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Quercus humboldtii

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Quercus humboldtii

Taxonomy and nomenclature
Family: Fagaceae

Distribution and habitat
Natural occurrence from the south of USA to Ecuador. Prefers high altitudes, 1000-2600 masl, annual precipitation of 1500-2500 mm and temperatures of 16-24°C. Ecologically very flexible, can be found both in moderately fertile and deep soils and in degraded, almost barren soils. Nevertheless, it grows better on shallow soils with a thick layer of humus, and relatively loose soils with good drainage not allowing excessive humidity and a pH between 5.8 and 7.0. It is light demanding and will dominate competing species.

Description and uses
Predominantly evergreen tree up to 25 m, diameter up to 1 m with buttresses up to 1 m. Crown is ovate and characteristically wide (10 - 12 m). Bark red/grey or grey, fissured, breaking into squares and flaking. Leaves simple, alternate, clustered at the end of the branches; lamina leathery and glabrous, shiny green above, lighter green beneath. Flowers yellow, small, unisexual; inflorescence a raceme.

The wood is hard and heavy, easy to work and with a smooth finish. Suitable for poles, tool handles, rollers, firewood and exterior use in general.

Fruit and seed description
The fruit is a light brown, ovoid acorn with leathery pericarp, 2 cm in diameter and 5,7 cm long, resting on a scaly cupule. Only one fruit per cupule is developed. There are 210-250 seeds/kg.

Flowering and fruiting habit
Time of flowering depends on the climatic conditions. In some regions it takes place from December to January in others from April to May.
Fruiting normally starts when the tree is 4-5 m tall, sometimes only 2 m. Fruiting is annual, the time varying from region to region.

Harvest
The fruits ar ripe when the colour changes from dark green to chestnut or dark brown. 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.

Storage and viability
The seeds can be stored for about four months in a cold and dry place with good aeration. Storage at humidities 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.

The fresh fruits have a moisture content of about 21%.

Dormancy and pretreatment
This species does not require any special pretreatments, but it is recommended to wash the fruits before sowing.

Sowing and germination
Sowing should be done immediately after the fruits have been washed , and the sowing beds generously irrigated. The seeds can be sown directly in beds, or better in large bags, 20 x 30 cm. Sowing depth should equal the diameter of the fruit and the sowing distance 5 x 5 cm. It is advisable to use soil taken from a natural oakwood.

Germination is hypogeal, lasting 60-65 days. The seedlings and saplings must not be exposed to direct sunlight. The seedlings can be transplanted to the field when they reach a height of 60-80 cm. Planting density should be about 380 trees per ha. Vegetative regeneration can be done from the bare root, by root suckers or stocks, or by cuttings. It has a great capacity for coppicing and it is advisable to cut 30-35 cm from the ground to obtain good shoots. A tree with a small diameter can produce as many shoots as a large one but the shooting capacity is lost when the tree reaches a diameter of more than 50 cm. Natural regeneration is prolific when there is a layer of moist humus on the forest floor.

Maximum commercial value is reached after 35 years, with 400 m^3 wood per ha.

Phytosanitary problems

The seed can be seriously attacked by a coleopteron of the family Curculionidae, whose larvae penetrates the seed 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 the so called "Descendent death of the oak" caused by the fungus *Caratocystis fagacearum*. penetration of this fungus can happen through injuries caused by attacks of *Xyleborus sp.*, a weevil that perforates the bark.

Selected readings

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