



How to Know the Trees of the Pacific Northwest

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Don't come to Washington State. It rains 355 days a year, and snows 10. If the mosquitos don't get you, Bigfoot will!

Why would I say this? Because I am a Washingtonian. My natural instinct is to protect where I am and what I have. But this year, from October 9-12, the NAMA 2014 Foray will be held near Eatonville, at Camp Arnold. Everyone is coming, regardless of the warnings.

Set in an area that is rated as a warm temperate, warm-dry-summer climate, Eatonville receives an annual rainfall average of 1 meter (39"), and a snowfall average of 10 cm (4"). Sitting at 250+ m (800+ feet) in elevation, this area has an August average high temperature in the upper 70's, and a low winter average in the lower 30's. Comprised of hills and lows, the land is tree laden.

Motoring down the driveway of Camp Arnold, you

immediately notice the woods. With the camp set onto 250 diverse hectares (650 acres), you can't help but to see the forest, and the trees. Additionally, the camp is known to host several species of fungi, but this only represents a small portion of the much larger picture.

Stretching from Eatonville to Mt. Rainier, are countless acres of forested land. Sections ranging from State Forest to National Park, stand invitingly open, yet mysteriously protective, with the hint of fungi laden floors. Seven different soil types, varying from gravelly silt loam to sandy loam, comprise this area (Boling et al., 1998). Each soil variation hosts similar, although minutely different, tree and understory species, and occur in different areas depending on the topography.

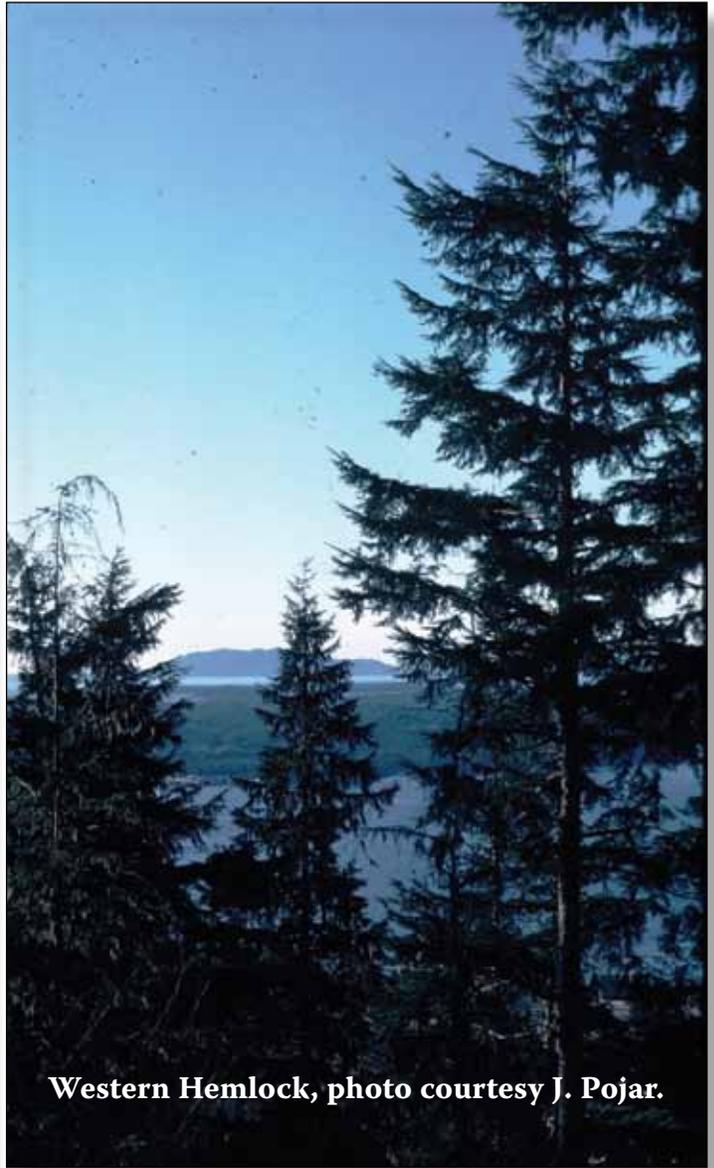
Predominantly featured trees are the Western Hemlock (*Tsuga heterophylla*) and Douglas-fir (*Pseudotsuga menziesii*),



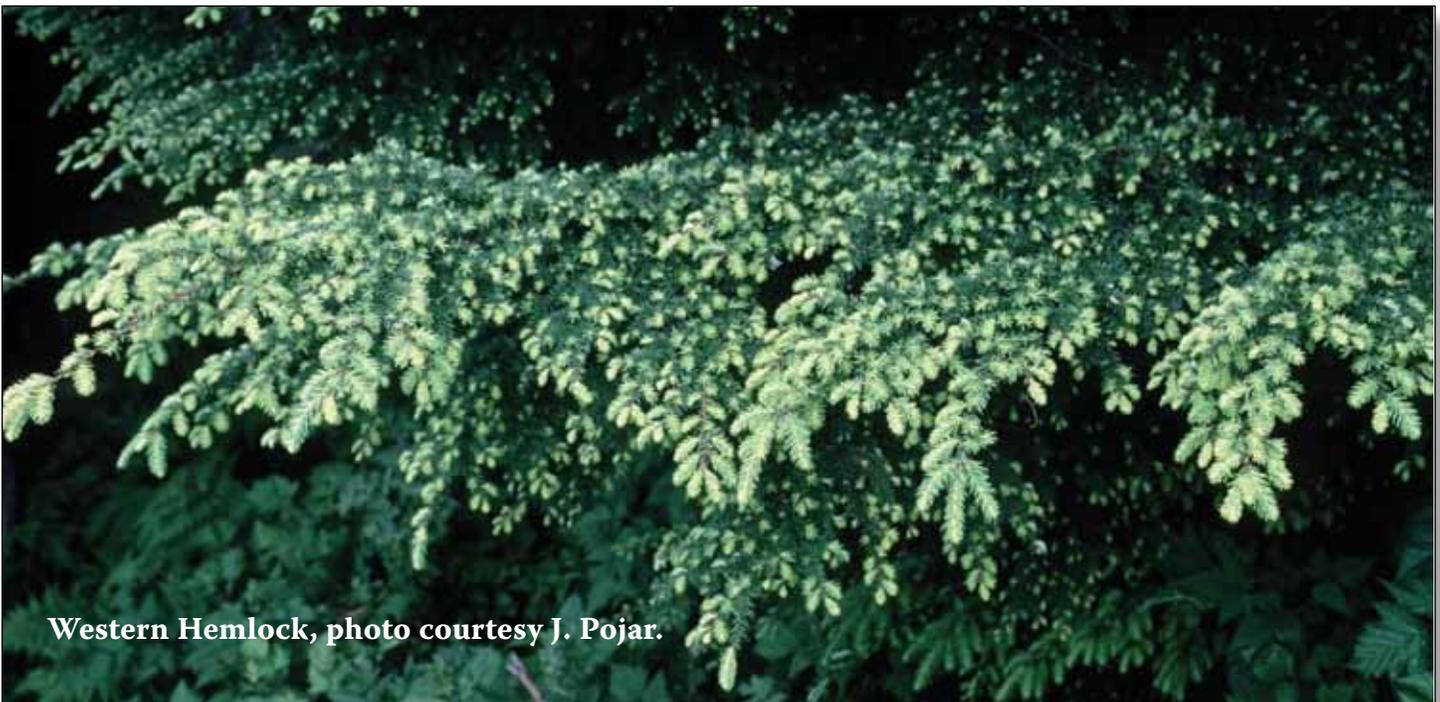
Western Red Cedar



Lodgepole Pine, photo courtesy J. Pojar.



Western Hemlock, photo courtesy J. Pojar.



Western Hemlock, photo courtesy J. Pojar.



Western Hemlock, photo courtesy J. Pojar.



Western Hemlock, photo courtesy J. Pojar.

while secondary trees, Red Alder (*Alnus rubra*), Western Redcedar (*Thuja plicata*), Bigleaf Maple (*Acer macrophyllum*), Pacific Silver Fir (*Abies amabilis*), and Grand Fir (*Abies grandis*), fight for the available gaps.

Salal (*Gaultheria shallon*), Vine Maple (*Acer circinatum*), Western Brackenfern (*Pteridium aquilinum*), Red Huckleberry (*Vaccinium parvifolium*), and Cascade Oregon-grape (*Mahonia nervosa*) make up the majority of the understory.

However, it is what's beneath the understory, that fascinates so many of us. As recent as last year, I documented multiple species of fungi, from the areas surrounding Camp Arnold. Species of the following genera were noted: *Amanita*, *Boletus*, *Cantharellus*, *Cortinarius*, *Gomphus*, *Hydnum*, *Hypomyces*, *Phaeolus*, *Pleurotus*, *Russula*, *Tapinella*, *Tricholoma*, and *Turbinellus*. Although my record keeping was limited, I observed countless other species that I did not document, but will be of interest to participants of the NAMA forays.

As mentioned earlier, most areas around Eatonville are forested... that is, the dominant plants are trees. And because most areas are forested, most of the fungi we encounter on our forays will be in forests, and associated with trees. On North America's West Coast, most trees are evergreen conifers with needle-like or scale-like leaves. Broad-leaved deciduous trees—angiosperms, or flowering plants—are commonly associated with forest edges or disturbed areas.

A successful foray depends on successful hunting. Successful hunting demands an understanding of your prey. Identifying the area trees and plants can save you countless hours of fruitless searching, for mushrooms that wouldn't dare associate with the habitat you're foraging in.

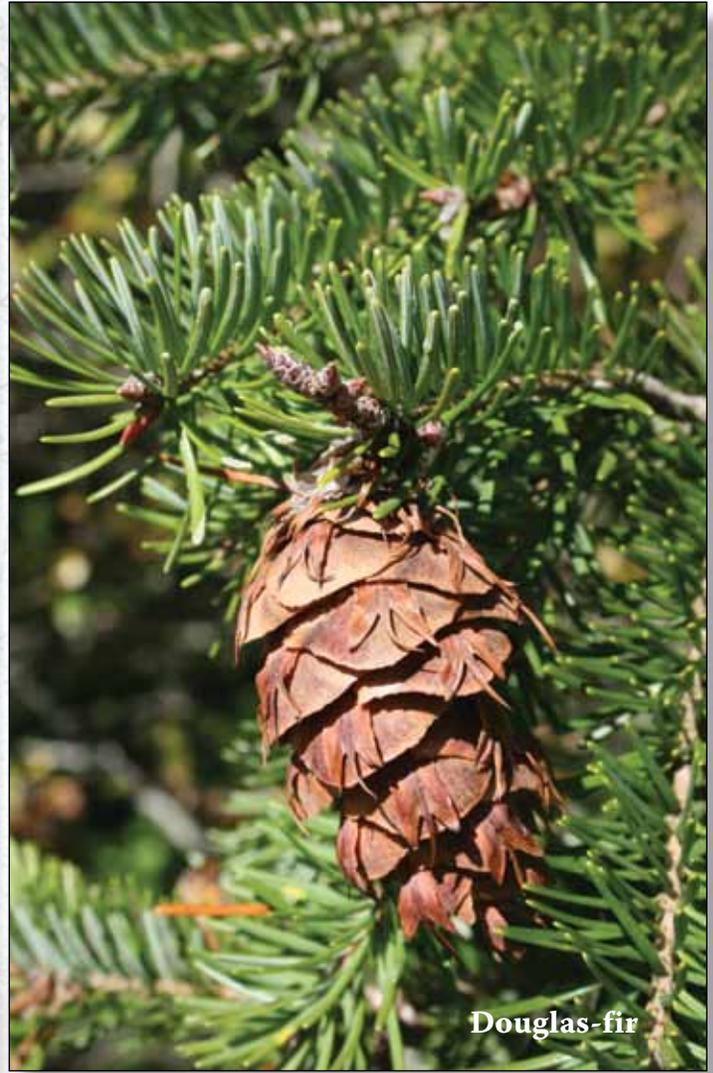
For those new to the area, we recommend Trudell and Ammirati's *Mushrooms of the Pacific Northwest* and David Arora's *Mushrooms Demystified* for mushrooms, and Pojar and MacKinnon's *Plants of the Pacific Northwest Coast* for plants. All of these are in the References at the end of this article.

Most of the evergreen conifers have needle-like leaves. If your evergreen tree has, instead, scale-like leaves and stringy bark, it is Western Redcedar (*Thuja plicata*), see photo. This species occurs from Alaska to California, on the coast and in the interior wetbelt. For visitors from eastern North America, this western North American arborvitae is similar to your Northern White-cedar (*T. occidentalis*) but, like most things in the West, larger. Western Redcedar, like other Cupressaceae, forms arbuscular mycorrhizae (AM) with fungi in the Glomeromycota. What this means for our forays is that most large mushrooms, in these woods the fruiting bodies of ectomycorrhizal fungi attached to the roots of other conifer species, will be largely absent in Redcedar-dominated forests.

If your evergreen conifer has needle-like leaves, then it is Pinaceae and will form ectomycorrhizae (ECM) with a



Western Hemlock, photo courtesy J. Pojar.



Douglas-fir



Pacific Silver Fir, photo courtesy J. Pojar.

variety of different fungi. For our NAMA foray, most of the conspicuous macrofungi will be fruiting bodies of ECM fungi attached to conifer roots.

To separate these other conifers, have a close look at the needles. Are they in bundles of two or five? If in bundles of two, this is Lodgepole Pine (*Pinus contorta*). If in bundles of five, this is Western White Pine (*Pinus monticola*). Both pines are western North American species distributed from BC to California.

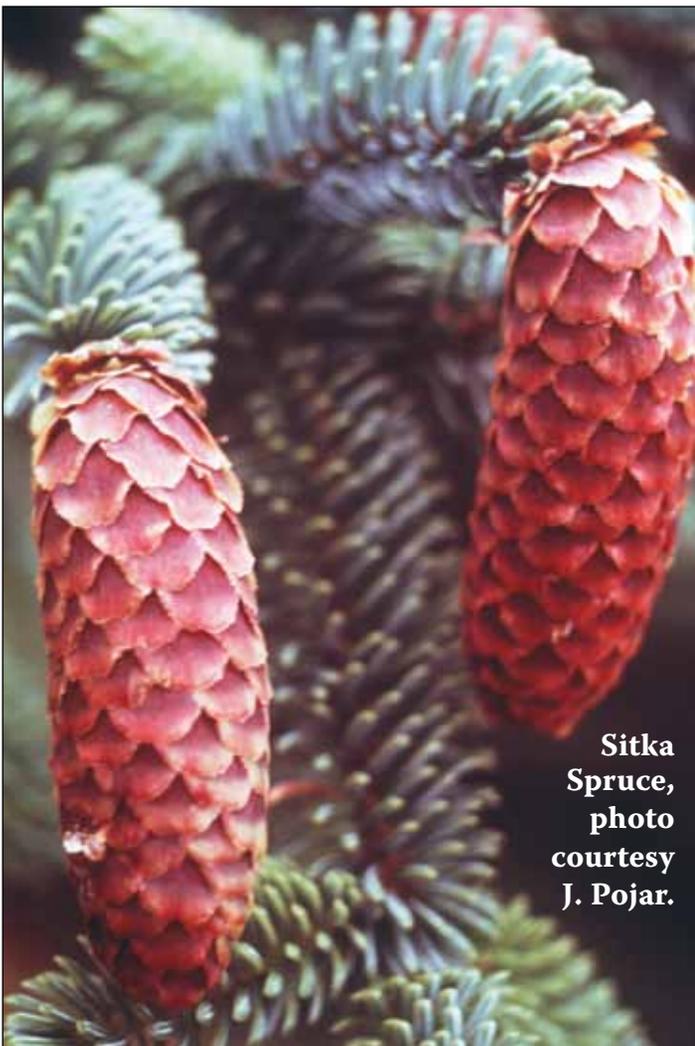
If your evergreen conifer has needle-like leaves not in bundles, it's likely Western Hemlock (*Tsuga heterophylla*), Coast Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), Pacific Silver Fir (*Abies amabilis*) or Grand Fir (*A. grandis*), or Sitka Spruce (*Picea sitchensis*).

Western Hemlock is very similar to eastern north America's Eastern Hemlock (*T. canadensis*), with small (1.5-2.5 cm [0.6-1"] long) seed cones, brownish bark becoming deeply furrowed in age, and leaves somewhat two-ranked and unequal in length (hence *heterophylla*, "different-leaved"). This tree—Washington's state tree—occurs from Alaska to California, on the coast and in the Interior wetbelt.

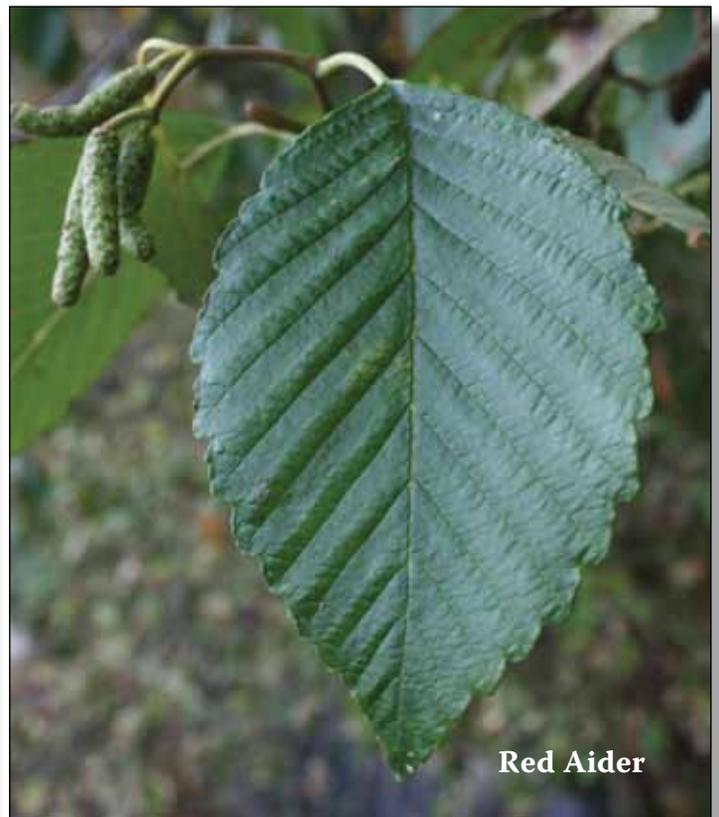
Coast Douglas-fir has larger seed cones (4-7 cm [1.5-3"] long) with three-pointed bracts extending out between the scales, deeply furrowed bark, and pointy needles extending in all directions from branches. This coastal variety grows from



Grand Fir



Sitka Spruce,
photo
courtesy
J. Pojar.



Red Alder

BC to California. Douglas-fir is Oregon's state tree.

The True Firs (*Abies* spp.) have smooth, blistered younger bark and cones that stand upright (vs. hanging down as in all of our other conifers) and fall apart while attached to the branches (vs. falling intact from the trees). At NAMA 2014 you may encounter Pacific Silver Fir (*A. amabilis*), with needles

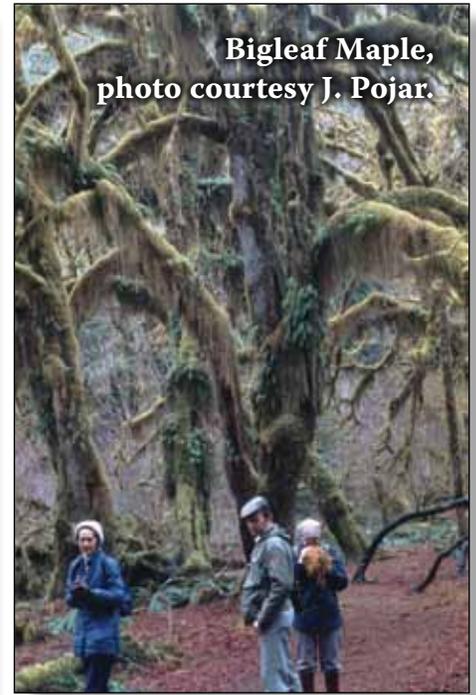
spreading to erect, and Grand Fir (*A. grandis*), with needles in two distinct, opposite rows.

Sitka Spruce, like Coast Douglas-fir, has larger seed cones (5-10 cm [2-4"] long) and pointy leaves arranged in all directions from the twigs, but in the Spruce these needles are arranged on little pegs, and they're stiff, so grasping a Sitka Spruce branch is often a painful experience. In the southern part of its range—from, say, Vancouver Island south—this scaly-barked tree is largely confined to riparian zones.

While conifers dominate, deciduous flowering trees provide welcome diversity to an otherwise evergreen landscape. Often the most common is Red Alder (*Alnus rubra*), a grey- or white-barked tree to 25m (80 feet) tall. The leaves are egg-shaped to elliptic and doubly-toothed. This is an ECM species, though there don't appear to be many mycorrhizal fungi associated with its roots, perhaps because the roots are already colonized with *Frankia* bacteria (which fix nitrogen). Red Alder grows on disturbed sites (including streamsides), along the coast from



Black Cottonwood,
photo courtesy J. Pojar.



Bigleaf Maple,
photo courtesy J. Pojar.

Alaska to California.

Black Cottonwood (*Populus trichocarpa*) is a large tree with deeply furrowed, greyish bark. Leaves are generally ovate to triangular, dark green and shiny above, whitish-green below. This western species (Alaska to Mexico, inland

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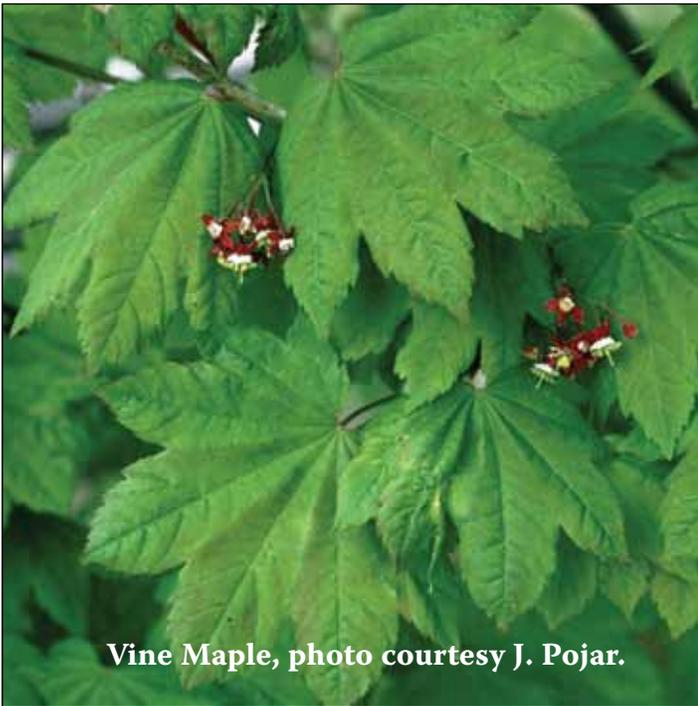


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Bigleaf Maple

to Idaho, Montana, Nevada, Utah and Wyoming) is most commonly found at lakeside or streamside. Black Cottonwoods, like other poplars, establish both AM and ECM associations. And let's end with two coastal maples: Bigleaf Maple (*Acer macrophyllum*) and Vine Maple (*A. circinatum*). Bigleaf Maple is a spreading tree to 30m (100 feet) tall with, well, big 5-lobed leaves—up to 30 cm (1 foot) wide. Its older greyish-brown bark is often deeply ridged and draped in mosses and lichens. This species grows from northern Vancouver Island to California. Vine Maple is a shrub or small tree to 8m (25 feet) tall, with



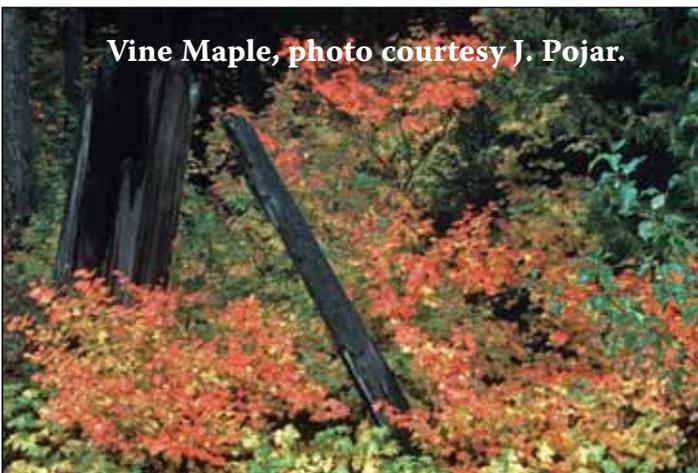
Vine Maple, photo courtesy J. Pojar.

7- to 9-lobed leaves to 12 cm (5") wide. It can be found from southwestern BC to northern California. Both maple species form AM associations.

Which all sounds very exciting—but consider how much rain is required to maintain this temperate rainforest. And then there's bears, and cougars, and Bigfoot...

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Vine Maple, photo courtesy J. Pojar.



Vine Maple