
WSU Extension Forestry


Welcome to the Forestry Lunch Breaks!

We'll get started promptly at 12PM

In the meantime, please remember to set your chatbox "To" setting to "Everyone" so your questions get shared to the group.



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EXTENSION

Forestry Lunch Breaks: Benefits of Western WA Hardwoods

Red alder (*Alnus rubra*)

Patrick Shults, WSU Extension

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The Basics

Scientific name: *Alnus rubra*

Family: Betulaceae

Height: 40-80 ft (tallest - 105')

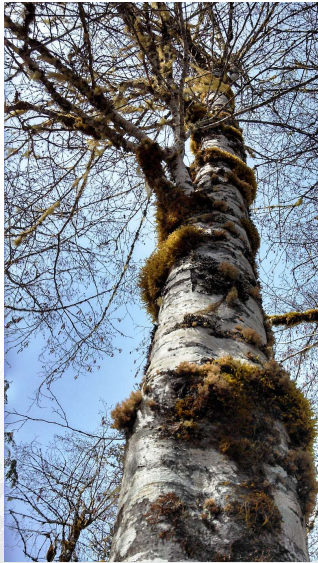
Diameter: 22-30 in (largest - 78")

Crown: 35-50 ft

Age: 60-70 years (max: ~100)

Notable features:

- Nitrogen fixer
- Rapid juvenile growth
- Shade-intolerant, "pioneer species"
- One of the largest *Alnus* species in the world
- Can be considered a "weed"



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Identification

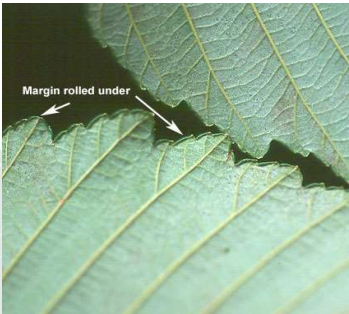
Leaves: Oval shaped, pointed tips, coarsely toothed edges that sometimes curl under, hairy veins. Leaves stay green through fall.

Leaf/twig arrangement: Alternate


Bark: brown/green when young turning grey/white (*red inner bark)

Flowers: male flowers are long catkins, female flowers are short, woody cones

Habitat/range: California to BC, moist soils with adequate drainage (floodplains, streambanks, drainage slopes), below 1500' elevation



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Life Cycle - Regeneration

- Sexual maturity by age 5-6
- Monecious – separate male and female catkins but on the same tree
- Flower in late winter/early spring
- Sometimes self-pollinating
- Prolific seed producer
- Seeds are small, winged nuts disseminated by wind



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Life Cycle – Early Growth

- Seeds establish best on moist, mineral soil
- Small seeds = less food reserves = less time to find root substrate
- Survival and growth is typically excellent
- Rapid juvenile growth:
 - Height growth can exceed 9’/year
 - Often reach half their height potential by age 15
- Can also produce vegetatively (stump-sprouts) and be coppiced




Photo by John F. Williams

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Life Cycle – Development and Maturity

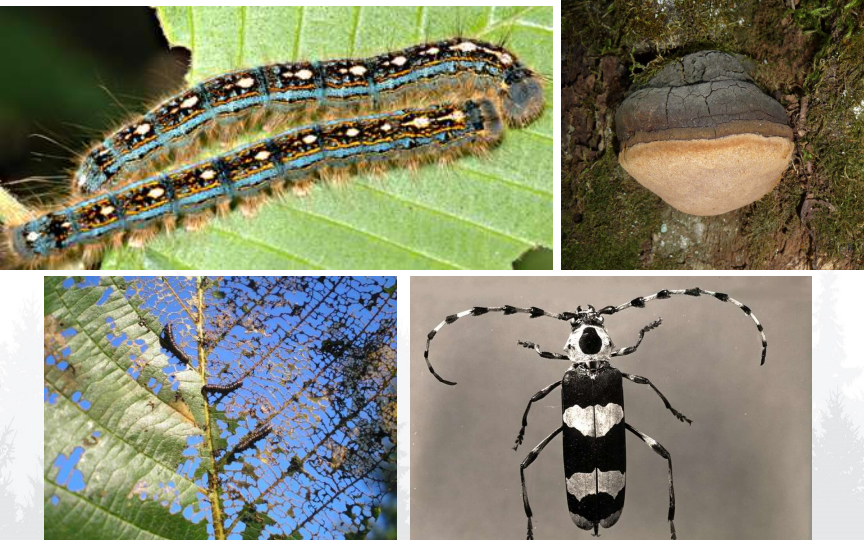


- Growth slows after age 20 but continues to maintain vigor for another 10-20 years
- Can create dense stands, effective for self-pruning
- Trees mature by age 60-70 and begin to decline
- Decadent alder stands are common in western WA
- Produces light shade, which can allow noxious weeds to develop in understory
 - Also creates forage opportunities

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Damage and Disease Agents



Fungal agents

- *Phellinus igniarius* (heart root)
- Armillaria and annosus root rots
- Cankers

Insects/Defoliators

- Forest tent caterpillar
- Alder flea beetle
- Alder bark beetle
- Banded alder borer*


Climate

- Windbreak
- Frost-pockets (seedlings)
- Fire

Animals


- Deer/elk (browse)

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Ecological Role and Importance

- Can grow in pure or mixed stands
- Associated species: Douglas-fir, western hemlock, western redcedar, bigleaf maple, Sitka spruce, black cottonwood, vine maple, elderberry, osoberry, nettle, sword fern, thimbleberry, devil's club, salmonberry, and more . . .
- Pioneer/early seral species
- Important riparian species
 - Reduces soil and stream bank erosion
 - Enhances riparian habitats
 - Shade, woody debris, and nutrient inputs




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Ecological Role and Importance

- Importance to wildlife:
 - Deer/elk browse on twigs and foliage
 - Beaver feed on bark and use stems for dams and lodges
 - Small birds (redpolls, siskins, goldfinches) eat seeds
 - + nesting habitat
 - Mice and small mammals feed on seed





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Ecological Role and Importance

- Nitrogen fixation
 - Symbiotic relationships with nitrogen-fixing bacteria (*Frankia spp.*) housed in root “nodules”
 - Nodules on mature trees can be over 3”!
 - Bacteria fix atmospheric nitrogen in exchange for carbon/sugars
 - Nitrogen added to forest soils through leaf litter, root exudates, and mycorrhizal associations
 - Good for building organic matter and nutrients on poor sites



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Ecological Role and Importance

- Increases soil fertility, microbial biomass, and microbial activity
 - Selmants et al. 2005
- Can accelerate rock-weathering of other nutrients (P, Ca)
 - Perakis & Pett-Ridge (2019)
- Young growth alder sites linked to increases in macroinvertebrate export downstream
 - Piccolo et al. 2002
- Host to over 160 lichen species
 - Geiser & Ingersoll (2005)




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Indigenous Uses:

- Dye from inner bark
- Bark/inner bark used to treat headaches, cough, wounds, and joint aches
- Wood used to carve dishes, utensils, and ceremonial pieces like masks
- Young stems used in baskets or lashing for sweat houses
- Wood used to smoke salmon and other fish
- Some evidence of sap collection (used to treat wounds)
- Firewood




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Uses/Products

- Characteristics
 - Moderate weight and hardness
 - Very workable (easy to machine, turn, glue, etc.)
 - Sands to a smooth finish and accepts a variety of stains
- Wood products
 - Veneer ("peelers")
 - Plywood
 - Furniture, cabinetry
 - Musical instruments
 - Chip/pulp wood
 - Pallets
- Market tends to be volatile but can produce high price/mbf (\$750 in Oct 2022 – WA DNR)
- Knotty alder vs clear alder (mgmt. is important)



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Agroforestry Opportunities

- Silvopasture
 - Nitrogen fixer
 - Tree fodder
 - Light to medium shade for forage production
- Log-grown Specialty Mushrooms
 - Red alder a good substrate for shiitake
 - Utilizes small-diameter wood = conducive to early thinning
- Forest Farming
 - Light shade creates opportunities to grow "forest crops"
 - Ex: hazelnuts, osoberry, currants, service berry, Oregon grape, cascara, salal, sword fern, devil's club



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Management - Planting

- Site selection - moist, well-drained sites (loams and sandy loams)
 - Salmonberry = indicator
 - “A method of site quality evaluation for red alder” – Connie Harrington
- Site preparation – initial treatment is usually sufficient
 - Vigorous early growth usually puts it above competing vegetation
- Can plant by seed (more site prep required) but seedlings are most common
 - + volunteers on the right site
- Avoid frost pockets
- Recommended density – 9-12’ spacing (538-303 trees/acre)
- Planting mixed stands for N benefits?



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Management - Thinning

- High density encourages self-pruning and clean wood
- Hitting your “thinning windows” is very important in pure stands
 - Age 5-10 – pre-commercial thin
 - Age 15-20 – second thin (likely pre-commercial too)
- Less forgiving than conifers like Doug-fir
- Maintain live crown ratios of 50% to continue vigorous growth



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Management - Harvesting

- If well-managed and on high quality sites, regeneration harvest with sawlog production could occur as early as 30-35 years
 - In unmanaged stands 45-50 years
- Maximum volume per acre typically occurs between 50-70
 - 5000-7000 ft³
- Typically regenerated via clearcut, potential for seed tree harvest
- Shelterwood harvest possible when combined with underplanting shade tolerant species
- Cut logs don't last – don't wait to get them to the mill!



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Management – Declining Stands

- A “decadent” stand has lost vigorous growth and is in decline
 - Typically 60+ years
- More susceptible to pests/pathogens (particularly heart rot)
- Common symptoms include large branches breaking, top-snap, and windthrow
- Without understory recruitment, can lead to noxious weed takeover
- Underplanting of conifers combined with overstory thinning/harvesting



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Management Options for Declining Red Alder Forests

WSU EXTENSION MANUAL EM003



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Questions?

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