

# *Quercus humboldtii* Bonpl.

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## FAGACEAE (BEECH FAMILY)

### *No synonyms*

Encino, roble, roble amarillo, roble blanco, roble colorado, roble negro

*Quercus humboldtii* has a wide geographical distribution from South Texas in the United States to Esmeraldas in Ecuador. Because *Q. humboldtii* forms a relatively stable association with respect to composition and structure, pure stands of the species are common. In natural forests, the species is dominant. Its natural regeneration is quite vast in areas where moisture is high in the raw humus (primarily decomposing oak leaves), especially in forest clearings and peripheries where sunlight is abundant.

*Quercus humboldtii* is a slow-growing tree that reaches 30 m in height and 35 to 40 cm d.b.h. The trunk is thick with a rugose and blackish bark. The crown is rounded and the foliage is light green. The leaves are 14 cm long, grouped in bundles, and alternate, with a wavy margin and short petioles. *Quercus humboldtii* can grow in soils that are moderately fertile and deep and in those that are degraded and almost barren. However, it prospers in clayey and heavy soils with high acidity (pH 5.8 to 7.0) and a thick layer of humus. These soils are not very deep and drain well (Barreto and Herrera 1990). The tree grows well in areas with temperatures of 16 to 24 °C and average annual precipitation between 1500 and 2500 mm, with a relative humidity of 40 to 70 percent. It is found in elevations ranging from 1000 to 3600 m. In South America, it is restricted to high and humid parts of the Andean orographic system of three mountain ranges, at elevations ranging from 1900 to 2900 and 3200 m.

Because the wood of *Q. humboldtii* resists weathering, it is used for posts, railroad ties, handles for tools, and wooden rollers. It is also used as charcoal and firewood. Being hard and heavy, the wood is also used to make handles for agricultural tools. Considered a high-quality wood, it is used in fine furniture, cabinetmaking, and decorative veneer. In Colombia, it is used for railroad ties, levers for mines, heavy construction, shafts and handles for tools, and barrels. The bark is used in

industrial tanning. Because the trees adapt to degraded soils, they are used to preserve natural resources.

The flowers are cream in color; fruits are oval, and brown, with the base shaped as a goblet and one dark-green seed. Fructification can occur when the trees are 2 m in height. However, the process commonly starts at 4 to 5 m in height. Once begun, fructification occurs annually. The seed is the size of an acorn, ovoid and globose, 2 to 3 cm in diameter by 5 to 7 cm in length; its pericarp has a coriaceous consistency. The dark-green seeds turn brown or dark coffee color when they are ripe (Barreto and Herrera 1990).

Seeds are collected during February, March, and August. Because seeds gathered from the ground have low viability, seeds should be collected from the tree or by shaking the branches. These large seeds do not disperse well. Seeds average 150 per kg.

Seeds should be stored in a cold, dry environment (relative humidity less than 12 percent). However, storing these recalcitrant seeds directly in water at a low temperature or stratifying them in wet sand, moss, or sawdust to prevent attacks by fungi or insects has shown good results. Moisture content at the moment of storage is about 21 percent, and seeds remain viable less than 4 months (Barreto and Herrera 1990).

Although the seeds do not require pregermination treatment, washing the seeds before planting is recommended. The seeds can be placed in 10 °C water for 4 days before planting. Germination percentage is 80 percent when the seeds are fresh; seeds germinate in 30 to 50 days. Germination is hypogeal, and two cotyledons unfold in 60 to 65 days.

Seeds may be sowed in the threshing floor, but sowing in 20 by 30 cm bags or in seedbeds of soil and loose sand is recommended. Soil from a natural oak grove is best. Seeds are sowed 5 cm apart to a depth equal to the seed's smallest diameter. Seeds should be covered lightly and watered abundantly. Although

the species thrives in sunlight, some shade should be provided to prevent the burning of stems and bark. When the plantules reach a height of 10 to 15 cm in seedbeds, they must be transplanted to bags and watered and shaded for 30 days. The plants must be outplanted when they reach 60 to 80 cm in height.

*Quercus humboldtii* can also be propagated by stem cuttings, shoots, or bareroots. Shoots from the roots are cut 30 to 35 cm from the ground. Trees greater than 50 cm d.b.h. have lost their sprouting capacity.

Because the species is resistant to pests and grows rapidly, no special care is required.

#### ADDITIONAL INFORMATION

In Colombia, *Q. humboldtii* has been subjected to intense felling. However, some trees still grow in the central region of the country, in the high zones of the central and eastern mountain ranges, and more abundantly in some regions of the southern region.

