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SPECIAL FOREST PRODUCTS
Species Information Guide for the Pacific Northwest

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Disclaimer

This publication reports research and management information involving mushroom and plant harvesting. It neither recommends the use and ingestion of mushrooms and plants nor implies that using wild plants and mushrooms is without risks.

CAUTION: Mushroom and wild plant consumption can pose a serious, even fatal, risk to humans. It is strongly recommended that you spend your first collecting season using field identification guides and collecting with an expert if you intend to collect wild plants or mushrooms to eat.

Abstract

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This guide is a collection of information about economically important vascular and nonvascular plants and fungi found in the Pacific Northwest that furnish special forest products. Many of these plants and fungi are also found in Alaska, northern Idaho, and western Montana. They contribute to many botanical, floral, woodcraft, and decorative industries and to the rapidly growing medicinal, herbal, and natural foods industries. Internet commerce has made these products available to consumers worldwide and expanded interest in medicinal plants, decorative floral products, and edible wild fruits and mushrooms. This guide provides a consolidated information resource that briefly describes biological, ecological attributes of over 60 plants and fungi, and their wild harvest methods, alternatives to wild harvest, and uses. The harvest techniques described in the guide are based on the recommendations of experienced harvesters and experts who have worked with these botanical resources and support sustainable practices. Information for this guide was gathered from various documents and other sources. The technical areas of expertise consulted spanned a wide range of knowledge including plant biological and ecological sciences, ethnobotany, horticulture, mycology, and forest ecology.

Keywords: Special forest products, nontimber forest products, medicinal plants, edible fungi, botanical industry, herbs, wildcraft, Pacific Northwest, sustainable forestry.

Contents

Introduction

Abundant biotic resources of North American forests have provided not only recreational and personal collecting opportunities but also profitability in products that come from various plants, lichens, fungi, algae, and micro-organisms. These special forest products are the basis of many botanical, floral, woodcraft, and decorative industries; they also contribute significantly to the rapidly growing medicinal, herbal, and natural foods industries (Schlosser et al. 1992, Schlosser and Blatner 1994, Vance and Thomas 1997).

Species harvested from forests for other than timber commodities have been referred to variously as special forest products, nontimber forest products, nonwood products, botanical products, and secondary forest products. They refer to the same group of species—plants, lichens, fungi, and other organisms—collected from the forest for various uses including subsistence, education, research, recreation, and commercial enterprise. The process of collecting from the wild is termed **wildcrafting** and is generally a term applied to collecting material from the wild to sell or trade. Native Americans regarded the use and often the maintenance of the many species found in forests and prairies as a fundamental part of their world and life, and would take exception to the concept that they are "special." It is important therefore to acknowledge that the species we are discovering to be beneficial today were already intimately known by people who lived on this continent and who collected and used these fungi and plants for thousands of years.

Interest in special forest products has increased along with demand for herbal medicines, decorative floral products, and edible wild fruits and mushrooms. This increasing interest in the use of many of the wild botanical resources in the Pacific Northwest accompanies a corresponding increase in questions about how to determine what species are used for which purpose and how are these species properly collected. At the same time, the forested and nonforested habitats where many of these species normally thrive may be altered by land management practices such as clearcutting and wildfire suppression, catastrophic wildfires, and other environmental disturbances. Species such as beargrass, salal, and several medicinal plant species have been so heavily harvested that the quality of the product may have changed. Species growth and reproductive capacity may be affected as well as genetic and population structure. With few exceptions, these species have been harvested without inventories or monitoring, and without addressing sustainability or conservation of the resources or their habitats.

How do all these pieces fit together? As people collect plants and fungi for commercial products, how do they ensure that these species are not overexploited, that their habitats and environments are not being damaged, and that

they are not adversely influencing important ecological functions such as critical interactions with insect and animal pollinators, other mutualisms, and the provision of food and habitat for wildlife. Many of the species being collected in commercial quantities have not been thoroughly studied, yet there is considerable information in the literature and among practitioners that collectively is informative and educational. This guide is a compilation of the information we found to date about selected species in the Pacific Northwest. It is incomplete because new information is continually being generated. We have focused on that information most relevant and useful to sustainable management and conservation of these valuable biological resources growing in the wild.

Based on the information compiled for this publication, we list in table 1 the vascular plants covered in this guide noting species that are exotic, species that can be cultivated, and species deemed vulnerable because the **plant and or its habitat** may be jeoparized by harvest. Of the 76 vascular plant species, 59 species or about 78 percent are available commercially as plant or seed; 10 species or about 13 percent are exotic weeds. About 32 percent are considered vulnerable based direct and indirect effects of harvest. The nonvascular byrobphyes (mosses and liverworts) and the lichen *Usnea* are not cultivated and are also considered vulnerable. Harvest pressure on these byrophytes continues while similar species in other parts of the world are disappearing or threatened by habitat loss, environmental pollution, and overharvest.

Although this guide is a collection of information about economically important plants and fungi species found primarily in the Pacific Northwest, many of these species also are found in Alaska, northern Idaho, and western Montana. The species lists were developed with the input of local harvesters, botanists, land managers, and researchers. This is **not** a comprehensive list of all plants with medicinal, edible, or decorative uses. It is a compilation of species that commonly are harvested for commercial purposes and found on Forest Service lands. Many of these species were and are important to indigenous people, and many tribes today have first rights to collect and use these species. We hope the user of this guide will be sensitive to tribal and treaty rights and the feelings of others who care about these species.

How to Use This Guide

This guide primarily provides information that describes the biological and ecological attributes of each species. The guide is comprehensive but not detailed. It summarizes information while referring the reader to sources that have more specific information. For those interested in harvesting these plants and fungi, this guide includes useful information about low-impact harvest techniques. We also intend for the information to be used to increase awareness of the importance of ethical

Table 1—List of vascular plants indicating those species that are exotic, commercially available (CA) seed or plants (native species), and native plants that are vulnerable or have vulnerable habitats if harvested

Botanical name	Common name	Seed or plant		
		Exotic	CA	Vulnerable
Abies procera	Noble fir		X	
Acer circinatum	Vine maple		X	
Achillea millefolium	Common yarrow		X	
Anaphalis margaritacea	Pearly everlasting		X	
Angelica genuflexa	Kneeling angelica			X
A. arguta	Lyall's angelica			X
Aralia californica	Spikenard		X	X
Arctostaphylos columbiana	Hairy manzanita		X	
A. nevadensis	Pinemat manzanita		X	
A. patula	Greenleaf manzanita		X	
A. viscida	White-leaved manzanita		X	
A. uva-ursi	Kinnikinnick		X	
Arnica cordifolia	Heart-leaved arnica		X	
A. latifolia	Broadleaf arnica		X	
Artemisia douglasiana	Mugwort		X	
Asarum caudatum	Wild ginger		X	X
Berberis aquifolium	Tall Oregon grape		X	
B. nervosa	Dwarf Oregon grape		X	
Calocedrus decurrens	Incense-cedar		X	
Capsella bursa-pastoris	Shepherd's purse	X		
Ceanothus velutinus	Snowbrush ceanothus		X	
C. sanguineus	Redstem ceanothus		X	
Chimaphila umbellata	Pipsissewa		X	X
Coptis laciniata	Oregon goldthread		X	X
C. trifolia	Threeleaf goldthread			X
C. occidentalis	Western goldthread			X
Crataegus douglasii	Black hawthorn		X	
C. monogyna	Oneseed hawthorn	X	X	
C. suksdorfii	Suksdorfi's hawthorn		X	
Cupressus lawsoniana	Port-Orford-cedar		X	X
Cytisus scoparius	Scotch broom	X		
Dipsacus fullonum	Common teasel	X		
D. sylvestris	Wild teasel	X		
Equisetum arvense	Common horsetail		X	
E. hyemale	Scouring-rush		X	
Eriodictyon californicum	Yerba santa		X	
Frangula purshiana	Buckthorn		X	
Gaultheria shallon	Salal		X	
Gentiana sceptrum	King's gentian		X	X

Table 1—List of vascular plants indicating those species that are exotic, commercially available (CA) seed or plants (native species), and native plants that are vulnerable or have vulnerable habitats if harvested (continued)

Botanical name	Common name	Seed or plant		
		Exotic	CA	Vulnerable
G. calycosa	Mountain bog		X	X
Gypsophila paniculata	Baby's breath	X		
Hypericum perforatum	St. John's wort	X		
Juniperus occidentalis	Western juniper		X	
J. scopulorum	Rocky Mountain juniper		X	
Ligusticum apiifolium	Celeryleaf lovage			X
L. canbyi	Canby's lovage			X
L. grayi	Gray's lovage			X
Lomatium dissectum	Desert parsley		X	X
Oplopanax horridum	Devil's club		X	X
Pachistima myrsinites	False box		X	
Petasites frigidus v. *palmatus*	Coltsfoot		X	
Polystichum munitum	Western sword fern		X	
Prunella vulgaris	Selfheal		X	
Pteridium aquilinum	Bracken fern		X	
Rosa gymnocarpa	Dwarf rose		X	
R. nutkana	Nootka rose		X	
Rubus idaeus	Red raspberry		X	
Rumex acetosella	Sheep sorrel	X		
R. crispus	Curly dock	X		
Sambucus racemosa ssp. *pubens*	Red elderberry		X	
S. cerulea	Blue elderberry		X	
Scutellaria lateriflora	Blue skullcap		X	X
S. galericulata	Marsh skullcap			X
S. nana	Dwarf skullcap			X
Taxus brevifolia	Pacific yew		X	
Thuja plicata	Western redcedar		X	
Trillium ovatum	Western trillium		X	X
Urtica dioica	Stinging nettle		X	
Vaccinium membranaceum	Black huckleberry		X	
V. deliciosum	Cascade bilberry		X	
V. ovatum	Evergreen huckleberry		X	
Valeriana sitchensis	Sitka valerian		X	X
V. occidentalis	Western valerian		X	X
V. scouleri	Scouler's valerian		X	X
Verbascum thapsus	Mullein	X	X	
Xerophyllum tenax	Beargrass		X	X

and ecologically sensitive collection and use of these species. For example, it is important to be certain of the exact botanical identity of the plant or fungus being harvested. There are species look-alikes that are federally or state listed as sensitive, threatened, or endangered; other look-alikes are poisonous or toxic. Some species are exotic and invasive. It is important not to spread these invasive or exotic species because of carelessness in harvest and transport. Land managers who make decisions about how to structure permits or management plans, who are responsible for sensitive plants, or who determine harvest impacts also may find this information useful. It is also useful for harvesters who simply want to learn more about the species they are working with. There are also gaps in information revealing where further knowledge may be needed. This guide is intended to increase awareness of the use of many plants and fungi and of their importance to people and the ecosystem. It is also intended to increase knowledge of techniques, whether cultivation or careful harvest, that will promote sustainability and conservation of species, plant and fungal communities, and habitats.

The harvest techniques described in this guide are those recommended by local harvesters who have worked with the plants for years developing techniques that promote sustainable harvest. These techniques have not been, for the most part, field tested, monitored, or scientifically evaluated. Most of these harvest recommendations are locally specific. **Changes in climate or the environment can result in different reactions from species being harvested.** Therefore, always consider the environment when collecting. For example, many species grow in road cuts and fills. Before harvesting a species on a steep slope, consider the consequences of that action to slope stability and erosion. Before collecting along roadsides in particular, the application of herbicides or pesticides should be determined. Consider any potential for adverse impacts on both the species and the land. Note that for species growing on public lands, transplanting is permitted for a limited number of species and not on all forests. Transplanting is total removal of a plant with disturbance of soil and forest floor. It is usually permitted only in areas where destruction of vegetation and soil disturbance have to occur owing to such activity as increasing or maintaining power lines or road rights-of-way.

For many species, it is difficult to locate patches in the wild that are large enough to harvest without impact and still collect enough to be economical. Many are suitable for cultivation, but for some species, successful propagation still eludes growers. Cultivation for commercial markets is not developed for many species, so they tend to be collected only in the wild. In some cases, a price difference exists between wildcrafted and cultivated species, but this is more the exception rather than the rule. In fact, many cultivated species can be

certified organic, which increases their value, although as yet there is not a formal process to certify wildcrafted species. For many species in this guide, cultivation is a recommended alternative to wild harvest. For more detailed information on cultivation of the native plant species listed in this guide, we have referenced, for example, the journal *Hortus West* (1998), the publications "Seeds of Woody Plants in the United States" (USDA Forest Service 1974), "Propagation of Pacific Northwest Plants" (Rose et al. 1998), "Collecting, Processing and Germinating Seeds of Wildland Plants" (Young and Young 1986), and the web site http://gardenbed.com. Over the timespan of preparing this guide, web-based information has increased exponentially. We encourage using the Internet to find additional information but caution that reliability of sources should be checked.

The publication is just a guide. The collector should make personal observations about the effects of any harvest and note any significant changes in populations or habitats across the landscape.

General Harvest Guidelines

Know the species that is to be collected.

Be sure of its identification before harvesting a plant or mushroom. Many plants look similar but do not necessarily have the same properties. There are species in the same genus that look similar to the more common species but may be rare, at risk, or federally or state listed as threatened or endangered. Another reason for careful identification is that certain plants and fungi have poisonous look-alikes! If you are uncertain, take a small sample and consult a qualified botanist. You may find one at most colleges and universities, or you can call your forest or agriculture extension agent who will know where to refer you. Native plant societies have local chapters and provide excellent opportunities to identify plants and fungi, and discover and learn the local flora as well.

Know the end use.

If collecting plants to sell, you should first contact the buyer and a discuss what criteria and quality standards are to be met. Many buyers will only take products that have been collected, dried, or processed in a certain way. Many plants are sensitive enough that just a few days or even hours of improper handling can result in unusable products. Know how to handle collected material properly and use proper storage facilities or materials.

Pay attention to the environmental conditions.

Avoid harvesting during extreme conditions. After heavy rain, the soil will be more prone to compaction or slippage. When harvesting plants that grow in riparian areas, avoid taking plants that are critical to maintaining the integrity of the streambanks. When it is particularly dry, some plants may become stressed. Harvesting parts of a plant at this time may add to stress and negatively impact regeneration. In addition, be aware of plants or plant parts that are diseased or infested with insects so as not to spread contamination.

Learn about the life cycle of the plant you are harvesting.

Plants need to be able to reproduce or regenerate to continue to exist. For example, if you are collecting roots and the plant reproduces by seed, is it possible to collect in fall after the seeds have dropped? This type of awareness will help assure there are plants in the area to harvest again next year.

Harvesting Responsibilities

Wildcrafter training and responsibilities:

- Have in-field instruction on how to identify, harvest, and handle plant material properly including quality control, sustainable harvest guidelines, bagging, bundling, tagging, storing, and transporting.
- Know land and landowner regulations including use permit requirements with location, harvest dates, full name of harvester, and owner's signature; land use ethics.

Collector responsibilities:

- Train and supervise wildcrafters.
- Weigh, tag, and document harvested plant material including location.
- Transport plant material to processor.
- Communicate regularly with landowner and assure permit compliance.

Processor responsibilities:

- Train and supervise collector.
- Receive plant material and harvest documentation from collector.
- Inspect and process product. Bag tags identify each wildcrafter's product.
- Communicate with landowner and be involved in use permit process.

Monitor and observe a patch over time.

Notice what impact your harvest is having. Take notes with map locations so you know how to return to the same area. Evaluate harvest recommendations for your area. Surprisingly, some plants may actually increase if harvested in the right quantities and if the right techniques are used.

Always secure permission to harvest on anyone's land.

This applies to public land as well as private. In Oregon, a permit is required to carry commercial quantities of product in your vehicle. This can a handwritten permit from a private landowner. Other states in the Pacific Northwest have or are now enacting similar laws. Know the requirements set forth in these laws. Public lands also require permits for harvesting. Some public lands are off-limits to harvesting (such as national parks and many special management areas on national forest lands). Presently, public land managers will sell permits for many of the species listed in this guide. They often want to know generally where harvesting is occurring so that they can track areas of heavy use in order to balance impact across the landscape. Personal-use permits are available for noncommercial harvest. Even if you do not like the current permit systems, getting involved with them is the best way to have input into future changes.

Use harvest techniques that minimize disturbance.

This means using the right tools and using them correctly. If you are collecting leaves and stems, gently clip them off of the plant. Do not simply break them off or pull them out of the ground, as you tend to get more of the plant than you can use. Also, breaking stems may produce more extensive injury and create sites for pathogens. With roots, dig gently with a small shovel, trowel, or your hands (depending on the conditions). Avoid disturbing surrounding vegetation. Fill in any holes you make after you finish collecting. Take out litter and trash with you.

Sustainable harvest does not come with a formula.

There are no bottom line numbers that work for each species. Think of the species in context, as part of the ecosystem. For some species, ecological function or importance has already been documented and is described in this guide. Many species, however, have not been thoroughly researched. Draw conclusions about the sensitivity of a patch by using observation and the information contained here. Harvest conservatively. Then watch the results. Over the next few seasons, observe what impact harvesting had on the species collected as well its surroundings.

Transplanting Tips

The following transplanting tips have been adapted from the brochure "*Collecting Native Plants Permit Conditions and Transplanting Tips"* (Johnson and Warner 1997).

- Be sure you have written permission first from the landowner or land manager.
- Important! Know where your transplants will be located in your yard **before** finding them. Select plants growing in conditions that match where they will be planted; e.g., sun exposure, moisture, soil drainage, frost, etc.
- Reduce transplant shock by collecting plants between October and May, when soils are moist and plants are not actively growing. The best days for transplanting are cool-overcast days.
- Avoid collecting on steep slopes to prevent soil erosion.
- Dig plants carefully, retaining as much soil around the roots as possible. Keep roots moist at all times. Wrap wet newspapers or burlap around the outside of the root ball.
- Completely cover your plants when carried in the back of an open truck. The air movement will rapidly dry the foliage and roots, which severely stresses the plants, possibly causing them to die. Roots must be kept covered and moist at all times as they die rapidly when exposed to air.
- Replant your newly collected plants as soon as possible. Until then, keep them cool, shaded, and slightly moist.
- Trees take 1 to 2 years to reestablish themselves in your landscape. Supplemental watering is advised during this period. Keep shrubs, grasses, and herbs watered until they are actively growing. During dry summer months, water every 1 to 3 weeks (depending on species).
- Even with the greatest care, the establishment rate of transplanted herbs can be low. We encourage you to propagate herbs with seeds or cuttings, or obtain from a nursery.

The commercial value of the special forest products industry to the Pacific Northwest has been reported in excess of $190 million (Schlosser and Blatner 1992). It is estimated that the value of the personal-use sector exceeds the commercial value by 3 to 1. Today, as in the past, a major value of special forest products from native plants and fungi of the Pacific Northwest is their use by the ordinary person. Over 85,000 people enter the public forest each year to collect plant material and mushrooms for their own personal use. Also 65 percent of 90,000 nonindustrial private forest land owners stated that a primary reason for owning forest property was for other products besides timber. These products represent the full range of commercial, educational, environmental, and aesthetic uses for the owners, their families, friends, and others. Protecting plants and fungi helps maintain forest complexity and is an inclusive activity not only for ecosystem and species diversity but also for engaging people who represent all of the values for which public forest lands are managed.

Harvesting Mushrooms

The following harvest guidelines are adapted from the brochure "Mushroom Picking—What Makes a Good Harvest?" (USDA Forest Service 1995).

Know where mushrooms grow.

Forest ecosystems provide diverse plant, animal, and fungal species. Unlike green plants, fungi cannot use sunlight to make food but use other living organisms or dead organic matter for food and moisture. Mushrooms can be found in different forest and nonforest environments. They commonly are found in leaf litter or other plant organic material, and near trees in deciduous and coniferous woodlands as well as in nonforest lands. When locating mushrooms for harvest, disturb the ground as little as possible as many grow during the rainy season when the ground is soft.

Know the mushroom.

Know the mushroom **before** picking it! Remember, not all mushrooms are edible, and some are poisonous. There are many guidebooks available at bookstores, local libraries, and county extension offices to assist with mushroom identification. Picking mushrooms and identifying them later may result in contamination and throwing out mushrooms that could do more good left on site.

Take care of mushroom habitat.

Improper techniques, such as raking, can damage mushrooms by breaking caps and stems. It also can damage mushroom habitat. Remember areas that are disturbed because of picking should be carefully restored. This protects the underground portions of the fungi, which produce the mushrooms. Mushrooms will return almost every year if they are harvested carefully—and the weather cooperates.

Know good harvesting techniques.

Depending on the type of mushroom, there are three methods a picker should use to minimize resource damage during harvest:

- Grasp the mushroom at its base and gently rock and twist until it comes loose.
- Use a sharp knife to cut the mushroom off at ground level.
- Insert a narrow object like a stick or knife under the base while prying straight up and out of the ground. This method "pops" the mushroom out without disturbing the surrounding area or damaging the mushroom.

Mushrooms damaged by improper harvesting or storage have little or no commercial value.

Methods

This information guide was developed in multiple stages. First, a selection process was developed for including species in the document. Second, information categories were defined and refined. Third, information was collected and carefully documented for each of the species. Finally, the document was reviewed for completeness and content accuracy.

The species list for this guide was compiled first from permit lists obtained from the U.S. Department of Agriculture (USDA), Forest Service and U.S. Department of the Interior (USDI), Bureau of Land Management. These lists provided the names of species for which permits were obtained in the USDA Forest Service, Pacific Northwest Region. Additional species were added based on recommendations from harvesters and business owners who knew that other products were being collected. As other species were suggested, researchers determined what quantities were being removed and if the species were commercially important enough to be included on the list.

A draft category list was completed in 1996. The original categories included description, ecology, uses, and harvest suggestions. Throughout the data-collection process, these categories were reworked. For example, as more information became available on the cultivation of medicinal plants, a section on

propagation of the species was included. The section addressing markets was reduced in detail; it became clear that information would be difficult to keep current with market and price information proliferating and becoming more fluid.

Drafts of a prototype were presented at workshops and conferences, which allowed an opportunity to refine the format. Feedback was solicited that provided key areas on which to focus the work. Suggestions were made about how a category could be made more useful. As the document was tailored to fit the needs of the users, additional categories were added and modified when necessary. For example, land managers repeatedly mentioned that the literature would say that nothing was known about many species. Thus, as data were collected, references were listed, thereby allowing end users to followup with their own research as needed. Our goal here was to summarize what information exists while providing extensive references for accessing details on each species.

This feedback also helped streamline the categories that were included in the document. The result was an emphasis on the resource rather than products. People wanted to know about the species, its ecological attributes and harvest concerns rather than just focusing on its economic attributes. We have accompanied each species or taxon with a botanical illustration, most of which for plant species are from Hitchcock et al. (1969).

Information for this guide was gathered from documents that cover various sciences including ecology, ethnobotany, horticulture, and mycology. Other sources were found on the Internet, a growing source of information. Because information on the Internet often is updated more frequently than publications, web-based information was consulted as recently as possible before this document went to press. Important sources of unpublished information were provided by people with experience or knowledge in harvesting these species or in processing their products. They have been added as personal contacts and their credentials confirmed by peers in their field. Information also was referenced against several lists including threatened and endangered species lists, regional sensitive plant species lists, United Plant Savers, and lists of seeds available in cultivation. All citations, including the web sites, were cross checked for accuracy.

As information was collected, decisions had to be made about how to treat special cases. We acknowledge that "moss" harvest includes many liverwort and moss genera. We grouped them under the name "Bryophyta" and provided general information as applicable. Harvesters are not selective about which species of moss they bring in because the market is concerned about the look of the moss, not the species. For genera such as *Rosa* and *Juniperus,* several species within the genus are collected for the same purposes. We identified the most prominent, but other species within the genus also may be used. Where information was identical among species, we did not provide species-specific information. Wherever possible when we found species-specific information, we included it.

This guide was reviewed by scientists, managers, and special forest products business people at various stages. Several reviewers were asked to review those species with which they work most closely or have the most familiarity.

Explanation of Information Categories in This Guide

Identification

Botanical name: Binomial nomenclature is used (genus and species name in Latin) followed by the accepted abbreviation of the person recognized as first naming the species. The nomenclature used is primarily from the National Plants Data Center (NPDC). Note exception with "mosses," which are harvested bryophytes. Bryophyta is a taxonomic division.

Name: Most common name for the species, or for coverage of multiple species under a single genus, the genus name, additional common names used in the region for the species.

Family: The family name for each species. Nomenclature follows NPDC.

Plants code: Code established by the NPDC. Composed of the first two letters of the genus and first two letters of the species. A number is added if there is more than one species with the same first two letters.

Species names: Botanical, common names, and plants code where only genus is listed. For those species covered together under the generic name, differences relating to an individual species are identified; otherwise a generic description is used.

Ecology

This section covers ecology that is most relevant to sustainable management and conservation of the species.

Description: First, nativity to the United States is identified followed by a botanical description of the species including size, shape, and color of leaves, flowers, and fruits. Most species identified as exotics were introduced in the United States for garden plants or for some other purpose.

Range and distribution: A generalized description of the range of the species is given. Distribution includes geographic information and in general how the species occurs; e.g., widely distributed but infrequent.

Associations: In most cases, we have included primary and dominant tree associates, representative for the region. For any particular area, tree series and plant associations can be found in national forest plant association guides within

the Pacific Northwest in addition to material we have referenced. We did not include most zones, series, or associations but tried to include representative associated plants from most common habitats. For nonforest, weedy, or roadside species, we suggest several types of plants that commonly would be associated with these species.

Habitat: General descriptions of the types of environmental conditions in which the species grow. If possible, this included general physiographic information, moisture, and temperature.

Successional stage: An indicator of the vegetative structure type where the species is typically found, based on ecological theories of succession. For example, early-successional stage refers to recently disturbed areas and open conditions, whereas later successional stage refers to stages of development where the overstory tree structure has developed relatively disturbance free, and in nonforest communities, where the plant community structure is stable over time. It also refers to the response of a species to disturbance and its shade tolerance.

Ecological relations: Interactions between the species and other plants, animals, the soil, or other components of the ecosystem are listed including pollinator-related information, if found. Also included are fire ecological relations, if known. In some cases where information was not found for a specific species, inferences are made based on associated plants. Far more ecological information exists than we have found or included. The wide body of literature precludes our providing an exhaustive list.

Biology

This section includes information on reproductive biology, applied seed biology, and information related to propagation and cultivation of the species.

Flowering and fruiting: Includes the months or seasons that the species typically flowers and descriptions of plant or fruit when fruit and seed are mature.

Seed: Includes seed dispersal and natural germination requirements where found, as well as general germination requirements for artificial seed propagation. Most seeds are stored dried, and noted if stored otherwise. For many species, there is much literature on seed management; therefore, we provided key references rather than details.

Vegetative reproduction: Regeneration in the wild vegetatively by layering, coppicing, or by rhizomes; or in cultivation, species that can be vegetatively propagated, for example, by rooted cuttings.

Cultivation: Species that have been cultivated, or evidence that they can be cultivated. In addition we denote as "commercially available" those species for which seed and plants can be obtained from commercial nurseries based on plants listed in the "Plant and Seed Directory" (Hortus West 1998.)

Transplant viability: Suitability for transplanting based on using good transplant techniques (see "Transplanting Tips").

Collection

Information and recommendations were compiled from local harvesters who emphasize long-term use of the resource, as well as from publications.

Part harvested: The part of plant or fungus that is harvested depending on use.

Harvest techniques: Generally accepted ways to collect fungi, plant, or plant parts.

Harvest season: Season in which fungi, plant, and plant parts typically are harvested.

Regeneration after harvest: Describes how the species reacts to harvest. Harvest of branch tips may stimulate secondary branch growth and increased sprouting. Rhizomatous plants generally have better regenerative potential to limited harvest of belowground tissue. Fungi may regenerate sporocarps after harvest but take a full reproductive cycle.

Uses and Products

Lists of most common uses, products, and markets for which species are collected.

Common uses: The primary uses for which the species are collected. This includes personal medicinal, craft, and other uses as well as various commercial uses. In this category, there often are more individual uses than we have listed.

Indigenous uses: A general list of various uses by native peoples of the Pacific Northwest. Most likely, there are more specific uses of these species by Native Americans than we have documented here.

Common products: Most common products and representative types of the products distributed and sold in wholesale and retail markets. Many botanical plant products are sold wholesale as bulk dried and cut or sifted. We usually

describe the common retail product; however, the diversification of products has increased so rapidly that there are often many more types of products than we list.

Types of markets: Categories of general markets. Extent of the market for the commercial products where known; i.e., local, regional, national, or international. If local, regional, and national, we indicate those collectively as "domestic." From its inception to when this guide was published, the markets have expanded. Because of Internet commerce, many products find international buyers; small local companies are able to reach consumers worldwide, so the distinction between domestic and international has blurred. Some terms are overlapping such as medicinal, herbal, nutraceutical, or dietary supplement. In addition, the commercial enterprises we list, e.g., nursery, landscape, and horticultural, overlap.

Comments and Areas of Concern

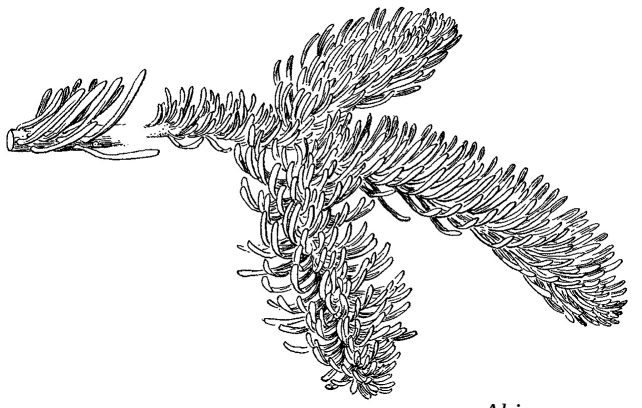
Comments that may be important to the user or harvester, and additional information of interest or importance to conservation, sustainable harvest, or management have been placed in this section. We note other species in the same genus as the harvested plants that are federally and state listed. We have included web sites where information on state listing can be obtained (see "References").

Referenced Material

All referenced material used for each species is listed alphabetically by name and date. The full citation can be found under "References." This section also includes several publications and web sites of general interest or value to the reader but not cited with any particular species.

Continued

Abies procera Rehder
Noble fir
Pinaceae
ABPR



Abies procera

Ecology

Description: Native. Evergreen coniferous tree, to 80 m tall; symmetrical; bark smooth on younger trees, breaking up into plates with age; needles roughly four-sided, 2-3 cm long, and bluish green; two rows of stomata below and one to two rows on top of needle surface, fine, white striped; pollen cones reddish; seed cones large (10-15 cm long), erect; scales concealed by bracts. Largest trees of the genus *Abies*.

Range and distribution: Cascade Range from Oregon to British Columbia, about 900-1700 m. In Klamath Mountains of northern California. Scattered populations in Oregon and Washington Coast Range. Can occur in pure stands or mixed with other conifers.

Associations: Primarily Pacific silver fir zone. Douglas-fir, Pacific silver fir, western hemlock, mountain hemlock, western white pine, and lodgepole pine; huckleberry, various currants, beargrass, avalanche fawn-lily, queencup beadlily, and inside-out flower.

Habitat: Higher elevation mixed-conifer to subalpine forests; sheltered sites with moraine soil and hilly terrain. Can grow on a wide range of soils if moisture not limiting. Grows best on sites characterized by rich herbaceous understories.

Successional stage: Early-successional or pioneer species. Early colonizer after stand-replacing fires. Shade intolerant.

Ecological relations: Insects commonly prey on seeds and cones. Black bears (*Ursus americanus* Pallas) occasionally strip bark from trunks. The bark of young noble fir is relatively thin; fire resistance of larger, thicker barked trees is low to moderate.

Biology

Flowering and fruiting: Monoecious, outcrosser and hybridizes with other *Abies* species. Flowers from early May to early June. Pollen dispersal occurs in early June, and seed dispersal in late September to early October.

Seed: Trees begin producing cones after 20 years old. Seed quality is typically poor, with an average as low as 10 percent viable seeds. Seed quality is correlated with cone crops, which must be medium size before sound seed exceed 10 percent. Seed must be stratified and can be stored for several years under proper conditions. May regenerate after burns, but regeneration success is variable.

Vegetative reproduction: Not known to reproduce vegetatively.

Cultivation: Can be cultivated. Plants and seeds are commercially available. Stratified seed should be sown from February through March. Germination may take several weeks; growth is best in shady, cool, and somewhat moist conditions. Initial growth is slow; stock usually outplanted as 2- to 3-year-old seedlings or 3- to 4-year-old transplants.

Transplant viability: Fairly successful for seedlings and small saplings. Has been successfully transplanted from the wild for landscaping.

Collection

Part harvested: Branches, boughs, and cones. Entire tree can be harvested for timber or Christmas trees. Overstocked trees can be harvested when less than 3 m tall for landscape industry.

Harvest techniques: Branches selected from trees generally less than 18 m tall for blue-green to dark green color, desirable form, symmetry, and needle curl. Standing on the ground, the harvester cuts the boughs with strong clippers or pole pruners generally leaving lateral branches closest to main bole. The boughs selected are free of disease, insects, dirt, and broken or damaged needles. All needles should be dark green and firmly attached. Branches are kept cool during transport and storage to prevent desiccation. Branches higher on the bole are generally of better quality, have needles of better color, and are curved and have less damage. Tree branches can be reclipped after several years when lateral branches have grown sufficiently to produce a harvestable bough. Cones should be collected before they open as they disintegrate quickly.

Harvest season: Fall to winter, ideally when autumn precipitation and cooler temperatures are occurring. Christmas greens are purchased from the second week of September through the first week of December by the largest buyers. Boughs are harvested after foliage has hardened off. This usually follows a hard frost in September.

Regeneration after harvest: Uncut lateral branches are stimulated to grow after harvest of branch terminal in younger trees and can be reharvested after several years. Shaded branches lower on the bole have poorer regeneration capacity.

Uses and Products

Common uses: Floral. Christmas trees, decorative boughs; wood is valued for specialty products because of its high strength-to-weight ratio. Also used for ornamental planting and landscaping.

Indigenous uses: Bark of fir trees used to tan leather. Paiute used dried foliage as cold remedy and decoction of leaves for cough medicine.

Common products: Branches: Christmas decorations, wreathes, and decorative greens; tree: specialty wood, plywood, and Christmas trees.

Types of markets: Christmas greens and trees, floral crafts, landscaping, and timber. Domestic and international markets for Christmas trees, finished holiday greenery products, bulk holiday greenery, floral, and crafts. Domestic markets for landscaping and specialty lumber.

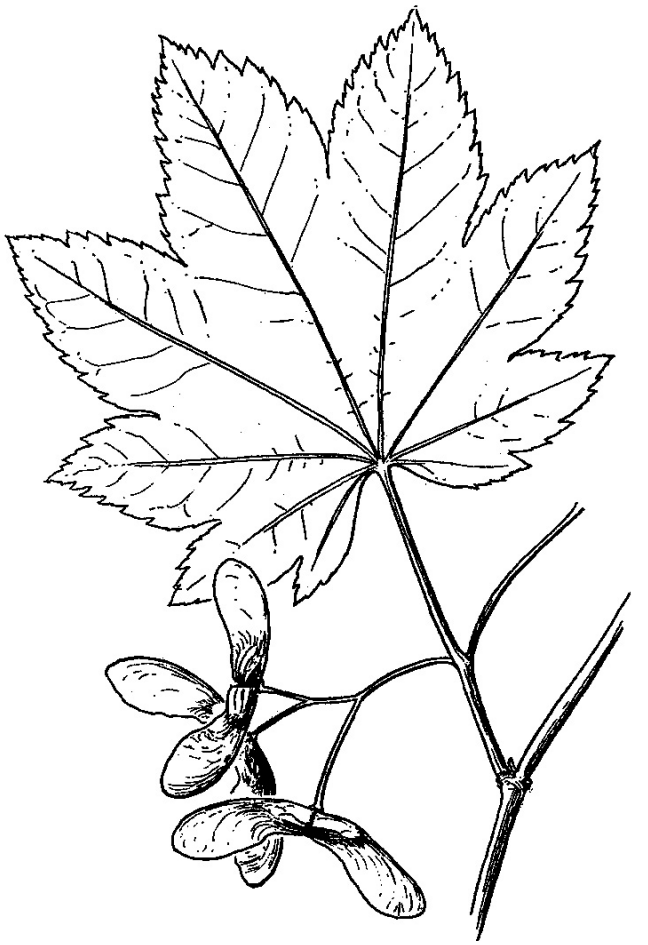
Comments and Areas of Concern

Intergrades with Shasta red fir. Noble fir was introduced into Denmark in the mid 19th century and is now common throughout the country. Boughs are harvested commercially for decorative uses in Scandinavian countries. Noble fir young enough for bough harvest has been reported to be decreasing in wild stands.

References

Burns and Honkala (1990), Cope (1993), Danish Forest Sales Catalogue (n.d.), Franklin (1974), Hickman (1993), Hortus West (1998), Moerman (1998a), Pojar and MacKinnon (1994), USDA Forest Service (1963), Young and Young (1992)

Acer circinatum Pursh
Vine maple
Aceraceae
ACCI



Acer circinatum

Ecology

Description: Native. Shrub or small tree, to 7 m, sprawling branches often rooting and forming new colonies; assumes erect, treelike form in clearings; diameter to 20 cm; bark gray or brown, smooth or finely fissured; stems pale green, becoming dull brown; leaves, opposite, deciduous, palmately lobed, 5-12 cm across, 3-6 cm long, seven to nine lobes, toothed, and hairy; dense inflorescence, 4 to 10 flowers, purple sepals, white petals, 6-9 mm broad, in clusters at end of shoots; winged fruits (samaras), 2-4 cm green, becoming reddish brown, widely spreading. Autumn leaves vary from yellow (in the shade) to shades of red (in open sun).

Range and distribution: Alaska to northern California, coast to the east side of the Cascade Range; low to middle elevations (1500 m). May form dense stands when growing in the shade.

Associations: Pacific silver fir, western hemlock, Sitka spruce zones. Douglas-fir, grand fir, western hazel, dwarf Oregon grape, salal, trailing blackberry, western sword fern, and twinflower.

Habitat: Shaded streambanks; moist to wet well-drained sites; generally under other trees but sometimes in forest openings, open ridges, or talus slopes. In the transition zone between wetland and upland where soils are moist but not saturated for long periods.

Successional stage: From early- through late-successional stages, most frequent in mid-successional forests. Moderately shade tolerant; grows in canopy gaps.

Ecological relations: Wildlife value high. Browse for elk and deer; seeds, buds, and flowers food for birds and small mammals; abundant pollen and nectar high in sugar content important to bees; nest material; cover; bank stabilization; buffer from wetland intrusion. Well adapted to fire; sprouts from the root crown after disturbance.

Biology

Flowering and fruiting: Flowers from April through June, fruits (samaras) ripen from September through October, and dispersed through November.

Seed: Poor seed producer, small quantities produced annually; dispersed in fall, germinate in spring. Bare mineral soil required for natural seed germination. Samaras collected when wings are green. Seed should not be allowed to dry. Seeds require a cold, moist stratification; mechanical rupture of pericarp may aid germination.

Vegetative reproduction: Natural regeneration primarily by layering shaded forests. Cuttings difficult to root; propagation by layering slow.

Cultivation: Can be cultivated. Plants and seeds are commercially available. Seeds should be sown in fall in mulched beds. Shade is important during seedling establishment. Seedlings can be transplanted as 2-year-old stock. Four recognized cultivars developed for ornamentation. Grows best in slightly acidic soil with abundance of organic material.

Transplant viability: Seedlings growing around a dense patch of vine maple, if not flowering or leafed out, may be dug up and potted immediately, well into spring.

Collection

Part harvested: Branches, stems, whole plant, and seeds.

Harvest techniques: Seeds are collected by hand or by shaking on tarp. Branches and stems are clipped with pruners. Whole plants are dug up as young saplings up to 1 m in height. (Note: widely available from nurseries.)

Harvest season: Seed collection in September and October. Stem, branches clipped preferably when buds dormant. Branches best harvested when dormant but can be harvested year-round. Whole plant is harvested from late fall until spring bud break. Transplants are taken in fall or early spring in cool, damp weather.

Regeneration after harvest: If a small proportion of branches are clipped, regeneration is good.

Uses and Products

Common uses: Fresh and dried floral and greenery and ornamental silk trees; used locally for tool handles, firewood, roundwood furniture, and home decoration crafting.

Indigenous uses: Snowshoe frames, drum hoops, small implements, baskets, salmon scoop nets, bows, and wood for smoking fish or fowl.

Common products: Silk tree stems and indoor ornamental plants. Native landscape or restoration plants, traditional crafts, baskets and furniture, home interior decorations, dried flower arrangements.

Types of markets: Floral (silk trees), crafts, and landscaping. International and domestic markets for floral, silk tree stocks, specialty wood and finished traditional crafts. Domestic markets for native landscape plants, restoration plantings, and specialty furniture.

Comments and Areas of Concern

The tree grows to its largest size in older second-growth and mature Pacific coastal forests. Vine maple stems provide important habitat for many bryophytic species (mosses, liverworts, and lichens) and associated organisms. They should not be harvested when heavily occupied by bryophytes and associates. Because of wide adaptability and fibrous root system, vine maple is used for reclamation, restoration, and erosion control.

References

Burgett et al. (1989), Cooke (1997), Flessner et al. (1992), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Olson and Gabriel (1974), Pojar and MacKinnon (1994), Rose et al. (1998), Sudworth (1967), Thomas and Schumann (1993), Uchytil (1989), USDA Forest Service (1988), Vance and Kirkland (1997), Whitney (1997)

Achillea millefolium L.
Common yarrow, yarrow
Asteraceae
ACMI2

Achillea millefolium

Ecology

Description: Native and exotic. Perennial herb; 10-100 cm; erect stems; alternate, fernlike leaves, 3-15 cm long; umbel inflorescence, flat or round topped cluster; flower head, both ray and disk flowers; ray flowers usually five, 2-4 mm long, white to pink or reddish; disk flowers 10 to 30, cream color; fruits hairless flattened achenes. Name translates to "thousand flowers."

Range and distribution: Common throughout North America, from sea level to above timberline, but generally at elevations of 1200-3350 m. Widely distributed and scattered across open habitats.

Associations: Mixed dry forest types, brushfield, tall forb prairie, and grassland plant communities. Ponderosa pine, Douglas-fir, grand fir, snowberry, bitter-brush, groundsel, bluebunch wheatgrass, and fescues.

Habitat: Open forest, dry meadows, brushlands, prairie, overgrazed grasslands, and open disturbed environments such as roadsides and vacant lots.

Successional stage: Early-successional species, often in disturbed sites, roadcuts, etc. Shade intolerant.

Ecological relations: This aromatic herb is generally unpalatable to animals, but flower heads may be grazed by sheep, pronghorn, and deer. Pungency repels many insects yet attracts others, thereby resulting in maintenance of biodiversity. Good soil binder, used in erosion control because of extensive rhizomes. Yarrow is usually undamaged or only slightly damaged by fires of any intensity. Severe fires that burn into the soil, however, may damage rhizomes. Regeneration after fire is from rhizomes and airborne seeds that spread from adjacent sites. Because of extensive rhizome sprouting, yarrow usually increases immediately in density, frequency, and cover for at least the first few years after a fire. Often an indicator of past overstocking and excessive utilization.

Biology

Flowering and fruiting: Flowers in April, at lower elevations, through September, at higher elevations; fruiting occurs from August through September.

Seed: Seeds are persistent and generally abundant. When flower heads turn brown, the seed is mature and ready to be collected. Germination requires light and moderate temperatures.

Vegetative reproduction: Can be propagated by sprigs divided from parent plant and rhizomes.

Cultivation: Widely cultivated. Plants and seeds are commercially available.

Transplant viability: Good; regenerates naturally via rhizomes.

Collection

Part harvested: Leaves, stems, and flowers.

Harvest techniques: Inflorescences differ and tend to be larger in wetter more productive sites. Flowers and leaves are collected by using sharp clippers to clip stem during flowering; some stem and leaves of mature plant should be left.

Harvest season: Generally during blooming period.

Regeneration after harvest: Plant responds to clipping by producing more shoots.

Uses and Products

Common uses: Flowers, leaves, and stems: anti-inflammatory, styptic, astringent, and acute fever-reducer. European phytomedicine herb for fever and colds, and menstrual cramps. Skin and hair tonic: antidandruff, facial steams; food seasoning, bitters, vermouths, and beer. Dried flowers: summer and winter bouquets. Whole plant: erosion control and xeric landscaping.

Indigenous uses: Used to treat colds, fevers, anorexia, indigestion, gastric inflammations, and internal bleeding. Fresh herb used as a styptic poultice, expectorant analgesic, and sweat inducer. Used to treat ear, tooth, and headaches.

Common products: Teas, tinctures, decorative, smoking mixtures, and food additive; landscape plant.

Types of markets: International and domestic. Medicinal, pharmaceutical, herbal, floral; regional, nursery, restoration.

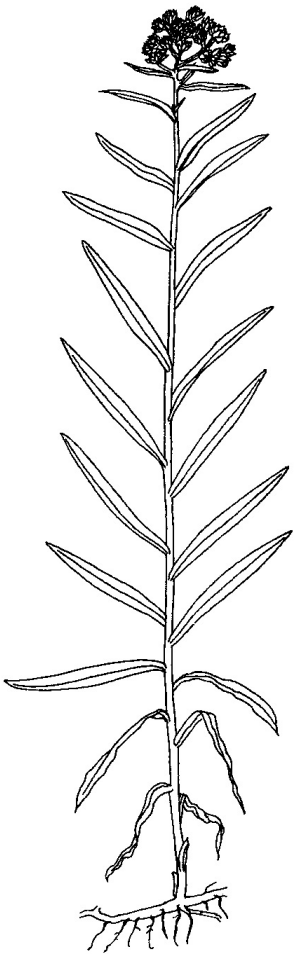
Comments and Areas of Concern

May cause dermatitis; not recommended for use during pregnancy. Herbicides often are used in roadsides and areas where yarrow is common. Yarrow is traditionally used by Native American tribes, and Alaska Natives have requested limited commercial use. Often grows on unstable slopes and roadcuts; should not be collected if there is risk of increase in slope instability and erosion potential.

References

Duke (1997), Everett (1997), Foster and Duke (1990), Franklin and Dyrness (1973), Hickerson (1986), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Leung and Foster (1996), Mizerak (1998), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Ross and Chambers (1988), Seda (1989), Tilford (1998), USDA ARS (2000), USDA NRCS (1999), Young and Young (1986)

Anaphalis margaritacea (L.) Benth.
Pearly everlasting
Asteraceae
ANMA



Anaphalis margaritacea

Ecology

Description: Native. Perennial herb from rhizomes; multiple unbranched leafy stems; 20-100 cm; alternate leaves, narrow lance shaped, 5-15 cm; umbel inflorescence, heads in dense, flat-topped clusters; flowers are yellow disks surrounded by dry, pearly white involucral bracts; fruit small, rough, hairless to sparsely hairy achenes.

Range and distribution: Common and widespread, from low to subalpine elevation, California through Alaska to east coast, and most of northern and central United States. May grow in dense patches.

Associations: Mixed forest types, brushfield shrubs and herbs, bracken fern, common yarrow, fireweed, and grasses such as red fescue.

Habitat: Rocky slopes, semidry open forest, clearings, meadows, fields, roadsides, burned-over and cut-over areas.

Successional stage: Early successional; responds favorably to disturbance; has invasive characteristics. Shade tolerant.

Ecological relations: Larval food for American lady butterfly (*Vanessa virginiensis* Drury); used by bees attracted to nearby growing fireweed.

Biology

Flowering and fruiting: Flowers from June through August.

Seed: Matures from July to September, wide seed dispersal, carried long distances by hairs on seeds, difficult to separate from the fluffy chaff. Seeds germinate easily.

Vegetative reproduction: Easy to propagate from pieces of rhizome.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Can be dug up, divided, and replanted when the clumps become too dense. Best time to transplant is spring or fall.

Collection

Part harvested: Aerial part of stem with leaves and inflorescence.

Harvest techniques: The herb is harvested by clipping stem well above root crown.

Harvest season: When flowering is at its peak for dried flowers and into late summer for herbal use.

Regeneration after harvest: Once inflorescence is harvested, it does not produce new flowering stems the same season.

Uses and Products

Common uses: Floral arrangements. Dried pearly everlasting used to make long-lasting bouquets and decorations. Infusion or teas for astringent and anti-inflammatory properties, for soothing irritable stomach. Leaf and flower poultice for bruises and sunburn.

Indigenous uses: Influenza medicine, poultice of boiled leaves applied to burns, plants used for tuberculosis, colds, and sore throat. Infusion of flower used as an herbal steam for rheumatism and paralysis. Roots and stalks used for diarrhea and dysentery. Also a hand softener and smoking herb.

Common products: Dried floral decoratives, herbal teas, and ingredient in personal care products.

Types of markets: Primarily domestic. Floral, herbal, and personal care.

Comments and Areas of Concern

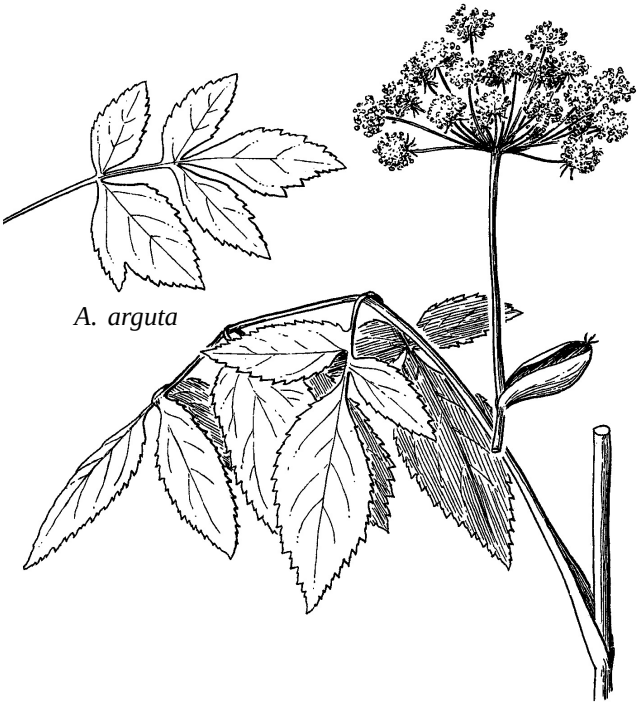
Considered a range weed; unpalatable to livestock. May be a good candidate for restoration following fire and other major disturbance on erosive sites.

References

Burgett et al. (1989), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Kruckeberg (1993), MacFarlane (1985), Moore (1993), Munz and Keck (1959), Pojar and MacKinnon (1994), Rose et al. (1998), USDA Forest Service (1988), USDA ARS (2000), USDA NRCS (1999), Whitney (1997)

Angelica L. spp.
Angelica
Apiaceae
ANGEL

A. genuflexa Nutt., Kneeling angelica- ANGE2
A. arguta Nutt., Lyall's angelica- ANAR3



A. arguta

Angelica genuflexa

Ecology

Description: Native. *Angelica genuflexa*: stout perennial from taproot, inside root usually solid; stem leafy, hairless, hollow, arising from erect, tuberous, chambered stem base; stem 1-1.5 m, often purplish and glaucous; leaves compound, 4-10 cm long, with three major divisions, primary divisions bent back; leaf stalk bent above the first pair of primary leaflets; ultimate leaflets egg- to lance-shaped, coarsely toothed; veins tending to end at the points of the teeth; leaf stalks with inflated bases sheathing the main stem; flowers white or pinkish, small in numerous compact heads arranged in several umbrella-shaped clusters, more than 20 per umbel; involucral bracts lacking; fruits rounded, 3-4 mm, broadly winged lateral ribs. *Angelica arguta* similar but does not have bent leaves and leaf stalks.

Range and distribution: *Angelica genuflexa*: common at low to middle elevations in northern two-thirds of region, sporadic southwards in Washington and Oregon, Klamath Mountains and northern California coast; *A. arguta*: scattered from southernmost British Columbia to California, more common in Oregon. *Angelica genuflexa* forms large mats; *A. arguta* in high elevation in dispersed stands.

Associations: Mountain hemlock, Pacific silver fir, western hemlock zones. Red alder, thimbleberry, lady fern, Sitka valerian, sedges, cow-parsnip, stinging nettle, and common horsetail.

Habitat: Moist thickets, forest openings, swamps, streambanks, wet ditches and clearings, and flooded or ponded marshes.

Successional stage: Part of stable plant communities but also populates openings or canopy gaps. Moderately shade tolerant.

Ecological relations: Habitat for ground-nesting birds and mammals, concealment; pollinator attractor; rapid decomposer contributes substantially to soil structure.

Biology

Flowering and fruiting: Blooms from July through August.

Seed: Angelica is a perennial that may require two or more seasons to produce seed. Seeds require cold stratification to germinate.

Vegetative reproduction: Unknown.

Cultivation: Can be cultivated from seed. Plants are commercially available for species sea-watch (*Angelica lucida*).

Transplant viability: Not known; probably more reliable to start from seed.

Collection

Part harvested: Root and seeds.

Harvest techniques: Seeds are collected before they fall off, preferably when slightly green. Only mature roots are collected. Size is checked by gently brushing away soil. Unharvested parts of plant are left for mulch. Most of the plants in a patch are left. Roots are collected only from plants growing in areas that will not be sensitive to digging.

Harvest season: Seeds are gathered as late in season as possible, late summer to early fall after seeds have ripened. Roots are gathered in late summer to early fall. Positive identification is more difficult after the seeds have completely gone.

Regeneration after harvest: Gathering roots generally kills the plant.

Uses and Products

Common uses: Seeds: upset stomach. Roots: medicinal, tea, tinctures for menstrual regulation, expectorant, to induce sweating, antibacterial, antifungal, antispasmodic, and diuretic. Now angelica root rarely used as a pharmaceutical preparation; fragrance ingredient in soaps, detergent, creams, lotions, perfumes; flavor ingredient in most major categories of food products; beverages, baked goods, etc.

Indigenous uses: Spiritual uses, medicine, cathartic, analgesic, headache, intestinal cramps; cooking tools; soap and fragrance; spice; stems as underwater breathing tubes.

Common products: Tea, tinctures, food and beverage additive, fragrance, herbals.

Types of markets: International and domestic. Herbal, medicinal, food additives, and fragrances.

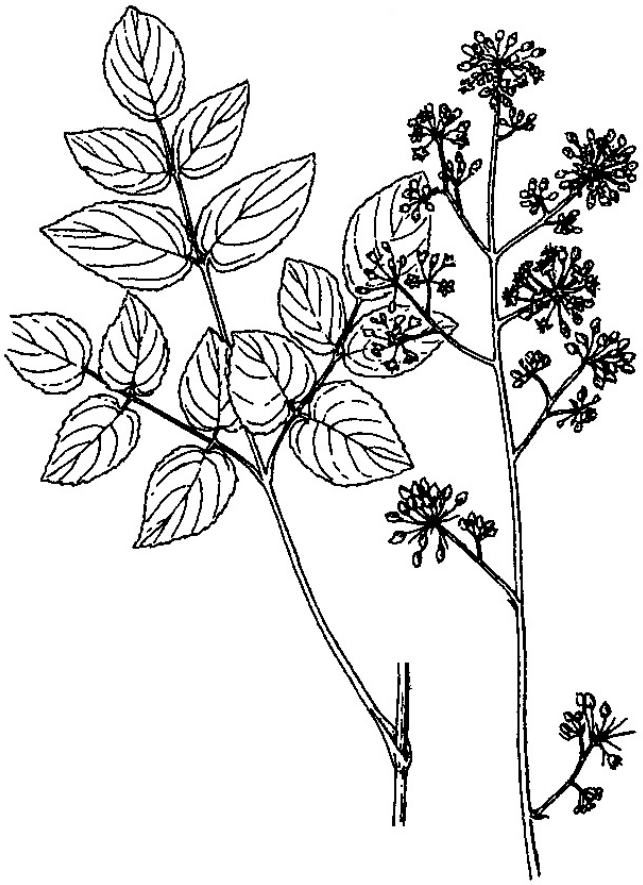
Comments and Areas of Concern

Similar in appearance to poisonous Douglas' waterhemlock (*Cicuta douglasii*); be certain of identification. Riparian soils compact easily. Riparian areas and streambanks susceptible to human disturbance. Native Americans use Angelica for spiritual and cultural purposes. Precautions should be taken that the patch being harvested is not a Native American gathering site. Encourage cultivation of this plant rather than wildcrafting. *Angelica polymorpha*, primary source of Dong Quai, an important Chinese herbal medicine, interbreeds with *A. genuflexa*.

References

Cooke (1997), Hortus West (1998), Leung and Foster (1996), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Tilford (1993, 1998)

Aralia californica S. Wats.
California spikenard, spikenard
Araliaceae
ARCA2



Aralia californica

Ecology

Description: Native. Perennial shrub; erect stem 2-3 m; one to three large pinnately compound leaves, 1-2 m; umbels in clusters of two or in spreading panicle; yellow-green flowers in panicles; fruits, blue-black berries in globose clusters.

Range and distribution: Below 1800 m, southern Oregon to the Sierras and along the California coast. Grows in patches within its range.

Associations: Western hemlock, mixed-conifer zones. Common associations in riparian plant communities; Douglas-fir, tanoak, Oregon ash, alder, big-leaf maple, sweet-cicely, bedstraw, and willow.

Habitat: Mixed forest type; moist, shady areas; creeks, streams, and canyons.

Successional stage: Mid to late successional. Shade tolerant.

Ecological relations: Streambank stabilizer.

Biology

Flowering and fruiting: Flowers from June through August, fruits August through October.

Seed: Seeds small (4 mm wide). Fruits are collected in late summer. Ferment berries to get viable seed. Berries are black when seed is mature and ready to harvest. Can be propagated from seed; seed needs stratification to germinate.

Vegetative reproduction: Sprouts easily from root division. Vegetative reproduction by roots. Cuttings root best in early to mid winter.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Unknown.

Collection

Part harvested: Root, berries for seed, and occasionally leaves.

Harvest techniques: Center portion of root is cut out, leaving the crown and outer nodes in the ground to resprout.

Harvest season: The root is collected in winter or late fall, after the plant has seeded (berries collected after ripe, late September to October).

Regeneration after harvest: Roots regenerate after harvest, but sustainable harvest intervals have not been determined.

Uses and Products

Common uses: Roots: tonic and lung expectorant; whole plant: garden landscaping.

Indigenous uses: Decoction of roots used as a soak for arthritis, consumption, colds, fevers, lung and stomach diseases, and as a wash for itching sores.

Common products: Tinctures, dried herbal products such as capsules, powders, and teas. Supplement to American ginseng products.

Types of markets: International and domestic. Herbal and nutraceutical.

Comments and Areas of Concern

Grows in fragile riparian areas; banks are sensitive to erosion after roots are removed. Spikenard is a sought-after source of ginsenglike products resulting in increasing harvest pressure; on United Plant Savers North American medicinal plants "To Watch" list.

References

Blakley (1997), Dyrness et al. (1974), Hickman (1993), Hortus West (1998), Kruckeberg (1993), Mizerak (1998), Moore (1993), Munz and Keck (1959), Rolle (1997), United Plant Savers (2000)

Arctostaphylos Adans. spp.
Manzanita

Ericaceae

ARCTO3

A. columbiana Piper, Hairy manzanita-ARCO3
A. nevadensis Gray, Pinemat manzanita-ARNE
A. patula Greene, Greenleaf manzanita-ARPA6
A. viscida Parry, White-leaved manzanita-ARVI4

Arctostaphylos patula *A. columbiana* *A. nevadensis*

Ecology

Description: Native. Includes about 50 species, mostly evergreen, ranging from small mat-forming shrubs to small trees up to 10 m; prostrate to erect stems; fire-resistant burl sometimes present at base; bark generally reddish, smooth or gray, rough and shredded; leathery, alternate leaves, spoon to lance shaped, spreading to ascending; inflorescence panicle or racemose clusters; urn-shaped flowers, white to pink; blackish-red, berry-like fruit 6-8 mm.

Range and distribution: British Columbia south to northern California. *Arctostaphylos columbiana*: British Columbia to western Cascade Range south to northwestern California. *Arctostaphylos patula* and *A. nevadensis*: Washington south to California, east to Idaho (*A. nevadensis*), east to Colorado (*A. patula*). *Arctostaphylos viscida*: Southern Oregon to northern California east to Sierra Nevada Range. Elevations from 60-2200 m. Widespread; some species form dense stands.

Associations: Western hemlock, mixed-conifer zones. Douglas-fir, white fir, ponderosa pine; oak, chaparral, brushfield, and nonforest communities; Pacific rhododendron, ceanothus, groundsel, lupine, and bracken fern.

Habitat: Foothills to high montane, semidry to dry, open sites, well drained, rocky slopes or rock outcrops on slightly acidic soil.

Successional stage: Early to mid successional; responds favorably to mild to moderate fire. Low to moderate shade tolerance.

Ecological relations: Berries eaten and dispersed by wildlife; deer and elk make some use of foliage in fall and winter. Source of nectar for native pollinators; major nectar source in the Rogue River valley and south coast. Important watershed cover and erosion control. Although fire kills aboveground portion of plant, may grow back from root crown or regenerate by fire-stimulated germination of dormant seeds stored in the soil. The plant has several characteristics related to fire intensity including shedding of bark and leaves, plant dieback during droughts, and formation of dense stands.

Biology

Flowering and fruiting: Small flowers bloom in early winter to spring; fruits ripen from summer to fall.

Seed: Seeds usually have hard seed coats and dormant embryos so dormancy-breaking treatments are necessary.

Vegetative reproduction: Can be propagated by rooted cuttings.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Seedlings collected in the wild can be transplanted.

Collection

Part harvested: Leaves, branches, flowers, and berries.

Harvest techniques: Branches are pruned off on larger bushes that may need thinning. If shrub is not to be destroyed, branches with leaves on stems are carefully selected and clipped leaving most leafy branches on shrub.

Harvest season: Once the new growth is hardened off. Late summer, early fall until new growth starts in spring.

Regeneration after harvest: Plants that have branches clipped can resprout the following growing season.

Uses and Products

Common uses: Floral and landscaping. Branches are used for bird and reptile perches. Artificial trees made from preserved branches. Berries are edible but said to cause constipation; leaves and berries are used for herbal remedies.

Indigenous uses: Berries used for food and drink, dried for future use; decoction of bark for diarrhea, poison-oak rash; leaves mixed with tobacco; flowers sucked and eaten by children; wood has various uses.

Common products: Transplants, wreaths, decorative branches and twigs, preserved stems, salves, and poultices.

Types of markets: Decorative and herbal. Domestic and international markets for decorative material and herbal products. Local markets for specialty interior decoration crafts.

Comments and Areas of Concern

Manzanita protected by California law. Used in site restoration and slope stabilization within its natural range. Manzanita species have a high degree of hybridization. Gasquet manzanita (*A. hispidula*) found in the Siskiyou region of southern Oregon and globally listed.

References

Burg (1974), Burgett et al. (1989), Everett (1997), Franklin and Dyrness (1973), Hall (1988), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Howard (1992a), Kruckeberg (1993), Mizerak (1998), Oosting (1958), Pojar and MacKinnon (1994), Steinfeld (1996), Thomas and Schumann (1993), Tilford (1998), USDA Forest Service (1988), Whitney (1997), Young and Young (1986, 1992)

Arctostaphylos uva-ursi (L.) Spreng.
Kinnikinnick, bearberry
Ericaceae
ARUV


Arctostaphylos uva-ursi

Ecology

Description: Native. Perennial, trailing, low growing shrub, 5-20 cm high; erect, woody, branches up to 75 cm long; opposite leaves rounded to oblong, 15-20 mm long, 10 mm wide, dark green and shiny above, paler below; long, woody, reddish-brown stems; raceme inflorescence; flowers are pinkish white, urn shaped and drooping, 4-5 mm long; berries smooth, bright red, 7-10 mm resembling miniature apples.

Range and distribution: Circumboreal species, Alaska to Labrador, coastal California, Pacific Northwest, Rocky Mountains; from sea level to 3400 m, low slopes to alpine tundra. Common and widespread; forms extensive ground carpets.

Associations: Primarily Pacific silver fir zone. Douglas-fir, subalpine fir, and grand fir series. Indicator species or dominant part of several forest communities including alpine communities; Oregon grape, pinemat manzanita, arnica, beargrass, yarrow, balsamroot, and penstemon.

Habitat: Sun or partial shade, rocky outcrops, dry slopes, sandy soils, acidic soils, shallow soils, chaparral, and coniferous forest.

Successional stage: Early to mid successional. Enters early-successional communities on glacial outwash in pioneer stage or after fire, reaches highest cover early in open savanna or meadow, declines with canopy cover increase in early shrub stage. Shade intolerant.

Ecological relations: Browsed by bighorn sheep (*Ovis canadensis* Shaw), mountain goat (*Oreamnos americanus* Blainville), deer; berries important source of winter forage for birds, deer, elk, small mammals, and for bear in autumn and early spring; nectar for bees and hummingbirds; some cover value for small mammals and nongame birds; soil retention-stabilizer. A sprouting species that is best suited to short fire cycles with low fuel buildup and low fire intensities. When rooted in mineral soil, it can survive moderate fire; in organic soil horizons, however, a fire that removes those horizons will kill bearberry. May sprout from root crown or stolons.

Biology

Flowering and fruiting: Generally flowers from March to May, fruit ripens from June through August, seed dispersal from August to March. Seed somewhat fire resistant.

Seed: Fruit turns bright red or pink on ripening from June to August; collect from plants or ground. Sulfuric acid bath and warm and cold stratification. Ferment berries to separate seeds. Seeds need to be cold-stratified to germinate; collect berries in fall and freeze them for spring planting or direct seed in fall.

Vegetative reproduction: Layering or rooted cuttings are the surest means of propagation.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Transplantable; stem cuttings best method of establishment.

Collection

Part harvested: Leaves, stems, flowers, and berries.

Harvest techniques: Loose runners are gathered, after checking that they have not rooted. Significant dieback occurs; gather conservatively from periphery.

Harvest season: Gather any time plant is in good condition; during spring and summer chemical constituents are highest.

Regeneration after harvest: Sensitive to harvest and should be monitored. Regeneration in the wild is reported to be poor, especially in poor, high-elevation sites.

Uses and Products

Common uses: Strong astringent, urinary tract infections, first aid dressing. Urinary antiseptic, component of diuretics and laxatives; herbal tea. Branches and fruits used as Christmas decorations. Plants used for erosion control along highway embankments; landscaping ground cover; dyes.

Indigenous uses: Plant salve for rashes and sores; a mouthwash for cankers and sore gums; leaves roasted to powder placed on cut for rapid healing; paste of leaves applied to boils and pimples; leaves ingested for dropsy, urinary diseases, and back pain; smoked leaves used as a narcotic; raw berries, as a laxative.

Common products: Tinctures, herbals, smoking mixtures, floral bouquets and filler, and transplants.

Types of markets: International and domestic. Pharmaceutical, herbal, floral crafts, and landscaping.

Comments and Areas of Concern

Do not use internally during pregnancy; gather conservatively with awareness of erosion potential, never when ground is wet; avoid stands that animals are using for forage. It is listed as a European species of concern by the World Wide Fund for Nature.

References

Craighead et al. (1991), Crane (1991), Franklin and Dyrness (1973), Hortus West (1998), Kruckeberg (1993), Leung and Foster (1996), Mizerak (1998), Pojar and MacKinnon (1994), Rose et al. (1998), Thomas and Schumann (1993), Tilford (1993,1998), USDA Forest Service (1988), Williams et al. (1995)

Arnica L. spp.
Arnica
Asteraceae
ARNIC

A. cordifolia Hook., Heartleaf arnica-ARCO9
A. latifolia Bong., Broadleaf arnica-ARLA8

Arnica cordifolia

Ecology

Description: Native. Perennial herb, generally from long, naked rhizomes; 10-50 cm; stems loose, generally unbranched, white hairs; leaves opposite, basal leaves heart-shaped and toothed, stem leaves, two to four pairs, lance shaped to almost heart shape; flowers bright yellow, daisylike; both ray and disk flowers, ray flowers 10 to 15; fruits small 6-10 mm hairy achenes. *Arnica cordifolia* usually single flower; *A. latifolia* one or more sets paired flowers; however, these species hybridize and may be difficult to distinguish.

Range and distribution: Widespread and abundant in the West. Common in southwestern and central Oregon, and California mountains; 1000 m to above timberline. Grows in large, dense patches (colonies) in shady locations, forming almost pure stands.

Associations: Western hemlock, Pacific silver fir, and grand fir zones. Douglas-fir, grand fir, subalpine fir series. Dominant or indicator species in several forest communities; ponderosa pine, lodgepole pine, trembling aspen, huckleberry, bunchberry dogwood, queencup beadlily, and twinflower.

Habitat: Shaded, high meadows, hillsides and coniferous forest. Open canopy, often exposed, moderately dry mineral soils.

Successional stage: Early to late successional; highest coverage in late-successional stages of grand fir-globe huckleberry association. Moderately shade tolerant.

Ecological relations: Low palatability to animals but important constituent of summer diets of mule deer and elk; poor cover for wildlife; pollinator-attractor; extensive rhizomes aerate forest floor and provide habitat for subterranean insects and others. Moderately fire resistant, typically sprouting from surviving rhizomes after fire and occasionally from wind-borne seeds. High-intensity fires reduce quantities of plant, but moderate fires tend to only kill the top portion of plant. Sprouts from surviving rhizomes. May also rapidly colonize burned areas by windborne seed.

Biology

Flowering and fruiting: Flowers from May through August, first to emerge in early spring, short bloom or not at all in drought; perennial after second year. Seeds wind dispersed.

Seed: Up to 80 percent of the seeds are typically infertile. Seed heads should be harvested before turning to fluff.

Vegetative reproduction: Can be propagated from rhizomes.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Can be transplanted, but timing and moisture are important. Plant is susceptible to transplant shock.

Collection

Part harvested: Flowers and roots.

Harvest techniques: Stem is severed at base just above root crown. Collecting roots destroys plants. Roots should be collected leaving sufficient number of plants in population intact. For commercial quantities, cultivation is recommended. Collect during active growing period in dry weather to avoid soil compaction.

Harvest season: Collect flowers from mid-June through July; collect root after flowers have seeded.

Regeneration after harvest: If upper stem of plant is harvested, can regenerate vegetatively; for *A. latifolia*, regeneration is slower. Removing flowers removes ability to regenerate by seed that year. To ensure population viability a majority of flowering plants are left intact.

Uses and Products

Common uses: Medicinal: used externally for bumps, bruises, arthritis, bursitis, myalgia, sore throat, and sprains.

Indigenous uses: Roots used as a love medicine; plant used for sore eyes; mashed plant used for swellings, bruises and cuts; infusion of plant taken for tuberculosis.

Common products: Tinctures, salves, oils, gels, liniments, topical preparations; ingredient in foot powders.

Types of markets: International and domestic. Herbal and medicinal.

Comments and Areas of Concern

Arnica's primary use is external, not recommended for internal use, some use sparingly (see Moore 1993). A European species, mountain arnica (*Arnica montana*), used in wound healing, is listed as a species of concern by the World Wide Fund for Nature. *Arnica* is on United Plant Savers North American medicinal plants "To Watch" list. Mount Shasta arnica (*A. viscosa*) is globally and state (Oregon) listed.

References

Hall (1988), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Mizerak (1998), Moore (1993), Reed (1993a), Ross and Chambers (1988), Schofield (1989), Seda (1989), Tilford (1993, 1998), United Plant Savers (2000), USDA Forest Service (1988), Williams et al. (1995)

Artemisia douglasiana Bess.
Mugwort, sagewort, wormwood
Asteraceae
ARDO3

Artemisia douglasiana

Ecology

Description: Native. Perennial aromatic herb, 50-250 cm from rhizomes; many erect, brown to gray-green stems; evenly spaced, lanceolate leaves, lower ones cleft, upper ones entire, slightly covered with matted hairs above, densely matted below; panicle inflorescence, 10-30 cm, 3-9 cm wide; disk flowers generally 9 to 25; fruits, generally small less than 1 mm, smooth achenes.

Range and distribution: Baja California to Washington east to Idaho; below 2200 m. Locally abundant, grows as scattered individuals or may form a colony of plants connected by rhizomes.

Associations: Mixed-conifer/hardwood forests. Western hemlock, Douglas-fir, ponderosa pine, black cottonwood. Varied plant communities, including a tall forb meadow community in the Olympics. Component of mixed grass-weed types, associated with fringed sage, needlegrasses, and muhly grasses.

Habitat: Lower subalpine zone in open to shade, shallow gullies, waste places, riparian zones, drainages, moist valleys, along the coast. Common on west slopes of inland foothills.

Successional stage: Pioneer species also found in stable meadow communities. Low to moderate in shade tolerance.

Ecological relations: Fire ecology is not well documented. The top portion of the plant is damaged or killed by fires. Probably the rhizome will resprout after most fires. Fire intensity may be mediated by the typically wet habitat of mugwort. Important nectar and pollen source for pollinators.

Biology

Flowering and fruiting: Flowers from June through October.

Seed: Little information on species. Most seeds of genus stored dry.

Vegetative reproduction: Rhizomatous; divide rootstock.

Cultivation: Can be cultivated. Seeds are commercially available for coastal mugwort.

Transplant viability: May be transplanted.

Collection

Part harvested: Leaves and stems.

Harvest techniques: Aerial parts of plant are clipped in spring just before onset of flowering; others recommend summer or fall. Foliage and inflorescence are stripped from cut stems and stored dry without crushing. Plants are pruned to avoid removing important cover for other plants.

Harvest season: Annually, late spring and summer before going to seed.

Regeneration after harvest: Good, when only stems are harvested.

Uses and Products

Common uses: As a tea for gastritis, gastric ulcers, topical anesthetic and anti-inflammatory, antifungal, and antimicrobial.

Indigenous uses: Has been an important plant in the pharmacopoeia, as well as in the cleansing rituals and religious ceremonies. Used as compress for wounds and rheumatism. Bitter tea used for menstruation problems. Oil liniment for sprains and bruises. Decoction of plant to treat urinary problems, asthma, diarrhea, stomach ache, and pin worms. The plant can be burned and inhaled for grippe. Placed in nostril to treat headache. In a dried bundle used as a smudge or incense. Used to help prevent insect infestations in granaries and food caches.

Common products: Herbal, teas, and tinctures.

Types of markets: International and domestic. Medicinal and herbal.

Comments and Areas of Concern

Be cautious in collecting to avoid sensitive riparian habitats. *Artemisia* species have been used since ancient times as a vermifuge (dewormer). Use moderately; do not use during pregnancy. Can cause stomach upset and overstimulate heart and circulation. Field sagewort (*A. campestris* ssp. *borealis* var. *wormskioldii*), U.S. Fish and Wildlife Service Species of Concern, has endangered status in Washington. Other *Artemisia* species including Suksdorf's mugwort (*A. suksdorfii*) that occur in the Pacific Northwest may be harvested. White sage (*A. ludoviciana* ssp. *estesii*), U.S. Fish and Wildlife Service listed as Species of Concern and listed in Oregon. Know identity of species being harvested.

References

Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Klein and Johnson (1997), Mizerak (1998), Moore (1993), Munz and Keck (1959), Stevens and Ryan (1997), USDA Forest Service (1988), Young and Young (1986)

Asarum caudatum Lind.
Wild ginger
Aristolochiaceae
ASCA2

Ecology

Description: Native. Perennial evergreen herb, 15-25 cm, extending from creeping rhizomes; stems trailing, rooting freely; alternate, dark green, heart-shaped leaves, two on each node, 4-10 cm long, to 15 cm wide, velvety on underside; bell-shaped flowers brownish purple to greenish yellow, near ground, petallike sepals extending from a cup-shaped base; fruits are fleshy capsules.

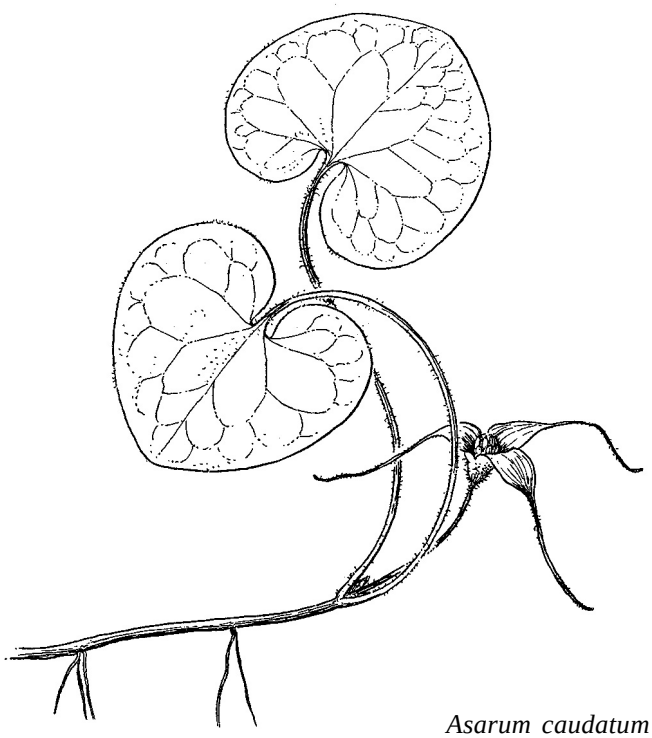
Range and distribution: British Columbia, Washington, Oregon, northern California, Idaho, Montana; below 1500 m; less frequent on east side of Cascade Range. Localized, large, loose mats.

Associations: Western hemlock, Pacific silver fir zones. Grand fir, western redcedar, western white pine, Douglas-fir; pathfinder, queencup beadlily and western goldthread.

Habitat: Old-growth, shady, moist forests; organic, slightly acidic soil. Flowers often hidden by leaf litter.

Successional stage: Most common in mid- to late-successional stages. Shade tolerant.

Ecological relations: Flowers give off odor, attracting insects, especially flies. Seeds dispersed by ants. Extensive horizontal root system aerates soil and allows for infiltration of water; structure for subterranean forest floor life; key element in forest floor biocommunities. Wild ginger is susceptible to fire-kill. Aboveground and belowground parts can be killed by fires of even light to moderate intensity because soils are usually shallow. Reestablishment of new plants must be from seeding by survivors or off-site individuals.



Asarum caudatum

Biology

Flowering and fruiting: Flowers from April through July, one flower per plant, flowers close to ground.

Seed: Small amount of seed produced per flower; seed widely dispersed. Timing of seed collection may be difficult.

Vegetative reproduction: Rhizomatous; reproduces best from divisions taken when parent plant is not actively growing.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Transplant successful if habitat requirements of overstory shade, soil, and moisture are met.

Collection

Part harvested: Entire plant; leaves most flavorful.

Harvest techniques: A length of rhizome is pulled up (will have many plants connected to it). The ends are clipped off, replacing the rest of the rhizome in the ground.

Harvest season: Any time.

Regeneration after harvest: Readily regenerates from rhizomes.

Uses and Products

Common uses: Secretory stimulant, relief of indigestion, antiseptic, to induce sweating; seasoning, flavor substitute for ginger root; ground cover plant for shaded areas.

Indigenous uses: For stomach afflictions, tuberculosis, boil for beverage; decoction of plant externally for headache, intestinal and knee pain; decoction of roots for stomach pains, as laxative; heated leaves applied to boils; decoction of leaves to wash sores, baby's navel. Roots can be baked and eaten.

Common products: Tea, dried leaves or roots, for flavoring, herbal; ornamental or landscape plant.

Types of markets: Domestic, herbal; international landscape, nursery.

Comments and Areas of Concern

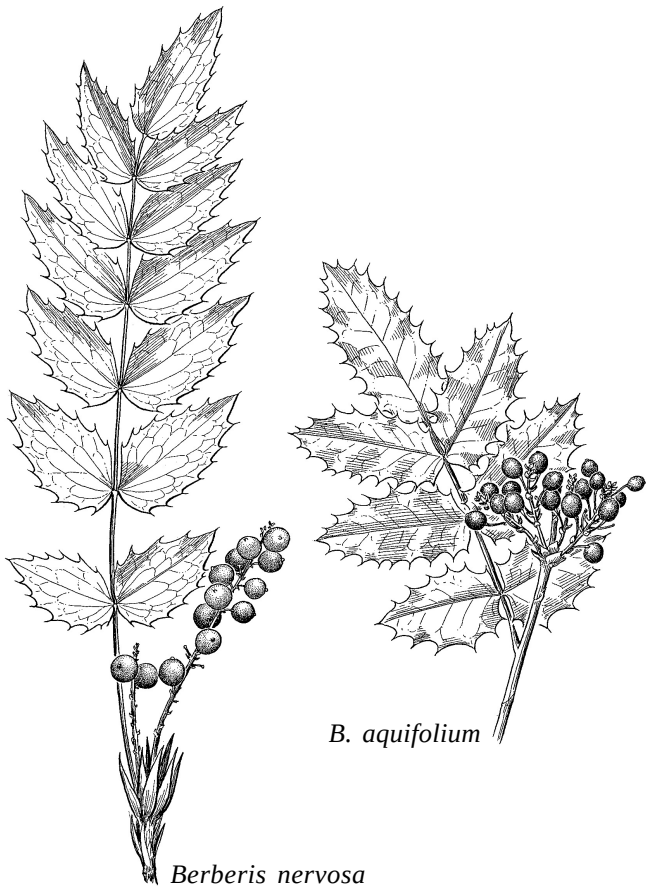
Often grows in stands with dense canopies where little else can establish until the soil is aerated. Species identification should be verified to avoid harvesting a similar but rare species of *Asarum*. Habitat sensitive to soil compaction and disturbance. Streamside populations and sensitive species in close proximity should not be disturbed.

References

British Columbia Ministry of Forests (1995), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Stewart (1988), Tilford (1998), Zimmerman and Griffith (1991)

Berberis L. spp.
Oregon grape
Berberidaceae
BERBE

B. aquifolium Pursh, Tall Oregon grape-BEAQ
B. nervosa Pursh, Dwarf Oregon grape-BENE2



Ecology

Description: Native. *Berberis aquifolium*: evergreen shrub up to 2 m; woody stems, spreading to erect, bark and wood yellowish; compound, 5 to 9 hollylike lance-shaped leaves, 5-10 cm long, spiny tipped, glossy above, less so below, with one central vein; dense clusters of yellow flowers; clusters of 1-cm diameter dark blue berries with waxy or powdery coating. *Berberis nervosa*: evergreen shrub to 60 cm; woody stems, erect, bark and wood yellowish; compound, 9 to 19 oblong to egg-shaped leaves, spiny tipped, leathery, somewhat glossy on both surfaces, with three to five central veins; dense clusters of yellow flowers to 20 cm long; clusters of 1-cm diameter, dark blue berries with waxy or powdery coating.

Range and distribution: *Berberis aquifolium*: Coast to Cascade Range, Oregon through British Colombia, mostly confined to western side of the Cascade Range; 400-2100 m. Fairly common forest floor covering, broad, conspicuous undershrub. *Berberis nervosa*: British Columbia to central California (Sierra Nevada) to western Idaho; less than 2200 m. Common undershrub. Widely distributed in mixed and pure patches.

Associations: Western hemlock and Pacific silver fir zones. *Berberis aquifolium*: Douglas-fir, western hemlock, oceanspray, white hawkweed, arnica, yarrow, starry false Solomon's seal, kinnikinnick, valerian, and balsamroot. *Berberis nervosa*: understory dominant in montane and submontane coniferous and mixed evergreen forests; western hemlock, Port-Orford-cedar, and Douglas-fir; oceanspray, salal, Pacific rhododendron, vine maple, salmonberry, huckleberry; snowqueen, twinflower, and western sword fern.

Habitat: *Berberis aquifolium*: dry to moist coniferous woodlands, shaded rocky slopes, occasionally openly exposed slopes. *Berberis nervosa*: dry to fairly moist, open to closed forest; common in second-growth Douglas-fir forests.

Successional stage: *Berberis aquifolium*: important component of both successional and climax communities. *Berberis nervosa*: important component of both successional and climax communities, not prominent until mid-successional stages. More shade tolerant than *B. aquifolium*.

Ecological relations: Occasional browse for deer, elk, moose, bears, rodents; berries eaten and seeds dispersed by small birds and mammals. Plant provides cover for small animals. *Berberis nervosa*: important food for the white-footed vole in the Coast Range of Oregon. Early spring flowering important nectar source for bees and other pollinators. The rhizomatous plant is important for soil aeration and erosion control. Aerial portion of plant killed by fire, resprouts from rhizomes after moderate-intensity fires. Cover increases with distance from stream.

Biology

Flowering and fruiting: Flowers in early to late spring; fruit ripens from July through August.

Seed: Fruit produced annually. The fruit contains one to several seeds. Dispersal by birds and mammals. Fermentation needed to remove seed from berry, seeds dormant and can be started after a cold or warm-cold stratification in the case of *Berberis aquifolium*.

Vegetative reproduction: Easily propagated from rhizomes and stem cuttings. *Berberis aquifolium*: cuttings taken in fall root best. *Berberis nervosa*: in the absence of disturbance, gradually spreads from rhizomes.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: *Berberis aquifolium*: field collected transplants do poorly and are slow to establish. *Berberis nervosa*: plants may be slow to establish.

Collection

Part harvested: Roots, stems, and leaves.

Harvest techniques: *Berberis aquifolium*: roots are collected for medicinal products from fall into early spring. This is the preferred species for commercial collection because the roots are larger. Only lower stems that have yellow color in them are collected. *Berberis nervosa*: floral: new growth is dark green and free of dirt and insect damage. Each stem is 40-45 cm long and has 9 to 15 leaflets. Each bunch contains 25 to 28 stems. For both species, if collected for personal medicinal use, portions of the roots-rhizomes with shoot buds are left in the ground or replanted.

Harvest season: Roots and stems are collected from mid summer to winter. Leaves are collected from May to mid fall. In fall, roots are most potent.

Regeneration after harvest: Regeneration has been reported in productive habitats as long as sufficient portion of roots and rhizomes are left in the ground to resprout. Studies are needed to assess sprouting from rhizomes left after harvest. Regeneration of foliage differs widely depending on habitat and impact of harvest.

Uses and Products

Common uses: *Berberis aquifolium*: liver stimulant and blood purifier, laxative, antimicrobial, digestive tonic; berries as edibles; roots used to make a yellow dye; landscaping, goldenseal substitute, and antiseptic. *Berberis nervosa*: antimicrobial, tonic, roots or possibly the leaves used for yellow dye, goldenseal substitute, laxative, and antiseptic; in floral arrangements; landscaping border plant.

Indigenous uses: *Berberis aquifolium*: decoction of root used for stomach trouble or hemorrhages, tuberculosis, as gargle for sore throat, wash for arthritis; fruits if eaten cause diarrhea, used as laxative; root tonic used for the kidneys; yellow dye from roots and inner bark. *Berberis nervosa*: roots: laxative; decoction of root bark taken or used as wash for arthritis, for syphilis, an eyewash for red, itchy eyes; fruit also an excellent laxative; berries used to make jelly; infusion of roots and leaves taken for nosebleeds.

Common products: *Berberis aquifolium*: tincture, leaf tea, tonics, eyedrops, herbal teas, and tonics. *Berberis nervosa*: medicinal, herbal, floral crafts, ornamental greens, yellow dye.

Types of markets: International and domestic. *Berberis aquifolium*: medicinal, herbal, and landscaping. *Berberis nervosa*: medicinal, herbal, floral, nursery, and landscaping.

Comments and Areas of Concern

The berries are important to wildlife for winter forage. Identification of species may be difficult when gathering. *Berberis nervosa* and *B. aquifolium* may hybridize in the wild. *Berberis aquifolium* introduced as an ornamental plant in Europe in 1822. It is now naturalized in Europe and in some forested areas of Germany, considered an invasive species. *Berberis* on United Plant Savers North American medicinal plants "To Watch" list because it has been heavily collected in some areas.

References

Auge and Brandl (1997), British Columbia Ministry of Forests (1995), Cooke (1997), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Huffman et al. (1994), Leung and Foster (1996), Logan et al. (1987), Minore and Weatherly (1994), Mizerak (1998), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Seda (1989), Thomas and Schumann (1993), Tilford (1993, 1998), Tirmenstein (1990c), United Plant Savers (2000), USDA Forest Service (1988), Young and Young (1986)

Continued

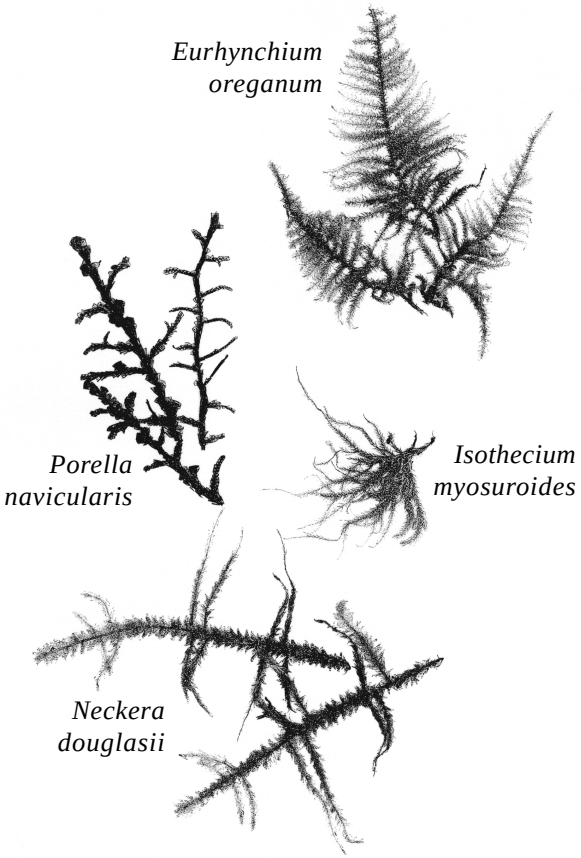
Bryophyta (division)
Moss, tree moss, log moss moss (musci), liverwort (hepaticae)

Moss (most common species):

Antitrichia curtipendula (Hedw.) Brid.
Eurhynchium oreganum (Sull.) Jaeg.
Hypnum subimponens Lesq.
Isothecium myosuroides Brid.
Neckera douglasii Hook.

Liverwort:

Porella navicularis (Lehm. & Lindenb.) Pfeiff
Frullania nisquallensis Sull.



Ecology

Description: Photosynthesizing (chlorophyllous) non-vascular plants consisting of liverworts and mosses. Liverworts thallose (flat bodied) or leafy. Moss colonizing branches may have small rhizoids or rootlets. Male and female moss plants (gametophytes) have simple leaves; sporophytes: thin stems (seta) emerging from top of female plants, vary in color, topped by a capsule. Capsule oval or long with a lid and an opening (peristome) where spores are released.

Range and distribution: Range differs among species. Most species found in lower elevations of Coast Range and the west side of Cascade Range from Washington to northern California and in moist, shady pockets in western Montana and northern Idaho.

Associations: Sitka spruce, western hemlock, Pacific silver fir zones. Mixed-conifer/hardwood forests in the spruce, hemlock, cedar series. Douglas-fir, western redcedar, western hemlock, vine maple, big-leaf maple, Oregon grape, and western sword fern.

Habitat: Grow on horizontal or vertical stems of hardwood trees, primarily vine maple and big-leaf maple. Some tree (epiphytic) species grow on logs and stumps; a few also may grow on forest floor often obscured by leaf litter.

Successional stage: Grow in mid- to late-successional forests, require shade. Mosses themselves are colonizers growing on substrate unoccupied by any other plant.

Ecological relations: Bryophytes provide food and habitat for invertebrates and vertebrates, source of readily decomposable organic material, contribute to nutrient capture and cycling. Certain bryophytes are important air quality indicators, particularly of SO_2 pollutants. In areas that have heavy industrialization and air pollution, bryophytes disappear. Bryophytes provide nesting material for birds and mammals including the threatened marbled murrelet. Most epiphytic bryophytes are desiccation tolerant and able to tolerate a wide range of moisture content or about 300 to less than 10 percent.

Biology

Flowering and fruiting: Male plants release zoospores (male sex cells), which, via water, unite with the female reproductive cells of the female plant. The fertilized female plant grows a leafless stem (sporophyte) and a capsule at the tip, which produces spores. Water is an essential vector to sexual reproduction. Liverworts differ slightly from moss in their structures, but the life cycle is similar.

Seed: Moss capsules release spores, which are spread by air current or water. Require moisture to germinate and grow into a plant.

Vegetative reproduction: All can reproduce vegetatively.

Cultivation: Some mosses can be cultivated on proper kinds of bark with mildly acidic pH, and sufficient moisture and shade; this has not been proven to be a viable economic option.

Transplant viability: Some bryophytes can be transplanted and grow in terrariums, but most require conditions that replicate their original forest habitat conditions.

Collection

Part harvested: Whole plants grow twined together in a mat and are easily peeled off limbs and stumps forming a kind of "pelt."

Harvest techniques: Moss is selected from vine maple and off the ground because it is relatively green, free of dirt, needles, and leaves. Dry moss is stripped from trees, cleaned of debris, and air dried. Moss clumps and fragments are left on the stem bark as inoculum for regrowth. Moss is not harvested from the tips of tree branches, which also leaves some inoculum for new growth. It is carried out of the woods in large burlap sheets or bags. When thoroughly dry, it is bound into 25-pound bales for shipment.

Harvest season: Moss is harvested and purchased primarily in summer. In the Coast Range and at lower elevations, moss is harvested almost year-round.

Regeneration after harvest: Regeneration is slow. Plants will regenerate by growing new leaves and branches from any remaining moss branch fragments if they have rhizoids anchored to the bark.

Uses and Products

Common uses: Packing material, decorative mulch around potted plants, and decorations in floral crafts. Mosses and liverworts contain several secondary metabolites being investigated for various agricultural, phytochemical, and pharmacological products.

Indigenous uses: Used as absorbent material for cradleboards and wrapping material.

Common products: Dried decorative mulch; dried decorative greens.

Types of markets: International and domestic. Floral industry, U.S. exports primarily to The Netherlands and Germany. Craft market, mass market outlets such as large chain stores.

Comments and Areas of Concern

Bryophytes recover slowly from harvest. Past forest management practices decreased the habitat that supports large-diameter vine maple and other hardwoods. Managing for diverse forest structure should help in creating and maintaining mixed-conifer hardwood forests. Harvest levels increased in the 1990s and remain high. Bulk harvest does not distinguish among species, including rare species.

References

Greenaway (1991), Peck (1997), Peck and McCune (1998), USDA Forest Service (1965), USDA and USDI (1994), Vance and Kirkland (1997), Vitt et al. (1988)

Calocedrus decurrens (Torr.) Florin (*Libocedrus decurrens* (Torr.) Florin) Incense-cedar

Cupressaceae

CADE27

Calocedrus decurrens

Ecology

Description: Native. Tall pyramidal trees, 25-40 m; thick, smooth purplish brown bark; small scalelike leaves densely surrounding branchlets; leaves yellowish-green in four rows; seed cones up to 2.5 cm long.

Range and distribution: Oregon to California, south to Baja, Mexico, western Nevada; 300-2500 m. Common in mixed-evergreen forests. Continuous stands in southwestern Oregon, distribution more interrupted in northern and central Oregon. The trees grow as scattered individuals or in small groups, rarely in pure stands. More common on serpentine soil and may comprise up to 50 percent of stand.

Associations: Western hemlock zone and mixed-conifer forest: white fir, ponderosa pine, Douglas-fir, canyon live oak, Oregon white oak, California black oak, and Pacific madrone. Common understory species include manzanita, salal, ceanothus, whipple vine, poison oak, and western sword fern.

Habitat: Grows well in various soil and climate types; typically grows in areas with dry summers.

Successional stage: Early to mid successional, can be an early colonizer after disturbance but reproduces under Douglas-fir canopy. Moderately shade tolerant.

Ecological relations: Many insects feed on incense cedar cones, bark, or leaves but rarely cause significant damage. Mature trees are protected from fire by their thick bark; however, fire scars make trees susceptible to pocket dry rot. Small trees highly susceptible to fire; seedlings have flammable bark and foliage, usually totally consumed by fire; more mature trees have a thicker basal bark (up to 15 cm) that adequately protects them from ground fires. Trees shed needles each fall, creating a thick duff layer that fuels medium- to high-intensity fires; seedlings do well, however, in bare mineral soil created by burns or light duff layers. Honey bees have been known to collect honeydew from the incense-cedar scale (*Xylococculus macrocarpae* Coleman).

Biology

Flowering and fruiting: Pollen cones produced in September, pollen shed in late winter to early spring. Seed cones are mature in late summer.

Seed: Easily grown from seed. Seeds require prechilling for germination. Seeds sown in fall have higher and more uniform emergence.

Vegetative reproduction: Progeny can be produced from rooted cuttings, though incense cedar does not reproduce vegetatively in nature. Cuttings are difficult to root; however, hardwood cuttings taken in August show the best potential for rooting success.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Small plants collected in the wild transplant easily.

Collection

Part harvested: For holiday greens and decoratives: at least 46 cm of branch tip is clipped. Tips desirable with pollen cones.

Harvest techniques: The tips of branches are clipped leaving a live side branch. This permits the tree to develop new tips for future harvest.

Harvest season: Once the temperatures are low enough for a hard frost, the tree will harden off and cut boughs will have longer storage and product life.

Regeneration after harvest: When bough tips are removed correctly, branch sprouts regrow to reharvestable length in 3 to 5 years.

Uses and Products

Common uses: Boughs: decorative and floral uses; wood: home exterior use because the lumber is exceptionally durable and resistant to decay; trees: landscaping. Primary wood used in making pencils.

Indigenous uses: Wood: housing and fence posts; bark: temporary camp housing and basketry; roots: basketry; boughs and twigs: brooms, implements and flavorings; leaves: infusion steam for colds and stomach troubles.

Common products: Fresh and preserved Christmas greenery, preserved craft materials, dried potpourri, specialty woodcrafts and landscape ornamentals.

Types of markets: Local: direct marketing of finished holiday greenery: products and retail landscape nursery plants; Regional: wholesale bulk cut greenery; National: preserved craft material for dried floral arrangements.

Comments and Areas of Concern

Incense-cedar is the one of three species in the genus *Calocedrus* found in the United States. *Calocedrus* was recently separated from the genus *Libocedrus* based on geographic distribution, and vegetative and reproductive morphology. It is not a true cedar but a member of the Cupressaceae family that includes many of the most important species in the horticultural trade.

References

Burgett et al. (1989), Burns and Honkala (1990), Earle (1999), Franklin and Dyrness (1973), Habeck (1992a), Hall (1988), Hickman (1993), Hortus West (1998), Kruckeberg (1993), Moerman (1998a, 1998b), USDA Forest Service (1963), Young and Young (1992)

Capsella bursa-pastoris (L.) Medik.
Shepherd's purse
Brassicaceae
CABU2

Ecology

Description: Exotic. Annual herb; finely hairy; stems to 50 cm, simple to usually branched; basal leaves in rosette, 3-6 cm long including the stalks, lance shaped, toothed to pinnately divided; stem leaves alternate, stalkless and clasping, lance shaped to oblong, irregularly toothed; many flowered raceme inflorescence; small white flowers, four petals each to 4 mm; fruits flattened, triangular to heartshaped silicles; many small seeds, oblong, reddish brown with single ridge on each side.

Range and distribution: Widespread weed throughout most of North America; low to subalpine elevations. Widespread and common.

Associations: Mixed-conifer/hardwood forests. Forbs and grasses of open, disturbed land.

Habitat: Waste places, roadsides, fields, gardens, and disturbed sites.

Successional stage: Early successional. Colonizes following disturbance. Shade intolerant.

Ecological relations: Seeds eaten by birds and small rodents; when wet, seeds become sticky and can trap insects; reported to reduce mosquito larvae; often harbors fungi that can be transmitted to cabbage, turnips and other members of the mustard family.

Capsella bursa-pastoris

Biology

Flowering and fruiting: One of the first plants to flower in spring, flowering and seed production may occur from April to September.

Seed: Seeds itself abundantly. Seed may be dispersed by birds and foraging animals.

Vegetative reproduction: Does not reproduce vegetatively.

Cultivation: Cultivation possible, but not recommended because of weedy habit.

Transplant viability: Transplants best in early rosette stage. Do not move plant during flowering and seed production to avoid unwanted spread of species.

Collection

Part harvested: Entire plant.

Harvest techniques: Entire plant taken including roots. Keep whole until used; does not store well.

Harvest season: Plants are harvested after plant forms seed capsules. For proper identification, gather leaves before flowering stage. Gather seeds summer to fall; roots, autumn to spring.

Regeneration after harvest: Shepherd's purse is an annual and produces abundant seeds. As long as some plants are left to produce seed, the patch will continue.

Uses and Products

Common uses: Medicinal, diuretic, astringent, and styptic; edible leaves in salad, seeds as pepper, root as ginger. Possibly to treat cancer and liver damage, antibiotic, and stop hemorrhaging (birth).

Indigenous uses: Young, peppery leaves used for food; traditionally used during childbirth; analgesic, for dysentery and diarrhea, infusion for rashes, and poison ivy.

Common products: Tea, tincture, herbals, and food and beverage additive.

Types of markets: Domestic. Herbal, natural, health food, and condiment.

Comments and Areas of Concern

Use care not to spread the plant into uncontaminated native plant communities. Other members of mustard family may be mistaken for this species.

References

Burrill et al. (1996), Elias and Dykeman (1990), Foster and Duke (1990), Hickman (1993), Hitchcock and Cronquist (1978), Moerman (1998b), Pojar and MacKinnon (1994), Schofield (1989), Thomas and Schumann (1993), Tilford (1998), Willard (1992)

Ceanothus L. spp.
Ceanothus, red root, buckbrush
Rhamnaceae
CEANO

C. velutinus Dougl. ex Hook., Snowbrush ceanothus-CEVE
C. sanguineus Pursh, Redstem ceanothus-CESA

Ecology

Description: Native. Rounded to spreading, single to many stemmed, thicket-forming evergreen shrub; typically 1-3 m, but can reach 3.7 m or more in the open; bark olive-green when young, becoming gray or reddish-brown, finely furrowed and ridged at maturity; roots often knotted, with inner bark characteristically red; leaves alternate, evergreen, broadly oval, 3-6 cm long, shiny and often sticky on top, velvety beneath, three main veins, finely toothed, often tightly curling; panicle inflorescence, 5-12 cm; small white flowers; fruits three-lobed, explosive capsule, 4-5 mm, each with single, shiny brown seed.

Range and distribution: Coast Range from British Columbia to California, east to Alberta, South Dakota and Colorado; *C. velutinus* var. *hookeri* (M.C. Johnston), sea level up to 900 m; var. *velutinus*, 1000-3000 m. Scattered individuals or patches, often forms dense thickets on disturbed sites.

Associations: Western hemlock and Pacific silver fir, grand fir zones. Douglas-fir, red fir, ponderosa pine and mixed conifer, mountain maple, ninebark, manzanita, serviceberry, shiny leaf spirea, and oceanspray.

Habitat: Dry to moist open forest habitats, rocky or wooded slopes, sunny locations. Important component of persistent brushfields after fire or timber harvest.

Successional stage: Colonizer following fire, early successional. Shade intolerant.

Ceanothus velutinus

Ecological relations: Important food and cover for various wildlife, especially in winter; browse for deer, moose, mountain goats, small mammals; fruits and seeds eaten by small mammals, birds and ants; attracts bees and other pollinators; good secondary nectar and pollen source; because of deep-rooting habit, can be important in preventing soil erosion; nodules located on the roots contain nitrogen-fixing fungi, which enhance soil nutrients; soil aerator. As a shade-intolerant species,

snowbrush ceanothus requires disturbance for regeneration; regenerates from both long-lived seeds stored in the soil and sprouts from the root crown. Often snowbrush forms dense stands after a fire.

Biology

Flowering and fruiting: Flowers from April to June, fruits from May to August.

Seed: Prolific production, but varies annually; seed can remain dormant in soil for 300 years; collect seed by tying cloth bag over the clusters of capsules as the fruits explode when ripe. Pretreatments of hot water and prechilling are needed to soften seedcoat and to break embryo dormancy; seeds are planted in fall or summer. Early mortality of seedlings is high in the wild.

Vegetative reproduction: Propagated from stem cuttings; can sprout from the stump, root crown, or roots; sprouting ability decreases with age of plant. Cuttings are taken from young plants in summer.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Young seedlings can be transplanted, but for older plants, the deep taproot makes transplanting almost impossible.

Collection

Part harvested: Foliar sprays, leaves, and root. Most desirable roots have reddish or wine-colored bark.

Harvest techniques: No more than two of the smaller peripheral roots are cut; not necessary to dig out the entire root; removed soil is replaced; leaves gathered conservatively.

Harvest season: Anytime; roots gathered in fall have higher levels of active constituents.

Regeneration after harvest: Roots and foliage can regenerate if plant is harvested conservatively.

Uses and Products

Common uses: Medicinal, lymphatic stimulant, astringent, tonic, antiseptic, for tonsillitis, to relieve internal bleeding and nervous irritability; hair rinse; and ornamental. Is combined with purple bee balm for use in cold and cough remedies. Substituted for commercial black tea; crafted decorations.

Indigenous uses: Tea for tuberculosis, dermatological aid, fevers, and coughs; tobacco, soaps, and cleaning.

Common products: Roots or leaves: herbal, tincture (roots favored), and extracts. Foliage: dried craft materials for wreaths and floral arrangements.

Types of markets: International and domestic. Medicinal and herbal. Retail direct marketing at craft fairs and farmer's markets, wholesale commodity markets of raw floral materials and unfinished wreaths.

Comments and Areas of Concern

There are more than 30 species of *Ceanothus* in the Pacific West. *Ceanothus sanguineus* contains the surfactant glycoside, saponin. These compounds have a soapy characteristic and may cause foaming when flower heads are shaken with water. Because saponins are known toxins, products from this species should be ingested with caution.

References

Burgett et al. (1989), Conard et al. (1985), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Tilford (1993, 1998), Tirmenstein (1990a), Willard (1992), Young and Young (1992)

Chimaphila umbellata (L.) Bart.
Pipsissewa, Prince's pine
Ericaceae
CHUM

Chimaphila umbellata

Ecology

Description: Native. Evergreen perennial subshrub; stout stems to 35 cm long; whorled, oblong leaves 3-7 cm, shiny green above, toothed above the middle; umbel inflorescence, several pink to red flowers (5 to 15) in small cluster, 5-7 mm long, radial and nodding; fruits, 5-7 mm, erect capsules.

Range and distribution: Circumboreal, Alaska to southern California to Eastern United States; 300-2900 m. Common understory species in many habitat types, but often does not reach dominance.

Associations: Pacific silver fir and western hemlock zones. Present in many associations. Common in Pacific silver fir-Pacific rhododendron. Douglas-fir, Pacific silver fir, and noble fir, subalpine fir, black huckleberry, common snowberry, dwarf Oregon grape, rattlesnake plantain, bunchberry dogwood, and twinflower.

Habitat: Dry to moist, cool, well-drained sites in conifer and mixed forests, clearings, humus and decomposing logs.

Successional stage: Mid to late successional. Shade tolerant.

Ecological relations: Minor importance to elk. Component of white tailed deer winter diets. Pollinated by bumblebees and staphylinid beetles. Soil aerator: the long, horizontally spreading roots break up the soil and allow the introduction of air, water, and organisms. Fire-sensitive species may survive moderate fire; however, they are susceptible to damage and may show a strong decline after fire. Typically absent on highly disturbed sites.

Biology

Flowering and fruiting: Flowers from June to August.

Seed: Capsules contain thousands of seeds resembling grains of dust, wind dispersed. Slow to germinate but best propagation option; small size makes seed difficult to collect; gathered in fall and sown immediately as storage survival is not known. Requires stratification; freeze-thaw cycles may help germination.

Vegetative reproduction: By division of underground stems. The long rhizomes of the plant generally grow quickly.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Difficult; seedlings may be transplanted.

Collection

Part harvested: Whole plant and leaves.

Harvest techniques: Aerial portion of plant collected by using a knife or pruning shears, and clipping the stems, leaving two brackets of leaves. If harvest is done in this way, many of the plants in a patch can be collected without impacting regeneration. For medicinal purposes, only current year's foliar growth is harvested. To collect roots, a portion of the interconnected rhizome is gently pulled up. Ends are clipped off and remaining rhizome is replaced in the ground.

Harvest season: The herb is useful anytime; gathering in fall allows seeds to mature; some herbalists prefer to harvest plant in spring.

Regeneration after harvest: Generally poor for harvest of roots or large amount of aerial portion. If foliage tip is clipped, will regenerate with multiple branches.

Uses and Products

Common uses: Disinfectant, astringent reportedly less irritating than manzanita, used for urinary tract infections and inflammation of the kidneys; leaves are edible. Flavoring ingredient in some soft drinks and candy; herbal teas; floral and decorative.

Indigenous uses: For head colds, backache, gonorrhea, blisters, after birth for internal bleeding; root for eyedrops; for chest pain from heart conditions; tea for kidney or bladder infection; for lowering blood sugar; to induce sweating; and to flavor medicine.

Common products: Flavorings, herbal, medicinal, dried, and fresh floral greens.

Types of markets: International and domestic. Beverage, herbal, and floral.

Comments and Areas of Concern

Has been harvested in large quantities for flavorings. Monitoring of harvested plants in northern California is indicating that recovery from total plant harvest takes years. *Chimaphila* is on United Plant Savers North American medicinal plants "To Watch" list.

References

Everett (1997), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Leung and Foster (1996), Logan et al. (1987), Matthews (1994), Mizerak (1998), Pojar and MacKinnon (1994), Rose et al. (1998), Seda (1989), Thomas and Schumann (1993), Tilford (1998), United Plant Savers (2000), Willard (1992)

Coptis laciniata Gray
Oregon goldthread, cut-leaved goldthread

Ranunculaceae

COLA3

C. trifolia (L.) Salisb., Threeleaf goldthread-COTR2

C. occidentalis (Nutt.) Torr. & Gray, Western goldthread-COOC

Coptis laciniata

Ecology

Description: Native. Evergreen perennial herb; 11-24 cm; bright yellow, threadlike rhizomes; touch of yellow at base of leaf stalk; divided leaves with three deeply lobed, toothed leaflets, shiny above, 2-6 cm; flowering stalks shorter than the leaves, sepals linear, 8-10 mm, greenish-white, petals shorter; fruits: follicles 10-12 mm; follicle splits at maturity.

Range and distribution: *Coptis laciniata*: west-central Washington to California; below 1000 m. *Coptis trifolia*: Alaska, British Columbia, northwest coast to Washington. *Coptis occidentalis*: eastern Washington, Idaho, and western Montana; 600-1800 m.

Associations: Western hemlock, subalpine fir zones. Western hemlock-Pacific rhododendron-dwarf Oregon grape; Douglas-fir, lodgepole pine, grand fir, red huckleberry, Oregon dogwood, evergreen violet, queencup beadlily, and pipsissewa.

Habitat: Cool, moist, coastal forests at low to mid elevation, wet sites, and streambanks.

Successional stage: Late successional. Predominant ground cover in old-growth forests. Shade tolerant.

Ecological relations: Rhizomes aid in soil aeration and water infiltration. Used in small quantities as forage for ruffed grouse. Adapted to dense shade and breaks up the forest floor, thereby allowing micro-organisms important to breaking down decayed plant material and releasing nutrients to thrive. Will sprout from the rhizome if undamaged after a fire; however, the rhizome is sufficiently near the surface that moderately severe fires may kill it. Leaves provide important deer forage in some areas.

Biology

Flowering and fruiting: Flowers from March through April. Fruits from April through June. Fruits consist of follicles that contain 5 to 10 seeds each.

Seed: Small and difficult to collect, seeds disperse by water. Fruits collected at maturity but before follicle splits. Seeds sown as soon as ripe in ericaceous compost. Germination: 1 to 6 months at 10 °C. Seedlings grown in cool shade.

Vegetative reproduction: Propagates easily from rhizomes.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Does not transplant well.

Collection

Part harvested: Root primarily, also upper plant parts.

Harvest techniques: Recommended to gather carefully from edge of patches. Collect only where species is abundant. No more than 7.5 cm of rhizome and roots are gently pulled up and clipped with shears. Roots are clipped using clippers; do not pull out (see **"Comments and Areas of Concern"** below).

Harvest season: Late summer and fall.

Regeneration after harvest: If rhizomes are impacted, remaining plants may not survive well after harvest.

Uses and Products

Common uses: Roots: medicinal, antimicrobial, antiviral, liver stimulant, laxative, astringent, anti-inflammatory, uterotonic, antiparasitic, and styptic. Whole plant: shady gardens and landscaping.

Indigenous uses: Native Americans chewed or made tea from *Coptis* roots to treat mouth sores. The tea also was used as an eyewash, to treat indigestion, and as a tonic after prolonged illness.

Common products: Tea, tincture, capsules, and landscape plants. May be additive in goldenseal products.

Types of markets: International and domestic. Herbal, horticultural, and landscape.

Comments and Areas of Concern

The rhizomes generally grow in the duff layer, rather than the soil beneath, thereby making them highly susceptible to damage. Cannot support extensive collections. Moist areas and streamsides highly susceptible to disturbance. Lives in sensitive habitat; yields a disproportionately small amount of medicine. One of the main active ingredients in goldthread, berberine, also is found in Oregon grape, a more common plant, thus, a better substitute. This plant should not be used during pregnancy. *Coptis* is on United Plant Savers North American medicinal plants "To Watch" list. Fern-leaved goldthread (*Coptis aspleniifolia*) and threeleaf goldthread (*C. trifolia*) are on the sensitive species list of the Pacific Northwest Region.

References

Franklin and Dyrness (1973), Gardenbed (2000), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Munz and Keck (1959), Pojar and MacKinnon (1994), Sullivan (1992), Tilford (1993, 1998), United Plant Savers (2000)

Crataegus L. spp.
Hawthorn
Rosaceae
CRATA

C. douglasii Lindl., Black hawthorn-CRDO2
C. monogyna Jacq., Oneseed or common hawthorn-CRMO3
C. suksdorfii (Sarg.) Kruschke, Suksdorfi's hawthorn-CRSU16

Crataegus douglasii

Ecology

Description: *Crataegus douglasii*: Native. *Crataegus monogyna*: Naturalized, exotic. *Crataegus suksdorfii*: Native. *Crataegus*: Deciduous tree or shrub to 5 m tall; branches, lined with 2.5-7.6-cm curved thorns; flowers, white in flat, terminate clusters; each flower has five petals and many stamens; fruit, berry-sized pomes, in clusters, and red to black.

Crataegus douglasii: leaves alternate 2-9 cm long, wedge shaped, lobed, tip truncate, margin above base toothed. *Crataegus monogyna*: leaves deeply lobed. *Crataegus suksdorfii*: leaves wedge shaped, unlobed, with a margin above base toothed.

Range and distribution: *Crataegus douglasii*: northern California to Alaska, east-central North America to 1700 m. *Crataegus monogyna*: chiefly western slope of Cascade Range but has spread. *Crataegus suksdorfii*: northern California montane, Coast Range and Klamath north to British Columbia, east to Montana.

Associations: Mixed-hardwood/coniferous forests. Black cottonwood, red alder, Oregon ash; nonforest shrub-meadow communities, choke cherry, common snowberry, wild rose, cow-parsnip, stinging nettle, poison oak, and grasses.

Habitat: Prefers nitrogen-rich soils in open areas. Streamsides, forest edges, meadows, grassland, roadsides, and along fencelines. Typically grows in riparian thickets.

Successional stage: Early to mid successional. Responds to disturbance that creates openings particularly in or near moist habitats. Low to moderate shade tolerance.

Ecological relations: Provides food, nesting, and escape habitat to various animals and birds; dense thickets serve as a buffer around wetland communities. Tolerates fire that does not damage root system; also an offsite colonizer in the first two years after a fire. In thick stands, provides fuel and can be severely impacted by fire. Good minor source of pollen for insects where hawthorn is abundant.

Biology

Flowering and fruiting: Flowers from early May to late August. Fruits ripen from mid July through September.

Seed: Seed dispersed by animals. Fruits persist on tree until winter. Collect fruit from tree or off the ground. Seed extracted by maceration. Cold stratification increases germination, acid scarification also may help. Sow seed early in fall or if stored in cold over winter, sow in spring.

Vegetative reproduction: Can be propagated from suckers that will sprout after removal of stems.

Cultivation: Can be cultivated. Plants and seeds are commercially available for *Crataegus douglasii*.

Transplant viability: Can be purchased at nurseries; grows well with ample watering, but grows slowly. For best success, transplant a shrub that is at least 3 years old.

Collection

Part harvested: Flowering branch tips in spring (leaves, flowers, buds, and thorns); berries in fall.

Harvest techniques: The outermost small limbs, when flowering and leaves are just beginning to bud, are clipped with pruners. Only leaves and berries within reach from the ground are gathered to minimize impact on the tree.

Harvest season: Spring for flowers, fall for berries.

Regeneration after harvest: Branches resprout from buds on uncut portion of stem.

Uses and Products

Common uses: As a tonic to aid the cardiovascular system. It is reported to increase circulation, serve as an antioxidant, and steady a weak or erratic heartbeat. Dried fruits (China), flowering tips, leaves, fruits (Europe) carditonic, hypotensive, antibacterial, and analgesic; cardiac drug preparations (Europe); flowering tips used in sleep-inducing preparations; fruits as food, in beverages, candied fruit slices, jams, wine in major American Chinatowns.

Indigenous uses: Fruits and flowers used to create a heart tonic. The wood, because of its strength, is used for handles of small tools.

Common products: Dietary supplement, tea, tablets, tinctures, and specialty foods.

Types of markets: International and domestic. Health food and herbal.

Comments and Areas of Concern

Black hawthorn is similar to Columbia hawthorn (*Crataegus columbiana*), which is hairier and smaller. Notice which birds are feeding when harvesting hawthorn. Because it is so favored by various animals, harvest lightly and over several locations. Suksdorfi's hawthorn and oneseed hawthorn, an introduced species from Europe, may be invasive.

References

Antos et al. (1996), Burgett et al. (1989), Cooke (1997), Habeck (1991), Hall (1988), Hickman (1993), Hortus West (1998), Leung and Foster (1996), Pojar and MacKinnon (1994), Rice (1997), Rose et al. (1998), Sudworth (1967), Tilford (1998), USDA Forest Service (1974)

Cupressus lawsoniana (A. Murr.) (*Chamaecyparis lawsoniana* (A. Murr.) Parl.)
Port-Orford-cedar
Cupressaceae
CULA3

Cupressus lawsoniana

Ecology

Description: Native. Evergreen tree, 20-65 m, pyramidal in youth, drooping branches; trunk less than 6 m diameter, bark 15-25 cm thick, red-brown to tan, deep, fibrous ridges, fire-resistant; scalelike leaves arranged in fernlike sprays; pollen cone, pink to red, 2-3 mm; seed cone, red-brown, 6-10 mm.

Range and distribution: Coastal northwest California, Klamath Mountains, southwest Oregon; sea level to below 1700 m. Uncommon; mixed stands with other conifers, small pure stands or scattered trees.

Associations: Sitka spruce, western hemlock zones. White fir, Douglas-fir, grand fir; dwarf Oregon grape, salal, Pacific rhododendron, and evergreen huckleberry.

Habitat: Coastal conifer, mixed-evergreen, moist soils, often on rocks with high magnesium and iron concentrations, sandy and clay loams. Grows in shade of other conifers but grows faster in the open.

Successional stage: Early- and late-successional species. Shade tolerant.

Ecological relations: Low palatability for browse; mountain beavers and rabbits occasionally eat sapling foliage, woodrats and porcupines eat the bark, squirrels eat the cone seeds; susceptible to fatal root rot (*Phytophthora lateralis* Tuck. & J.A. Milb.) caused by soil-borne fungi.

Biology

Flowering and fruiting: Pollen and seed cones on same branches; buds grow in spring, develop in summer, pollinate after spring; seeds mature in September or October.

Seed: Dispersal from September through May. Seed bearing starts from 5 years; production differs year to year; heavy crops may occur every 4 to 5 years. Seeds may be stored dried for more than 10 years.

Vegetative reproduction: Layering rarely occurs, and plants do not naturally sprout. Stem cuttings easily rooted if proper methods are followed.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Can be transplanted.

Collection

Part harvested: Boughs.

Harvest techniques: Branches are pruned from trees leaving live side branches on each twig. No more than 50 percent of the total green mass is removed if future harvest is planned. Boughs are not harvested when raining or wet to avoid spread of root rot.

Harvest season: Annually, in fall after the first frost when all growth has stopped and foliage cold hardened.

Regeneration after harvest: Can reproduce effectively from seed after clearcutting or partial cutting stand of trees.

Uses and Products

Common uses: Stems: poles, posts, specialty woodwork, and interior finishes; cut branches: flower arrangements and holiday greens; whole plant: wind breaks and ornamental plantings. Popular in Asia for woodenware, toys, and temple construction.

Indigenous uses: Wood: house planks, sweathouses, and furniture; branches: brushes and brooms.

Common products: Branches: wreaths, swags, holiday and decorative crafts, aromatics; whole plant: landscaping or wind-break plant; stems: various wood products.

Types of markets: Local: floral, crafts, restoration, home landscaping, logs, and finished lumber. Regional: floral, landscape, and restoration. International: floral, landscape, and export logs and wood.

Comments and Areas of Concern

Buyers prefer boughs with "bloom"- yellow buds of pollen cones, and will pay more for them. Leaves sometimes become needle or awllike because of grazing or infection. Trees can live more than 600 years. Populations severely reduced by spread of *Phytophthora*. Use caution in harvesting; guidelines available from Forest Service to avoid spreading disease.

References

Burns and Honkala (1990), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Mizerak (1998), Moerman (1998a), Munz and Keck (1959), Uchytil (1990), USDA Forest Service (1965), Whitney (1997), Young and Young (1992)

Cytisus scoparius (L.) Link.
Scotch broom
Fabaceae
CYSC4

Cytisus scoparius

Ecology

Description: Exotic. Woody deciduous shrub to 3 m tall, more or less erect; branches green and strongly five angled; leaves small, dark green, mostly three-parted with entire leaflets and arranged spirally up stems; stem, dark green, waxy smooth, five-sided; stems group together to make a single branch cluster or shoot 50-100 cm long; flowers showy ranging from light yellow to deep yellow with crimson wings, typical of pea family having one banner petal, wings, and two keel petals. Young plant often will spend 2 to 4 years in a grasslike state until it has established an extensive root system. Once established, it can grow annually from 30-75 cm and generally attain heights of over 2.5 m.

Range and distribution: Western North America from British Columbia to northern California. It is most invasive west of the Cascade Range but can be found on the eastern slopes of the Cascade Range and in the Blue Mountains of southeast Washington and northeastern Oregon. Isolated populations have been identified in cool, wet sites in northeastern Washington.

Associations: Mixed-hardwood/coniferous forests. Mid to lower elevations. Also nonforest meadows, grasslands, farmland. Associated with various shrubs, forbs, and grasses of fields and forest openings.

Habitat: Quickly invades areas where farming, forestry, utility, and road building practices expose mineral soil. May take advantage of land management practices that favor spread of exotics. Tolerant of saline conditions. Plants grow most rapidly in open areas having at least 12 hours of full sun and sufficient moisture.

Successional stage: Colonizer and early successional. Shade intolerant.

Ecological relations: Like many leguminous species, attractive to bees for its abundant pollen. Nitrogen-fixing plant, does well in poor soil.

Biology

Flowering and fruiting: Fruits, black flattened pods about 4 cm long. Flowering occurs on plants as young as 2 years but is most abundant on plants over 4 years old.

Seed: As the pod matures and dries, the two halves warp in different directions and snap apart to throw the seeds from 1-4 m. About 65,000 seeds per pound. Seeds remain viable in the soil for many years.

Vegetative reproduction: Reproduces easily from cuttings or suckers.

Cultivation: Introduced as ornamental; ornamental cultivars and varieties sold at many commercial nurseries. Easy to cultivate and grow; it can take over a garden.

Transplant viability: Readily transplantable if basic requirements are met but not recommended because it can spread readily to other areas.

Collection

Part harvested: Long straight shoots, without leaves, seeds and flowers are desired.

Harvest techniques: Harvested stems are waxy and green. Desired stems are unbranched single spikes 80-83 cm long gathered in 2-lb bunches. Stems hand clipped with clippers are free of dirt, blemishes, insect damage, and seed pods. Shoots must be dormant to maintain quality during storage, processing, and shipment.

Harvest season: From September to May.

Regeneration after harvest: Good; branches sprout below clipped top.

Uses and Products

Common uses: Erect green spikes with tiny leaves in floral arrangements. Deep green color and waxy stems used as accent in floral arrangements.

Indigenous uses: Not known.

Common products: Decorative stems, fresh and dried flower arrangements.

Types of markets: Floral. International and domestic markets for fresh floral, preserved floral arrangements, and floral crafts.

Comments and Areas of Concern

Caution: Contains several toxic alkaloids that can depress the hearing and nervous system. Aggressive noxious weed, pollen common allergen during flowering season. Native of Europe that escaped from cultivation in 19th century to become a major pest to many landowners. Use care to not spread species inadvertently. Washington State law requires scotch broom to be controlled by landowners.

References

Burgett et al. (1989), Burrill et al. (1996), Gill and Pogge (1974), Kozloff (1976), Pojar and MacKinnon (1994), Rice (1997), Schlosser and Blatner (1992), USDA Forest Service (1965, 1974), Van Dersal et al. (1938)

Dipsacus L. spp.
Teasel
Dipsacaceae
DIPSA

D. sylvestris Huds., Wild teasel- DISY
D. fullonum L., Common teasel- DIFU2

Ecology

Description: Exotic. Biennial herb, erect stem up to 2 m tall; stem is covered with several rows of downward-turned prickles; basal rosette of leaves and opposite leaves on stem; leaves deeply veined, up to 25 cm long, entire or toothed; flowers 5-10 cm, purple, with cylindrical heads; fruits four-angled and hairy. *Dipsacus sylvestris*: flower subtended by prickly, curved involucral bracts that are longer than the head. *Dipsacus fullonom*: spine tips of receptacular bracts recurved.

Range and distribution: Northern California to Oregon. Below 1700 m. Native to Europe. Common, increasing in the Pacific Northwest

Associations: Shrubs, herbs of open fields, moist meadows; wild rose, thistle, grasses, and rushes.

Habitat: Moist sites, roadsides, pastures, old fields, and disturbed areas.

Successional stage: Early successional. Colonizes after disturbance. Shade intolerant.

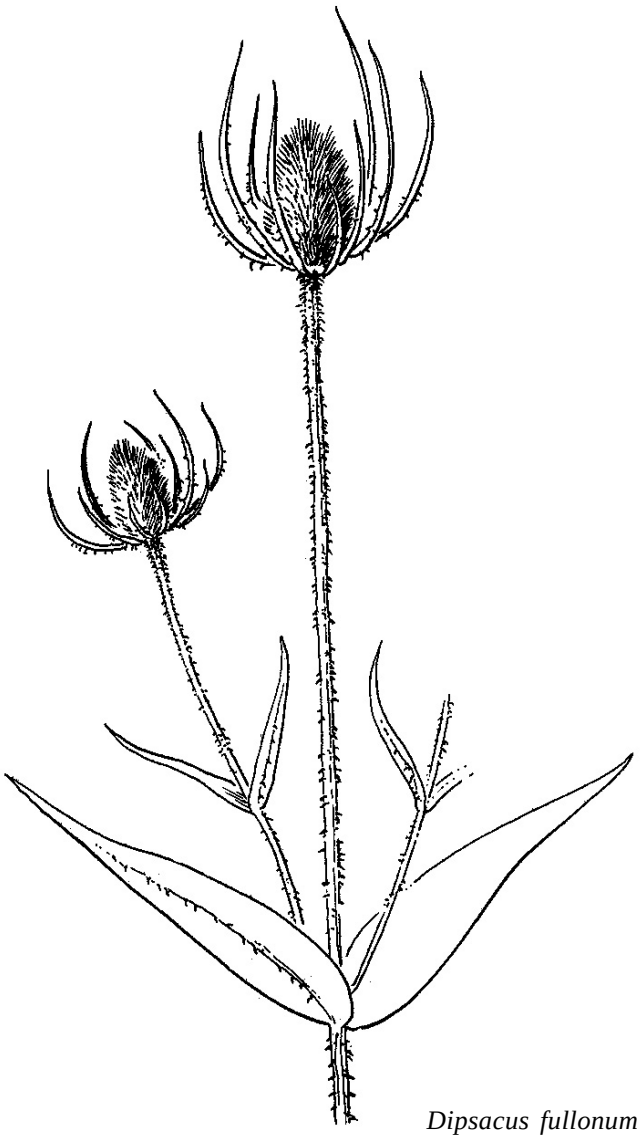
Ecological relations: Nectar producing, attracts bees.

Biology

Flowering and fruiting: Flowers from July to August.

Seed: Seed may be dispersed by birds and animals. Readily germinates from seed.

Vegetative reproduction: Biennial; reproduction by seed.



Dipsacus fullonum

Cultivation: Was a commonly cultivated plant in Europe; caution should be exercised because of weedy habit.

Transplant viability: May be transplanted in rosette stage, but has long tap-root.

Collection

Part harvested: Crown of plant and stems with seed heads.

Harvest techniques: Stems are prickly and may be picked, but using shears or clippers and gloves is preferred.

Harvest season: Late summer through fall, after flowering.

Regeneration after harvest: By seed only.

Uses and Products

Common uses: Stems and fruiting heads are preserved for decorating and are commonly silvered or gilded for winter bouquets. Fresh herb as bitter tonic; tea for indigestion.

Indigenous uses: Medicinally for skin problems; seed heads for carding wool (Navajo).

Common products: Dried floral decoration.

Types of markets: Domestic. Craft and floral.

Comments and Areas of Concern

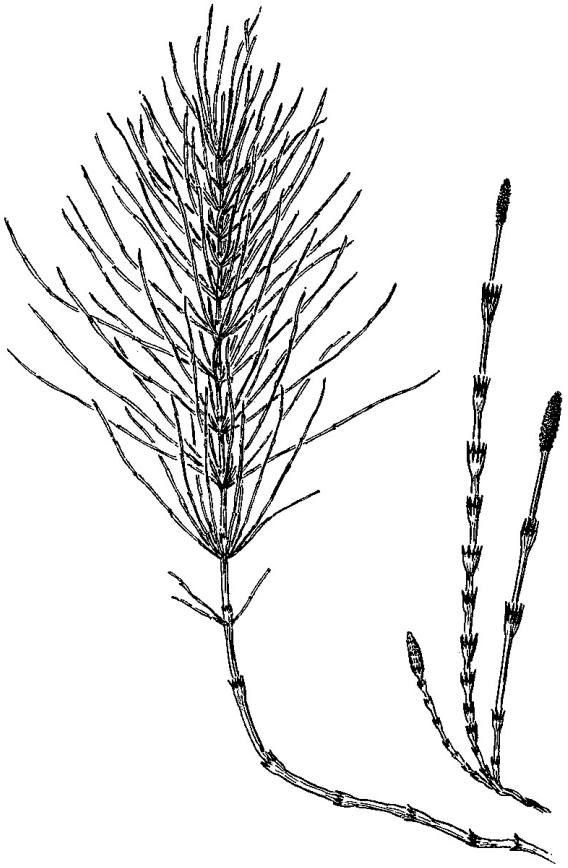
Because it is a weedy exotic, care should be taken not to spread seed. Has not been listed as noxious. Was introduced in the west coast because seed heads used for carding wool.

References

Burgett et al. (1989), Burrill et al. (1996), Hickman (1993), Hitchcock et al. (1969), Moerman (1998b), USDA Forest Service (1963)

Equisetum L. spp.
Horsetail
Equisetaceae
EQUIS

E. arvense L., Common horsetail-EQAR
E. hyemale L., Scouring-rush-EQHY



Equisetum arvense

Ecology

Description: Native. Perennial. Rhizomatous; two types of jointed stems: sterile stem: 10-60 cm, green, branching (horsetail), hollow, whorled stems; fertile stem: unbranched, 11-32 cm, fleshy, usually thick, brown, tipped with a terminal cone, 2-3.5 cm long, of clustered spores.

Range and distribution: Widespread, below 3000 m; North America, Europe, Asia.

Associations: Conifer and mixed-conifer/hardwood forests. Spruce, alder, Oregon ash, willow, salmonberry; coltsfoot, and cow-parsnip.

Habitat: Various soils, moist to wet areas, from lowlands to alpine areas, in openings. Often found in disturbed, roadside ditches and irrigation waterways.

Successional stage: Early to late successional. Moderately shade tolerant

Ecological relations: Food for bears, low palatability to deer and elk; shelter for small animals; rhizomes help reduce erosion. Horsetail habitat is usually wet enough that it does not go through frequent fires; however, rhizomes are deep and typically survive even severe fires.

Biology

Flowering and fruiting: Fertile stems appear first in early spring; green sterile stems, later.

Seed: Produces spores, dispersed by wind or water.

Vegetative reproduction: Spreads from rhizomes. Segments of rhizomes will sprout.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Poor, but possible if entire plant and root ball is dug up with the surrounding soil and transplanted into a similar environment.

Collection

Part harvested: Whole female plant, also stems.

Harvest techniques: Stems are gathered in early growth before leaves have elongated and silica concentrates in stem. Stalk just above base of plant is cut with sharp clippers or knife.

Harvest season: Early to mid spring.

Regeneration after harvest: If root-crown and rhizomes are intact, will resprout following season.

Uses and Products

Common uses: Silica extracted from horsetail is used in remineralizing and diuretic medicinals. Aboveground green portion used as medicinal, astringent, diuretic, and to stop bleeding. Tender, young shoots are eaten raw or boiled. Black, edible nodules attached to roots used for food; dye. Additive in shampoos and skin care products; herbal dietary supplement for mineral content, pet food flavoring; because it can concentrate gold in its tissues, it has been used as an indicator in bioassays.

Indigenous uses: Poultice of stem for rash under arm and groin; fertile stem roots used as powerful diuretic; powdered stem in shoe to avoid foot cramps; for kidneys, strong infusion for constipation; stem for dysuria, joint ache, headache, teething, cuts, poison ivy wash, and as an abrasive.

Common products: Tincture, tea, and capsules.

Types of markets: International and domestic. Herbal and medicinal.

Comments and Areas of Concern

Soil often sensitive to compaction; gather from the margins of driest stands. Considered a weed with some crops, and probably toxic to surrounding vegetation; considered noxious in Oregon. Mature stems are not considered edible because of high silicaceous content.

References

Ambrose and Johnson (1999), Burrill et al. (1996), Hickman (1993), Hortus West (1998), Mizerak (1998), Moore (1993), Munz and Keck (1959), Ody (1993), Pojar and MacKinnon (1994), Rice (1997), Schofield (1989), Sullivan (1993), Tilford (1998)

Eriodictyon californicum (Hook. & Arn.) Torr.
Yerba santa, mountain balm
Hydrophyllaceae
ERCA6

Eriodictyon californicum

Ecology

Description: Native. Evergreen shrub; stems 1-3 m erect with shedding bark, twigs sticky; leaves simple, alternate, leathery, sticky, lance shaped to oblong, 4-15 cm; flowers white to purple, funnel to bell shaped, at end of stems; fruit a four-valved capsule; seeds 1-1.5 mm.

Range and distribution: Northwest California, Cascade Range, Oregon; 60-1900 m. With decreased competition, can form pure, dense stands.

Associations: Annual grassland and oak woodland, member of chaparral community; narrow-leaved buckbrush, white-leaved manzanita.

Habitat: Dry habitats of foothills, slopes, fields, roadsides, woodland, and chaparral. Common on south- or east-facing slopes.

Successional stage: Both a residual colonizer and survivor in disturbed communities; mature shrubs found in early-successional communities. Shade intolerant.

Ecological relations: Lightly browsed by deer in winter and spring; full seed capsules may be eaten by birds and rodents; seeds by insects. Young shrubs provide cover for birds and small mammals; in California found to be valuable to bees for nectar and pollen. Yerba santa establishes after fire by sprouting from rhizomes or through germination of seed stored in the soil. Resinous leaves and branches produce flammable litter. Rhizomes survive low- to moderate-intensity fires.

Biology

Flowering and fruiting: From May to July; seed ripe in September.

Seed: Germinates after disturbance such as a fire or mechanical site preparation. Seedlings may be abundant after fire.

Vegetative reproduction: Vegetative reproduction is the most successful method of self-propagation.

Cultivation: Can be cultivated. May be difficult but can be done if the correct growing medium is created. Plants are commercially available.

Transplant viability: May be transplanted.

Collection

Part harvested: Leaves. Leaves of yerba santa and narrow-leaf yerba santa (*Eriodictyon angustifolium*) are carefully dried to avoid mold.

Harvest techniques: Leaves are pruned, leaving most of the plant intact. For commercial quantities, harvest only in patches where plants are sufficiently abundant. Harvested patches should be monitored for plant survival and regrowth.

Harvest season: Spring and early summer while foliage is fresh and green and resins are high in the stem.

Regeneration after harvest: Does not regenerate leaves after harvest.

Uses and Products

Common uses: For treating colds and asthma, pharmaceutical flavoring and expectorant, and food flavoring in beverages and baked goods.

Indigenous uses: Branches and leaves in steam bath for rheumatism; chewed plant for colds; leaves in a wash for painful, fatigued limbs; poultice of heated leaves applied to headaches; leaves-plant for rheumatism, tuberculosis, colds, to purify blood, gonorrhea, stomach pains, asthma; also used by early settlers.

Common products: Tincture, smoking mixture, food additive, and herbal medicinals.

Types of markets: International and domestic. Medicinal, herbal, and food processing.

Comments and Areas of Concern

Can be used in rangeland rehabilitation because the plant establishes well in disturbed soil. Attractive to pollinators. *Eriodictyon* is on United Plant Savers North American medicinal plants "To Watch" list.

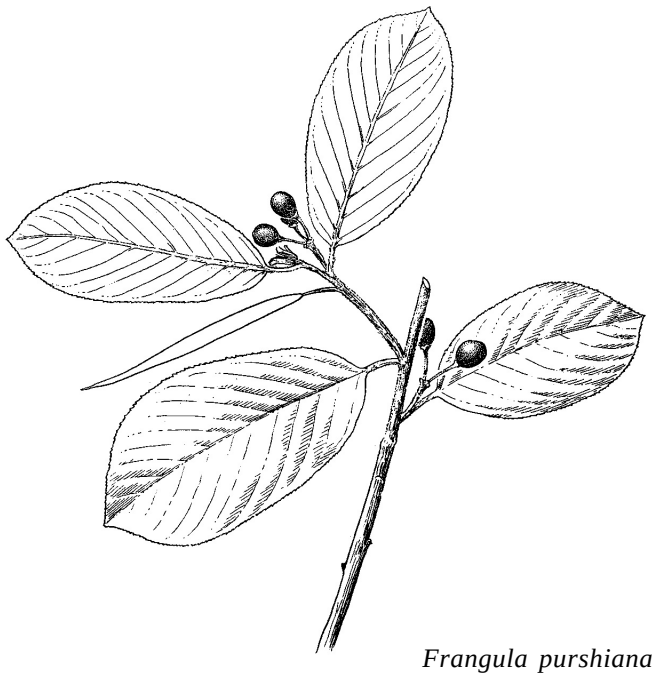
References

Burgett et al. (1989), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Howard (1992b), Leung and Foster (1996), McMinn (1970), Mizerak (1998), Moore (1993), Munz and Keck (1959), Thomas and Schumann (1993)

Frangula purshiana DC. Cooper (*Rhamnus purshiana* DC. Cooper) Buckthorn, cascara buckthorn, chittum

Rhamnaceae

FRPU7



Frangula purshiana

Ecology

Description: Native. Deciduous, erect, tall shrub or small tree, up to 20 m; bark thin, smooth, silver-gray, bitter tasting, trunk diameter 10-40 cm; twigs red to brown; terminal bud not covered with scale; alternate leaves, oblong, dark glossy green, 6-12 cm long, finely toothed, prominent parallel veins; flowers greenish-yellow, 3-4 mm, five sepals, petals and stamens, 8 to 40 in umbrella-shaped clusters in axils of leaves; fruits blue-black to purplish-black berries, 5-8 mm containing two to three seeds.

Range and distribution: British Columbia to California, mostly in western slope of Cascade and Coast Ranges, but can be found in northern Idaho and northwestern Montana; below 2000 m. Widespread, brushy stands, but not abundant.

Associations: Sitka spruce, western hemlock zones. Coniferous and mixed-evergreen forests; Douglas-fir, ponderosa pine, red alder, and vine maple.

Habitat: Lower mountain slopes, wet to semidry, semishady sites, mixed-coniferous forest edge, and chaparral.

Successional stage: Early to mid successional, often found in understory of second-growth forests; rose shrub community of Willamette Valley grasslands. Moderately shade tolerant.

Ecological relations: Birds are the predominant distributors of seeds, as well as bears, raccoon, and other mammals; browsed by deer, elk, and bears; thermal and hiding cover. Cascara will sprout from the root crown after low-intensity fires. Important nectar and pollen source for pollinators, especially bees.

Biology

Flowering and fruiting: Flowers from April through July, fruit ripens from July to September.

Seed: Usually reproduces by seed. Collect seed about 2 weeks before fruit is ripe. Sow outdoors in autumn or cold stratify.

Vegetative reproduction: Layering and cuttings possible. Take hardwood cuttings in fall. Layering possible in spring. Cut stems will resprout or coppice.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Seedlings and small saplings can be transplanted.

Collection

Part harvested: Bark of limbs and small trunks, should come off with ease; underneath side a bright golden yellow color; store bark as long as possible before use, at least 1 year; pick fruit about 2 weeks before fully ripe.

Harvest techniques: After harvesting bark, tree is cut leaving sufficient stump so it can resprout.

Harvest season: Collection from mid-April to end of August.

Regeneration after harvest: May resprout stems from stump of cut tree assuming a shrubby form.

Uses and Products

Common uses: For digestive tract, skin protectant.

Indigenous uses: Bark boiled, tea as laxative, washing sores and swellings, treating heart strain, and internal strains.

Common products: Bark yields cathartic drugs. Bark widely collected and processed by pharmaceutical companies for laxatives; sunscreen; dyes.

Types of markets: International and domestic. Medicinal, herbal, and mass market.

Comments and Areas of Concern

Bark and fruits toxic in excess, especially to children. The inner bark is especially potent before it is cured. Older trees cut for bark are becoming uncommon. Most sprout back but trees converted to shrubs. *Frangula* is on United Plant Savers North American medicinal plants "To Watch" list.

References

British Columbia Ministry of Forests (1995), Franklin and Dyrness (1973), Habeck (1992b), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Seda (1989), Sudworth (1967), Thomas and Schumann (1993), United Plant Savers (2000), Whitney (1997), Willard (1992), Young and Young (1992)

Gaultheria shallon Pursh
Salal
Ericaceae
GASH

Ecology

Description: Native. Erect to spreading evergreen shrub; stems branched, hairy, 0.4-3.0 m; twigs reddish brown with shredding bark; leaves alternate, leathery, thick, shiny, egg-shaped, 5-10 cm long, sharply and finely toothed; inflorescence raceme; sticky flowers white or pinkish, 5 to 15, 7-10 mm long, urn shaped on terminal clusters; fruits round, covered with tiny hairs, reddish blue to dark purple 6-10 mm, each containing an average of 126 brown, 1-mm seeds.

Range and distribution: British Columbia from the eastern slope of the Cascade Range to the coast along southern California; below 800 m. Common forest understory shrub in coastal forests, forms large, dense thickets.

Associations: Sitka spruce, western hemlock, Pacific silver fir, mixed-conifer zones. Western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, dwarf Oregon grape, rhododendron, and western sword fern.

Habitat: Warm, moist forest margins, moist to dry woods, rocky bluffs, brushfields, acidic soils pH about 5.0, and tolerates poor soil.

Successional stage: Not typically a colonizer; survives disturbance. Commonly attains peak abundance in mid-successional stages after fire, grows best at mid-light levels. Shade tolerant.

Ecological relations: Pollinated by bees and flies, abundant nectar producer; seeds dispersed by various birds and mammals; leaves, buds, and twigs browsed by deer and elk, mountain beaver, white-footed vole; cover for various species. Salal is adapted to shade and infrequent fires. The plant can sprout from rhizomes if the aboveground portion is burned.

Gaultheria shallon

Biology

Flowering and fruiting: Generally flowers in late spring or early summer, from May to July; fruit ripening from August to October, may persist on the stem until December. Flowers produce abundant nectar; honey is light amber colored. Fruits are modified sepals, fleshy, purple black with many seeds.

Seed: Propagation from seed is the most economical means. Prechilling and light appear to help with germination; however, various sources have different recommendations. Seedling production is poor; few seedlings establish; slow growing.

Vegetative reproduction: Grows from roots, rhizomes, underground stems, and layering; best results from cuttings of new wood taken in late summer. Slow to establish, but once established spreads well. Planting spacing should be about 1 m.

Cultivation: Can be cultivated. Plants and seeds are commercially available. Plants are commercially available for alpine wintergreen (*Gaultheria humifusa*) and Oregon wintergreen (*G. ovatifolia*).

Transplant viability: Small plants have been successfully transplanted.

Collection

Part harvested: Fruit, branches, and leaves.

Harvest techniques: For floral markets, select green and healthy branches, free of spots, blemishes, or insect damage. Partial shade is required for a bright green color and flattened sprays. Most buyers want a mixture of "sprays" and single stems. Leaves are inspected for deformities, spots, and insects. Brown spot disease (*Phyllostica gaultheriae* Ell. & Ev.) is commonly the limiting factor in determining whether a spray is marketable. Leaves are clipped from plants leaving over half of the branches on each plant. Harvest is conservative and spread over a wide area. Recommendation is for removal of no more than 25 percent of foliage from plants on good sites. Fruit is picked by hand; some fruit is left on each plant.

Harvest season: Fruit: from August through October; branches: year-round, best in late spring to mid fall.

Regeneration after harvest: Fair to good depending on site quality. Harvest rotation of 3 years reported on better sites. Foliage reported to readily grow back. Long-term monitoring is needed.

Uses and Products

Common uses: Medicinal: astringent and anti-inflammatory; floral: used as dried decorative filler, for wreaths; landscaping: ornamental shrub, landscaping ground cover, erosion control; food: fruit jams and leaves of related species, for wintergreen flavoring agent.

Indigenous uses: Food: fruit, berries eaten fresh, dried or in cakes; trading and selling; medicinal: young leaves chewed as hunger suppressant, leaves dried and mixed with kinnikinnick and smoked; leaves to heal burns and sores, teas used to treat coughs, tuberculosis and diarrhea, used in rituals and dances.

Common products: Teas and dried and dyed decorative greenery.

Types of markets: International and domestic. Floral, craft suppliers, herbal, specialty, food, and nursery; wholesale commodity markets buy greens directly from harvester.

Comments and Areas of Concern

Salal is traditionally used by American tribes, and Alaska Natives have requested limited commercial use for salal. Anecdotal reports of scarcity of harvestable plants in Washington and Oregon, smaller sized plants, and plants with leaves showing more fungal disease. Care should be taken not to spread disease through collection practices. Creeping snowberry (*Gaultheria hispidula*) listed as sensitive in Washington. Creeping snowberry is rare in the United States and closely related to eastern tea berry (*G. procumbens*), a natural source of wintergreen.

References

Burgett et al. (1989), Cooke (1997), Freed (2000), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Thomas and Schumann (1993), Tirmenstein (1990b), USDA Forest Service (1963, 1965), Vance and Thomas (1997), Whitney (1997), Young and Young (1992)

Continued

Gentiana L. spp.
Gentian
Gentianaceae
GENTI

G. sceptrum Griseb., King's gentian-GESC
G. calycosa Griseb., Explorer's gentian-GESA

Ecology

Description: Native. About 300 species, 36 in Western United States; annual or perennial herb; simple stems; fleshy roots or slender rhizomes; opposite, occasionally whorled, often clasping leaves; inflorescence compact cyme or solitary flowers, bell or funnel shaped, four or five lobed corollas, blue, violet purple, greenish, yellow, red or white; capsule, two valved, many seeded. *Gentiana sceptrum*, 25-100 cm, leaves 10 to 15, 3-6 cm, blue 3-4.5 cm flowers; *G. calycosa*, 5-30 cm.

Range and distribution: Temperate to subarctic and alpine America and Eurasia. *Gentiana sceptrum*: from British Columbia to California, western slope of Cascade Range to coast; *G. calycosa*: also to Rocky Mountains. Widespread and common for some species; others locally abundant.

Associations: Sitka spruce, western hemlock, Pacific silver fir zones. Western redcedar, alder, willow, black cottonwood, and bog or moist meadow. *Gentiana calycosa*: mountain heather, black huckleberry, broadleaf lupine, and showy sedge.

Habitat: Meadows; *G. calycosa*, moist open sites in mountains; other gentian species including *G. sceptrum,* lower foothills and near coast.

Successional stage: Component of well-developed, stable plant communities. Shade intolerant.

Ecological relations: Deer and elk have been known to browse.

Gentiana calycosa *G. sceptrum*

Biology

Flowering and fruiting: *Gentiana sceptrum* blooms from July through September, *G. calycosa* from July through October.

Seed: Abundant seed producer; seeds small; disperse well. Seeds are sown in autumn to early spring on top of well-drained, sandy soil, watered from beneath. Germination in full sunlight.

Vegetative reproduction: May be rooted from stem cuttings; difficult to start.

Cultivation: Can be cultivated. Plants and seeds are commercially available for *G. calycosa*, *G. sceptrum,* and other *Gentiana* species.

Transplant viability: Difficult to transplant from the wild. Should not be attempted.

Collection

Part harvested: All parts, but please see "**Comments and Areas of Concern**." Rhizomes and roots harvested for medicinal purposes.

Harvest techniques: Plant tops are clipped, whole plants have been dug up **but not recommended.**

Harvest season: Late summer and early fall.

Regeneration after harvest: Poor; regrowth slow.

Uses and Products

Common uses: Yellow gentian (*Gentiana lutea*) native to Europe is a well-known wild herb used as a bitter, for anti-inflammatory tonics, beverages, and liqueur flavorings. *Gentiana* species: for improving thyroid function, to aid digestion, and treat infection; rock garden landscaping.

Indigenous uses: Roots of some species used for medicine.

Common products: Herbal tonic and tincture; garden plants and seed.

Types of markets: International for herbal products, landscaping plants and seeds.

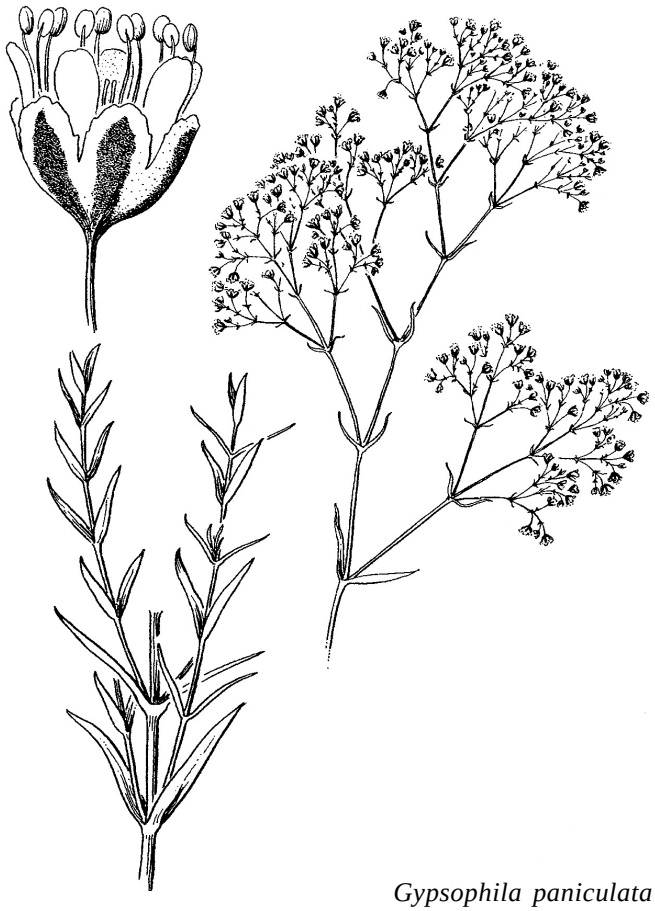
Comments and Areas of Concern

Glaucous gentian (*Gentiana glauca*), swamp gentian (*G. douglasiana*), and slender gentian (*G. tenella*) are listed as sensitive (vulnerable or declining) in Washington; Newberry's gentian (*G. newberryi*), elegant gentian (*G. plurisetosa*), and Mendocino gentian (*G. setigera*) are listed in Oregon. The latter two are U.S. Fish and Wildlife Service "species of concern." Macoun's fringed gentian (*G. macounii*) and one-flowered gentian (*G. simplex*) are listed in Montana as imperiled, and four-parted gentian (*G. propinqua*) is listed in Idaho. Yellow gentian (*G. lutea*) is listed as a European species of concern by the World Wide Fund for Nature. *Gentiana sceptrum*, national wetland indicator species. Moist habitats highly susceptible to damage. *Gentiana* is on United Plant Savers North American medicinal plants "To Watch" list. Do not recommend wildcrafting.

References

British Columbia Ministry of Forests (1995), Cooke (1997), Duke (1997), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), United Plant Savers (2000), USDA NRCS (1999), USDA Forest Service (1988), Whitney (1997), Williams (1990a, 1990b)

Gypsophila paniculata L.
Baby's breath
Caryophyllaceae
GYPA



Gypsophila paniculata

Ecology

Description: Exotic. Perennial herb, 40 to 80 cm tall, thick root; leaves opposite, narrow, 1.8 to 10 cm long with pointed tips; flowers many, tiny, white, massed in clusters, 1.6-3.2 mm wide; inflorescence diffusely branched.

Range and distribution: Widely over Pacific Northwest, primarily east of the Cascade Range, 1200-2000 m. Native to east and central Europe. Widely scattered, dense stands.

Associations: Dry Douglas-fir types, ponderosa pine, bitter-brush, yarrow, sagewort, fescues and other graminoids.

Habitat: Dry, disturbed areas, pastures, and rangeland. Grows on well-drained, poor, and alkaline soil.

Successional stage: Early colonizer; however, can become firmly established after colonization. Appears shade intolerant; cultivated species tolerate shade.

Ecological relations: Noxious weed. Once established, it is difficult to control.

Biology

Flowering and fruiting: Flowers from June through August.

Seed: Two to five black seeds about 2 mm long in small capsule. Reproduces easily from seed; germinate in 1 to 2 weeks at about 20-27 ºC temperature.

Vegetative reproduction: For cultivated varieties, cuttings and tissue culture.

Cultivation: Can be cultivated, but can readily escape and is difficult to control.

Transplant viability: Large taproot makes plant difficult to transplant.

Collection

Part harvested: Branching stems with inflorescent tops.

Harvest techniques: Stems clipped with knives or clippers.

Harvest season: Summer, when plant is in early to mid flower.

Regeneration after harvest: As long as root intact, will

readily resprout following season. In favorable sites, may regrow second crown with inflorescence after clipping, during same season.

Uses and Products

Common uses: Flowering stems as filler in floral arrangements; whole plant, in gardens and flower borders.

Indigenous uses: Not known.

Common products: Floral, dried and fresh flower tops and xeric landscape plant.

Types of markets: Domestic. Fresh floral, and floral crafts; xeric or natural landscape.

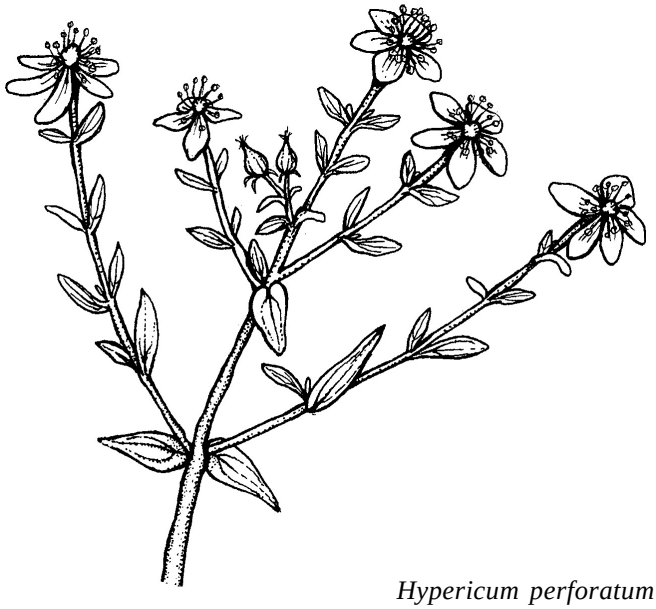
Comments and Areas of Concern

Gypsophila from Latin meaning "gypsum loving." This Eurasian species originally brought to the United States as an ornamental; has escaped cultivation and is now scattered at low elevations throughout the region, especially in dry climates. Listed as a noxious weed in California and Washington. Once established, difficult to control.

References

Antos et al. (1996), Burrill et al. (1996), Rice (1997), USDA NRCS (1999)

Hypericum perforatum L.
St. John's wort, Klamath weed
Hypericaceae (Clusiaceae)
HYPE



Hypericum perforatum

Ecology

Description: Exotic. Perennial herb from taproot; many branched, erect stems 0.3-1.2 m, rust colored, woody at base; leaves opposite, linear to oblong, 1.5-2.5 cm, edges rolled under, black-dotted, lower surface clear-dotted; flowers bright yellow, five petals, 8-12 mm with black-dotted margins, twice as large as sepals, many stamens; flowers bruise red, stain purple; fruit 7-8 mm, brown seeds less than 1-mm with rows of pits.

Range and distribution: From Tacoma, Washington, to southern California; below 1500 m, Pacific Coast to Rocky Mountains. Weedy; commonly grows in dense patches.

Associations: Various species of open grasslands, disturbed openings including annual fescues, wild oats, bromes, needlegrass and bluegrass; and other exotics, oxeye daisy, Queen Anne's lace, as well as native herbs.

Habitat: Full sunshine on well-drained slopes, pastures, abandoned fields, roadsides, and disturbed places.

Successional stage: Colonizer, early successional. Shade intolerant.

Ecological relations: Flowers attract bees and other pollinators; toxic to livestock; invader of disturbed sites; listed as a noxious weed in several Pacific Northwest states; has been successfully controlled in some areas by the introduced beetle, *Chrysolina quadrigemina* Suffrian; research directed toward controlling further spread is ongoing.

Biology

Flowering and fruiting: Abundant; flowering late June to August; flowers attractive to bees.

Seed: Copious seed production. Washing seeds can improve germination capacity. A germination inhibitor is present in the seed capsule exudate. Also, pretreatment for 7 to 14 days at 4 ºC can increase germination percentage.

Vegetative reproduction: Sprouts seasonally from tap root, short runners or rhizomes. One creeping root mass may have many aboveground plants. Occasional clipping of flowering tops promotes root spread and invigorates aerial stem growth.

Cultivation: Can be cultivated. Seeds are commercially available from various sources.

Transplant viability: Can be transplanted, but exercise caution because it spreads rapidly.

Collection

Part harvested: Flowering tops (leaves and flowers).

Harvest techniques: The uppermost flowering stems of the plant provide the highest quality product. Plants are cleaned of insects before collecting. Plants are clipped in late spring-early summer when flowers are a mixture of buds and blossoms. If flowering stems are cut early in the season, they will rebloom and seed.

Harvest season: Annually, from early to mid bloom, June to early August.

Regeneration after harvest: Good, resilient perennial.

Uses and Products

Common uses: Used as an antidepressant and sedative, for various mood and nervous disorders, anti-inflammatory, antiviral, antibacterial, astringent, antiseptic, and for healing wounds. Reported to have antiretroviral activity especially in the presence of light.

Indigenous uses: Used traditionally in Europe most commonly as a wound healer, but was also hung over doorways, pinned onto clothes or kept under the pillow for symbolic protection against the "evil spirits" that were thought to cause illness. Indigenous American (Cherokee and Iroquois) uses include an infusion taken for bloody flux and bowel complaint, cough, fever, and crushed plant sniffed for nosebleed; milky substance on sores and venereal disease; root as wash to give infants strength; to prevent sterility.

Common products: Tinctures, oils, capsules, tea bags, red dye, and extract in alcoholic beverages.

Types of markets: International and domestic. Dietary supplement and herbal.

Comments and Areas of Concern

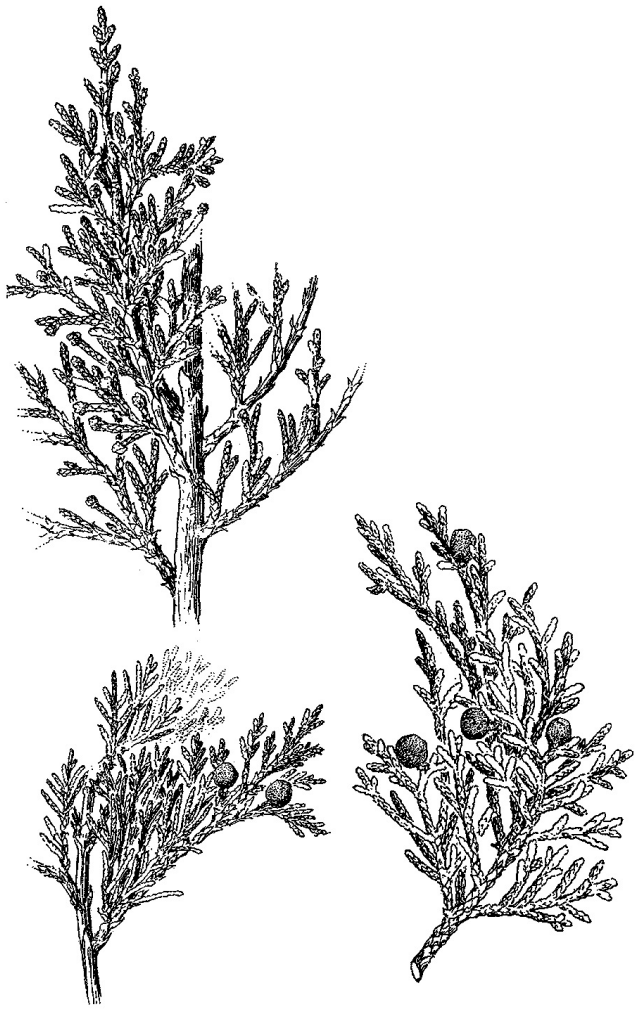
When collecting wild *Hypericum perforatum*, check for herbicide application particularly near roadsides and settled or farmed areas. Grows in disturbed sites; typical impact from harvest may encourage spread. An invasive species exotic to North America, considered a noxious weed in Montana, Oregon, and Washington. Cultivation should be undertaken with care to prevent the spread of the plant beyond the cultivated area. Seeds readily stick to animals, vehicles, and clothes. NOTE: It is illegal to grow *H. perforatum* in Washington and Montana; seed suppliers will not ship to these states.

References

Brevoort (1998), Burrill et al. (1996), Campbell and Delfosse (1984), Cooke (1997), Everett (1997), Hickman (1993), Hortus West (1998), Leung and Foster (1996), Mizerak (1998), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Rice (1997), Thomas and Schumann (1993), Tilford (1998), USDA Forest Service (1988), Vance and Thomas (1997)

Juniperus L. spp.
Juniper
Cupressaceae
JUNIP

J. occidentalis Hook., Western juniper-JUOC
J. scopulorum Sarg., Rocky Mountain juniper-JUSC2



Juniperus scopulorum *J. occidentalis*

Ecology

Description: Native. About 60 species in the Northern Hemisphere, 13 native to the United States; *Juniperus occidentalis* and *J. scopulorum* most common in the Northwest; shrub, tree, generally dioecious; bark thin, peeling in strips; leaves opposite and four-ranked or whorled in threes and six ranked, scalelike to less often needlelike; male flower, short catkin, 3-5 mm, pollen sacs two to six per scale; seed cone 5-18 mm, scales fused and fleshy, berrylike; seeds one to three per cone, flat, unwinged; immature "berries" greenish, ripen blue-black to red-brown, covered with white, waxy bloom. *Juniperus occidentalis*: slow growing and long lived; full crowned, heavy limbed tree 4.6-9.1 m, average circumference 107 cm; bark reddish brown, furrowed, and shredded; spreading branches; leaves mostly in threes 1.5 mm, scalelike, gray-green; cones 6-10 mm, berrylike, blue-black with a bloom, juicy, resinous, two to three seeds. *Juniperus scopulorum*: shrub to small tree, conical crown shape; 6.1-15.3 m, diameter to 45 cm; bark reddish gray to brown, furrowed and shredded; slender twigs; blue-green scalelike leaves 1-4 mm, mostly opposite; cones berrylike, bright blue with whitish coat, juicy, resinous, and two seeds.

Range and distribution: Widely distributed throughout the temperate and subtropical regions of the Northern Hemisphere; common juniper (*J. communis*) is the only conifer with worldwide distribution; *J. occidentalis*: from central, southeast Washington to California, to 3048 m; *J. scopulorum*: of junipers reaching tree size, it is the most widely distributed in North America; much of Pacific Northwest, Rocky Mountains, Great Basin, central British Columbia, to eastern Washington and Oregon; California juniper (*J. californica*), southwest Oregon and California. *Juniperus occidentalis*: scattered individuals, small groups, extensive stands depending on range (greatest abundance in central Oregon); *J. scopulorum*: scattered, but concentrations generally follow Rocky Mountains.

Associations: *Juniperus occidentalis*: ponderosa pine, big sagebrush, Idaho fescue, and bluebunch wheatgrass; *J. scopulorum*: component of the foothills or woodland coniferous zone, complex transition zones or exposed or severe sites within other forest types; most common understory is big sagebrush.

Habitat: *Juniperus occidentalis*: mountain slopes and plateaus, mostly on shallow, rocky soils; occurs in zone between ponderosa pine communities and sagebrush steppe; *J. scopulorum*: open, exposed sites, rocky calcareous soils, wide range of sites in drier lower foothills of Rocky Mountains and northern plains.

Successional stage: *Juniperus occidentalis*: indicator of climax in many sagebrush-grassland, shrub-steppe and drier conifer habitat types; *J. scopulorum*: indicator of climax in many ponderosa pine, mountain brushland, and sagebrush-grassland habitat types; because of its ability to survive where other species cannot, it is considered a pioneer species in some early-successional communities. Shade intolerant.

Ecological relations: Wildlife cover, nesting and hibernation sites, shade, and food; seeds disseminated during fall primarily by birds and mammals; browsed only on winter ranges; helps prevent erosion on steep hillsides. In general, junipers are highly vulnerable to fire and usually occur in large numbers only in fire refugia. Typically juniper does not resprout after fire, but seeds in the soil may germinate. Some juniper species can survive light fires.

Biology

Flowering and fruiting: Begin bearing at 10 to 20 years old; flowers borne in spring, fruit ripens in fall of second year; remains on tree for 2 years until mature.

Seed: Seeds dispersed in fall usually by birds. Good seed production; seeds removed by macerating and flotation, and store quite well; warm and cold stratification needed; sown in fall or spring, germination completed in several weeks.

Vegetative reproduction: Does not naturally reproduce vegetatively; grafting, cutting, and layering possible.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Does not transplant well from natural environment.

Collection

Part harvested: Berries, leaves, and branches.

Harvest techniques: Berries are picked when dark blue and juicy; collect fruit by handpicking or after berries drop off tree to ensure picking 2-year-old ripe fruit; leaves and branch tips clipped. Berries can be picked in bunches by pruning twig tips; also can be removed by hitting branches with a strong stick and collecting berries on a plastic ground cloth. Twigs with firm, blue berries are harvested by pruning the branches. Branches need to be at least 30 cm long.

Harvest season: Collect berries in fall; leaves and branches anytime. Floral products: branches are picked after the berries harden off but before they fall. Best time is mid summer.

Regeneration after harvest: New branches can sprout below clip point, particularly if younger branches are clipped. In dry locations regrowth is slow.

Uses and Products

Common uses: Wood: fencing, decks, paneling, furniture, particleboard, toys, and firewood; boughs: Christmas wreaths and decorations; used as a diuretic, laxative; in soaps, detergents, perfumes; extracts and oils used in major food categories, gin, herbal tea flavoring; cosmetics; insecticides; whole plant: to inhibit bacteria, as a tonic, for low blood sugar; as a garden ornamental and for landscaping.

Indigenous uses: Food, gastrointestinal aid, coughs, colds, analgesic, poultice for wounds, liniment, ceremonial paint, and decorations.

Common products: Specialty lumber, finish wood, decorative fruits and greens, Christmas wreaths, table decorations, grave blankets, door arches, medicinal herbal products, and transplants.

Types of markets: Domestic and international markets for holiday greenery, health food, herbal, specialty food, and specialty lumber. Domestic markets for home decoration materials and native landscaping products.

Comments and Areas of Concern

Do not use during pregnancy or in presence of kidney disease; gather conservatively; it is important wildlife food and shelter source, and it regenerates slowly. Juniper is traditionally used by Alaska tribes, and Alaska Natives have requested limited commercial use. Is considered an invasive species in sagebrush-steppe rangelands of eastern Oregon where fire has become less frequent. Since 1936, juniper forests have increased fivefold from 456,000 to 2.2 million acres in eastern Oregon.

References

Burns and Honkala (1990), Gedney et al. (1999), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Leung and Foster (1996), Moerman (1998b), Schofield (1989), Tilford (1998), Tirmenstein (1986a, 1986b), USDA Forest Service (1974), Whitney (1997), Willard (1992), Young and Young (1992)

Ligusticum L. spp.
Lovage, osha, licorice-root
Apiaceae
LIGUS

L. apiifolium (Nutt. ex Torr. & Gray) Gray, Celeryleaf lovage- LIAP
L. canbyi Coult. & Rose, Canby's lovage-LICA2
L. grayi Coult. & Rose, Gray's lovage- LIGR

Ligusticum apiifolium *L. canbyi*

Ecology

Description: Native. About 25 species in North America and Eurasia. Perennial herb to 120 cm; stems hollow and stout; root large, brown, fibrous at base, spicy celery odor; mostly basal leaves pinnately divided into one to four pairs, up to 20.3 cm long; umbel inflorescence 5-13 cm broad; flowers white or pinkish; fruit, small oblong, ribbed.

Range and distribution: High elevations in British Columbia, Montana, Idaho, Washington, Blue Mountains in Oregon; most species ring the Great Basin, east of the Sierras, Nevada ranges and along the Rocky Mountains; up to 3658 m. *Ligusticum apiifolium* from Washington to California at low elevations, *L. canbyi* in Washington, Idaho, Blue Mountains, *L. grayi* in the Cascade and Sierra Ranges to Nevada.

Associations: True fir, ponderosa pine, lodgepole pine, mixed-coniferous forests. Willow, angelica, false Solomon's seal, stinging nettle, cow-parsnip, sedges, and bluegrass.

Habitat: Wet mountain meadows, montane forests, marshes, along streambanks, sparsely wooded slopes and prairies.

Successional stage: Mid to late successional; in stable plant communities. Moderately shade tolerant.

Ecological relations: Eaten by moose, deer, and other large animals; flowers attract pollinators. Called "bear medicine" based on observations of sick bears eating the plant and rolling in patches of osha. Highly palatable to livestock.

Biology

Flowering and fruiting: *Ligusticum apiifolium* flowers from May through July; *L. grayi* and *L. canbyi* flower from July to September.

Seed: Small, about 1-2 mm in length. Difficult to start from seed. Reproduction naturally poor from seed.

Vegetative reproduction: From root division.

Cultivation: Can be cultivated. Seeds are commercially available for Porter's lovage (*L. porteri*).

Transplant viability: Nearly impossible to transplant.

Collection

Part harvested: Root.

Harvest techniques: Roots are dug conservatively from healthy patches. Patches are approached carefully as the wet environment is sensitive to impact. Roots are dried quickly as they are susceptible to mold.

Harvest season: After flowers have gone to seed but before aerial parts die back (making identification difficult).

Regeneration after harvest: Osha and its habitat are sensitive to harvest. Consider alternatives for the same effects.

Uses and Products

Common uses: Antiviral, expectorant, to induce sweating, upper respiratory infections, herbal baths and deodorants; parsley substitute.

Indigenous uses: Colds, sore throats, and sinus infections.

Common products: Teas, tinctures, capsules, and essential oils.

Types of markets: International and domestic. Herbal and medicinal.

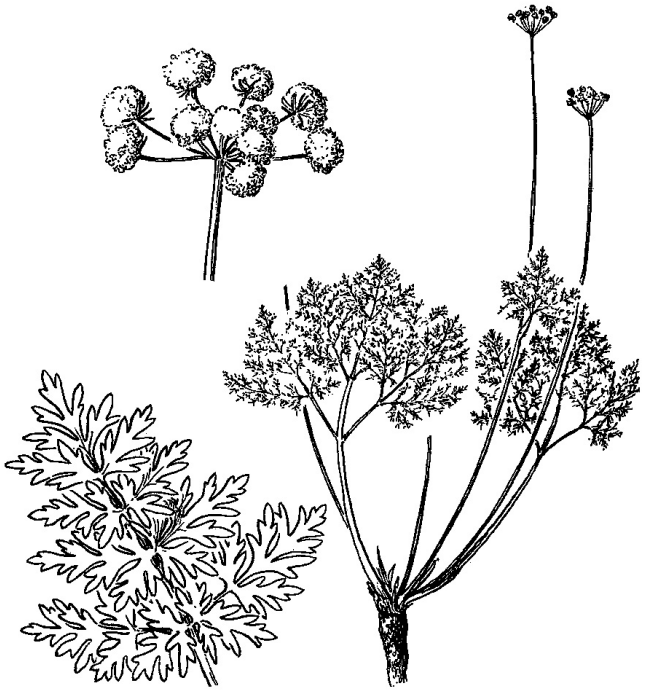
Comments and Areas of Concern

About 18 species occur in the mountain ranges of the West. *Ligusticum* species is being substituted for Chinese *Ligusticum* herbs. Because of market pressure and habitat loss, *Ligusticum* species are becoming increasingly rare; suggest finding alternatives. Use caution when collecting; osha resembles poison hemlock. One of the seven wild medicinal plants under a moratorium imposed on harvest or removal from Montana State lands. No permits are being issued on National Forest System lands and collection or harvest is not permitted on National Forest System lands in the Northwestern and Intermountain Regions. *Ligusticum* on United Plant Savers North American medicinal plants "At Risk" list.

References

Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Medicine Roots (2001), Moore (1993), Niehaus (1976), Ross and Chambers (1988), Schofield (1989), Tilford (1993), United Plant Savers (2000), USDA Forest Service (1988), USDA NRCS (1999), Willard (1992)

Lomatium dissectum (Nutt.) Mathias & Constance
Desert parsley, fern-leaved lomatium
Apiaceae
LODI



var. *eatonii* var. *multifidum*

Lomatium dissectum

Ecology

Description: Native. Perennial herb; 30-140 cm; stalks extending well above foliage; umbel inflorescence, bracts of umbellets narrow; basal, leaves, finely dissected, fernlike, 15-35 cm wide; flowers yellow or purple; fruits 12-16 mm; seeds large, flat oval, slightly winged.

Range and distribution: Mainly the Great Basin, eastern Washington and southern Oregon to Colorado; sporadically from California to Western Canada; 150-3000 m. Large stands, but widely separated.

Associations: Dry Douglas-fir, ponderosa pine, juniper-sagebrush, shrub-steppe zones. Ponderosa pine, black hawthorn, common snowberry, big sagebrush, arrowleaf balsamroot, yarrow, penstemon, bluebunch wheatgrass, and fescue.

Habitat: Wooded or brushy, rocky slopes, dry hillsides, and meadow steppe.

Successional stage: Part of established prairie plant community, but can be colonizer after disturbance on exposed rocky soil. Shade intolerant.

Ecological relations: Large taproot stabilizes soil; forage plant, sometimes upper parts and roots are eaten by rodents, bears, bighorn sheep, deer, and elk; flowers are pollinator attractors, among first to bloom in spring.

Biology

Flowering and fruiting: Blooms in early spring, from April through June.

Seed: Reproduction primarily by seed. Collect seed before fully dried to avoid beetles drilling seed. Bring into greenhouse to dry. Multicycle germinator; needs pretreatment for full germination.

Vegetative reproduction: Can reproduce from tuberous portions of the root.

Cultivation: Can be cultivated. Seeds are commercially available.

Transplant viability: Young plants can be put into "long cells" to increase root systems before transplanting; difficult to propagate; do not transplant well.

Collection

Part harvested: Root.

Harvest techniques: Do not collect commercially in southern Oregon. If it is collected for personal use, be sure root crowns are replanted. Easier to find, identify and dig earlier in the year.

Harvest season: Late spring, summer, early fall (spring is easiest time to identify).

Regeneration after harvest: If enough of root and root crown left, can regenerate from root.

Uses and Products

Common uses: As an antiviral, expectorant, antimicrobial, immunostimulant, for respiratory and skin infections; starchy root stock has been used as flour substitute in allergenic diets.

Indigenous uses: Infusion of root to increase appetite, and to treat tuberculosis, arthritis, dandruff, and pimples. Root combined with tobacco for sinus trouble. Pounded roots applied to open cuts, sores, and bruises; root chewed for sore throat; young shoots eaten; mature tops and roots considered poisonous, and purple shoots considered poisonous by Okanogan and Colville Native Americans.

Common products: Medicinal and herbal.

Types of markets: International and domestic. Medicinal and herbal, dietary supplement.

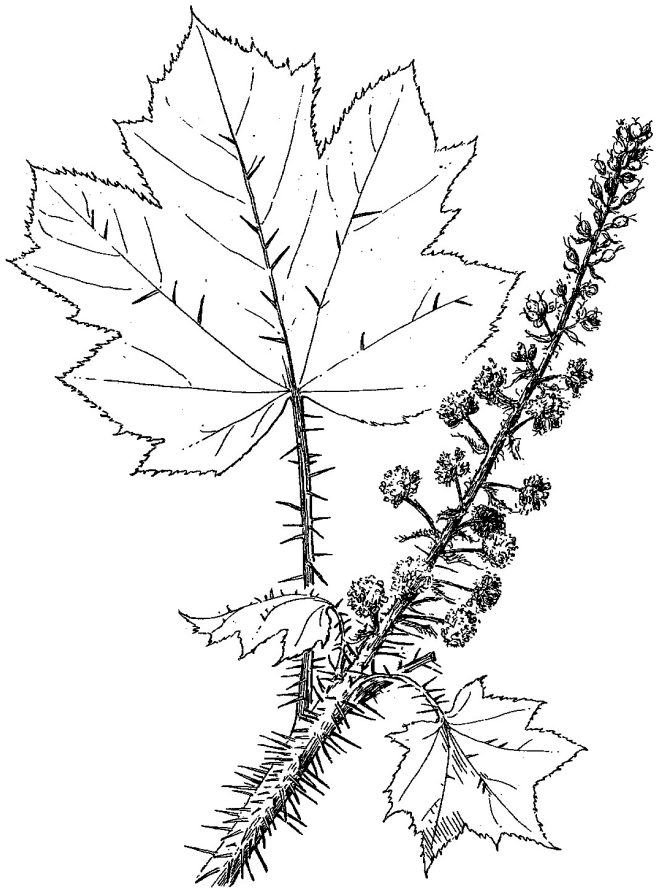
Comments and Areas of Concern

Loose, rocky growing site can be heavily impacted during harvest; slow growing. Consumer demand increasing. There are several dozen species in the Pacific Northwest; many of them are sensitive, rare, and at risk. One of the seven wild medicinal plants under a moratorium imposed on harvest or removal from Montana State lands. In Northwestern and Intermountain Regions of the USDA Forest Service, removal or collection of all *Lomatium* species is not permitted. In the Pacific Northwest Region of the USDA Forest Service, 12 *Lomatium* species are listed. Geyer's lomatium (*L. geyeri*) is listed in Montana as critically imperiled, and in Idaho, Salmon River lomatium (*L. salmoniflorum*) is listed as rare and imperiled. *Lomatium dissectum* on United Plant Savers North American medicinal plants "At Risk" list.

References

British Columbia Ministry of Forests (1995), Craighead et al. (1991), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Mizerak (1998), Moore (1993), Niehaus (1976), Pojar and MacKinnon (1994), Tilford (1993, 1998), United Plant Savers (2000), USDA Forest Service (1988)

Oplopanax horridum (Smith) Miq.
Devil's club
Araliaceae
OPHO



Oplopanax horridum

Ecology

Description: Native. Erect to slightly spreading deciduous shrub, 1-3 m; stems 1-4 cm thick, crooked, almost unbranched but often entangled, dense large yellowish spines up to 1 cm long; leaves alternate, up to 35 cm across, maple-leaf shape, prominent veins, seven to nine sharply pointed and toothed lobes, numerous spines on underside; flowers small, 5-6 mm, whitish, numerous in compact pyramidal terminal clusters; bright red, flattened shiny berries, 5-8 mm, in large clusters, with two to three seeds.

Range and distribution: Alaska to Oregon, east and west slope of the Cascade Range, east to Idaho and Montana, also sparsely distributed as far east as Ontario and upper peninsula of Michigan; low to middle elevations, below 1525 m. In cool, moist, shaded habitats may form nearly pure, dense stands.

Associations: Sitka spruce, Pacific silver fir, mountain hemlock, western hemlock zones. Sitka spruce, western redcedar, Alaska-cedar, western hemlock, Douglas-fir; Alaska huckleberry, salmonberry, vine maple; deerfoot vanillaleaf, western trillium, lady fern, and bedstraw.

Habitat: Moist woods, along streams, wet but well-drained seepage sites, and avalanche tracks.

Successional stage: Mid to late successional, will fill in alluvial openings. Shade tolerant.

Ecological relations: Emergent leaves and stems in spring and fruit in summer eaten by bears; browsed lightly by deer and elk; leaves eaten by slugs; provides shade cover for salmonid fishes and eggs; hiding, escape, and thermal cover for various birds and rodents; provides stream-edge protection and buffer to prevent human-livestock intrusion into wetlands.

Biology

Flowering and fruiting: Flowers in late spring to mid summer from June through August, fruits ripen about 4 weeks later and remain over winter.

Seed: Seeds collected from ripe fruit and sown in autumn. Requires moist shady conditions and rich, well drained potting soil. Seedlings transplant after 1 year old.

Vegetative reproduction: Regenerates naturally through layering. To vegetatively propagate, cuttings should be taken in late spring. Take cuttings from horizontal branches with at least one leaf bud scar; stick into well-drained potting mix; keep moist and cool.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Transplants well into appropriate habitat by using rooted stem cuttings.

Collection

Part harvested: Root bark or whole roots, aerial and layered stems, berries, and leaves.

Harvest techniques: Stem harvesting concentrated on outer edges of patches. As many true roots are left with attached stem pieces in the ground as possible. If patch is greater than 100 m^2, interior patch harvesting is more acceptable but proceed cautiously, especially in Oregon and southern Washington where Devil's club is not as extensively distributed as in areas farther north. Until monitoring shows otherwise, no more than 20 percent of patch is harvested. After being harvested, a patch is left undisturbed until regrowth replaces amount harvested.

Harvest season: Late summer-early fall. Occasionally spring.

Regeneration after harvest: Good, damage to stems initiates new shoot growth.

Uses and Products

Common uses: Astringent, cathartic, to induce sweating and lower blood sugar, expectorant and respiratory stimulant; only the young spring shoots are edible. Increasingly used as a specialty ornamental species in shaded gardens.

Indigenous uses: Extensively used; to Alaska natives and indigenous people of the north Pacific coast it is one of the most important of all medicinal plants. Roots are the major part used for many ailments, including arthritis, ulcers, digestive tract ailments, diabetes (still used today), medicinal tea, poultice, and liniment; hair tonic; protective charms and body paint; fishing lures and dyes.

Common products: Dietary supplement, bulk milled and dried for tea and herbal tinctures, fresh tinctures.

Types of markets: International and domestic; herbal and medicinal. Primarily domestic for landscape markets.

Comments and Areas of Concern

Devil's club has the potential to be overharvested as its popularity increases. This species may be found in easily damaged habitats. Riverbanks and other sensitive areas should be avoided. Central Oregon marks its southern range, where it is limited to moist draws. Devil's club is listed as threatened in Michigan. Commercial harvest is not permitted on the Tongass National Forest in Alaska.

References

British Columbia Ministry of Forests (1995), Cooke (1997), Gardenbed (2000), Hitchcock and Cronquist (1978), Hortus West (1998), Howard (1993), Kruckeberg (1993), Moore (1993), Pojar and MacKinnon (1994), Roorbach (1999), Rose et al. (1998), Thomas and Schumann (1993), Vance and Thomas (1997), Whitney (1997)

Pachistima myrsinites Raf.
False box, Oregon boxwood
Celastraceae
PAMY

Ecology

Description: Native. Low, evergreen shrub to 60 cm tall; oval to elongate leaves, opposite, 1-3 cm long, leathery, toothed margins, and darkly evergreen; flowers small and maroon, in clusters along branches; fruit mostly white, oval capsules.

Range and distribution: Northern Mexico to British Columbia, Rocky Mountains; 600-2000 m. Common throughout mountainous forests of the West. Dominant shrub in many habitat types.

Associations: Subalpine fir, Engelmann spruce, grand fir zones. Hemlock, western redcedar, lodgepole pine, mountain maple, mountain snowberry, bunchberry dogwood, huckleberry, ninebark, sweet-cicely, queen-cup beadlily, heartleaf arnica, meadow rue, and pinegrass.

Habitat: Shaded places, dense woods, also rocky openings, and clearings.

Successional stage: Early to late succession. Will establish in openings. Shade tolerant.

Ecological relations: Good browse for deer, elk, and moose. Occasionally browsed by livestock but not considered an important forage. Can be used to revegetate disturbed sites. Can sprout from buds on the taproot or from the root crown after low- or moderate-intensity fire.

Biology

Flowering and fruiting: Fruits from June through September. The seed may remain viable for decades.

Pachistima myrsinites

Seed: Dispersed by gravity. Seeds retain viability for long period. Some seedling establishment may occur from seedbank in soil. May need stratification to break dormancy.

Vegetative reproduction: Easily reproduced from cuttings. Stem cuttings are taken in early fall. Reproduces naturally from layering.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Although transplantable, a less intrusive procedure is to take stem cuttings. With this method, there is less risk of forest ground cover and soil disturbance.

Collection

Part harvested: Leafy fanlike branches 60-75 m long that are free of fruit-flowers. Leaves must be dark green to obtain best prices.

Harvest techniques: Selected branches from no more than 25 percent of total foliage of plant are clipped with sharp clippers. Stems must be 40-45 cm long. A bunch of branches called a "hand" contains 26 to 28 pieces and weighs slightly less than 1 lb. Hands are placed in bundles weighing 40 to 60 lbs. Stem tips clipped for rooting cuttings are refrigerated until stuck for rooting.

Harvest season: Late summer-fall when leaves have hardened, before new growth begins in spring.

Regeneration after harvest: Regrowth occurs, but slowly in the wild. If plant and growing conditions are favorable, regrowth may be sufficient for plant foliage to be collected on an alternate year schedule. New growth will develop where harvest cuts have been made. Often multiple new stems grow from harvest cut on a single older stem.

Uses and Products

Common uses: Branches for floral decorations, a substitute for evergreen huckleberry and salal in floral arrangement, preserved and dried crafts. Whole plant easily shaped and adapts well to both sunny and shady spots, thereby making it ideal for an ornamental and ground cover.

Indigenous uses: Tea for colds, tuberculosis, and kidney troubles. To heal broken bones and internal ailments.

Common products: Floral greenery and landscape plant.

Types of markets: International and domestic for finished floral and craft products and bulk raw materials. Domestic for florist, landscaping, and nursery.

Comments and Areas of Concern

Patches of *Pachistima* near urban centers have been depleted by harvest of branches and leaves for floral industry.

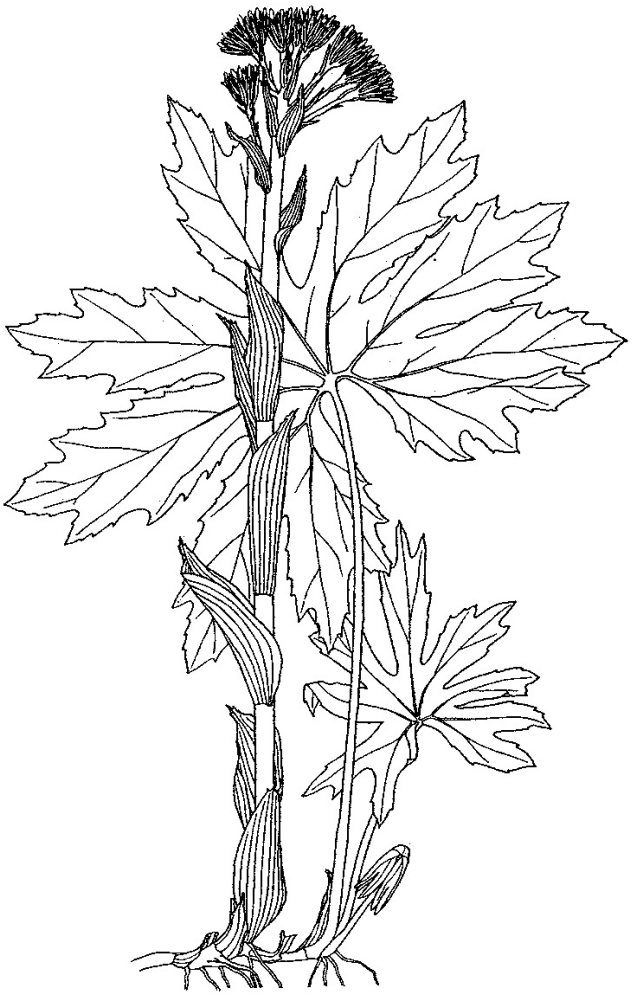
References

Antos et al. (1996), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Kruckeberg (1993), Rose et al. (1998), Snyder (1991), USDA Forest Service (1963)

Petasites frigidus (L.) Fries var. *palmatus* (Ait.) Cronq.
Coltsfoot, palmate coltsfoot

Asteraceae

PEFRP



Petasites frigidus var. *palmatus*

Ecology

Description: Native. Perennial herb, from rhizome; numerous stems 20-60 cm; basal leaves, to 40 cm wide, palmately lobed and veined, coarsely toothed, hairless above, white woolly below; umbel inflorescence; flowers in flat-topped clusters, ray flowers creamy white, 2-7 mm, disk flowers white to pinkish, 3-5 mm; fruits, hairless achenes. Flowering stems grow before leaves.

Range and distribution: Circumboreal, widespread at low to mid elevations. Patchy distribution; may grow in pure stands.

Associations: Pacific silver fir, western hemlock zones. Big-leaf maple, vine maple, alder, maple, ferns and allies, Brewer's mitrewort, foamflower, and horsetail.

Habitat: Small forest openings, generally moist soil, along embankments, streams; also found in clearcuts and in moist, open meadows.

Successional stage: Early to late successional. Moderately shade tolerant.

Ecological relations: Plants eaten by elk; as a riparian plant with large leaves, it helps to keep the ground moist and provides habitat for animals including salamanders. Early blooming flowers provide first nectar of season for bees. Goldfinches line nests with the underleaf "felt."

Biology

Flowering and fruiting: Flowers from April to June, fruits mid to late summer.

Seed: Collect before the seeds turn to fluff; time is required to separate the seed from the chaff.

Vegetative reproduction: Easy to propagate from division of rhizome.

Cultivation: Can be cultivated. Plants and seeds are commercially available for *Petasites frigidus palmatus*. Seeds are commercially available for *P. frigidus*.

Transplant viability: Can be transplanted.

Collection

Part harvested: Leaves, stems, and roots.

Harvest techniques: Leaves are cut from stems with a serrated knife. Stems are plucked at ground level. Roots are dug carefully. Avoid collecting in sensitive riparian areas.

Harvest season: Mid June to late August for stems and leaves. Root harvested in spring.

Regeneration after harvest: Regeneration from stem harvest good if root crown and rhizomes left intact. Leaves regenerate after spring.

Uses and Products

Common uses: Cough medicine, antispasmodic, nerve sedative, and topical first aid (anti-inflammatory, sedates nerve pain). Stems, leaves, and roots edible; tobacco substitute-additive. Used as a facial compress; salt obtained from burned ashes.

Indigenous uses: Tobacco or snuff additive, infusion of leaves for colds, and head or chest congestion. Young leaves and stems eaten as salad, cooked as potherb or as "sauerkraut." Seed heads used for mattress stuffing with duck feathers. Roots applied to boils, sores, and to help soothe itching.

Common products: Tincture, smoking mixture, tea, and poultice.

Types of markets: International and domestic. Herbal and dietary supplement.

Comments and Areas of Concern

Coltsfoot (*Petasites frigidus* var. *palmatus*) is listed in Idaho as critically imperiled; it should **not** be harvested. In Montana, sweet coltsfoot (*P. frigidus* var. *nivalis*) is listed as critically imperiled. *Petasites* hybridizes readily; because of this, difficult to distinguish varieties. Arrowleaf coltsfoot (*P. sagittatus*) is also listed in Idaho. Although *Petasites* is not listed in Washington and Oregon, wild harvest should be conducted with restraint, if at all. Use cautiously; contains traces of pyrrolizidine alkaloids, a potential liver toxin; some local companies use imported European species. The root is commonly referred to as "butterbur."

References

Brill and Dean (1994), Hickman (1993), Hortus West (1998), Kruckeberg (1993), Miller (1988), Mizerak (1998), Moore (1993), Munz and Keck (1959), Pojar and MacKinnon (1994), Saunders (1976), Schofield (1989), Thomas and Schumann (1993), Toogood (1993)

Polystichum munitum (Kaulfuss) K. Presl.
Western sword fern
Dryopteridaceae
POMU

Ecology

Description: Native. Large, to 1.5 m, evergreen with erect leaves forming a crown from a stout, woody, scaly rhizome; leaves, stipe dry-scaly, blade lance shaped, erect to arching, 50-180 cm, once pinnate, leaflets alternate, 3-15 cm, pointed, sharp toothed with incurved spine tips, with small lobe pointing forward at bottom; sori large, circular, halfway between mid vein and margin; indusium round with fringed margins, centrally attached.

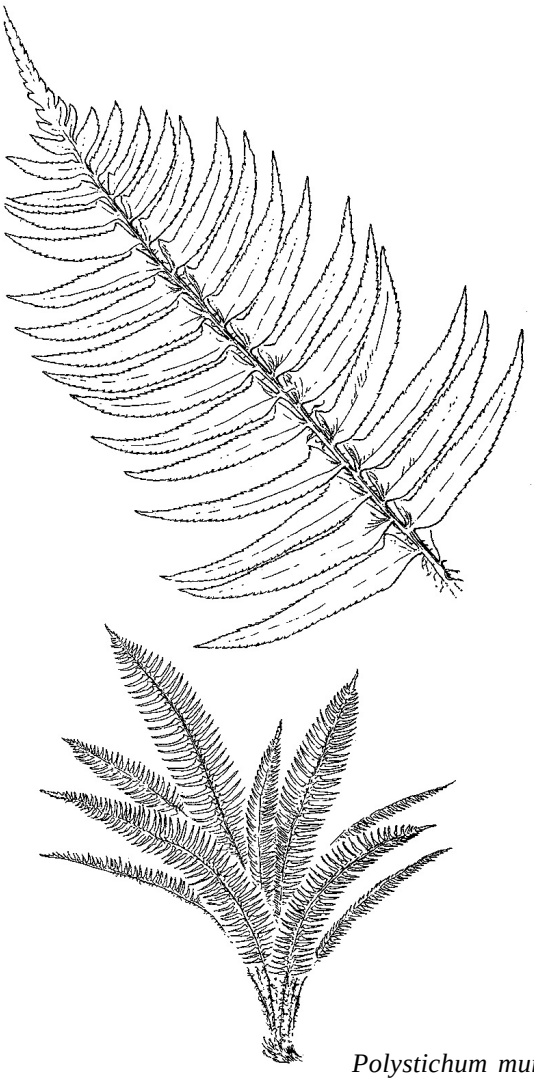
Range and distribution: Alaska to California, Washington to northern Idaho to Montana; low to mid elevations. Common and widespread.

Associations: Primarily Sitka spruce, western hemlock and Pacific silver fir zones. Also mixed-conifer/hardwood forest. Douglas-fir, red alder, vine maple, salmonberry, salal, dwarf Oregon grape, and evergreen huckleberry.

Habitat: Moist forests, wooded hillsides, and slopes; greatest in outer edges of riparian zones.

Successional stage: May be present in all, but best growth and persistence in mid- to late-successional stages.

Ecological relations: Forage for elk, deer, and black bear. Sword fern sprouts from woody underground rhizomes after fire. A single plant also can produce millions of spores that can colonize burn sites.



Polystichum munitum

Biology

Flowering and fruiting: Fronds unroll by May; spores near maturity by late July.

Seed: Spores.

Vegetative reproduction: Limited, but can occur through division of rhizome.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Transplants well.

Collection

Part harvested: Fronds (leaf blade).

Harvest techniques: Fronds are cut by using a special small, curved knife that is attached to a ring that fits over the finger. Fronds must be green and healthy. The underside of the frond has few or no spore cases. Spore cases when present are firm. All fronds are free of insect damage and dirt and 65-70 cm long; all bunches must have 52 frond blades stacked flat and evenly.

Harvest season: Year-round, but if harvested too early in spring, tips will wilt. Edible young fronds (fiddleheads) in early spring.

Regeneration after harvest: Good when less than 50 percent of the new fronds are harvested at any one time.

Uses and Products

Common uses: In flower arrangements, as a decorative; edible (young fronds); and garden landscaping.

Indigenous uses: Edible, cooking, protective layer in ovens, dermatological aid, burn dressing, sore throats, gynecological aid, flooring, and bedding.

Common products: Floral background or filler for fresh flower arrangements.

Types of markets: International and domestic markets for floral and floral crafts. Small domestic landscaping and restoration markets.

Comments and Areas of Concern

Some species of fern are carcinogenic; should not be eaten unless identification is certain and the carcinogenic properties are known. California sword fern (*Polystichum californicum*), found in the Cascade Range of Oregon is listed as imperiled. The more common sword fern resembles this species; collecting not permitted on the Willamette National Forest where it is found.

References

British Columbia Ministry of Forests (1995), Crane (1989a), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moerman (1998b), Pojar and MacKinnon (1994), Seda (1989), Thomas and Schumann (1993), USDA Forest Service (1963, 1965), Vance and Thomas (1997)

Prunella vulgaris L.
Selfheal
Lamiaceae
PRVU

Prunella vulgaris

Ecology

Description: Native and exotic. Perennial herb, fibrous, rooted from a short rhizome or stem base; 10-50 cm; stems solitary or clustered, erect to spreading or reclining, square in cross section, unbranched; leaves opposite, few, lower petioled, 5-30 mm, upper subsessile, 2-7 cm, 1-4 cm wide, oval to lance shaped, margins smooth or obscurely toothed; inflorescence bract, 2-6.5 cm; flowers purplish to pink, 1-2 cm, sepals united in two-lipped tube, petals fused into two-lipped tube, upper lip hooded, lower lip fringed; fruits four nutlets. *Prunella vulgaris* var. *lanceolata* is native to North America; var. *vulgaris* is introduced from Eurasia.

Range and distribution: Global; low to mid elevations, under 2400 m. Widely scattered.

Associations: Most forests; treeless areas in Sitka spruce zone. Widely associated with moist meadow and roadside herbs; field mint, St. John's wort, thistle, and oxeye daisy.

Habitat: Moist roadsides, clearings, fields, lawns, and forest edges.

Successional stage: Early successional, colonizer after disturbance. Moderately shade tolerant.

Ecological relations: Forage; flowers attract pollinators; rhizomes are soil aerators.

Biology

Flowering and fruiting: From May through September.

Seed: Seed dispersal in fall, tiny seeds disperse quickly once mature.

Vegetative reproduction: Typically grown best from seed. Sow seed in neutral-basic soil in mid to late spring.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Good for seedlings and young plants.

Collection

Part harvested: All aboveground parts.

Harvest techniques: Stems are cut at base without pulling the roots. Do not damage roots while harvesting.

Harvest season: Gather while blooming.

Regeneration after harvest: Generally poor although may resprout the following year if root-rhizome intact.

Uses and Products

Common uses: Medicinal, astringent, tonic, healing wounds, anti-inflammatory; contains ursolic acid, a diuretic, and anti-tumor compound. Medicinal ingredient in several all-purpose salves, ointments, and lotions for burns, wounds, and irritations.

Indigenous uses: As a skin ointment, to treat boils and skin inflammations, as a heart medicine, to reduce fevers, and back and eyewash for horses.

Common products: Teas, capsules, dried herb, ointment, and salves.

Types of markets: International and domestic. Herbal, medicinal, and nutraceutical.

Comments and Areas of Concern

Avoid soil compression in marshy areas; avoid gathering near roads, as it absorbs toxic compounds; use caution where herbicides may have been sprayed as it commonly grows in association with weedy species.

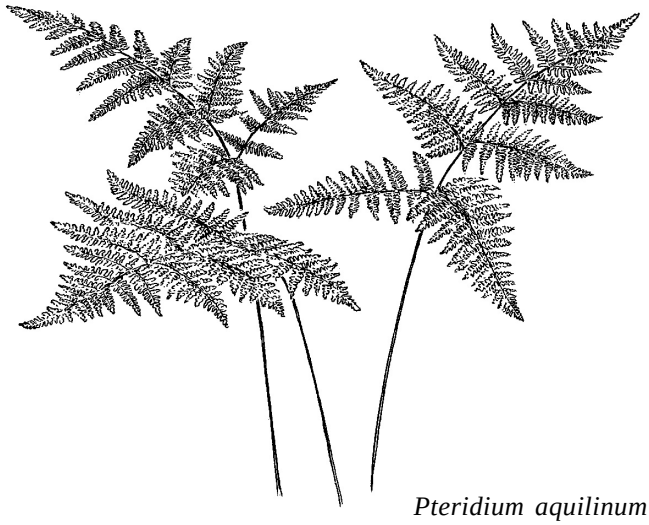
References

Franklin and Dyrness (1973), Gardenbed (2000), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Moerman (1998b), Niehaus (1976), Pojar and MacKinnon (1994), Tilford (1993, 1998)

Pteridium aquilinum (L.) Kuhn var. *pubescens* L. Underw.
Bracken fern, western bracken fern

Dennstaedtiaceae

PTAQ



Pteridium aquilinum

Ecology

Description: Native. Fronds large, solitary, erect, deciduous, to 3 m, sometimes up to 5 m; rhizomes spreading, hairy; leaf blades triangular, two to three times pinnate, hairy; stipes stout, straw colored to greenish, longer than the blades; leaflets 10 or more pairs, mostly opposite, lowest pair broadly triangular, upper ones progressively reduced and lance shaped; ultimate segments round toothed, margins rolled under; sori marginal, continuous, indusium not evident.

Range and distribution: Coast to subalpine elevations. Alaska to California, to Colorado; cosmopolitan and widespread.

Associations: Western hemlock and Pacific silver fir hemlock zones. East of Cascade Range, Douglas-fir, ponderosa pine; salal, red huckleberry, thimbleberry, Sitka valerian, fireweed, and grasses.

Habitat: Various habitats, meadows, roadsides, dry to wet forests, open and disturbed sites.

Successional stage: Colonizer, invasive following disturbance. In early-successional communities. Shade intolerant.

Ecological relations: Elk and deer eat new fronds; cover for birds and small mammals; insect habitat in decomposing litter. Bracken fern is adapted to fire and promotes fires by producing a highly flammable layer of dry fronds each fall. Deeply buried rhizomes allow the fern to resprout after fire. Wind-borne spores and surviving rhizomes result in bracken fern being an effective postfire colonizer. Rhizomes effective at mobilizing phosphorus and contributes to potassium cycling. Allelopathic.

Biology

Flowering and fruiting: Fronds emerge between March and early May.

Seed: Spore production differs from year to year. Few plants have been found in the wild that start from spores, but germination in culture is common. Spores germinate best at 1 to 2 ºC and in soil at pH range of 5.5 to 7.5.

Vegetative reproduction: Most regeneration is vegetative by rhizomes.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Good, best with young plants. Propagation by division most successful.

Collection

Part harvested: Fiddlehead (tightly coiled new growth of fern frond) and rhizome.

Harvest techniques: Fronds are cut from rhizomes. Rhizomes are carefully dug from soil leaving portions to resprout buried in the ground. Fronds must be green and healthy. The underside of the frond generally has few or no spore cases. Spore case when present must be firm. All fronds are free of insect damage and dirt.

Harvest season: Spring.

Regeneration after harvest: Will resprout the following season if root crown left intact.

Uses and Products

Common uses: Food, floral, and ornamental. Fronds and rhizomes have been used for brewing beer, food and herbal remedy, and rhizome starch for confections; potential source of insecticides; indicator of acid rain pollution.

Indigenous uses: Young shoots, tonic, antiemetic, decoctions made for various ailments, tuberculosis, rheumatism. Protective layers in ovens, rhizomes and sprouts eaten (sparingly); bronchitis remedy. Roasted and peeled rhizomes used for a starch, also used medicinally. Fronds: to wrap fish and as camp bedding.

Common products: Preserved and dyed craft materials. Young shoots, culinary dishes based on oriental cuisine.

Types of markets: International market for fresh and processed fiddleheads, particularly Japan. Domestic markets for dried and dyed floral and craft products.

Comments and Areas of Concern

All portions of fern, both green and dried, are toxic to livestock in quantity; contains thiaminase, which lead to severe deficiency of vitamin B_1; also contains ptaquilside a substance reported to be a potent carcinogen. **No sources we found recommend eating this plant.** Commercially sold edible fiddleheads primarily from ostrich fern (*Matteuccia struthiopteris*) found in eastern North America. Fiddleheads may be similar in appearance among fern species, know species being eaten.

References

Cooke (1997), Crane (1990a), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Moerman (1998b), Pojar and MacKinnon (1994), Seda (1989), USDA ARS (2001), USDA Forest Service (1963), USDI Bureau of Land Management (1999)

Rosa L. spp.
Wild rose
Rosaceae
ROSA5

R. gymnocarpa Nutt., Baldhip rose-ROGY
R. nutkana Presl., Nootka rose-RONU

Rosa gymnocarpa

R. nutkana var. *hispida*

Ecology

Description: Native. Perennial shrub that looks similar to domesticated roses. Wild rose leaves and flowers are smaller, flowers five-petaled. *Rosa gymnocarpa*: bristly stems, compound leaves, five- to nine-toothed leaflets, smooth on both sides; flowers, pale pink to rose, 1-2 cm across, borne singly at the end of branches on glandular stalks; fruit, or hips, orange to scarlet without attached sepals. *Rosa nutkana*: leaves compound with five- to seven-toothed leaflets, slightly hairy underneath; flowers pink and large, 4-8 cm across, borne singly at the end of side branches; hips purplish red with sepals remaining on top.

Range and distribution: Pacific Northwest, western California to Alaska. *Rosa gymnocarpa* below 2000 m; *R. nutkana* below 700 m, scattered and locally common.

Associations: Open-conifer shrub, prairie grass, and mixed-conifer/hardwood forests. Douglas-fir, ponderosa pine, Oregon white oak; snowberry, shinyleaf spirea, oceanspray, white hawkweed, groundsel, heartleaf arnica, and wood violet.

Habitat: Moist flats, forests, and shrublands. *Rosa nutkana*: dry to moist habitats both west and east of the Cascade Range; occurs in upland wooded regions or in open shrub wetlands. *Rosa gymnocarpa*: moist to dry woods.

Successional stage: Primarily in early-successional open shrub and grasslands, persists in established plant communities and forest openings. Intolerant to moderately shade tolerant.

Ecological relations: Birds, deer, coyotes, bears, and other animals browse rose hips. Thick stands of wild rose bushes provide habitat for various animals and insects. The flowers attract pollinators including honey bees. Well adapted to low- to medium-severity fires. Sprout from both root crowns and rhizomes and are off-site colonizers.

Biology

Flowering and fruiting: Flowers from May through July; fruits develop late summer into fall. Fruits often are retained over winter on plant.

Seed: Seeds dispersed by animals. Seeds germinate slowly, over-winter stratification helps. One of the most effective means for propagating roses is to sow freshly cleaned seeds before they dry out.

Vegetative reproduction: For *Rosa nutkana*, small offshoots from parent root transplant easily; plant sprouts form the root crown. Can root semihardwood cuttings of *R. gymnocarpa*.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Small shrubs can be transplanted.

Collection

Part harvested: Flowers, fruits, bark, and roots.

Harvest techniques: Flowers and fruits (hips) are clipped. Bark is harvested by using a sharp pair of pruning shears to harvest young stems, and bark is peeled off with a sharp knife. Root bark is collected by digging around the base of the shrub to find a side root. Carefully collecting these roots will not permanently harm the plant.

Harvest season: Rose hips gathered after the petals have fallen and the hips have turned bright red. Buds and flowers gathered early to mid summer. Bark is best collected in early spring.

Regeneration after harvest: Stems readily resprout after clipping.

Uses and Products

Common uses: Leaves and stems: astringent, different plant parts offer differing levels of effectiveness; soothing herbal teas, digestion, dermatitis, urinary tract infection, anti-inflammatory; rosehips: beverages, jellies, decoratives, and potpourri.

Indigenous uses: Tonics, smoking powder, and an eyewash. Hips were usually only eaten when no other food was available. The interior Salish believe the Nootka rose offers protection from any bad influences and cleanses people after contact with the dead. Rose leaves were chewed and put on insect bites to alleviate pain and swelling. The Ninilchik people of Alaska make tea from hips and petals of the Nootka rose. Jelly and syrup made from hips, sometimes in combination with other fruit.

Common products: Major commercial source of rose hips for vitamin C, tablets and capsules, herbal teas, vitamin supplement, hot, cold beverages, syrups, jellies, botanical crafts, and ingredient in various herbal products.

Types of markets: International and domestic. Food, herbal, nutraceutical, health care, and floral craft.

Comments and Areas of Concern

Rosa species can substitute well for other less common plants with similar uses. However, wild rose species are traditionally used by American tribes, and Alaska Natives have requested limited commercial use for native rose species in their region. Wood's rose (*Rosa woodsii*) widely distributed east of the Cascade Range and cluster rose (*R. pisocarpa*) west of the Cascade Range also are popular for similar uses as *R. gymnocarpa* and *R. nutkana*.

References

Cooke (1997), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Kruckeberg (1993), Leung and Foster (1996), Reed (1993b), Rose et al. (1998), Russell (1994), Tilford (1998), Young and Young (1992)

Rubus idaeus L.
Red raspberry
Rosaceae
RUID

Ecology

Description: Native. Deciduous, erect or arching, thicket-forming shrub, 0.5-3 m; woody stems bristly or prickly (main prickles not hooked) with shredded, exfoliating yellow brown bark; leaves are alternate and pinnately compound in leaflets of three to five; small white flowers in cluster of one to four; fruit is several drupelets (berry), pink and hard as immature, red or pinkish purple when mature.

Range and distribution: Over much of temperate North America and Eurasia; the common species on the drier east side of the Coast and Cascade Ranges; low to mid elevations. Common and locally abundant, dense thickets.

Associations: Grand fir, Douglas-fir zones. Mixed conifer, cedar, black cottonwood, trembling aspen, spirea, and serviceberry.

Habitat: Moist or dry woods to open and often rocky mountain slopes, clearings or borders in boreal forests, ravines, bluffs, and streambanks, and on talus.

Successional stage: Pioneer or early successional. Vigorously invades and colonizes many types of disturbed sites, decreases as canopy closes. Shade intolerant.

Ecological relations: Provides forage and cover for various wildlife; fruits important for bear, grouse, quail, and other birds. Deer, elk browse leaves and berries. Seed dispersed by birds and mammals; provides nesting habitat and erosion control and used in restoration projects. Minor producer of pollen and nectar; primarily pollinated by bees.

ssp. *idaeus* var. *peramoenus*

Rubus idaeus

Biology

Flowering and fruiting: Flowers from June through July, fruits soon after, from July through September. Attractive to bees. Honey-bee pollination is considered important in formation of well-shaped fruit and a good crop.

Seed: Produces an abundance of seed, but production varies annually according to climate and age; germination slow, requires both warm and cold stratification; can remain viable for 60 to 100 years. Seed germination about 70 to 90 percent. Best germination usually follows late-summer or early-fall sowing of scarified seeds.

Vegetative reproduction: Rhizomes, root sprouts, and leaf bud cuttings.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: When plants dormant can be transplanted.

Collection

Part harvested: Usually fruits, shoots, leaves, and sometimes roots.

Harvest techniques: Leaves are gathered just after flower buds form in early spring; fruits, when ripe.

Harvest season: Shoots in spring; leaves in spring to summer; fruits in summer; roots in spring and fall.

Regeneration after harvest: Shoots readily sprout back; if portion of root system taken, roots will readily regenerate.

Uses and Products

Common uses: Leaves, as an astringent, reproductive tonic, source of vitamin C, diuretic, to relieve diarrhea, and mild sedative; roots, diuretic; fruits, in jams, jellies, flavor additives, juice, tea, and syrup.

Indigenous uses: Eaten fresh, boiled and dried into cakes, preserved for winter use, various medicinal preparations, urinary aid, antidiarrhea, and dermatological aid.

Common products: Teas and food. Dried leaves sold in bulk.

Types of markets: Primarily domestic. Food, herbal and nutritional supplement.

Comments and Areas of Concern

Biology and use of blackcap raspberry (*Rubus leucodermis*) are similar to *R. idaeus* and collection techniques would be the same. *Rubus leucodermis* grows in foothills from British Columbia to Wyoming; common in brushy draws and second-growth forests. Use leaves either dried or fresh as wilted leaves can be toxic; be aware of herbicide use when collecting near roadsides.

References

Burgett et al. (1989), Hitchcock and Cronquist (1978), Hortus West (1998), Moerman (1998b), Pojar and MacKinnon (1994), Rose et al. (1998), Schofield (1989), Tilford (1998), Tirmenstein (1990d), USDA Forest Service (1988), Willard (1992), Young and Young (1992)

Rumex acetosella L.
Sheep sorrel, red sorrel
Polygonaceae
RUAC3

Ecology

Description: Exotic. Perennial herb from slender rhizome; several unbranched, slender stems 15-50 cm, somewhat woody at base; leaves generally basal, arrowhead shaped, 2-10 cm; flowers small reddish (female) or yellowish (male) along erect panicle; fruits triangular, yellow brown, 1-2 mm achenes.

Range and distribution: Common and widespread to 3000 m throughout temperate North America. Grows in groups from common rhizome.

Associations: Willow, bull thistle, redstem ceanothus, ninebark, perennial bunchgrass communities, and annual grasses.

Habitat: Flood-plain and riparian habitats, disturbed sites, pastures, meadows, grasslands, woods, and hillsides.

Successional stage: Early successional, colonizes from seed after disturbance. Shade intolerant.

Ecological relations: Summer food of ruffed grouse (*Bonasa umbellus* L.) and Canada geese (*Branta canadensis* L.); seeds are common diet of ground-feeding birds; deer eat the leaves; probably sought by black bears (*Ursus americanus* Pallas) and grizzly bears (*Ursus arctos* L.); food for American copper butterfly larvae (*Lycaena phlaeas* L.). Colonizes disturbed sites, but erosion control is low. Data are limited, but sheep sorrel probably resprouts after fire from rhizomes and roots and is reestablished by seeds in the soil. Presence of sheep sorrel indicates poor soils.

Rumex acetosella

Biology

Flowering and fruiting: From May through September in Washington and Oregon; from March through August in California; fruits small reddish and three angled.

Seed: Flower stalk turns brown when seeds are mature. Seed is triangular and mahogany colored. Can be grown from seed.

Vegetative reproduction: Can propagate from portions of rhizome.

Cultivation: Can be cultivated. Plants are commercially available for western dock, a native *Rumex* species.

Transplant viability: Can be transplanted.

Collection

Part harvested: Leaves and roots.

Harvest techniques: Roots are gathered by pulling up gently. Leaves are clipped from stem; 40 to 50 percent of the plants in a patch can be collected without impact. Should be checked to be sure they have not been treated with herbicides.

Harvest season: Late spring-summer, before flower is mature.

Regeneration after harvest: If part of root rhizome system left intact, may regenerate new aerial stems the following year.

Uses and Products

Common uses: Edible; astringent, sore throat, as a source of vitamin C; dyes. Ingredient in two commercial herbal tonics used by cancer patients.

Indigenous uses: Poultice of bruised leaves and blossoms applied to old sores, fresh leaves chewed as a stomach aid, and to treat tuberculosis; leaves eaten raw or boiled; tart tangy leaves used with salt in a brine for cucumbers.

Common products: Tinctures, fresh leaves, dried herb, and root.

Types of markets: International and domestic markets for herbal use. Medicinal, herbal, and nutraceutical.

Comments and Areas of Concern

Contains oxalic acid, which can be poisonous in large quantities. Considered a noxious weed in 6 states, none of which are in the Northwest. Because it is a weedy exotic, care should be taken not to spread seed.

References

Brill and Dean (1994), Burrill et al. (1996), Cooke (1997), Craighead et al. (1991), Elias and Dykeman (1990), Esser (1995), Everett (1997), Franklin and Dyrness (1973), Hickman (1993), Hortus West (1998), Klein and Johnson (1997), Mizerak (1998), Pojar and MacKinnon (1994), Rice (1997), Richardson et al. (2000), Ross and Chambers (1988), Schofield (1989)

Rumex crispus L.
Curly dock
Polygonaceae
RUCR

Ecology

Description: Exotic. Perennial herb from taproot; stems unbranched below flower clusters, 50 cm-1.5 m often slightly reddish; leaves both basal and stem, oblong to lance shaped 10 to 30 cm long, 5 cm wide, with curly edges; flowers ovate to round, greenish to rusty brown, clustered on stalk; entire plant turns reddish to rusty brown at maturity; fruit: triangular reddish brown 1-2 mm achenes.

Range and distribution: Abundant through North America in disturbed areas, below 2500 m. Scattered over wide expanses of open ground.

Associations: Common dandelion, mullein, common yarrow, chickweed, perennial and annual grasses.

Habitat: Waste places, roadsides, meadows, fields, pastures; also in undisturbed wet sites; adapted to areas that dry out in summer.

Successional stage: Early colonizer, thrives in disturbed places. Shade intolerant.

Ecological relations: Taproot aerates compacted soils, help prevent erosion; provides iron as a nutrient.

Biology

Flowering and fruiting: Blooms from June to September, mature achenes release in fall.

Seed: Winged seeds disperse by wind and water. Germinates in light, 18 to 24 ºC.

Vegetative reproduction: May regenerate aerial stems from root crowns.

Rumex crispus

Cultivation: Can be cultivated. Plants are commercially available for western dock, a native *Rumex* species.

Transplant viability: Easily transplanted.

Collection

Part harvested: Roots for medicinal, flowers for floral.

Harvest techniques: Roots are collected before the plant goes to seed. A tool is used to dig roots out of the ground.

Harvest season: Flowers are collected in spring at the beginning of flowering; roots in fall after seeding.

Regeneration after harvest: If entire plant and root is removed, will not regenerate. Space may be reoccupied by seedlings germinating from seed bank.

Uses and Products

Common uses: Dried flowers used in floral arrangements. Leaves used as a potherb, roots used to stimulate and aid digestion, for skin disorders, and an iron source; as a dye.

Indigenous uses: Mashed root used for swellings and sores. Infusion of root used to treat constipation, dysentery, to correct fluids, and as salve for various skin problems. Leaves rubbed in mouth for sore throat, decoction of plant for urinary problems, and roots for jaundice, eaten as greens. *Rumex fenestratus* and *R. arcticus* are called wild rhubarb by the Ninilchik people and other Alaska natives.

Common products: Roots, herbal; dried bulk supplied in manufacture of herbal cancer tonics, flowering stems, dried decorative.

Types of markets: International and domestic. Medicinal, herbal, nutraceutical, floral, and crafts.

Comments and Areas of Concern

Along roadsides be aware of herbicide use. Is considered a noxious weed in Midwestern Unites States. Curly dock is the *Rumex* species preferred by herbalists. Leaves contain oxalic acid, which can cause digestive and urinary tract problems when used excessively.

References

Brill and Dean (1994), Burrill et al. (1996), Cooke (1997), Elias and Dykeman (1990), Everett (1997), Hortus West (1998), Klein and Johnson (1997), Mizerak (1998), Moore (1993), Pojar and MacKinnon (1994), Rice (1997), Russell (1994), Schofield (1989), Thomas and Schumann (1993), Tilford (1993, 1998), Young and Young (1986)

Sambucus racemosa L.
Red elderberry, bear berry (locally, Alaska)

Caprifoliaceae

SARAP

S. cerulea Raf., Blue elderberry-SACE3

Sambucus racemosa *S. cerulea*

Ecology

Description: Native. Deciduous shrub to small tree, 0.5-6 m tall; bark dark reddish brown, warty; soft pithy twigs; foliage with strong characteristic odor; leaves large, opposite compound, with five to nine leaflets, lance shaped, 5-15 cm long, pointed, sharply toothed, somewhat hairy beneath; small flowers white to creamy, with unpleasant odor, numerous in a pyramidal cluster; fruits bright red, berrylike drupes; two to four seeds. *Sambucus* is a genus in which there is much hybridization and backcrossing. *Sambucus racemosa* is the designation of a circumboreal species; the American plants are considered *S. racemosa* ssp. *pubens* by many authorities. Black elderberry (var. *melanocarpa*) has black or purplish-black fruits, blue elderberry, *S. cerulea*, has blue fruits (edible) with a whitish bloom.

Range and distribution: Across North America; red elderberry (*S. racemosa* ssp. *pubens*) is most common on the coastal and western slope of the Cascade Range from Alaska to California; black elderberry (var. *melanocarpa*), eastern slope of the Cascade Range, British Columbia, Washington, Oregon, northeastern California; blue elderberry, *S. cerulea*, from British Columbia to California, east into Montana, most common in eastern Oregon and Washington, and Willamette Valley in Oregon. In low valleys, may form large clumps; where found in upland sites, it is high in frequency and low in density.

Associations: Sitka spruce, western hemlock, Pacific silver fir, and grand fir zones. Grand fir, Douglas-fir, and ponderosa pine forests; trembling aspen, red alder, snowberry, and serviceberry; in coastal forests, vine maple, salmonberry, red huckleberry, and western sword fern.

Habitat: Streambanks, swampy thickets, moist clearings and open forests, and cooler uplands; low to subalpine elevations; *S. cerulea*, open hillsides and roadsides, and along fence rows.

Successional stage: *Sambucus racemosa*, early to mid successional; can persist in relatively open conifer stands; may also persist in long-lived deciduous forests of trembling aspen or red alder; *S. cerulea*, primarily short lived early successional; intolerant to slightly shade tolerant.

Ecological relations: Fruit, food for many bird species and small mammals; nectar for hummingbirds; elk and deer browse on var. *melanocarpa* and *S. cerulea*; pollinated by insects; valuable for cover and nesting habitat; stabilizes soil and helps prevent erosion on moist sites. Elder responds to disturbance including fire by resprouting from root crowns, rhizomes, or regenerating from long-lived seed bank. Seeds may be stored in soil, will germinate even if the plant is completely killed or not present before fire. Because of extensive root systems, valuable for streambank or slope stabilization.

Biology

Flowering and fruiting: Blooms from May through July, fruit ripens from June through September.

Seed: Dispersed by birds and other animals that eat fruit. Direct seeding can be erratic. Seeds are difficult to germinate because of their hard seed coats and dormant embryos; heat treatment or sulfuric acid scarification and stratification can hasten germination. Long-term storage viability.

Vegetative reproduction: Regenerates from sprouts, rhizome suckers and layering; softwood cuttings are taken in June.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Wild shrubs do not transplant well, but those from nurseries are easy to establish.

Collection

Part harvested: Flowers, berries, leaves, and inner bark.

Harvest techniques: Flower clusters and berries are gathered that are only within easy reach, minimizing impact to each tree and the surrounding area. Limbs break easily.

Harvest season: Flower clusters are gathered when beginning to open; fruits when fully ripe.

Regeneration after harvest: If inner bark is harvested, will not regenerate. Leaves and branch tips regenerate the following season if not overharvested.

Uses and Products

Common uses: Fruits for foods and flavoring, fruits and flowers for beverages, wine, jelly; medicinal uses from berries and other plant parts; antioxidant protection, diuretic, expectorant, laxative, antiviral, and skin care; bark, fruit, and stems for dyes; dried leaves for insecticides; whole plant used for restoration, landscaping, and windbreaks.

Indigenous uses: Important food source; analgesic, cathartic, gastrointestinal aid, emetic, and witchcraft medicine. Ninilchik people make jelly and wine (and possibly ketchup) from the berry. Branches have been used as steam bath switches.

Common products: Fruits, jams, yogurts, desserts, beverages, flavorings, and coloring; whole plant or parts, tea, nutraceutical, capsules, and tablets; perfumes; nursery crop for landscape restoration, wildlife, and orchards.

Types of markets: Food, herbal, and landscaping. International and domestic markets for finished food and herbal products. Domestic markets for live plants, nursery, and restoration industries.

Comments and Areas of Concern

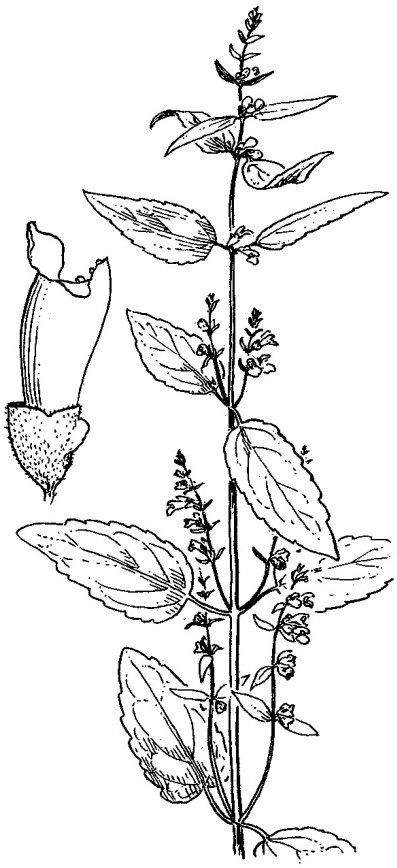
Gather conservatively, be aware of possible animal presence. Berries should always be cooked and seeds removed, as raw berries may cause nausea; stems, bark, leaves, and roots are toxic because of presence of cyanide-producing glycosides. Elder is traditionally used by American tribes, and Alaska Natives have requested limited commercial harvest.

References

British Columbia Ministry of Forests (1995), Cooke (1997), Crane (1989b, 1989c), Hitchcock and Cronquist (1978), Hortus West (1998), Kilham (2000), Leung and Foster (1996), Moerman (1998b), Pojar and MacKinnon (1994), Rose et al. (1998), Russell (1994), Tilford (1998), USDA Forest Service (1963), Whitney (1997), Willard (1992), Young and Young (1992)

Scutellaria L. spp.
Skullcap
Lamiaceae
SCUTE

S. lateriflora L., Blue skullcap-SCLA2
S. galericulata L., Marsh skullcap-SCGA
S. nana Gray, Dwarf skullcap-SCNA



Scutellaria laterifolia

Ecology

Description: Native. About 300 species; perennial herb; from rhizomes or tubers; stems erect, square; leaves opposite, basal, and cauline; bracted raceme inflorescence; solitary flowers in leaf axis, bilaterally symmetric, with five fused sepals and five petals usually fused into a five-lobed, two-lipped tube; stamens two or four; fruit of four nutlets. *Scutellaria galericulata* 20-90 cm, lance-shaped, blunt-toothed leaves 2-5 cm long, single blue or pink-purple flower on axils; *S. lateriflora* 20-150 cm, leaves 3-10 cm, several flowers on leaf axils.

Range and distribution: Circumboreal; low to mid elevations (*S. galericulata* and *S. lateriflora*); *S. nana* and snapdragon skullcap (*S. antirrhinoides*) Oregon to Idaho. At low elevations, *S. lateriflora* may grow in pure stands.

Associations: Mixed-conifer hardwoods throughout region. Alder, willow, stinging nettle, bedstraw, field mint, sedges, and rushes.

Habitat: *Scutellaria galericulata* and *S. lateriflora* are facultative wetland species; wet meadows, marshes, bottomlands, streams; *S. lateriflora*, alluvial thickets, meadows and swampy woods; *S. galericulata*, moist acidic or calcareous soils near water; *S. nana* foothills and plains, open, dry soil.

Successional stage: Varies from early to late successional. Moderately shade tolerant.

Ecological relations: Nectar source for pollinators including bees and flies.

Biology

Flowering and fruiting: *Scutellaria lateriflora* and *S. galericulata* blooms July to September. Several to many flowers in elongate clusters. Fruits yellowish, warty nutlets, late summer to fall, July through September.

Seed: Four nutlets each contain a single seed.

Seedling production: Sow outside in late spring. If only small amounts of seed, better to germinate seed in a cold frame in March and April. When large enough to handle, seedlings are put into individual pots and then planted in early summer.

Vegetative reproduction: Basal cuttings in early summer in a frame.

Cultivation: Can be cultivated. Seeds are commercially available for *S. lateriflora*.

Transplant viability: Sensitive to transplant from wild; not recommended.

Collection

Part harvested: Flowering aerial portion of plant.

Harvest techniques: Grows in moist soil so care should be taken not to pull out whole plant. Top should be clipped with clippers.

Harvest season: Late in flowering period.

Regeneration after harvest: If root crown and some aerial stem is left, plant will regrow the following season. Care is taken not to harvest aerial parts of one plant too frequently as harvest of crowns removes flowers and seeds and removes ability to regenerate sexually.

Uses and Products

Common uses: Substituted for valerian for sleeplessness; as a nerve sedative, for drug withdrawal symptoms, antifungal, anti-inflammatory, antibacterial, antispasmodic, astringent; garden ornamental.

Indigenous uses: Heart medicine, to treat rabies, menstrual cramps, and colds.

Common products: Herbal tea, tincture, and landscape plant.

Types of markets: International and domestic. Medicinal, herbal, seed, horticulture, and landscape.

Comments and Areas of Concern

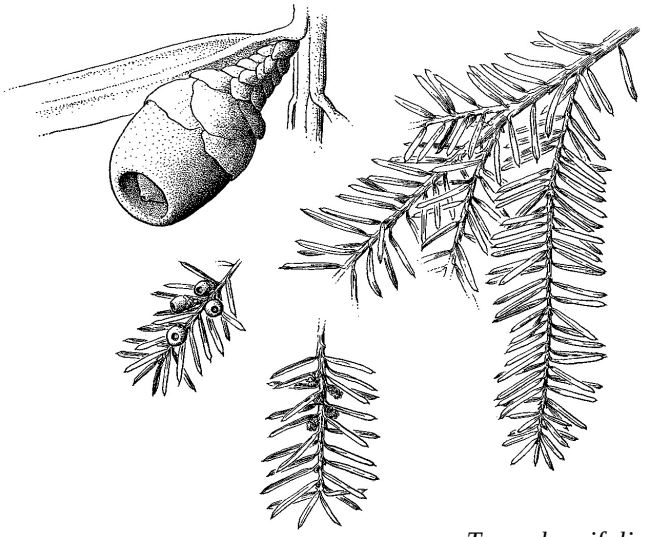
Some species grow on moist habitats highly susceptible to disturbance. The distribution of *Scutellaria galericulata* in California is limited and species endangered in a portion of its range. This species rarely used in herbal medicine, may promote miscarriage; use with caution.

References

Cooke (1997), Gardenbed (2000), Hanes (1998), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Moore (1993), Ody (1993), Plants for a Future (1997), Pojar and MacKinnon (1994), Thomas and Schumann (1993), Tilford (1998), Willard (1992)

Continued

Taxus brevifolia Nutt.
Pacific yew
Taxaceae
TABR2



Taxus brevifolia

Ecology

Description: Native. Small dioecious evergreen tree, 5-10 m tall; bark light red brown, thin, and papery; needles flat, yellow green, pale below, sharply pointed, and attached to twigs by short-ridged stalks in two rows forming flat sprays; both male and female "flowers" (strobili) inconspicuous; fruit fleshy, red aril, attached on lower side of branches.

Range and distribution: Pacific Northwest, north and central California to Alaska, to western Montana; from sea level to 1500 m; widely, but variably distributed from scattered individuals to thick understory patches.

Associations: Sitka spruce, western hemlock, Pacific silver fir, grand fir and mixed-conifer zones. Douglas-fir, grand fir, white fir, Pacific silver fir, and western hemlock; vine maple, dwarf Oregon grape, deerfoot vanillaleaf, queencup beadlily, wild ginger, and western sword fern.

Habitat: Dense, moist, mature, mixed-evergreen forest, and mid to lower slopes or canyon bottoms. Seedlings found in open forests or after management activity or fires remove canopy and expose bare mineral soil.

Successional stage: Common component of old-growth Douglas-fir, grand fir, and western redcedar communities. Shade tolerant, but reproduces from seed in openings.

Ecological relations: Birds and small mammals eat fruit and disperse seed. Moose, deer, and elk browse foliage in winter. Browsed heavily in western Montana and northern Idaho; retains shrubby form. Pacific yew snags are habitat for cavity-nesting birds. In mountainous riparian areas, an important streambank stabilizer.

Susceptible to heat damage; can resprout after mechanical or some fire damage, but because of thin bark, it rarely survives major fires. After fire, generally reestablishes by means of bird-dispersed offsite seed or seed bank as the overstory canopy develops.

Biology

Flowering and fruiting: Flowers from April to June; arils ripen from September to October; fruit and seed production increases with openness of canopy but predation by birds and animals also increases.

Seed: Seeds are mature when fleshy aril turns red. Fruits should be picked as soon as they are ripe to avoid losses to predation. If used for seedling production, seeds are extracted from fruit, put immediately into prechilling treatments, and stored at recommended temperatures. Warm stratification followed by chilling can break dormancy of yew seeds. Seeds from freshly collected fruit and sown directly in bed may not germinate until second spring. Stored seeds can be pretreated and seeded in spring. Seeds are high in fat content; dry to low moisture content to retain viability during long-term freezer storage.

Vegetative reproduction: Easily propagated from cuttings. In many areas, layering is the primary means of reproduction in the wild. Branch-tip cuttings collected fall and winter after current growth has stopped.

Cultivation: Can be cultivated; under cultivation, susceptible to root weevil. Plants and seeds are commercially available.

Transplant viability: Good for small saplings or seedlings; seedling establishment usually better in some shade.

Collection

Part harvested: Bark and foliage.

Harvest techniques: Bark peeled with knives in vertical strips from cut stem or standing tree. If bark is peeled from circumference of trunk, tree will die. Foliage: bough tips are clipped with sharp clippers up to point where stem begins to become woody (about 15-20 cm).

Harvest season: Bark is harvested in spring and early summer when sap flow makes it easier to peel off. Bough tips are harvested in summer and early fall.

Regeneration after harvest: Cut trees may resprout if sufficient stump is left, but not always. Bark will not regenerate. When foliage harvested by clipping bough tips, new sprouting and growth will occur from secondary buds. New growth will replace removed material in about 3 to 4 years.

Uses and Products

Common uses: Bark source of phytopharmaceutical used for chemotherapy on certain forms of cancer. Foliage used as herbal medicine for boosting immune system, and externally for skin problems. Occasionally used as an ornamental plant. Wood used for crafts.

Indigenous uses: Wood is highly prized by the west coast Native Americans because it is strong and dense. Used for making bows, other tools, and carvings.

Common products: Pharmaceutical products from bark of *Taxus brevifolia* and foliage of other *Taxus* species. Foliage: salves, tinctures, and teas. Wood: carved specialty products; landscape plant.

Types of markets: All parts, international and domestic; whole plant, domestic landscape nursery. Foliage, domestic; international bulk export medicinal markets.

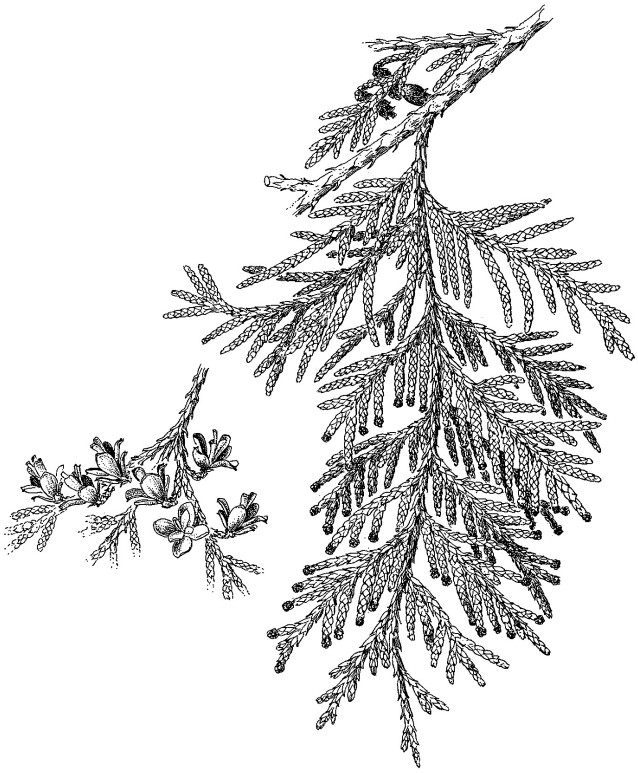
Comments and Areas of Concern

Although foliar plant parts are low in toxic alkaloids, seeds may have higher levels. Other species in this genus are toxic so use caution in harvesting and know precisely the species. Yew bark harvest and past timber harvest practices have resulted in losses or reductions in populations, which have not yet recovered. Yew is traditionally used by Alaskan tribes; Alaska Natives have requested limited commercial use.

References

Antos et al. (1996), Cooke (1997), DiFazio et al. (1998), Hortus West (1998), Tirmenstein (1990e), USDA Forest Service (1963, 1974), Walters-Vertucci et al. (1996)

Thuja plicata Donn ex D. Don
Western redcedar
Cupressaceae
THPL



Thuja plicata

Ecology

Description: Native. Evergreen tree, 30-70 m, tapering trunk 0.6-1.2 m in diameter, occasionally to 1.8 m or more; bark 1-2 cm thick, gray to reddish brown, tearing off in long fibrous strips, aromatic wood; mature trees fluted and buttressed at base; many have forked tops; branches tend to spread or droop slightly then turn upward, J-shaped; branchlets spraylike, strongly flattened horizontally; leaves scalelike, opposite pairs in four rows, the leaves in one pair folded, in the other pair, unfolded, closely pressed to stem in overlapping shingled arrangement, 1.5-3 mm long; cones are clustered near the ends of twigs and become turned up on short stalks; pollen cones 1.5-2 mm, numerous; seed cones green, becoming brown, 10-19 mm; winged seeds, three to six per cone, 4-6 mm, narrow, light brown.

Range and distribution: Pacific coast, Alaska to northern California, Cascade Range from central Oregon to British Columbia to western Montana. Pure stands cover some small areas, but it is usually associated with other tree species.

Associations: Western hemlock, Pacific silver fir, grand fir zones. Western hemlock, Douglas-fir, red alder, Devil's club, salal, false box, black huckleberry, raspberry, western sword fern, maidenhair fern, and prince's pine.

Habitat: Wet soils, shady forests, best on seepage and alluvial sites, also in drier habitats in richer soils; low to mid elevations; below 1800 m.

Successional stage: Late successional in most forests, but can be found in all stages of forest succession. Shade tolerant.

Ecological relations: Deer, elk, and rodent browse; black bears remove bark feed on exposed sapwood; hiding and thermal cover for several wildlife species, mammal dens, and nest trees for cavity nesting birds; host for several damaging insect species, such as the gall midge (*Mayetiola thujae* Hedlin) and western redcedar borer (*Trachykele blondeli* Marseul), fungi host, leaf blight (*Didymascella thujina* (E.J. Durand) Maire) and trunk and root rots (*Poria asiatica* (Pilát) Overholt) and *(Phellinus weirii* (Murrill) R.L. Gilbertson), respectively; erosion control and long-term revegetation potential.

Biology

Flowering and fruiting: Reproductive cycle over 16 months; flowers in late May to early June, cones ripen in early August, seedfall in October to November.

Seed: Seeds germinate well without stratification; generally in fall or spring. Seedling survival is low in the wild.

Vegetative reproduction: Layering, rooting of fallen branches, and rooting of stem cuttings all successful.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Young seedlings transplant well.

Collection

Part harvested: Branches, cones, bark, small roots, and wood.

Harvest techniques: Foliage is clipped; roots are dug and pulled; bark is scored and pulled; wood, usually downed wood with splitting wedge and maul. Live branches with healthy green foliage are clipped in lengths from 30-75 cm. Branches in 40- to 60-lb bundles kept wet, shaded, and cool until used. Branches should be free of dirt, leaf spot, insect damage, or mechanical damage.

Harvest season: Branches of younger trees are gathered in summer or fall for highest oil content; cones collected when they turn from yellow to brown; bark in spring when sap runs and bark can be peeled; foliage for Christmas greens in fall after cool temperatures harden off foliage; roots and wood all year. Holiday greenery is harvested typically from late September until two weeks before Christmas for wholesale raw materials. For local finished decorations, the harvest season runs until the week before Christmas.

Regeneration after harvest: Foliage branches can sprout laterally after branch tip is clipped. Bark does not regenerate. Taking bark leaves permanent scar. The tree and its branches will recover to its original mass within 3 to 5 years depending on the health of the tree. If side limbs are removed leaving small green growth on each limb, the new growth will replace the removed material in 3 years when fertilized and 5 years under natural conditions.

Uses and Products

Common uses: Boughs used as an antifungal, antibacterial, mild diuretic, for toothaches, oil for warts, and fungus infections; aromatic oil and incense, embalming fluids, salves, liniments; industrial cleaners; ornamental and floral. Tree bole and branches used for building material, shingles, shakes, siding, utility poles, fence posts, interior finishing, closets, chests, boxes, etc.; perfumes and deodorants; insecticides; medicinal preparations; veterinary soaps; extractives and residues in lead refining and glue extenders.

Indigenous uses: The most valuable tree to Native Americans on the Pacific Northwest coast up through Alaska and in the Cascade Range, providing wood to make canoes, house planks, totem poles, tools and implements, baskets, and clothing. Foliage or bark used to treat various ailments; tea of boughs for coughs and colds, and diarrhea.

Common products: Ornamental boughs, oil, and herbal tinctures.

Types of markets: International and domestic. Medicinal, herbal, floral, crafts, and wood products.

Comments and Areas of Concern

Oil of leaves can be toxic, causing low blood pressure and convulsion. Redcedar is traditionally used by Native American tribes, and Alaska Natives have requested limited commercial use. Bark and root harvest stress the tree; best to collect from trees being felled for legitimate purposes.

References

British Columbia Ministry of Forests (1995), Burns and Honkala (1990), Cooke (1997), Davis (2000), Franklin and Dyrness (1973), Freed (2000), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Moore (1993), Pojar and MacKinnon (1994), Rose et al. (1998), Tesky (1992), Thomas and Schumann (1993), Willard (1992)

Trillium ovatum Pursh
Western trillium, wake-robin
Melanthiaceae
TROV2

Ecology

Description: Native. Perennial, erect unbranched herb to 45 cm; single stalk from short, fleshy rhizome; three stemless leaves, 4-20 cm at end of the stalk; flowers erect to nodding, solitary, erect, with three green sepals 0.5-6 cm long and three white pink or purple (with age) petals 0.5-7 cm long; fruits oval, berrylike capsule with many seeds.

Range and distribution: Common. British Columbia to California from coast inland to Montana; lowland forest and montane forest zones; 10-2000 m. Widespread.

Associations: Western hemlock/western sword fern, Pacific silver fir/rosy twisted stalk associates; white fir, grand fir, Alaska huckleberry, starry false Solomon seal, prince's pine, queencup beadlily, and salal.

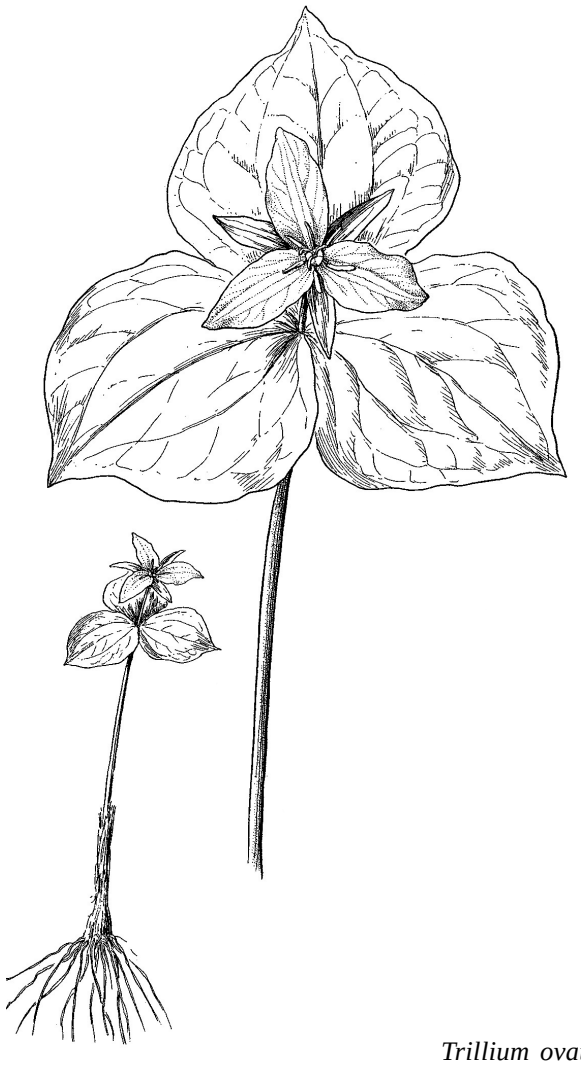
Habitat: Mixed evergreen forest on moist wooded slopes, damp meadows, streambanks, and often boggy in spring.

Successional stage: Mid to late successional. Shade tolerant but also found in small openings.

Ecological relations: The oil-rich appendage of the seed is eaten by ants.

Biology

Flowering and fruiting: From March through June; one flower for each plant annually.



Trillium ovatum

Seed: Grows readily from seed. Seed requires cold stratification, 15 ºC is recommended, may take from 1 month to 3 years. Care taken not to keep conditions too moist as seedlings prone to damping off.

Vegetative reproduction: Cultivated plants may be propagated from rhizome division.

Cultivation: Can be cultivated. Plants and seeds are commercially available.

Transplant viability: Does not survive transplanting, seed propagation more successful.

Collection

Part harvested: Leaves, stems, and roots.

Harvest techniques: Has small roots; do not encourage collection from wild. Leaves and stems are collected late in the season (just as they are about to turn yellow) so the roots will have already stored adequate nutrients for winter and can produce new growth. Plants should be collected in small quantities. Plant patches are easily reduced by harvest. Gathering leaves in early summer or during bloom will harm and may kill plant.

Harvest season: Late fall.

Regeneration after harvest: None. If leaves collected just before they yellow late in season, plant may not be harmed and will produce new aerial stem and leaves the following season.

Uses and Products

Common uses: Cut flowers for fresh floral bouquets. Stems, leaves, and roots, for medicinal purposes, uterine bleeding, bladder irritation, and nosebleeds. Whole plant, landscaping and as shade plant.

Indigenous uses: Roots used as an eye wash for sore eyes, childbirth aid, and sometimes cooked for greens.

Common products: Fresh floral, herbal, and landscape plant.

Types of markets: International and domestic. Florist, herbal, landscape nursery, and horticultural.

Comments and Areas of Concern

Large amounts reported removed from east coast forest for use abroad. In California, collecting and habitat loss have reduced populations. One of the seven wild medicinal plants under a moratorium on harvest or removal from Montana State lands. Harvest prohibited on national forests in the Northern and Intermountain Regions (Montana and Idaho), and no permits are being issued. Ensure that harvest is not locally restricted before collecting. On United Plant Savers North American medicinal plants "At Risk" list. Siskiyou trillium (*Trillium angustipetalum*) is listed in Oregon as "critically imperiled" and on Forest Service Northern Region sensitive species list.

References

Craighead et al. (1991), Franklin and Dyrness (1973), Gardenbed (2000), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Logan et al. (1987), Mizerak (1998), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Ross and Chambers (1988), Stewart (1988), Toogood (1993), United Plant Savers (2000)

Urtica dioica L.
Stinging nettle
Urticaceae
URDI

Urtica dioica

Ecology

Description: Native. Erect, perennial, rhizomatous herb, 1-3 m tall; four-angled stems; stems, leaves, and flowers sparsely to moderately covered with stinging hairs; leaves opposite, lance shaped to oval, 7-15 cm, coarsely toothed, prominent stipules 5-15 mm; panicle-like inflorescence, 1-7 cm; flowers greenish in dense drooping clusters in the leaf axils and at stem tips; fruits flattened, ovate achenes. *Urtica dioica* ssp. *dioica* introduced from Eurasia.

Range and distribution: Much of United States and southern Canada; lowlands to subalpine elevations, under 3000 m. Dense colonial patches can dominate large areas.

Associations: Mixed-conifer/hardwood forests; most coniferous zones in the Pacific Northwest. Common understory component of riparian communities, such as in black hawthorn/cow-parsnip associations; and wet meadow grasses, sedges, and rushes.

Habitat: Moist, forested riparian areas; in and adjacent to marshes and meadows, thickets, streambanks; grows in deep, rich, and undisturbed soils.

Successional stage: Colonizes following disturbance, also part of stable riparian communities. Low to intermediate in shade tolerance.

Ecological relations: Cover for small animals and birds; may have value for rehabilitation of disturbed sites as it may be tolerant of metal-contaminated soil; replenishes the soil through rapid decomposition; protects riparian habitats from human encroachment. Impenetrable stands may be used to keep livestock out of streams. Stinging nettle regenerates from buried rhizomes and seed after fire. Stinging nettle is a common early species on burned sites. Frequent fires during the growing season, however, may negatively impact the plants.

Biology

Flowering and fruiting: Coastal plants bloom in spring, mountain plants in early summer; seeds are mature by mid to late summer.

Seed: Produces abundant seed, have germinated after 10 years of storage.

Seedling production: Initiate vegetative spread in first growing season.

Vegetative reproduction: By rhizomes.

Cultivation: Can be cultivated. Seeds are commercially available.

Transplant viability: Can transplant seedlings and rhizomatous cuttings.

Collection

Part harvested: Whole plant, leaves, and root.

Harvest techniques: Gathered before it begins to bloom in early spring; stems are cut at an angle, at least 5 cm above ground level; roots are dug conservatively from the periphery of a patch.

Harvest season: Spring, leaves and stems; spring-summer, new growth at end of stems; late summer, seeds; fall to spring, rootstalks.

Regeneration after harvest: If aerial parts harvested, will resprout from root stalk and rhizomes. If whole plant removed but root and rhizome system fairly intact, can grow new stems.

Uses and Products

Common uses: The leaves can be steamed and eaten as a potherb, vegetable. As a diuretic, antispasmodic, antiallergenic, for rheumatic complaints, and urinary tract inflammation; as treatment for benign prostatic hyperplasia; as a supplement in shampoos and hair conditioners, for skin care; for vitamin and mineral content.

Indigenous uses: Young leaves and stems eaten; general spring tonic, analgesic, gastrointestinal, dermatological, and gynecological aid; fiber is used for fishnets and snares.

Common products: Skin care and cosmetic, beverage supplement, herbal teas, tablets, and nutritional supplement.

Types of markets: Dietary supplement, specialty foods, cosmetic, and health care.

Comments and Areas of Concern

The stems and leaves are covered in stinging hairs that cause contact dermatitis until dried. Once it begins to bloom, older leaves can develop particles that can be irritating to the kidneys; thrives in easily damaged moist habitats; on grazing lands considered a weedy pest; may have been sprayed with herbicides; absorbs compounds from industrial and agribusiness areas. Traditionally used by Native American tribes, and Alaska Natives have requested limited commercial harvest of nettle.

References

Burrill et al. (1996), Carey (1995), Cooke (1997), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Leung and Foster (1996), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Russell (1994), Schofield (1989), Tilford (1998), Vance and Thomas (1997)

Usnea Dill. ex Adans. spp.
Old man's beard

Parmeliaceae

USNEA2

U. longissima Ach., Beard lichen-USLO50

U. wirthii P. Clerc, Blood spattered beard-USWI

Ecology

Description: Native. General: fruticose, hanging lichen, brown, greenish yellow, and whitish gray. *Usnea wirthii* tufted, multiple, stiff branches two to four long, pale yellow central cord, sparse red spotting. *Usnea longissima* hairlike, 15 to more than 35 cm long, single unbranched central strand with short lateral branchlets; inside strand a white central cord.

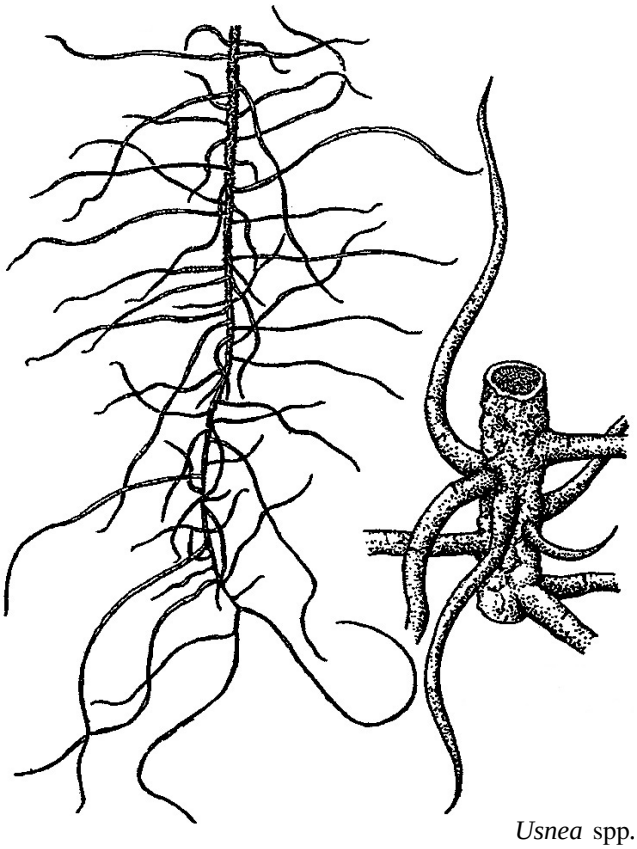
Range and distribution: Widespread. Forested areas of temperate North America; at least four species of *Usnea* are abundant throughout the Western United States, Canada to southeast coastal Alaska. *Usnea longissima* infrequent but locally abundant. *Usnea wirthii* frequent.

Associations: Sitka spruce, western hemlock zones. Mixed-conifer/hardwood forests. Oregon white oak, red alder, and big-leaf maple, other lichens.

Habitat: *Usnea wirthii* grows on conifers in open lowland. *Usnea longissima* grows on various trees and shrubs, in open, well-ventilated deciduous and mixed-conifer/deciduous forests; rare on conifer branches; common in trees along beach and riparian areas.

Successional stage: Mid to late successional. Moderately shade tolerant.

Ecological relations: Browsed by deer and food for invertebrates; natural antifungal, may serve that role for trees. Because of sensitivity to SO_2, good index of air quality.



Usnea spp.

Biology

Flowering and fruiting: Does not flower.

Seed: Not applicable.

Vegetative reproduction: Reproduces from detached tissue that falls from one tree branch and reestablishes on another branch.

Cultivation: Not cultivated.

Transplant viability: Can be transplanted within its forest habitat to other host trees.

Collection

Part harvested: Whole plant.

Harvest techniques: It is not known how long it takes *Usnea* to regrow. The lichen is gently removed from tree branches. Because regrowth and recovery not known, care is taken to leave sufficient lichen to maintain growth and to recover. Generally what is easily reached from ground or collected from fallen trees is taken.

Harvest season: No special time; however, in summer it is often too dry and disintegrates easily.

Regeneration after harvest: Unknown; regrowth thought to be slow and recovery takes years. Monitoring needed.

Uses and Products

Common uses: As an immunostimulant, antifungal, antimicrobial, and antitumor. Lab studies and clinical trials suggest *Usnea* may be used to inhibit gram-positive bacteria, for dried floral arrangements, and as a decorative.

Indigenous uses: In bags as pillows when feathers are unavailable; to wipe slime when cleaning salmon; wound dressing material and bandages; baby diapers and female sanitary napkins; source of yellow dye; antifungal.

Common products: Craft material, floral filler, nutraceutical, teas, and tinctures.

Types of markets: Primarily domestic for floral and crafts. International and domestic for medicinal and herbal.

Comments and Areas of Concern

Has threatened or extinct status in most of its European range owing to air pollution and habitat destruction. Does not occur in young forests because it generally spreads from tall older trees to younger trees. Can be confused with witch's hair (*Alectoria sarmentosa*); however, *A. sarmentosa* lacks a central cord inside strand. Loss of old-growth habitat and harvest threatens species. Has already disappeared throughout much of its range.

References

Franklin and Dyrness (1973), Geiser et al. (1994), Hale and Cole (1988), Mizerak (1998), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Tilford (1998)

Vaccinium L. spp.
Huckleberry, blueberry, bilberry
Ericaceae
VACCI

V. membranaceum Dougl. ex Torr., Black huckleberry-VAME
V. deliciosum Piper., Cascade bilberry-VADE
V. ovatum Pursh., Evergreen huckleberry-VAOV2

Vaccinium ovatum *V. deliciosum* *V. membranaceum*

Ecology

Description: Native. *Vaccinium* leaves are deciduous, ovate, simple, and alternate; *V. ovatum*, evergreen, shiny, and toothed. Flowers are pink to red and are usually bell shaped, typical of the heath family in clusters of 3-10. *Vaccinium deliciosum*, low mat-forming shrub; fruits dusk blue. *Vaccinium membranaceum* is an upright spreading shrub; fruits, purple to reddish black; *V. ovatum* fruit usually shiny and purplish black.

Range and distribution: *Vaccinium ovatum*, British Columbia south, west side of Cascade Range to coast to northwest California. *Vaccinium membranaceum*, British Columbia south through Oregon mountains to California east to Idaho and western Montana. *Vaccinium deliciosum*, British Columbia south to northern Oregon Cascade Range and Olympic Mountains.

Associations: *Vaccinium membranaceum*, *V. deliciosum*: Pacific silver fir zone. Mountain hemlock, beargrass; *V. deliciosum*, mountain heather communities. *Vaccinium ovatum*: Sitka spruce zone. Salal and rhododendron.

Habitat: *Vaccinium ovatum*: Edges and openings of coniferous forests near coastal areas; *V. membranaceum* and *V. deliciosum*, high-elevation forests mid to alpine; *V. deliciosum*, subalpine parklands, heaths, and edges of wet meadows.

Successional stage: Early to late successional. Shade tolerant but flowering, fruiting, and reproduction increase in openings, or after fire.

Ecological relations: Browse for deer, elk, and sheep. Fruits are eaten by various birds and mammals. Huckleberry can resprout from root crowns, but seedling establishment is rare. New shoots tend to produce more fruit, so burning can help berry production. Fire suppression and canopy closure has reduced productive huckleberry areas. High-intensity fire, however, also has been shown to delay berry production for 5 to 20 years.

Biology

Flowering and fruiting: Flowers from May through July depending on elevation; fruits from July through September. Fruit may contain several dozen seeds. *Vaccinium ovatum* flowers and fruits earlier than other species, but fruits remain on plant up to December.

Seed: Seeds are collected from macerated fruit and dried. Seed may germinate without stratification, but stratification may aid germination; overwintering outside is helpful. Light is essential for the germination of *Vaccinium* seeds. Seedlings can be reared in a mixture of peat and sand, are small, and must be transplanted several times before being established outside.

Vegetative reproduction: Primary means of natural regeneration. Can be started from layering or rhizome and stem cuttings.

Cultivation: *Vaccinium membranaceum*, *V. ovatum*, and *V. deliciosum* can be cultivated. Plants and seeds are commercially available for various *Vaccinium* species.

Transplant viability: Possible for seedlings but may not become established if soil conditions are not favorable. Transplant should have a large root ball with minimum root exposure.

Collection

Part harvested: *Vaccinium membranaceum* and *V. deliciosum*: berries. *Vaccinium ovatum*: branches with foliage and leaves. Leaves and stems for floral markets, berries for food markets, and the total plant of *V. ovatum* for landscape market.

Harvest techniques: For *V. ovatum* (floral greens), branches are snapped off by hand, or clipped, flat branches, deep green in color without flowers or berries are desired. Desirable growth and color characteristics are found under partial shade. Older plants with heavy stems are pruned back heavily to encourage new growth. This method produces the most attractive sprays. Large sprays of dark-green foliage, 60-75 cm long, and sprays 30-50 cm long for tips are harvested from understory plants. New growths spikes 45-60 cm long are harvested from plants grown in open areas for the red-huck markets. All foliage is free of dirt, insect damage, and black leaf spots. Transplants: small plants from rhizome sprouts are dug carefully so as not to disturb other plants, and must be placed in transplant bed for 1 year to be sold in the commercial nursery market. Food: berries picked by hand or with small hand rake. Large rakes that strip foliage with berries not recommended. Berries are cooled to below 5 ºC within 1 hour of picking to maintain freshness and salability.

Harvest season: Berries when ripe, in late summer and early fall. *Vaccinium ovatum* is harvested for its greens in late summer through fall after new growth hardens off, up until new growth begins in spring. For transplants, plants are dug after buds are dormant (late fall to winter).

Regeneration after harvest: New growth sprouts from buds below harvested branch. Floral: healthy plants under favorable growing conditions have been observed replacing removed foliage within 2 to 3 years. Good response is expected if less than 40 percent of the green leaf areas of the plant are removed.

Uses and Products

Common uses: Huckleberry leaves combined with raspberry, rose hips, and hibiscus flowers in teas. *Vaccinium membranaceum* and *V. deliciosum*: berries used in various processed foods and condiments, eaten fresh, as a natural food coloring, source of vitamins, antioxidant, juice as a beverage and to make wine, fruits and leaves, astringent, and diuretic; leaves (Europe) for diabetes, gastrointestinal, kidney, and urinary tract disorder; fruits for diarrhea, mucous membrane inflammation of mouth and throat, and improved vision; for food, beverage, and wine coloring. *Vaccinium ovatum*: foliage is used in fresh and preserved floral arrangements; many horticultural uses including as a hedge plant or ground cover.

Indigenous uses: Fruit of the evergreen huckleberry was traditionally used by many indigenous peoples of the west coast and interior as a fresh or dried staple. The Capella Indians reportedly traveled up to 30 to 50 km annually to harvest the fruit. Berries were eaten fresh, mashed, or dried and made into cakes. Preserved berries provided essential vitamin C during winter.

Common products: *Vaccinium deliciosum* and *V. membranaceum*: fresh and frozen berries, jams, syrups, candies, beverages, and other food items. *Vaccinium ovatum*: dried and fresh floral greens, landscaping, and restoration material.

Types of markets: International and domestic markets for all food and crafts products. Specialty and dessert food, and floral. Domestic markets for nursery stock.

Comments and Areas of Concern

Vaccinium species are traditionally used by American tribes, and Alaska Natives have requested limited commercial use for several species. Poor berry crops in the interior to northern Rocky Mountains are of concern as berries are a substantial part of the diet of some wildlife including grizzly bear (*Ursus arctos* L.). Illegal harvest is an increasing problem, and some areas are being heavily impacted by harvesters. Bog cranberry (*V. oxycoccos*) is listed as imperiled in Idaho. Velvetleaf huckleberry (*V. myrtilloides*) is listed in Oregon.

References

Antos et al. (1996), Franklin and Dyrness (1973), Gardenbed (2000), Hitchcock and Cronquist (1978), Hortus West (1998), Kruckeberg (1993), Leung and Foster (1996), Minore (1972), Pojar and MacKinnon (1994), Rose et al. (1998), Thomas and Schumann (1993), Tilford (1998), Tirmenstein (1990f), USDA Forest Service (1965), Vance and Thomas (1997), Young and Young (1992)

Valeriana L. spp.
Valerian
Valerianaceae
VALER

V. sitchensis Bong., Sitka valerian-VASI
V. occidentalis Heller, Western valerian-VAOC2
V. scouleri Rydb., Scouler's valerian-VASC2

Valeriana scouleri *V. columbiana* *V. sitchensis*

Ecology

Description: Native. About 200 species: perennial herb from rhizomes. *Valeriana sitchensis*: erect stems 30-120 cm; short, hairy leaves, mostly undivided basal leaves, one or more sets of opposite, dissected stem leaves; clustered inflorescence; flowers white or pink; fruit generally compressed, veined achene. *Valeriana occidentalis*: commonly 30-90 cm. *Valeriana scouleri*: 15-70 cm tall; fibrous rooted from a stout branched rhizome; crenate leaves.

Range and distribution: Genus worldwide in temperate zone, over a dozen species in Western States, fewer species in California; moderate to high elevations, 1500-3000 m. Often found in small, dense colonies but generally widely dispersed.

Associations: Pacific silver fir, mountain hemlock, white fir zones. *Valeriana sitchensis*: American false hellebore, sedge, black huckleberry, lupine, and arnica. *Valeriana scouleri*: Western hemlock zone. Douglas-fir and sedge.

Habitat: Moist sites in coniferous forests, subalpine meadows, cliffs and streambanks, open or shaded soils.

Successional stage: Early to late successional in meadow communities. Shade intolerant.

Ecological relations: Common browse for deer, elk, bear, moose, and smaller animals; indicates cool, moist sites with heavy winter snow pack; cats and rats attracted to root odor.

Biology

Flowering and fruiting: Flowers from June to August; fruit is small, hard ribbed with feathery plumes.

Seed: Timing is critical when collecting seed as it can fall in a few days after mature. Seed is small. Easily established from seed; establishes well in rich, moist soil, but can survive drought.

Vegetative reproduction: Can reproduce from rhizomes. In cultivation, clumps can be divided to get new plants.

Cultivation: Can be cultivated. Seeds are commercially available for *Valeriana officinalis*. Plants are commercially available for *V. scouleri* (Scouler's valerian).

Transplant viability: Can be transplanted, but because plants are easily established from seed and populations are small, do not recommend.

Collection

Part harvested: Roots.

Harvest techniques: Sitka valerian (*Valeriana sitchensis*) is the most popular commercially wildcrafted species but is not being cultivated as much as other species. It is easier to grow in commercial quantities. For fall and winter collecting, patches are located when the plants are flowering.

Harvest season: Late summer through fall; in fall, roots have higher medicinal potency.

Regeneration after harvest: Low; entire root is collected; if seeds are present, spread them at time of harvest or wait until seeds have dispersed before harvesting.

Uses and Products

Common uses: As an antispasmodic and hypotensive; skin softener; flavoring in beverages and desserts; to relieve anxiety and promote sleep.

Indigenous uses: Rubbed on sore muscles; pounded roots rubbed on rheumatism and for swelling, root as a tapeworm medicine, raw root poisonous and cooked root for food; plant for stomach troubles; dried roots as incense; leaves mixed with tobacco as flavoring.

Common products: Tea, tinctures, capsules, ingredient in heath care as specialty products.

Types of markets: International and domestic. Medicinal, herbal, and health care.

Comments and Areas of Concern

Check for signs of browse before harvesting; gather conservatively from dense, healthy patches; avoid gathering on fragile, steep slopes and when the soil is wet and prone to compaction; moist sites susceptible to disturbance. Not always well-tolerated, use cautiously at first.

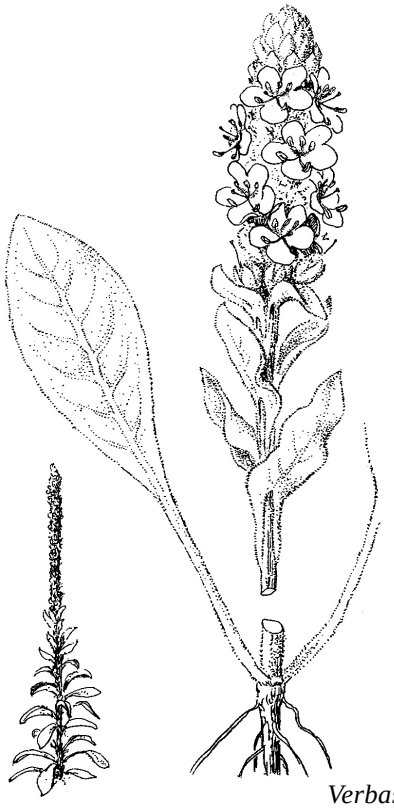
References

Brevoort (1998), Craighead et al. (1991), Elias and Dykeman (1990), Hartmann et al. (1990), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Leung and Foster (1996), Mizerak (1998), Moerman (1998b), Moore (1993), Pojar and MacKinnon (1994), Thomas and Schumann (1993), Tilford (1993,1998), USDA Forest Service (1988)

Verbascum thapsus L.
Mullein, common mullein, woolly mullein

Scrophulariaceae

VETH



Verbascum thapsus

Ecology

Description: Exotic. Biennial herb, densely covered with wooly hairs; first year producing rosette of wooly basal leaves; second year producing single erect stem 30 cm-2 m tall; basal leaves 8-50 cm long, wider at end; stem leaves alternate, 30-40 cm long, smaller up the stem; raceme inflorescence; flowers yellow, circular, 15-30 mm wide, five stamens, upper three hairy, yellow, lower two hairless; seeds in ovoid capsule, 8 mm long.

Range and distribution: Throughout temperate North America; below 2200 m. Widespread and common.

Associations: Herbs of open fields, dock, burdock, common dandelion, chickweed, and common yarrow.

Habitat: Common on roadsides, along river bottoms, fields, and dry open waste places or disturbed areas in rocky mineral soil.

Successional stage: Early successional; colonizes following disturbance, frequently in bare mineral soil. Shade intolerant.

Ecological relations: Important for soil stabilization, breaking up compacted soil; reintroducing pollinators and first source of small animal habitat in disturbed areas; seeds are a source of winter food for small birds; elk will eat the dry leaves and stems on overused winter ranges.

Biology

Flowering and fruiting: From June to September; fruits are capsules.

Seed: Seeds numerous and wingless, complex germination requirements, best temperature, 30 °C, slow to germinate, but establishes easily.

Vegetative reproduction: Can be propagated by root cuttings taken in early spring.

Cultivation: Can be cultivated. Plants are commercially available.

Transplant viability: Easily transplanted in rosette stage.

Collection

Part harvested: Leaves and flowers.

Harvest techniques: Best product when harvested in spring of the first year of growth. Second year is still usable. Leaves and flowers are harvested to minimize environmental consequences of reducing shade and microsites that the plant may be providing.

Harvest season: Leaves in summer, May to August best condition; flowers when buds are half open.

Regeneration after harvest: Biennial plant will not regenerate if flowering head is removed. If small percentage of leaves are removed from rosette, the plant will produce plant stem the following year.

Uses and Products

Common uses: Medicinal, as an expectorant, mild diuretic, sedative, astringent, and herbal cough remedy; to treat bronchitis and asthma; dyes; oil as skin emollient.

Indigenous uses: Medicinal, roots worn as necklace by teething babies, decoction of leaf taken for colds, cough, and fever. Leaf poultice applied to cuts; scalded leaves used on swollen glands; plant smoked as cure for people not in their right mind; powdered root for skin infections; smoking mixture base.

Common products: Tea, tincture, oil, cough syrup, eardrops, and eyewash.

Types of markets: Domestic. Medicinal, herbal, and health care.

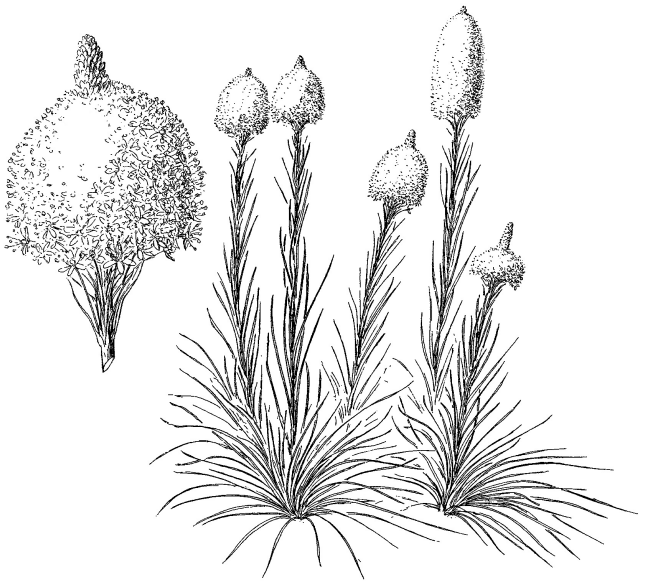
Comments and Areas of Concern

May be used for restoration purposes in harsh degraded areas. Harvest with caution in areas where it may be important for slope stabilization. Although nonnative, is generally not invasive and not considered noxious in Pacific Northwest states.

References

Abrams and Ferris (1960), Brill and Dean (1994), Burrill et al. (1996), Craighead et al. (1991), Hartmann et al. (1990), Hickman (1993), Hortus West (1998), Mizerak (1998), Munz and Keck (1959), Moerman (1998b), Ody (1993), Pojar and MacKinnon (1994), Rice (1997), Thomas and Schumann (1993), Tilford (1993, 1998), Young and Young (1986)

Xerophyllum tenax (Pursh) Nutt.
Beargrass, Indian basket grass
Melanthiaceae
XETE



Xerophyllum tenax

Ecology

Description: Native. Perennial herb; grows from 1-2 cm thick woody rhizome; stem 15 cm-1.5 m; basal leaves 30-100 cm long, 2-6 mm wide, grasslike, rough edged, tough, and wiry in large clumps; stem leaves shorter farther up the stem, green on upper, pale gray below; many white flowers, 5-10 mm on long stalk in a dense, conical, terminal cluster; fruits 5-7 mm three-lobed capsules; seeds 4 mm.

Range and distribution: British Columbia to California to Rocky Mountains; near sea level to over 2600 m, primarily in higher elevations. In Washington, from near sea level to subalpine. In patches, can be abundant in certain areas (drier subalpine meadows and understory), but not common.

Associations: Western hemlock and Pacific silver fir zones. Also, understory dominant on cool upper slopes in western spruce-fir forests; Douglas-fir, mountain hemlock, subalpine fir, noble fir; black huckleberry, rhododendron, whortleberry, bearberry, and sedges.

Habitat: Open woods, clearings, meadows, slopes, ridges, coniferous forests, well-drained soils, and non-forested talus slopes; serpentine soils in Siskiyou Mountains. Can grow well on shallow or rocky soils. Grows well on serpentine soils, but does not tolerate limestone-based soils.

Successional stage: Early to late successional; pioneer species and highly tolerant of disturbance; regenerates or resprouts well after fire. Persistent, long-lived species, but rarely blooms under a dense forest canopy. Moderately shade tolerant.

Ecological relations: The fleshy leaf bases or root-stock is food for bears in spring, as well as mice and pocket gophers; elk and deer eat the more tender leaves year-around; the leaves remain over winter, providing food for the mountain goat in cold weather. Fair cover for small mammals. Long-term revegetation and erosion control is provided from the roots. The primary fire adaptation of beargrass is its ability to sprout from rhizomes following fire. Beargrass is a survivor species that is present before a fire and regrows in place after the fire. Meristematic region of the rhizome, however, is near the soil surface so plant may be killed by high-intensity fires.

Biology

Flowering and fruiting: From May to August; stalks of white flowers bloom in mid summer; perennial, nonflowering for several years. Tends to bloom in multiple-year cycles, possibly based on environmental conditions.

Seed: Needs cold stratification for germination. Good germination rates have been obtained.

Vegetative reproduction: Will sprout from rhizomes more frequently than flowering.

Cultivation: Can be cultivated, but difficult. Has been successfully cultivated at the University of British Columbia Botanical Garden. Plants and seeds are commercially available.

Transplant viability: Mature plants do not transplant well. Seedling can be transplanted. Strongly mycorrhizal; may need appropriate soil to grow.

Collection

Part harvested: Leaves and flowers.

Harvest techniques: Leaves of current year's growth gently are pulled or cut at base of plant. All stems must be free of dirt and brown tips removed. Leaves commercially harvested are collected into about ½-lb bunches.

Harvest season: Late fall and winter.

Regeneration after harvest: Good, after growing season if rhizome left intact. Cutting into or tearing out rhizome to collect leaves is detrimental to the plant.

Uses and Products

Common uses: Filler in floral arrangements; basket weaving; fresh flower arrangements.

Indigenous uses: Baskets; garments; for decoration; poultice of chewed roots applied to wounds; grated roots used to stop bleeding.

Common products: Floral greens, fresh, dried, dyed, and preserved; basket weaving materials.

Types of markets: International and domestic. Dried and fresh floral, and crafts; export primarily to Japan and Europe.

Comments and Areas of Concern

Clearcutting and soil scarification may severely reduce beargrass (Montana) or increase density (Oregon). After a disturbance that opens canopy, beargrass increases in size and number; declines under canopy closure. Because of high level of harvest taking place on high-elevation sites, there is concern for degradation of habitat.

References

Craighead et al. (1991), Crane (1990b), Franklin and Dyrness (1973), Hickman (1993), Hitchcock and Cronquist (1978), Hortus West (1998), Pojar and MacKinnon (1994), Ross and Chambers (1988), Smart and Minore (1977), Thomas and Schumann (1993), USDA Forest Service (1988), Vance and Thomas (1997), Whitney (1997)

Continued

Boletus edulis Bull. ex Fr.
King bolete
Boletaceae

Boletus edulis

Ecology

Description: Native. Cap 8-30 cm wide, convex or bun shaped, brown to yellow brown; undercap pore sponge-like, white when young, then yellowish brown; stalk 8-25 cm long, 2-7 cm thick, white to brown; flesh thick, does not turn blue when bruised; spore print olive brown.

Range and distribution: Temperate forests throughout Northern Hemisphere. Widespread and locally common; solitary or in groups.

Associations: Conifers, especially spruce species in the Pacific Northwest.

Habitat: Terrestrial, woods, and edges.

Successional stage: Clearcutting eliminates fruiting until a new stand is established.

Ecological relations: Forms ectomycorrizae with range of conifer and hardwood species. Fire ecology is unknown.

Biology

Flowering and fruiting: Main fruiting in autumn, especially on the coast. A complex of similar species fruit from spring through autumn at high elevations.

Seed: Wind-dispersed spores.

Vegetative reproduction: Mycelia might be transported by insects or animals to establish new colonies. New harvestable parts are produced from a perennial mycelium

Cultivation: Not cultivated in North America.

Transplant viability: Techniques under development in Europe and New Zealand.

Collection

Part harvested: Mushroom (fruiting body, sporocarp).

Harvest techniques: Plucked or cut. Harvested when young or else becomes riddled with insect larvae.

Harvest season: During fruiting season locally.

Regeneration after harvest: Perennial mycelium and ectomycorrhizae.

Uses and Products

Common uses: As food, specialty food in restaurants.

Indigenous uses: As part of diet, cooked on hot stones, baked, or fried.

Common products: Fresh or dried food product.

Types of markets: Specialty food markets, restaurants, and export to Europe.

Comments and Areas of Concern

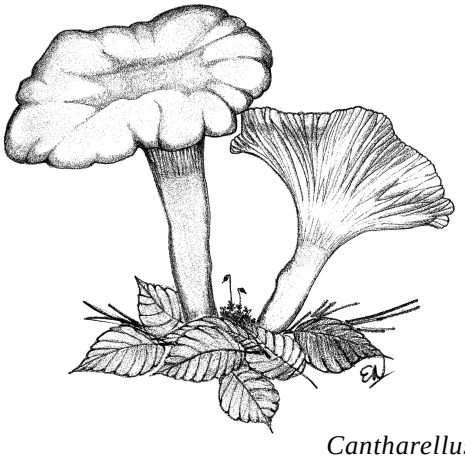
Long-term reduction of spore dispersal. Effects of timber management on productivity and managing stands to sustain and enhance production.

References

Arora (1986, 1991), Moerman (1998b), Molina et al. (1993)

Cantharellus spp.
Chanterelle
Cantharellaceae

C. formosus Corner, Pacific golden chanterelle
C. subalbidus Smith & Moorse, White chanterelle



Cantharellus

Ecology

Description: Native. Trumpet shaped; orange to yellow-orange cap 3-15 cm wide, concave or wavy when mature; gills veinlike with folds and ridges running down stalk, same color as cap or paler; solid stalk 2-10 cm long; 0.5-3 cm wide; spore print creamy or yellow; odor fruity like apricots. White chanterelle is off-white, bruises yellow orange, and is more robust.

Range and distribution: Edible chanterelle species widespread globally. *Cantharellus formosus* and *C. subalbidus* restricted to coniferous forests of the Pacific Northwest. Singly, but often in groups, occasionally in fused clusters.

Associations: Douglas-fir/hemlock forests.

Habitat: Terrestrial, conifer forests; *C. formosus* common in young stands, but similar (undescribed) species may be an old-growth associate. White chanterelles in conifer forests and somewhat higher elevations.

Successional stage: Regenerated stands must be 15 years or older before fruiting resumes.

Ecological relations: Forms symbiotic relations with roots of forest trees through ectomycorrhizae.

Biology

Flowering and fruiting: Fruits in cool, moist weather, summer through autumn.

Seed: Wind-dispersed spores.

Vegetative reproduction: Mycelia might be transported by insects or animals to establish new colonies. New harvestable parts are produced from a perennial mycelium.

Cultivation: Not cultivated in North America.

Transplant viability: Commercial cultivation not yet achieved, although methods are being developed in Sweden.

Collection

Part harvested: Mushroom (fruiting body, sporocarp).

Harvest techniques: Plucked or cut. Dirty base removed before placing in collection container.

Harvest season: From summer through autumn.

Regeneration after harvest: Regeneration is from perennial mycelium and ectomycorrhizae. Better regeneration if these are not disturbed.

Uses and Products

Common uses: Food for personal use and in restaurants.

Indigenous uses: Only two documented cases in western North America.

Common products: Fresh or canned mushrooms. Occasionally dried and exported.

Types of markets: Specialty produce markets, restaurants, and export to Europe.

Comments and Areas of Concern

Long-term reduction of spore dispersal. Effects of timber management on productivity and managing stands to sustain and enhance production.

References

Arora (1986, 1991), Molina et al. (1993)

Leucangium carthusianum
Tuslane & Tuslane
Oregon black truffle
Helvellaceae

Leucangium carthusianum

Ecology

Description: Native. Potato-shaped, underground fruiting body, 0.5-4.5 cm broad, round to irregular, minutely warty; dark brown to black; interior solid with pockets of fertile tissue, marbled with paler sterile veins, whitish when young, becoming gray to green-gray; aroma of pineapple.

Range and distribution: Pacific Northwest and Europe. Singly or small groups.

Associations: Douglas-fir forests.

Habitat: Underground with Douglas-fir in the Northwest, other tree genera in Europe.

Successional stage: Most common in young dense plantations at low elevations and valley margins; often on private land.

Ecological relations: Forms mycorrhizae with Douglas-fir. Fire ecology unknown.

Biology

Flowering and fruiting: Late fall through early spring.

Seed: Spores. Sporulates underground; odor induces mammal mycophagy. Spores dispersed in feces.

Vegetative reproduction: Mycelia might be transported by insects or animals to establish new colonies. New harvestable parts are produced from perennial mycelium.

Cultivation: Not cultivated in North America other than informal inoculation trials.

Transplant viability: Anecdotal evidence of spore slurries enhancing production; not confirmed statistically.

Collection

Part harvested: Truffle (fruiting body, sporocarp).

Harvest techniques: Litter and duff layers are raked. Dogs can be used to sniff out ripe truffles. Look for rodent digs. Disturbed duff and litter should be replaced. Marketing unripe truffles can diminish product reputation.

Harvest season: From October through February.

Regeneration after harvest: Perennial mycelium and ectomycorrhizae.

Uses and Products

Common uses: Flavoring, added to sauces, popular gourmet item in restaurants.

Indigenous uses: None documented.

Common products: Fresh, frozen, and preserved in oil.

Types of markets: Restaurants.

Comments and Areas of Concern

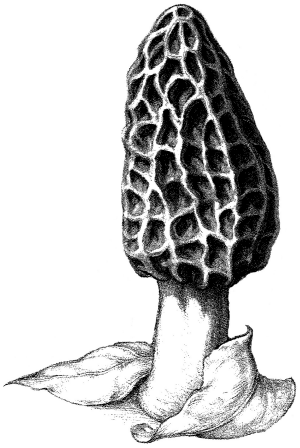
Damage to soil, tree roots or truffle mycelium from deep raking. Possible spread of root rot fungi on rake tines.

References

Arora (1986), Molina et al. (1993)

Morchella spp.
Morel
Morchellaceae

M. elata Fr.:Fr. sensu Weber (1995), Natural or black morel



Morchella

Ecology

Description: Native. Many species. The black morel has a fertile head, 2-17 cm high, 2-6 cm wide, round to cone-shaped, honeycombed with pits and ridges; grayish tan to brown to black; pits lighter color than ridges; cap ingrown to stalk, minutely grandular stalk 1.5-10 cm long, 1-4 cm wide, without a sack or cup at base; color from ivory to tan; cap and stem hollow.

Range and distribution: Various species widespread throughout North America; natural or black morel (*M. elata*) common in intermountain West. Widespread; solitary to clustered.

Associations: Mixed conifers at mid to high elevations.

Habitat: Terrestrial, forested, and previously forested areas; streamsides, and burned or disturbed areas.

Successional stage: Early to late successional; some species fruit perennially, others in large flushes after fires, tree death, or ground disturbance.

Ecological relations: Most species saprobic, some may be facultatively mycorrhizal; complex life cycles. Large flushes of some morel species fruit for the first spring or two after fires.

Biology

Flowering and fruiting: Fruiting in spring and summer after snowmelt.

Seed: Wind-dispersed spores.

Vegetative reproduction: New harvestable parts are produced from a perennial mycelium. Pseudosclerotia serve as nutrient storage structures.

Cultivation: Small cultivation industry in North America.

Transplant viability: Spores generate readily in culture, but difficult to fruit, some commercial cultivation, mycelium can be purchased to establish "patches."

Collection

Part harvested: Fruiting body.

Harvest techniques: Cut with a knife about 1.5 cm from the ground to obtain clean specimens. Leave the mycelium in the ground and undisturbed. Some of the mushrooms are left, especially old ones (spores mature late). Search areas disturbed the previous year by logging, fire, or tree death.

Harvest season: From spring through summer.

Regeneration after harvest: Unknown mechanism, possibly perennial pseudosclerotia, mycelium, mycorrhizae, or spores.

Uses and Products

Common uses: Food.

Indigenous uses: Documented uses not found.

Common products: Dried or fresh mushroom products.

Types of markets: Specialty produce markets, restaurants, and export to Europe.

Comments and Areas of Concern

Multiple species with differing ecological relations. Potentially reduced spore dispersal among species that only fruit episodically after disturbance.

References

Arora (1986, 1991), Mizerak (1998), Molina et al. (1993), Weber (1988)

Tricholoma magnivelare (Peck) Redhead
Matsutake, American matsutake, pine mushroom
Tricholomataceae

Tricholoma magnivelare

Ecology

Description: Native. White robust mushroom; stem is solid, firm, and fibrous; 4-15 cm long, 1-5 cm thick, base of stalk tapered and without a bulb; cap 5-20 cm, is smooth; ring on stem develops from a cottony veil; spore print is white; aroma is spicy.

Range and distribution: Widespread in North America, coincides with boreal and temperate conifer forests; most abundant in British Columbia, Washington, Oregon, and northern California: Olympic Peninsula to Cascade Range, sand dunes of coastal Oregon, southern Cascade Range and Klamath Mountains. Fruits from 3-2000 m. Widespread but in clustered patterns; can vary greatly in occurrence, abundance, and distribution from year to year.

Associations: Douglas-fir, western hemlock, grand fir, Shasta red fir, lodgepole pine; in southwestern Oregon and along northern California coast, it often associates with tanoak.

Habitat: Various soils, climates, and host trees. Most abundant in well-drained, infertile soils.

Successional stage: Rarely fruits in stands under 40 years old.

Ecological relations: Forms symbiotic relations with roots of forest trees through its ectomycorrhizae. Mycelium form a dense mat in the soil. Animals eat mushroom and disperse spores. Fire ecology unknown.

Biology

Flowering and fruiting: Fruits in late summer to winter depending on habitat, elevation, and latitude.

Seed: Wind-dispersed spores. Possible dispersal in animal feces.

Vegetative reproduction: New harvestable fruits are produced from a perennial mycelium that may fragment into multiple colonies. Insects or animals may distribute mycelium.

Cultivation: Not cultivated in North America.

Transplant viability: No successes.

Collection

Part harvested: Mushroom (fruiting body, sporocarp).

Harvest techniques: The mushroom is carefully plucked, as cutting the stem destroys its commercial value. Avoid disturbing the mycelium. Do not use rakes or other tools to search under the duff layer. Learn how to spot the mounds that matsutakes make under the ground, and carefully move the soil away. Cover any holes. Commercial harvest concentrated in lodgepole pine, Shasta red fir, and tanoak forests.

Harvest season: Autumn.

Regeneration after harvest: Perennial mycelium.

Uses and Products

Common uses: Eaten fresh.

Indigenous uses: Food and flavoring.

Common products: Fresh mushrooms.

Types of markets: International. Specialty-produce markets and restaurants. Japan imports over 90 percent.

Comments and Areas of Concern

Though a common practice has been raking litter and soil to find young and most valuable mushrooms, this may negatively impact subsequent mushroom production and should be avoided. Long-term reduction of spore dispersal. Optimal habitat may be affected by timber harvest practices.

References

Arora (1986, 1991), Hosford et al. (1997), Mizerak (1998), Molina et al. (1993)

Tuber gibbosum Gilkey
Oregon white truffle
Tuberaceae

Tuber gibbosum

Ecology

Description: Native. Potato-shaped, underground fruiting body, 1.5-5 cm broad, round to irregular knobby and firm, color whitish when young, becoming buff to dark brown, exterior lacks hairs or warts; often cracks with age; interior solid, white when young becoming dark brown to red-brown with white veins when mature; odor strong and garliclike when mature.

Range and distribution: Northern California to British Columbia west of Cascades. Singly or more commonly in groups; common in Oregon.

Associations: Douglas-fir.

Habitat: Underground, almost exclusively under Douglas-fir.

Successional stage: Most common in young dense plantations at low elevations and valley margins; often on private land.

Ecological relations: Spores disseminated by rodents; forms mycorrhizae with Douglas-fir. Fire ecology unknown.

Biology

Flowering and fruiting: Late fall through early spring.

Seed: Spores. Sporulates underground. Odor induces mammal mycophagy, spores dispersed in feces.

Vegetative reproduction: Mycelia might be transported by insects or animals to establish new colonies. New harvestable parts are produced from a perennial mycelium.

Cultivation: Not widely cultivated in North America other then informal inoculation trials.

Transplant viability: Anecdotal evidence of spore slurries enhancing production; not confirmed statistically.

Collection

Part harvested: Truffle (fruiting body, sporocarp).

Harvest techniques: Litter and duff layers are raked. Dogs can be used to sniff out ripe truffles. Look for rodent digs. Disturbed duff and litter should be replaced. Marketing unripe truffles can diminish product reputation.

Harvest season: From October through March.

Regeneration after harvest: Perennial mycelium and ectomycorrhizae.

Uses and Products

Common uses: Flavoring, as gourmet item in restaurants.

Indigenous uses: None documented.

Common products: Fresh, frozen, or preserved in oil.

Types of markets: Restaurants.

Comments and Areas of Concern

Damage to soil, tree roots, or truffle mycelium from deep raking. Possible spread of root rot fungi on rake tines.

References

Arora (1986, 1991), Molina et al. (1993)

Continued

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Morchella spp.

Metric and English Equivalents

English to metric		Metric to English	
1 inch (in)	= 2.540 cm	1 centimeter (cm)	= 0.394 in
1 foot (ft)	= 0.305 m	1 meter (m)	= 3.281 ft
1 acre (acre)	= 0.405 ha	1 hectare (ha)	= 2.471 acres
1 pound (lb)	= 453.592 g	1 gram (g)	= 0.003 lb
Degrees Fahrenheit (ºF)	= 9/5(ºC) + 32	Degrees Celsius (ºC)	= 5/9(ºF-32)

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1 mile (mi) =1.609 km 1 kilometer (km) = 0.622 mi

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Appendix 1

Additional species used and traded in the Pacific Northwest not described in text. Other medicinal and useful plants not included in this text are described in publications in the "References" section of this paper.

Florals:

Maidenhair fern (*Adiantum pedatum* L.)

Pacific madrone (*Arbutus menziesii* Pursh)

Deer fern (*Blechnum spicant* L. Sm.)

Coastal reindeer lichen (*Cladina portentosa* (Dufour) Follmann)

Red-osier dogwood (*Cornus stolonifera* Michx.)

Oceanspray (*Holodiscus discolor* (Pursh) Maxim.)

Yellow moss (*Homalothecium fulgescens* (Mitt. ex C. Muell) Lawt.)

Western bog laurel (*Kalmia microphylla* (Hook.) Heller)

Pacific willow (*Salix lucida* Muhl.)

Hardhack (*Spiraea douglasii* Hook.)

Common snowberry (*Symphoricarpos albus* (L.) Blake)

Twisted ulota moss (*Ulota obtusiuscula* C. Muell. & Kindb.)

Medicinals:

Yerba mansa (*Anemopsis californica* (Nutt.) Hook. & Arn.)

Pacific madrone (*Arbutus menziesii* Pursh)

Arrowleaf balsamroot (*Balsamorhiza sagittata* (Pursh) Nutt.)

Bunchberry dogwood (*Cornus canadensis* Michx.)

Bleeding heart (*Dicentra formosa* (Haw.) Walp.)

Fireweed (*Epilobium angustifolium* L.)

Labrador tea (*Ledum glandulosum* Nutt.)

False Solomon's seal (*Maianthemum racemosa* (L.) Link)

Licorice fern (*Polypodium glycyrrhiza* D.C. Eat.)

Balsam poplar (*Populus balsamifera* L.)

Milkthistle (*Silybum marianum* (L.) Gaertn.)

California bay laurel (*Umbellularia californica* (Hook. & Arn.) Nutt.)

Blue vervain (*Verbena hastata* L.)

Edibles:

Burdock (*Arctium minus* Bernh.)

Lamb's quarter's (*Chenopodium album* L.)

Miner's lettuce (*Claytonia perfoliata* Donn ex Willd.)

Wild licorice (*Glycyrrhiza lepidota* Pursh.)

Mountain sorrel (*Oxyria digyna* (L.) Hill)

Currant (*Ribes* L. spp.)

Blackberries (*Rubus* L. spp.)

Common dandelion (*Taraxacum officinale* G.H. Weber ex Wiggers)

Cat-tail (*Typha latifolia* L.)

Edible mushrooms:

Giant puffball (*Calvatia booniana* A.H.S.)

Shaggy mane (*Coprinus comatus* (Müll. ex Fr.) S.F.G.)

Hen of the woods (*Grifolia frondosa* (Fr.) S.F.G.)

Lion's mane (*Hericium erinaceus* (Fr.) Pers.)

Hedgehog (*Hydnum repandum* (Fr.) S.F.G.)

Lobster mushroom (*Hypomyces lactiflorum* (Schw. ex Fr.) Tul.)

Candy cap (*Lactarius fragilis* (Burl.))

Oyster mushroom (*Pleurotus ostreatus* Fr.)

Pink coral (*Ramaria botrytis* (Fr.) Rick.)

Cauliflower mushroom (*Sparassis crispa* Wulf. ex Fr.)

Several mushrooms illustrated in this publication are representative of several closely related species that are all commercially harvested, especially the chanterelles, morels, and boletes. As many as 20 other edible mushroom species are harvested commercially in the Pacific Northwest. Arora (1991) provides a succinct overview of most of the major edible mushrooms in the Western United States. The ones that are harvested commercially differ greatly depending on region, season, buyers, markets, and whether they appear similar to poisonous species.

Christmas greenery:

American holly (*Ilex opaca* Ait.)

Lodgepole pine (*Pinus contorta* Dougl. ex Loud.)

Sugar pine (*Pinus lambertiana* Dougl.)

Western white pine (*Pinus monticola* Dougl. ex D. Don)

Coastal redwood (*Sequoia sempervirens* (Lamb. ex D. Don) Endl.)

Christmas trees:

Pacific silver fir (*Abies amabilis* Dougl. ex Forbes)

Subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.)

Shasta red fir (*Abies magnifica* var. *shastensis* Lemm)

Coastal redwood (*Sequoia sempervirens* (Lamb. ex D. Don) Endl.)

Craft materials:

Big-leaf maple shoots (*Acer macrophyllum* Pursh)

Coastal reindeer lichen (*Cladina portentosa* (Dufour) Follmann)

Antlered perfume lichen (*Evernia prunastri* (L.) Ach.)

Common scissor-leaf liverwort (*Herbertus aduncus* (Dicks.) Gray)

Sitka spruce cone (*Picea sitchensis* (Bong.) Carr.)

Sugar pine cone (*Pinus lambertiana* Dougl.)

Ponderosa pine cone (*Pinus ponderosa* P. & C. Lawson)

Appendix 2

Common name	Scientific name
Alaska-cedar	*Chamaecyparis nootkatensis* (D. Don) Spach
Alaska huckleberry	*Vaccinium alaskaense* How.
Alder	*Alnus* P. Mill.
Alpine wintergreen	*Gaultheria humifusa* (Graham) Rydb.
American false hellebore	*Veratrum viride* Ait.
American matsutake	*Tricholoma magnivelare* (Peck) Redhead
Angelica	*Angelica* L.
Angelica	*Angelica polymorpha* Maxim.
Arnica	*Arnica* L.
Arrowleaf balsamroot	*Balsamorhiza sagittata* (Pursh) Nutt.
Arrowleaf coltsfoot	*Petasites sagittatus* (Banks ex Pursh) Gray
Avalanche fawn-lily	*Erythronium montanum* Wats.
Baby's breath	*Gypsophila paniculata* L.
Baldhip rose	*Rosa gymnocarpa* Nutt.
Balsamroot	*Balsamorhiza* Nutt.
Bearberry	*Arctostaphylos uva-ursi* (L.) Spreng.
Beard lichen	*Usnea longissima* Ach.
Beargrass	*Xerophyllum tenax* (Pursh) Nutt.
Bedstraw	*Galium* L.
Big sagebrush	*Artemisia tridentata* Nutt.
Big-leaf maple	*Acer macrophyllum* Pursh
Bilberry	*Vaccinium* L.
Bitter-brush	*Purshia tridentata* (Pursh) DC
Black cottonwood	*Populus trichocarpa* Torr. & Gray ex Hook.
Black elderberry	*Sambucus racemosa* L. var. *melanocarpa* (Gray) McMinn
Black hawthorn	*Crataegus douglasii* Lindl.
Black huckleberry	*Vaccinium membranaceum* Dougl. ex Torr.
Black morel	*Morchella elata* Fr.:Fr. sensu Weber (1995)
Blackcap raspberry	*Rubus leucodermis* Dougl. ex Torr & Gray

Common name	Scientific name
Blood spattered beard	*Usnea wirthii* P. Clerc
Blue elderberry	*Sambucus cerulea* Raf.
Blue skullcap	*Scutellaria laterifolia* L.
Blueberry	*Vaccinium* L.
Bluebunch wheatgrass	*Agropyron spicatum* (Pursh) Scribn. & J.G. Sm.
Bluegrass	*Poa* L.
Bog cranberry	*Vaccinium oxycoccos* L.
Bracken fern	*Pteridium aquilinum* (L.) Kuhn var. *pubescens* L. Underw.
Brewer's mitrewort	*Mitella breweri* Gray
Broadleaf arnica	*Arnica latifolia* Bong.
Broadleaf lupine	*Lupinus latifolius* Lindl. ex J.G. Agardh
Brome	*Bromus* L.
Buckbrush	*Ceanothus* L.
Buckthorn	*Frangula purshiana* (DC.) Cooper
Bull thistle	*Cirsium vulgare* (Savi) Ten.
Bunchberry dogwood	*Cornus canadensis* L.
Burdock	*Arctium* L.
California black oak	*Quercus kelloggii* Newberry
California juniper	*Juniperus californica* Carr.
California spikenard	*Aralia californica* S.Wats.
California sword fern	*Polystichum californicum* (DC. Eat.) Diels
Canby's lovage	*Ligusticum canbyi* Coult. & Rose
Canyon live oak	*Quercus chrysolepis* Liebm.
Cascade bilberry	*Vaccinium deliciosum* Piper.
Cascara buckthorn	*Frangula purshiana* (DC.) Cooper
Ceanothus	*Ceanothus* L.
Cedar	*Thuja* L.
Celeryleaf lovage	*Ligusticum apiifolium* (Nutt. ex Torr. & Gray) Gray

Common name	Scientific name
Chanterelle	*Cantharellus* Corner
Chickweed	*Stellaria media* (L.) Vill.
Chittum	*Frangula purshiana* (DC.) Cooper
Choke cherry	*Prunus virginiana* L.
Cluster rose	*Rosa pisocarpa* Gray
Coltsfoot	*Petasites frigidus* (L.) Fries var. *palmatus* (Ait.) Cronq.
Columbia hawthorn	*Crataegus columbiana* T.J. Howell
Common dandelion	*Taraxacum officinale* G.H. Weber ex Wiggers
Common hawthorn	*Crataegus monogyna* Jacq.
Common horsetail	*Equisetum arvense* L.
Common juniper	*Juniperus communis* L.
Common mullein	*Verbascum thapsus* L.
Common snowberry	*Symphoricarpos albus* (L.) Blake
Common teasel	*Dipsacus fullonum* L.
Common yarrow	*Achillea millefolium* L.
Cow-parsnip	*Heracleum lanatum* Micht.
Creeping snowberry	*Gaultheria hispidula* (L.) Muhl. ex Bigelow
Curly dock	*Rumex crispus* L.
Currant	*Ribes* L.
Cut-leaved goldthread	*Coptis laciniata* Gray
Deerfoot vanillaleaf	*Achlys triphylla* (Smith) DC.
Desert parsley	*Lomatium dissectum* (Nutt.) Mathias & Constance
Devil's club	*Oplopanax horridum* Miq.
Dock	*Rumex* L.
Douglas' water-hemlock	*Cicuta douglasii* (DC.) Coult. & Rose
Douglas-fir	*Pseudotsuga menziesii* (Mirb.) Franco
Dwarf Oregon grape	*Berberis nervosa* Pursh
Dwarf skullcap	*Scutellaria nana* Gray

Common name	Scientific name
Eastern tea berry	*Gaultheria procumbens* L.
Elegant gentian	*Gentiana plurisetosa* C.T. Mason
Engelmann spruce	*Picea engelmannii* Parry ex Engelm.
Evergreen huckleberry	*Vaccinium ovatum* Pursh.
Evergreen violet	*Viola sempervirens* Greene
Explorer's gentian	*Gentiana calycosa* Griseb.
False box	*Pachistima myrsinites* Raf.
False box	*Paxistima myrsinites* Raf. (see *Pachistima*)
False Solomon's seal	*Maianthemum racemosa* (L.) Link
Fern-leaved goldthread	*Coptis asplenifolia* (Salisb.)
Fern-leaved lomatium	*Lomatium dissectum* (Nutt.) Mathias & Constance
Fescue	*Festuca* L.
Field mint	*Mentha arvensis* L.
Field sagewort	*Artemisia campestris* ssp. *borealis* (Pallas) Hall & Clements var. *wormskioldii* (Bess. Ex Hook.) Cronq.
Fir	*Abies* P. Mill.
Fireweed	*Epilobium angustifolium* L.
Foamflower	*Tiarella trifoliata* L.
Four-parted gentian	*Gentiana propinqua* Richards
Fringed sage	*Artemisia frigida* Willd.
Gasquet manzanita	*Arctostaphylos hispidula* T.J. Howell
Gentian	*Gentiana* L.
Geyer's lomatium	*Lomatium geyeri* (S. Wats.) Mathias & Constance
Glaucous gentian	*Gentiana glauca* Pallas
Globe huckleberry	*Vaccinium globulare* Rydb.
Goldenseal	*Hydrastis canadensis* L.
Grand fir	*Abies grandis* (Dougl. ex D. Don.) Lindl.
Gray's lovage	*Ligusticum grayi* Coult. & Rose

Common name	Scientific name
Greenleaf manzanita	*Arctostaphylos patula* Greene
Groundsel	*Senecio* L.
Hairy manzanita	*Arctostaphylos columbiana* Piper
Hawthorn	*Crataegus* L.
Heartleaf arnica	*Arnica cordifolia* Hook.
Hemlock	*Tsuga* Carr.
Horsetail	*Equisetum* L.
Huckleberry	*Vaccinium* L.
Idaho fescue	*Festuca idahoensis* Elmer
Incense cedar	*Calocedrus decurrens* (Torr.) Florin
Indian basket grass	*Xerophyllum tenax* (Pursh) Nutt.
Inside-out flower	*Vancouveria hexandra* (Hook.) Morr. & Dec.
Juniper	*Juniperus* L.
King bolete	*Boletus edulis* Bull. ex Fr.
King's gentian	*Gentiana sceptrum* Griseb.
Kinnikinnick	*Arctostaphylos uva-ursi* (L.) Spreng.
Klamath weed	*Hypericum perforatum* L.
Kneeling angelica	*Angelica genuflexa* Nutt.
Lady fern	*Athyrium filix-femina* (L.) Roth
Licorice-root	*Ligusticum* L.
Lodgepole pine	*Pinus contorta* Dougl. ex Loud.
Lovage	*Ligusticum* L.
Lupine	*Lupinus* L.
Lyall's angelica	*Angelica arguta* Nutt.
Macoun's fringed gentian	*Gentiana macounii* (Holm) Iltis
Maidenhair fern	*Adiantum pedatum* L.
Manzanita	*Arctostaphylos* Adans.
Maple	*Acer* L.
Marsh skullcap	*Scutellaria galericulata* L.

Common name	Scientific name
Matsutake	*Tricholoma magnivelare* (Peck) Redhead
Meadow rue	*Thalictrum* L.
Mendocino gentian	*Gentiana setigera* Gray
Morel	*Morchella* Pers.:Fr.
Moss	Musci (Bryophyta)
Mountain arnica (European)	*Arnica montana* L.
Mountain balm	*Eriodictyon californicum* (Hook. & Arn.) Torr.
Mountain heather	*Phyllodoce empetriformis* (Sm.) D. Don
Mountain hemlock	*Tsuga mertensiana* (Bong.) Carr.
Mountain maple	*Acer glabrum* Torr.
Mountain snowberry	*Symphoricarpos oreophilus* Gray
Mt. Shasta arnica	*Arnica viscosa* Gray
Mugwort	*Artemisia douglasiana* Bess.
Muhly grass	*Muhlenbergia* Schreb.
Mullein	*Verbascum thapsus* L.
Narrow-leaf yerba santa	*Eriodictyon angustifolium* Nutt.
Narrow-leaved buckbrush	*Ceanothus cuneatus* (Hook.) Nutt.
Natural morel	*Morchella elata* Fr.:Fr. sensu Weber (1995)
Needlegrass	*Stipa* L.
Newberry's gentian	*Gentiana newberryi* Gray
Ninebark	*Physocarpus malvaceus* (Greene) Kuntze
Noble fir	*Abies procera* Rehd
Nootka rose	*Rosa nutkana* Presl.
Oak	*Quercus* L.
Oceanspray	*Holodiscus discolor* (Pursh) Maxim.
Old man's beard	*Usnea* Dill. ex Adans.
One-flowered gentian	*Gentiana simplex* Gray
Oneseed hawthorn	*Crataegus monogyna* Jacq.
Oregon ash	*Fraxinus latifolia* Benth.

Common name	Scientific name
Oregon black truffle	*Leucangium carthusianum* Tuslane & Tuslane
Oregon boxwood	*Pachistima myrsinites* Raf.
Oregon dogwood	*Cornus nuttallii* Audubon ex Torr. & Gray
Oregon goldthread	*Coptis laciniata* Gray
Oregon grape	*Berberis* L.
Oregon white oak	*Quercus garryana* Dougl. ex Hook.
Oregon white truffle	*Tuber gibbosum* Gilkey
Oregon wintergreen	*Gaultheria ovatifolia* Gray
Osha	*Ligusticum* L.
Ostrich fern	*Matteuccia struthiopteris* L. Tod.
Oxeye daisy	*Chrysanthemum leucanthemum* L.
Pacific golden chanterelle	*Cantharellus formosus* Corner
Pacific madrone	*Arbutus menziesii* Pursh
Pacific rhododendron	*Rhododendron macrophyllum* G. Don ex G. Don
Pacific silver fir	*Abies amabilis* Dougl. ex Forbes
Pacific yew	*Taxus brevifolia* Nutt.
Palmate coltsfoot	*Petasites frigidus* (L.) Fries var. *palmatus* (Ait.) Cronq.
Pathfinder	*Adenocaulon bicolor* Hook
Pearly everlasting	*Anaphalis margaritacea* (L.) Benth
Penstemon	*Penstemon* Mitch.
Pine	*Pinus* L.
Pine mushroom	*Tricholoma magnivelare* (Peck) Redhead
Pinegrass	*Calamagrostis rubescens* Buckl.
Pinemat manzanita	*Arctostaphylos nevadensis* Gray
Pipsissewa	*Chimaphila* Pursh
Pipsissewa	*Chimaphila umbellata* (L.) W. Bart.
Poison oak	*Toxicodendron diversilobum* (Torr. & Gray) Greene
Ponderosa pine	*Pinus ponderosa* P. & C. Lawson

Common name	Scientific name
Porter's lovage	*Ligusticum porteri* Coult. & Rose
Port-Orford-cedar	*Cupressus lawsoniana* (A. Murr.)
Prince's pine	*Chimaphila* Pursh
Prince's pine	*Chimaphila umbellata* (L.) W. Bart.
Purple bee balm	*Monarda fistulosa* L.
Queen Anne's lace	*Daucus carota* L.
Queencup beadlily	*Clintonia uniflora* (Schult.) Kunth
Raspberry	*Rubus* L.
Rattlesnake plantain	*Goodyera oblongifolia* Raf.
Red alder	*Alnus rubra* Bong.
Red elderberry	*Sambucus racemosa* L. ssp. *pubens* (Michx.) House
Red fescue	*Festuca rubra* L.
Red fir	*Abies magnifica* A. Murr.
Red huckleberry	*Vaccinium parviflorum* Sm.
Red raspberry	*Rubus idaeus* L.
Red root	*Ceanothus* L.
Red sorrel	*Rumex acetosella* L.
Redstem ceanothus	*Ceanothus sanguineus* Pursh
Rhododendron	*Rhododendron* L.
Rocky Mountain juniper	*Juniperus scopulorum* Sarg.
Rosy twisted stalk	*Streptopus roseus* Michx.
Sagewort	*Artemisia douglasiana* Bess.
Salal	*Gaultheria shallon* Pursh
Salmon River lomatium	*Lomatium salmoniflorum* (Coult. & Rose) Mathias & Constance
Salmonberry	*Rubus spectabilis* Pursh
Scotch broom	*Cytisus scoparius* (L.) Link
Scouler's valerian	*Valeriana scouleri* Rydb.
Scouring-rush	*Equisetum hyemale* L.

Common name	Scientific name
Sea-watch	*Angelica lucida* L.
Sedge	*Carex* L.
Selfheal	*Prunella vulgaris* L.
Serviceberry	*Amelanchier alnifolia* Nutt. ex M. Roemer
Serviceberry	*Amelanchier* Medik.
Shasta red fir	*Abies magnifica* var. *shastensis* Lemm
Sheep sorrel	*Rumex acetosella* L.
Shepherd's purse	*Capsella bursa-pastoris* (L.) Medik.
Shinyleaf spirea	*Spiraea betulifolia* Pall. var. *lucida* (Dougl.) Hitchc.
Showy sedge	*Carex spectabilis* Dewey
Siskiyou trillium	*Trillium angustipetalum* (Torr.) J.D. Freeman
Sitka spruce	*Picea sitchensis* (Bong.) Carr.
Sitka valerian	*Valeriana sitchensis* Bong.
Skullcap	*Scutellaria* L.
Slender gentain	*Gentiana tenella* Rottb.
Snapdragon skullcap	*Scutellaria antirrhinoides* Benth.
Snowberry	*Symphoricarpos* Duhamel
Snowbrush ceanothus	*Ceanothus velutinus* Dougl. ex Hook.
Snowqueen	*Synthyris reniformis* (Dougl. ex Benth.) Benth.
Spikenard	*Aralia californica* S.Wats.
Spirea	*Spiraea* L.
Spruce	*Picea* A. Dietr.
St. John's wort	*Hypericum perforatum* L.
Starry false Solomon's seal	*Maianthemum stellata* (L.) Link
Stinging nettle	*Urtica dioica* L.
Subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.
Suksdorf's mugwort	*Artemisia suksdorfii* (Piper)
Suksdorfi's hawthorn	*Crataegus suksdorfii* (Sarg.) Kruschke
Swamp gentian	*Gentiana douglasiana* Bong.

Common name	Scientific name
Sweet coltsfoot	*Petasites frigidus* (L.) Fries var. *nivalis* (Greene) Cronq.
Sweet-cicely	*Osmorhiza chilensis* Hook & Arn.
Tall Oregon grape	*Berberis aquifolium* Pursh
Tanoak	*Lithocarpus densiflora* (Hook & Arn.) Rehd.
Teasel	*Dipsacus* L.
Thimbleberry	*Rubus parviflorus* Nutt.
Thistle	*Cirsium* P. Mill.
Threeleaf goldthread	*Coptis trifolia* (L.) Salisb.
Trailing blackberry	*Rubus ursinus* Cham. & Schlect.
Trembling aspen	*Populus tremuloides* Michx.
Twinflower	*Linnaea borealis* L.
Usnea	*Usnea* Dill. ex Adans.
Valerian	*Valeriana* L.
Velvetleaf huckleberry	*Vaccinium myrtilloides* Michx.
Vine maple	*Acer circinatum* Pursh
Wake-robin	*Trillium ovatum* Pursh
Western bracken fern	*Pteridium aquilinum* (L.) Kuhn var. *pubescens* L. Underw.
Western dock	*Rumex occidentalis* S. Wats
Western goldthread	*Coptis occidentalis* (Nutt.) Torr. & Gray
Western hazel	*Corylus cornuta* Marsh
Western hemlock	*Tsuga heterophylla* (Raf.) Sarg.
Western juniper	*Juniperus occidentalis* Hook.
Western redcedar	*Thuja plicata* Donn ex D. Don
Western sword fern	*Polystichum munitum* (Kaulfuss) K. Presl.
Western trillium	*Trillium ovatum* Pursh
Western valerian	*Valeriana occidentalis* Heller
Western white pine	*Pinus monticola* Dougl. ex D. Don
Whipple vine	*Whipplea modesta* Torr.

Common name	Scientific name
White chanterelle	*Cantharellus subalbidus* Corner
White fir	*Abies concolor* (Gord. & Glend.) Lindl. ex Hildebr.
White hawkweed	*Hieracium albiflorum* Hook.
White sage	*Artemisia ludoviciana* Nutt. ssp. *estesii* Chambers
White-leaved manzanita	*Arctostaphylos viscida* Parry
Whortleberry	*Vaccinium scoparium* Leib. ex Coville
Wild ginger	*Asarum caudatum* Lindl.
Wild oats	*Avena fatua* L.
Wild rhubarb	*Rumex arcticus* Trautv.
Wild rhubarb	*Rumex fenestratus* Greene
Wild rose	*Rosa* L.
Wild teasel	*Dipsacus sylvestris* Huds.
Willow	*Salix* L.
Witch's hair	*Alectoria sarmentosa* Ach. (Ach.)
Wood violet	*Viola glabella* Nutt.
Wood's rose	*Rosa woodsii* Lindl.
Woolly mullein	*Verbascum thapsus* L.
Wormwood	*Artemisia douglasiana* Bess.
Yarrow	*Achillea millefolium* L.
Yellow gentian	*Gentiana lutea* L.
Yerba santa	*Eriodictyon californicum* (Hook. & Arn.) Torr.

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