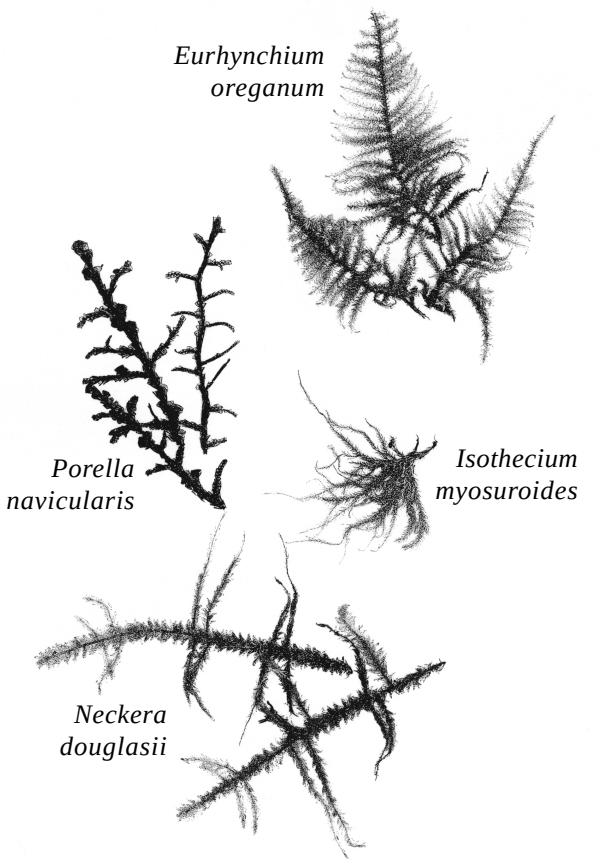
Bryophyta (division)
Moss, tree moss, log moss moss (musci), liverwort (hepaticae)

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

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.

Chimaphila umbellata

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

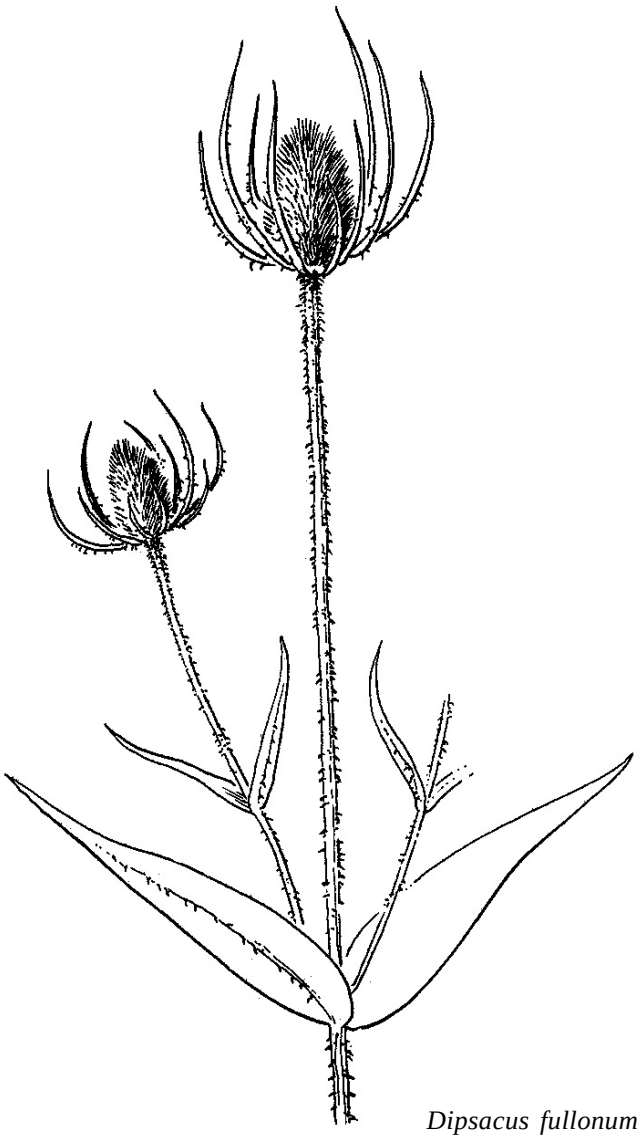
Caution: Contains several toxic alkaloids that can depress the hearing and nervous system. Aggressive noxious weed, pollen common allergen during flowering season. Native of Europe that escaped from cultivation in 19th century to become a major pest to many landowners. Use care to not spread species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



Dipsacus fullonum

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.

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

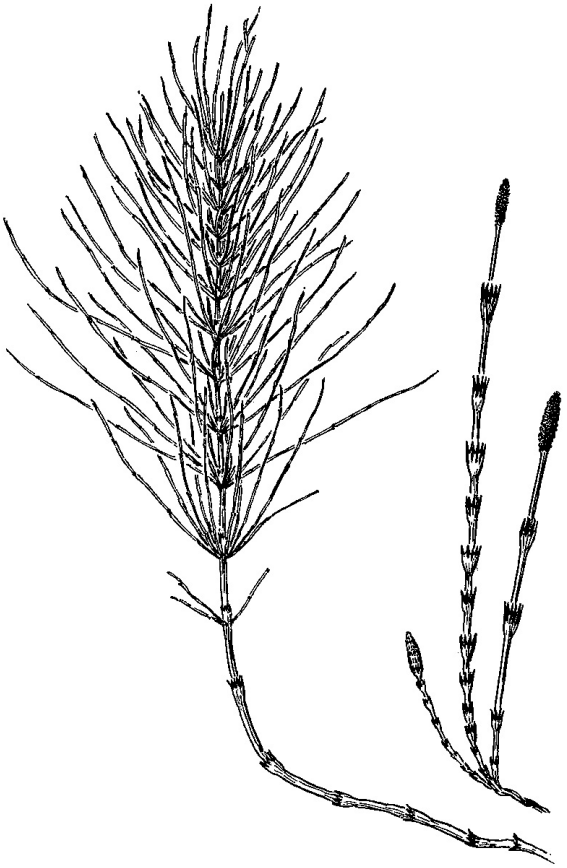
Because it is a weedy exotic, care should be taken not to spread seed. Has not been listed as noxious. Was introduced in the west coast because seed heads used for carding wool.

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.

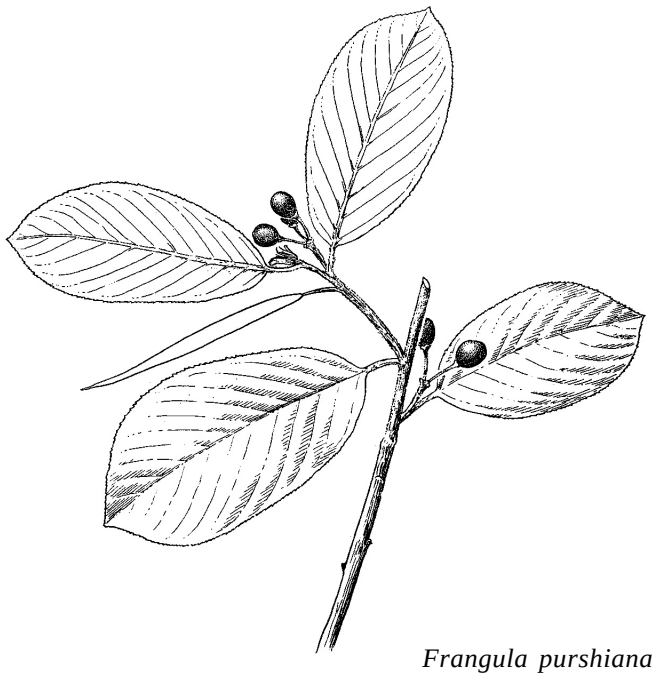
References

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)

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