

LOCAL NAMES

English (South American oak, Colombian oak); Spanish (roble negro, roble blanco, roble amarillo, roble)

BOTANIC DESCRIPTION

Quercus humboldtii is predominantly evergreen tree to 25 m and a diameter to 1 m with buttresses to 1 m. The bark red/grey or grey, fissured, breaking into squares and flaking.

Leaves simple, alternate, lanceolate, 10-20 cm long, clustered at the end of the branches; lamina leathery and glabrous, apex acute, base cuneate, shiny green above, lighter green beneath.

Flowers yellow, small, unisexual; inflorescence a raceme; male flowers numerous, feminine ones in a cupula, styles long.

Fruit light brown, ovoid capsule (acorn) with leathery pericarp, 2-2.5 cm in diameter and 5-7 cm long, resting on a scaly cupule. Only one fruit per cupule is developed, inside of acorn shell woolly.

BIOLOGY

Time of flowering depends on the climatic conditions. In some regions, it is in December-January whereas in others, April-May. Fruiting normally starts when the tree is 4-5 m tall, sometimes only 2 m. Fruiting is annual, maturing in 18 months, the time varying from region to region. The fruits are ripe when the colour changes from dark green to chestnut or dark brown.

ECOLOGY

It is light demanding and often dominates competing species. In Colombia it is associated with *Hedyosmum huilense*, *Clethra fagifolia* and *Billia columbiana* in mid-zone forest.

BIOPHYSICAL LIMITS

Altitude: 1000-2600 m

Mean annual temperature: 16-24°C

Mean annual rainfall: 1500-2500 mm

Soil type: Ecologically very flexible, it can be found in moderately fertile and deep soils as well as in degraded almost barren soils. It nevertheless grows better on shallow soils with a thick layer of humus

DOCUMENTED SPECIES DISTRIBUTION

Native: Colombia, Ecuador, Panama, Venezuela

Exotic:



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

Food: The acorns are nutritious but, unlike the white oaks, are bitter. They serve as an important food for wildlife. If it is to be used as human food, then the acorns should be boiled repeatedly to get rid of the bitterness as the natives Americans did.

Fuel: It produces good firewood and charcoal.

Timber: The wood is hard and heavy, easy to work, with a smooth finish. Wood density is 0.9-1.0 grams/cm³. Suitable for poles, tool handles, rollers and exterior use in general.

Other products: In the mid-elevation Andean region, *Q. humboldtii* are the last remnants of the original vegetation; the reforestation programmes with native species obtain necessary germplasm in these sites.

SERVICES

Reclamation: In the mid-Andean montane region of Colombia, reforestation programmes use the native species for revegetation such as *Quercus humboldtii*, *Billia columbiana*, *Alnus acuminata* and *Beilschmiedia sulcata*.

Ornamental: It's a good ornamental plant especially along the road.

Other services: Two Colombian parrot species (*Hapalopsittaca amazonia* and *Hapalopsittaca fuertesi*) endemic to the threatened montane ecosystems of the Colombian Andes and particularly dependant on Oak (*Quercus humboldtii*) as a home.

TREE MANAGEMENT

The seedlings and saplings must not be exposed to direct sunlight. Planting density should be about 380 trees/ha. Maximum commercial value is reached after 35 years, yielding 400 m³ of wood/ha.

GERMPLASM MANAGEMENT

The fruits should be collected directly from the tree or by shaking the branches, as fresh fruits will have better viability and are less susceptible to attack by arthropods, worms, birds and rodents. The seed has a very limited capacity of dispersal due to its large size.

The seed storage behaviour is recalcitrant. The fresh fruits have a moisture content of about 21%. The seeds can be stored for about four months in a cold and dry place with good aeration. Storage at humidity above 12% may result in premature germination or deterioration. Good results have been achieved by storing the fruits in water at low temperatures or in humid sand, moss or sawdust and kept under observation for insect or fungal attacks. There are 210-250 seeds/kg.

PESTS AND DISEASES

The seed can be seriously attacked by a coleopteron of the family Curculionidae, whose larvae penetrate the seeds at an early stage of development. In the nursery, the seedlings are susceptible to the attack of the fungus *Pestalotia* sp., which causes brick-yellow stains, necrosis and death of the foliage. In plantations, the species from time to time suffers from "descendent death of the oak" caused by the fungus *Caratocystis fagacearum*. Penetration of this fungus usually happens through injuries caused by attacks of *Xyleborus* sp., a weevil that perforates the bark.

FURTHER READING

Aldana-Gómez, Ruth & Franco-Molano Ana E. 2001. A new species of *Gloiocephala* from Colombia. *Mycotaxon*. 80: 447-452.

Alegría M, Semanate X. 1994. Propagación sexual y asexual del Roble (*Quercus humboldtii*) bajo diferentes condiciones ambientales. Cali, Colombia. Informe de investigación No. 166, Smurfit Cartón de Colombia.

Barreto G. Herrera J. 1990. El Roble, Manual general. Instituto Nacional de los Recursos Naturales Renovables y del Ambiente - INDERENA. 21 pp.

CONIF 1997. Guía de Insectos Dañinos en Plantaciones Forestales. 99 pp.

Ruiz P. 1994. Fuentes alimenticias de la ardilla común, *Sciurus granatensis*, en la región de Cajibío Cauca, Colombia. Informe de Investigación No. 162, Smurfit Cartón de Colombia.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestry Database: a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/af/treedb/>)