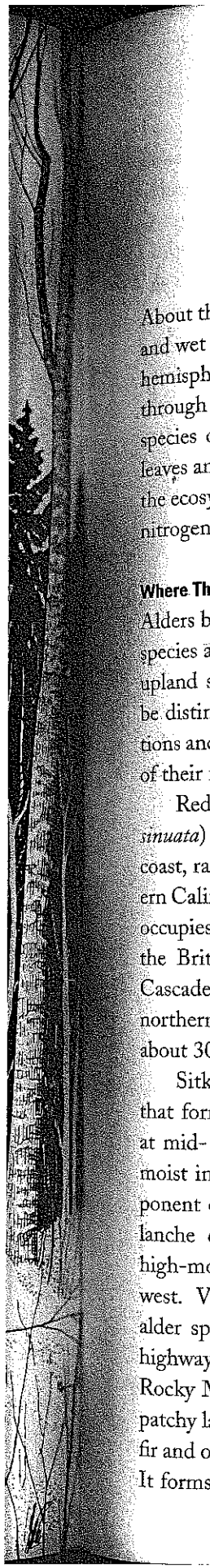

Ramona Hammerly



ALDERS

Alnus spp., Birch family—Betulaceae

About thirty-five species of alder inhabit moist and wet sites throughout most of the northern hemisphere, some even extending southward through the South American Andes. Four species occupy the Greater Northwest. Alder leaves and especially the roots are important to the ecosystem because they enrich the soil with nitrogen and other nutrients.

Where They Grow

Alders border streams and other wetlands; two species also spread out extensively across moist upland slopes. Northwestern alders can often be distinguished by their contrasting distributions and life-forms as well as by characteristics of their foliage.

Red alder (*Alnus rubra*) and Sitka alder (*A. sinuata*) are most abundant near the Northwest coast, ranging from southern Alaska to northern California. Red alder is a midsized tree that occupies large areas at low elevations west of the British Columbia Coast Range and the Cascades, with small, isolated populations in northern Idaho. It extends from sea level up to about 3000 feet (900 m) in elevation.

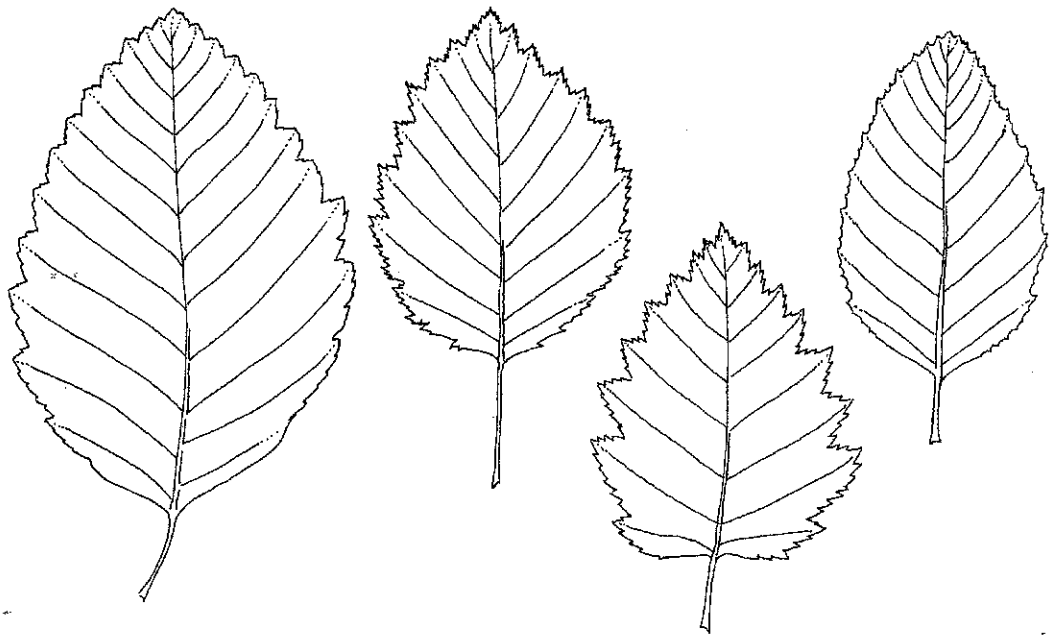
Sitka alder is primarily a very large shrub that forms extensive thickets on moist slopes at mid- to high elevations in the coastal and moist inland mountains. It is the major component of junglelike shrub-fields that fill avalanche chutes and other openings in moist high-mountain forests of the Greater Northwest. Vertical swathes of deep-green Sitka alder spill down mountainsides as seen from highways crossing the Cascades, Selkirks, and Rocky Mountains. Sitka alder also grows as a patchy layer among open canopies of subalpine fir and other conifers in moist subalpine basins. It forms luxuriant thickets along the southern Alaskan coast. In Glacier National Park, Montana, its thickets provide dangerous opportunities for grizzly bears and humans to suddenly bump into each other on an overgrown trail!

Thinleaf or mountain alder (*A. incana,* also known as *A. tenuifolia*) and white alder (*A. rhombifolia*) are inland species largely restricted to streams and other wetlands. Thinleaf alder is a very small, bushy tree that is widespread along watercourses among lower-elevation conifer forests and sometimes grows at middle elevations in the mountains east of the Cascade Divide. Unlike red and Sitka alders, thinleaf alder seldom ventures away from water, and its occurrence indicates the presence of springs, seeps, or streams.

White alder is a small to midsized tree that grows in the warmest inland valleys and canyons. Unlike other Northwest alders, it has an affinity for warm, dry climates, where it grows along watercourses—for instance, along the lower Columbia River east of the Cascades and the Snake River, including Hells Canyon. Similarly, white alder occupies the middle of the Willamette and Rogue River valleys of western Oregon, whereas red alder replaces it in nearby foothill and mountain drainages.

Comparative Appearance

Alders have spreading canopies composed of rather large—3 to 6 inches (7.5 to 15 cm) long—egg-shaped leaves with sawtoothed edges. The leaves are attached to twigs in an alternate arrangement and are unusual in being shed in autumn while still essentially green. Like other members of the birch family (but unlike willows and cottonwoods), alders bear both male and female flowers in catkins on the same tree. The male catkins are bright yellow and several



Left to right: red alder, Sitka alder, thinleaf alder, white alder

red alder

inches long, and they hang like tassels from the branches in early spring before the leaves are fully developed. Then they disintegrate. The female catkins are woody, persist year-round, and look superficially like tiny conifer cones. They are ½ to ¾ inch (1 to 2 cm) long.

Red alder. Red alder is our largest alder and the most plentiful and commercially important broad-leaved tree in the coastal Northwest. Groves of red alders 10 to 20 inches (25 to 50 cm) in diameter intermingle with young Douglas-fir forests west of the Cascades. Red alders attain their maximum height of 100 to 110 feet (30 to 33 m) in about sixty years and then

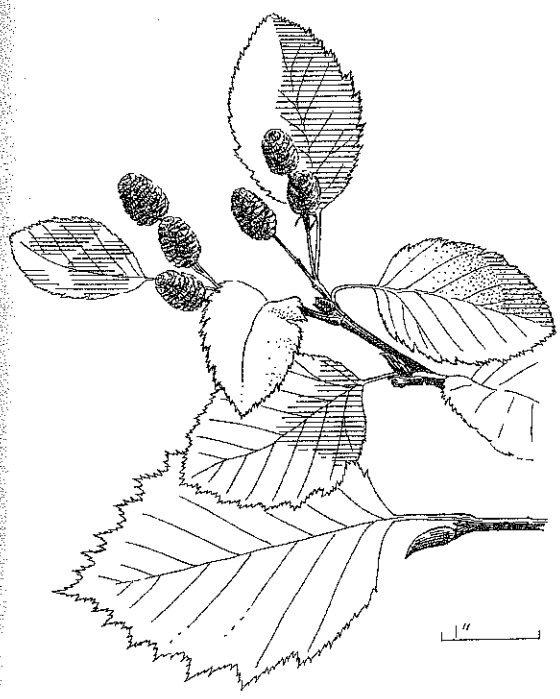
lose vigor as heart rot sets in. On good sites, red alders can reach 70 to 80 feet (21 to 24 m) in height by age twenty, outgrowing all other trees except black cottonwood, which is nowhere near as abundant as alder on upland sites.

Red alder differs from the other species in having leaves whose margins are rolled under (downward) and in having short, rust-colored hairs on their pale undersides. These alders have smooth, gray bark that is mottled or nearly covered with very light gray lichen, making them superficially resemble paper birch. However, the birch has white bark that peels off in sheets.

Sitka alder. Sitka alder is usually shrubby, and its branches can be distinguished by their stalkless buds, which contrasts with the stalked buds of other alders. Only occasionally, where this species descends to lower elevations in canyons west of the Cascades, does it become a small tree, up to 30 feet (9 m) tall. Any hiker who has traversed tangles of "slide alder" without a trail will remember the intertwined, springy, sprawling stems—3 to 6 inches (7.5 to 15 cm) thick and 10 to 15 feet (3 to 4.5 m) tall—that are as hard to squeeze through as they are to walk upon. Elk seem to negotiate these thickets with ease, however. The resilient, slanted stems are well suited to surviving the snow avalanches that mow down erect trees.

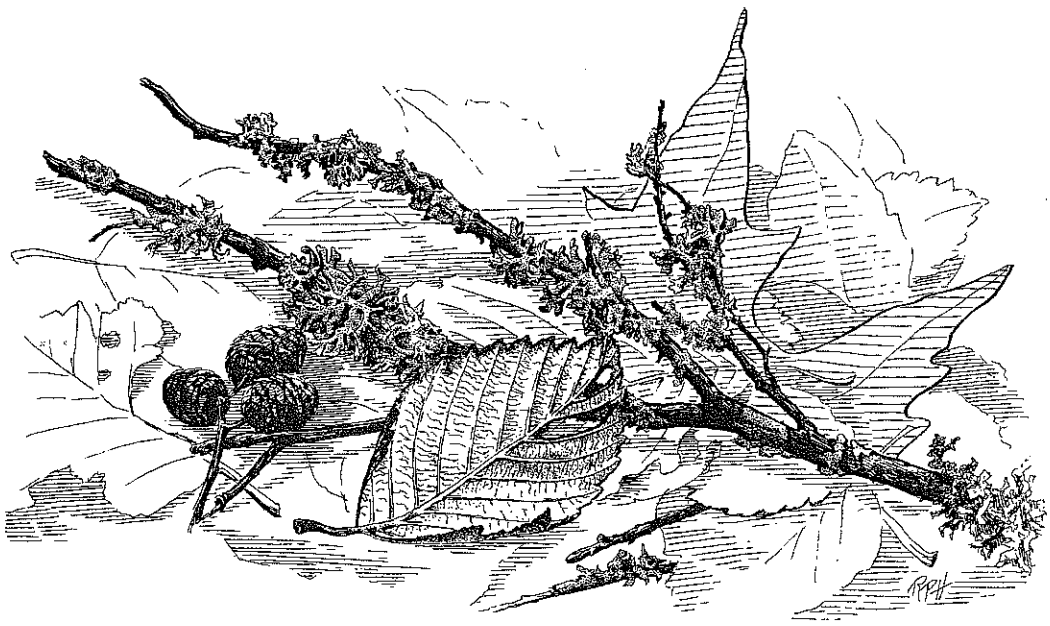
Thinleaf alder. Thinleaf or mountain alder is a tall shrub or small multistemmed tree often 6 inches (15 cm) thick and 25 to 30 feet (8 to 9 m) tall. The leaves have small teeth superimposed on larger teeth and feel thinner than leaves of red alder and white alder.

White alder. White alder is a small tree, often with multiple trunks about 12 inches (30 cm) thick and 50 to 60 feet (15 to 18 m) tall arising from a single clump. It may have been named for the very pale green, almost silvery color of its leaves when they emerge in spring. White alder stands out from the others in having rounded, rather than pointed, leaves and reddish brown bark, rather than gray, on mature trunks. Earlier, in midwinter, the trees put on a colorful display as showy yellow male catkins bloom in the otherwise naked canopies.



Sitka alder

thinleaf alder



alder twig, leaves, and cones on forest floor

Ecological Role

Alders, like some legumes, have the ability to extract nitrogen from the atmosphere via bacteria in swellings or nodules on their roots. The nitrogen is then added to the soil from the roots and also from the leaves, which fall when still green and abound in nutrients. Unlike conifer needles, alder leaves decompose rapidly to form a rich humus amendment that improves soil tilth.

Because of its abundance, red alder delivers large amounts of nitrogen to enrich forest soils. Red alder stands have been found to supply between 120 and 290 pounds of nitrogen per acre (130 to 320 kg per ha) annually to the soil. From Alaska to Oregon, Sitka alder characteristically pioneers fresh, gravelly sites at the foot of retreating glaciers. Studies show that Sitka alder adds nitrogen to the soil at an average of 55 pounds per acre (60 kg per ha) per year, helping convert the sterile glacial terrain to soil capable of supporting a conifer forest.

Prior to the mid-1900s when fire suppression became very effective west of the Cascades, fires—along with floods, catastrophic windstorms, etc.—were the disturbances that killed conifer forests and initiated their replacement by stands of red alder. Alder groves themselves often served as natural firebreaks since these broad-leaved trees are much less flammable than conifers. Their foliage and leaf litter does not carry a fire well, and their thin bark is sufficiently resistant to protect them from light surface fires. Today, logging, clearing for land development, and epidemics of insects and disease have largely replaced fire in creating opportunities for red alder. Every few years, severe outbreaks of tent caterpillars defoliate most of the red alders over large areas, but despite the disastrous appearance of this damage, the trees recover quickly the next year. Red alder seeds are light—650,000 per pound (1.5 million per kg)—and are showered over virtually the entire landscape west of the Cascades and British Columbia Coast Range by the wind. In initial growth, red alder often exceeds Douglas-fir. Its seedlings often attain 3 feet (0.9 m) the first year.

Red alder is so vigorous and abundant especially on logged, burned, and other disturbed sites west of the Cascades that it could be considered the broadleaf counterpart of the omnipresent coastal Douglas-fir. In fact, red alder colonizes disturbed sites even more readily than Douglas-fir does, because it sprouts from

stumps and shallow roots as well as regenerating from copious seed crops. So why doesn't red alder dominate most of the lower-elevation coastal forest? Although it outgrows coastal Douglas-fir for the first 25 years, it is very shade intolerant and seldom lives 100 years. Also, red alder helps create conditions favorable for the giant conifers that replace it.

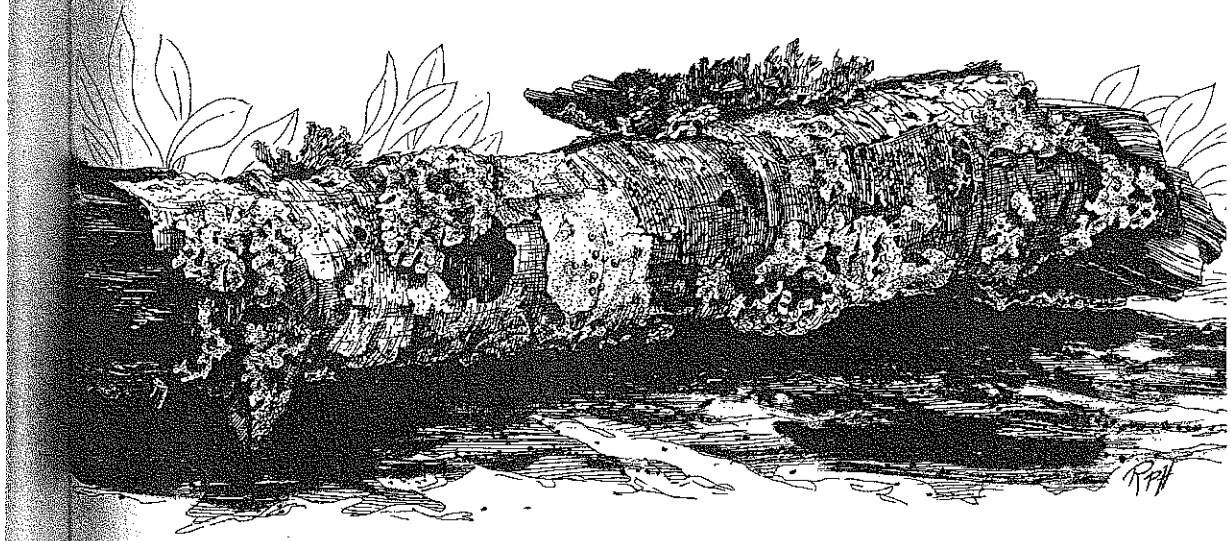
Human History

Red alder has long been useful to humans. Coastal Natives extracted red, orange, and brownish dyes from its bark. A common application of alder dye was to make fish nets nearly invisible to fish (Moermann 1998). Red alder was second only to western redcedar for utensils and other carvings. Red alder coals were used for smoking salmon, a tradition that enterprising tribal people provide today in the form of festive salmon bakes for conferences and other special occasions.

Blackfeet, Kutenai, Flathead, and Nez Perce peoples boiled the bark of thinleaf alder to obtain reddish and orange dyes, which they used to color their bodies, clothing, and other articles (Hart 1976). Some Flatheads even dyed their hair a flaming red with alder bark, which requires no added mordants to set the color because apparently its tannin serves this purpose.

Early foresters and timbermen often considered red alder a "weed tree" because it took over disturbed sites and outcompeted more-valuable conifers. However, today this species is more highly regarded due to an understanding of its ecological contributions, how it can be managed, and its increasing value for a variety of products.

Red alder is now considered a Cinderella tree in forestry circles. Its moderately dense, even-grained wood has good woodworking and staining qualities that have made it popular for furniture and a number of other specialty products. Its success in colonizing barren ground and its role in boosting soil nutrition has many applications for reclamation of damaged land. It is considered as an alternative tree crop to rehabilitate sites where the soil is infused with root rots that destroy young conifers. Because of its rapid growth and sprouting ability, it has potential for biomass plantations for electric energy production. Alder serves as clean-burning, noncrackling firewood, and it is valuable in horticulture, especially since it often emerges naturally where sorely needed to revegetate road cuts and other bulldozed areas or to provide screening in suburban areas.



alder log on forest floor