

Alnus acuminata Kunth in H.B.K.

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BETULACEAE (BIRCH FAMILY)

Alnus jorullensis Kunth in H.B.K., *A. arguta* (Schlecht) Spach, *A. ferruginea* HBK.,
A. mirbellii Spach., *A. spachii* (Reg.) Call.

Aile, aliso, cerezo, ilamo, jaúl, jaulillo, palo de lana, saino

Alnus acuminata occurs naturally from Mexico to Peru, Bolivia, and Argentina. It is widely cultivated in its natural range in plantations and in agroforestry systems combined with pastures of *Axonopus scoparius* (Flüggé) Kuhl. and *Pennisetum clandestinum* Hochst. ex Chiov. (primarily in dairy farms). It has been introduced successfully to southern Chile and New Zealand (South Island).

Alnus acuminata is a fast-growing, medium-sized tree up to 25 m in height and 50 to 60 cm d.b.h. The trunk is cylindrical and straight with a slightly swollen base, and the pyramidal crown has few well-developed branches. The bark is gray-brown and smooth; the branches are terete and more or less glabrous. The buds are sparsely ferruginous-velutinous. Leaves are 5 to 17 cm long, 3 to 7 cm wide, acute to acuminate at the apex, and obtuse to rounded at the base. The leaf margin is serrate, peltate glandular above when young, and peltate glandular and ferruginous-velutinous below. Secondary veins are parallel and prominent in the lower surface of the blade. The leaves are usually deciduous. The tree thrives in poor and degraded soils because it is capable of fixing nitrogen in root nodules (a symbiotic relationship with *Actinomyces allenii*), and develops a symbiotic relationship with a mycorrhizal symbiont *Alnicola* sp. (*Basidiomycetes*, *Agaricales*). However, *A. acuminata* requires high atmospheric humidity and humid soils with good drainage. It grows over a wide elevational range from 1300 to 3000 m as a pioneer species in almost pure stands. The tree has adapted to a wide range of rainfall (1500 to 3000 mm per year) and an annual average temperature of 16 to 18 °C. It can also survive temperatures below 0 °C for short periods of time (Camacho 1981).

Alnus acuminata is a variable species, and three subspecies are recognized (Centro Agronómico Tropical de Investigación y Enseñanza 1986a): (1) *Alnus acuminata* subsp. *acuminata* has a natural range limited to South America, elliptic

leaves, and is pubescent with serrate margin. (2) *Alnus acuminata* subsp. *arguta* (Schlecht.) Furlow is from Mexico and Central America, has ovate leaves, and is marginally double serrate. (3) *Alnus acuminata* subsp. *glabrata* (Fern) Furlow is from the central and southern parts of Mexico, has narrow-ovate leaves, is glabrous, and has a double serrated margin. *Alnus jorullensis* Kunth in H.B.K., a native of Mexico and Guatemala, is considered a closely related species.

With a specific gravity of 0.36 to 0.41, the wood of *A. acuminata* is considered moderately light. Both the sapwood and the heartwood of *A. acuminata* are reddish yellow with good luster when dry (Carpio 1992). The wood dries fast and easily without defects. It has excellent workability and preserves well, but is not durable when exposed to the weather. The wood is used for furniture, window parts, doors, poles (preserved), veneer, paper pulp, boxes, cement forms, pencils, matches, posts, musical instruments, broomsticks, and shoe parts (Camacho 1981, Carpio 1992, Centro Agronómico Tropical de Investigación y Enseñanza 1986a). The species is widely used for firewood in the mountains of Guatemala (Centro Agronómico Tropical de Investigación y Enseñanza 1986a). The wood of 20- to 50-year-old trees in Guatemala has a caloric content of 19,250 kJ per kg and a very low content of ashes (0.34 percent). In Costa Rica, charcoal is produced from the hardwood of 20- to 50-year-old trees, which have a caloric power of 29,220 kJ per kg with a 0.65 percent of ash. The charcoal produced from young trees (2 to 3.5 years old) has a caloric power of 32,400 kJ per kg with 0.28 percent of ash. In Guatemala, the litter from natural stands of the species is used as organic fertilizer in corn orchards.

Flowering occurs more than once during the year but is very abundant from March to May. The trees begin to flower and set fruit at the age of 7 to 8 years. The staminate, pendulous catkins (immature) are 2.5 mm long and 4 mm wide, with

small pistillate flowers in erect or pendulous aments, 1.5 to 2 cm long. Pistillate inflorescences develop into a woody, cone-like structure that contains 80 to 100 minute winged nuts. These cones mature from June through February depending on the country.

Seeds should be collected when the mature female catkins (cones) turn dark brown and are close to dehiscence. The cones are collected from the trees and are placed on blankets until they open and the seeds are gathered. Seeds average 2.5 million per kg. The seeds should be stored in glass containers in refrigerators and kept at 4 °C to maintain viability. Even under these conditions seeds lose their viability in 1 year or less (CATIE 1986).

Seeds are usually germinated in flat boxes filled with sterilized sand. Seedlings are transferred to nursery banks or plastic bags. When transferred as bare roots to nursery banks,

seedlings must be kept moist. The seedlings can be outplanted in about 6 to 8 months, when they are 30 to 40 cm in height. Saplings collected from areas of natural regeneration are outplanted or kept in the nursery for 2 to 3 months. Leaf cutting ants (*Atta* sp.), fungi, and weeds should be kept under control.

ADDITIONAL INFORMATION

Arguedas and others (1993) report the attack of 14 species of insects that produce damage to different parts of the tree, leaves, bark, and stems. Squirrels (*Sciurus granatensis*) feed on the bark; wild rabbits (*Sylvilagus brasiliensis*) destroy many seedlings that grow naturally; and six genera of fungi (*Colletotrichum*, *Fusarium*, *Melampsoridium*, *Phomopsis*, *Rosellinia*, and *Trichoderma* affect different parts of the tree species (Arguedas and others 1993).

