

LOCAL NAMES

English (andes alder, alder); French (aulne des Andes); Spanish (ramràm, lambré, lambràn, jául, ilite, aliso andino, aliso, aile)

BOTANIC DESCRIPTION

Alnus acuminata grows to 30 m and 50 cm diameter at breast height at 30 years of age. The bark is light grey or silvery with yellowish lenticels. Crown shape is rounded to pyramidal.

Leaves simple, alternate, elliptical, 6-15 cm long, 3-8 cm wide, border double dentate, deciduous or semi-deciduous. The upper leaf surface is dark green and the lower surface pale, whitish to light green.

Inflorescence conelike with lignified scales, dark brown when ripened, and bearing more than 100 fruits per cone. Male and female flowers occur on different catkins on the same branch.

Fruit a small, membranous samara, 2 to 3 mm long, 1-seeded.

'*Alnus*' is the classical Latin name of alder. The specific name '*acuminata*' means 'sharp pointed'; from the Latin '*acuminare*' (to make sharp).

BIOLOGY

A. acuminata may begin flowering at 4-5 years from seed (3 to 4 years from field planting). Male and female flowers are in separate catkin shaped inflorescences on the same tree. Clusters of male catkins are long (10-12 cm) and hanging, opening in mid-winter to release wind-borne pollen. Female catkins are borne in erect clusters and are condensed into a lignified cone (1.2-2 cm) from which approximately 100 winged seeds emerge when the cone dries in late summer.

Phenology is variable according to latitude. In its southernmost distribution in the Andes, and in southern New Zealand this Alder sheds its leaves toward the end of March-April and sprouts new ones in September-October. Flowering begins in June-July. Provenances from tropical latitudes (mountains of Ecuador to Costa Rica) may shed their leaves gradually so they are never bare.



A. acuminata, natural regeneration of trees in pasture, Santa Cruz, Costa Rica. (David Boshier)



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Alnus acuminata in germination trays (Thomas Raussen)

ECOLOGY

A. acuminata is a fast-growing pioneer species that regenerates naturally in open, disturbed areas. Grows in moist soil environments, usually along the banks of streams, rivers, ponds and swamps, where it typically forms dense, pure stands; can also be associated with floodplains or moist mountain slopes, and it may be adapted to somewhat drier conditions. However, it is usually restricted to zones with extra soil moisture such as cool, tropical highlands, and cool, high-latitude regions with abundant rainfall.

BIOPHYSICAL LIMITS

Altitude: 1 200-3 800 m

Mean annual temperature: 4 to 27 deg C

Mean annual rainfall: 1000-3000 mm

Soil type: Prefers deep, well-drained soils with high content of organic matter. Commonly found growing on shallow soils such as landslides. It will grow on soil of pH as low as 4.5.

DOCUMENTED SPECIES DISTRIBUTION

Native: Argentina, Bolivia, Costa Rica, Ecuador, Guatemala, Peru

Exotic: Chile, New Zealand



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

Fodder: The palatable, nitrogen-rich leaves make a useful source of emergency fodder.

Fuel: Reputed to be good for firewood; in a rotation of 20 years, the annual yield of wood for fuel is estimated at 10-15 cubic m/ha. The calorific value is estimated at 19 250 kJ/kg. Reports on specific gravity vary from 0.34-0.6. It has good even burning characteristics.

Timber: The wood is light yellowish-brown to pink, odorless and tasteless, without difference between the heartwood and sapwood. It dries easily and preserves well. It has even grain, seasons fairly well, and is easy to work and finish by hand or machine. Despite its light weight, it is tough and strong, and is sometimes used for construction. Timber is used for posts, poles, lumber, boxes, broom handles, plywood cores, particleboard and musical instruments. A match company in Colombia evaluated 20 species and found *A. acuminata* the best suited for making match sticks.

Apiculture: The abundant wind-borne pollen is a valuable bee food supplement, coming as it does in winter when there are few other sources available.

Tannin or dyestuff: The bark is rich in tannin which can be extracted to tan leather.

Medicine: Macerated leaves are used in a variety of medicinal applications for joint and muscular pains and for rheumatism as well as skin infections. An infusion is recommended as part of a treatment for prostate inflammation.

SERVICES

Reclamation: Useful for reforestation, soil reclamation on slopes and reclamation of unstable soils, as it grows well on slopes and the roots are lateral and extended rather than deep and confined.

Nitrogen fixation: Although not a legume, *A. acuminata* is a nitrogen-fixing species. The symbiosis between *A. acuminata* and *Actinomyces alni* (syn. *Franki alni*) enables the root system of the tree to fix atmospheric nitrogen in quantities sufficient for the development of the plant. In Latin America where it has been intermixed with pasture grasses, it has been found to improve forage production up to 7-fold.

Soil improver: Among other positive effects of *A. acuminata* are the supply of organic matter and the control of soil moisture due to its shade.

TREE MANAGEMENT

In areas where it is grown in plantations, the initial spacing of 3 x 3 m is preferred. At least 2 thinnings are recommended, the 1st after the 3rd year and the 2nd after 10-15 years, leaving 250-350 trees/ha. The trees are harvested in rotation of about 20 years. Average annual wood production is 15-20 cubic m. Field reports estimate that 30-year-old trees with a density 35 trees/ha yielded 70 cubic m/ha of timber, 18.3 t/ha of dry firewood and 3.6 t/ha of leaves and fine branches. Frequent weeding is important as the seedlings do not compete effectively with weeds.

GERMPLASM MANAGEMENT

The seeds of *A. acuminata* are recalcitrant and must be planted quickly -- viability decreases from 70% to 20% in a few months. Storing seeds in an airtight container at 5 deg. C can extend seed viability; viability is 50% after 2 months and 31% after 3 months. There are approximately 2 million seeds/kg.

PESTS AND DISEASES

A. acuminata is susceptible to attack by defoliators (*Nodonota irazuensis* and *Nodonota ca.parvula*). A stem borer, *Scolytodes alni*, has been observed in Costa Rica in the dry season. Vertebrates such as *Sciurus* spp. (Rodentia, Sciuridae) may cause debarking and *Sylvilagus brasiliense* may destroy seedlings. Fungi like *Fusarium* spp. and *Phomopsis* spp. may affect leaves; and *Rosellina* spp. may affect stems and roots in mature trees.

FURTHER READNG

Duij E Van. 1998. Monitoring women's tree planting in Kabale district, Uganda: a study on farmers preferences for tree species and planting niches. Nairobi, Kenya: ICRAF. 58p.

FAO. 1986. Databook on endangered tree and shrub species and provenances. FAO Forestry Paper 77. FAO, Rome.

MacDicken GK. 1994. Selection and management of nitrogen fixing trees. Winrock International, and Bangkok: FAO.

NFTA. 1994. *Alnus acuminata*: valuable timber tree for tropical highlands. NFTA 94-03. Waimanalo.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide version 4.0* (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)