CATIE

SEED LEAFLET

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Cordia alliodora (Ruiz & Pavón) Oken.

Taxonomy and nomenclature

Family: Boraginaceae

Synonyms: *Cerdana alliodora* Ruiz & Pav., *Cordia alliodora* var. *boliviana* Chodat & Vische, *C. alliodora* var. *glabra* DC., *C. andina* Chodat, *C. cerdana* (Ruiz & Pav.) Roem. & Schult, *C. gerascanthus* auct. non L., *C. goudoti* Chodat, *C. macrantha* Chodat, *C. velutina* Mart., *Lithocardium alliodorum* (Ruiz & Pav.) Kuntze, *Varronia tuberosa* Sesse & Moc.

Common names: Spanish elm, cordia (Eng.); laurel (Sp.); salmwood (trade name)

Distribution and habitat

Widely distributed in tropical America from Mexico to Argentina and in the Caribbean islands. It can be found up to 2000 m altitude but is more abundant at lower altitudes. Prefers humid tropical forests with annual precipitation of 2000 mm or more and mean temperature above 23°C, but is also common in dry areas with less than 1000 mm/yr. Best growth is achieved on well drained soils.

Botanical description

Deciduous tree, 20 - 45 m high and 30 - 75 cm in diameter; bole straight. Bark greyish, 8-15 mm thick, rough, with fissures forming squares. Leaves simple, alternate. Leaf elliptic-oblong, 10-20 cm x 2-7 cm.

Inflorescence a terminal panicle. Flowers small, 8-12 mm, white. The corolla is persistent and serves as an agent of wind dispersal when dry.

Uses

The wood is valuable, used for carpentry, furniture, cabinets, flooring, panelling and has potential for being used in paper production.

Also used in agroforestry where it is grown with coffee and cocoa. Flowers and fruits are used in medicine and the leaves in ointments and tonics.

Fruit and seed description

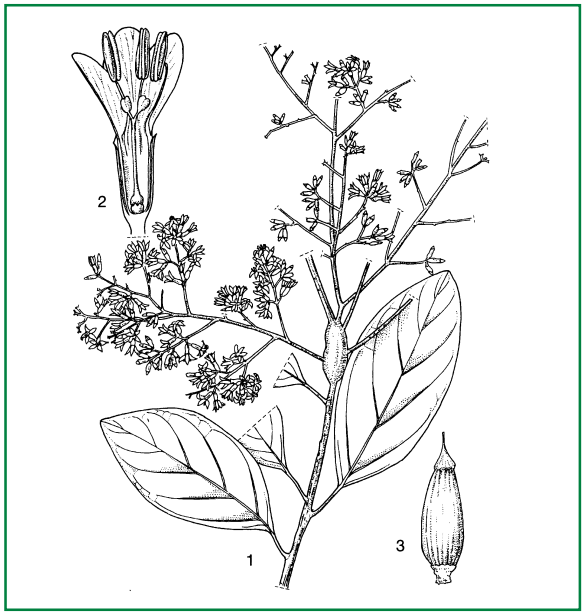
Fruit: brown at maturity, 1 cm long, 6 mm wide. Floral parts persistent.

Seed: white, 7 mm long, 5 mm wide. Seed weight is variable. In Costa Rica 80,000-115,000 seeds/kg is typical while it is 20,000-60,000 seed/kg in Colombia.

Flowering and fruiting habit

The flowers have a nectariferous disk and are pollinated by butterflies like the other species in this genus; self-pollination is rare. Flowering begins when the tree is only 2-3 year old and viable seed is produced from its 5th year. A large canopy tree can produce as much as 10 mill flowers and 1 mill seeds in a year.

In Mexico, Central America and the Caribbean, flowering generally starts about December and may extend through to April, whereas at the southern end of its range, flowering starts in January. In places like Colombia, where the climate is less seasonal, flowering all year is common.



1, Flowering branch; 2, vertical section through flower; 3, fruit. From: Plant Resources of South-East Asia. No. 11. Auxiliary plants.

Harvest

Timing the collection is critical to ensure high germination in this species. The fruits are mature when they are of the same light brown colour as the persistent corolla. Tests have shown that when they turn darker brown, viability is reduced. The optimal time for harvest is when the fruit changes colour from yellow to brown. As a rule of thumb, collection from the tree should wait until two weeks after the last flowers have opened.

To test seed maturity the seed is removed from the calyx and squeezed at the point of the shrivelled style to remove the embryo. The seed is mature when the embryo is hard, like a grain of rice, but immature if the embryo is still soft and translucent. Seed collected too soon before natural fruit fall have low germination.

The tree can be climbed with ladders or spurs. Small branches with mature fruits are cut and caught on a sack or tarpaulin before they hit the ground. One tree can produce up to 8 kg fruit, but the normal yield is 0.5-3 kg.

Processing and handling

Immediately after harvest the fruits are transported in jute sacks to a well ventilated storeroom where they are spread out on tarpaulins. The moisture content at harvest varies from 10 to 40%. The fruits are dried in shade, or at most 3-4 hours a day in the sun, until they reach a moisture content of 7-10%. Shade drying typically takes four to six days. The fruit is separated from the floral parts by shaking and finally washed.

Storage and viability

The seed is orthodox, but if not stored properly it loses viability fast. It is especially important to use bags that are completely airtight, either heavy plastic or aluminium.

In Costa Rica experience is that after two weeks at room temperature the germination is down to 40%. Best storage is at 5°C and moisture content 7-10%. An experiment from Colombia showed that seed stored at 5°C and 8.5% moisture content retained 76% germination after 14 months.

Dormancy and pretreatment

Pretreatment is not necessary.

Sowing and germination

Germination begins two weeks after sowing and is finished after 6 weeks. Germination is typically 50-60%. The seeds can be sown in bags or in sandbeds and transplanted to bags after germination.

In Costa Rica seeds are sown in boxes with sterilised sand, and 22 days after germination the seedlings are transplanted to shady beds at 25 x 25 cm distance. After 5-6 months the plants are planted out. Propagation by pseudo-grafting is often used in Costa Rica.

In Columbia sowing in a mixture of dark soil, sand and rice husks in the ratio 2:1:1 resulted in a germination of 80% after 10-20 days. Seeds can be broadcast or sown in 1-1.5 cm deep furrows.

Phytosanitary problems

Seed are predated prior to dispersal by bruchid beetles (*Amblycerus* spp.), with as much as 50% of seed killed, although levels of attack vary between trees and years. The larvae eat the developing seed embryo and attacked seed are distinguished by the round hole left in the calyx by the emerging adult beetle.

Selected readings

Boshier, D.H. 1992. *A study of the reproductive biology of Cordia alliodora* (Ruiz & Pavón) Oken. Ph.D. Thesis. University of Oxford.

Boshier, D.H., and Lamb, A.T. 1997. *Cordia alliodora: genetics and tree improvement.* Tropical Forestry Paper. No. 36. Oxford Forestry Institute, Oxford, UK;

CATIE, 1994. *Laurel Cordia alliodora (Ruiz y Pavón) Oken, especie de árbol de uso múltiple en América Central*. Serie Técnica, Informe Técnico no. 239, CATIE, Turrialba, Costa Rica.

Faridah Hanum, I., van der Maesen, L.J.G., eds., 1997. *Plant Resources of South-East Asia. No. 11. Auxiliary plants*. Leiden, Netherlands: Backhuys.

Greaves, A. and Carter, P.S. 1990. *Cordia alliodora a promising tree for tropical agroforestry*. Oxford (R.U.). Oxford Forestry Institute. Tropical forestry papers no. 22.

A wet zone population in a 14-year-old provenance trial, Tumaco, Colombia. Photo: David Boshier, OFI

THIS NOTE WAS PREPARED IN COLLABORATION WITH CENTRO AGRONÓMICO TROPICAL DE INVESTIGACIÓN Y ENSEÑANZA

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