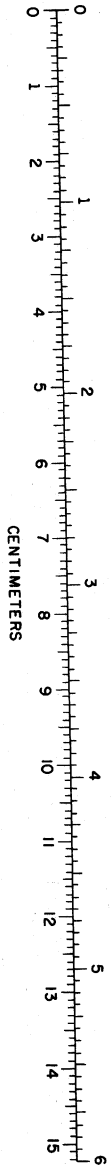
Key to Important Woody Plants of Eastern Oregon and Washington

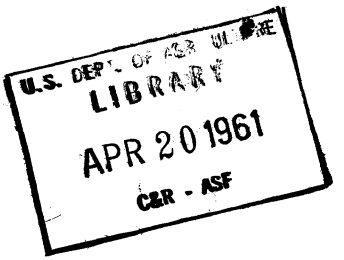
Forest Service **Agriculture Handbook No. 148**

U.S. DEPARTMENT OF AGRICULTURE



KEY TO IMPORTANT WOODY PLANTS OF EASTERN OREGON AND WASHINGTON

by Doris W. Hayes, range conservationist, Division of Range Management Research, and George A. Garrison, range conservationist, Pacific Northwest Forest and Range Experiment Station, Forest Service



Agriculture Handbook No. 148 *December 1960*

U. S. Department of Agriculture

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C. - Price $2.00

CONTENTS

INTRODUCTION

Winter, spring, summer, and fall, big-game biologists, forest rangers, hunters, and recreationists are on the mountain trails of eastern Oregon and eastern Washington. Regardless of season, shrubs are always conspicuous to these travelers. And in the work of game biologists and rangers, knowledge of browse plants at all seasons is becoming increasingly important. Hence, a demand has arisen for a shrub key based on twig or leaf characters and prepared in laymen's language. This key represents an attempt to meet that demand.

Vegetative keys designed to distinguish shrubs without reference to flowers or fruit require the definition of many characteristics for each species. Therefore, some of the species descriptions are rather lengthy; however, primary characteristics are in boldface type and will commonly suffice to identify a shrub.

Primary divisions of the key are based on whether or not a plant is "evergreen" and the season of the year. Subsequent divisions make use of such simple characteristics as arrangement of twigs (alternate or opposite branching), subdivision of leaves, and the presence or absence of thorns. Within the major divisions, each pair of alternative characters is given the same number for the convenience of the user. By choosing one character of a pair as applicable and proceeding to the next pair, the user can move quickly through the key to determine the name of the specimen he is interested in and can compare the specimen with the illustrations provided.

The alternate character of buds, leaves, and twigs for some species is examined in more detail. For them the spiral arrangement serves as a further characteristic for quick and reliable identification. Smooth sumac is an excellent example (fig. 1). Starting with any given bud and counting clockwise around the stem, the observer makes two complete circles to reach the next bud directly above, and in the process counts this bud as the fifth. This is called the ⅖ bud arrangement, the one most commonly found; each bud is 144 degrees around the stem from the preceding one. A ⅜ bud arrangement is found in the wax currant (fig. 2).

Scientific or Latin names are given for each species in addition to common names, which follow the nomenclature in Standardized Plant Names, by Harlan P. Kelsey and William A. Dayton (2d. ed., 1942). The index of accepted scientific and common names also includes such synonyms as are needed for cross-reference to names used in Oregon and Washington manuals or floras commonly consulted.

Botanists have not explored all of the Okanogan highlands, the Blue Mountains, and the east slope of the Cascades; hence, some shrubs may be found that are not among the 180 or so species and varieties listed in the key. Some omissions were deliberate, as was the case with certain willows. The 18 willows presented are the ones most commonly encountered. In a work of this kind, more than errors of omission are bound to occur in the first edition, but it is hoped none of them will seriously handicap the field worker.

The present work is the outcome of plant collections by the authors and R. S. Rummell. During preparation of the key from collections

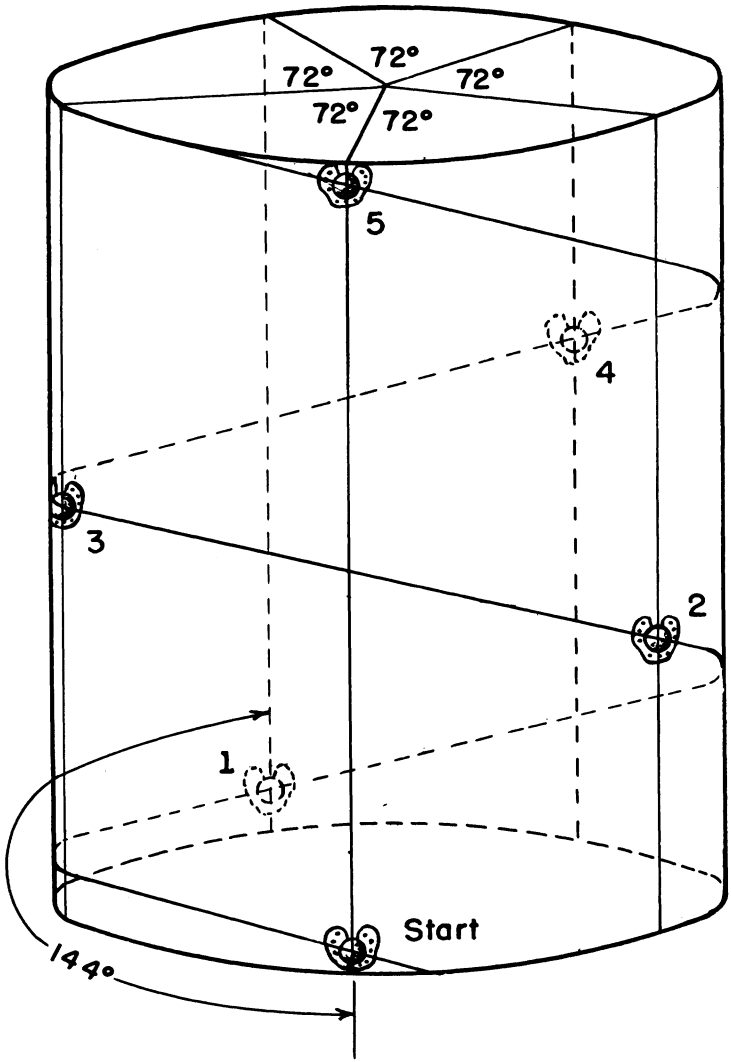


FIGURE 1.—Diagram of the ⅔ bud arrangement of smooth sumac.

in eastern Oregon and Washington, herbaria of the Forest Service and the National Museum in Washington, D. C., were consulted. Dr. S. F. Blake contributed material relating to the composite family. Some of the scientific drawings are from the Range Plant Handbook, now out of print, and most of the remainder were executed by the late Leta Hughey and Jane Roller.

Those who may wish to obtain information from plant manuals of the standard type are referred to such works as:

Abrams, Leroy. Illustrated Flora of the Pacific States. (Three volumes.)

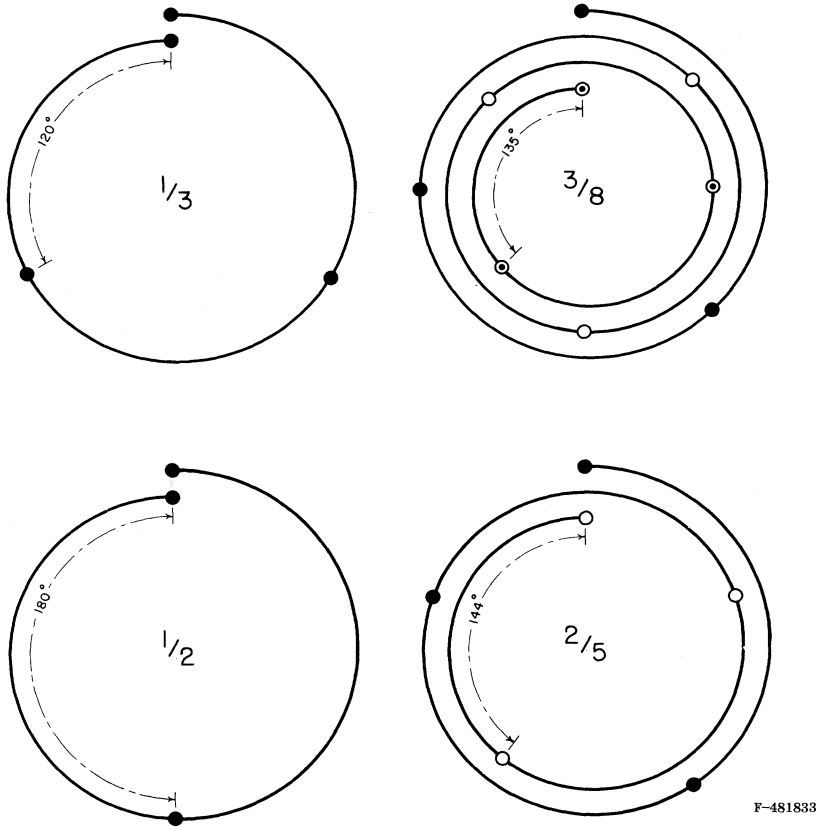


FIGURE 2.—Spiral arrangement of buds: ½, netleaf hackberry is an example; ⅓, characteristic of alders and birches; ⅖, as shown in smooth sumac; ⅜, as found in wax currant.

Gilkey, Helen. Handbook of Northwest Flowering Plants.
Hitchcock, Cronquist, Owenbey, and Thompson. Vascular Plants of the Pacific Northwest.
Peck, Morton E. A Manual of the Higher Plants of Oregon.

Appended to this new shrub key are notes on the relative forage value of numerous shrubs. These were compiled from published works of many authors, and observations by G. A. Garrison and other U. S. Forest Service range workers. The notes were not inserted in the key because that would have added to the already lengthy species descriptions and impaired the key's usability. A list of publications consulted is included for the benefit of those seeking further information on food habits of animals and nutritive value of certain plants.

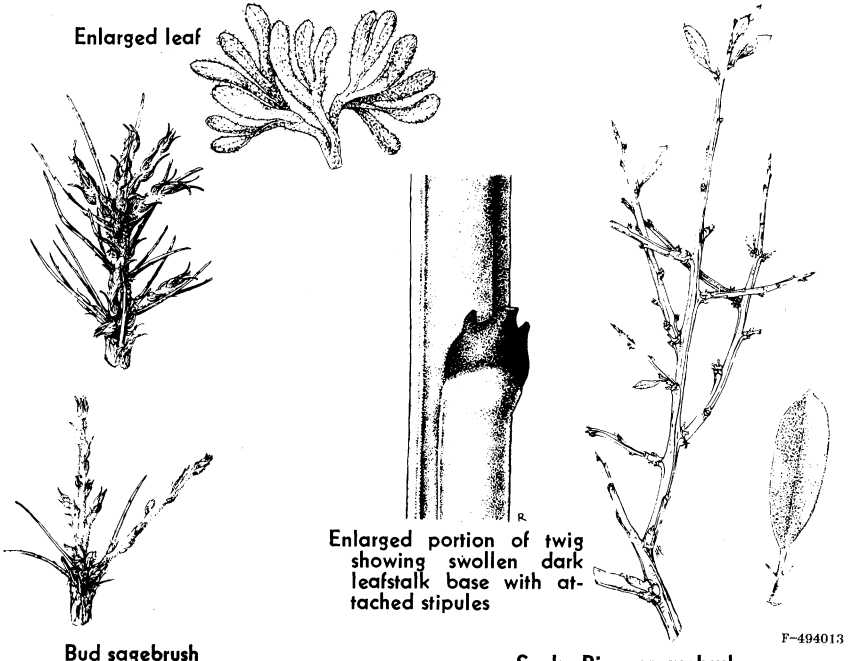
Where any plant is suspected of being poison-oak or poison-ivy, precautions should be taken to keep it from coming in contact with any person who might be susceptible, because almost all parts of the plant can be poisonous to touch.

PLANTS DECIDUOUS · SPRING AND SUMMER

Leaves Alternate and Simple
Plants Armed

1. **Twigs spiny-tipped.**
   2. **Shrubs with sagebrush odor and taste,** less than 2 feet high; **leaves broadly fan-shaped, deeply cut into several 3-lobed divisions, shed in early summer; twigs of 2 kinds:** (a) short, rigid, flowering twigs becoming spiny-tipped, (b) stouter leafy twigs becoming big-budded after leaves fall, not spiny-tipped; bushy, much-branched shrubs with shreddy bark; desert or aklaline areas of Lake, Harney, and Malheur Cos., se. Oreg., not reported from Wash_____**bud sagebrush (*Artemisia spinescens*).**[1]
   2. **Shrubs without sagebrush odor or taste.**
      3. **Twigs bright green, ridged and lined;** leaves small (to ½ inch long), gray green, reversely lance-shaped; margins entire; **stipules tiny, pointed at tips, grown to bulbous leafstalk base, appearing as dark swelling at point of attachment to twig;** stems often arching; much-branched shrubs to 10 feet high; dry, rocky limestone areas, Harney Co. to Snake River canyons in ne. Oreg., se. Wash.
         Snake River greasebush (*Forsellesia stipulifera*).

[1] See Evergreen Key for low sagebrush (*Artemisia arbuscula*), the persistent dead flowering twigs of which are sometimes weakly sharp-tipped.

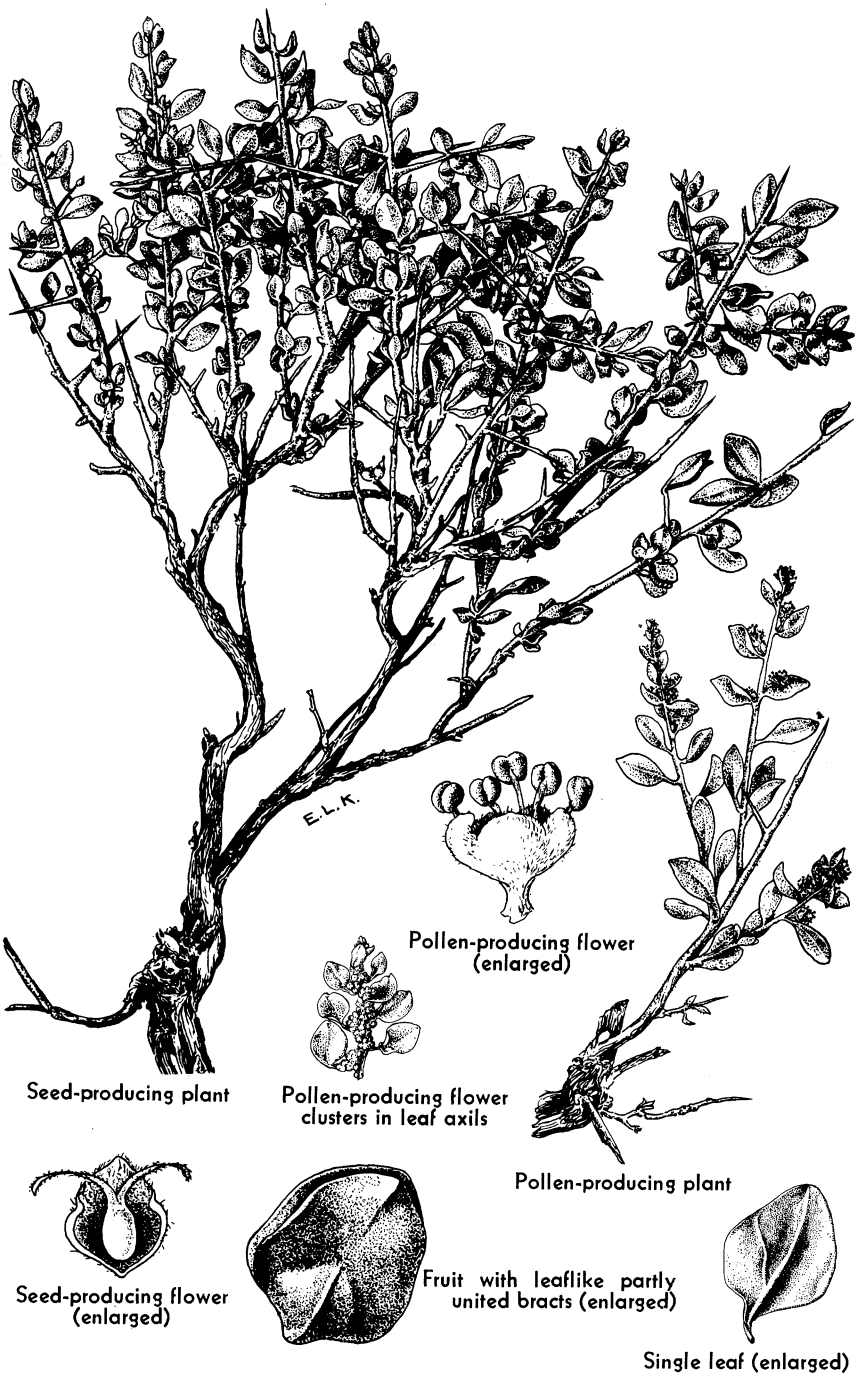


3. **Twigs not as above.**
   4. **Leave densely white- or gray-scurfy with branlike scales, 1- to 3-veined from near base, broadly egg-shaped or oval,** rounded or wedge-shaped at base, to ¾ inch long and ½ inch wide, thick, stalked; pollen-producing flowers in ball-like clusters in leaf axils near twig tips, borne on different plants from the seed-producing flowers which are solitary or several together in upper leaf axils; **each seed enclosed between 2 leaflike bracts united at base but free at top and side edges;** erect, rounded shrubs 1–3 feet high, with rigid spiny-tipped twigs and smooth, straw-colored bark; dry, alkaline hillsides, Lake, Harney, Malheur Cos., se. Oreg., not reported from Wash_____**shadscale saltbush** (***Atriplex confertifolia***).[2]

[2] See Evergreen Key for fourwing saltbush (*Atriplex canescens*), the fruiting twigs of which are weakly spiny-tipped.

F–486444

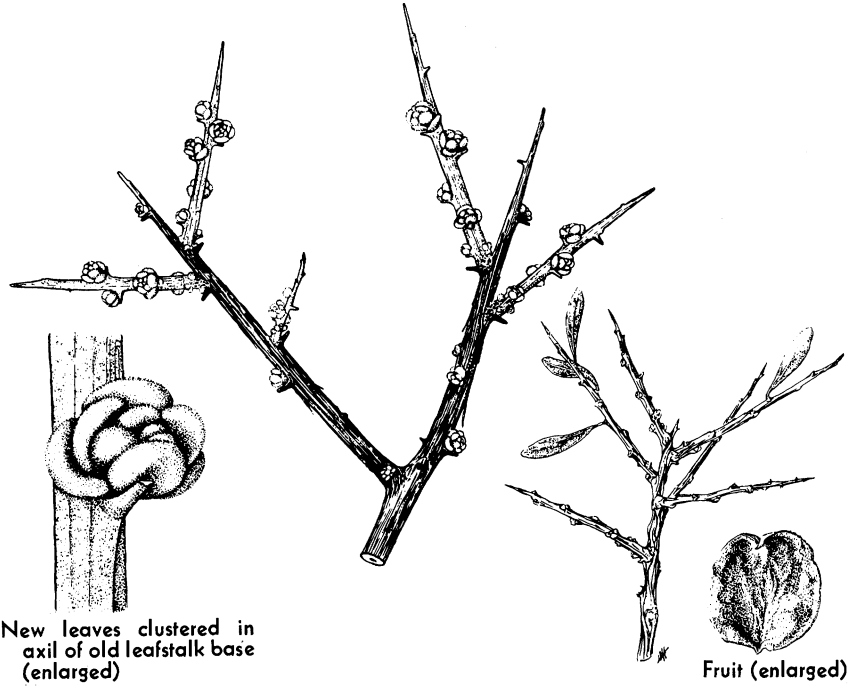
Shadscale saltbush



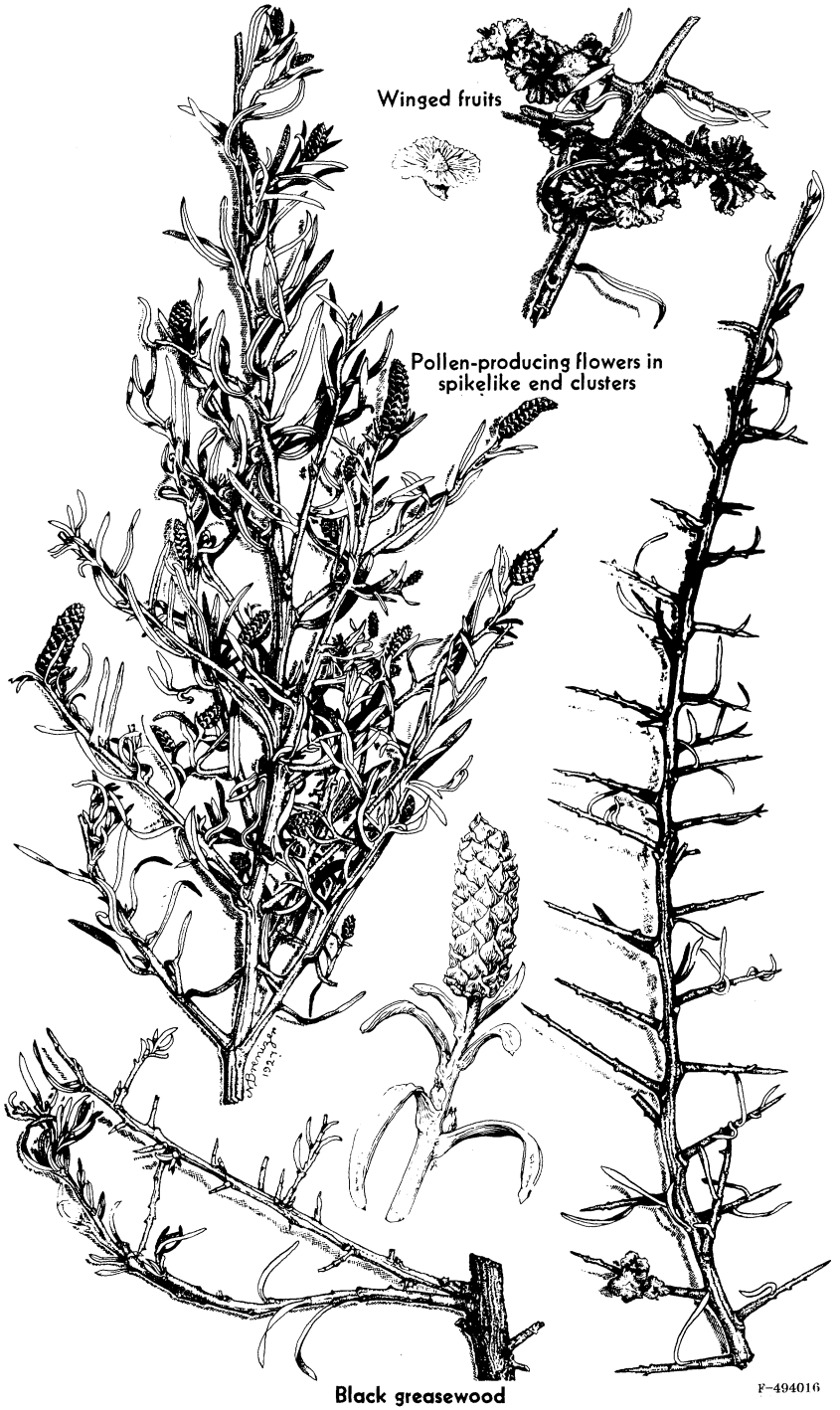
Shadscale saltbush

F-494014

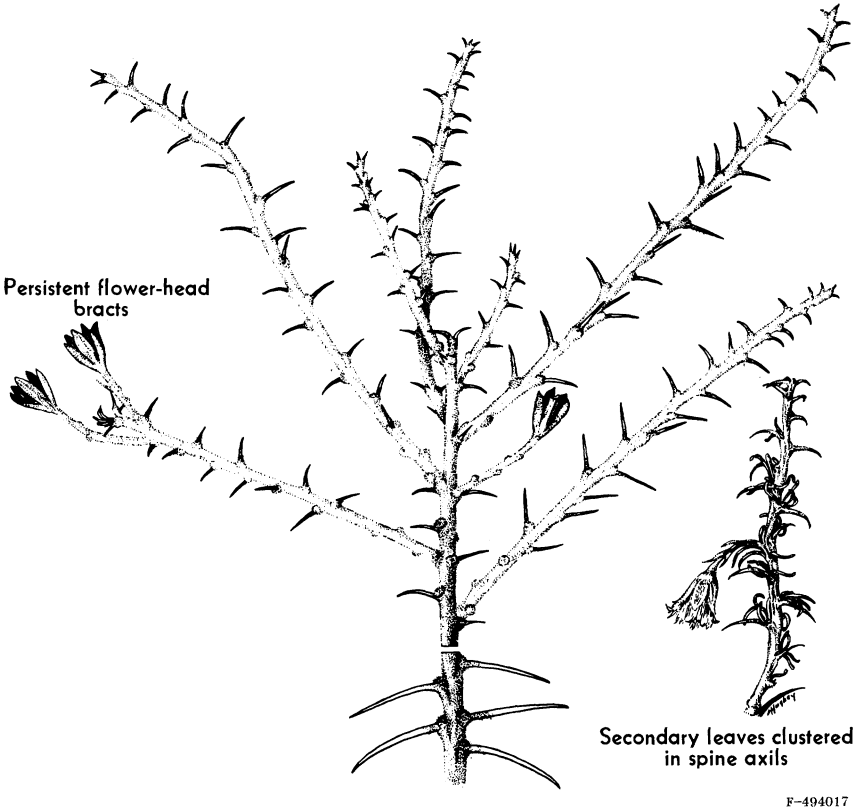
4. **Leaves green when mature, more or less whitish-scurfy with star-shaped hairs when young, somewhat fleshy, rather narrow,** usually not more than 2 inches long and ¼ inch wide; pollen- and seed-producing flowers separate, borne on the same or on different plants; fruits distinctive.
   5. **Leaves linear, to ⅛ inch wide, some of the lower ones often opposite, dark green;** pollen-producing flowers in scaly, spikelike end clusters; seed-producing flowers small, 1 or 2 in upper leaf axils; **fruits top-shaped with encircling wing near middle;** wood green, fibrous, very hard; bark whitish to gray or brownish; much branched shrubs to 8 or 10 feet high, often in almost pure stands in alkaline flats or low, moist sites; poisonous to livestock if eaten to excess; s. and e. Oreg., e. Wash.
   black greasewood (*Sarcobatus vermiculatus*).
   5. **Leaves reverse-lance-shaped, to ¼ inch wide, pale or gray green;** pollen-producing flowers clustered in leaf axils; seed-producing flowers crowded in spikelike end clusters; **each seed enclosed in a united, saclike pair of narrowly margined, greenish white or reddish bracts;** bark dark gray, shreddy; bushy-branched shrubs to 3 or 4 feet high; dry, rocky sites, e. Oreg., e. Wash.
   spiny hopsage (*Grayia spinosa*).



Spiny hopsage


Winged fruits
Pollen-producing flowers in spikelike end clusters
Black greasewood
F-494016

1. **Twigs not spiny-tipped.**
   6. **Plants with spines.** [Alternate 6, p. 18.]
      7. **Twigs and young spines** (the hardened, persistent midribs of the primary leaves) **densely white-woolly-hairy;** spines becoming rigid, spreading or recurved, and with clustered, green, hairless, linear, secondary leaves in their axils by the second season; flowers 5–9, all alike, in flower heads surrounded by 4–6 woolly-hairy bracts in a single row; flower-head bracts persistent after the hairy-tufted "seeds" (achenes) have fallen; stiff, much-branched shrubs to nearly 5 feet high; probably (if ever browsed) poisonous to livestock; dry, rocky sites, e. Oreg., e. Wash_____**cottonthorn horsebrush (*Tetradymia spinosa*).**
      7. **Twigs and spines not as above; leaves palmately 3- to 7-lobed or cleft,** round in outline, square-cut, wedge- or heart-shaped at base, clustered at tips of short, spurlike twigs or solitary at joints (nodes) on young or fast-growing shoots; **stems armed with simple or 3-forked (sometimes 7- to 9-parted) spines around leafstalk bases, often also with scattered prickles and/or bristles;** pith spongy; flowers and berries stalked, in stalked and bracted clusters (racemes); berries tipped by withering-persistent flowers; erect or spreading shrubs, often with arching



Cottonthorn horsebrush

branches and crown-sprouting or layering after fire or top injury; alternate hosts to the white pine blister rust.

currants, gooseberries (*Ribes* spp.).

8. **Spines 3- to 9-parted; flowers 3–20, saucer- or shallowly bowl-shaped with spreading calyx lobes; berries covered with gland-tipped bristles,** jointed to their stalks (pedicels), **falling free when ripe;** twigs brownish, prickly and/or bristly between joints (especially in sunny sites).

currants (*Ribes* spp.).

9. **Leaves deeply 5- to 7-lobed, to 2½ inches wide, nearly hairless;** margins cut-toothed; **leafstalks** often as long as leaves, **with coarse, gland-tipped hairs near base; twigs whitish-hairy but without gland-tipped bristles;** spines weak and short; flowers often 10–15; currants purplish black; much-branched shrubs, erect and to 3 or 4 feet high, or, if in shade, trailing and with weaker spines and prickles; shade-tolerant; often reproducing by layering; very susceptible to white pine blister rust; moist sites in mountain woods; widely distributed in e. Oreg., e. Wash.

prickly (or swamp) currant (*Ribes lacustre*).

9. **Leaves deeply 3- to 5-lobed, to 1 inch wide, with gland-tipped hairs on both surfaces;** leafstalks usually shorter than leaves; **twigs with gland-tipped bristles in addition to prickles;** spines rigid, rather stout and long; flowers 3–7; straggly, stiff-branched shrubs to 4 feet high; on rocky, exposed sites at higher (often subalpine) altitudes, sometimes near snowbanks; Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

gooseberry currant (*Ribes montigenum*).

8. **Spines single or 3- (rarely 4-) parted; flowers 1–5, bell-shaped or tubular;** calyx lobes often spreading or recurving in age; **berries falling with stalks attached.**

gooseberries (*Grossularia* section of *Ribes*).

10. **Mature leaves 1–2½ inches wide,** 3- to 5-lobed; **styles 2 in each flower;** erect or spreading shrubs; moist woods or streambanks.

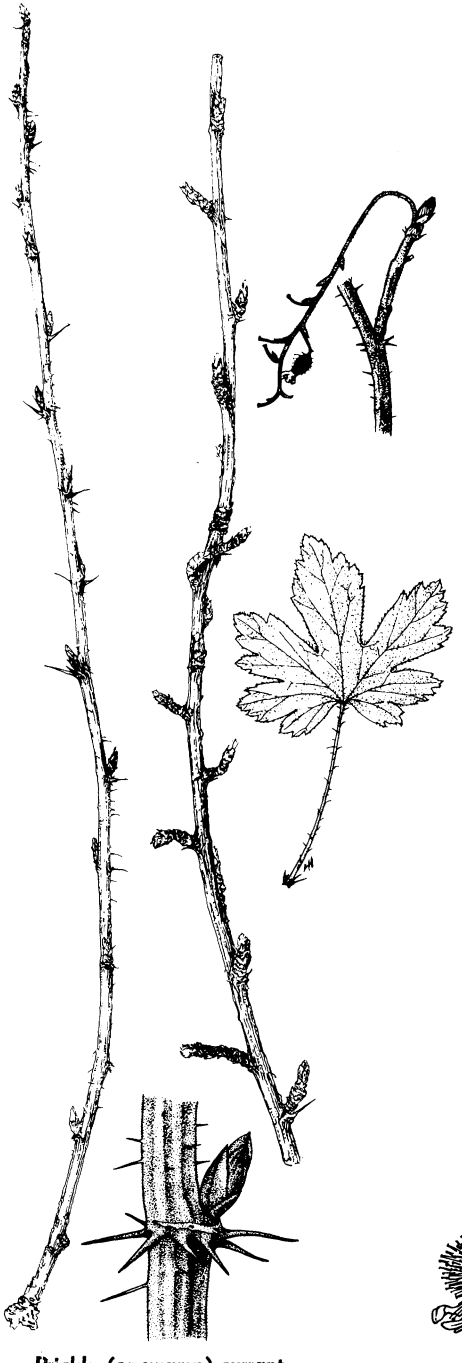
11. **Spines less than ½ inch long.**

12. **Gooseberries with gland-tipped spines; leaves and leafstalks with gland-tipped hairs; spines mostly 3-forked, stiff;** stems stout, rarely prickly or bristly between joints; flowers bell-shaped, green, usually sparsely hairy outside; petals white; **styles hairless;** middle altitudes, e. slopes of Cascades from Mt. Hood, Oreg., n. into Wash.; type locality, Wash.

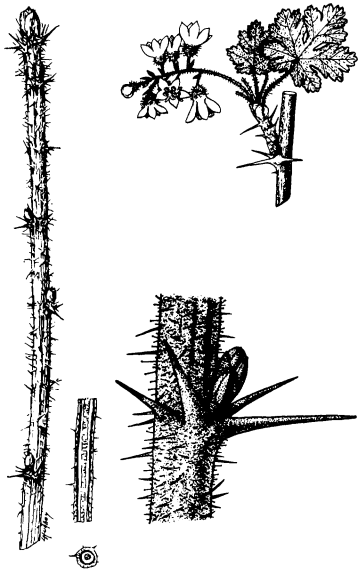
Watson (or Mt. Adams) gooseberry (*Ribes watsonianum*).

12. **Gooseberries smooth; styles hairy.**

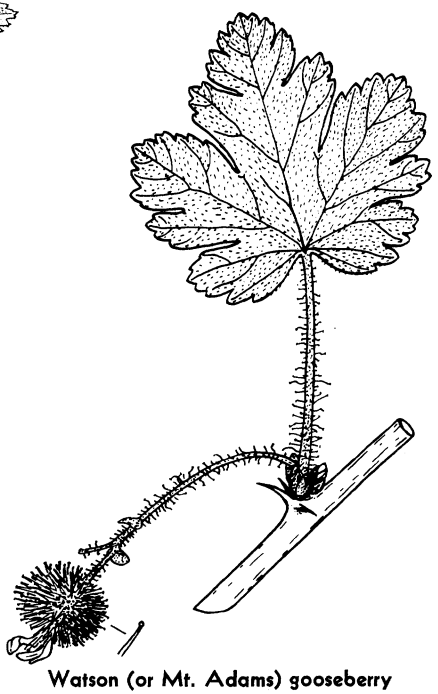
13. **Twigs white or pale straw-colored,** rarely prickly or bristly between joints; **spines weak,** usually single, sometimes absent; **gland-tipped hairs usually lacking except near base of leafstalk;** flowers bell-shaped, greenish or purplish-tinged; petals white, or sometimes pink.



Prickly (or swamp) currant



Gooseberry currant



Watson (or Mt. Adams) gooseberry

F-494018

14. **Leaves usually hairless except for finely white-hairy-fringed margins** (sometimes with fine, whitish hairs on under leaf-surfaces); flowers nodding, hairless outside, lobed to near the middle; petals white or pink; gooseberries wine-colored; very susceptible to white pine blister rust; erect shrubs to 6 feet high; e. Oreg., e. Wash.. **whitestem gooseberry (*Ribes inerme*).**

14. **Leaves soft-hairy, often broader than long;** leafstalks hairy-fringed; flowers sparsely soft-hairy outside, lobed to below middle; gooseberries black, with whitish "bloom"; tall, spreading shrubs with long-arching branches; along streambanks; Jefferson Co., Oreg., s. to Klamath Lake; type locality, banks of Klamath River near Keno, Oreg.

Klamath gooseberry (*Ribes klamathense*).

13. **Twigs gray to brown, finely white-hairy, not glandular-hairy,** often prickly and/or bristly between joints on old wood; **spines rigid,** usually single except on fast-growing shoots where they are 3-parted; **leaves** mostly 5-lobed, heart-shaped at base, **finely hairy on both sides, glandular-hairy on under surface; leafstalks glandular-hairy;** flowers tubular-bell-shaped, greenish, lobed to below middle, hairless outside, nodding in inch-long clusters; petals white; gooseberries reddish purple to black; erect shrubs to 10 feet high, with widely spreading branches; somewhat susceptible to white pine blister rust; along streams, Wallowa and Blue Mts., ne. Oreg., se. Wash.; type locality, Blue Mts., lat. 46° 33′.

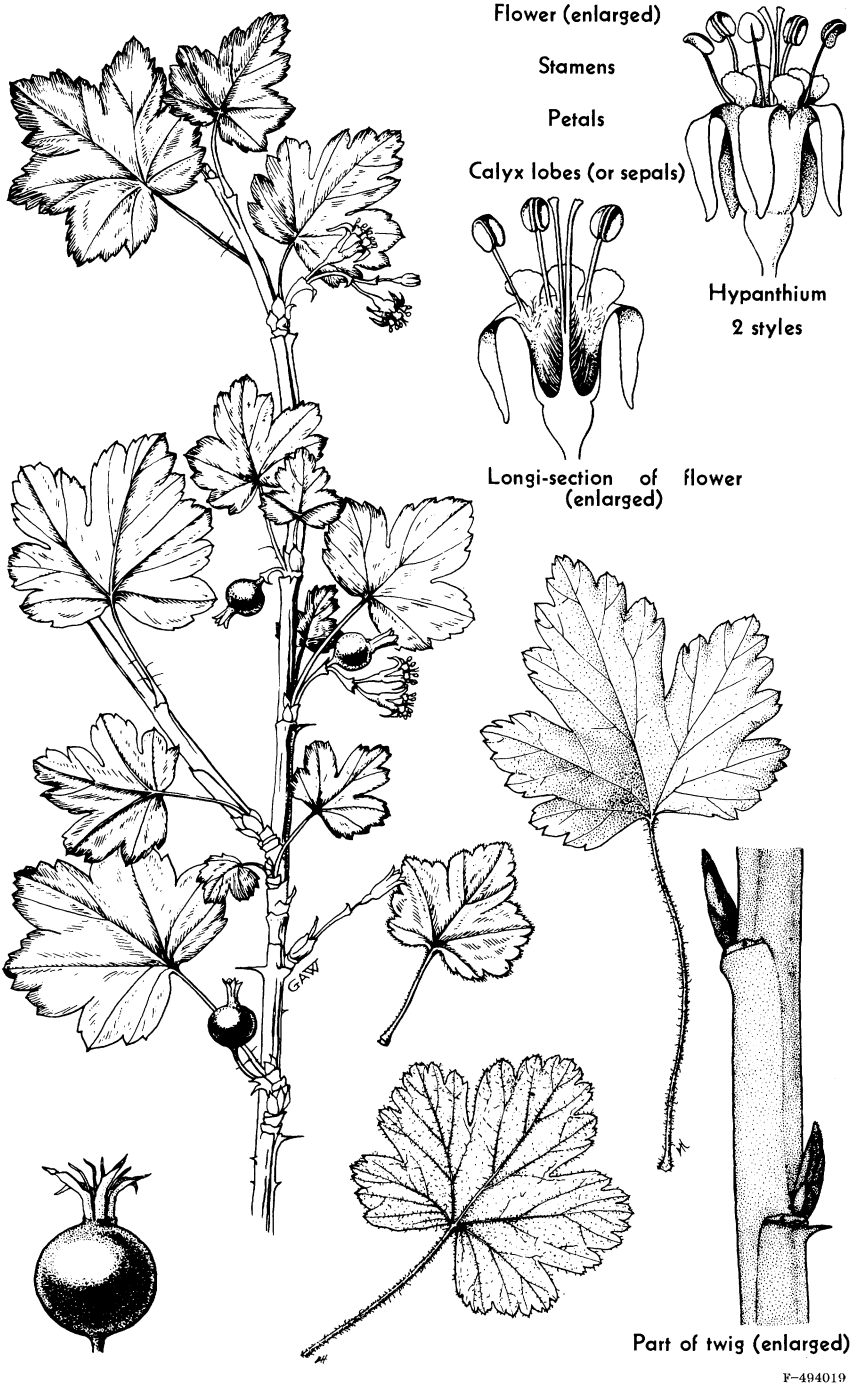
Idaho gooseberry (*Ribes irriguum*).

11. **Spines more than ½ inch long; stems slender; gooseberries smooth; styles hairy toward base.**

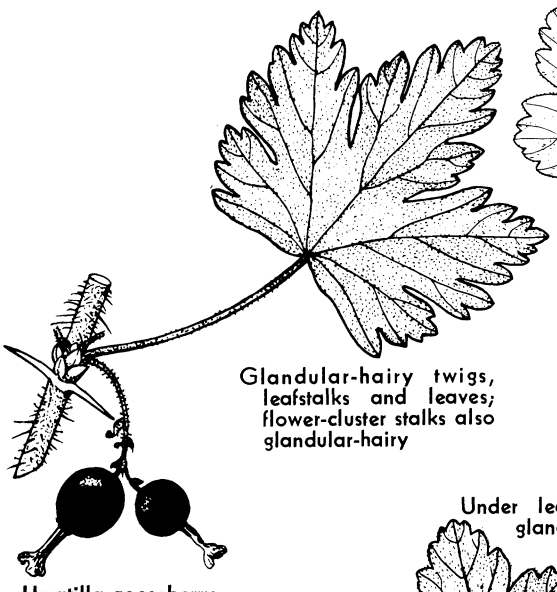
15. **Twigs white, grayish, or buff-colored, glandular-hairy as are also both leaf surfaces, leafstalks, and the inch-long flower-cluster stalks;** white, soft, spreading hairs also present on young twigs, leafstalks, and under leaf-surfaces; leaves square-cut or heart-shaped at base; the coarser spines usually 3-parted; prickles and bristles often numerous on younger branches; **flowers tubular,** lobed above middle, greenish white to pinkish, soft-hairy outside; gooseberries purplish black, in drooping clusters; **stems long arching, to 13 feet long;** along streams, ne. Oreg., e. Wash.; type locality (probably Umatilla) River banks near Pendleton, Oreg.

Umatilla gooseberry (*Ribes cognatum*).

15. **Twigs cinnamon to dark reddish brown, hairless or nearly so,** usually not prickly or bristly between joints; spines darker than twigs, often 3-parted; **leaves suggestive of those of golden currant,** thick, shiny, shallowly lobed and with few, broad, rounded



Whitestem gooseberry

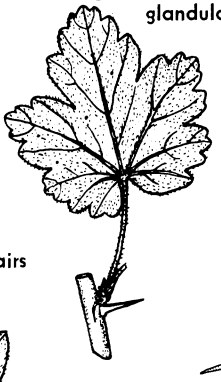


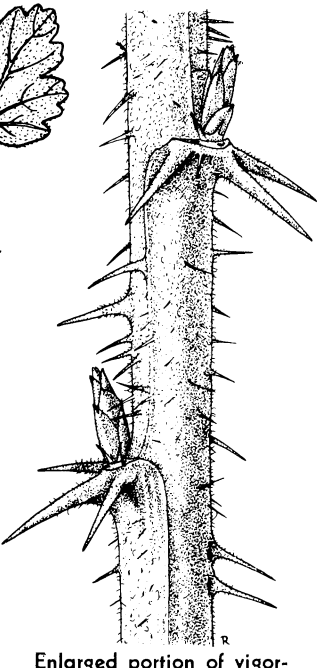
Glandular-hairy twigs, leafstalks and leaves; flower-cluster stalks also glandular-hairy

Umatilla gooseberry

Klamath gooseberry

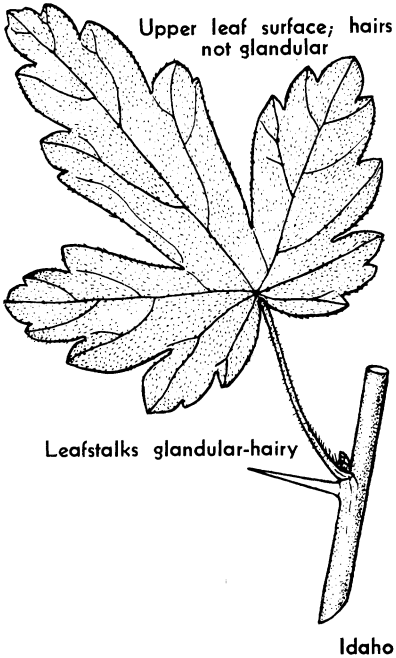
Under leaf surface with glandular hairs





Enlarged portion of vigorous shoot with 3-forked spines. Hairs not glandular

Upper leaf surface; hairs not glandular



Leafstalks glandular-hairy

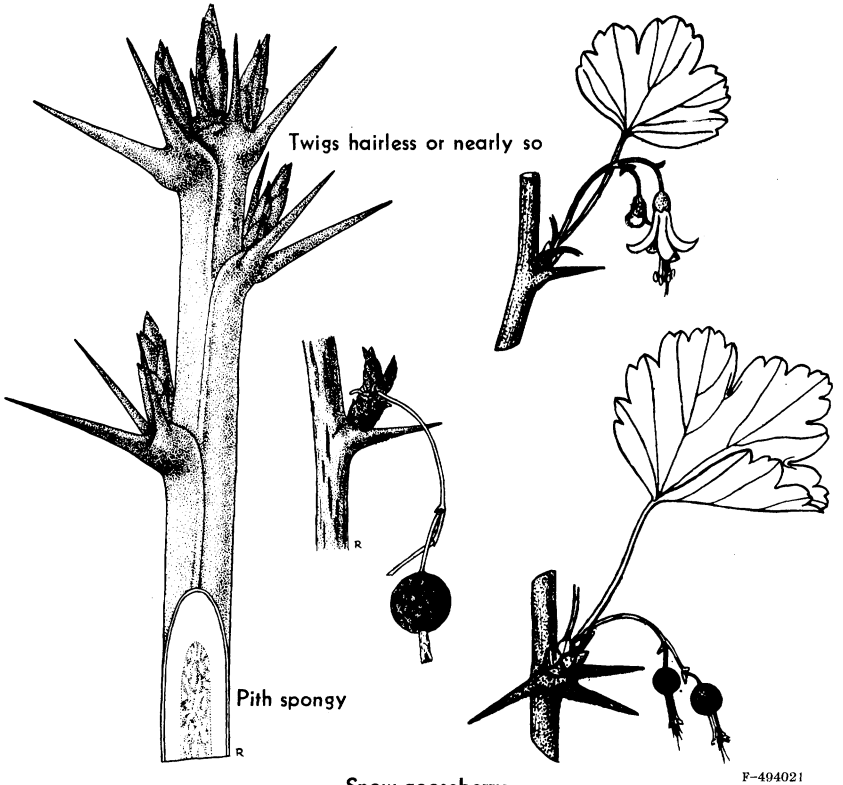
F-494020

Idaho gooseberry

teeth square-cut to wedge-shaped at base; **flowers snow-white, bell-shaped,** deeply lobed, with long-exserted, hairy stamens; gooseberries bluish black, long- and slender-stalked, in drooping clusters often 2 inches long; graceful, widely branching shrub to 13 feet high; moist thickets, rocky banks or gravelly soils along streams, ne. Oreg., se. Wash.

snow gooseberry (*Ribes niveum*).

10. **Mature leaves less than 1 inch wide (often not much more than ¼ inch wide), deeply 3- to 5-cleft;** stems with recurved or arching branches, the older ones gray, often without spines, usually with many short, scarred, spur-like twigs at tips of which are clustered leaves; **twigs and younger branches pale, yellowish to reddish brown, usually with single spines of same color, rarely prickly or bristly between joints; spines to nearly 1 inch long;** flowers hairy outside, broadly tubular, lobed to near or below the middle; **styles hairless, united and appearing as a single style;** gooseberries small, yellow (ripening black) or red, hairless or finely short-white-hairy and/or with stalked glands; shrubs to 6 feet high; dry, often rocky sites.



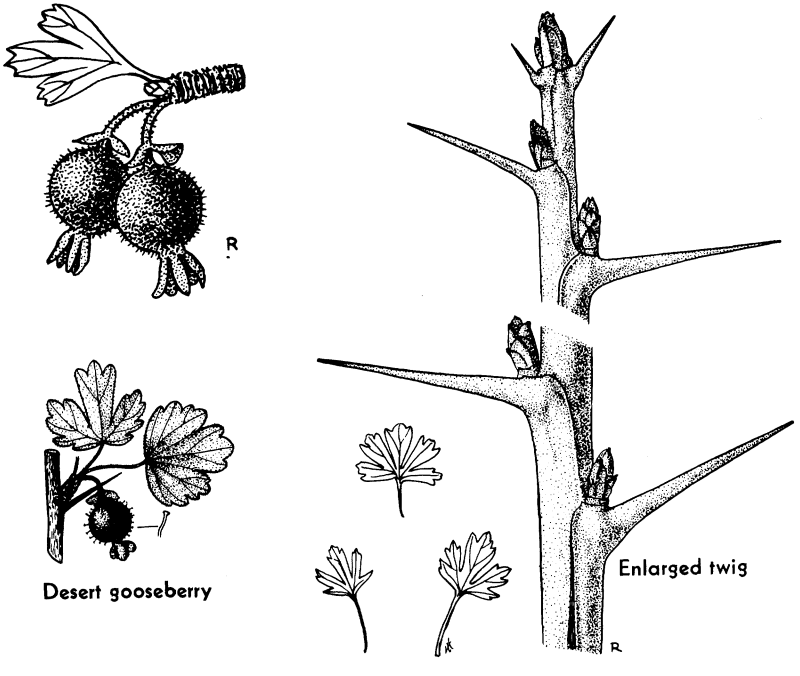
Snow gooseberry

16. **Leaves, leafstalks, twigs, and gooseberries finely short-white-hairy, sometimes also with gland-tipped hairs;** flowers yellowish, with yellowish petals, the tubular part often broader than long; **gooseberries yellow,** ripening to black, **rarely without hairs;** shrubs to 6 feet high, with rigid, often recurved branches; Crook and Deschutes Cos., s. to Jackson, Klamath and Lake Cos., s. Oreg.; not reported from Wash.; type locality, n. part of Calif., and regions adjacent.

desert gooseberry (*Ribes velutinum*).

16. **Leaves, leafstalks, twigs, and gooseberries hairless or nearly so** (leaves and leafstalks sometimes finely short-white-hairy-fringed along edges or leaves some what scurfy on under surface); leaves usually with narrow lobes and relatively broad spaces between them; flowers whitish to pinkish; petals white; **gooseberries cherry-red,** sweet, **shrubs with long-arching, yellow or pale straw-colored branches with single spines of the same color,** often forming dense, spiny thickets; closely related to desert gooseberry; rocky ledges, lower elevations, ne. Oreg., se. Wash.; canyons along Snake River; type locality, about 5 miles w. of Imnaha, Wallowa Co., ne. Oreg.

Goodding gooseberry (*Ribes gooddingii*).

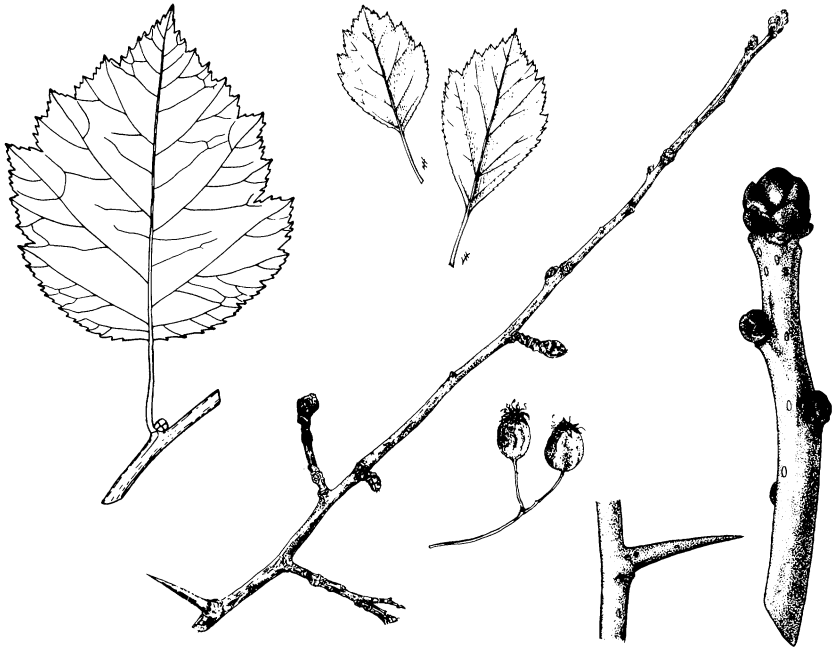


Goodding gooseberry

6. **Plants with thorns** (aborted twigs) **in leaf-scar axils** (thorns sometimes lacking on young or sucker shoots); leaves variable in shape and lobing, usually wedge-shaped at base and lobed above middle, firm, glossy on upper surface; fruits (pomes) berrylike, with 1–5 bony "seeds" (carpels), tipped by withering-persistent flower parts, stalked, in clusters (cymes or corymbs); small trees or erect shrubs, often in thickets; moist sites, flood plains or river valleys, e. Oreg., e. Wash_____**hawthorns** (***Crataegus*** spp.).[3] [Alternate 6, p. 10.]

17. **Ripe fruits shiny purplish black** (chestnut-colored in form **badia**), **hairless; thorns stout, to 1 inch long, often blunt;** twigs reddish brown, aging gray; leaves elliptic to reversely egg-shaped, usually shallowly lobed and coarsely and unevenly saw-toothed above middle, entire or finely toothed below middle; all parts hairless or nearly so when mature; compact shrubs or trees to 35 feet high, common; type locality, near Vancouver, Wash.
black (or **Douglas**) **hawthorn** (***Crataegus douglasii***).

[3] Some hawthorns reportedly crossbreed naturally; some of the resultant hybrids (with characteristics variously intermediate between those of their two parents) can produce fertile seed without pollination. Each seedling so produced is exactly like its hybrid parent. This specialized "vegetative" reproduction (apomicty) probably accounts for some of the well-known hawthorn variability that has resulted in the description of over 1,100 North American "species," and also for some of the difficulties in identifying hawthorns. (See W. H. Camp, *Ecological Problems and Species Concepts in Crataegus.* Ecology 23: 368–369. 1942).



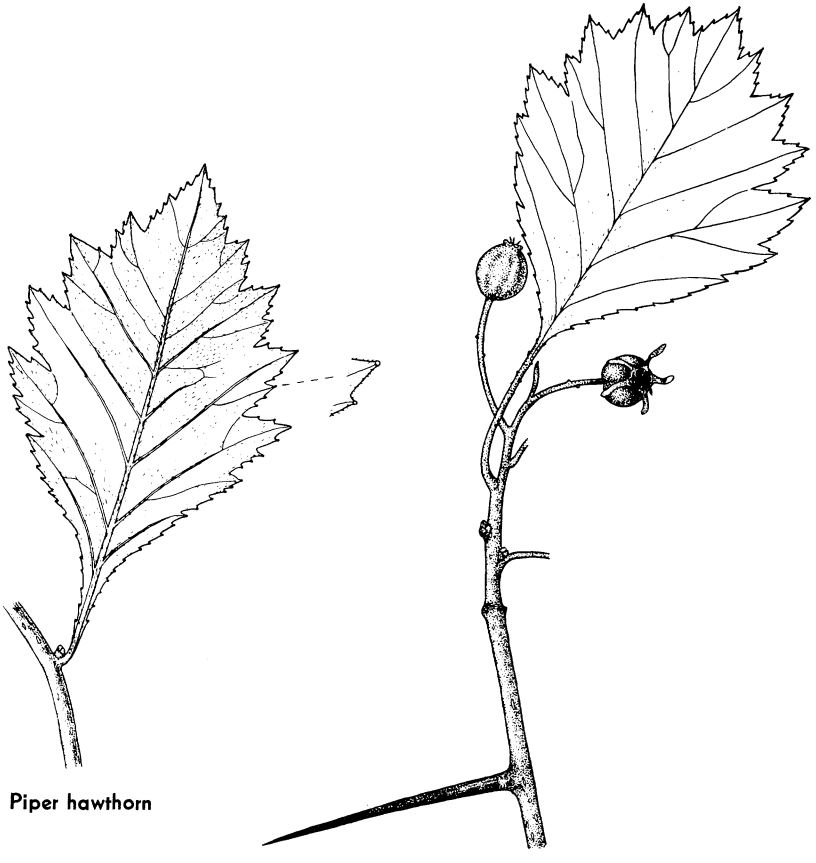
F-494023

Black (or Douglas) hawthorn

17. **Ripe fruits red, hairless to hairy; thorns stout to slender, to 2½ inches long, usually sharp;** twigs brown, aging light gray; leaf margins, leafstalks and sepals usually with gland-tipped teeth; occasional, near streams, e. Oreg., e. Wash.

    18. **Fruits scarlet (or dark red to purplish), hairless; thorns often stout, straight;** leaves reversely egg-shaped, often appressed-hairy; margins 5- to 9-lobed above middle, saw-toothed; flower- and fruit-clusters nearly hairless; much-branched shrubs or small trees 6–15 feet high; type locality, along Columbia River and its tributaries e. of Cascades.
    Columbia hawthorn (*Crataegus columbiana*).

    18. **Fruit coral red, hairy; thorns slender, straight or somewhat reflexed;** leaves broadly oval, shortly tapered at tip, appressed-hairy on both sides; margins doubly saw-toothed above (singly so below) middle; shrubs to 10 feet high; type locality, springy, gravelly hillsides, Pullman, Wash.
    Piper hawthorn (*Crataegus piperi*).

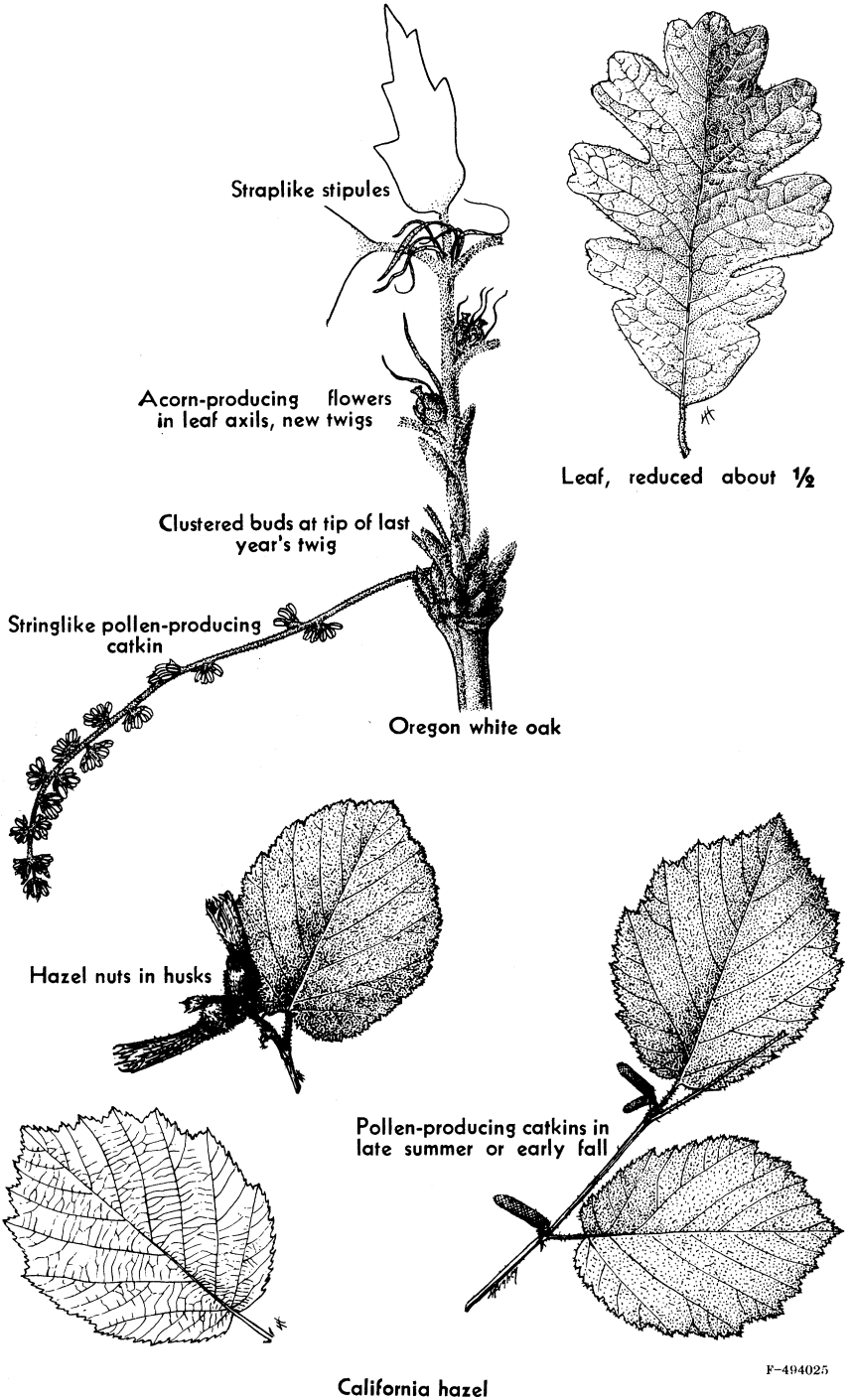


PLANTS DECIDUOUS · SPRING AND SUMMER

Leaves Alternate and Simple
Plants Unarmed • With Catkins

[Flowers scaly bracted, in elongated clusters (catkins or aments)—oak, hazel, alders, birches, aspen, cottonwood, and willows]

1. **Pollen-producing flowers in string- or tassellike catkins; nut-producing flowers not in catkins, becoming acorns or hazel nuts.** **oak** and **hazel.**
   2. **Leaves pinnate-lobed, to 6 inches long,** dark shiny green and nearly hairless above, pale green with yellowish, clustered or star-shaped hairs underneath, in 2/5 (clockwise) arrangement on twig; **pith somewhat 5-angled in cross section;** pollen-producing flowers in drooping stringlike catkins from buds near tips of last year's twigs, spring-blooming, soon withering, on same plant with the single or paired acorn-producing flowers in leaf axils on new twigs; **acorns ripe in one season,** to 1½ inches long, in saucer- or top-shaped cups, stalkless or nearly so; trees (shrubby at high elevations), stump- or root-sprouting; common west, often locally abundant east slopes of Cascades, along streams tributary to Yakima and Columbia Rivers, Wash., and southward to Mt. Hood National Forest, Oreg.; type locality, "on the plains near Fort Vancouver," along the Columbia River.
   Oregon white oak (*Quercus garryana*).
   2. **Leaves not pinnate-lobed,** rarely somewhat 3-lobed, doubly saw-toothed on margins, **to 4 inches long,** sparsely hairy above, soft-hairy, net-veined and velvety to touch underneath, in 1/2 (clockwise) arrangement on twig (2-ranked); **twigs slender, zigzag, with spreading, yellowish** (often gland-tipped) **hairs;** pollen-producing catkins whitish-hairy, tassellike, preformed and out of their buds by late summer or early fall but flowers not opening to shed pollen until late winter or early spring; **hazel nuts (filberts) in green or brown, rough-hairy, fringe-beaked husks,** single or 2- to 4-clustered at twig tips; tall, clustered shrubs (sometimes treelike and to 25 feet high), often suckering from base, sometimes thicket-forming; mostly w., occasionally e. of Cascades, Oreg., Wash.; type locality, Santa Cruz, Calif.
   California hazel (*Corylus cornuta* var. *californica*).
1. **Pollen- and seed-producing flowers both in catkins; catkins cone-, spike-, or tassellike.** **alders, birches, aspen, cottonwood, and willows.**
   3. **Pollen- and seed-producing catkins on same plant;** pollen-producing catkins stalked or stalkless, erect, clustered at twig tips, formed in late summer, elongating, drooping and shedding pollen in early spring before or with unfolding of leaves; "seeds" (nutlets) winged or margined. [Alternate 3, p. 26.]
   alders and **birches.**
      4. **Twigs slightly angled, smooth;** leaves in 1/3 clockwise arrangement on twigs (each leaf at 120° angle around the twig from leaf next below or above); **pith triangular; seed-producing catkins conelike, persistent, with woody, mostly 5-lobed scales, in stalked clusters;** roots often with (presumably nitrogen-fixing) nodules ..... **alders (*Alnus* spp.).**


Straplike stipules
Acorn-producing flowers in leaf axils, new twigs
Clustered buds at tip of last year's twig
Stringlike pollen-producing catkin
Leaf, reduced about ½
Oregon white oak
Hazel nuts in husks
Pollen-producing catkins in late summer or early fall
F-494025
California hazel

5. **Seed-producing catkins long-stalked, on new leafy shoots, appearing with the leaves; "seeds" tissue-papery-winged, leaves shiny on under surface, sticky when young,** yellowish or bright green on upper surface; margins doubly and finely glandular-saw-toothed; buds stalkless or nearly so; bud scales 3 or more, overlapping; tall, slender shrubs or small trees, often thicket-forming; along cool mountain streams, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
Sitka alder (*Alnus sinuata*).

5. **Seed-producing catkins short-stalked, on last year's twigs, in leafless clusters, appearing before the leaves; buds mostly stalked; bud scales 2 (or 3), meeting at edges but not overlapping (valvate).**

6. **Leaves shiny dark green above, paler and often sticky underneath; margins finely** (sometimes doubly) **glandular-toothed, usually not lobed;** leafstalks flattened on upper side, slender, hairy, glandular; "seeds" narrowly margined; **inner bark and sapwood not turning red when peeled;** large trees, commonly to 40 feet high; both sides of Cascades, along streams, e. Oreg., e. Wash.
white alder (*Alnus rhombifolia*).

6. **Leaves dull green on both sides, not sticky;** margins **usually lobed;** leafstalks round in cross section.

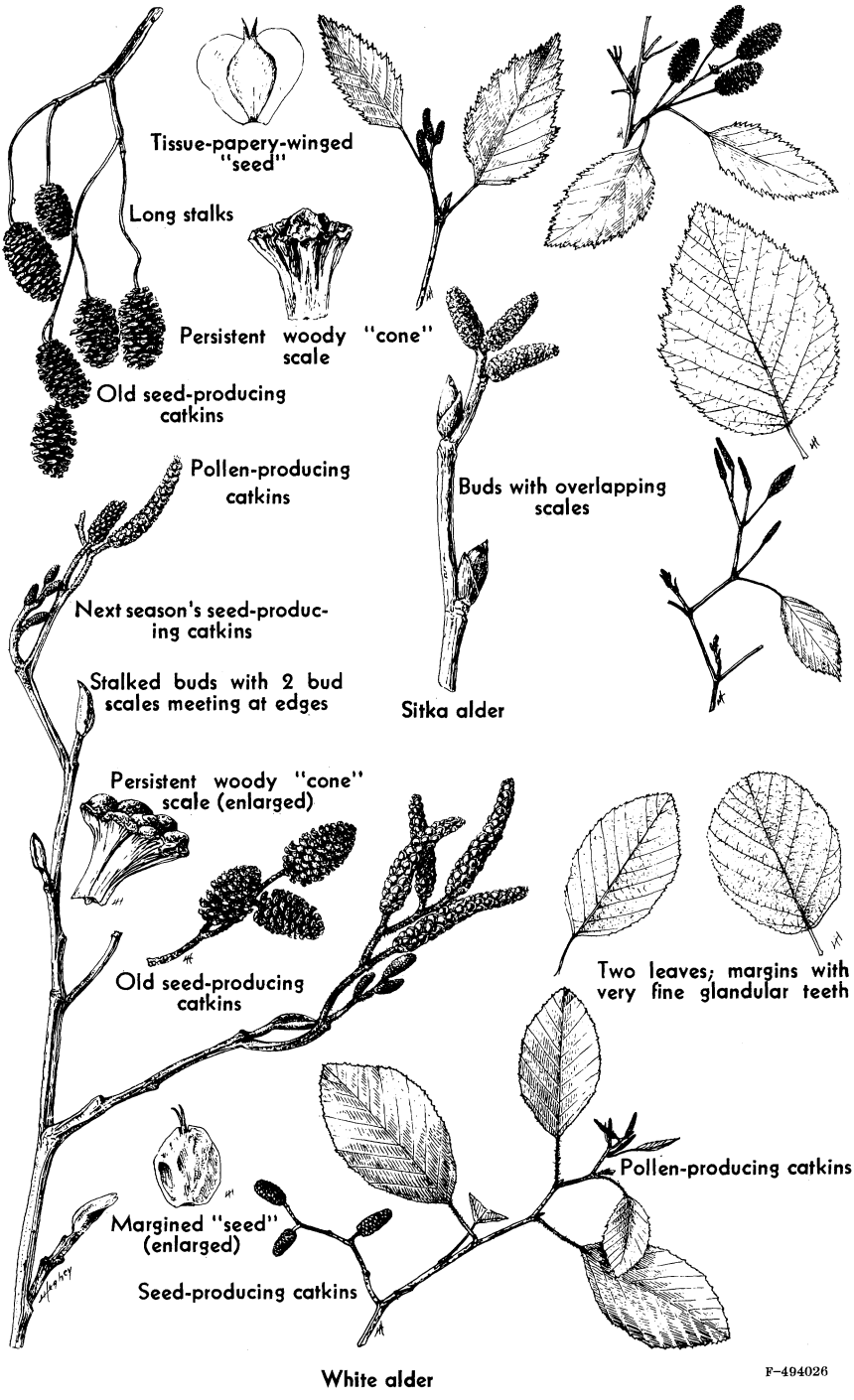
7. **Leaf margins blunt-toothed, thickened, rolled under;** "seeds" with narrow, nearly encircling papery wings; **inner bark, sapwood turning bright red or orange when peeled;** large, valuable hardwood trees, often in almost pure stands on burns or logged-over areas w., rare e. of Cascades; type locality, probably w. Oreg.
red alder (*Alnus rubra*).

7. **Leaf margins doubly saw-toothed, not thickened or rolled under;** "seeds" narrowly margined; seed-producing catkins often diseased, with enlarged curly bracts; tall shrubs or small trees, often thicket-forming; commonest alder in e. Oreg., e. Wash.
thinleaf alder (*Alnus tenuifolia*).

4. **Twigs round, sparsely resin-dotted or densely resin-warty when young,** becoming smooth and dotted with pale pores (lenticels); leaves in a 1/3 counterclockwise arrangement on the twigs; pith compressed, small; **seed-producing catkins tassel-like, not persistent except for their erect or recurved central stalks from which the 3-lobed papery scales fall either with or after shedding of the tissue-papery-winged "seeds";** buds with 3 or more overlapping bud scales; shrubs or trees of moist sites, sometimes thicket-forming---------- **birches (*Betula* spp.).**

8. **Bark at base of old trunks shredding or separating into layers; leaves dull green on both sides, sharp- or taper-pointed at tips;** second-year twigs usually smooth except for whitish dotlike pores (lenticels); trees.
paper birches (varieties of ***Betula papyrifera*).**

9. **Leaves square-cut or broadly** (sometimes unevenly) **wedge-shaped at base, thin; margins finely, doubly saw-toothed, slightly lobed;** new twigs sparsely resin-dotted, with straggly white hairs, becoming shiny orange-brown

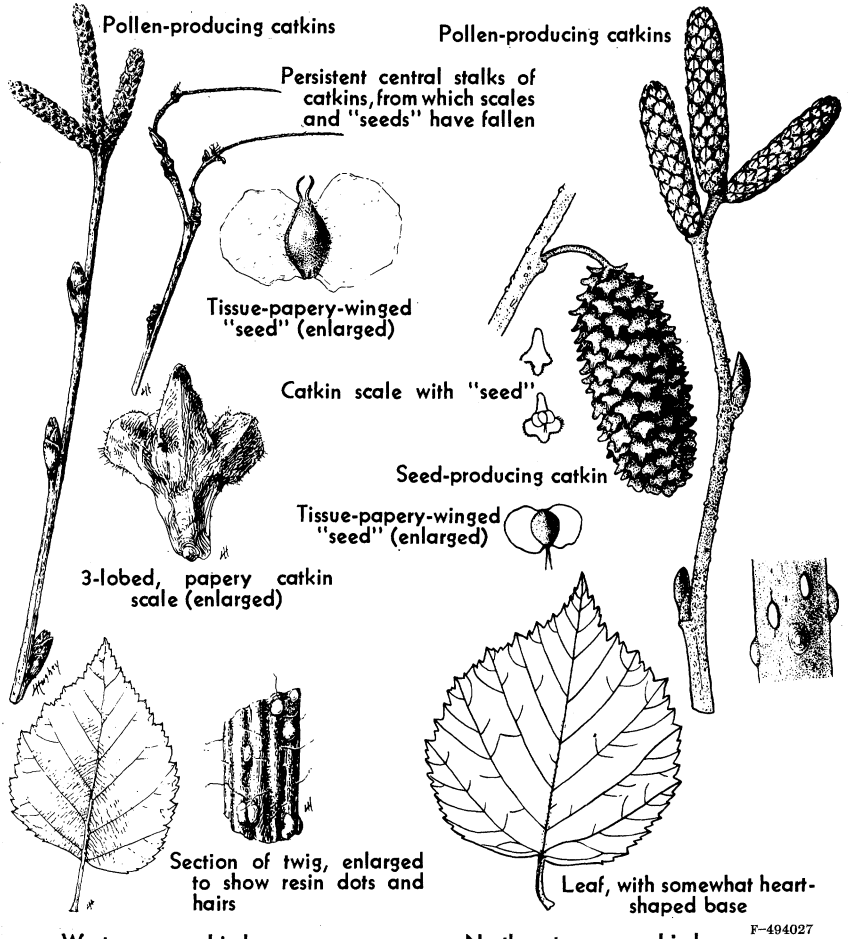

Tissue-papery-winged "seed"
Long stalks
Persistent woody "cone" scale
Old seed-producing catkins
Pollen-producing catkins
Buds with overlapping scales
Next season's seed-producing catkins
Stalked buds with 2 bud scales meeting at edges
Sitka alder
Persistent woody "cone" scale (enlarged)
Old seed-producing catkins
Two leaves; margins with very fine glandular teeth
Pollen-producing catkins
Margined "seed" (enlarged)
Seed-producing catkins
White alder
F-494026

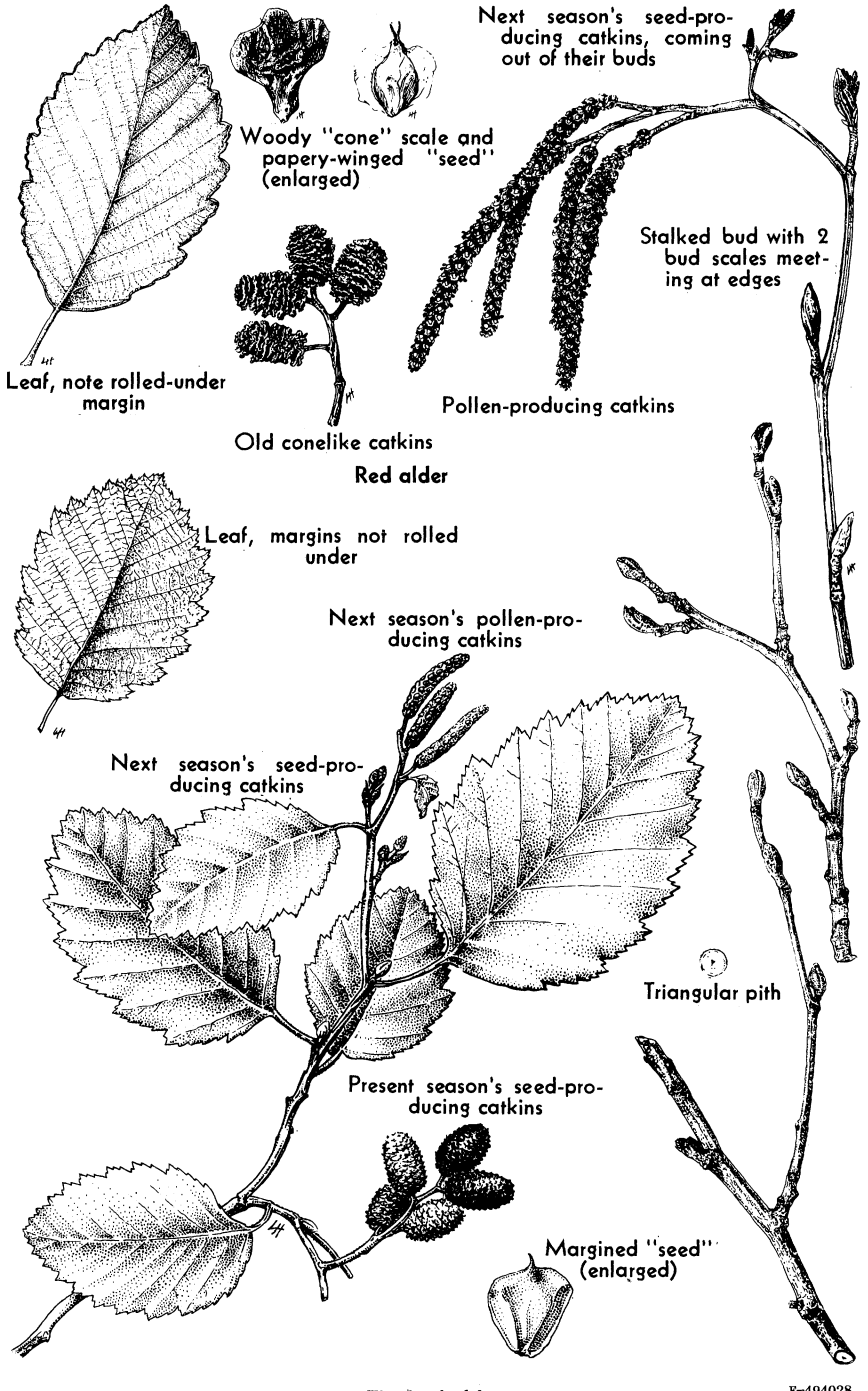
and smooth; bark of lower trunk warm brown, shredding to show orange-brown or creamy papery layers beneath; both sides of Cascades, Blue Mts., se. Wash.; not reported from Oreg.; type locality, "Straits of Juan de Fuca."

western paper birch (*Betula papyrifera* var. *commutata*).

9. **Leaves somewhat heart-shaped (subcordate) at base, thick; margins coarsely (sometimes doubly) toothed, usually not lobed;** new twigs hairless or finely hairy, often with a whitish "bloom," sometimes resin-dotted, becoming shiny red-brown or grayish; bark of lower trunk dark silvery gray, peeling to show purplish or whitish, shreddy layer beneath; Wallowa Mts., ne. Oreg., Blue Mts., se. Wash. type locality, Hatwai Creek, Nez Perce Co., Ida.

northwestern paper birch (*Betula papyrifera* var. *subcordata*).




Next season's seed-producing catkins, coming out of their buds
Woody "cone" scale and papery-winged "seed" (enlarged)
Stalked bud with 2 bud scales meeting at edges
Leaf, note rolled-under margin
Pollen-producing catkins
Old conelike catkins
Red alder
Leaf, margins not rolled under
Next season's pollen-producing catkins
Next season's seed-producing catkins
Triangular pith
Present season's seed-producing catkins
Margined "seed" (enlarged)
Thinleaf alder
F-494028

8. **Bark at base of old trunks not shredding or separating into layers; leaves shiny on one side, blunt- to sharp-pointed or rounded at tips; twigs with persistent, warty resin dots;** shrubs or small trees with clustered trunks, often thicket-forming.

10. **Mature leaves to 2½ inches long, thin but firm, shiny yellowish green underneath, dull dark green and (when young) resin-dotted above, broadly egg- or diamond-shaped to nearly round; margins unevenly saw-toothed, slightly lobed;** bark bronze or dark reddish or purplish brown, shiny; tall shrubs or bushy trees to 40 feet high, with ascending branches; wooded areas along streams, commonest birch of e. Oreg., e. Wash.

water birch (*Betula occidentalis*).[4]

10. **Mature leaves to 1½ inches long, thick, pale green, resin-dotted on under surface, shiny dark green on upper surface, net-veined, round or reverse-egg-shaped; margins scallop-toothed;** bark dark brown or reddish; much-branched shrub to 6 or 8 feet high, with flexible twigs; boggy places in mountain meadows, e. Oreg., e. Wash.

bog birch (*Betula glandulosa*).

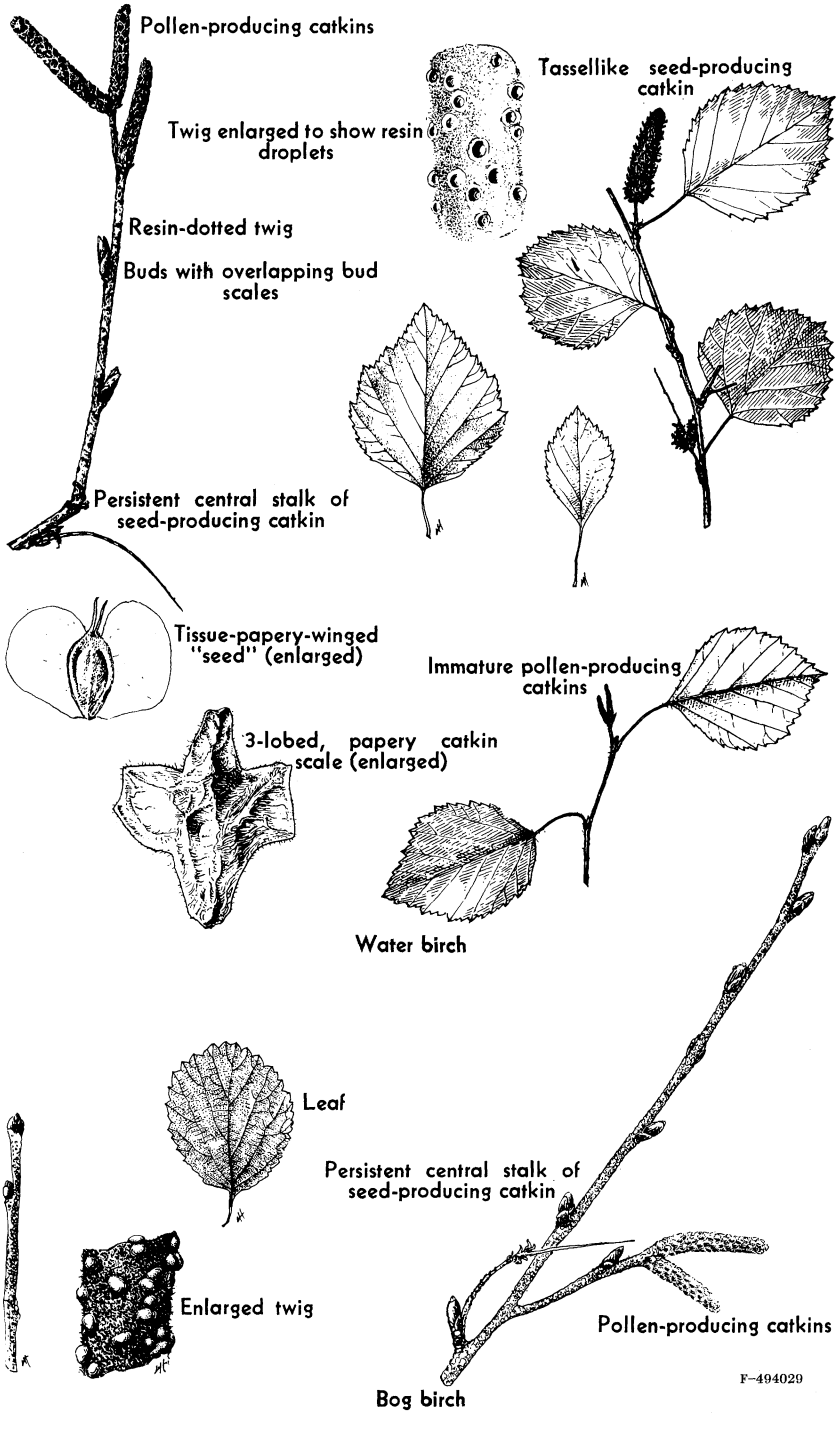
3. **Pollen- and seed-producing catkins on different plants, appearing before, with, or after the leaves; seed pods (capsules) cone-, globe-, or bottle-shaped, splitting down from top into 2 or 3 parts** (valves); seeds tiny, hairy-tufted at base; twigs often self-pruning; leaves in a ⅖ arrangement on the twigs; trees or shrubs. [Alternate 3, p. 20.] **aspen, cottonwood,** and **willows.**

11. **Buds more or less resinous; end buds present; bud scales several, overlapping; leaves relatively broad and long-stalked; leave margins finely saw- or scallop-toothed, or sometimes almost entire;** stipules inconspicuous, soon falling; catkins drooping from last year's twigs, appearing before the leaves; each pollen- or seed-producing flower in a stalked cuplike disk in the axil of a fringed or cut-lobed, hairy, soon-falling flower scale; seed pods stalked, cone- or globe-shaped; trees, often spreading by root suckers . . **aspen** and **cottonwood.**

12. **Leafstalks twisted near the leaf blade and flattened at right angles to it, slender; leaves nearly round in outline, abruptly pointed at tip, green on both sides, turn bright golden or orange-yellow in fall;** seed pods cone-shaped, splitting into 2 parts; trees often 30–40 feet high (to 60 or 80 feet), with smooth, whitish bark except near ground,

---

[4] A drooping-branched variety of water birch [*Betula occidentalis* Hook., var. *fecunda* Fern. (Rhodora 47: 317. 1945)] with paired or clustered seed-producing catkins and dark bronze bark was first described as a new, unnamed species by Piper and Beattie (*The Flora of the Palouse Region,* p. 55. 1901) from material growing on "Springy hillsides near Almota," Garfield Co., e. Wash.; it was indicated merely as the authors' third "B." Perhaps this is the same as Guthrie birch (*Betula guthriei* Sudw.) which Major Guthrie found in 1924, "in northeastern Oregon growing along the Imnaha River and its tributary canyons from the mouth of the river to a point 35 miles above, reaching elevations of from about 2,500 to 4,500 feet," and which the late Dr. George B. Sudworth named for Major Guthrie [*A New Western Birch.* Amer. For. and For. Life 33 (401): 286–7. May, 1927]. It also answers the description of *B. piperi* Britton (Torr. Bot. Club Bul. 31: 165. 1904) but unfortunately not the type specimen of that species.

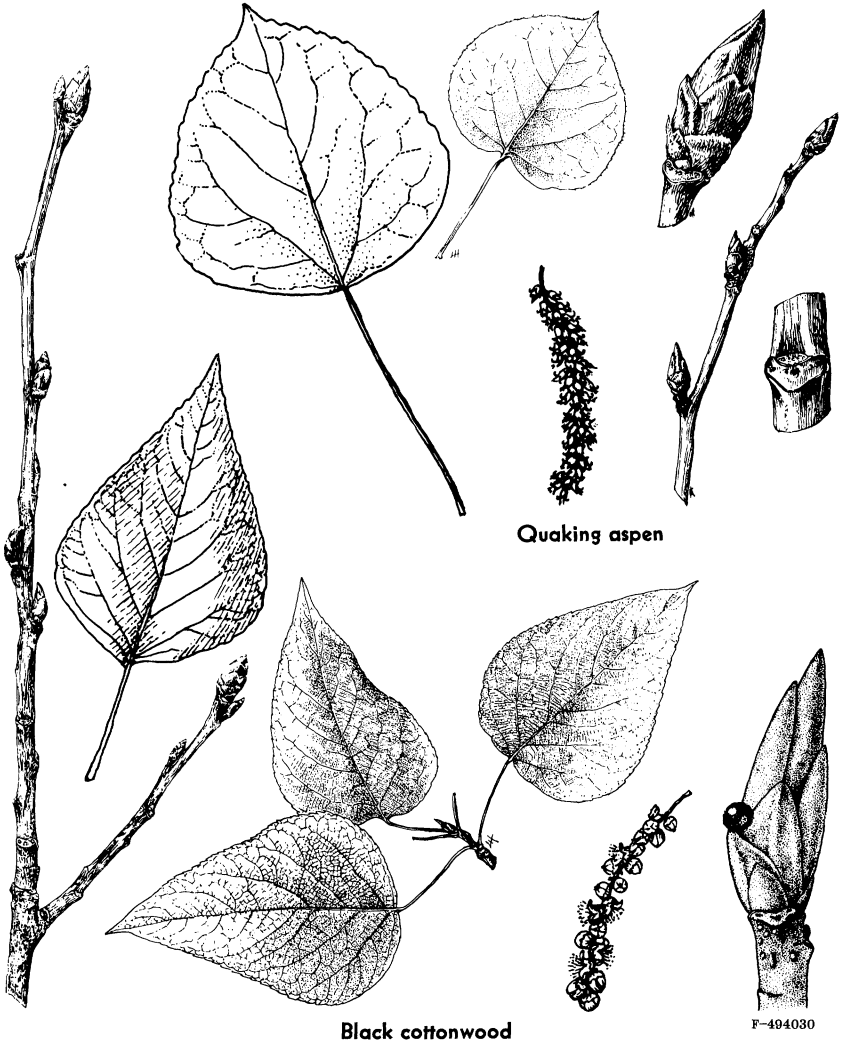

Pollen-producing catkins
Twig enlarged to show resin droplets
Tassellike seed-producing catkin
Resin-dotted twig
Buds with overlapping bud scales
Persistent central stalk of seed-producing catkin
Tissue-papery-winged "seed" (enlarged)
Immature pollen-producing catkins
3-lobed, papery catkin scale (enlarged)
Water birch
Leaf
Persistent central stalk of seed-producing catkin
Enlarged twig
Pollen-producing catkins
F-494029
Bog birch

often in almost pure stands; at higher altitudes, Cascades, and in mountains of e. Oreg., e. Wash.

quaking aspen (*Populus tremuloides*).

12. **Leafstalks round in cross section, grooved; leaves egg- or pear-shaped, pointed at tip, slightly heart-shaped or rounded at base, dark green and shining on upper surface,** pale or often whitish with a "bloom" on under surface; **seed pods** globe-shaped, **hairy, splitting into 3 parts;** large, fast-growing trees, mostly less than 50 feet high (to about 125 feet in best sites), with deeply furrowed bark; river bottoms or along streams, mostly w. of Cascades, Oreg., Wash., occasional in mountains, e. Oreg., e. Wash.

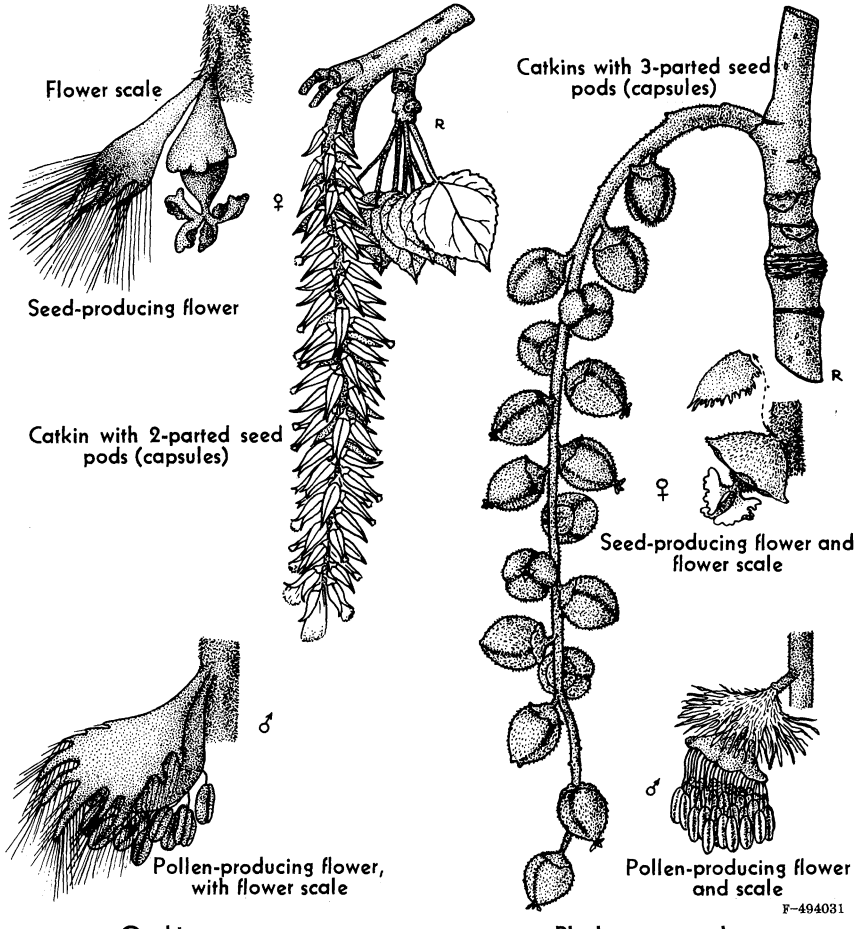
black cottonwood (*Populus trichocarpa*).

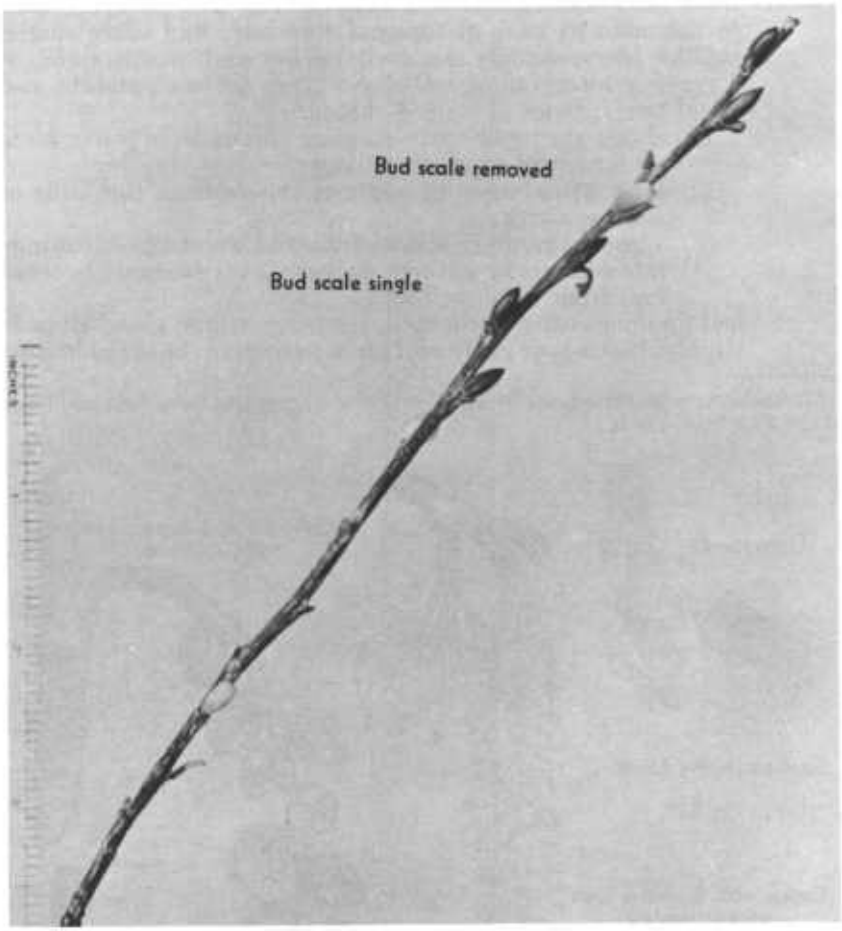


11. **Buds not resinous; true end buds lacking, twig tip dying back to tiny stub at base of topmost side bud; bud scale single, caplike;** leaves usually relatively narrow and short-stalked, of 3 varying, intergrading leaf-shape types (at base, middle, and tip of twig); twigs of 3 (or 4) kinds:[5]
    (1) short, spring or early summer shoots from lower buds on flowering or fruiting twigs;
    (2) long, often vigorous summer shoots from top buds of fruiting twigs;
    (3) vigorous summer shoots from old wood after fruiting;
    (4) late summer or autumn sucker shoots (sometimes lacking) from trunk or root;

    leaf margins entire or toothed, teeth sometimes gland-tipped; stipules lacking, or green and often persistent, or scalelike and

[5] Unless otherwise stated, the illustration is of a mature leaf from near middle of a type 2 or type 3 twig.





Willows (*Salix* spp.) F-486452

soon falling (leaving stipule scars); catkins erect or spreading, stalkless or stalked, appearing before, with, or after leaves; each pollen- or seed-producing flower with 1 (or 2) peg-shaped glands and in axil of a usually entire and hairy, often persistent flower scale; stamens usually 2–5, sometimes 1, rarely more than 5; seed pods (capsules) somewhat pear-shaped, stalked or stalkless, splitting into 2 (rarely 3) parts; seeds many, very tiny, surrounded at base by long, fine, silky, white hairs; trees or shrubs **with very bitter bark,** often stump- or root-sprouting (in favorable sites, sometime reproducing by rooting of fallen twigs), mostly insect-pollinated, often cross-breeding (hybrids often with both pollen- and seed-producing flowers in same catkin)_____**willows** (***Salix*** spp.).[6]

[6] See C. R. Ball, *Illustrating Plant Organs for Taxonomic Purposes.* Castanea 8:67–71. 1943, and *More Plant Study; Fewer Plant Names.* Arn. Arb. Jour. 27:371–385. 1946.

13. **Leaves 4 (or 5) to 15 times as long as wide** (except peachleaf willow which is sometimes only 3 times as long as wide); **catkins persistent;** flower scales yellow, soon falling; tall shrubs or trees; along streams, e. Oreg., e. Wash.

14. **Leaves narrowly to broadly linear, tapering at both ends, stalkless or nearly so; margins entire or with tiny, wide-spaced, often glandular teeth; stipules scalelike, soon withering; catkins 1–3 together, at ends of new leafy twigs,** appearing with or after leaves; stamens 2.
gravelbar or **sandbar willows.**

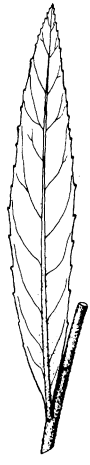
15. **Twigs spreading, dark brown to red or black, often shiny, nearly hairless;** leaves dark green on upper side, paler green or slightly whitened (glaucescent) on under side, nearly hairless, to 3½ inches long (young twigs, stipules, leaf blades, leafstalks more or less densely gray-hairy in var. *bolanderiana*); seed pods hairless; tall shrubs (rarely small trees), in clumps, usually on gravel bars_____**dusky willow (*Salix melanopsis*).**

15. **Twigs ascending, yellow to brown, hairy; seed pods hairy** (at least when young); usually tall shrubs, often thicket-forming_____**sandbar willows.**

16. **Leaves finely (sometimes sparsely) short-gray-hairy** (young twigs and leaves often densely short-white-hairy at first and then mistaken for silverleaf willow), 2–5 inches long; margins often with tiny, dotlike, glandular teeth; catkins to 2½ inches long; seed pods soon becoming hairless or nearly so.
coyote willow (*Salix exigua*).

16. **Leaves and seed pods silvery-white, usually densely long-soft-hairy,** leaves to 3½ inches long, with a short, awnlike (aristate) tip; margins entire or nearly so; catkins to less than 2 inches long.
silverleaf willow (*Salix argophylla*).

Coyote willow

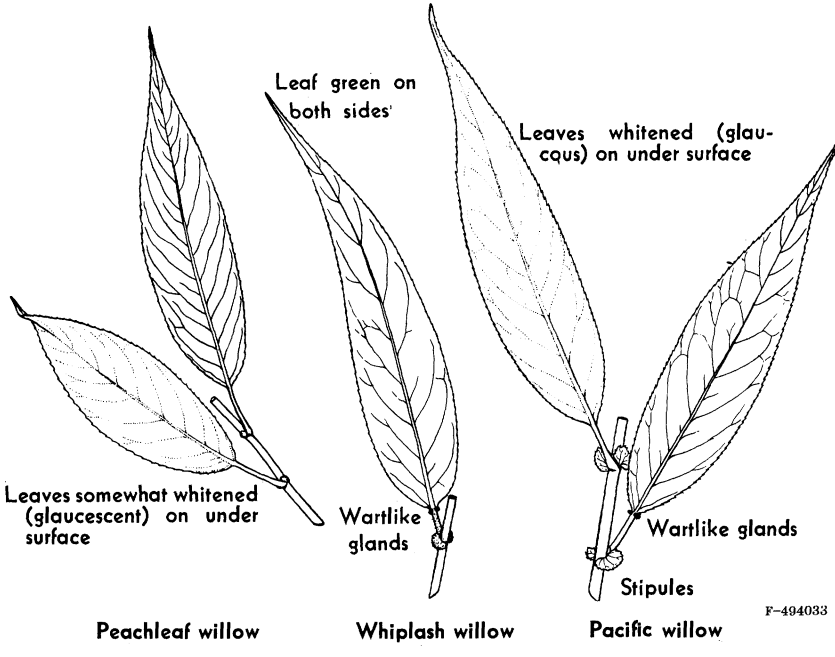


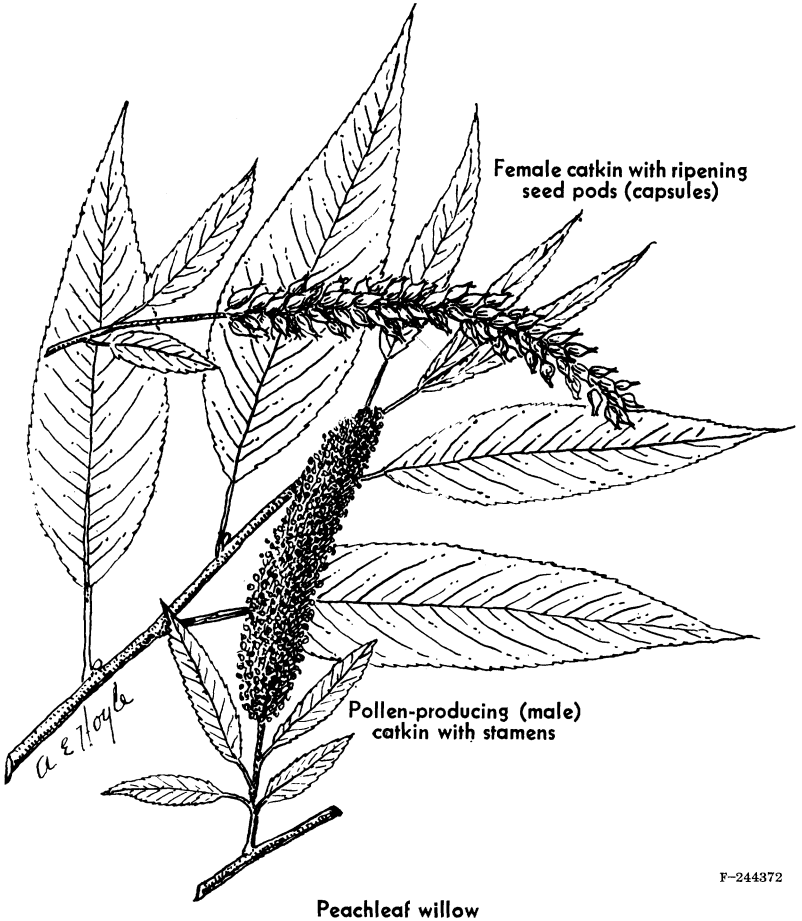
Dusky willow

F–494032

Silverleaf willow

14. **Leaves broadly lance-shaped, long-tapering at tip, stalked; margins closely toothed; stipules green, persistent;** catkins single, from side buds on last season's twigs, leafy or leafy-bracted at base, short-stalked, appearing with the leaves; **stamens 3–8;** usually trees, in valleys or along streams.
    17. **Wartlike glands present along edges of the stoutish leafstalks, usually near leaf blades;** leaves to 10 inches long; twigs stoutish, yellow to reddish.
        18. **Leaves green on both sides,** tapering from below middle; twigs chestnut to reddish, finely hairy, as are also the leafstalks (hairless in var. *bryantiana*); stipules small; small trees or few-stemmed shrubs with smooth brown bark.
        whiplash willow (*Salix caudata*).
        18. **Leaves whitened (glaucous) on under side, shiny green on upper side,** tapering from above middle; twigs shiny, yellow to dark red-brown, nearly hairless, as are also the leafstalks (hairy in the var. *lancifolia*); stipules conspicuous, semicircular; mostly trees with rough, furrowed, blackish bark.
        Pacific willow (*Salix lasiandra*).
    17. **Wartlike glands lacking from leafstalks which are to 1½ inches long;** leaves to 6 inches long, whitened (glaucous) on under side; stipules soon falling; twigs slender, flexible, yellowish to gray, often drooping; small to large trees, often with 2–4 leaning trunks.
    peachleaf willow (*Salix amygdaloides*).





Peachleaf willow

13. **Leaves 2–4 times as long as wide;** catkins from side buds on last season's twigs, naked or leafy-bracted at base, stalkless or stalked, appearing with the leaves or before them; flower scales persistent, brownish to black (yellowish with reddish tips in Bebb and Geyer willows); stamens 2 (only 1 in Sitka willow).
    19. **Leaf margins entire** (sometimes distantly and indistinctly scallop- or saw-toothed), often slightly rolled under (revolute).
        20. **Leaves mostly broadest above middle.**
            21. **Leaves reversely egg- or broadly lance-shaped (obovate or oblanceolate), larger leaves sometimes oblong-elliptic,** wedge-shaped at base, to 3 (or 5) inches long and 1½ inches wide; upper leaf surface dull green with impressed veins; under leaf surface with raised veins; twigs yellowish to brown, aging dark brown to black, more or less hairy at least when young; shrubs or small trees.

22. **Under leaf surface whitened (glaucous) and thinly to densely white- (or rusty-) hairy; leaves thick, prominently net-veiny;** stipules, when present, to ⅛ inch long, somewhat egg- or kidney-shaped in outline; twigs stout, widely spreading to ascending; catkins appearing before leaves (sometimes called Christmas willow because of very early blooming), to 3 inches long and nearly 1 inch wide, stalkless or nearly so; seed pods (capsules) gray-woolly-hairy, beaked; freshly crushed new bark and leaves often with strong, unpleasant odor; shrubs or small trees (to nearly 50 feet high in best sites); often first shrubs to come in after fire (sometimes called fire willow); commonest upland willow, e. Oreg., e. Wash., from low to high elevations; type locality along Columbia River_____**Scouler willow (*Salix scouleriana*).**

22. **Under leaf-surface not as above, with satiny sheen, usually densely silky-hairy; leaves thin, with parallel veins upcurving near margins;** stipules none or small and broadly lance-shaped; twigs slender, long, straight, ascending; catkins appearing before or with the leaves, to 3½ inches long and ½ inch wide; seed pods (capsules) silky-hairy; usually shrubs, to 23 feet high; valleys at lower elevations, mountain areas of e. Oreg., e. Wash. (commoner w. of Cascades).

Sitka willow (*Salix sitchensis*).

21. **Leaves narrowly and reversely lance-shaped (bolanceolate) or oblong and narrowed at base;** stipules lacking or small and only on vigorous shoots; catkins appearing before the leaves, stalkless or nearly so.

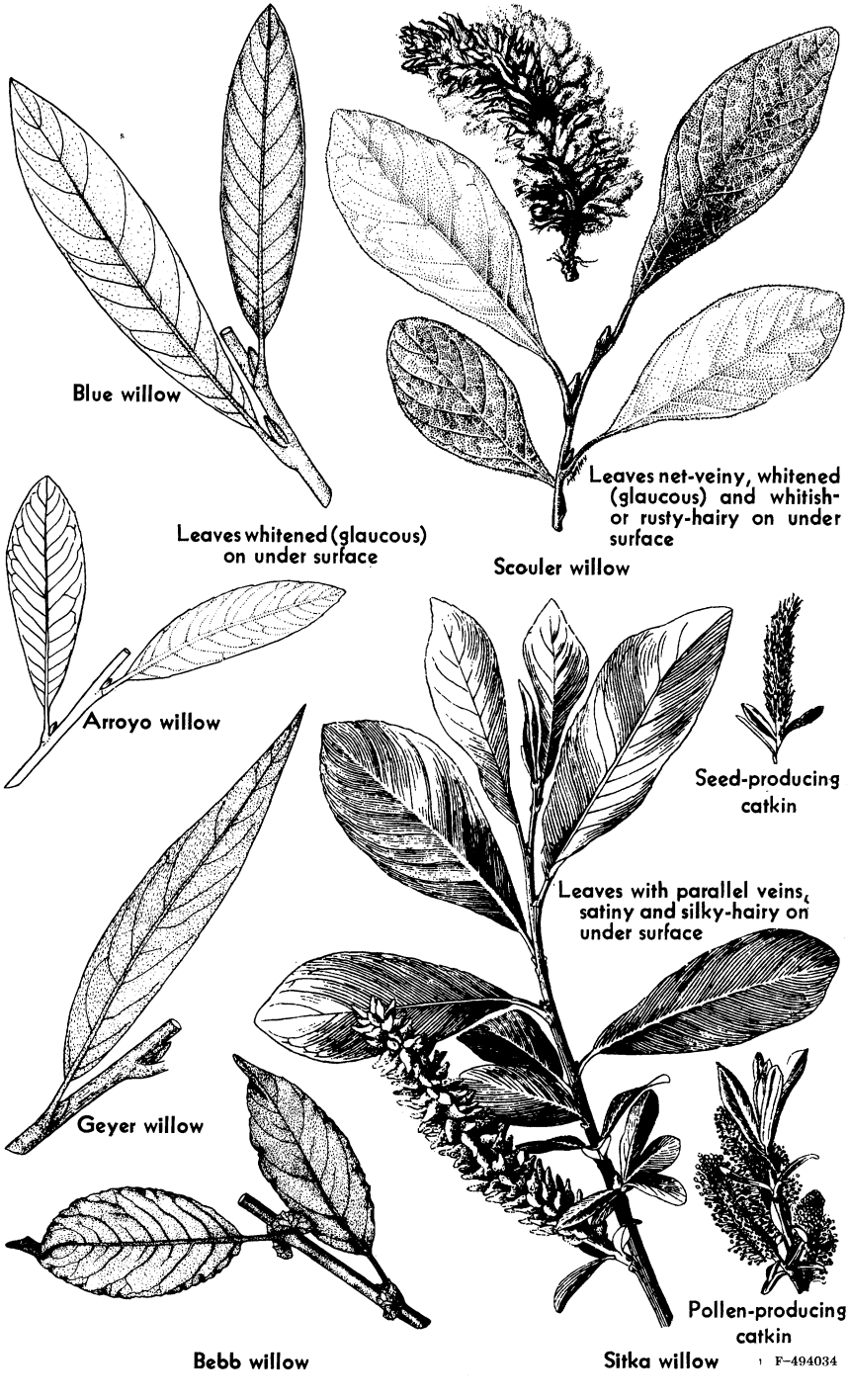
23. **Under leaf-surface silvery-silky-hairy, sometimes becoming hairless and whitened (glaucous) with age;** leaves to 3 (or 4) inches long and 1 inch wide, pointed or tapering at tip; twigs slender, dark, with a dense whitish "bloom" (pruinose) easily rubbed or washed off (twig then becoming shiny); catkins to 1½ inches long, often with a few leafy bracts at base; seed pods silky-hairy, almost stalkless; flower scales thinly long-hairy; anthers sometimes a striking red before shedding their pollen; shrubs to nearly 10 feet high; wet meadows or along streams, higher elevations, e. Oreg., e. Wash.; type locality, near head of Eagle Creek in Powder Mts., Wallowa Co., ne. Oreg.

blue willow (*Salix drummondiana* var. *subcoerulea*).[7]

[7] Beautiful willow (*Salix drummondiana* var. *bella*, syn. *S. bella*) is similar to blue willow, but has stouter, yellowish, finely hairy to hairless twigs with only a faint whitish "bloom" (slightly pruinose) soon rubbing or washing off. Its leaves are narrower and relatively longer, with prominent yellow midrib and whitish, matted hairs on under surface; the seed pods (capsules) are grayish-silky-hairy; the catkins appear before the leaves; stipules are often present; shrubs to 13 feet high, at lower elevations, along streams, e. Oreg., e. Wash.; type locality, about 6 miles east of Pullman, near Garrison, Whitman Co., Wash.

F–88664

Scouler willow


Blue willow
Leaves net-veiny, whitened (glaucous) and whitish- or rusty-hairy on under surface
Scouler willow
Leaves whitened (glaucous) on under surface
Arroyo willow
Seed-producing catkin
Leaves with parallel veins, satiny and silky-hairy on under surface
Geyer willow
Pollen-producing catkin
Bebb willow
Sitka willow
F-494034

23. **Under leaf-surface whitened (glaucous), hairy to nearly hairless,** net-veiny; leaves from 2½ to 4 (or 6) inches long and ½ to 1½ inches wide, bluntly pointed or rounded at tip; twigs rather stout, yellowish, becoming dark brown, hairy to nearly hairless; catkins to 3 inches long, not leafy-bracted at base; seed pods (capsules) hairless, almost stalkless; flower scales blackish but densely white-hairy; stamen stalks united near base; clustered shrubs or small trees to nearly 40 feet high; dry to moist watercourses at lower elevations, e. Oreg., e. Wash.; type locality, near Monterey, Calif.
arroyo willow (*Salix lasiolepis*).

20. **Leaves mostly not broadest above middle, variable in shape, to 3 inches long, hairy on both surfaces, whitened (glaucous) on under surface;** stipules none, or small and on fast-growing shoots; young twigs very leafy; catkins on short, leafy or leafy-bracted stalks; seed pods (capsules) beaked, hairy, stalked; flower scales yellowish with reddish tips; stamen stalks often hairy; tall shrubs or small trees.

24. **Under leaf-surface deeply net-veiny or cross-wrinkled (rugose), densely grayish-hairy to almost hairless, often somewhat whitened (glaucescent to glaucous); twigs short, slender, spreading, brownish, often hairy, with a slight whitish "bloom" (pruinose) that is soon rubbed or washed off;** leaves rigid, elliptic, oblong or somewhat diamond-shaped (sometimes reversely egg-shaped in outline), pointed at both ends or rounded at base and abruptly short-tapered and often twisted to one side at tip, to 1 inch wide; catkins appearing before the leaves, to 3 inches long; **seed pods (capsules)** finely hairy, to ⅜ inch long, **long- and slender-stalked;** bushy upland shrubs or small trees to 16 feet high; moist sites in open woods, often at low elevations, e. Oreg., e. Wash.
Bebb willow (*Salix bebbiana*).

24. **Under leaf-surface not deeply net-veined or cross-wrinkled as above, thinly silky-hairy, whitened (glaucous); twigs slender, olive green to brown or black, hairless, with a whitish "bloom" (pruinose) soon rubbed or washed off;** leaves thick or leathery, narrowly elliptic-oblong to somewhat lance-shaped (sometimes reversely lance-shaped), to ⅝ inch wide, pointed at tip, narrowed at base, often with margins rolled under (revolute); catkins appearing with the leaves, to 1 inch long, egg- or almost globe-shaped; seed pods (capsules) silky-hairy, to ¼ inch long, on short, stoutish, hairy stalks; erect, clustered shrubs or small trees to 13 (or 20) feet high; moist meadows, streambanks, middle to higher elevations, e. Oreg., e. Wash. **Geyer willow (*Salix geyeriana*).**

19. **Leaf margins finely (often glandular-) saw-toothed** (sometimes almost entire); leaves to 4 (or 6) inches long;

stipules often present; catkins appearing with the leaves, usually on short, leafy or leafy-bracted stalks; **seed pods and stamen stalks hairless;** flower scales hairy.

25. **Under leaf-surface whitened (glaucous).**

26. **Leaves lance-shaped, broadest near base,** rounded or heart-shaped at base, pointed or tapering at tip, hairless or nearly so.

27. **Twigs yellowish, hairless; leaves yellowish-green on upper surface;** stipules egg- or half-moon-shaped in outline; clustered shrubs to nearly 20 feet high; meadows or along streams, to 7,000 feet, e. Oreg., e. Wash.; type locality, "Rocky Mountains westward to the Oregon" (Columbia River).
yellow willow (*Salix lutea*).

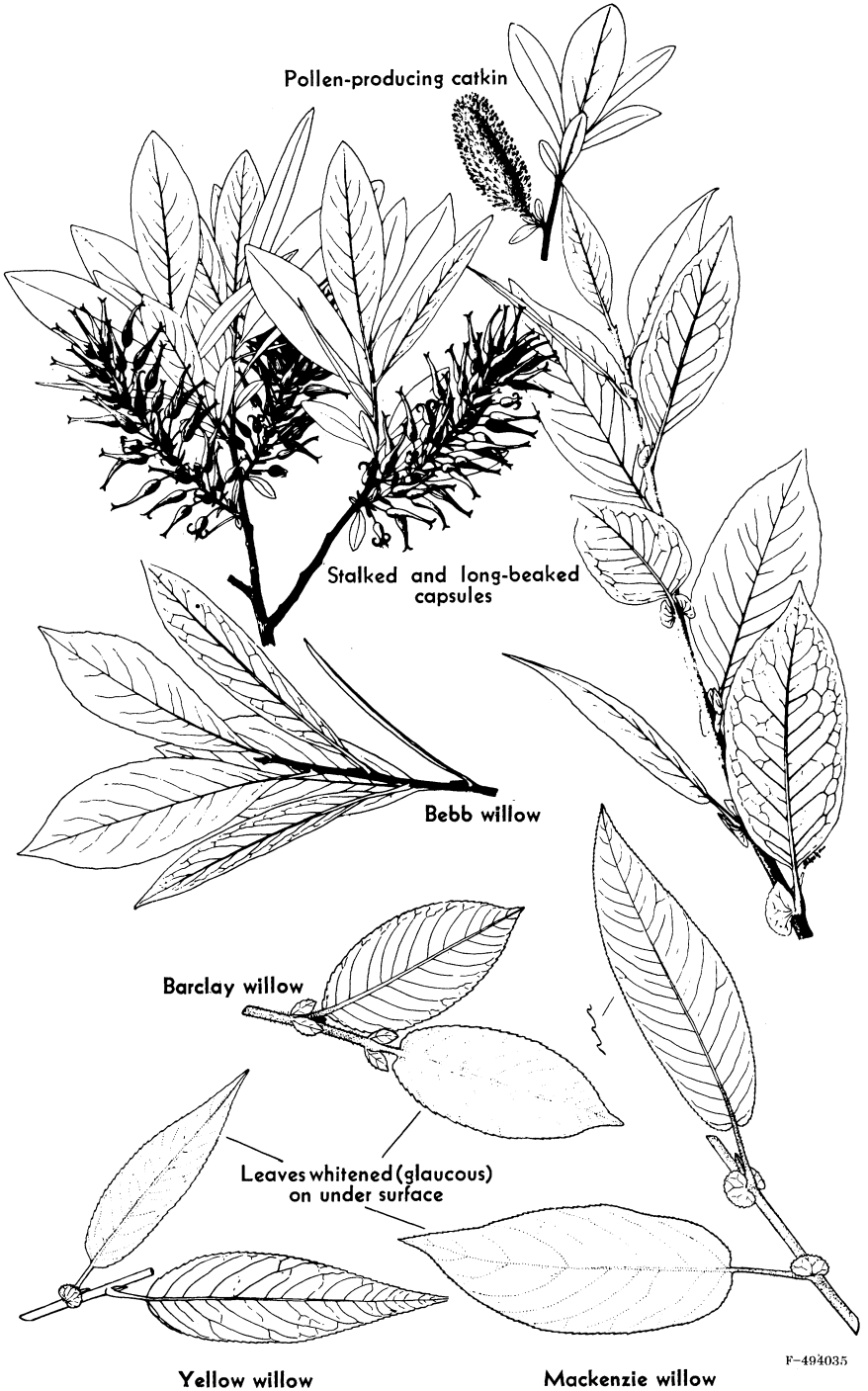
27. **Twigs reddish to dark brown, often hairy; leaves dark green on upper surface;** stipules kidney- or half-moon-shaped in outline; catkins long; anthers often bright red before shedding pollen; shrub or small tree to nearly 20 feet high; moist sites, to 5,000 feet, both sides of Cascades, Oreg., Wash.
Mackenzie willow (*Salix mackenziana*).

26. **Leaves varying from reversely egg-shaped (obovate) to elliptic-oval or broadly oblanceolate,** narrowed to somewhat heart-shaped at base, pointed to abruptly short-tapered at tip, dark green and thinly hairy on upper surface, net-veiny and usually hairless on under surface; stipules egg- to heart-shaped in outline, to ½ inch long; twigs stoutish, yellow, soon becoming brown, drying black, often thinly soft-hairy; shrubs to 13 feet high, in boggy sites, higher altitudes, mts. of ne. Oreg., rare in Cascades.
Barclay willow (*Salix barclayi*).

25. **Under leaf-surface not whitened (glaucous) as above, green; leaves net-veiny, rather broad;** stipules usually present, at least on fast-growing shoots; twigs yellowish when young, soon becoming brown to reddish or black; catkins appearing with the leaves, stalked, leafy or leafy-bracted at base.

28. **Leaf margins cartilaginous, finely saw-toothed, teeth glandular; leaves thickish,** paler green on under surface, hairless or nearly so, elliptic-lance-shaped to oblong-oval, rounded or heart-shaped at base; stipules narrowly egg-shaped in outline, to ⅜ inch long; catkins to 1½ inches long; twigs yellowish to reddish brown, shining, almost hairless; shrubs, often in clumps, to 13 feet high; mountain streams, e. side of Cascades, in ne. Oreg., e. Wash.
firmleaf willow (*Salix pseudocordata*).

28. **Leaf margins not cartilaginous and leaves not thickish as above;** leaves nearly equally green on both sides, pointed or abruptly tapered at tip; shrubs to nearly 10 feet high.

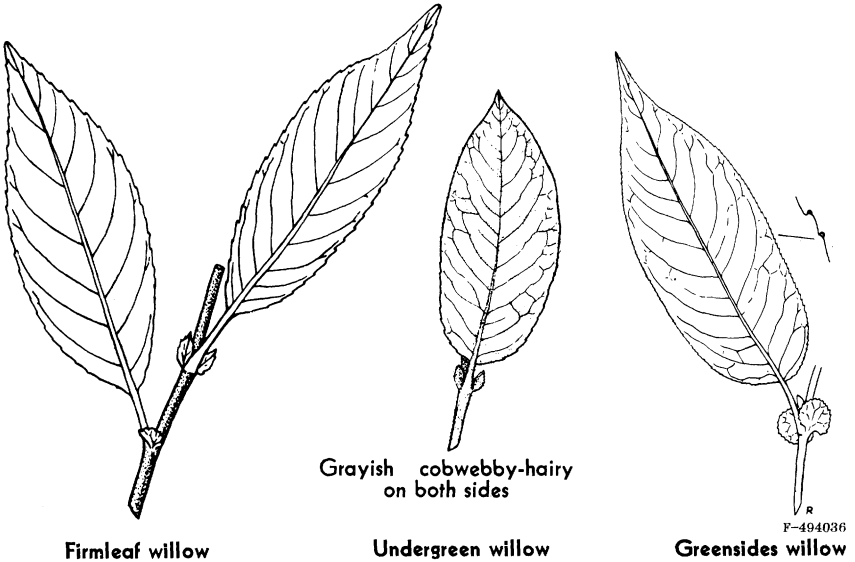

Pollen-producing catkin
Stalked and long-beaked capsules
Bebb willow
Barclay willow
Leaves whitened (glaucous) on under surface
F-494035
Yellow willow
Mackenzie willow

29. **Leaves grayish-cobwebby-hairy on both surfaces, dull opaque green,** oblong to oval or reversely egg-shaped (obovate) to reversely lance-shaped (oblanceolate), narrowed to rounded at base; stipules heart- to egg-shaped in outline; catkins to 2 inches long; stamen stalks not united; twigs stoutish, drying black, almost hairless; mountain bogs, middle to higher elevations, Cascades, Wallowa Mts., ne. Oreg.; type locality, Wallowa Mts.

undergreen willow (*Salix commutata*).

29. **Leaves nearly hairless, dark almost transparent green,** broadly lance- to egg-shaped, rounded to heart-shaped at base; stipules half-moon- or broadly egg-shaped in outline; catkins to 2½ inches long, lax; stamen stalks united near base; flower scales dark brown, hairy, persistent; twigs yellow to brown, shiny, hairless; along streams, e. Oreg., e. Wash.; type locality, Hatwai Creek valley, Nez Perce Co., Idaho.

greensides willow (*Salix monochroma*).



Firmleaf willow | Undergreen willow | Greensides willow

PLANTS DECIDUOUS · SPRING AND SUMMER

Leaves Alternate and Simple
Plants Unarmed · Without Catkins

[Flowers not in scaly bracted, elongated clusters (catkins or aments)]

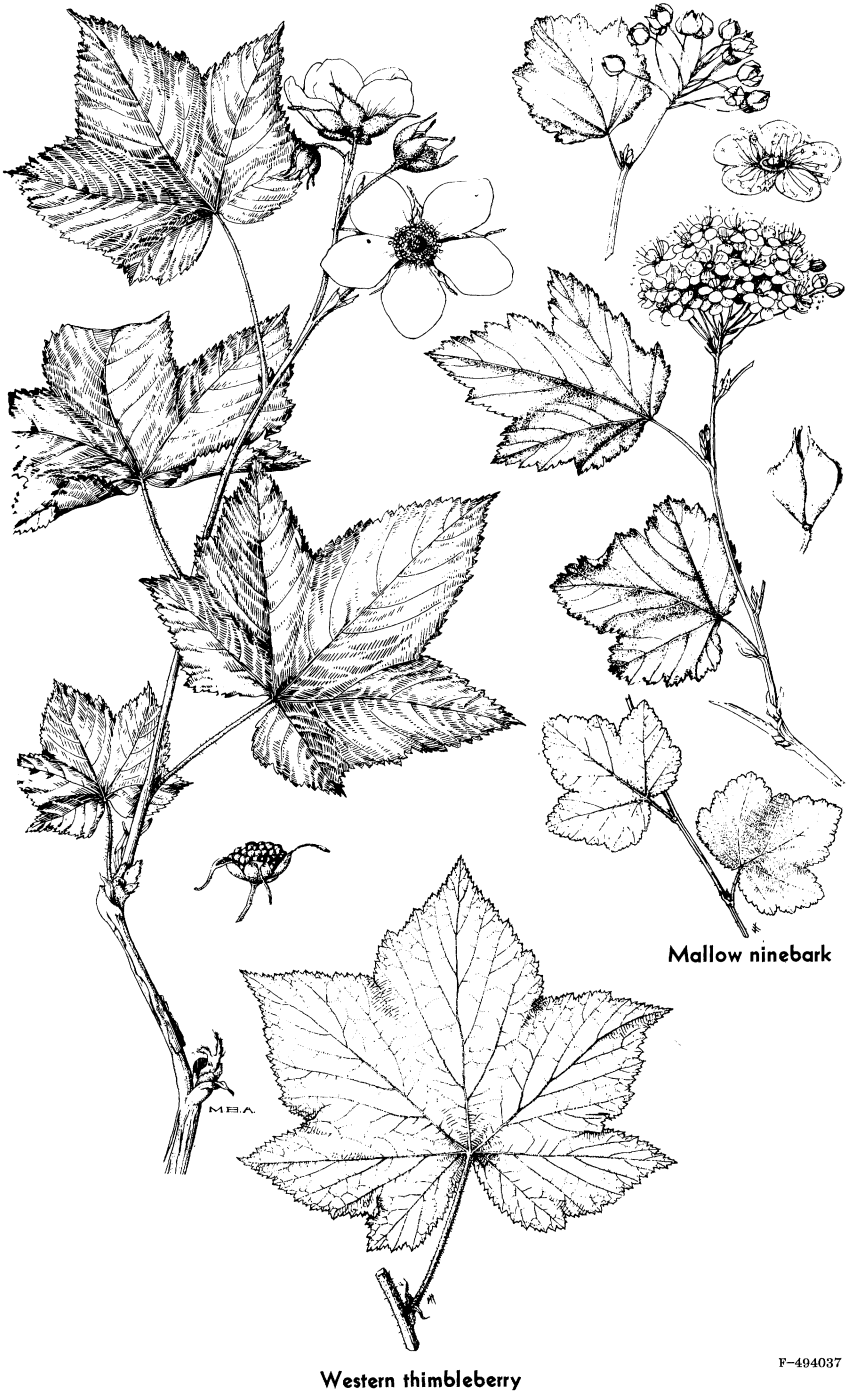
1. **Plants with sagebrush odor and taste; leaves, flower-head bracts shed in fall,** silver-gray-hairy, deeply 3-parted at tips (some entire, linear); **bracts longer than flower heads;** flower-head clusters usually spikelike; low, spreading, shrubs to 2 feet high, not layering or root-sprouting; scablands, e. Oreg., e. Wash.; type locality, plains of Snake River----------**stiff sagebrush** (***Artemisia rigida***).[8]

[8] See Evergreen Key for big sagebrush, low sagebrush, silver sagebrush, and threetip sagebrush; see Plants Armed Key for bud sagebrush.

Stiff sagebrush

F-481218

1. **Plants without sagebrush odor and taste.**
   2. **Leaves palmately 3- to 7-lobed.** [Alternate 2, p. 48.]
      3. **Bark shreddy or peeling in long strips or layers; stipules (or their scars) at leafstalk bases;** flowers, fruits stalked, in stalked, umbrellalike end clusters (corymbs).
         4. **Leaves bluntly 3- to 5-lobed,** slightly heart-shaped or rounded at base, to 3 inches wide, often red by late July; leaf margins doubly scallop-toothed; leafstalks to 1 inch long; stipules soon falling; hairs star-shaped; seed pods (follicles) 2 to each flower, persistent; **bark peeling in many layers,** grayish brown; rootstocks long, spreading, yellow inside; burned or cutover areas, rocky dry hillsides, washes, open woods, or roadsides; common, Wallowa, Blue Mts., ne. Oreg., se. Wash.
            mallow ninebark (*Physocarpus malvaceus*).
         4. **Leaves sharply 5- to 7-lobed,** deeply heart-shaped at base, to 8 inches wide, yellow or brown in fall; leaf margins doubly saw-toothed; leafstalks often as long as leaf blades; stipules attached to leafstalk bases, persistent; hairs simple, gland-tipped; thimbleberries soon falling; **bark shreddy,** brown; several-stemmed shrub; root crown erect, woody, elongated; moist, shady woods, common in e. Oreg., e. Wash.
            western thimbleberry (*Rubus parviflorus*).
      3. **Bark not shreddy or peeling in long strips or layers as above; stipules lacking;** flowers, fruits jointed to bracted stalks pedicels), in stalked end clusters (racemes); berries falling free from stalks when ripe_____**currants (*Ribes* spp.).**
         5. **Leaves shiny pale green, firm, almost fleshy and translucent,** deeply 3- (rarely 5-) lobed, square-cut or wedge- or heart-shaped at base, **unrolling lengthwise from bud;** leaf margins entire or with a few large, rounded teeth; flowers clear yellow, tubular, shallowly lobed; currants yellow, red, or black; erect shrubs, to 8 feet high; common along streams or moist hillsides, e. Oreg., e. Wash.; type locality, banks of Columbia River_____**golden currant (*Ribes aureum*).**
         5. **Leaves not as above, unfolding from bud in accordionlike pleats.**
            6. **Under leaf-surface dotted with tiny yellow resin drops; leaves maplelike, thin, with distinctive, unpleasant odor when crushed;** leaf margins sharply, irregularly toothed; leafstalks often longer than leaf blades; flower clusters erect, slender; currants black, resin-dotted.
               7. **Leaves to 10 inches wide, 5- to 7-lobed; leafstalks usually with long bristly hairs near bases;** flower clusters to 8 inches long; flower-stalk bracts often leaflike, longer than flower stalks; currants with whitish "bloom"; shrubs to 12 feet high; common w., occasional e. slopes of Cascades, Oreg., Wash.; type locality, near mouth of Columbia River____**stink currant (*Ribes bracteosum*).**
               7. **Leaves to 5½ inches wide, 3- to 5-lobed; leafstalks usually without bristly hairs near base;** flower clusters to 6 inches long; flower-stalk bracts not leaflike, shorter than flower stalks; currants without whitish "bloom";



Mallow ninebark

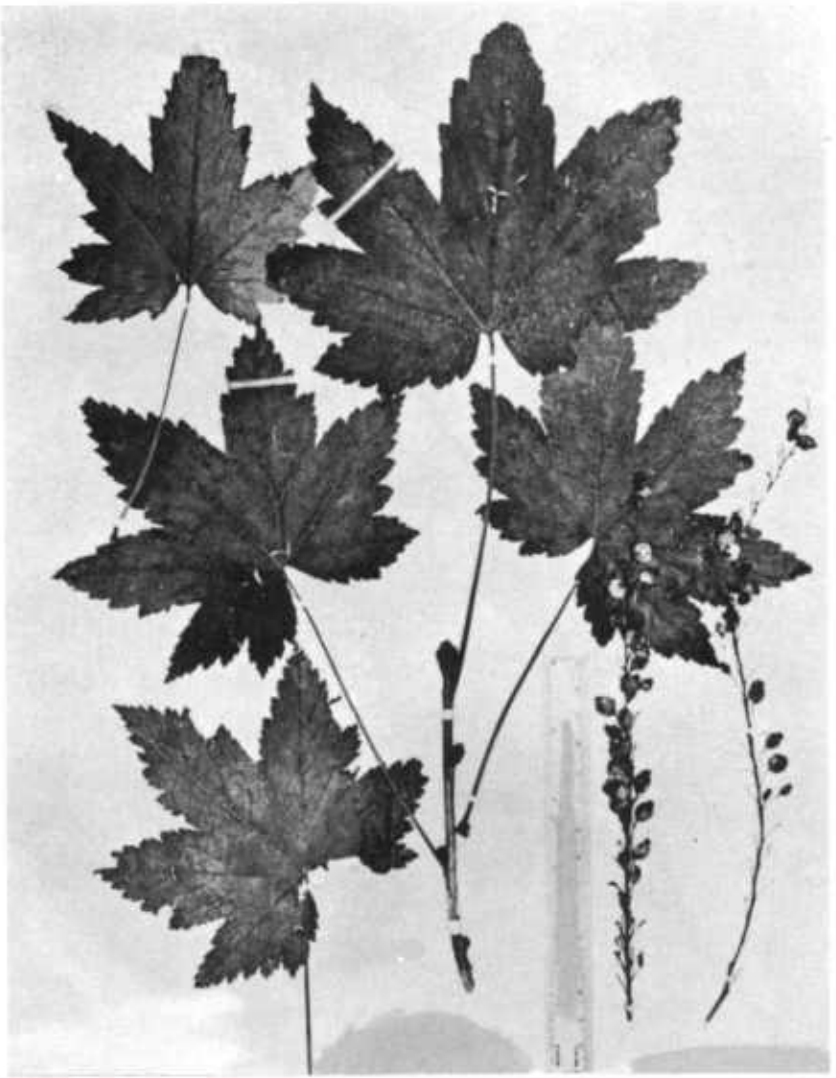
Western thimbleberry

F-494037


Golden currant
Yellow resin dots on under leaf-surface
F-494038
Western black currant
Stink currant

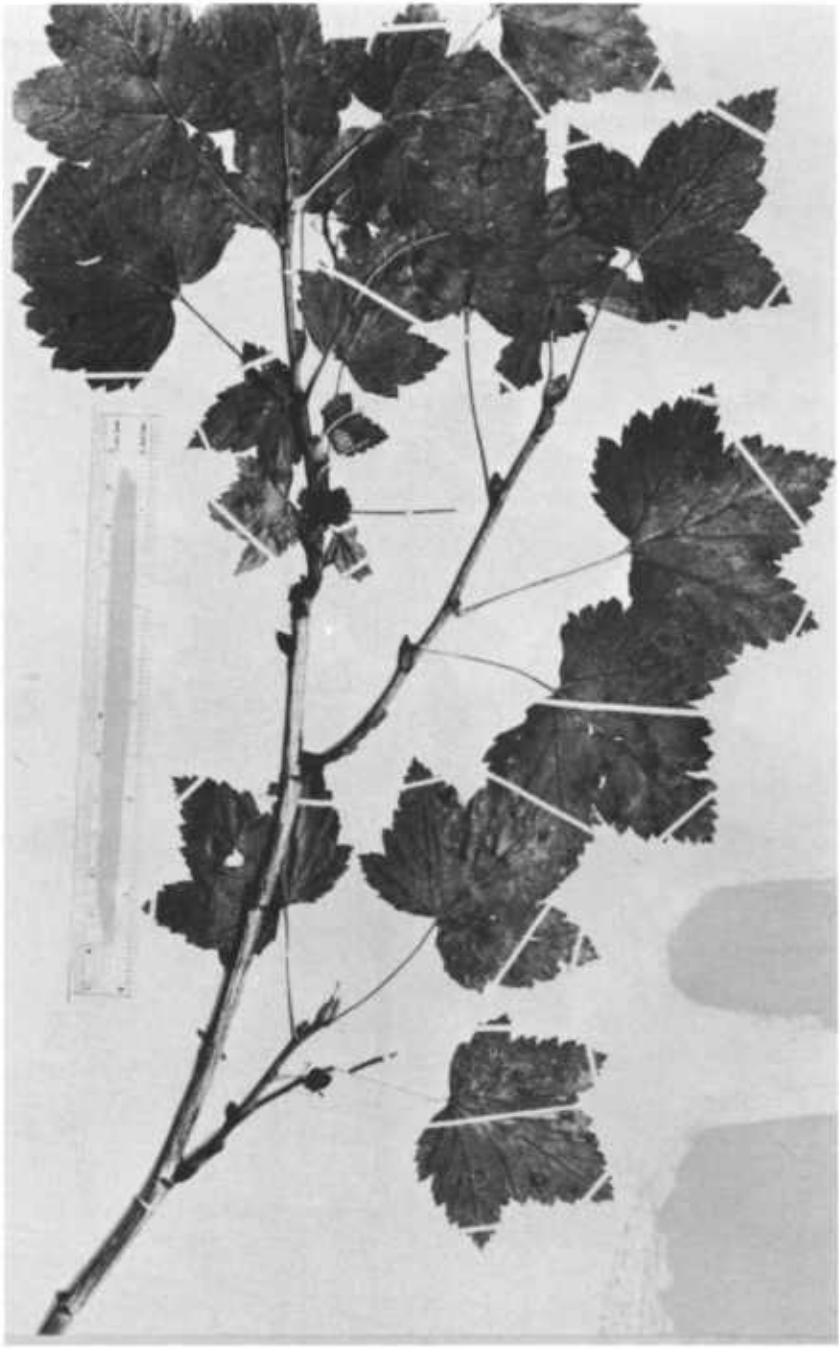
shrubs to 6 feet high; mountain streams, e. Oreg., e. Wash.; type locality, w. base, Rocky Mts.
western black currant (*Ribes petiolare*).

6. **Under leaf-surface without yellow resin droplets; leaves kidney-shaped or round in outline, thickish, with pleasant odor when crushed;** leaf margins rather bluntly toothed; leafstalks often shorter than leaf blades; flower clusters drooping to ascending, rather broad; currants red or black, not resin-dotted.



Stink currant

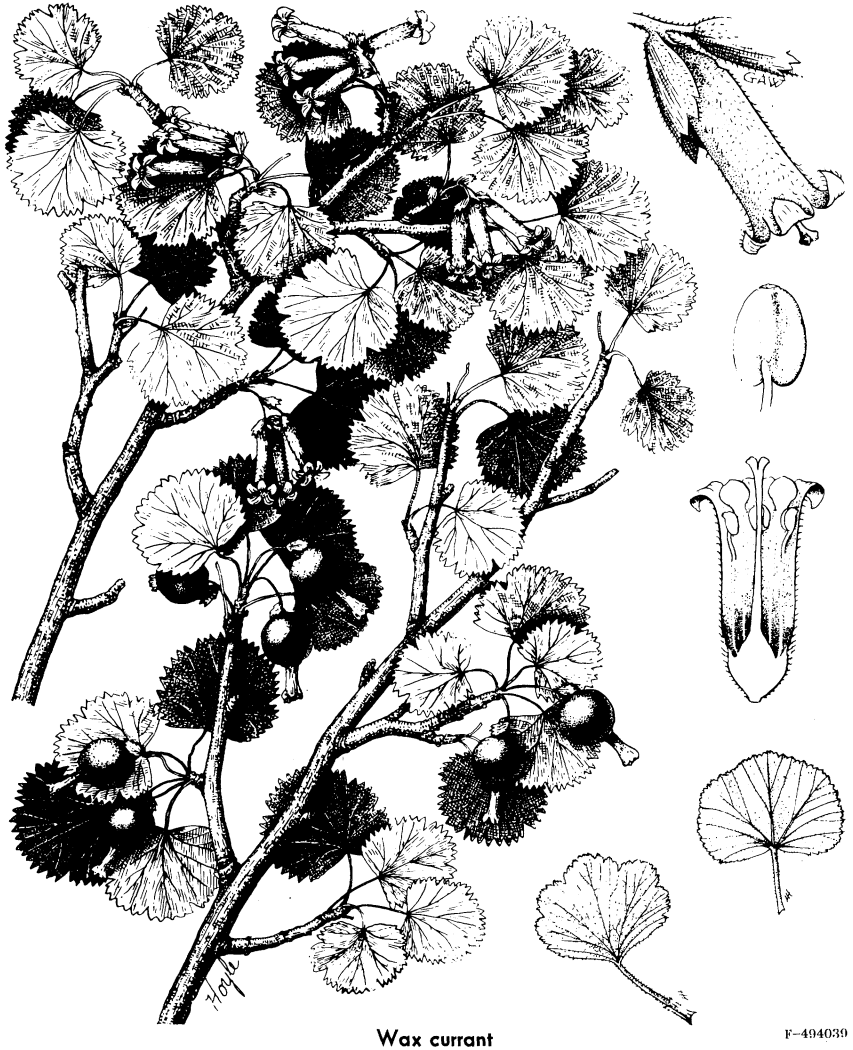
F-486438



Western black currant

F-486440

8. **Leaves shiny and gummy or whitish-waxy on upper surface, in ⅜ arrangement on twig,** often indistinctly lobed, **with musky or rather heavily fragrant odor when crushed;** leaf margins doubly scallop-toothed; flowers tubular, greenish-white to pinkish, very short-stalked, few (1–9) in each drooping cluster; flower-stalk bracts green, usually lobed or toothed, longer than flower stalks; currants bright red (sometimes orange); bark smooth, light grayish; much-branched shrubs, to 6 feet high; common in dry woods or on rocky hillsides, e. Oreg., e. Wash.; type locality, upper Columbia River in Wash.----------**wax currant (*Ribes cereum*).**



Wax currant F-494039

471114 O–60–4

8. **Leaves not as above, in 2/5 arrangement on twig,** distinctly 3- (sometimes 5-) lobed, **with pleasantly pungent odor when crushed;** leaf margins irregularly toothed; flowers funnel- or bell-shaped, often more than 10 to a cluster; **currants black,** usually with gland-tipped hairs; bark somewhat shreddy; usually in moist sites.

9. **Leaves densely white- or grayish-woolly-hairy on under surface,** aromatic; leaf margins finely toothed; flowers 10–30, showy, deep pink to red, funnel-shaped; flower-stalk bracts red; currants blue-black, with whitish "bloom"; bark brownish; branches erect; stout shrubs 3–12 feet high; common in moist, rich soils w. of Cascades, occasional on lower e. slopes, Oreg., Wash.; type locality, along Columbia River.
blood currant (*Ribes sanguineum*).

9. **Leaves with tack-shaped glands on both surfaces, rough to the touch, hairy,** with citronella odor; margins irregularly scallop-toothed; flowers 3–12, whitish to pink, bell-shaped; flower-stalk bracts greenish; currants black, without whitish "bloom"; bark reddish; branches many; stiff, bushy shrub to 5 feet high; scattered, often locally abundant, in open, rather dry to moist woods, e. Oreg., e. Wash.; type locality, Rocky Mts.
sticky currant (*Ribes viscosissimum*).

2. **Leaves not palmately lobed.** [Alternate 2, p. 42.]

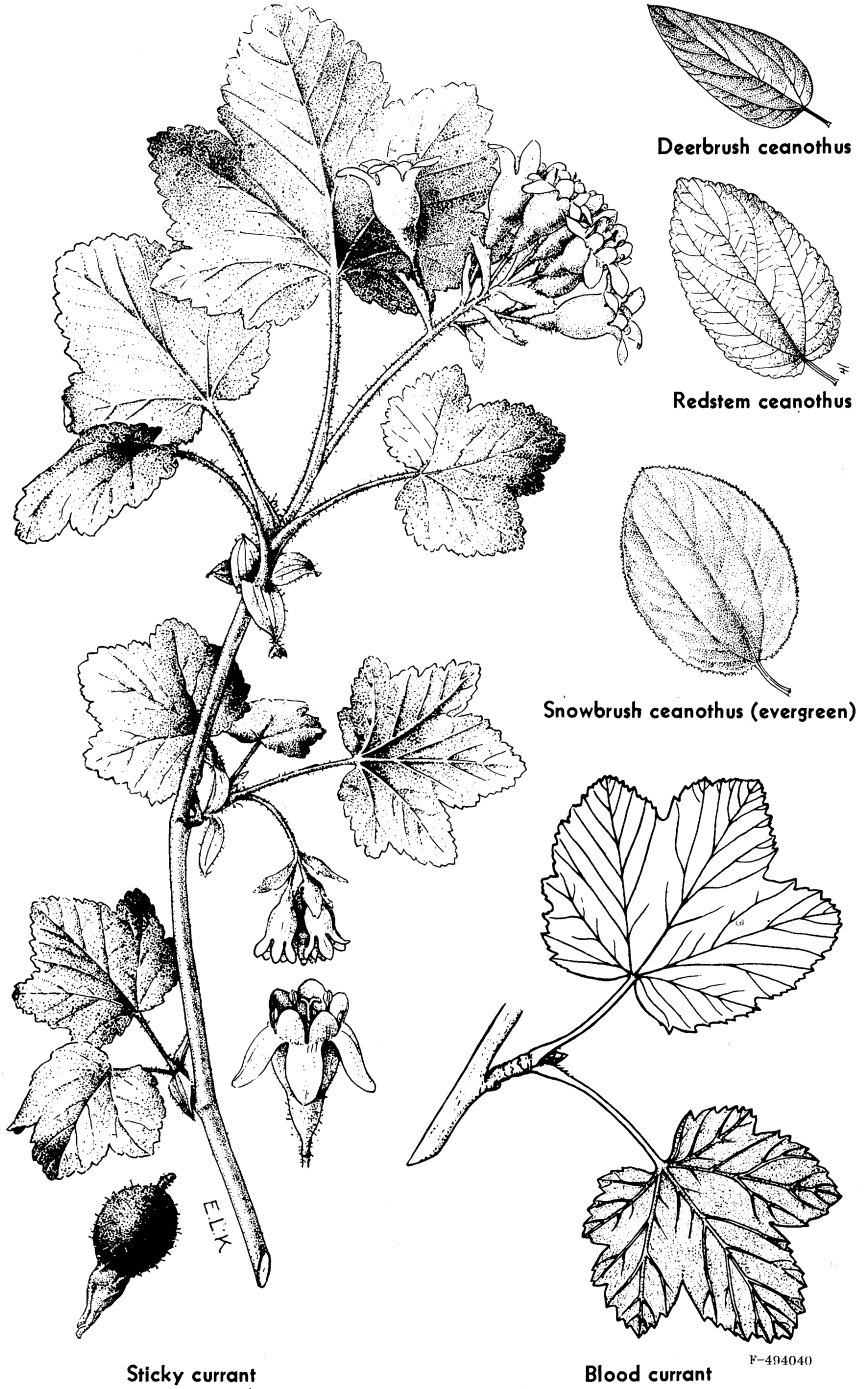
10. **Leaves (at least some) 3-veined from near base,** broad, elliptic to egg- (or reversely egg-) shaped, oblong, oval, or nearly circular.

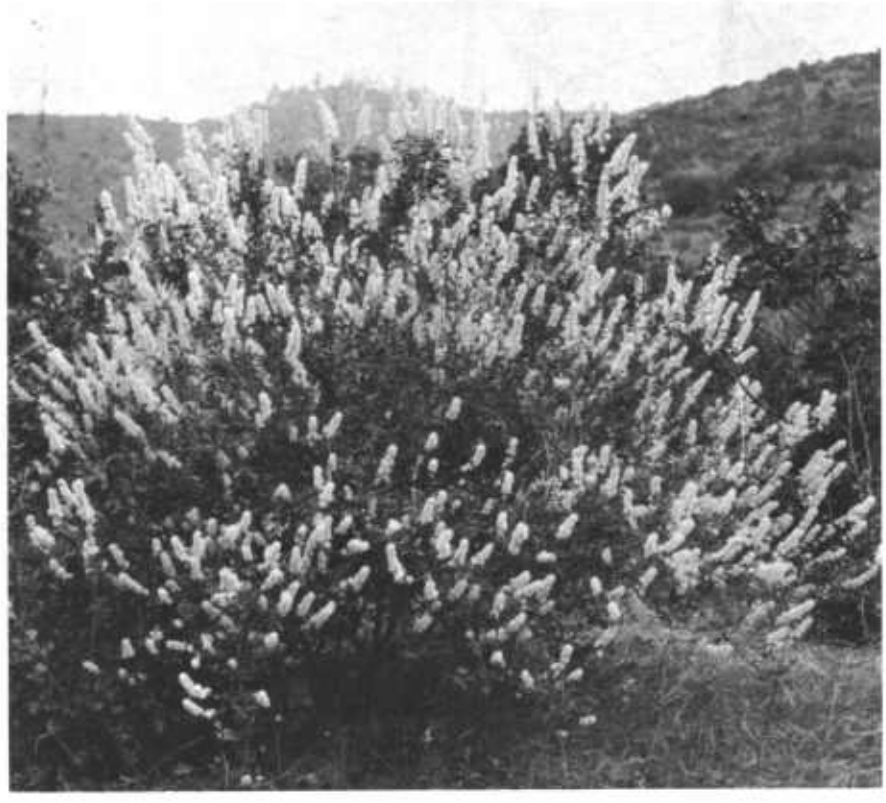
11. **Pith solid;** older twigs dotted with reddish, resinlike blisters; shrubs with many tiny flowers or 3-lobed seed pods (capsules) in stalked, branched clusters (panicles).
ceanothus (*Ceanothus* spp.) [9]

12. **Leaf margins entire;** leaves softly hairy, larger and more distinctly 3-veined in moist sites; leafstalks to ½ inch long; **flowers blue or white,** rarely pink, **in usually leafless, elongated end clusters on new shoots;** loosely branched shrubs 3–12 feet high, stump-sprouting after cutting; branches green or yellowish, hairy, slightly drooping; rare e. of Cascades; along roads near Columbia River, Klickitat Co., Wash., Hood River Co., Oreg.
deerbrush ceanothus (*Ceanothus integerrimus*).

12. **Leaf margins toothed; teeth gland-tipped;** leaves nearly hairless; leafstalks to 1 inch long; **flowers white, in leafless clusters on old wood; branches red or purplish,** flexible; erect shrubs to 10 feet high; thickets, open woods or on burns, sunny slopes, or along streams; e. lower slopes of Cascades, Wallowa and Blue Mts., Oreg., Wash.
redstem ceanothus (*Ceanothus sanguineus*).

[9] See Evergreen Key for snowbrush ceanothus. See pp. 58–60 for the spireas, some of which have at least part of their leaves faintly 3-nerved near base.


Deerbrush ceanothus
Redstem ceanothus
Snowbrush ceanothus (evergreen)
Sticky currant
Blood currant
F-494040



Deerbrush ceanothus

F-175913, 168271

11. **Pith chambered;** twigs without reddish, resinlike blisters; leaf margins entire or partly toothed; **leaves one-sided at base, strongly net-veined on under surface,** rough to the touch on upper surface, **in ½ arrangement on twig;** leafstalks about ¼ inch long; flowers single, stalked, in leaf axils; fruits berrylike (drupes), reddish to yellowish brown; small trees, often with witches brooms on the twigs and insect galls on the leaves; bottom lands or canyons, e. Oreg., e. Wash.---**netleaf hackberry (*Celtis reticulata*).**[10]

[10] Syns. *Celtis douglasii, C. laevigata* var. *reticulata, C. occidentalis* var. *reticulata.* Netleaf hackberry is a very variable species, with intergrading forms. Typical *C. reticulata* is more or less xerophytic with thick, conspicuously net-veined leaves. Typical *C. douglasii* has oblong-ovate, rough, taper-tipped, sharply saw-toothed leaves and longer-stalked, purplish (rather than orange) fruits. Type locality of *C. douglasii* is ". . . arid interior region, along the Columbia River."

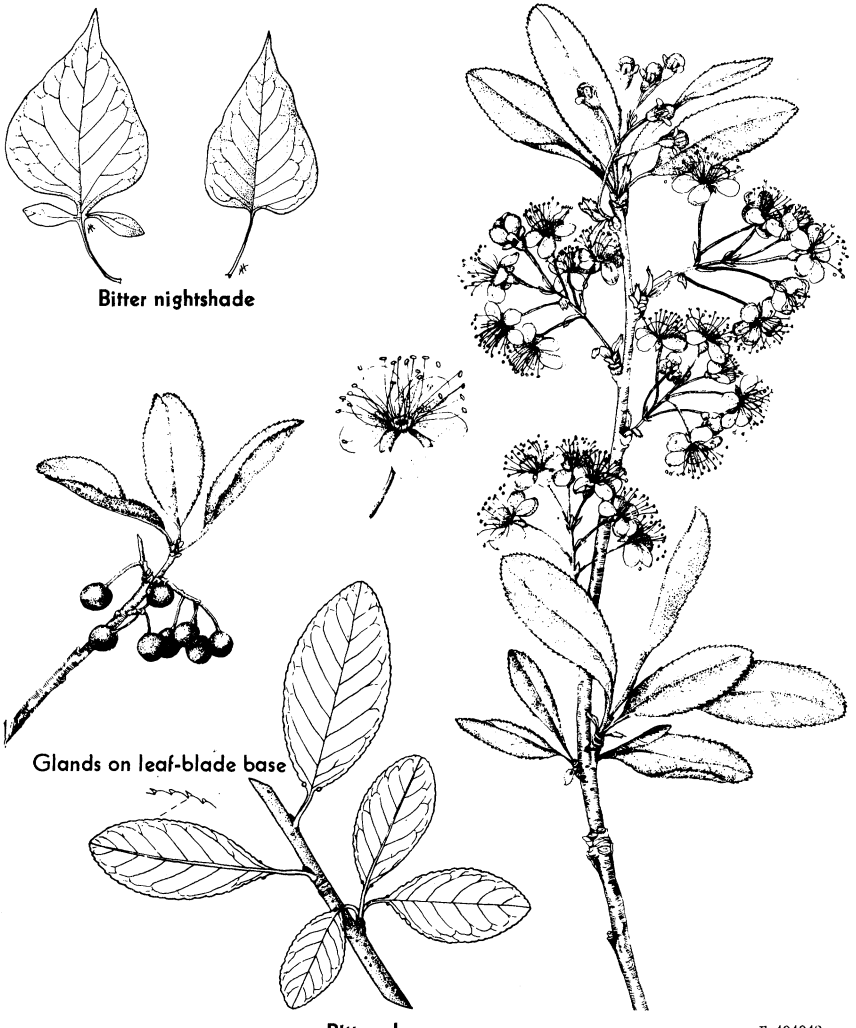
Netleaf hackberry

Redstem ceanothus

F-494041

Redstem ceanothus F-486443

10. **Leaves not 3-veined from near base,** with but one main midrib.
    13. **Stems twining or climbing,** woody only near base; **leaves entire or deeply lobed near base,** with rank odor when crushed; berries red, clustered; poisonous introduced vine; occasional in moist sites or near streams, e. Oreg., e. Wash. **bitter nightshade** (***Solanus dulcamara***).
    13. **Stems not twining or climbing.**
        14. **Leaves broad,** mostly less than 4 times as long as wide. [Alternate 14, p. 74.]
            15. **Leafstalk and/or leaf-blade base with 1–4 pinhead-sized glands.**
                bitter cherry, chokecherries, Klamath plum
                16. **Glands on leaf-blade base;** leaf-margin teeth rounded (crenulate); gland tips lying between teeth (appressed) or spreading to give finely saw-toothed



(serrulate) effect; leaves often oblong, variable in shape and hairiness, blunt to pointed or slightly notched (emarginate) at tip, wedge-shaped at base, to 3 inches long; flowers dull white, appearing with leaves, in branched, umbrellalike clusters (corymbose racemes) in leaf axils; cherries very bitter, bright red (drying dark); crushed twigs with peach-pit odor and bitter taste; outer bark easily separated from inner bark; moist to dry hillsides near streams, e. Oreg., e. Wash., also w. of Cascades; type locality, upper part of Columbia River, near Kettle Falls.

bitter cherry (*Prunus emarginata*).

16. **Glands on leafstalk** (sometimes also on leaf-blade base); **leaf margins finely** (sometimes doubly and unevenly) **saw-toothed.**
    17. **Leaves circular or broadly egg-shaped,** often somewhat heart-shaped (subcordate) at base and abruptly sharp-pointed at tip, 1–2 inches long; leaf margins sharply, doubly saw-toothed; **true end buds lacking**, twig tips dying back to topmost side bud, sometimes becoming sharp-pointed (spinescent); flowers white, fading rose, in clusters of 2 to 4, appearing before or with the leaves; plums red; straggly, crooked-branching shrubs or small trees; dry thickets, sw. Oreg., e. to Lake Co.; not reported from Wash.

        Klamath plum (*Prunus subcordata*).

    17. **Leaves broadly elliptic to reversely egg-shaped, sharp- to taper-pointed at tip,** rounded or broadly wedge- to heart-shaped at base, to 5 inches long; margins finely saw-toothed; **true end buds present**; fresh-crushed leaves, twigs with strong peach-pit odor and taste; foliage fatally poisonous to livestock under certain conditions; flowers stalked, many, in elongate, erect or drooping end clusters (racemes) on new leafy shoots; ripe fruits shiny, bright red or black, sweet but with astringent after-taste, falling free or with their stalks (pedicels) attached; fruit-stalk scars in axils of flower-stalk bract scars, or lowest sometimes in leaf (or leaf-scar) axils; varieties hard to tell apart except when in ripe fruit (late summer and early fall).

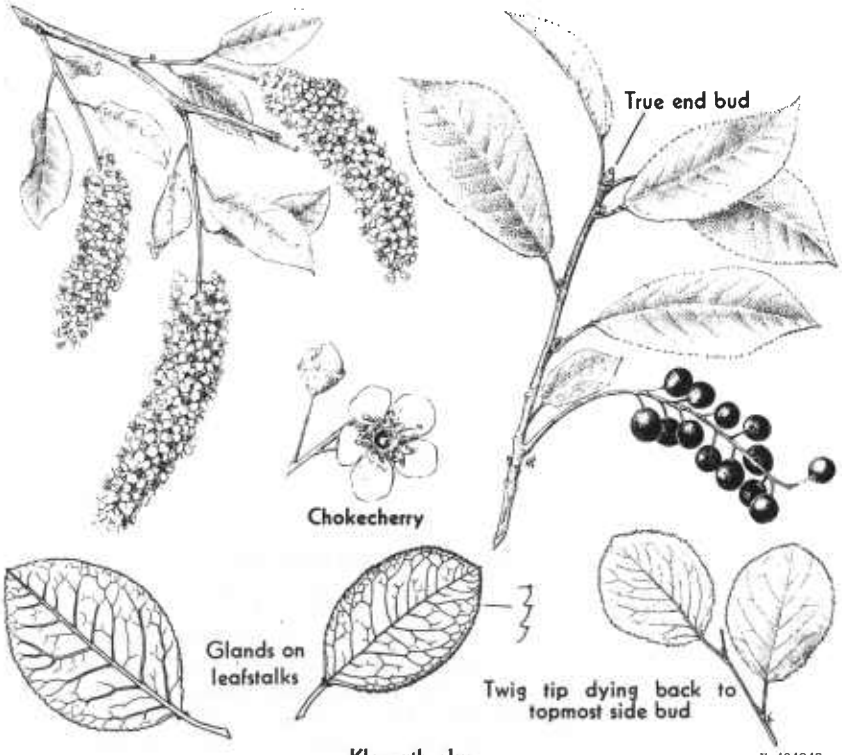
        common chokecherry (*Prunus virginiana*).

        18. **Ripe fruits bright red** (drying dark purplish) only slightly astringent, often persistent (as are also abortive fruits); fruit-stalk scars often elongate, with torn edges; leaves usually hairy, averaging larger, thinner than those of black common chokecherry; leaf-margin teeth straight, evenly appressed, containing very little green leaf substance (being mostly pale cartilaginous margin), their gland tips mostly persistent until leaves fall.

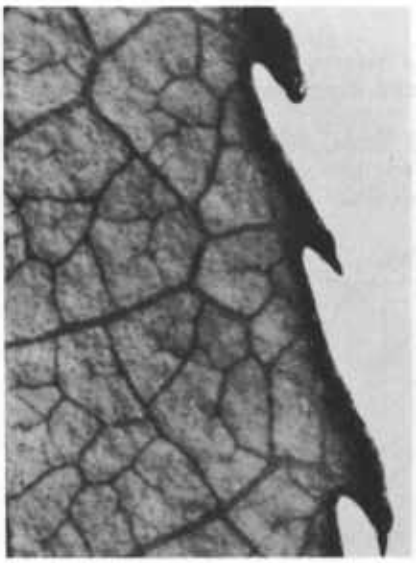
            western common chokecherry (*Prunus virginiana* var. *demissa*).

        18. **Ripe fruits black,** astringent, often falling with stalks attached; abortive fruits rarely present; fruit-stalk scars mostly circular, callus-covered; leaves usually hairless, averaging smaller and thicker than those of western common chokecherry; leaf-margin teeth incurved, unevenly appressed, containing more leaf substance and less cartilaginous margin, their gland tips tiny, soon falling or lacking.

            black common chokecherry (*Prunus virginiana* var. *melanocarpa*).



Klamath plum



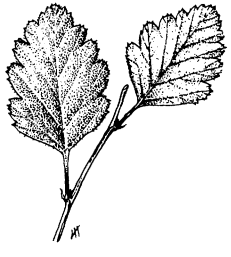
F-486431

Western common chokecherry
(under leaf-surface)

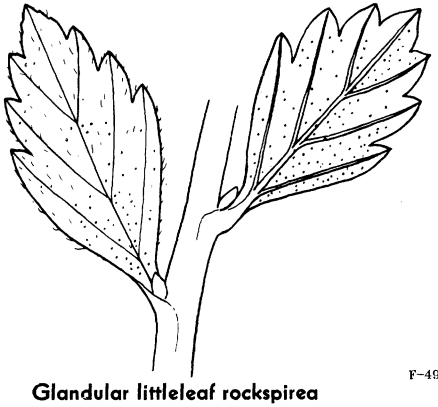
F-486432

Black common chokecherry
(upper leaf-surface)

15. **Leafstalk and leaf-blade base without pinhead-sized glands.**
    19. **Leaves pinnately lobed** (each lobe with 2–6 abruptly short-pointed teeth), broadly egg-shaped, square-cut at base, to 4 inches long and 3 inches wide, green above, paler and often densely gray- or whitish-hairy beneath; flowers tiny, creamy white, in showy, much-branched end clusters (panicles); "seeds" (achenes) tiny, 5 to each flower, beaked, long-soft-hairy, winter-persistent, in clusters distinctive even at a distance; erect shrubs to 20 feet high; open woods, cutover lands, canyon bottoms, e. Oreg., e. Wash., also w. of Cascades; type locality, banks of Clearwater River, Idaho.
    creambush rockspirea, or oceanspray (*Holodiscus discolor*).
    19. **Leaves not pinnately lobed as above.**
        20. **Leaf margins distinctly** (sometimes coarsely and/or doubly) **toothed,** at least on upper part. [Alternate 20, p. 64]
            21. **Mistlike gland droplets on leaves and twigs;** leaves to 1 inch long, broadly rounded and toothed at tip, wedge-shaped and entire at base, hairy to nearly hairless; twigs often sharp-tipped; bark dark red, aging gray, flaking off; flowers, fruits like those of creambush rockspirea but in smaller, narrower clusters; low, spreading shrubs of dry mountain sites, e. Oreg., not reported from Wash.; type locality, Steens Mts., s. Oreg.
            glandular littleleaf rockspirea (*Holodiscus microphyllus* var. *glabrescens*).
            21. **Mistlike gland droplets lacking on leaves and twigs.**
                22. **True end buds, stipules and stipule scars lacking;** twig tips dying back to topmost side buds; leaf scars with single bundle trace;



Creambush rockspirea



F-494044

Glandular littleleaf rockspirea

F-298716

Creambush rockspirea

flowers and seed pods tiny, many, in showy, flattish-topped or elongate end clusters distinctive even at a distance.

spireas, also called **hardhack, meadow-sweet, steeplebush** (***Spiraea*** spp.).

23. **Leaves hairless or nearly so,** paler green or with whitish "bloom" on under surface, lowest pair of side veins attached so near base of midrib that leaf appears 3-veined.
    24. **Flowers white, in flattish-topped end clusters;** leaves shiny on upper surface, oval to reversely egg-shaped, to 3 inches long; stems erect, to 3 feet high, from trailing, shallow, woody rootstocks, often dying down to near base in winter; bark shiny, tan to brown; dry hillsides, open woods; commonest spirea of middle altitudes, e. Oreg., e. Wash.

    shinyleaf spirea (*Spiraea lucida*).[11]

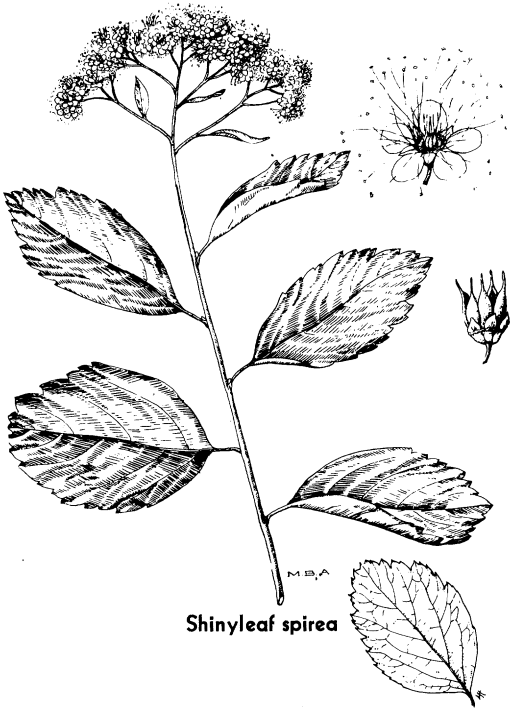
    24. **Flowers pink to rose.**
        25. **Flower and seed-pod clusters flattish-topped;** leaves oval to elliptic, to 2 inches long; stems much-branched, to 3 feet high; bark dark red-brown; bushy shrubs growing separately or in patches, on rocky ridges or with lodgepole or western white pine at higher altitudes; Cascades, Blue and Wallowa Mts., e. Oreg._____**subalpine spirea (*Spiraea densiflora*).**
        25. **Flower, seed-pod clusters spikelike to pyramidal;** leaves elliptic, rounded or wedge-shaped at base, to 4 inches long, thin, often a little hairy; in patches, moist stream sites, both sides of Cascades, Blue Mts., e. Oreg., se. Wash.; type locality, northwest coast.

        Menzies spirea (*Spiraea menziesii*).

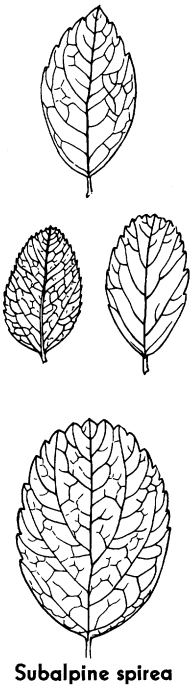
23. **Leaves finely white-woolly-hairy on under surface,** leathery, to 4 inches long, elliptic to oblong or oval, rounded or pointed at ends; flowers rose-colored, in pyramidal clusters; stems, branches erect, to 8 feet tall; twigs finely white-woolly-hairy, striped, reddish brown; often thicket-forming, spreading by suckers; wet sites, mostly w. of Cascades, Oreg., Wash.; type locality, nw. coast near Columbia River.

    Douglas spirea (*Spiraea douglasii*).

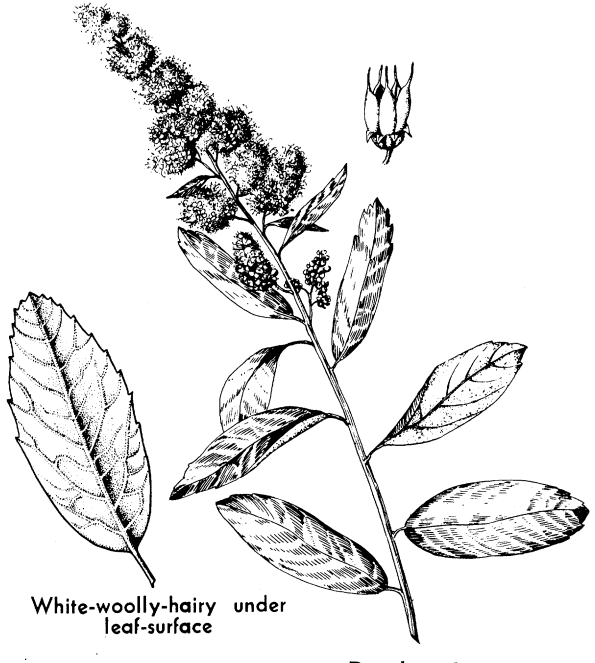
[11] White- and rose-flowered spireas sometimes crossbreed naturally, the resulting hybrids with variously mixed and intergrading characters; such hybrids are reported from Yakima River near Cle Elum, and from Falcon Valley, Wash. The rose-colored spireas also crossbreed naturally, with many intermediate forms reportedly growing near the Cascades of the Columbia River, and also along the Hood River in Oregon.



Shinyleaf spirea

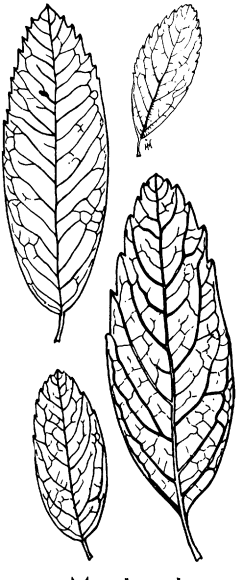


Subalpine spirea



White-woolly-hairy under leaf-surface

Douglas spirea



Menzies spirea

F-494045

22. **True end buds and stipules present;** leaf scars with 3 bundle traces; leaf veins parallel or nearly so (sometimes upcurving or branching a little near margins); flowers with showy, usually white petals to 1 inch long, often fragrant, 3–15, in stalked, often erect, end clusters (racemes) on new leafy twigs; "berries" (pomes) tipped by persistent flower parts (bent-back calyx lobes and 2–5 separate or partly united styles); low to tall shrubs or small trees; moist sites, open woods or springy hillsides.

serviceberries (*Amelanchier* spp.).[12]

26. **Mature leaves hairless or nearly so; new twigs reddish brown.**

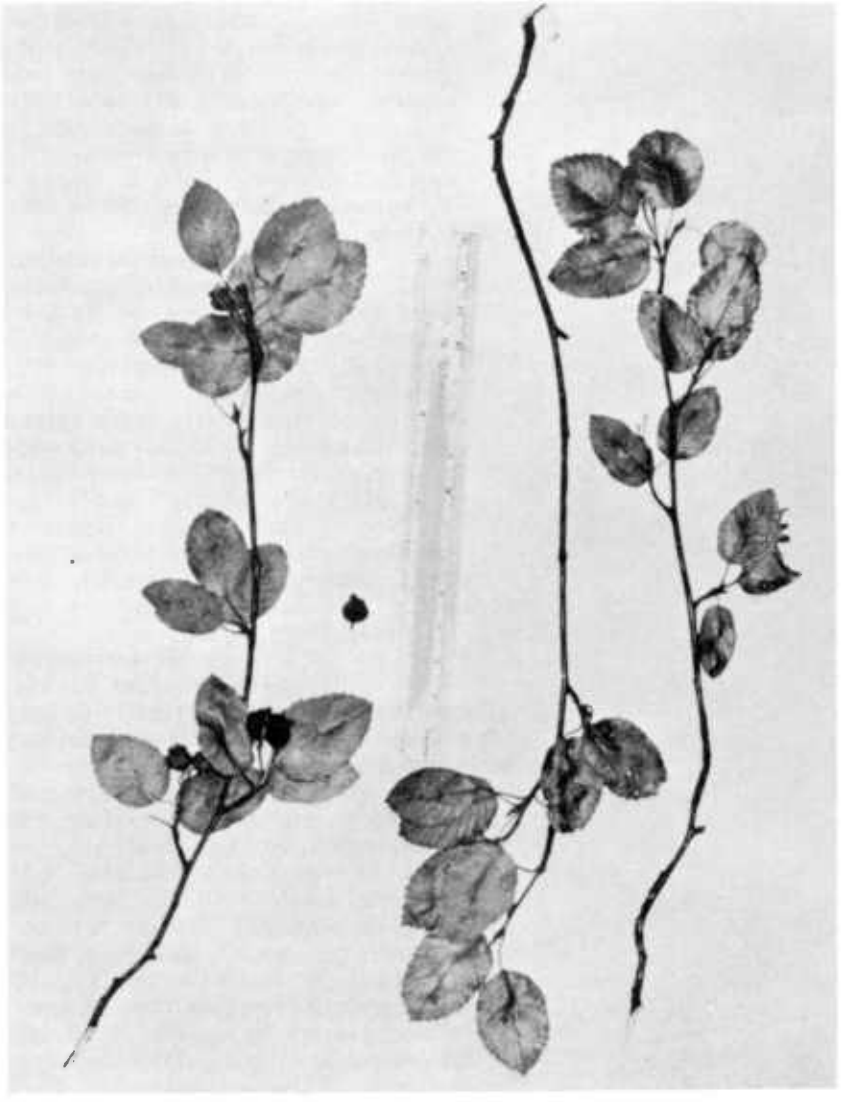
27. **Twigs, leaves hairless even when young;** new twigs pliable, slender, wandlike, shiny; **leaves pale green on both sides,** mostly oval, to 2 inches long, rounded or abruptly pointed at tip; **veins 7–10 pairs, upcurving, branching near the sharply saw-toothed margins;** teeth 3–15 on each side; flowers large (petals to 1 inch long), stalked, 3–8 in each cluster, blooming 10–15 days earlier than Saskatoon serviceberry with which it often grows; "berries" scarlet, ripening black, often hairless in depression around base of the 4 or 5 styles, **with lance-shaped calyx lobes to nearly ¼ inch long;** slender shrubs to 10 feet high; e. slopes of Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.; type locality, stony hillsides, Union Co., ne. Oreg.

Cusick serviceberry (*Amelanchier cusickii*).

27. **Twigs, leaves hairy when young, soon hairless; leaves pale or with whitish "bloom" on under side; veins 8–12 (or 13) pairs, often running out to teeth;** flowers 5–15 in each cluster; petals to ¾ inch long; "berries" purplish black, **tipped by triangular-lance-shaped calyx lobes to ⅛ inch long.**

28. **New twigs silky-hairy; leaves dark green on upper side,** firm to leathery, **mostly quadrangular or round in outline,** rarely wedge-shaped at base, usually ½ grown at flowering time; **teeth incurved, 2–20 on each side**

[12] Serviceberry species are variable and often hard to tell apart. The present treatment is based on that of Dr. George Neville Jones, *American Species of Amelanchier.* Ill. Biol. Monog. 202 (2): 126–206, illus. 1939.



Cusick serviceberry

F-486441

5 styles, ± united near base inside depression

Stamen-stalk fringe inside the 5 bent-back calyx lobes

Serviceberry fruit (berrylike pome)

F-404046

Cusick serviceberry leaves

flowers small (petals less than ½ inch long) blooming 10–15 days later than Cusick serviceberry with which it often grows; "berries" often reversely pear-shaped, woolly-hairy at style bases; tall shrubs or small trees, sometimes low and twiggy from browse injury or exposed site conditions; e. slopes of Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

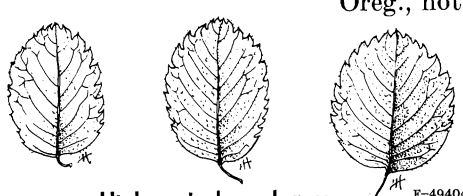
Saskatoon serviceberry (***Amelanchier alnifolia***).

28. **New twigs and leaves woolly-hairy; leaves bright green on upper side,** thin, often fully grown at flowering time, rounded, somewhat square-cut or slightly pointed at tip; **teeth spreading, triangular, 5–20 on each side;** veins slightly upcurving; flower petals to ⅝ inch long; "berries" woolly-hairy at base of the 5 styles (united to middle or above); tall shrubs or small trees; mostly w. of Cascades, occasional in Columbia Gorge area e. of Cascades, Oreg., Wash.

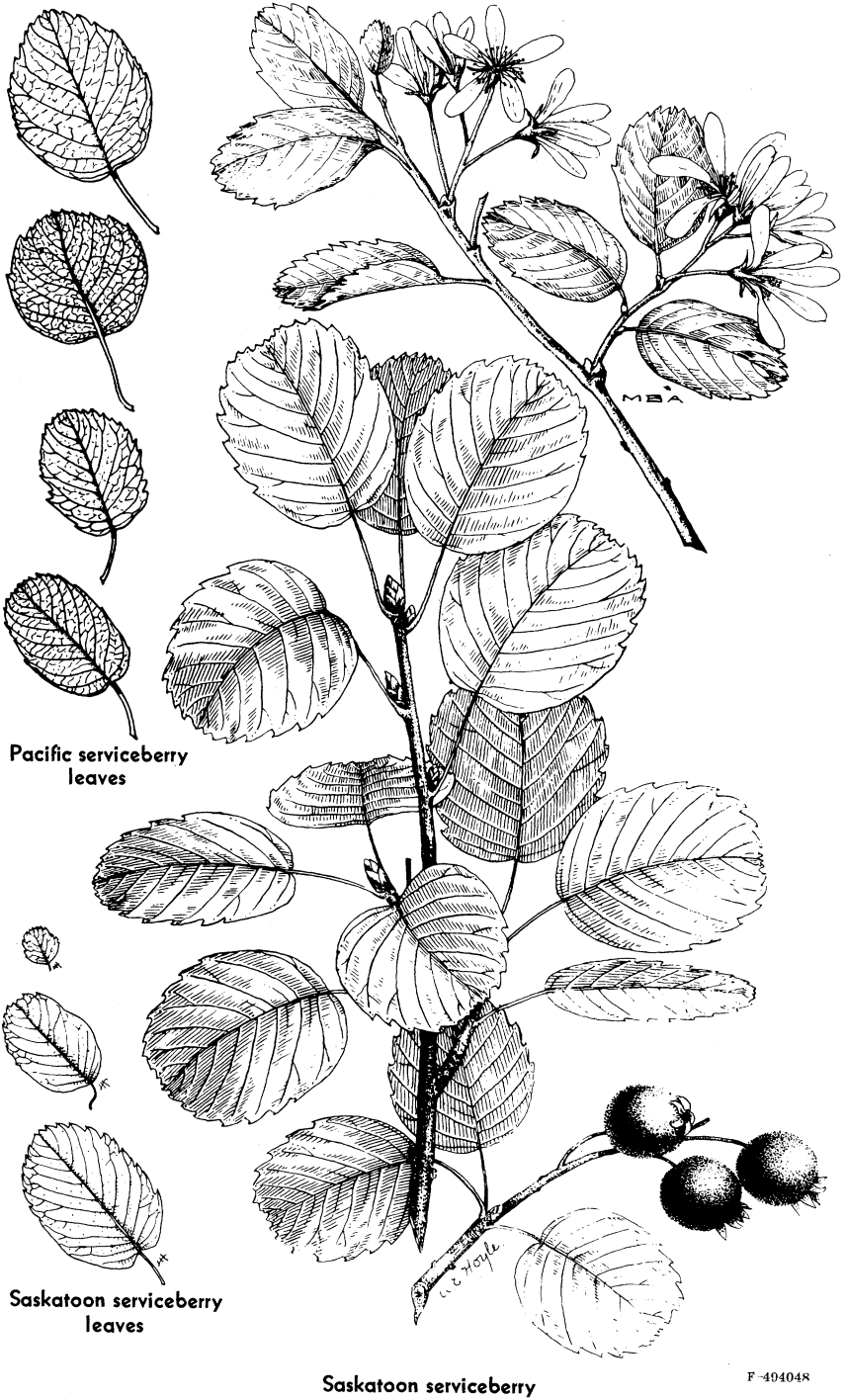
Pacific serviceberry (***Amelanchier florida***).

26. **Mature leaves finely woolly-hairy or grayish with soft curly hairs, somewhat leathery, to 1½ inches long,** varying from roundish to egg- (or reversely egg-) shaped, square-cut, shallowly notched, rounded or with short spiny-pointed tip, and rounded, square-cut or wedge-shaped at base; **veins 11–13 pairs;** teeth 3–10 on each side, spreading or scalloped; flowers 3–6 in a cluster, with petals to ⅜ inch long, sometimes reddish in bud; "berries" bluish-black (sometimes brownish, dry, leathery), finely woolly-hairy in depression at base of the 2–4 (or 5) styles; calyx lobes sometimes erect, linear-lance-shaped, finely woolly-hairy on both sides; shrubs usually bushy, much-branched, with rigid, ashy-gray twigs; Lake to Malheur Cos., se. Oreg., not reported from Wash.

Utah serviceberry (***Amelanchier utahensis***).

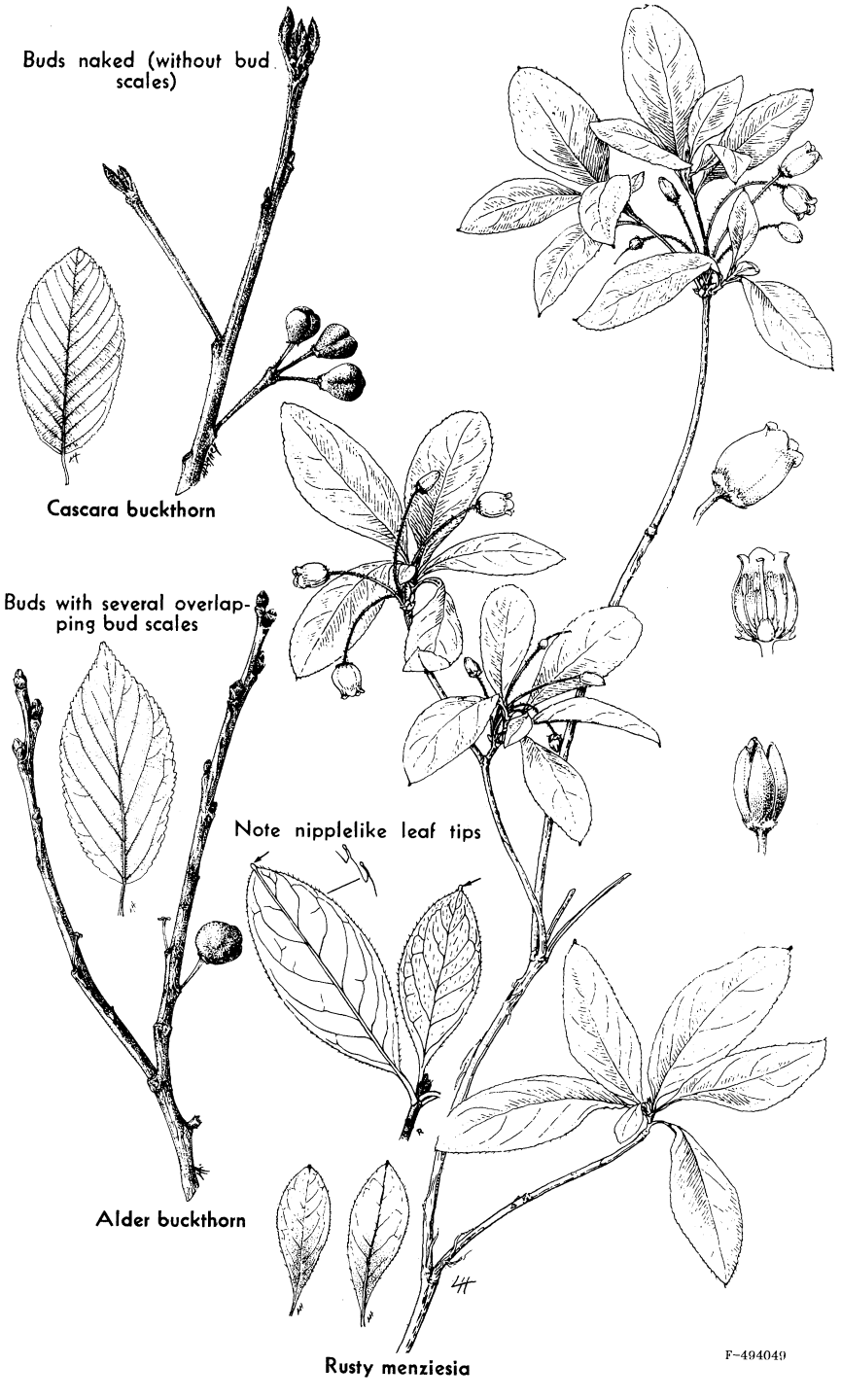


Utah serviceberry leaves F–494047


Pacific serviceberry leaves
Saskatoon serviceberry leaves
Saskatoon serviceberry
F-494048

471114 O–60–5

20. **Leaf margins entire or very finely toothed.**
[Alternate 20, p. 56.]
29. **Side veins distinct, nearly parallel** (upcurving near margins); teeth gland-tipped; true end buds lacking, stem tips dying back to topmost side buds; ripe "berries" (drupes) black, cathartic-emetic, stalked, borne singly or in umbrella-shaped clusters in leaf axils; "seeds" (nutlets) usually 3.
buckthorns (***Rhamnus*** spp.).
30. **Leaf margins almost entire** (wavy or distantly fine-toothed); **leaves clustered near twig tips,** elliptic to oblong or reversely egg-shaped, to 6 (or 8) inches long, 3 inches wide; **side veins 9–16 pairs; buds naked** (without bud scales), resembling tiny, brown-hairy, clustered leaves; "berries" purplish-black, in stalked clusters; "seeds" smooth, on outer side; bark (the cascara sagrada of the drug trade) smooth, gray, stripped for medicinal use; tall shrubs or small trees, stump-sprouting after cutting; moist sites, mostly w. of Cascades but also in e. Oreg., e. Wash. at lower elevations (3,000 feet); type locality along Clearwater River near Kamiah, Nez Perce Co., Idaho.
cascara buckthorn (***Rhamnus purshiana***).
30. **Leaf margins with rounded teeth;** gland tips appressed, apparently lying between teeth; **leaves scattered along twigs,** elliptic to oval, often taper-pointed at tip, to 4 inches long and nearly 2 inches wide; **side veins 6–10 pairs; buds with several overlapping bud scales;** "berries" black, single or 2- to 3-clustered in leaf axils; "seeds" notched at tip, ridged down from top on outer sides; spreading shrubs to 6 (or 10) feet high; wet sites at higher elevations (to 7,000 feet or more), e. Oreg., e. Wash.
alder buckthorn (***Rhamnus alnifolia***).
29. **Side veins indistinct, not parallel,** leaves sometimes net-veiny; leaf margin veins (or teeth; if present) ending in gland-tipped hairs; leaf scars with only 1 bundle trace.
31. **Bud scales several, overlapping;** flower-and-leafy-shoot buds separate, opening about same time, on last year's twigs.
32. **End buds present; leaves clustered near twig tips,** to more than 1 inch long; seed pods (capsules) splitting down along partitions into 4 or 5 parts, cupped in calyx lobes; erect shrubs usually 2–6 feet high, poisonous, cause sheep losses; moist sites,


Buds naked (without bud scales)
Cascara buckthorn
Buds with several overlapping bud scales
Note nipplelike leaf tips
Alder buckthorn
Rusty menziesia
F-494049

F-494050

Westernbog blueberry

Cascades azalea

higher elevations, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

rusty menziesia, Cascades azalea.

33. **Flowers from end buds,** in umbrella-shaped clusters, greenish red or purple, urn-shaped; **leafy shoots from top side buds,** appearing whorled; leaves dull bluish green; **midrib tips nipple-shaped, whitish, cartilaginous, protruding;** herbage sticky, with rank odor; hairs whitish often chaffy), appressed, gland-tipped, on twigs, upper leaf-surfaces, under side of midribs, on leaf- and flower stalks, and fringing calyx lobes; tiny rusty scales sometimes on young parts; bark brownish, soon shredding; seed pods 4-parted.

rusty menziesia (*Menziesia ferruginea*); probably not specifically distinct from **smooth menziesia (*M. glabella*).**

33. **Flowers from side buds,** single or 2- to 3-clustered, creamy white, open bell-shaped; **leafy shoots from end buds;** leaves shiny, bright green; **midrib tip not protruding;** herbage not sticky, often fragrant; hairs reddish, appressed, not gland-tipped, on twigs, upper leaf-surfaces, under sides of midribs, leaf- and flower stalks and calyx lobes; bark usually smooth, gray-brown; seed pods (capsules) 5-parted.

Cascades azalea, or **false-azalea (*Rhododendron albiflorum*).**

32. **End buds lacking** (stem tip dying back to tiny stub at base of bud in axil of top leaf); **leaves scattered along twigs,** ¾ inch long, pale green, reversely lance- or egg-shaped, wedge-shaped at base, nearly erect; leaf margin slightly rolled under; flowers 1, 2, or 3, from buds near tip of last year's twigs; twigs round in cross section, rigid, ascending; berries blue, tipped by 4 (or 5) calyx lobes; whitish "bloom" often on under leaf-surfaces, twigs, berries; shrubs to 3 feet high, bogs or marshes, higher elevations, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

westernbog blueberry (*Vaccinium occidentale*).

31. **Bud scales only 2, meeting at edges, not overlapping; true end buds lacking,** stem tips dying back to tiny stub at base of topmost side bud in leaf (or leaf-scar) axil; flower and

leaf buds not separate; flowers single, from axil of first (or also of second) leaf (or leaflike bract) on new shoots, white or pink, urn- or globe-shaped; berries red, blue or black, tipped by calyx lobes.

whortleberries, bilberries,[13] **blueberries,** and/or **"huckleberries"** (***Vaccinium*** spp.).

F-494051

Grouse whortleberry

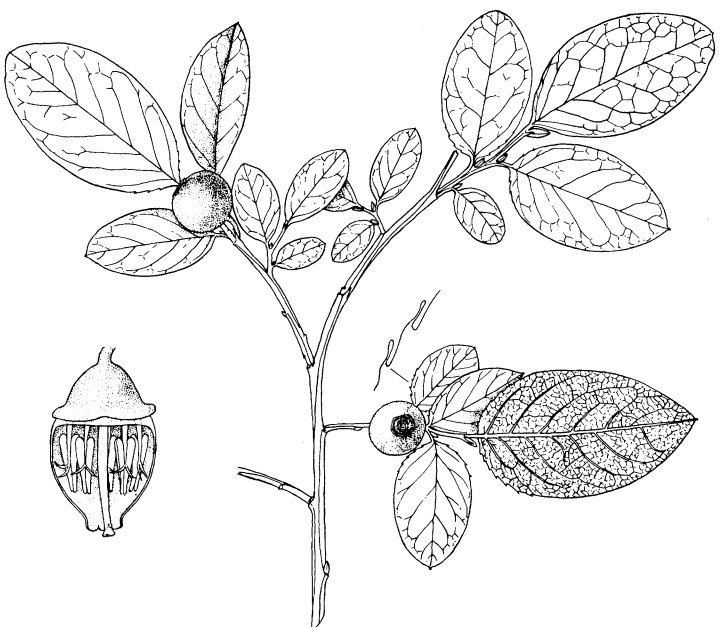
F-77291

[13] Dr. W. H. Camp who has made many special studies of blueberries and their relatives, uses "bilberries" as the common name for this group of species. See *A Survey of the American Species of Vaccinium, Subgenus Euvaccinium.* Brittonia 4: 205–247. 1942.

The name "huckleberry" is often misapplied to species of *Vaccinium*; it should be restricted to *Gaylussacia.*

The use by the Forest Service and the U. S. Department of Agriculture of "whortleberry" for red- and black-fruited *Vaccinium* spp. stems from usage by the late Dr. Frederick V. Coville in Standardized Plant Names and Department publications. Dr. Coville long was the foremost American student of this genus and the pioneer in introducing these plants in horticultural improvement and cultivation for their fruits. "Whortleberry" is the common Old World English name for the black-fruited *V. myrtillis*, to which our *V. membranaceum* and *V. ovalifolium* are botanically closely related.

34. **Twigs grooved and/or angled).**
    35. **Shrubs low** (to 15 inches high), much-branched, broomy; leaves to ½ inch long, oval or egg-shaped often pointed at both ends; margins finely saw-toothed; twigs very slender, bright green, deeply grooved, sharply angled, hairless; berries red; often in carpetlike patches under lodgepole pine; Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
    grouse whortleberry (*Vaccinium scoparium*)
    35. **Shrubs tall** (usually 2–6 feet high).
        36. **Leaf margins entire or faintly toothed near base;** leaves to 2 inches long, elliptic or almost round in outline, rarely oval, hairless, glandless, dull green on upper surface, often with whitish "bloom" on under surface; flowers pink, blooming before leaves unfold; berries blue, with whitish "bloom", large, tart, used in jellies; twigs spreading, rather deeply grooved at first, greenish on angles, reddish in grooves, soon almost round; straggling shrubs to 12 feet high in good sites, sometimes low and broomy after browse injury due to repeated sprout-



Ovalleaf whortleberry

F-494052

ing from dormant basal buds; common e. slopes of Cascades, Wash., n. Oreg., but scattered or rare in s. Oreg.

ovalleaf whortleberry (*Vaccinium ovalifolium*).

36. **Leaf margins finely, sharply saw-toothed; teeth ending in gland-tipped hairs;** leaves to 3 inches long, egg-shaped, with tapering or pointed tips, bright shiny green above, paler underneath, often with whitish, slightly curved hairs and some glands on both surfaces as well as on twigs; flowers pinkish, blooming with or after unfolding of leaves; twigs shallowly grooved, slightly angled, often bright red in sunny spots; berries wine-colored to purplish black, favorites for "huckleberry" pie; Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

big whortleberry (*Vaccinium membranaceum*).[14]

34. **Twigs round or faintly angled;** leaves broader above middle; wedge-shaped at base, net-veined, to 1½ inches long; flowers white or pinkish; calyx scarcely lobed; berries on recurved stalks, deep blue with whitish "bloom", sweet; much-branched or tufted shrubs usually less than 1 foot high. often growing in patches and connected by underground stems.

blueberries (*Vaccinium* spp.).

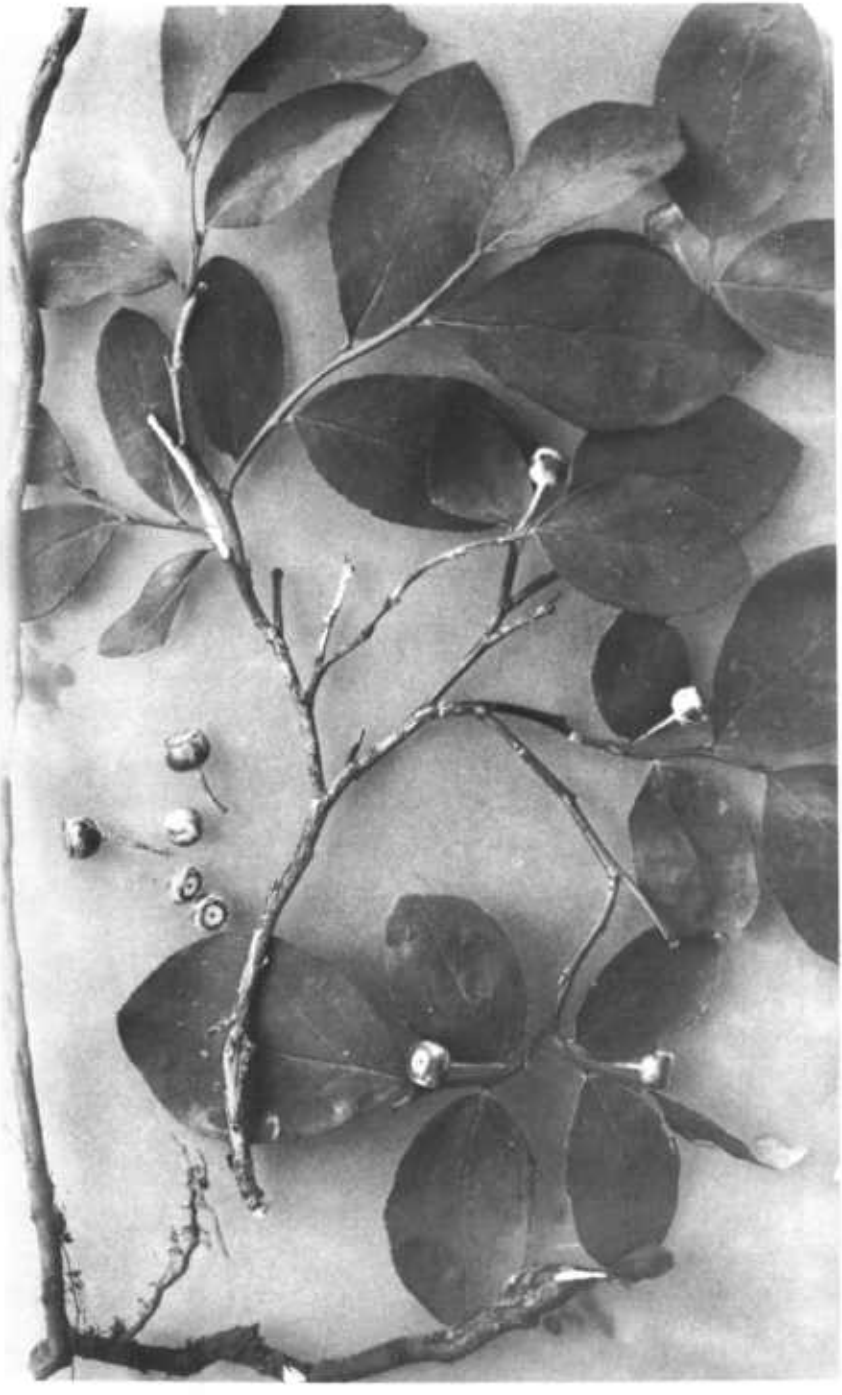
37. **Leaves thick, pale dull green above,** with whitish "bloom" underneath, usually rather broad and rounded at tip, hairless and glandless; margins finely, often distantly toothed at least above the middle; twigs rather coarse, usually with a whitish "bloom"; flowers globe-shaped; berries eaten raw and prized for pies; much-branched shrubs of subalpine or alpine meadows, common from 4500–6500 feet, Cascades of Wash. and n. Oreg., less common s. of the Three Sisters; type locality Mt. Rainier.

delicious blueberry (*Vaccinium deliciosum*).

[14] In the Blue Mts. area of northeastern Oregon and southeastern Washington, big whortleberry shrubs tend to be less coarse and not so tall as those of the Cascades; also, their leaves are paler on the under surface, relatively broader, shorter, more rounded at tip, and they have smaller marginal teeth. Their flowers tend toward globe-shaped, their berries are more flat-topped, average smaller in size and are less juicy. These big whortleberries of the Blue Mt. area are referred to the *Vaccinium globulare* complex by some botanists. See W. H. Camp, *A Survey of the American Species of Vaccinium, Subgenus Euvaccinium.* Brittonia 4: 205–247. 1942.

F-494053 F-304231

Big whortleberry

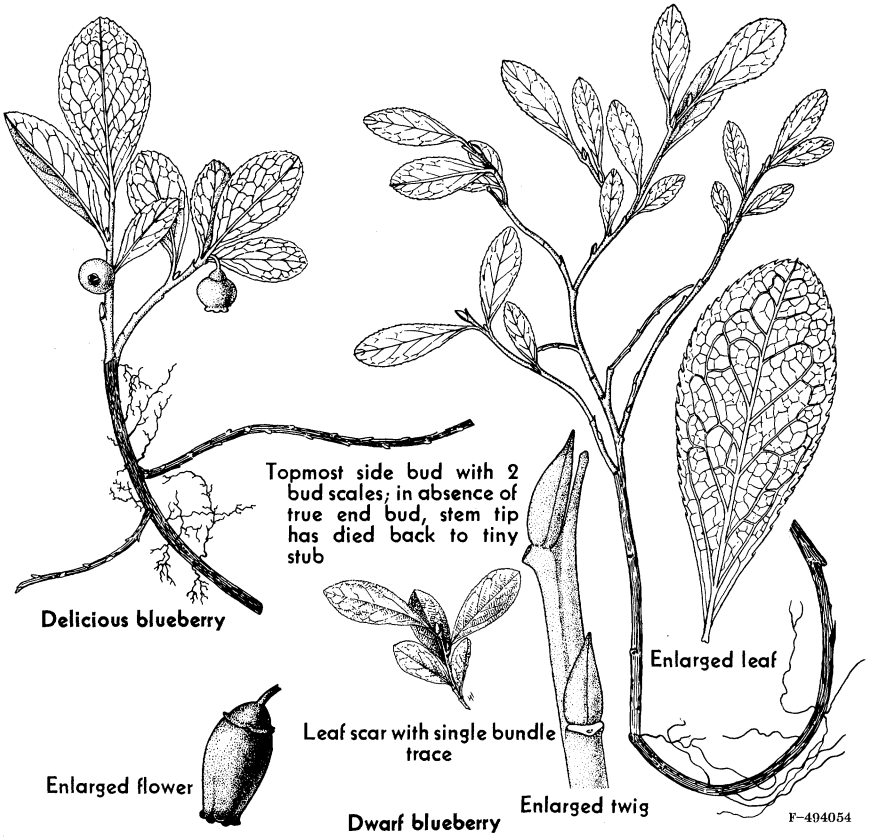


Globeflower whortleberry

F-84576

37. **Leaves thin, bright green and often glossy on upper surface,** paler green underneath, usually rather narrow, pointed or rounded at tip; often hairy and glandular on both surfaces; margins finely but sharply saw-toothed; twigs slender, shiny brown or hoary with tiny, whitish, curved hairs, rarely with whitish waxy "bloom"; flowers ellipsoid; low tufted shrub of higher altitudes, often on old lodgepole pine burns, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

dwarf blueberry
(***Vaccinium cespitosum***).[15]



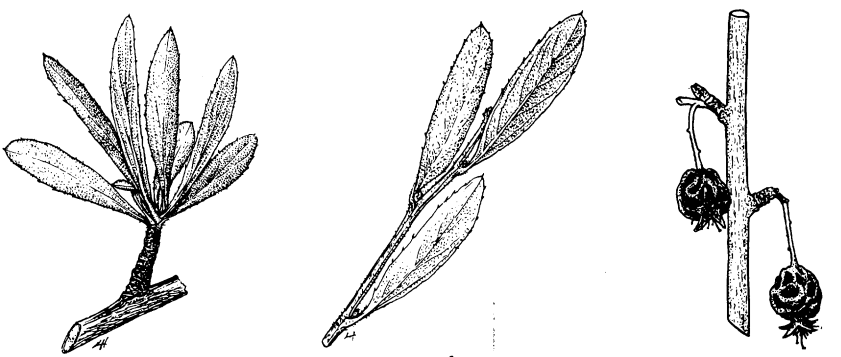
[15] At lower altitudes in mountain areas in both eastern Oregon and eastern Washington, there are erect, taller, and coarser shrubs with redder twigs and larger leaves than those of dwarf blueberry; these are referred by some botanists to taller dwarf blueberry (*Vaccinium cespitosum* var. *arbuscula*); other botanists regard these coarse shrubs as possibly polyploid and as a separate species (*Vaccinium arbuscula*).

14. **Leaves narrow, mostly more than 4 times longer than wide,** threadlike to linear or narrowly elliptic to lance- (or reversely lance-) shaped; leaf margins entire or nearly so; half-shrubs or low to tall shrubs of dry or sometimes alkaline sites. [Alternate 14, p. 52.]

38. **Twigs (at least some) spurlike, to 1 inch long, pitted by leaf scars,** tipped by clustered leaves (often also by 1 to 3 or 4, stalked, white to pinkish flowers appearing with the leaves); leaves nearly stalkless, to 2 inches long, narrowly and reversely lance-shaped, softly and finely whitish-hairy (at least when young), borne singly on fast-growing shoots; leaf margins entire or finely and rather distantly toothed (each tooth at first gland-tipped); "berries" (pomes) tipped by 5 calyx lobes, yellowish to reddish brown, often drying persistent on drooping stalks; rigidly much-branched shrubs with smooth gray bark, to 6 feet high; often with western juniper or ponderosa pine, e. Oreg.; not reported from Wash.; type locality, ". . . dry hillsides near the Blue Mtns. of the Oregon". . . **squawapple (*Peraphyllum ramosissimum*).**

38. **Twigs not spurlike as above; flower heads with distinctive cups** (involucres), arranged in elongated or roundish- to flattish-topped, often branched end clusters; fruits (achenes) seedlike.
eriogonums, horsebrushes, rabbitbrush goldenweed, rabbitbrushes.

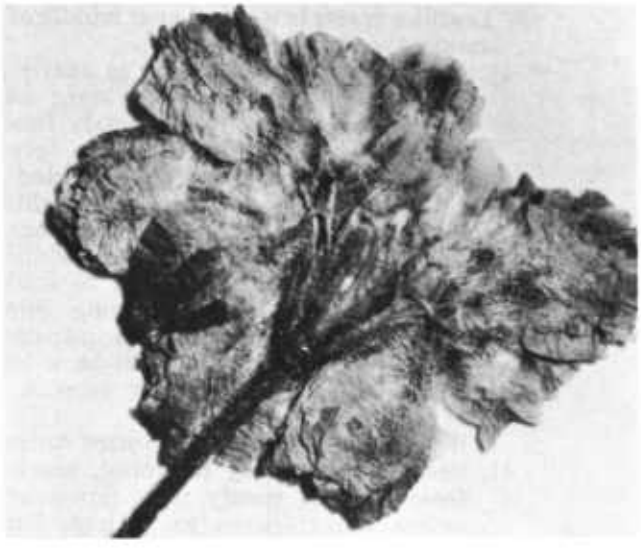
39. **Leaves densely woolly-hairy on under surface, much less hairy to nearly hairless on upper surface,** often whorled or clustered at branch tips or joints (nodes); roots and stem bases woody and with dark brown, shreddy bark; stem bases often clustered (caespitose) and much-branched; each flower jointed to its stalk, several to many clustered in a lobed or toothed cup (involucre) to form a flower head; flower heads mostly stalked, in branched clusters at tips of annual flowering twigs; "seeds" (achenes) elongate, 3-angled.
eriogonums (*Eriogonum* spp.).



Squawapple F-494055

40. **Leaflike bracts in a whorl near middle of flowering stems;** "seeds" hairy near tips.
    41. **Stem bases loosely tufted to nearly prostrate;** flower stems to 16 inches high; leaves to 2 inches long, linear to reversely lance-shaped, yellowish-hairy on under side, clustered at branch tips; **leaflike bracts whorled at tips of flowering stems and also at branching of rays** when flower-head clusters are compound; flowers dull yellow to whitish, drying reddish, hairless or nearly so, each narrowed to stalklike base (flower stalks thus appearing jointed near middle); flower-head cup top-shaped, hairy, with 5–8 spreading or bent-back lobes; half-shrubs of dry, often rocky sites, e. Oreg., e. Wash.
    Wyeth eriogonum (*Eriogonum heracleoides*).
    41. **Stem bases closely clustered, much-branched from a stout woody root;** flower stems to 6 inches high; leaves to ½ inch long, linear, almost leathery, clustered at branch tips; **leaf edges tightly rolled under;** flowers densely white-woolly-hairy on outside, each narrowed to very short, stalklike base, cream-, aging rose-colored, in dense, ball-shaped clusters (each cluster in hairy, top-shaped cup with erect or slightly spreading lobes); rocky sites, ne. Oreg., e. Wash.; type locality, along Spokane River, Wash.
    thyme eriogonum (*Eriogonum thymoides*).
40. **Leaflike bracts lacking; bush-branching, scattered-leafy shrubs** to 1 foot high; leaves to 1 inch long, reversely lance-shaped to almost linear, short-stalked; **leaf edges often rolled under;** flowers hairless outside, white, yellow, or rose-tinted, not narrowed to stalklike bases; flower-head cups hairy to almost hairless, single on each ray of the 3- to 6-times branched, flattish- to roundish-topped flower-head clusters (compound corymbose cymes); dry, rocky hillsides, e. Oreg., e. Wash.; type locality, ". . . on the sides of hills, in Oregon, east of Walla-Walla."
    slenderbush eriogonum (*Eriogonum microthecus*).

39. **Leaves equally hairy (or hairless) on both sides;** flower heads with bracted cups (involucres); flowers yellow; "seeds" (achenes) usually hairy, crowned by long, whitish to yellowish, slightly roughened or very finely barbed, hairlike bristles (pappus).
    42. **Flower-head bracts 4, whitish-woolly-hairy, erect, in a single row;** disk flowers 4, all alike; ray flowers lacking; blooming from May to Sept.; flower-head clusters flattish-topped; much-branched, strong-scented shrubs 2–4 feet high,



F-486434

Thyme eriogonum (flower head, enlarged)

F-486435

Thyme eriogonum (flower-head cup, involucre, enlarged)

Enlarged involucre with one flower; flower stalks

Rays

Leaflike bracts in whorl near middle of flower stem

Wyeth eriogonum

F-494056

Thyme eriogonum (enlarged)

F-486433

Leaf edges rolled under

Involucre, flowers, enlarged

Slenderbush eriogonum

poisonous to sheep especially in spring just before flowering and when browsed together with sagebrush_____**horsebrushes** (***Tetradymia*** spp.).

43. **Twigs with interconnected lines or ridges of persistent white-woolly hairs;** leaves to ½ inch long, soon greening, losing much of their hairiness, of 2 kinds: (a) almost needlelike, nearly erect, soon-shed primary leaves, (b) broader, somewhat fleshy, blunt-tipped, soon-spreading,

F-494057

Gray horsebrush

Littleleaf horsebrush

clustered secondary leaves; branches slender, wide-spreading; bark gray, shreddy; dry, open sites, often with sagebrush, central and se. Oreg., not reported from Wash.

littleleaf horsebrush (***Tetradymia glabrata***).

43. **Twigs and leaves permanently grayish- to whitish-woolly-hairy;** leaves to 1½ inch long, linear to reversely lance-shaped, sometimes with shorter and broader leaves clustered in their axils; branches nearly erect; shrubs with rough, shreddy bark, not so poisonous as littleleaf horsebrush; dry scablands or sagebrush areas, e. Oreg., e. Wash.; type locality, along the Columbia River.

gray horsebrush (***Tetradymia canescens***).

42. **Flower-head bracts more than 4, overlapping, in several, often vertically ranked rows,** papery, leathery or leaflike, sometimes keeled; flowers 5–20 in each flower head; leaves sometimes spirally twisted, 1- and/or 3- to 5-veined from near base.

rabbitbrush goldenweed (***Aplopappus bloomeri***); varieties (or subspecies) of **Douglas rabbitbrush** (***Chrysothamnus viscidiflorus***), and of **rubber rabbitbrush** (***C. nauseosus***).

44. **Twigs brittle;** leaves to 2½ inches long, threadlike to linear or reversely lance-shaped, almost hairless to finely, often stiffly, short-hairy, at least along margins, sometimes resinous; flower-head bracts in indistinctly vertical ranks; low to medium-sized shrubs, usually not more than 3 feet high; dry or rocky hillsides at lower elevations.

rabbitbrush goldenweed; varieties (or subspecies) of **Douglas rabbitbrush.**

45. **Flower-head bracts leaflike or at least green-tipped,** with cobwebby hairs near edges and stiffer, spreading hairs on margins; flower heads short-stalked, bell-shaped, to ½ inch high, often surpassed by leaves, blooming May–Aug., in somewhat elongated end clusters (on well-developed plants); **ray flowers 1–5, strap-shaped;** disk flowers 4–12, tubular; "seeds" (achenes) 5-nerved; leaves 1-nerved, usually resinous, especially near flower heads.

rabbitbrush goldenweed (***Aplopappus bloomeri***).

45. **Flower-head bracts not leaflike or green-tipped as above,** firm-papery, mostly blunt-tipped, not keeled, usually 15; flower-head cups "(involucres)" narrow, tubular-bell-shaped, to ⅓ inch high; flower heads not

471114 O–60–6

surpassed by leaves, in flattish- to roundish-topped (cymose) end clusters, blooming July–Oct.; **ray flowers lacking;** disk flowers mostly 5; seed heads (at least some) persistent until flower buds of following season appear; "seeds" 5-angled, less than ¼ inch long, hairy; leaves 1-, 3-, and/or 5-nerved, often sticky-resinous and spirally twisted; twigs with white or pale green bark; mostly bushy shrubs branched from near base; taproots dividing near soil surface; characters variable, sometimes intergrading in the following varieties (or subspecies) of

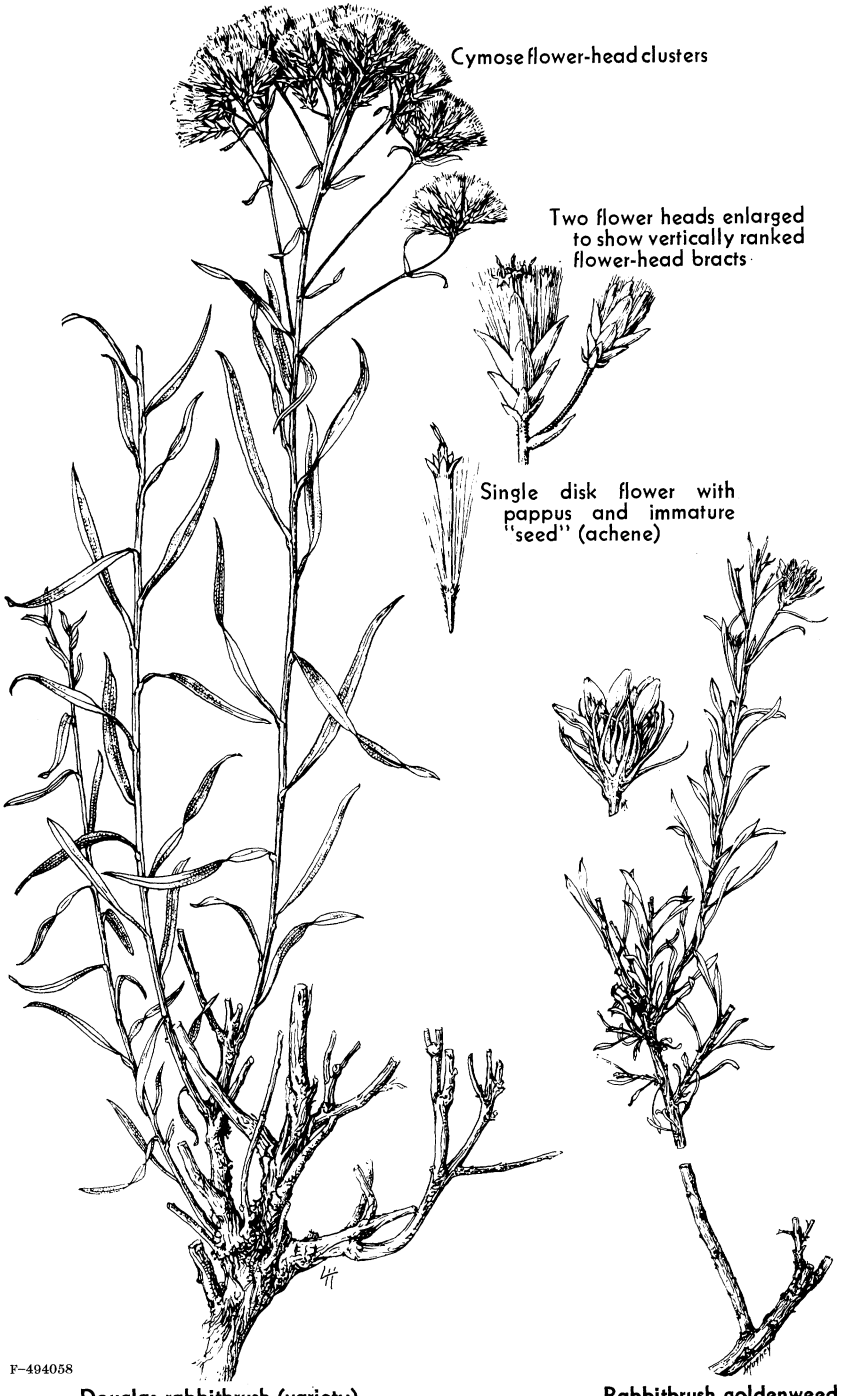
Douglas rabbitbrush (*Chrysothamnus viscidiflorus*).

46. **Twigs, leaves finely, more or less densely hairy,** especially near the usually small, compact flower-head clusters; low shrubs, rarely more than 2 feet high.
    47. **Leaves pale grayish-green, narrow,** to 1/12 inch wide.
        48. **Leaves to nearly 2 inches long and 1/25 inch wide,** mostly 1-nerved, often twisted; shrubs to 20 inches high; disturbed areas or on poor soils, with sagebrush; rather common, e. Oreg., e. Wash.

            downy rabbitbrush (*Chrysothamnus viscidiflorus puberulus*).
        48. **Leaves to 1 inch long, 1/12 inch wide,** sometimes 3-nerved and slightly twisted; to 1 foot high; dry plains, central, s. Oreg.; type locality, plains of Truckee River, Nevada Co., Calif.

            Truckee (or **low**) **rabbitbrush (*Chrysothamnus viscidiflorus humilis*).**
    47. **Leaves bright green, lance-shaped, to 2 inches long, ¼ inch wide,** mostly 3- and/or 5-nerved, seldom twisted, abruptly pointed at tips; stems stiffly erect, to more than 2 feet high, e. Oreg., e. Wash.

        lanceleaf rabbitbrush (*Chrysothamnus viscidiflorus lanceolatus*).
46. **Twigs, leaves mostly hairless except for fine, stiff marginal hairs,** often sticky-resinous.
    49. **Shrubs tall, to 4 feet or more high;** leaves bright or bluish green, to ⅛ inch wide, often 3-nerved, sometimes spirally twisted; flower-head clusters open, broad, often sticky-resinous; flower-head bracts



Douglas rabbitbrush (variety)

Rabbitbrush goldenweed

rounded at tips except for protruding midrib tip; commoner in e. Wash. than in e. Oreg.; type locality, barren plains, Columbia River; typical variety (or subspecies) of..... **Douglas rabbitbrush (*Chrysothamnus viscidiflorus*).**

49. **Shrubs low,** to 1½ feet tall; leaves threadlike to linear, to 2 inches long; flower-head clusters small.

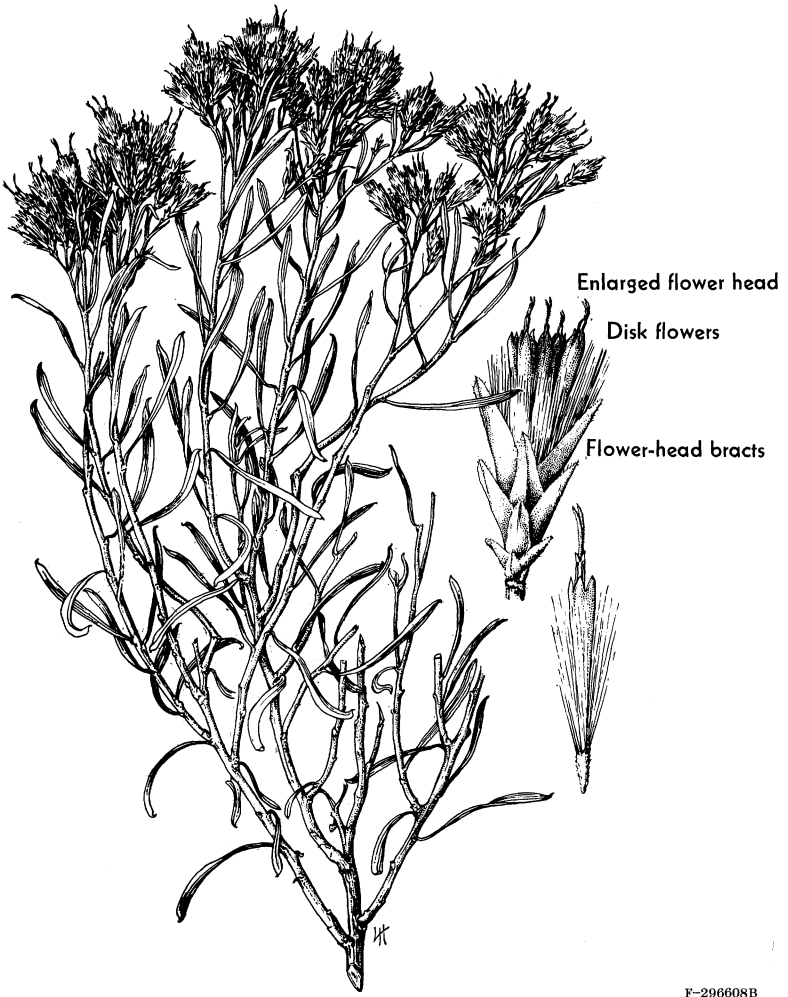
50. **Leaves pale green, threadlike,** to 1½ inches long, 1/25 inch wide, 1-nerved, often twisted; flower-head clusters compact; stony slopes, dry ridges, e. Oreg..... **small rabbitbrush (*Chrysothamnus viscidiflorus stenophyllus*).**

50. **Leaves bright green, linear,** to 2 inches long, 1/12 inch wide, often 3-nerved, plane, or sometimes twisted; flower-head clusters often lax; plains, foothills, e. Oreg., e. Wash. **low Douglas rabbitbrush (*Chrysothamnus viscidiflorus pumilus*).**

44. **Twigs flexible, loosely to tightly matted-woolly-hairy** (scraping often needed to detect hairiness); leaves threadlike to narrowly linear, to 3 inches long, 1/8 inch wide, mostly 1-nerved and plane, often grayish- or whitish-woolly-hairy; flower-head bracts keeled, 20–25, in 5 distinctly vertical ranks; flower heads in roundish-topped, sometimes elongate, compound end clusters; "seeds" hairy; low to (usually) tall shrubs, round-bushy, several-stemmed at base, with tap roots; variable, often with intergrading characters, poisonous to livestock under certain conditions, sometimes rubber-producing; varieties (or subspecies) often hard to tell apart. **rubber rabbitbrush (*Chrysothamnus nauseosus*).**

51. **Leaves threadlike** (1/25 inch wide), **somewhat resinous,** very numerous, often nearly hairless; **herbage with bad odor; twigs striate, pale yellowish green with close-matted, felt-like hairs; flower heads in elongate, cylindrical or pyramidal end clusters;** flower-head bracts often sticky, rarely hairy; to 5 feet high; alkaline valleys, plains, Lake, Harney, Malheur Cos., e. Oreg.; not reported from Wash..... **fetid rubber rabbitbrush (*Chrysothamnus nauseosus consimilis*).**

51. **Leaves linear** (to ⅛ inch wide), usually hairy; **herbage not odorous; twigs not, or indistinctly, striate, densely wooly-hairy;** flower heads in broad, round-topped end clusters; flower-head bracts (at least lower ones) hairy; shrubs to 6 feet high, often with big sagebrush, e. Oreg., e. Wash., especially in the Columbia River Basin area.
    52. **Twigs, leaves persistently, loosely white-woolly-hairy.**
    whitestem rubber rabbitbrush (*Chrysothamnus nauseosus albicaulis*).
    52. **Twigs, leaves closely greenish- or grayish-woolly-hairy._____tall rubber rabbitbrush (*Chrysothamnus nauseosus speciosus*).**



Rubber rabbitbrush

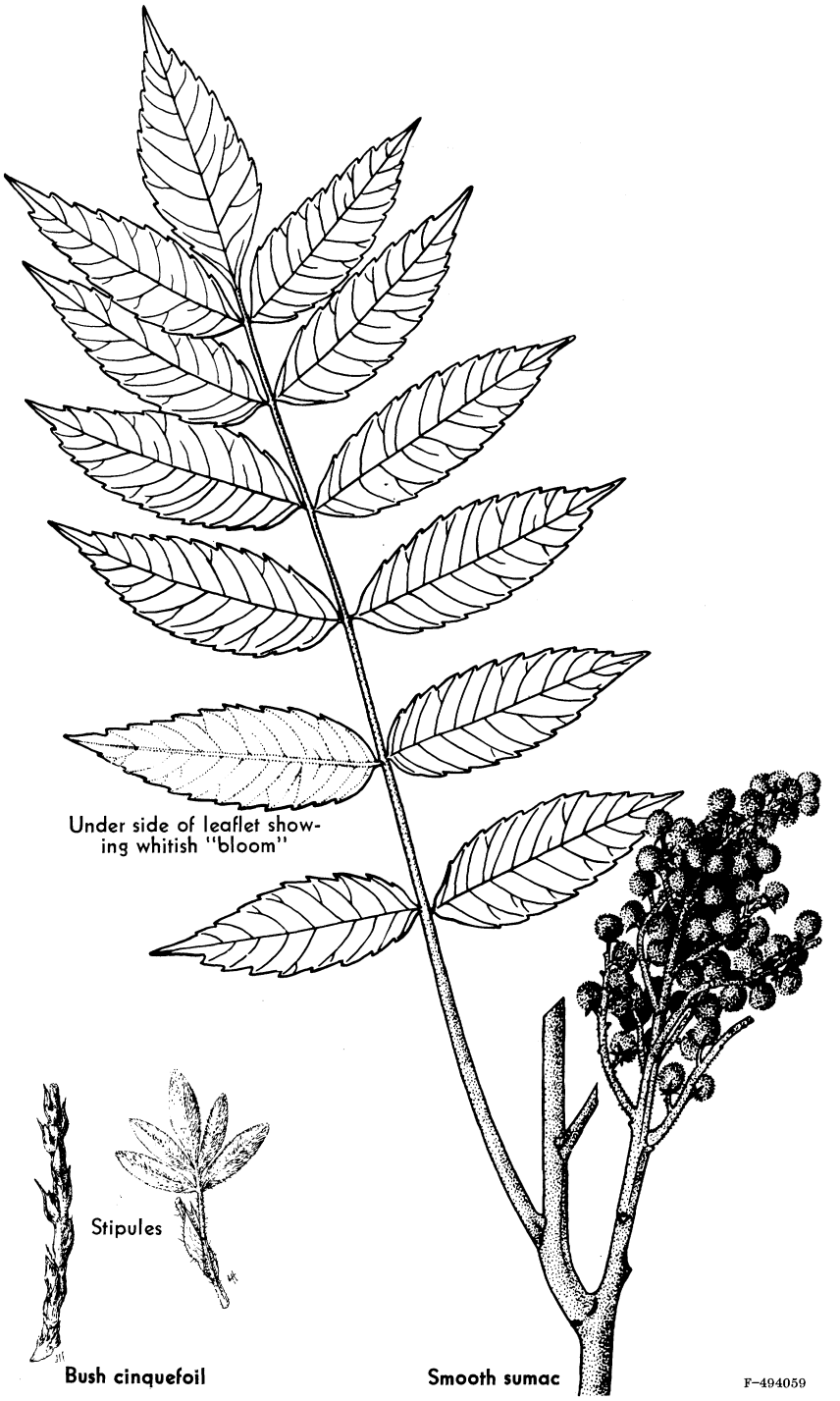
PLANTS DECIDUOUS • SPRING AND SUMMER

Leaves Alternate and Compound

1. **Plants unarmed.**
   2. **Leaves with 5 or more leaflets.**
      3. **Sap milky; leaflets 7–31,** coarsely toothed, whitened (glaucous) on under surface, often rich in tannin; twigs stout, large-pithy, somewhat 3-angled; flowers small, greenish; **"berries" (drupes) red, sticky-hairy,** massed in conspicuous, much-branched, pyramidal end clusters (panicles); shrubs usually not much over 6 feet high, rarely treelike, often in large patches connected underground by long-running root branches, **not poisonous;** along roadsides, in canyons, e. Oreg., e. Wash.---------- **smooth sumac (*Rhus glabra*).**
      3. **Sap not milky.**
         4. **Leaflets 5–7 (rarely 3), silky-hairy on both sides,** narrowly oblong or linear; margins entire, somewhat rolled under; **stipules conspicuous, grown to leafstalk base, persistent on twig after leaf falls,** flowers yellow; "seeds" (achenes) very hairy, small, many; **stems twisted; bark shreddy, brown; low, bushy shrubs;** moist mountain valleys or meadows, lower altitudes, e. Oreg., e. Wash.
            bush cinquefoil (*Potentilla fruticosa*).
         4. **Leaflets 7–17, with dotlike glands** (often also hairy) **at points of attachment to "midrib"** (rachis); margins toothed, at least toward leaflet tips; the fragrant white flowers and the orange to red or scarlet "berries" (pomes) in flat- or roundish-topped end clusters (compound corymb); **stems few-branched; bark smooth; shrubs tall, often growing in clumps;** moist mountain sites, e. Oreg., e. Wash.
            mountain-ashes (*Sorbus* spp.).
            5. **Leaflets 11 or more, lance- to oblong-lance-shaped, firm; upper surface glossy, wrinkled, net-veined;** margins finely, singly or doubly saw-toothed to near base; **stipules soon falling;** hairs (if any) white; buds shiny, sticky, brownish; bark reddish; **"berries" glossy, orange to scarlet, globe-shaped, in dense, flat-topped clusters;** seeds light brown, oblong; shrubs to 13 feet high; Cascades, the only native mountain-ash in Wallowa and Blue Mts., ne. Oreg., se. Wash.
               Greenes mountain-ash (*Sorbus scopulina*).[16] [17]
            5. **Leaflets 11 or less; stipules persistent; bark gray;** Cascades, Oreg., Wash.; not in Wallowa or Blue Mts.

[16] Natural hybrids between Saskatoon serviceberry (*Amelanchier alnifolia*) and Greenes mountain-ash found in the Wallowa Mts., near Cornucopia, Oreg., have been named ×*Amelasorbus jackii* by the late Dr. Alfred Rehder in honor of their discoverer and collector, J. G. Jack (Jour. Arnold Arb. 6: 154. 1925).

[17] Both Greenes mountain-ash and Cascades mountain-ash have been confused by some authors with Sitka mountain-ash (*S. sitchensis* Roem.) and/or with Siberian mountain-ash (*S. sambucifolia* Cham. & Schlecht.), neither of which occurs in Oreg. or Wash.

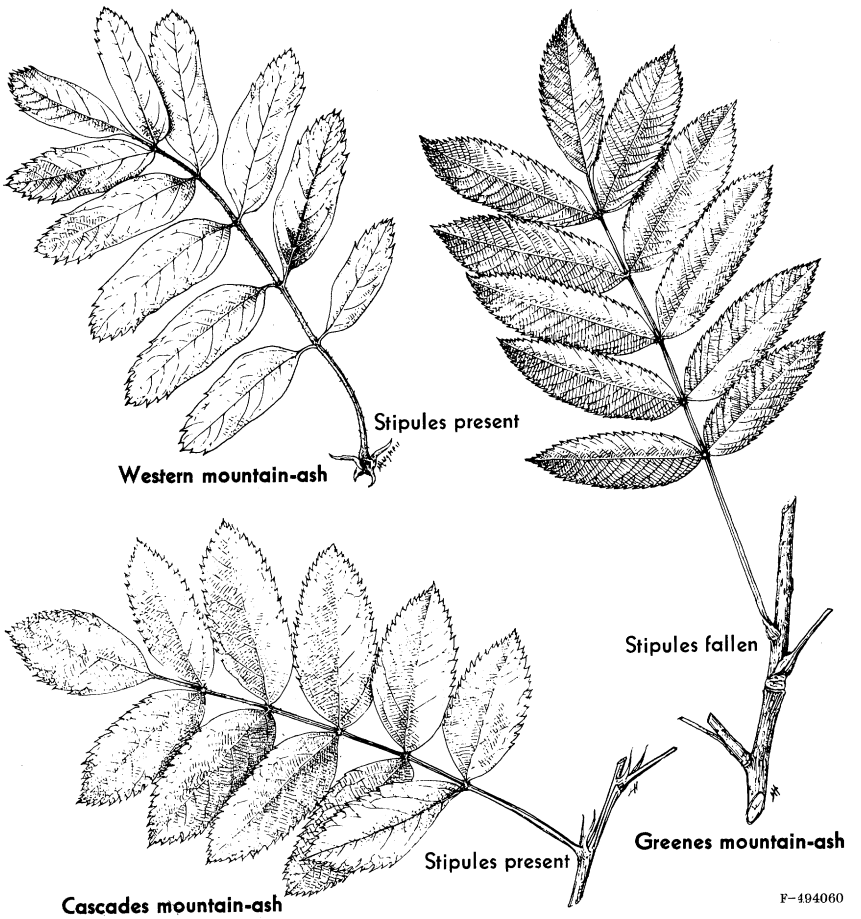

Under side of leaflet showing whitish "bloom"
Stipules
Bush cinquefoil
Smooth sumac
F-494059

6. **Leaflets 7–11, dull bluish green on upper surface, thin, oblong to oval, rounded or square-cut at tip; margins entire below middle, with incurved teeth near tip; leafstalks, twigs, buds finely reddish-hairy; "berries" ellipsoid, red, with a whitish waxy "bloom" (glaucous);** seeds chestnut-colored, flattened-egg-shaped, pointed at base; shrubs 3–10 feet high; elevations from 4,000 feet in n. Wash. to 7,500 feet in s. Oreg.; type locality, Cascades, 49° N. lat.

western mountain-ash (*Sorbus occidentalis*).

6. **Leaflets 9–11, glossy on upper surface, firm, oval, abruptly pointed at tip; margins coarsely saw-toothed to below middle; hairs mostly whitish;** buds shiny, sticky, greenish-brown; **"berries" globe-shaped, glossy, scarlet;** seeds dark brown, egg-shaped; shrubs to nearly 17 feet high; elevations from 3,000 feet in n. Wash. to 6,000 feet in s. Oreg.; type locality, Mt. Rainier, Wash.

Cascades mountain-ash (*Sorbus cascadensis*).[17]



2. **Leaves with 3 leaflets; "berries" (drupes) whitish or red, in erect or drooping clusters (panicles or panicled spikes).**
   7. **End leaflet stalked; leaflets glossy,** turning brilliant red in fall, usually egg-shaped; **"berries" whitish, shiny, ribbed or lined;** sap resinous or sometimes milky-whitish; leaf scars crescent-shaped, distinct, with 5 bundle traces; almost all plant parts poisonous to touch by susceptible persons although often browsed by livestock without any ill effect.
      poison-oak, poison-ivy (*Toxicodendron*).
      8. **Leaflets blunt or rounded at tip;** margins entire to bluntly toothed or lobed; **"berries" in loose, drooping clusters;** low to tall shrubs, or woody vines climbing by aerial rootlets; dry woods, along roadsides, mostly w. of Cascades but coming through Columbia River gorge to e. of The Dalles on both the Oreg. and Wash. sides of the river.
         Pacific poison-oak (*Toxicodendron diversilobum*).
      8. **Leaflets sharp- to taper-pointed at tip;** margins entire or coarsely and sharply toothed or lobed; **"berries" in dense, erect or ascending clusters;** low, erect or clambering shrubs connected by creeping underground stems, not climbing by aerial rootlets; sunny, rather moist sites, often common locally, e. Oreg., e. Wash.
         western poison-ivy (*Toxicodendron radicans* var. *rydbergii*).
   7. **End leaflet stalkless** (appearing stalked because of tapering, wedge-shaped base), **nearly as broad as long, shallowly to deeply lobed or 3-parted; leaflets dull,** reversely egg-shaped; **"berries" red, sticky-hairy, in dense, spikelike end clusters;** leaf scars and bundle traces indistinct; low, much-branched shrubs with disagreeable odor; **not poisonous;** often in dense stands in dry sites, se. Oreg., not reported from Wash.
      skunkbush (or **lemonade**) **sumac (*Rhus trilobata*).**

1. **Plants armed with prickles and/or bristles.**
   blackberry, raspberries, salmonberry (***Rubus*** spp.), and roses (***Rosa*** spp.).
   9. **Stipules attached to leafstalk only at base, flaring at tips, linear or narrowly lance-shaped.**
      blackberry, raspberries, and **salmonberry (*Rubus* spp.).**
      10. **Stems (canes) soft-woody, large-pithy, living 2 years,** leafing 1st year (new canes), flowering, fruiting, dying second year (old cane); new canes each year from perennial, woody underground parts and/or woody crown or from canes rooting at tips; leaves with 3 and/or 5 or 7 leaflets, or sometimes simple and lobed or parted; flowers white.
         trailing blackberry, raspberries.
         11. **Stems trailing, long-running, rooting at tip, unbranched except for short, erect flowering shoots on old canes;** prickles short, straight or hooked; **tack-shaped glands on flower stalks and sepals;** male flowers larger than female, often on separate plants; blackberries not hollow, not falling free when ripe; burns, cut-over lands, common w., occasional e. of Cascades, Oreg., Wash.; type locality Columbia River Valley.
            trailing blackberry (*Rubus macropetalus*).

11. **Stems erect or arching, much-branched; raspberries and salmonberries hollow, cap- or thimble-shaped, falling free when ripe.**
    12. **Leaflets hairy, at least on under surface.**
        13. **Leaflets sparsely to densely gray-hairy on under surface, usually long-tapered at tips; stems suckering or with runners but not rooting at tips;** new canes with slight, whitish "bloom" (glaucous); old cane bark flaking, peeling; bristles spreading; tack-shaped glands present; coarse prickles lacking; raspberries red or whitish, dry, crumbly when ripe; moist to rather dry sites, open woods, e. Oreg., e. Wash.

            American red raspberry (*Rubus strigosus*).[18]

        13. **Leaflets densely white-woolly on under surface; stems clustered, over-arching, rooting at tips; new canes with heavy white-waxy "bloom" (glaucous);** straight or hooked prickles on stems, leafstalks, midribs, flower stalks; tack-shaped glands lacking; raspberries grayish-downy, yellow to red or purplish black, firm, juicy; moist sites, open woods, e. Oreg., e. Wash.; type locality, Oregon.

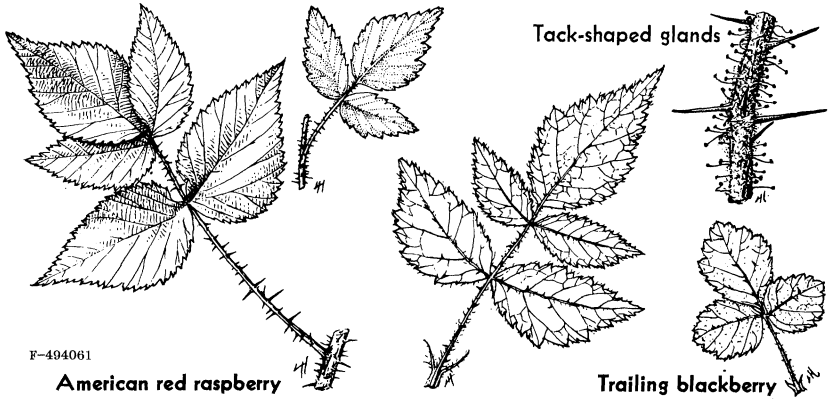
            whitebark raspberry (*Rubus leucodermis*).

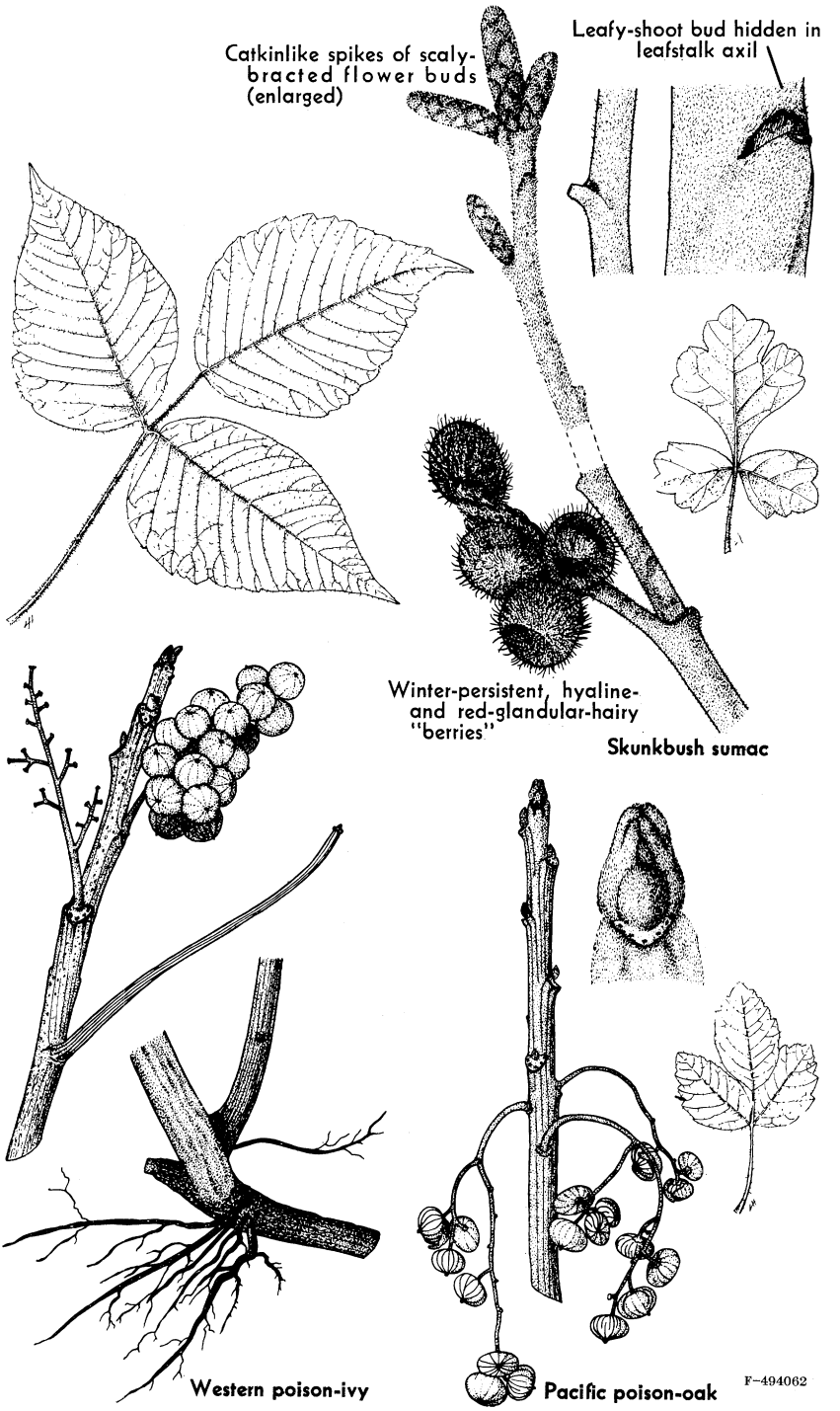
    12. **Leaflets hairless, green on both surfaces; stems with slight whitish "bloom" soon rubbed or washed off (pruinose) and then brown and shiny;** prickles broad-based, straight or hooked, on stems, leafstalks, midribs, flower stalks; fine, gland-tipped hairs often on sepals; raspberries black, without a whitish "bloom"; lower altitudes, creek banks, ledges, ne. Oreg., se. Wash.; type locality, Snake River Canyon at Wawawai and Almota, Whitman Co., Wash.

        northwestern blackcap raspberry (*Rubus nigerrimus*).

10. **Stems (canes) woody, small-pithy, perennial, branched, erect or somewhat arching, from spreading underground stems;** older bark loosely shredding; **prickles few and weak or lacking;** leaflets usually 3 and hairless on both surfaces, often

[18] This is not the cultivated red raspberry.




Catkinlike spikes of scaly-bracted flower buds (enlarged)
Leafy-shoot bud hidden in leafstalk axil
Winter-persistent, hyaline- and red-glandular-hairy "berries"
Skunkbush sumac
Western poison-ivy
Pacific poison-oak
F-494062

lobed; margins coarsely and doubly saw-toothed; flowers showy, reddish purple; salmonberries yellow to salmon-colored or bright red, soft and watery but sweet; moist woods along streams; common w., occasional e. slopes of Cascades, Oreg., Wash.; type locality, banks of the Columbia River.
salmonberry (*Rubus spectabilis*).

9. **Stipules attached for most of their length along leafstalk base (sometimes for more than half of leafstalk length), narrow but conspicuous;** berrylike fruits (hips) single or clustered.
roses (*Rosa* spp.).

14. **Leaflets 5–9, shiny green on upper surface, broadly oval, thin; margins doubly saw-toothed; teeth gland-tipped; stems usually green, armed with intermixed bristles and straight, slender prickles; tack-shaped glands on leafstalks, stipule margins, leaf "midribs" (rachises), and flower stalks;** flowers usually solitary, small, early blooming; **fruits (hips) soon losing their crown of calyx lobes** (as indicated by common name of "baldhip" rose), ellipsoid or globe-shaped, to ¼ inch across; "seeds" (achenes) few (1–7), large, hairless; small, **shade-tolerant shrubs;** woods, e. Oreg., e. Wash.; type locality, shady woods, Oreg.
baldhip rose (*Rosa gymnocarpa*).

14. **Leaflets 5–7, dull green on upper surface; margins singly saw-toothed; teeth not gland-tipped; stems often brown or red where exposed to sun, usually armed with straight, slender, paired prickles; tack-shaped glands lacking; stipule** margins with gland-tipped teeth; **fruits with persistent crown of calyx lobes;** "seeds" many (more than 7), small, hairy; **not shade tolerant;** in moist sites along streams, on hillsides, in open thickets or openings in woods, e. Oreg., e. Wash.
interior rose and **Spalding rose.**

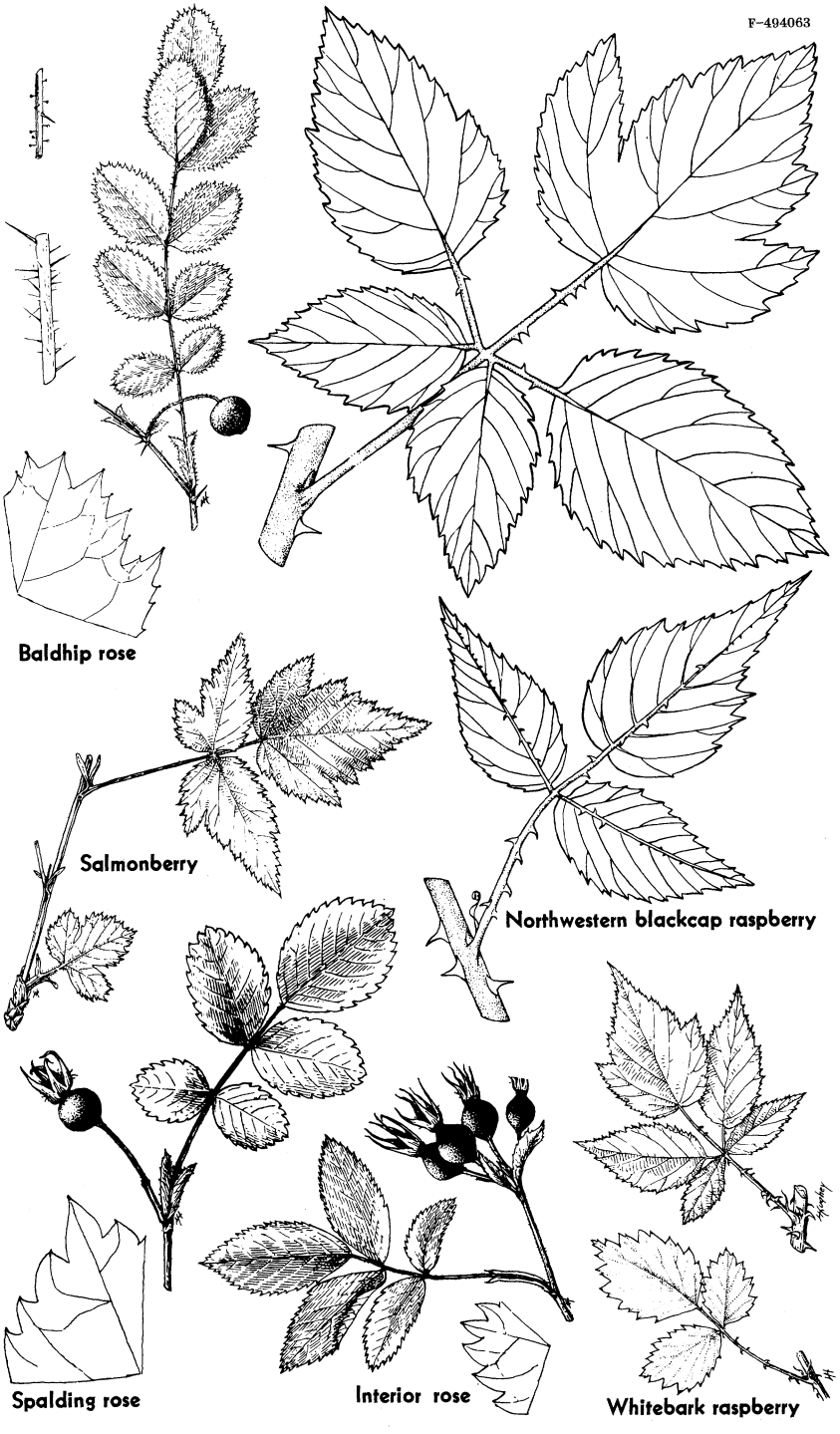
15. **Leaflets narrowly oval or reverse-egg-shaped, wedge-shaped at base,** firm; **flowers small, rose-colored,** later blooming, **clustered, each cluster with a basal leaf- or stipule-like bract;** calyx lobes smooth or finely hairy on back; **fruits ¼ to ⅝ inch across, clustered;** leafy shoots sometimes arching a little and overtopping flowering or fruiting branches; bark with a whitish "bloom"; shrubs to 9 or 10 feet high, often in clumps.
interior rose (*Rosa ultramontana*).[19]

15. **Leaflets broadly oval, rounded at base,** thin; **flowers large, pink,** earlier blooming, **usually solitary** on slender, hairless, somewhat prickly flowering branches; **fruits** globe-shaped, **⅜–1 inch across;** branches usually not arching; bark without any whitish "bloom"; bushy shrubs about 3 feet high_____**Spalding rose (*Rosa spaldingii*).**[20]

---

[19] Interior rose is sometimes confused with the peafruit rose (*Rosa pisocarpa*) from west of the Cascades where it grows in low, moist sites (often near the ocean) in Oregon and Washington. The type locality of peafruit rose is Multnomah Co., Oreg.

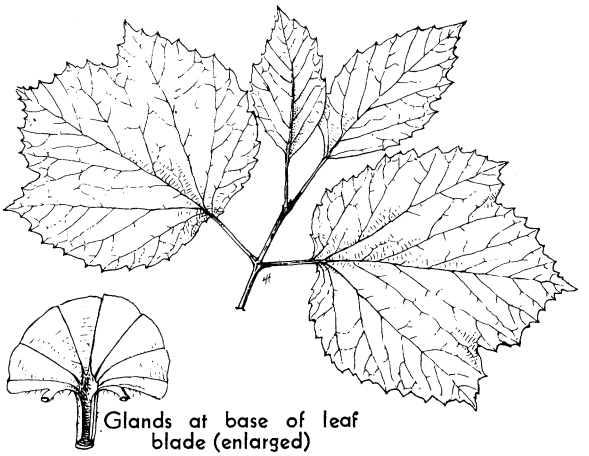
[20] Spalding rose is sometimes confused with Nootka rose (*Rosa nutkana*) from west of the Cascades where it grows in moist sites, especially near the seashore or salt marshes in Oregon and Washington. The type locality of Nootka rose is Nootka Sound in British Columbia.


F-494063
Baldhip rose
Salmonberry
Northwestern blackcap raspberry
Spalding rose
Interior rose
Whitebark raspberry

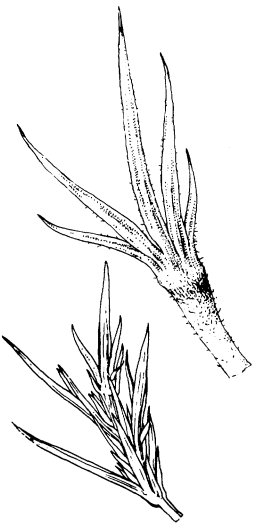
PLANTS DECIDUOUS · SPRING AND SUMMER

Leaves Opposite and Simple

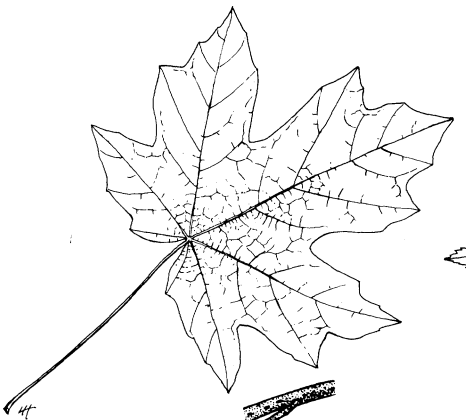
1. **Leaves lobed or variable, at least lobed on vigorous shoots.**
   2. **Leaves palmately lobed or parted.**
      3. **Plants dwarf, rigid or matted shrubs of dry, sandy, rocky sites; odor sweet-musky;** leaves cut into 3–7 needlelike parts, opposite near stem base, alternate and crowded near stem tips, often with single needlelike leaves in their axils; twigs pale, more or less glandular-hairy; e. Oreg., e. Wash.
         granite gilia (*Leptodactylon pungens*).
      3. **Plants erect or trailing shrubs or trees of moist sites.**
         4. **Leaves shortly 3-lobed above middle, often also unlobed; dotlike glands on leaf margin near leafstalk;** margins toothed; flowers white, in flattish-topped, compound clusters (cymes); "berries" (drupes) red, squashy, each with single stone; tall straggling shrubs of cool sites, e. slopes of Cascades, Wallowa and Blue Mts., ne. Oreg., se. Wash.
            moosewood (or **squashberry**) **viburnum (*Viburnum edule*).**
         4. **Leaves 3- to 11-lobed; dotlike glands lacking;** fruits ("keys" or paired samaras) seedlike, winged, stalked, usually clustered---------- **maples (*Acer* spp.).**
            5. **Leaves broadly egg-shaped, 3- to 5-lobed, or sometimes** 3-parted; lobes taper-pointed, margins sharply toothed; leafstalks long, often red; fruits hairless, their wings usually spread at a little less than right angles to each other; erect shrubs or small trees; e. slopes of Cascades, Wallowa and Blue Mts., commonest maple of e. Oreg., e. Wash.
               Douglas maple (*Acer glabrum* var. *douglasii*).
            5. **Leaves circular in outline, with 5 or more lobes.**
               6. **Lobes 7–11, irregularly and doubly saw-toothed; twigs slender;** fruits hairless, their wings in a nearly straight line; erect shrubs or small trees in open sites, or trailing and with vinelike twigs that dip and root at tips to form thickets in wet shady sites; common w., occasional e. slopes of Cascades and in Wallowa Mts., ne. Oreg.
                  vine maple (*Acer circinatum*).
               6. **Lobes usually 5, deep, entire- or wavy-margined; twigs coarse;** fruits in elongated clusters, yellowish-hairy on the "seeds", their wings usually spread at less than right angles to each other; trees; **the only native maple of Oreg., Wash. with milky sap (easily seen by breaking leafstalk);** common w., occasional e. slopes of Cascades, Oreg., Wash.
                  bigleaf maple (*Acer macrophyllum*).
2. **Leaves (at least on some of the young shoots) pinnately lobed, mostly entire and oval,** dark green above, paler beneath, short-stalked; **shriveled tips of last season's twigs often persistent between topmost pairs of new twigs;** pith usually brownish; leaf



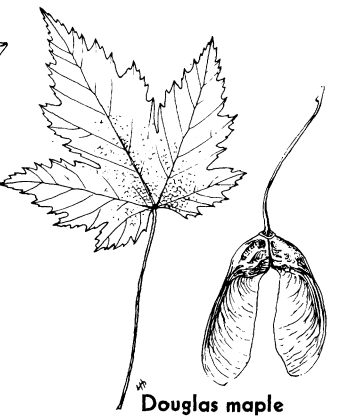
Moosewood viburnum



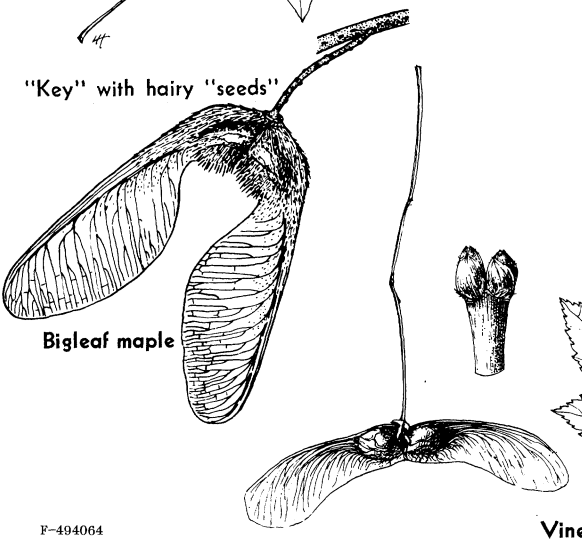
Granite gilia



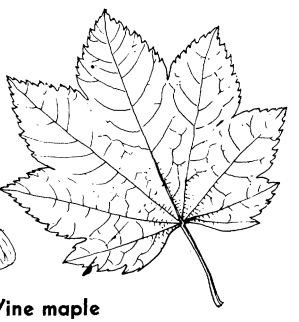
"Key" with hairy "seeds"



Douglas maple

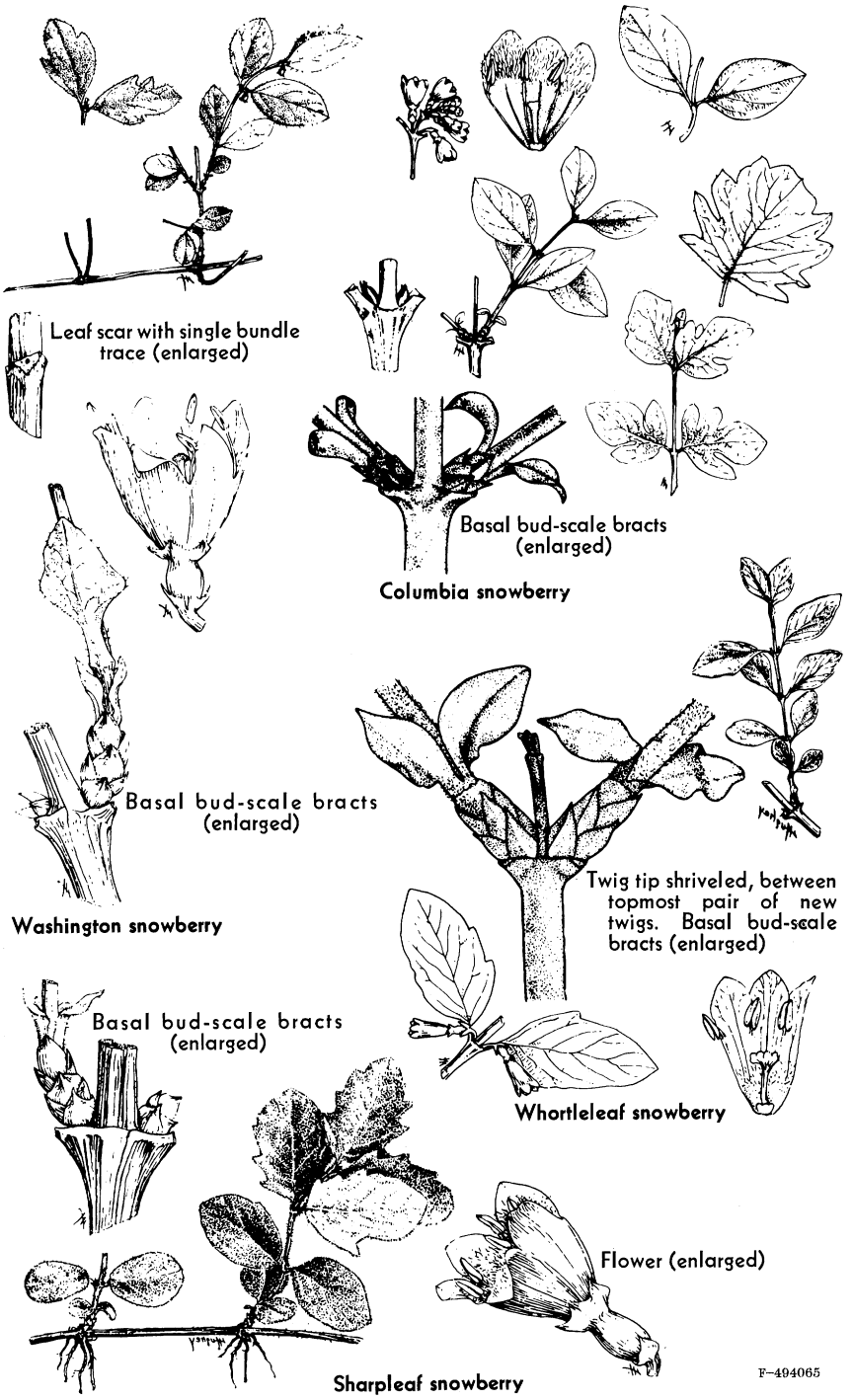


Bigleaf maple



Vine maple

F-494064


Leaf scar with single bundle trace (enlarged)
Basal bud-scale bracts (enlarged)
Columbia snowberry
Basal bud-scale bracts (enlarged)
Washington snowberry
Twig tip shriveled, between topmost pair of new twigs. Basal bud-scale bracts (enlarged)
Basal bud-scale bracts (enlarged)
Whortleleaf snowberry
Flower (enlarged)
Sharpleaf snowberry
F-494065

scars small, raised, often with ragged edges, connected around the twig by lines or ridges; **bundle trace 1,** indistinct; "berries" (drupes) white, each with 2 "seeds" (nutlets); erect or trailing shrubs..... **snowberries** (***Symphoricarpos*** spp.).

7. **Shrubs erect, spreading by suckers or underground stems.**

8. **Pith hollow; twigs, leaves usually hairless;** leaves often lobed, seldom crowded, thin; flowers open-bell-shaped, lobed to near middle, densely hairy in throat, unsymmetrical near base, to ¼ inch long, clustered in upper leaf axils and near twig tips; "berries" nearly globe-shaped, about ½ inch in diam.; bark gray, usually smooth; shrubs to 10 feet high, often thicket-forming; native snowberry (also cultivated), common at lower altitudes, e. Oreg., e. Wash. (type locality, Holmes Creek, near Laurel, Klickitat Co., Wash.)

Columbia snowberry (***Symphoricarpos rivularis***).

8. **Pith solid; twigs, leaves usually densely hairy with fine, whitish, short, curved hairs;** leaves seldom lobed, often crowded, firm, veiny, with slightly thickened, rolled-under margins; flowers tubular-bell-shaped, shallowly lobed, a little hairy deep in tube, symmetrical near base, to ⅜ inch long, drooping singly or in pairs from upper leaf axils; bark dark brown, smooth or shreddy; shrubs to 5 or 6 feet high; moist to dry sites, higher elevations, e. Oreg., e. Wash.

whortleleaf snowberry (***Symphoricarpos vaccinioides***).

7. **Shrubs trailing; stems sometimes rooting at joints (nodes);** bark gray, shreddy; leaves thin, much paler and prominently net-veined on under surface; flowers open-bell-shaped, lobed to near middle, symmetrical at base; "berries" nearly globe-shaped, to ¼ inch in diameter.

9. **Branches erect, short; stems long-trailing (to 10 feet);** young twigs often with a few soft, fine hairs; leaves sometimes lobed, nearly hairless and finely net-veined on upper surface; margins finely hairy-fringed; flowers 2–5, in small end clusters (racemes); gravelly slopes, lower altitudes, open woods, Blue Mts., se. Wash., otherwise only w. of Cascades (type locality, Upper Valley, Nisqually River, Pierce Co., Wash.)

Washington snowberry (***Symphoricarpos hesperius***).

9. **Branches loosely spreading, 2 feet long; stems trailing,** rooting at joints; young twigs, leaves, and leafstalks densely soft-velvety-hairy; leaves often lobed; flowers single or in pairs in upper leaf axils, densely hairy in the throat; Klamath and Swan Lake Valleys, Keno and Crater Lake areas, s. Oreg. (Type locality, Lassen Peak, Calif.)

sharpleaf snowberry (***Symphoricarpos acutus***).

1. **Leaves not lobed.**

10. **Margins toothed.**

11. **Plants low (to 2 feet high), clump-forming half-shrubs with unpleasant odor;** stems woody, spreading and much-branched at base; seasonal shoots erect; leaves bright green, leathery, to 2 inches long and nearly 1 inch wide, narrowly lance- to egg-shaped, abrupt- or taper-pointed at tip and short-stalked on leafy shoots, stalkless or clasping, few and bract-

like on the unbranched flowering shoots; **leaf margins coarsely, unevenly, sharply toothed;** flowers yellowish, with violet lines in throat, glandular inside and out (often dust-collecting), tubular, unevenly 5-lobed (upper lip shorter), to ½ inch long; stamens 5: 4 with purple-black anthers, 1 without anthers and usually hairless; anther sacs splitting wide open in an almost straight line; seed pods (capsules) cartilaginous, ¼ inch long, egg-shaped, pointed at tip, splitting downward into 2 parts, persistent; seeds tiny, numerous, honeycomb-pitted under a lens; dry sites, basaltic soils or lava-rock cracks, e. Oreg., e. Wash.

scorched (or **hot-rock**) **penstemon** (***Penstemon deustus***).

11. **Plants tall (to 12 or 15 feet high), straggling shrubs;** branches slender, greenish, 4-angled; leaves thin, to 4 inches long, lance- to egg-shaped or oblong, sharp- to taper-pointed at tip, short-stalked; **margins finely saw-toothed;** flowers 1 to several, on long, slender, drooping flower stalks, with spreading, brownish purple petals and a dark red, fleshy disk; seed pods (capsules) deeply 3- to 5-lobed, smooth or warty, splitting along middle back of each lobe; seeds usually 2 to each lobe, each covered by a fleshy red outgrowth (aril); along wooded streams, e. slopes Cascades, Oreg., Wash. (type locality, Oreg.)

western wahoo or **burningbush** (***Euonymus occidentalis***).

10. **Margins entire or nearly so.**

12. **Leaves with 3 (rarely 5) major veins from leaf base,** lance- to egg-shaped, somewhat hairy on margins and veins; tall shrubs with up-curving branches; bark checking, finally flaking off; flowers numerous, conspicuous, white, very fragrant; seed pods (capsules) top-shaped, partly enclosed in calyx-tube, 4- to 5-celled, splitting down middle back of each cell, persistent; very common, moist sites along roads or in open woods, e. Oreg., e. Wash.

Lewis mockorange (***Philadelphus lewisii***).

12. **Leaves with single major vein (midrib).**

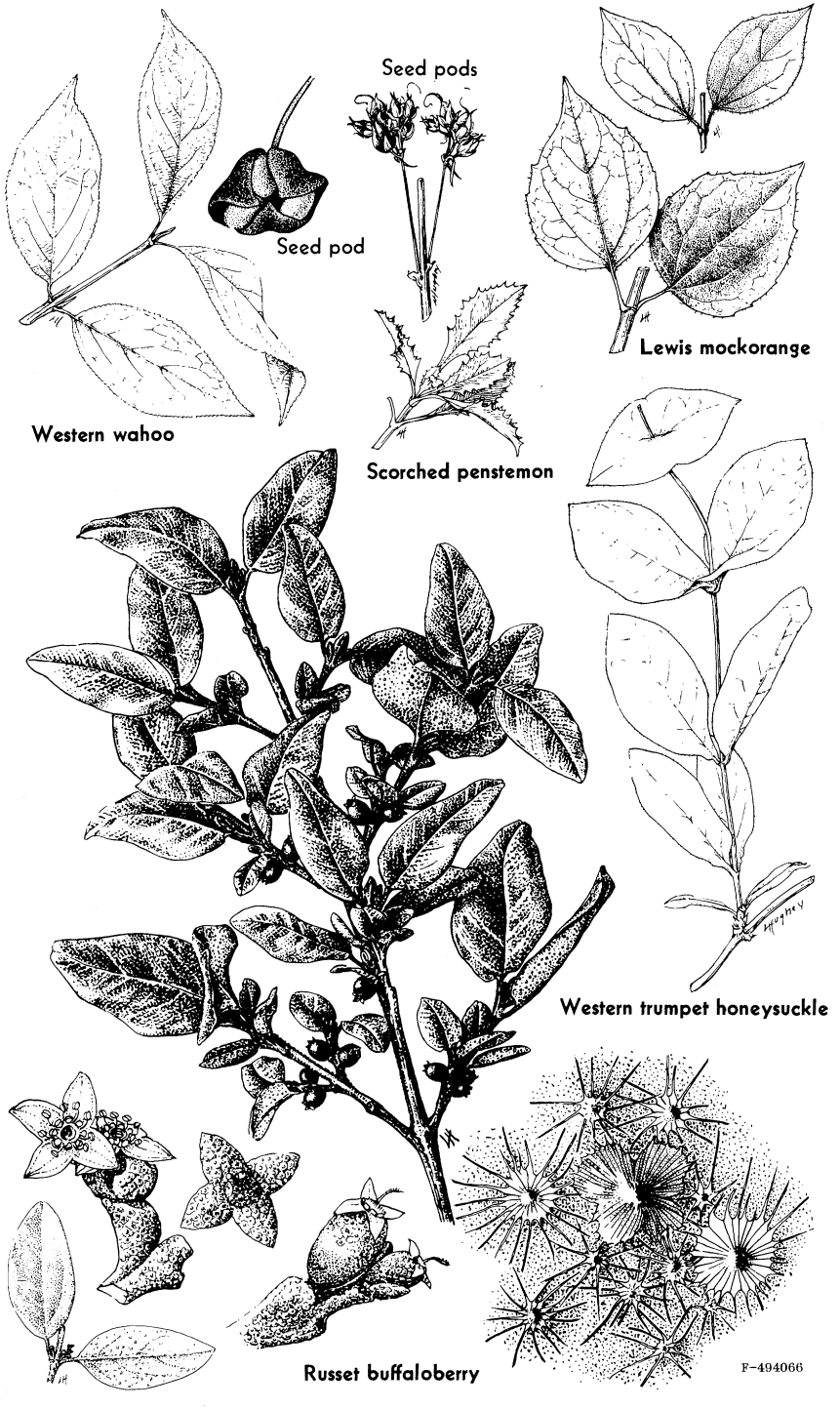
13. **Twigs, under leaf-surfaces brown-scurfy with silver-fringed scales;** flower buds clustered in leaf axils or at old-wood joints, formed in summer, not opening until following spring; male and female flowers on separate plants; fruits berrylike, reddish; shrubs much-branched, to 6 feet high; open woods, middle altitudes, Blue Mts., ne. Oreg., rare in e. Wash.

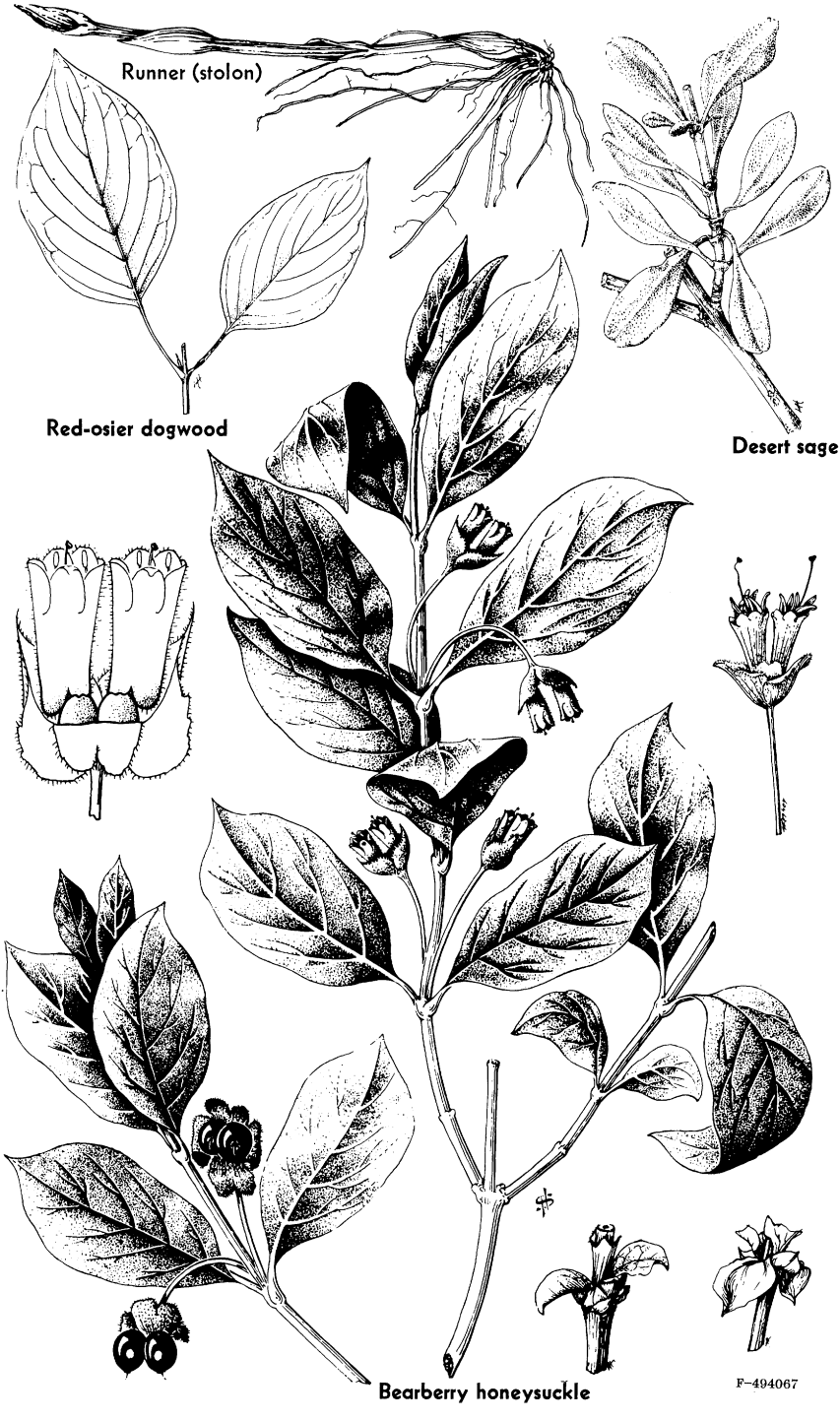
russet buffaloberry (***Shepherdia canadensis***).

13. **Twigs, under leaf-surfaces not brown-scurfy.**

14. **Plants vines;** stems coiling or twining; **upper leafpair bases fused, at least uppermost pair like a single leaf through which stem has grown;** leaves green above, with whitish "bloom" beneath, hairy only along margins; flowers large, orange, trumpet-shaped, clustered at stem ends or in upper leaf axils; berries red; high-climbing, often over trees; open moist woods, e. slopes of Cascades, Wallowa and Blue Mts.

western trumpet honeysuckle (***Lonicera ciliosa***).


Seed pods
Seed pod
Lewis mockorange
Western wahoo
Scorched penstemon
Western trumpet honeysuckle
Russet buffaloberry
F-494066


Runner (stolon)
Red-osier dogwood
Desert sage
Bearberry honeysuckle
F-494067

14. **Plants erect or spreading shrubs.**
15. **Leaves shiny-resin-dotted on both sides, silvery-hairy, fragrantly aromatic,** to 2 inches long, elliptic or oval, narrowing to short leafstalk; branches ashy-white; flowers blue, in purplish-bracted, whorled, ball-like clusters near twig ends; "seeds" (nutlets) 4 to each flower, jellylike when wet; low shrubs of dry or alkaline sites, common in sagebrush areas in central Wash., less common in Oreg.
desert sage (*Salvia carnosa*).
15. **Leaves not as above; leaf scars with 3 bundle traces; shrubs of moist sites.**
16. **Branches bright to purplish red, pliable, osierlike, without bud-scale bracts at base;** leaves with 5–7 pairs of parallel veins upcurving near margin; flowers small, whitish; "berries" (drupes) whitish or lead-colored, in flat- or roundish-topped end clusters; stems often lodging, rooting at tips, forming runners (stolons); streambanks or along roadsides or in open woods, e. Oreg., e. Wash.
red-osier dogwood (*Cornus stolonifera*).
16. **Branches not as above; twigs with distinctive basal bud-scale bracts;** bark straw-colored or gray to dark or reddish brown, flaking, peeling, or shredding; pith whitish, solid; flowers and berries twinned, each pair with 2 outer bracts and 4 inner bractlets which drop off or are variously modified (grow together, enlarge, or become fleshy and colored) as berries ripen, stalked, in leaf axils; stems erect or spreading, often suckering near base.
honeysuckles (*Lonicera* spp.)
17. **Twigs coarse, 4-angled, straw-colored; basal bud-scale bracts conspicuous, lower recurved, upper leaflike;** leaves 2–6 inches long; flowers yellowish to reddish; flower stalks (peduncles) to 2 inches long; the 2 outer flower bracts and the 4 inner bractlets enlarging, reddening as twin berries ripen to shiny black, sometimes withered-persistent on last year's twigs; shrubs to 10 feet high; commonest honeysuckle in e. Oreg., e. Wash.
bearberry honeysuckle (*Lonicera involucrata*).
17. **Twigs slender, round or slightly 4-angled; leaves to 2 (sometimes to 4) inches long; berries bright to dark red or nearly black;** shrubs to 5 (or 6) feet high; mountain areas, e. Oreg., e. Wash.
18. **Bud-scale bracts sharp-pointed, in 4 vertical rows, appearing tightly laced around base of twigs, persistent for 1 or more years;** leaves thick, pointed at tip, wedge-shaped at base; flowers dark red to purplish; flower stalks (peduncles) to 1 inch long; 2 outer flower bracts small, scalelike, soon falling; 4 inner bractlets

tiny, bump- or scale-like or lacking; twin berries dark red to nearly black, joined to near tips.

purpleflower honeysuckle (*Lonicera conjugialis*).

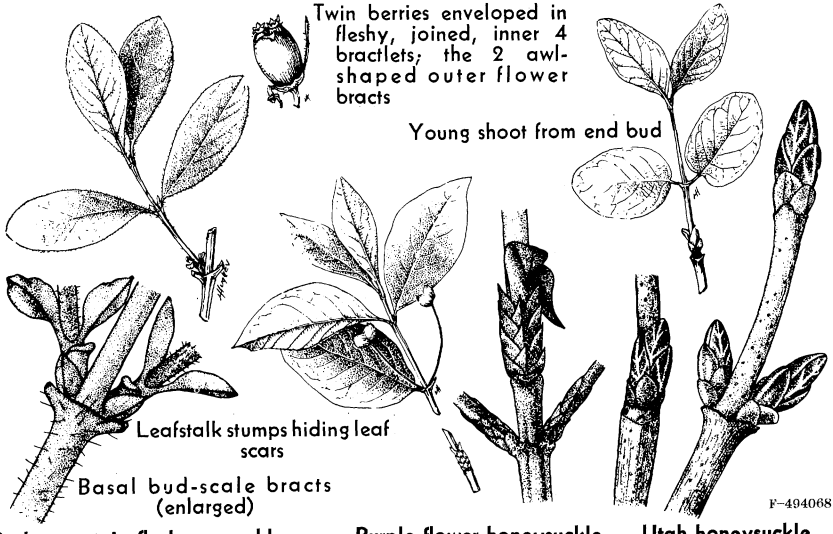
18. **Bud-scale bracts not as above, not long-persistent; leaves thin; flowers yellowish.**

19. **Branches spreading; bark gray; basal bud-scale bracts spreading at tips, thin-papery, purplish-tinged, pale-veiny;** leaves net-veined, rounded at both ends or somewhat heart-shaped at base, egg-shaped, oval, or elliptic; flower stalks (peduncles) ½ inch long; 2 outer flower bracts small, like bud-scale bracts, not persistent; 4 inner bractlets tiny or wanting; twin berries joined at base, wide-spreading at tips, bright red.

Utah honeysuckle (*Lonicera utahensis*).

19. **Branches ascending; bark dark reddish brown; lower basal bud-scale bracts recurved, upper leaflike;** leaves oblong or narrowly reverse-lance-shaped; **leafstalks breaking off near base, their stumps hiding leaf scars;** flower stalks (peduncles) ¼ inch long; 2 outer flower bracts awl-shaped, hairy; 4 inner bractlets united into a red fleshy sac enclosing twin berries, thus appearing as a single red berry (drying bluish-black); subalpine meadows s. from Mt. Adams along Cascades, lower sites, e. side.

red mountain-fly honeysuckle (*Lonicera cauriana*).



Red mountain-fly honeysuckle **Purple-flower honeysuckle** **Utah honeysuckle**

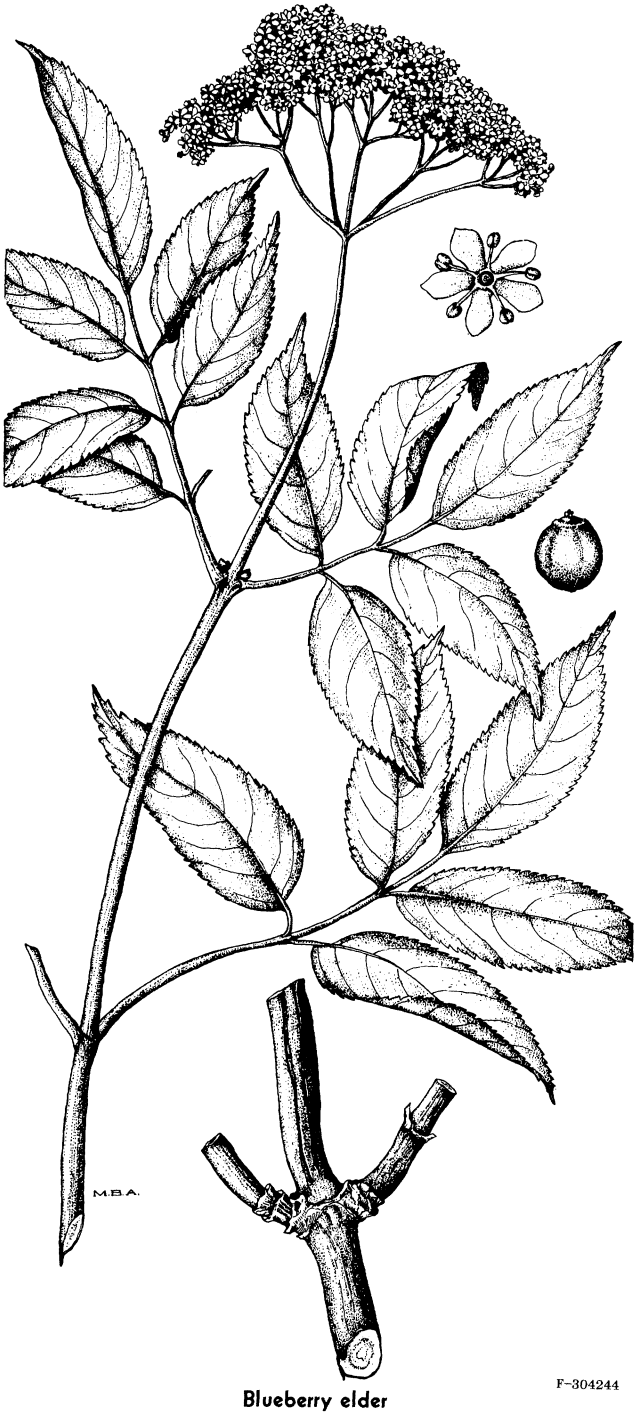
PLANTS DECIDUOUS · SPRING AND SUMMER

Leaves Opposite and Compound

1. **Plants woody climbers with branched and coiling leafstalks;** stems ridged and grooved; bark stringy; pith hollow; "joints" (nodes) swollen_____**clematis, virginsbower** (***Clematis*** spp.).
   2. **Stems low-climbing or clambering over rocks; leaflets 3;** flowers large, purplish, single at "joints" on old wood; moist open woods, middle altitudes, Wallowa and Blue Mts., ne. Oreg., se. Wash.
   Columbia rock clematis (***Clematis verticillaris*** var. ***columbiana***).
   2. **Stems high-climbing, often over trees; leaflets 5–7;** flowers smaller, white, in clusters at "joints" on new wood; along streams at lower altitudes, common in e. Oreg., e. Wash.
   western virginsbower (***Clematis ligusticifolia***).

Columbia rock clematis **Western virginsbower**

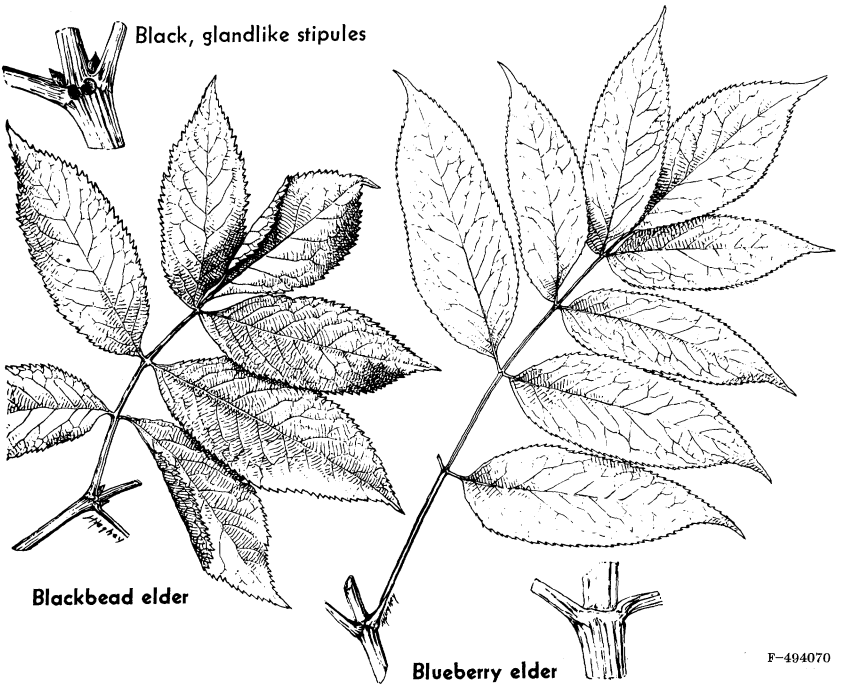
F-494069



F-304244

Blueberry elder

1. **Plants erect shrubs or trees; leaflets 5 or more; moist sites.**
   3. **Leaflets distinctly toothed, not symmetrical at base, taper-pointed at tip; pith large; fruits berrylike** (drupes).
      elders (*Sambucus* spp.).
      4. **Twigs, under leaf-surfaces and fruits whitened (glaucous);** pith white to yellowish; stipules lacking; leaflets 7–11, pale green, thick, usually hairless; margins finely saw-toothed; flowers whitish, in large, flat-topped, several-rayed end clusters; "berries" sky blue; large, several-stemmed shrubs or small trees with fissured bark; commonest elder in e. Oreg., e. Wash.; along fence rows or stream valleys.
         blueberry elder (*Sambucus glauca*).
      4. **Twigs, under leaf-surfaces and fruits not whitened as above;** pith yellowish to dark brown or sometimes whitish in new shoots; stipules usually present on line or ridge between the leaf pairs on younger twigs; leaflets 5–7, dark green above, paler beneath, thin, hairy at least when young; flowers creamy or yellowish, in round-topped or pyramidal end clusters with single main axis; "berries" shiny, black or red; shrubs, several-stemmed from base, with warty bark on older branches; open woods at higher altitudes.
         5. **Leaflets coarsely saw-toothed, almost hairless; stipules dark, glandlike, crescent-shaped, usually 2, flattened against stem;** older branches reddish brown, smooth or with corky pores (lenticels); "berries" shiny black; "seeds" (nutlets) cross-wrinkled (rugose); occasional, e. slopes of Cascades, common in Wallowa and Blue Mts.
            blackbead elder (*Sambucus melanocarpa*).

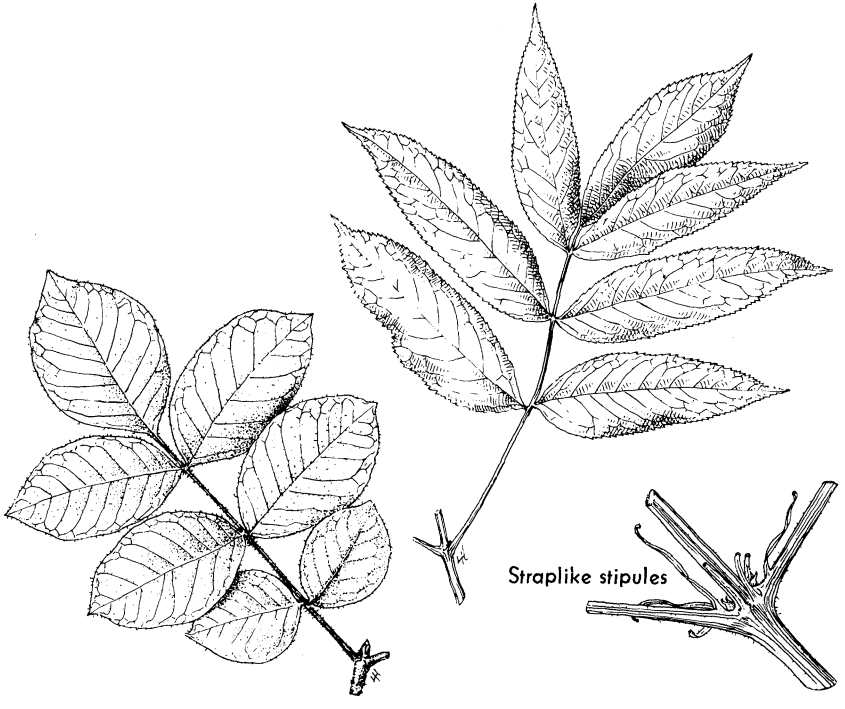


Blackbead elder

F–88624

5. **Leaflets with sharply incurved teeth along margins, often hairy on midrib beneath; stipules thin, straplike,** to ⅜ inch long, often callus-tipped; older branches dark brown, warty; "berries" red; "seeds" (nutlets) smooth; shrubs with spreading stems, forming loose, open clumps; woods along Cascades, Oreg., Wash., not reported from Wallowa or Blue Mts.; type locality, near Crater Lake, Oreg.
western red elder (*Sambucus leiosperma*).[21]

3. **Leaflets entire or faintly toothed, symmetrical at base, abruptly pointed at tip, lance- to egg-shaped or reversely lance- to reversely egg-shaped;** pith small; fruits (samaras) dry, seedlike, winged from top, in loose branched clusters at leaf scars of preceding year, on female trees; common in river valleys, w., rare e. of Cascades, Oreg., Wash.
Oregon ash (*Fraxinus latifolia*).



Oregon ash Western red elder F-494071

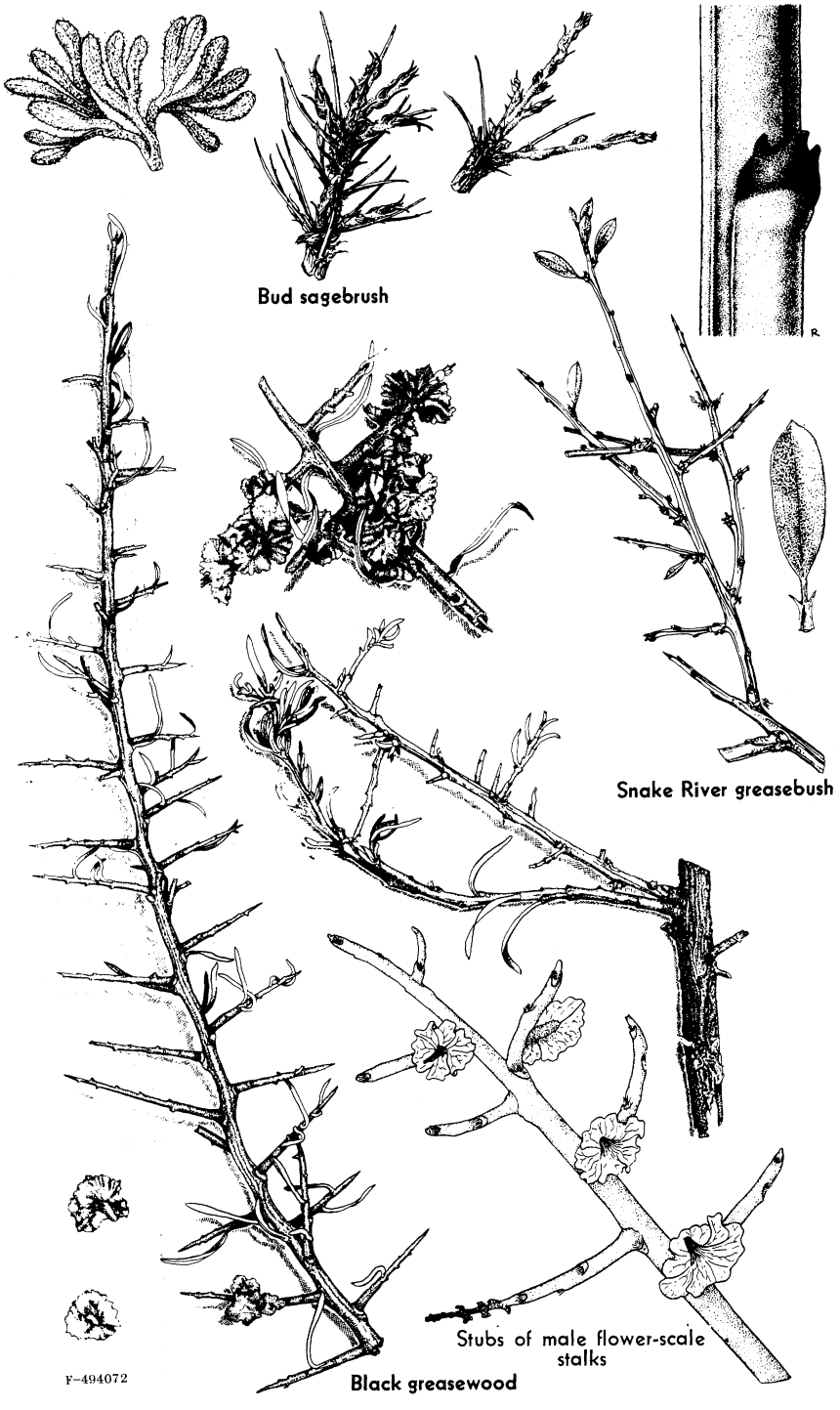
[21] Field notes are needed to determine relationship between western red elder and Pacific red elder (*Sambucus callicarpa*); the latter is typically a tall shrub or small tree, shade tolerant and growing with the redwoods of the California Coast Ranges. Pacific red elder was originally described by Dr. E. L. Greene (Flora Franciscana, p. 343. 1892.) as having light brown, flaky rather than fissured bark, white pith, and the young twigs and leaves with sparse, short, stiff hairs. Stipules are described as straplike, the leaves with 2–5 pairs of leaflets which are often with conspicuous stipellae, or the later leaves on sucker shoots as being doubly compound (bipinnate). The flowers were noted as white, the fruit bright red and in small but broad and flat-topped clusters. Some authors regard these two red-berried elders as a single species, *S. callicarpa*.

PLANTS DECIDUOUS · FALL AND WINTER

Buds, Twigs Alternate
Plants Armed

1. **Twigs spiny-tipped.**
   2. **Shrubs with sagebrush odor and taste,** to nearly 2 feet high, much-branched, densely whitish-hairy; bark shreddy; twigs of 2 kinds: (a) short, rigid, spiny-tipped twigs, (b) stouter, unarmed, big-budded twigs that leaf out in late winter and shed in early summer; desert or alkaline areas of Lake, Harney, and Malheur Cos., s. Oreg., not reported from Wash.
      bud sagebrush (*Artemisia spinescens*).[22]
   2. **Shrubs without sagebrush odor and taste.**
      3. **Twigs bright green, ridged and lined;** leaf scars raised, hidden by dark, swollen leafstalk bases to which 2 tiny, pointed stipules often remain attached; buds small, in leafstalk-base axils; bud scales several; stems often arching; much-branched shrubs to 10 feet high; dry, rocky limestone areas, Harney Co. to Snake River canyons in ne. Oreg., se. Wash.
         Snake River greasebush (*Forsellesia stipulifera*).
      3. **Twigs not as above;** fruits and/or leaves sometimes persistent; buds without bud scales, the tiny, undeveloped, whitish-scurfy-hairy leaves naked in axils of leaf scars or of persistent leafstalk stumps; shrubs of dry, rocky soils or of alkaline sites.
         4. **Fruits top-shaped with encircling wing near middle, sometimes persistent in leaf-scar axils on the spiny-tipped twigs or leaving a pocketlike cavity lined with fine, white, protruding hairs after falling;** spiny-tipped twigs sometimes with dark stubs of male flower-scale stalks scattered along their withered tips, often with somewhat spongy bark; twigs ridged downward from middle of the broadly V- or U-shaped (sometimes opposite) leaf scars; bundle traces 3; leaf scars often partly covered by membrane which is split down on 1 side between 2 bundle traces by the bud which emerges at an angle to left or right from the leaf-scar axil; buds sometimes 2 (1 above the other) in some of the leaf-scar axils; much-branched shrubs to 8 or 10 feet high, with whitish to gray or brownish stems and hard, greenish, fibrous wood; often in almost pure stands in alkaline flats or low, moist sites; poisonous to sheep if eaten to excess; s. and e. Oreg., e. Wash.
            black greasewood (*Sarcobatus vermiculatus*).
         4. **Fruits not as above; shrubs to about 4 feet high.**
            5. **Buds evident, globe-shaped, the tiny, undeveloped leaves white-scurfy, clustered in axils of persistent leafstalk stubs which hide leaf scars;** fruits saclike, reddish, rarely winter-persistent; bushy shrubs with brown to dark gray, shreddy bark; dry, rocky sites, e. Oreg., e. Wash.
               spiny hopsage (*Grayia spinosa*).

[22] See Evergreen Key for low sagebrush (*Artemisia arbuscula*) which often has weakly spiny-tipped twigs.


Bud sagebrush
Snake River greasebush
Stubs of male flower-scale stalks
Black greasewood
F-494072

Shadscale saltbush

F–486444

5. **Buds not evident;** spiny-tipped twigs rigid, short, tan or straw-colored, with indistinct leaf scars in axils of which are usually 3 to several tiny stumps where flowers or fruits were attached; roundish leaves persistent on lower twigs, densely whitish-scurfy with branlike scales as are also the few leaflike fruits sometimes persistent on spiny-tipped twigs; compact, rounded shrubs of dry alkaline sites, Lake, Harney, and Malheur Cos., se. Oreg., not reported from Wash.

shadscale saltbush (***Atriplex confertifolia***).[23]

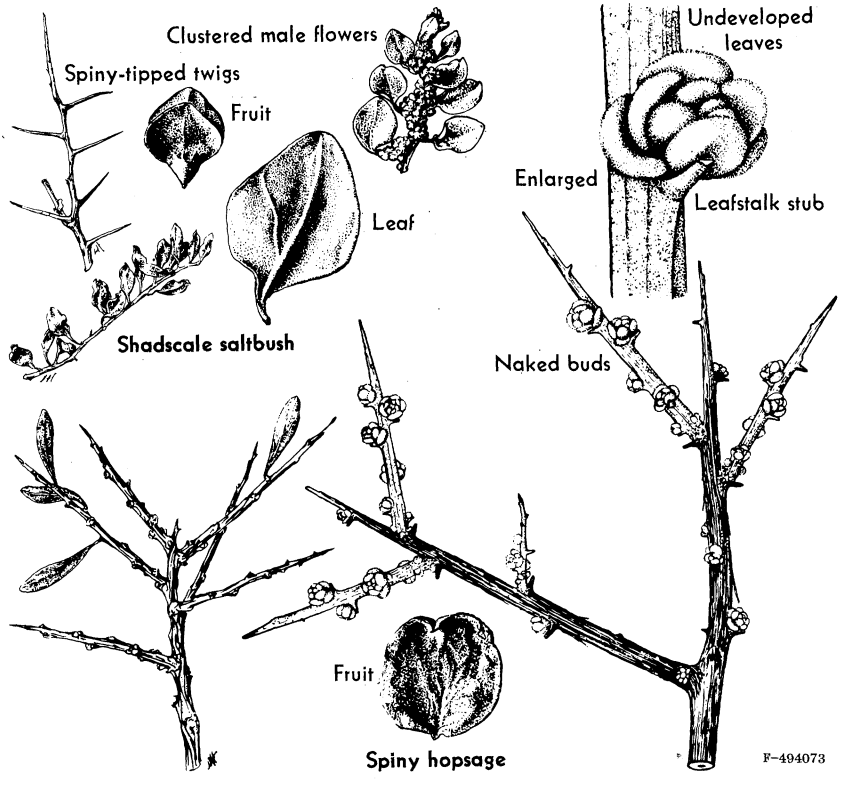
1. **Twigs not spiny-tipped;** plants armed with thorns (aborted twigs, not leaf-bearing), with spines (strong, woody, sharp-pointed outgrowths mostly from the wood of the twig or stem), and/or with prickles (small, weak, spinelike outgrowths borne irregularly on the bark).

6. **Plants with thorns** in leaf scar axils (thorns sometimes lacking on young or sucker shoots); buds small, globe-shaped; bud scales several, overlapping; "berries" (pomelike drupes) persistent; small trees or erect shrubs, often thicket-forming; moist sites, flood plains, river valleys, e. Oreg., e. Wash.

hawthorns (***Crataegus*** spp.).

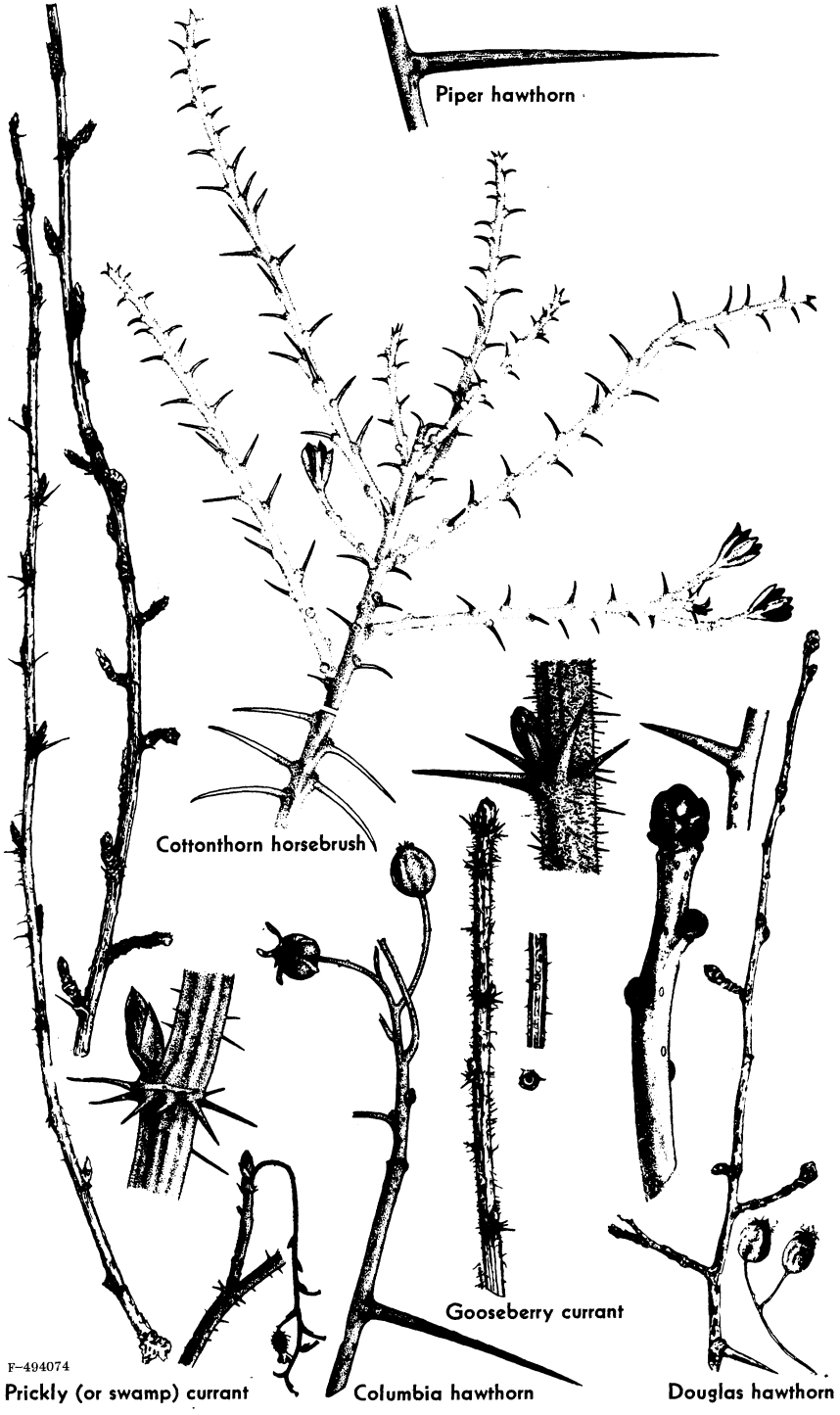
---

[23] See Evergreen Key for fourwing saltbush (*Atriplex canescens*), the twigs of which are weakly spiny-tipped and the leaves are winter-persistent.



7. **Thorns stout, to 1 inch long;** twigs shiny, reddish brown, hairless or nearly so; "berries" purplish black, hairless; commonest hawthorn in e. Oreg., e. Wash.
Douglas hawthorn (*Crataegus douglasii*).
7. **Thorns slender, to 2½ inches long; twigs brown.**
8. **"Berries" dark red to purplish, hairless;** thorns averaging shorter, straight; shrubs or small trees, to 15 feet high.
Columbia hawthorn (*Crataegus columbiana*).
8. **"Berries" coral red, hairy;** thorns longer, often reflexed; shrubs to 10 feet high.
Piper hawthorn (*Crataegus piperi*).[24]
6. **Plants without thorns.**
9. **Spines present.**
10. **Twigs densely white-woolly-hairy;** spines recurved or spreading, formed from hardened, persistent midribs of primary leaves; buds and leaf scars indistinct, in spine axils; flower-head bracts 5–6 in a single series, persistent; stiff, much-branched shrubs to 5 feet high; dry, sandy or alkaline sites, se. Oreg., not reported from Wash.
cottonthorn horsebrush (*Tetradymia spinosa*).
10. **Twigs not densely white-woolly-hairy,** often with scattered prickles and/or bristles in addition to simple or 3- to 9-parted spines bordering the usually narrow leaf scars; bundle traces 3; buds evident, somewhat egg- or spindle-shaped; bud scales papery, several, overlapping, persistent after buds open; short, spurlike twigs common; pith spongy; erect or spreading shrubs, often with arching branches and crown-sprouting or layering after fire or top injury; alternate hosts of white pine blister rust.
currants, gooseberries (*Ribes* spp.).
11. **Spines 3- to 9-parted,** usually to about ¼ inch long; prickles and/or bristles commonly present, especially in sunny sites; twigs brown or deeply straw-colored; buds symmetrical, at 30° angle to twig; fruit-cluster stalks (peduncles) elongate, often drying-persistent with 4–20 bracted berry stalks (pedicels) attached; berries with gland-tipped bristles, usually not persistent . . **currants.**
12. **Twigs with gland-tipped bristles;** spines rigid, rather stout; buds rounded at tips, end buds about same size as side buds; stiff-branched shrubs to 4 feet high; on rocky exposed sites at higher (often subalpine) altitudes . . **gooseberry currant (*Ribes montigenum*).**
12. **Twigs finely whitish-hairy but bristles not gland-tipped;** spines less rigid, rather slender; buds pointed at tips, end buds larger than side buds; much-branched shrubs, erect and to 3 or 4 feet high, or, if in shade, trailing and with weaker spines and prickles; moist sites in open mountain woods; very susceptible to white pine blister rust.
prickly (or swamp) currant (*Ribes lacustre*).

[24] Piper hawthorn is listed in the *Check List of Native and Naturalized Trees of the United States* (U. S. Dept. Agr., Agr. Handb. 41. 1953) as a synonym of Columbia hawthorn; these need field study.


Piper hawthorn
Cottonthorn horsebrush
Gooseberry currant
F-494074
Prickly (or swamp) currant
Columbia hawthorn
Douglas hawthorn

471114 O-60-8

11. **Spines single or 3-parted; prickles and/or bristles present or lacking; twigs distinctly ridged or lined downward from ends of leaf scars;** bark often split and peeling somewhat spirally; fruit-cluster stalks (peduncles) sometimes persistent but berry stalks (pedicels) falling with the berries ..... **gooseberries.**

13. **Twigs hairless or nearly so, usually without prickles or bristles.**

14. **Spines mostly single; end buds about same size as side buds.**

15. **Twigs whitish or pale straw-colored; spines few, weak, short (¼ to ⅜ inch long);** side buds appressed, flattened on side next to twig; older bark reddish brown; branches often drooping or trailing; moist to rather dry sites along streams; widely distributed, e. Oreg., e. Wash.; susceptible to white pine blister rust.

whitestem gooseberry (*Ribes inerme*).

15. **Twigs yellow or deeply straw-colored, often long-arching; spines strong, to about ½ inch long, straight, spreading at almost right angles to twig;** side buds somewhat egg-shaped, about ⅛ inch long, not appressed or flattened on side next to twig; older bark gray; shrubs often thicket-forming, growing along dry, rocky ledges; from northern Crook Co. through John Day Gorge to Blue and Wallowa Mts., ne. Oreg., upper Snake River canyons, se. Wash. (type locality, 5 miles w. of Imnaha, Wallowa Co., ne. Oreg.).

Goodding gooseberry (*Ribes gooddingii*).

14. **Spines often 3-parted, to nearly 1 inch long, ascending on younger shoots, spreading or recurved on older branches, darker than buds and the cinnamon or reddish-brown twigs;** prickles and bristles lacking or few, weak, short, reflexed; older bark dark gray; buds sometimes clustered at twig tips; fruit-cluster stalks (peduncles) to 2 inches long, slender, drooping, often persistent; berry stalks (pedicels) very slender, sometimes persistent with the large, bluish black berries; widely branching shrubs to 13 feet high; rocky banks or gravelly soils in moist sites along streams of ne. Oreg., se. Wash.

snow gooseberry (*Ribes niveum*).

13. **Twigs hoary with whitish or grayish hairs; spines, prickles and/or bristles usually reflexed; fruit-cluster stalks (peduncles) short (to about 1 inch long), sometimes persistent.**

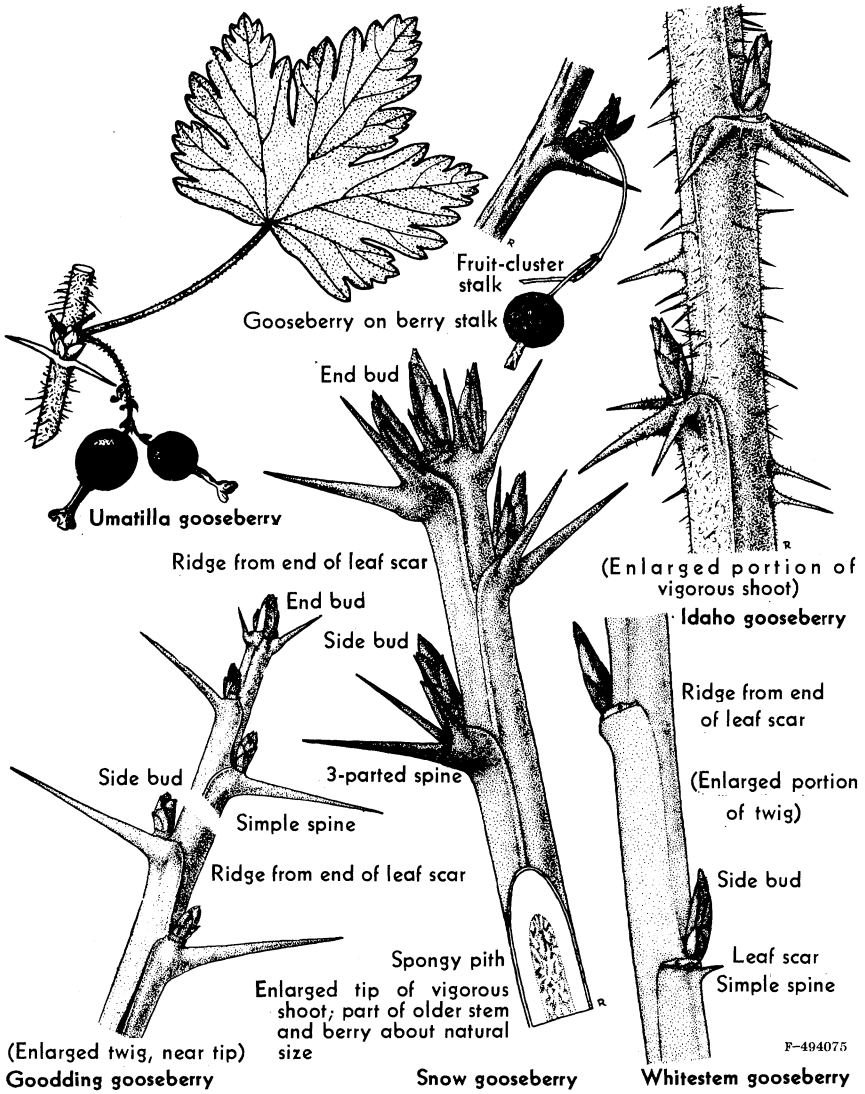
16. **Spines mostly single except on vigorous twigs where they are often 3-parted, to nearly ½ inch long;** prickles and/or bristles usually on older parts of twigs; twigs pale gray or straw-colored, with very fine, short whitish hairs, not glandular; erect shrubs to 10 feet high, with widely spreading branches; somewhat susceptible to white pine blister

rust; along streams, Wallowa, Blue Mts., ne. Oreg., se. Wash. (type locality, Blue Mts., lat. 46° 33′).

Idaho gooseberry (*Ribes irriguum*).

16. **Spines mostly 3-parted, to slightly more than ½ inch long;** prickles and bristles often numerous; twigs rather densely whitish- or grayish-hairy, with many gland-tipped hairs; stems slender, long-arching, somewhat vinelike, to 13 feet long; along streams, ne. Oreg., e. Wash. (type locality along Umatilla River near Pendleton, Oreg.).

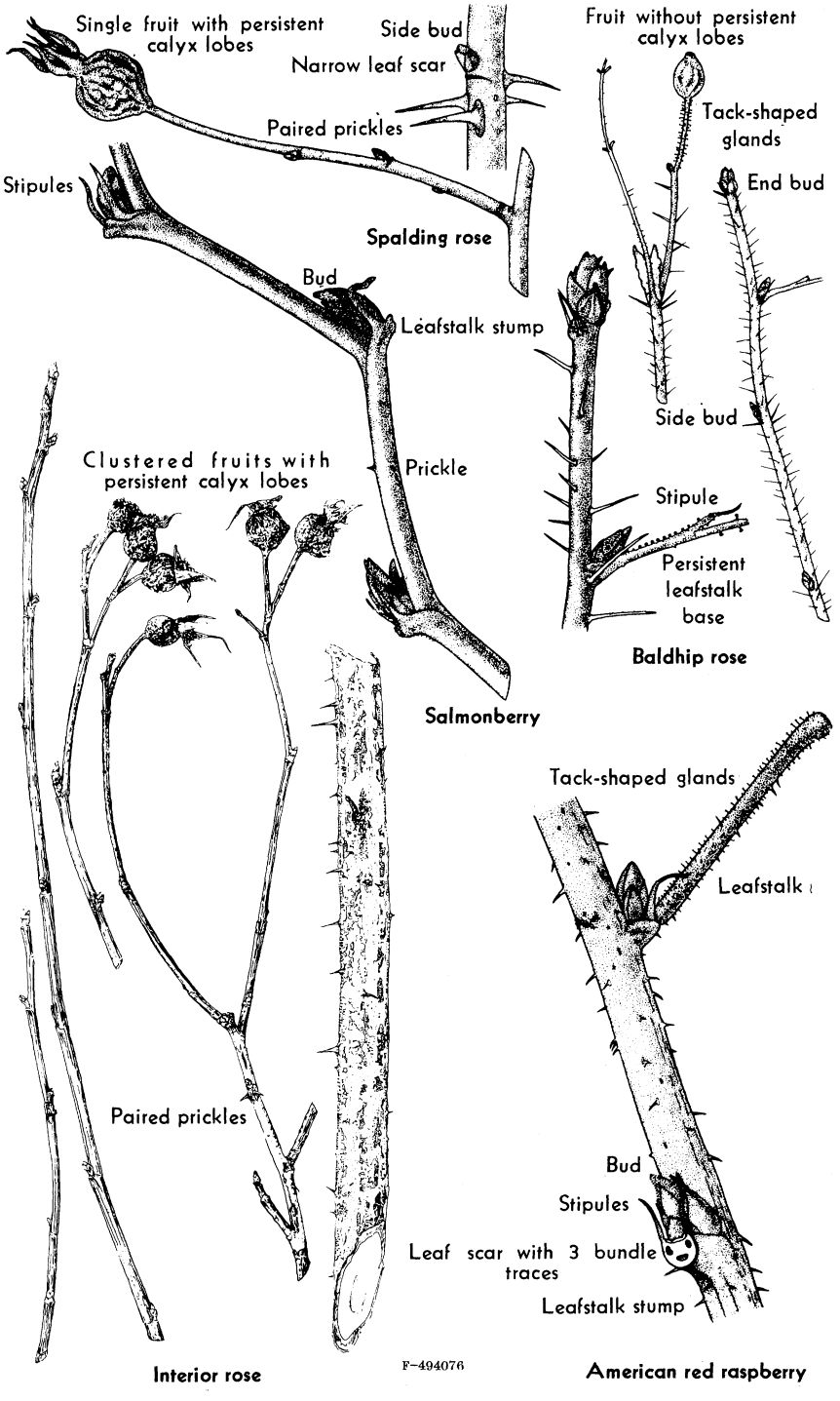
Umatilla gooseberry (*Ribes cognatum*).



9. **Spines lacking; prickles and/or bristles present.**
   17. **Fruits berrylike, red, showy, persistent; shrubs with erect or arching, perennial woody stems;** prickles often paired beneath the very narrow leaf scars; buds small, often slightly above the leaf scar; end buds present; stipule scars lacking; bundle traces 3 _____ **roses** (***Rosa*** spp.).
      18. **Calyx lobes persistent on fruits;** twigs hairless or nearly so, brown or red; not shade tolerant, growing in open, moist sites, e. Oreg., e. Wash.
         19. **Fruits large (to more than ½ inch across), usually single** (sometimes 2 or 3 together); stems or branches usually not arching; twigs brown, without a whitish "bloom," sometimes bristly in addition to the paired, straight prickles under the leaf scars; bushy shrubs, usually about 3 feet high.
            Spalding rose (*Rosa spaldingii*).[25]
         19. **Fruits smaller (less than ¼ inch across), usually clustered;** fruiting branches often arching a little; twigs reddish, with a slight whitish "bloom"; vigorous, sterile shoots often overtopping the fruiting stems; tall, often clumpy shrubs, to 9 or 10 feet high.
            interior rose (*Rosa ultramontana*).
      18. **Calyx lobes not persistent on the small, somewhat egg-shaped, single fruits;** twigs green, often with intermixed bristles and straight, slender prickles; tack-shaped glands on fruit stalks, also on the often persistent leafstalks; small, straggly shrubs of shady woods.
         baldhip rose (*Rosa gymnocarpa*).
   17. **Fruits not berrylike (aggregate drupes), their whitish cores sometimes persistent; prickles and/or bristles scattered on stems; buds egg-shaped, with several overlapping bud scales, in axils of persistent leafstalk stumps;** bundle traces 3; older bark flaking or peeling.
      salmonberry, raspberries (*Rubus* spp.).
      20. **Twigs and branches zigzag;** stems erect, woody, perennial; prickles straight, few, short and weak, or lacking; shrubs spreading by underground stems; moist woods along streams, common w., occasional e. slopes of Cascades, Oreg., Wash.
         salmonberry (*Rubus spectabilis*).
      20. **Twigs and branches not zigzag; stems (canes) erect or spreading, soft-woody, large-pithy, living only 2 years** (leafing first year, flowering, fruiting and dying second year), suckering or with runners at base but not arching and rooting at tips (as does white-bark raspberry), often with whitish waxy "bloom"; **tack-shaped glands on younger parts and on the often persistent leafstalks;** stiff bristles usually present, sometimes gland-tipped when young; straight prickles sometimes present; moist to rather dry sites, open woods, e. Oreg., e. Wash.
         American red raspberry (*Rubus strigosus*).[26]

[25] Spalding rose of eastern Oregon and Washington has often been confused with Nootka rose (*Rosa nutkana*) of western Oregon and Washington. Nootka rose has prickles usually large, stout, and more or less flattened near their bases.

[26] This is not the red raspberry of cultivation.


Single fruit with persistent calyx lobes
Side bud
Narrow leaf scar
Paired prickles
Stipules
Spalding rose
Bud
Leafstalk stump
Prickle
Salmonberry
Fruit without persistent calyx lobes
Tack-shaped glands
End bud
Side bud
Stipule
Persistent leafstalk base
Baldhip rose
Clustered fruits with persistent calyx lobes
Paired prickles
Interior rose
Tack-shaped glands
Leafstalk
Bud
Stipules
Leaf scar with 3 bundle traces
Leafstalk stump
American red raspberry

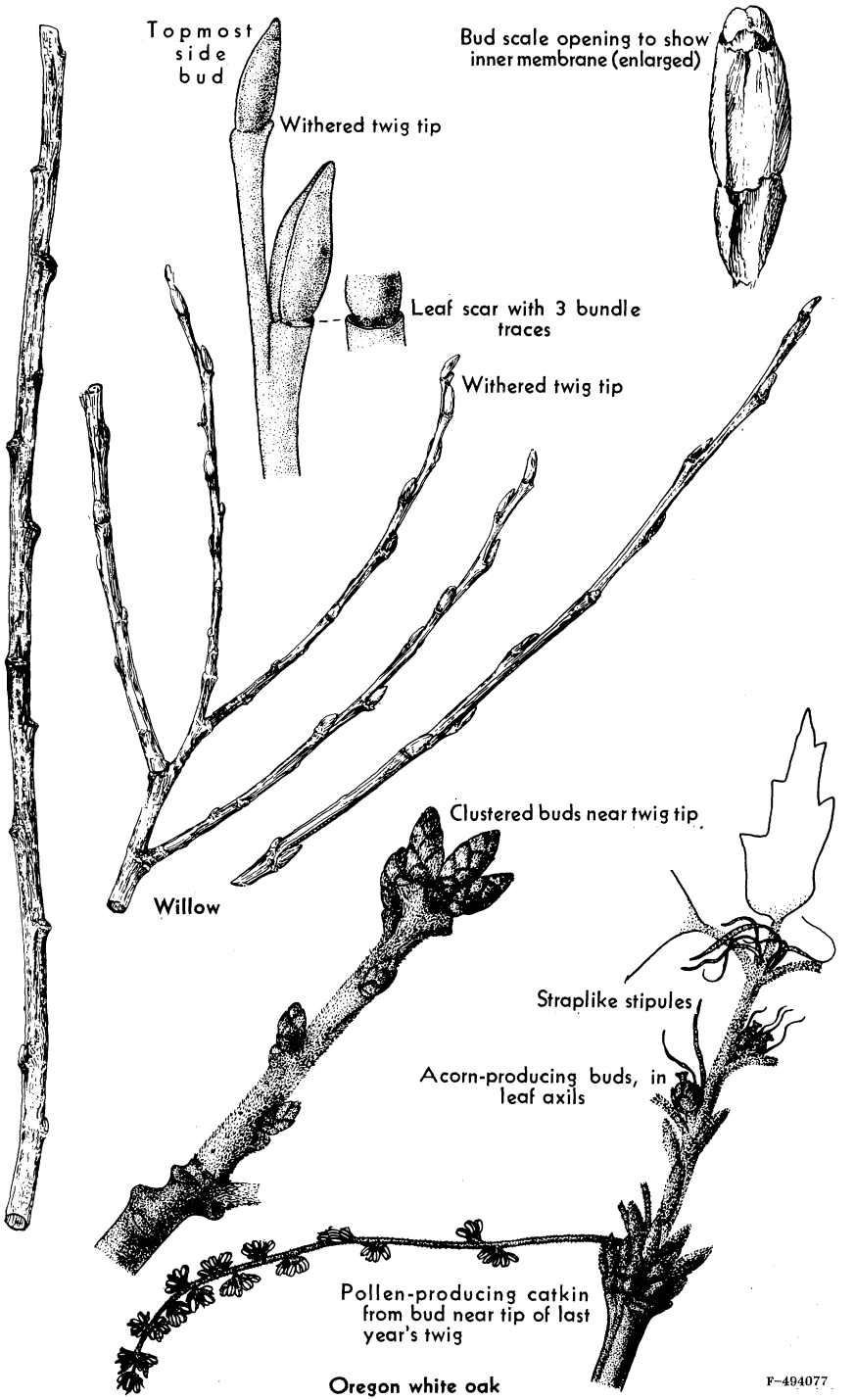
F-494076

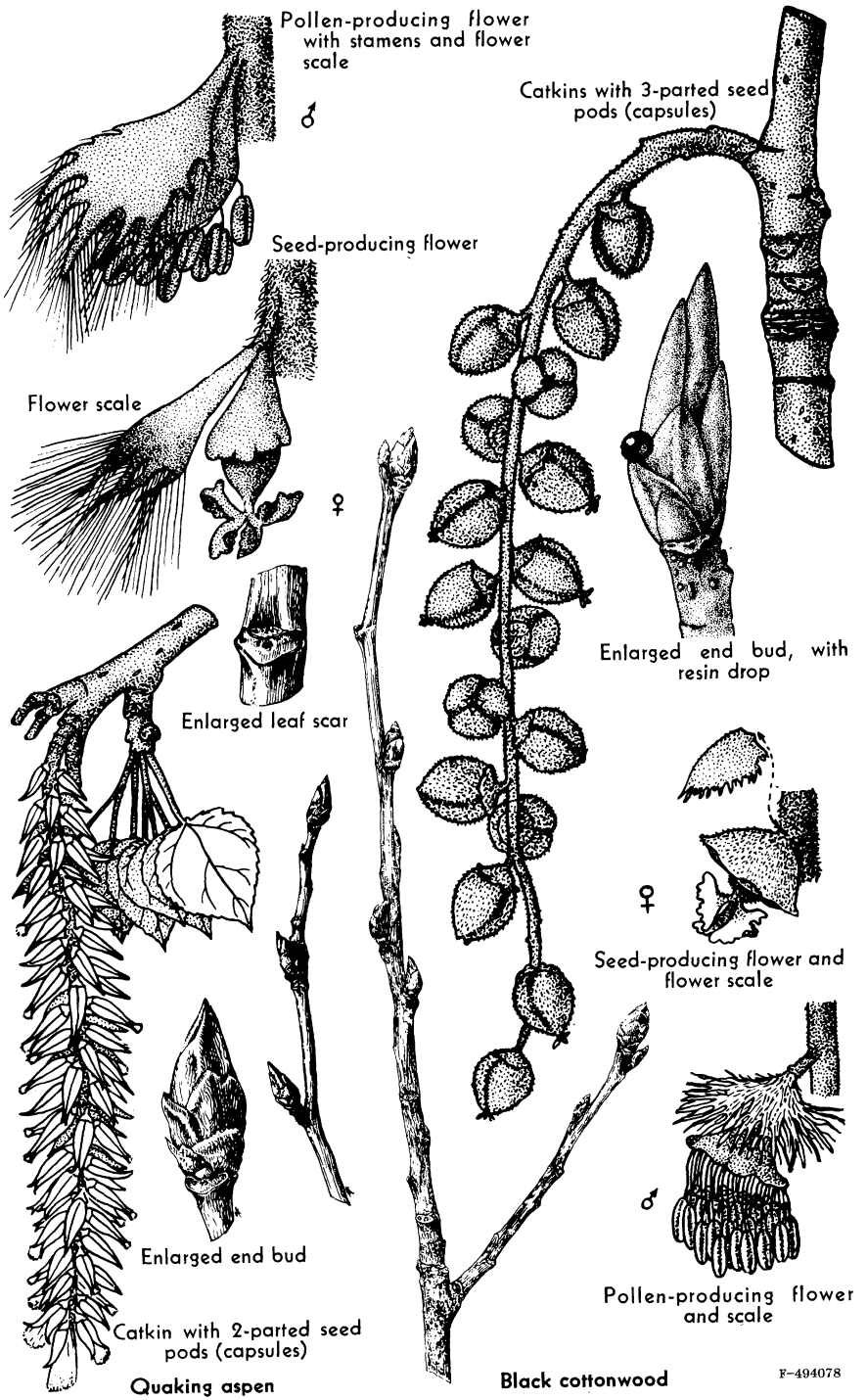
PLANTS DECIDUOUS · FALL AND WINTER

Buds, Twigs Alternate
Plants Unarmed · With Catkins

[Willows, oak, aspen, cottonwood, hazelnut, alders, and birches]

1. **Catkins hidden in buds until late winter or spring;** leaf scars often on raised cushions; bundle traces 3 or more; stipule scars linelike or ridgelike, at ends of leaf scars; buds in the ⅖ arrangement on twigs (each bud at 144° around twig from bud next below or above).
willows, oak, aspen, cottonwood.
2. **End buds lacking, twig tips dying back to topmost side bud; bud scale 1, caplike,** centered over leaf scar, opening on side next to twig, membrane-lined; catkin buds sometimes larger than leafy-shoot buds and opening before them (as in the pussy willows); pollen- and seed-producing catkins on separate plants, usually erect or spreading; twigs and buds often highly colored (red, yellow, orange, or bronze), shiny or dull, or with bluish or whitish "bloom" easily rubbed or washed off (pruinose); twigs flexible near tips, brittle near base, often breaking off and rooting in moist soils; **bark very bitter,** in some species known to contain the antirheumatic and tonic glucoside (salicin) formerly a source of aspirin; shrubs or trees commonly stump- or root-sprouting or layering, often thicket-forming; along streams, on sand or gravel bars, or sometimes in open woods (as, for example, the 2 common upland species, Bebb and Scouler willows)----------**willows** (***Salix*** spp.).
2. **End buds present,** like side buds but often larger; **bud scales several to many, spirally overlapping;** pith somewhat 5-angled in cross section.
Oregon white oak, quaking aspen, black cottonwood.
3. **Twigs, buds finely fuzzy with yellowish-rusty, star-shaped or clustered hairs; buds clustered at twig tips;** egg-shaped, bluntly pointed at tip, to ½ inch long; **bud scales many, in 5 nearly vertical rows;** pollen-producing catkins stringlike, soon withering, drooping from buds near tip of last year's twigs, on same plant as the single or paired acorn-producing flowers in leaf axils of new twigs; bundle traces to 12; stipules narrowly strap-shaped, persistent or leaving small, indistinct stipule scars; usually trees (shrubby at higher elevations), stump- or root-sprouting; common w., abundant locally e. slopes of Cascades, Yakima Valley, Wash., and southward to Mt. Hood National Forest, Oreg.
Oregon white oak (*Quercus garryana*).
3. **Twigs, buds shiny, usually hairless or nearly so; buds resinous, not clustered at twig tips,** egg- or cone-shaped, taper-pointed, often curved at tip; **bud scales 6 or 7, the lowest (smallest) one centered over leaf scar; catkin buds plumper than leafy-shoot buds and opening before them;** twigs often somewhat spurlike and roughened by raised, crowded leaf scars; bundle traces 3, simple or compound; pollen- and seed-producing catkins on separate trees, drooping, stalked, from


Topmost side bud
Withered twig tip
Bud scale opening to show inner membrane (enlarged)
Leaf scar with 3 bundle traces
Withered twig tip
Clustered buds near twig tip
Willow
Straplike stipules
Acorn-producing buds, in leaf axils
Pollen-producing catkin from bud near tip of last year's twig
Oregon white oak
F-494077


Pollen-producing flower with stamens and flower scale
♂
Catkins with 3-parted seed pods (capsules)
Seed-producing flower
Flower scale
♀
Enlarged end bud, with resin drop
Enlarged leaf scar
Seed-producing flower and flower scale
♀
Enlarged end bud
♂
Pollen-producing flower and scale
Catkin with 2-parted seed pods (capsules)
Quaking aspen
Black cottonwood
F-494078

1½ to nearly 8 inches long, many-flowered; each flower in shallowly cup-shaped disk attached to deeply cleft, hairy-fringed, often soon-falling flower scale; seed pods (capsules) greenish, to ¼ inch long, cone- or globe-shaped, splitting down from top into 2 or 3 parts (valves); seeds many, tiny, silky- or cottony-hairy-tufted; fast-growing trees, stump- or root-sprouting; moist sites along river valleys, or on cut- or burned-over mountain areas__**quaking aspen** and **black cottonwood.**

4. **End buds to ⅜ inch long, only slightly resinous, reddish brown, little (if any) larger than the often appressed and incurved side buds; twigs with 5-lobed pith;** pollen-producing catkins to 2 inches long, each flower with 6–12 red, maroon, or purple anthers; seed-producing catkins to 4 inches long in fruit, each flower tipped by 2 slender, 2-lobed pollen-receiving organs (stigmas); flower scales 3- to 8-cleft; **seed pods cone-shaped, thin-walled, splitting into 2 parts;** bark of young trees greenish to chalky white, with dark scarlike patches; trees, often in almost pure stands, commonly 20–40 feet high, often much taller, widely distributed at middle elevations, mountains of e. Oreg., e. Wash.

quaking (or **golden**) **aspen** (***Populus tremuloides***).

4. **End buds to nearly 1 inch long, very resinous** (drops of fragant reddish resin often on bud scales), **orange brown, often curved and a little larger than side buds; twigs with 5-sided pith (star-shaped when dry);** pollen-producing catkins to 3 inches long, each flower with 30–60 purplish anthers; seed-producing catkins to nearly 8 inches long in fruit; each flower tipped by 3 broad, deeply lobed pollen-receiving organs (stigmas); flower scales cleft into many, narrow (almost threadlike) lobes; **seed pods globe-shaped, thick-walled, hairy, splitting into 3 parts;** bark of young trees smooth, greenish to yellow or gray; large trees (to more than 100 feet high in river valleys w. of Cascades), e. Oreg., e. Wash.

black cottonwood (***Populus trichocarpa***).[27]

1. **Catkins visible in fall and winter; pollen-producing catkins preformed and out of the bud by late summer, tassellike, erect or drooping, single or clustered; pollen- and seed-producing flowers on same plant;** twigs with small, compressed or triangular pith.

hazel, alders, and **birches.**

5. **Only pollen-producing flowers in catkins; hazelnuts sometimes persistent, in bristly-hairy, brownish, fringe-beaked husks, single or 2- to 4-clustered at twig tips;** catkins hoary, tan or straw-colored, 1–3 inches long, erect at first, soon spreading or drooping, appearing almost stalkless but at tips of very short side twigs; hazelnut-producing flower buds globe-shaped, plumper than leafy-shoot buds, each with 2 bright red, short, threadlike pollen-receiving organs (stigmas) visible at tip in early spring; end buds lacking; leaf scars triangular to half-round, 2-ranked; bundle traces 3 to several, scattered and indistinct; **both buds**

[27] The very similar balsam poplar (*Populus balsamifera*) has egg-shaped, hairless seed pods that split into only 2 parts; it is introduced in Multnomah Co., Oreg., otherwise not reported from Oregon or Washington.

and leaf scars in ½ arrangement on twigs (each bud or leaf scar 180° around twig from bud or leaf scar next below or above); twigs slender, zigzag, with spreading yellowish (often gland-tipped) hairs; clustered shrubs (sometimes treelike and to 25 feet high), often suckering from base, sometimes thicket-forming; mostly w., occasionally e. of Cascades.

California hazel (***Corylus cornuta*** var. ***californica***).

5. **Both pollen- and seed-producing flowers in catkins; buds and twigs somewhat resinous;** leaf scars with 3 simple (or sometimes compounded) bundle traces; **buds and leaf scars in ⅓ arrangement on twigs** (each bud or leaf scar 120° around twig from bud or leaf scar next below or above)_____**alders** and **birches.**

6. **Seed-producing catkins conelike, persistent, with woody, mostly 5-lobed scales,** stalked, in stalked clusters at twig tips; twigs faintly 3-angled, smooth, with pale, dotlike pores (lenticels) but not warty with resin dots; pith triangular in cross section; end buds present, stalked; roots often with (presumably nitrogen-fixing) nodules; buds in clockwise spiral on twigs_____**alders** (***Alnus*** spp.).

7. **Bud scales overlapping, at least 3; buds stalkless or nearly so** (except end buds), **sharply taper-pointed at tips, dark purplish;** "seeds" (nutlets) tissue-papery-winged; last season's seed-producing catkins long-stalked; next season's seed-producing catkins hidden in the bud until leaves unfold; seasonal twigs yellow brown, shiny-resinous as are also the pollen-producing catkins; tall, slender shrubs or small trees, often thicket-forming; along cool mountain streams, Cascade, Wallowa, and Blue Mts., e. Oreg., e. Wash.

Sitka alder (***Alnus sinuata***).

7. **Bud scales meeting at edges but not overlapping** (valvate), **2 or 3; buds distinctly stalked, bluntly pointed or rounded at tips;** last season's seed-producing catkins short-stalked to almost stalkless; next season's seed-producing catkins out of the bud by winter but small and undeveloped (white alder usually earlier than red alder).

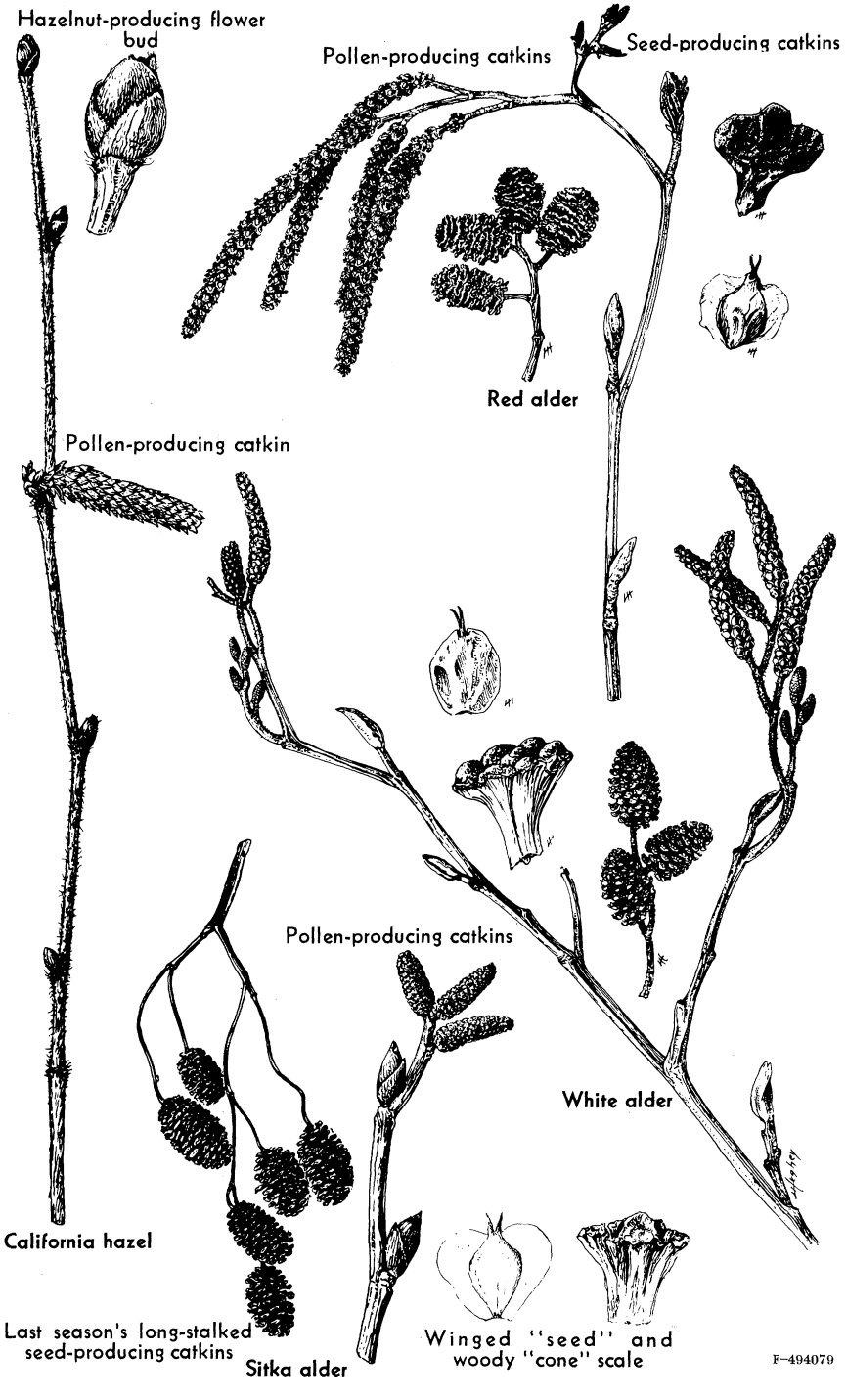
8. **Trees, commonly to 40 feet high, often much taller; bark pale grayish or whitish, smooth except on lower trunks; new twigs and pollen-producing catkins shiny-resinous.**

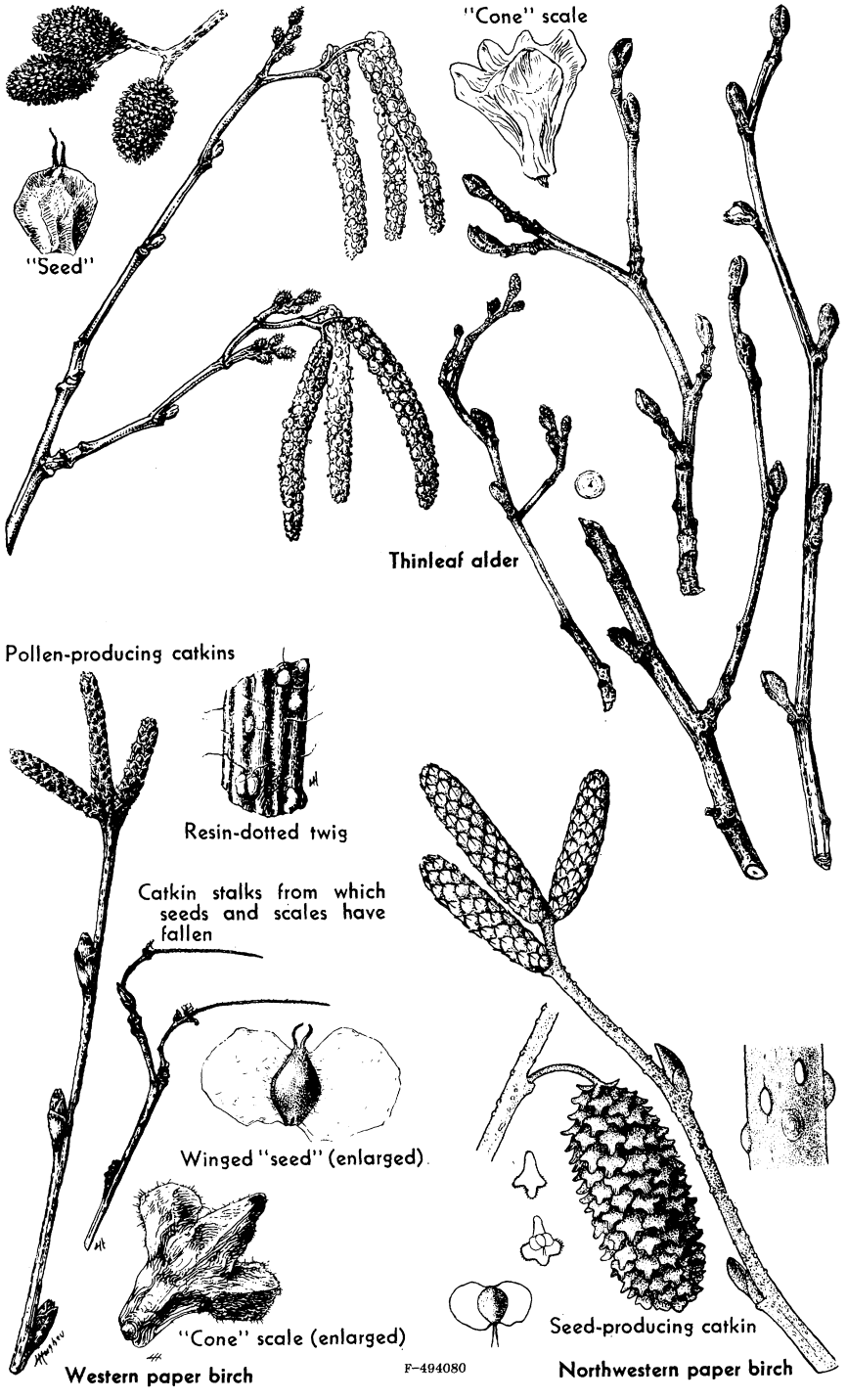
9. **Inner bark and sapwood turning orange or bright red when freshly cut; pollen-producing catkins brownish to red; "seeds" with narrow (often nearly encircling) papery wings;** seasonal twigs often clear bright red; buds dark red; valuable hardwood trees, often in almost pure stands on cut- or burned-over areas; mostly w. of Cascades, Oreg., Wash.

red (or **Oregon**) **alder** (***Alnus rubra***).

9. **Inner bark and sapwood not as above; pollen-producing catkins pale green to olive brown, becoming reddish; "seeds" narrowly margined, scarcely winged;** twigs greenish at first, becoming dark orange red; buds bright red; both sides of Cascades, common along streams e. Oreg., e. Wash.

white alder (***Alnus rhombifolia***).


Hazelnut-producing flower bud
Pollen-producing catkins
Seed-producing catkins
Red alder
Pollen-producing catkin
Pollen-producing catkins
White alder
California hazel
Last season's long-stalked seed-producing catkins
Sitka alder
Winged "seed" and woody "cone" scale
F-494079


"Cone" scale
"Seed"
Thinleaf alder
Pollen-producing catkins
Resin-dotted twig
Catkin stalks from which seeds and scales have fallen
Winged "seed" (enlarged)
"Cone" scale (enlarged)
Seed-producing catkin
Western paper birch
F-494080
Northwestern paper birch

8. **Tall shrubs or small, straggly trees; bark gray brown and smooth on young stems, reddish brown and scaly on old trunks; pollen-producing catkins and seasonal twigs dull-waxy-resinous, minutely ashy-hairy;** last season's seed-producing catkins commonly disfigured by disease; "seeds" narrowly margined, scarcely winged; commonest alder of e. Oreg., e. Wash.

thinleaf (or **mountain**) **alder** (***Alnus tenuifolia***).

6. **Seed-producing catkins somewhat conelike or tassellike, stalked, single** (sometimes clustered), **erect or drooping at tips of dwarf side twigs, not persistent except for their central, erect or recurved stalks from which the 3-lobed papery scales fall**—either with or after shedding of the tissue-papery-winged "seeds" (nutlets or samaras); next season's seed-producing catkins hidden in the bud until leaves unfold in spring; twigs slender, round, sparsely resin-dotted or densely warty with resin glands when young, becoming smooth and marked with pale pores (lenticels); pith compressed, somewhat 3-sided; end buds lacking, stem tips dying back to topmost side buds except on dwarf side twigs; buds only slightly resinous, to ¼ inch long, stalkless but sometimes appearing stalked at tips of dwarf side twigs; bud scales at least 3, spirally overlapping; leaf scars somewhat crescent-shaped; bundle traces 3; buds and leaf scars in counterclockwise spiral on twigs; shrubs or trees of moist sites, sometimes thicket-forming.

birches (***Betula*** spp.).

10. **Bark shredding or separating into papery layers at base of old trunks; seasonal twigs sparsely resin-dotted but not warty with resin glands;** seed-producing catkins rather plump, soon drooping, their scales sometimes persistent until late fall; trees to 60 or 90 feet high.

paper birches (varieties of ***Betula papyrifera***).

11. **Seasonal twigs orange brown, with a few straggly white hairs; bark of lower trunk warm brown, shredding to show orange brown or creamy layers underneath;** large trees to 90 feet high; both sides of Cascades in n. Wash. and on the Colville Indian Reservation, also in Blue Mts., se. Wash.; not reported from Oreg.

western paper birch (***Betula papyrifera*** var. ***commutata***).

11. **Seasonal twigs finely hairy or almost hairless, reddish brown to gray; bark of lower trunk dark silvery gray, peeling to show purplish or whitish, shreddy layers underneath;** trees to 60 feet high, sometimes with clustered trunks; rather rare, in Wallowa Mts. of ne. Oreg., Blue Mts. of se. Wash.

northwestern paper birch (***Betula papyrifera*** var. ***subcordata***).

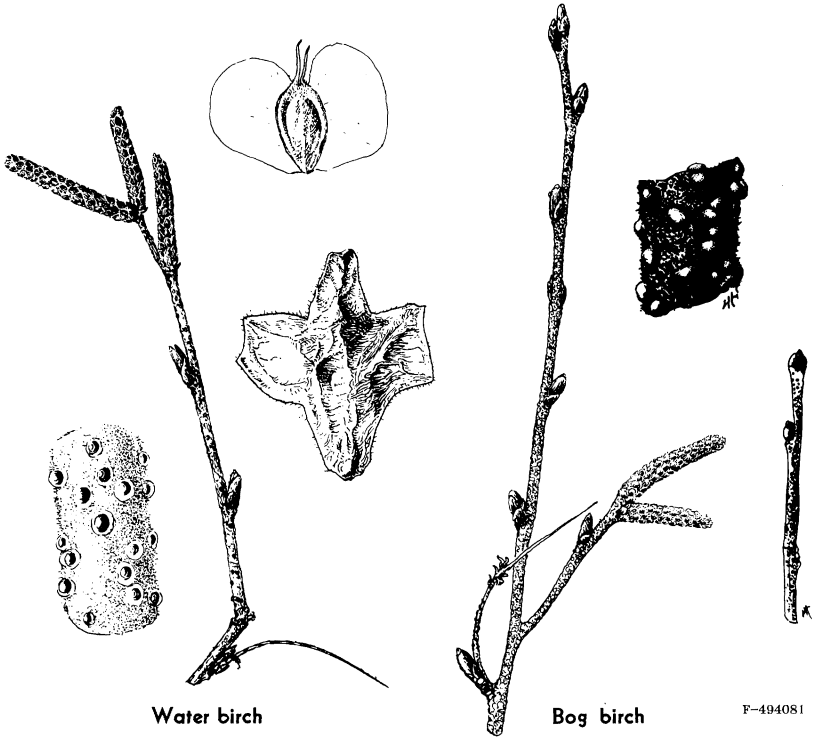
10. **Bark not shredding or separating into layers as above; twigs densely warty with resin glands,** minutely hairy under a lens; seed-producing catkins often erect; shrubs or small trees, often thicket-forming.

12. **Bushy trees to 40 feet high, or tall shrubs;** branches wandlike, ascending; bark bronze, dark red to purplish brown or gray, shiny, marked with elongated, brownish pores (lenticels); twigs with mostly reddish or amber-colored resin glands; seed-producing catkins rather stout, usually single, erect or drooping; **"seeds" broadly winged;** wooded areas along streams; commonest birch of e. Oreg., e. Wash.

water birch (*Betula occidentalis*).[28]

12. **Much-branched, spreading shrubs to 8 or 10 feet high;** branches flexible; twigs dark reddish brown with whitish, warty resin glands; seed-producing catkins rather slender; **"seeds" narrowly winged;** often in dense thickets in mountain bogs, e. Oreg., e. Wash.

bog birch (*Betula glandulosa*).



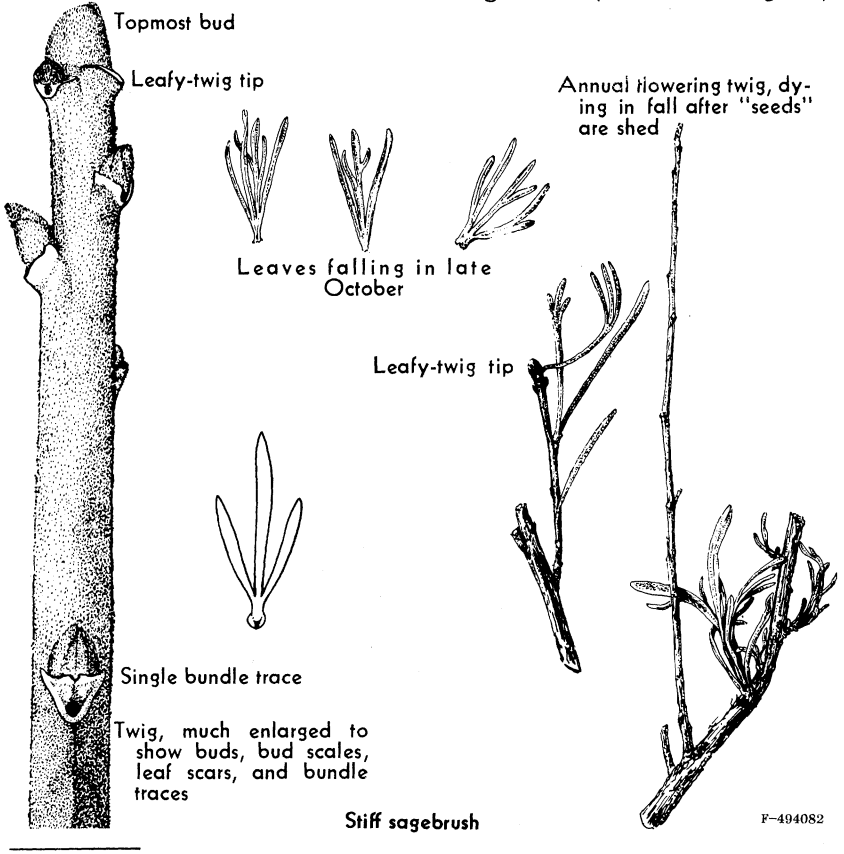
[28] A drooping-branched variety of water birch (*Betula occidentalis* Hook., var. *fecunda* Fern., Rhodora 47:317. 1945.), with paired or clustered seed-producing catkins and dark bronze bark, was originally described by Piper and Beattie in *The Flora of the Palouse Region*, p. 55, 1901, from material growing on "Springy hillsides near Almota," Garfield Co., e. Wash., but was not given any name, being merely the third "B". Perhaps this is the same as Guthrie birch (*Betula guthriei* Sudw., *A New Western Birch.* Amer. For. and For. Life 33 (401):386–387. May 1927.), which Major Guthrie found in 1924, "in northeastern Oregon growing along the Imnaha River and its tributary canyons from the mouth of the river to a point 35 miles above, reaching elevations of from about 2,500 to 4,500 feet."

PLANTS DECIDUOUS · FALL AND WINTER

Buds, Twigs Alternate
Plants Unarmed · Without Catkins

1. **Plants with sagebrush odor, taste; low, rigidly branched shrubs to 2 feet high, losing their (mostly deeply 3- to 5-cleft) leaves by late fall;** twigs tan to brownish, finely white-woolly-hairy to almost hairless; older bark stringy-fibrous, dark; **buds present except on the dead (but drying-persistent) annual seed-head twigs, small,** to ⅛ inch long, topmost bud larger than side buds; bud scales several, overlapping, hard to see (even under lens) because of dense, white-woolly hairs; leaf scars often edged with torn leaf-base remnants, bundle trace 1; shrubs not layering or root-sprouting; poor rocky soils, common locally in scablands, e. Oreg., e. Wash.; type locality, plains of Snake River.

stiff sagebrush (*Artemisia rigida*).[29]



[29] In spring and summer, stiff sagebrush is often confused with threetip sagebrush (*Artemisia tripartita*) which is evergreen, as are also low sagebrush (*A. arbuscula*), silver sagebrush (*A. cana*) and big sagebrush (*A. tridentata*). Bud sagebrush (*A. spinescens*) also sheds its leaves, but it has spiny-tipped twigs.

1. **Plants without sagebrush odor or taste.**
   2. **Seed-head or fruit clusters persistent, distinctive** (even after seeds have fallen), **often conspicuous at a distance.** [Alternate 2, p. 136.]
      3. **Shrubs fall-blooming;** flower heads bracted, with tiny, yellow disk flowers, ray flowers lacking; seed heads stalked, narrowly cylindrical or bell-shaped, in usually broad (elongate in fetid rubber rabbitbrush), roundish-topped end clusters; **seed-head bracts firm-papery, often keeled, overlapping, in 4 or 5 more or less vertically ranked rows;** "seeds" (achenes) hairy, crowned by ring of whitish or tawny, hairlike bristles (pappus); leaves often drying-persistent, threadlike to (mostly) linear, 1- and/or 3- to 5-nerved, plane or spirally twisted; leaf buds not developing until spring or, when moisture and temperature favorable, clusters of tiny leaves remain in leaf-scar or leaf-base axils; usually round-bushy shrubs 1–6 (or 8) feet high; common, often with sagebrush, in dry (sometimes in alkaline) sites, e. Oreg., e. Wash.

         rabbitbrushes (***Chrysothamnus*** spp.).

      4. **Twigs flexible, whitish or greenish, hairy (loosely white-woolly-hairy, or grayish- to greenish-feltlike and so resin-matted that scraping twig is necessary to detect hairiness),** not or indistinctly striate; seed heads to ½ inch long; seed-head bracts to 25, in distinctly vertical ranks; leaves usually 1-nerved, plane; stems often with appreciable rubber content; shrubs with deep taproots, sprouting from base after cutting but rarely after burning; reportedly somewhat poisonous to livestock under certain conditions; varieties (or subspecies) with various intergrading characters, often hard to tell apart.

         rubber rabbitbrushes (***Chrysothamnus nauseosus***).

      4. **Twigs brittle, white to pale green, hairless or minutely stiff-hairy** (finely sand-papery to the touch), **sometimes shiny, often sticky-resinous near seed heads or with resin drops in leaf or leaf-scar axils, striate;** seed heads to ⅓ inch long; seed-head bracts to 15, often in indistinctly vertical ranks, sometimes broadest near their bent-inward tips; leaves 1- and/or 3- to 5-nerved, often spirally twisted, usually linear (sometimes to nearly ½ inch wide); stems usually much-branched from near base; varieties (or subspecies) with various intergrading characters, often hard to tell apart.

         Douglas rabbitbrushes (***Chrysothamnus viscidiflorus***).

   3. **Shrubs not fall-blooming** (mallow ninebark, shinyleaf spires, creambush rockspirea, deerbrush ceanothus, redstem ceanothus, smooth sumac, mountain-ashes, Pacific poison-oak, western poison-ivy).
      5. **Bark peeling in many layers; seed pods** (follicles) usually 2 for each flower, **in drooping, somewhat umbrella-shaped clusters** (**corymbs**) **at tips of short side twigs; sucker** shoots common, usually stouter, taller than other branches, **and with smooth, deep reddish or purplish bark;** buds with several overlapping bud scales; leaf scars with 3 (rarely 5) bundle traces and with a stipule scar on either side at top

Rubber rabbitbrush F-486427

edge of leaf scar; **star-shaped hairs on twigs, seed pods and bud scales;** rootstocks long-spreading, with yellow pith; much-branched, erect shrubs to 6 feet high; burned or cut-over areas, rocky dry hillsides, washes, open woods or roadsides; common, Wallowa and Blue Mts., ne. Oreg., se. Wash._____**mallow ninebark (*Physocarpus malvaceus*).**

5. **Bark not peeling in many layers as above,** sometimes loose-stringy or flaking off in small, thin patches on older stems.
   6. **Fruits more or less seedlike** (achenes, follicles, capsules), **massed in distinctive clusters;** true end buds lacking, stem tips dying back to topmost side bud.

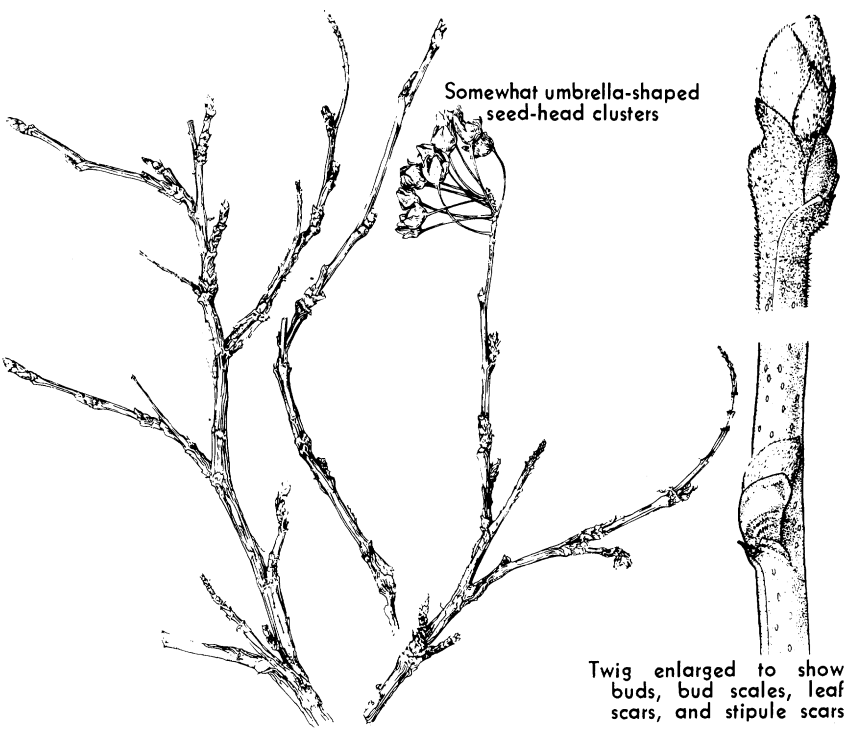
471114 O–60–9

7. **Seed-head clusters roundish- to flattish-topped** (corymbose), to 4 inches across, **at tips of erect, shiny, tan- to brown-barked, low, often unbranched stems which grew from buds on shallow, trailing, woody underground stems;** seed pods (follicles) splitting down from top along inner groove; buds tiny (to ⅛ inch long); bud scales several, overlapping; leaf scars indistinct, bordered by torn edges of leafstalk base; bundle trace single; buds, bud scales, leaf scars hard to see without hand lens; **stipules, stipule scars lacking;** low shrubs to 2 or 3 feet high, stems sometimes dying back to near ground line; commonest spirea of middle altitudes; dry hillsides, open woods; Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

shinyleaf (or **birchleaf**) **spirea** (***Spiraea lucida***).

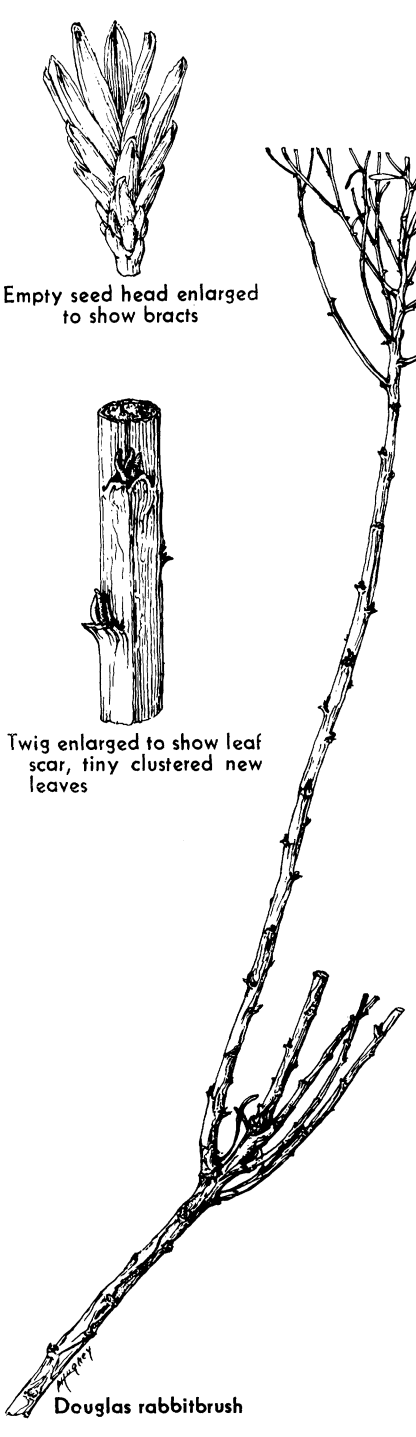
7. **Seed-head clusters elongate, narrow to broad, sometimes much-branched, nearly erect, ascending or drooping, at twig or stem tips; bud scales 2 to several, about equally sized, overlapping little if any, soon spreading, sometimes falling, exposing tiny, densely hairy, undeveloped leaves; bundle traces 3 (sometimes appearing fused into 1 in ceanothus).**

8. **Seed pods (achenes) tiny, long-white-hairy, beaked,** 5 for each flower, on a disk, **opposite the 5 persistent**



Empty seed head enlarged to show bracts

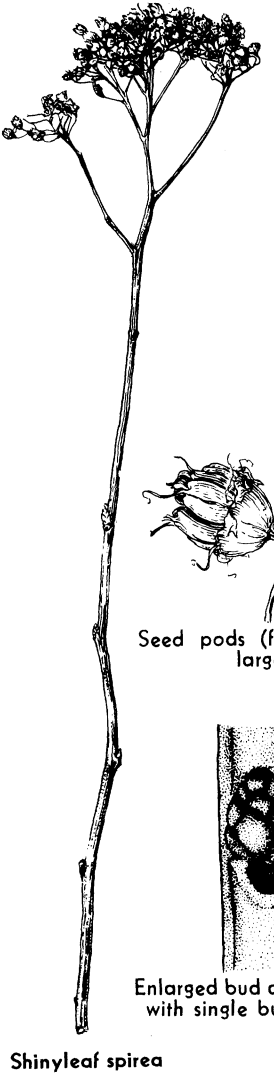
Twig enlarged to show leaf scar, tiny clustered new leaves



Douglas rabbitbrush

Sterile stem tip dying back

Corymbose seed-head clusters



Shinyleaf spirea

Seed pods (follicles) enlarged

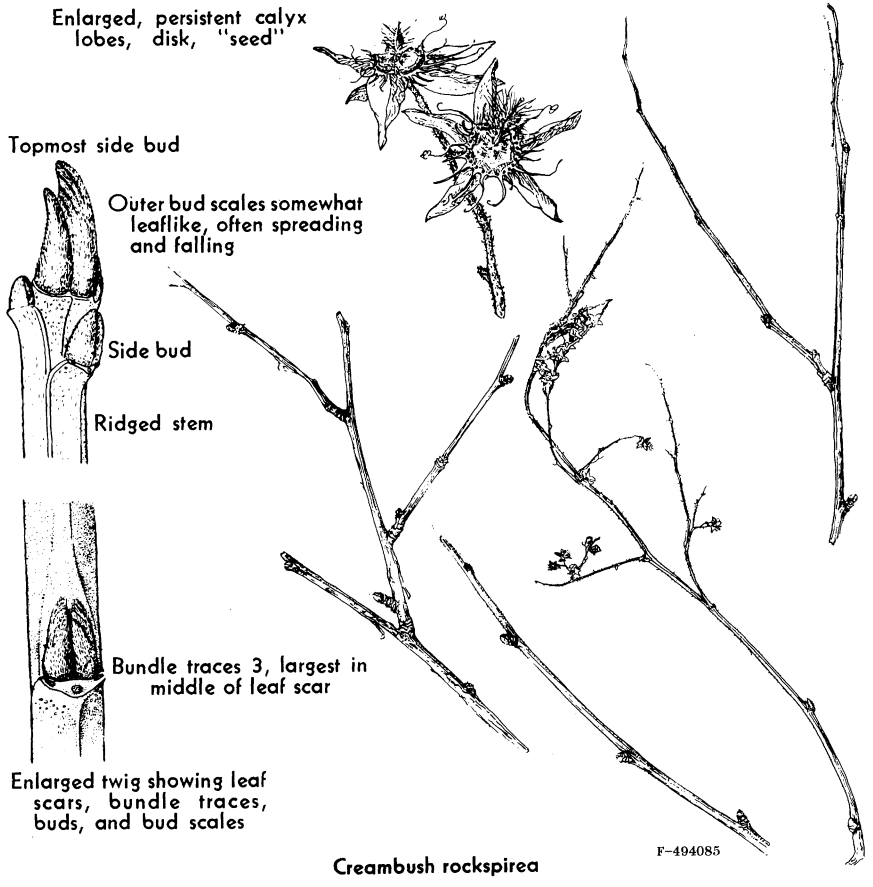
Enlarged bud and leaf scar with single bundle trace

F-494084

calyx lobes, massed in much-branched, pyramidal, drooping end clusters; twigs, bud scales finely, often thinly hairy; buds to ¼ inch long; **bud scales 2 (or 3), purplish brown, with leaflike veining toward tips, soon spreading, falling, exposing tiny, densely white-hairy, undeveloped leaves,** buds then appearing naked; leaf scars crescent- or broadly V-shaped, cushioned; **stipules, stipule scars lacking;** twigs lined or ridged downward from leaf scars; erect, bushy shrubs with slate-gray bark; stems, branches often arching near tips, 3–20 feet high; open woods, cutover lands or canyon bottoms, e. Oreg., e. Wash.; type locality, Clearwater River, Idaho.

creambush rockspirea, or **oceanspray (*Holodiscus discolor*).**

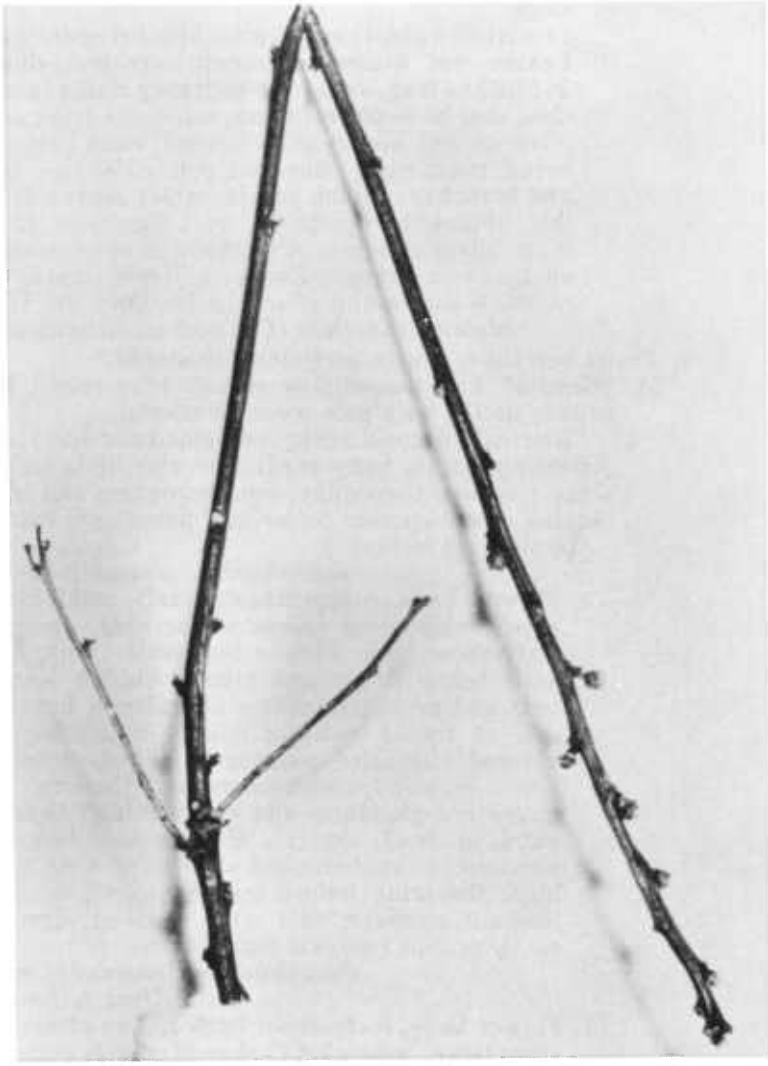
8. **Seed pods (capsules) 3-parted, sticky-resinous, mostly fallen from their stalked, cuplike disks which persist in elongated, branched, compound, stalked clusters; twigs dotted with tiny, reddish resin blis-**



Creambush rockspirea

ters; side buds often stalked; bud scales several, dark, resembling stipules, spreading to expose tiny, densely hairy, undeveloped leaves and/or flower-bud clusters; stipule scars reddish-resinous-glandular, on either side at top edge of leaf scar; **bundle traces 3 but often appearing single because of a resinous-corky substance soon covering the leaf scar;** loosely branched or erect shrubs 3–12 feet high, stump-sprouting after cutting.

ceanothus (***Ceanothus*** spp.).



Redstem ceanothus
(note stalked buds)

F–486439

9. **Leaves (at least a few) winter-persistent,** entire-margined; seed-pod clusters to 6 inches long, 4 inches wide; **leaf scars present on lower part of the 3- to 5-inch long stalk (peduncle) bearing the seed-pod clusters;** side buds erect or nearly so, stalkless or short-stalked, slender; outer bud scales lance-shaped; **twigs and branches greenish, tan or reddish brown, slender,** often slightly drooping, usually hairy; loosely branched shrubs 3–12 feet high; rare e. of Cascades; along roads near Columbia River, Klickitat Co., Wash., Hood River Co., Oreg.

deerbrush ceanothus (*Ceanothus integerrimus*).

9. **Leaves not winter-persistent; seed-pod clusters 2–4 inches long, on 2- to 3-inch long stalks (peduncles) that have no leaf scars;** side buds at an angle, often stalked, mostly globe-shaped; outer bud scales broad, rounded or somewhat pointed at tips; **twigs and branches reddish purple, rather stout** but flexible, hairless or nearly so; erect shrubs to 10 feet high; along streams, in thickets, in open woods or on burns or sunny hillsides; e. lower slopes, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.

redstem ceanothus (*Ceanothus sanguineus*).

6. **Fruits berrylike, winter-persistent, clustered.**

10. **"Berries" red (sometimes orange or scarlet); bark usually dotted with pale pores (lenticels).**

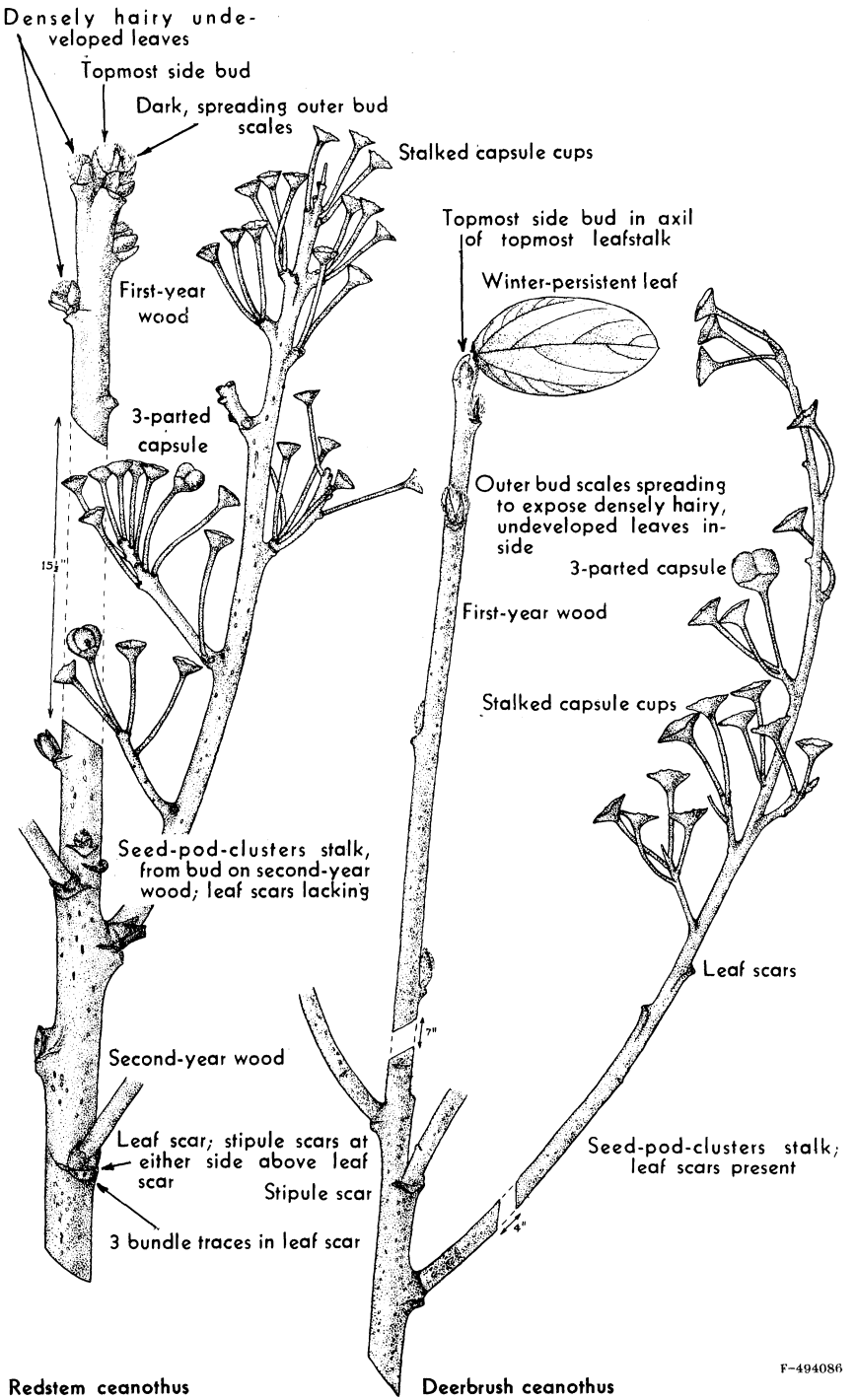
11. **"Berries" (drupes) sticky, red-glandular-hairy, each bearing single, bony seed; true end buds lacking;** sap resinous, thin-milky, soon hardening and blackening after exposure to air, not poisonous; stipules, stipule scars lacking.

skunkbush and **smooth sumacs.**

12. **Flower buds conspicuously scaly, catkinlike, in mostly compound spikes at (or near) twig tips; leafy-shoot buds without bud scales, tiny, hairy, each borne singly and almost hidden between twig and persistent stump of leafstalk base;** leaf scar at tip of leafstalk stump, nearly circular, covered with dried resinous sap which makes the 7 or 8 bundle traces hard to see; **"berries" with mixed red-glandular and clear whitish (hyaline) hairs,** in small, elongate clusters near twig tips; slenderly much-branched shrubs to 4 or 5 feet high, **flowering before leaves appear,** with unpleasant aromatic odor when crushed; dry hills, se. Oreg., not reported from Wash.

skunkbush (or **lemonade**) **sumac (*Rhus trilobata*).**

12. **Flower buds, leafy-shoot buds not as above; leaf scars large, somewhat C-shaped, nearly encircling the small, roundish, hairy buds which lack bud scales;** bundle traces easy to see, several, often in 3 groups of 3 each; **"berries" with mixed red-**



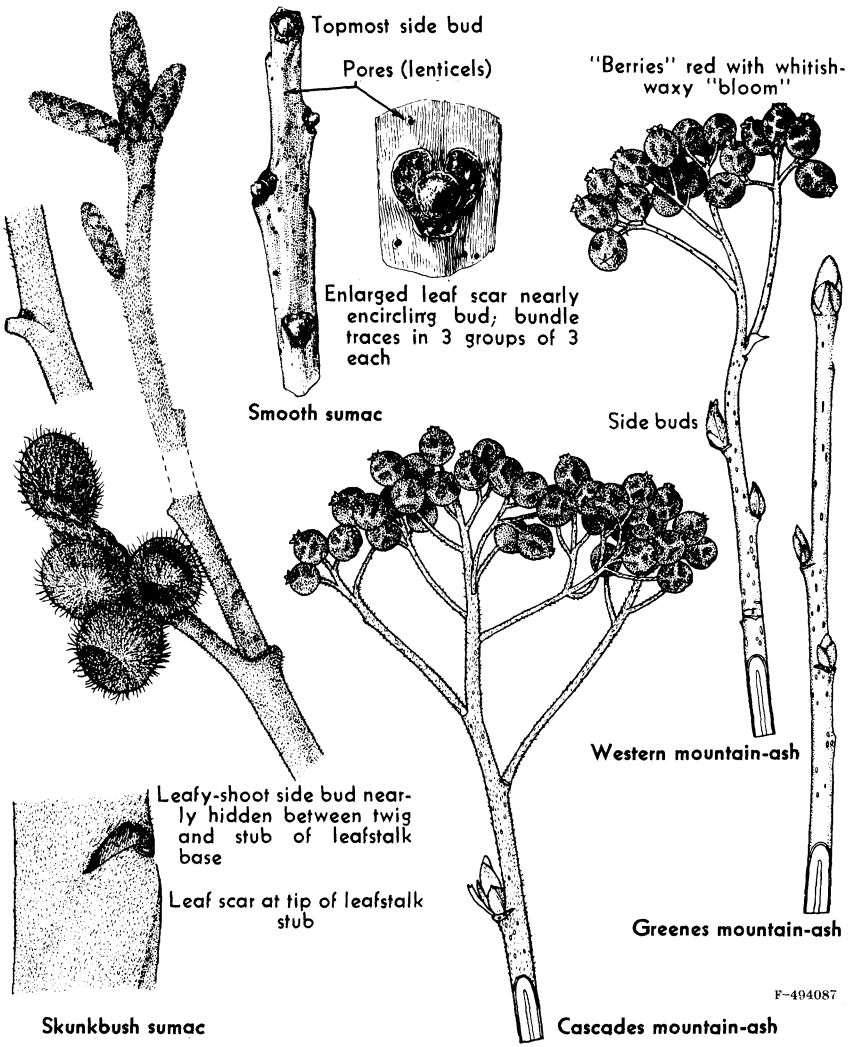
Redstem ceanothus

Deerbrush ceanothus

glandular and red-stained hairs, in large, much-branched, pyramidal end clusters; few- and staghorn-branched shrubs with coarse, 3-sided twigs, to 6 feet or more high, **flowering after leaves appear;** often in large patches connected underground by long-running root branches, along streams, extending to roadsides and upward along dry, rocky hillsides, e. Oreg., e. Wash.

smooth sumac (*Rhus glabra*).

11. **"Berries" (pomes) not as above, hairless or nearly so, 2- to several-seeded,** in usually large, flat- or roundish-topped end clusters (compound corymbs); **true end buds present,** mostly larger than side buds, ellipsoid or somewhat conical, about ½ inch long;



bud scales several, unequal, overlapping, sometimes appearing twisted, outer ones stipulelike, less hairy than inner ones; stipules sometimes remaining attached to base of persistent leafstalks after leaflets fall; stipule scars absent; **leaf scars crescent- to broadly U- or V-shaped, raised on narrow darkened ledges, often with band of tiny reddish glands along inner border or around bud base; bundle traces usually 5, arranged in a single curved line;** low to tall, few-branched mountain shrubs often growing in clumps in or near clearings in moist wooded sites, Cascades, Blue and Wallowa Mts., e. Oreg., e. Wash. ---------- **mountain-ashes** (***Sorbus*** spp.).

13. **Buds dull brown, finely yellowish- to gold-brown-hairy;** lowest bud scales often red or purplish; **"berries" red with whitish-waxy** "bloom," ellipsoid, 14–40, in roundish-topped clusters; **seeds dark or chestnut brown, oval to egg-shaped, somewhat flattened; pointed and lop-sided at base; bark gray;** pores (lenticels) oblong; shrubs 2–10 feet high; Cascades (also Coast Ranges), at 4,000 feet in n. Wash. to 7,500 feet in s. Oreg.; type locality, Cascades, 49° N. lat.

western mountain-ash (***Sorbus occidentalis***).

13. **Buds shiny, sticky or gummy, greenish or greenish-brown, white-hairy** (sometimes only sparsely so); **"berries" globe-shaped.**

14. **"Berries" glossy, orange to scarlet, 80–200, in dense, flat-topped clusters; seeds light brown, oblong; bark reddish,** thick; **pores elongate; bud scales usually sparsely white-hairy;** shrubs to 13 feet high; conspicuous on lower slopes, e. watershed of Cascades; the only native mountain-ash in Wallowa and Blue Mts., ne. Oreg., se. Wash.; type locality, near Pagosa Peak at 9,000 feet alt., sw. Colo.

Greenes mountain-ash (***Sorbus scopulina***).[30]

14. **"Berries" scarlet, often with whitish-waxy "bloom", 30–60, in somewhat roundish-topped (convex) clusters; seeds dark brown, egg-shaped, flattened; bark gray; pores nearly circular; bud scales** (at least the inner) **often rather densely white-hairy;** shrubs to nearly 17 feet high; mostly w. side of Cascades, at elevations of 3,000 feet in n. Wash. to 6,000 feet near Crater Lake, s. Oreg.; type locality, Frog Heaven, Mt. Rainier, Wash.

Cascades mountain-ash (***Sorbus cascadensis***).[30]

[30] Greenes mountain-ash and Cascades mountain-ash have both been confused with Sitka mountain-ash (*Sorbus sitchensis*) and with Siberian mountain-ash (*S. sambucifolia*) neither of which occurs in Washington or Oregon; both Sitka mountain-ash and Siberian mountain-ash have the yellowish- or golden-brown hairiness characteristic of western mountain-ash (*Sorbus occidentalis*).

10. **"Berries" (drupes) whitish, shining, appearing ribbed or lined,** their papery outer coats finally shed and exposing waxy, fibrous inner coats surrounding hard, ridged, single seeds, **borne in dense erect or ascending clusters (racemes) or in lax, spreading or drooping clusters (panicles) in leaf-scar axils; true end buds lacking; buds without bud scales,** the tiny, hairy, undeveloped leaves exposed; leaf scars crescent-shaped; bundle traces mostly 5, arranged in a single curved line; **sap resinous, milky, poisonous to the touch for humans;** shrubs or vines often browsed by cattle and sheep.

poison-ivy and **poison-oak** (***Toxicodendron*** spp.).

15. **Stems simple or erect-branched, sometimes clambering but not vinelike,** often connected underground; leafstalks persisting awhile after their 3 leaflets have fallen; **"berries" in dense, erect or ascending clusters;** shrubs to 3 or 4 feet high; in sunny but rather moist sites, often common locally, e. Oreg., e. Wash. **western poison-ivy (*Toxicodendron rydbergii*).**[31]

15. **Stems often vinelike, climbing by aerial rootlets;** leafstalks not persisting after leaflets fall; **"berries" in loose, drooping clusters;** slender-branched, often tall shrubs; dry woods, roadsides, mostly w. of Cascades but coming through Columbia River Gorge to e. of the Dalles on both the Oregon and Washington sides of the river.

Pacific poison-oak (*Toxicodendron diversilobum*).

2. **Seed-head or fruit clusters not persistent and distinctive as above.** [Alternate 2, p. 126.]

16. **Buds undeveloped or tiny and hard to see.**

17. **Twigs densely white-woolly-hairy, at least in interconnected ridges or lines and around buds; seed-head bracts 4, in a single row, a few persisting until late fall; leaf-cluster scars resembling very short spurs;** low, strong-scented shrubs of dry open sites; poisonous to sheep, especially in spring just before flowering and when browsed together with sagebrush.

horsebrushes (*Tetradymia* spp.).

18. **Branching rather rigid, broomlike; woolly-hairiness close, evenly matted,** thinning with age especially below the tiny, spurlike leaf-cluster scars; shrubs with rough, shreddy bark, not so poisonous as littleleaf horsebrush; dry scablands or sagebrush areas, e. Oreg., e. Wash.; type locality along the Columbia River.

gray horsebrush (*Tetradymia canescens*).

18. **Branching slender, spreading; woolly-hairiness in fluffy, interconnected lines or ridges, persistent, twigs bare or nearly so between them;** more poisonous than is gray horsebrush; bark gray, shreddy; dry open sites, often with sagebrush, central and se. Oreg., not reported from Wash.---**littleleaf horsebrush (*Tetradymia glabrata*).**

[31] Some authors reduce *Toxicodendron rydbergii* to synonymy under *T. radicans.*

F-486443

Western poison-ivy

Pacific poison-oak

F-494088

Western poison-ivy

17. **Twigs not as above,** reddish to purplish brown and finely gray- or yellowish-hairy when young, becoming dark gray and nearly hairless; **spurlike twigs numerous, densely leaf-scarred,** to 1 inch or more long, sometimes branched, **often with drooping-stalked, 4- to 6-seeded "berries" (pomes) hanging near tips until late fall;** end buds and side buds similar, about ⅛ inch long, abruptly pointed at tips; leaf scars narrow, slightly raised; bundle traces 3, tiny; stipule scars lacking; **rigidly much-branched shrubs with smooth gray bark, to 6 feet high;** often growing with western juniper or ponderosa pine, e. Oreg., not reported from Wash.; type locality, " . . . dry hillsides near the Blue Mountains of the Oregon."

squawapple (*Peraphyllum ramosissimum*).

16. **Buds not as above.**

19. **Leafstalk stumps and their attached stipules persistent, partly surrounding the oblong or egg-shaped buds, distinctive;** true end buds lacking; **leaf scars raised, cushioned on leafstalk stumps between the stipules;** bark brown, shreddy or peeling in thin layers; low to tall shrubs.

20. **Twigs soft-woody, canelike, dying back from tips,** sometimes slightly zigzag, **nearly hairless to densely and stiffly glandular-hairy; stipules lance-shaped, brittle, more or less twisted and bent back; leaf scars shriveled, often torn, with 3 indistinct bundle traces, hard to see;** tiny secondary (collateral) buds sometimes produced near base and at side of other buds; stem joints (nodes) appearing knotted and ragged with buds, persistent leafstalks, stipule remnants, and bud scales; **outer bud scales 2 or 3, brownish or purplish, broad, rounded at tips, with indistinct midribs;** inner bud scales several, densely pale-silky-hairy; dried, branched thimbleberry stalks tipped by 5 persistent calyx lobes surrounding the hairy disk from which fruit has fallen, remaining through late fall or early winter; several-stemmed shrubs to 6 feet or more high, from erect, woody, elongated root crowns; moist, shady woods, mountain areas, e. Oreg., e. Wash.

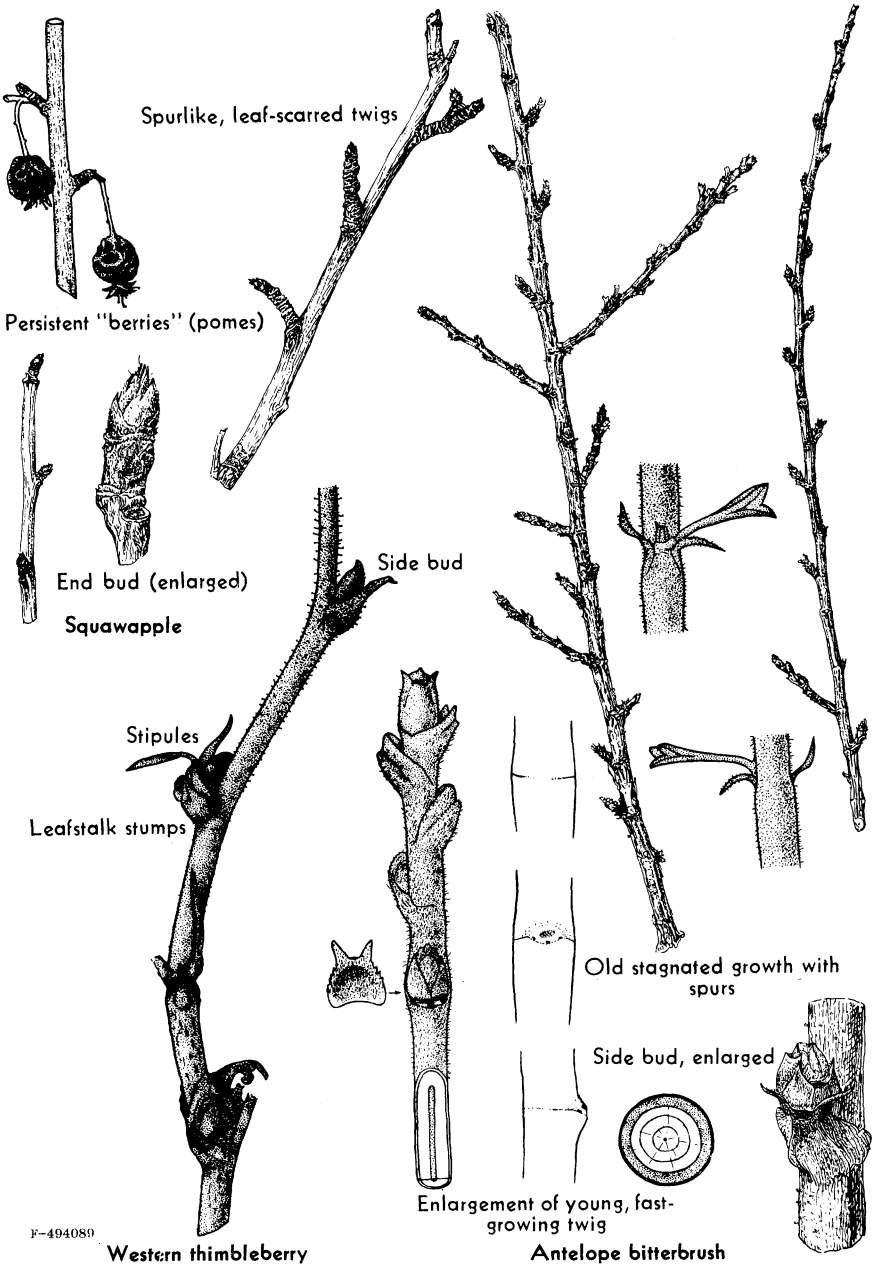
western thimbleberry (*Rubus parviflorus*).[32]

20. **Twigs not soft-woody or canelike as above; leaf scars raised, cushioned on leafstalk stubs between the stipules;** bundle trace 1.

21. **Short, spurlike twigs numerous** (especially on old, stagnated growth), **scarred with persistent leafstalk stumps which, with their attached stipules, overlap like bud scales and appear partly telescoped into each other;** vigorous new twigs often appearing jointed because of encircling stipule scars (when leafstalk stump pulled off, 1 bundle trace is from it and the 2 outer ones for the stipules); tiny, wedge-shaped, winter-persistent leaves with 3-lobed tips sometimes

[32] See Plants Armed Key for winter characters of salmonberry (*Rubus spectabilis*).

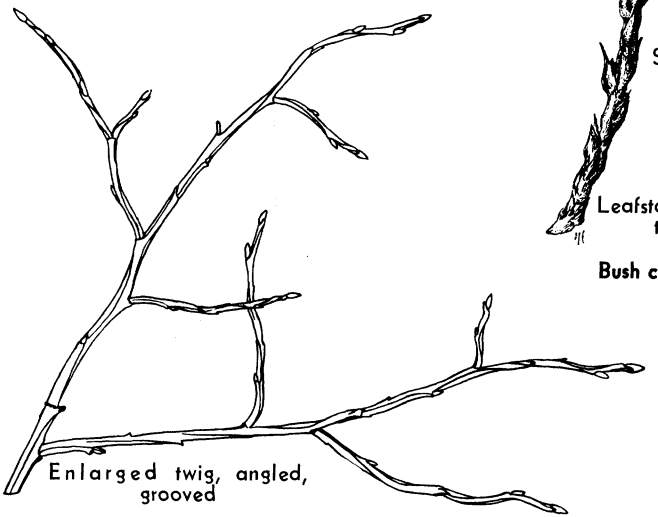
present; typically tall and rigidly branched shrubs or else moundlike and with arching branches, but often low and prostrate after long overgrazing; open places in ponderosa pine woods or with sagebrush, e. Oreg., e. Wash. —**antelope bitterbrush** (***Purshia tridentata***).



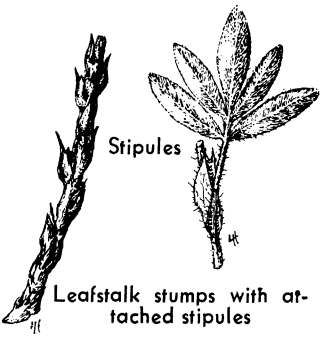
21. **Short, spurlike twigs lacking; leafstalk stumps conspicuous, 3-nerved (outer 2 nerves apparently passing up and out to near tips of the attached, tan to brownish, tissue-papery stipules), nearly enclosing the comparatively large buds and almost encircling the twigs;** bud scales about 4, striate; bark tan to cinnamon or dark reddish brown, mostly finely silky-hairy (hairs usually from tiny, pimplelike bases), soon shreddy; low, bushy or straggly shrubs less than 5 feet high, often with twisted stems and the lowest twigs almost stolonlike; moist mountain valleys or meadows, e. Oreg., e. Wash.
bush cinquefoil (*Potentilla fruticosa*).

19. **Leafstalk stumps, stipules, and leaf scars not as above.**
22. **Leaf scars with only 1 bundle trace.**
23. **True end buds lacking,** stem tips dying back to tiny **stub at side of topmost side bud; fruit berries.**
24. **Bud scales 2, meeting at edges but not overlapping** (valvate).
25. **Twigs grooved and/or angled.**
26. **Shrubs low** (to 15 inches high), **broomy with fine bright green, deeply grooved, sharp-angled twigs; berries red;** often in carpetlike patches under lodgepole pine; Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
grouse whortleberry (*Vaccinium scoparium*).
26. **Shrubs tall** (to 3 feet or more high).
27. **Twigs often bright red** (sometimes green in shady sites), ascending to somewhat spreading, shallowly grooved, slightly angled, often hoary with tiny, whitish, curved hairs, rarely with white-waxy "bloom"; flowering with or after leaf-unfolding; berries purplish-black, flattened-globe-shaped; e. slopes of Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
big whortleberry (*Vaccinium membranaceum*).[33]
27. **Twigs reddish in grooves, greenish on angles,** hairless, glandless, with slight white-waxy "bloom," rather deeply grooved near tips, nearly round toward base; flowering before leaves unfold; berries blue with white-waxy "bloom," globe-shaped; usually straggling shrubs (to 12 feet high in good sites); common on e. slopes of Cascades, Wash. and n. Oreg., scattered or rare in s. Oreg.
ovalleaf whortleberry (*Vaccinium ovalifolium*).

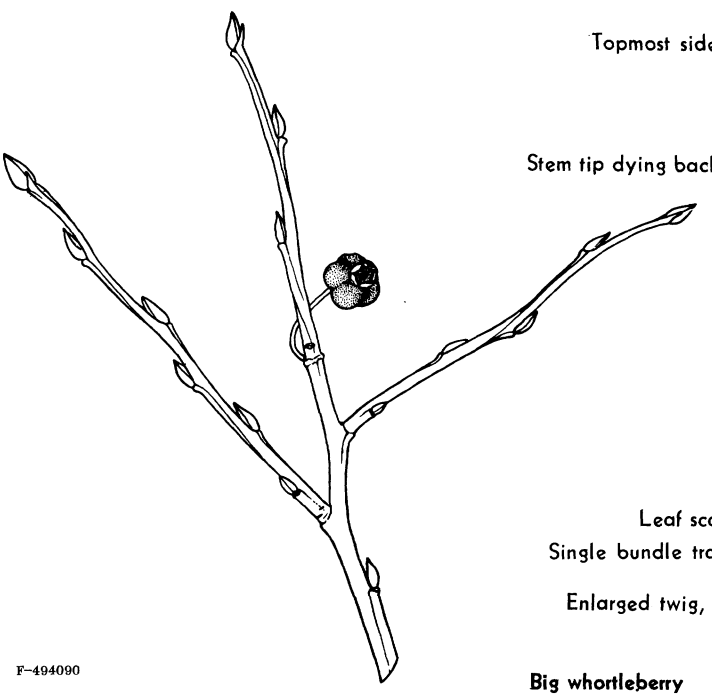
[33] In the Blue Mountains area of northeastern Oregon and southeastern Washington, big whortleberry shrubs tend to be less coarse and not so tall as those of the Cascades, and their berries are more flattened and less juicy. These big whortleberries of the Blue Mountain area are referred to the *Vaccinium globulare* complex by some authors. (See Dr. Ray J. Davis' *Flora of Idaho*, 1952; also Dr. W. H. Camp, Britt. 4: 205–247. 1942.)

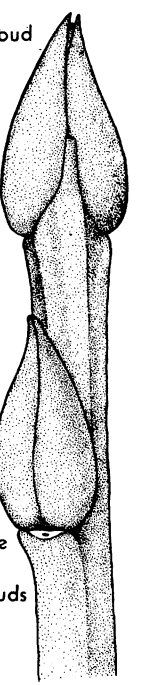


Grouse whortleberry



Bush cinquefoil





F-494090

Big whortleberry

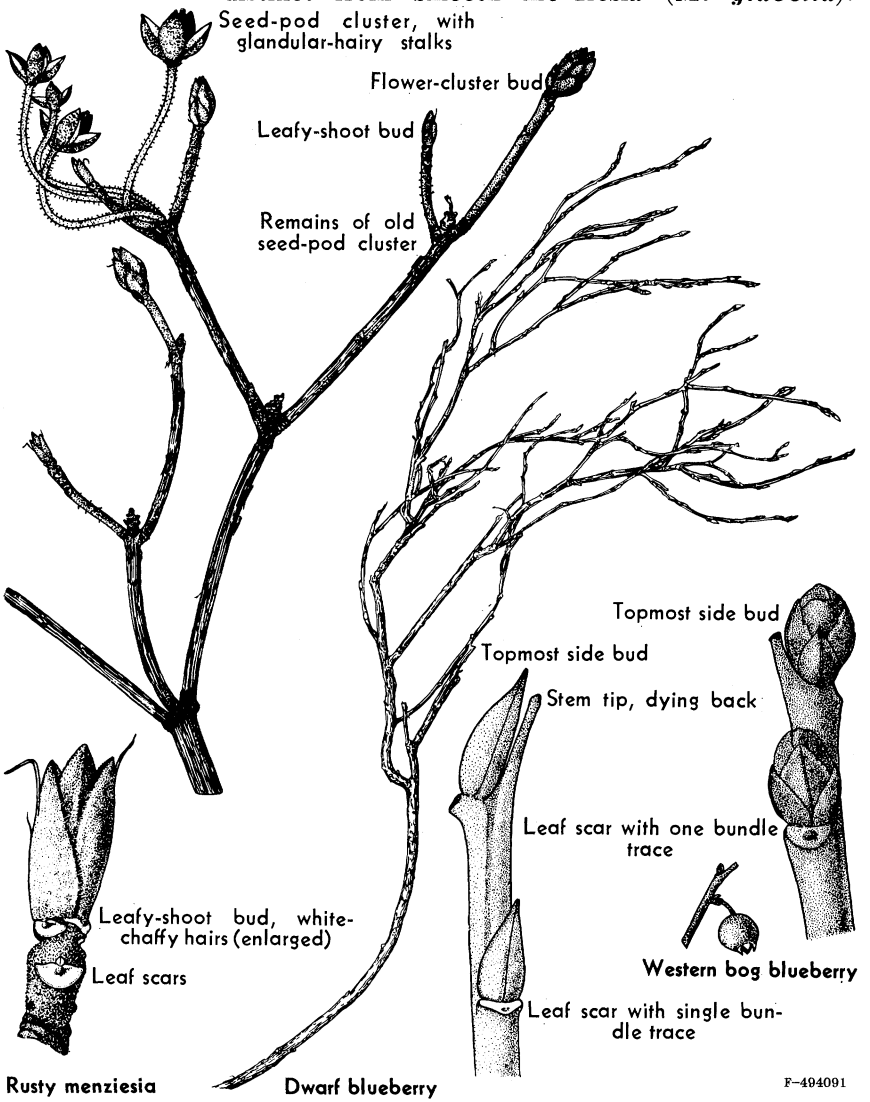
25. **Twigs round or very slightly angled;** low, much-branched or tufted shrubs to 1 foot high, often in patches connected by underground stems; berries deep blue with white-waxy "bloom," tipped by disklike flange (calyx); moist sites in mountains, usually at higher altitudes, Cascades, also in Wallowa and Blue Mts., e. Oreg., e. Wash. _____ **blueberries** (***Vaccinium*** spp.).
    28. **Shrubs densely tufted,** usually less than 8 inches high; twigs slender, shiny brown or hoary with tiny, whitish, curved hairs, rarely with a white-waxy "bloom"; often in patches in old lodgepole pine burns.
        dwarf blueberry (***Vaccinium cespitosum***).[34]
    28. **Shrubs much-branched,** to nearly 1 foot high; twigs relatively coarse, pale with a white-waxy "bloom," hairless; moist subalpine meadows, limited to and common in Cascades, Wash. and n. Oreg., less common south of the Three Sisters.
        delicious (or **Cascades**) **blueberry** (***Vaccinium deliciosum***).

24. **Bud scales several, overlapping;** buds tiny (about ⅛ inch long); leaf scars distinct, semicircular; bundle trace easily seen; twigs round, rigid, ascending, often with a white-waxy "bloom"; berries blue, 1 to 3, from scaly buds near tips of second-year twigs; much-branched shrubs to 3 feet high, in mountain bogs or marshes, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
    westernbog blueberry (***Vaccinium occidentale***).

23. **True end buds present;** leafy-shoot and flower buds separate; larger buds with several overlapping bud scales at or near twig tips; smaller side buds often with only 2 visible bud scales, especially near twig base; seed pods (capsules) persistent, stalked, glandular-hairy, split down from top into 4 or 5 parts and separated from central core; calyx lobes persistent at seed-pod base; twigs often appearing whorled; erect shrubs usually 2–6 feet high, poisonous, sometimes causing sheep losses on poorly managed summer range; moist mountain sites, Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
    29. **Seed pods split into 4 parts,** shallowly cupped in 4 tiny, glandular-hairy-fringed calyx lobes, **clustered at tips of second-year twigs and between bases of 2 usually unequally sized first-year twigs** (the larger twig usually tipped by a flower-cluster bud and the smaller twig by a leafy-shoot bud);

[34] At lower altitudes in mountain areas in both e. Oreg. and e. Wash., there are erect, taller and coarser shrubs with redder twigs than those of dwarf blueberry. These are referred by some botanists to taller dwarf blueberry (*Vaccinium cespitosum* var. *arbuscula*); other botanists regard these coarse shrubs as possibly polyploid a nd as a separate species (*Vaccinium arbuscula*).

flower-cluster buds larger and with more and variously sized bud scales than the leafy-shoot buds which have fewer and nearly equally sized bud scales; buds, twigs, and seed-pod stalks hoary with tiny, whitish, curved hairs (often also glandular-hairy); bud scales white-hairy-fringed, with rather coarse, often bent-back, white hairs at tips and yellowish- or white-chaffy hairs along middle back; bark brownish, often shreddy; moist, crushed twigs often with rank odor_____**rusty menziesia.** (***Menziesia ferruginea***); probably not specifically distinct from **smooth menziesia** (***M. glabella***).



471114 O-60-10

29. **Seed pods split into 5 parts,** more deeply cupped in 5 conspicuous calyx lobes, often with flat-tipped style persistent and extending out from central core; **flower buds several, along first-year twigs below leafy-shoot buds which are at or near twig tips; buds and new twigs with rather coarse, appressed, dark- or coppery-red hairs;** bark smooth, gray brown; moist, crushed twigs often somewhat fragrant.

Cascades azalea, or false-azalea (*Rhododendron albiflorum*).

22. **Leaf scars with 3 bundle traces.**

30. **Buds without bud scales** (tiny, brownish, hairy, undeveloped leaves and flowers exposed); **true end buds lacking,** topmost side bud larger than other side buds on same twig; leaf scars oval, slightly raised; stipule scars present; new twigs green, hairy; older twigs red brown, hairless or nearly so; **"berries" (drupes) black, often emetic-cathartic, stalked, in stalked, umbrellalike clusters in leaf-scar axils;** "seeds" (nutlets) 2 or 3, smooth on outer side; bark (cascara sagrada of drug trade) smooth, gray, often stripped for medical use; tall shrubs or small trees, stump-sprouting after cutting; moist sites, mostly w. of Cascades, also in e. Oreg., e. Wash. at lower altitudes (3,000 feet); type locality along Clearwater River near Kamiah, Nez Perce Co., Idaho.

cascara buckthorn (*Rhamnus purshiana*).

30. **Buds with bud scales.**

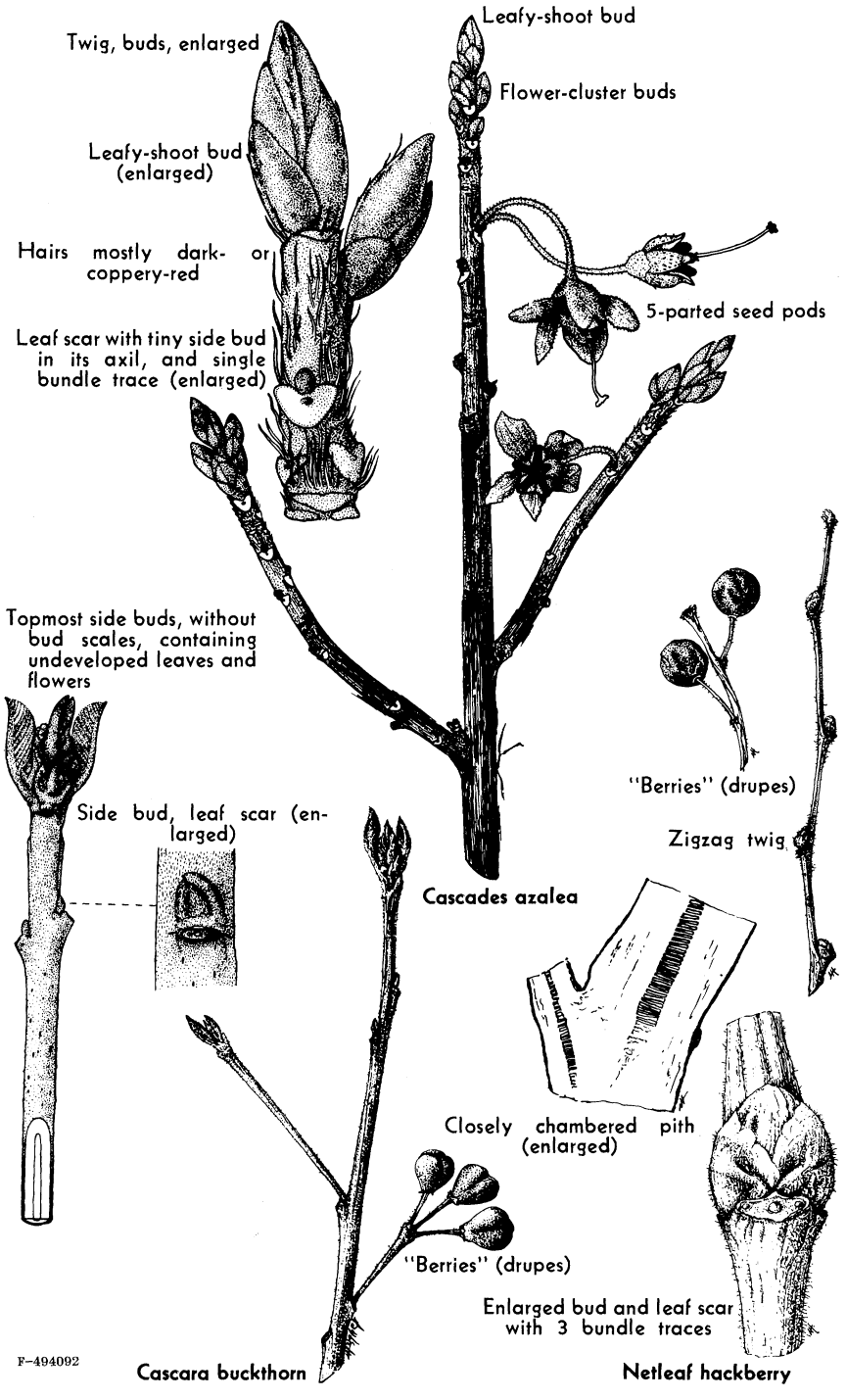
31. **Twigs zigzag, 2-ranked,** that is, each bud half way (180 degrees) around twig from bud next above or below, often distorted by witches' brooms (fungus disease); **pith closely chambered,** at least near "joints" (nodes); true end buds lacking; buds small, almost globe-shaped; bud scales 4, overlapping, 2-ranked; **"berries" (drupes) slender-stalked, borne singly in leaf-scar axils on new twigs,** dull orange to dark cinnamon- or reddish-brown or purplish, with single bony "seed" (nutlet); small trees or shrubs with smooth or warty bark; rocky canyon slopes, or valleys along streams, e. Oreg., e. Wash.

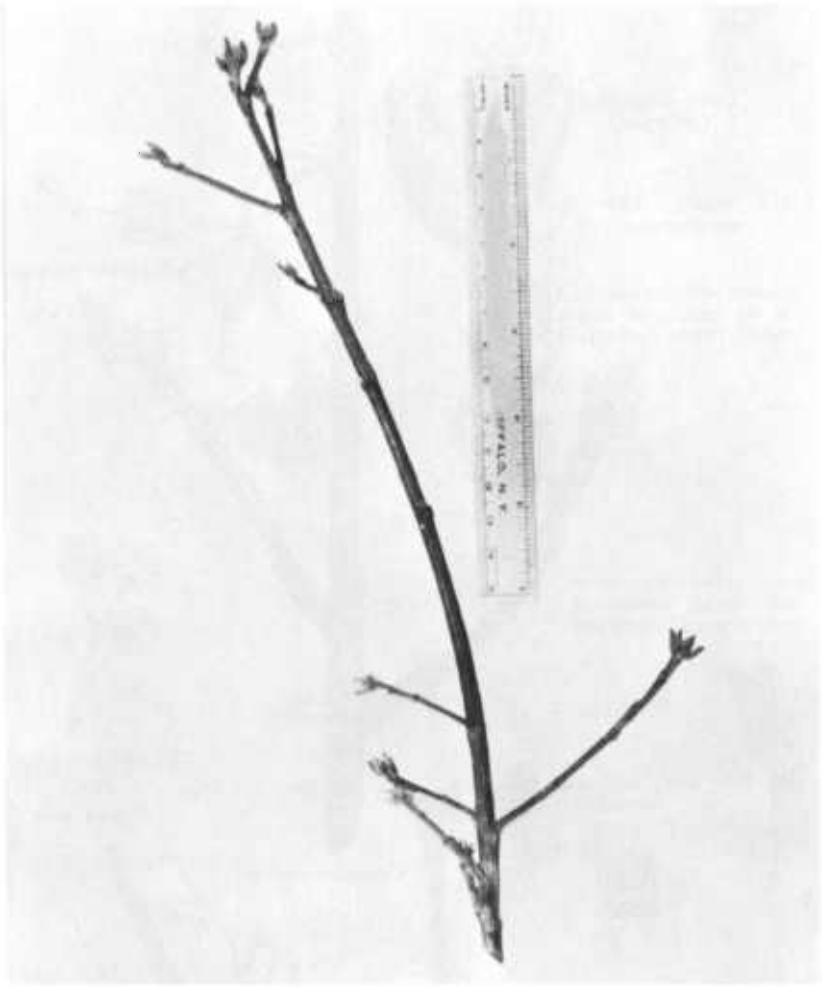
netleaf hackberry (*Celtis reticulata*).[35]

31. **Twigs not zigzag or 2-ranked as above; pith not chambered; bud scales several to many spirally overlapping, 2 lowest above leaf-scar ends,** fruits berrylike (drupes or pomes), or true berries.

32. **Buds usually clustered at twig tips,** sharp-tipped; many side buds nearly as large as end buds; stipule scars present; fruit-cluster stalks

[35] Netleaf hackberry is a very variable species, with many intergrading forms. Syns. *Celtis douglasii, C. laevigata* var. *reticulata; C. occidentalis* var. *reticulata.* The type locality of netleaf hackberry is "Base of the Rocky Mountains," Colorado or New Mexico; the type locality of Douglas hackberry (*Celtis douglasii*) is along the Columbia River.


Twig, buds, enlarged
Leafy-shoot bud
Flower-cluster buds
Leafy-shoot bud (enlarged)
Hairs mostly dark- or coppery-red
5-parted seed pods
Leaf scar with tiny side bud in its axil, and single bundle trace (enlarged)
Topmost side buds, without bud scales, containing undeveloped leaves and flowers
"Berries" (drupes)
Zigzag twig
Side bud, leaf scar (enlarged)
Cascades azalea
Closely chambered pith (enlarged)
"Berries" (drupes)
Enlarged bud and leaf scar with 3 bundle traces
F-494092
Cascara buckthorn
Netleaf hackberry



Cascara buckthorn F–486442

(sometimes with dried fruits attached) on second-year twigs, often winter persistent; **bark bitter, dotted with pale pores** (lenticels); trees in favorable sites, shrubs sometimes thicket-forming in poor sites; in mountain areas, near streams, or woods after fire or clearing, e. Oreg., e. Wash.; also w. of Cascades.

common chokecherries, bitter cherry.

33. **Bud scales many, all about same size, brownish, rounded and thin-papery along upper edges,** often slightly notched at "midrib" tips **buds often to ½ inch long;** twigs hairless or

nearly so; **bark hard to peel, with strong or peach-pit odor when freshly bruised;** varieties hard to tell apart after chokecherries fall.

common chokecherry (*Prunus virginiana*).

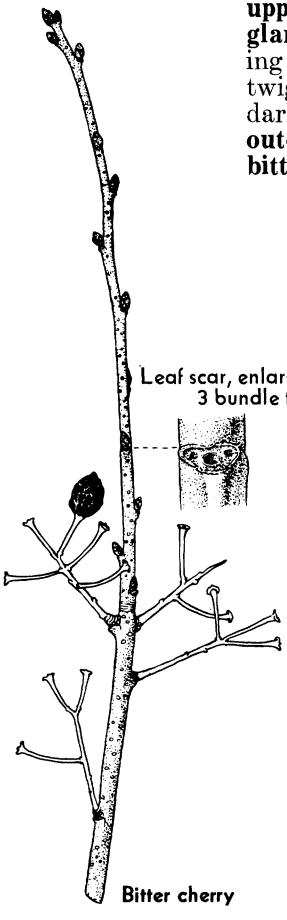
34. **Ripe fruits bright red,** often drying dark purplish and persistent, less astringent and sweeter than black common chokecherry; type locality, "Plains of the Oregon (Columbia) towards the sea, and at the mouth of the Wahlamet (Willamette)."

western common chokecherry (*Prunis virginiana* var. *demissa*).

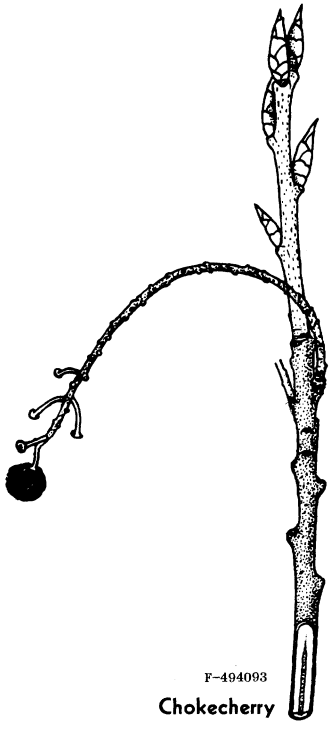
34. **Ripe fruits black,** astringent, often falling with stalks attached, leaving circular, mostly callus-covered scars on the persistent fruit-cluster stalks.

black common chokecherry (*Prunus virginiana* var. *melanocarpa*).

33. **Bud scales several, lower usually shorter than upper, often shiny-sticky, somewhat hairy and glandular-fringed**; stipules sometimes persisting at bud bases; **buds small, to 1/4 inch long;** twigs shiny red and nearly hairless to dull, dark gray brown and finely but densely hairy; **outer bark easily separated from inner, very bitter----bitter cherry (*Prunus emarginata*).**



Bitter cherry



F-494093

Chokecherry

32. **Buds rarely clustered at twig tips; bark not bitter or with peach-pit odor.**

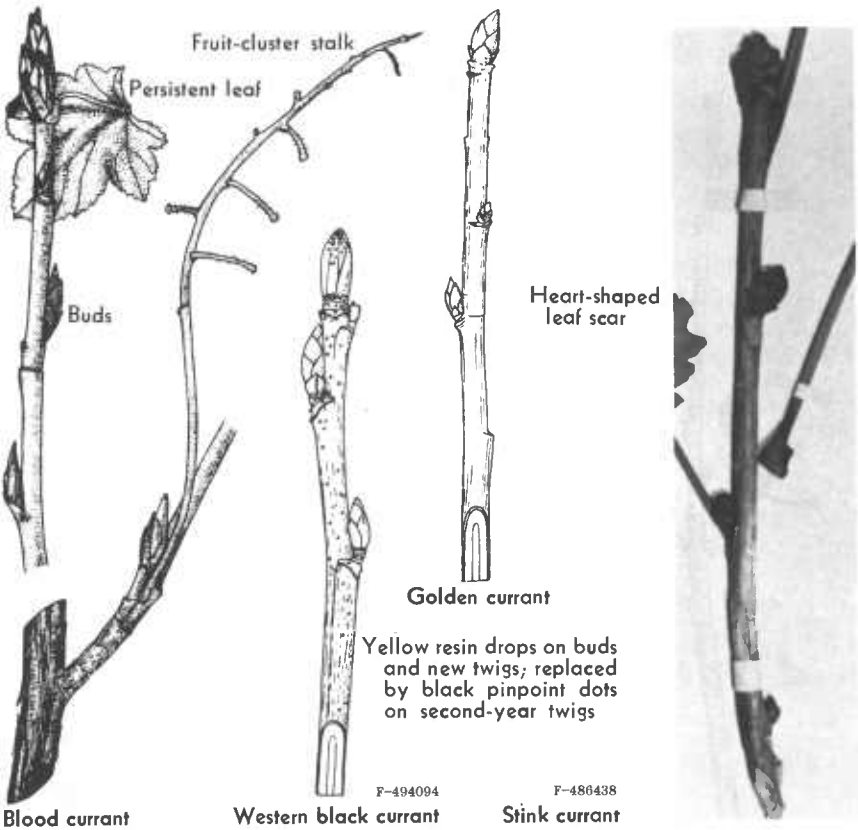
currants, alder buckthorn, serviceberries.

35. **Twigs ridged or lined downward from leaf-scar ends; pith porous or spongy;** bark of new twigs thin-papery, splitting, shredding or peeling, soon shed; **pale pores** (**lenticels**) **lacking;** leaf scars narrowly U- or V-shaped to broadly crescent- or heart-shaped, slightly raised; spur-like, leaf-scarred twigs common; buds often short-stalked; **true end buds present;** fruit-cluster stalks sometimes persistent; alternate hosts for white pine blister rust, some species more susceptible than others. [Alternate 35, p. 155.]

currants (***Ribes*** spp.)

36. **Buds, new twigs yellow-resin-dotted;** buds to ⅜ inch long; wood sometimes with bad odor; branches few, erect, ascending or sprawling; coarse-stemmed shrubs of moist woods.

37. **Leaf scars heart-shaped;** buds egg- to globe-shaped, hairless, brown to purple



Blood currant

F–486447, 486448, 486454

reddish; **resin dots few;** older bark dark gray or brown; shrubs to 12 feet high; common w., occasional e. slopes of Cascades; type locality near mouth of Columbia River.

stink currant (*Ribes bracteosum*).

37. **Leaf scars crescent-shaped,** extending ½ way around twig; buds pinkish, oblong, pointed at tips, finely, shortly whitish-hairy; twigs mostly hairless; **yellow resin dots replaced by black pinpoint dots on**

Fast growing shoots, with 2/5 arrangement of buds and twigs

Branches with spurlike twigs

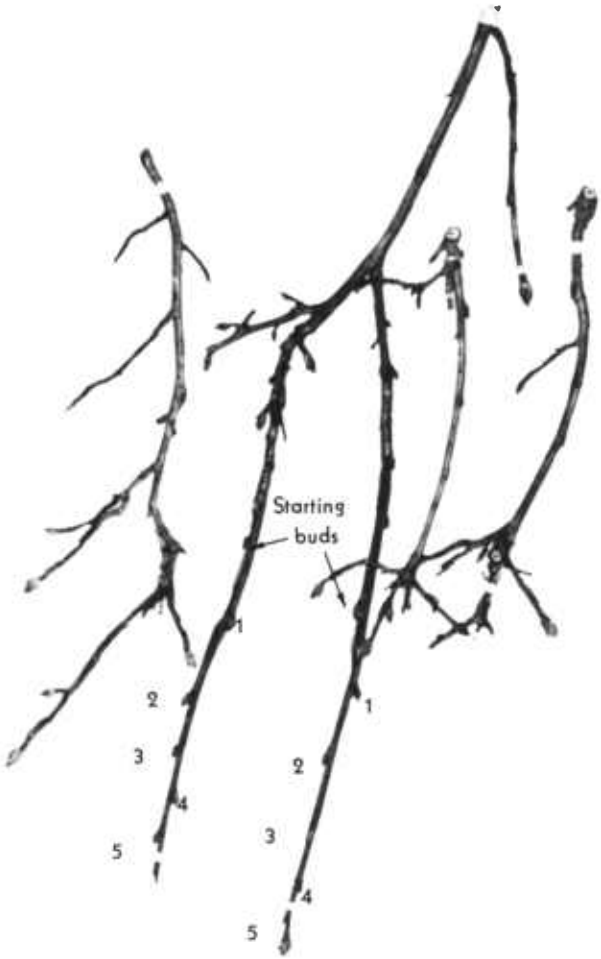
Golden currant

F-486453, 486450, 486451

second-year twigs; highly susceptible to white pine blister rust, blamed for many of first long-range rust introductions into Inland Empire areas; shrubs to 6 feet high; mts., e. Oreg., e. Wash.; type locality, w. base, Rocky Mts., lat. 48–52°.

western black currant (***Ribes petiolare***).

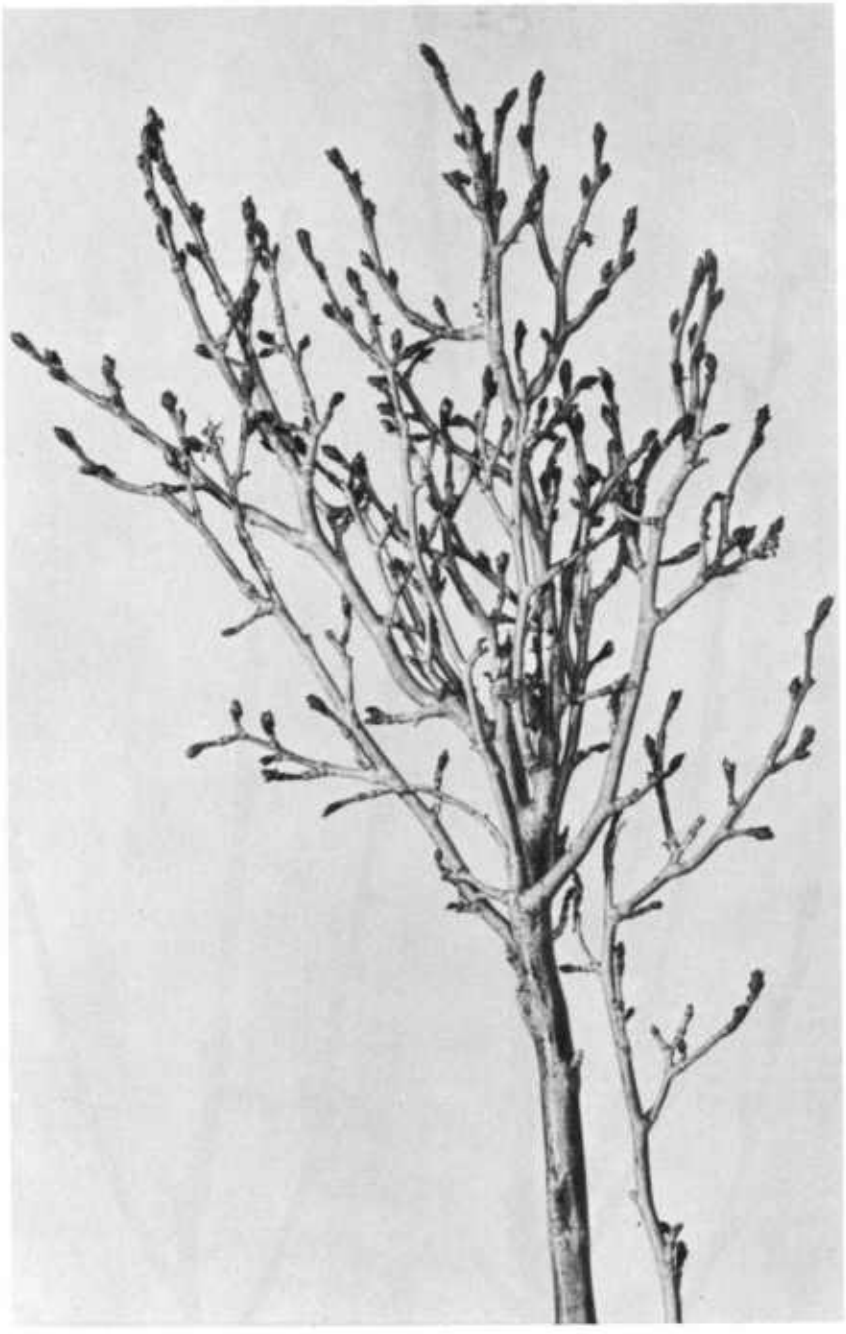
36. **Buds, new twigs not yellow-resin-dotted as above.**
    38. **Buds red, conspicuous, to 3/4 inch long,** slender, pointed at tips; **bud scales often 3-veined (veins merging near bud-scale top, protruding beyond it in a dark, glandular tip),** lower shorter than upper, spreading at tips; fruit-cluster stalks erect, usually with a few stalked glands and dark glandular dots; leaves finely whitish-hairy-matted on under surface, sometimes persistent; shrubs to 12 feet high, often cultivated for its beautiful red flowers; common in moist soils w., occasional along road cuts or streams, e. slopes of Cascades; type locality, Columbia River.
    blood currant (*Ribes sanguineum*).
    38. **Buds not red or as above.**
        39. **New twigs shiny, pale to golden- or reddish-tan, usually hairless** (rarely with fine, short, whitish hairs or with longer, gland-tipped hairs); **end buds about same size** (¼ inch long) **as the usually appressed side buds; leaves rolled lengthwise (convolute) in the bud, other native Oreg. and Wash. currants have leaves accordion-pleated (plicate) in the bud;** sometimes cultivated for its spicy-fragrant, golden-yellow blossoms; shrubs to 8 feet high; common along streams, moist hillsides, or often in rocky sites with sagebrush, e. Oreg., e. Wash.; type locality, "On the banks of the rivers Missouri and Columbia."
        golden currant (*Ribes aureum*).
        39. **New twigs, buds not as above, sometimes sticky-shiny** (viscid) **or sugary-** (crystalline-) **waxy; young bark reddish brown to reddish tan, with fine, short, ashy-white hairs;** older bark gray, smooth; bud scales very finely glandular-hairy-fringed on margins.
        sticky currant, wax currant.
            40. **Gland-tipped hairs short, rather coarse, present on new twigs; young bark peeling off in patches; end buds like side buds but larger (to ½ inch long), broadly egg-shaped, with pointed tips;** bud scales broad, thin-papery, finely gland-dotted, pale pinkish tan to purplish brown, often 3-veined (veins merging near bud-scale top, protruding beyond it in a short, dark glandular tip); stiffly branched,



Sticky currant F-486437

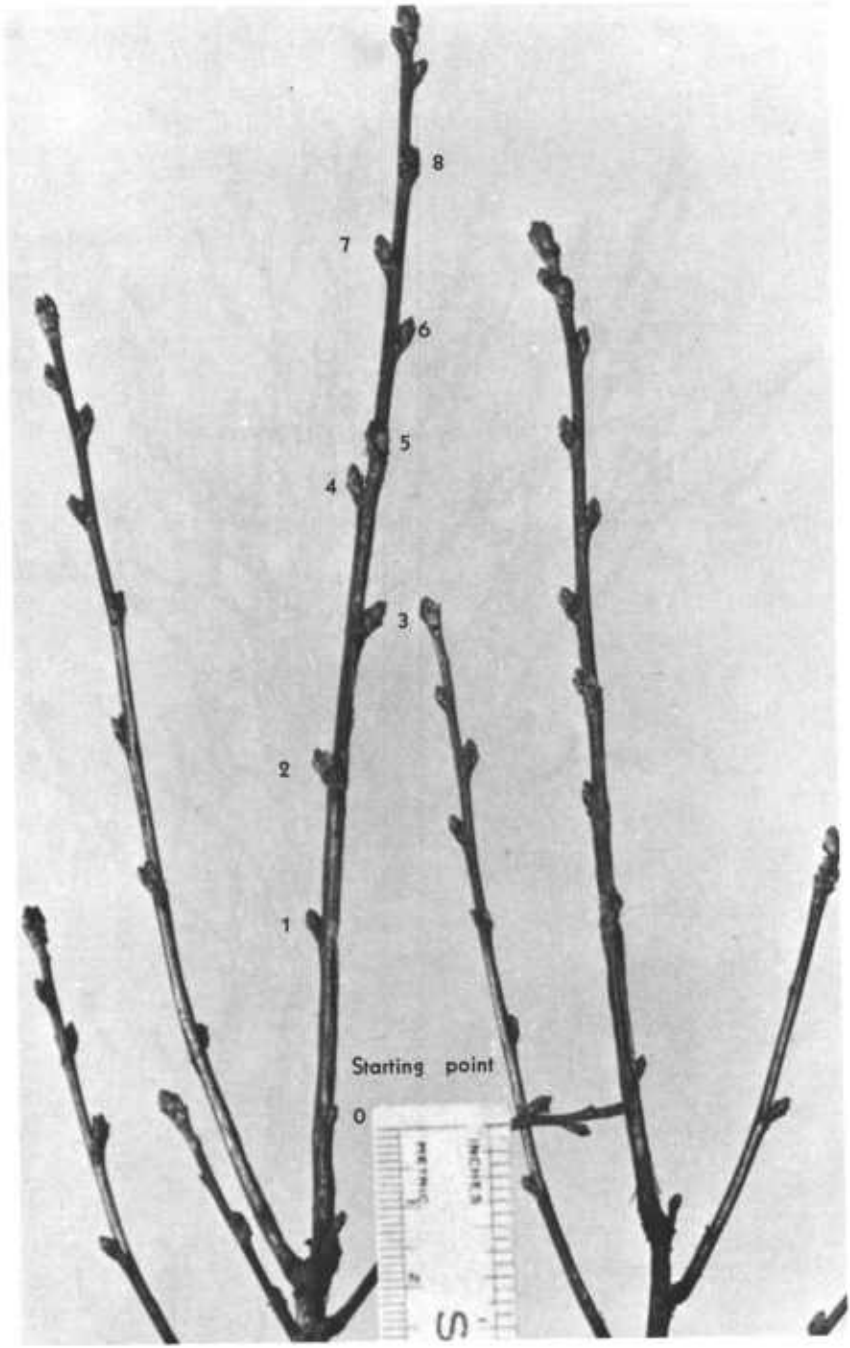
bushy shrubs to 5 feet high, with taproots, not sprouting or layering, heavy seed-producers; highly susceptible to white pine blister rust; not very shade tolerant; on open ridgetops, cut- or burned-over areas or along rights-of-way in wooded areas; often with western larch, lodgepole, or ponderosa pine, also at higher elevations with subalpine fir; Cascades, Wallowa and Blue Mts., Oreg., Wash.; type locality, Rocky Mts.

sticky currant (***Ribes viscosissimum***).



Wax currant
(Showing branching habit and short, branchlike twigs)

F–486449



Wax currant
(3/8 arrangement of buds on fast-growing shoots)

F-486455

40. **Gland-tipped hairs lacking from twigs;** the reddish or yellowish, sticky-shiny resin on buds and twigs often drying sugary-waxy; young bark splitting, shredding; end buds like side buds, about ¼ inch long, oval, mostly blunt at tips; **buds in 3/8 arrangement** [36] **on the twig (buds of all other native Oreg. and Wash. currants are in 2/5 arrangement);** much-branched shrubs, to 6 feet high; common, dry woods, rocky hillsides, e. Oreg., e. Wash.; type locality, upper Columbia River in Wash.—**wax currant (*Ribes cereum*).**

35. **Twigs not ridged or lined downward from leaf-scar ends; pith continuous** (not spongy or porous); bark of new twigs not splitting, shredding or peeling; fruits berrylike (drupes or pomes). [Alternate 35, p. 148.]

41. **Buds egg-shaped, to ¼ inch long, true end buds lacking;** bud scales 5, lowest 2 longer, sheathing base of upper 3; **stipule scars present;** the usually 3 bundle traces sometimes fused into 1; "berries" (drupes) black, juicy but bitter, stalked, mostly single, in leaf-scar axils on new twigs, their disk-tipped stalks often persistent; "seeds" (nutlets) 3, ridged near tips; twigs reddish brown, becoming gray; spreading shrubs to 6 (or 10) feet high; wet sites, mountain meadows to 7,000 feet or more elevation, e. Oreg., e. Wash.

alder buckthorn (*Rhamnus alnifolia*).

41. **Buds conical, often asymmetrical,** varying in color, hairiness, size, often conspicuous; **true end buds present on some twigs** (on fruiting twigs, the topmost side bud at base of persistent stub of the fruit-cluster stalk functions as an end bud); **visible bud scales usually 6, often twisted, finely white-hairy-fringed (ciliate) on margins** (sometimes red-glandular-tipped or -edged); inner bud scales usually finely long-white-hairy; **bark of new twigs red, reddish brown, or purplish, dotted**

[36] In the 3/8 bud arrangement, the 8th bud above or below any given bud on the same twig (and of a single season's growth) is the first bud directly above or below it and exactly 360 degrees around the twig from it; each bud on the twig is 135 degrees (3/8 of 360 degrees) around the twig from the bud next above or below it. This is best seen on a fast-grown twig.

In the 2/5 bud arrangement, the 5th bud above or below any given bud on the same twig (and of a single season's growth) is the first bud directly above or below it and exactly 360 degrees around the twig from it; each bud on the twig is 144 degrees (2/5 of 360 degrees) around the twig from the bud next above or below it. See diagrams on p. 3.

with pale pores (lenticels); pith slightly 5-angled; leaf scars narrowly crescent-shaped; **stipule scars lacking;** "berries" (pomes) sometimes drying-persistent, tipped by 5 bent-back (rarely nearly erect) calyx lobes rimmed around inside base by 10–20 persistent anther stalks; seeds 4–10, small, smooth, dark brown, sometimes asymmetrical; species often hard to tell apart; slender shrubs or small trees, in exposed sites or when overbrowsed sometimes dwarfed and prostrate; moist sites, open woods or springy hillsides in drier sites, e. Oreg., e. Wash.

serviceberries (***Amelanchier*** spp.)

42. **New twigs purplish red, hairless, with whitish-waxy "bloom" or slightly glossy; buds conspicuous, to ½ inch or more long, purplish red, hairless except for white-hairy fringe on bud-scale margins;** branches many, slender, wandlike, flexible; shrubs to 10 feet high; common on basaltic ledges along rivers, e. Oreg., e. Wash.; type locality, "On stony hillsides, Union County, Oregon."

Cusick serviceberry (***Amelanchier cusickii***).

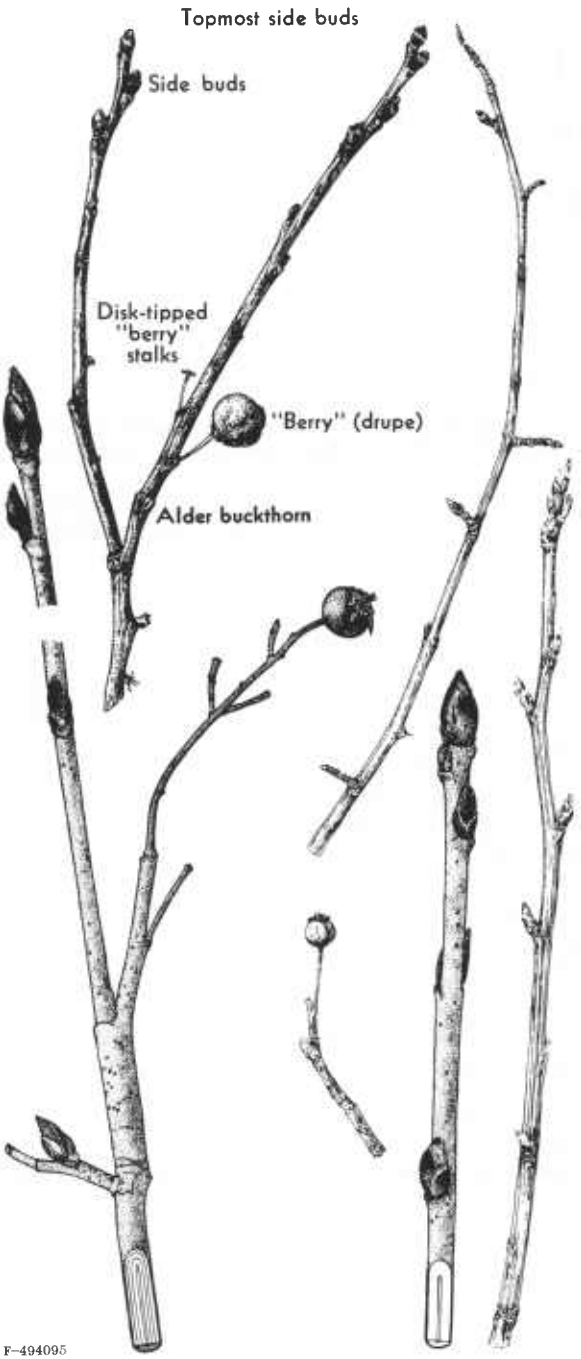
42. **New twigs and buds not as above, finely soft-white-hairy** (sometimes only sparsely so), hairs not matted.

43. **Bud scales** (at least some) **densely long-hairy; buds ¼ to ⅜ inch long, dark purplish;** twigs dark reddish or purplish brown, slender, erect; slender shrubs 3–15 feet high, or sometimes small trees; mostly w. of Cascades, sometimes in Columbia Gorge area, Oreg., Wash.; type locality, "Northwest America," probably along the lower Columbia River, near Vancouver, Wash.

Pacific serviceberry (***Amelanchier florida***).

43. **Bud scales (at least some of them) sparsely, shortly silky-hairy; buds to ¼ inch long, reddish to dark brown; twigs reddish brown;** bark of older twigs dark gray; shrubs or small trees to 20 feet or more high; e. slopes of Cascades, Wallowa, Blue Mts., e. Oreg., e. Wash.

saskatoon serviceberry (***Amelanchier alnifolia***).



F-494095

Cusick serviceberry

Saskatoon serviceberry

F-486428

Pacific serviceberry

PLANTS DECIDUOUS · FALL AND WINTER

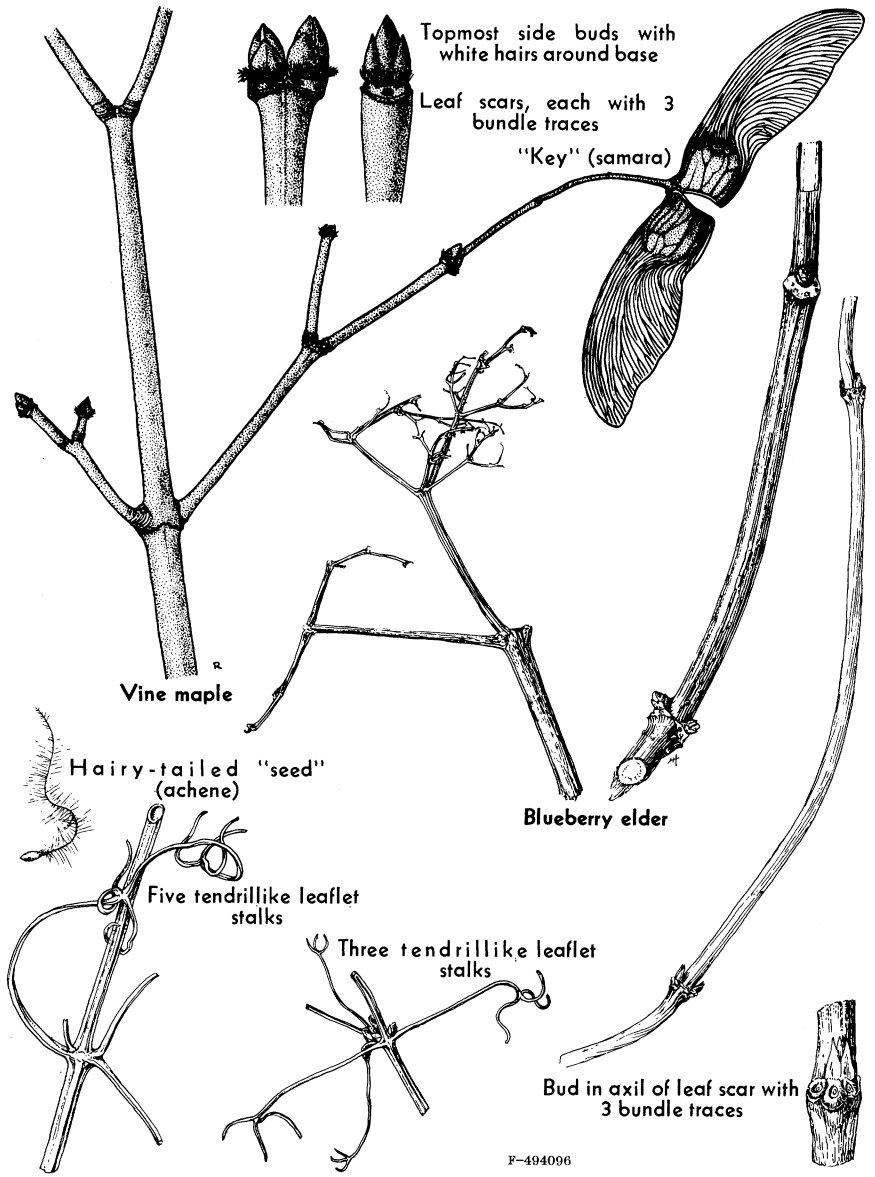
Buds, Twigs Opposite

1. **Plants woody climbers or vinelike shrubs.**
   2. **Stems climbing by tendrillike leaflet stalks, ridged, grooved, swollen at joints; leafstalks persistent, hiding leaf scars;** old bark shredding in long strips; buds conspicuous at joints of old wood; "seeds" (achenes) with long, hairy tails, clustered, sometimes persistent; moist sites, e. Oreg., e. Wash.
      clematis and **virginsbower** (***Clematis*** spp.).
      3. **Leafstalks with 5–7 leaflet stalks;** stems high-climbing, often over trees; common in stream valleys.
         western virginsbower (***Clematis ligusticifolia***,.
      3. **Leafstalks with only 3 leaflet stalks;** stems low-climbing or clambering over rocks; moist sites in open mountain woods.
         Columbia rock clematis (***Clematis verticillaris*** var. ***columbiana***).
   2. **Stems and leafstalks not as above; leaf scars visible,** each pair connected by ridge or line; bundle traces 3; in moist woods.
      4. **Stems spirally twining, to 30 feet long, often climbing over trees; pith hollow;** buds pale straw-colored, hairless; end buds present; bud scales lance-shaped, at least 2 pairs visible, equal in size; berries orange to bright red, in short-stalked heads, rarely persistent but leaving tissue-papery bracts at their darkened attachment scars; e. slopes of Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
         western trumpet honeysuckle (***Lonicera ciliosa***).
      4. **Stems reclining or arching and rooting at tips to form tangled thickets; pith solid,** white to yellowish; buds bright red, tiny (⅛ inch long), bluntly pointed or white-hairy-tufted at tip, white-hairy-fringed around base; true end buds sometimes developed but usually the top 2 side buds erect at twig tips; fruits ("keys," or samaras) long-stalked, their wings in a nearly straight line, sometimes persistent at twig tips; common w., occasional e. of Cascades, Oreg., Wash., Wallowa Mts., ne. Oreg. **vine maple** (***Acer circinatum***).[37]

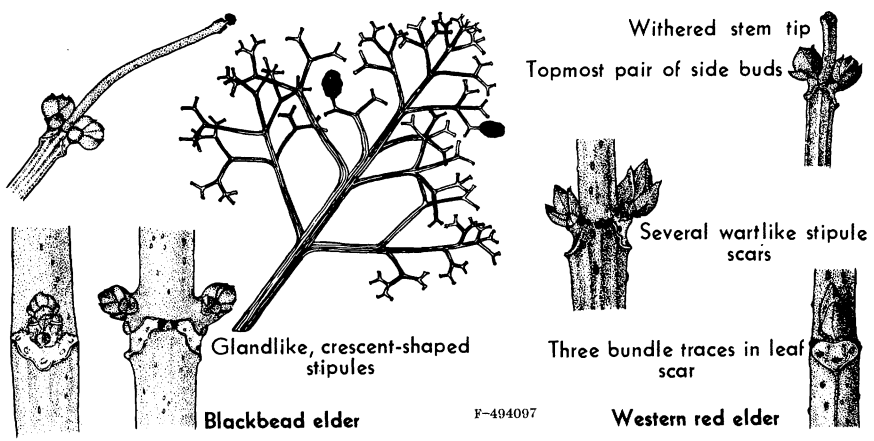
1. **Plants erect shrubs (sometimes with arching or reclining branches) or trees.**
   5. **End buds lacking, twig tips dying back to top pair of side buds.** (See also vine maple, under "4".)
      6. **Leaf scars conspicuous, crescent- or shield-shaped, meeting or connected by line or ridge on which dark glandlike or wartlike stipules or stipule scars are sometimes present; bundle traces 5 (or 3–7);** buds solitary or multiple, stalked or stalkless; several pairs of bud scales visible; pith large, soft, white to yellowish or dark brown; branched fruit-cluster stalks persistent after "berries" (drupes) fall; tall shrubs or small trees of moist sites **elders** (***Sambucus*** spp.).

[37] In open sites vine maple grows also as an erect shrub or as a small tree; however it is not included again in this winter key.

7. **Twigs, "berries" waxy-whitened (glaucous); stipules, stipule scars lacking;** buds relatively small, egg-shaped; pith white to yellowish; "berries" blue, in flat-topped, several-rayed clusters; "seeds" (nutlets) cross-wrinkled; tall shrubs or trees; roadsides or stream valleys, lower to middle altitudes; commonest elder of e. Oreg., e. Wash.
blueberry elder (*Sambucus glauca*).

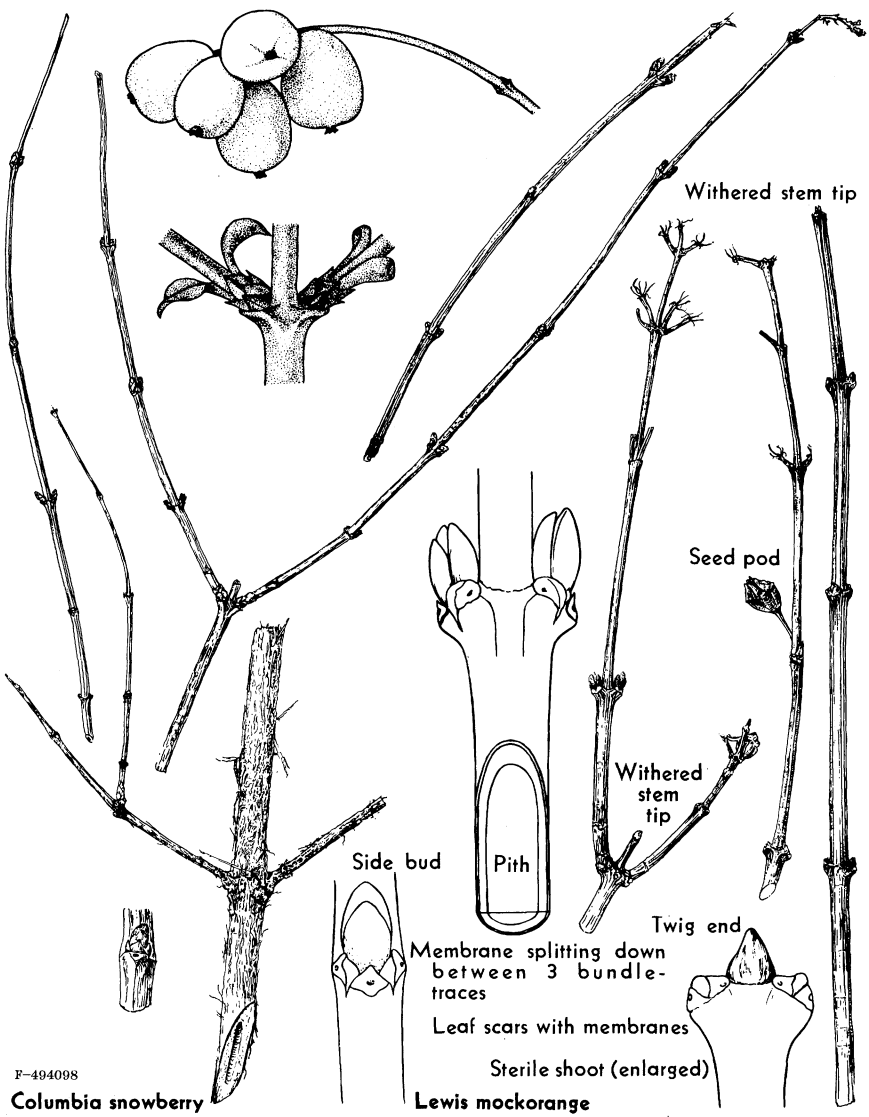


7. **Twigs, "berries" not waxy-whitened; stipules (or stipule scars) usually present;** buds relatively large; pores (lenticels) corky or warty, often conspicuous; pith yellowish to brown; "berries" in rounded or pyramidal end clusters with central axis; shrubs of moist mountain woods.
   8. **Stipules black, glandlike, crescent-shaped, usually 2, flattened against line or ridge between leaf scars;** buds almost globe-shaped; "berries" shiny-black; "seeds" cross-wrinkled; erect shrubs; stems sometimes arching or reclining, often in patches; e. slopes of Cascades, Wallowa and Blue Mts., e. Oreg., e. Wash.
   blackbead elder (*Sambucus melanocarpa*).
   8. **Stipules strap-shaped with callus tips, not winter-persistent but leaving several wartlike scars along line or ridge between leaf scars;** buds egg-shaped, with pointed tips; "berries" red; "seeds" smooth; shrubs with spreading stems, forming loose, open clumps; Cascades, Oreg., Wash., not reported from Wallowa or Blue Mts.; type locality, Crater Lake area, Oreg.
   western red elder (*Sambucus leiosperma*).[38]
6. **Leaf scars not as above.**
   9. **Clustered seed pods (capsules) conspicuous even at a distance, stalked, top-shaped, 3- to 5-celled, splitting down middle-back of each cell;** sterile shoots with bright reddish-tan, cross-checked bark; leaf scars with thin, tissue-papery membranes covering buds until they start swelling, then splitting down between the 3 bundle traces; branches upcurving, wide-spreading; common in moist sites in open woods or along roads, e. Oreg., e. Wash.
   Lewis mockorange (*Philadelphus lewisii*).



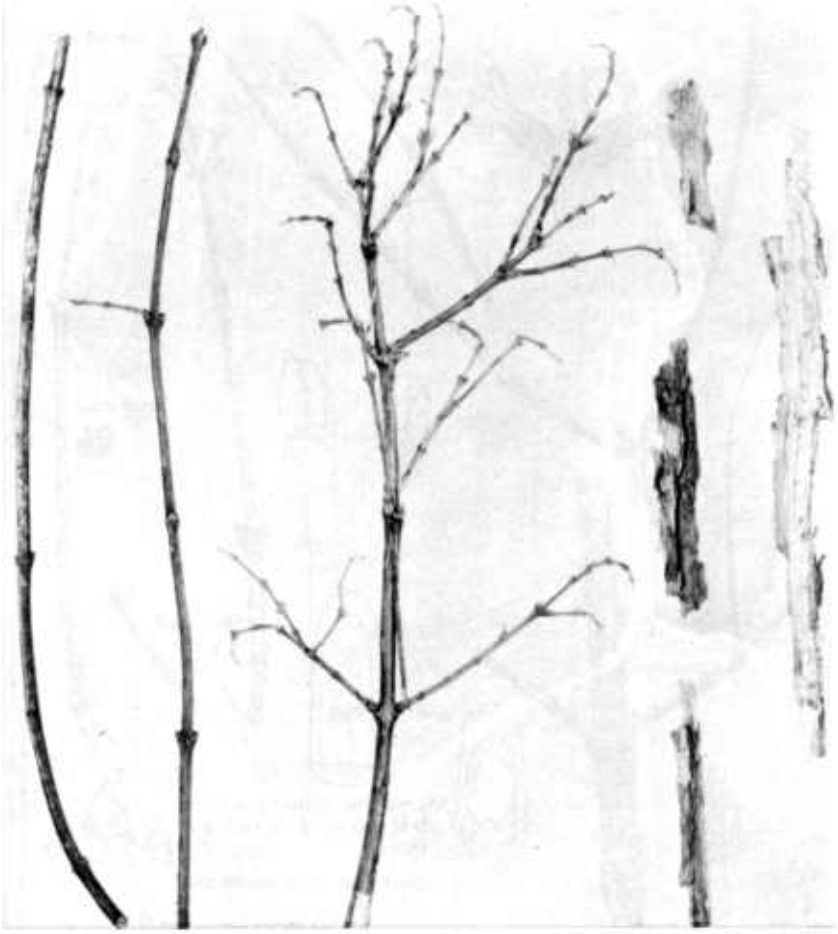
[38] Field observations needed to determine relationship between western red elder and Pacific red elder (*Sambucus callicarpa*) typically a shade-tolerant tall shrub or small tree of the redwoods area of the California Coast ranges. Pacific red elder was originally described by Dr. E. L. Greene (Flora Franciscana, p. 343. 1892.) as having white pith, small winter buds and strap-shaped stipules with callus tips. Some authors regard these two red-berried elders as one species. *Sambucus callicarpa.*

9. **Clustered seed pods lacking; white berries often persistent; leaf scars indistinct, with only 1 bundle trace;** twigs slender; side buds tiny (about ⅛ inch long), with several pairs of bud scales visible_____**snowberries** (***Symphoricarpos*** spp.).
10. **Pith hollow;** twigs hairless; bark of older branches gray; berries globe-shaped, clustered at twig tips; commonest snowberry of lower and middle altitudes, e. Oreg., e. Wash.; type locality, Holmes Creek, near Laurel, Falcon Valley, Klickitat Co., Wash.
Columbia snowberry (***Symphoricarpos rivularis***).



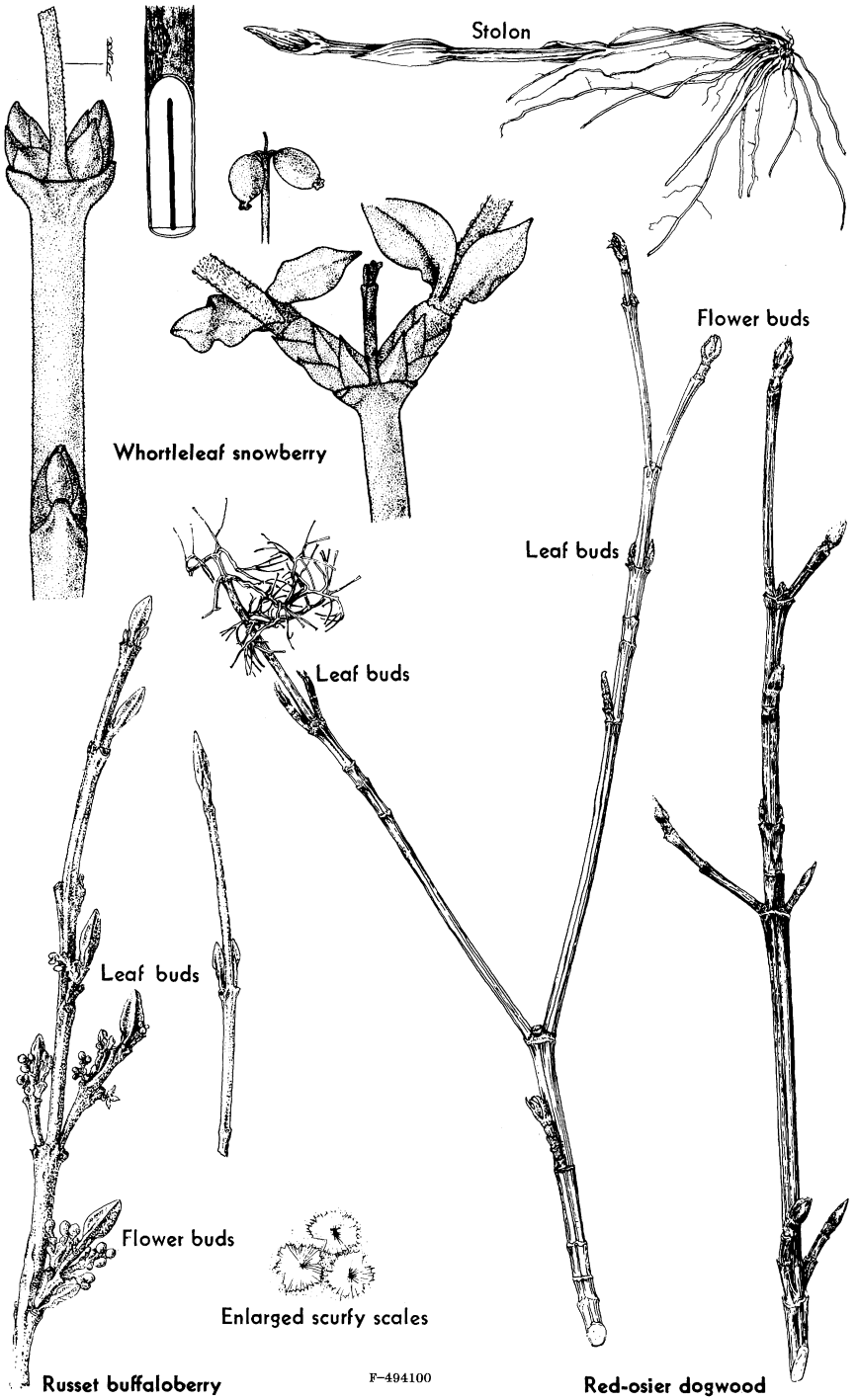
10. **Pith solid;** twigs faintly hoary with fine, whitish, curved hairs; bark of older branches dark brown; berries ellipsoid, single or in pairs at upper joints; moist to dry sites, at higher altitudes, e. Oreg., e. Wash.
whortleleaf snowberry (*Symphoricarpos vaccinioides*).

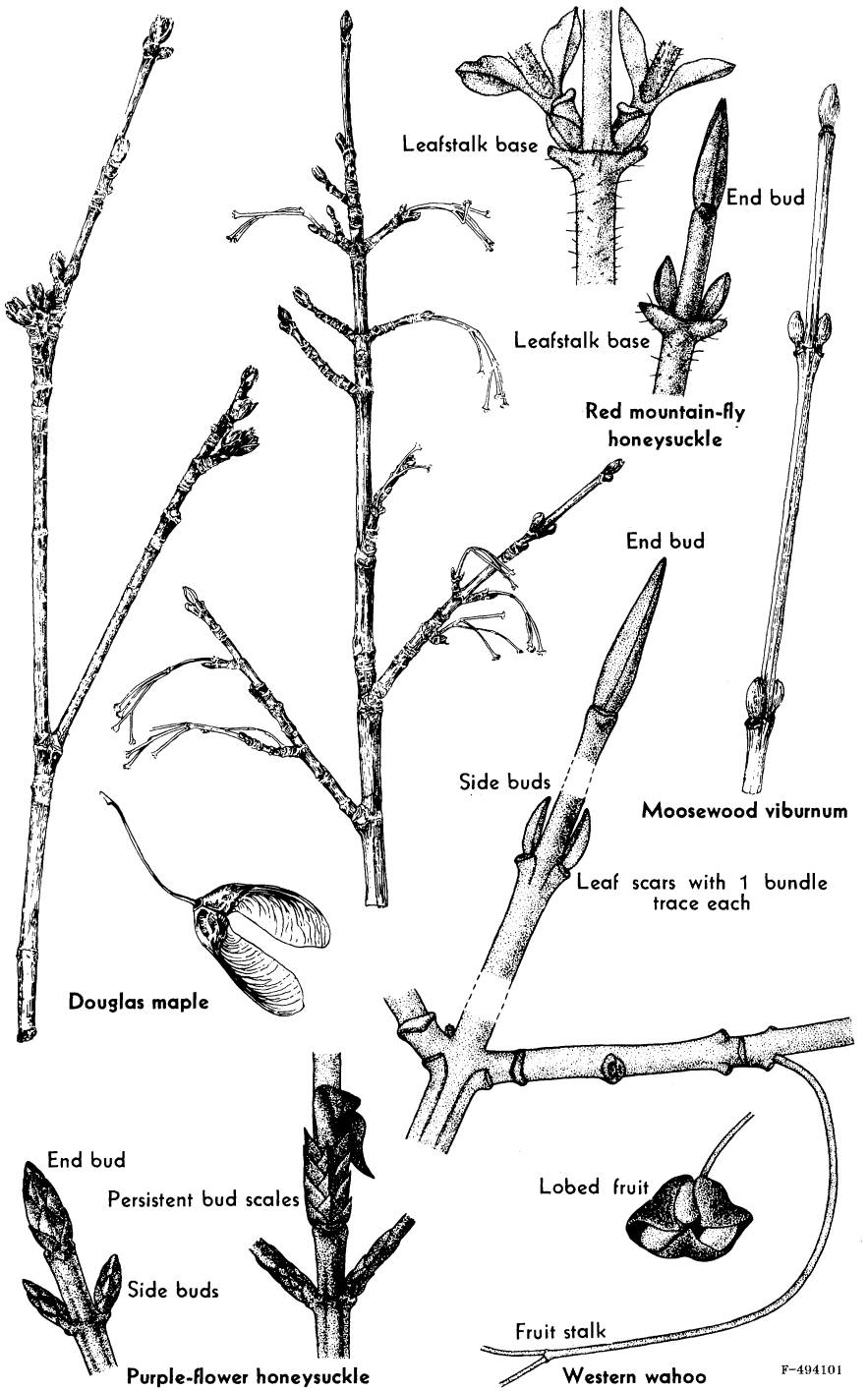
5. **End buds present, twig tips not dying back.**
11. **Buds (at least some) stalked.**
12. **Twigs and buds brown-scurfy with silvery-fringed scales; leaf scars with only 1 bundle trace;** buds of 2 kinds: (a) tiny, globe-shaped flower buds in branched clusters, and (b) larger leaf buds with only 1 pair of bud scales visible; shrubs to 6 feet high; open woods, medium altitudes, Blue Mts., ne. Oreg., rare in e. Wash.
russet buffaloberry (*Shepherdia canadensis*).
12. **Twigs and buds not brown-scurfy; leaf scars with 3 bundle traces.**



Whortleleaf snowberry

F-494000


Stolon
Whortleleaf snowberry
Flower buds
Leaf buds
Leaf buds
Leaf buds
Flower buds
Enlarged scurfy scales
Russet buffaloberry
F-494100
Red-osier dogwood


Leafstalk base
End bud
Leafstalk base
Red mountain-fly honeysuckle
End bud
Side buds
Moosewood viburnum
Leaf scars with 1 bundle trace each
Douglas maple
End bud
Persistent bud scales
Side buds
Purple-flower honeysuckle
Lobed fruit
Fruit stalk
Western wahoo
F-494101

13. **Stems bright or purplish red, pliable, sometimes lodging, rooting at tips and forming stolons;** fruit-cluster stalks branched, persistent at twig tips after the whitish or bluish "berries" (drupes) fall; plumper end buds contain flower-bud clusters, side buds and other end buds are leafy-shoot buds with a single pair of leaflike bud scales visible; stream banks or moist sites, e. Oreg., e. Wash.
red-osier dogwood (*Cornus stolonifera*).

13. **Stems not as above.**

14. **Bud scales brown, outer pair fused at edges, appearing as a single bud scale, last year's bursted scales often hanging collarlike around twig bases;** buds hairless, to ⅜ inch long; squashed reddish "berries" (drupes) persistent, in stalked, branched clusters; tall straggling shrubs; moist sites; occasional, e. slopes of Cascades, Wallowa and Blue Mts., ne. Oreg., se. Wash.
moosewood (or **squashberry**) **viburnum (*Viburnum edule*).**

14. **Bud scales bright red, outer pair meeting at edges (valvate) but not fused as above, sometimes spreading at tip to show second pair,** hairless outside, densely white-woolly-hairy inside; fruit-cluster stalks persistent; fruits ("keys," or samaras) with wings erect or nearly so, forming an acute angle with each other; erect shrubs or small trees; e. slopes of Cascades, Wallowa and Blue Mts.; commonest maple of e. Oreg., e. Wash.
Douglas maple (*Acer glabrum* var. *douglasii*).[39]

11. **Buds stalkless.**

15. **Only 1 pair of bud scales visible.**

16. **Leafstalks broken off near base, their persistent stubs hiding leaf scars;** bundle traces 3; twigs ascending, with a few straggly hairs; bark dark reddish brown; subalpine meadows; s. from Mt. Adams along Cascades and lower sites on e. slopes.
red mountain-fly honeysuckle (*Lonicera cauriana*).

16. **Leafstalks not as above; leaf scars visible; bundle trace 1;** twigs slender, green, ridged or lined; pith greenish, spongy; buds purplish, to ⅜ inch long; seed pods (capsules) long-stalked, deeply 3- (or 5-) lobed; seeds with red fleshy outgrowths (arils); tall, erect or straggling shrubs; moist woods along streams; occasional e. slopes of Cascades; type locality near Vancouver, Wash., along Columbia River.
western wahoo or western burningbush (*Euonymus occidentalis*).

15. **More than 1 pair of bud scales visible** (except in poorly developed buds of bearberry honeysuckle).

17. **Leaf scars with 3 bundle traces;** buds sometimes one above the other (superposed); pith solid; shrubs of moist sites, often at higher elevations, in mountains, e. Oreg., e. Wash. ---------- **honeysuckles (*Lonicera* spp.).**

[39] For vine maple (*Acer circinatum*) see under vinelike shrubs.

18. **Bud scales firm, in 4 vertical rows, pointed at tips, persistent, appearing tightly laced around twig base for several months;** bark grayish brown; shrubs to 5 feet high; at higher sites.
purpleflower honeysuckle (*Lonicera conjugialis*).

18. **Bud scales thin-papery, not as above.**

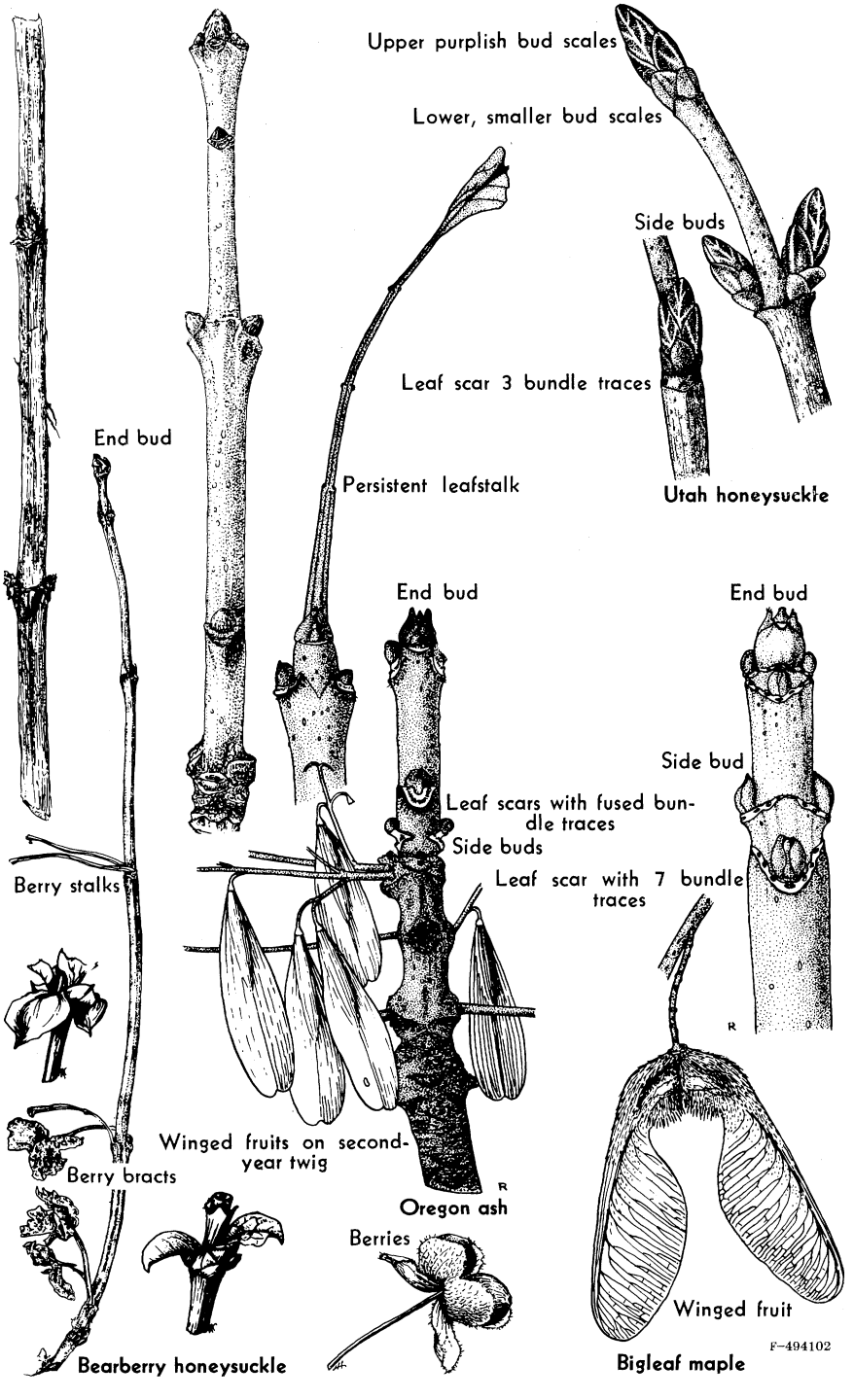
19. **Twigs 4-lined or 4-ridged, appearing square,** often coarse, finely hairy, glandular-hairy, or hairless; bud scales about equal in size, straw-colored, pointed at tips; berry bracts stalked, dark reddish, drying-persistent after berries fall, on youngest twigs (stalks often persisting for 2 years); erect or straggling shrubs to 10 feet high; middle to higher altitudes; commonest honeysuckle in e. Oreg., e. Wash.
bearberry honeysuckle (*Lonicera involucrata*).

19. **Twigs not as above;** lower bud scales smaller and straw-colored, upper ones larger, purplish with whitish veins, rounded at tips; bark gray or straw-colored; branches widely spreading; erect shrubs to 5 feet high; at higher sites.
Utah honeysuckle (*Lonicera utahensis*).

17. **Leaf scars with 5 or more bundle traces;** twigs coarse, their bark with small, whitish pores (lenticels); end buds about ¼ inch long, larger than side buds; fruits (samaras) with winged "seeds" (nutlets), stalked, in stalked, elongated clusters, often winter-persistent; valuable hardwood timber trees; on rich, moist soils, river valleys; common w., occasional or rare e. side of Cascades, Oreg., Wash. **ash, maple.**

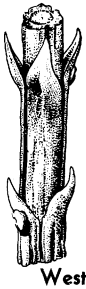
20. **Bundle traces many, fused into a band;** leaf scars broadly U-shaped to half-round, not meeting or connected by line or ridge around twig; buds dark brown to nearly black, conical; end buds pointed at tip, with 4 pairs of bud scales visible, sometimes with an erect leafstalk at one side; fruits persistent, in stalked clusters (panicles) from leaf scars on second-year wood, each "seed" tipped by a single wing which runs down on each side to near its base; twigs somewhat brownish-scurfy-hairy at first, becoming nearly hairless and a shiny dark reddish brown.
Oregon ash (*Fraxinus latifolia*).

20. **Bundle traces 5–7, distinct;** leaf scars narrow, V-shaped, meeting or connected by line or ridge around twig; buds about same color as twigs; end buds with 3 pairs of bud scales, almost globe-shaped, abruptly pointed or rounded at tip; fruits in stalked, elongated clusters (racemes) at tips of twigs on female trees, each 2-winged and with 2 yellowish-hairy "seeds," the wings at almost right angles to each other; twigs pale to bright green or dark reddish, often with whitish, waxy "bloom"; **the only native maple in Oreg. and Wash. with milky sap;** often planted for shade in cities.
bigleaf maple (*Acer macrophyllum*).

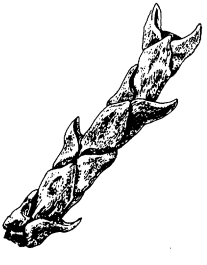

Upper purplish bud scales
Lower, smaller bud scales
Side buds
Leaf scar 3 bundle traces
Utah honeysuckle
End bud
Persistent leafstalk
End bud
End bud
Side bud
Leaf scars with fused bundle traces
Side buds
Leaf scar with 7 bundle traces
Berry stalks
Winged fruits on second-year twig
Berry bracts
Oregon ash
Berries
Winged fruit
Bearberry honeysuckle
Bigleaf maple
F-494102

PLANTS EVERGREEN, or With Winter-Persistent Leaves

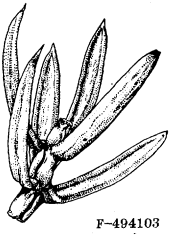
1. **Leaves scale-, awl-, or needlelike.**
   2. **Plants producing berrylike cones requiring 2 years to mature, often with strongly aromatic or resinous odor and taste;** "berry"- and pollen-producing flowers usually on separate plants; trees or prostrate, high-altitude shrubs—**junipers** (***Juniperus*** spp.).
      3. **Leaves mostly scalelike, overlapping, close-pressed to twigs** (leaves on young twigs sometimes awllike and slightly spreading); winter buds without bud scales (naked); trees, or in unfavorable sites sometimes shrubby.
         4. **Twigs round in cross section, rather stout, reddish, paper-scaly; leaves in whorls of 3, resin-dotted,** gray green; ripe "berries" blue black with a whitish "bloom"; trunk bark cinnamon brown, long- and flat-ridged and widely and shallowly furrowed, stringy; trees, usually 15–30 (rarely over 60) feet high; e. slopes of Cascades, Oreg., Wash., often growing with sagebrush, commonest juniper of mountain areas of e. Oreg., rather rare in e. Wash., occasional in Snake and Grande Ronde River valleys, se. Wash.; type locality, "Common on the higher parts of the Columbia at the base of the Rocky Mountains."
         western (or **Sierra**) **juniper** (***Juniperus occidentalis***).
         4. **Twigs flattened, slender, brownish; leaves opposite,** each pair at right angles to pair next above or below (decussate), **gland-pitted,** dark green, often with a whitish "bloom"; ripe "berries" bright blue with a whitish "bloom"; trunk bark reddish brown, with a network of low, narrow ridges and furrows, shreddy; trees (or sometimes shrubby), often 15–20 feet high, or sometimes more than 45 feet high in favorable sites; Wallowa Mts., ne. Oreg., near Spokane, e. Wash.
         Rocky-Mountain juniper (***Juniperus scopulorum***).
      3. **Leaves all awllike, spreading, chalky-white on upper surface,** dark green on lower surface, **in whorls of 3;** winter buds scaly; "berries" bright blue, with a whitish "bloom"; prostrate shrubs with stout branches; dry slopes, at higher altitudes, Cascades, Oreg., Wash.
      mountain common juniper (***Juniperus communis*** var. ***saxatilis***).



Western juniper



Rocky-Mountain juniper



F–494103

Mountain common juniper

2. **Plants not producing berrylike cones as above; shrubs heath- or heatherlike, matted or clumped, to 2 feet high;** flowers bell- or urn-shaped, 4- or 5-lobed, stalked, in somewhat umbrellalike end clusters; stamens 8–10; anthers opening by end pores; seed pods (capsules) 4- or 5-celled, globe- or egg-shaped; subalpine or alpine bogs or wet meadows---- **mountainheaths, cassiope.**
   5. **Leaves fir- or heathlike, alternate, to about ½ inch long,** crowded near ends of branches, stiffly ascending or spreading, jointed to erect "leafstalks" grown fast to twig; midrib prominent on under surface, paralleled by 2 grooves lined with glands and stomata; margins rolled under; seed pods splitting down from top along partitions between cells.
      mountainheaths (*Phyllodoce* spp.) [40]
      6. **Flowers bell-shaped, reddish;** calyx lobes ⅓ as long as corolla; flowers and flower stalks nearly hairless, or with a few gland-tipped hairs; **leaves glandular-hairy only on margins or along edges of midrib; straggly shrubs;** Cascades, Wallowa and Blue Mts., Oreg., Wash.
         red mountainheath (*Phyllodoce empetriformis*).
      6. **Flowers urn-shaped, yellowish;** calyx lobes ⅝ as long as corolla; flowers densely glandular-hairy as are also flower stalks; **leaves glandular-hairy on both sides as well as along margins; bushy shrubs;** Cascades, Oreg., Wash.; Wallowa Mts., ne. Oreg.
         cream mountainheath (*Phyllodoce glanduliflora*).
   5. **Leaves scale- or heatherlike, opposite, to ¼ inch long,** 4-ranked, overlapping, erect or ascending; flowers white, bell-shaped, few; stamens with pair of recurved awns at anther tips; seed pods splitting down middle-back of each cell; Cascades, Oreg., Wash.; Wallowa Mts., ne. Oreg.
      Mertens cassiope (*Cassiope mertensiana*).

1. **Leaves not scale-, awl-, or needlelike.**
   7. **Leaves simple.** [Alternate 7, p. 202.]
      8. **Leaves opposite or whorled** (3 or more at a joint). [Alternate 8, p. 177.]
         9. **Leaf margins spiny-toothed (hollylike), leaves broadest above middle, wedge-shaped at base, thick and leathery,** to 1¼ inches long and ⅜ inch wide, shiny green on upper surface, whitish between veins on under surface; stipule bases swollen, somewhat corky, persistent; flowers blue, fading lavender, stalked, in small, somewhat umbrellalike clusters; **seed pods (capsules) globe-shaped, borne in cup-shaped disks,** 3-celled, each cell prominently horned and also wrinkled, ridged or crested near tip; **prostrate shrubs** with rigid branches to 6 inches high and dark, creeping stems often rooting in contact with soil but not crown-sprouting after fire or cutting, **forming mats to 10**

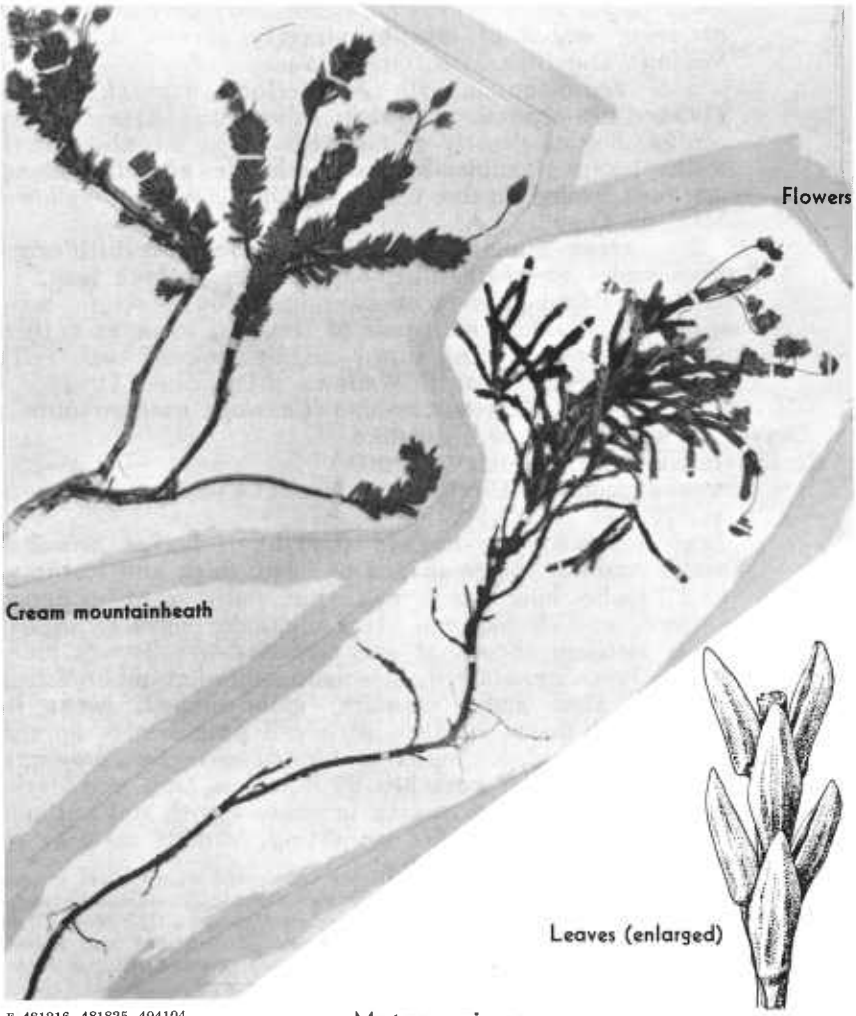
[40] Red and cream mountainheaths sometimes crossbreed where their ranges overlap, producing hybrids with characteristics variously intermediate between those of the two parents (see W. H. Camp, *Phyllodoce Hybrids.* The New Flora and Silva 12: 207–211. Aug. 1940). For descriptions, illustrations, and discussion of leaf structure, see Herbert F. Copeland, *A Study, Anatomical and Taxonomic, of the Genera of Rhododendroideae.* Amer. Midl. Nat. 30: 533–627. Nov. 1943, and also Fred Stoker, *The Genus Phyllodoce.* The New Flora and Silva 12: 30–42. Nov. 1939.

feet across; in dry, burned- or cutover pine woods, e. slopes of Cascades from Klamath Co., s. Oreg., n. to Klickitat Co., s. Wash.

squaw-carpet (or **Mahala-mat**) **ceanothus** (***Ceanothus prostratus***).

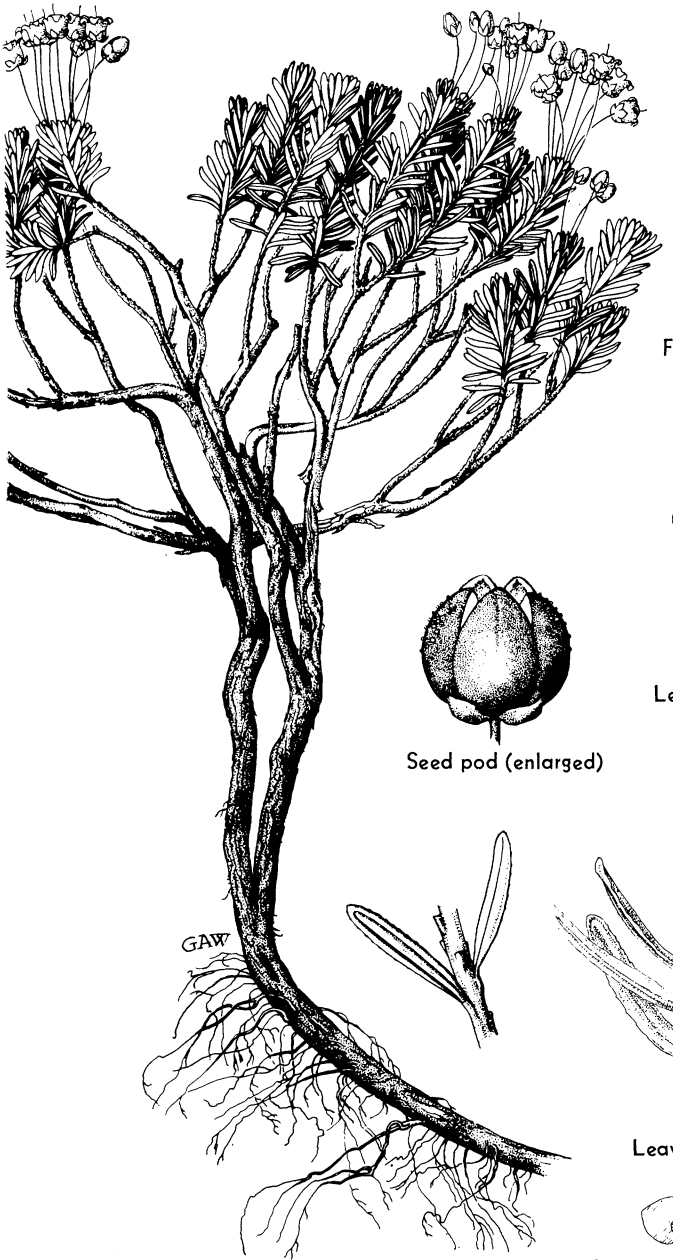
9. **Leaf margins and leaves not as above.**

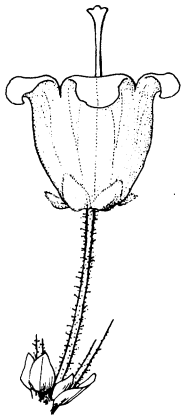
10. **Leaf margins entire, rolled under on young leaves; leaves sometimes in whorls of 3,** to nearly 1 inch long, almost stalkless, green on upper surface, whitish and with prominent midrib on under surface; flowers openly bowl-shaped, pink or pale purplish, stalked, in somewhat umbrellalike end clusters, **each flower with 10 pouches where anthers rest until stamen stalk is tripped by insect** (or touched with a pin) **when they spring out and**



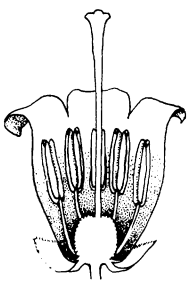
F–481216, 481825, 494104

Mertens cassiope



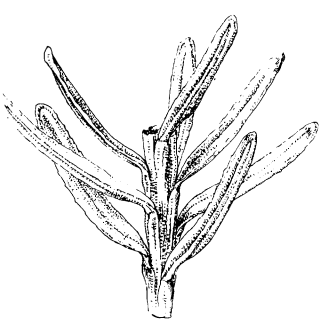


Flower (enlarged)



Lengthwise section of flower (enlarged)

Seed pod (enlarged)

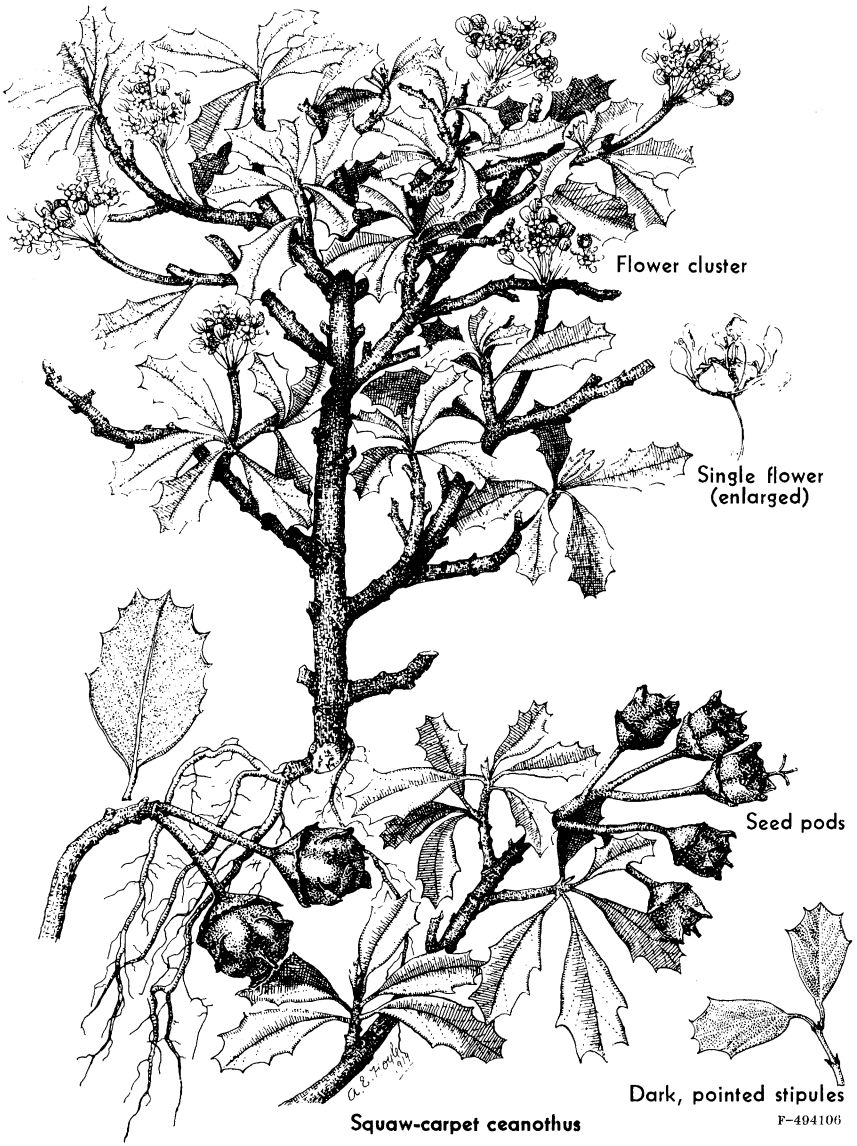


Leaves (enlarged)

Cross-section of leaf (enlarged)

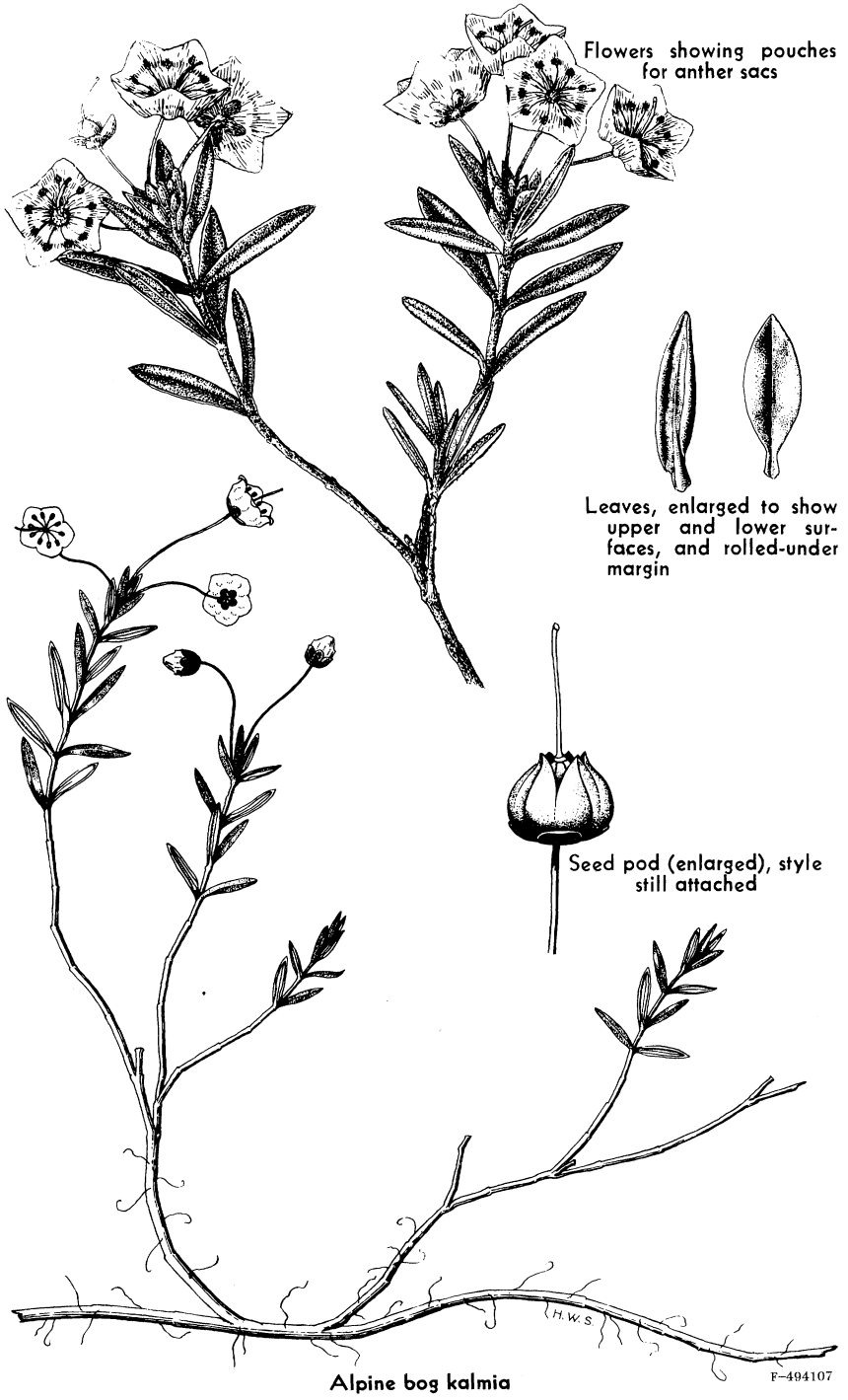
F–494105

Red mountainheath



dust pollen from end slits in the anther sacs; seed pods (capsules) globe-shaped, 5-celled, **splitting along partitions between cells** (and also part way down middle-back of some cells), **at last falling and leaving a flanged core topping their stalks;** dwarf alpine or subalpine shrubs less than 2 feet high, with several stems from underground rootstocks; poisonous to livestock; Cascades, Oreg., Wash.; Blue and Wallowa Mts., ne. Oreg. **alpine bog kalmia (*Kalmia polifolia* var. *microphylla*).**

10. **Leaf margins toothed; shrubs or half-shrubs of moist sites in open or dense woods.**



Alpine bog kalmia

11. **Stems vinelike, trailing, to 4 or 5 feet long, slender, slightly woody, leafing, rooting, or sending up short (to 8 inches high), finely glandular-hairy shoots at stem joints (nodes) or tips;** leaves to nearly 1 inch long, variable, usually round in outline and wedge-shaped at base, dark shiny green on upper surface, pale and veiny on under surface; margins scallop-toothed; flowers pinkish, tubular-bell-shaped, to ½ inch long, stalked, in pairs at tips of nearly leafless flowering shoots; twin, awl-shaped bracts near base of each flower and at tip of flowering shoot; seed pods (capsules) egg-shaped, glandular-hairy, yellowish, crowned with 5, sharply pointed, soon-falling calyx lobes; common in favorable sites, e. Oreg., e. Wash. **American twinflower (*Linnaea borealis* var. *americana*).**

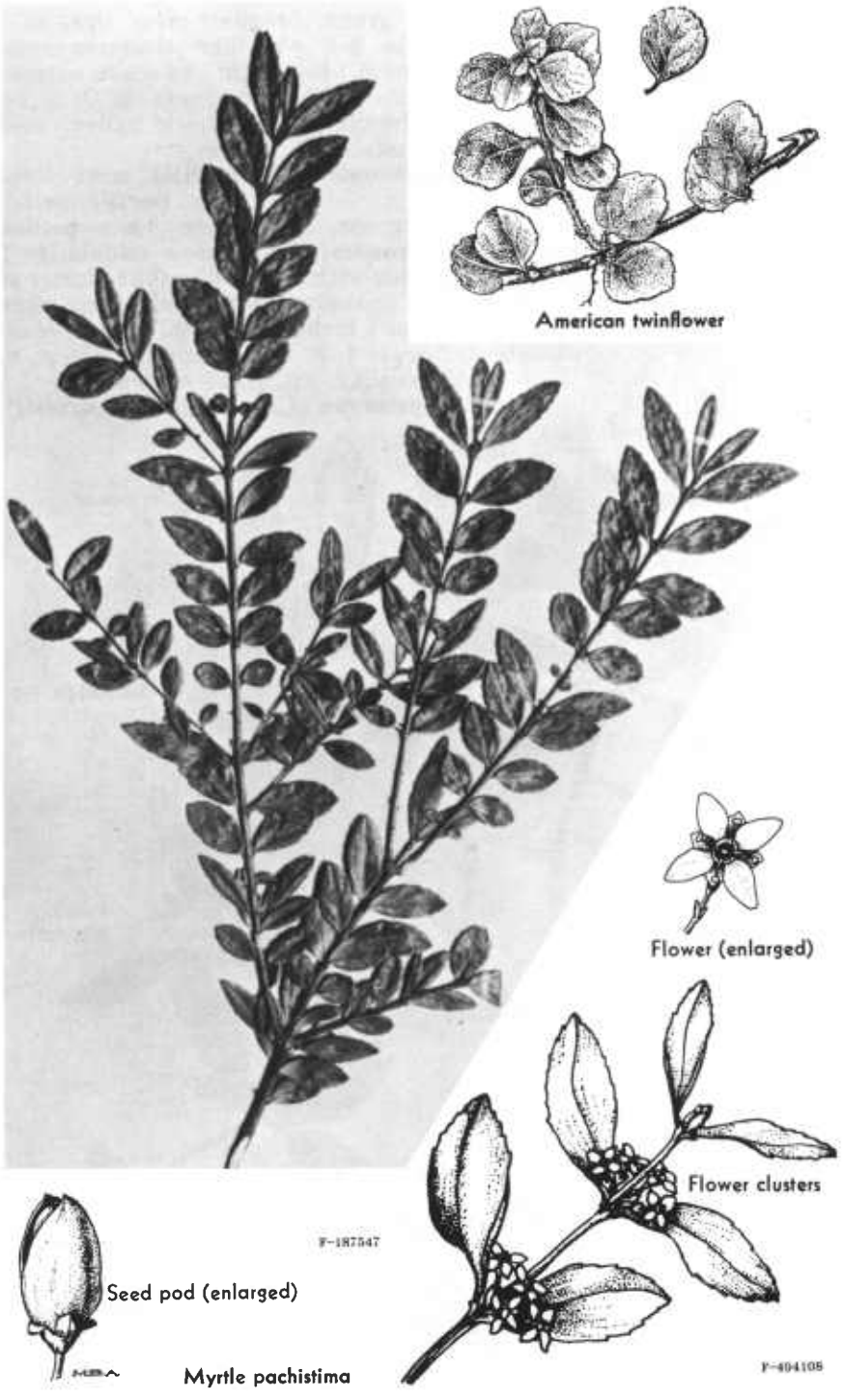
11. **Stems not vinelike or trailing.**

12. **Shrubs to 3 or 4 feet high, much-branched; branches spreading or ascending, dark, rigid, 4-sided, ridged, usually very leafy;** leaves variable, egg- to spatula-shaped, to 1¼ inches long; margins finely saw-toothed (at least above the middle), often slightly rolled-under; flowers greenish or reddish, small, few, in nearly stalkless clusters in leaf axils; seed pods (capsules) pale, egg-shaped, to ¼ inch long, splitting down from top into 2 valves; seeds 1 or 2, shiny brown or black, more or less enclosed by whitish, deeply fringed outgrowth (aril); Blue and Wallowa Mts., at middle elevations, also in the Cascades; type locality, Lolo Trail near Hungry (Lolo) Creek, n. Idaho_____**myrtle** (or **mountain-lover**) **pachistima (*Pachistima myrsinites*).**

12. **Half-shrubs to 1 foot high, clumped or matlike, erect, from long, scaly, underground stems; leaves shiny, sharply toothed, in annually produced whorl-like clusters or (mostly) opposite,** green and persistent 3–8 years before long-stalked flower clusters appear at shoot tips; buds in leaf axils not opening until after flowering, then developing into leafy branches which bear smaller flower clusters at their tips; flowers 1–9, stalked, whitish or pink to purplish, saucer-shaped; calyx lobes finely toothed, persistent; stamen stalks swollen, white-hairy near base; anther sacs erect at first, hanging when mature, shedding pollen from round pores at tips; **seed pods (capsules) globe-shaped, 5-angled, opening along middle-backs of the 5 cells, topped by persistent, close-fitting, shield-shaped stigma;** seeds many; moist evergreen woods; middle altitudes, Cascades, mts. of e. Oreg., e. Wash.

pipsissewa, or **princes-pines (*Chimaphila* spp.).**[41]

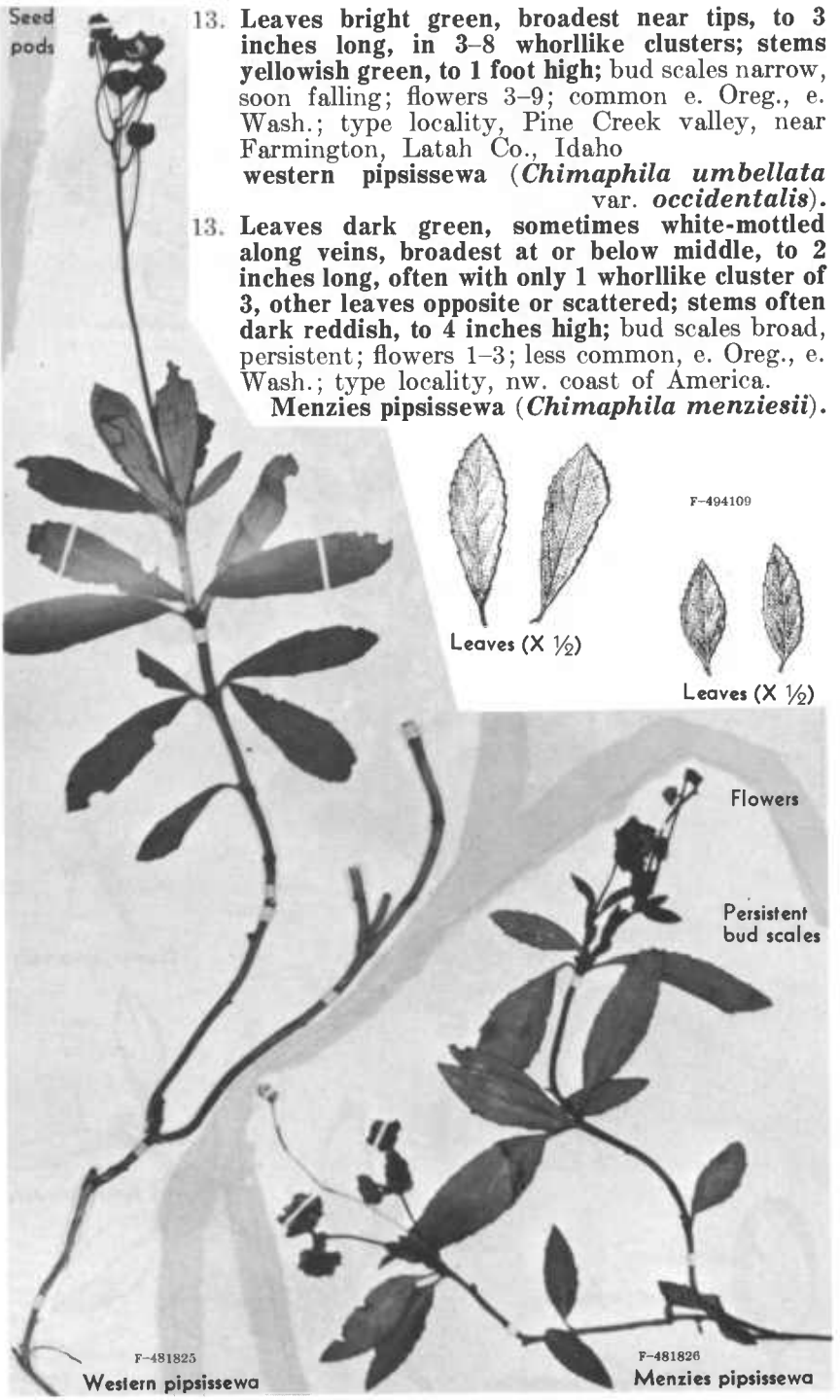
[41] See Herbert F. Copeland. *Observations on the Structure and Classification of the Pyroleae.* Madrono 9: 65–102. 1947.



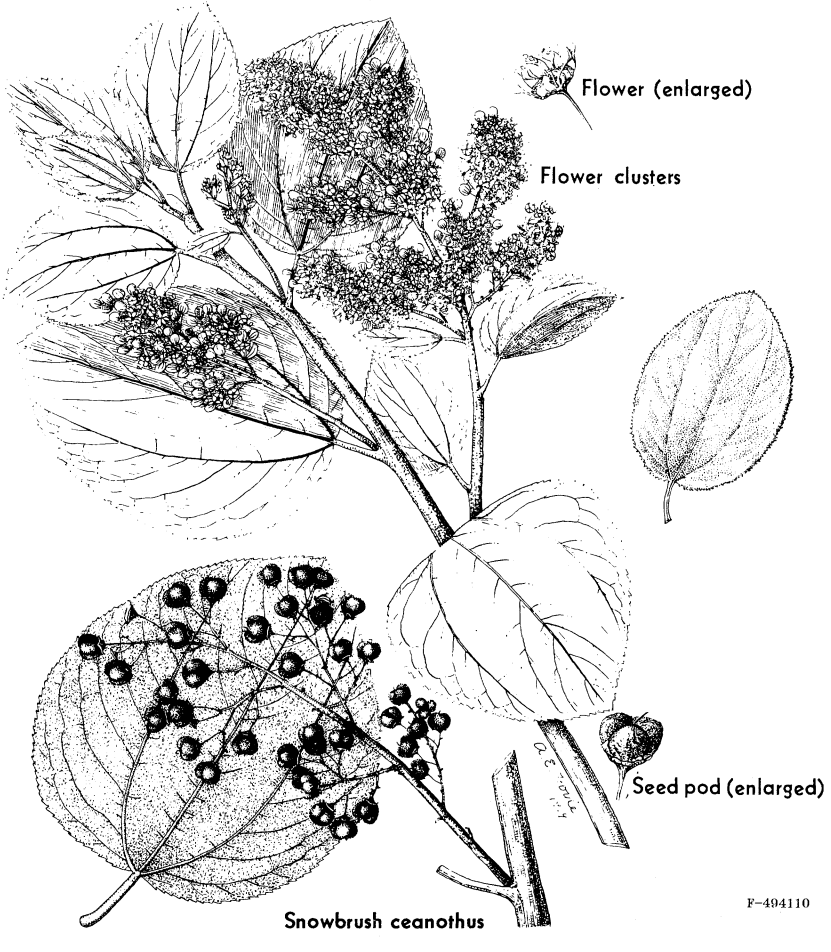
471114 O–60–12

13. **Leaves bright green, broadest near tips, to 3 inches long, in 3–8 whorllike clusters; stems yellowish green, to 1 foot high;** bud scales narrow, soon falling; flowers 3–9; common e. Oreg., e. Wash.; type locality, Pine Creek valley, near Farmington, Latah Co., Idaho
western pipsissewa (*Chimaphila umbellata* var. *occidentalis*).

13. **Leaves dark green, sometimes white-mottled along veins, broadest at or below middle, to 2 inches long, often with only 1 whorllike cluster of 3, other leaves opposite or scattered; stems often dark reddish, to 4 inches high;** bud scales broad, persistent; flowers 1–3; less common, e. Oreg., e. Wash.; type locality, nw. coast of America.
Menzies pipsissewa (*Chimaphila menziesii*).



8. **Leaves alternate.** [Alternate 8, p. 169.]
   14. **Leaves 3-veined from near base,** broadly elliptic, to 3 inches long, **shiny green** (**bronze in winter**) **and sticky-varnished on upper surface,** pale-velvety on under surface; **odor spicy-resinous; leaf margins with fine, gland-tipped teeth;** flowers creamy white, in umbrellalike bunches massed in showy end clusters; **seed pods** (**capsules**) **cupped in shallow disks,** stalked, somewhat globe-shaped, **3-lobed,** smooth or slightly roughened and/or with tiny crests at lobe tips, often sticky-glandular; roots with (probably nitrogen-fixing) nodules; round-topped shrubs with spreading branches, 2–15 feet high; rather common, Cascades; mts. of e. Oreg., e. Wash.; type locality, "Subalpine hills near the source of the Columbia, and at Kettle Falls," (Wash.)--**snowbrush ceanothus** (***Ceanothus velutinus***).[42]



[42] See the Summer and Winter Keys for deerbrush ceanothus (*Ceanothus integerrimus*), the leaves of which are somewhat winter-persistent.

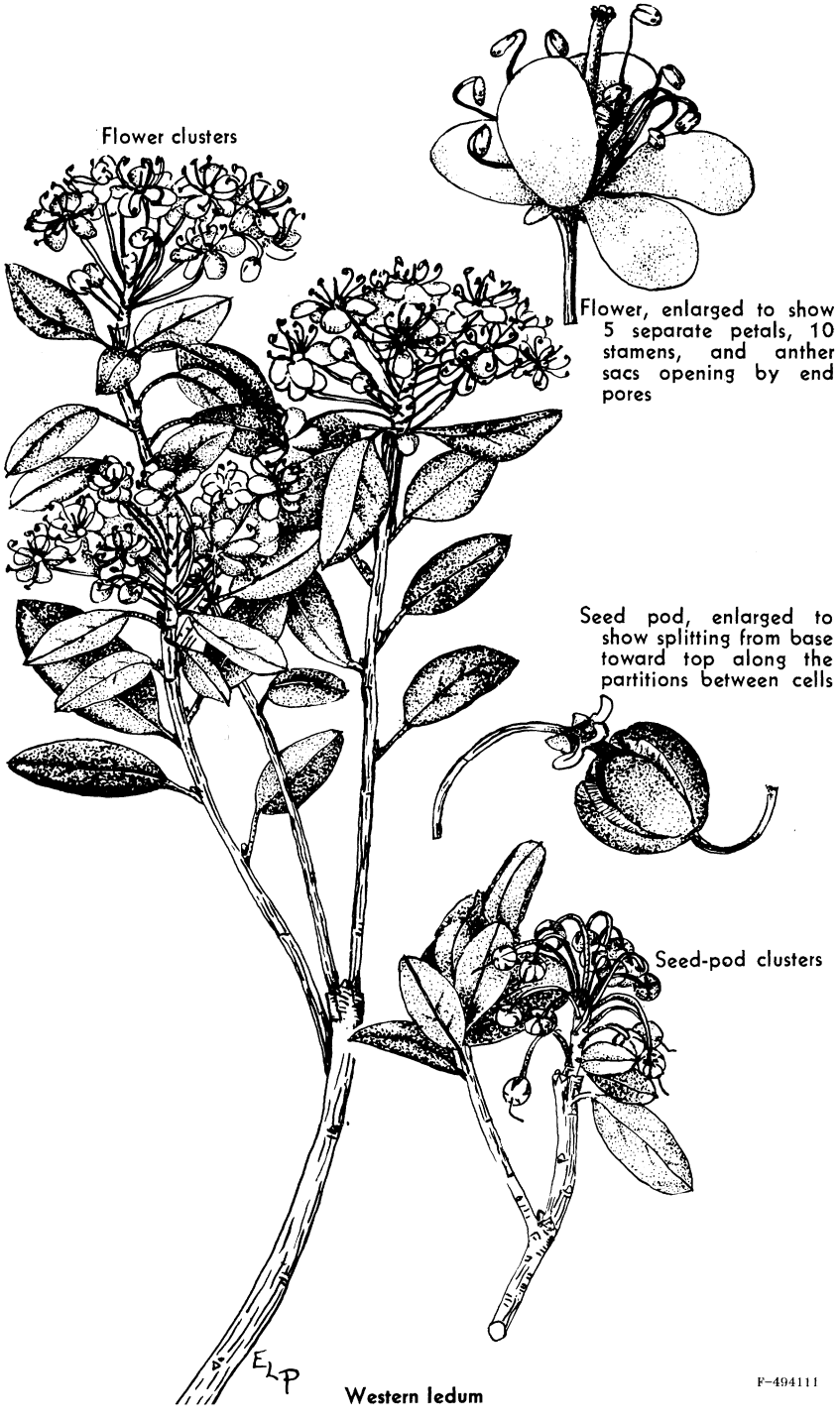
14. **Leaves with 1 main midrib.**
15. **Leaf margins entire.** [Alternate 15, p. 189.]

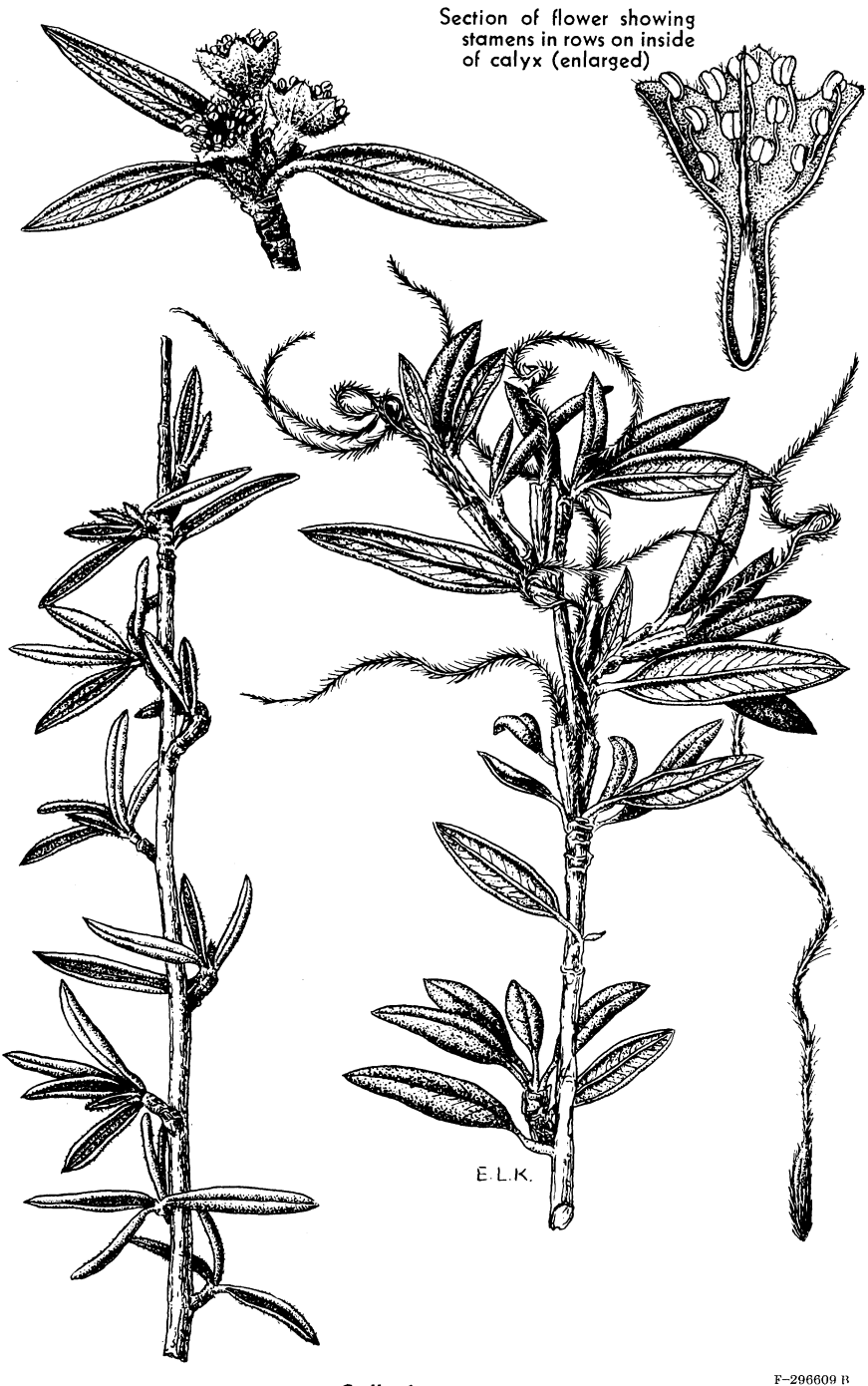
16. **Under leaf-surfaces** (often also leafstalks, young twigs, bud scales and seed pods) **dotted with tiny yellow resin drops** (glistening in the sun), whitened (glaucous); **upper leaf-surfaces dark green, finely crinkly with vein network;** leaves oblong to broadly egg-shaped, to 2 inches long, abruptly pin-pointed at tip, clustered near branch tips, **fragrant;** leaf margins not rolled under; end buds larger than side buds, with spirally overlapping bud scales, producing umbrella-like clusters of small white flowers; petals 5, separate; stamens 10, with long stalks white-hairy below; each anther sac with pore near tip; **seed pods** (**capsules**) **splitting up from base along partitions between their 5 cells;** seeds tiny, white, long-tailed; erect shrubs to 6 feet high in favorable sites; probably somewhat poisonous to livestock if browsed; wet mountain meadows or subalpine bogs, Cascades; Wallowa and Blue Mts., ne. Oreg., not reported from se. Wash.
western ledum, or smooth Labrador-tea (*Ledum glandulosum*).[43]

16. **Under leaf-surfaces not resin-dotted.**
17. **Leaf margins rolled under.**
18. **Leaves dark green and shiny resinous on upper surface,** white- or yellowish-hairy on under surface, **aromatic,** single or clustered near tips of spurlike twigs; twigs brown, whitish-hairy, soon gray and smooth; flowers in leaf axils near twig tips; petals lacking; calyx soft-hairy, abruptly flaring top part falling after stamens shed pollen, tubular lower part persistent around **long-, twisted-, feathery-tailed "seed"** (achene); tall, straggly shrubs or small trees with hard, brittle, mahogany-colored wood; warm, dry, rather rocky ridges or slopes in pine woods openings or with sagebrush, mt. areas, e. Oreg., Blue Mts., se. Wash.
curlleaf cercocarpus (*Cercocarpus ledifolius*).[44]
18. **Leaves** (as well as rest of plant) **densely white-**(aging rusty-)**hairy with both star-shaped and straight hairs, linear, to 2 inches long, erect,** often with smaller leaves clustered in their axils, winter-persistent; seed leaves (cotyledons) broad, green; **scaly winter buds lacking;** pollen- and

[43] C. Leo Hitchcock in a recent paper, *The Ledum Glandulosum Complex* (Leafl. West. Bot. 8 (1): 1–8. 1956.), states (p. 4), ". . there is a complete transition between '*columbianum*' and *L. glandulosum*, . ."; he regards *L. columbianum* Piper as a subspecies of *L. glandulosum*.

[44] In southern Oregon, curlleaf cercocarpus sometimes crossbreeds with longtail birchleaf cercocarpus (*Cercocarpus betuloides* var. *macrourus*), producing hybrids with characters intermediate between the two parents. See p. 193 for illustration.


Flower clusters
Flower, enlarged to show 5 separate petals, 10 stamens, and anther sacs opening by end pores
Seed pod, enlarged to show splitting from base toward top along the partitions between cells
Seed-pod clusters
E L P
Western ledum
F-494111

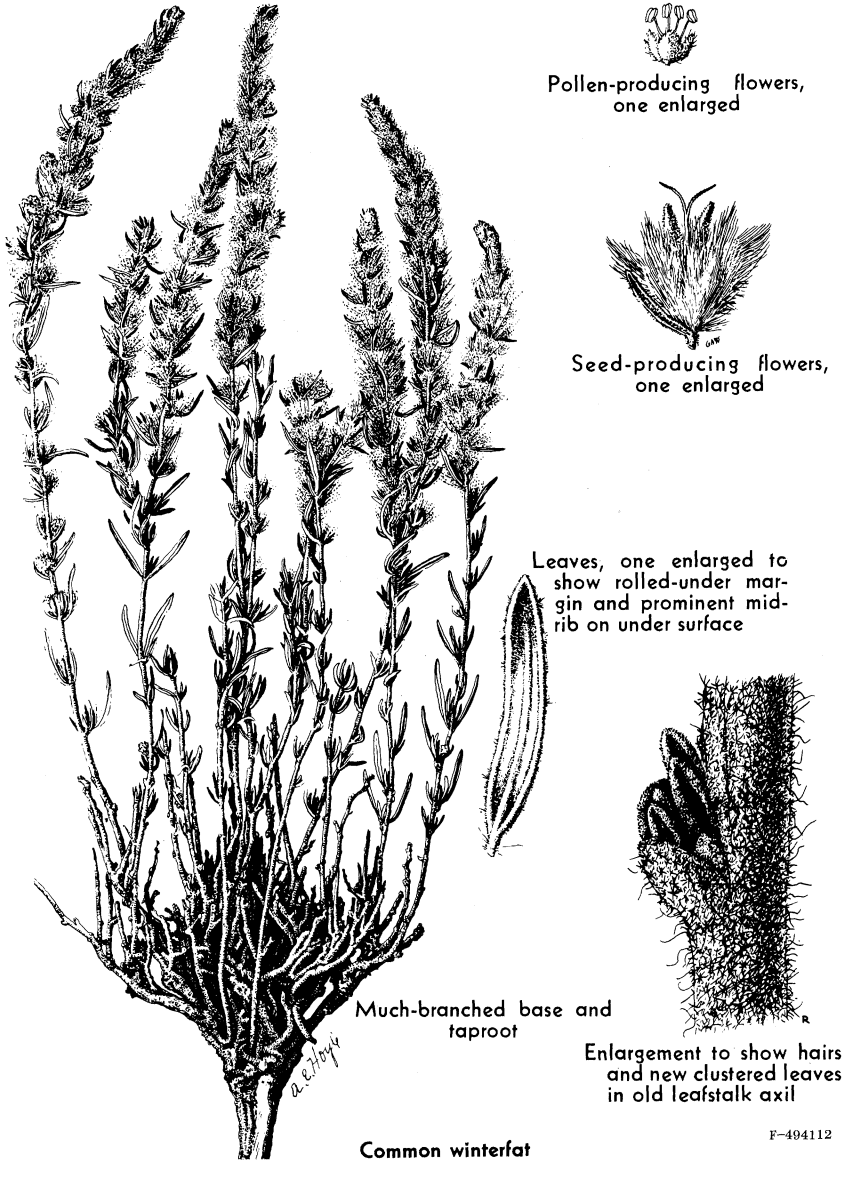


F-296609 R

Curlleaf cercocarpus

seed-producing flowers usually on same plant (sometimes only seed-producing flowers present); pollen-producing flowers smaller, above the larger, long-white-silky-hairy seed-producing flowers in the leafy-bracted, spikelike end clusters; **low half-shrubs, much-branched at base,** with several to many stems from a deep taproot; dry, alkaline soils; locally, e. Oreg., e. Wash.

common winterfat (*Eurotia lanata*).



17. **Leaf margins not rolled under.**
    19. **Leaves densely silvery-hairy or white-scurfy, narrow.**
        20. **Plants with sagebrush odor and taste;** freely branching at base; shoots erectly parallel, of 2 kinds: (a) perennial, evergreen-leafy, and (b) annual, drying-persistent after producing leafy-

Silver sagebrush

F–481880

bracted flower heads in loose- or narrow-branched end clusters during July, Aug.; **leaves densely silvery-hairy, linear or reversely lance-shaped, entire, pointed at tip, rarely with 1 or 2 irregular teeth or lobes,** to 2½ inches long; scaly winter buds lacking; rounded shrubs 2–3 (or 5) feet high, often root-sprouting or layering after top injury or fire; locally in big sagebrush areas, central and s. Oreg., not in Wash.

silver sagebrush (***Artemisia cana***).[45]

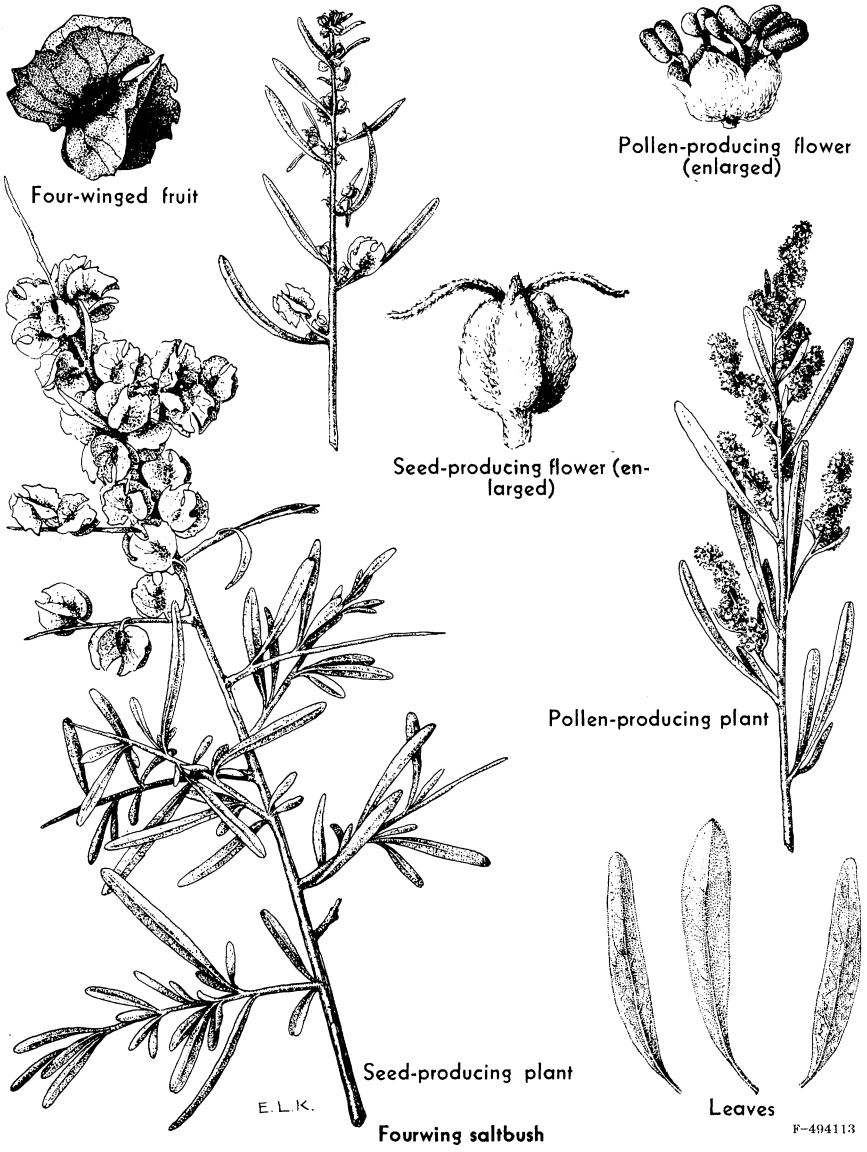
Annual, drying-persistent flower-head shoots

Perennial, evergreen-leafy shoots

Silver sagebrush (winter condition)

F–481883

[45] See George H. Ward. *Artemisia, Section Seriphidium, in North America. A Cytotaxonomic Study.* Dudley Herb. Contrib. 4 (6): 155–205. Dec. 30, 1953.



20. **Plants without sagebrush odor or taste,** usually salty to taste; branches spreading; twigs pale straw-colored to white-scurfy with branlike scales, **often becoming sharp- or spiny-tipped; leaves white-scurfy, narrowly oblong,** to 2 inches long and ⅜ inch wide; scaly winter buds lacking; pollen- and seed-producing flowers usually on separate plants; fruits 4-winged, clustered and persistent along end twigs; much-

Fourwing saltbush F-486446

branched shrubs 2–6 (or 10) feet high; dry, sandy to strongly alkaline soils; locally e. Oreg., e. Wash.

fourwing saltbush (*Atriplex canescens*).[46]

19. **Leaves green, narrow to broad;** bark reddish, purplish, chocolate, or dark reddish brown, smooth and polished or rough-scaly and shreddy; flowers urn-shaped, white, pink or rose, usually 5-lobed, stalked, in scaly-bracted end clusters; stamens 10; anther sacs tipped by recurved awns, opening by end pores; **"berries" (drupes) creamy white to yellowish brown, red, or brown to blackish;** "seeds" (nutlets) 4–10, fused or separable; mat-forming, low and depressed, or erect shrubs with crooked branches and to several feet high.

bearberry (or **kinnikinnick**) and **manzanitas** (***Arctostaphylos*** spp.).

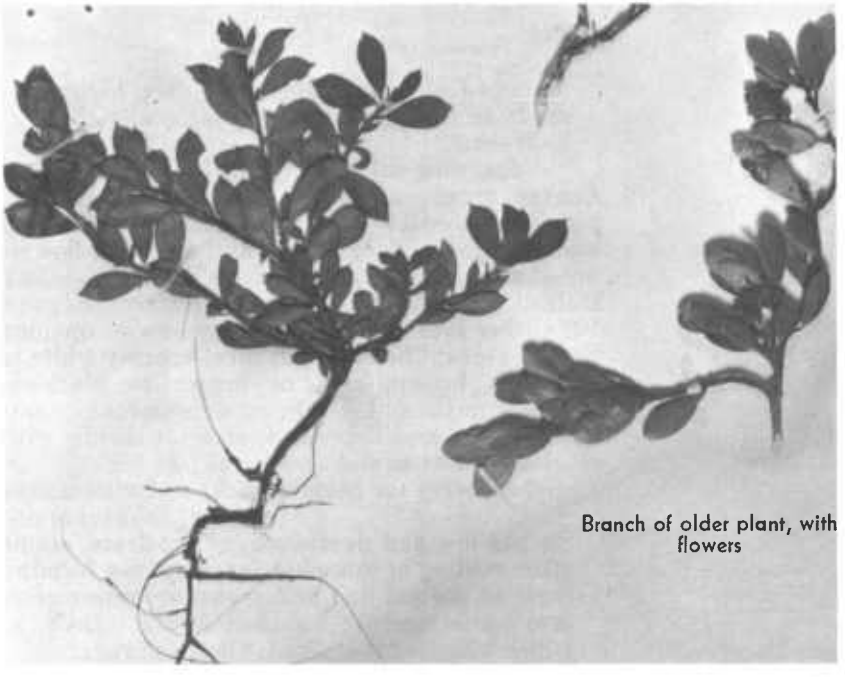
21. **Shrubs low and depressed, or prostrate, stems often rooting or branches layering, not forming burls at ground line and crown-sprouting after fire;** leaves narrow, broadest above middle, to 1 inch long, short-stalked; "berries" red.

[46] See Plants Armed sections of Summer and Winter Keys for shadscale saltbush (*Atriplex confertifolia*).

22. **Stems long-creeping; branches flexible,** to 8 inches high; bark rough-scaly, shreddy, dark reddish brown; **leaves rounded or broadly and shallowly notched at tips; stomata only on under surface;** trailing or matted shrubs with bright red "berries"; often on acid or granitic soils; at lower as well as higher elevations, Cascades; Wallowa, Blue Mts., ne. Oreg., se. Wash.
bearberry, kinnikinnick (*Arctostaphylos uva-ursi*).

22. **Stems much-branched from near base; branches rigid, to 2 feet high;** bark smooth after scaly flaking; **leaves mostly abruptly sharp-pointed at tip** (mucronate or cuspidate); **stomata on both surfaces;** "berries" light red; often on basaltic soil; usually at elevations over 4,000 feet; Cascades, Wallowa and Blue Mts., ne. Oreg.; type locality, Sierra Nevada, Calif., at elevations of 8,000 to 10,000 feet.
pinemat manzanita (*Arctostaphylos nevadensis*).

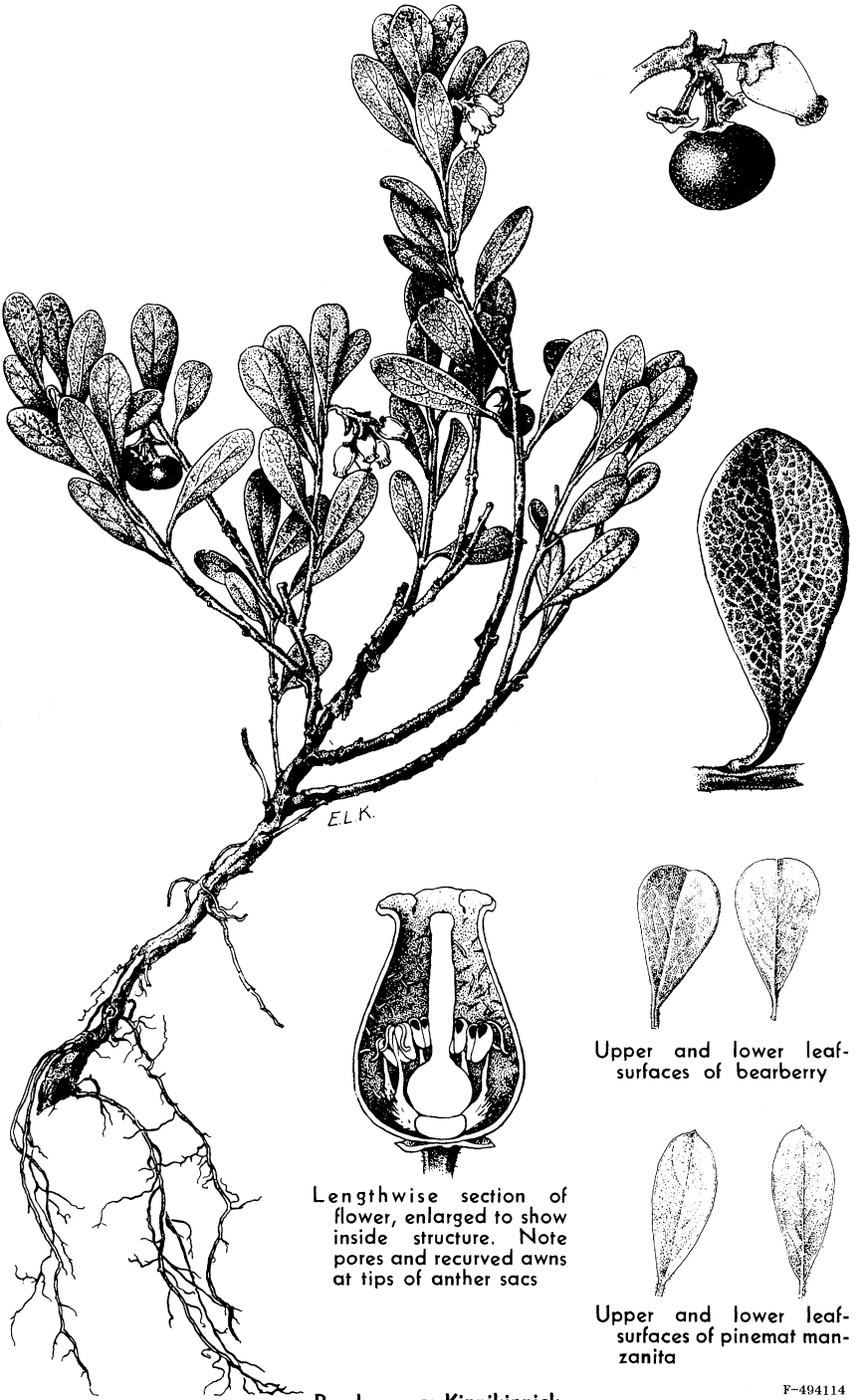
21. **Stems erect or spreading, to 8 feet high; leaves broad,** oval to egg-shaped in outline, to 2 inches long, often somewhat pointed at tip; stomata on both sides; twigs, leafstalks, flower-cluster



Seedling

F-481216

Pinemat manzanita



Lengthwise section of flower, enlarged to show inside structure. Note pores and recurved awns at tips of anther sacs

Upper and lower leaf-surfaces of bearberry

Upper and lower leaf-surfaces of pinemat manzanita

Bearberry, or Kinnikinnick

F-494114

branches and the awl- to broadly lance-shaped or triangular flower bracts often glandular-hairy; shrubs, often layering and in large patches or thickets; open pine woods at moderate altitudes, mostly e. of Cascades from near Mt. Hood (possibly from s. Wash.), s. and e. to Lake Co., Oreg.

pine and greenleaf manzanitas.[47]

23. **Bark scaling off; leaves erect or erect-spreading;** sepals almost circular, tissue-

F-486429

Pine manzanita

[47] The original descriptions of pine and greenleaf manzanitas have been rather closely followed here.

papery-margined; **"berries" creamy white to yellowish brown,** shining, splitting irregularly (often while still on plant), mealy flesh curling back to expose 3–5 smooth, light brown "seeds"; **layering but not forming burls or crown-sprouting, killed by fire;** type locality, 7,500 feet elevation, Mesa Co., w. Colo.

pine manzanita (*Arctostaphylos parryana* var. *pinetorum*).

23. **Bark smooth; leaves spreading or drooping (never vertical) on leafstalks;** "berries" chestnut brown to blackish; "seeds" often fused into a deeply, irregularly lobed body; **crown-sprouting after fire, forming burls,** sometimes layering after heavy snows; **not killed by fire;** type locality, ". . . dry rocky ridges in pine woods of middle altitudes in the Sierra Nevada, California."

greenleaf manzanita (*Arctostaphylos patula*).[48]

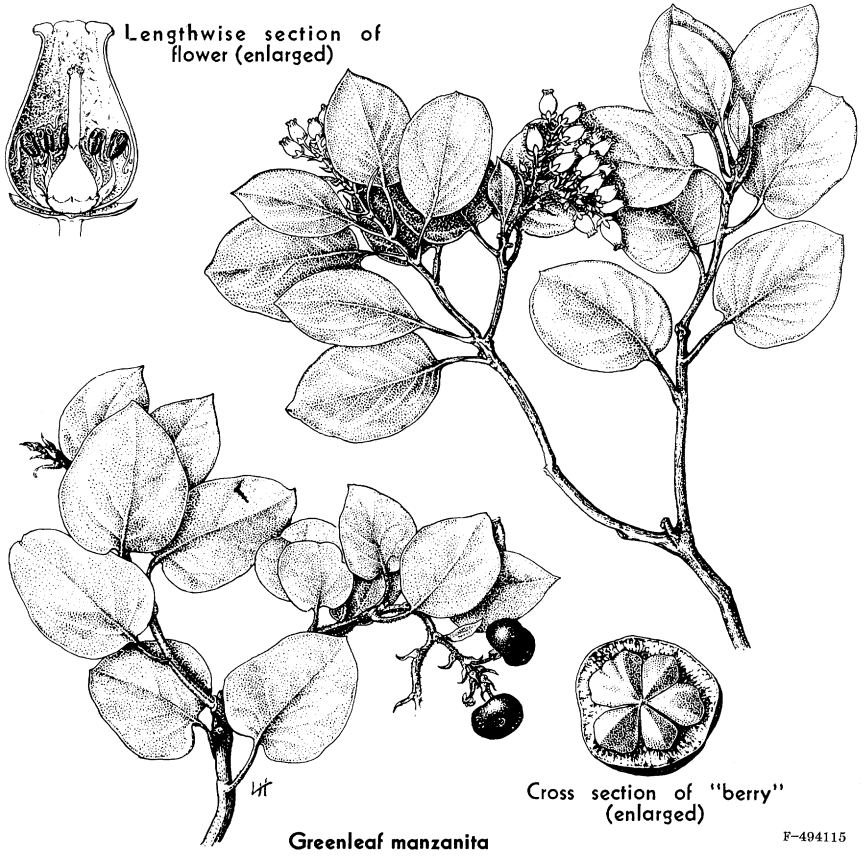
15. **Leaf margins toothed or lobed.** [Alternate 15, p. 178.]

24. **Leaves broad, oval or elliptic to almost round, egg-shaped or reversely egg-shaped in outline; short-stalked to almost stalkless.**

25. **Dwarf, much-branched shrubs; stems creeping and rooting or trailing and prostrate; branches often with rusty, gland-tipped hairs;** leaf margins finely toothed, each tooth ending in gland-tipped hair pointed toward leaf tip; flowers small, white, broadly bell-shaped, single at tips of short, bracted stalks in leaf axils; **"berry"** (capsule enclosed in fleshy calyx) **spicy, juicy, bright red, smooth or with gland-tipped hairs,** often hidden under leaves; usually on moist mountain slopes; Cascades, Oreg., Wash.; Blue and Wallowa Mts., ne. Oreg., not reported from se. Wash.

wintergreens (*Gaultheria* spp.).

[48] L. R. Abrams (*Illustrated Flora of the Pacific States* 3: 314. 1951.) and J. E. Adams (*A Systematic Study of the Genus Arctostaphylos Adans.* Elisha Mitchell Sci. Soc. Jour. 56: 1–62. 1940.) regard both *Arctostaphylos parryana* var. *pinetorum* (Rollins) Wiesl. & Schreib. (1939) and *A. obtusifolia* Piper (1902) as synonyms of *A. patula* Greene (1891). However, for the present at least, it seems preferable to keep the nonsprouting pine manzanita separate from the crown-sprouting greenleaf manzanita (*A. patula*). Recent Forest Service field studies of large patches of manzanita plants (apparently typical *Arctostaphylos obtusifolia*) from Black Butte, Oreg., (the type locality of *A. obtusifolia*) have proved these plants to be nonsprouting and without burls. Moreover, this material was compared with Cusick's type specimen of *A. obtusifolia* (in the Herbarium of the University of Oregon at Eugene) and both seemed to be identical with the nonsprouting pine manzanita. If indeed *A. pinetorum* Rollins (1937) and *A. obtusifolia* Piper (1902) prove to be synonymous, the latter name (having 35 years' priority) should stand for both. It would not be surprising if further field studies prove that the crown-sprouting greenleaf maznanita is rare (if present at all) in this Oregon area, and that the correct scientific name of the common nonsprouting manzanita there is *A. obtusifolia* Piper.

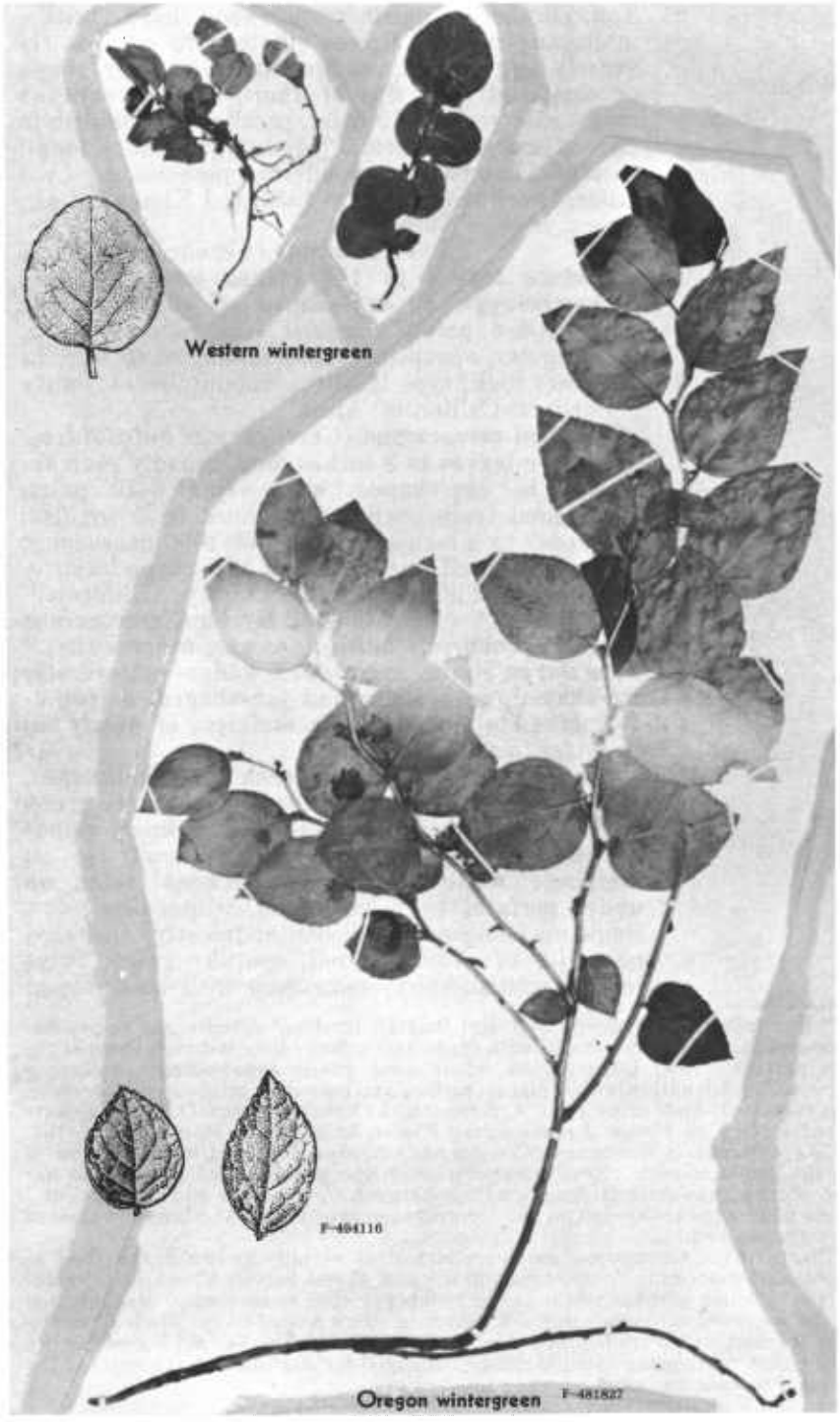


26. **Leaves to ¾ inch long, oval to almost round in outline; margins very finely toothed or almost entire** (gland-tipped hairs mark position of the tiny teeth); flowers, "berries" hairless or nearly so; corolla little longer than calyx; plants matlike, with leafy shoots to 4 inches high, sometimes with a few gland-tipped hairs; higher elevations (to subalpine slopes.

western wintergreen (***Gaultheria humifusa***).

26. **Leaves to 1½ inch long, egg- or somewhat heart-shaped in outline; veins impressed on upper surface; margins finely but distinctly toothed;** flowers and "berries" with gland-tipped hairs; corolla much longer than calyx; plants with trailing or prostrate stems and bushy-spreading branches to 1 foot high, often rather densely hairy with rusty, gland-tipped hairs; lower elevations; type locality, "Cascade Mountains, borders of British Columbia, Washington Territory, and northern Oregon."

Oregon wintergreen (***Gaultheria ovatifolia***).



471114 O-60-13

25. **Tall shrubs or small trees; wood hard, brittle, mahogany-colored; leaves elliptical to egg- or reversely egg-shaped, wedge-shaped at base, single or clustered near tips of short, scarred spurlike twigs; side veins 4–10 pairs, parallel from midrib to tips of marginal teeth; "seeds" (achenes) long-, twisted-, hairy-tailed;** ponderosa pine woods; Cascades, Deschutes Co., s. to Lake and Klamath Cos., Oreg., not in Wash.

cercocarpus (***Cercocarpus*** spp.).

27. **Mature leaves to 1½ inches long, narrowly reverse-egg-, or egg-shaped to elliptical; side veins 4–6 pairs;** marginal teeth short, broad, triangular, abruptly short-pointed; small tree, to 26 feet high; type locality, "mountains of Santa Barbara, California: April."

birchleaf cercocarpus (***Cercocarpus betuloides***).

27. **Mature leaves to 3 inches long, broadly reverse-egg- to egg-shaped; side veins 6–10 pairs;** marginal teeth coarse, egg-shaped or triangular; "seeds" to ½ inch long, with tails to 4 inches long; shrub or small tree to 16 feet high; type locality, "on rocky hillsides, Modoc County, California."

longtail birchleaf cercocarpus (***Cercocarpus betuloides*** var. ***macrourus***).[49]

24. **Leaves not as above, narrow and wedge- or reversely lance-shaped, or broader and fan-shaped, 3- (or 4- to 9-)toothed or lobed at tips, stalkless or nearly so;** very bitter to taste, aromatic.

antelope bitterbrush and **sagebrushes.**

28. **Leaf margins rolled under (revolute); leaves green or softly white-hairy, or (under lens) finely gland-dotted on upper surface** (more coarsely so on margins), **white-woolly-hairy between veins on under surface,** to ¾ inch long, winter-persistent, single on fast-growing shoots, or (mostly) clustered near tips of short, scarred, spurlike twigs; **twigs** brown, whitish-hairy, sometimes with tack-shaped

[49] In southern Oregon, curlleaf and longtail birchleaf cercocarpus sometimes crossbreed, resulting in hybrids with characters intermediate between those of the two parents. Near Logan, Utah, where some winter deer-feeding experiments were made with native browse plants, curlleaf and mountain cercocarpus (*Cercocarpus montanus*) have crossbred. Concerning the hybrid, Arthur D. Smith reports (*Feeding Deer on Browse Species during Winter*, Jour. Range Mangt. 3: 130–132. 1950.): "Mountain mahogany (*Cercocarpus ledifolius*) p(r)oved most desirable of all the plants offered. Next in importance in the list, although based upon but one offering, was material from a hybrid between *C. montanus* and *C. ledifolius*." More field notes are needed on the occurrence, reproduction, and browse values of cercocarpus hybrids.

Plants of the *Cercocarpus* genus are almost universally known in the West as "mountain-mahogany." However, in the new Forest Service Check List "cercocarpus" (which perhaps might better be abbreviated to cercocarp) was adopted as the approved common name. This action stems from Federal Trade Commission hearings on fair trade practice in "mahogany" in which the old Forest Service ruling that "mahogany" should not be employed for any plants but species of the genus *Swietenia* was cited.

Hybrid cercocarpus

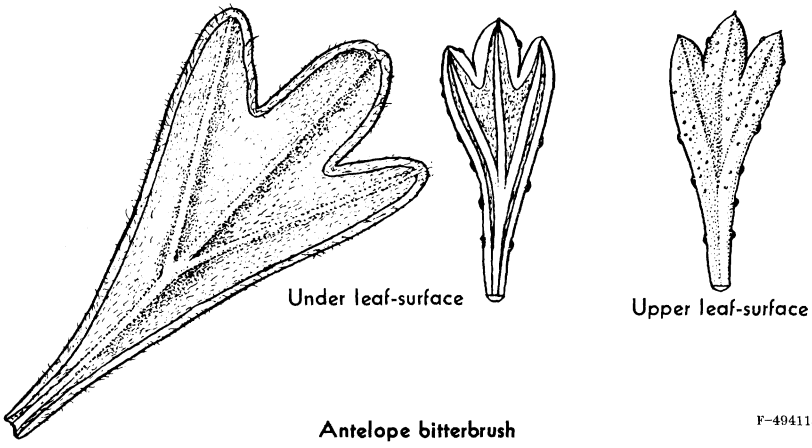
F-481882

Curlleaf cercocarpus

Longtail birchleaf cercocarpus

Birchleaf cercocarpus

F-494117



Antelope bitterbrush F-494118

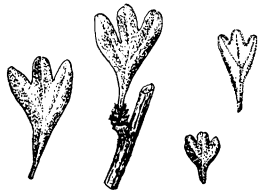
glands, **appearing jointed because of encircling stipule scars;** scaly winter buds in axils of persistent leafstalk bases to which stipules are attached, developing into leafy spurlike twigs; bundle trace 1 for leaf and 1 on either side for the attached stipules; flowers funnel-shaped, with 5 yellow spreading petals, solitary at tips of short side twigs; "seeds" (achenes) to ½ inch long, spindle-shaped, grooved, tipped by persistent tapering style; typically tall and rigidly branched shrubs or else moundlike and with arching branches, but often low and prostrate after long overbrowsing; open places in ponderosa pine or with sagebrush, e. Oreg., e. Wash.

antelope bitterbrush (*Purshia tridentata*).

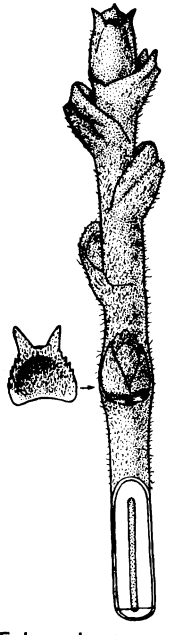
28. **Leaf margins not rolled under; leaves densely white- gray- or silvery-hairy on both sides;** variable in size and shape (especially new spring leaves and the often entire ones on the flowering shoots), single or clustered and in all stages of development; **twigs and branches erectly parallel, of 2 kinds:** (a) **perennial, evergreen-leafy shoots** and (b) **annual, leafy-bracted, drying-persistent, flowering shoots;** scaly winter buds lacking; dwarf to tall shrubs with sagebrush odor and taste; arid places, e. Oreg., e. Wash.....**sagebrushes (*Artemisia* spp.).**[50]

29. **Leaves of evergreen-leafy shoots mostly reversely lance-shaped and deeply 3-lobed at tips** (lobes sometimes again 3-cleft), or some entire and linear (as are many on the flowering shoots), or a few lobed to the middle (pinnatifid), to nearly 1½ inches long; flower-head clusters (panicles) usually much-branched, rarely spikelike; **leafy bracts of flower heads not overtopping end clusters (as**

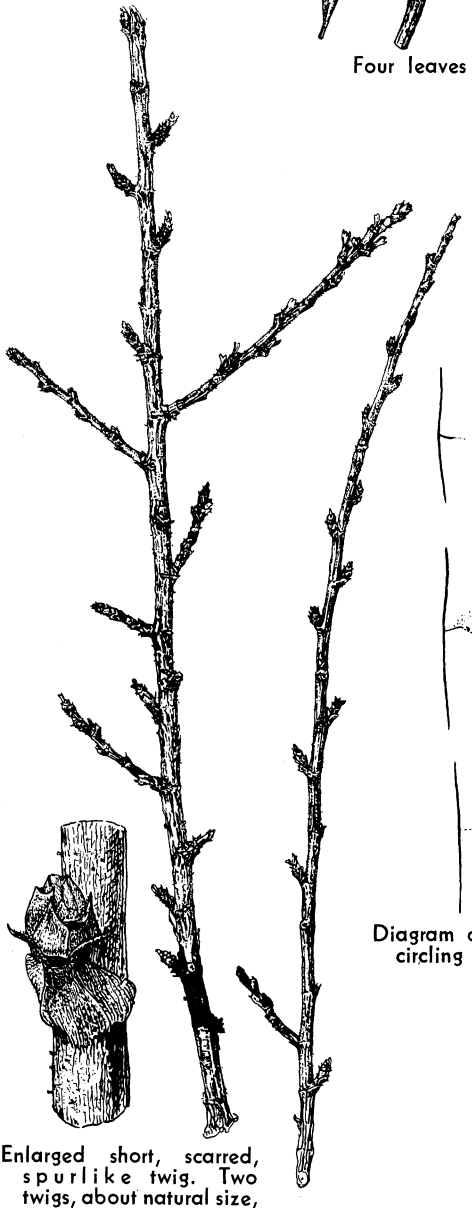
[50] See George H. Ward. *Artemisia, Section Seriphidium, in North America. A Cytotaxonomic Study.* Dudley Herb. Contrib. 4 (6): 155–205. Dec. 1953.



Four leaves



Enlarged twig tip with end bud and scaly winter buds in leafstalk base axils. One leafstalk base (with 2 attached stipules) removed to show leaf and stipule scar



Enlarged short, scarred, spurlike twig. Two twigs, about natural size, showing short spurlike branches and buds

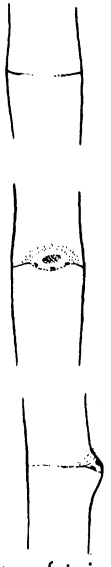
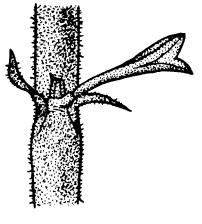
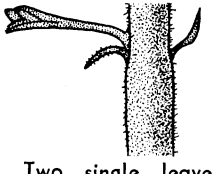


Diagram of twig with encircling stipule scars





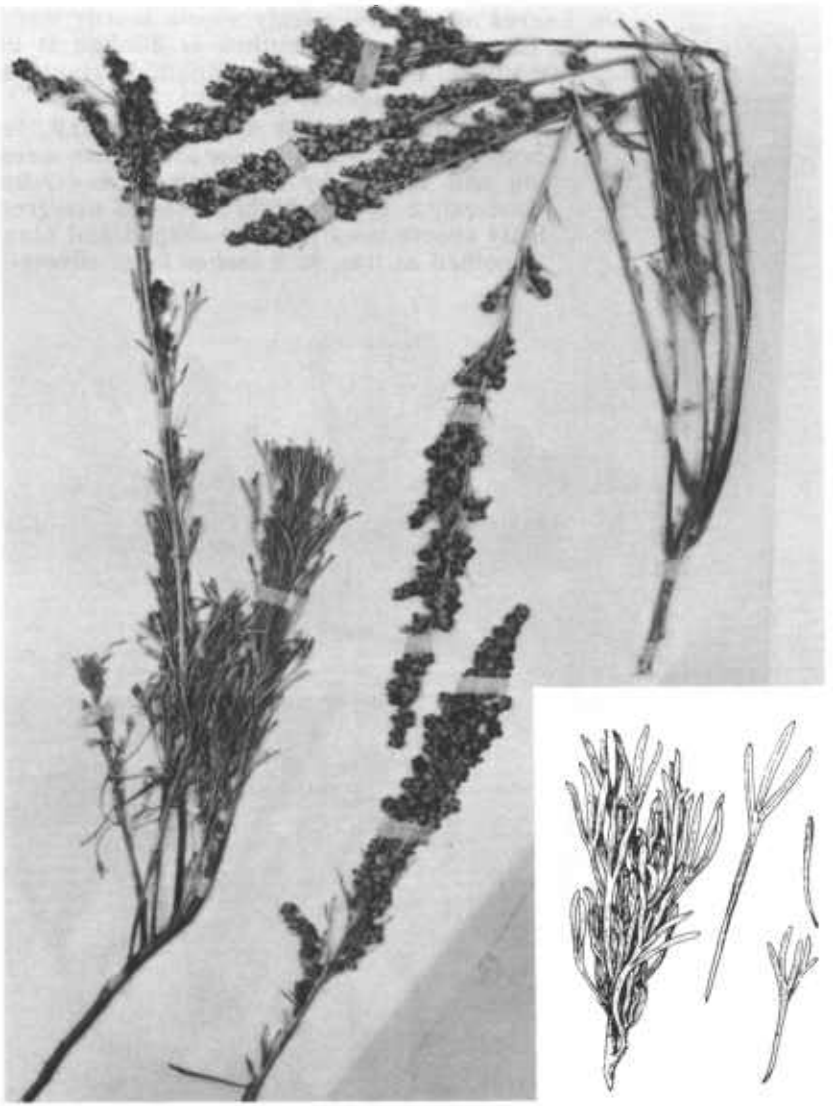
Two single leaves with stipules (enlarged)

Antelope bitterbrush

F-494119

Antelope bitterbrush

F–494120



Three-tip sagebrush F-481881, 494121

they usually do in stiff sagebrush—compare illustrations); flower-head buds appearing in June, not opening until early Sept.; rounded or bushy shrubs to 4 feet high, branched from near base, often root-sprouting, sometimes layering; locally, e. Oreg., e. Wash.

three-tip sagebrush (***Artemisia tripartita***).[51]

[51] For stiff sagebrush (*Artemisia rigida*), which sheds its leaves in winter, see pages 41 and 125.

29. **Leaves of evergreen-leafy shoots mostly wedge- to fan-shaped and 3-toothed or 3-lobed at tips, sometimes entire, never pinnatifid; plants not root-sprouting, seldom layering.**

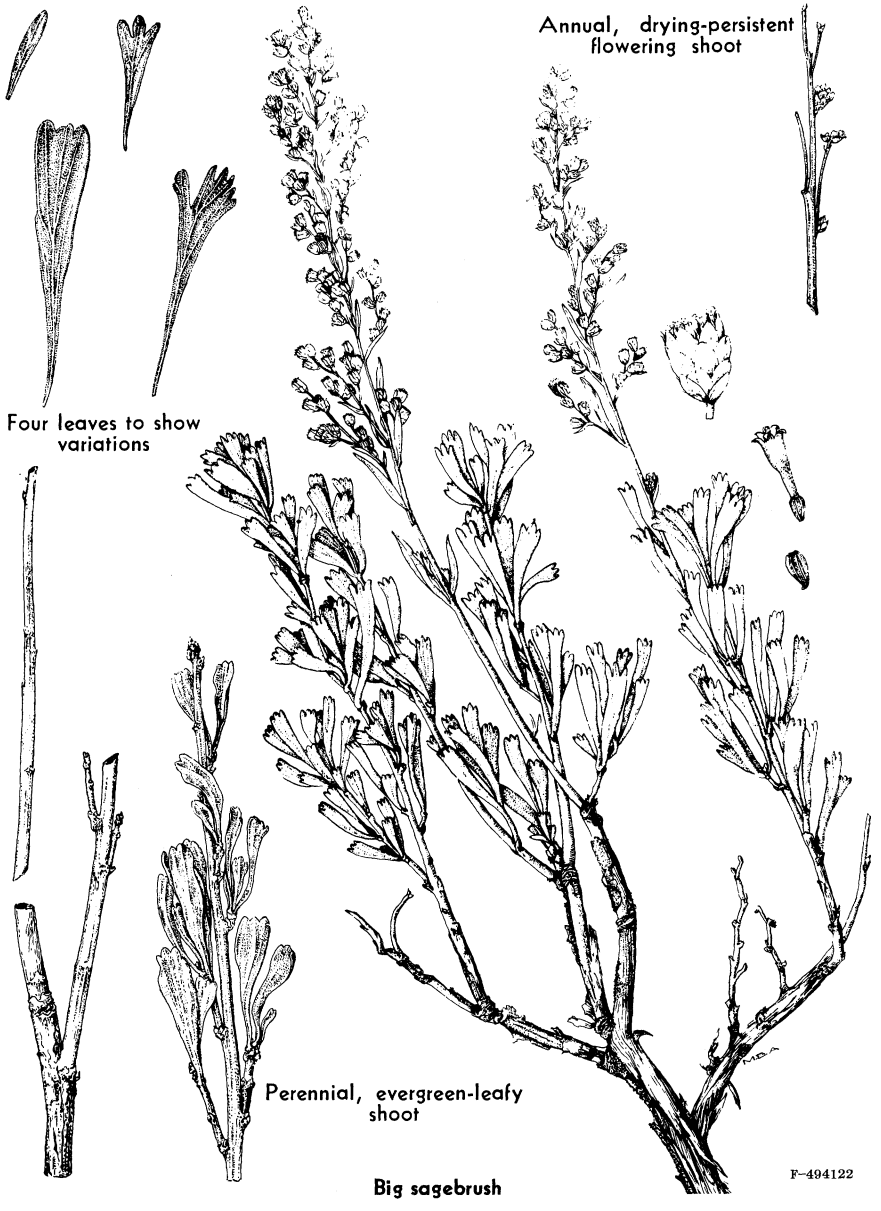
30. **Tall, rounded shrubs with short trunk, few-branched from near base (or sometimes spreading and topped by long-stalked flower-head clusters), 2–15 feet high; leaves of evergreen-leafy shoots mostly wedge-shaped and bluntly 3-toothed at tips, to 2 inches long, silvery- or**

F–481217

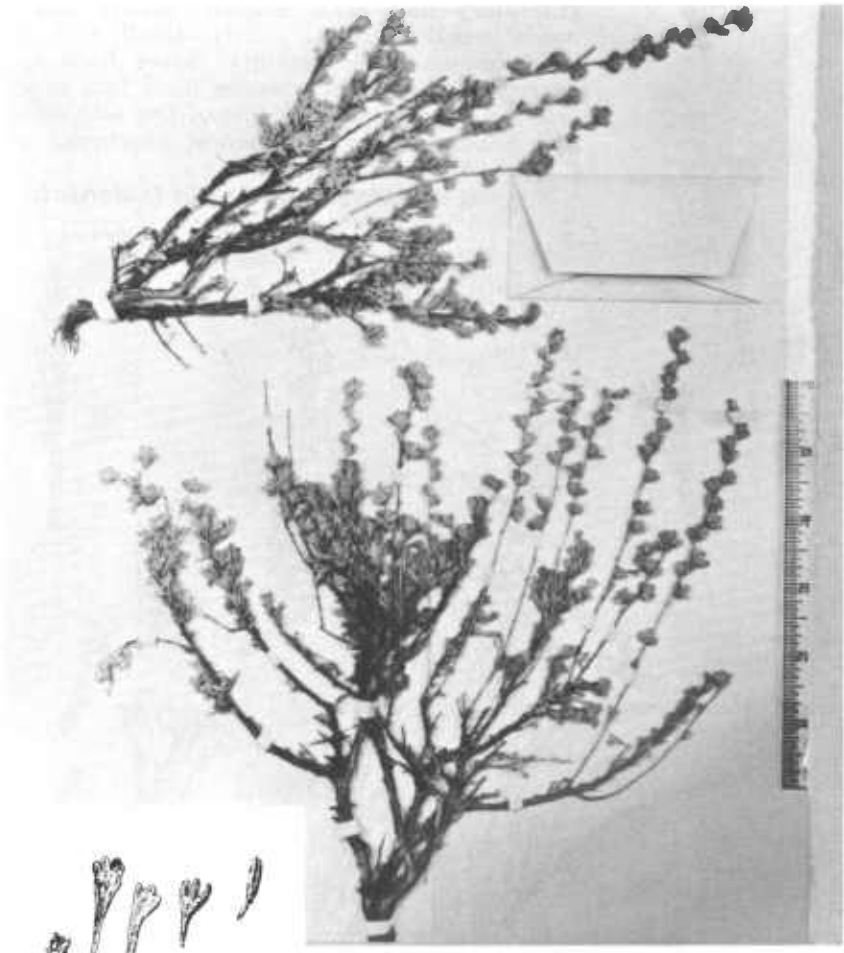
Stiff sagebrush

gray-hairy and often slightly sticky; flower heads usually comparatively small and in much-branched end clusters; flower buds appearing in June, not opening until late Sept. or Oct.; type locality, plains of the Columbia and Snake Rivers; commonest sagebrush of e. Oreg., e. Wash.

big sagebrush (***Artemisia tridentata***).



Big sagebrush



Low sagebrush F-481879

F-494123

30. **Dwarf, spreading shrubs to 16 inches high; leaves of evergreen-leafy shoots usually broadly wedge- or fan-shaped and not more than ½ inch long;** leafy bracts of flowering shoots sometimes narrowly and deeply 3-lobed at tips; **flower heads comparatively large** (small in se. Oreg. form with reddish flowering shoots), **usually in spikelike clusters; flowering shoots often becoming sharp- or weakly spine-tipped after "seeds" fall;** type locality, arid plains of Snake River; often on scablands; Columbia plateau, slopes of Cascades, Chelan, Yakima, and Kittitas Cos., Wash., and s. and e. Oreg. **low sagebrush (*Artemisia arbuscula*).**

F-494124

Desertsweet

7. **Leaves compound.** [Alternate 7, p. 169.]
   31. **Stems unarmed; erect or prostrate shrubs.**
      32. **Leaflets finely divided, fern- or tansy-like, winter persistent,** clustered near tips of short, leaf-scarred, spurlike twigs or scattered along flowering shoots, **with both reddish gland-tipped and white-woolly star-shaped hairs, fragrant;** stipules lance-shaped, entire, leaving scar with a single bundle trace at either end of leaf scar when they finally fall; leaf scars with 3 bundle traces; twigs reddish, with tack-shaped glands, often very resinous; flowers white, in branched, pyramidal end clusters (panicles); seed pods (follicles) splitting across top and down on inner side, 5 for each flower, united at base and cupped in persistent, 5-lobed calyx fringed inside by many drying-persistent stamens; central fruit-cluster stalk hardening and becoming sharp-

F-494125

Leaflet, with typically rounded tip

Creeping mahonia or Hollygrape

F-481829

tipped after fruits fall; erect, often straggly shrubs, to 6 feet high; among lava rocks in dry sites, Deschutes and Crook Cos., s. and e. in Oreg.; not reported from Wash.

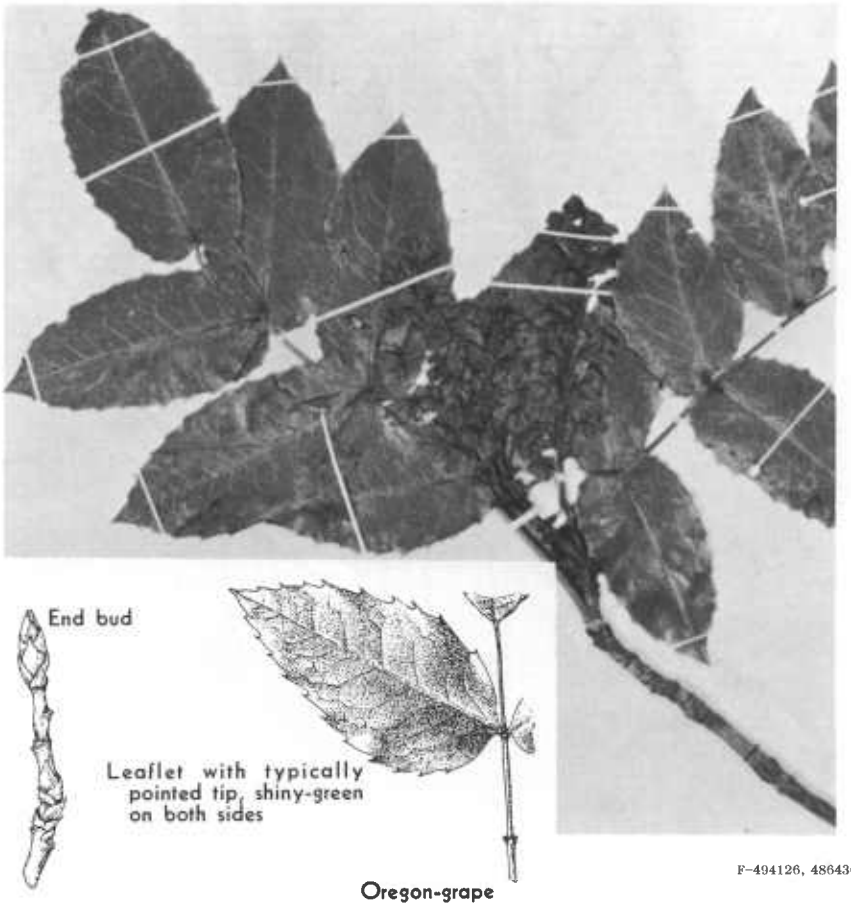
desertsweet, or **tansybush** (***Chamaebatiaria millefolium***).

32. **Leaflets broad, hollylike, 3–23, odd-pinnately compound** (or end leaflet sometimes lacking); berries blue, with whitish waxy "bloom" (glaucous), in end clusters (racemes); shrubs with yellow wood and very bitter inner bark.

mahonia, hollygrape, and **Oregongrape** (***Mahonia*** spp.).

33. **Stems prostrate, runnerlike or short-upright, from long, much-branched, scaly underground stems; leaflets** usually 5 (3–7), thin-leathery, with 1 main midrib, **dull bluish green on upper surface, whitish with microscopic "pimples"** (papillae) **on under surface, rounded at tip,** turning brilliant red in fall except where leaflets overlap or where growing in shade; hillsides or open pine woods; common, e. Oreg., e. Wash.

creeping mahonia, or **hollygrape** (***Mahonia repens***)



F-494126, 486436

Oregon-grape

Cascades mahonia

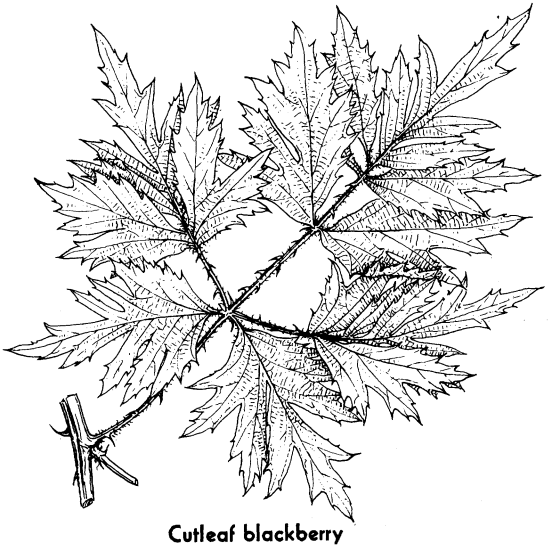
F–481828, 494127

33. **Stems erect; leaflets glossy green, pointed at tips;** common w., occasional e. side of Cascades and mountain areas of e. Oreg., e. Wash.; type locality for both, the Cascades of the Columbia River.
Cascades mahonia and **Oregon-grape.**

34. **Leaflets 7–23, each 3- to 5-veined from near base, thick-leathery;** leaves nearly erect, clustered near stem tip; stems usually single, unbranched, to 1 or 2 feet high, arising from long, scaly underground stems and ending in showy bud ½ to 2 inches long; **bud scales rigid, sharp-tipped, persistent.**
Cascades mahonia (*Mahonia nervosa*).

34. **Leaflets 5–9, with 1 main midrib,** turning red, bronze, or purplish in winter; leaves spreading, scattered along branches; stems often clustered, branched, and suckering at base; end buds with triangular, soon-falling bud scales about ¼ inch long; shrubs to 10 feet high, or sometimes dwarfed; flowers in clustered, somewhat drooping racemes; often cultivated; the Oregon State flower.....**Oregon-grape (*Mahonia aquifolium*).**

31. **Stems armed with curved and hooked prickles** (as are also the leafstalks, the midribs and veins on under side of leaflets, the flower stalks, and the flower-cluster stalks), coarse, angled, much-branched, often to 10 feet long, **perennial, vinelike,** creeping on ground or clambering over other plants, rocks, etc.; leaves of the main stems with 5 leaflets, leaves on flowering shoots with 3 leaflets (or sometimes only 1); **leaflets deeply and variously cleft or parted;** flowers mostly pink or rose-colored; blackberries large and juicy; somewhat weedy; naturalized from the Old World; commoner w. of the Cascades; occasional e. Oreg., e. Wash.
cutleaf blackberry (*Rubus laciniatus*).



Cutleaf blackberry

F-494128

NOTES ON FORAGE VALUE

Acer spp.

The foliage of maples is of fair palatability for domestic stock. Leaves are also eaten by big game and in the fall and winter deer and elk heavily browse the twigs.

Alnus spp.

For livestock, deer, and elk, the palatability is rather low. Forage value is further depreciated by frequent inaccessibility of the plants. Seeds are relished by doves and some other birds.

Amelanchier spp.

Palatability of most species of *Amelanchier* appears to be fair to good for livestock, and good to excellent for deer and elk. Serviceberries are considered to be among the more valuable and nutritious browse plants of the region. Some Idaho studies suggest that on sheep range the proper-use factor for *A. alnifolia* is 60–65 percent.

Aplopappus bloomeri

Is of low value to worthless for livestock.

Arctostaphylos spp.

A. nevadensis and *A. uva-ursi* are unpalatable to domestic livestock. Deer and elk make limited use of them, particularly in the winter. Tender shoots, buds, and leaves of *A. parryana* var. *pinetorum* are palatable to sheep and especially deer, but older parts are of small forage value except when there is a near shortage of winter browse.

Artemisia arbuscula

Various species of sagebrush, particularly *A. arbuscula*, are important year-long food items for pronghorn antelope on Hart Mountain, Oreg., range.

Artemisia cana

In most localities where this species occurs, it is considered to be of little value for sheep feed, and of no value for cattle.

Artemisia rigida

Fair forage for sheep and particularly liked by horses.

Artemisia spinescens

Probably its most important use in some places has been as sheep browse. Use by antelope has been noted.

Artemisia tridentata

Although of low palatability, big sagebrush is important because of its wide distribution, abundance, and its unwanted invasions of some depleted range lands. With the exception of sheep use on desert winter ranges, the species is considered to be of almost no value for livestock. Big sagebrush is a moderately palatable winter food supply for elk and mule deer, and apparently very palatable for antelope. There is also an eastern Oregon record of considerable summer use of big sagebrush by elk. Body weights, health, and productivity of deer

are not maintained by a winter diet of mostly sagebrush, despite its rather high phosphorus and protein content.

Artemisia tripartita

Value of this species for domestic stock is very low.

Atriplex spp.

Flowers, leaves, and twigs of *A. canescens* have a good palatability rating for all classes of livestock except horses. The seeds are highly palatable. Deer freely use this shrub, especially on winter range. *A. canescens* is considered as one of the better spring and winter feeds for antelope. Nutritive value is high. There is speculation that elk would use *A. canescens* and *A. confertifolia* if the animals ever again get into the sagebrush plains.

Betula spp.

The western species appear to be fairly palatable to livestock and big game.

Cassiope mertensiana

This alpine plant may furnish forage for mountain goats. Known to be nibbled by mountain sheep.

Ceanothus integerrimus

This species is good to excellent summer browse for domestic livestock and probably a year-round food item for deer. Protein content is fairly good, but declines about the time seed matures.

Ceanothus prostratus

Is of little forage value for any class of domestic livestock, but is one of the species preferred by deer. Its protein content in summer is rather good.

Ceanothus sanguineus

Both leaves and twigs are considered to have a fair to good palatability for livestock. It is probably equal or better in palatability than *C. velutinus* for big game, but it is of lesser importance because of its tendency to grow out of reach of browsers and its lesser abundance. Proper-use level suggested by some Idaho studies for *C. sanguineus* is 60 percent where the shrub is grazed in late summer and early fall.

Ceanothus velutinus

Although this species is purported to be worthless for cattle and horses and of only slight palatability for goats and sheep, domestic livestock will consume it in fall and winter during a feed shortage. Protein content of snowbrush, at least in the summer, is relatively high. Deer will eat *C. velutinus* at any season and it is part of the elk diet from late summer to spring. According to studies in eastern Oregon and eastern Washington, the three most important species in the winter diet of deer and elk are *C. velutinus*, *Purshia tridentata*, and *Cercocarpus ledifolius*. According to clipping studies made in eastern Oregon, the level of use for maximum sustained production of *C. velutinus* on winter ranges is 35 to 40 percent.

Celtis reticulata

Is eaten by livestock where it occurs on their winter ranges.

471114 O–60–14

Cercocarpus spp.

C. betuloides and *C. ledifolius* are used to a limited extent by domestic stock in fall and winter where available. These highly nutritious species are relished feed for deer. *C. ledifolius* is rated as one of the three most important winter browse plants for deer and elk in eastern Oregon and eastern Washington. The old and tall plants of *C. ledifolius* can be easily highlined and converted to trees whose twigs cannot be reached by big game animals. Varying degrees of pollarding have been tried, with fair success, to induce good quantities of accessible twigs and leaves. Benefits of this rather expensive measure are short-lived if overuse by browsing animals continues. It has been suggested that the level of winter use for maximum sustained production of *C. ledifolius* is about 50 percent.

Chamaebatiaria millefolium

Probably a fair browse for sheep and goats and of slight value for deer.

Chimaphila spp.

These partially herbaceous species are fair forage for elk, but of lower value for deer.

Chrysothamnus spp.

Palatability of *C. nauseosus* is ordinarily low for livestock, but rated as good for antelope. It is a poor to fair winter browse for deer and elk where it is available to them. Clipping studies in Oregon have shown it could withstand heavy winter browsing. Attempts to eradicate it from overgrazed ranges by fire and some mechanical methods have not been very successful. It has been noted, however, that it will succumb to girdling by rodents. The species produces *chrysil*, a good rubber which vulcanizes readily. *C. viscidiflorus* is another species of low value for livestock, yet it is used on some winter ranges or when feed is in short supply. Use by antelope has been noted. *C. viscidiflorus* var. *lanceolatus* is considered as poor to worthless for forage.

Clematis spp.

Domestic stock have been reported to use lightly various species of *Clematis* when the plants are young and tender. Importance of the species to big game is also slight.

Cornus stolonifera

This species is rated as of slight importance to sheep and of no value to cattle. Deer and elk probably browse it occasionally.

Corylus californica

Is of low palatability to domestic stock and only slightly used by big game.

Crataegus spp.

Although a little use by domestic stock and big game has been reported, the thorny species are rated as poor forage.

Eriogonum spp.

The various species are of little importance to livestock or big game, but both classes of animals do eat the flowers and fruits and antelope will eat the foliage.

Euonymus occidentalis

Not used by livestock.

Eurotia lanata

On some winter ranges it is a valuable source of food for deer, elk, antelope, and all classes of livestock. Its protein content is above minimum level for cattle nutrition.

Forsellesia spinescens

Use of this shrub by both sheep and deer has been reported for certain ranges.

Fraxinus latifolia

A fair to good browse for sheep and cattle.

Gaultheria spp.

So far as can be determined from available records, *G. humifusa* and *G. ovatifolia* are of no forage value in eastern Oregon and Washington. However, in other areas some elk and considerable deer use has been noted on other species of the genus.

Grayia spinosa

A good winter forage for sheep, cattle, and antelope.

Holodiscus spp.

Palatability is poor for cattle and sheep, and fair for deer and elk. Results of clipping studies in eastern Washington suggest that the level of winter use for maximum sustained production of *H. discolor* is about 60 percent.

Juniperus spp.

There is considerable variation in the acceptability by big game of even one species of juniper from place to place. Supposedly the berries are freely eaten by mule deer whenever available, but browsing mainly occurs during the winter. Winter use of juniper by elk has been reported for several species of juniper. Palatability of *J. occidentalis* for antelope is rated as good in the fall.

Kalmia polifolia var. ***microphylla***

This and one other species of *Kalmia* are unpalatable and poisonous to domestic livestock. Use occurs only when stock are short of other forage.

Ledum glandulosum

This rather poisonous species is seldom eaten by domestic livestock and it is also of low palatability to big game.

Leptodactylon pungens

New growth in spring is a fairly good feed for livestock.

Linnaea borealis var. ***americana***

This rather herbaceous creeper is eaten by elk and probably by deer, but not by livestock.

Lonicera spp.

A poor to worthless forage for livestock, but sheep may use considerable amounts of it in some localities. According to clipping

studies in Idaho a proper-use factor of 60–65 percent should be applied to *L. utahensis* where it is grazed by sheep.

Mahonia spp.

M. repens, a low-growing species, is acceptable to deer and elk during the snow-free periods of the winter. Use of the other species of *Mahonia* by deer and elk is also low to fairly good, depending upon the availability of better feed. *M. aquifolium*, the State Flower of Oregon, is important in ornamental horticulture.

Menziesia ferruginea

Is of fair palatability for sheep and low for cattle; is also eaten by elk. The closely related *M. glabella* is poisonous to sheep when eaten in quantity.

Pachistima myrsinites

A palatable winter browse for deer and elk and may receive light summer use by sheep. It is reported to have caused sickness in sheep when heavily browsed in west-central Washington. Needs further study.

Penstemon deustus

Of slight value to livestock or big game. Limited use of the herbaceous parts has been observed.

Peraphyllum ramosissimum

A fair browse for sheep and cattle in spring and fall and for deer in the winter.

Philadelphus lewisii

In some localities it is of fair palatability to cattle and sheep, but relished by deer and elk.

Phyllodoce spp.

P. empetriformis is of no value for livestock forage and probably of little or no value for big game. Furthermore, it is suspected of being poisonous. It would appear that *P. glanduliflora* is also practically worthless as forage.

Physocarpus malvaceus

A poor forage for cattle and fair for sheep. It is very palatable to elk in the winter.

Populus spp.

Fair browse for cattle, sheep, and deer. It is a preferred species for elk.

Potentilla fruticosa

Is of rather low palatability and practically of no value for cattle. Used some by sheep and on some winter ranges by deer and elk.

Prunus spp.

Species of this genus are poor to fair forage for livestock; under certain conditions *P. virginiana* can be fatal to livestock if large quantities are eaten. Palatability of these species rates from fair to good for deer and elk. Protein content of *P. emarginata* is known to be relatively high and it is a preferred species for deer and of moderate palatability for elk.

Purshia tridentata

One of the three most valuable browse species in the Pacific Northwest for antelope, deer, and elk. Its palatability and nutritional value is generally good to excellent and it is commonly cropped by sheep, goats, and cattle, but not horses. Periods of use by big game are most commonly late fall, winter, and spring, but it may be grazed throughout the year. According to clipping studies made in eastern Oregon, the level of use for maximum sustained production of this shrub on winter range is 60 to 65 percent on best sites, and 50 percent on poorer sites.

Quercus garryana

Palatability of leaves is rated as poor to fair for cattle and fairly good for sheep.

Rhamnus spp.

Forage value of the species is low. Cattle make no use of them and sheep only browse them lightly. They appear to be of fair palatability to deer and elk. Fruits relished by birds and *R. purshiana* is an important medicinal species.

Rhododendron albiflorum

An unpalatable species; contains some toxic substances.

Rhus spp.

Palatability is low for livestock and big game.

Ribes spp.

Species of this genus are generally of poor palatability for cattle and fair for sheep, deer, and elk. Important food sources of many birds, such as grouse and prairie chickens, and of smaller wildlife such as rodents.

Rosa spp.

Although roses are generally regarded as being rather poor forage, *R. gymnocarpa, R. spaldingii,* and *R. ultramontana* are above the group average in palatability. They are rated as fair for cattle and fair to good for sheep, deer, and elk. Clipping studies on an Idaho sheep range suggest that the proper-use factor for roses is 60 to 65 percent. Valuable producers of food for birds and small wildlife.

Rubus spp.

Species of this group, while valuable food sources for many birds and small mammals, are generally of secondary palatability to livestock, although *R. macropetalus, R. parviflorus,* and *R. spectabilis* rate as fair sheep forage. These three species are also the most palatable of the group for deer and elk, and rated as fair to good. *R. leucodermis* is one of the most important feeds for the Olympic wapiti and Roosevelt deer.

Salix spp.

Willows are a common and important source of browse along streams and in moist meadows. Palatability varies with species, but they are generally considered as fair forage for cattle and good for sheep. Deer and elk will utilize some willows at all times, particularly in the winter. The tall species are easily highlined, but if, following over-

use, they are given protection for a few years, new shoots from the plant base will replace the destroyed parts.

Salvia carnosa

Palatability is low.

Sambucus spp.

These shrubs have a good to high palatability in the fall. Their importance is sometimes downgraded because they are not as abundant as some of the other palatable shrubs. Cattle, sheep, deer, and elk all eat shrubs of this genus.

Shepherdia canadensis

Palatability is low for domestic stock but the plant is taken quite well by deer and elk in eastern Oregon.

Solanum dulcamara

Probably eaten by deer and elk.

Sorbus spp.

Palatability of *S. occidentalis* and *S. scopulina* is fair to good for sheep. They are also eaten by deer and elk. Mildly toxic. Has been known to poison rabbits.

Spiraea spp.

Palatability of the group is generally low for domestic stock and big game. *S. menziesii* is above the group average in palatability, rating fair to good, and *S. lucida* is rated as a fair browse for livestock in eastern Oregon.

Symphoricarpos spp.

Species of *Symphoricarpos* are of low palatability for cattle and elk, but of fair palatability for sheep and deer.

Tetradymia spp.

These are poor to worthless forage species. Some species may be poisonous to sheep if a large amount is eaten.

Toxicodendron spp.

Although most people are susceptible to being poisoned (rhus dermatitis caused by the oil urushiol), livestock and game can eat the leaves without harmful effects. However, in the Northwest they are considered worthless for cattle and of low value for sheep.

Vaccinium spp.

In general these plants are of low value for cattle, and but little better for sheep. Deer, and especially elk, consume stems and twigs in fall and winter. *V. membranaceum*, probably the most palatable of the group, is fair forage for sheep and good browse for deer and elk.

Viburnum edule

Value for livestock is low. A little use by elk has been observed.

Selected References

The preceding information on various woody species of eastern Oregon and eastern Washington is based largely on published observations and studies of several authorities and U. S. Forest Service range

workers. The following publications were consulted, and in many instances they will supply additional details for the interested reader:

DAYTON, WILLIAM A.
1931. IMPORTANT WESTERN BROWSE PLANTS. U. S. Dept. Agr. Misc. Pub. 101, 214 pp.

DENIO, R. M.
1938. ELK AND DEER FOODS AND FEEDING HABITS. Third North American Wildlife Conference Trans., pp. 421–427.

DIXON, JOSEPH S.
1934. A STUDY OF THE LIFE HISTORY AND FOOD HABITS OF MULE DEER IN CALIFORNIA. Calif. Fish and Game 20: 3–4.

EINARSEN, ARTHUR S.
1948. THE PRONGHORN ANTELOPE AND ITS MANAGEMENT. 238 pp. Wildlife Mangt. Inst., Washington, D. C.

FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
1937. RANGE PLANT HANDBOOK. [842 pp.]

FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
1950. PLANT USE FACTORS—EASTERN OREGON AND EASTERN WASHINGTON. Pacific Northwest Forest and Range Expt. Sta. and Region 6. 12 pp.

GARRISON, GEORGE A.
1953. EFFECTS OF CLIPPING ON SOME RANGE SHRUBS. Jour. Range Mangt. 6 (5): 309–317.

HAGEN, HERBERT L.
1953. NUTRITIVE VALUE FOR DEER OF SOME FORAGE PLANTS IN THE SIERRA NEVADA. Calif. Fish and Game 39 (2): 163–175.

JAMESON, DONALD A.
1952. NUTRITIVE VALUE OF BROWSE ON MONTANA WINTER RANGES. Jour. Range Mangt. 5 (5): 306–310.

LASSEN, ROBERT W., FERREL, CAROL M., and LEACH, HOWARD
1952. FOOD HABITS, PRODUCTIVITY AND CONDITION OF THE DOYLE MULE DEER HERD. Calif. Fish and Game 38 (2): 211–224.

MASON, ELLIS
1952. FOOD HABITS AND MEASUREMENTS OF HART MOUNTAIN ANTELOPE. Jour. Wildlife Mangt. 16 (3): 387–389.

MURIE, OLAUS J.
1951. THE ELK OF NORTH AMERICA. 376 pp. Stackpole Co., Harrisburg, Pa.

REID, ELBERT H.
1942. IMPORTANT PLANTS ON NATIONAL FOREST RANGES OF EASTERN OREGON AND EASTERN WASHINGTON. Pacific Northwest Forest and Range Expt. Sta. 64 pp.

SMITH, ARTHUR D.
1952. DIGESTIBILITY OF SOME NATIVE FORAGES FOR MULE DEER. Jour. Wildlife Mangt. 16 (3): 309–312.

VAN DERSAL, WILLIAM R.
1938. NATIVE WOODY PLANTS OF THE UNITED STATES, THEIR EROSION-CONTROL AND WILDLIFE VALUES. U. S. Dept. Agr. Misc. Pub. 308, 362 pp.

YOUNG, VERNON A., and PAYNE, GENE F.
1948. UTILIZATION OF "KEY" BROWSE SPECIES IN RELATION TO PROPER GRAZING PRACTICES IN CUTOVER WESTERN WHITE PINE LANDS IN NORTHERN IDAHO. Jour. Forestry 46 (1): 35–40.

INDEX

Accepted scientific names appear in boldface type, synonyms in ordinary italic, and accepted common names in ordinary type.

U.S. GOVERNMENT PRINTING OFFICE : 1960 O—471114