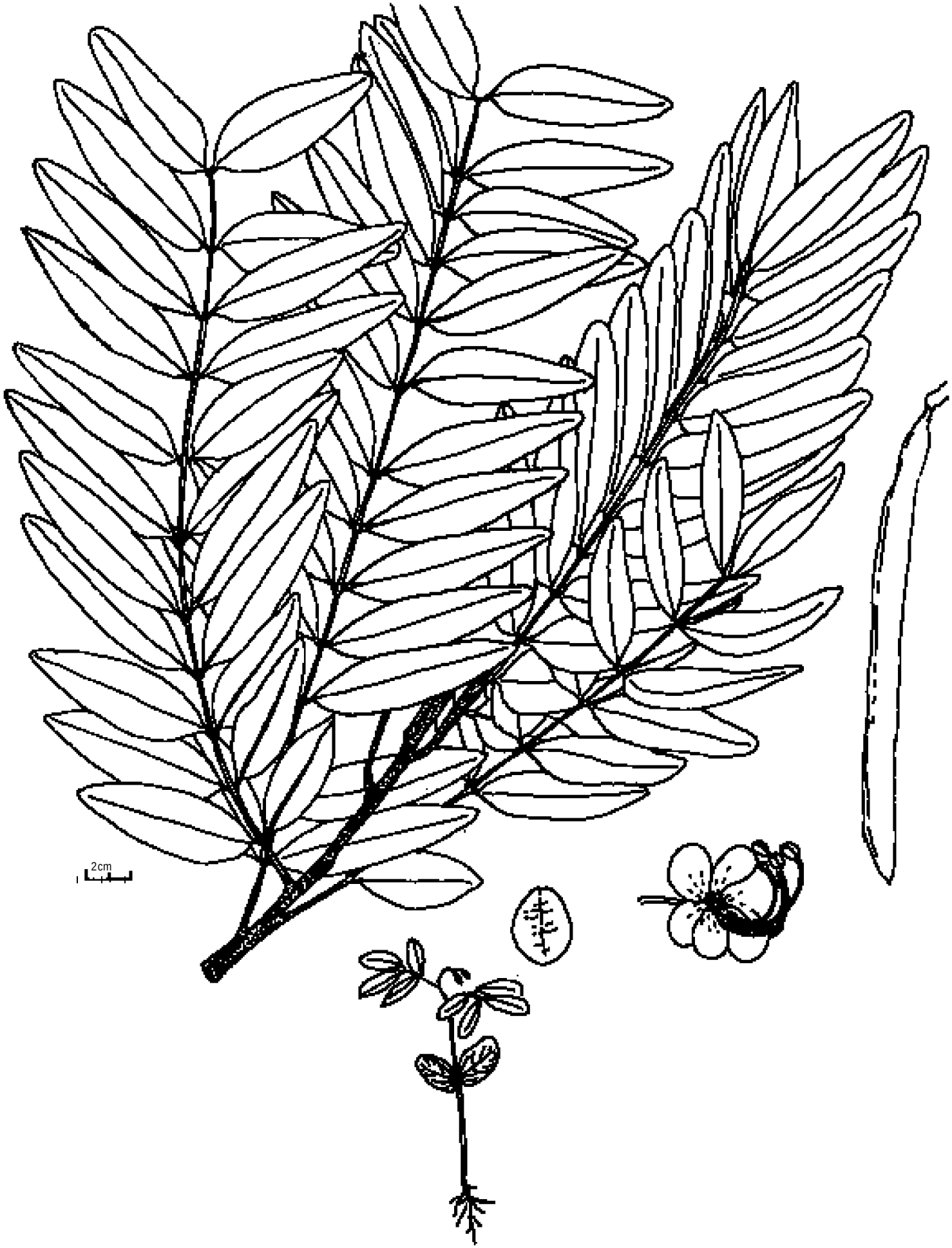
tional Center for Research in Agroforestry 1992), seeds maintain their viability for 1 year when viability begins to decrease.

The germination of seeds is phanerocotylar. Fresh seeds germinate at 50 to 90 percent without pretreatment. Old seeds must undergo various pregerminative treatments such as: (1) immersion in concentrated sulfuric acid for 5 to 15 minutes; (2) soaking in water at ambient temperature for 48 hours; or (3) immersion in boiling water for 1 minute and then soaking in water at ambient temperature for 6 hours (von Carlowitz 1991). Seeds germinate 4 days to 6 weeks after sowing.

In nurseries, seeds are planted in seedbeds and when the plantules reach a height of 7 to 10 cm, they are transplanted to black polyethylene containers. In about 3 months, when seedlings reach a height of 25 cm and a diameter of 2.6 mm at the base of the stem, they are outplanted (Parrotta and Francis 1990). *Senna siamea* also regenerates by stump shoots after the trees have been cut down (Irwin and Barneby 1982).

ADDITIONAL INFORMATION

The hilum is subbasal. The micropyle is indiscernible. The endosperm is whole, cornaceous, whitish, and translucent, and located on the lateral surfaces of the embryo. The embryo has a straight axis and is spatulate, almost bilaterally symmetrical, and greenish yellow in color. The two cotyledons are shaped like the seed, whole, equal, expanded, flat, pulpy, and independent of one another, with an auriculate base. The plumule is rudimentary. The radicle is conical and not covered by the cotyledons (Irwin and Barneby 1982).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