

Red alder (Dr) - *Alnus rubra*

Tree Species > Red alder



Page Index

Distribution
Range and Amplitudes
Tolerances and Damaging
Agents
Silvical Characteristics
Genetics and Notes

BC Distribution of Red alder (Dr)

Range of Red alder



Red alder inhabits low and middle benches of alluvial floodplains and forms a temporary or permanent component of the communities along coastal streams as at this Carmanah River site

Geographic Range and Ecological Amplitudes

Description

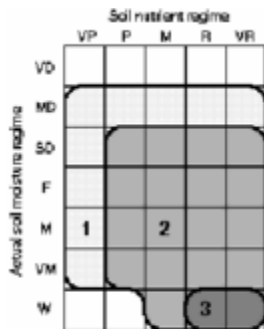
Red alder is a medium-sized (<40 m tall), deciduous broad-leaved tree at maturity with a narrow rounded crown, straight, slightly tapered stem, and smooth, light gray bark. Red alder wood is moderately dense, and uniformly textured. It is used for firewood and specialty products.

Geographic Range

Geographic element:
Western North American/Pacific

Distribution in Western North America:
north, central, and south in the Pacific region

Ecological Amplitudes



The generalized edaphic amplitude of red alder according to actual soil moisture and nutrient regimes.

Climatic amplitude:

(cool temperate) - cool mesothermal

Orographic amplitude:

submontane - montane

Occurrence in biogeoclimatic zones:

CDF, CWH

Edaphic Amplitude

Range of soil moisture regimes:

(moderately dry) - slightly dry - fresh - moist - very moist - **wet**

Range of soil nutrient regimes:

(very poor) - poor - medium - **rich - very rich**

Red alder has high requirements for calcium, magnesium, phosphorus and potassium; however, after fire, it can become established, like any other alder species, in nitrogen-poor soils because of a symbiotic relationship with a nitrogen-fixing actinomycete. Thus, the presence of red alder will result in increases in both nitrogen content and its availability in the soil, along with increases of organic matter and soil acidity and decreases in bulk density.

Nitrogen fixed in the nodules is added to the soil in four ways: direct excretion from living roots or nodules, decomposition of dead roots or nodules, leaching from foliage, and decomposition of nitrogen-rich litter. Maximum annual fixation rates of 320 kg/ha have been reported.

Tolerance and Damaging Agents

Root System Characteristics

Red alder develops an extensive, fibrous root system, with root nodules that fix atmospheric nitrogen. The nodules are a symbiotic association between the tree and an actinomycete (*Frankia* spp.). Nodulation occurs soon after seed germination. Roots are associated with ecto- and endo-mycorrhizae.

Tolerances

| tolerance to | tolerance class | comments |
|--------------------------------|-----------------|---|
| low light | L | a very intolerant, exposure-requiring species |
| frost | L | not a major concern in mesothermal climates |
| heat | L | infrequent on insolated sites |
| water deficit | L | sheds leaves during acute summer water deficits |
| water surplus | H | tolerates wet sites, flooding, and sites with a strongly fluctuating water table well |
| nutrient (mainly N) deficiency | H | infrequent in acid, very poor soils |

Damaging Agents

| damaging agent | resistance class | comments |
|----------------|------------------|--|
| snow | L | ice storm damage quite frequent |
| wind | M | high winds will break the boles rather than uproot trees |

| risk class | | |
|------------|---|--------------------------------------|
| fire | L | fire risk in red alder stands is low |
| insect | L | not a major concern |
| fungi | L | not a major concern |

Associated tree species and

In British Columbia, red alder grows in even-aged, pure stands and, in later

successional role

successional stages, with shade-tolerant conifers. It is a pioneer species (primary succession) on floodplains and present in early and intermediate stages of secondary succession on upland sites.

| associated tree species | occurrence class | major area of occurrence |
|-------------------------|------------------|-------------------------------------|
| western hemlock | M | CWH |
| sitka spruce | M | mainly in hypermaritime CWH |
| black cottonwood | M | floodplains in southern coastal B.C |
| western redcedar | M | CDF and CWH |
| grand fir | L | southern coastal B.C |
| bignone maple | L | southern coastal B.C |

Silvical Characteristics

| characteristic | interpretive class | comments |
|---|--------------------|---|
| reproduction capacity | H | reproduces vegetatively from stump sprouts; the minimum age for seed crops is as low as 3 years |
| seed dissemination capacity | H | dispersed by wind and water |
| potential for natural regeneration in low light | L | practically nil; a very shade-intolerant and exposure-requiring species |
| potential for natural regeneration in the open | H | regenerates nearly exclusively on mineral soil; direct seeding yields good results |
| potential initial growth rate (<5 years) | H | exceptionally rapid (>1 m in the first growing season) |
| response of advance regeneration to release | na | advance regeneration does not develop in the absence of adequate light and seedbeds |
| self-pruning capacity in dense stands | H | provided initial stand density is high |
| crown spatial requirements | M | varies with density |

| | | |
|---|---|---|
| light conditions beneath closed-canopy, mature stands | H | associated with well-developed understory vegetation |
| potential productivity | H | site index (50 yr @ bh) close to 40 m on productive sites |
| longevity | L | maturing at about 60 years, rarely >100 years old |

Genetics and Notes

Genetics

Population differences in morphological and physiological characters have been demonstrated in trials (Dang et al. 1994), but no races and natural hybrids have been described.

Notes

Red alder produces in a short time (about 30 years or less) high yields of wood. Considering its productivity, easy regeneration (prolific annual seed crops), and low risk of being affected by damaging agents, it is a suitable species for intensive management on some coastal sites, especially those where the establishment of conifers is fraught with difficulties (e.g., on riparian sites).

It is also suitable as a nurse crop species on nitrogen-poor sites (although the more shrubby and shade-tolerant Sitka alder may be more appropriate) and severely disturbed sites (landslides, landings, etc.). It has been suggested as a nurse species for Sitka spruce, as its shade and visual diversion will deter spruce weevil. More detailed silvics information is given by:

Harrington, C.A. 1990. *Alnus rubra*. Pp. 117-123 in R.M. Burns and B.H. Honkala (technical coordinators) *Silvics of North America*, Vol. 2. *Agri. Handbook 654*, USDA For. Serv., Washington, D.C.

Peterson, E.B., G.R. Ahren, and N.M. Peterson. 1996. *Red alder manager's handbook for British Columbia*. FRDA Report 240, B.C. Min. For., Victoria, B.C. 124 pp.