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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Ball, Carleton R., Salix draft

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10-11, May 27, 1920

11-16, June 30, 1920

for Standley, P. C. - Flora of Glacier National Park, Contr. U. S. Nat.
Herb. 22: 317-324. 1921.

1 SALIX L.

Plants perennial, low and spreading to taller and erect shrubs or small trees; bark bitter; bud scales single; leaves alternate, usually with stipules; flowers of the two sexes on different plants, in sessile or leafy-peduncled catkins, appearing before or with or after the leaves; flower scales yellow, brown, or black, entire or occasionally shallowly toothed at apex; fruit a dry glabrous or pubescent capsule, lanceolate to lanceolate-ovoid, of 2 valves, ^vrecurring at maturity; seeds minute, with a dense tuft of long silky hairs at the base; stamens usually 2 (3-8 in Nos. 1, 2 and 3).

Scales pale yellow, deciduous; styles about 0.3-0.5 mm. long; leaves linear-lanceolate to broadly lanceolate, more than 5 cm. long.

Leaves closely and finely toothed; petioles distinct; catkins solitary; stamens 3-8.

Petioles glandular at outer end; capsules 6-9 mm. long.

Flowers in early summer; leaves green beneath. . . . 1. S. caudata.

Flowers in late summer; leaves white beneath. . . . 2. S. serissima.

Petioles never glandular; capsules 4-5 mm. long. . . . 3. S. amygdaloides.

Leaves remotely and irregularly toothed; petioles gradually merging into leaf blades; catkins often in pairs; stamens 2.

Leaves linear, light green or gray-green; teeth few to numerous,

long, slender, sharp; capsules short-pedicelled. . . . 4. S. interior.

Leaves narrowly elliptical, dark green; capsules sessile

or subsessile. 5. S. melanopsis.

Scales brownish, at least at the tip (yellow in Nos. 13, 14 and 20 but then persistent, and the leaves and capsules hairy);

Capsules glabrous; catkins appearing with the leaves.

Leaves lanceolate or oblanceolate, acuminate, glabrous; styles about 0.5 mm. long.

Leaves glaucous beneath.

Leaves 2-5 cm. long; pedicels 1 mm. long. 5. S. farrae.

Leaves mostly 5-7 cm. long; pedicels 2-4 mm. long. 7. S. mackenziana.

Leaves green beneath 8. S. pseudomyrsinites.

Leaves elliptic-lanceolate or oval-lanceolate to oval, acute or obtuse; styles 1-2 mm. long.

Leaves glabrous; catkins nearly sessile. 9. S. pseudomonticola.

Leaves tomentose;

Catkins on leafy peduncles; styles about 1 mm. long 10. S. commutata.

Catkins sessile; style about 2 mm. long 11. S. barrattiana.

Capsules hairy.

Styles elongated, 1-1.5 mm. long.

Leaves more or less woolly on both sides.

Plants ascending or erect, 0.2-2 m. high.

Styles 1.5-2.5 mm. long, catkins large, sessile. 11. S. barrattiana.

Styles 1-1.5 mm. long; catkins leafy-peduncled

Leaves linear-oblong, 4-10 cm. long, white woolly

on both sides. 12. S. candida.

Leaves elliptical, or elliptic-oblong, 2-6 cm. long,

Catkins 1-1.5 ^c/_{mm.} long; leaves and twigs yellow-woolly. 15. S. brachycarpa.

Catkins 1.5-5 cm. long; leaves gray-woolly, glaucous beneath. 14. S. glaucops glabrescens.

Plants low, creeping, alpine, less than 1 dm. high;

Leaves pale beneath. 15. S. petrophila.

Leaves glaucous beneath. 16. S. anglorum.

Leaves densely silvery-silky beneath; capsules silvery silky.

Leaves lanceolate to oblanceolate, pubescent; styles 0.8-

1.5 mm. long; twigs often pruinose. 17. S. subcoerulea.

Leaves obovate or obovate-oblong, tomentose; style 0.5-1

mm. long; twigs never pruinose. 18. S. drummondiana.

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Styles short, obsolete or only 0.2-0.3 mm. long.

Erect shrubs, mostly tall; capsules slender, 6-10 mm. long, on pedicels 1-5 mm. long.

Catkins dense, sessile or nearly so; scales black, densely

silky with long hairs; stigmas long, slender. . . 19. S. scouleriana.

Catkins loose, leafy-peduncled; scales yellowish, thinly

hairy; stigmas very short.

Leaves elliptic-oval, strongly net-veined beneath;

Leaves more or less tomentose. 20. S. bebbiana.

Leaves glabrate 20a. S. bebbiana perrostrata.

Leaves linear-oblanceolate, not net-veined beneath. 21. S. keveriana.

Low or creeping alpine shrubs; capsules ovate, 3-5 mm. long, sessile.

Ascending, 3-10 dm. tall; leaves long-hairy beneath.

Leaves thick, broadly oval, capsules somewhat pointed. 22.S.vestita.

Leaves thinner, narrower, capsules blunter. . . 22a.S.vestita erecta.

Creeping, 0.5-1 dm. tall; leaves glabrous beneath.

Leaves roundish-oval, glaucous beneath.

Blades 1.5-2.5 cm. long; aments usually many-flowered.
. 23.S.saximontana.

Blades 7-12 mm. long; aments usually few-flowered. 24.S.nivalis.

Leaves narrowly elliptical, green beneath. 25.S.cascadensis.

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1. *Salix candata* (Nutt.) Heller. Rare; at low altitudes, in wet thickets. Mountain streams from B. C. and Alb. to N. M. and Calif. -- Stems few, 3-5 m. high; twigs chestnut, shining; leaves narrowly to broadly lanceolate, 6-13 cm. long, tapering to a long slender point; catkins stout, 1.2-2 cm. wide, 2-5 cm. long, becoming 3-6 cm. long in fruit; capsules thin-walled, 6-7 mm. long, yellowish.

2. *Salix serissima* (Bailey) Fernald. In cold bog about spring near Swiftcurrent Creek below Lake McDermott. East of the Divide, in Southern Alberta and Northern Montana (the only other Montana specimen collected near Chouteau), eastward to Northern Ohio, New England and Lower Canada, -- Plant similar to the last; leaves elliptic - lanceolate, acute or only short pointed at the apex; the capsules thick-walled, 7-9 mm. long, shining, olive brown or darker. -- Remarkable for its flowering in mid-summer or later and producing fruit in late summer and autumn.

3. *Salix amygdaloides* Andersson, Peach-leaved willow. Belton, in thicket along the river. Along streams at low elevation, east of the Cascades from B. C. to Oregon, east to Northwest Texas, Central New York and Quebec. -- Tall shrub or small tree, yellowish-green; twigs slender, yellowish, often drooping; petioles 1-2 cm. long, slender, twisted; leaves lanceolate or broadly lanceolate, 5-12 cm. long, long-pointed; catkins about 1 cm. wide, 3-5 cm. long, the pistillate becoming 4-7 cm. long in fruit; pedicels 2 mm. long, slender.

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4. *Salix interior* Rowles. Sandbar Willow. East entrance, along the edge of Two Medicine Creek, at the foot of a steep shale slide. Alaska to Idaho and N. Mex., eastward to La., Del., and N. B. Not common west of the Divide but abundant in the Central States. - - Bright green, clustered shrub, 1-5 m. high; twigs reddish; leaves linear or linear-lanceolate, very acute at both ends, 5-12 cm. long, 2-12 mm. long, pure green on both sides, glabrate when mature, often thinly villous with long white hairs when young; catkins at the ends of leafy branches; capsules 5-8 (mostly 7) mm. long, glabrous when mature; pedicels 0.5-1.5 mm. long. Forms with very narrow leaves, somewhat grayish rather than bright green, and with numerous long slender teeth, represent *S. longifolia tenerrima* Henderson, which Schneider makes a variety of *S. exigua* Nutt. but states that he is doubtful as to what specimens should be referred to this variety and what to *S. longifolia pedicellata* Anders. They require further study.

5. *Salix melanopsis* Nuttall. Common at low altitudes, on rocky slopes, in low thickets, or on streams and lake banks. Alb. to Idaho and west to Calif. and B. C. - - - Dark green clustered shrub, 1-5 m. high; twigs brownish; leaves oblanceolate or elliptical, acute, 4-8 cm. long; 6-15 mm. wide, usually subentire, sometimes with sharp slender teeth, deep green and glabrous above, pale green or subglaucous and often thinly hairy beneath (in the Park and northward a form with leaves rather densely shining-hairy on both sides occurs rather commonly); catkins on short leafy branches; capsules glabrous, nearly sessile, 4-5 mm. long.

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6. *Salix farrasii* Ball. Frequent on the east slope at middle altitudes or about timber line; in bogs or wet meadows. Rocky Mountains of Southern Alberta and B. C. and Northern Montana. - - Small shrub, probably 3-6 dm. high; twigs red or the youngest reddish-yellow, shining; leaves oblanceolate to elliptical or broadly lanceolate, usually widest just above the middle, acute or abruptly short acuminate at apex, 3-5 cm. long, entire or nearly so; ^{glaucous and} rather finely net-veined beneath at maturity, capsule 4-5 mm. long; pedicels 1-1.5 mm. long.

7. *Salix mackenziana* (Hooker) Barratt. Solon on brushy rocky slopes, Saskatchewan to Wyoming, California, and B. C. - - Shrub 2-4 m. high; leaves oblanceolate, or the lower narrowly obovate, sometimes lanceolate, acute to short-acuminate, 4 - 7 or 10 cm. long, subentire to finely toothed; capsules 4-5 mm. long; pedicels 2-4 mm. long, 2-3 times as long as the scales

8. *Salix pseudomyrsinites* Andersson. Frequent on the east slope at low altitudes, in wet thickets or along streams. Sask. to N.Mex., Calif., and Washn. - - Shrub 1-3 m. high; twigs short, diverging, shining; leaves lanceolate-oblong to elliptic-lanceolate, 4-8 cm. long, thick, coarsely net-veined beneath, subentire to sharply gland-toothed, dark green on both sides, catkins 2-3 cm. long; capsules 4-5 mm. long; pedicels 1-1.5 mm. long.

9. *Salix pseudomonticola* Ball. Frequent on the east slope at low or middle altitudes; rarely found above timber, on rocky slides; usually in wet woods or thickets. Sask. and Alb. to northern Wyoming. - - Shrub 1-3 m. high; twigs stoutish, shining; leaves narrowly to broadly ovate (young obovate), 4-6 or 8 cm. long, 1.5-3 cm. wide, rounded to subcordate at base, acute to abruptly short-acuminate at apex, rather coarsely wavy-toothed or subentire; catkins 3-7 cm. long, nearly sessile; capsules 6-8 mm. long; pedicels 1-1.5 mm. long; styles about 1 mm. long.

10. *Salix commutata* Bebb. Common above timber line, in wet meadows or on open rocky slopes. One of the characteristic plants of alpine meadows. Alaska to N. Wyo. and Calif. - - Shrub 1-3 m. high; twigs tomentose; leaves elliptical to broadly oblanceolate or obovate, 4-8 cm. long, entire or nearly so, cuspidate at apex, green and tomentose on both sides, becoming glabrate with age; catkins short, 2-3 or 4 cm. long, on leafy peduncles 2-4 cm. long; capsules 5-7 mm. long; pedicels about 1 mm. long.

11. *Salix barrattiana* Hooker. Gunsight Pass on rock slide.

High elevations in the Rocky and Selkirk Mountains of Alberta and British Columbia; not before collected in the United States. -- Shrub 0.5-1.5 m. high; twigs stout, short, with thick wrinkled bark, the younger more or less gray woolly; leaves elliptic-lanceolate, oblanceolate or ovate-lanceolate, acute at apex, acutish to somewhat heart-shaped at base, entire or with a few glandular teeth, usually densely clothed with long gray hairs, becoming somewhat glabrate in age. 4-7 cm. long, 1-2 cm. wide; catkins stout, sessile, on old wood, 4-7 cm. long; capsules densely hairy, 7-9 mm. long, subsessile, bearing a style 1.5-2.5 mm. long. The specimen collected in the Park was only 1-2 feet high and differs from typical material in the shorter and relatively broader elliptic-oval leaves, 2-4 cm. long, and aments (one) only 4 cm. long. A similar collection has been made in the Rocky Mountain Park, at Banff, Alberta.

12. *Salix candida* Fluegge. Bog willow, Sage-leaved willow. In a

cold bog about a spring near Swiftcurrent Creek below Lake McDermott. Alb. south to Wyoming and eastward to N. J. and Nfld., in cold bogs and swamps. -- Shrub 2-10 dm. high; young twigs white woolly; leaves linear to oblong or narrowly oblanceolate, margins inrolled, entire, 3-8 cm. long, densely white woolly beneath, thinly so above; aments 1-3 cm. long, on short leafy peduncles; capsules subsessile, white woolly, 6-8 mm. long; style reddish, 1-1.5 mm. long.

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13. *Salix brachycarpa* Nuttall. Occasional above timberline and in some localities abundant; on open slopes or rock slides or in wet meadows; also in an open mossy bog along Apekunny Creek. Sask. and Alb. to southern Colo., west to Utah, eastern Oreg. and B. C. (*S. stricta* (And.) Rydb. - - - Alpine shrub, 2-10 dm. high; young twigs woolly; leaves elliptic-oblong or oblanceolate to narrowly obovate, 2-3.5 cm. long; acutish at apex, mostly obtuse at base, yellowish-green on both sides, somewhat woolly above, densely yellowish-woolly beneath, sometimes becoming glabrate, entire; catkins numerous, roundish to oblong, 0.5-2 cm. long; capsules ovoid-lanceolate, ~~0.5-2~~ 2 mm. long; capsules ovoid-lanceolate, 5-7 mm. long, subsessile, woolly; styles 1-1.5 long.

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14. *Salix glaucops glabrescens* Andersson. Frequent above or near timberline, in meadows, on gravelly slopes, or in moist woods; also in thicket along Swiftcurrent Creek below Lake McDermott, /Yukon and Alaska south to H.M. and west to Utah and Idaho. *S. glauca glabrescens* Schneider, *S. pseudolappinum* v. Seem.) Subalpine shrub, 4-15 dm. high; twigs shining brown, the bark separating in gray papery flakes; leaves elliptic-lanceolate, oblanceolate, or obovate-oblong, entire, 3-6 cm. long, thinly gray woolly to glabrate on both sides, glaucous beneath, often drying dark; catkins 2-5 cm. long, on leafy peduncles 2-3 cm. long; scales yellowish throughout or brownish at the tip; capsules gray-woolly, 6-8 mm. long; pedicel and style each about 1 mm. long.

15. *Salix petrophila* Rydberg. Abundant above timberline, in meadows or on rocky slopes. A characteristic plant of alpine meadows, frequently forming large dense mats. Alb. and B. C. south to northern N. M. and west to Calif. and eastern Oregon. - - - Stem creeping, branches erect, 5-10 cm. high, glabrous; leaves broadly elliptical and acutish to narrowly obovate and often obtuse, entire, 1.5-4 cm. long, deep green above, pale and rather strongly veined beneath, sparingly hairy to glabrous, petioles slender, yellow; catkins on short leafy branches, 1-5 or 4 cm. long; capsules lanceolate, sessile, gray-woolly, 4-6 mm. long; style 1-1.5 mm. long.

16a. *Salix anglorum araioclada* Schneider. Frequent above timberline, in wet meadows or on rocky slopes. Rocky and Selkirk mts., northern Montana to B. C. and Alb., also eastern Quebec. - - - Plant prostrate; branches yellowish to purplish; leaves thin, papery, oval, elliptical, ovate-elliptical or obovate-elliptical, usually obtuse at apex, entire, 2-5 cm. long, 1-3 cm. wide, usually glabrous at maturity, deep green above, glaucous beneath; catkins on leafy branches 3-4 cm. long; the pistillate 3-5 cm. long in fruit; capsule 7-8 mm. long, subsessile, gray-woolly; style 1.5 mm. long.

16b. *Salix anglorum kophophylla* Schneider. Habitat of the last, often in the highest, most exposed places. Cited by Schneider only from Eastern Quebec and Nfld. - - - As the last but the leaves thicker, broadly elliptical to roundish, more strongly nerved, and more densely glaucous beneath.

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17. *Salix subsecerula* Piper. Common on the east slope at all altitudes; along streams, in wet thickets or on high slopes; scarce on the west slope, apparently, and noted only at Avalanche Lake. Alb. and B.C., south to N.H., and Calif. Shrub 1-5 m. high; twigs, glabrous, usually covered with a bluish powder; leaves narrowly to broadly lanceolate or oblanceolate, acute at both ends, 3-6 or 8 cm. long, 0.8-2.5 cm. wide; entire or subcrenulate, green and sparsely pubescent above, densely silvery pubescent with short appressed shiny hairs beneath; catkins sessile or nearly so; the pistillate 2-4 cm. long; scales brown or black; capsules 4-6 mm. long, style 1-1.5 mm. long. subsessile or on pedicels 0.5-1 mm. long;

18. *Salix drummondiana* Barratt. Frequent at low and middle altitudes, and sometimes found above timberline; in thickets or meadows, on moist slopes or along streams. Rocky and Selkirk Mtns. of Alb. and B.C., and N.W. Montana. Shrub 1-5 (?) m. high; young twigs mostly pubescent or woolly, not bluish powdery; leaves obovate, obovate-oblong, or elliptic-oblanceolate, entire, broadly acute to obtuse at apex, 3-6 or 8 cm. long, 1.5-5 cm. wide, densely silvery woolly beneath with a thick mat of tangled hairs, thinly so above; catkins as in No. 17; capsules 5-6 mm. long, silvery woolly; pedicel 0.5-1.5 mm. long; style 0.5-1 mm. long.

19. *Salix seculariana* Barratt. Frequent at low, and sometimes at middle altitudes, in moist woods, or thickets, along streams, or on rather dry, thinly wooded hillsides. On the west slope frequently a small slender, isolated tree; the only species of the Park, apparently, which ever attains the dimensions of a tree. Alb. to N.M. and west to the Coast. -----
Shrub or small tree, 2-4 m. high; twigs glabrate to densely woolly; leaves obovate to broadly oblanceolate, obtuse or mostly abruptly pointed at apex, wedgeshaped at base, entire or shallowly crenulate, dark green and glabrate above, glaucous, net-veined, and often densely tomentose beneath; catkins before the leaves, sessile or nearly so, the pistillate 3-5 cm. long; scales obovate or oblanceolate, black, cover with ^{long} shining hairs; capsules beaked, 7-9 mm. long, gray-woolly; pedicels 1-2 mm. long; styles short; stigmas about 1 mm. long.

20. *Salix hebbiana* Sargent. Common at low altitudes, in swamps, along streams, or on brushy slopes. Across the continent to Alaska N.M. and Calif. --- A shrub or small tree, 2-5 m. high; leaves broadly oblanceolate to obovate-oval, entire or somewhat crenulate, 2-5 cm. long, 1-2.5 cm. wide, dull green above, paler to subglaucous and coarsely net-veined beneath; more or less gray woolly on both sides,

especially beneath, catkins before or with the leaves, the staminate subsessile, 1-2 cm. long, yellow; the pistillate (on peduncles 0.5-2 cm. long) 2-5 cm. long, very lax in fruit; scales yellowish, oblong, 2 mm. long; capsules 6-10 mm. long, thinly pubescent, on slender pedicels 2-5 mm. long.

20 a. *Salix bebbiana porrostrata* (Rydberg) Ball.

Occasional at low altitudes, in some situations as the species.

Throughout the Rocky mountains. Differs in smaller and thinner, elliptical or oblanceolate leaves, acute at both ends, 2-3.5 cm. long, glabrous or glabrate on both sides, and more finely net-veined on the lower surface.

21. *Salix geyeriana* Anderson. Bolton, on a

dry bushy slope. Mont. to Colo., west to the coast. ---

Shrub 1-3 m. high; twigs glabrous, leafy, black with a bluish powdery bloom; leaves linear-oblong or narrowly elliptical, very acute at both ends, 2-4 or 6 cm. long, entire, dark green above, more or less glaucous beneath, thinly to densely silky hairy on both sides; catkins on short leafy peduncles, roundish, 1-2 cm. long, 1-1.5 cm. wide; capsule 5-7 mm. long, pubescent, on stoutish pedicels about 2 mm. long.

22. *Salix vestita* Pursh. Cracker Lake and switchbacks near Swiftcurrent Pass, on rocky slopes. A very handsome shrub because of the striking contrast in the leaves between the bright green, netted upper surface and the silvery-silky under surface. Alb. and B. C. to Mont. and E. Oreg., also Labrador, Newfoundland, Anticosti and the Gaspé Peninsula of Quebec. --- Ascending shrub, 2-10 dm. high; leaves broadly elliptical to obovate-oblong to suborbicular, rounded to retuse at the apex, 3-5 or 6 cm. long, 2-4 cm. wide, thick, deep green and glabrous above, clothed beneath with long white silky hairs, especially on midrib and veins; aments on short villous peduncles, slender, 2-3 or 4 cm. long; capsules ovoid-conic, pointed, 4-5 cm. long.

22 a. *Salix vestita erecta* Andersson, Abundant above timber line, in meadows and on rock slides. One of the most characteristic plants of alpine situations, frequently forming large dense patches. More erect, with narrower, more pointed leaves, longer aments and more ovoid-ellipsoid, blunter capsules.

23. *Salix saximontana* Rydberg. Gunsight Pass, on rock slides and rocky slopes. Alpine summits, Alb. and B. C. to Nev. and N. Mex. --- Prostrate, 3-6 cm. high; leaves elliptic-oblong to broadly oval, obtuse or acutish at both ends, entire, 1.5-3 cm. long, 1-2 cm. wide, glabrous on both sides; aments several- to many-flowered, 1-1.5 cm. long; capsules ovoid, 3-4 mm. long.

24. *Salix nivalis* Hooker. Above timberline, Sieyeh Pass and Boundary Peak (B. C.), 7,600 - 8,000 feet elevation (collected by Vernon Bailey, Aug., 1917) Alpine summits, Alb. to Mont and westward. --- Scarcely 2 cm. high; leaves as the last but only 7-12 mm. long and 4-8 mm. wide; aments few-flowered, less than 1 cm. long; capsules 2.5 - 3 mm. long.

25. *Salix cascadiensis* Cockerell. Sexton Glacier, abundant on rocky slopes
Alpine summits, Wyo. and Mont. to Washn. --- Prostrate, creeping, 3-5 cm. high;
leaves narrowly elliptical to subobovate, mostly acute at both ends, deep green and
shining on both sides, glabrous, strongly veined, 8-15 mm. long, 4-8 mm. wide; aments
subglobose, 5-20- flowered, 7-20 mm. long; capsules sessile, 4-5 mm. long, gray-
tomentose. *Salix tanera* Andersson.