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Pentaclethra macroloba

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SEED LEAFLET

No. 35 September 2000

Pentaclethra macroloba (Willd.) Kuntze

Taxonomy and nomenclature

Family: Fabaceae.
Subfamily: Mimosoideae
Synonyms: *Acacia aspidioides* G.F.W. Mey., *A. macroloba* Willd., *Caullea macrostachya* Steud., *Entada werbaeana* Presl., *Mimosa macroloba* Poir., *Pentaclethra brevipila* Benth., *P. filamentosa* Benth.
Vernacular/common names: Oil bean tree (English name used for all three species of the genus); Gavilán, quebracho, palo de aceite, sangredo (Central America); carbonero, mulato (Venezuela); parachy, paranacachy (Brazil); paroa-caxi, pracaxy (Brazilian Amazonia); koeroebaharo (Surinam); koloballi (Guyanas).

Related species of interest: There are two other species in the genus: *P. macrophylla* Benth. and *P. eetveldeana* De Wild. & Th. Dur., both from tropical Africa. All three species have rich oily seeds and *P. macrophylla* is the source of 'owala butter' or 'owala oil', a product that is widely used in Africa.

Distribution and habitat

The area of natural distribution is from Nicaragua to Amazonia, including the Guyanas and some of the West Indian Islands.

There are three disjunctive populations. The largest population occupies the Amazonian lowlands on the Atlantic coast, from north-east Venezuela to the Guyanas and includes Trinidad and Tobago islands. A second population is found in Chocó in western Colombia and the humid lowlands in Darién, Panama. The third population is located in the Atlantic lowlands of south-east Nicaragua, Costa Rica and western Panama. There are probably genetic differences between the populations.

It is a lowland species found at 0-600 m altitude in areas with more than 3500 mm rain/year and temperatures of 24-30°C. In humid tropical forests it is one of the dominant canopy trees reaching 30-35 m, often found growing near rivers and in swampy areas.

Uses

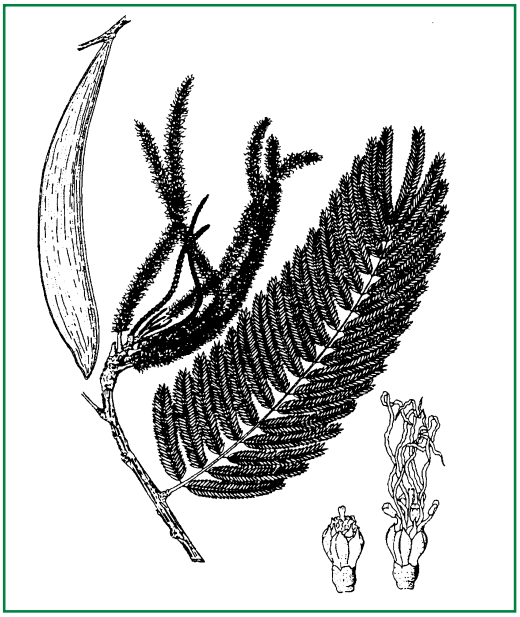
As a nitrogen-fixing pioneer species it has great potential in forest regeneration and reclamation of degraded lands. The wood is of high quality and often used as a substitute for mahogany. It is heavy, strong and easy to work.

The seeds have a high content of oil that may be used industrially in lubricants and soaps, and the bark is a source of tannins. Seeds and bark have multiple uses in local medicine. Both seeds and bark contain a toxic, and long contact with sawdust and bark may cause allergy.

Botanical description

Tree up to 35 m tall and 1.3 m in diameter with smooth, grey-brown bark. Leaves are biparipinnate, up to 30 cm long, with numerous small leaflets giving a feather-like appearance.

The flowers are hermaphrodite, small, crowded in 15-20 cm long, dense racemes. There are almost 200 flowers per raceme but only 1-5 flowers develop fruits.



Pod, flowering branch, flower bud and flower. Illustration from Flores, 1994.

Fruit and seed description

Fruit: dehiscent pod, 20-50 cm long, 4-6 cm wide, dark brown. There are 3-8 seeds/pod. The dehiscence is explosive and seeds can be thrown 10 m or more away from the tree.
Seed: the seeds are asymmetric and different from the typical mimosoid seed. The seed coat is brown and with longitudinal stone cells forming fine lines on the surface. They contain 45-48% lipid, 27-28% protein and 12-14% carbohydrates and lack endosperm. There are about 300 seeds/kg.

Flowering and fruiting habit

The peak of flowering is from April to May and from July to August but there is normally some flowering all through the rainy season. In the Atlantic lowlands it is common to see trees bearing flowers as well as immature and mature pods from September to December.

The main crop is produced from August to September and in most places there is a minor fructification in November-December.

The species is outcrossing and probably pollinated by small insects. It begins to produce seeds at a very early age. Trees that grow in open areas with plenty of light tend to start flowering when they are 2 years old.

Harvest

In July-August when the pods have turned dark grey and before they open, they are collected from the tree. They are transported in open bags to the processing site and must at all times be protected from wind and direct sun.

Processing and handling

The pods are dried in the shade for one day and the seeds are extracted manually.

Storage and viability

The seeds are probably recalcitrant but this has not been tested. They lose viability very quickly and do not seem to tolerate desiccation or low temperatures.

After collection the seeds must be handled very gently, kept moist and well aerated. After about one week most seeds will have lost viability.

Dormancy and pretreatment

It is not necessary to pretreat fresh seed.

Sowing and germination

Fresh seeds have high germination, often 90%. Germination is hypogeal, it starts 8-10 days after sowing and finishes after 30 days.

The seedlings produce 14-17 small, scaly leaves before the first biparipinate leaves emerge.

The seeds can be sown in germination beds but must be transplanted before the first biparipinate leaves have developed. It is preferable to sow the seeds with the pointed end down. They should be covered with a fine layer of substrate and the substrate must be kept moist at all times.

Germination takes place regardless of light conditions and the seedlings will grow under shade as well as in direct sun. If the shoot is damaged, axilliary buds from the scaly leaves take over growth. After 4-5 months when the plants are 35-40 cm tall, they are ready for transplanting into the field.

Phytosanitary problems

Because of the toxicity of the seeds, monkeys and birds avoid them. Some Lepidoptera lay eggs inside the seeds and the larvae come out when the seed germinates.

Selected readings

CATIE. 1998. *Pentaclethra macroloba. (Willdenow) O. Kuntze*. Nota Técnica sobre Manejo de Semillas Forestales, no. 26.

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Natural stand of flowering trees. Costa Rica. Photo: Dorthe Jøker, DFSC.

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