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A Flora of Wyoming

C. L. Porter

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November 1965

University of Wyoming

Bulletin 434
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A Flora of Wyoming

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PART IV
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Agricultural Experiment Station
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18. CYPERACEAE  Sedge Family

Grasslike or rushlike herbs with stems often triangular and solid in cross section, but sometimes rounded and sometimes hollow, never jointed. Leaves, when present, 3-ranked, with closed sheaths. Flowers perfect or unisexual, in spikelets or spikes, each flower subtended by a chaffy scale (in Carex and Kobresia there is an additional enveloping scale or perigynium associated with the ovary and fruit), the scales imbricate and spirally arranged or else 2-ranked. Perianth, if present, consisting of hypogynous bristles or scales. Stamens 1-3. Pistil 1, the style 2-3-cleft, and the ovary with a single ovule. Fruit a lenticular plano-convex, rounded, or triangular akene.

KEY TO THE GENERA

1. Ovary and fruit produced within a sac-like or enveloping scale (perigynium) that is closed except for the apical opening or else split nearly to the base; flowers unisexual; perianth lacking

2. Perigynium closed except for the apical opening; plants not exclusively alpine .............................................1. CAREX

2. Perigynium split down one side nearly to the base; plants exclusively alpine .............................................2. KOBRESIA

1. Ovary and fruit naked, not produced within an enveloping scale; flowers perfect; perianth present or lacking

3. Scales of spikelet 2-ranked; perianth lacking.............................................3. CYPERUS

3. Scales of spikelet spirally imbricated; perianth of 1-many bristles or scales, rarely lacking

4. Perianth bristles numerous and long exserted, cotton-like at maturity.............................................4. ERIOPHORUM

4. Perianth bristles or scales inconspicuous, not exserted, not numerous

5. Base of style enlarged and forming a persistent tubercle or cap at the top of the ovary; spikelet single on a bladeless stem.............................................5. ELEOCHARIS

5. Base of style not enlarged; spikelets usually 3 or more, rarely single; stems leafy or bladeless

6. Plants perennial in ours, often coarse and tall; perianth of 1 to several, slender bristles, rarely lacking .............................................6. SCIRPUS

6. Plants annual, mostly less than 1 dm. high; perianth of a single scale.............................................7. HEMICARPHA
1. Carex (Dill.) L. Sedge

Perennial, grasslike herbs with rhizomes. Culms mostly trigonous, usually leafy, either phyllopodic (having lower leaves with well-developed blades) or aphyllopodic (having lower leaves bladeless or nearly so). Leaves 3-ranked, the uppermost (bracts) either elongate or rudimentary, subtending the spikes. Plants usually monoecious, rarely dioecious. Spikes 1 to many, either wholly pistillate, wholly staminate, androgynous (staminate above, pistillate below) or gynaecandrous (pistillate above, staminate below), sessile or peduncled. Flowers solitary in the axils of the scales. Perianth none. Staminate flowers of 3 (rarely 2) stamens with filiform filaments. Pistillate flowers of a single pistil, with a single style and 2 or 3 stigmas. Akene trigonous or lenticular, completely enclosed in the sac-like perigynium.

KEY TO THE SECTIONS

1. Spike solitary

2. Stigmas 2; akenes lenticular

3. Spike androgynous or gynaecandrous

4. Perigynia tapering at base, stipitate or substipitate and striate

5. Stems densely tufted, not stoloniferous; perigynia erect or ascending; plants of dry, alpine situations.............1. NARDINA

5. Stems single or few together, stoloniferous; perigynia spreading or reflexed at maturity; plants of wet, mossy situations at middle or higher elevations..............13. DIOICA

4. Perigynia rounded at base, sessile, nerveless..............2. CAPITATA

3. Spike entirely staminate or pistillate........................................13. DIOICA

2. Stigmas 3; akenes trigonous

6. Perigynia strongly inflated, sessile or nearly so, not becoming reflexed; pistillate scales persistent.....3. INFLATA

6. Perigynia not inflated

7. Pistillate scales deciduous; perigynia stipitate, at least the lower reflexed at maturity........4. CALLISTACHYS

7. Pistillate scales persistent; perigynia not reflexed at maturity

8. Perigynia rounded and beakless at the apex, many-nerved ..................................16. POLYTRICHOIDEAE

8. Perigynia not rounded at the apex, beaked or beakless

9. Spike androgy nous

10. Perigynia coriaceous, shining ..................................19. OBTUSATAE

10. Perigynia not both coriaceous and shining

11. Perigynia finely striate; staminate portion of spike very short, inconspicuous ..................................18. FILIFOLIAE

11. Perigynia 2-keeled, otherwise nerveless; staminate portion of spike long, stout, conspicuous

12. Perigynia pubescent or puberulent at least at the base of the beak, 2.5-3.5 mm. long (except in C. elynoides, in which they are smooth to ciliate) ..................................18. FILIFOLIAE

12. Perigynia glabrous, 3-6 mm. long

13. Perigynia 3-4 mm. long ..................................23. RUPESTRES

13. Perigynia 6 mm. long ..................................24. FIRMICULMES

9. Spike entirely staminate or pistillate, or very nearly so

14. Perigynia pubescent 21. SCIRPINAE

14. Perigynia glabrous, C. hallii in ..................................34. ATRATAE

1. Spikes more than 1

15. Stigmas mostly 2; akenes lenticular

16. Lateral spikes short, sessile; terminal spike androgy nous or gynaecandrous

17. Perigynia not whitish-punctate (under a lens)

18. Culms arising singly or few together from long-creeping rhizomes

19. Perigynia not wing-margined, the beak obliquely cut dorsally, becoming bidentulate

20. Spikes densely aggregated into a globose or ovoid head, appearing like a single spike ..................................5. FOETIDAE

20. Spikes, at least the lower, distinct

21. Upper sheaths hyaline ventrally; perigynia not thin-margined ..................................6. DIVISAE

21. Upper sheaths green-striate ventrally except near the mouth; perigynia with body thin-margined above ..................................7. INTERMEDIAE
19. Perigynia wing-margined, the beak deeply bidentate ........................................ 8. ARENARIAE

18. Culms caespitose or the rhizomes short-prolonged and with short internodes, but not long-creeping

22. Spikes androgynous

23. Perigynia abruptly contracted into a beak

24. Spikes few (generally 10 or less); sheaths not red-dotted ventrally .......................... 9. BRACTEOSAE

24. Spikes numerous; sheaths strongly dotted with reddish-brown ventrally .......................... 10. PANICULATAE

23. Perigynia tapering to a beak...................... 11. VULPINAE

22. Spikes gynaecandrous

25. Perigynia without winged margins, at most thin-edged ........................................ 14. STELLULATAE

25. Perigynia with winged margins.......................... 15. OVALES

17. Perigynia whitish-puncticulate (under a lens), not wing-margined ................................ 12. HELEONASTES

16. Lateral spikes peduncled or, if sessile, elongated; terminal spike stamineate, rarely gynaecandrous or androgynous

26. Akenes jointed with the style; perigynia not lustrous

27. Lowest bract long-sheathing; perigynia whitish-pulverulent or golden-yellow at maturity .................. 25. BICOLORES

27. Lowest bract usually sheathless, occasionally short-sheathing; perigynia not pulverulent nor golden yellow at maturity 36. ACUTAE

26. Akenes continuous with the style; perigynia lustrous... 38. VESICARIAE

15. Stigmas mostly 3; akenes trigonous

28. Perigynia pubescent or puberulent

29. Stamineate and pistillate spikes on different culms...... 21. SCIRPINAE

29. Stamineate and pistillate spikes on the same culms

30. Bracts reduced to bladeless sheaths.................. 22. DIGITATAE

30. Bracts sheathing or sheathless, the blades well developed

31. Perigynia closely enveloping the ake ne, strongly tapering at the base; bracts sheathless or nearly so.... 20. MONTANAE

31. Perigynia not as above or, if so, the lowest bract strongly sheathing
32. Bracts sheathless or very short-sheathing .......................... 33. HIRTAEE

32. Bracts, at least the lower ones, long-sheathing .................................... 31. FERRUGINEAF

28. Perigynia glabrous

33. Style joined with the akene, not indurated, at length withering and deciduous

34. Scales (except sometimes the uppermost) leaf-like, concealing and partly enveloping the perigynia; akenes strongly constricted at the base, rounded at the apex .................................................. 17. PHYLLOSTACHYAE

34. Scales not leaf-like; akenes not strongly constricted at the base, apiculate

35. Lower bracts long-sheathing

36. Foliage, especially the sheaths, pubescent ........................................ 32. VIRESCENTES

36. Foliage glabrous

37. Beak of perigynium not bidentate

38. Pistillate spikes short, erect

39. Perigynia tapering at base, trigonous; akenes closely enveloped by the perigynium ............................................. 26. LAXIFLORAE

39. Perigynia rounded at base, suborbicular in cross section; akenes loosely enveloped ............................................. 27. GRANULARES

38. Pistillate spikes elongate, slender, on filiform, drooping peduncles ................................. 28. CAPILLARES

37. Beak of perigynium bidentate

40. Spikes 10-35 mm. long; perigynia 5-6 mm. long, at length deeply bidentate 29. LONGIROSTRES

40. Spikes 5-10 mm. long; perigynia 2-3 mm. long, minutely bidentate ..................... 30. EXTENSAE

35. Lower bracts sheathless or nearly so

41. Terminal spike staminate; roots clothed with a yellow felt .................................. 34. LIMOSAE

41. Terminal spike gynaecandrous or (in C. raynoldsii and C. tolmiei only) staminate; roots not clothed with a yellow felt ........................................ 35. ATRATAE

—6—
33. Style continuous with the akene, indurated, not withering

42. Perigynia finely and closely ribbed .......... 37. PSEUDOCYPERAEA

42. Perigynia coarsely ribbed

43. Perigynia subcoriaceous, firm, their teeth long ........................................ 38. PALUDOSAE

43. Perigynia membranaceous, their teeth short ........................................ 39. VESICAREAE

Section 1. Nardinae

1. Carex hepburnii Boott
Dry summits and slopes, mostly at 10,000-11,000 ft., and occasional in the higher mountains of Wyoming. Alberta and Alaska to Colorado, Utah, Nevada, and Washington

Section 2. Capitatae

1. Flowering stems 1-2 dm. high; spikes mostly 6-9 mm. long, greenish; perigynia exposed above, 2.5 (2.3-2.9) mm. long; akene filling only two-thirds of the perigynium ........................................ 2. C. capitata

1. Flowering stems less than 1 dm. high; spikes mostly 4-6 mm. long, brown; perigynia covered except for the beak by the scales, 1.9 (1.7-2.1) mm. long; akene nearly filling the perigynium ........................................ 3. C. arctogena

2. Carex capitata L.
Open, sunny slopes and summits, and apparently rare in the higher mountains of Wyoming. Greenland to Hudson Bay and Alaska, and southward to New Hampshire, Alberta, Wyoming, Nevada, California, and northern Mexico.

3. Carex arctogena H. Smith
Alpine meadows and exposed slopes, and seen only from the Absaroka Range in northern Fremont County. Northern Europe, Greenland, New Hampshire, Wyoming, and Tierra del Fuego.

Section 3. Inflatae

4. Carex engelmannii Bailey
Section 4. Callistachys

1. Leaves setaceous, strongly channeled, 0.25-1.25 mm. wide; plants densely caespitose; stamine flowers few; perigynia erect until full maturity ........................ 5. C. pyrenaica

1. Leaves linear, flat, 1.5-2 mm. wide; plants short-stoloniferous; stamine flowers many, conspicuous (sometimes absent); perigynia early reflexed........ 6. C. nigricans

5. Carex pyrenaica Wahl.
Open, rocky, steep, grassy, alpine slopes or occasionally wet, alpine meadows, often at the edge of snow banks, at 10,000-12,000 ft., and generally distributed in the higher mountains of Wyoming. Mackenzie to Colorado, and westward to British Columbia and California; Eurasia.

6. Carex nigricans C. A. Meyer
Sunny alpine meadows and tundra, often near melting snow, at or above 10,000 ft., in the higher mountains of Wyoming. Alaska and the Siberian Coast to Colorado and California. (Entirely pistillate heads often occur.)

Section 5. Foetidae

7. Carex vernacula Bailey
Open, sunny slopes and streambanks, at 10,000-11,000 ft., occasional, and seen only from the Medicine Bow Range. Wyoming and Colorado to Washington and California.

Section 6. Divisae

1. Plants dioecious or nearly so; perigynium beak nearly as long as the body ................................................................. 8. C. douglasii

1. Plants not dioecious, the spikes mostly androgynous; perigynium beak shorter

2. Leaves narrowly involute, at least above; culms obtusely angled, usually smooth ......................................................... 9. C. eleecharis

2. Leaves flat or channeled; culms sharply triangular, usually rough above

3. Perigynia chestnut-brown at maturity, 1.75-2.25 mm. long, the beak one fifth to one third the length of the body, hyaline-winged at the center .............................................. 10. C. simulata

3. Perigynia blackish-brown at maturity, 3-4 mm. long, the beak half the length of the body or more ...................................... 11. C. praegracilis
8. **Carex douglasii** Boott

Dry, often alkaline, open, sunny places, on the plains, foothills, and lower mountains, up to about 7,500 ft., and common throughout most of Wyoming. Manitoba to New Mexico, and westward to British Columbia and California.

9. **Carex eleocharis** Bailey

Dry plains and foothills, up to about 8,000 ft., on open slopes, and often locally abundant. Yukon southward to Manitoba, Iowa, New Mexico, Utah, and Oregon.

10. **Carex simulata** Mackenzie

Usually in wet soil on the plains, up to about 8,000 ft., and sporadic. The type is *A. Nelson 7316*, from Chug Creek, Albany County. Montana to Washington, and southward to New Mexico and California.

11. **Carex praegracilis** W. Boott

Moist, open habitats, chiefly on the plains, and up to about 8,000 ft. in the mountains. Variable, often abundant, and common throughout most of Wyoming. Manitoba, Iowa, and Kansas to Yukon, British Columbia, California, and Mexico; adventive eastward.

**Section 7. Intermediae**

12. **Carex sartwellii** Dewey

Marshes and bogs, usually in calcareous soils, and apparently infrequent, at lower to middle elevations, and seen only from Sheridan County, but probably to be found elsewhere. Ontario and New York to British Columbia, and southward to Illinois, Missouri, and Colorado.

**Section 8. Arenariae**

13. **Carex foenea** Willd.

Rather local in sterile, open habitats at lower to middle elevations, and seen from southern and eastern Wyoming. Maine to New Jersey, and westward to Mackenzie, Washington, and Arizona.
Section 9. Bracteosae

1. Leaf blades 1-3.5 mm. wide; sheaths tight, inconspicuously or not at all mottled with green and white, not septate-nodulose dorsally

2. Beak of perigynium obliquely cleft dorsally, minutely bidentulate; leaf blades 1-2 mm. wide................................................................. 14. C. vallicola

2. Beak of perigynium conspicuously bidentate; leaf blades 1.5-3.5 mm. wide

3. Perigynia ovate, dark glossy-brown, widely margined, the vivid green margin conspicuously serrulate above the middle, rather abruptly long-beaked, the beak conspicuously bidentate; scales lustrous, dark chestnut-brown; head stiff .......................................................... 15. C. hoodii

3. Perigynia elliptic, greenish straw-colored to brown-centered, the green margin narrow, usually less serrulate, the beak shorter, shallowly bidentate; scales greenish-brown; head lax .................................................... 16. C. occidentalis

1. Leaf blades 3.5-5 mm. wide; sheaths loose, mottled with green and white, usually septate dorsally .................................................................. 17. C. gravida

14. Carex vallicola Dewey

Dry slopes and clearings, chiefly at 6,000-8,000 ft., and frequent over most of Wyoming. South Dakota to Montana, Oregon, California and Mexico.

15. Carex hoodii Boott

A common species of mountain meadows and slopes throughout Wyoming. Alberta to South Dakota and Colorado, and westward to British Columbia and California.

16. Carex occidentalis Bailey

Occasional in dry, alpine or subalpine habitats in southern Wyoming. New Mexico, Arizona, and California, and northward to Utah and Wyoming.

17. Carex gravida Bailey

A species of the prairies and plains of the Central States, reaching the western limit of its range in north-central Wyoming, where it occurs at lower to middle elevations. Ontario and Ohio to North Dakota and Wyoming, and southward to Missouri and Kansas.
Section 10. Paniculatae

18. Carex diandra Schrank

A circumpolar species of wet meadows, and occurring in northwestern Wyoming at 6,500-8,000 ft. Newfoundland to Yukon, and southward to New Jersey, Indiana, Colorado, and very locally to southern California; widely distributed in Eurasia.

Section 11. Vulpinae

1. Perigynium 3-4 mm. long, the beak much shorter than the body; scales dark brown; heads usually capitate and simple

2. Leaves all clustered near the base; sheaths not cross-rugulose ventrally; culms slender (2 mm. thick at base), inconspicuously aphyllopodic..................................19. C. jonesii

2. Leaves not all clustered near the base; sheaths cross-rugulose ventrally; culms stout (3.5 mm. thick), strongly aphyllopodic..........................20. C. neurophora

1. Perigynium 4-5 mm. long, the beak as long as the body; scales pale brown to hyaline; heads not capitate, conspicuously compound.........................21. C. stipata

19. Carex jonesii Bailey

High mountain meadows, and seen only from Albany and Carbon counties. Montana to Colorado, and westward to Washington and California.

20. Carex neurophora Mackenzie

Banks of mountain streams and lakes, and in wet meadows, at 7,000-10,000 ft., and seen from southern and northwestern Wyoming. High mountains, from Montana and Colorado to Washington and California.


Occasional in swamps, wet meadows, and ditches, at lower to middle elevations, and seen only from Sheridan County. Newfoundland to Alaska, and southward to North Carolina, New Mexico, and California.

Section 12. Heleonastes

1. Spikes androgynous; perigynia unequally biconvex..................................22. C. disperma

1. Spikes gynaecandrous; perigynia plano-convex
2. Perigynia distinctly beaked (the beak 0.5 mm. long or more), serrulate, loosely spreading; spikes few (5-10)-flowered; leaves green, 1.25 mm. wide .................................................. 23. C. brunnescens

2. Perigynia apiculate to very short-beaked (the beak usually 0.25 mm. long or less), appressed-ascending; spikes many (9-20)-flowered; leaves glaucous, 2-4 mm. wide

3. Scales strongly brown or chestnut brown-tinged; perigynia 1.5-2.25 mm. long, the beak often sparingly serrulate.................. 24. C. praecoeptorum

3. Scales hyaline with green center, often light brownish-tinged at maturity; perigynia 1.8-3 mm. long.............................. 25. C. canescens

22. Carex disperma Dewey

Common in boggy, coniferous woods and peaty banks of streams and lakes, at 7,000-9,000 ft., throughout most of Wyoming. Labrador to Alaska, and southward to New Jersey, Indiana, Arizona, and California; Eurasia.

23. Carex brunnescens (Pers.) Poir.

Occasional in the high mountains, at 10,000-11,000 ft., in moist places, and seen only from the Medicine Bow Range, Albany County. Labrador to Alaska, and southward to New Jersey and the high mountains of North Carolina, Colorado, Wyoming, and Washington; Eurasia.

24. Carex praecoeptorum Mackenzie

Alpine bogs and tundra, boggy banks of high mountain streams, at about 8,000-11,000 ft., in the higher mountains of Wyoming. Wyoming, Utah, Nevada, Washington, Oregon, and California.

25. Carex canescens L.

Two varieties occur in Wyoming, distinguished by the following key.

Spikes oblong-ovoid to cylindric, 6-12 mm. long; perigynia 2.3-3 mm. long, often serrulate at the base of the beak.................................. var. canescens

Spikes short-ovoid to subglobose, 4-7 mm. long; perigynia barely 2 mm. long, usually quite smooth.................................... var. subloliacea

Lake margins, swamps, and bogs, at 5,000-10,000 ft., throughout Wyoming, most of our plants being var. canescens. Newfoundland to Alaska and southward to New Jersey, Arizona, and California; Eurasia, Australia; the var. subloliacea (Laestad.) Hartm. from Labrador to Alberta, and southward to New Jersey, Indiana, Wyoming, and Washington.
Section 13. Dioicae


Swampy meadows, often in sphagnum, at middle elevations, and occasional in Wyoming, seen from the Medicine Bow and Wind River ranges. Greenland to Yukon, and southward to New York, Michigan, Colorado, and British Columbia; Siberia.

Section 14. Stellulatae

1. Perigynium beak one fourth to one third the length of the body, shallowly bidentate, its broad teeth very short

27. Carex interior Bailey

Two forms occur in Wyoming, distinguished by the following key.

Perigynia ventrally nerveless or few-nerved only at the base...f. interior
Perigynia conspicuously nerved ventrally...f. keewenawensis

Swampy meadows and springy banks, at moderate elevations, and occasional, seen from Johnson and Lincoln counties, and Yellowstone National Park. The f. keewenawensis (Hermann) Fernald seems to be our more common form, and the two forms occupy similar habitats and probably the same range. Labrador to British Columbia, and southward to Pennsylvania, Kansas, California, and Chihuahua.

28. Carex angustior Mackenzie

Swampy meadows and wet banks, and infrequent at moderate elevations in northwestern Wyoming. Newfoundland to North Carolina, and westward to Washington and California.

Section 15. Ovales

1. Bracts not exceeding the head (except rarely in C. brevior), usually inconspicuous

2. Beak of perigynium slender and terete, scarcely margined at the tip, the upper 0.25-2 mm. little if at all serrulate

3. Perigynia 2.5-6 mm. long, if longer the scales very dark colored or spikes in a flexuous or moniliform inflorescence

4. Scales shorter and narrower than the perigynia, the perigynia conspicuous in the spikes

1. FESTIVAE
4. Scales about the same length as the perigynia, concealing them above or nearly so........................................2. LEPORINAE

3. Perigynia 6-8 mm. long, the scales light reddish-brown; spikes more or less aggregated into an erect head.................................3. SPECIFICAEE

2. Beak of perigynium flat and margined at the tip, serrulate to the apex

5. Scales shorter than the perigynia, noticeably narrower above and largely exposing perigynia..................................................4. FESTUCEAE

5. Scales almost equaling the perigynia, nearly the same width above and nearly concealing the perigynia above.............................5. FOENAEAE

1. Bracts conspicuously exceeding the head....................................6. ATHROSTACHYAE

Subsection 1. Festivae

1. Perigynia much flattened, thin and scale-like except where distended by the akene

2. Perigynia lightly few-nerved at least at the base ventrally

3. Perigynia 3.5-5 mm. long, ovate or lanceolate-ovate

4. Head oblong-ovoid, the spikes distinguishable; perigynia appressed, the tips inconspicuous, widely margined, ovate, rather abruptly narrowed into the beak; scales dark chestnut to blackish-brown ..........................................................29. C. festivella

4. Head ovoid to suborbicular, the spikes congested, often scarcely distinguishable; perigynia spreading-ascending, the tips conspicuous in the head, narrowly margined, lanceolate-ovate, usually gradually tapering into the long, slender beak; scales dull brown.........30. C. microptera

3. Perigynia 6-7 mm. long, narrowly lanceolate..............................31. C. ebenea

2. Perigynia nerveless ventrally

5. Perigynia 4.5-6 mm. long, greenish straw-colored and tinged with brown; heads triangular, 9-18 mm. wide, broadest at the base........32. C. haydeniana

5. Perigynia 2.5-3.5 mm. long, olive brown to blackish-brown; heads 5-10 mm. wide.................................................................33. C. limnophila

1. Perigynia plano-convex, not very thin and scale-like

6. Perigynia conspicuously nerved ventrally

7. Perigynia oblong-lanceolate to narrowly ovate-lanceolate, 1-1.5 mm. wide, straw-colored, very narrowly wing-margined, the wing often almost obsolete.............................................................34. C. stenoptila

7. Perigynia ovate, 1.5-2.25 mm. wide, greenish copper-colored, conspicuously wing-margined....................................................36. C. pachystachya f. monds-coulteri

—14—
6. Perigynia nerveless ventrally or very obscurely nerved toward the base

8. Perigynia 3 mm. long, ovate-lanceolate, blackish-brown, the margin entire; heads 6-15 mm. long ...................................................... 35. C. illota

8. Perigynia 3.5-5 mm. long, ovate, copper-colored at maturity, the margin serrulate to the middle; heads 10-25 mm.

long .......................................................... 36. C. pachystachya f. pachystachya

29. Carex festivella Mackenzie

Meadows and open slopes, mostly in the mountains, at middle and higher elevations. Manitoba and the Black Hills of South Dakota to British Columbia, and southward to Chihuahua and California.

30. Carex microptera Mackenzie

Moderately dry situations in the mountains, where it is common at about 6,000-10,000 ft. Occasionally hybridizing with C. stenoptila, and often confused with the infrequent C. festivella. Saskatchewan to British Columbia, and southward to South Dakota, Arizona, and California.

31. Carex ebenea Rydb.

Mountain meadows and clearings, at 9,000-11,000 ft., and seen from Albany, Carbon, and Sublette counties. Montana and Wyoming to Utah, and southward to New Mexico and Arizona.

32. Carex haydeniana Olney

Rocky slopes and clearings in the mountains, at higher elevations. Alberta to Oregon, and southward to Colorado, Arizona, and California.

33. Carex limnophila Hermann

Banks of montane lakes and streams, at middle elevations, and seen from Albany and Sublette counties, and Yellowstone National Park. The type is Hermann 12252 from Half Moon Lake, Sublette County, collected in 1955, and a paratype is Hermann 12527 from Bridge Bay, Yellowstone Lake, also collected in 1955. One collection, Hermann 17167, from the Medicine Bow Range, Albany County, appears to be a hybrid with C. microptera. Alberta and Washington southward to Wyoming and Oregon.
34. Carex stenoptila Hermann

Rocky openings and dry, coniferous woods in the mountains and high plateaus, at 8,000-9,500 ft., and seen from southeastern and northwestern Wyoming. Occasionally hybridizing with C. microptera. Wyoming and Colorado.

35. Carex illota Bailey

High mountain meadows, boggy shores of montane lakes, and alpine tundra, at 8,000-11,000 ft.; often abundant and dominant in wet meadows. Montana, Wyoming, and Colorado westward to British Columbia and California.

36. Carex pachystachya Cham. ex Steud.

Two forms occur in Wyoming: f. pachystachya, having perigynia nerveless or very obscurely nerved toward the base; and f. mondis-coulteri (Kelso) Hermann, having perigynia conspicuously nerved ventrally. These seem to occupy the same general habitats and range.

Open woods, slopes, and meadows in the mountains, at 8,000-10,000 ft. Wyoming to California, and northward to Alberta, British Columbia, and the Aleutian Islands.

Subsection 2. Leporinae

1. Culms and head stiff, the culms low, usually 1-3 dm. high

37. C. phaeocephala

2. Perigynia oblong-ovate, conspicuously margined, 4-6 mm. long; spikes usually 3 or 4.

38. C. leoprinella

1. Culms slender, taller, usually 2-8 dm. high, the head not stiff

3. Culms in small clumps, not leafy, the leaves mostly clustered near the base, their blades ascending; spikes in a flexuous or moniliform inflorescence, usually not overlapping; perigynia 4.5-6.5 mm. long, semi-translucent, glossy

39. C. praticola

3. Culms in large clumps, leafy, the leaves covering the lower third of the culms, their blades spreading; spikes, except sometimes the lowermost, closely approximate; perigynia 4-4.25 long, opaque, dull

40. C. platylepis
37. *Carex phaeocephala* Piper

Two forms occur in Wyoming: f. *phaeocephala*, having perigynia usually nerveless ventrally and broadest above the middle, abruptly contracted into a short beak; and f. *eastwoodiana* (Stacey) Hermann, having perigynia conspicuously nerved ventrally and broadest at or below the middle, usually tapering gradually into the beak. The two occupy similar habitats and similar ranges, but f. *eastwoodiana* is the commoner one in Wyoming.

High, usually rocky mountain summits, or occasionally in open, coniferous woods near timberline, at 9,000-11,000 ft., and common throughout most of Wyoming except for the northeastern and southwestern parts. Alberta to Colorado, and westward to British Columbia and California.

38. *Carex leporinella* Mackenzie

Apparently rare at higher elevations, and seen only from the Wind River Range and Yellowstone National Park. Western Wyoming to Utah, Nevada, Washington, Oregon, and California.


Infrequent in high meadows and on streambanks, at 8,000-9,000 ft., and seen from the Big Horn, Teton, and Wind River ranges. Labrador to Alaska, and southward to Quebec, Colorado, and California.

40. *Carex platylepis* Mackenzie

Open coniferous woods and rocky roadsides, at 7,000-9,000 ft., and seen from the Big Horn Range and Yellowstone National Park. The type is *T. A. Williams 2951*, from Ten Sleep Lakes, Big Horn County. Alberta to Wyoming and Idaho.

Subsection 3. Specificae

41. *Carex petasata* Dewey

Rocky soil in mountain meadows and open woods, at 6,000-9,000 ft., and widely scattered over Wyoming. Saskatchewan to Colorado and Arizona, and westward to British Columbia and California. Frequently confused with *C. xerantica*, but the perigynium beak is always much narrower than in that species and usually more terete.
Subsection 4. Festucaee

1. Perigynia 3-4.5 mm. long, 1.5-2 mm. wide

2. Spikes closely aggregated, not clavate at the base; perigynia 3-3.5 mm. long..........................................................42. C. bebbii

2. Spikes not closely aggregated, usually in a flexuous, moniliform inflorescence, clavate at the base; perigynia 3.2-4.5 mm. long..................43. C. tenera

1. Perigynia 3.5-6 mm. long, 2-3.5 mm. wide

3. Perigynia plano-convex to concavo-convex, coriaceous, broadly ovate to suborbicular, 3.5-5.5 mm. long and 2.5-3.5 mm. wide............44. C. brevior

3. Perigynia flattened concavo-convex, membranaceous, ovate, 6 mm. long and 2 mm. wide..........................................................45. C. egglestonii

42. Carex bebbii Olney

43. Carex tenera Dewey
Ravines and canyons in the hills of northeastern Wyoming. Quebec to Alberta, and southward to North Carolina, Illinois, and Wyoming.

44. Carex brevior (Dewey) Mackenzie
Frequent on plains and in dry openings in the hills of eastern and northern Wyoming, at 4,000-8,000 ft. Quebec to British Columbia, and southward to Tennessee, Texas, Arizona, and Oregon.

45. Carex egglestonii Mackenzie
Dry, open soil at higher elevations, up to 11,000 ft., in southeastern Wyoming. Wyoming, Colorado, and Utah.

Subsection 5. Foeneae

1. Perigynia broadest above the middle, finely nervetd ventrally, the beak white-hyaline-tipped; culms usually less than 4 dm. tall..........................46. C. arapahoenis

1. Perigynia usually broadest below the middle, nerveless ventrally, the beak bidentate, not white-hyaline-tipped; culms often more than 4 dm. tall..............47. C. xerantica
46. Carex arapahoensis Clokey
   The few collections seen came from lake shores in the Medicine Bow Range in southeastern Wyoming, at about 10,500 ft. Southeastern Wyoming to central Colorado.

47. Carex xerantica Bailey
   Seen only from the Laramie Range in southeastern Wyoming, in sagebrush and grassland along a stream, at 3,500 ft. Prairies and plains, from Manitoba to Alberta, and southward to New Mexico.

Subsection 6. Athrostachyae

48. Carex athrostachya Olney
   Wet meadows and thickets of foothills and valleys, mainly in southeastern and northwestern Wyoming. Saskatchewan to Alaska, and southward to Colorado, Arizona, and California.

Section 16. Polytrichoideae

49. Carex leptalea Wahl.
   Wet meadows and boggy shores, and seen only from northwestern Wyoming, at middle elevations, but probably occurring elsewhere in the state. Labrador to Alaska, and southward to Florida, Texas, Colorado, and California.

Section 17. Phyllostachyae

1. Perigynia 5-6 mm. long, the upper third of the body empty, the beak stout, 2 mm. long, smooth-margined; leaves flat, not white-striolate..................................................50. C. backii

1. Perigynia 4 mm. long, the upper part of the body filled by the akene, the beak 1 mm. long, more or less serrulate on the margins; leaves with revolute margins or white-striolate beneath..............................................51. C. saximontana

50. Carex backii Boott
   Dry woods at middle elevations, and seen only from the Big Horn Range in Wyoming. Quebec to Massachusetts, and westward to Wyoming and British Columbia.
51. Carex saximontana Mackenzie

Infrequent in woods and thickets at middle elevations, collections having been seen from Casper Mountain, Natrona County, and from the western slope of the Teton Range, Teton County. Manitoba, western Minnesota, and western Nebraska westward to Utah, Oregon, and British Columbia.

Section 18. Filifoliae

1. Leaf-blades flattened canalicate, 1-2 mm. wide toward the base; culms stoutish, often roughened below the spikes; lowest scales usually awned........52. C. oreocharis

1. Leaf-blades acicular, 0.25-0.5 mm. wide at the base; culms filiform, smooth below the spikes; lowest scale rarely awned

2. Perigynia rounded on the angles, obovoid to obovoid-orbicular, truncatedly short-beaked, puberulent above; pistillate scales with very broad, bright-white-hyaline margins; basal sheaths usually strongly filamentose; plant of medium elevations, up to 8,000 ft......................53. C. filifolia

2. Perigynia more sharply triangular, narrowly obpyramidal, strongly slender-beaked, the body slightly puberulent at the base of the beak or more often smooth to sparsely ciliate; pistillate scales reddish-brown, with dingy-white-hyaline margins; plant of higher elevations, above 8,000 ft.......54. C. elynoides

52. Carex oreocharis Holm

Rather dry, grassland hills, in granitic soil, at about 8,500 ft., in the Laramie Range of southeastern Wyoming. Wyoming, Colorado, and Arizona.

53. Carex filifolia Nutt.

Common on dry plains and ridges, up to 3,000 ft., throughout Wyoming. Manitoba to Yukon, and southward to Texas, Arizona and California.

54. Carex elynoides Holm

Fairly common on mountain summits and alpine slopes, at 8,000-12,000 ft. Montana to Colorado, and westward to Nevada.
Section 19. Obtusatae

55. Carex obtusata Lilj.

Apparently infrequent on dry plains, ridges, and rocky, open slopes in northern Wyoming. Manitoba to Yukon and British Columbia, and southward to South Dakota, New Mexico, and Utah; Eurasia.

Section 20. Montaneae

1. Fertile culms all alike, elongated, 5-35 cm. long, bearing both staminate and pistillate spikes; basal spikes absent..................56. C. heliophila

1. Fertile culms of two types, some short, 1-5 cm. long, partly hidden among the densely tufted leaf-bases and bearing only pistillate spikes, others elongated, 5-30 cm. long and bearing both staminate and pistillate spikes

2. Perigynia 2.5-3.5 mm. long, plump, the beak
   0.25-0.75 mm. long, shallowly bidentate..........................57. C. brevipes

2. Perigynia 3.5-4.5 mm. long, more slender, the beak more than 1 mm. long, deeply bidentate......................................58. C. rossii

56. Carex heliophila Mackenzie

Prairies and plains throughout Wyoming. Manitoba to Alberta, and southward to Indiana, Missouri, and New Mexico.

57. Carex brevipes W. Boott

Frequent in dry, open woods, clearings, and slopes, at 8,000-9,500 ft. Wyoming and Colorado westward to Washington and California.

58. Carex rossii Boott

Occasional in dry, open woods, clearings, and slopes. South Dakota and Colorado (locally in northern Michigan) to Arizona and California, and northward to Yukon and British Columbia.

Section 21. Scirpinae

1. Culms aphyllopodic, not clothed at the base with dried leaves of the previous year, strongly red-tinged at the base; pistillate scales ciliate, somewhat narrower and shorter than the perigynia..................................59. C. scirpoidea
1. Clumps phyllo podic, clothed at the base with the conspicuous dried leaves of the previous year, brownish to reddish-brown-tinged at the base; pistillate scales lacerate and ciliate, broader and longer than the perigynia .......................................................... 60. *C. pseudoscirpoidea*


Dry, open places, and apparently rather rare, being found only in the Big Horn Range at about 8,700 ft. Labrador to Alaska, and southward to New Hampshire, Michigan, and Colorado.

60. *Carex pseudoscirpoidea* Rydb.

Occasional in alpine meadows and on dry mountain slopes, up to about 11,000 ft., in western Wyoming. Montana to Washington, and southward to Colorado, Utah, and California.

**Section 22. Digitatae**

1. Staminate spikes 3-6 mm. long, sessile or very short-peduncled; pistillate spikes short, 5-12-flowered, 4-8 mm. long at maturity; bracts short, 7 mm. long or less, green; pistillate scales half the length of mature perigynia.............. 61. *C. concinna*

1. Staminate spike 10-25 mm. long, conspicuously peduncled; pistillate spikes long, 10-25-flowered, 8-22 mm. long at maturity; bracts long (10-20 mm.), spathe-like, dark red except for white-hyaline margins; pistillate scales equaling or exceeding the mature perigynia........................................ 62. *C. richardsonii*

61. *Carex concinna* R. Br.

Peaty soil in clearings or open woods, and apparently infrequent in Wyoming, having been seen only from Sublette County and Yellowstone National Park. Newfoundland to Alaska, and southward to Quebec, northern Michigan, South Dakota, Colorado, and British Columbia.

62. *Carex richardsonii* R. Br.

Dry, open woods, at moderate elevations, in northeastern Wyoming. Vermont to Alberta, and southward to Ohio, Indiana, Iowa, South Dakota, and northeastern Wyoming.
Section 23. Rupestris

63. Carex rupestris Bellardi ex All.
High, arctic and alpine regions, in alpine tundra, and seen from the Medicine Bow, Owl Creek, and Wind River ranges in Wyoming, at about 10,000-11,400 ft. Greenland to Alaska, and southward to Quebec, Colorado, and Utah.

Section 24. Firmiculmes

64. Carex geyeri Boott
Common on dry, mountain slopes, and often dominant in Lodgepole Pine forest, at 6,000-11,000 ft. Alberta and Colorado westward to British Columbia and California.

Section 25. Bicolores

1. Mature perigynia whitish-pulverulent, elliptic-ovoid, not fleshy nor translucent, rather obscurely ribbed; scales appressed........................................65. C. hassei

1. Mature perigynia golden-yellow or brownish, orbicular-ovoid, fleshy, translucent, coarsely ribbed; pistillate scales widely spreading at maturity.................................................................66. C. aurea

65. Carex hassei Bailey
Moist places at middle elevations, and seen only from Yellowstone National Park. Mackenzie and Yukon southward to Colorado and Arizona.

66. Carex aurea Nutt.
Common in wet places, especially streambanks, at 4,000-11,000 ft., throughout most of Wyoming. Newfoundland to Yukon, and southward to Connecticut, Indiana, Arizona, and California.

Section 26. Laxiflorae

67. Carex blanda Dewey
Shaded canyons and brushy slopes in northeastern Wyoming. Quebec to North Dakota and northeastern Wyoming, and southward to Alabama and Texas.
Section 27. Granulaires

68. Carex crawei Dewey

Boggy meadows at lower elevations in eastern Wyoming, the single collection seen having come from Goshen County. Quebec to Alberta and Washington, and southward to New Jersey, Alabama, Kansas, and eastern Wyoming.

Section 28. Capillares

69. Carex capillaris L.

Two varieties occur in Wyoming, distinguishable by the following key.

Tussocks dense, 2-20 cm. high; leaves 0.5-2 mm. wide; inflorescence 1-6 cm. long; pistillate spikes 6-18-flowered, 4-10 mm. long; perigynia 2-3 mm. long.................................................................var. capillaris

Tussocks loose, 2-6 dm. high; leaves 1.5-4 mm. wide; inflorescence 4-20 cm. long; pistillate spikes up to 20-flowered, 7-17 mm. long; perigynia 2.5-4 mm. long.................................................................var. major

The var. capillaris occurs in exposed, alpine habitats at about 11,000 ft., and has been seen only from the Medicine Bow Range in southeastern Wyoming, ranging from Greenland to Alaska, and southward to Quebec, New Hampshire, Colorado, and Utah; also Eurasia. The var. major Drejer occurs in less exposed habitats and usually at lower elevations, in woods, thickets, shores, and wooded swamps, ranging from arctic America southward to Vermont, New York, Michigan, New Mexico, and Nevada.

Section 29. Longirostres

70. Carex sprengeli Dewey

Infrequent in alluvial thickets, rich, rocky banks, and moist canyon sides in eastern Wyoming. New Brunswick to British Columbia, and southward to Delaware, Nebraska, and Colorado.

Section 30. Extensae

71. Carex viridula Michx.

Borders of streams and ponds, at 7,000-9,000 ft., in northwestern Wyoming. Newfoundland to Alaska, and southward to New Jersey, Indiana, Colorado, and California; Japan.

—24—
Section 31. Ferrugineae

1. Spikes black, drooping on capillary peduncles; alpine..................72. C. misandra
1. Spikes greenish or stramineous, erect; middle elevations...............73. C. ablata

72. Carex misandra R. Br.

Alpine tundra in northwestern Wyoming. Circumpolar and high arctic, southward in the mountains to Colorado.

73. Carex ablata Bailey

Occasional but locally abundant in mountain bogs and meadows in northwestern Wyoming. Montana and Wyoming to British Columbia, and southward to Utah and California.

Section 32. Virecentes

74. Carex torreyi Tuckerm.

Wooded ravines and moist situations, up to about 8,000 ft., in north-central and northeastern Wyoming. Manitoba and Minnesota to Alberta, and southward to South Dakota and Colorado.

Section 33. Hirtae

75. Carex lanuginosa Michx.

Common in wet meadows and on river banks and ditches, at 3,500-9,000 ft., throughout most of Wyoming. New Brunswick to British Columbia, and southward to Tennessee, New Mexico, and California.

Section 34. Limosae

1. Stamine spike 15-27 (average 22) mm. long; pistillate scales obtuse or acute, as broad or broader than the perigynia and barely exceeding them in length, persistent; leaves glaucous, involute or corrugated; plants strongly stoloniferous.................................................76. C. limosa
1. Stamine spike 4-12 (average 8) mm. long; pistillate scales long-attenuate, much narrower and longer than the perigynia, early deciduous; leaves scarcely glaucous, flat; plants loosely caespitose..............................................77. C. paupercula
76. Carex limosa L.

Occasional, and seen only from a sedge bog in the Big Horn Range, at about 8,000 ft. Labrador and Newfoundland to Yukon, and southward to Delaware, Iowa, Wyoming, and California; Eurasia.

77. Carex paupercula Michx.

Boggy places at middle elevations, the single collection seen from the Medicine Bow Range. Newfoundland to Alaska, and southward to Pennsylvania, Minnesota, Colorado, and Utah; Eurasia.

Section 35. Atratae

1. Terminal spike not gynaecandrous, in some pistillate or staminate only at the apex, in others staminate.............................................78. C. hallii

1. Terminal spike gynaecandrous or staminate

2. Pistillate scales small, 1.5-2.5 mm. long, obtuse, acutish, or short-mucronate; perigynia 2.25 mm. long (rarely to 3.5 mm. long in C. media)

3. Scales covering the perigynia or nearly so, dark reddish-brown, the midrib conspicuous; perigynia scarcely beaked, somewhat ciliate at the mouth; culms stiff, obtusely triangular.................................79. C. parryana

3. Scales much shorter than the perigynia, purple-black, the midrib almost obsolete; perigynia beaked, not ciliate at the mouth; culms scarcely stiff, sharply triangular above...............................80. C. media

2. Pistillate scales larger or sharp-pointed or both; perigynia 3 mm. long or more

4. Terminal spike staminate

5. Perigynia strongly flattened.......................................................81. C. tolmiei

5. Perigynia plump, nearly round in cross section, little or not at all flattened.................................................................82. C. rayoldsii

4. Terminal spike gynaecandrous, the terminal flowers pistillate

6. Perigynia densely papillosc, glaucous-green, trigonous-biconvex; pistillate scales usually aristate (rarely only cuspidate), their tips exceeding the perigynia......................................................83. C. buxbaumii

6. Perigynia otherwise; pistillate scales not aristate

7. Perigynia scarcely flattened, subinflated-triangular; scales often rough-papillosc......................................................84. C. nelsonii

7. Perigynia strongly flattened
8. Perigynia not granular-roughened (under a lens)

9. Spikes closely aggregated into a dense terminal head...........................................85. C. pelocarpa

9. Spikes, or the lowest spike, more or less peduncled, usually distant

10. Pistillate scales elliptic-ovate, blunt to acute (sometimes mucronate), often shorter than the perigynia and usually flaccid, the midvein inconspicuous to nearly obsolete; mature perigynia 3.5-4.5 mm. long..........86. C. epapillosa

10. Pistillate scales narrowly lanceolate, long-acuminate, conspicuously exceeding the perigynia, rather rigid and erect-ascending, the midvein prominent; mature perigynia 3.5 mm. long..........................87. C. heteroneura

8. Perigynia granular-roughened (under a lens), especially on the upper margins

11. Spikes contiguous, sessile or short-peduncled, forming a dense head; culms stiff, erect

12. Lowest spike slightly separate, short-peduncled; scales rough-papillose, with very conspicuous, white-hyaline apex and upper margins.................................88. C. albonigr

12. All spikes densely aggregated, sessile; scales with very inconspicuous, hyaline margins........................89. C. nova

11. Spikes, or the lowest spike, strongly peduncled, usually distant

13. Upper pistillate scales exceeding the perigynia; lowest peduncle less than half the length of the spike...............................................................90. C. chalciolepis

13. Upper pistillate scales exceeded by the perigynia; lowest peduncle 1-2 times the length of the spike....91. C. atrata

78. Carex hallii Olney

Sporadic and apparently infrequent in meadows, at lower to middle elevations, collections having been seen from southwestern Wyoming and Yellowstone National Park. Hudson Bay to Alberta, and southward to North Dakota and Colorado.

79. Carex parryana Dewey

This species may sometimes be confused with C. hallii, from which it may be distinguished by the following supplementary key.
Spikes 3 or 3.5-4.5 mm. wide; perigynia 1.5-2 mm. wide; akenes sessile. \[\ldots\] \textit{C. hallii}

Spikes 2-3 mm. wide; perigynia 1-1.5 mm. wide; akenes short-stipitate. \[\ldots\] \textit{C. parryana}

Apparently very local, and seen only from the plains in Sublette County. Manitoba to Alberta, and southward to North Dakota and Wyoming.

80. 

\textbf{Carex media} R. Br.

Frequent in moist, open or partially open habitats in the mountains, at 6,000-10,000 ft. Labrador to Alaska, and southward to Quebec, Michigan, New Mexico, and Washington.

81. 

\textbf{Carex tolmiei} Boott


82. 

\textbf{Carex raynoldsii} Dewey

Very common in mountain meadows, open woods, and on rocky or grassy, subalpine slopes, at 7,000-10,000 ft. Alberta and British Columbia southward to Colorado, Utah, and California.

83. 

\textbf{Carex buxbaumii} Wahl.

Very local, in sunny swamps and wet meadows, at middle elevations, and seen only from northwestern Wyoming. Newfoundland to southern Alaska, and southward to Georgia, Arkansas, Colorado, Utah, and California; Eurasia.

84. 

\textbf{Carex nelsonii} Mackenzie

The type is \textit{Aven \\& Elias Nelson 5264}, from the Medicine Bow Range, Albany County.

Mountain meadows and rocky slopes, at higher elevations, in southeastern Wyoming and on the Beartooth Plateau, Park County. Wyoming, Colorado, and Utah.
85. Carex pelocarpa Hermann

This species has been confused with *C. nova*, from which it is distinguished by its long-stipitate akenes, its glossy, erect or ascending perigynia, which are smooth margined (not ciliate-scabrous-margined), its much more deeply bidentate perigynium beaks, its acuminate scales with more or less prominent midrib, and its slender, generally flexuous culms. *Carex nelsonii* has much longer and broader, blunt scales, perigynia that are narrower, strongly granular-roughened and sub-inflated, and akenes that are stipitate.

Occasional on alpine slopes. Utah and Wyoming to Idaho and Montana.

86. Carex epapillosa Mackenzie

Frequent in mountain meadows and on margins of alpine lakes, at 8,000-10,000 ft. Alberta and Montana to Washington, and southward to Utah and California.

87. Carex heteroneura W. Boott

Seen only from the west slope of Mt. Washburn, Yellowstone National Park, at 8,700 ft., in a wet, mossy ravine. California, western Nevada, and Wyoming.

88. Carex albonigra Mackenzie

The type is *Merritt Cary 613*, from Needle Mountain in southwestern Park County.

Mountain slopes at about 8,000-11,000 ft. Alberta to Washington, and southward to Arizona and California.

89. Carex nova Bailey

Often resembling *C. nelsonii* in general aspect, but that species has more gradually-beaked perigynia which, like the blacker and more obtuse scales, are conspicuously granular-roughened throughout, and are narrower, mostly appressed, and not divergent to often squarrose-spread at maturity.

Mountain meadows and banks of streams, at 8,000-11,000 ft., and seen only from southeastern Wyoming. Montana and Oregon to New Mexico and Nevada.
90. *Carex chalciolepis* Holm

Rocky slopes, mountain meadows, and alpine tundra, at 9,000-12,000 ft., and seen from southeastern and northwestern Wyoming. Wyoming and Colorado to Nevada and Arizona.

91. *Carex atrata* L.

Fairly common in mountain meadows and on rocky, alpine slopes, at 9,000-12,000 ft. Greenland to Alberta, and southward to Colorado and Nevada; Eurasia.

Section 36. Acutae

1. Lowest bract definitely shorter than the inflorescence; pistillate scales with obsolete or slender midvein

2. Pistillate spikes stout, oblong, 6-7 mm. wide, densely flowered, often aggregated, subsessile or the lowest short-peduncled; lower bract scale-like .................................................. 92. *C. scopulorum*

2. Pistillate spikes slender, linear to narrowly oblong, generally 2-4 (5) mm. wide, usually few-flowered, the lowest slender-peduncled; lower bract leaf-like.......................................................... 93. *C. bigelowii*

1. Lowest bract about equaling to exceeding the inflorescence; pistillate scales with conspicuous midvein or with a broader and light-colored center

3. Perigynia conspicuously veined or ribbed ventrally

4. Perigynia membranaceous, slenderly nerved, the beak apiculate, entire.......................................................... 94. *C. kelloggii*

4. Perigynia coriaceous, strongly ribbed, the beak broad, bidentate .......................................................... 95. *C. nebraskensis*

3. Perigynia nerveless ventrally, or with obscure, impressed nerves .......................................................... 96. *C. aquatilis*

92. *Carex scopulorum* Holm

Three varieties occur in Wyoming, distinguishable by the following key.

Dried leaves of the previous year conspicuous at the base of the culms

Perigynia squarrose-spreading, the beak 0.2-0.5 mm. long; scales ovate, shorter than the perigynia.................................................. var. *scopulorum*

Perigynia spreading-ascending, the beak 0.1-0.2 mm. long; scales lanceolate or oblong-lanceolate, exceeding the perigynia.................................................. var. *chimaphila*

Dried leaves of the previous year not conspicuous.................................................. var. *bracteosa*
The var. *scopulorum* is more common in Wyoming than the other two varieties, var. *chimaphila* (Holm) Kükenth. being next in abundance; but var. *bracteosa* (Bailey) Hermann (*Carex gymnoclada* Holm) is known for Wyoming from a single collection. These varieties occupy rather similar habitats.

Alpine meadows and shores of alpine lakes, streambanks, and alpine tundra, at 9,000-11,000 ft. Wyoming and Colorado to Oregon and California; var. *chimaphila* in Montana, Wyoming, Colorado, and Utah; and var. *bracteosa* in Wyoming, Idaho, and Colorado.

**93. Carex bigelovii** Torr.

The single collection seen came from Meeteetse Creek, in alluvial soil, at about 8,500 ft., Park County. The species occurs mainly in the northeastern United States, but also occurs westward in Idaho, Wyoming, Colorado, and Utah.

**94. Carex kelloggii** W. Boott

Frequent on wet banks, rocky lake margins, and in moist meadows, at 6,000-11,000 ft. Alberta to Colorado, and westward to Alaska and California.

**95. Carex nebraskensis** Dewey

Common in swamps, wet meadows, and ditches, at 3,500-8,500 ft. South Dakota and Kansas to New Mexico, and westward to British Columbia and California.

**96. Carex aquatilis** Wahl.

Two varieties in Wyoming, distinguishable by the following key.

Perigynia elliptic, broadest below the apex, less than 3 mm. long, 1-1.75 mm. wide

var. *aquatilis*

Perigynia obovate, broadest at the apex, 3 mm. or rarely 2.5 mm. long, 1.75-2.5 mm. wide

var. *altior*

The two varieties occupy similar habitats, but var. *altior* (Ryd.) Fernald perhaps occurs more often in shallow water and is less common. Common in swamps and on lake shores and streambanks, often in shallow water, at 6,000-11,000 ft. Greenland to Alaska, and southward to Quebec, northern Michigan, Arizona, and California; var. *altior* from Newfoundland to Washington, and southward to New Jersey, Indiana, Missouri, Colorado, and Oregon.
Section 37. Pseudocypereae

97. Carex hystricina Muhl.

Occasional in swamps, wet meadows, and on streambanks, in the eastern half of Wyoming, at 3,500-6,000 ft. Quebec to Washington, and southward to Virginia, Texas, Arizona, and California.

Section 38. Paludosae

98. Carex atherodes Spreng.

Marshes and banks of swamps, at 6,000-8,000 ft., in southern Wyoming. Ontario to Yukon, and southward to New York, Indiana, Missouri, Colorado, and Oregon.

Section 39. Vesicariae

1. Stigmas mostly 2 and akenes lenticular; perigynia scarcely if at all inflated, obscurely few-nerved, the beak emarginate or shallowly bidentulate 99. C. saxatilis

1. Stigmas mostly 3 and akenes trigonous; perigynia strongly inflated, prominently several-nerved, the beak conspicuously bidentate

2. Leaves not conspicuously septate-nodulose, 1-7 mm. wide; culms rarely spongy-based, sharply triangular below the spikes, rough; perigynia appressed or ascending; teeth of perigynia long or the perigynia gradually long-beaked; lower sheaths fragile, becoming strongly filamentose; ligule much longer than wide; rhizomes without horizontal stolons..................100. C. vesicaria

2. Dry leaves conspicuously septate-nodulose, 2-15 mm. wide; culms mostly thick and spongy at the base, bluntly triangular below the spikes, smooth; perigynia ascending to squarrose at maturity; teeth of perigynia short or the perigynia abruptly short-beaked; lower sheaths not fragile, not becoming filamentose; ligule slightly if at all longer than wide; rhizomes with long, horizontal stolons....................................................101. C. rostrata

99. Carex saxatilis L.

Wyoming plants are all var. major Olney (C. physocarpa Presl).

Rocky shores of mountain lakes, wet mountain meadows, and wet places, at 8,000-10,000 ft., and seen from the Medicine Bow and Wind River ranges. Greenland, Labrador, and arctic Eurasia; var. major ranging from Alaska and Mackenzie southward to Utah and Colorado.
100. Carex vesicaria L.

Common in wet habitats, at 6,000-9,000 ft., and seen from the Wind River Range and northwestern Wyoming. Newfoundland to British Columbia, and southward to Delaware, Indiana, Missouri, Arizona, and California; Eurasia.

101. Carex rostrata Stokes

Very common in wet places at 6,000-10,000 ft. Greenland to Alaska, and southward to Maryland, Indiana, South Dakota, New Mexico, and California.

2. Kobresia Willd.

Low, densely caespitose perennials of alpine situations, with slender, erect culms that are leafy below, the basal sheaths bladeless, brownish, and persistent. Flowers in a terminal, spikelike, ebracteate inflorescence, monoecious, usually in pairs, one staminate and one pistillate, each pair enclosed by a scale (perigynium) that has its margins free to the base or nearly so. Perianth none. Stamens 3. Stigmas 3 and akenes triangular, included in the perigynium or slightly exserted.

KEY TO THE SPECIES

1. Spike simple, composed of a single spikelet

2. Spike 2-3 mm. wide; scales 2-3 mm. long, shining; perigynia 3-3.5 mm. long; akenes 2.5-2.75 mm. long, nearly beakless; culms exceeding the leaves .................................................................1. *K. myosuroides*

2. Spike 4-5 mm. wide; scales 4-5 mm. long, dull; perigynia 5.5 mm. long; akenes 3.5 mm. long, with conspicuous short beak; culms mostly shorter than the leaves..............................................2. *K. macrocarpa*

1. Spike compound, composed of a few spikelets.........................3. *K. simpliciuscula*

1. Kobresia myosuroides (Vill.) Fiori & Paol.

Alpine tundra, mostly above 10,000 ft., in northwestern Wyoming. Greenland to Alaska, and southward to Colorado and eastern Oregon; Europe. *Kobresia bellardii* (All.) Degl.
2. **Kobresia macrocarpa** Clokey


3. **Kobresia simpliciuscula** (Wahlenb.) Mackenzie

This species is not known to occur in Wyoming, but it may be present at high elevations in the northwestern mountains. It is reported by Mackenzie (N. Am. Fl. 18:6, 1931) as occurring in Colorado, but no collections from there have been seen. Circumpolar and arctic-alpine; Alaska and Greenland southward to Hudson Bay and Quebec.

3. **Cyperus L.** Galingale

Grasslike annuals or perennials with leafy, triangular culms. Inflorescence terminal, bracteate, of few to many spikelets in capitate or umbellate clusters, the scales of each spikelet 2-ranked. Flowers perfect, without a perianth, the stamens 1-3, the pistil with 2 or 3 stigmas, the style deciduous. Akenes lenticular or trigonous.

**KEY TO THE SPECIES**

1. Plants annual; culms not bulbous at the base; stigmas 2 or 3; akenes lenticular or trigonous

   2. Tips of scales squarrose and curved outward, with an awn 0.5-1.2 mm. long; stigmas 3 and ake ne trigonous..........................1. *C. aristasus*

   2. Tips of scales appressed, awnless; stigmas 2 and akenes lenticular ..........................................................2. *C. rivularis*

1. Plants perennial, culms bulbous at the base;
   stigmas 3 and akenes trigonous.........................................................3. *C. schweinitzii*

1. **Cyperus aristasus** Rottb.

Moist, sandy or gravelly streambanks, at lower elevations, in southeastern Wyoming. Quebec to British Columbia, and southward to Argentina and Chile; Eurasia.

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2. *Cyperus rivularis* Kunth

Moist, sandy or gravelly streambanks, at lower elevations, in eastern Wyoming. Maine and Quebec to North Dakota, eastern Wyoming, and California, and southward to Georgia and Texas.


Rather dry, sandy soil, at lower elevations, in southeastern Wyoming. New York and Quebec to Saskatchewan and Idaho, and southward to New Jersey, Ohio, Missouri, and New Mexico.

4. *Eriophorum* L. Cotton Grass

Grasslike perennials, usually with rhizomes but sometimes caespitose, often in boggly places, the culms rounded or triangular, leafy, or some of the leaves reduced to sheaths. Inflorescence terminal, with or without leafy bracts, the spikelets few to several or single, sessile or pedicellate, the scales spirally imbricate. Flowers perfect, with a perianth of usually many capillary bristles that are long-exserted and cottony at maturity, the stamens 1-3, and the pistil with 3 stigmas, these deciduous with the style at maturity. Akenes trigonous.

**KEY TO THE SPECIES**

1. Spikelet 1, sessile on the end of the culm; leafy bracts lacking

2. Plants loosely rhizomatous or stoloniferous, the culms not tufted; perianth bristles white or tawny; upper sheath not inflated; empty scales at base of spikelet 7 or less

3. Anthers about 1 mm. long; perianth bristles white; fruiting heads globose; scales with very narrow, pale margins.............1. *E. scheuchzeri*

3. Anthers 1.5-3 mm. long; perianth bristles usually tawny; fruiting heads longer than broad; scales with broad, pale margins.............2. *E. chamissonis*

2. Plants without rhizomes or stolons, the culms densely tufted; perianth bristles white; upper sheath inflated; empty scales at base of spikelet usually 10-15.................................................................3. *E. callitrix*

1. Spikelets several, some or all pedicellate; one or more leafy bracts present; perianth bristles white or nearly so
4. Leafy bracts 2-3; leaf blades flat below the middle, more than 3 mm. wide……………………………………………………A. E. angustifolium

4. Leafy bract 1; leaf blades channeled throughout, 1-2 mm. wide.……5. E. gracile

1. Eriophorum scheuchzeri Hoppe
   Boggy tundra and ponds, mostly above 10,000 ft., in northwestern Wyoming. Circumpolar and arctic-alpine, extending southward to Newfoundland, Alberta, Colorado, and Utah.

2. Eriophorum chamissonis C. A. Meyer
   Boggy areas in the mountains at middle to higher elevations in northwestern Wyoming. Circumboreal; Labrador to Alaska, and southward to Minnesota, Colorado, and Oregon.

3. Eriophorum callitrix Cham.
   Alpine tundra in northwestern Wyoming. Circumpolar and arctic-alpine, extending southward to Newfoundland and Wyoming.

4. Eriophorum angustifolium Honckeney
   Boggy meadows and banks of lakes, in the mountains, at middle to higher elevations. Greenland to Alaska, and southward to New York, Michigan, Iowa, New Mexico, and southern Oregon; Eurasia.

5. Eriophorum gracile Koch
   Boggy places, at middle elevations, in northwestern Wyoming. Newfoundland to British Columbia, and southward to Pennsylvania, Iowa, Colorado, and northern California; Eurasia.

5. Eleocharis R. Br. Spike Rush
   Annuals or (in ours) rhizomatous perennials, with simple, usually rounded culms, the leaves reduced to bladeless sheaths or nearly so. Inflorescence a single, terminal, ovoid to linear spikelet without any foliaceous bracts, the scales spirally imbricate, the basal 1-3 scales usually sterile. Flowers perfect, with an inconspicuous and included perianth of usually several (1-12) bristles, the stamens 1-3, and the pistil with 2 or 3 stigmas, the style base thickened and forming a persistent, cap-like tubercle at the summit of the ovary. Akene lenticular or trigonous.
KEY TO THE SPECIES

1. Stigmas 3 and akenes trigonous or very plump

2. Tubercle a subulate beak that is confluent with the apex of the akene; akenes not longitudinally ribbed; culms not capillary

3. Spikelet 2-7-flowered, 4-7 mm. long; culms 3-angled, less than 1 mm. thick, not arched or rooting at the tip; generally distributed........1. *E. pauciflora*

3. Spikelet 10-20-flowered, 7-12 mm. long; culms flattened, 1-2 mm. wide, often some of them arched and rooting at the tip; northwestern Wyoming..................2. *E. rostellata*

2. Tubercle compressed and forming a distinct cap at the apex of the akene; akenes longitudinally ribbed; culms capillary and often in dense, low mats..................................................3. *E. acicularis*

1. Stigmas 2 and akenes lenticular

4. Culms mostly 3-10 cm. high, yellow-green; sheaths with prolonged, scarsious tips; spikelet 2-7 mm. long, northwestern Wyoming..............4. *E. flavescens*

4. Culms mostly 15-40 cm. high, dark green; sheaths not scarsious at the summit; spikelet 6-20 mm. long; generally distributed.........................5. *E. macrostachy a*

1. *Eleocharis pauciflora* (Lightf.) Link

Wet places, usually at middle elevations, and generally distributed in Wyoming. Greenland to British Columbia, and southward to New York, Indiana, New Mexico, and California; South America; Eurasia.


Moist places at middle elevations in the vicinity of hot springs and geysers in Yellowstone National Park. Nova Scotia to Florida, rare inland in the eastern United States, and common in the western United States; Bermuda, Cuba, and Mexico.


A highly variable species including several varieties and forms (see Svenson in *Rhodora* 31:183-191, 1929). Submerged, sterile plants have been resigned as var. *acicularis* f. *inundata* Svenson. Much of the Rocky Mountain material with more rigid culms, more flattened tubercles, and no perianth, has been called var. *occidentalis* Svenson. These appear to be only minor variations and are scarcely deserving of taxonomic status.

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Wet places, sometimes submerged and sterile, at lower to moderately high elevations, up to nearly 10,000 ft., and generally distributed in Wyoming, Greenland to Alaska, and southward to Florida and Mexico; Eurasia.

4. **Eleocharis flavescens** (Poir.) Urban

Wyoming specimens seen were all taken from the vicinity of hot springs and geysers, at middle elevations, in Yellowstone National Park. New Jersey to Minnesota and northwestern Wyoming, and southward to Georgia and Mississippi; tropical America.

5. **Eleocharis macrostachya** Britt.

This, our commonest species, is a polyploid complex that is highly variable. It has been united with the European *E. palustris* (L.) Roem. & Schult. by some conservative authors, including also *E. smallii* Britt. of the northeastern United States. At present it seems best to accept Svenson's disposition of these entities (Rhodora 41:55-59, 1939; 49:61-67, 1947).

Common in bottom lands in wet places, at lower to middle elevations, throughout Wyoming. Great Slave Lake, Mackenzie District, southward through the western United States to northern Mexico, and eastward to Minnesota and Missouri.

6. **Scirpus L.** Bulrush

Low to tall, rhizomatous perennials, in ours, more or less aquatic, with triangular or rounded culms, the leaves either with grasslike blades or reduced to bladeless sheaths. Inflorescence of umbellate or capitate spikelets, or rarely reduced to a single spikelet, subtended by 1 or more bracts. Spikelets rounded, blunt or pointed, with their scales spirally imbricated. Flowers perfect, with an inconspicuous and included perianth of 1-6 bristles, rarely lacking, the stamens 2-3, the style 2-3-cleft. Akene lenticular or trigonous, not tubercled.

**KEY TO THE SPECIES**

1. Stems usually submersed, flaccid, subcapillary, about 1 mm. thick; inflorescence a single spikelet subtended by a single leafy bract
   up to 3 cm. long.........................................................1. **S. subterminalis**

1. Stems not submersed, not flaccid, erect, thicker; inflorescence various

2. Inflorescence subtended by 2 or more foliaceous bracts; leaves with flat blades
3. Spikelets mostly 10 mm. or more long, sessile or subsessile in a crowded cluster........................................2. *S. paludosus*

3. Spikelets mostly 3-8 mm. long, in an open and branching inflorescence

4. Sheaths of basal leaves prominently red-tinged; styles usually 2; akenes lenticular.................................3. *S. microcarpus*

4. Sheaths of basal leaves not red-tinged, pale or greenish; styles usually 3; akenes trigonous.................................4. *S. pallidus*

2. Inflorescence subtended by a single, erect, scarcely foliaceous bract; leaves with blades wiry and scarcely flattened, or the sheaths bladeless

5. Culms terete, usually 1 m. high or more; inflorescence more or less branching

6. Scales 2.5-3 mm. long, scarcely exceeding the akenes; inflorescence open, the primary branches up to 6 cm. long and nearly all the spikelets pedicelled..................................................5. *S. validus*

6. Scales about 4 mm. long, definitely exceeding the akenes; inflorescence compact, composed at least in part of a subsessile cluster of spikelets and with or without additional spikelet clusters on short peduncles 1-4 cm. long.................................................................6. *S. acutus*

5. Culms 3-angled or subterete, usually less than 1 m. high; inflorescence unbranched, of a capitate cluster of sessile spikelets

7. Scales awnless; culms subterete; leaves mostly basal, their blades about 1 mm. wide........................................7. *S. nevadensis*

7. Scales short-awned; culms sharply 3-angled; leaves few, not mostly basal, their blades 2-5 mm. wide

8. Bract subtending the inflorescence mostly 3-10 cm. long; culms merely sharply angled, with narrow, flat sides, and remaining so when pressed; blades convolute; throughout Wyoming.......................................................8. *S. americanus*

8. Bract subtending the inflorescence mostly 1-3 cm. long; culms wing-angled, with broad, concave sides, but soft and readily flattening when pressed; blades flat; northwestern Wyoming........................................9. *S. olneyi*


Usually submersed in bogs, swamps, and sluggish streams, the single Wyoming collection being sterile and from Teton County at 6,750 ft. Newfoundland to Alaska, and southward to South Carolina, Mississippi, Wyoming, and Oregon.
2. **Scirpus paludosus** A. Nels.

There is considerable confusion regarding the proper taxonomic disposition of this plant. Eastern authors call it *S. maritimus* L., var. *paludosus* (A. Nels.) Kükenth., thus relating it to the species of Europe and eastern North America. On the other hand, western authors have reduced it to synonymy under *S. robustus* Pursh, a species often considered to be coastal in North and South America. Our plants show a high degree of uniformity in having 2 styles, lenticular akenes, and light brown to stramineous scales, and while showing affinities to the foregoing species, they seem to be sufficiently distinct from both to warrant specific rank as given here. The type collection was made in western Sweetwater County, Wyoming, at Granger, *Aven Nelson 3874*.

Wet places, often in alkaline situations, and common on the plains and in the lower basins of Wyoming, at lower to middle elevations. New Brunswick and Quebec to Saskatchewan and British Columbia, and southward to New Jersey, Texas, and California; Argentina, Hawaiian Islands, Australia, and the East Indies.

3. **Scirpus microcarpus** Presl

In the past it has been traditional to recognize two species in this complex: *S. rubrotinctus* Fernald, with prominently reddish-purple basal sheaths and slightly smaller akenes, ranging from the northeastern United States to British Columbia, and southward to Utah and Colorado; and *S. microcarpus* Presl, with little pigmentation in the basal sheaths and somewhat larger akenes, ranging mainly through the Pacific States. Recent studies by A. E. Schuyler indicate, however, that these are better treated as a single species, within which our plants may be only varietally distinct.

Wet places, usually along freshwater streams and ditches, at lower to middle elevations, and common in Wyoming. Newfoundland to Alaska, and southward to New Jersey, Minnesota, New Mexico, and California.

4. **Scirpus pallidus** (Britt.) Fernald

This plant is sometimes treated as a variety of the more eastern *S. atrovirens* Willd. It differs significantly, however, in having spikelets more densely aggregated in larger clusters on the ends of the rays, in the paler color of mature spikelets, and particularly in having scales attenuate into an awn instead of merely mucronate. For these reasons, as well as because of its more western distribution, it is here treated as a distinct species.
Moist banks and swampy places, in north-central and eastern Wyoming, at lower to middle elevations. Manitoba to Washington, and southward to Missouri, Texas, and Arizona.

5. **Scirpus validus** Vahl

Common throughout the plains and major basin areas of Wyoming, in wet places, often in ditches and shallow ponds and lakes, at lower to middle elevations. Newfoundland to British Columbia, and southward to Georgia, Texas, and probably California; Mexico, the West Indies, Hawaiian Islands, Argentina. *S. lacustris* L., subsp. *validus* (Vahl) Koyama.

6. **Scirpus acutus** Muhl.

Marshes and shallow water of ponds, lakes, and ditches, throughout most of Wyoming, at lower to middle elevations. Newfoundland to Alaska, and southward to North Carolina, Oklahoma, Texas, Arizona, and California.

7. **Scirpus nevadensis** S. Wats.

Occasional in moist, alkaline areas, and known for Wyoming only from Albany and Fremont counties, at 5,000-7,000 ft. Saskatchewan to British Columbia, and southward to Nebraska, Wyoming, Nevada, and California; Argentina.

8. **Scirpus americanus** Pers.

Wyoming plants may be referred to var. *polyphyllus* (Boeckl.) Beetle, which is distinguished by having a trifid style and trigonous akenes, dark scales, and the culms having several blade-bearing leaves. The species is highly variable over its wide range, and varietal distinctions do not appear to be very significant.

Common in wet places at lower to middle elevations throughout Wyoming. Ranging across the United States and southern Canada; also Eurasia. The variety occupies the western part of the North American range; also South America, New Zealand, and Tasmania.

9. **Scirpus olneyi** A. Gray

This plant has been referred by Beetle (N. Am. Fl. 18:500, 1947) to the South American *S. chilensis* Nees & Meyen, a species doubtfully distinct from *S. americanus*. As pointed out by Fernald (Rhodora 45:390-393, 1943), *S. olneyi* is amply distinct in having uniquely broad-winged culms that are soft and become flattened and ribbon-like when pressed, and in having a consistently bifid style.
Wyoming collections seen are from hot springs and geyser areas, at middle elevations in Yellowstone National Park and adjacent Teton County. In swamps and around hot springs, on both coasts of the United States, and at scattered localities inland, southward to New Mexico and Arizona; eastern South America.


Low annuals with fibrous roots and caespitose, filiform, grooved or trigonous culms bearing basal, convolute, filiform leaves shorter than the culms. Inflorescence a solitary spikelet or a capitate cluster of 2-3 spikelets, subtended by 1-3 foliaceous bracts much longer than the spikelets. Scales spirally imbricated. Flowers perfect, the perianth a single scale-like part between the floret and the rachilla, or sometimes none, the stamens 1 or 2, the style bifid. Akene oblong, plump.

1. Hemicarpha micrantha (Vahl) Pax

Wyoming plants may be referred to var. aristulata Coville, distinguished by having the perianth scale as long as the akene or longer, and without vascular tissue, and by the scales of the spikelet with a slender point longer than the body.

Rare, and seen only from Albany County, on wet sands in foothill canyons. The species ranges widely throughout most of the Western Hemisphere in temperate and tropical regions. The variety occurs from Wyoming to Washington, and southward to Texas, New Mexico, and Oregon.

19. LEMNACEAE Duckweed Family

Small to minute, thalloid, free-floating or submersed, aquatic plants with or without 1 or a few simple rootlets from the under side. Reproduction vegetative by budding, and sexual by minute unisexual flowers. Inflorescence of 1 pistillate and 2 staminate flowers produced in a saccate spathe in a pouch on the edge of the upper surface of the plant (frond). Perianth none. Pistillate flowers consisting of a single pistil, the ovary flask-shaped and with 1-several ovules. Staminate flowers consisting of 1 stamen with a short filament and 2 or 4 anther sacs. Fruit a utricle.

KEY TO THE GENERA

1. Fronds without rootlets and entire, minute, 0.5 mm.
   long or less.................................................................................................................1. WOLFFIA
1. Fronds with 1 or more rootlets, or sometimes rootless but then lobed and stalked, more than 1 mm. long

2. Root 1 on each frond, or the fronds lobed, stipitate, and rootless; fronds green on both sides, the upper side with 1-5 nerves, these sometimes obscure.................................................................2. LEMNA

2. Roots 2-several on each frond; fronds purplish beneath, the upper side with 5-15 nerves.................................................................3. SPIRODELA

1. Wolffia Horkel

Minute, thalloid, rootless, globose or ellipsoid, free-floating aquatic plants with green fronds less than 0.5 mm. long in ours. Flowers rarely produced, the plants commonly reproducing by budding, the new plants soon detached.

These are the smallest flowering plants known, and are easily overlooked, appearing like green specks on the water or on mud, and often mixed with Lemna.

1. Wolffia punctata Griseb.

Ponds and ditches at lower elevations. No collection from Wyoming has been seen, but it is to be expected since it occurs in eastern Utah. Connecticut to Ontario and Minnesota, and southward to Florida and Texas; also Cache County, Utah.

2. Lemna L. Duckweed

Small, thalloid, rootless or single-rooted, free-floating or submersed aquatic plants with green, branched, or unbranched fronds 1 mm. or more long, flat or convex beneath, suborbicular to ovate or oblong, or stalked and cruciform, with 1-5 distinct or obscure nerves (these best observed by transmitted light). Plants commonly reproducing by budding, the new plants soon detached or sometimes remaining attached in colonies.

KEY TO THE SPECIES

1. Fronds stalked (stipitate) and lobed, often in chains or colonies, more or less submersed, usually rootless.................................................................1. L. trisculca

1. Fronds neither stipitate nor lobed, but sometimes appearing lobed because of budding, seldom remaining attached in chains or colonies, floating, and each with a single rootlet
2. Fronds gibbous on the lower side, appearing inflated, with large air-chambers in cross section, mottled yellow-green.................2. *L. gibba*

2. Fronds flat, with small air-chambers in cross section, green or yellow-green, not mottled

3. Nerves 1, or the frond apparently nerveless

4. Thallus oblong, symmetrical, the surface without papules.........................................................3. *L. valdiviana*

4. Thallus obovate-elliptic, asymmetric, the surface with papules..................................................4. *L. minima*

3. Nerves 3, distinct or sometimes obscure

5. Air-chambers in 2 layers in cross section of frond; thallus oblong to obovate, falcate at the base..............5. *L. perpusilla*

5. Air-chambers in 1 layer in cross section of frond; thallus broadly obovate, the base only slightly oblique...........6. *L. minor*

1. *Lemna trisulca* L.

Ponds and lakes at mostly middle elevations in mountains and mountain valleys, up to about 8,000 ft., in southern and northern Wyoming, but probably to be found elsewhere as well. Cosmopolitan.

2. *Lemna gibba* L.

Occasional in ponds, pools, and ditches, on the plains, at lower elevations, up to about 6,000 ft. Sporadic, and seen from Carbon, Johnson, Platte, and Sheridan counties. Cosmopolitan.

3. *Lemna valdiviana* Philippi

Ponds and ditches at lower elevations. Not known to occur in Wyoming, but to be expected since it occurs on both sides of the state. The definitely oblong, symmetrical frond shape is distinctive. Ranging across the United States and extending southward into South America. *Lemna cyclosta*sa (Ell.) Chev.

4. *Lemna minima* Philippi

Ponds, lakes, and ditches at lower to middle elevations, up to about 6,500 ft., Wyoming collections having been seen from Johnson County and Yellowstone National Park. Cosmopolitan.
5. **Lemna perpusilla** Torr.

Ponds, ditches and lakes at lower elevations. Not known to occur in Wyoming, but perhaps to be expected. Massachusetts to Minnesota, and southward to South America; California.

6. **Lemna minor** L.

Our commonest species, and probably found throughout most of the plains, foothills, and sometimes in the mountains of Wyoming, mostly at elevations up to about 7,000 ft., but occasionally higher, in ponds, lakes, and ditches, often forming extensive colonies on the water. Cosmopolitan.

3. **Spirodea** Schleiden Greater Duckweed

Free-floating aquatic plants with fronds flat or nearly so, about 6 (3-8) mm. long, green above and purplish beneath, each frond 5-15-nerved and with several rootlets from the lower surface. Plants commonly reproducing by budding, the young plants often remaining attached for some time and forming colonies.

1. **Spirodea polyrhiza** (L.) Schleiden

Ponds and ditches at lower to middle elevations, and seen only from northwestern Wyoming. Cosmopolitan.

20. **COMMELINACEAE** Spiderwort Family

Somewhat succulent, branching herbs from coarse, fibrous roots, in ours, with alternate, sheathing leaves. Flowers subtended by leafy bracts, hypogynous, perfect, 3-merous, the calyx green and the corolla delicate, fugacious, colored (purple in ours) or white. Stamens 6 in ours, with villous filaments. Pistil 1, of 3 united carpels, each 1-seeded. Fruit a loculicidal capsule.

1. **Tradescantia** L. Spiderwort

Our only genus, with characters as given for the family.

1. **Tradescantia occidentalis** (Britt.) Smyth

Common in dry, sandy soil, at lower to middle elevations on the plains and foothills of eastern and central Wyoming. Minnesota to Montana, and southward to Texas and Arizona. *T. laramiensis* Goodding.
21. JUNCAEAE  Rush Family

Grasslike, mostly perennial herbs, with narrow, sheathing leaves and small, regular, hypogynous, and persistent flowers. Inflorescence usually compound or decrumpound, paniculate, cymose, or umbeloid, the flowers inserted singly or loosely clustered, or aggregated into spikes or heads. Flowers chaffy, perfect, with or without bractlets. Perianth 6-parted, glumelike. Stamens 6 or 3, with introrse, 2-celled anthers. Stigmas 3, filiform. Ovary 1-celled or 3-celled, with 3 parietal placentae, forming a loculicidal capsule. Seeds 3 to many, often appendaged.

KEY TO THE GENERA

1. Plants glabrous; capsule 1- or 3-celled, with very numerous minute seeds; leaf-sheaths open.................................................................1. JUNCUS

1. Plants with at least a few long, soft hairs; capsule 1-celled with 3 large seeds; leaf-sheaths closed........................................................................2. LUZULA

1. Juncus L.  Rush

Chiefly perennial, grasslike herbs of wet habitats, with glabrous, pithy, or hollow, usually simple stems. Leaves glabrous, the sheaths open, the blades terete or flattened, or sometimes wanting. Inflorescence cymose, paniculate, or glomerate, sometimes unilateral. Flowers small, greenish or brownish to nearly black, glumaceous, borne either singly and with 2 bractlets, in heads and without bractlets, but each flower in the axil of a bract. Capsule 3-celled by intrusion of the placentae, or 1-celled and with parietal placentae. Seeds numerous, usually distinctly reticulated or ribbed, often tailed.

KEY TO THE SPECIES

1. Inflorescence appearing lateral, the involucral bract terete, stiffly erect, resembling a continuation of the stem; leaves all basal or nearly so, never septate

2. Seeds tailed; flowers few (1-5); densely caespitose, alpine plants without prolonged rootstocks

3. Uppermost leaf-sheath bristle-tipped, the blade reduced to a mere rudiment; capsule oblong, retuse..................................................1. J. drummondii

3. Uppermost leaf-sheath bearing a well-developed blade

1. Treatment prepared by Dr. F. J. Hermann, U. S. Forest Service.
4. Capsule oblong, acute; perianth 5-7 mm. long................2. *J. parryi*

4. Capsule ovoid, retuse; perianth 4-5 mm. long.............3. *J. hallii*

2. Seeds not tailed; flowers several to numerous (6-20); plants with prolonged rootstocks, not alpine

5. Anthers shorter than the filaments; perianth greenish, 3-4 mm. long; stems longitudinally striate when dry........................................4. *J. filiformis*

5. Anthers two to four times the length of the filaments; perianth dark reddish-brown, 4-6 mm. long; stems not striate....5. *J. balticus*

1. Inflorescence obviously terminal, or if not then the leaves septate and the involucral bracts flat or channelled along the upper side, not strictly erect or resembling a continuation of the stem

6. Leaf blades transversely flattened (inserted with the flat surface facing the stem), involute or hollow, not septic

7. Flowers borne singly on the branches of the inflorescence (not in heads), each with a pair of bracteoles at the base in addition to the bract at the base of the pedicel

8. Inflorescence more than half the height of the plant; flowers scattered along the loosely forking branches; low annuals..........6. *J. bufonius*

8. Inflorescence less than half the height of the plant; perennials

9. Capsule completely 3-celled, retuse

10. Seeds long-tailed; capsule conspicuously exceeding the perianth, greenish; leaves terete, the upper surface shallowly grooved........................................7. *J. vaseyi*

10. Seeds apiculate, not tailed; capsule little if at all exceeding the perianth, reddish-brown; leaves flat, often involute......8. *J. confusus*

9. Capsule 1-celled with sepal extending half way to the center, acutish to obtuse, not retuse

11. Auricles at the summit of the sheaths cartilaginous or coriaceous, yellow to amber; sheaths firm; bracteoles blunt.........................9. *J. dudleyi*

11. Auricles submembranaceous, pale brown or drab; sheaths membranaceous; bracteoles acuminate to aristate........10. *J. interior*

7. Flowers in heads, not bracteolate, having only the bractlet at the base of the pedicel

12. Leaves flat

13. Seeds tailed; ligule absent; auricles when present narrowly linear........................................11. *J. regelii*
13. Seeds not tailed; sheath-margins usually united above to form a short, broad ligule; auricles when present broadly ovate..................................................12. *J. longistyliis*

12. Leaves terete and hollow or deeply channeled or involute; seeds tailed

14. Flowers 3-4 mm. long; stem leafy only at the base; leaves about 1 mm. in diameter; plants caespitose

15. Capsule retuse, heads 1-2-flowered; perianth dark brown; involucral bract foliaceous, erect.................................13. *J. biglumis*

15. Capsule mucronate; heads 2-5-flowered; perianth pinkish-white to light chestnut-colored; involucral bract more or less membranaceous, divergent......................14. *J. albescens*

14. Flowers 5-10 mm. long; stem more or less leafy; leaves about 2 mm. in diameter; plants stoloniferous..............................................15. *J. castaneus*

6. Leaf blades septate

16. Leaf blades terete, the septae complete

17. Stamens 3; seeds long-tailed; plants caespitose, found near hot springs..................................................16. *J. tweedyi*

17. Stamens 6; seeds not tailed; plants stoloniferous or rhizomatous, not found only near hot springs

18. Capsule subulate; flowers echinate-spreadin

19. Plant low, 1-4 dm. high; leaf blades erect or ascending; flowers 3-4 mm. long; petals equaling or exceeding the sepals........................................17. *J. nodosus*

19. Plant taller, 4-10 dm. high; leaf blades divaricate; flowers 4-5 mm. long; petals shorter than the sepals...........18. *J. torreyi*

18. Capsule oblong or ovoid to obovlate; flowers erect-ascending

20. Capsule shorter than the acuminate sepals and petals .............................................................19. *J. mertensianus*

20. Capsule longer than the obtuse or acutish petals and sepals..................................................20. *J. alpinus*

16. Leaf blades laterally flattened so that one edge is toward the stem, the septate incomplete

21. Stamens 3; bract ensiform (sword-shaped), usually more than half the length of the inflorescence.....................21. *J. ensifolius*

21. Stamens 6; bract narrower, less than half the length of the inflorescence

22. Seeds tailed; styles long-exserted........................................22. *J. tracyi*

22. Seeds not tailed; styles little if at all exserted..................23. *J. saximontanus*
1. Juncus drummondii E. Mey.

Mountain meadows, alpine slopes, and open woods, at 7,000-11,000 ft., and generally distributed in the higher mountains of Wyoming. Alaska to Alberta, and southward to northern Arizona, New Mexico, and California.

2. Juncus parryi Engelm.

Alpine meadows and swamps, lake margins, open woods, and dry, rocky slopes, at 8,000-11,000 ft., and generally distributed in the higher mountains of Wyoming. British Columbia to Montana, Colorado, and southern California.


Mountain meadows and open coniferous forest, at 8,000-9,000 ft., and seen from Albany and Sheridan counties, and Yellowstone National Park. Montana to Colorado.

4. Juncus filiformis L.

Apparently rare in Wyoming, and seen only from the stony margin of Jenny Lake, Grand Teton National Park, at 6,700 ft. Alaska to Greenland and Labrador, and southward to Oregon, Utah, and Pennsylvania; Eurasia.

5. Juncus balticus Willd. Baltic Rush

The species is represented in Wyoming only by var. montanus Engelm. having rather short, slender, wiry stems and a compact inflorescence.

Common in wet and brackish meadows, alkaline flats, and on riverbanks, lake shores, and sand dunes, up to 8,000 ft., throughout Wyoming. Alaska to Kansas, New Mexico, and southern California, the species widespread in North America and the Old World.

6. Juncus bufonius L.

The species is represented in Wyoming by two varieties: var. bufonius, which is less common, having petals linear-lanceolate, subulate-tipped, the seeds ovoid to ellipsoid; and var. halophilus Fern. & Buch., which is more common, having petals obtuse and seeds truncate.

Boggy and seepage areas, often in alkaline soils, at about 4,000-6,000 ft., and generally distributed in Wyoming. The typical var. bufonius is nearly cosmopolitan in distribution; var. halophilus ranges from southern Labrador to Massachusetts, James Bay, Wyoming, and Colorado.
7. **Juncus vaseyi** Engelm.

Apparently rare in Wyoming, and seen only from damp rock crevices on the shore of Half Moon Lake, at 7,500 ft., in the Wind River Range, Sublette County. Quebec to Alberta, and southward to New York, Illinois, Colorado, and Utah.

8. **Juncus confusus** Coville

Meadows, open woods, hillsides, dried river bottoms, and muddy lake shores, at 4,000-9,000 ft., throughout most of Wyoming. British Columbia and Saskatchewan southward to Missouri and California.

9. **Juncus dudleyi** Wiegand

Marshy creekbanks, spring bogs, and other wet habitats, up to 7,000 ft., and infrequent but generally distributed in Wyoming. Newfoundland to British Columbia, and southward to Tennessee, Arizona, and Mexico.

10. **Juncus interior** Wiegand

The species is represented in Wyoming by two varieties: var. *interior*, having the perianth equaling the capsule, 3-4 mm. long; and var. *arizonicus* (Wiegand) Hermann, having the perianth exceeding the capsule, 4-5 mm. long. Of these, var. *interior* is more common.

Plains, river bottoms, and streambanks, at 4,000-7,000 ft., in the eastern half of Wyoming. The typical var. *interior* ranges from Illinois and Missouri to Washington and Arizona; var. *arizonicus* ranges from Wyoming and Colorado to Texas and Arizona.

11. **Juncus regelii** Buch.


Marshy meadows, spring bogs, ditchbanks, creek bottoms, and moist hillsides, at 6,000-8,000 ft., and generally distributed in Wyoming. Minnesota to British Columbia, and southward to New Mexico, Arizona, and California.
13. *Juncus biglumis* L.

Arctic-alpine regions on tundra, ours from about 10,500 ft. near Beartooth Pass, northern Park County, but probably present in the high Wind River Range. Greenland to Alaska, and southward to British Columbia, Montana, northern Wyoming, and Colorado; Eurasia.


Boggy alpine areas, and seen only from the Medicine Bow Range in southeastern Wyoming, at 10,800 ft. Greenland to Alaska, and southward to Colorado and Utah.

15. *Juncus castaneus* J. E. Smith

Alpine slopes and meadows, and seen only from the Medicine Bow Range in southeastern Wyoming and from the Beartooth Plateau in northern Park County, at about 11,000 ft. Greenland to Alaska, and southward to Labrador, Manitoba, and New Mexico; Eurasia.


Evidently confined to the immediate vicinity of hot mineral springs and streams, and in Wyoming known only from Yellowstone National Park and Teton County, where it is often associated with *Panicum thermale*. Montana, Idaho, northwestern Wyoming, and Utah.

17. *Juncus nodosus* L.

Common in wet habitats throughout Wyoming, at 6,500-8,000 ft. Newfoundland to Alaska, and southward to Virginia, New Mexico, and Nevada.

18. *Juncus torreyi* Coville

Generally distributed in Wyoming, but apparently less common in the western half of the state, at 3,500-6,500 ft. New York to Saskatchewan and Washington, and southward to Alabama, Texas, Arizona, and California.


This is a variable complex, and in Wyoming it includes two subspecies, one of the subspecies having two varieties. For a detailed treatment see Leaffl. West. Bot. 10:81-87, 1964. The following key will serve to distinguish the Wyoming taxa.
Head usually solitary (sometimes 2), with 12 or more flowers. subsp. *mertensianus* var. *mertensianus*

Heads usually several to many, with fewer flowers
Perianth segments 3-4.5 mm. long, usually exceeding the capsule. subsp. *gracilis* var. *gracilis*

Perianth segments 2.5-3 (3.5) mm. long, usually shorter than the capsule. subsp. *gracilis* var. *badius*

In Wyoming, subsp. *mertensianus*, var. *mertensianus*, and subsp. *gracilis* (Engelm.) Hermann, var. *badius* (Suksd.) Hermann (*J. badius* Suksd.), appear to be about equally common and widely distributed at middle and higher elevations, except for the extreme eastern part of the state. But subsp. *gracilis* (Engelm.) Hermann var. *gracilis* has been seen only from western Uinta County in southwestern Wyoming. The subsp. *mertensianus* ranges from Alaska southward to central New Mexico and southern California; subsp. *gracilis* var. *gracilis* ranges from Washington southward to western Wyoming and California; and subsp. *gracilis* var. *badius* ranges from eastern Washington and Oregon to central Montana, and southward to northwestern New Mexico.

20. *Juncus alpinus* Vill.

Spring bogs and muddy places, at middle elevations, and infrequent, having been seen from Albany, Carbon, and Sublette counties. Newfoundland to British Columbia, and southward to Minnesota, Colorado, and Washington; Eurasia.


Common in wet meadows at 7,000-9,000 ft., and rather generally distributed in Wyoming. Saskatchewan to Alaska, and southward to Arizona and California.


Wet, springy slopes, swamps, low meadows, streambanks, and moist aspen groves, at 5,000-10,000 ft., and generally distributed in Wyoming except for the eastern part. Alberta, Idaho, and Montana to northern Arizona and eastern Nevada.

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23. Juncus saximontanus A. Nels.

Two forms occur in Wyoming: the typical, f. saximontanus, having the inflorescence composed of mostly fewer than 10 heads that are many-flowered, the heads averaging 7-10 mm. in diameter; and f. brunnescens (Rydb.) Hermann, having the inflorescence composed of more than 10 heads that are fewer flowered, the heads averaging 5-6 mm. in diameter.

Wet meadows, streambanks, bogs, springy woods, and sandy lake shores, at 6,000-11,000 ft. The typical f. saximontanus is rather generally distributed in Wyoming, while f. brunnescens has been found only in Yellowstone National Park. Wyoming to British Columbia, and southward to New Mexico, Arizona, and California.

2. Luzula DC. Woodrush

Pilose or very sparsely pubescent perennials. Stems leafy, the leaf blades flat, channeled, or involute. Flowers in heads, spikes, or loose cymes, these forming dense or open, compound inflorescences. Flowers bracteolate, the bractlets often lacerate or denticulate. Stamens 6. Ovary 1-celled. Seeds 3, sometimes carunculate but not distinctly tailed.

KEY TO THE SPECIES

1. Flowers on slender pedicels, in a loose, somewhat drooping, many-flowered, cymose panicle; herbage glabrous except for a few long hairs near the throat of the sheath; perianth shorter than or barely equaling the capsule

2. Perianth 3-3.5 mm. long..........................1. L. glabrata

2. Perianth 1.5-2.5 mm. long

3. Bractlets entire or erose; leaves narrowly lanceolate, thin;
   stem leaves several, not greatly reduced..........................2. L. parvi flora

3. Bractlets conspicuously long-ciliate; leaves linear, long-acuminate, stiff, mostly clustered in a basal rosette; stem leaves few,
   notably reduced in size........................................3. L. wahlenbergii

1. Flowers crowded, subsessile, in few head-like or spike-like glomerules; herbage sparsely villous with long, loose hairs; perianth longer than the capsule

4. Inflorescence erect; glomerules capitulate, borne on elongate branches; leaves flat; perianth about 3 mm. long................4. L. intermedia

4. Inflorescence nodding; glomerules short-spicate, sessile or nearly so, forming in interrupted spike or a small, compact panicle of spikes; leaves channeled, often involute; sepals about 2 mm. long..........5. L. spicata
1. **Luzula glabra** (Hoppe) Desv.

Known only from the east slope of the Teton Range in northwestern Wyoming, at 8,500-8,700 ft. Alaska to Oregon, and eastward to Montana and Wyoming; Europe.

2. **Luzula parviflora** (Ehrh.) Desv.

Most of the Wyoming collections are referable to *L. piperi* (Coville) M. E. Jones (perianth and capsule dark brown rather than pale green as in typical *L. parviflora*, and leaves narrower, thicker, and dull), but this is intermediate between *L. wahlenbergii* Rupr. and *L. parviflora*, and other transitional forms between these two taxa occur. Reputed seed distinctions do not correlate with other characteristics, at least in the southern portion of the range, and until the group has received a complete revision it seems best to interpret *L. parviflora* in the broad sense to include the variations.

Subalpine slopes, wet meadows, streambanks, and lake shores, at 7,000-11,000 ft., and generally distributed in Wyoming except for the extreme eastern part. Labrador to Alaska, and southward to New York, New Mexico, and California; Eurasia.

3. **Luzula wahlenbergii** Rupr.

Seen only from higher elevations in the Teton Range, northwestern Wyoming. Circumpolar and low arctic, extending southward in North America to Washington and northwestern Wyoming.

4. **Luzula intermedia** (Thuill.) Spenner

Occasional in Wyoming, and seen only from southern Carbon County and Yellowstone National Park, in moist places at middle elevations. Newfoundland to British Columbia, and southward to Virginia, Illinois, New Mexico, and California; Eurasia.

5. **Luzula spicata** (L.) DC.

Open alpine, grassy or rocky slopes, mountain crests, lake shores, and open coniferous woods, at 8,000-11,000 ft., and generally distributed in the higher mountains of Wyoming. Greenland to Alaska, and southward to New York, Colorado, Arizona, and California; Eurasia.

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22. LILIACEAE  Lily Family

Perennials from bulbs, corms, rhizomes, or fleshy roots, or sometimes from a woody, vertical rhizome or caudex, either scapose or with leafy stems. Inflorescence terminal or axillary. Flowers hypogynous, regular, usually 3-merous, with 6 perianth segments that are similar and petaloid (the sepals green in *Trillium* and the perianth segments 4 in *Maianthemum*), usually perfect (dioecious in *Smilax*, and sometimes polygamous in *Zigadenus*). Stamens as many as the perianth segments. Pistil 1, of 3 united carpels (2 in *Maianthemum*), the styles distinct and 3, or united and 1, and sometimes the style short or none. Fruit a capsule or berry.

**KEY TO THE GENERA**

1. Leaves linear, rigid or wiry, 15-40 cm. long, in a large, basal tuft; plants with a vertical, woody rhizome or caudex; flowering stems usually 4-12 dm. high

2. Leaves rigid and spine-tipped, their margins bearing loose, thread-like fibers; flowering stems floriferous nearly to the base; perianth segments 3-5 cm. long; capsules woody, about 8 cm. long........................................1. YUCCA

2. Leaves flexous and wiry, not spine tipped, their margins not fibrous; flowering stems floriferous only near the summit; perianth segments 6-10 mm. long; capsules not woody, 5-7 mm. long........................................2. XEROPHYLLUM

1. Leaves various but not stiff or rigid, not in large basal tufts; plants not woody at the base; flowering stems mostly lower

3. Stems bearing tendrils; flowers dioecious........................................3. SMILAX

3. Stems without tendrils; flowers occasionally polygamous but usually perfect

4. Sepals unlike the petals in size, shape, or color

5. Leaves 3, in a terminal whorl; sepals dark green; petals not glandular at the base........................................4. TRILLIUM

5. Leaves alternate; sepals pale greenish-white, narrower than the petals; petals with a conspicuous, hairy gland at the base......5. CALOCHORTUS

4. Sepals and petals similar in size, shape, and color

6. Leaves reduced to minute scales; ultimate branches short-filiform ........................................6. ASPARAGUS

6. Leaves well developed; branches not filiform

7. Perianth of 4 segments; leaves 1 or 2..............7. MAIANTHEMUM

7. Perianth of 6 segments; leaves 2 or more

8. Stems branched, leafy

9. Flowers axillary, solitary or paired.............8. STREPTOPUS
9. Flowers terminal, solitary or in few-flowered umbels ........................................9. DISPORUM

8. Stem simple, scapose or leafy

10. Flowering stems 1-2 m. high, leafy; leaves 2-3 dm. long, 8-20 cm. broad; styles 3; fruit a capsule...........10. VERATRUM

10. Flowering stems lower, sometimes leafy; leaves not as ample; styles 1 or 3; fruit a capsule or berry

11. Plants with a cluster of fleshy roots; flowers originating from below the ground, the white perianth segments united below into a slender tube 3-8 cm. long.......................11. LEUCOCRINUM

11. Plants with rhizomes, bulbs, or corms; flowers entirely above ground, variously colored, the perianth segments distinct or united into a much shorter tube

12. Plants rhizomatous, the rhizomes short or long and creeping (see also LLOYDIA, which has a rhizome below the bulb)

13. Leaves chiefly basal, the flowering stems naked except near the base; rhizome short, not creeping........12. TOFIELDIA

13. Leaves all cauline; rhizomes creeping

14. Flowers axillary, 1-4 in a cluster ..................13. POLYGONATUM

14. Flowers in a terminal raceme or panicle ................14. SMILACINA

12. Plants with bulbs or corms (with bulbs and rhizomes in LLOYDIA)

15. Perianth segments 5-7 cm. long, up to 3 cm. broad, orange-red; upper leaves whorled..........................15. LILIUM

15. Perianth segments smaller, not orange-red; leaves sometimes whorled

16. Inflorescence an umbel subtended by 1 or more scarious bracts

17. Plants with an onion or garlic odor; perianth segments distinct; pedicels not jointed............16. ALLIUM
17. Plants not with an onion odor; perianth segments united to above the middle; pedicels jointed. 17. BRODIAEA

16. Inflorescence a raceme or panicle, or sometimes the flowers solitary; bracts present or absent

18. Flowers nodding (capsules erect)

19. Leaves 2, from the ground level; perianth segments recurved. 18. ERYTHRIONIUM

19. Leaves several, not all basal; perianth segments not recurved. 19. FRITILLARIA

18. Flowers not nodding

20. Perianth blue-purple, the segments 15-30 mm. long. 20. CAMASSIA

20. Perianth white or cream-colored, at most only tinged with blue or rose, the segments 10 mm. long or less

21. Flowers 1-2; style 1; dwarf alpine plants 5-20 cm. high. 21. LLOYDIA

21. Flowers several to many; styles 3; plants taller, sometimes alpine. 22. ZIGADENUS

1. Yucca L. Spanish Bayonet, Soapweed

Ours a large, scapose perennial with a woody caudex and a basal tuft of stiff, linear leaves mostly 2-4 dm. long, filamentose on the margins, and tipped with a sharp spine. Flowering stems (scapes) up to about 12 dm. high, floriferous nearly to the base, the flowers reflexed on short pedicels, creamy-white or pale greenish. Perianth segments 6, all similar, lanceolate to ovate, 3-5 cm. long. Stamens 6, the filaments thick, the anthers sagitate. Style short and thick. Fruit a woody, 3-valved, septicidal capsule about 8 cm. long. Seeds flat, suborbicular, black.

1. Yucca glauca Nutt.

Common on dry hills and plains, up to about 8,000 ft., east of the Continental Divide. South Dakota and Wyoming to Texas and New Mexico.
2. Xerophyllum Michx. Beargrass, Squawgrass

Large, scapose perennials with a woody, caudex-like, vertical rhizome and a large, basal tuft of wiry, flexuous, narrowly linear leaves mostly 5-8 dm. long, not spine-tipped. Flowering stems 5-15 dm. high, with numerous, somewhat reduced leaves that become shorter and more scale-like toward the summit, and bearing a terminal, compact raceme of numerous, small, white or cream-colored flowers. Perianth segments 6, all similar, 6-10 mm. long. Stamens 6, exerted, with subulate filaments and ovate anthers. Styles 3, filiform, recurved. Fruit a 3-valved, few-seeded capsule 5-7 mm. long.

1. Xerophyllum tenax (Pursh) Nutt.

Open coniferous forest and grassy slopes, at about 7,000 ft., on the northern flank of the Teton Range, bordering Yellowstone National Park, Teton County, where it is quite abundant. Northwestern Wyoming to Montana and British Columbia, and southward to central Idaho, western Oregon, and California.

3. Smilax L. Carrion-flower, Greenbriar

An herbaceous vine, in ours, with stems bearing paired tendrils (modified stipules) from the base of the petioles. Leaves alternate, the blades ovate to ovate-lanceolate, entire, with several longitudinal veins, mostly 4-9 cm. long and 4-8 cm. broad. Flowers malodorous, dioecious, small, greenish, in axillary umbels. Perianth segments 6, all similar, oblong or spatulate, 3-5 mm. long. Staminate flowers with 6 stamens having basifixed anthers and slender, flat filaments. Pistillate flowers with filiform staminodes, the ovary with 3 sessile stigmas. Fruit a bluish-black, subglobose, few-seeded berry 6-8 mm. in diameter.

1. Smilax herbacea L.

Wyoming plants may be referred to var. lasioneuron (Hook.) A. DC., characterized by having leaves puberulent on the veins and paler beneath, peduncles usually not more than twice the length of the subtending petioles, and fruits glaucous.

Streambanks and brushy areas, mostly at lower elevations, east of the Continental Divide, and mainly in eastern and northern Wyoming. The variety ranges from Ontario and Ohio to Georgia, Alabama, Wyoming, and Colorado. Two other varieties occur farther eastward.
4. **Trillium L.** Wake-robin

Perennial herbs from short rhizomes, the erect stem bearing a single, terminal whorl of 3 broad leaves and a single flower. Sepals 3, green, distinct, in ours mostly 2-4 cm. long. Petals 3, white, pink or purplish, distinct, about equaling the sepals. Stamens 6, with short filaments and basifixed anthers. Style short or none. Fruit a berry.

1. **Trillium ovatum** Pursh

Moist coniferous forest, at about 9,000 ft., and seen only from southern Carbon County in the Sierra Madre. Montana to British Columbia, and southward to Colorado and California.

5. **Calochortus** Pursh Mariposa Lily, Sego Lily

Glabrous, perennial herbs from bulbs, subscapose or with leaves reduced upward, the stems simple or sometimes branched, and the leaves grasslike. Flowers showy, solitary or subumbellate, erect, white or pale purplish to pale greenish in ours. Sepals 3, narrow and unlike the petals in size and shape, acute. Petals 3, broad and obtuse at the apex, cuneate or clawed toward the base, bearing a colored and bearded gland on the inner face below the middle. Stamens 6, with basifixed anthers and slender filaments. Ovary and fruit triangular in cross section, tapering into a trifid stigma. Fruit a many-seeded, septicidal capsule.

**KEY TO THE SPECIES**

1. Petals with a central, reddish-purple spot; capsules broadly elliptic to nearly orbicular, 3-winged; plants of northwestern Wyoming..........................1. **C. nitidus**

1. Petals with a transverse, purplish area near the base below the middle within; capsules oblong to linear, 3-angled but not 3-winged

2. Gland on face of petals suborbicular, surrounded by a conspicuous fringed area; anthers blunt; plants generally distributed in Wyoming........2. **C. nuttallii**

2. Gland on face of petals transversely oblong and arched, with a narrow purple band above it and a purple spot below it on the claw; anthers pointed or apiculate; plants from east of the Continental Divide in Wyoming .................................................................3. **C. gunnisonii**

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1. **Calochortus nitidus** Doug.

Dry meadows and open coniferous forest, at middle elevations, in northwestern Wyoming. Southwestern Montana to southeastern Washington, and southward to northwestern Wyoming and northeastern Nevada.

2. **Calochortus nuttallii** Torr.

Wyoming plants are all referable to the typical var. *nuttallii*.

Dry plains and hills, at lower to middle elevations, and generally distributed in Wyoming. Great Plains of the Dakotas and eastern Montana to southeastern Idaho, and southward to New Mexico and northwestern Arizona. Other varieties occur to the westward.

3. **Calochortus gunnisonii** S. Wats.

Plains, hills, and meadows, sometimes in open woods, at lower to middle elevations east of Continental Divide, from northeastern Yellowstone National Park to southeastern Wyoming. Western South Dakota to central Montana, and southward to central New Mexico and northeastern Arizona.

6. **Asparagus** L. *Asparagus*

Ours a perennial herb from rhizomes, the stems erect, freely branching, the ultimate branchlets short-filiform. Leaves scale-like, inconspicuous. Flowers small, 3-5 mm. long, the perianth greenish-white, campanulate. Stamens 6, inserted on the base of the perianth. Style 1, slender, and stigmas 3, short. Fruit a red, few-seeded berry about 8 mm. in diameter.

1. **Asparagus officinalis** L.

Commonly cultivated and sometimes escaped, at lower to middle elevations. Native of Europe.

7. **Maianthemum** Weber *False Lily-of-the-valley*

Low perennial herbs from rhizomes, the stems erect, each bearing 1-3 (usually 2) cordate-ovate to cordate-lanceolate, sessile leaves. Flowers in a short, terminal raceme, small, white, 4-merous, the perianth segments all alike and about 2 mm. long. Stamens 4. Style 1, short and thick, and stigmas 2. Fruit a pinkish, globose, 1-2-seeded berry.
1. *Maianthemum canadense* Desf.

Wyoming plants may be referred to var. *interius* Fern., which differs from the more eastern var. *canadense* in having leaves pubescent beneath.

Brushy slopes of the Bear Lodge Range, Crook County, at about 4,800 ft. Labrador and Newfoundland to Mackenzie, and southward to New Jersey, North Carolina, Indiana, South Dakota, and northeastern Wyoming; the var. *interius* mainly west of the Great Lakes.

8. *Streptopus* Michx. Twisted-stalk

Perennial herbs from rhizomes, the leafy stems branched, up to 1 m. high. Leaves alternate, in ours sessile and clasping the stem at the base, ovate-oblong to ovate-lanceolate, mostly 7-10 cm. long and 2-6 cm. broad, glaucous beneath. Flowers greenish-white, nodding, solitary or paired, on slender pedicels from a slender peduncle, the perianth campanulate, of 6 similar, distinct, narrow, recurved segments about 1 cm. long. Stamens 6, adnate to the base of the perianth, the anthers oblong to linear, basifixed, long-apiculate. Style and stigma 1, in ours, the stigma obliquely truncate. Fruit an orange or red, subglobose, several-seeded berry 10-15 mm. in diameter.

1. *Streptopus amplexifolius* (L.) DC.

Fassett (Rhodora 37:95-102, 1935) recognized several varieties, based chiefly on insignificant and intergrading differences in the minute serration of the leaves and on the vestiture of their lower surfaces. Most Wyoming collections, according to that treatment, are var. *americanus* Schult., having margins of leaves entire or with very minute teeth, and the lower surfaces of the leaves not papillate. It seems more realistic to regard the species as a single, somewhat variable unit without infraspecific subdivisions.

Moist, often brushy or wooded places in the mountains, at lower to middle elevations, probably throughout Wyoming. Greenland to Alaska, and southward to New York, North Carolina, Michigan, South Dakota, New Mexico, Arizona, and California; Eurasia.

9. *Disporum* Salisb. ex D. Don Fairy Bells

Perennial herbs from rhizomes, the leafy stems usually branched, finely pubescent, up to 6 dm. high. Leaves alternate, sessile or subsessile, scarcely clasping, ovate to ovate-lanceolate, in ours mostly 4-10 cm. long and 2-6 cm. broad, finely pubescent, the lower leaves reduced to sheathing
scales. Flowers white or cream-colored, drooping, terminal, solitary or in few-flowered umbels, the perianth campanulate, of 6 similar, distinct, narrow, nearly straight segments 10-15 mm. long. Stamens 6, adnate to the base of the perianth, the anthers oblong, basifixed, not apiculate. Style 1, slender, usually divided at the summit to form 3 short stigmas. Fruit a yellowish, orange, or red, 3-lobed, few-seeded berry about 1 cm. broad.


Moist to rather dry, usually shaded, often rocky slopes, canyons, and valleys, in the mountains, at lower to middle elevations, throughout most of Wyoming. Manitoba to British Columbia, and southward to New Mexico, Arizona, and Oregon.

10. *Veratrum L.* False Hellebore

Tall perennial herbs from thick rhizomes, the leafy stems unbranched, up to 2 m. high. Leaves alternate, clasping, broadly oval, in ours up to 35 cm. long and 12 cm. broad, the upper leaves reduced and narrower. Flowers cream-colored or greenish, in ample panicles, more or less polygamous (the lower often staminate and the upper perfect), the perianth segments 6, all alike, spreading, eglandular or nearly so, obovate to oblancoate, up to 15 mm. long. Stamens 6, free or slightly adnate to the very base of the perianth segments, the anthers short, innate, and the filaments slender. Ovary 3-horned at the summit, the styles and stigmas 3. Fruit a several-seeded capsule.

The plants are poisonous because of the presence of alkaloids.

1. *Veratrum californicum* Durand

Moist meadows and aspen groves, at middle elevations, in Lincoln and Teton counties. Montana to Washington, and southward to New Mexico, California, and northern Lower California. *Veratrum tenuïpetalum* Heller occurs in Jackson County, northern Colorado, but is not known to extend into Wyoming.

11. *Leucocrium* Nutt. Sand Lily

Low, acaulescent, perennial herbs with a short, vertical rhizome and a cluster of fleshy roots. Leaves linear, 1-2 dm. long, with scarious sheaths, all basal. Flowers white, showy, pedunculate, originating below the ground level. Perianth segments 6, similar, narrowly lanceolate, up to 25 mm. long, united below into a slender tube 3-8 cm. long. Stamens 6, the fila-
ments filiform, and adnate to the perianth tube, the linear anthers basified.
Style 1, slender, and stigmas 3. Fruit a membranaceous, subglobose, loculicidal capsule.

1. **Leucocrinum montanum** Nutt. ex A. Gray

A common spring-blooming plant of sandy plains and foothills, at lower to middle elevations, in the eastern half of Wyoming, but perhaps to be found elsewhere. South Dakota to Montana, and southward to New Mexico, Utah, and California.

12. **Tofieldia** Huds. False Asphodel

Perennial herbs with short rhizomes and coarse, fibrous roots. Stems solitary, slender, in ours 1-4 dm. high, leafy toward the base, glandular-puberulent especially in the upper part. Leaves linear, equitant, mostly 1-2 dm. long. Flowers terminal, in subcapitate, bracteate clusters, small, cream-colored. Perianth segments 6, similar, distinct, oblong or narrowly obovate, ascending or spreading, about 3-4 mm. long, eglandular. Stamens 6, free from the perianth, with filiform filaments and ovate, basified anthers. Ovary 3-horned at the summit, the styles 3, short and recurved. Fruit a many-seeded, septicidal capsule.

1. **Tofieldia glutinosa** (Michx.) Pers.

The species, as interpreted by C. L. Hitchcock (Am. Midl. Nat. 31:487-498, 1944), is a complex of five subspecies, and Wyoming plants are referred to subsp. *montana* C. L. Hitchc., characterized chiefly by the relatively long pubescence of the upper part of the stem.

Moist, boggy, or rocky banks and brushy or wooded places, at middle elevations, in northwestern Wyoming. The species ranges from Newfoundland and New York to southern Alaska, and southward to Wyoming, Idaho, and California; subsp. *montana* ranges from the southern Canadian Rocky Mountains southward to northwestern Wyoming and Idaho.

13. **Polygonatum** Mill. Solomon’s Seal

Perennial herbs from horizontal rhizomes, the leafy stems unbranched, up to about 1 m. high. Leaves alternate, 2-ranked, sessile, narrowly elliptic to broadly oval. Flowers greenish or yellowish, in small, drooping, axillary clusters, the perianth tubular, up to about 2 cm. long, regular, with 6 short teeth at the apex. Stamens 6, included, adnate to the perianth.
tube, the filaments filiform or flattened, the anthers short, sagittate at the base. Style 1, filiform, and stigma obscurely 3-lobed. Fruit a dark blue or black, globose, several-seeded berry.

1. **Polygonatum biflorum** (Walt.) Ell.

Not known to occur in Wyoming, but var. *necopium* R. Ownbey, which occurs in the Black Hills of western South Dakota, is to be expected in wooded areas in the Black Hills of northeastern Wyoming. Other varieties occur in the eastern United States.

14. **Smilacina** Desf. *False Solomon’s Seal*

Perennial herbs from horizontal rhizomes, the leafy stems unbranched, up to about 8 dm. high. Leaves alternate, 2-ranked, sessile or subsessile, oblong-lanceolate to elliptic or ovate. Flowers small, white, in a terminal raceme or panicle, the perianth of 6 similar, distinct, spreading segments up to 7 mm. long. Stamens 6, adnate to the base of the perianth segments, with linear, flattened filaments and ovate anthers. Style 1, short, and stigma obscurely 3-lobed. Fruit a few-seeded, globose, greenish or reddish berry often streaked or speckled with purple or black.

**KEY TO THE SPECIES**

1. Flowers in a panicle; most leaves more than 4 cm. broad..................1. *S. racemosa*

1. Flowers in a raceme; leaves mostly less than 3 cm. broad..................2. *S. stellata*

1. **Smilacina racemosa** (L.) Desf.

A variable species within which several varieties have been proposed (Fernald in Rhodora 40:404-407, 1938; Galway in Am. Midl. Nat. 33:644-666, 1945), all of which appear to be insignificant. Of these, var. *amplexicaulis* (Nutt. ex Baker) S. Wats, appears to be a common one in our area, characterized by having leaves that are short-acuminate, broadest toward the base, and more or less clasping.

Wooded or brushy areas, at lower to middle elevations, and generally distributed in Wyoming. The species ranges from Nova Scotia to British Columbia, and southward to Georgia, Texas, Mexico, and California.

2. **Smilacina stellata** (L.) Desf.

Moist, shaded, or brushy areas and meadows, at lower to middle elevations, throughout most of Wyoming. Newfoundland to Alaska, and
southward to New Jersey, Indiana, Missouri, northern Mexico, and California.

15. Lilium L. Lily

Tall perennial herbs from scaly bulbs, the leafy stems in ours unbranched and 3-8 dm. high. Leaves in ours alternate below and the uppermost whorled, narrowly lanceolate to linear, mostly 3-8 cm. long. Flowers solitary or sometimes 2-3 in an umbel, erect, the perianth showy, of 6 similar segments, reddish-orange with lower portion yellowish and spotted with purple or black, ovate-lanceolate, 5-7 cm. long, abruptly narrowed into a slender claw 1-2 cm. long. Stamens 6, free from the perianth, with long, filiform filaments and oblong to linear, versatile anthers. Style 1, slender, and stigma 3-lobed. Fruit a loculicidal, many-seeded capsule.

1. Lilium philadelphicum L.

Wyoming plants are referable to var. andinum (Nutt.) Ker, characterized by having the lower leaves alternate and relatively narrow, as compared with most leaves whorled and broader as in the more eastern var. philadelphicum.

Moist meadows and brushy or wooded areas, at lower to middle elevations, in the eastern half of Wyoming, and most abundant in the Black Hills. the var. philadelphicum occurs from New Hampshire to North Carolina and Kentucky; var. andinum from Ohio and Minnesota to British Columbia, and southward to New Mexico.

16. Allium L. Onion

Scapose or subscapose, perennial herbs with an odor and taste of garlic or onion, from tunicated or sometimes rhizomatous bulbs, the leaves linear, flat or terete, sometimes hollow. Flowers white, pink, or purplish, in a terminal umbel subtended by 1-3 scarious, more or less connate bracts. Perianth segments 6, persistent, similar, distinct or nearly so. Stamens 6, often adnate to the base of the perianth segments, included or sometimes exserted, the filaments often flattened, the anthers short. Style single, slender, and stigma entire or 3-lobed. Fruit an ovoid or globose, loculicidal capsule with 1-2 seeds in each locule.

KEY TO THE SPECIES

1. Umbel nodding; stamens exserted......................................................................1. A. cernuum
1. Umbel erect; stamens included

2. Leaves hollow, terete; inflorescence subcapitate, the pedicels shorter than the perianth at maturity...........2. Allium schoenoprasum

2. Leaves flat, involute, or folded, but not hollow, sometimes terete; inflorescence definitely umbellate, the pedicels longer than the perianth at maturity

3. Flowers white; inflorescence not bulbiferous

4. Bulb coat fibrous-reticulate; scapes 10-30 cm. high, often surpassing the leaves; plants of plains and foothills.........................3. Allium textile

4. Bulb coat membranaceous, not fibrous; scapes exceeded by the leaves; plants of higher elevations..........................4. Allium brandegei

3. Flowers pink, rose, or purplish; inflorescence sometimes bulbiferous

5. Bulb rhizomatous at the base, bearing roots from the side.................................5. Allium brevistylum

5. Bulb not rhizomatous, the roots all from its base

6. Outer coat of bulb fibrous-reticulate; leaves flat, grasslike, 2-4 mm. wide, not withering after anthesis; inflorescence often bulbiferous..........................................................6. Allium geyeri

6. Outer coat of bulb membranaceous, not fibrous; leaves involute, very slender, withering after anthesis; inflorescence not bulbiferous..................................................7. Allium acuminatum

1. Allium cernuum Roth

Dry to moderately moist slopes and hills, at lower to middle elevations, and fairly common throughout most of Wyoming. New York to British Columbia, and southward to Georgia, Arizona, and northern Mexico.

2. Allium schoenoprasum L. Chives

Moist meadows, lake shores, and streambanks, at lower to middle elevations, probably throughout most of Wyoming. Circumboreal; Newfoundland to Alaska, and southward to New York, Minnesota, northern Colorado, and northern Oregon.

3. Allium textile Nels. & Macbr.

This species is closely allied to Allium geyeri, from which it is distinguished by being found in more arid and often lower habitats on the plains and foothills; it usually has two leaves to each scape, whereas Allium geyeri usually has three or more; in dried flowers the inner perianth segments of Allium textile spread widely at the tips, whereas those of Allium geyeri remain nearly erect; and the flower color of Allium textile is almost invariably white, while
that of *A. geyeri* is nearly always pink, although white-flowered forms have been observed.

Dry plains and foothills, at lower to middle elevations, and common throughout Wyoming. Minnesota to Alberta, and southward to northern New Mexico, northeastern Utah, and northeastern Nevada.

4. **Allium brandegei** S. Wats.

Moist, often rocky slopes, at middle to higher elevations, and occasional in northern Wyoming from the western slope of the Big Horn Range to Yellowstone National Park and northern Lincoln County. Montana to eastern Oregon, and southward to northern Colorado, northern Utah, and southern Idaho.

5. **Allium brevistylum** S. Wats.

Moist meadows and banks in the mountains, at middle elevations, and common throughout most of Wyoming. Central Montana to northeastern Idaho, and southward to Colorado and southeastern Utah.

6. **Allium geyeri** S. Wats.

Two varieties occur in Wyoming: var. *geyeri*, a sexual diploid having normal flowers, and var. *tenerum* M. E. Jones, a series of asexual polyploids in which most of the flowering pedicels are replaced by bulbs and the few flowers produced are usually sterile.

The var. *geyeri* occurs in meadows and on streambanks on the plains and foothills of southern Wyoming, ranging from the Black Hills of South Dakota to southern Alberta and eastern Washington, southward to western Texas and eastern Arizona; var. *tenerum* occurs in similar habitats at mostly middle elevations across Wyoming west of the Laramie and Big Horn ranges, and ranges from Alberta to British Columbia, and southward to New Mexico, eastern Arizona, and northeastern Nevada.

7. **Allium acuminatum** Hook.

Dry sagebrush slopes and gravelly bottomland, at mostly middle elevations, in western Wyoming. Idaho to British Columbia, and southward to western Colorado, Arizona, and California.

17. **Brodiaea** Smith

Scapose, perennial herbs, in ours up to 7 dm. high, from a fibrous-coated corm, the leaves few, linear, grasslike. Flowers blue in ours, in a
capitate-umbellate cluster subtended by scarious bracts, the pedicels jointed beneath the flowers. Perianth in ours broadly tubular, mostly 15-20 mm. long, with 6 similar teeth at the apex. Stamens 6, included, in ours in two sets and inserted on the perianth at two levels, the anthers versatile. Ovary stipitate, the style 1, short, and the stigma subcapitate. Fruit a capsule with several seeds.

1. **Brodiaea douglasii**  S. Wats.

   A variable species, but Wyoming plants are all var. *douglasii*.

   Moist, usually timbered areas, at middle elevations, and seen only from Teton County, but probably also occurring in Yellowstone National Park. Western Montana to British Columbia, and southward to northwestern Wyoming, northern Utah, and eastern Oregon.

18. **Erythronium**  L.  Glacier Lily, Dog-tooth Violet

   Low perennial herbs from a deep-seated, elongate, membranaceous-coated corm, with a pair of elliptical or oblanceolate leaves arising from the stem at ground level. Flowers in ours yellow, showy, nodding, single or in a few-flowered raceme, the perianth of 6 similar, recurved, lanceolate segments 2-4 cm. long, each with a nectar groove at the base. Stamens 6, free from the perianth segments, with filiform filaments and oblong to linear, basifixed, reddish or yellow anthers. Style 1, often 3-cleft into stigmatic lobes. Fruit an obovoid or oblanceolate, 3-angled, many-seeded, loculicidal capsule.

1. **Erythronium grandiflorum**  Pursh


   The subsp. *grandiflorum* occurs in moist meadows and slopes, at middle and higher elevations, in northwestern Wyoming, in and near Yellowstone National Park, and ranges from Montana to the eastern slope of the Cascade Range in Washington, and southward to northern Wyoming, Utah, and Oregon; subsp. *chrysandrum* is common in the mountains throughout most of Wyoming, at middle and higher elevations, ranging from Wyoming to Colorado and Utah, and at isolated localities in Idaho.
19. Fritillaria L. Fritillary

Low to moderately tall, perennial herbs from fleshy-scaled bulbs, these with or without numerous bulblets, the stems erect, simple, in ours up to 6 dm. high, with alternate or whorled, linear to narrowly lanceolate leaves. Flowers nodding, solitary or in few-flowered racemes, the perianth of 6 similar, distinct segments, in ours mostly 15-20 mm. long, yellow or brownish to greenish-purple, sometimes mottled. Stamens 6, included, inserted on the base of the perianth segments, the filaments slender and the anthers attached near the base or below the middle. Style entire or 3-cleft. Fruit an erect, 6-angled, loculicidal, many-seeded capsule.

KEY TO THE SPECIES

1. Flowers yellow, not mottled; style subentire; stems 7-30 cm. high; leaves mostly 4-12 mm. wide .................................................. 1. F. pudica

1. Flowers brownish or purplish-green, mottled; style trifid above; stems mostly 12-50 cm. high; leaves mostly 1-4 mm. wide .................................................. 2. F. atropurpurea

1. Fritillaria pudica (Pursh) Spreng.

Moist, open slopes, often in sagebrush, usually at middle elevations, in the Big Horn and Sierra Madre ranges and westward in Wyoming. Montana to British Columbia, and southward to northwestern Colorado and California.

2. Fritillaria atropurpurea Nutt.

Hillsides and plains, often in brushy areas, at lower to middle elevations, probably throughout most of Wyoming. North Dakota to Oregon, and southward to New Mexico and California.

20. Camassia Lindl. Camas

Ours perennial, scapose herbs from tunicated bulbs, with a basal whorl of linear leaves 1-4 dm. long, the scape up to 6 dm. high and bearing a terminal raceme of about 3-12 violet-blue, slightly irregular flowers. Perianth segments 6, distinct, spreading (5 curving upward and 1 curving downward), withering-persistent, mostly 2-3 cm. long. Stamens 6, inserted on the base of the perianth segments, with filiform filaments shorter than the perianth, and oblong, versatile anthers. Style 1, slender, and stigma 3-lobed. Fruit an ovoid, loculicidal, several-seeded capsule.
1. **Camassia quamash** (Pursh) Greene

The species is a complex of several subspecies, of which Wyoming plants are all subsp. *quamash*.

Meadows and open timbered areas, at middle elevations, in northwestern Wyoming. The subsp. *quamash* ranges from southern Alberta to British Columbia, and southward to northwestern Wyoming, northern Idaho, and northern Oregon.

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21. **Lloydia Salisb.** Alp Lily

Dwarf, alpine, perennial herbs from a tunicated bulb arising from a horizontal rhizome, the stems 5-15 cm. high, with a few alternate, linear leaves. Flowers solitary or sometimes in a few-flowered raceme, erect, the perianth segments 6, similar, distinct, spreading, 5-12 mm. long, white or cream-colored on the inner face and with a purplish center stripe on the outer face. Stamens 6, free from the perianth segments, the filaments dilated below, and the oval anthers basifix. Style 1, entire, rather thick, and stigma 3-lobed. Fruit an ovoid or subglobose, erect, loculicidal, several-seeded capsule.

1. **Lloydia serotina** (L.) Rchb.

Grassy slopes, at higher elevations, usually above timberline, from the Big Horn Range westward to the Beartooth Plateau and Teton Range in Wyoming. Arctic and alpine, circumboreal; Alberta to Alaska, and southward to New Mexico, Nevada, and Oregon.

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22. **Zigadenus Michx.** Death Camas

Perennial herbs from tunicated bulbs, with simple, erect stems up to about 6 dm. high, leafy below, the leaves linear, glabrous. Flowers small, in a terminal, bracteate raceme or panicle, greenish or cream-colored, perfect or sometimes the lower ones staminate. Perianth segments 6, similar, distinct or slightly united below, 4-10 mm. long, each with a subbasal gland. Stamens 6, free from the perianth segments, with slender filaments and reniform anthers. Ovary 3-horned at the summit, the styles 3, short and slender. Fruit a 3-lobed, loculicidal, many-seeded capsule. (*Zygadenus* is a later spelling.)

The plants are poisonous to livestock because of the presence of alkaloids.
KEY TO THE SPECIES

1. Perianth segments mostly 7-10 mm. long, adnate to the base of the ovary; glands at the base of the perianth segments prominent, obcordate; leaf blades flat; stamens included, shorter than the perianth segments; plants of middle and higher elevations in the mountains.  1. Z. elegans

1. Perianth segments mostly 3-5 mm. long, free from the ovary; glands at the base of the perianth segments rather obscure, semicircular or obovate; leaf blades usually folded; stamens exserted, longer than the perianth segments; plants of foothills and plains

2. Inflorescence usually a raceme; perianth segments obtuse, rounded on the end; basal leaves mostly less than 10 mm. wide; rather slender plants of general distribution in Wyoming.  2. Z. venenosus

2. Inflorescence a panicle, the lower branches rebranched; perianth segments broadly acute; basal leaves up to 20 mm. wide; rather coarse plant of southwestern Wyoming.  3. Z. paniculatus

1. Zigadenus elegans Pursh

Moist meadows and banks of lakes and streams in the mountains, at middle to higher elevations, throughout most of Wyoming. Minnesota and Saskatchewan to Alaska, and southward to Missouri, New Mexico, Arizona, and Nevada.

2. Zigadenus venenosus S. Wats.

Wyoming plants are all var. gramineus (Rydb.) Walsh ex Peck, with perianth segments 4-5 mm. long and short-clawed, ranging from Alberta to Colorado and Utah.

Dry plains and foothills, at lower to middle elevations, throughout most of Wyoming. Saskatchewan to British Columbia, and southward to New Mexico, Utah, and California.


This species is similar to the preceding and apparently intergrades with it, but distinguished by the coarser plants, the larger bulbs, thicker stems, broader leaves, and inflorescence paniculate below.

Dry to moderately moist foothills and mesas in southwestern Wyoming, at middle elevations. Montana to Washington, and southward to New Mexico and California.
23. IRIDACEAE  Iris Family

Perennial herbs, in ours, from rhizomes or apparently from fibrous roots, with leaves mostly from near the base, linear, and equitant. Flowers in few-flowered clusters subtended by spathe-like bracts, perfect, regular, epigynous, with 6 petaloid perianth segments. Stamens 3. Ovary 3-celled. Fruit a loculicidal, several- to many-seeded capsule.

KEY TO THE GENERA

1. Flowers more than 5 cm. wide; style-branches resembling an inner set of petals; ovary elongate; leaves mostly 4-8 mm. wide........................................1. IRIS

1. Flowers much smaller; style-branches filiform, not petaloid; ovary subglobose; leaves narrower.....................................................2. SISYRINCHIUM

1. Iris L. Iris or Blue-flag

Erect perennials from thick, horizontal rhizomes, with sword-shaped leaves and large, showy, blue or purplish, rarely white flowers. The three outer perianth segments (sepals) spreading or reflexed, the three inner perianth segments (petals) somewhat smaller and erect or ascending. Stamens hidden under the three petaloid style-branches. Perianth and stamens produced from the summit of a solid, epigynous hypanthium extending above the ovary. Capsule oblong or oval.

1. Iris missouriensis Nutt.

Highly variable in habitat and in flower color, but characteristically with blue to purple flowers, and usually found in moist meadows, at middle elevations or on the plains, at about 3,500-8,500 ft., throughout most of Wyoming. North Dakota to British Columbia, and southward east of the Cascade and Sierra Nevada ranges to New Mexico, Arizona, and California.

2. Sisyrinchium L. Blue-eyed Grass

Erect or spreading perennials from very short rhizomes bearing clusters of fibrous roots. Stems flattened, in ours, and more or less winged. Leaves grass-like. Flowers mostly 7-15 mm. long, on slender pedicels, produced from between a pair of spathe-like bracts, the perianth of 6 similar segments, rotate or saucer-shaped. Hypanthium very short. Capsule subglobose.
KEY TO THE SPECIES

1. Spathes on long peduncles arising from the axil of a leaf-like bract, the inflorescence thus divaricately branching; bracts of spathes subequal in length; capsules dark brown; plants of eastern Wyoming..............................1. S. graminoides

1. Spathes sessile and solitary on the end of the stem; bracts of spathe subequal to very unequal in length; capsules pale greenish or straw-colored

2. Flowers and fruits all terminal on elongate stems

3. Bracts of the spathe very unequal, the outer bract usually about twice as long as the inner bract; mainly east of the Continental Divide..............................................2. S. montanum

3. Bracts of the spathe subequal to slightly unequal, the outer one always less than twice as long as the inner one; mainly west of the Continental Divide..............................................3. S. sarmientosum

2. Flowers and fruits both terminal on elongate stems as well as some from near the base of the plant on dwarf stems; bracts very unequal in length, the outer one about twice the length of the inner one............................4. S. heterocarpum

1. Sisyrischium graminoides Bickn.

Moist meadows and banks at lower elevations, about 4,000-5,000 ft., in eastern Wyoming, and seen only from Platte and Goshen counties. Newfoundland to Minnesota and eastern Wyoming, and southward to Florida and Texas.

2. Sisyrischium montanum Greene

Moist meadows and banks at lower to middle elevations, about 3,500-8,500 ft., mainly east of the Continental Divide in Wyoming. Quebec to Mackenzie, and southward mainly east of the Continental Divide to North Carolina, Nebraska, and New Mexico.

3. Sisyrischium sarmientosum Suksd.

Moist meadows and banks at middle elevations, about 6,000-9,500 ft., mainly west of the Continental Divide in Wyoming. Montana to British Columbia, and southward west of the Continental Divide to western Colorado, Utah, Nevada, and California.

4. Sisyrischium heterocarpum Bickn.

Moist meadows and banks at middle elevations, about 6,000-8,000 ft., and seen only from Albany and Converse counties. Wyoming southward to central Colorado.
24. ORCHIDACEAE  Orchid Family

Terrestrial herbs, in ours, with green leaves or sometimes saprophytic and lacking green color, the stems scapose or leafy. Flowers 3-merous, epigynous, perfect, the corolla irregular, white, greenish, or variously colored, the two lateral petals similar and the third or lower petal (lip) conspicuously different in size and shape. Stamens 1 or 2, the anthers sessile and united with the style to form the column, the pollen coherent in waxy masses (pollinia). Ovary 1-celled, with 3 parietal placentae. Fruit a 3-valved capsule. Seeds very numerous and minute.

KEY TO THE GENERA

1. Plants saprophytic, without green leaves...........................................9. CORALLORHIZA

1. Plants with 1 or more green leaves

2. Lip inflated and saccate, at least at the base

3. Stem arising from a fleshy corm; plants with a single, basal leaf; lip bearded...........................................2. CALYPSO

3. Stem arising from fibrous or fleshy roots or rhizomes, never from a corm; plants with 2 or more leaves; lip not bearded

4. Lip saccate throughout, without any terminal, blade-like projection; fertile anthers 2..............................1. CYPRIPEDIUM

4. Lip saccate at the base and with a terminal, flattened, blade-like projection; fertile anther 1

5. Stems scapose; leaves usually variegated, the mid-vein usually white..................................................7. GOODYERA

5. Stems leafy; leaves never variegated......................................8. EPIPACTIS

2. Lip neither inflated nor saccate

6. Perianth spurred

7. Lip purple-spotted..............................................................3. ORCHIS

7. Lip never spotted..............................................................4. HABENARIA

6. Perianth not spurred

8. Leaves more than 2, alternate and mostly basal; inflorescence a many-flowered, compact, twisted spike of white flowers..................................................5. SPIRANTHES

8. Leaves 2, near the middle of the stem, apparently opposite; inflorescence a few-flowered raceme of greenish flowers..................................6. LISTERA

—74—
1. Cypripedium L.  Lady’s Slipper

Herbs with coarse, fibrous roots and short or long rhizomes. Leaves 2 or more, broad, sheathing, alternate or subopposite. Flowers 1-4 in ours, usually showy, subtended by leaf-like bracts. Sepals spreading, the lateral ones united almost to the apex. Petals spreading, not united, the lip inflated and pouch-like, without any flattened, terminal portion. Fertile anthers 2, one on each side of the short, incurved column, and a petaloid sterile stamen covering the summit of the column. Pollen granular. Stigma obscurely 3-lobed. Capsule obovoid or ellipsoid.

KEY TO THE SPECIES

1. Leaves 2, subopposite; flowers small, 1-4 in a compact cluster, the tip 8-14 mm. long..............................................................................................1. C. fasciculatum

1. Leaves several, alternate; flowers large, in an elongate raceme or solitary, the lip mostly 20-30 mm. long

2. Lip yellow ...........................................................................................................2. C. calceolus

2. Lip white .............................................................................................................3. C. montanum

1. Cypripedium fasciculatum Kellogg ex S. Wats.

Clustered Lady’s Slipper

Rare, and seen only from coniferous forest, at about 8,000-9,000 ft., in the Medicine Bow Range, Albany County. Montana to Washington, and southward to Colorado, Utah, and California.

2. Cypripedium calceolus L.

Wyoming plants are all var. pubescens (Willd.) Correll, the Yellow Lady’s Slipper.

Moist, often shaded or wooded places, at middle elevations, and seen only from the eastern flank of the Big Horn Range, Sheridan County. Newfoundland and Quebec to Yukon and British Columbia, and southward to Georgia, Alabama, Arkansas, Texas, New Mexico, and Arizona.

3. Cypripedium montanum Dougl. ex Lindl.

Mountain Lady’s Slipper

Moist to dry, open woods, at middle elevations, and seen only from the east slope of the Big Horn Range in Johnson and Sheridan counties. Montana to Alaska, and southward to Wyoming, Idaho, Oregon, and California.

—75—
2. **Calypso Salib.** Calypso, Fairy Slipper

A low, scapose herb with a fleshy corm and coraloid roots. Leaf single and basal, cordate-oval to elliptic, the blade mostly 2-5 cm. long and up to about 4 cm. wide. Scape 1-flowered, mostly 1-2 dm. high. Flower showy, the sepals and petals purplish, the pendent lip pale yellowish or reddish-brown, sacculate, mostly 15-20 mm. long, the sac expanded in front to form a whitish, spotted and bearded apron which spreads above the 2-horned apex, the sac marked on the inside with reddish-brown spots and lines. Column petaloid, convex, forming a projection above the orifice of the lip, the single anther just below its apex. Pollen-masses 2, waxy, sessile on a square gland. Capsule erect, 2-3 cm. long.

1. **Calypso bulbosa** (L.) Oakes

Fairly common in open forested areas, at middle elevations, throughout most of Wyoming, blooming in late spring. Labrador to Alaska, and southward to New York, Michigan, New Mexico, Utah, and California; Eurasia.

3. **Orchis L.** Orchis

Ours a low herb with fleshy, fibrous roots, a single, subbasal, broadly elliptic to suborbicular, nearly sessile leaf mostly 4-7 cm. long. Scape 1-2 dm. high, terminated by a short, spikelike, few-flowered raceme. Flowers white to pinkish, the sepals and petals subequal, the petals adherent to the dorsal sepal to form a hood over the column. Lip white, prominently spotted with purple, 3-lobed at the base, and produced behind into a spur a little shorter than the lip. Column 3-4 mm. long. Anther 2-celled, the cells contiguous and parallel, the pollinia granular, their caudicles attached to viscid glands. Capsule ellipsoid, about 15 mm. long.

1. **Orchis rotundifolia** Banks ex Pursh Round-leaved Orchis

Occasional in moist, coniferous forests in calcareous areas, and seen only from northwestern Park County, at about 7,000 ft. Greenland and Quebec to Hudson Bay, Yukon, and Alaska, and southward to New York, Michigan, Wisconsin, northwestern Wyoming, and British Columbia.

4. **Habenaria** Willd. Rein Orchis

Glabrous herbs with simple, scapose or leafy stems arising from fleshy or tuberous roots. Leaves 1 or more, sessile and sheathing at the base
(tapering to a narrow, sheathing base in *H. obtusata*). Flowers in lax or dense, bracteate, spikelike racemes, white or greenish, small, the lip in ours less than 1 cm. long. Sepals similar and spreading. Petals erect, connivent with the dorsal sepal. Lip entire, toothed, or 2-3 lobed, produced into a spur at the base. Column short. Anther with 2 separate, relatively distant cells, the pollen granular and attached to naked glands. Capsules cylindrical to ellipsoid.

**KEY TO THE SPECIES**

1. Leaves basal or nearly so, 1-4

2. Leaves usually 2-4, withering early; inflorescence
   1-3 dm. long; spur cylindric........................................1. *H. unalascensis*

2. Leaf 1, not withering; inflorescence seldom as much
   as 1 dm. long; spur tapering toward the tip..........................2. *H. obtusata*

1. Leaves cauli ne, several

3. Lip 2-3-toothed at the apex, the central tooth often much reduced;
   bracts much exceeding the flowers in length........................3. *H. viridis*

3. Lip entire; bracts longer or shorter than the flowers

4. Flowers white; lip rhombic-lanceolate, broadened at the base
   and tapering toward the apex; bracts usually incurved........4. *H. dilatata*

4. Flowers greenish; lip lanceolate or linear, not broadened at the base;
   bracts more or less spreading

5. Inflorescence densely flowered,
   the flowers congested..................................................5. *H. hyperborea*

5. Inflorescence laxly flowered, the flowers scattered...............6. *H. saccata*

1. **Habenaria unalascensis** (Spreng.) S. Wats.

   In moist or dry forests or open slopes, at middle elevations, about
   7,000-8,500 ft. (lower in the Black Hills of northeastern Wyoming),
   and occasional in the northern two-thirds of the state. Quebec to
   Alaska, and southward to South Dakota, Colorado, Utah, Nevada, Cali-
   fornia, and Lower California.

2. **Habenaria obtusata** (Banks ex Pursh) Rich.

   Boggy or swampy areas in the mountains, at middle and higher eleva-
   tions, up to about 9,000 ft. Newfoundland to Alaska, and southward
   to New York, northern Michigan, Wisconsin, Colorado, and Utah; Nor-
   way.

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3. **Habenaria viridis** (L.) R. Br.

Wyoming, and all North American plants of this species, are var. *bracteata* (Muhl. ex Willd.) A. Gray, in which the bracts are somewhat longer than the typical and Eurasian var. *viridis*.

Moist, often wooded areas, at lower to middle elevations, and seen only from Crook and Sheridan counties. Circumboreal, and extending southward in the United States to North Carolina, New Mexico, Utah, and Washington.

4. **Habenaria dilatata** (Pursh) Hook.

In his treatment of the Native Orchids of North America (Chronica Botanica Company, Waltham, Mass., 1950) Correll has distinguished three varieties, two of which occur in Wyoming: var. *dilatata*, with a slender, nearly terete spur about as long as the lip; and var. *albiflora* (Cham.) Correll (*Habenaria dilatatiflora* Rydb.), with a shorter, clavate spur. These varieties are poorly distinguished and about equally common in Wyoming.

Moist, often swampy areas in the mountains, at middle elevations, and common throughout most of Wyoming except for the northeastern part. Greenland to Alaska, and southward to New York, Michigan, Wisconsin, South Dakota, New Mexico, Utah, and California.

5. **Habenaria hyperborea** (L.) R. Br.

Wet meadows and swampy areas in the mountains, mostly at middle elevations, and common throughout most of Wyoming. Iceland and Greenland to Alaska, and southward to Pennsylvania, Indiana, Nebraska, New Mexico, Arizona, and California; Asia.

6. **Habenaria saccata** Greene

Wet meadows and swampy areas in the mountains, mostly at middle elevations, and infrequent from the Medicine Bow and Big Horn ranges westward. Alberta to Alaska, and southward to New Mexico, Arizona, Nevada, and California.

**Ladies’ Tresses**

Low herbs with simple, erect stems 1-4 dm. high in ours, from a cluster of elongate, tuberous roots. Leaves mostly basal, linear to oblong or oblanceolate, tapering below to the sheathing base. Flowers white, not spurred, in 3 spirally twisted rows of a bracteate spike 3-10 cm. long.
Sepals and petals 6.5-15 mm. long, in ours, narrow, connivent to form a hood over the column. Lip 7-11 mm. long, constricted near the middle, coiled downward. Column 2-3 mm. long. Pollinia 2, granular, narrowly obovoid, their filaments attached to a narrow, viscid gland which is set in the rostellum terminating the column. Capsule ellipsoid or obovoid.

1. **Spiranthes romanzooffiana** Cham.

Moist or damp to fairly dry meadows, streambanks, and swamps, at elevations up to 10,500 ft., in the mountains and mountain valleys of most of Wyoming, blooming in late summer or autumn. Newfoundland to Alaska, and southward to New York, Nebraska, New Mexico, Arizona, Nevada, and California; Ireland.

6. **Listera** R. Br. Twayblade

Low herbs with simple, erect stems from fibrous roots. Leaves a single broad pair attached about midway up the stem. Inflorescence a terminal raceme of small, greenish flowers. Sepals and petals free and subequal. Lip longer than the sepal and petals, notched or deeply 2-cleft at the apex, and often toothed or auricled at the base. Anther borne on the back of the column near its apex, the pollinia 2 and powdery. Capsule slender.

**KEY TO THE SPECIES**

1. Lip deeply cleft into 2 narrow lobes

1. Lip merely notched at the apex

2. Base of lip with 2 ear-like lobes; leaves 1.5-3.5 cm. long

2. Base of lip narrow, without rounded lobes but with a minute tooth on each side; leaves 3-5 cm. long

1. **Listera cordata** (L.) R. Br.

The typical phase of the species, var. *cordata*, has dark-purplish flowers and occurs generally to the northward; while var. *nephrrophylla* (Rydb.) Hultén has greenish flowers and is apparently the only variety found in Wyoming. It ranges far to the northward, also, where it has been found in association with var. *cordata*. No intermediate forms have been observed, but these color phases may not be taxonomically significant.

Damp coniferous or mixed forests, in the mountains, at middle elevations of about 6,000-9,000 ft., in southeastern and northwestern Wyo-
ming. Circumboreal, and extending southward in the mountains of the eastern United States to North Carolina, and in the western mountains to New Mexico, Utah, and California.

2. **Listera borealis** Morong

Moist coniferous forests in the mountains, at middle elevations of about 6,000-9,000 ft., from the western slope of the Big Horn Range westward, and in northern Sublette County. Gulf of St. Lawrence to Hudson Bay, Yukon, and Alaska, and southward to Colorado, Utah, and British Columbia.

3. **Listera convallarioides** (Sw.) Nutt.

Moist coniferous forests in the mountains, at middle elevations of about 6,000-8,000 ft., and occasional in the Medicine Bow and Big Horn ranges, and in Jackson Hole. Newfoundland to Alaska, and southward to New York, Michigan, Colorado, Arizona, Nevada, and California; also in the southern Appalachian Mountains, and in the Commander Islands in the Bering Sea.

7. **Goodyera R. Br.** Rattlesnake Plantain

Scapose of subscapose herbs from short rhizomes and thick, fibrous roots. Leaves in ours in a basal rosette, spreading, ovate to elliptical, 3-8 cm. long, obtuse or acute, dark green and with white or pale green markings along the principal veins. Scape with a few sheaths, 1-4 dm. high, terminated by a bracteate, spikelike, more or less spirally secund raceme of small, white or greenish-tinged flowers. Dorsal sepal and the petals connate into a hood over the lip. Lip 5-8 mm. long in ours, saccate at the base, with a straight or recurved, flattened, terminal portion. Column short and straight, the single anther borne on its back, the two pollinia attached to a narrow gland situated between the 2 teeth of the beak terminating the column. Capsule ellipsoid, about 1 cm. long in ours.

1. **Goodyera oblongifolia** Raf.

Dry or moist coniferous or mixed forests, at middle elevations of about 6,000-8,500 ft., and seen only from Casper Mountain, Natrona County, the Big Horn Range, and the Jackson Hole area in Wyoming. Nova Scotia to Alaska, and southward to Maine, Michigan, Wisconsin, South Dakota, New Mexico, Arizona, and California; Mexico.
8. Epipactis Sw.  False Lady’s Slipper

A simple-stemmed herb 3-10 dm. high, from a short rhizome and fibrous roots, the leaves sheathing and alternate along the stem. Inflorescence a few-flowered, somewhat secund raceme with foliaceous bracts. Sepals greenish to reddish or purplish, 1.5-2 cm. long, free and subequal. Petals similar to sepals but smaller, pale pink or rose-colored with red or purple veins. Lip 15-17 mm. long, marked with red or purple, constricted near the middle, saccate at the base, and expanded above to form a flat blade. Spur none. Column short and erect. Anther 1, sessile, behind the broad truncate stigma. Pollinia 4, mealy-granular, attached to a gland capping the rounded beak of the stigma. Capsule ellipsoid, pendent, 2-2.5 cm. long.

1. Epipactis gigantea Doug. ex Hook.

The single Wyoming collection came from Shell Canyon, western slope of the Big Horn Range, at about 4,000 ft. The species is usually found in limestone areas. South Dakota to British Columbia, and southward to Texas, Mexico, and Lower California.

9. Corallorhiza (Hall.) Chat.  Coral-root

Saprophytic herbs with little or no green color, the leaves reduced to membranaceous sheaths, the erect stems reddish, purplish, or brownish, up to about 5 dm. high, from a cluster of coral-like roots. Inflorescence a few to many flowered, spikelike raceme or small purplish, reddish, brownish, or greenish flowers. Sepals subequal, the lateral ones united at the base and often forming a short, saccate spur (mentum) which is free or somewhat adnate to the top of the ovary. Petals similar to the sepals but usually smaller. Lip entire, 3-toothed, or 3-lobed. Column compressed. Anther 1, terminal. Pollinia 4, waxy, free. Capsule pendent, ovoid to ellipsoid.

KEY TO THE SPECIES

1. Sepals and petals 6-15 mm. long, prominently
   3-5-striped with reddish-purple……………………………………1. C. striata

1. Sepals and petals smaller, not prominently striped

2. Ovaries and immature fruits green; lip 3-5 mm. long;
   stems slender and low, 5-25 cm. high………………………………2. C. trifida

2. Ovaries and immature fruits reddish, purplish, or brownish, never green;
   lip usually more than 5 mm. long; stems stout and mostly taller

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3. Lip purplish ............................................................... 3. C. mertensiana
3. Lip white, usually spotted with red or purple .................................. 4. C. wisteriana
4. Lip entire .............................................................................. 4. C. wisteriana
4. Lip unequally 3-lobed, the lateral lobes smaller than the central one .......................................................... 5. C. maculata

1. Corallorhiza striata Lindl.

Rich, moist, wooded areas, at middle elevations of about 5,000-9,000 ft., and generally distributed in Wyoming except for the eastern part. Quebec to British Columbia, and southward to Michigan, Wisconsin, North Dakota, Oklahoma, Texas, New Mexico, Oregon, and California; Mexico.

2. Corallorhiza trifida Chat.

Deep, rich, coniferous forests, in moist places, at middle elevations of about 6,000-9,000 ft., and generally distributed over Wyoming except in the eastern part. Greenland and Newfoundland to Yukon and Alaska and southward to Virginia, South Dakota, New Mexico, Utah, Oregon, and Washington; Eurasia.

3. Corallorhiza mertensiana Bongard


4. Corallorhiza wisteriana Conrad

Rich, moist forests, the two Wyoming collections seen having come from northern Lincoln County at about 6,000 ft. Pennsylvania and Virginia to central Florida, and along the Gulf Coast to Texas and Arkansas; Ohio, Indiana, South Dakota, Montana, Wyoming, Utah, Colorado, Arizona, and Mexico.

5. Corallorhiza maculata Raf.

Plants of this species are quite variable, both in the shape and lobing of the lip, and in color. The following color variants have been described but are probably not of much taxonomic significance: var. flavida (Peck) Cockerell, with orange-yellow stem and sheaths, and lemon-yellow flowers having an immaculate lip; var. intermedia Farrell, in which the plants are brown and the sheaths purplish-brown; the
var. *punicea* Bartlett, with dark lavender-purple stems and fruits, the sheaths much paler than the stems.

Rich, moist to moderately dry coniferous forests, at middle elevations of about 6,500-9,000 ft., throughout most of the mountainous parts of Wyoming, and our commonest species. Newfoundland to British Columbia, and southward to North Carolina, New Mexico, Arizona, Texas, and California; Mexico and Guatemala.
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