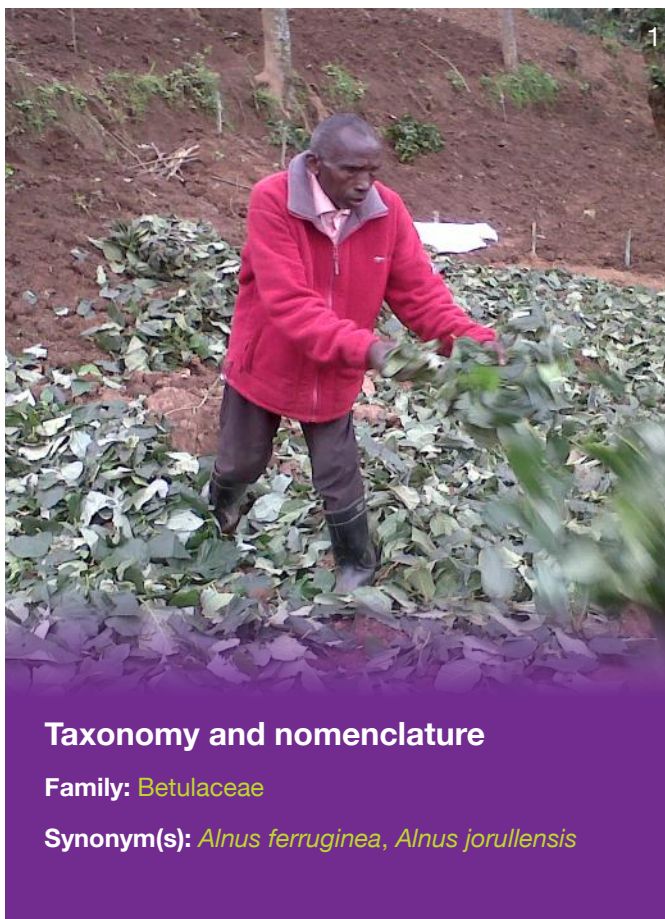


Alnus acuminata



Taxonomy and nomenclature

Family: *Betulaceae*

Synonym(s): *Alnus ferruginea*, *Alnus jorullensis*



Pic 1: Kadihira a farmer from Kadahenda Cell, Karago Sector, Nyabihu District incorporates *Alnus acuminata* leaf biomass to improve his crop yields

Pic 2: Farmers working under the project in Bahimba cell, Nyundo sector and Rubavu district incorporate *Alnus acuminata* leaf biomass a strategy of maximizing crop yields

Pic 3: Transforming Kadahenda landscape with plantation of *Alnus acuminata* as a method of controlling soil erosion and protecting Lake Karago

Photos ©ICRAF/Rwanda

Botanical description

Alnus acuminata is a fast-growing, medium-sized tree that grows up to 25 m in height, with a 50-60 cm diameter measured at breast height (DBH). The trunk is cylindrical and straight with a slightly swollen base, and the pyramidal crown has few well-developed branches. The bark is light grey or silver with yellowish lenticels.

Leaves are simple, alternate, elliptical, 6-15 cm long, 3-8 cm wide, border double dentate, deciduous or semi-deciduous. The buds are sparsely ferruginous-velutinous. Male and female flowers occur in separate catkins on the same branch.

Distribution and habitat

A. acuminata is native to Mexico, Peru, Bolivia and Argentina. It has been introduced successfully to southern Chile and New Zealand (South Island). The species occurs in areas where mean annual temperature ranges between 4-27°C. In Rwanda *A. acuminata* can be found in high altitude areas (ranging from 1600-3000 m above sea level) of Western, Northern provinces and

part of the Southern province. There are three suitable agro-ecological ranges for *A. acuminata* in Rwanda:

1. Highland lava lands (Nyabihu, Musanze and Rubavu districts)
2. Congo-Nil Crest (Nyamagabe, Karongi, Ngororero, Nyabihu districts)
3. Highlands of Buberuka (Burera, Gakenke and Rulindo districts)

Fruits and seed description

The fruit is a cone-like, dehiscent, 1.5-2.0 cm long, 1.2-2 cm wide, with persistent, woody scales; green/yellowish at first, and later brown. It is a one-seeded samara with winged bract. There are 80-100 seeds per catkin and 6,000-10,000 female catkins per tree.

The seed is elliptic, flattened, very small (0.65-1.30 mm long) and usually dispersed by wind – 800,000-4,500,000 seeds per kg. Seeds are recalcitrant and must be planted quickly-viability decreases from 70% to 20% in a few months.



Alnus acuminata fruits (left) and seeds (right) flowering and fruiting habit

Flowering occurs more than once during the year but is abundant from June to July in Rwanda, and fruit maturation occurs from August to September. The trees begin to flower and set fruit at the age of 4-5 years from seed and 3-4 years from field planting. Male and female flowers are in separate catkin-shaped inflorescences on the same tree. These cones mature from June through February depending on the country.

Harvesting

Seed collection is done when mature female catkins (cones) turn dark brown and are close to dehiscence. The cones are manually collected from the standing trees.

Seed extraction and cleaning

The cones collected from the trees are placed on blankets or papers until they open and the seeds gathered. After extraction, the seed can be cleaned with a sieve. If collection is done at the right time, flotation is not necessary.

Germplasm management

Alnus acuminata seeds are recalcitrant and should be planted quickly to avoid viability loss. Seed viability can be extended by storing seeds in airtight containers at 5°C; viability is 50% and 31% after two and three months, respectively.

Propagation and cultivation

Alnus acuminata prefers deep, well-drained soils with high organic matter content. It is propagated by seeds (more than 2 million pure seeds per kilogram). No seed pre-treatment is required. Germination starts 6-7 days after sowing and is complete within 15 days. Germination rate is 50-70 percent. The species is fast-growing and requires pruning. Field spacing is 3x3m while close spacing is 2.5x2.5m. In Rwanda, it is scattered in farmland, planted on contour hedgerows for soil erosion control and intercropped with food crops. *Alnus* coppices after 12 months for green manure production and also 18 months for stakes for climbing beans.



Alnus acuminata leaves (left) and flowers (right)

Uses

Timber: *Alnus acuminata* wood is light yellowish-brown to pink, odourless and tasteless. There is no difference between the heartwood and sapwood. It dries easily and preserves well. Despite its light weight, it is tough and strong, and is sometimes used for construction. It is also used for posts, poles, lumber, boxes, broom handles, plywood cores, particleboard and musical instruments.

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

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.

Agroforestry: The species contains soil improvement characteristics, the benefits of larger size, faster growth rates and reduced water dependence, thus making it a good agroforestry species. Although not a legume, *A. acuminata* is a nitrogen-fixing species.

Further reading

1. CAB International. 2000. *Alnus acuminata*. In: Forestry Compendium, Global Edition. CAB International. Wallingford, UK.
2. Rodolfo S, Jøker D. 2000. *Alnus acuminata* spp. Danida Forest Seed Centre.
3. Forest, Farm, and Community Tree Network. 1994. A quick guide to useful nitrogen-fixing trees from around the world. Winrock International. Morrilton, Arkansas, USA.
4. Holdridge LR. 1951. The alder, *Alnus acuminata*, as a farm timber tree in Costa Rica. Caribbean Forester.
5. Orwa C, Mutua A, Kindt R, Jamnadas R, Simon, A.. 2009. *Cyphomandra betacea*. Agroforestry Database 4.0. World Agroforestry Centre –ICRAF.
6. National Academy of Sciences. 1989. Firewood crops: shrubs and tree species for energy production Vol.1. National Academy of Sciences, Washington, D.C.
7. World Conservation Monitoring Centre. 1998. *Alnus acuminata*. The IUCN Red List of Threatened Species. Version 2015.

Authors: A. Mukuralinda; E. Kiptot; D. Twagirayezu; C. Muthuri; B.S. Musana 2016