

## Alnus rubra

red alder

### LOCAL NAMES

English (Western slider, red alder, Pacific coast alder, Oregon alder, alder); French (aune rouge); German (Rot-Erle); Italian (ontano rosso); Spanish (aliso colorado); Trade name (red alder)

### BOTANIC DESCRIPTION

*Alnus rubra* is a medium-sized tree to 16-20 m, but may reach 40 m tall and DBH up to 1 m; bark smooth, gray; crown pyramidal, branches pendulous. It grows multi-stemmed in riparian thickets, and single-stemmed in pure or forest stands. It forms an extensive root system.

Leaves short petioled, alternate, ovate.

Inflorescence a catkin. Staminate catkins occur in pendulous clumps, 2-3 cm when young and green in colour, turning to reddish brown and 7-8 cm when mature. Pistillate catkins are borne upright, 5-8 mm long and reddish green when receptive.

Fruit a small hard cone. Seed a small winged nut, borne in pairs on the bracts of woody conelike strobili. Strobili 11-32 mm long, 8-15 mm wide.

'*Alnus*' is the classical Latin name of alder. The specific name '*rubra*' means red.

### BIOLOGY

*A. rubra* reaches sexual maturity after 3-4 years for individual trees and 6-8 years for most dominant trees in a stand. It is generally monoecious, with separate male and female catkins developing on the previous year's young branches. Pistillate catkins also occur in clumps, but are borne upright. Seed dispersal begins in late September in the middle of the species' range, somewhat earlier in Alaska, and several weeks later in California. Most of the seeds are shed during the late fall and winter. Flowering occurs in late winter or early spring. Peak shedding of pollen generally precedes peak receptivity by only a few days.

Bong.

Betulaceae



Foliage (Chris Evans, The University of Georgia, [www.forestryimages.org](http://www.forestryimages.org))



Trees (Chris Evans, The University of Georgia, [www.forestryimages.org](http://www.forestryimages.org))

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### ECOLOGY

Red alder is a temperate species confined to the lowland Pacific coast region of North America from Alaska to central California, where it is the most common broadleaf tree. It occurs in humid to super humid temperate climates and tolerates wide fluctuations in temperature, ranging from a minimum of -18 to a maximum of approximately 38 deg C. Relatively shortlived, the species is an aggressive pioneer on disturbed sites.

### BIOPHYSICAL LIMITS

Altitude: 0-900 m

Mean annual temperature: -18-38 deg C

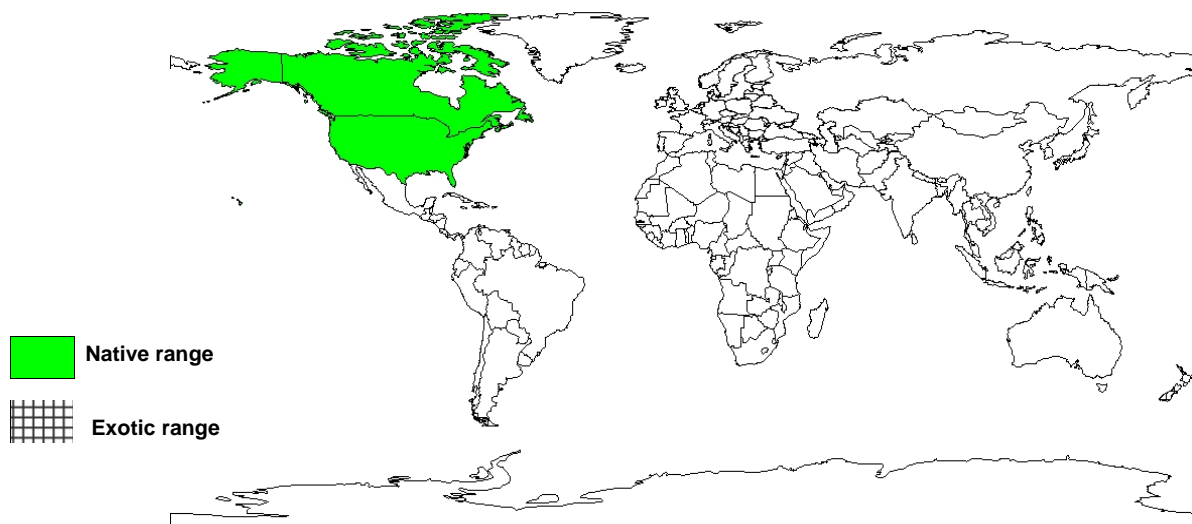
Mean annual rainfall: 600-3 000 mm

Soil type: It grows on soils varying from gravel or sandy to clay, but is commonly found on moist sites such as swamps, bottom lands, and along streams. Best growth is on deep, well-drained loams.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Canada, US

Exotic: Netherlands, New Zealand, United Kingdom



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.

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### **PRODUCTS**

**Fuel:** The tree is used for firewood and has been considered for fuel to generate electricity. The wood has a calorific value of 4 600 kcal/kg and makes good charcoal.

**Fibre:** The wood is used in the production of fibre based products such as tissues and writing paper.

**Timber:** Wood moderately dense (specific gravity 0.33-0.48), fine and even textured; it is easy to work and stain. The wood is used for furniture, panelling and pulp.

**Medicine:** The methanol extract of the bark of *A. rubra* has shown antibacterial activity against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Bacillus subtilis*. Diarylheptanoid and its glycoside (oregonin) have been identified as the active ingredients.

### **SERVICES**

**Erosion control:** It is used in stabilization of ditch banks.

**Shade or shelter:** *A. rubra* is planted as a wind and fire break.

**Reclamation:** The tree is used to rehabilitate infertile and industrially disturbed sites such as coal mine spoils in the USA, and areas of poor drainage.

**Nitrogen fixing:** The red alder has root nodules containing Actinomycetes that fix nitrogen, thus improving soils fertility.

**Soil improver:** Its roots and leaf litter are high in nutrients and on decaying enhance soil structure and builds up organic fraction.

**Ornamental:** Red alder is planted as an ornamental in Europe.

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### **TREE MANAGEMENT**

*A. rubra* is a pioneer species intolerant of competition but capable of rapid juvenile growth. Young trees coppice vigorously from the stump especially if the timing of the cut is optimal. For short coppice and pulp-log rotations, estimated total stem yields are 17-21 cu m/ha/yr. Thinning to 4-5 m x 4-5 m ensures tree lean is minimized. *A. rubra* tends to become weedy in disturbed sites, inoculation with the fungus *Nectria ditissima* has been employed to control this tendency. The tree self-prunes.

### **GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox. There is no loss in viability after 10 years hermetic air-dry storage at 2-5 deg C. *A. rubra* is a prolific and consistent producer of seed. Moderate seed crops are produced almost annually and large crops occur every 3-5 years. The seeds are very light, numbering 800 000-3 000 000/kg.

### **PESTS AND DISEASES**

*A. rubra* is fairly free from most insect and disease problems, especially when young and uninjured. White heart rot (*Phellinus igniarius*) is the major cause of cull in older trees. Three canker-causing stem diseases (*Didymosphaeria oregonensis*, *Hymenochaete agglutinans*, and *Nectria galligena*) cause some damage in young stands. Tent caterpillars, sawflies and flea beetle occasionally defoliate trees.

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### **FURTHER READNG**

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Brozek S. 1990. Effect of soil changes caused by alder (*Alnus rubra*) on biomass and nutrient status of Douglas-fir (*Pseudotsuga menziesii*) seedlings. Canadian Journal of Forest Research. 20(9): 1320-1325.

Dorworth CE. 1995. Biological control of red alder (*Alnus rubra*) with the fungus *Nectria ditissima*. Weed Technology. 9(2): 243-248.

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National Academy of Sciences. 1980. Firewood crops. National Academy Press. Washington D.C.

Saxena G, Farmer S, Hancock REW and Towers GHN. 1995. Antimicrobial compounds from *Alnus rubra*. International Journal of Pharmacognosy. 33(1): 33-36.

### **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/>)