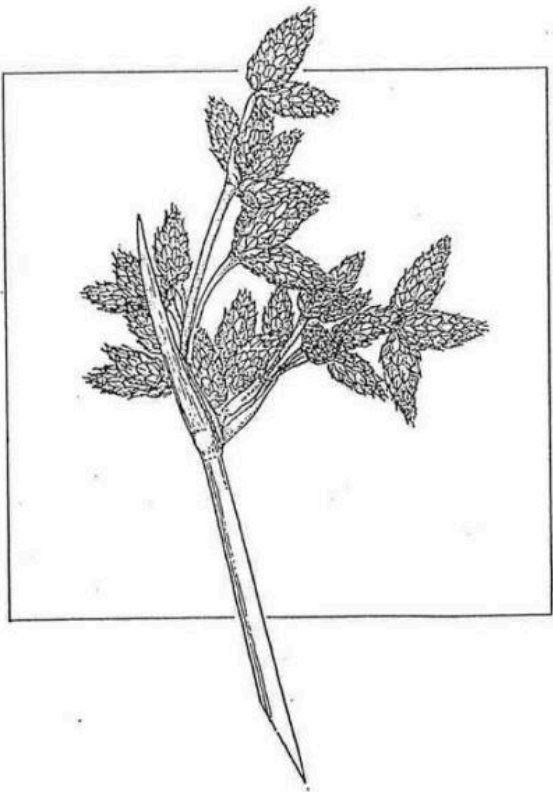


Field Guide to Intermountain Cyperaceae (excluding *Carex*)

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This manual describes morphological characteristics for 15 genera and 49 species of intermountain Cyperaceae. Genus and species descriptions, an illustrated morphology for each genus, dichotomous keys, a glossary, and an index of common and scientific names simplify its use. Line drawings and photographs illustrate diagnostic features of each species. The guide is not inclusive; comprehensive local floras should be consulted to confirm identification. The genus *Carex* is treated separately in RMRS-GTR-10, Field guide to intermountain sedges.

Keywords: Grasslike species, plant taxonomy, revegetation, riparian, wetlands

Contents

	PAGE
Introduction	6
References	8
Family Cyperaceae Jussieu – Sedge	
Family	14
Key to the Genera of Cyperaceae in the Intermountain Region	15
Descriptions of Genera and Species	18
Amphiscirpus	18
<i>Amphiscirpus nevadensis</i>	20
Bolboschoenus	22
Key to <i>Bolboschoenus</i> species	22
<i>Bolboschoenus fluviatilis</i>	24
<i>Bolboschoenus glaucus</i>	26
<i>Bolboschoenus maritimus</i> subsp. <i>paludosus</i>	28
Cladium	30
<i>Cladium californicum</i>	32
Cyperus	34
Key to <i>Cyperus</i> species	36
<i>Cyperus acuminatus</i>	38
<i>Cyperus bipartitus</i>	40
<i>Cyperus difformis</i>	42
<i>Cyperus erythrorhizos</i>	44
<i>Cyperus esculentus</i>	46
<i>Cyperus schweinitzii</i>	48
<i>Cyperus squarrosus</i>	50
<i>Cyperus strigosus</i>	52
Dulichium	54
<i>Dulichium arundinaceum</i> var. <i>arundinaceum</i>	56
Eleocharis	58
Key to <i>Eleocharis</i> species	58
<i>Eleocharis acicularis</i>	62
<i>Eleocharis bella</i>	64
<i>Eleocharis bolanderi</i>	66
<i>Eleocharis coloradoensis</i>	68
<i>Eleocharis engelmannii</i>	70
<i>Eleocharis erythropoda</i>	72
<i>Eleocharis flavescens</i> var. <i>flavescens</i>	74
<i>Eleocharis macrostachya</i>	76
<i>Eleocharis obtusa</i>	78
<i>Eleocharis palustris</i>	80
<i>Eleocharis parishii</i>	82
<i>Eleocharis quinqueflora</i>	84
<i>Eleocharis rostellata</i>	86
<i>Eleocharis suksdorfiana</i>	88
Eriophorum	90
Key to <i>Eriophorum</i> species	90
<i>Eriophorum angustifolium</i> subsp. <i>angustifolium</i>	92
<i>Eriophorum chamissonis</i>	94
<i>Eriophorum gracile</i>	96
<i>Eriophorum scheuchzeri</i>	98
<i>Eriophorum viridicarinatum</i>	100
Fimbristylis	102
Key to <i>Fimbristylis</i> species	102
<i>Fimbristylis puberula</i>	104
<i>Fimbristylis thermalis</i>	106
Kobresia	108
Key to <i>Kobresia</i> species	108
<i>Kobresia myosuroides</i>	110
<i>Kobresia simpliciuscula</i>	112
Lipocarpa	114
<i>Lipocarpa micrantha</i>	116
Schoenoplectiella	118
<i>Schoenoplectiella saximontana</i>	120
Schoenoplectus	122
Key to <i>Schoenoplectus</i> species	124
<i>Schoenoplectus acutus</i>	126
<i>Schoenoplectus americanus</i>	128
<i>Schoenoplectus californicus</i>	130
<i>Schoenoplectus pungens</i> var. <i>longispicatus</i>	132
<i>Schoenoplectus subterminalis</i>	134
<i>Schoenoplectus tabernaemontani</i>	136
Schoenus	138
<i>Schoenus nigricans</i>	140
Scirpus	142
Key to <i>Scirpus</i> species	142
<i>Scirpus microcarpus</i>	144
<i>Scirpus pallidus</i>	146
Trichophorum	148
<i>Trichophorum cespitosum</i>	150
Glossary	152
Index of Scientific Names	159
Index of Common Names	162

Introduction

Cyperaceae species occur in a wide range of wetland or riparian settings. In the Intermountain Region, these range from seeps and springs to the shores of the Great Salt Lake. These plants help to stabilize streambanks, catch sediment, and filter runoff, thus improving downstream water quality and slowing flood waters. They contribute to the conservation of biological diversity by providing habitat for numerous species of fish, birds, small mammals, plants, and other organisms. Healthy wetland communities provide livelihoods, recreational opportunities, and aesthetic enjoyment for human populations.

Past and current human uses of wetlands have contributed to their widespread degradation and loss through water diversions, nutrient inputs, urban expansion, expansion of exotic weeds into destabilized communities, and climate change impacts. The UN Decade on Restoration (2021–2030) and increasing recognition of the importance of wetland communities have focused efforts to better manage and restore this valuable resource, either passively by removing destabilizing factors, ensuring water quality and quantity, or with more active intervention including weed control and planting (Kettenring and Tarsa 2020; Henry et al. 2024).

Accurate identification of Cyperaceae species is essential for land managers, wetland scientists, and other specialists facing the challenge of managing, protecting, and restoring the communities where they occur. Many members of the 15 Cyperaceae genera occurring in the Intermountain West are not easily identified. This field guide and the Field guide to Intermountain sedges (Hurd et al. 1998) can be used along with other resources to assist in making identifications. This guide is not inclusive; readers are advised to consult comprehensive local floras to verify identifications. The geographic area encompassed by this guide includes southeastern Oregon, Nevada, Utah, western Wyoming, and Idaho south of the Salmon River (fig. 1).

This field guide begins with a description of the Family Cyperaceae followed by a key to the genera. Genera are then presented in alphabetical order by scientific name. Each genus description includes illustrations of its characteristic morphology, and, where appropriate, a dichotomous key to its species. Species descriptions for each genus are arranged alphabetically by scientific name and generally include characteristics of its growth habit, leaves, bracts, inflorescences, floral scales, flowers, achenes, habitat, and distribution. Comparisons with

similar species are provided where appropriate. Drawings and photographs illustrate the diagnostic morphology of each species. A glossary of botanical terms and an index of common and scientific names follows the technical descriptions.

Common names, morphological descriptions, habitat requirements, and geographical distributions were derived from the literature, online databases, and examination of specimens and notes from the herbarium at the Rocky Mountain Research Station, Boise, ID; Reno/Nesh Herbarium, University of Nevada, Reno; Intermountain Herbarium, Utah State University, Logan; Monte L. Bean Herbarium, Brigham Young University, Provo, UT; and Tucker Herbarium, Albertson College of Idaho, Caldwell, ID. Most photographs and some line drawings for this publication were prepared by the senior author. Permission for use of additional photographs was provided by the USDI Bureau of Land Management Seeds of Success Program, Oregon Flora, California Botanic Garden, USDA NRCS PLANTS Database, Trent Draper, and Gabriel Campbell, Portland University. Additional line drawings were used with permission from the Flora of North America Association (Flora of North America Editorial Committee 2002), the Jepson Flora Project (Jepson Flora Project, eds. (2025), and the University of Washington Press (Hitchcock et al. 1969). Taxonomy follows the Flora of North America Editorial Committee (2002) and USDA NRCS PLANTS Database (2024).

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Figure 1. Intermountain region. Drawing: USFS RMRS.

Family Cyperaceae Jussieu

Sedge Family

Plants grasslike, annual or usually perennial; **habit** caespitose, rhizomatous, or stoloniferous, rarely tuberous; **roots** fibrous; **culms** usually solid, often triangular, sometimes terete or flattened, rarely hollow or septate; **leaves** basal, cauline, or both, alternate, mostly 3-ranked; sheaths closed, rarely open; ligules often present; blades divergent or ascending, entire, parallel-veined, often narrow, elongate and flat to terete, rolled, plicate, or reduced, often absent from basal leaves; **inflorescence** a panicle or modified panicle (corymb, cyme, raceme, umbel or spike) subtended by bracts and consisting of **spikelets** or **spikes** with 1-many floral scales, spirally or distichously arranged and appressed or ascending on the compressed axis, the proximal an/or the distal scales sometimes empty; **flowers** axillary to the floral scale, sessile, reduced, bisexual in most genera or unisexual (and the plants then usually monoecious) wind-pollinated; perianth of 3-6 (1-30) bristles or scales, longer to shorter than the floral scales, reduced, or lacking; stamens commonly 3, rarely 1 or 2; exerted at anthesis, the plants wind pollinated; anthers basifixed; ovary superior, (1-2) 3 carpellate, 1-celled with a single basal anatropous ovule; style unbranched, bifid or trifid with the stigmas accordingly 2 or 3; **achene** mostly leathery, biconvex or trigonous, pericarp thin; **seeds** 1, testa thin; endosperm well developed; embryo small, basal, embedded in the endosperm; $x = 5 - ca. 100$.

A large, cosmopolitan family, most common in wet or moist areas of both hemispheres.

Key to the Genera of Cyperaceae in the Intermountain Region

S.G. Smith

1. Leaves cauline or some leaves attached to the culm above those attached to the base of the culm; leaf blades well developed.
2. Flowers unisexual, the staminate and pistillate in the same or different spikelets; achene enclosed in a sac-like scale (perigynium) as well as subtended by a scale; staminate and pistillate spikelets or portions of them usually dissimilar in appearance; perianth absent.
3. Perigynium open on one side above the middle, loosely wrapped around the achene and sometimes also a staminate flower or flowers; spikelets with 1 pistillate flower and 1 staminate flower or unisexual and 1-flowered, solitary or forming a compound or paniculate head; leaves filiform and involute; culms short (usually less than 35 cm) and obtusely triangular. *Kobresia* p. 108
3. Perigynium closed, open only at the apical orifice through which the style or stigmas protrude, loosely or tightly enclosing only the achene; spikelets unisexual or bisexual, few to many-flowered, solitary or much more often racemously arranged in a terminal, rarely branched inflorescence; leaves and culms various. *Carex* (see Hurd et al. [1998])
2. Flowers bisexual, only rarely some of them (apart from empty scales at base of the spikelet) with stamens or pistil abortive; achenes in scale axils, not enclosed in a perigynium; all spikelets essentially alike in appearance; perianth of stiff or soft "bristles" or absent.
4. Spikelets flattened laterally or sometimes 4-angled in *Cyperus*, the scales 2-ranked.
5. Inflorescences several to many in leaf axils; internodes hollow; leaves cauline. *Dulichium* p. 54
5. Inflorescence solitary, terminal on culm; culm internodes solid or spongy; leaves basal or basal and cauline.
6. Leaf blades flat, at least near the sheath; sheaths not black; inflorescence various; spikelets brown; 0-1 sterile proximal scales; plants relatively soft, not wiry. *Cyperus* p. 34
6. Leaf blades not flat, thickly subcylindric and grooved on one side or 3-angled with 2 sharp angles and 1 rounded angle; sheaths black; inflorescence a dense unbranched head, dark brown to blackish; spikelets black or dark purple; 2 or more sterile proximal scales; plants wiry. *Schoenus* p. 138
4. Spikelets not flattened, circular in section, the scales spirally arranged.
7. Culms clearly 3-angled, at least distally (near inflorescence).
8. Spikelets (4-) 6-10 mm thick; spikelet scales finely pubescent (but the hairs often worn off in age), the apex notched, the midrib extended into a prominent awn; hard corms (commonly called tubers) formed at culm bases and persistent on rhizomes for 1-2 years. *Bolboschoenus* p. 22
8. Spikelets 1-3.5 mm thick; spikelet scales glabrous, the apex not bifid or with a prominent awn; tubers lacking. *Scirpus* p. 142

7. Culms cylindric or sometimes obscurely 3-angled or flattened.
9. Culms 5–10 mm thick; leaf blades with harsh, sharp spinules on margins and abaxial midrib; inflorescences 1 or more in axils of leaves; perianth absent. *Cladium* p. 30
9. Culms less than 5 mm thick; leaf blades smooth; inflorescence 1; perianth present, consisting of 10 or more conspicuous, smooth, filiform perianth bristles much longer than spikelet scales in fruit and forming cottonlike tufts. *Eriophorum* p. 90
1. All leaves attached to the base of the culm (or one leaf attached to culm above basal leaves in *Schoenoplectiella saximontanus*); leaf blades well-developed, rudimentary or absent.
10. Leaves bladeless or rarely represented by a tooth-like structure less than 1 mm long; inflorescence a solitary erect spikelet; involucre bracts absent; achenes usually with a persistent enlarged style base (tubercle) at apex. *Eleocharis* p. 58
10. At least some leaves with blades more than 1 mm long; inflorescence various; one or more involucre bracts present; achenes rarely with a tubercle.
11. Inflorescence of 1 spikelet with 1 erect involucre bract; plants perennial, forming tussocks or mats.
12. Inflorescence bract to about as long as spikelet; plants stiff, forming dense tussocks in wet soil, not in water. *Trichophorum* p. 148
12. Inflorescence bract mostly longer than spikelet; plants usually flaccid, rarely stiff, forming mats, usually in deep water. *Schoenoplectus subterminalis* p. 134
11. Inflorescence of 1 to many spikelets with one to several involucre bracts; plant habit various.
13. Culms clearly 3-angled; robust rhizomatous perennials forming large colonies. *Schoenoplectus (in part)* p. 122
13. Culms cylindric or ridged or sometimes slightly compressed, not clearly 3-angled; habit various.
14. Spikelet scales less than 2 mm long; flowers and achenes subtended by 1-2 thinly membranous scales hidden behind the spikelet scale; small tufted annual to about 20 cm tall. *Lipocarpus* p. 114
14. Spikelet scales more than 2 mm long; flowers and achenes subtended only by a spikelet scale; large to medium-sized rhizomatous perennials or rarely a small tufted annual.
15. Inflorescences unbranched heads or sometimes solitary; rhizomatous perennial or tufted annual; rare in our area.
16. Spikelet scale apices with midribs prolonged into a distinct mucro or awn; achenes prominently rugose; tufted annual, amphicarpic flowers produced in inner sheaths of basal leaves; soft; non-saline and non-alkaline habitats. *Schoenoplectiella saximontana* p. 120
16. Spikelet scale apices with midribs not prolonged; achenes smooth; rhizomatous perennial, wiry; saline or alkaline habitats. *Amphiscirpus* p. 18

- 15.** Inflorescences branched (the branches sometimes short); rhizomatous perennials; some species common.
- 17.** Culms 2–10 mm thick; plants 1–4 m tall; leaf blades shorter than their sheaths (rarely longer in *S. heterochaetus*); perianth present; achenes without sculpturing, smooth, with short apical beak. *Schoenoplectus (in part)* p. 122
- 17.** Culms less than 2 mm thick; plants to 1.5 m tall; leaf blades much longer than their sheaths; perianth absent; achenes finely honeycomb-reticulate, without an apical beak. *Fimbristylis* p. 102

Descriptions of Genera and Species

Amphiscirpus Oteng-Yeboah

Bulrush

S.G. Smith

Perennials lacking evident internal air spaces, smooth except for the scabrous leaf blade margins; rhizomatous; culms solid, solitary or clustered, terete, wiry, lacking evident internal air spaces; **leaves** basal; sheaths often disintegrating into fibers; ligules present, ciliate; blades well-developed, tough, wiry, C-shaped to subcylindric; **involucral bracts** 1–3; the proximal bract leaflike, spreading to erect, exceeding the inflorescence; **inflorescences** capitate, terminal on the culms but sometimes appearing lateral; **spikelets** 1–6 (10), sessile, not laterally flattened; **scales** spirally arranged, smooth, the apex not notched; proximal 1–2 scales with awn-like blades to 15 mm long; distal scales with midrib not prolonged; **flowers** perfect, solitary in the scale axils; perianth bristles 1–6, straight, attached to the achene base, shorter than the achene; stamens 3; style bifid, the base not enlarged into a tubercle, deciduous; **achenes** plano-convex to biconvex, smooth, the apex rounded and beakless.

A genus of a single species, growing in wet saline and often alkaline soil; western North America and South America.

Amphiscirpus differs from *Scirpus* in lacking internal air spaces. It differs from *Schoenoplectus* by the presence of prominent ciliate ligules.

See Figure 2.

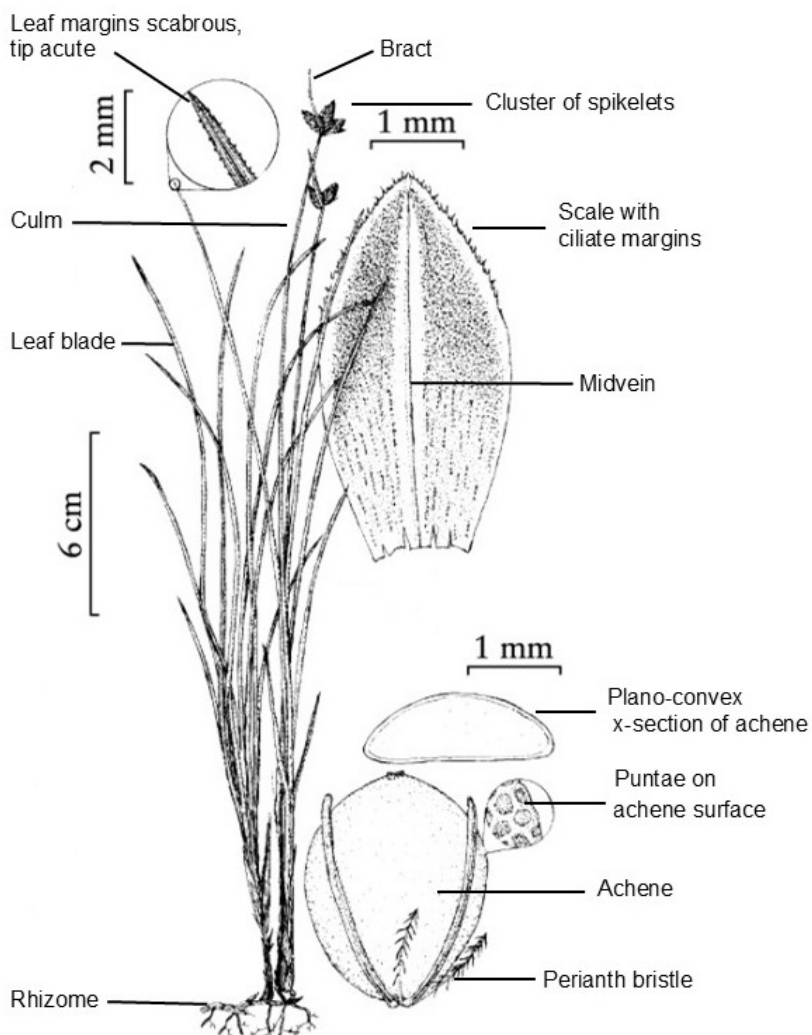


Figure 2. *Amphiscirpus* morphology. Drawings: J. Meyers (Smith 2002a).

Amphiscirpus nevadensis (S. Watson) Oteng-Yeboah

Nevada bulrush

SYNONYMS: *Scirpus nevadensis* S. Watson

PLANT HABIT: Perennial; **rhizomes** robust, horizontal or sometimes vertical; **culms** solitary to clustered, terete to subterete, lacking internal air cavities, wiry, tough, 1–7 dm tall, up to 2 mm wide.

LEAVES: 5–10, basal; **sheaths** persistent, the lower ones sometimes bladeless and often disintegrating to fibers; **ligules** ciliate; **blades** 5–10, C-shaped to subcylindric or flat, thick, wiry, sparsely scabrous along the margins, apex acute, lacking internal air cavities, 3–30 cm long, 0.5–2 mm wide; distal blades exceed their sheaths.

INVOLUCRAL BRACTS: 1–3; proximal bract spreading to erect, leaflike, green, 1–15 cm long, resembling a continuation of the culm and exceeding the inflorescence; distal bracts reddish, resembling enlarged spikelet scales.

INFLORESCENCES: Sessile, capitate, terminal on the culms but often appearing lateral; **spikelets** 1–6 (10), sessile, ovoid to lanceolate, not flattened, 5–20 mm long, 3–5 mm wide.

SCALES: 30–60, spirally arranged, oval, smooth, shiny, pale to red-brown with pale, hyaline, sometimes ciliate margins, the apex not notched; the proximal 1 or 2 scales with awn-like blades to 15 mm long resembling involucre bracts; other lower scales ovate, papery to tough and hard, prominently 9-veined, apex rounded, midribs not prolonged, 4 mm long, 3 mm wide.

FLOWERS: Perfect, solitary in the scale axils; **perianth bristles** 1–6, unequal, straight, retrorsely spinulose, pale brown, shorter than the achene and attached to its base; **stamens** 3; **styles** bifid, the base not enlarged into a tubercle, deciduous.

ACHENES: Obovoid, plano-convex or biconvex, smooth to minutely punctate, greenish to orange-brown, apex rounded and lacking a beak, 2–2.5 mm long, 1.5–1.7 mm wide. Fruiting: summer.

HABITAT AND DISTRIBUTION: Seasonally wet saline and often alkaline places to 2400 m elevation. Interior western North America from British Columbia to western North Dakota and south to eastern California and central, western and southern Colorado, also in southern South America.

SIMILAR SPECIES: *Amphiscirpus nevadensis* plants are similar to small *Schoenoplectus pungens* plants and sometimes grow with them. *S. pungens* is distinguished by its three-angled culms and leaf blades, spikelet scales with bifid apices and awned midribs, and its beaked achenes.

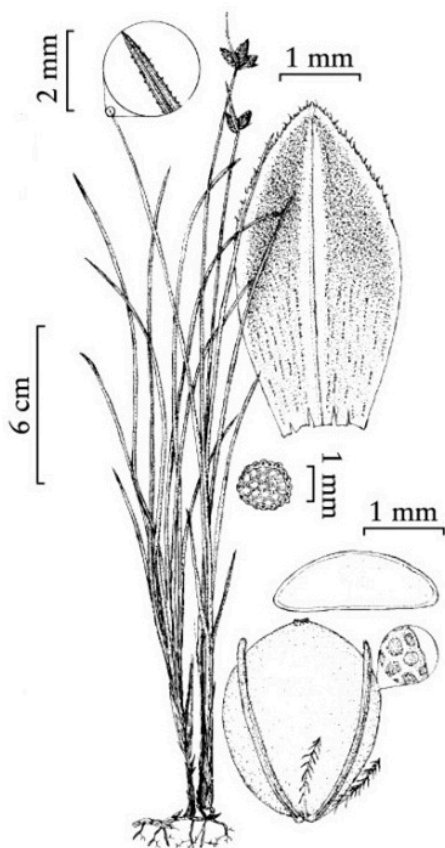
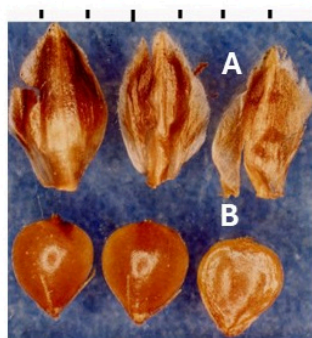


Figure 3. *Amphiscurpus nevadensis*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: J. Meyers (Smith 2002a).

Bolboschoenus (Ascherson) Palla

Tuberous bulrush

Plants **perennial**, robust, forming large colonies from long, scaly rhizomes; **culms** cormose at the base, solitary or clumping, sharply 3-angled, smooth, internally solid without evident air cavities; **leaves** about 10, basal and cauline; sheaths tubular; ligules absent; blades flat or V-shaped and prominently keeled; **inflorescences** open, capitate or umbel-like clusters or sometimes solitary, surpassed by one or more spreading to erect **involucral bracts** that resemble leaf blades; **spikelets** (1) 2–80, ovoid, not laterally flattened; **scales** spirally arranged, ovate, membranous, finely pubescent, apex prominently notched (notches often lacking in older specimens), midrib prolonged into a prominent apical awn; **flowers** perfect, borne singly in the scale axils; perianth bristles 3–6, retrorsely spinulose, shorter to longer than the achene, persistent on the achene or detaching separately (and thus apparently lacking); stamens 3; styles bifid or trifid, the base not enlarged into a tubercle; **achenes** mostly obovoid, lenticular or trigonous, smooth, the apex narrowed to a short beak.

A nearly cosmopolitan genus of 6–15 species (5 in North America), depending on the taxonomic treatment. *Bolboschoenus* occurs in wet environments where they are often ecologically dominant and provide important wildlife habitat.

See Figure 4.

Key to Intermountain *Bolboschoenus* species

- 1. Mature inflorescences with all spikelets sessile or up to half of the spikelets on branches; styles bifid (rarely trifid); achenes lenticular, rarely compressed trigonous; perianth bristles not persistent on achenes and thus apparently absent; veins at leaf sheath mouth diverging, leaving a triangular membranous and veinless area; widely distributed in brackish to saline or alkaline places. *B. maritimus* subsp. *paludosus* p. 28
- 1. Mature inflorescences with all or most spikelets on evident, elongated branches; styles mostly trifid; achenes mostly trigonous in cross-section; perianth bristles persistent on achenes; very locally distributed in the Intermountain region.
 - 2. Culms 1.5–3 mm thick; widest leaf blade 2–6 mm wide; leaf sheath fronts membranous at the summit, veins there diverge, leaving an acute triangular area lacking veins; spikelets 3–5 mm thick; awns of the scales 0.25 mm wide at the base; achene beak minute. *B. glaucus* p. 26
 - 2. Culms 5–15 mm thick; widest leaf blade 7–22 mm wide; veins nearly reach the papery summits of the leaf sheaths; spikelets 5–10 mm thick; awns of the scales 0.5 mm wide at the base; achene beak distinct, to 0.8 mm long. *B. fluviatilis* p. 24

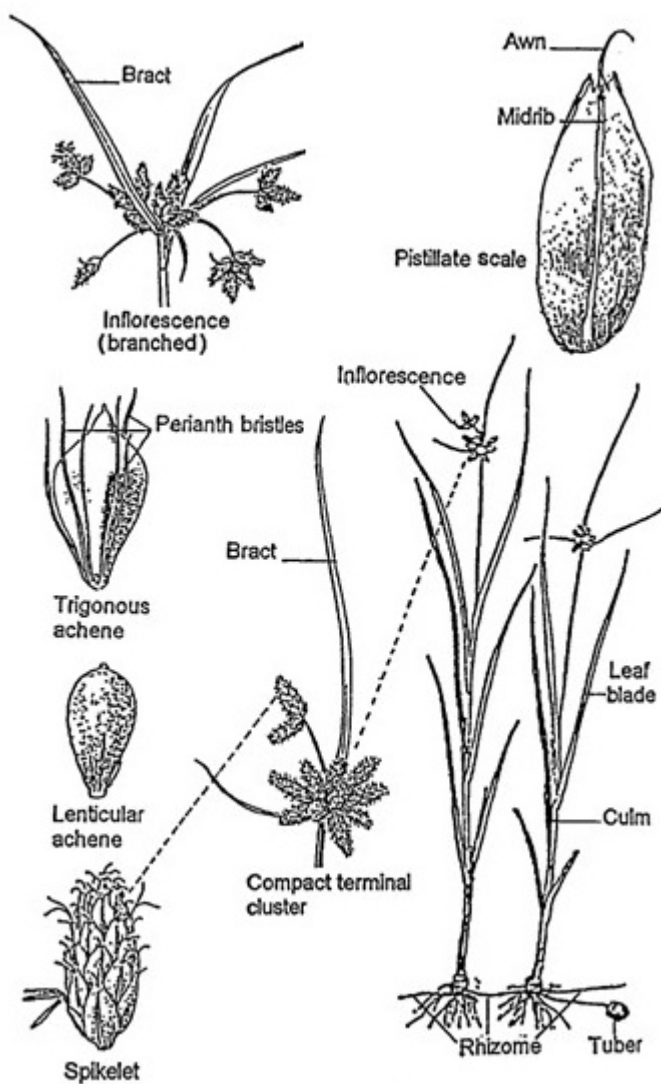


Figure 4. *Bolboschoenus* morphology. Drawings: J.R. Janish (Hitchcock et al. 1969).

Bolboschoenus fluviatilis (Torrey) Soják

River bulrush

SYNONYMS: *Bolboschoenus maritimus* subsp. *fluviatilis* (Torrey) Å. Löve & D. Löve, *Schoenoplectus fluviatilis* (Torrey) M.T. Strong, *Scirpus fluviatilis* (Torrey) A. Gray, *Scirpus maritimus* L. var. *fluviatilis* Torrey

PLANT HABIT: Stout **perennials** from horizontal **rhizomes** thickened at the rooting nodes; **culms** erect, sharply triangular, often with concave sides, smooth, 1–2 m tall, 5–15 mm thick.

LEAVES: Several, distributed along the culm and shorter than or equal to it; **sheaths** about half the culm length, fronts of the sheath with veins that nearly reach the papery summit; **blades** flat with finely scabrous midrib and margins, 7–22 mm wide.

INVOLUCRAL BRACTS: 3–6, unequal, the lower ones leaflike, flat, spreading and ascending, exceeding the inflorescence, 20 cm or more long, 4–15 mm wide.

INFLORESCENCES: Open, subumbellate (compact when very young); **spikelets** 10–40, ovoid to lanceolate, tan to brown, 10–25 mm long, 5–10 mm wide, solitary or in clusters of 2–3 (8) on 4–12 flexuous rays up to 10 cm long.

SCALES: Spirally arranged and loosely imbricate, narrowly oblong with the apex notched, thin, scarious, often lacerate distally, orange-brown or straw-colored, 7–10 mm long, 3–4 mm wide; the midrib excurrent as an awn, 2–3 mm long, 0.5 mm wide, exceeding the notch and often recurved.

FLOWERS: Perfect; **perianth bristles** 6, unequal, retrorsely barbellate, tightly attached to and equaling the achene; **stamens** 3; **styles** trifid.

ACHENES: Narrowly obovoid, unequally trigonous, tapered at the base, apiculate at the somewhat rounded apex, minutely cellular-reticulate, dull gray-brown to dark brown, 3.8–5.5 mm long (including the 0.2–0.8 mm beak), 2–2.9 mm wide. Fruiting: summer.

HABITAT AND DISTRIBUTION: Marshes, shores of lakes and streams to about 2100 m, often emergent in water, not salinity tolerant. Often forms dense, monospecific stands that rarely flower and are therefore often overlooked. In the Intermountain Region known only from northern Utah, southeastern Oregon, and southwestern Idaho. Widespread in most of temperate North America.

SIMILAR SPECIES: Easily confused with the introduced *Bolboschoenus glaucus*, which has slender culms and leaves with lax inflorescences.

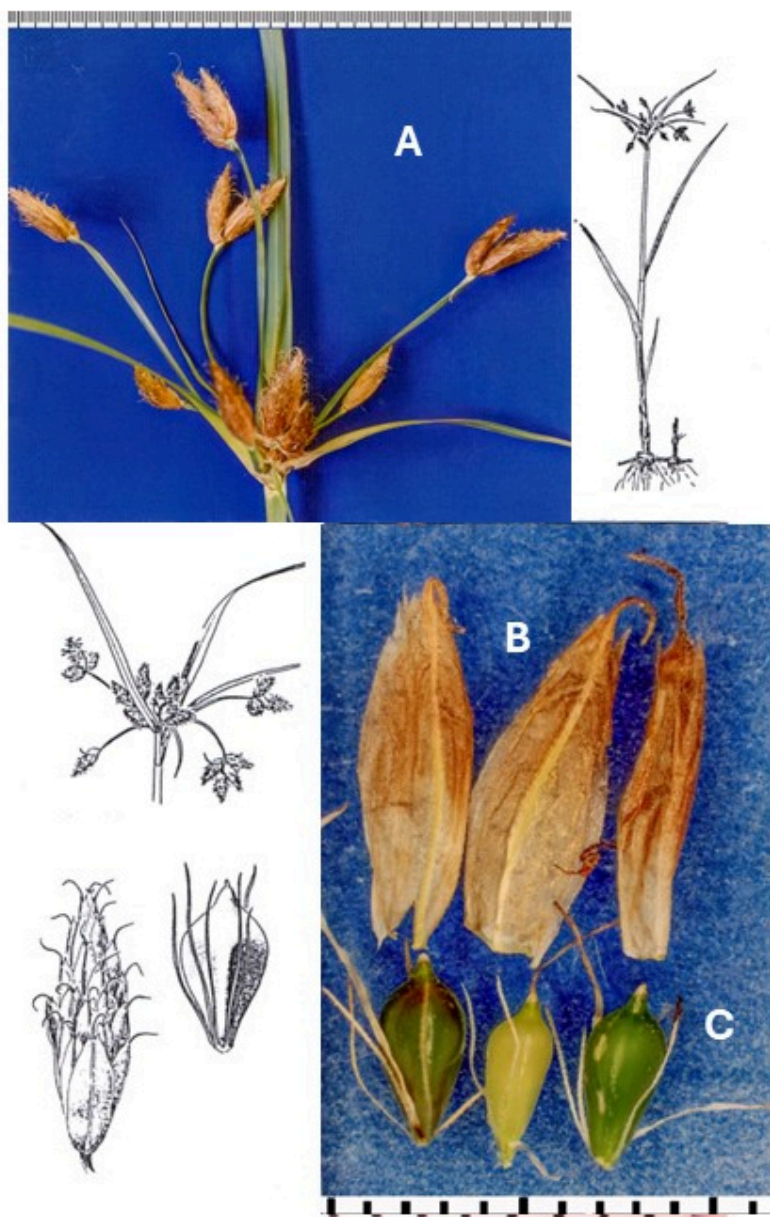


Figure 5. *Bolboschoenus fluviatilis*. (A) Inflorescence, (B) scales, (C) achenes with bristles attached. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Bolboschoenus glaucus (L.) S.G. Smith

Tuberous bulrush

SYNONYMS: *Schoenoplectus glaucus* (L.) Kartesz, *Scirpus glaucus* L.

PLANT HABIT: Slender, erect **perennials** from dark brown **rhizomes** that bare tubers about 2 cm thick; **culms** obtusely triangular, smooth, to 1.5 m tall, 1.5–3 mm thick.

LEAVES: **Sheaths** reach to middle of culm; veins diverge below the membranous summit leaving a triangular area that is veinless; **blades** 2–6 mm wide.

INVOLUCRAL BRACTS: 1–3, leaf-like, elongate, narrow, 2–3 mm wide, flat proximally, scaberulous distally, the lowest longer than the inflorescence.

INFLORESCENCES: Open, subumbellate, compact when very young; **spikelets** 3–30, ovoid to narrowly lanceolate, medium brown to reddish brown, 10–40 mm long, 3–5 mm thick, mostly solitary or in clusters of 2–7 on 3–11 lax rays that are less than 9 cm long.

SCALES: Loosely imbricate, oblong with the apex mostly lacerate and deeply notched, membranous-hyaline, orange-brown or straw-colored, 5–6 mm long, 2.5 mm wide; the midrib prolonged into a straight or slender, somewhat recurved awn that is 0.25 mm wide at the base.

FLOWERS: **Perianth bristles** 4–6, unequal, minutely retrorsely barbellate, light to medium brown, shorter than to equaling the achene, persisting through dispersal; **stamens** 3; **styles** trifid.

ACHENES: Obovoid with a cuneate base and rounded apex, bluntly to obscurely trigonous, pale brown to blackish when mature, 2.5–3.3 mm long (including the minute apiculus), 1.3–2.3 mm wide. Fruiting: summer.

HABITAT AND DISTRIBUTION: *B. glaucus* occurs along shores and in waste places from sea level to about 800 m. In California it is a weed of rice fields and managed ponds in wildlife refuges. It is slightly salinity tolerant. In the Intermountain Region it is known only from southwestern Idaho and west-central Oregon. Hybrids with *B. maritimus* have been reported from Idaho. The species is widespread from the Mediterranean to central Asia and southern Africa. Introduced in North America, it is most abundant in California.

SIMILAR SPECIES: *B. glaucus* is easily confused with small specimens of the native and more robust *B. fluviatilis* because of their similar inflorescences and with *B. maritimus* subsp. *paludosus* because of hybridization and their similar leaf sheaths and floral scales.

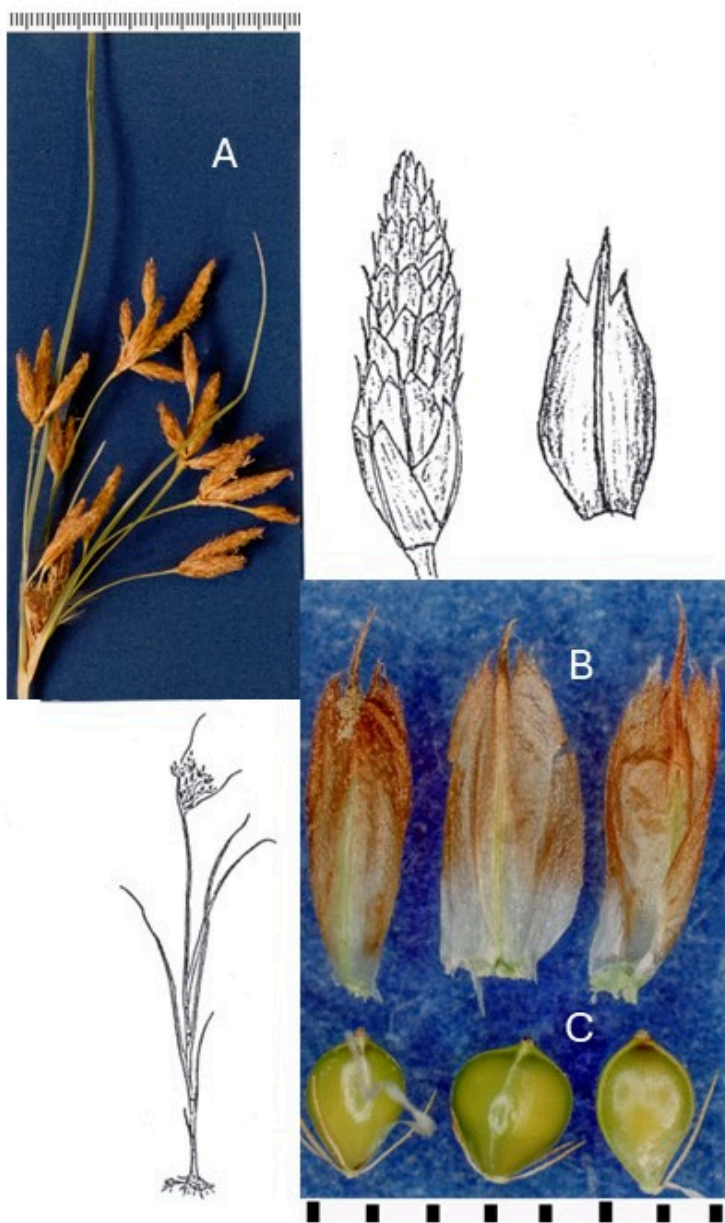


Figure 6. *Bolboschoenus glaucus*. (A) Inflorescence, (B) scales, (C) achenes with bristles attached. Drawings and photos: E.G. Hurd.

Bolboschoenus maritimus (L.) Palla
subsp. *paludosus* (A. Nelson) T. Koyama

Alkali bulrush, Bayonet grass, Salt-marsh bulrush

SYNONYMS: *Scirpus campestris* Britton; *S. maritimus* L. var. *paludosus* (A. Nelson) Kükenhal; *S. pacificus* Britton ex Parish; *S. paludosus* A. Nelson

PLANT HABIT: Stout **perennial** from rhizomes that usually bear firm tubers; **culms** erect, sharply triquetrous, sides commonly concave, scabrous at the angles, to 1.5 m tall, 1–8 mm thick.

LEAVES: Several, flat or folded, scattered along the stem or all below the middle, 10–40 cm long, up to 1 cm wide; **sheaths** ventrally membranous at the summit, the veins diverging well below summit leaving a sharply triangular veinless area; the lowest sheaths sometimes bladeless; **blades** to 12 mm wide.

INVOLUCRAL BRACTS: 1–4, very unequal, elongate, green and leafy, surpassing the inflorescence, one much exceeding the others, up to 34 cm long, 1–6 mm wide.

INFLORESCENCES: Compact to partly open (compact when very young), unbranched terminal cluster or a simple branched cluster with up to half of the spikelets solitary or in clusters of 2–10 spikelets on 1–4 rays; **spikelets** (1) 2–40, oblong, with a roughened appearance, brown to stramineous, 7–40 mm long, (4) 7–10 mm thick.

SCALES: Loosely imbricate, hyaline, lacerate distally and notched, orange-brown or straw-colored or lighter, 5–8 mm long, 3–4 mm wide; awn slender, exceeding the notch, slightly contorted, 1–3 mm long, 0.25 mm wide at the base.

FLOWERS: **Perianth bristles** 6, about half the length of the achene, retrorsely barbellate, usually detaching separately from the achene and thus apparently absent; **stamens** 3; **styles** bifid (rarely trifid).

ACHENES: Obovoid to orbicular, mostly lenticular, tapered or cuneate at the base, rounded to truncate and apiculate at the apex, smooth, shiny, bright brown to straw-colored or pale, 2.3–4 mm long, 1.9–2.8 mm wide. Fruiting: spring–fall.

HABITAT AND DISTRIBUTION: Saline, brackish, or alkaline shores and marshes to about 2900 m. Often found in roadside ditches with other halophytes due to roadside salting. Distributed nearly worldwide, widespread in suitable habitats in the Intermountain Region. Hybrids with *B. glaucus* known from Idaho.

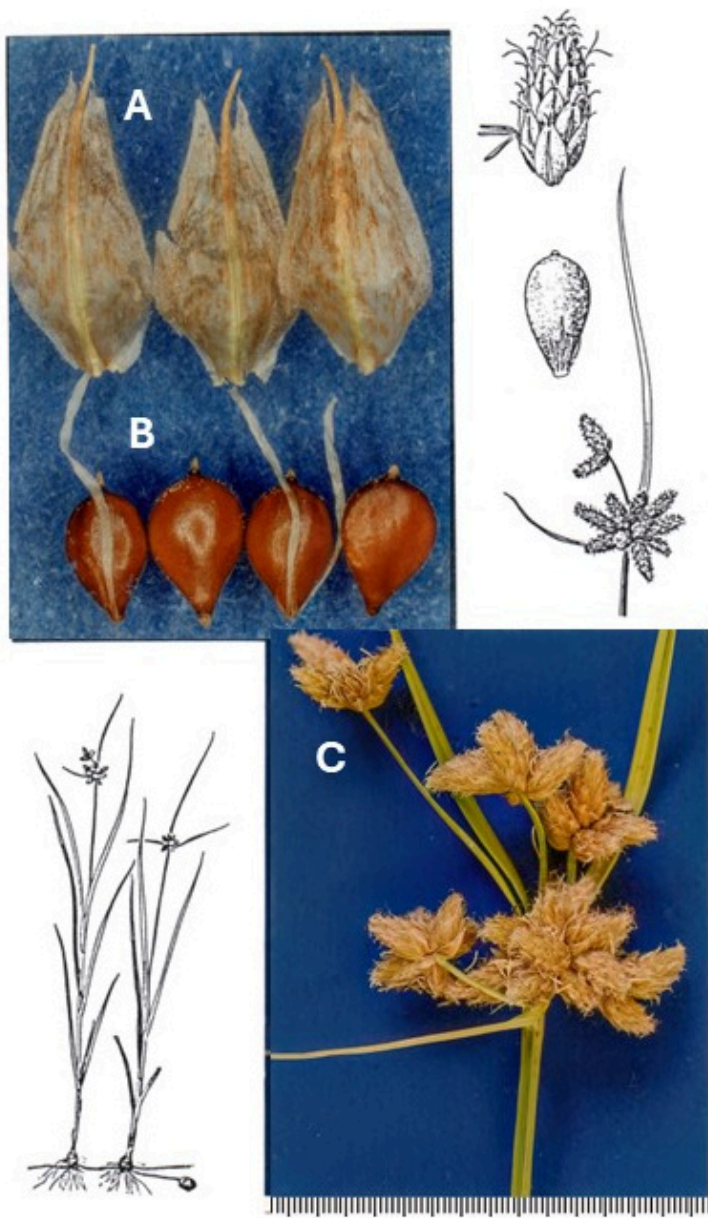


Figure 7. *Bolboschoenus maritimus* subsp. *paludosus*. Scales, (B) achenes—some with strap-like filaments attached, (C) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cladium P. Browne

Sawgrass, Marisque, Twig-rush

Leafy rhizomatous or stoloniferous **perennials**; **culms** solitary or clumped, rounded to rounded-trigonous, hollow, often more than 70 cm tall, 5–10 mm thick; **leaves** cauline with flat to involute **blades**; **ligules** absent; **inflorescences** one or more, terminal and axillary, capitate to panicle-like, highly branched (to 3rd or rarely 4th order), subtended by 3–4 spreading, leafy **involucral bracts**; **spikelets** numerous (100–1,000+), rounded, each with 5–6 spirally arranged **scales**, the lowest empty, the upper 3–4 each subtending a flower; **flowers** lack a perianth, lower flowers staminate, upper flowers perfect; **stamens** 2–3; **styles** linear, trifold or bifid with a somewhat thickened base; **achenes** terete with a truncate base; the style base may persist as a tubercle.

A genus of about four species of marshes and other wetlands distributed worldwide, particularly in Australia. Uncommon in the Intermountain Region.

See Figure 8.

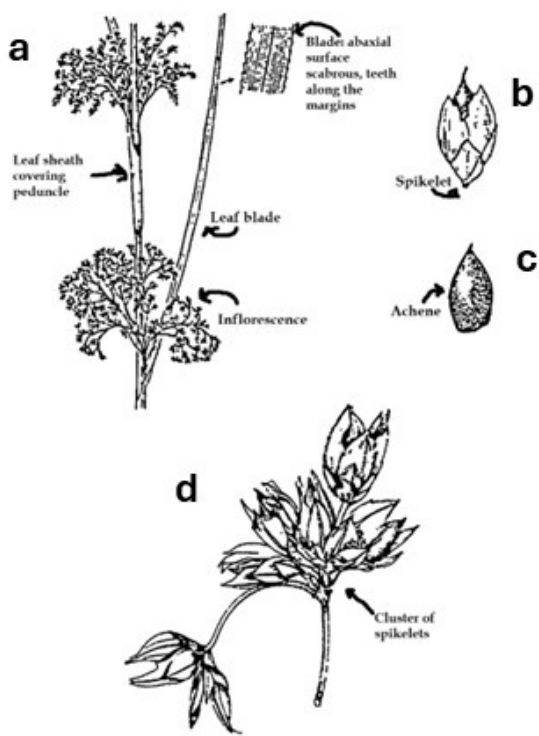


Figure 8. *Cladium* morphology. Drawings: a-c: E.E. Reid (Tucker 2012), d: Y. Wilson-Ramsey (Tucker 2002a).

Cladium californicum (S. Watson) O'Neill

California sawgrass, Sawgrass

SYNONYMS: *Cladium mariscus* (L.) Pohl var. *californicum* S. Watson, *Mariscus californicus* (S. Watson) Fernald

PLANT HABIT: Coarse perennial forming dense clumps; **rhizomes** stout, 20 cm long, 10 mm in diameter; **culms** subterete to subtriangular, 1–2 m tall, 5–10 mm thick.

LEAVES: Cauline; ligules absent, **blades** flat to broadly V-shaped, serrated with cartilaginous teeth along the margins and abaxial side of the midvein, 1–2 m long, 7–10 mm wide.

INVOLUCRAL BRACTS: Three or more, leaf-like, spreading.

INFLORESCENCES: Terminal and lateral, panicle-like, purplish brown, 30–50 cm long with flexuous branches (to 3rd and sometimes 4th order); peduncles at least partially covered by the leaf sheaths; **spikelets** numerous, mostly in groups of (3) 4–6, ellipsoid to lanceolate with acute apices, reddish brown, to 3 mm long.

SCALES: Few, spirally arranged, ovate to oblong-lanceolate with a distinct midvein, reddish-brown, 2.5–3 mm long, 2 mm wide, lowest scale empty, middle scale empty or subtending staminate flowers, terminal scale subtending a perfect flower.

FLOWERS: **Perfect** and staminate; **perianth** lacking; **stamens** 2, anthers 2 mm long, connective apices 0.1 mm; **styles** trifid, 1–1.5 mm long; stigmas 1–1.5 mm long.

ACHENES: Ovoid, barely trigonous, the base truncate and the apex acute, smooth or irregularly rugulose, glossy purplish brown, 1.5–2 mm long, 1 mm wide; the persistent style base forms a beak 0.2 mm long. Fruiting: spring–summer.

HABITAT AND DISTRIBUTION: Alkaline marshes, swamps, and springs from sea level to 2000 m elevation. Rare in the Intermountain Region. Occurs in Arizona, California, southern Nevada, southern Utah, Texas, and Mexico. Most Utah populations were inundated by Lake Powell.

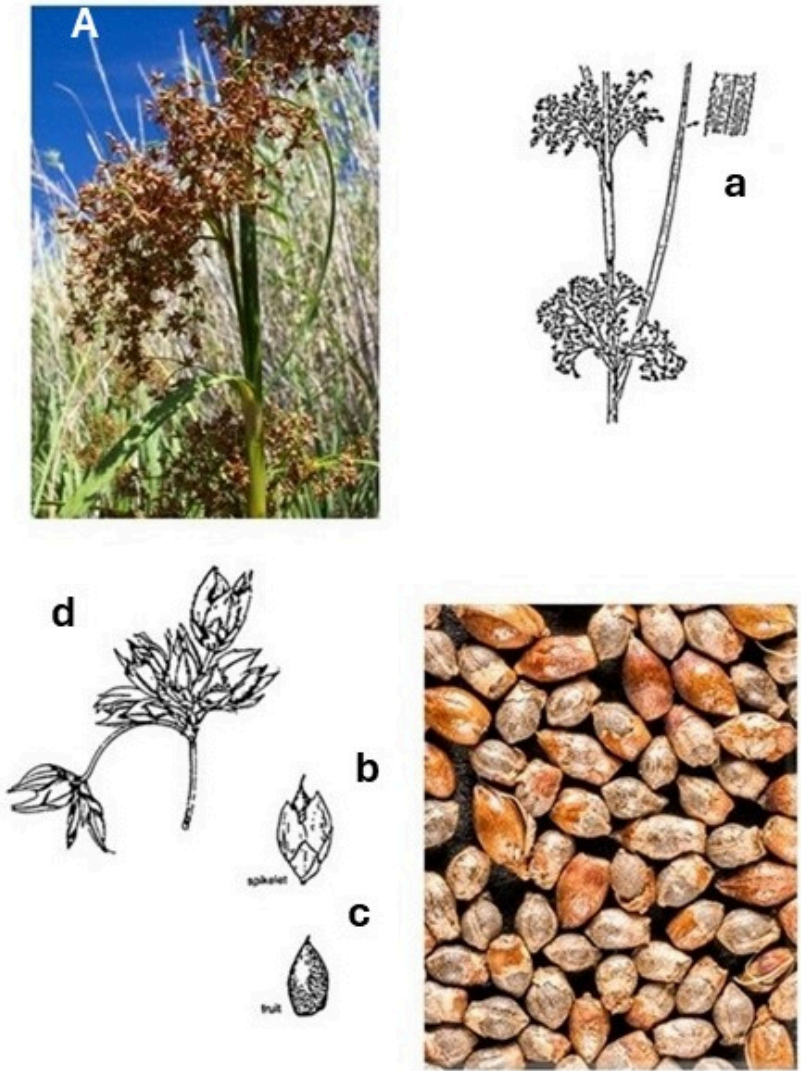


Figure 9. *Cladium californicum*. (A) Inflorescence, (B) achenes. Photos: (A) BLM SOS_2003_NV-052. (B) J. McDonald (California Botanic Garden). Drawings: a-c: E.E. Reid (Tucker 2012), d: Y. Wilson-Ramsey (Tucker 2002a).

Cyperus L.

Flatsedge, Nutgrass, Umbrella sedge

Grasslike rhizomatous, stoloniferous, or rarely tuberous **perennials** or **annuals**; **culms** to 1 m tall, cespitose or solitary, triangular or sometimes terete, solid, smooth or with prickles; **leaves** grasslike, usually basal with closed sheaths; ligules absent, blades elongate, flat or V-shaped, keeled abaxially or absent; **involucral bracts** 1-10, leaflike, sheathless, spirally arranged, spreading to erect from the culm apex, 1-50 cm long, exceeding the inflorescence; **inflorescence** capitate, spicate, or subumbellate clusters; terminal clusters usually sessile; others on unequal rays from axils of the involucral bracts; **spikelets** 1-150, flat to subterete, many-flowered, deciduous or persistent and the scales deciduous; **rachilla** straight, offset, or zigzag, often with decurrent bases of the scales forming wings; **scales** distichous, keeled, each subtending a single flower or the lower ones empty and modified; **flowers** perfect, perianth absent; stamens (1-2) 3; style bifid or trifid, the base deciduous or persistent; **achene** flattened, lenticular, or trigonous.

A large genus of about 600 species found predominantly in tropical and warm temperate regions.

Species characteristics are often variable, and mature fruit is needed for identification. Annual flatsedges are frequently abundant on sandbars or riverbanks in years when rivers are lower than usual.

See Figure 10 and Figure 11.

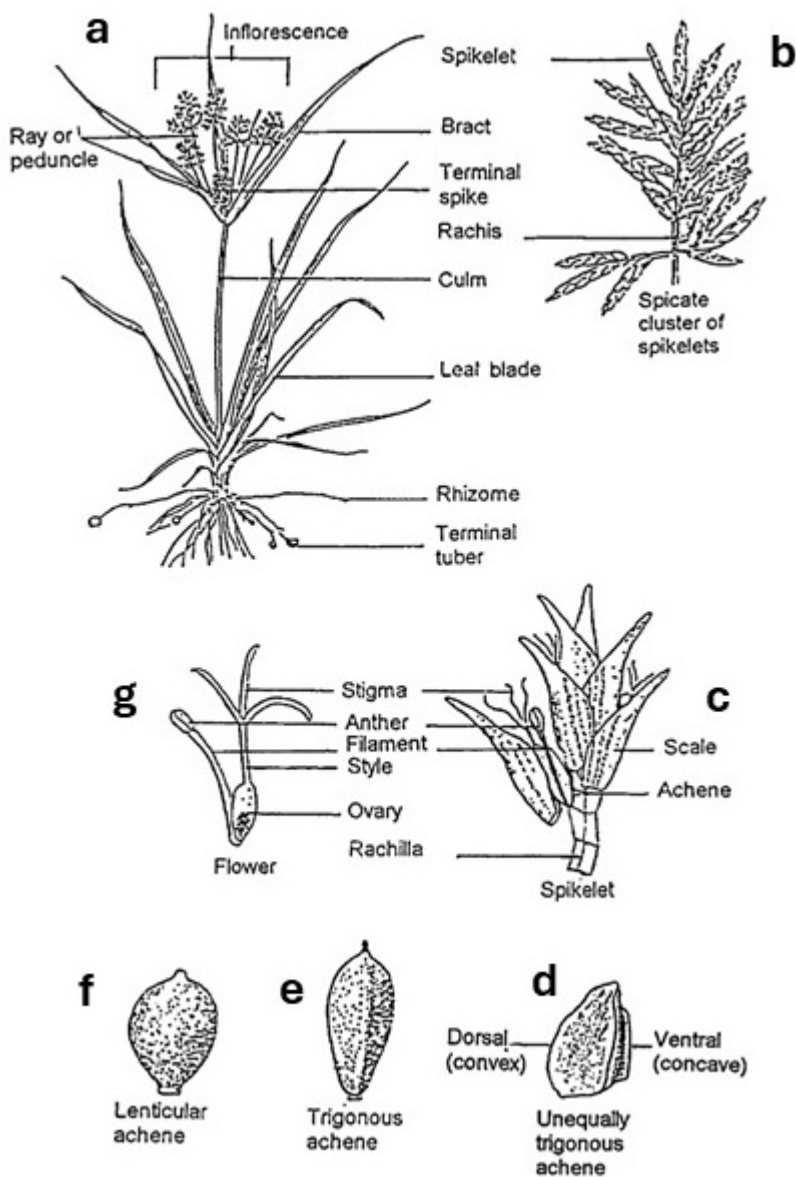


Figure 10. *Cyperus* morphology. Drawings: a, b, e, f: J.R. Janish (Hitchcock et al. 1969). c, d, g: E.G. Hurd.

Key to Intermountain *Cyperus* species

1. Stamens 1 (except in *C. difformis*); stigmas 3; tufted annuals; culms usually not tuberous-thickened at the base.
 2. Scales awn-tipped, recurved (especially when dry), 5–9 nerved; spikelets in loose to dense capitate clusters. *C. squarrosus* p. 50
 2. Scales not awn-tipped, 3-nerved; spikelets in dense capitate clusters.
 3. Scales ovate-lanceolate, acuminate; tip straight or slightly recurved. *C. acuminatus* p. 38
 3. Scales orbicular; tips obtuse. *C. difformis* p. 42
1. Stamens 2 or 3; plants mostly tufted, annual or perennial, tuberous or thickened at the base (except *C. bipartitus*).
 4. Rachilla wingless; annual; stamens 2; style bifid; achene lenticular, biconvex; scales anthocyanic except for the pale or greenish midrib. *C. bipartitus* p. 40
 4. Rachilla winged; stamens 3; style trifid; achene trigonous or terete; scales mostly yellowish brown to straw-colored.
 5. Plants annual; scales rounded or blunt apically, mucronate with a wide green midvein and a minutely excurrent keel; achene mucronate. . *C. erythrorhizos* p. 44
 5. Plants perennial (seldom annual, except *C. bipartitus*); scales mostly not mucronate and without a wide green midvein (except *C. schweinitzii*); achenes obtuse or mucronate.
 6. Rachilla disarticulating above the two lowest sterile scales; spikelets spreading at right angles to the rachis; plants without rhizomes; rachilla wing clasps the achene toward the base. *C. strigosus* p. 52
 6. Rachilla persistent; scales deciduous; spikelets not spreading at right angles to the rachis, plants rhizomatous, rachilla wings not clasping the achene.
 7. Spikelets linear, loosely clustered; scales not conspicuously nerved and midrib not excurrent; rhizomes slender and elongate, often terminating in small tubers; plants not tufted. *C. esculentus* p. 46
 7. Spikelet clusters oblong, somewhat closely clustered, rachilla narrowly or scarcely winged; scales conspicuously nerved and midrib excurrent; rhizomes short, without tubers; plants tufted. *C. schweinitzii* p. 48

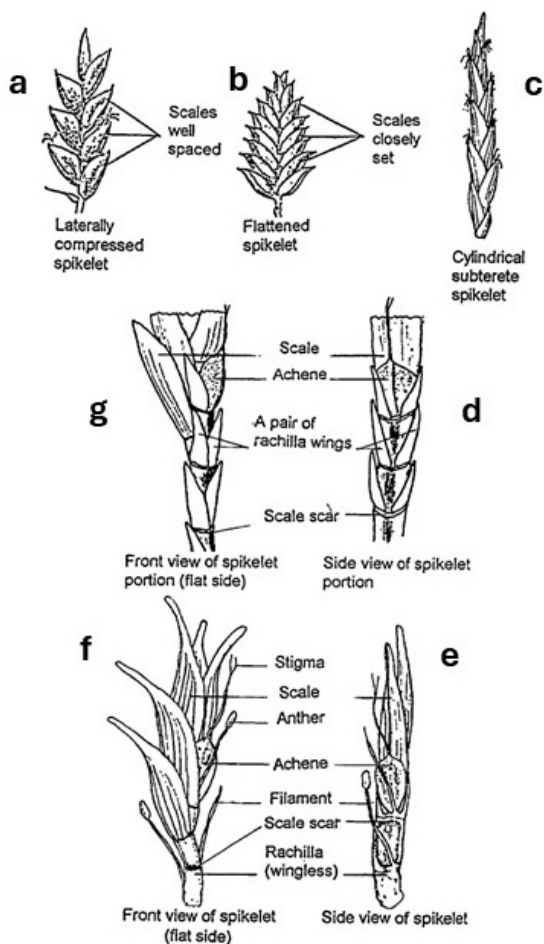


Figure 11. *Cyperus* morphology—spikelets. Drawings: a,b: J.R. Janish (Hitchcock et al. 1969). c-g: E.G. Hurd.

Cyperus acuminatus Torrey & Hooker ex Torrey

Tapertip flatsedge, Short-pointed flatsedge

PLANT HABIT: Tufted **annual** with fibrous roots; **culms** slender, roundly trigonous or subcompressed, multistriated, distal half glabrous or rarely scabridulous, sometimes thickened at the base, 0.5–4.5 dm tall, 0.4–1.2 mm thick.

LEAVES: Few, 2–6 to a culm, borne near the base, slender, elongate, flat or V-shaped, light green, scaberrulous on the margins, shorter than or about equal to the culm, 8–12 cm long, 1–3 mm wide; **sheaths** often reddish at the base.

INVOLUCRAL BRACTS: 3–6, erect to ascending or somewhat spreading, elongate, unequal, some or all of them much longer than the inflorescence, 3–12 cm long, 1–2.5 mm wide.

INFLORESCENCES: Umbels with 2–5 very short (0.2–3 cm), unequal rays terminating in dense globose clusters of 8–60 spikelets 5–18 mm wide; **spikelets** ovate-oblong, strongly flattened, pale green becoming light to reddish brown, 3–7 mm long, 2.5–3.5 mm wide.

RACHILLA: Straight, wingless, persistent; scales deciduous.

SCALES: 8–25, 2-ranked, closely set and overlapping, the tip of each scale surpassing the one beneath it, ovate-lanceolate, somewhat hyaline and cellular-reticulate, prominently 2-keeled, shortly recurved-acuminate at the tip, yellowish to light brown or reddish brown with a lighter or greenish nerved center, 1.5–2.5 mm long, 0.5–1.4 mm wide, deciduous at maturity.

FLOWERS: **Perfect;** **perianth** lacking; **stamen** 1, anther 0.5 mm; **style** trifid.

ACHENES: Obovoid-elliptic or oblong, trigonous, abruptly contracted at the base, slenderly stipitate, smooth, brown, 0.6–1.1 mm long, 0.3–0.6 mm wide with a short apiculate beak formed from the style base. Fruiting: June–October.

HABITAT AND DISTRIBUTION: Drying shores, mudflats, disturbed seasonal wetlands, and other wet places, usually in sandy soils, 0 to 1500 m. Tolerant of alkali. Uncommon in the Intermountain Region where it is reported from locations in west-central Nevada and central and southern Utah and northern and central Colorado. Washington to New Hampshire and south from California to Alabama; Mexico.

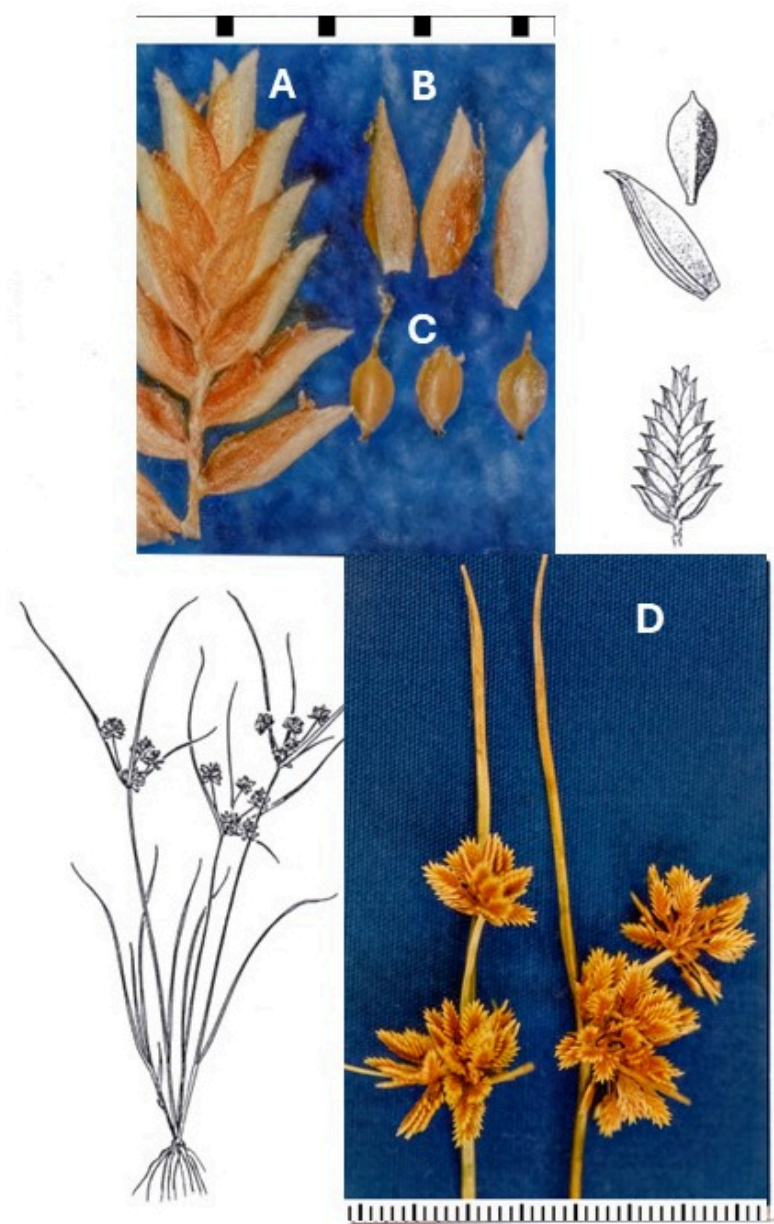


Figure 12. *Cyperus acuminatus*. (A) Spikelet, (B) scales, (C) achenes, (D) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cyperus bipartitus Torrey

Slender flatsedge, Streamside flatsedge

SYNONYMS: *Cyperus niger* Ruiz & Pav. var. *rivularis* (Kunth) V.E. Grant, *C. rivularis* Kunth, *Pycnus rivularis* (Kunth) Palla

PLANT HABIT: Small, densely tufted **annual** with fibrous roots; **culms** slender, triangular to rounded, smooth, multistriate, 0.5–3 dm tall, 0.3–1.4 mm thick, sometimes thickened at the base.

LEAVES: Few, 1–3 to a culm, all borne near the base, slender, flat to V-shaped, margins smooth, becoming scaberulous distally; shorter to longer than the culms, 1–8 cm long, 0.5–2 mm wide; lower basal **sheath** brown or reddish brown.

INVOLUCRAL BRACTS: 2–4, leaflike, horizontal to mostly ascending, V-shaped to flat, unequal, 1–12 cm long, 0.5–1.5 mm wide; the longest bract much surpassing the inflorescence; others reduced, spreading.

INFLORESCENCES: One to several capitate clusters of ascending to spreading spikelets aggregated at a point; clusters are 7–14 mm long, 9–14 mm wide, the primary or terminal cluster sessile at the top of the peduncle; others (if present) with 1–10 spikelets on 1–4 slender rays 2–3 cm long; **spikelets** lanceolate to ovate, flat with thinner edges, mostly reddish purple, 3–12 mm long, 2–3 mm wide.

RACHILLA: Persistent, wingless or minutely winged, slightly angular-twisted, about 0.5 mm wide.

SCALES: Floral scales 6–24 per spikelet, ovate to lanceolate, obtuse at the tip, prominently 2–3-ribbed medially, 2-keeled, pale greenish to yellowish along the midrib, strongly splotched anthocyanic and somewhat shiny along the margins, 2–2.7 mm long, 0.75–2.3 mm wide, very closely set, strongly overlapping and giving the spikelets a smooth outline, deciduous from the rachilla at maturity.

FLOWERS: **Perfect;** **perianth** absent; **stamens** 2 (rarely 3); anthers 0.5 mm long; **style** deeply bifid, stigmas 2.

ACHENES: Broadly ovoid, lenticular, olive to blackish or dull brown, becoming minutely roughened or cross-ridged at maturity, sometimes with prominent indentations on the upper half of the angle (ventrally) next to the rachilla, 1.0–1.9 mm long, 0.6–0.9 mm wide. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Exposed shorelines, ditches, disturbed wetlands, sandy streambanks from sea level to 1500 m, tolerant of alkali. Uncommon in the Intermountain Region. Collections have been made in southeastern Oregon, southwestern Idaho, and central and northeastern Utah. More frequent eastward across the United States, also in southern Canada, and the mountains of Mexico and Central and South America.

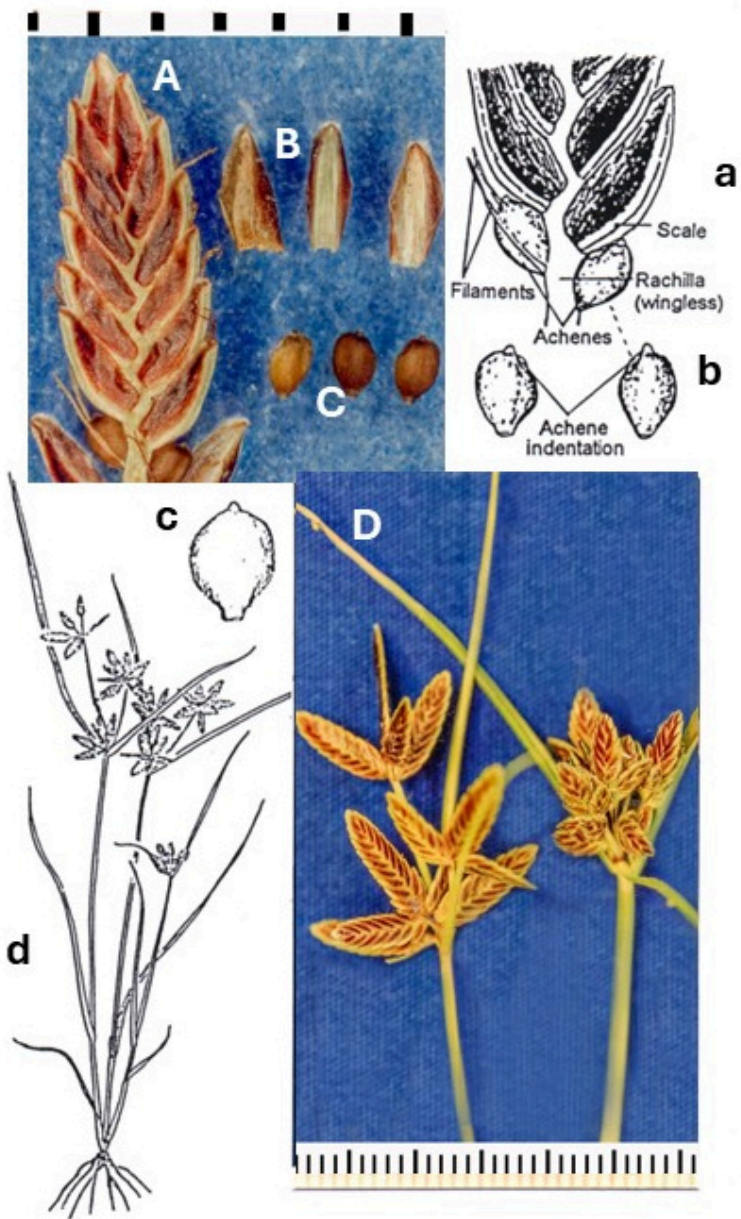


Figure 13. *Cyperus bipartitus*. (A) Spikelet, (B) scales, (C) achenes, (D) inflorescences. Photos: E.G. Hurd. Drawings: a, b: E.G. Hurd. c, d: J.R. Janish (Hitchcock et al. 1969).

Cyperus difformis L.

Variable flatsedge

SYNONYMS: *Cyperus lateriflorus* Torrey

PLANT HABIT: Small, tufted **annuals**; roots fibrous, reddish; **culms** 1–15, sharply triangular, narrowly winged on the angles, smooth, soft, 1–3 dm tall, 1.5–2.5 mm thick.

LEAVES: 2–7, borne toward the base, flat, keeled, 2–22 cm long, 2–4 mm wide, shorter than the culms; lower **sheath** with reddish venation at the base and reddish speckles toward the hyaline mouth.

INVOLUCRAL BRACTS: 2–4, flat, keeled, margins and keel slightly scabridulous (especially near the tip), 1–22 cm long, up to 3.5 mm wide, sometimes wider than the culms; the largest bract erect, appearing as a continuation of the culm; other bracts reduced and spreading.

INFLORESCENCES: Very tight clusters of 30–120 spikelets forming globose (7–17 mm diameter) to irregular lobate heads (2–32 mm diameter); the central cluster sessile; the lateral (0) 1–5 on short rays less than 3 cm long; **spikelets** oblong, flat or compressed, yellowish to reddish purple, about 3 mm long, 1.1 mm wide.

RACHILLA: Obscurely **winged**, persistent, not angular-twisted or only obscurely so, not flattened.

SCALES: 6–20, 2-ranked, 3-nerved, closely spaced, orbicular, apex obtuse with a small mucro, greenish to pale, 3-nerved medially, margins hyaline to transparent, very small, about 0.7–1 mm long, 0.5–1 mm wide, deciduous.

FLOWERS: **Perfect**; **perianth** lacking; **stamens** 1–2; anthers broadly oval, about 0.1 mm long; **styles** bifid or trifid.

ACHENES: Broadly oblong with a cuneate base, unequally **trigonus**, ventrally concave, apex short apiculate, surface papillose and finely reticulate, pale brown to yellowish brown at maturity, 0.5–0.8 mm long (about equaling the subtending scale), about 0.3–0.5 mm wide. Fruiting: July–November.

HABITAT AND DISTRIBUTION: A common weed of moist to wet sandy or muddy soils in disturbed areas. Occurs along ditches, roadsides, ponds, streambanks, shores, and rice fields from sea level to 1000 m. In the Intermountain Region known from banks of the Boise River in Canyon County, Idaho. Native to the Eastern Hemisphere and widely introduced in the Western Hemisphere.

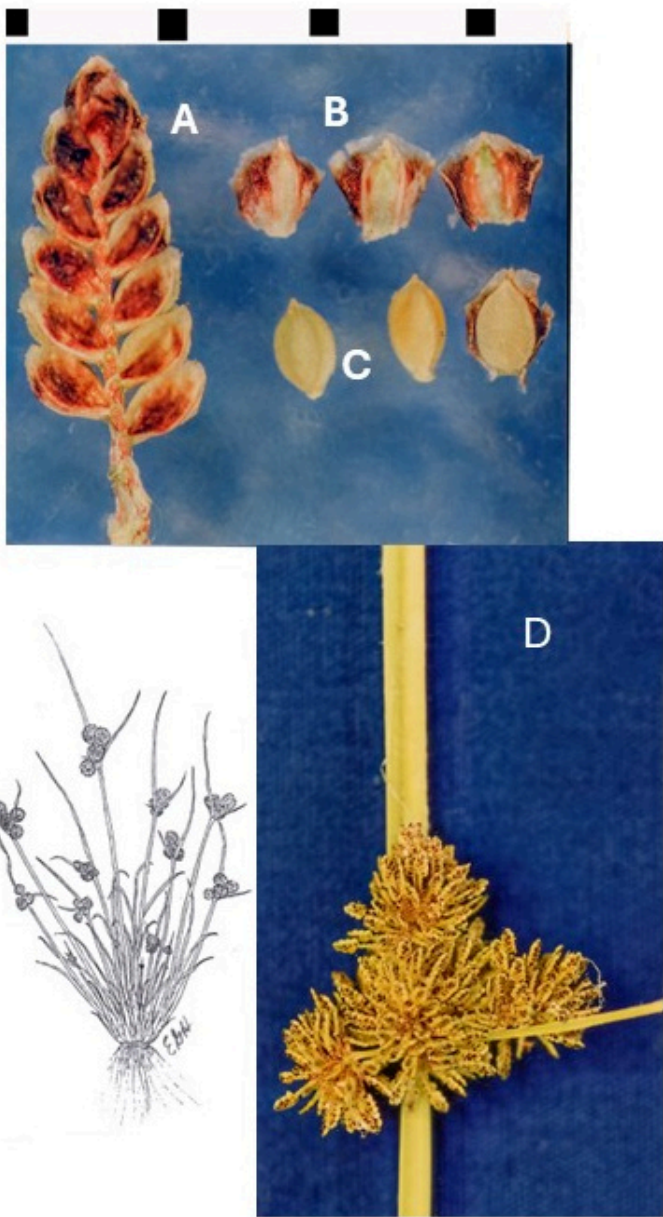


Figure 14. *Cyperus difformis*. (A) Spikelet, (B) scales, (C) achenes: right—with scale attached on the dorsal side, (D) inflorescence. Photos and drawing: E.G. Hurd.

Cyperus erythrorhizos Muhlenberg

Redroot flatsedge, Redroot nutgrass

SYNONYMS: *Cyperus cupreus* J. Presl & C. Presl, *C. halei* Torrey ex Britton, *C. occidentalis* Torrey, *C. washingtonensis* Gandoger

PLANT HABIT: **Annual;** **roots** reddish, fibrous; **culms** tufted or occasionally arising singly or few together, sharply triangular to rounded, rather stout, smooth, (0.5) 1–7 (10) dm tall, 1–4 mm wide.

LEAVES: Several, crowded toward the base, lower leaves reddish; **sheaths** loosely envelope the culm; **blades** flat to an inverse W shape, elongate, scaberulous along the midrib and margins, shorter to longer than the culm, 5–25 (90) cm long, 2–10 mm wide.

INVOLUCRAL BRACTS: 4–10, leaflike with scaberulous margins, horizontal to ascending, unequal, up to 40 cm long, the larger ones sometimes wider than the leaves and longer than the inflorescence.

INFLORESCENCES: 1–3 (6) cylindric to ovoid spikes 1–4 cm long bearing 40–80 loosely clustered spikelets spirally arranged on an elongate rachis; the terminal cluster sessile; the lateral clusters on rays 8 cm long or longer; **spikelets** quadrangular, reddish brown, 3–12 mm long, 1–1.5 mm wide.

RACHILLA: Persistent, slightly angular-twisted with narrowly hyaline, readily deciduous wings at the nodes.

SCALES: 6–20 per spikelet, closely set, the broadly rounded tip of each scale surpassing the one below it by 0.4–0.7 mm, oblong-lanceolate or oblong-obovate, inconspicuously 3–5 nerved, greenish along the scarcely excurrent keeled midrib, satiny and golden brown to reddish brown along the margins, 1–1.5 mm long, 0.5–1 mm wide, eventually deciduous.

FLOWERS: **Perfect;** **perianth** lacking; **stamens** 3; anthers short, about 1 mm long; **style** trifid for up to half its length.

ACHENES: Sessile, broadly oblong, unequally trigonous, concave on the ventral side, side angles acute, apex rounded and mucronate, smooth, shining, pale brown or grayish, (0.4) 0.7–2.0 mm long, about 0.5 mm wide. Fruiting: July–October.

HABITAT AND DISTRIBUTION: Emergent shorelines of ponds, lakes, rivers, marshes, and other wet places from sea level to 1800 m. Weedy in cultivated areas. Occurs at Utah Lake, along the Rio Grande River, and other scattered locations in the Intermountain Region. Native in the United States, southern Canada, and Mexico.

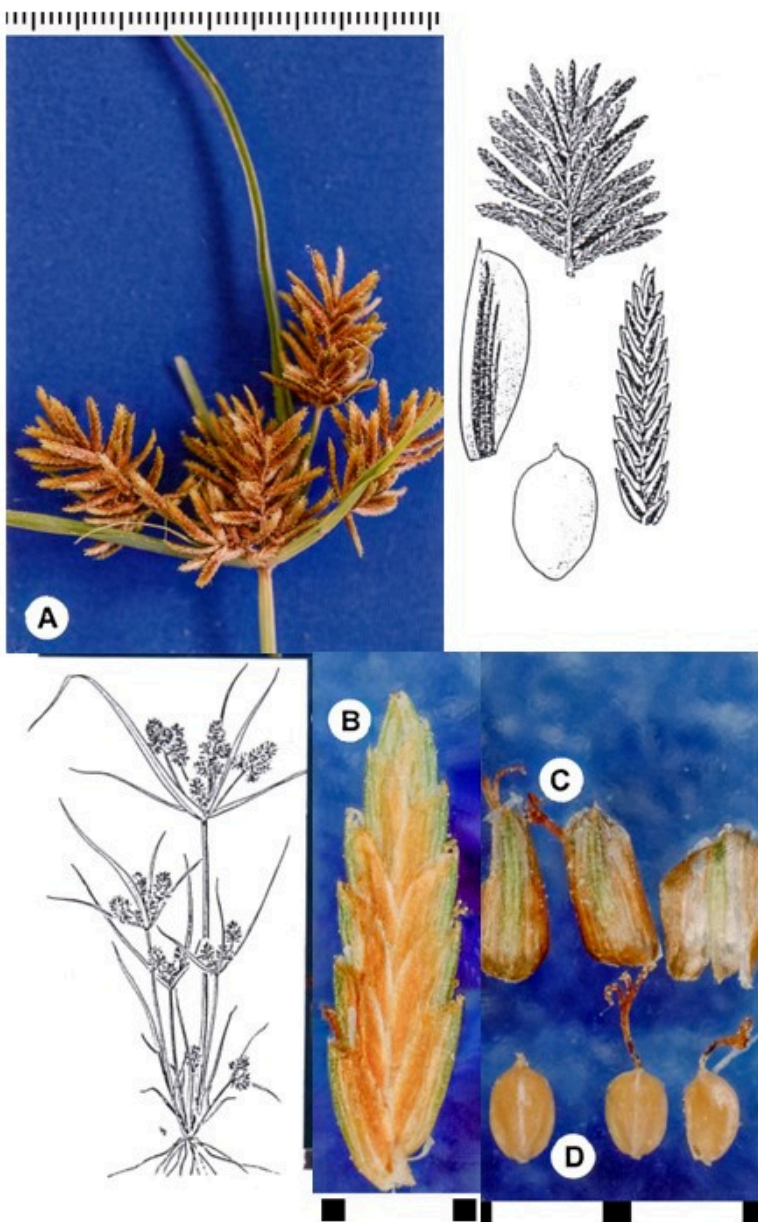


Figure 15. *Cyperus erythrorhizos*. (A) Inflorescence, (B) spikelet, (C) scales, (D) achenes. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cyperus esculentus L.

Yellow nutsedge, Chufa flatsedge, Yellow nutgrass

PLANT HABIT: Highly polymorphic, non-tufted **perennial**, producing many slender, spongy **stolons** that terminate with small, edible tubers; **culms** arise singly, stout, sharply triquetrous, smooth, 1–7 (10) dm tall, 0.6–5 mm wide.

LEAVES: Few to many, sweet-scented, clustered at the base; **sheaths** pale or reddish brown at the base; **blades** firm, flat to V-shaped with smooth margins that are scaberulous distally, shorter to longer than the culms, mostly 2–8 mm wide.

INVOLUCRAL BRACTS: 3–6, unequal, leaf-like, bright green, V-shaped to V-shaped and flanged, sometimes slightly wider than the lower leaf blades, spreading to ascending, shorter to much exceeding the inflorescence.

INFLORESCENCES: Clustered cylindric spikes, 1–4 cm long, 18–35 mm wide; terminal cluster sessile, others single or in groups on 5–10 rays up to 12 cm long; **spikelets** numerous, spirally arranged on the elongate (4–17 mm long) rachis, divaricate, slender, linear, flattened, reddish to golden brown, 10–20 mm long, 1–3 mm wide.

RACHILLA: Persistent with narrow hyaline wings 0.3–0.5 mm wide, the scales disarticulate from it.

SCALES: 6–34 per spikelet, ovate to elliptic, laterally 3–5 nerved, medially 3-ribbed, obscurely mucronulate, pale to greenish along the center, scarious, yellowish brown to reddish brown along the margins, 2–4 mm long (the lowest one shorter), much overlapping laterally, the tip of each scale only slightly exceeding the one below it, deciduous at maturity.

FLOWERS: **Perfect;** **perianth** lacking; **stamens** 3; anthers about 1 mm long or longer; **style** trifid for one-fourth to one-half its length, stigmas 3.

ACHENES: Seldom maturing, sessile, ellipsoid, unequally **trigonus**, angles acute or obtuse, punctulate, shiny, brown, 1.3–2 mm long, 0.3–0.8 mm wide; style somewhat persistent. Fruiting: June–October.

HABITAT AND DISTRIBUTION: Moist and disturbed soil along streams and ditches, lakes, and sandbars. A difficult weed in cropland. Distributed worldwide, but generally lacking in cold temperate regions. Uncommon in the Intermountain Region where collections of *C. e.* var. *leptosctachyus* and *C. e.* var. *heermannii* are reported from southwestern Idaho, northeastern and east-central Utah, west-central Nevada and southeastern Oregon.

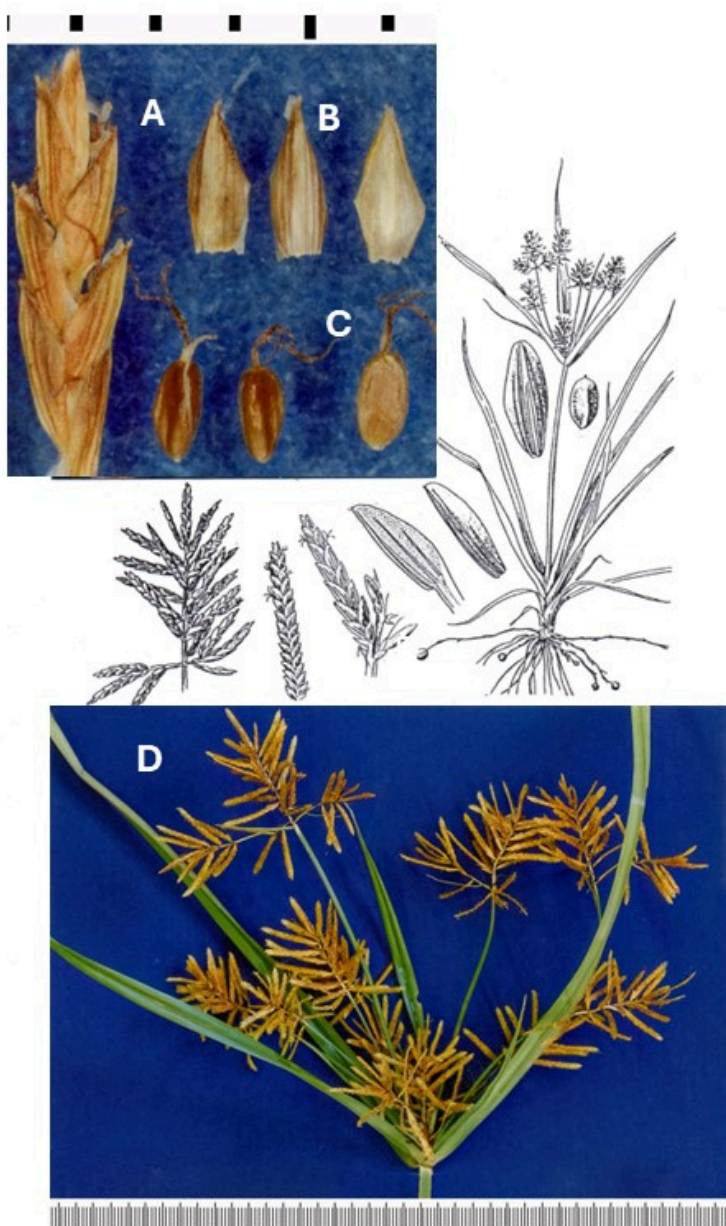


Figure 16. *Cyperus esculentus*. (A) Spikelet, (B) scales, (C) achenes: left and center dorsal views, right-ventral view, (D) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cyperus schweinitzii Torrey

Schweinitz cyperus, Rough sand sedge, Schweinitz flatsedge

SYNONYMS: *Cyperus alterniflorus* Schweinitz, *Mariscus schweinitzii* (Torrey) T. Koyama,

C. schweinitzii Torrey var. *uberius* Kük.

PLANT HABIT: Tufted **perennial** from short, irregularly thickened rhizomes; **culms** bulbous at the base, triquetrous, glabrous or often antrorsely scabrous distally, 1–7 dm tall, 1.5–2 mm thick.

LEAVES: 3–5 to a culm, crowded toward the base; **sheaths** papery, 1–4 cm long, brownish or yellowish proximally, lowest sheaths bladeless; **blades** well developed, elongate, flat to V-shaped, keeled, rough margined, (2) 7–35 cm long, 1–6 mm wide.

INVOLUCRAL BRACTS: Leaflike, 3–7, erect to ascending, narrow but sometimes slightly wider than the leaves, unequal, up to 10 cm long; the longest 2–4 times longer than the inflorescence.

INFLORESCENCES: 1-several, umbellate to ovoid, unequal **spikes**, the terminal spike sessile, others on rays up to 8 cm long; **spikelets** linear-oblong, laterally compressed, pale brown, 0.5–2.5 cm long, mostly 2–4 mm wide.

RACHILLA: Narrowly or obscurely winged, wings sometimes scarious but scarcely hyaline, more or less deciduous.

SCALES: 5–10, broadly ovate, apex rounded and erose, convex on the dorsal side, mucronate with the midrib excurrent as a short point, straitly 9–15 nerved, centers green when fresh, margins straw-colored, whitish, or red spotted, (2.3) 3–4 mm long, the lowest ones shorter, 2–3.2 mm wide, well-spaced, spreading, the tip of each scale surpassing the scale below it by about half its length, deciduous at maturity.

FLOWERS: **Perfect;** **perianth** lacking; **stamens** 3; **style** trifid almost to the base.

ACHENES: Ovoid or elliptical or infrequently obovoid, equally trigonous, cuneate to stipelike at the base, apex obtuse, surface papillose, dark brown or blackish, 2–2.5 mm long, 0.9–2.6 mm wide; style somewhat persistent. Fruiting: early spring—early summer.

HABITAT AND DISTRIBUTION: Lakeshores, streambanks, sandy openings in woods, dunes and sandy soils, from sea level to 2000 m elevation. In the Intermountain region reported from Kane County, Utah. Washington to Alberta and east to southern Quebec, south to Arizona, Texas, and Mexico. Not reported for the southeastern United States.

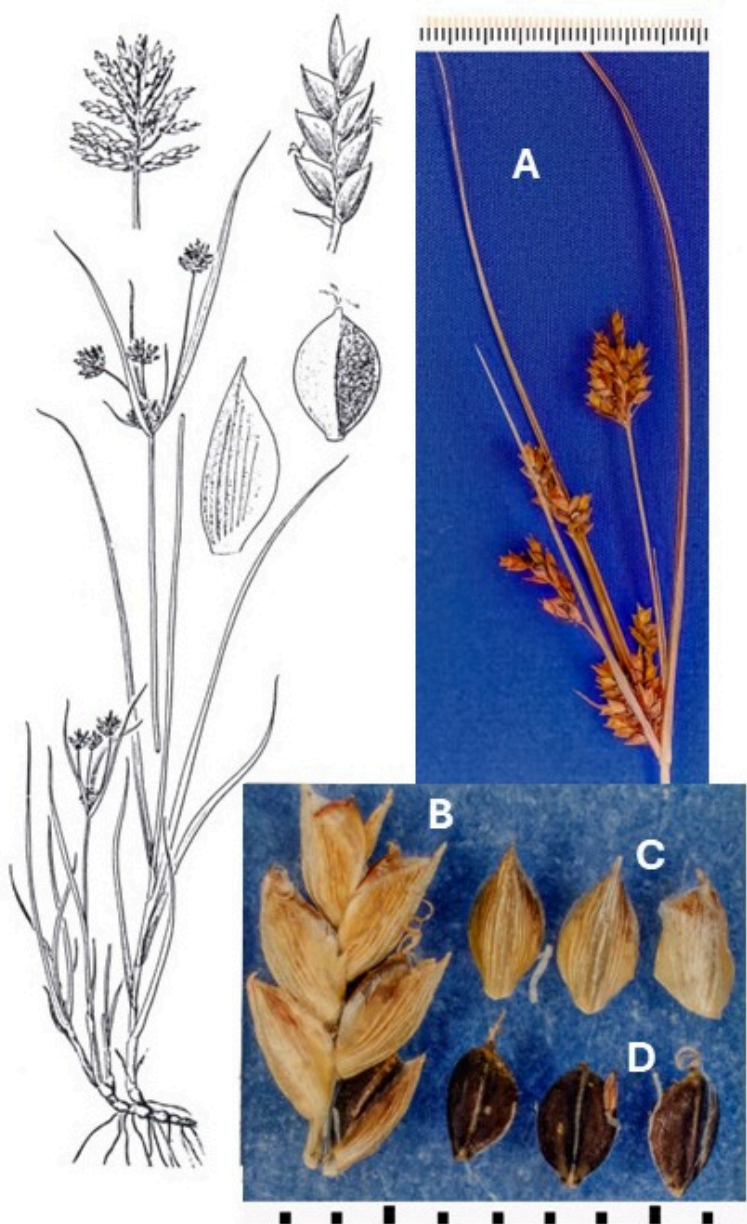


Figure 17. *Cyperus schweinitzii*. (A) Inflorescence, (B) spikelet, (C) scales, (D) achenes. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cyperus squarrosus L.

Bearded flatsedge, Awned flatsedge, Bearded nutgrass

SYNONYMS: *Cyperus aristatus* Rottb., *C. inflexus* Muhlenberg

PLANT HABIT: Very small tufted **annual** with fibrous roots; fresh herbage sweet, celery-scented; dry herbage clover scented; **culms** 1–20, slender, sharply triangular, smooth, unequally ribbed or striated, 0.3–1.5 dm tall, 0.5–2 mm wide.

LEAVES: Few, all borne near the base, flat to V-shaped, keeled distally, light green, shorter to longer than the culms, 2–10 cm long, 0.5–2.5 mm wide; **sheaths** of older leaves reddish brown.

INVOLUCRAL BRACTS: Leaflike, 1–6, elongate, unequal, 1–15 cm long, some or all surpassing the inflorescence.

INFLORESCENCES: 1–4 capitate clusters of spikelets, 5–15 mm wide; terminal cluster sessile, others (if present) on slender rays up to 3 cm long; **spikelets** 1–30 in a cluster, lanceolate to oblong, somewhat compressed, greenish, yellowish, or reddish brown, 4–10 mm long, 1–2.2 mm wide.

RACHILLA: Straight, wingless, persistent.

SCALES: 4–20 per spikelet, somewhat closely set, oblong-lanceolate, 5–11 nerved (prominent when dry), slenderly bristle tipped, prominently spreading or recurved (prominent when dry), greenish or yellowish to reddish brown, midrib commonly greenish or paler, 1–2 mm long including the awn, 0.4–0.8 mm wide, deciduous.

FLOWERS: **Perfect**; **perianth** lacking; **stamens** 1; **style** trifold.

ACHENES: Narrowly obovoid or oblong, trigonous, obtusely angled, papillose, stipitate, apex truncate and apiculate, light brown or reddish brown to blackish, 0.6–1.0 mm long, 0.3–0.5 mm wide; stipe 0.06–1.0 mm. Fruiting: June–November.

HABITAT AND DISTRIBUTION: Seeps, springs, disturbed areas in wet meadows and wetlands, flood plains, drying margins of ponds and lakes, and river sandbars from sea level to 2500 m elevation. Occurs throughout much of the continental United States and Mexico, including scattered locations across the Intermountain Region.

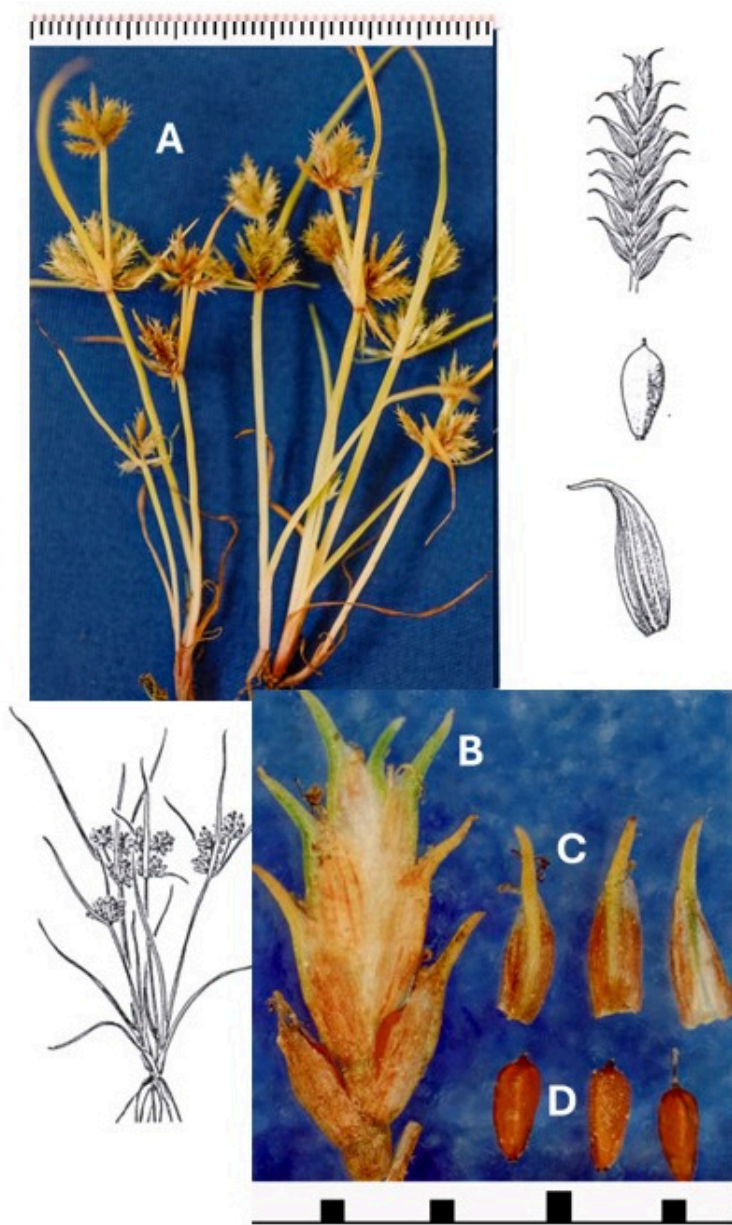


Figure 18. *Cyperus squarrosus*. (A) Plant with inflorescences, (B) spikelet, (C) scales, (D) achenes. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Cyperus strigosus L.

Strawcolored flatsedge, False nutsedge, Strawcolored nutgrass

SYNONYMS: *Cyperus stenolepis* Torrey, *C. hansenii* Britton, *Mariscus stenolepis* (Torrey) C.B. Clarke, *M. strigosus* (L.) C.B. Clarke.

PLANT HABIT: Short-lived **perennial**; **culms** few or solitary, erect, mostly stout, trigonous, smooth, swollen, and cormlike at the base, 1–9 dm tall, 1–6 mm thick; often flowers the first year.

LEAVES: One to several, crowded toward the base, flat, glabrous or scaberulous at the margins and midrib and becoming more so distally, light green to yellowish green, longer or shorter than the culms, 10–40 cm long, 2–8 (15) mm wide; lower **sheaths** brown.

INVOLUCRAL BRACTS: Leaflike, 3–6 (10), flat, scaberulous on the margins, lax and spreading, cross ribs may be conspicuous; longer bracts are 1–2 times longer than the inflorescence and up to 5 mm wide.

INFLORESCENCES: Umbellate with up to 10 spikelike or headlike clusters, some (or all) clusters sessile, others on elongate, unequal rays to 7 (20) cm long. **Spikelets** 10–30 flat, elongate, 6–25(50) mm long, 1–2 mm wide, spreading to perpendicular to the elongate rachis.

RACHILLA: Somewhat zigzag shaped, slightly angular twisted, broadly hyaline-winged (0.4–0.5 mm wide) at each node, wings clasping the lower part of each achene, sometimes disarticulating at the node just above the lowermost pair of scales.

SCALES: 3–11 per spikelet, 2-ranked, appressed, each scale overlapping the lower half of the next scale, oblong to obovate with a somewhat acute apex, 7–11 nerved, margins stramineous to yellowish or golden brown and narrowly hyaline distally, greenish or paler along the midrib, 3–6 mm long, 1–1.8 mm wide, persistent on the rachilla or deciduous.

FLOWERS: 10–16, **perfect**, **perianth** lacking, **stamens** 3; anthers 0.5 mm long or less; **style** deeply trifid, exerted beyond the scale.

ACHENES: Linear-oblong, unequally trigonous, punctulate, somewhat less stipitate, mucronate, dark purplish brown, 0.3–0.5 mm wide, 3–4 times as long as wide; style somewhat persistent. Fruiting: July–October.

HABITAT AND DISTRIBUTION: Disturbed soil in wet areas, marshy ground, emergent shorelines, and sandy gravel areas along streams at elevations from sea level to 1600 m. A weed in garden and croplands. Uncommon in the Intermountain Region with collections reported from southwestern Idaho, central and southern Nevada, and Utah. Widespread elsewhere in the United States and southern Canada.

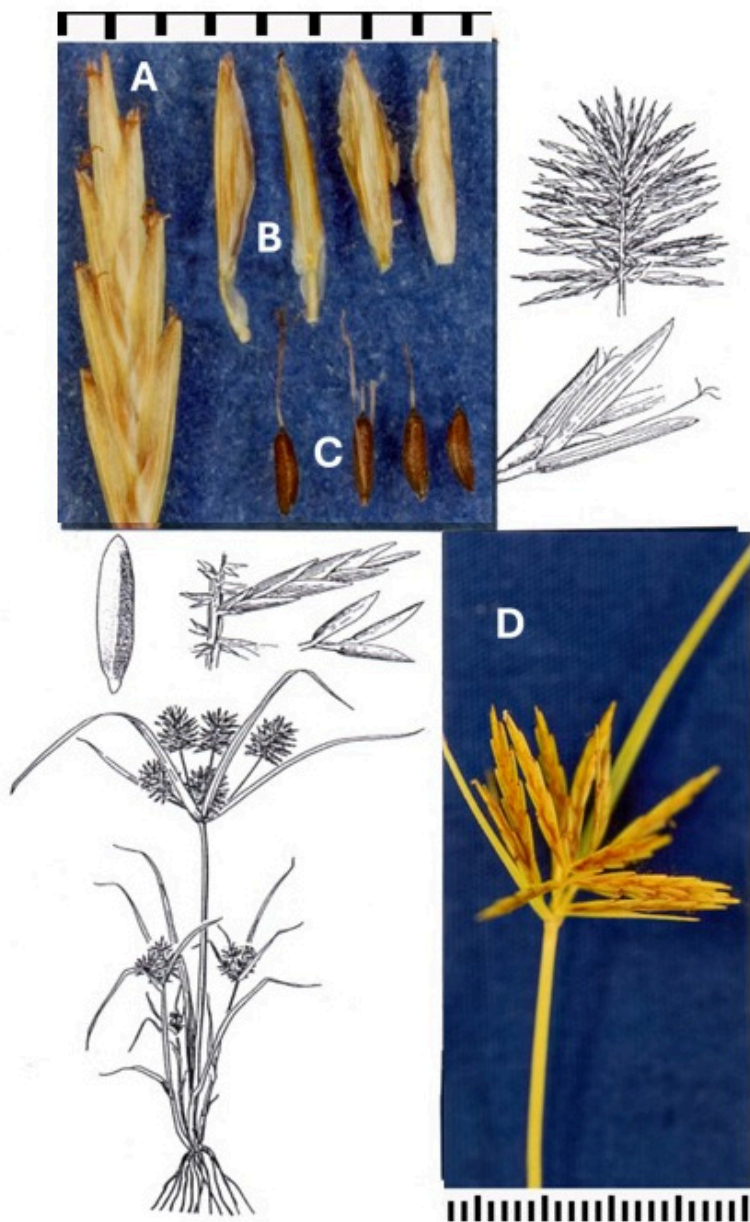


Figure 19. *Cyperus strigosus*. (A) Spikelet, (B) scales: the first and second on left with winged rachilla segments attached at the base, (C) achenes, (D) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Dulichium Persoon

Dulichium

Grasslike **perennials** with horizontal rhizomes, cespitose or spreading; **culms** tall, terete to obtusely triangular, jointed with hollow internodes; **leaves** numerous, 3-ranked, well distributed along the culms, ligulate; lower leaves bladeless; upper leaves with short, flat, well-developed blades; **inflorescences** consist of spikes borne in the sheath axils of the bract-like upper leaves; **spikelets** 3–10 per spike, 2-ranked, appressed to ascending, linear, flat or compressed, jointed, deciduous; **scales** 4–8, 2-ranked, green with gold-hyaline margins, decurrent on the joints; **flowers** perfect, 2–4 ranked, borne singly in the scale axils; perianth bristles 6–9, well developed, stiff, retrorsely barbellate, slightly longer than the achene; stamens 3, exceeding the bristles; stigmas 2; **achene** lenticular, stipitate, light brown; the style base persistent on the achene.

A North American genus of a single species with two varieties.

See Figure 20.

Dulichium Morphology

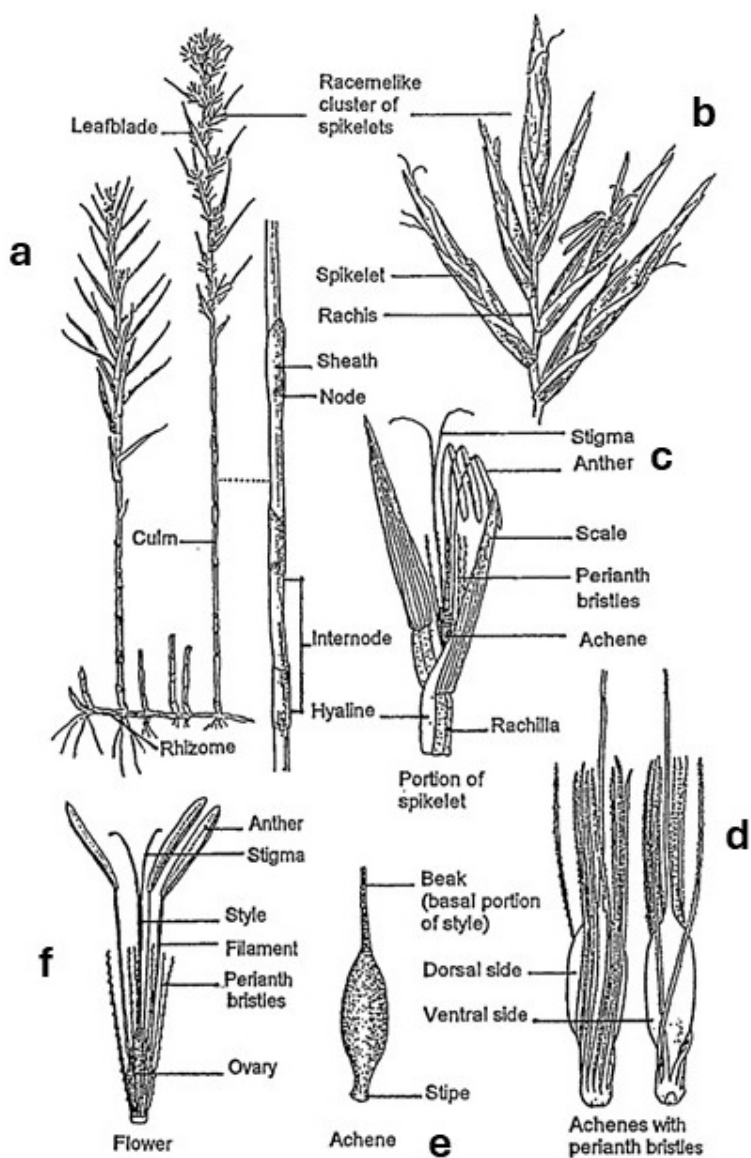


Figure 20. *Dulichium* morphology. Drawings: a, b, d: J.R. Janish (Hitchcock et al. 1969), c, e, f: E.G. Hurd.

***Dulichium arundinaceum* (L.) Britton**
var. *arundinaceum*

Three-way sedge

SYNONYMS: *Cyperus arundinaceus* L.

PLANT HABIT: Perennial; **rhizomes long**, 3–5 mm thick; **culms** 2–14, arising singly, stout, erect, cylindric, stout, jointed with hollow internodes, leafy, 2–10 dm tall, 4 mm thick.

LEAVES: Numerous, well distributed along the stem; lower 2–14 leaves firm, bladeless, green **sheaths** with brown, hyaline margins at the mouth, sheaths not splitting; upper 3–15 leaves spreading or ascending with flat, leathery, glabrous 3-ranked grasslike **blades** with acute tips, 4–15 cm long, (1.5) 3.5–8 mm wide; distal 5–20 leaves are bracts.

INFLORESCENCES: 6–30 cm long, consisting of 1–17 spikes, about 2–5 cm long in sheath axils; **spikelets** 5–20 per spike, 2-ranked, flat, ascending to spreading, linear-lanceolate, greenish to brownish, 15–30 mm long, 1.2–2.5 mm wide; rachilla hyaline winged, readily disarticulating with the scale at maturity.

SCALES: 4–8 per spike, 2-ranked, decurrent, lanceolate, acute to acuminate, prominently many-nerved, light green becoming pale, hyaline along the margins, spongy at the base, (3) 5–9.5 mm long, about 2 mm wide.

FLOWERS: **Perfect**, sessile, borne singly in the scale axils; **perianth bristles** 6–9, rigid, retrorsely barbellate, about 4–8 mm long, from shorter than the achene to much longer; **stamens** 3, longer than the perianth bristles; anthers 3–4 mm; **stigmas** 2, deeply branched, much exerted from the scale.

ACHENES: Narrowly ellipsoid, flattened or somewhat planoconvex with a short, stout stipe, yellowish brown, 2.5–4 mm long (excluding the 1 mm style base), about 1 mm wide; the persistent, undivided basal portion of the style forms a linear beak. Fruiting: July–October.

HABITAT AND DISTRIBUTION: Marshy shores, wet meadows, bogs, pond margins, and ditch banks from sea level to 700 m. Distributed from southwestern British Columbia to California and in eastern North America. Rare in the Intermountain Region, known from Valley County, Idaho and east central California.

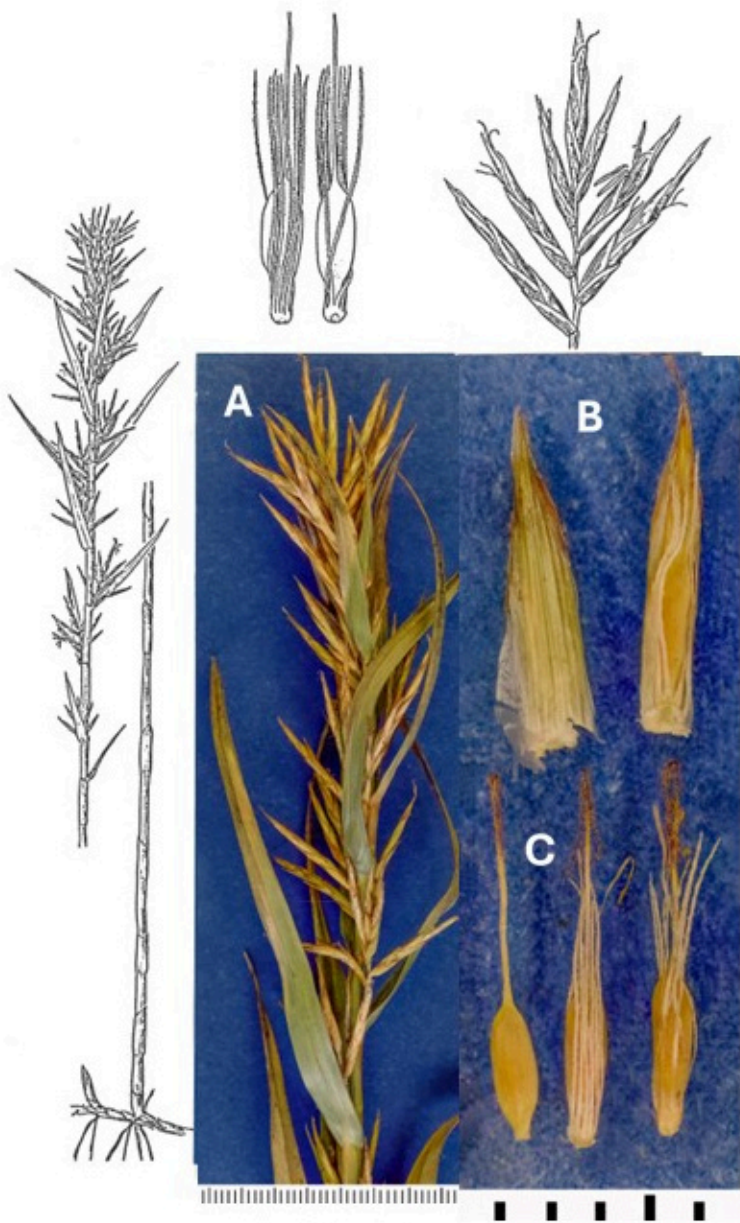


Figure 21. *Dulichium arundinaceum* var. *arundinaceum*. (A) Inflorescence, (B) scales, (C) achenes with styles and stigmas attached, center and right with perianth bristles attached. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis R. Brown

Spikerush, Spikesedge

Mostly **perennials** forming mats or tufts; **rhizomes** long and horizontal, short and ascending, absent, or not evident; some with stolons, tubers, or bulbs; **culms** angular or cylindrical, ridged or smooth, spongy, not hollow; **leaves** usually 2, basal, sheaths well-developed, blades absent or sometimes present as a mucro (tooth) less than 1 mm long; ligule absent; **inflorescence** terminal; **spikelet** 1, erect, not laterally flattened; **involucral bracts** absent; **scales** spirally arranged, ovate or lanceolate, dark brown to straw-colored, the apex not notched, midrib not apically prolonged; proximal scales often empty; the lowest scale may resemble a short bract; **flowers** perfect, solitary in the scale axils; **perianth bristles** (0) 3–6 (8), attached to achene base, retrorsely spinulose (rarely smooth), up to twice as long as the achene; stamens 1–3; styles bifid or trifid, style base usually enlarged into a persistent tubercle distinct from or merging with the achene apex; **achenes** mostly obovoid, trigonous or lenticular to sometimes nearly circular in cross section, ribbed or smooth, yellowish to dark brown, the apex sometimes narrowed into a short tubercle or beak.

Notes: Descriptions of the genus and species are based on specimens from the Intermountain Region as much as possible. Achene measurements given for the species do not include the tubercle, which is technically the base of the style and not part of the achene.

A cosmopolitan genus of about 200 species growing in wet soil or emergent or submerged in water. Most common in tropical and warm temperate regions.

See Figure 22.

Key to Intermountain *Eleocharis* species

1. Tufted annuals without evident rhizomes.
 2. Lowest scale of spikelet with a flower; achenes with longitudinal ribs connected by fine horizontal bars; plants 1–7 cm tall. *E. bella* (in part) p. 64
 2. Lowest scale of spikelet without (or rarely with) a flower; achenes smooth, without longitudinal ribs or horizontal bars; plants 2–90 cm tall.
 3. Achenes brown ripening to black; tubercles not markedly compressed dorsiventrally; spikelet scales membranous to tough and hard (cartilaginous); leaf sheath without an apical tooth. *E. geniculata* (under *E. obtusa*) p. 78

3. Achenes brown when ripe; tubercles markedly compressed dorsiventrally; spikelet scales membranous; leaf sheath often with an apical tooth to 0.3 mm long.
4. Achene with bristles absent or not reaching much beyond the tubercle; tubercles low, 0.1–0.4 times as high as wide and not more than 0.25 times as high as the achene. *E. engelmannii* p. 70
4. Achene with bristles present and reaching markedly beyond tubercle; tubercle 0.3 times to fully as high as wide and at least 0.25 the height of the achene.
5. Tubercles 0.5–0.8 mm wide. *E. obtusa* p. 78
5. Tubercles 0.3–0.5 mm wide. *E. ovata* (described under *E. obtusa*) p. 78
1. Perennials forming mats from long horizontal rhizomes or from culms arching over and rooting at their tips or forming dense clumps from short, ascending or vertical rhizomes.
6. Some culms arching over and rooting at their tips; long horizontal rhizomes absent; achenes usually with a narrow beak; tubercle merges with the achene in color, texture, and form. *E. rostellata* p. 86
6. Culms arching over and rooting at the tips lacking (but see *E. pachycarpa* description under *E. bolanderi*); long horizontal rhizomes present or absent; achene apex and tubercle various.
7. Leaf sheaths transparent, very delicate, or not evident; culms to 0.7 mm thick.
8. Proximal scale with a flower; achenes with longitudinal ribs and horizontal bars.
9. Scales 1–1.5 mm long, narrowly acute; achenes to 0.75 mm long; anthers to 0.5 mm long. *E. bella* p. 64
9. Scales 1.5–3.5 mm long, blunt to acute; anthers exceed 0.7 mm long. *E. acicularis* p. 62
8. Proximal scale empty; achenes without ribs or bars.
10. Stigmas 2; achenes 2-angled, tubercle clearly distinguished from the achene; tubers absent. *E. flavescens* var. *flavescens* p. 74
10. Stigmas 3; achenes 3-angled, tubercle often not clearly distinguished from the achene summit; tubers often present on rhizomes or at culm bases. *E. coloradoensis* p. 68
7. Leaf sheaths usually opaque, firm, evident; culms 0.2–3.5 mm thick (rarely thicker).
11. Stigmas 2; achenes 2-angled; rhizomes long and horizontal.
12. All spikelets with the lowest scale clasping the entire culm.
13. The second scale of all spikelets with a flower.
14. Spikelets with scales to 1.7 mm wide. *E. erythropoda* p. 72
14. Spikelets with scales at least 2 mm wide. *E. uniglumis* (under *E. erythropoda*) p. 72
13. The second scale of all spikelets with or sometimes without a flower. *E. macrostachya* p. 76
12. Some spikelets with the lowest scale not clasping the entire culm.
15. Spikelets with the lowest scale clasping about 2/3 to 3/4 of the culm, the second scale always without a flower. *E. palustris* p. 80

15. Spikelets with the lowest scale clasping 3/4 or more of the culm, at least some spikelets with a flower in the second scale. *E. macrostachya* p. 76
11. Stigmas 3; achenes 3-angled; rhizomes long and horizontal or short and ascending.
16. Distal leaf sheath summits on some or all culms with a distinct tooth-like projection; rhizomes long and horizontal. *E. parishii* p. 82
16. Distal leaf summits lacking a distinct tooth-like projection; rhizomes long and horizontal or short and ascending.
17. Culms sharply 4-angled, not flattened, to 0.5 mm wide; tubercle bases 3-lobed; spikelets often proliferating to form plantlets; plants densely tufted; rhizomes short and ascending. *E. pachycarpa* (under *E. bolanderi*) p. 66
17. Culms not 4-angled, sometimes flattened, to 1 mm wide; tubercle bases 3-lobed or not; spikelets never proliferating to form plantlets; plants forming mats from long horizontal rhizomes or sometimes densely tufted from short, ascending rhizomes.
18. Achenes less than 1.3 mm long, apex not narrowed to a beak; scales 8–40, 1.5–3 mm long; bulbs absent; plants forming mats from long horizontal rhizomes or dense clumps from short ascending rhizomes.
19. Spikelets narrowly lanceolate, plants forming mats; rhizomes long and horizontal; tubercles at least as high as wide. *E. parishii* p. 82
19. Spikelets ovate; plants forming dense clumps from short ascending rhizomes; tubercles lower than wide. *E. bolanderi* p. 66
18. Achenes at least 1.6 mm long, apex usually narrowed to a distinct beak; scales 3–12, 2.5–6 mm long; bulbs on rhizomes or at culm bases present or not; plants forming mats from long, horizontal rhizomes.
20. Lowest scale of some or all spikelets without a flower (rarely all without a flower); culms to 0.5 mm wide (rarely to 0.9 mm); culm bases often swollen; bulbs often present on rhizomes or at culm bases.
E. quinqueflora p. 84
20. Lowest scale of all spikelets with a flower (rarely a few with a flower); culms 0.5–1.5 mm wide; culm bases never swollen; bulbs absent.
E. suksdorfiana p. 88

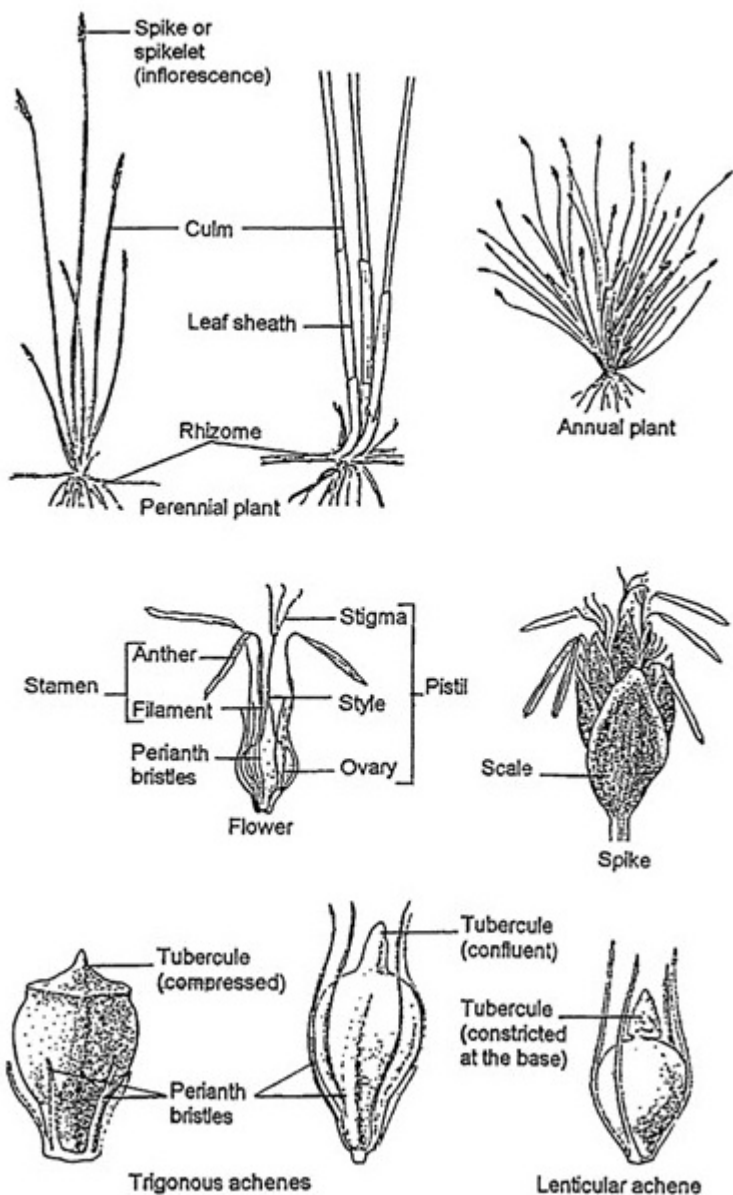


Figure 22. *Eleocharis* morphology. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis acicularis (L.) Roemer & Schultes

Needle spikerush, Needle spikesedge, Slender spikerush

SYNONYMS: *Scirpus acicularis* L.

PLANT HABIT: Small, slender **perennial**, 1–60 cm tall, often forming large, rooted mats or floating masses from slender **rhizomes** 0.25–0.5 mm thick with 5–15 mm internodes; **culms** sometimes arching, filiform, more-or-less cylindric or sometimes flattened, smooth or with 3–12 angles or ridges, soft or firm, 0.2–0.5 mm thick. Culms of submerged plants are terete, smooth, soft, and translucent with the air cavity partitions visible. Phenotypic plasticity, often associated with water depth, complicates identification.

LEAVES: Usually solitary, needle-like, tightly sheathing to loose and inflated distally; proximally purplish, distally delicately membranous, with the apex rounded to acute, usually disintegrating; **tooth** absent.

INVOLUCRAL BRACTS: Absent.

SPIKELETS: One, 3–15 (25) flowered, ovoid to lanceolate, nearly cylindric, apex acute, purplish brown with a greenish midrib when fresh, 2–8 mm long, 1–2 mm thick. Submerged and floating plants often lack spikelets.

SCALES: 4–25; 4–6 per mm of rachilla; ovate-lanceolate, purplish or pale, midrib region prominent and green with hyaline margins, apex obtuse to acute, 1.5–3.5 mm long, 1–1.5 mm wide; **lowest scale** completely clasps the culm and includes a flower.

FLOWERS: **Perianth bristles** generally absent, uncommonly 2–4, slender, shorter than to equaling or sometimes exceeding the achenes; **stamens** 3; anthers 0.7–1.3 mm long; **styles** trifid.

ACHENES: Obovoid or ovoid-oblong, obscurely 3-angled to nearly terete with 8–12 longitudinal ribs and 30–60 very fine horizontal bars, whitish to pale gray or faintly yellowish, 0.7–1.1 mm long, 0.4–0.6 mm wide; **tubercles** distinct, conic to triangular and ribbed, basally constricted, 0.1–0.2 mm high, 0.15–0.25 mm wide. Achenes often absent in submerged, non-flowering submerged plants, complicating identification. Fruiting: spring–fall.

HABITAT AND DISTRIBUTION: Freshwater lakes, streams, drying soil, bogs, wet meadows, vernal pools, and disturbed areas from sea level to 3300 m. Often submerged. Common throughout the Intermountain Region and most of North America and Eurasia, local in Central and South America and Australia.

SIMILAR SPECIES: Terrestrial plants of *E. acicularis* are easily confused with *E. bella*, a closely related species. *E. bella* is apparently annual with scales 1–1.5 mm long, apex acute to acuminate and usually slightly recurved, anthers 0.5 mm, and achenes less than 0.8 mm long. *E. acicularis* may also be confused with the diminutive, unrelated *E. coloradoensis*, which lacks a flower in the axil of the lowest spikelet scale and produces very different achenes and tubercles. Submerged vegetative plants of *E. acicularis* often have very long, filiform culms similar to those of *Schoenoplectus subterminalis*.

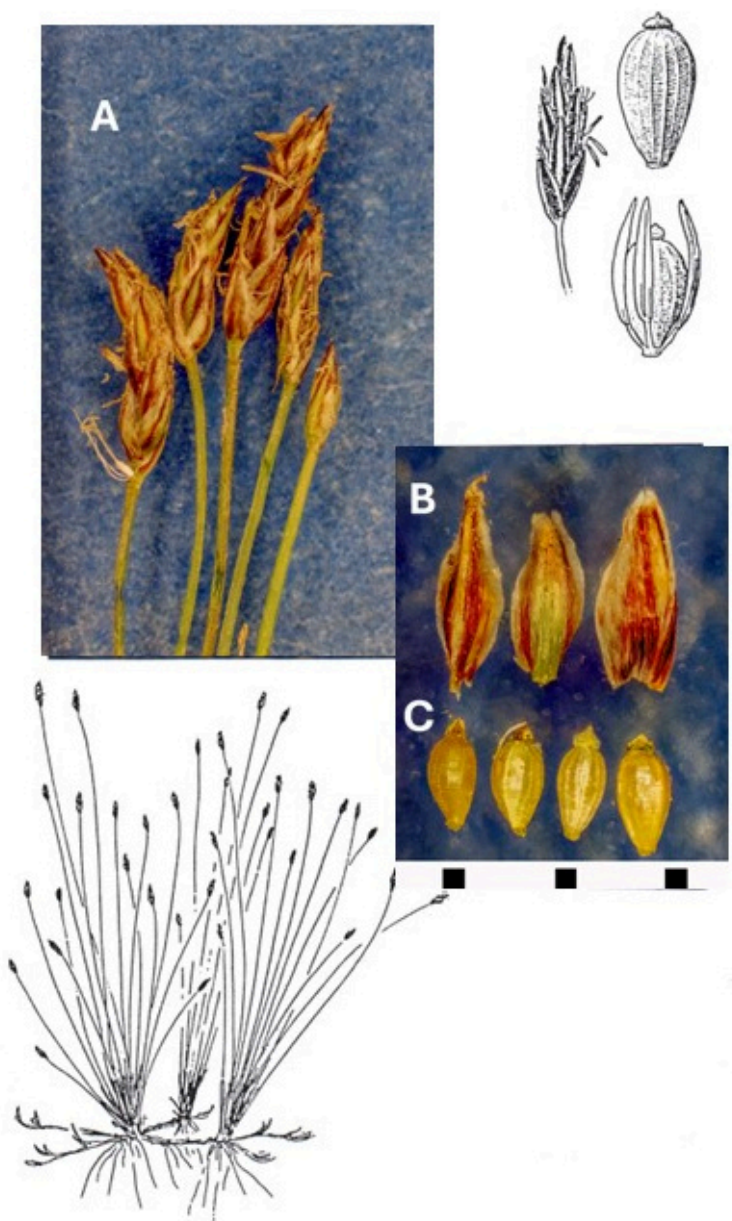


Figure 23. *Eleocharis acicularis*. (A) Inflorescences, (B) scales, (C) achenes. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis bella (Piper) Svenson

Pretty spikerush, Beautiful spikerush, Delicate spikerush

SYNONYMS: *Eleocharis acicularis* (L.) Roemer & Schultes var. *bella* Piper, *E. acicularis* (L.) var. *minima* Torrey ex Britton

PLANT HABIT: Very slender **annual** (rarely perennial) 1–7 cm tall, forming small, dense, rounded tufts; **rhizomes** usually absent; **culms** ascending or spreading, filiform, four-angled or more-or-less cylindric, furrowed, soft to firm, 1–8 cm tall, 0.2–0.3 mm thick.

LEAVES: Usually solitary, straw-colored, apex acute, **tooth** absent; upper sheath delicately membranous, slightly inflated distally, often disintegrating.

INVOLUCRAL BRACTS: None.

SPIKELETS: 3–10 (15) flowered, ovoid to ovoid-oblong, terete, apex acute to obtuse, greenish-red to reddish-brown, 1.5–4 mm long, 0.8–2 mm thick.

SCALES: 4–15, 8 per mm of rachilla, oblong-ovate, apex acute to acuminate and slightly recurved, midrib obscure to somewhat keeled, midstripe greenish or pale, its margins variably hyaline and somewhat reddish-brown, 1–1.5 mm long, 0.5–0.7 mm wide; **lowest scale** with a flower and completely clasping the culm.

FLOWERS: **Perianth bristles** absent; **stamens** 3, anthers 0.3–0.5 mm; **styles** trifid.

ACHENES: Obovoid, obscurely 3-angled to nearly terete with 6–10 longitudinal ridges (3 ridges prominent), 2–30 very fine horizontal bars, apex blunt, whitish to pale brown or slightly yellowish, 0.6–0.8 mm long, 0.3–0.4 mm wide; **tubercles** distinct, short and broad, grayish, 0.1–0.2 mm high, 0.1–0.25 mm wide. Fruiting: spring–summer.

HABITAT AND DISTRIBUTION: Bare, often drying soil along streams, lake shores, and in wet meadows from 100 to 2900 m. Locally common in the western states from Washington and Montana south to California, Arizona, New Mexico, and adjacent Mexico. Intermountain collections are from the Reno area, northeastern Nevada, southeastern Oregon, southwestern and northern Idaho, northeastern and east-central Utah.

SIMILAR SPECIES: *Eleocharis bella* is easily confused with the closely related *E. acicularis*, a rhizomatous perennial with scales exceeding 1.5 mm long, apex blunt to acute, anthers and achenes exceeding 0.7 mm in length.

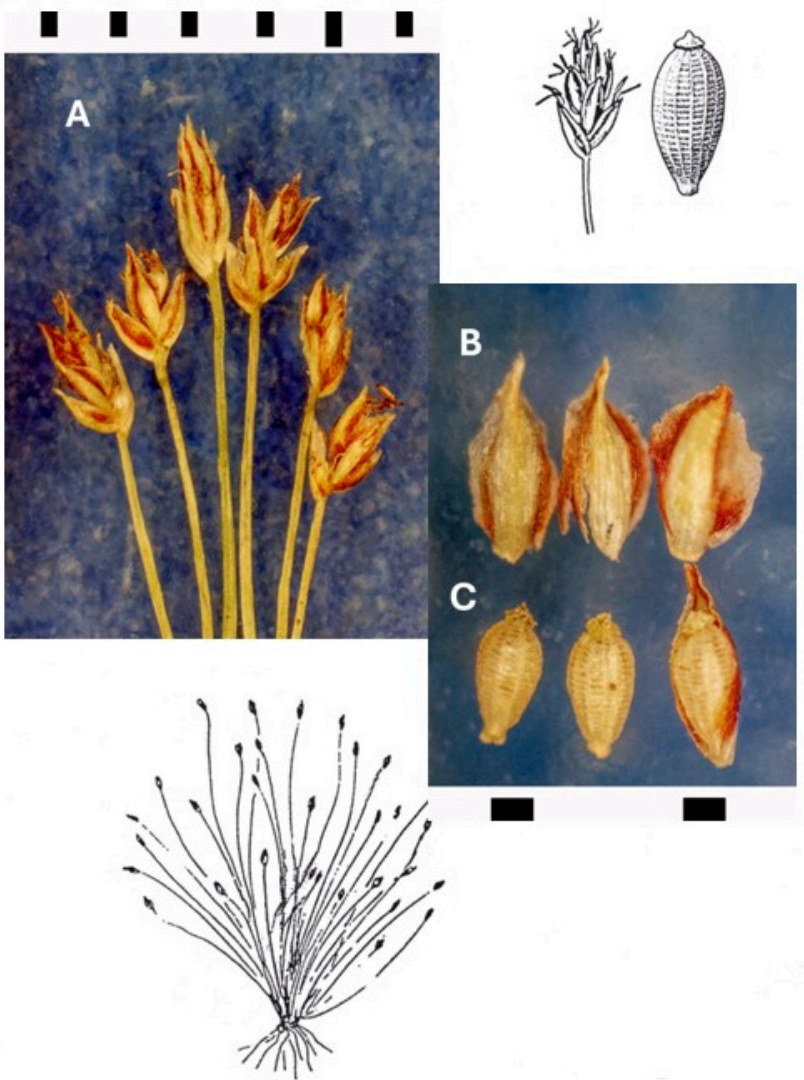


Figure 24. *Eleocharis bella*. (A) Inflorescences, (B) scales, (C) achenes; right with scale attached on the dorsal side. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis bolanderi A. Gray

Bolander's spikerush

SYNONYMS: *Eleocharis montevidensis* Kunth var. *bolanderi* (A. Gray) V.E. Grant

PLANT HABIT: **Perennial**, 10–30 (50) cm tall, forming densely clustered tussocks from short ascending **rhizomes** 1.5–4 mm thick and mostly hidden by culms and roots; **culms** numerous, wiry, cylindric to angled, firm, spongy, striated with 10–18 blunt ridges when dry, 0.2–0.3 (0.5) mm thick. Debris from previous year's growth persists at the base.

LEAVES: 1–2, distal **sheaths** persistent, rarely splitting, commonly purplish to brownish at the base becoming stramineous to spotted purple distally, loosely sheathing and papery upward, papery; apex obtuse to truncate, sometimes cartilaginous; **tooth** absent.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, 10–25 flowered, 4–5 per mm of rachilla, ovoid to ellipsoid, 3–8 mm long, 2–3 mm thick, dark brown or blackish, apex obtuse to acute.

SCALES: 8–30, ovate to orbicular, membranous, apex acute to obtuse, blackish brown with a paler tip and no midstripe, 2–3 mm long, 1.5 mm wide; lowest scale broad, orbicular, lacking a flower, completely clasping the culm.

FLOWERS: **Perianth bristles** 3–6, often unequal, minutely retrorsely barbellate, reddish-brown or whitish, up to half as long as the achene; **stamens** 3; **styles** trifid.

ACHENES: Obovoid, unequally **trigonus** and prominently 3-angled or rarely 2-angled, short stipitate, finely rugulose or reticulate, greenish yellow becoming straw-colored or rarely dark brown to black, apex truncate, 0.9–1.2 mm long, 0.6–0.8 mm wide, deciduous with the scales; **tubercles** variable, usually distinct, sessile on achene, often 3 lobed, very low and broad, white to brown, to 0.3 mm high, 0.4–0.7 mm wide. Fruiting: late spring–summer.

HABITAT AND DISTRIBUTION: Fresh, often summer-dry springs, seeps, wet meadows, and stream margins from 1000 to 3400 m. In summer masses of dry culms can be found in dry stream beds. Oregon and California east to Colorado. In the Intermountain Region known from southwestern Idaho, northwestern, northeastern and east central Nevada, and the Uinta Mountains and Zion National Park in Utah.

SIMILAR SPECIES: In the Intermountain Region, *E. bolanderi* might be confused with the introduced *E. pachycarpa* because of their similar achenes and tussock-forming habits. *Eleocharis pachycarpa* differs by its sharply 4-angled culms, pale spikelet scales, and tendency to proliferate from spikelets (see key and *E. rostellata*). It is also easily confused with *E. decumbens*, known only from the mountains of California and southwestern Oregon and distinguished by its mostly thicker rhizomes (3–4 mm thick), wider culms (0.3–2 mm wide), and longer spikelet scales (3–3.5 mm long).

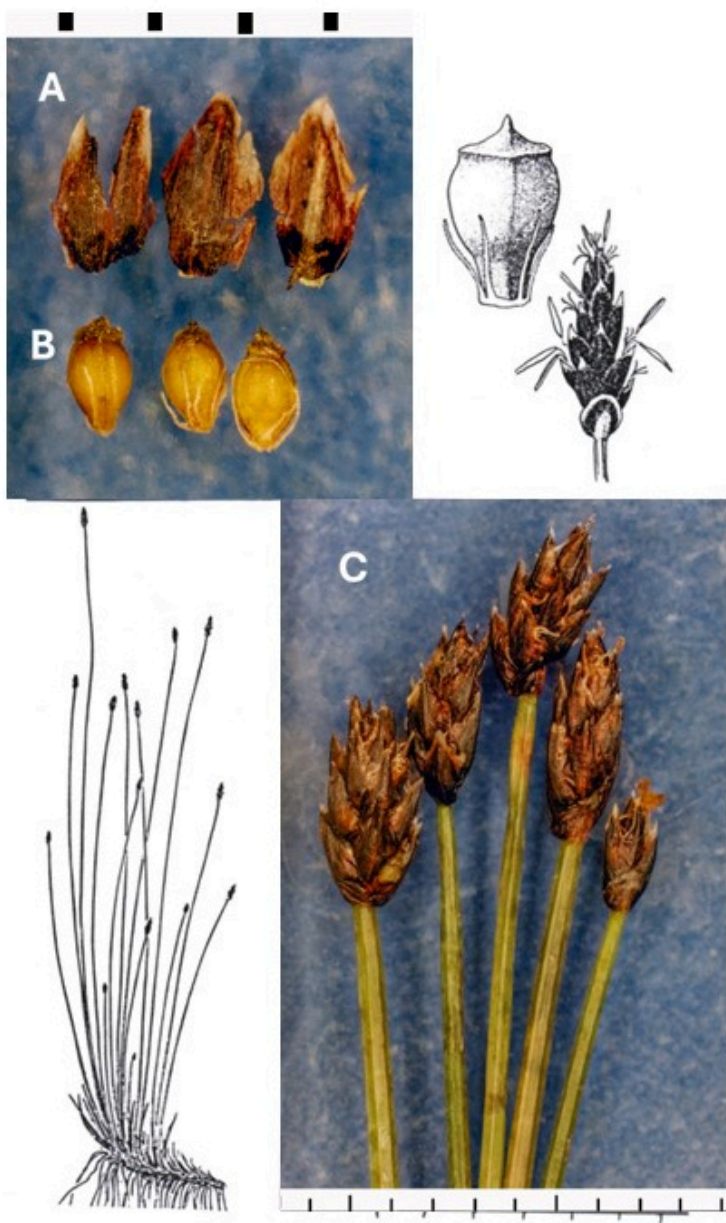


Figure 25. *Eleocharis bolanderi*. (A) Scales, (B) achenes with some perianth bristles attached, (C) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis coloradoensis (Britton) Gilly

Colorado spikerush, Dwarf spikerush

SYNONYMS: *Eleocharis parvula* (R. & S.) Link x Bluff, Nees & Shauer var. *anachaeta* (Torrey) Svenson, *E. p.* var. *coloradoensis* (Britton) Beetle, *Scirpus coloradoensis* Britton

PLANT HABIT: Dwarf tufted **perennial**, 2–9 cm tall, forming mats from short, slender, horizontal **rhizomes** up to 1.5 mm diameter that are often terminated by broadly oblong to orbicular **tubers** to 4 mm long; **culms** cylindric, very soft, 0.2–0.5 mm thick.

LEAVES: Generally solitary near the culm base and tightly clasping it; upper **sheath** thinly membranous, often disintegrating, reddish basally, apex rounded or acute; **tooth** absent.

SPIKELETS: Solitary, 4–6 flowered, ovoid or oblong-cylindric, base usually cuneate, apex acuminate, 3–8 mm long, 1–1.5 mm thick; floral scale tips appressed, giving the spikelet a smooth outline.

SCALES: 6–25, ovate to lanceolate, bright orange to brown, midstripe green to pale, margins purplish, apex obtuse to acute, 1.7–2.5 mm long; **lowest scale** completely clasping the culm, one-half or less of the spikelet length, lacking a flower.

FLOWERS: **Perfect**; **perianth bristles** mostly absent, seldom 5, very unequal, when present coarsely barbellate, to one-half the achene length; **stamens** 2–3, anthers .05–.08 mm; **styles** trifid.

ACHENES: Obovoid, subtriangular, prominently 3-angled or sometimes 2-angled, finely roughened, medium to dark brown, apex truncate, 0.5–1.1 mm long, 0.5–0.7 mm thick; **tubercles** about 0.1 mm high, often indistinct and merging with the achene summit in color, form, and texture. Fruiting: summer.

HABITAT AND DISTRIBUTION: Drying margins of fresh or brackish lakes and ponds, streams, and vernal pools. Generally inland to 2100 m. In the Intermountain Region occurs locally in Idaho, Nevada, Oregon, and Utah. Distributed from Oregon to Alberta and Saskatchewan and south from California to Mississippi and Mexico.

SIMILAR SPECIES: *Eleocharis coloradoensis* is similar in habit to *E. acicularis*, which has a flower in the lowest spikelet scale, very different achenes, and lacks tubers.

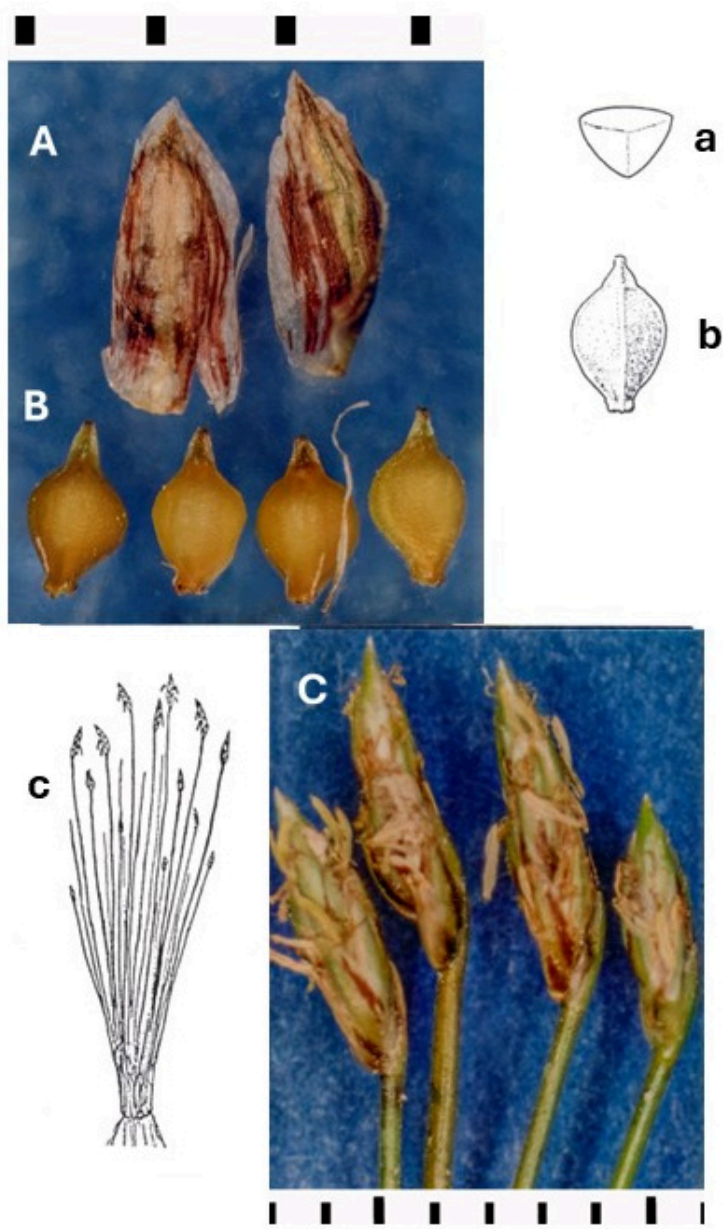


Figure 26. *Eleocharis coloradoensis*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: a, b: J.R. Janish (Hitchcock 1969). c: E.G. Hurd.

Eleocharis engelmannii Steudel

Engelmann's spikerush

SYNONYMS: *Eleocharis engelmannii* var. *detonsa* A. Gray, *E. e.* var. *monticola* (Fernald) Svenson, *E. monticola* Fernald, *E. monticola* Fernald var. *leviseta* Fernald

PLANT HABIT: **Annuals** with few stems or forming dense clumps; **rhizomes** absent; **culms** erect or ascending, cylindric, ribbed, firm to soft, dark green, up to 40 cm tall, 0.5–1.5 mm thick.

LEAVES: 1 or 2, basal, extending to 4.5 cm up the culm, upper **sheath** membranous, persistent, fragile to somewhat firm, pale brown, apex obtuse to acute; **tooth** often present and up to 0.3 mm long.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary with more than 40 tightly clustered flowers, erect, lanceolate to ovoid or subcylindric, reddish brown to brown, apex obtuse or acute, 5–10 (20) mm long, 2–3 (4) mm thick.

SCALES: 25–100 (200), 8–12 per mm of rachilla, orbicular to ovate-oblong, membranous, margins reddish-brown or hyaline, midstripe pale or greenish keeled, apex obtuse to acute, 2–2.5 mm long, about 1 mm wide; lowest scale clasping about two-thirds of the culm and without a flower.

FLOWERS: **Perfect**, **perianth bristles** (0) 5–8, stout, brown, from rudimentary to reaching the tubercle summit; **stamens** 3; anthers yellow-brown, 0.3–0.8 mm long; **styles** trifid or some bifid in the same spikelet.

ACHENES: Broadly ovate, lenticular, smooth, shiny, straw-colored ripening to dark brown, 0.9–1.1 mm long, 0.7–1.1 mm wide; **tubercles** distinct, sessile on the achene summit, much lower than wide, one-fourth or less as high as the achene. Fruiting: spring–fall.

HABITAT AND DISTRIBUTION: Wet shores, marshes, and disturbed places to 2400 m. Local in the Intermountain Region occurring in southeastern Oregon, west-central Idaho, northwestern Nevada, and southern Utah. Southernmost British Columbia east to Ontario and Maine and south to California, Texas and Mississippi.

SIMILAR SPECIES: *Eleocharis engelmannii* is easily confused with closely related *E. obtusa* and *E. ovata* (see under *E. obtusa*), which differ mainly in their tubercle widths as indicated in the key. Specimens in which the perianth bristles are absent or rudimentary may deserve taxonomic recognition as *E. engelmannii* var. *detonsa* A. Gray (= *E. monticola* Fernald var. *leviseta* Fernald).

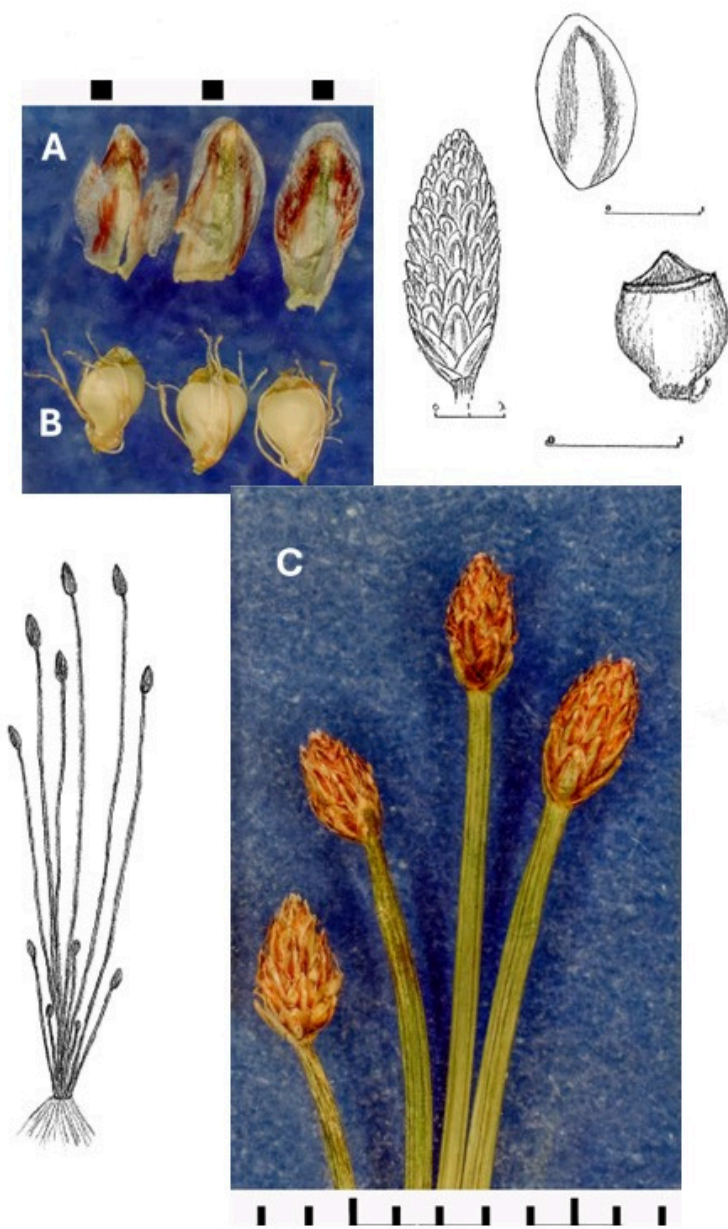


Figure 27. *Eleocharis engelmannii*. (A) Scales, (B) achenes, (C) inflorescences. Photos and drawings: E.G. Hurd.

Eleocharis erythropoda Steudel

Bald spikerush, Redrooted spikerush, Spikesedge

SYNONYMS: *Eleocharis calva* Torrey, *Scirpus glaucus* Torrey, *Trichophorum palustre* (L.) Farw. var. *calvum* (Torrey) House

PLANT HABIT: **Perennial**, 8–80 cm tall, forming mats from long, thin, horizontal **rhizomes**, 0.5–1.5 mm thick; **culms** somewhat cylindric, often with blunt ridges when dry, firm to soft, internally spongy, 0.3–1.4 mm thick.

LEAVES: Distal **sheaths** persistent, not splitting, usually inflated, membranous to papery, often callose, red to golden basally, green to golden distally, apex obtuse to subacute; **tooth** absent or only 0.1 mm long.

SPIKELETS: Solitary, ovoid to lanceolate to subcylindric, brown to reddish brown, apex acute, 0.3–18 mm long, 2–3 (4) mm thick.

SCALES: 15–50, 4–5 per mm of rachilla, often spreading in fruit, not prominently tapered, membranous, medium brown without a distinct pale midstripe, apex rounded to subacute, 2–3.5 mm long, about 1.5 mm wide; lowest scale completely clasping the culm and lacking a flower; subproximal scale with a flower; lower scales ovate, distal scales more lanceolate.

FLOWERS: **Perfect**; **perianth bristles** 0 or 4, usually equal, as long or slightly longer than the achene and tubercle; **stamens** 3, anthers dark yellow, over 1 mm long; **styles** deeply bifid.

ACHENES: Broadly oblong-ovoid, lenticular, slightly tapered toward the base and apex, surface smooth or faintly rugulose, straw-colored to brown, 0.9–1.6 mm long, 0.7–1.2 mm thick, deciduous; **tubercles** distinct, to about 0.6 mm high. Fruiting: summer.

HABITAT AND DISTRIBUTION: Fresh springs, calcareous or brackish water, fens, wet meadows, stream margins, and marshes from sea level to 2300 m. More common in Utah with scattered populations in eastern Oregon and southern Idaho in the Intermountain Region. Widely distributed and often abundant in temperate eastern North America except the far southeastern area.

SIMILAR SPECIES: *Eleocharis erythropoda* is easily confused with the closely related *E. macrostachya* and *E. uniglumis*, which differ chiefly in the spikelet scale widths as indicated in the key. These three species and *E. palustris* belong to a circumboreal complex in which intermediates are common. Many authors prefer to treat most of this complex as a single highly variable species. *Eleocharis uniglumis* (Link) Schultes differs from *E. erythropoda* in its wider floral scales (1.8–2.5 mm) that are often darker brown and more loosely placed on the spikelet axis.

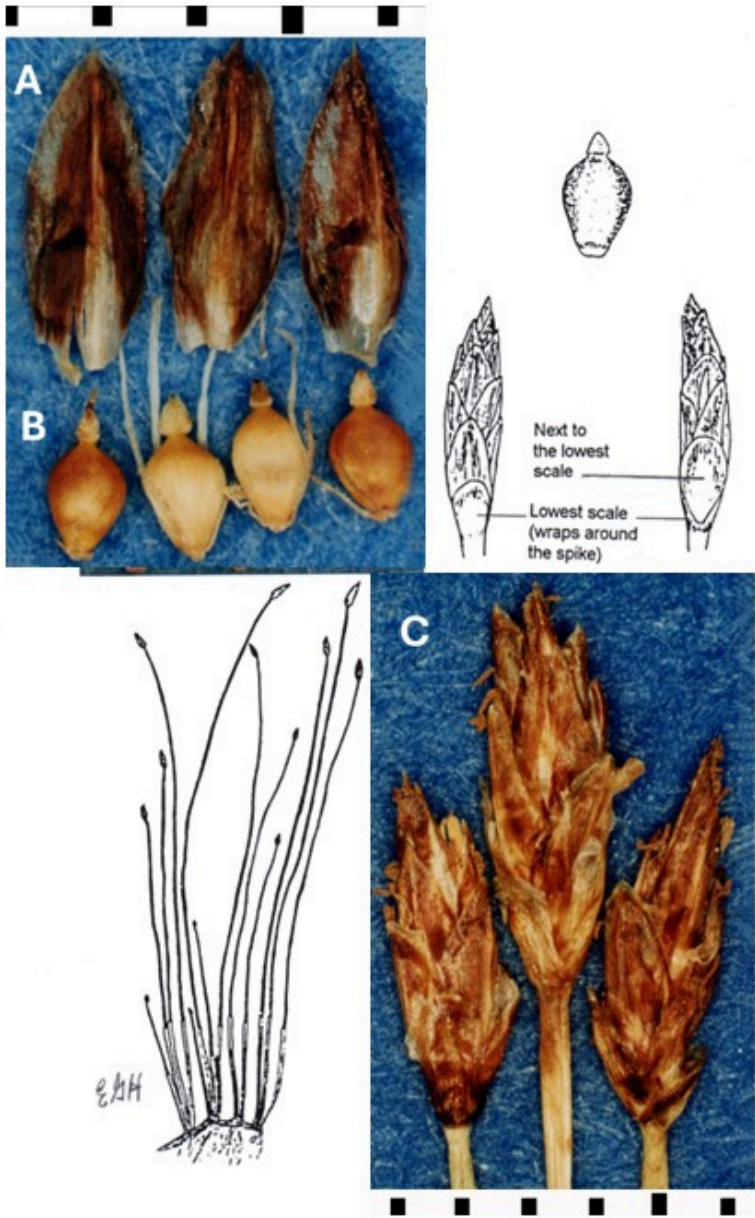


Figure 28. *Eleocharis erythropoda*. (A) Scales, (B) achenes- center and right with some perianth bristles attached, (C) inflorescences. Photos and drawings: E.G. Hurd.

Eleocharis flavescens (Poirot) Urban
var. *flavescens*

Yellow spikerush, Pale spikerush

SYNONYMS: *Eleocharis flavescens* var. *thermalis* (Rydberg) Cronquist, *E. thermalis* Rydberg, *Scirpus flavescens* Poirot

PLANT HABIT: Tufted and mat-forming **perennials** with long, slender, horizontal **rhizomes**; **culms** of taller plants erect, cylindric to somewhat flattened, grooved, soft, bright green, 3–42 cm tall, 0.3–0.6 mm thick. Dry leaves and culms accumulate at the base.

LEAVES: 1–2, basal; upper **sheath** inflated distally, loosely wrapping the stem, thinly membranous and often disintegrating, scarious, wrinkled, white; **tooth** absent.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, 4–16 (20) flowered, ellipsoid or ovoid, pale to light green, apex acute, 1.5–4 (9) mm long, 1–3.5 mm thick.

SCALES: Up to 65, 5–7 per mm of rachis, loosely appressed to appressed, elliptic or ovate, membranous, straw-colored to brown with a broad greenish to reddish-brown midstrip, margins hyaline scarious, apex obtuse or acute, 1–3 mm long, 0.4–1.6 mm wide; lowest **scale** without a flower and not amplexicaulis.

FLOWERS: Perfect; **perianth bristles** (0) 5–8, spinulose, rudimentary to slightly exceeding the achene, white to straw-colored; **stamens** 3; **styles** bifid, rarely trifid.

ACHENES: Obovoid, lenticular to roundish, rarely trigonous, smooth to finely reticulate, shiny, reddish brown to blackish brown when ripe, 0.4–0.8 (1.0) mm long, 0.3–0.6 mm wide; **tubercles** distinct, conical, pale, 0.2–0.5 mm high, 0.2–0.4 mm wide. Fruiting: spring–summer.

HABITAT AND DISTRIBUTION: Brackish wet places, creeks, dunes, hot springs, and salt marshes from sea level to 1600 m elevation. In the Intermountain region known from Cache County, Utah, and around hot springs in Yellowstone Park. In the United States from Montana to California, Arizona, and Texas in the West; Arkansas to Virginia and south to Louisiana and Florida in the East; South America and the Caribbean Islands. **Spring–summer.**

SIMILAR SPECIES: See *Eleocharis geniculata* (last paragraph of *E. obtusa*).

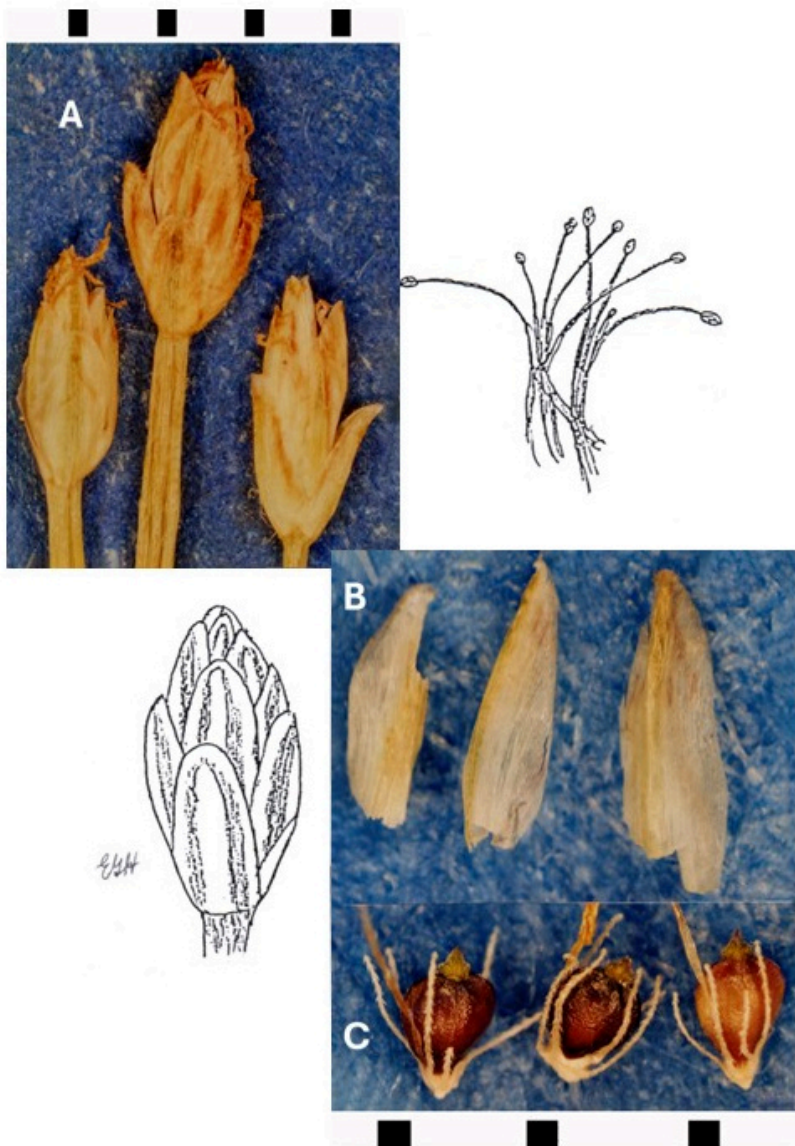


Figure 29. *Eleocharis flavescens* var. *flavescens*. (A) Inflorescences, (B) scales, (C) achenes with bristles attached. Photos and drawings: E.G. Hurd.

Eleocharis macrostachya Britton

Pale spikerush, Confusing spikerush

SYNONYMS: *E. perlonga* Fernald & Brackett, *E. xyridiformis* Fernald & Brackett

PLANT HABIT: Perennial forming mats from long horizontal **rhizomes**; **culms** cylindric to flattened, irregularly shallowly ribbed, firm to soft, spongy, light green, 10–100 cm tall, 0.5–2.5 (3.5) mm thick.

LEAVES: Distal sheaths persistent, loosely sheathing, rarely splitting abaxially, thickly membranous, basally reddish purple, distally green or straw-colored, apex truncate to obtuse; **tooth** absent or less than 1 mm long.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, 10-many flowered, narrowly lanceolate to ovoid, brown, apex usually acute, 5–40 mm long, slightly wider than the stem.

SCALES: 30–80, 3–5 per mm of rachilla, ovate to oblong, slightly tapered, apex acute to obtuse, membranous, medium to reddish or dark chestnut brown with a straw-colored to green midrib, 2–3.5 mm long, about 1.5 mm wide, often spreading in fruit; lowest **scale** variable, clasping three-fourths to all of the culm, lacking a flower; subproximal scale with or without a flower; upper scales all with a flower.

FLOWERS: Perfect, **perianth bristles** 4–5 or sometimes rudimentary or absent, unequal, slender to stout, brown, retrorsely barbed, much shorter than the achene to equaling the tubercle; **stamens** 3; **styles** bifid.

ACHENES: Ovoid, lenticular, surface smooth to faintly rugulose, straw-colored when young, maturing to dark brown, 1.1–1.9 mm long, 0.8–1.5 mm thick; **tubercles** distinct, conical with a constricted base, white to brown, to about 0.7 mm high. Fruiting: spring—summer.

HABITAT AND DISTRIBUTION: Fresh to slightly brackish or alkaline shores, stream beds, vernal pools, wet meadows, marshes, artificial ponds, and ditches from sea level to 2500 m elevation. Common at low to medium elevations throughout most of the West and eastward to southern Manitoba and Mississippi; Mexico and South America. Scattered throughout the Intermountain region.

SIMILAR SPECIES: *Eleocharis macrostachya* is highly variable and difficult to separate from the closely related species *E. palustris*, *E. erythropoda* and *E. uniglumis* (see under *E. erythropoda*), which differ in the degree that the lowest scale of the spikelet clasps the culm and the presence of a flower in the axil of the subproximal scale as indicated in the key and under *E. palustris*.

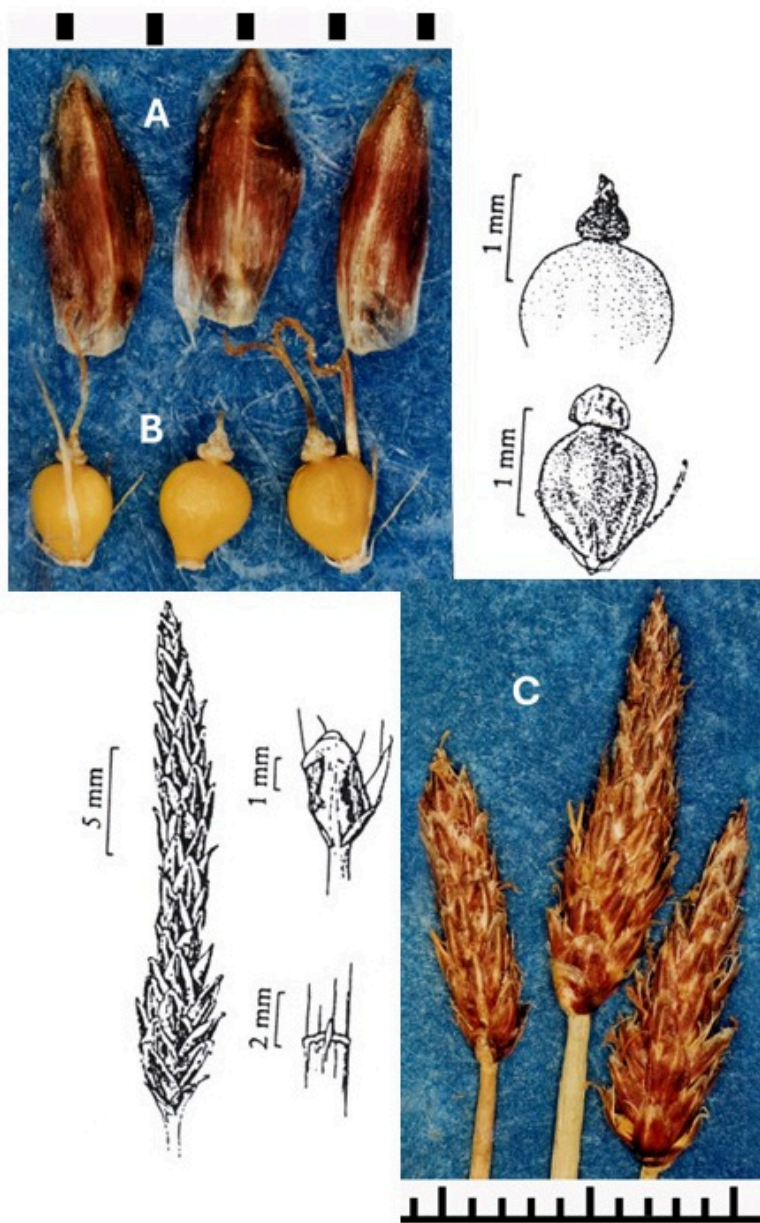


Figure 30. *Eleocharis macrostachya*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: E. Zimmerman (Smith et al. 2002).

Eleocharis obtusa (Willdenow) Schultes

Blunt spikerush, Blunt spikesedge

SYNONYMS: *Eleocharis obtusa* var. *ellipsoidalis* Fernald ex Svenson, *E. o.* var. *gigantea* Fernald, *E. o.* var. *jejuna* Fernald, *Scirpus obtusus* Willdenow

PLANT HABIT: Densely tufted **annual** to 50 (90) cm tall; **rhizomes** absent or not evident; **culms** cylindric, erect to ascending, slender, firm to soft, spongy, 0.2–2 mm thick.

LEAVES: Usually 2, upper **sheath** persistent, loosely enveloping the culm, firm, entire, obliquely truncate, purplish at the base, greenish to stramineous distally and slightly thickened at the rim; **tooth** often present, to 0.3 mm long.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, erect, many-flowered, broadly ovoid to ellipsoid or lanceolate, apex obtuse, brownish, (2) 5–13 mm long, (2) 3–4 mm thick; achenes and scales deciduous.

SCALES: 15–150, 8–20 per mm of rachilla, ovate-oblong to suborbicular, membranous, margins scarious, midrib seldom keeled, apex obtuse to broadly rounded, brownish orange with paler midstripe, 1–2.5 mm long, 1–1.5 mm wide; lowest scale clasping about 2/3 of the culm, without a flower.

FLOWERS: **Perfect;** **perianth bristles** 5–8, present or rarely absent, coarse, retrorsely barbed, brownish, slightly to usually greatly exceeding the tubercle; **stamens** (2) 3; **styles** usually trifid and bifid in the same spikelet.

ACHENES: Ovoid to broadly ovoid, lenticular, smooth, shiny, straw-colored ripening to dark brown, 0.9–1.3 mm long, 0.7–0.9 mm wide; **tubercles** distinct, sessile on achene, compressed, lamellate-deltoid, the base not narrowed, 0.3–0.5 mm high, 0.5–0.8 mm wide. Fruiting: summer–fall.

HABITAT AND DISTRIBUTION: Fresh wet shores, marshes, and disturbed places to 1600 m. In the Intermountain Region reported from southern Idaho, west-central Nevada, and southwestern Utah. Southern British Columbia to Prince Edward Island south to northern California, Colorado, Texas, and Georgia; Hawaii and other Pacific Islands.

SIMILAR SPECIES: *Eleocharis obtusa* is easily confused with the closely related *E. engelmannii*, *E. geniculata*, and *E. ovata*, which differ as indicated in the key (see also *E. engelmannii*). *E. geniculata* is known from southern Nevada and southeastern Utah in the Intermountain Region. It is distributed in the southern states from California to Florida and in most northeastern states. The species also occurs south to South America and in Africa, Asia and the Pacific Islands. *Eleocharis ovata* (Roth) R. & S. closely resembles *E. obtusa*, from which it differs mainly in its smaller tubercles that are 0.3–0.5 mm wide. Plants, spikelets, and achenes of *E. ovata* are also usually smaller. *E. ovata* is known from British Columbia to Labrador and south to Oregon, Oklahoma, and Virginia, with an isolated locality in Arizona.

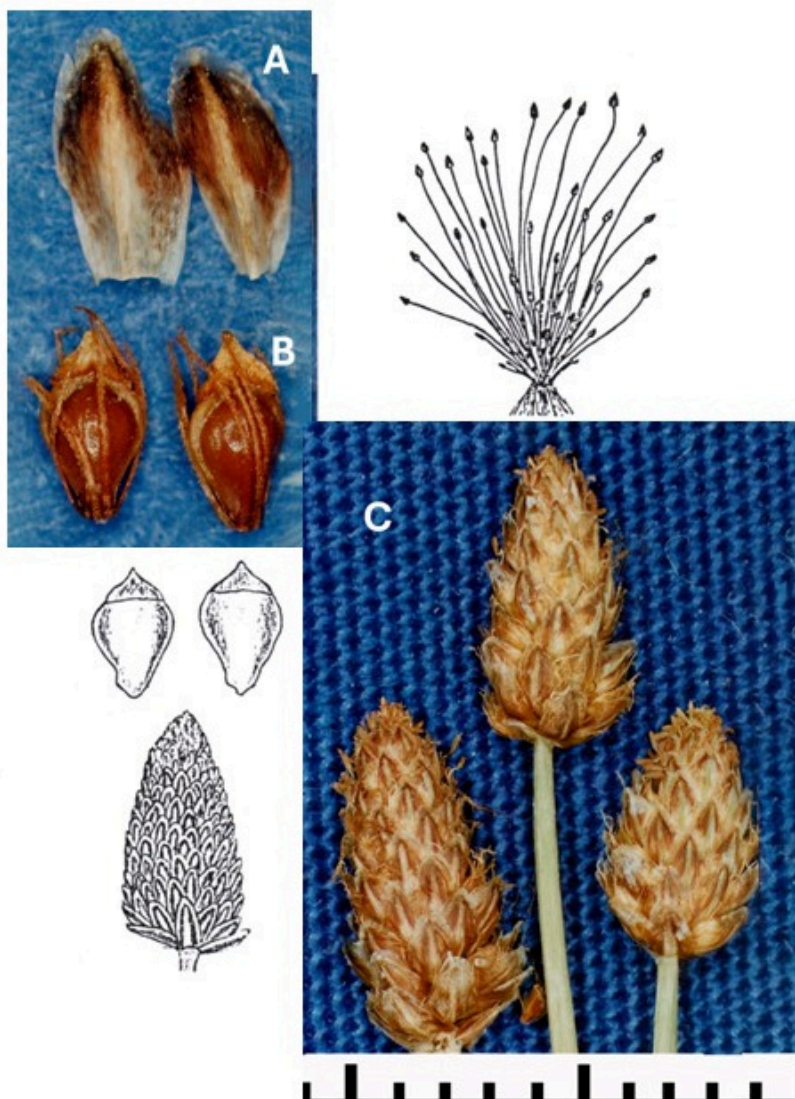


Figure 31. *Eleocharis obtusa*. (A) Scales, (B) achenes, (C) inflorescences. Photos and drawings: E.G. Hurd.

Eleocharis palustris (L.) Roemer & Schultes

Common spikerush, Creeping spikerush, Spikesedge

SYNONYMS: *E. smallii* Britton, *Scirpus paulustris* L.

PLANT HABIT: **Perennial** with culms arising singly or densely clustered, forming mats from long horizontal **rhizomes**; **culms** cylindric, terete or oval in cross section, slender to stout, striated, firm to soft, spongy, pale green to dark green, 30–115 cm tall, 0.5–2.5(5) mm wide.

LEAVES: Usually 2 basal; distal portion of the **sheaths** extend 2–15 cm on the culm, loosely sheathing, firm, membranous to papery, not inflated or callose, apex broadly obtuse to acute, red to black proximally, green to red distally, persistent or sometimes disintegrating or splitting; **tooth** absent or mucronate.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, several to many flowered, erect, lanceolate to lanceolate, cylindric, light to dark brown, apex acute to obtuse, 5–25 mm long, 3–7 mm thick.

SCALES: Lowest scale clasping about 2/3 (to 3/4) of the culm, entire, orbicular, lacking a flower; subproximal 2–3 scales without flowers; upper scales 30–100, 4–8 per mm of rachilla, spreading in fruit, oblong with acute tips, brown, midrib area straw-colored to green, margins hyaline, 2–3.5 mm long, about 1.5 mm wide.

FLOWERS: **Perianth bristles** (0) 4 (5–6), brown, retrorsely barbellate, much shorter than achene to equaling tubercle, rarely twice as long; **stamens** 2 or 3; anthers 1.3–2.5 mm long; **styles** bifid.

ACHENES: Obovoid, lenticular, rounded at the apex, surface smooth or faintly rugulose, straw-colored to dark brown or yellowish, 1.1–2.5 mm long, 1–1.5 mm wide; **tubercles** distinct, constricted at the base, to about 0.7 mm high, at least as high as wide. Fruiting: May–August.

HABITAT AND DISTRIBUTION: In many plant communities on recently exposed shores, stream beds, and marshes from sea level to 3200 m elevation throughout the Intermountain region. Somewhat alkali tolerant. Widely distributed and common throughout North America but absent from Georgia and Florida. Widespread in temperate North America, Mexico, Eurasia, and New Zealand.

SIMILAR SPECIES: *Eleocharis palustris* belongs to a highly variable and taxonomically difficult circumboreal species complex well known only in northern Europe. Members of this complex in the Intermountain Region are *E. palustris*, *E. macrostachya*, and *E. erythropoda*. These three species differ mainly in the amount that the lowest scale of the spikelet clasps the culm and in the presence of a flower in the subproximal scale of many spikelets.

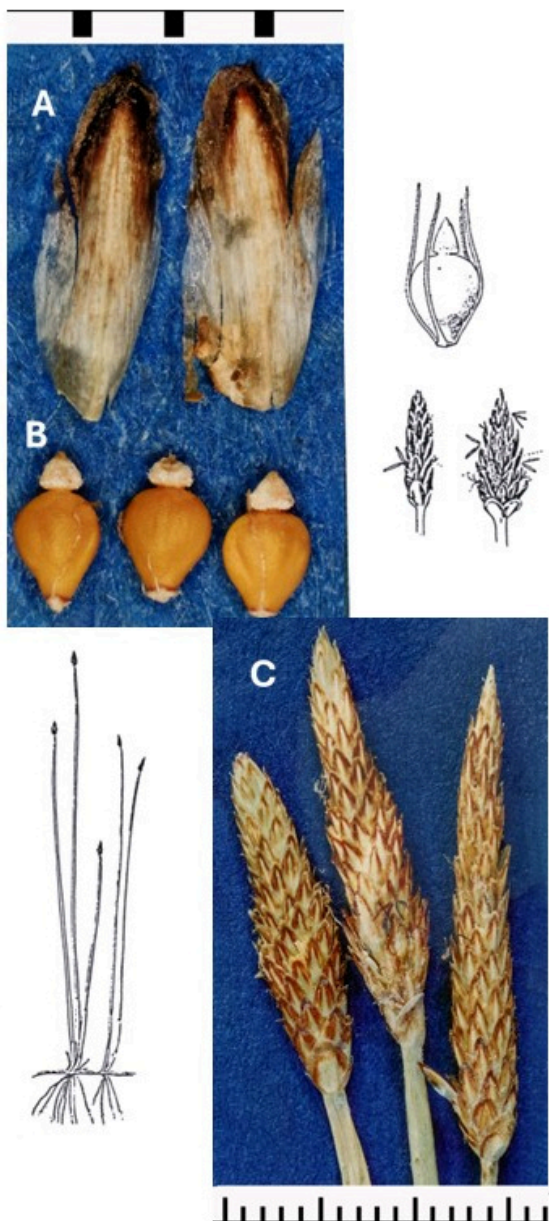


Figure 32. *Eleocharis palustris*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis parishii Britton

Parish's spikerush

SYNONYMS: *Eleocharis disciformis* Parish, *E. montevidensis* Kunth var. *disciformis* (Parish) V.E. Grant, *E. m.* var. *parishii* (Britton) V.E. Grant

PLANT HABIT: **Perennial** arising singly or forming mats from long horizontal **rhizomes**; **culms** slender, cylindric to elliptic, 6-8 ribbed when dry, firm to soft, minutely reddish spotted, 10-50 cm tall, 0.2-0.7 (1) mm thick.

LEAVES: Usually 2, basal; upper portion of the **sheaths** thickly membranous to thinly papery, persistent, not splitting, often reddish brown becoming stramineous, apex subtruncate to obtuse; **tooth** to 1 mm long, present on leaves of all or some culms.

INVOLUCRAL BRACTS: None.

SPIKELETS: Solitary, erect, much wider than the stem, narrowly lanceolate, purplish to reddish brown, apex acute to acuminate, 3-20 mm long, 1.5-2.5 mm thick, 2-7 times longer than wide.

SCALES: Lowest scale completely clasping the culm, entire, lacking a flower; subproximal scale with a flower or empty; upper scales 15-40, fertile, 3-4 per mm of rachilla, appressed or spreading in fruit, ovate-lanceolate, orange-brown with greenish midstripe and a pale, purplish to brownish hyaline apex and margins, 2-3 mm long, 1 mm wide; lower ones shorter, broader with an obtuse apex; upper scales acute, membranous, keeled.

FLOWERS: **Perfect**; **perianth bristles** 3-7, rarely absent to rudimentary, often unequal, retrosely barbellate, straw-colored or whitish, to slightly exceeding the tubercle; **stamens** 3; **styles** trifid.

ACHENES: Often falling with the scales, obovoid, planoconvex or unequally trigonous, smooth, yellow brown to dark brown, 0.8-1.4 mm long, 0.5-0.7 mm wide; **tubercles** distinct, pyramidal-conic to about 0.3 mm high, not noticeably constricted at the base, often higher than wide. Fruiting: spring-fall.

HABITAT AND DISTRIBUTION: Fresh to brackish water, springs, shores, and stream margins to 2700 m. In the Intermountain Region found in Nevada, Utah, and southern Idaho. It is locally common from southern California east to New Mexico, Texas, and Kansas.

SIMILAR SPECIES: *Eleocharis parishii* is easily confused with the closely related *E. montevidensis* which is more southern in distribution and differs mainly in its narrow lanceolate spikelets, scale tips that are broadly rounded, often horizontally wrinkled, and curved outward. They often co-occur.

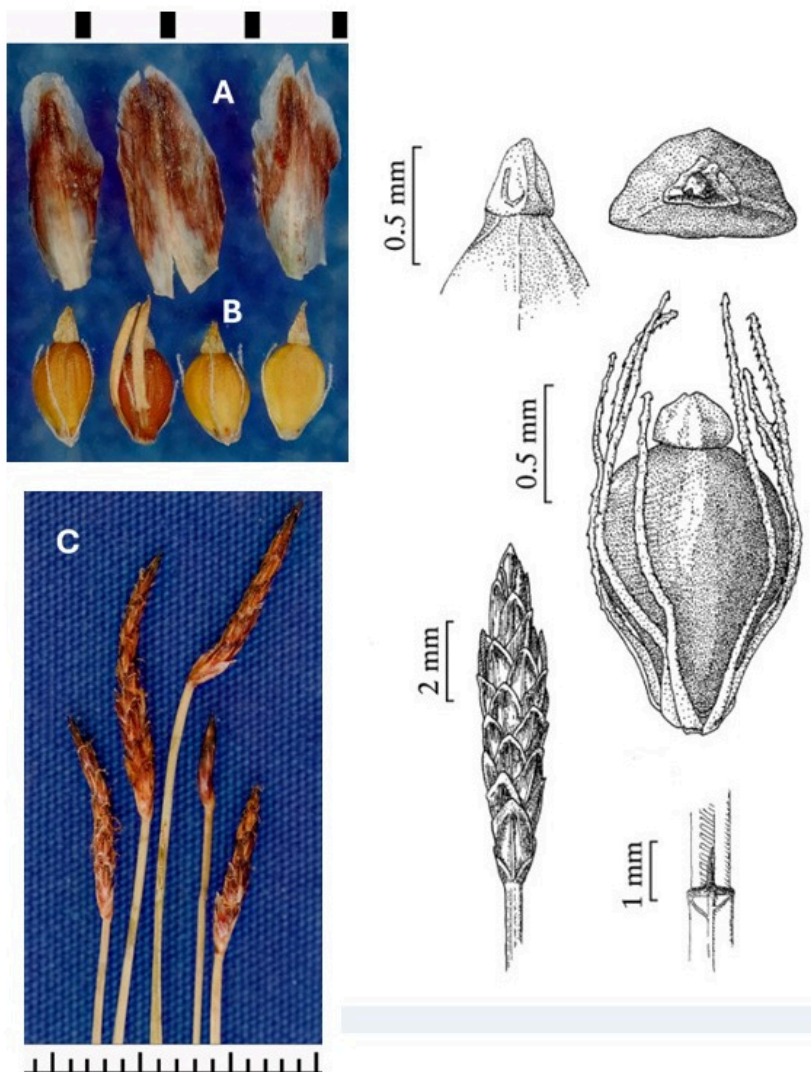


Figure 33. *Eleocharis parishii*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: E. Zimmerman (Smith et al. 2002).

Eleocharis quinqueflora (Hartmann) O. Schwarz

Few-flowered spikerush, Fewflowered spikesedge

SYNONYMS: *Eleocharis fernaldii* (Svenson) Á. Löve, *E. pauciflora* (Lightfoot) Link, *E. p.* var. *fernaldii* Svenson, *E. quinqueflora* (Hartmann) O. Schwarz subsp. *fernaldii* (Svenson) Hultén, *Scirpus pauciflorus* Lightfoot, *S. quinqueflorus* Hartmann

PLANT HABIT: **Perennial**, occurring singly or forming mats from fairly long, filiform, horizontal **rhizomes**; small **bulbs** (“resting buds”) often present on the rhizomes or culm bases; **culms** erect, cylindric to elliptic, somewhat ridged when dry, hard to soft, 5–35 cm tall, 0.2–0.5 (1) mm thick; culm bases often swollen, bulb-like, and covered with papery scales.

LEAVES: 1–2, basal; **sheaths** 1–2, extending up to 3 cm on the culm, upper portion of sheaths membranous to papery, reddish becoming stramineous distally, apex subtruncate to acute; **tooth** absent.

INVOLUCRAL BRACTS: Absent.

SPIKELETS: Solitary, erect, 3–9 flowered, ovoid or oblong, reddish brown, apex acute, 3–8 mm long, 1.5–4 mm thick.

SCALES: 3–10 per spikelet, broadly ovate, membranous, purplish to blackish with hyaline margins, often lacking a paler midstripe, apex obtuse, 2.5–6 mm long, 1.5–2.5 mm wide; lowest scale completely clasping the culm and with (seldom without) a flower; second scale with a flower; lowest 2–3 scales are at least half as long as the spikelet or sometimes reduced.

FLOWERS: **Perfect**; **perianth bristles** (0) 3–6, often unequal, slender, finely retrosely barbellate, rudimentary to equaling the tubercle; **stamens** 3; **styles** trifid or trifid and bifid in same spikelet.

ACHENES: Obovoid, broadest above the middle, unequally trigonous or rarely lenticular, smooth or with fine longitudinal ridges, straw-colored to medium brown or gray-brown, usually narrowed to a distinct beak, 1.6–2.3 mm long, 0.7–1.3 mm wide; **tubercles** rarely absent, usually merging with achene summit, higher than wide, about 0.3 mm high, 0.2–0.3 mm wide. Fruiting: spring—summer.

HABITAT AND DISTRIBUTION: Boggy streams, fens, wet meadows, seeps, springs, and hot springs from sea level to 3600 m elevation, sometimes occurring above timberline. Tolerant of salinity and alkali. Locally distributed in all Intermountain states. Occurs across most of North America, except for the Southeast; Eurasia. Circumboreal.

SIMILAR SPECIES: *Eleocharis quinqueflora* is easily confused with the closely related *E. suksdorfiana*, which is more robust. See the characteristics given in the key.

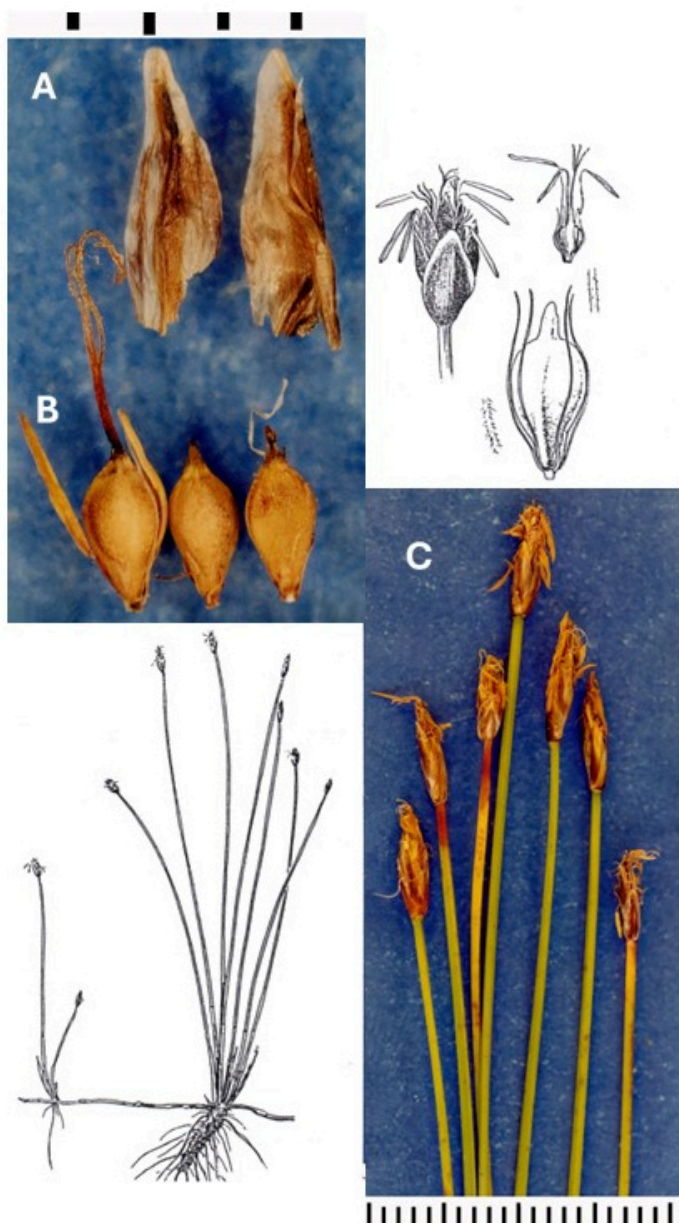


Figure 34. *Eleocharis quinqueflora*. (A) Scales: left dorsal view, right ventral view, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis rostellata (Torrey) Torrey

Beaked spikerush, Torrey's spikerush, Walking sedge

SYNONYMS: *Eleocharis rostellata* (Torrey) Torrey var. *congdonii* Jeps., *E. r.* (Torrey) Torrey var. *occidentalis* S. Watson, *Scirpus rostellatus* Torrey

PLANT HABIT: **Perennial**, loosely clustered or in dense tussocks from short ascending **rhizomes** (mostly hidden by the crowded culms) or mats from rooting culm tips; **culms** erect, firm, wiry, flattened, 1.5–3 times as wide as thick; fruiting **culms** 10–50 cm tall, 0.3–2 mm thick; sterile culms longer (to 1 m or more), arching over or decumbent and rooting at the tips.

LEAVES: Usually 2, basal, leaf **sheaths** brownish, greenish or reddish purplish, extending up to 8 cm on the culm; upper sheath firm or papery, apex obtuse to subacute and reddish; **tooth** absent.

INVOLUCRAL BRACTS: Absent.

SPIKELETS: Solitary, (5) 10–20 (35) flowered, erect, ovoid or oblong, wider than the stem, brownish to blackish-purplish, apex acute, 5–17 mm long, 2.5–5 mm thick; spikelets on stolons rudimentary and non-flowering.

SCALES: Lowest scale ovate, without a flower and completely clasping the culm, 2–4 mm long, longer than the other scales, but rarely more than half the spikelet length; subproximal scale with a flower; upper floral scales 10–40, ovate-lanceolate, membranous to cartilaginous, apex obtuse to acute, straw-colored to medium brown with broad pale hyaline margins, midrib may be paler, purplish to blackish-purple spots sometimes present, 3.5–6 mm long, 2–3 mm wide.

FLOWERS: **Perfect**; **perianth bristles** (0) 4–6 (8), unequal, stout, retrorsely barbellate, olive to brown, equaling the achene or tubercle; **stamens** 3, anthers about 2 mm long; **styles** trifid or trifid and bifid.

ACHENES: Variable, obovoid, trigonous to lenticular, rugulose to finely reticulate or smooth and shiny, medium brown to dark brown or olive green, abruptly tapered to a distinct beak, 0.9–2.8 mm long, 2–3 mm wide; tubercles absent or obscure to prominent, conic, often merging with the achene in form, color, and texture, 0.15–0.3 mm high, 0.5 mm thick. Fruiting: summer-fall.

HABITAT AND DISTRIBUTION: Very wet brackish to fresh fens, springs, hot springs, and shores to 2400 m. Indicator of saline or calcareous soils. Locally distributed in Idaho, Nevada, Utah and Wyoming; Found across most of the United States. Newfoundland to Vancouver, Canada, south through Central and South America to northern Argentina; Europe. Very competitive and forms large monospecific colonies.

SIMILAR SPECIES: The introduced *Eleocharis pachycarpa* is similar to *E. rostellata* in forming tussocks from short, ascending rhizomes and sometimes proliferating spikelets. It differs in its slender, sharply 4-angled culms, different achenes, and the proliferating culms that are not greatly elongating or mat forming (see key herein and *E. bolanderi*).

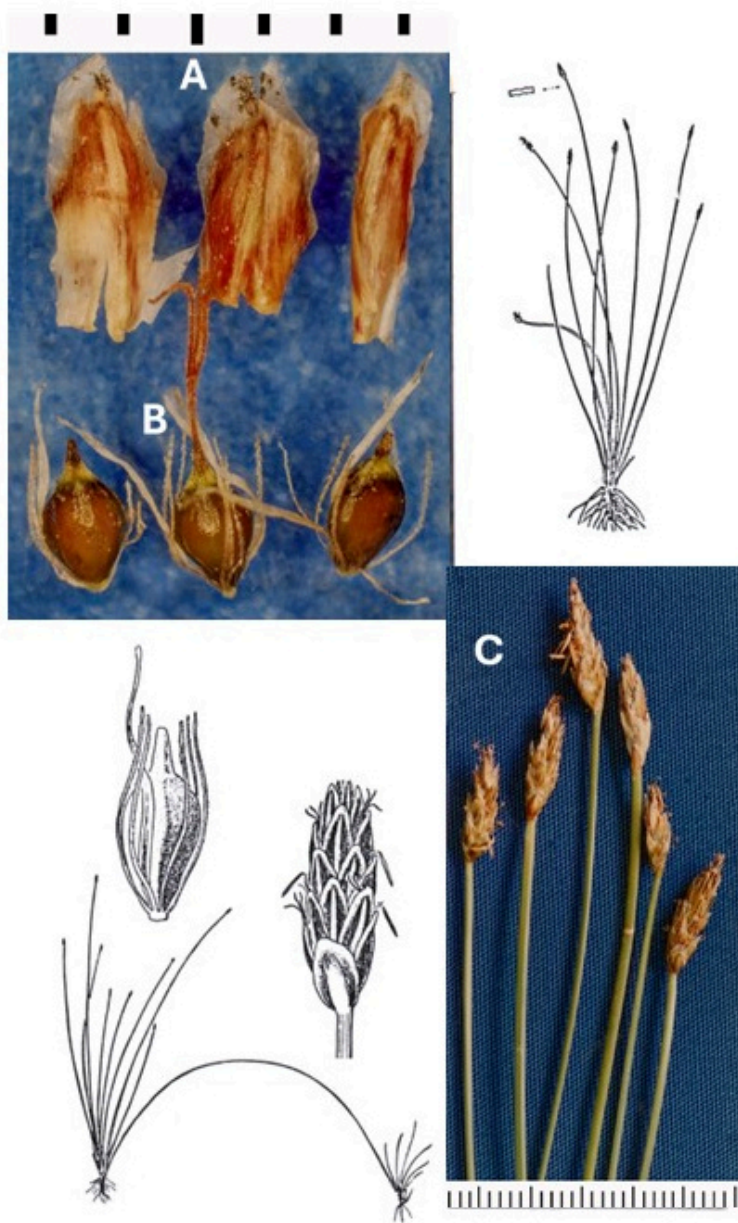


Figure 35. *Eleocharis rostellata*. (A) Scales, (B) achenes with filaments and bristles, (C) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eleocharis suksdorfiana Beauverd

Suksdorf's spikerush

SYNONYMS: *Eleocharis pauciflora* (Lightfoot) Link var. *suksdorfiana* (Beauverd) Hultén, *E. quinqueflora* (Hartmann) O. Schwarz var. *suksdorfiana* (Beauverd) J.T. Howell

PLANT HABIT: **Perennials** forming mats from long horizontal **rhizomes** 0.5–1.5 mm thick; **bulbs** (“resting buds”) unknown; **culms** erect, cylindric to slightly flattened, twice as wide as thick, firm to hard, bluntly ridged when dry, not swollen (bulb-like) at the base, 12–40 cm tall, 0.5–1.2 mm thick.

LEAVES: Usually 2, basal; distal leaf **sheath** straw-colored to brown or reddish proximally and green to reddish distally; apex subtruncate to obtuse; **tooth** absent.

INVOLUCRAL BRACTS: Absent.

SPIKELETS: Solitary, erect, ovoid or oblong, 4–10 mm long, 2–4 mm thick.

SCALES: Floral scales 8–12 per spikelet, lanceolate to ovate, membranous, 3.5–5 mm long, 2–2.5 mm wide; lowest scale completely clasps the culm and lacks (seldom with) a flower, 3–5 mm long, half or more as long as the spikelet; second scale with a flower.

FLOWERS: **Perfect;** **perianth bristles** 6, about equal, slender, spinules dense, the longest bristle equaling the achene to exceeding the tubercle; **stamens** 3; **styles** trifid or trifid and bifid in same spikelet.

ACHENES: Trigonous, some lenticular, apically narrowed to a distinct straw-colored beak, smooth or with fine longitudinal ridges, medium to dark brown or gray, 2–2.7 mm long, 0.7–1.3 mm wide; **tubercles** to about 0.5 mm high, often not distinct, usually merging with achene summit in form, texture and color. Fruiting: late spring–summer.

HABITAT AND DISTRIBUTION: Fens, bogs, wet meadows, seeps, springs, and ponds from (0) 1100 to 3300 m elevation. Locally distributed in Nevada, Oregon, and southern Idaho. Southern British Columbia to California and east to Alberta and Colorado.

SIMILAR SPECIES: *Eleocharis suksdorfiana* is easily confused with the closely related *E. quinqueflora*, within which it has usually been placed. These species differ as given in the key. *E. suksdorfiana* has long horizontal rhizomes, lacks stoloniferous culms, and produces achenes that are finely ridged longitudinally.

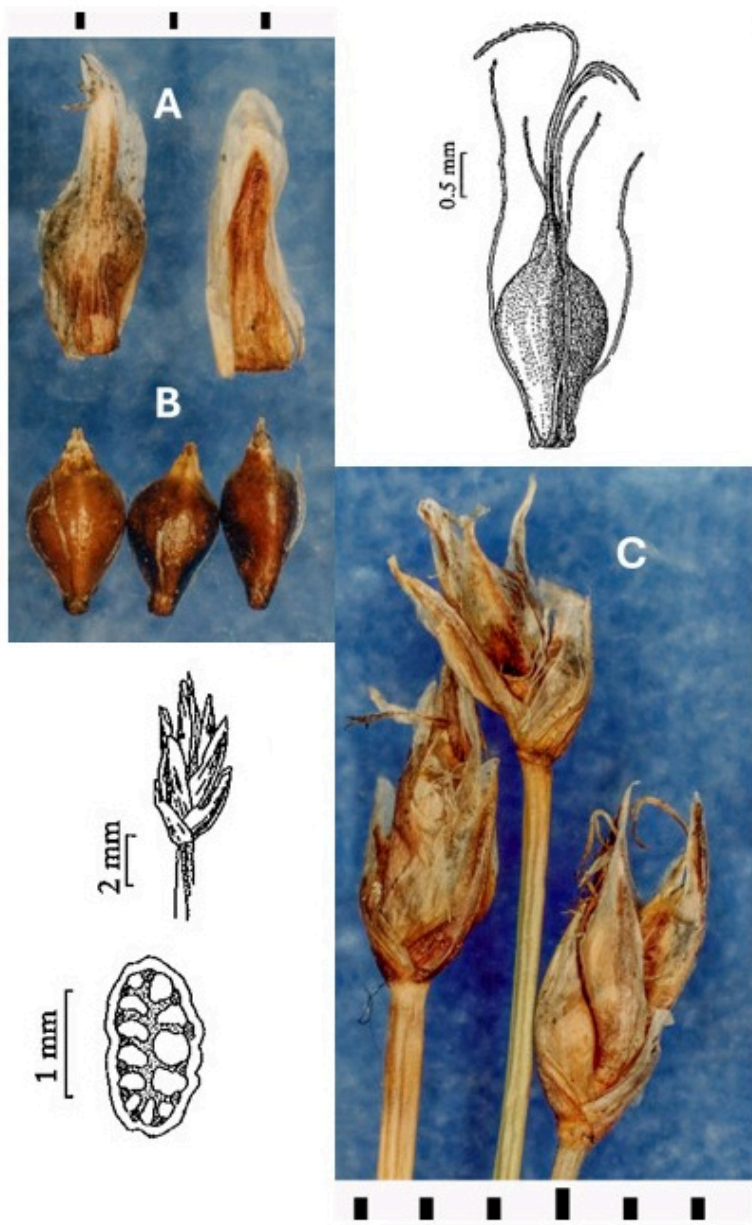


Figure 36. *Eleocharis suksdorfiana*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: E. Zimmerman (Smith et al. 2002).

Eriophorum L.

Cottongrass, Cottonsedge

Rhizomatous **perennials**; culms solitary or clumped, terete or obscurely triangular, mostly solid; leaves basal and cauline; sheaths closed, ligulate; blades grasslike, flat with a narrow apex, smooth, up to 25 cm long, 2.5–4 mm wide; cauline leaves sometimes bladeless; **inflorescences** terminal; **spikelets** terete, solitary and erect or multiple (2–10 [30]) in a terminal cluster; **involucral bracts** 1-several, scalelike or elongate and leafy; **scales** spirally arranged, mostly thin and scarious, greenish or blackish, not awned; **flowers** perfect with a conspicuous perianth of numerous persistent, smooth, white to rufous, filiform bristles much exerted from the scales and obscuring them at maturity so that the fruiting spikelet forms a dense cottony mass commonly 2–4 cm long; stamens 3; styles rather long, trifid, deciduous; **achenes** oblong or oblanceolate, unequally trigonous, medium to dark brown at maturity, often with a short, slender stylar apiculus.

A mostly boreal genus of about 25 species. Plants of cool, wet places in temperate, alpine, and arctic regions of the Northern Hemisphere.

See Figure 37.

Key to Intermountain *Eriophorum* species

1. Spikelet solitary, terminal, erect; leaves few, reduced or lacking, dark-tipped and bladeless; uppermost leaves borne at about the middle of the culm; proximal spikelet scales generally empty.
 2. Perianth bristles bright white; spikelets broadly obovoid to subglobose in fruit; fertile scales narrow, tapering, up to 1 mm wide; anthers mostly 0.5–1 mm. *E. scheuchzeri* p. 98
 2. Perianth bristles reddish-brown to white; spikelets globose in fruit; fertile scales broader and more blunt; anthers 1–2.5 mm or longer. *E. chamissonis* p. 94
1. Spikelets two or more in a subumbellate inflorescence, subtended by one or more usually blade-bearing involucral bracts; proximal scales usually subtend flowers; leaves few, distal leaves with blades at least 1 cm long.
 3. One inflorescence bract blade-bearing; leaf blades channeled in cross-section; peduncles slender, subterete but not compressed, hirtellous-pubescent; perianth bristles do not easily disarticulate from the achene. *E. gracile* p. 96
 3. Inflorescence with 1 (2–5) blade-bearing bracts, leaf blades flat; peduncles compressed, smooth or minutely scabrous-hirtellous; perianth bristles easily disarticulate from the achene.
 4. Scales blackish green or purplish green, thin with hyaline margins; midrib slender, attenuated distally and not reaching the tip. *E. angustifolium* subsp. *angustifolium* p. 92
 4. Scales consistently dark green to gray, firm with inconspicuous hyaline margins; midrib wider, green or paler, expanding distally and reaching the tip, sometimes excurrent. *E. viridicarinum* p. 100

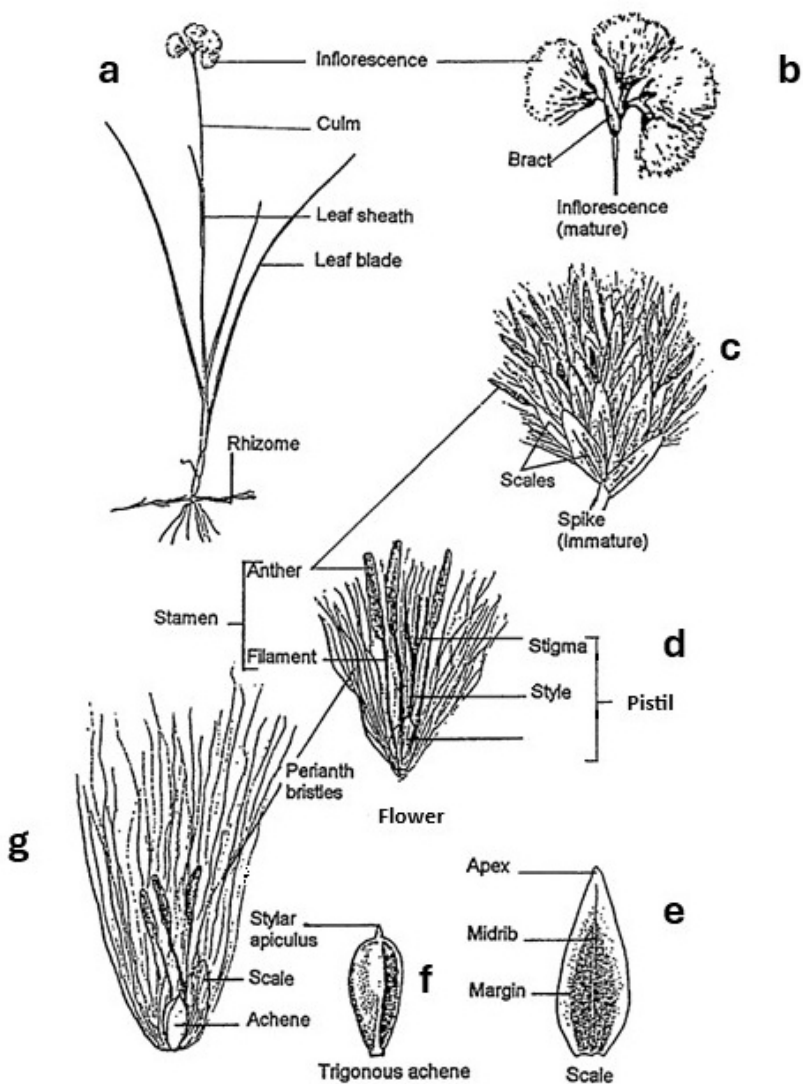


Figure 37. *Eriophorum* morphology. Drawings: a, b, e, f: J.R. Janish (Hitchcock et al. 1969), c, d, g: E.G. Hurd.

Eriophorum angustifolium Honckeney **subsp. *angustifolium***

Tall cottongrass, Many-spiked cottongrass, Narrowleaf cottonsedge

SYNONYMS: *Eriophorum polystachion* L.

PLANT HABIT: Robust colonial **perennials**; **culms** mostly arising singly from long creeping **rhizomes**, subterete or obtusely angled, smooth, 2–10 dm tall, 1–1.2 mm thick distally.

LEAVES: Basal and cauline; **sheaths** with a small area of hyaline tissue near the mouth ventrally, rims may be darker; **blades** well developed, elongate, mostly flat proximally, tapering distally, apex triangular and channeled, 40 cm long, 1.5–6 (8) mm wide, shorter than the culms; distal blade much longer than the sheath. Blades will stain red when crushed.

INVOLUCRAL BRACTS: Several, blade-bearing, unequal, the lowest leaflike, green to dark purple or black toward the base; longest bract to 2.5–5.5 (12) cm, shorter to equaling or surpassing the inflorescence; upper bracts reduced.

INFLORESCENCES: 2–10 spreading or pendent **spikelets** in a compact or open umbelliform cyme; lateral spikelets with slender, compressed, smooth or more commonly minutely scabrous-hirtellous peduncles 0.5–2.5 cm long, central spikelets may be sessile; mature inflorescence cotton-like, 10–20 mm long in flower, 20–50 mm long in fruit.

SCALES: Spirally arranged, ovate or lanceolate, brown to greenish, blackish or purplish green on the lower half, paler and very thin with broad white margins distally, 5–10 mm long 2–3 mm wide, midrib attenuated distally, not reaching the acute to obtuse tip; proximal scales lack lateral ribs; fertile scales concealed by the long cottony bristles at fruiting.

FLOWERS: **Perfect**; **perianth bristles** numerous, long, smooth, usually white to pale yellow brown, 1.5–4 cm long, forming cottonlike tufts; **stamens** 3; anthers 2–5 mm long; **stigmas** trifid, slender.

ACHENES: Broadly oblanceolate to obovoid with a blunt tip, unequally trigonous, blackish with somewhat paler angles, 2–3.5 (5) mm long, 1–1.5 mm wide, 2–3 times as long as wide; achenes disarticulate readily from the perianth bristles. Fruiting: July–August.

HABITAT AND DISTRIBUTION: Bogs, swamps, fens, marshes, and wet meadows from sea level to 1100 m. Uniform stands appear reddish due to red leaf tips. Known from northeastern Utah and eastern Idaho in the Intermountain Region. Circumboreal at high latitudes, extending south in North America to New York, Indiana, Illinois, Iowa, Nebraska, New Mexico, Idaho, and northwestern Oregon.

SIMILAR SPECIES: *E. gracile*: Leaf blades channeled; peduncles hairy and not compressed; perianth bristles not readily disarticulating from the achene; achene stramineous, 3–4 times as long as wide. *E. viridicarinatum* scale midrib is pale green and expands distally, extending to the tip.

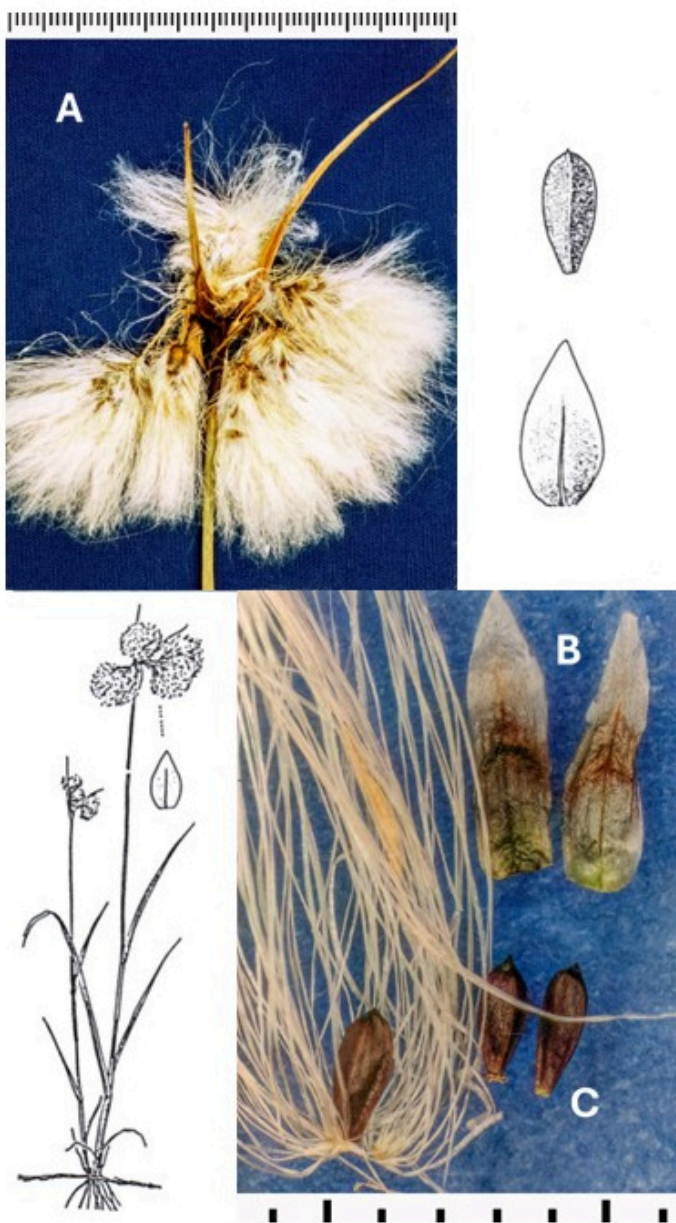


Figure 38. *Eriophorum angustifolium* subsp. *angustifolium*. (A) Inflorescence, (B) scales, (C) achenes: left with bristles attached at the base. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eriophorum chamissonis C.A. Meyer

Russett (Rusty) cotton-grass, Chamisso's cottongrass

SYNONYMS: *Eriophorum altaicum* Meinshausen var. *neogeum* Raymond, *E. chamissonis* C.A. Meyer var. *aquatile* (Norman) Fernald, *E. russolum* Fr. ex Hartm. subsp. *rufescens* (E.S. Anderson) Hyl., *Scirpus chamissonis* C.A. Meyer

PLANT HABIT: **Perennials** forming extensive colonies from long creeping rhizomes; **culms** solitary or few together, stout, somewhat trigonous, 20–80 cm tall, 1.5–4 mm thick at the base.

LEAVES: Few, borne mostly near the base; basal **sheaths** persistent, septate-nodulose, brown; **blades** filiform, trigonous-channeled, smooth, 2–10 cm long, 1–2 mm wide; 1–2 leaf sheaths near the middle of the culm are bladeless and inflated.

INVOLUCRAL BRACTS: Absent.

INFLORESCENCES: **Spikelet** solitary, terminal, erect, globose, broader at the base in fruit, 1.5–4 cm wide.

SCALES: Spirally arranged, black to purplish brown; proximal scales (up to 7) empty, slightly sheathing at the base, obovate or obovate-trigonal with a blunt apex, margins white, conspicuous, 4–20 mm long; distal scales fertile, ovate-lanceolate, 1 mm wide or more, blackish green with the tip and distal margins paler and hyaline.

FLOWERS: **Perfect;** **perianth bristles** many, smooth, reddish-brown to white, 20–40 mm long; **stamens** 3; anthers mostly 1.5–3 mm long; **stigmas** 3.

ACHENES: Oblong-obovoid, unequally trigonous, dark, apex apiculate, 2–2.7 mm long and as wide. Fruiting: May–August.

HABITAT AND DISTRIBUTION: Found in peat, bogs, fens, marshes, swamps, and other wet places from sea level to 3000 m elevation. Circumboreal. In the Western Hemisphere from Greenland to Alaska and south to Washington, Oregon, northern and central Idaho, the Uinta Mountains of northeastern Utah, Montana, Wyoming, Colorado, North Dakota, Nebraska, Minnesota, and Wisconsin. The complex exhibits continuous variation with many intermediates.



Figure 39. *Eriophorum chamissonis*. (A) Plants with seedheads, (B) achene with bristles, (C) achenes. Photos: (A) USDI BLM SOS_ 2010_AK930. (B) G. Campbell (CalPhotos). Drawings: J.R. Janish (Hitchcock 1969).

Eriophorum gracile W.D.J. Koch

Slender cottongrass, Slender cottonsedge

SYNONYMS: *Scirpus ardea* T. Koyama

PLANT HABIT: Colonial **perennials** with long, slender **rhizomes**; **culms** slender, subterete below, distally triangular and straited to unequally ribbed, 2–6 dm tall, 0.5–0.8 mm wide.

LEAVES: Few, mostly borne toward the base; basal leaves well developed; **sheaths** septate dorsally, straited, hyaline and brown dotted ventrally; **blades** narrow and elongate, deeply channeled or triangular distally, 2–30 cm long, 1–2 mm wide; uppermost cauline leaf with reduced blade, 1–4 cm long, 1–1.5 mm wide, usually shorter than its 3.5–5.5 cm long sheath.

INVOLUCRAL BRACTS: Proximal bract similar to the distal leaf but not prominently triangular distally, somewhat spongy, green or brownish, 0.6–2 cm long, usually shorter than the inflorescence; distal bracts reduced, lacking blades, gray or black.

INFLORESCENCES: Subumbels of 2–5 spikelets in an umbelliform cyme; **spikelets** narrowly ovoid, 7–10 mm in flower, 15–25 mm in fruit; lateral spikelets short hirtellous-pubescent with slender, subterete (not compressed), peduncles 3–30 mm long; central spikelets subsessile or short pedunculate.

SCALES: Spirally arranged, lanceolate to broadly ovate, 5–9 ribbed, scarious, pale near the base, upper portion blackish-green, margins very narrow, apex black and subacute to obtuse, the midrib slender and firm, distally dilated, pale, terminates just below the apex, 3–4 mm long, 1.5–2.3 mm wide, 1.5–2 times longer than wide.

FLOWERS: **Perfect;** **perianth bristles** numerous, smooth, and mostly white, 10–15 mm long, concealing the fertile scales; **stamens** 3; anthers 1–3 mm; **stigmas** deeply trifid.

ACHENES: Narrowly elliptic oblong to narrowly oblanceolate, unequally trigonous (flat side widest), the angles prominent, apex blunt, stramineous to light brown, 1.5–3.5 mm long, 1–1.2 mm wide, 3–4.5 times as long as wide; bristles do not readily disarticulate from the achenes. Fruiting: May–August.

HABITAT AND DISTRIBUTION: Meadows, bogs, and other wet places from sea level to 4000 m, usually in peaty, acidic substrates. Circumboreal, extending south in North America to Pennsylvania, Iowa, Colorado, central and northern Idaho, central California, and reportedly to eastern Oregon, western Wyoming, Nevada, and Utah.

SIMILAR SPECIES: *E. angustifolium*: Stouter plants, 2–6 (9) dm tall; leaves flat; blade-bearing bracts 4–5; floral scales 3–4 times longer than wide; peduncles compressed and not hairy; achene 2–3 times as long as wide; mature achenes disarticulate easily from the bristles.

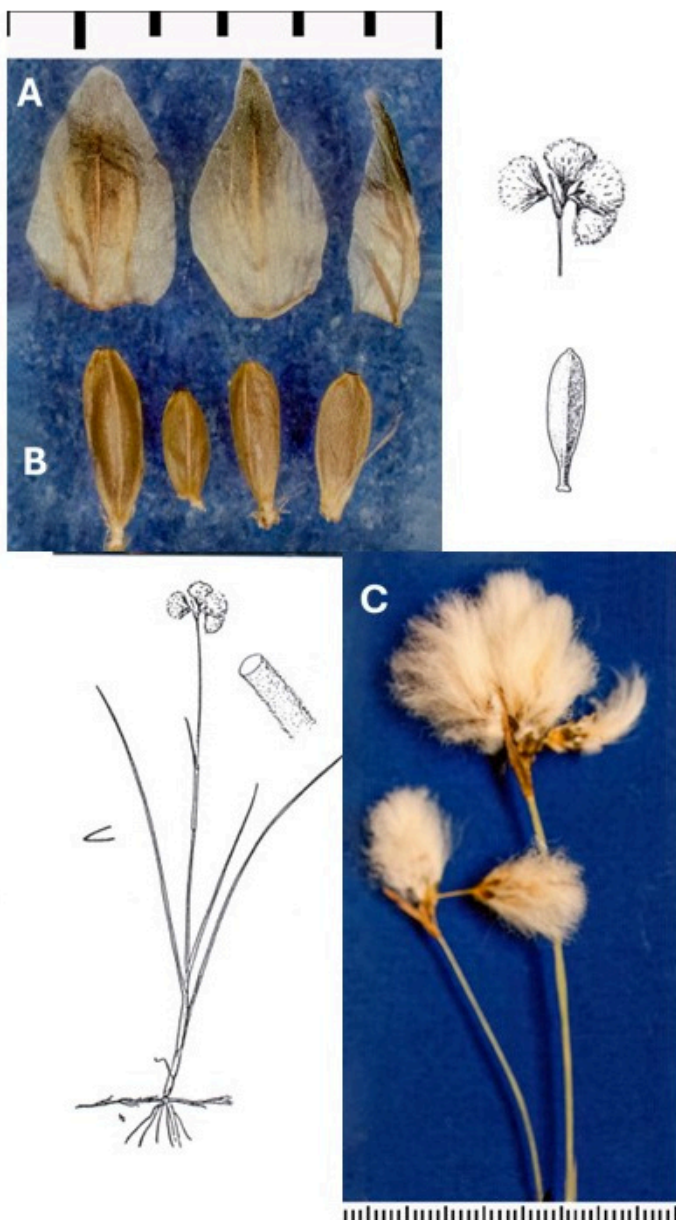


Figure 40. *Eriophorum gracile*. (A) Scales, (B), achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eriophorum scheuchzeri Hoppe

White cottongrass, Dense cottongrass, Scheuchzer's cottongrass, Shealted cottongrass

SYNONYMS: *Eriophorum leucocephalum* Boeck., *Scirpus leucocephalus* T. Koyama, *S. scheuchzeri* (Hoppe) Vitman

PLANT HABIT: **Perennials** forming large colonies from long, slender, creeping **rhizomes**; **culms** mostly arising singly or in small groups, erect, subterete, somewhat trigonous, smooth, evenly straited, reddish tinged, 1–4 (7) dm tall, about 1 mm wide at the base.

LEAVES: Few, most borne toward the base, slender, smooth; basal **sheaths** well-developed, septate-nodulose, brown to reddish, persistent; **blades** slender, channeled or triangular, up to 12 cm long, 1 mm wide, shorter than the culms, sometimes reduced or lacking; distal leaves borne at about the mid-culm are dark tipped and bladeless.

INFLORESCENCES: Spikelet solitary, terminal and erect.

SCALES: Spirally arranged. Numerous, closely clustered; sterile scales proximal, several (7 or fewer), gray to blackish or blackish-purple with inconspicuous midribs not reaching the apex, 4–10 mm long; fertile scales distal, narrowly oblong, very thin, less than 1 mm wide, tapering gradually to an acute or obtuse tip, upper half blackish-green with broad to narrow white hyaline margins, paler toward the base, the inconspicuous midrib reaching to about one-half to two-thirds the scale length.

FLOWERS: **Perfect**; **perianth bristles** numerous, smooth, straight, soft, mostly white to reddish tinged, 1.5–3.5 cm long, forming a cotton-like tuft that conceals the fertile scales; **stamens** 3 with short anthers (0.5–1.0 mm); **stigmas** trifid, slender.

ACHENES: Oblanceolate, unequally trigonous with blunt angles, brown or blackish, 0.4–2.5 mm long, 0.5–1 mm wide with a short, dark, slender beak. Fruiting: July–August.

HABITAT AND DISTRIBUTION: Cold, wet places, tundra, meadows, margins of lakes, marshes, and wet peatlands from sea level to 3800 m elevation. Circumboreal and southward in the United States to isolated mountainous areas of Montana, Wyoming, Utah (Duchesne, Summit, Uintah, and Wasatch Counties), Colorado, and New Mexico.

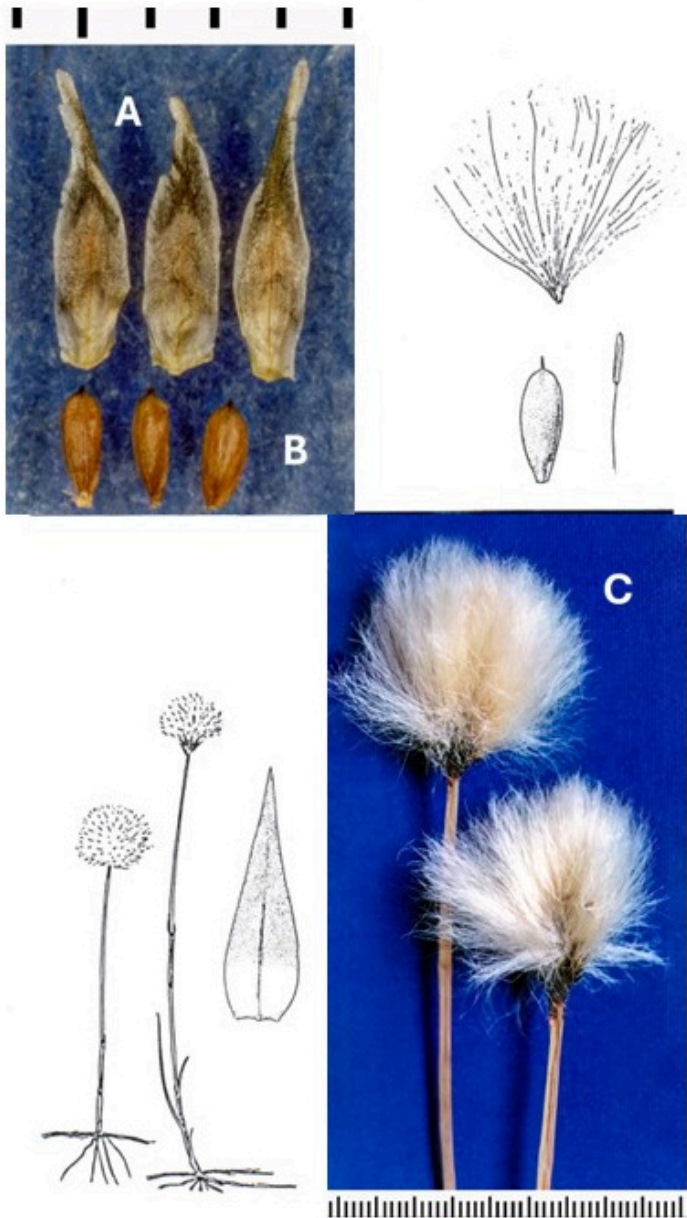


Figure 41. *Eriophorum scheuchzeri*. (A) Scales, (B) achenes, (C) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Eriophorum viridicarinatum (Engelmann) Fernald

Thinleaf cottonsedge, Green-keeled cottongrass, Tassel cotton-grass

SYNONYMS: *Eriophorum latifolium* Hoppe var. *viridicarinatum* Engelmann

PLANT HABIT: **Perennials** from creeping **rhizomes**; **culms** tufted or sometimes solitary, not sharply trigonous, glabrous, finely striated, up to 10 dm tall, 0.9–1.2 mm wide distally.

LEAVES: Several, basal and cauline; lower leaf **sheaths** overlapping, bases persistent; ventral sheath of cauline leaves veined except for a small hyaline area next to the concave mouth; **blades** elongate, flat, distally trigonous, minutely scabrous, up to 30 cm long, 2–6 mm wide; uppermost blade much exceeding the sheath.

INVOLUCRAL BRACTS: 2–4 blade-bearing bracts, foliaceous, flat, coarsely ribbed toward the base, triangular distally, minutely scabrous, green; lowest bract erect, equaling or exceeding the inflorescence; upper bracts reduced, brownish throughout.

INFLORESCENCES: Subumbels of 3–30 many-flowered, oblong to ovoid, terete **spikelets**, 6–10 mm long in flower, 15–30 mm long in fruit, most on slender, lax, minutely hairy, scabrous peduncles up to 6 cm long in mature inflorescences.

SCALES: Spirally arranged, ovate-lanceolate, several nerved, pale to gray proximally, greenish or blackish-green distally, 4–6 mm long, 2.5 mm wide at the base; margins narrow, hyaline, scarious; prominent pale to green midrib expanded distally and extending to the blunt or acute tip or sometimes excurrent.

FLOWERS: **Perfect**; **perianth bristles** numerous, straight, smooth, white to cream or buff, 15–25 mm long; **stamens** 3, anthers 0.8–2 mm long; **stigmas** 3-branched.

ACHENES: Narrowly obovoid, unequally trigonous, tapered toward the base, apex rounded, brown or reddish brown, about 3 mm long and 1.5 mm wide. Fruiting: June–July.

HABITAT AND DISTRIBUTION: Cold, wet, especially peaty places in swamps, bogs, fens, and wet woods from sea level to 3000 m elevation. A North American species distributed from Alaska to Newfoundland and south from Washington to Colorado, North Dakota, Iowa, Illinois and east to Delaware. Peripheral to the Intermountain Region, occurring in Fremont and Teton Counties in southeastern Idaho, and possibly in Park and Teton counties in northwestern Utah.

SIMILAR SPECIES: Fertile scales of *E. angustifolium* are very thin and not consistently greenish black, the basal portion purplish brown, the midvein not expanded distally and does not reach the tip.

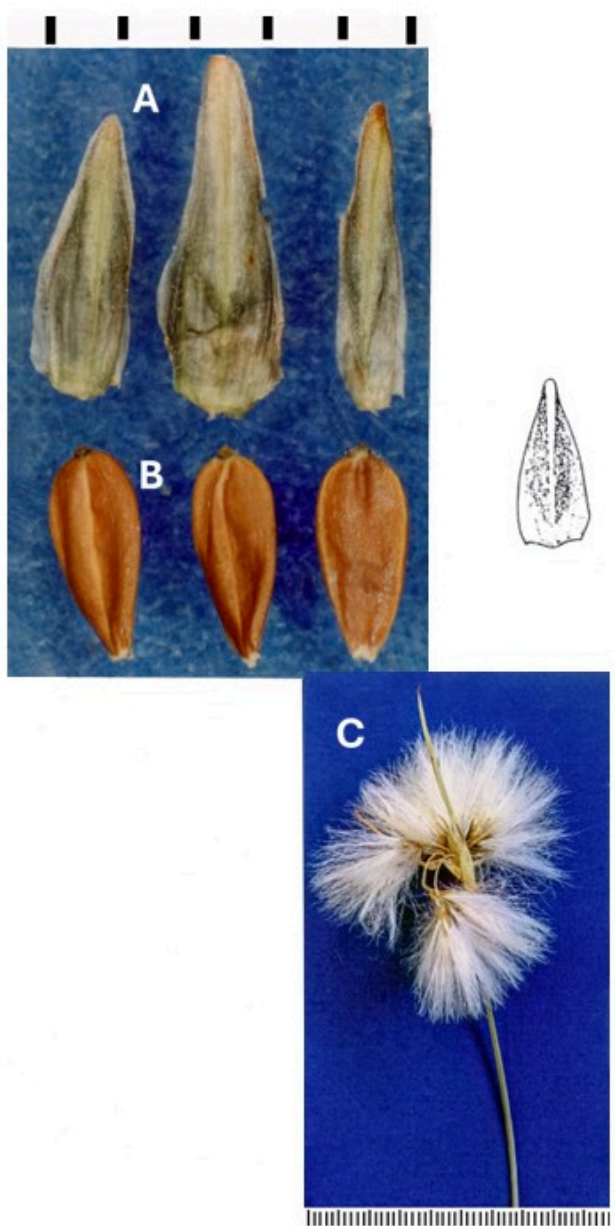


Figure 42. *Eriophorum viridicarinatum*. (A) Scales, (B) achenes: left and center—dorsal views, right—ventral view, (C) inflorescence. Photos: E.G. Hurd. Drawing: J.R. Janish (Hitchcock et al. 1969).

Fimbristylis Vahl

Fimbry, Fimbristyle

Annual or **perennial**, generally tufted, to 15 dm tall, rhizomatous or not; culms sometimes solitary, erect, scapose, slender (< 2 mm thick), ridged or grooved, terete, triangular, or compressed; **leaves** several, grasslike, borne near the base in two or more rows, shorter than the culms; sheaths open apically, margins wide and scarious, much shorter than the blades; ligules of erect short hairs or lacking; blades flat, folded, terete, or sulcate, not keeled ventrally, 2–4 mm wide; **inflorescences** of several to many ovoid to cylindric or compressed **spikelets** in terminal, simple or compound umbelliform cymes subtended by 2–5 sheathless, leafy or scalelike **involucral bracts** that are shorter than to exceeding the inflorescence; **scales** 8–100 or more, arranged spirally, imbricate, ovoid, 2 mm long or more; proximal 1–2 scales often empty; fertile scales ridged, the midrib often excurrent; **flowers** borne singly in the axils of upper scales, perfect, perianth lacking, protandrous, stamens 1–3; style bifid or occasionally trifid, generally fringed below the branched stigmas, enlarged toward the base, completely deciduous at maturity; **achene** lenticular, trigonous or terete, brown at maturity, surface cells somewhat square or horizontally elongate at high magnification.

The genus is distributed worldwide and includes more than 100 species, mainly tropical or subtropical plants in open, wet places. Occurs in the Nevada and Utah portions of the Intermountain Region.

See Figure 43.

Key to Intermountain *Fimbristylis* species

1. Ligule present or absent, complete or incomplete; spikelet ovoid to lance-ovoid; fertile scales with abaxial surface lustrous, glabrous or puberulent apically with, apex rounded, midrib excurrent as a mucro. *F. puberula* p. 104
1. Ligule of short hairs present, complete; spikelet lance-ovoid to cylindric; fertile scales with abaxial surface dull, uniformly puberulent, apex broadly acute. *F. thermalis* p. 106

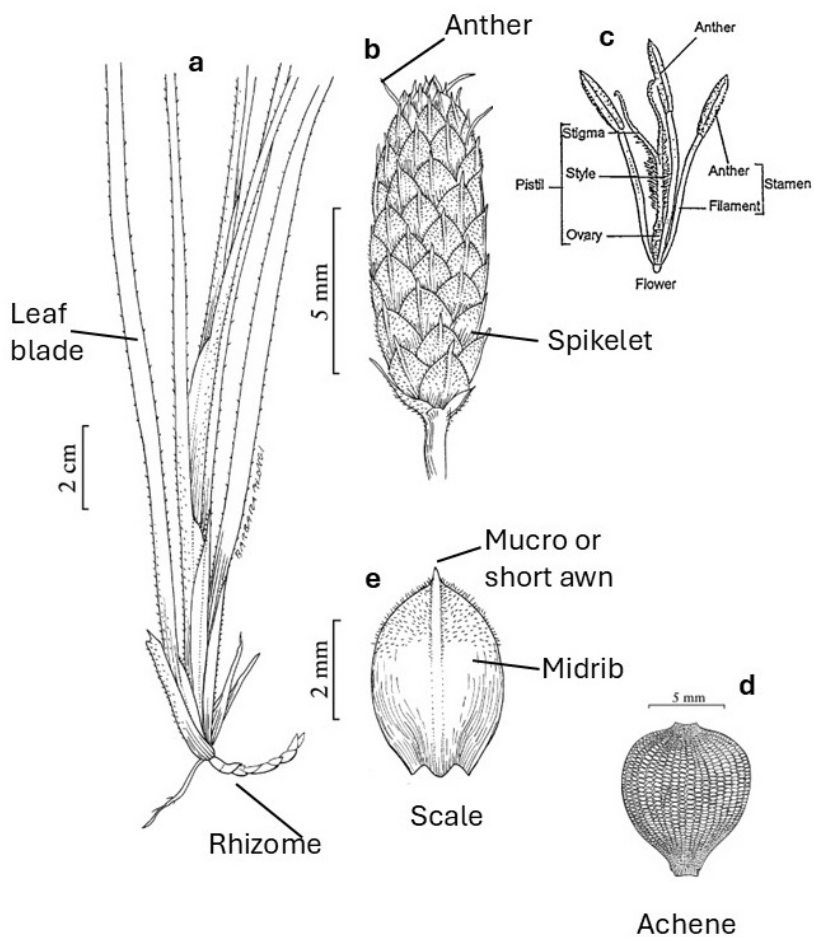


Figure 43. *Fimbristylis* morphology. Drawings: a,b,d,e: B. Alongi (Kral 2002a), c: E.G. Hurd.

Fimbristylis puberula (Michx.) Vahl

Hairy fimbry

SYNONYMS: *Scirpus puberulus* Michaux

PLANT HABIT: Robust **perennial** to 15 dm tall with swollen bases forming small tufts from short, slender, scaly or knotty, contorted rhizomes; **culms** sometimes solitary, narrow, somewhat triangular distally, striated, glabrous to sparsely pubescent, 1.2–2 mm wide.

LEAVES: Few, borne near the base, ascending, shorter than to equaling the culms; **sheaths** closed, apically ciliate, ventral side membranous, green to brown, often with minute brownish or reddish spots; **ligules** absent or present on rhizomatous plants, incomplete or complete; **blades** narrow, elongate, involute, glabrous to short hairy, 1–2 (4) mm wide, exceeding the sheaths.

INVOLUCRAL BRACTS: 2 or more, sheathless, unequal, elongate, scaberulous, ascending, shorter to longer than the inflorescence.

INFLORESCENCES: Usually a compound umbelliform cyme, but occasionally a simple umbel, broad, branching, ascending; terminal spikelet sessile and subtended by an involucre of several rays or peduncles 1–7 cm long, each with a terminal spikelet which may be subtended by an involucre with one or more secondary rays with terminal spikelets; **spikelets** many-flowered, ovoid to lance-ovoid, elliptic-cylindric, red-brown, 5–10 mm long, 3–5 mm thick.

SCALES: Numerous, spirally arranged, ovate to oblong, apex rounded, lustrous, reddish brown or grayish, lower surface glabrous to puberulent, 2.5–3.5 mm long; midrib lighter, raised dorsally and prolonged into a mucro or short awn.

FLOWERS: **Perfect;** **perianth** lacking; **stamens** 3; **style** bifid above the middle, somewhat flattened and fringed below the branched stigmas, about 2 mm long.

ACHENES: Broadly obovoid, biconvex, finely ribbed and lightly cross-rugulose at high magnification, shiny, yellow to dark brown, 1.5 mm long, about 1 mm wide. Fruiting: July–August.

HABITAT AND DISTRIBUTION: Moist stream sides, prairie swales, pinelands, sandy or clay soils from sea level to 1000 m. Uncommon in the Intermountain Region, occurrences have been noted for Utah and Nevada. Primarily a midwestern species in the United States.

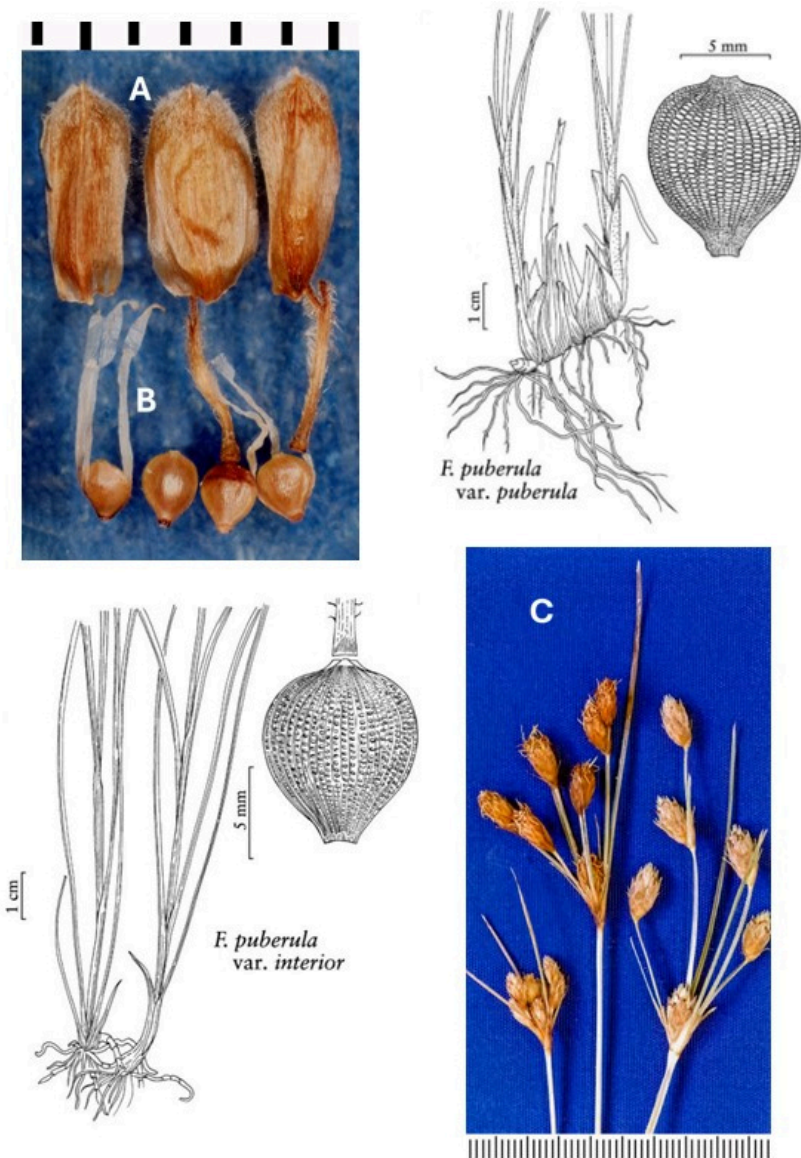


Figure 44. *Fimbristylis puberula*. (A) Scales, (B) achenes: first and fourth with filaments attached, third and fourth with styles and stigmas attached, (C) inflorescences. Photos: E.G. Hurd. Drawings: B. Alongi (Kral 2002a).

Fimbristylis thermalis S. Watson

Hot springs fimbry, Hot springs fimbristylis

SYNONYMS: *Fimbristylis spadicea* (L.) Vahl, *Scirpus spadiceus* L.

PLANT HABIT: Robust **perennial**, 0.5–1.5 dm tall; **rhizomes** long, slender, scaly; **culms** solitary or cespitose, terete but flat distally, grooved.

LEAVES: All near the culm base, spreading to ascending, one-half the length of the culms; **sheaths** smooth to puberulent on the backs, margins entire, **ligules** of short hairs; **blades** narrow, flat, margins scabrid-ciliate, proximally pubescent or not, 1–3.5 (4) mm wide.

INVOLUCRAL BRACTS: Few, narrow, short, longest bract shorter than the inflorescence.

INFLORESCENCES: Simple or usually compound, elongate cymose corymbs, scapes narrow with scabrid ribs, up to 6 cm long; **spikelets** numerous, ovoid to cylindric-ellipsoid, pale dull brown, 8–15 mm long, 3–4 mm wide.

SCALES: Fertile scales ovate, ciliate, apex broadly acute, pale brown, 3.5–4 mm long; midrib greenish and excurrent as an acute mucro.

FLOWERS: **Perfect**; **stamens** 3; **styles** bifid, flat, fimbriate, especially distally.

ACHENES: Ovoid, biconvex, dark gray to brown, shiny, sides with 20 or more rows of pits, 1.5 mm long, mucronate. Fruiting: spring–fall.

HABITAT AND DISTRIBUTION: Wet alkaline soils, seeps, hanging gardens, marshes, pond and lake margins, often near hot springs from 100 to 1350 m elevation. Utah, Nevada, Arizona, California, and Mexico. In the Intermountain Region this species occurs in scattered locations in Nevada and is uncommon in Utah. It may occur in the northeastern portion of California within the region.

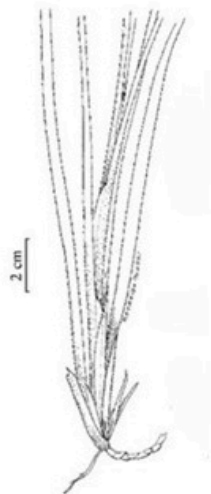
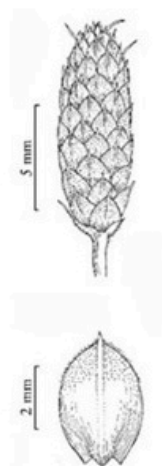


Figure 45. *Fimbristylis thermalis*. (A) Inflorescence, (B) achenes. Photos: (A) USDI BLM SOS_2003_NV-05-2-0116, (B) J. McDonald (California Botanic Garden). Drawings: B. Alongi (Kral 2002a).

Kobresia Willdenow

Bog sedge, Kobresia

Densely caespitose, grasslike **perennials**; rhizomes short or absent; **culms** solid, obtusely-trigonal or terete, especially toward the base, usually less than 35 cm tall; **leaves** basal and cauline, ligulate; leaf sheaths closed, basal sheaths persistent; blades well-developed, narrow to involute; **inflorescence** a solitary terminal spike or simple or compound panicle; **involucral bracts** leaflike or scalelike if present; **spikelets** 10–30, spirally arranged, each subtended by a scarious, scalelike bract on the axis of the spike; distal and terminal spikelets one-flowered and staminate; proximal spikelets one-flowered and pistillate or 2–4 flowered with a proximal pistillate flower and one or more distal staminate flowers; **flowers** unisexual, **perianths** lacking; **stamens** 3; **styles** trifid; **achene** unequally trigonal, dark brown, shiny; the apex with a persistent apiculate stylar base; the inner scale subtending each flower wraps around the achene (and the spikelet) and is homologous with the perigynium of *Carex*, but remains open, with the achene exposed.

A genus of about 30 species, found mostly in mountainous areas of Asia. A few circumboreal or boreal species in North America extending south in high elevation mountainous regions of the western United States.

See Figure 46.

Key to Intermountain Kobresia species

- 1. Inflorescence usually a simple spike 2–3 mm wide; basal sheaths persistent, glossy, bladeless; plants 5–20 cm tall; in the Intermountain region on dry rocky slopes or alpine tundra, often above timberline. *K. myosuroides* p. 110
- 1. Inflorescence usually compound, 3–8 mm wide with 3–12 spikes; basal sheaths persistent, dull with remains of blades attached; plants 25–35 cm tall; in the Intermountain region in boggy, usually calcareous meadows and ponds at high elevations. *K. simpliciuscula* p. 112

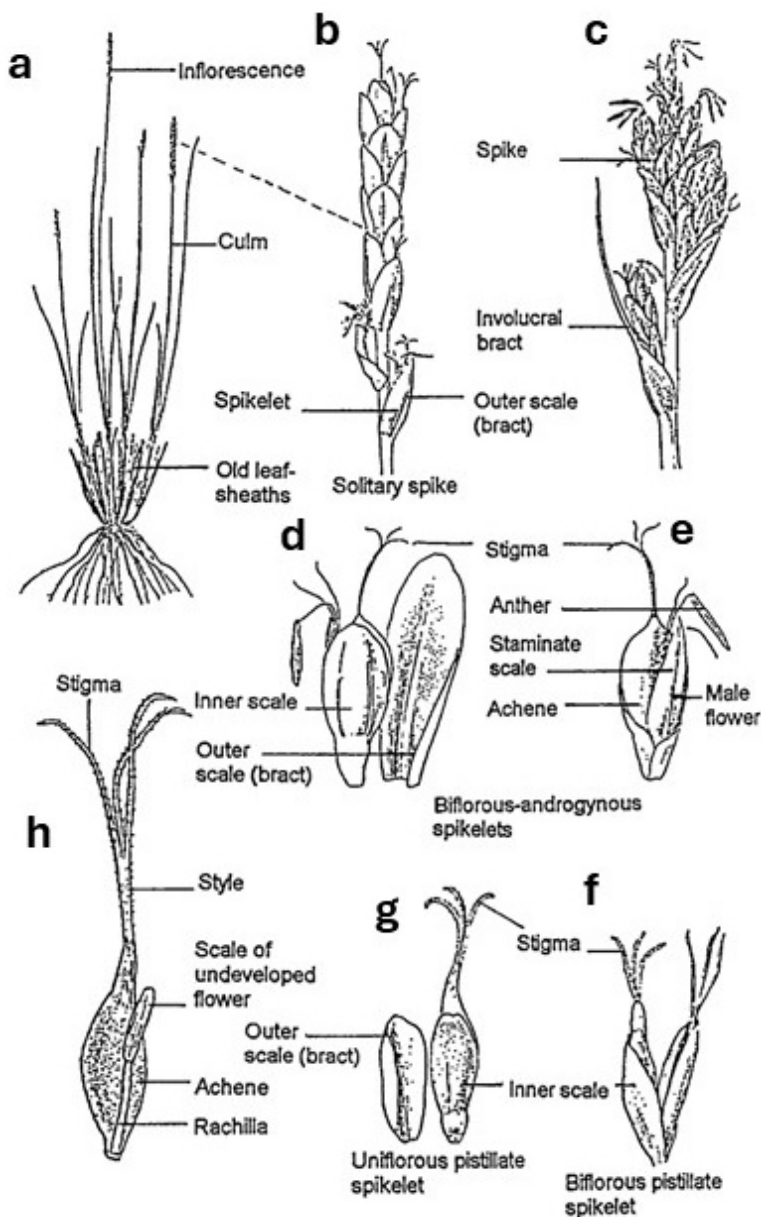


Figure 46. *Kobresia* morphology. Drawings: a-g: J.R. Janish (Hitchcock et al. 1969), h: E.G. Hurd.

Kobresia myosuroides (Villars) Fiori

Bellardi bog sedge, Bellardi kobresia

SYNONYMS: *Carex myosuroides* Villars, *Elyna bellardii* (Allioni) C. Koch, *Kobresia bellardii* (Allioni) Degland

PLANT HABIT: Densely tufted **perennial**; **culms** slender, smooth, terete, (0.5) 1–2 (5) dm tall, 1 mm wide, longer or shorter than the leaves.

LEAVES: Few, mostly basal; cauline leaves on the lower stem, wiry; old **sheaths** persistent, bladeless, glossy, brown; **blades** slender, flat to tightly involute or channeled, glabrous but sometimes scabrous along the margins, 2–20 cm long, 0.3–0.8 mm wide.

INVOLUCRAL BRACTS: None.

INFLORESCENCES: **Spike** solitary, terminal, slender, stramineous to brownish, 1–3 cm long, about 2–3 mm thick; **spikelets** 8–20, small, spirally arranged.

SCALES: Outer floral scale larger than the inner scale, 3–4 mm long, mostly scarious with hyaline margins, the midrib distinct nearly to the acute to obtuse tip; the inner floral scale brown to hyaline, smooth, equaling the achene, margins free to the base, 2–3.5 mm long.

FLOWERS: Those in proximal spikelets mostly androgynous (a staminate flower above a pistillate flower, but occasionally only a pistillate flower); the distal spikelets staminate, **stamens** 3, anthers 1–1.5 mm, **styles** trifid.

ACHENES: Broadly oblong, unequally trigonous with blunt greenish angles when fresh, shiny dark brown with a darker persistent apiculate stylar base, short stipitate, approximately 2.5 mm long, 1 mm wide. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Alpine tundra communities, rock stripes and talus, open dry or somewhat moist places from sea level to 3500 m elevation. Circumboreal, extending south irregularly in the United States in high elevation areas, often above timberline in Washington, southeastern Idaho, northeastern Utah, southeastern Oregon, California, and the Rocky Mountains south to New Mexico.

SIMILAR SPECIES: *Carex elynoides*: achene is wrapped in a closed perigynium (See Hurd et al. (1998)).

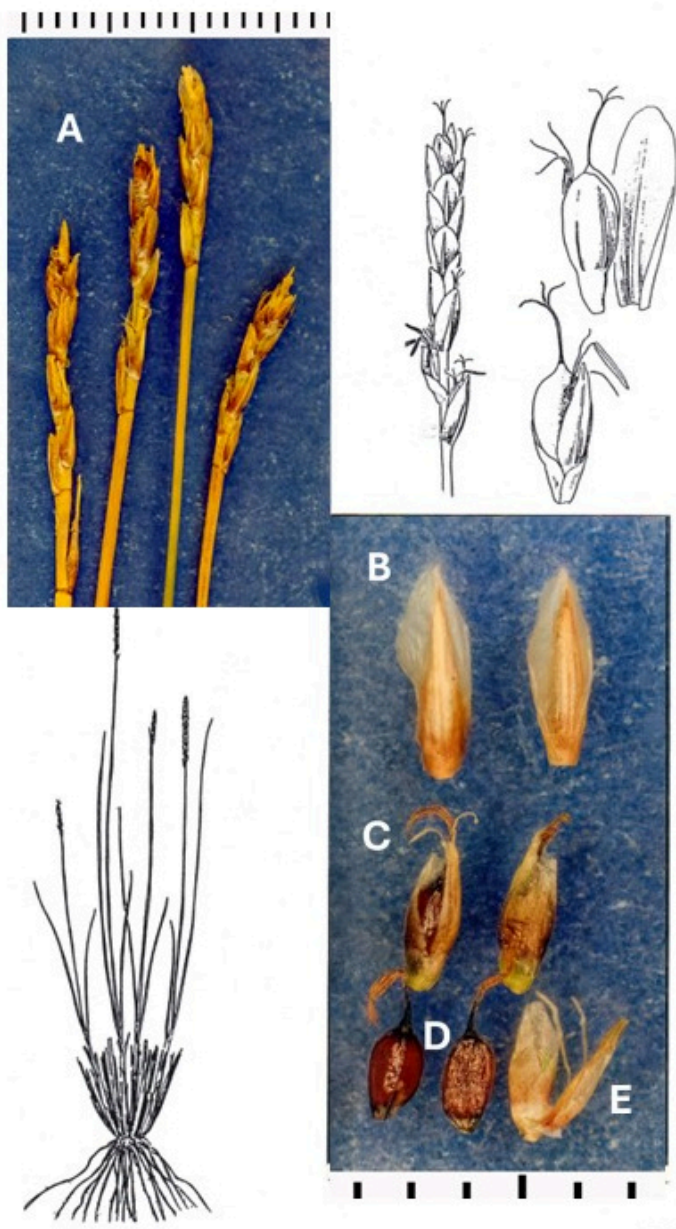


Figure 47. *Kobresia myosuroides*. (A) Inflorescences, (B) outer scales, (C) inner scales attached to the achene with staminate flower, (D) achenes, (E) inner scale. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Kobresia simpliciuscula (Wahlenberg) Mackenzie

Simple bog sedge, Simple kobresia

SYNONYMS: *Carex bipartita* Allioni, *C. simpliciuscula* Wahlenberg, *Kobresia bipartita* (Allioni) Dalla Torre

PLANT HABIT: **Perennial**, densely cespitose, lacking rhizomes; **culms** erect, terete to subterete, smooth, 0.5–3.5 (5) dm tall, longer than the leaves.

LEAVES: Few, borne on the lower fifth of the stem; **sheaths** very thin ventrally and soon breaking open, margins scarious; leaf sheaths brownish with bases of some dry blades persistent; **blades** flat or strongly folded, somewhat channeled, triangular and scabrous towards the tip, 2–20 cm long, 0.5–1.2 (2) mm wide.

INVOLUCRAL BRACTS: Ovate to oblong-ovate, brown with hyaline margins; lowest bract elongate and leaflike, equaling or shorter than the inflorescence; upper bracts reduced.

INFLORESCENCES: Compound, 1.5–4 cm long with 3–12 spikes, each subtended by a scarious bract; **spikelets** few flowered; proximal spikelets 2-flowered and androgynous or 1-flowered and pistillate; distal spikelets 1-flowered, staminate.

SCALES: **Outer floral scale** ovate to oblong with a conspicuous midrib reaching nearly to the tip, largely scarious, brownish, 2–4 mm long, 1–1.8 mm wide; inner scale thinner, lacking the conspicuous midrib, partially enclosing the achene with the margins free to the base.

FLOWERS: **Perianth** lacking; **stamens** 3, **styles** trifid.

ACHENES: Elliptical, unequally trigonous, brown with a darker styler base, 2–3 mm long, 1 mm wide. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Bogs, fens, tundra, calcareous meadows, gravels, rocky areas, edges of beaver ponds and other wet, usually calcareous places from sea level to 3500 m elevation. Circumboreal. South irregularly in western North America in high-elevation locations of northeastern Oregon, central and southeastern Idaho, Utah, and the Rocky Mountains to northern New Mexico.



Figure 48. *Kobresia simpliciuscula*. (A) Outer scales, (B) inner scales attached to the ventral side of the achenes and concealing them, (C) achenes, (D) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Lipocarpus R. Brown

Halfchaff sedge, Hemicarpha

Densely caespitose **annuals** with fibrous roots; **culms** clustered or solitary, erect to spreading, delicate, terete or compressed, glabrous, striated, nodeless, up to 2 dm tall, 0.2–0.5 mm wide; **leaves** few, basal; sheaths closed, purplish or brownish; the lower sheath bladeless; ligules absent; blades of distal sheaths filiform, flat to involute, glabrous to setaceous, up to 10 cm long, 0.5–2.5 mm wide; **inflorescence** a spherical or cylindrical cluster of one to several sessile spikes, terminal or appearing lateral, subtended by 1 to 4 unequal, leaflike **involucral bracts**, the longest of which resembles a continuation of the stem and exceeds the inflorescence; shorter bracts divergent; **spikes** compound, sessile with numerous ([20] 50–150) spirally arranged, sessile spikelets; **spikelets** imbricate, each with a single perfect flower subtended by a well-developed, awned **outer scale** that is brown with 1–11 lighter veins, and a smaller, very thin, hyaline, often much reduced or obsolete **inner scale** between the flower and the axis of the spikelet; perianth otherwise lacking; **flowers** perfect, stamens 1–3; style deeply bifid or trifid with elongate stigmas, deciduous at maturity, sometimes leaving a small mucro at the top of the achene; **achene** brown, dorsiventrally somewhat compressed, obovoid, terete or trigonous, the surface minutely papillate.

A genus of about 35 species, chiefly in tropical and warm temperate regions globally. Six species are native in the United States.

See Figure 49.

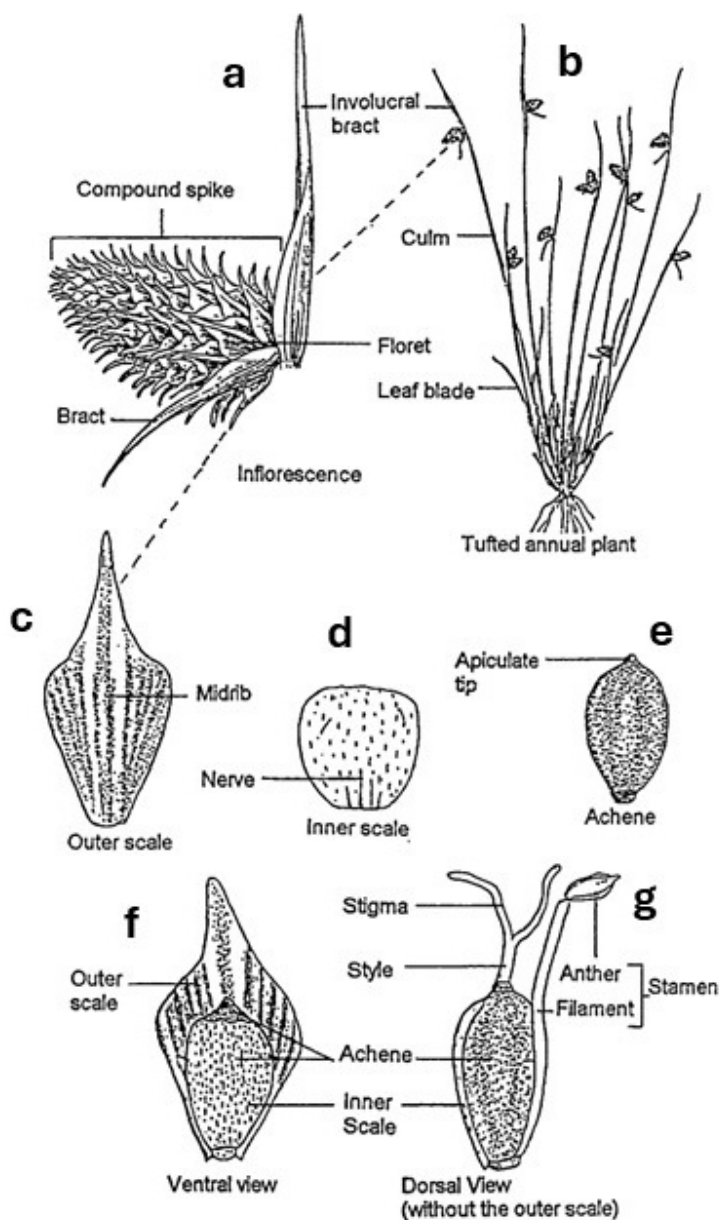


Figure 49. *Lipocarpa* morphology. Drawings: a-c: J.R. Janish (Hitchcock 1969), d-g: E.G. Hurd.

Lipocarpus micrantha (Vahl) G.C. Tucker

Smallflower halfchaff sedge, Small-flowered dwarf bulrush, Small-flowered hemicarpha

SYNONYMS: *Hemicarpha micrantha* (Vahl) Pax, *H. subsquarrosa* (Muhlenberg) Nees, *Isolepis subsquarrosa* (Muhlenberg) Schrader, *Scirpus micranthas* Vahl, *S. subsquarrosus* Muhlenberg

PLANT HABIT: Delicate, tufted **annuals** with fibrous roots; **culms** slender, terete to compressed, glabrous, ribbed, 3–20 cm tall, 0.3–0.5 mm wide, outer culms recurved-spreading.

LEAVES: 1–2, basal, very narrow; 1.5–10 cm long, 0.3–0.5 mm wide; old sheaths present; lower sheath ribbed dorsally, bladeless; upper sheath very thin, hyaline ventrally; blade channeled, lightly ribbed, brownish, sharp pointed at the tip, much shorter than the culms.

INVOLUCRAL BRACTS: 2–3, unequal; lowest 2–5 cm long, erect, channeled, lightly ribbed, longer than the others and appearing as a continuation of the stem; upper reduced and spreading.

INFLORESCENCES: 1–3 clusters of globose to narrowly ovoid spikes, sessile, terminal but appearing lateral on the stem, not bristly, 1–5 mm long, 1–2 mm thick, each with numerous, sessile, spirally arranged **spikelets**, each with a single perfect flower.

SCALES: Outer scale obovate, thick, firm, 0.5–1.0 mm long, 0.3–0.4 mm wide, abruptly contracted to a blunt spreading mucro or a short, stout awn tip that is longer on the lower scales, brownish to reddish brown, greenish to pale along the midstripe; inner scale adaxial, inconspicuous, very thin, hyaline, unvascularized or imperfectly vascularized, obtuse-truncate or toothed at the apex, 0.1–0.2 mm long, up to half the length of the achene (but obsolete to exceeding the achene) and partially enclosing its adaxial side, usually disarticulating with the achene.

FLOWERS: **Perfect;** **perianth** bristles absent; **stamens** 1 (2); anthers 0.1–0.25 mm; **style** deeply forked, elongate, deciduous at maturity.

ACHENES: Obovoid, dorsiventrally compressed, short apiculate or with a short mucro, light to dark brown, 0.4–0.7 mm long, 0.2–0.3 mm wide, 1.5–2.5 times as long as wide. Fruiting: June–September.

HABITAT AND DISTRIBUTION: Wet bottomlands, floodplains, riverbanks, sandbars, tidal marshes, and beaches from sea level to 1500 m elevation. Uncommon in the Intermountain Region. Scattered occurrences in west-central Idaho, northwestern Nevada, and south-central Utah. Tropical regions, Africa, South and Central America, north through the United States, and in eastern and western Canada.

SIMILAR SPECIES: *Lipocarpus aristulata* (Colville) G. C. Tucker (awned halfchaff sedge) is similar to *L. macrantha*, differing primarily in the presence of longer inner scales (0.5–0.8 mm long) that may be slightly shorter or longer than the achene; culms (2–15 cm) and leaves (1–6 cm) are slightly shorter and spikes (1–5 [8] mm) and rhomboid outer scales (0.9–1.6 mm) are slightly longer than

those of *L. macrantha*. *L. aristulata* occurs on sandy soils along pond shores, streambanks, and emergent shorelines in tropical America, north through Midwest and eastern United States. It is uncommon in the western states with scattered occurrences from Arizona and California north to southern Washington and Wyoming.

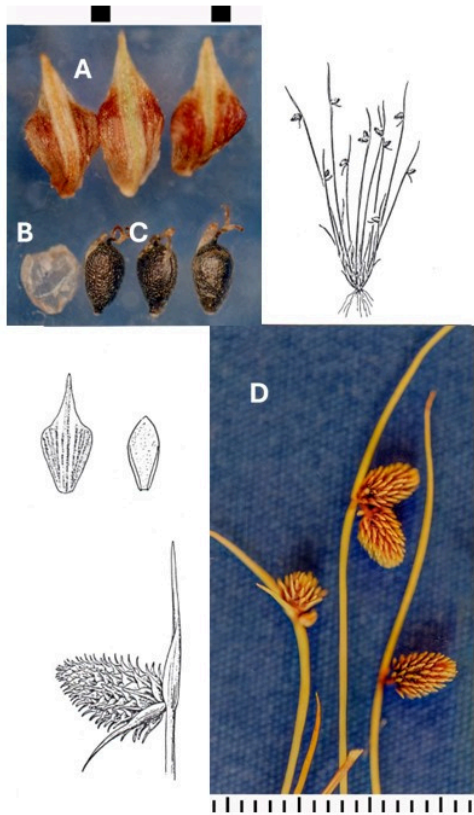


Figure 50. *Lipocarpha micrantha*. (A) Outer scales. (B) inner scale, (C) achenes, (D) inflorescences. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock 1969).

Schoenoplectiella Lye

Bulrush

Plants annual, cespitose; rhizomes short, slender, to 1 mm thick; **culms** cylindrical; **leaves** primarily basal; sheaths of basal leaves bladeless; inner sheaths of some plants produce a single female amphicarpic flower, hidden except for the protruding style; cauline blades 1–2, proximally C-shaped in cross section, flat distally; proximal **involucral bract** erect, resembles the blades, appears as a continuation of the culm and is shorter than to usually exceeding it; **inflorescence** appearing lateral, capitate, compact, spherical, or with only one **spikelet**, sometimes with 1–2 branches; **scales** with prominent midrib, apex entire, awned or with a mucro, veins faint if present; **flowers** lack perianths, stamens 3; style bifid or trifid; **achenes** biconvex or sometimes trigonous with wavy transverse ridges; **amphicarpic achenes** are larger, ovoid or trigonous, and basally inflated.

A nearly cosmopolitan genus of terrestrial to emergent species on wet soils, ponds, lake shores, and other wet places. Rare in the Intermountain Region.

Note: The genus *Schoenoplectiella* was separated from *Schoenoplectus* based on its usually annual habit, production of solitary female (amphicarpic) flowers in basal leaf sheaths, and results of molecular analyses.

Schoenoplectiella includes three species in North America and about 50 species globally.

Schoenoplectiella saximontana (Fernald) Lye

Rocky Mountain bulrush, Sharp-scale bulrush

SYNONYMS: *Schoenoplectus saximontanus* (Fernald) J. Raynal, *Scirpus bergsonii* Schuyler, *Scirpus saximontanus* Fernald, *Scirpus supinus* L. var. *saximontanus* (Fernald) T. Koyama

PLANT HABIT: Tufted **annuals** with fibrous roots, lacking evident **rhizomes** (if present, short and 1 mm in diameter); **culms** cylindric, unequal, erect or often arching, slender and wiry, ridged when dry, 1–60 cm tall, 1 mm thick.

LEAVES: 3–4, basal but with 1 (2) on the lower half of the culm; **sheaths** prominent, splitting, not leaving fibers; **blades** 1–2, rudimentary to longer than the sheath, 1–200 mm long, 0.2–1 mm wide, proximally C-shaped in section, distally flat, smooth or the margins spinulose near the tip.

INVOLUCRAL BRACTS: Main bract erect or somewhat curved, resembling a continuation of the culm, 5–15 cm long; subsidiary bracts inconspicuous.

INFLORESCENCES: Compact heads of 6–20 spreading spikelets, a single spikelet, or with 1–2 branches to 15 mm long with clusters of 4–7 spikelets; **spikelets** 6–20 mm long, about 3 mm thick.

SCALES: Broadly ovate, glabrous, margins minutely ciliate, apex rounded and not notched, pale brown to colorless, sometimes with a thick green midrib that is keeled distally, 2.5–3.5 mm long, 1.5–2.5 mm wide; mucro or awn bent outward, not contorted, sparsely spinulose, 0.2–0.5 mm long, longer on basal scale.

FLOWERS: **Perfect;** **perianth bristles** absent; **stamens** 3; **styles** all trifid; solitary pistillate **amphicarpic flowers** often present in basal leaf sheaths.

ACHENES: Blackish brown, sharply triquetrous, surface with conspicuous, wavy, transverse ridges, 1.3–1.9 mm long (includes 0.1 mm long apiculus), 1–1.4 mm wide; **Achenes of amphicarpic flowers** are trigonous, transverse ridges less evident, 2.2–3 mm long with a tapered beak (0.3 mm). Fruiting: summer.

HABITAT AND DISTRIBUTION: On wet and often sandy soil or emergent in freshwater swales, shores, ponds, ditches, and disturbed areas from sea level to 2200 elevation. Rare and local in the Intermountain Region. British Columbia and California east to Ohio and Texas, mostly in the Great Plains from North Dakota to Texas; Mexico. Known only from Millard, Salt Lake, and Uintah Counties in Utah and Klamath County, Oregon.

SIMILAR SPECIES: *Schoenoplectus subterminalis* is perennial with a single erect spikelet, and smooth achenes. It forms mats of long, slender rhizomes that are often vegetative and submerged.

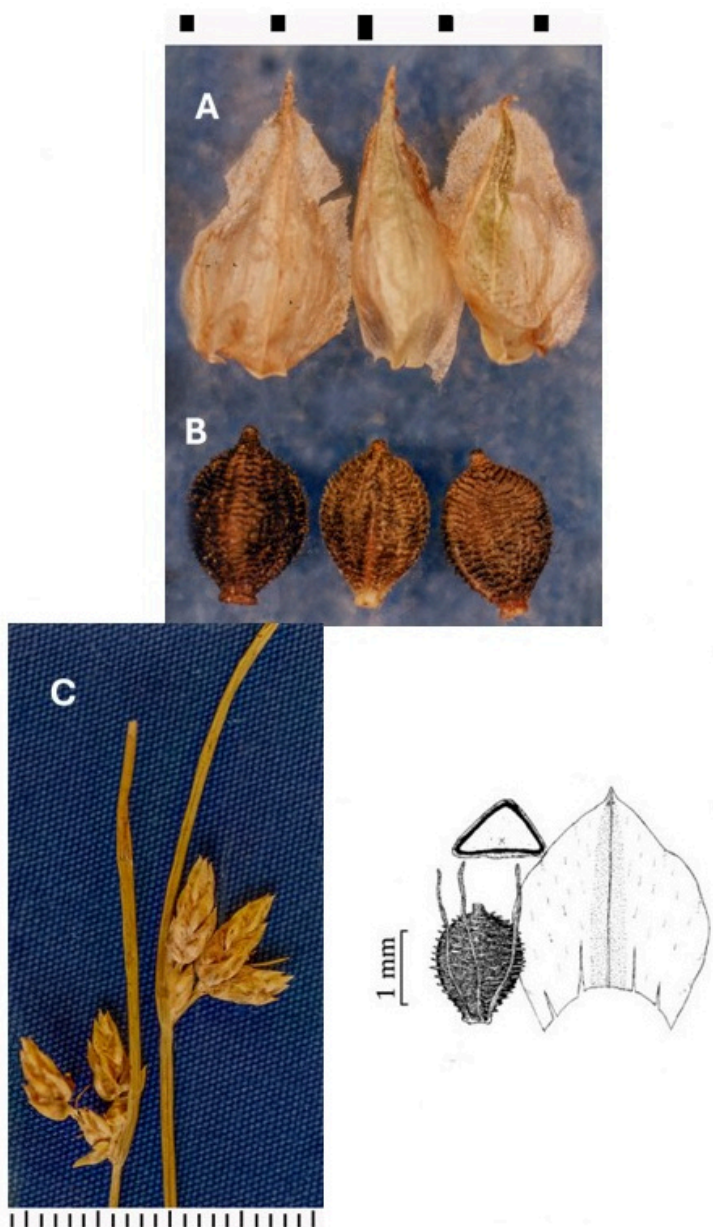


Figure 51. *Schoenoplectiella saximontana*. (A) Scales, (B) achenes, (C) inflorescences. Photos: E.G. Hurd. Drawings: S.A. Reznicek (Smith 2002c).

Schoenoplectus (Reichenbach) Palla

Synonym: *Scirpus* L. subg. *Schoenoplectus* Reichenbach

Naked-stemmed bulrush, Bulrush, Threesquare

Perennial herbs, generally erect, spreading from long scaly **rhizomes**, or **annual** and forming small tufts without evident rhizomes (rare in the Intermountain Region). **Culms** cylindric or triangular, smooth, spongy with internal air cavities, not hollow. **Leaves** few, all basal or very rarely one or two cauline; sheaths closed, smooth; blades present (in the Intermountain Region), at least on the uppermost sheath (often absent in *S. californicus*); ligules present, glabrous; **involucral bracts** one or more; lowest bract usually resembling the leaf blades and sometimes resembling a continuation of the culm; other bracts often scalelike; **inflorescences** terminal, sessile or paniculate, branches often scabrous; **spikelets** in dense clusters of up to 100 or rarely solitary, ovoid, not laterally flattened; **scales** spirally arranged, ovate, membranous, sparsely to rarely densely scabrous or rarely smooth, margins usually ciliate, brown, often with numerous bright brown streaks on a paler background; apex usually notched, midrib usually prolonged (excurrent) into an apical mucro or short awn; **flowers** perfect, borne singly in the scale axils, proximal scale may be empty; perianth bristles (0) 2–6 (8), straight to curved and shorter to longer than the achene and strongly attached to it, brown or rarely reddish with retrorse spinulose hairs (hairs blunt in *S. californicus*); stamens 2–3; styles bifid or trifid, deciduous, base not enlarged into a tubercle; **achenes** brown when mature (blackish in *S. saximonanus*), mostly obovoid, lenticular or trigonous, smooth or (rarely in the Intermountain Region) with fine wavy transverse ridges, the apex narrowed into a short beak or minute apiculus.

A cosmopolitan genus of about 77 species of wet habitats in temperate and tropical regions. Common throughout the Intermountain Region. They are often community dominants and provide habitat for many organisms.

See Figure 52.

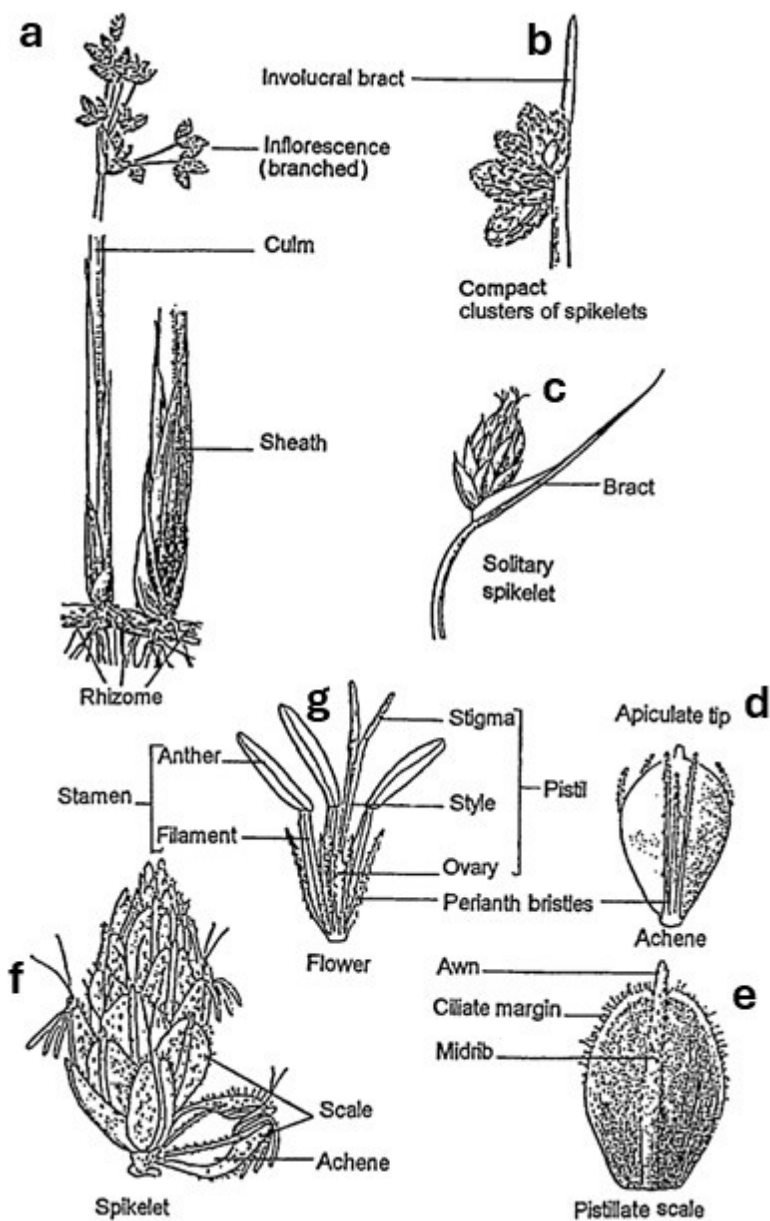


Figure 52. *Schoenoplectus* morphology. Drawings: a-e: J.R. Janish (Hitchcock et al. 1969), f-g: E.G. Hurd.

Key to Intermountain *Schoenoplectus* species

S.G. Smith

1. Culms triangular, at least distally (angles blunt in *S. californicus*).
 2. Inflorescences branched, panicle-like, with 25–100+ spikelets; 2–4 soft-hairy perianth bristles; culms 4–10 mm thick, cylindric proximally; plants 1–4 m tall. *S. californicus* p. 130
 2. Inflorescences unbranched, with 1–20 spikelets; perianth bristles with spinulose hairs; culms 1–10 mm thick, sharply triangular; plants 0.1–2.5 m tall.
 3. Uppermost leaf blade much shorter than to about equaling its sheath (rarely to 1.5 times longer); spikelets with scale apices notched 0.1–0.4 mm deep, the awn (mucro) 0.2–0.6 mm long. *S. americanus* p. 128
 3. Uppermost leaf blade (1) 2–5 times longer than its sheath (rarely about equaling sheath); spikelets with scale apices notched (0.3) 0.5–1 mm deep, awn 0.5–2.5 mm long. *S. pungens* var. *longispicatus* p. 132
1. Culms cylindric.
 4. Culms 0.2–1.5 mm thick; inflorescences with one erect spikelet or rarely with 1–2 short branches; scale apices not notched; plants to 1.5 m long; rare species, usually aquatic and mat-forming with leaf tips floating. *S. subterminalis* p. 134
 4. Culms 2–10 mm thick; inflorescences branched with 3–100 or more spikelets; scale apices notched; plants to 3 (4) m tall; common or rare species.
 5. At least some scales with excurrent midribs (awns) markedly contorted, 0.5–2 mm long (often broken off late in season); many scales very scabrous; culms firm; inflorescences with spikelets never all solitary, some or all spikelets in clusters of 2–8; styles all bifid or bifid and trifid in the same spikelet; achenes all lenticular or some obscurely trigonous and dorsally keeled. *S. acutus* p. 126
 5. Excurrent midribs (awns) of the scales straight to irregularly bent, not markedly contorted, 0.2–0.8 mm long; scales usually nearly smooth (rarely very scabrous); culms soft; inflorescences with spikelets usually with some or all spikelets in clusters of 2–4 (7); styles either all bifid or sometimes a few trifid in the same spikelet, achenes lenticular. *S. tabernaemontani* p. 136

Schoenoplectus acutus

(Muhlenberg ex Bigelow) Á. Löve & D. Löve

Hardstem bulrush, Common tule

SYNONYMS: *Scirpus acutus* var. Muhlenberg ex Bigelow

PLANT HABIT: Stout **perennials** 1–3 (4) m tall, forming large colonies from thick rootstocks and robust, brown **rhizomes**; **culms** stout, cylindric, usually firm, largest air cavities about 0.5–1.5 mm wide, 1–4 m tall, 2–10 (30) mm thick.

LEAVES: 3–4, all basal; **sheaths** prominent, strongly veined, reddish tinged basally, ventrally hyaline and splitting leaving fibers, dorsally septate-nodulose; ligules glabrous; **blades** 1–2, poorly developed, C-shaped to flat in cross section, smooth or margins minutely spinulose, 1–12 cm long and 3–7 mm wide, shorter than the sheaths.

INVOLUCRAL BRACTS: Main bract erect to divergent, usually green, 1–9 cm long, sometimes resembling a continuation of the culm, shorter or longer than the inflorescence; subsidiary bracts small, chaffy, brownish, margins sometime scabridulous.

INFLORESCENCES: Open to compact, 2–3 times branched, branches 6 (18) cm long, sometimes drooping; **spikelets** 3–100 or more, ovoid, in sessile clusters of 2–8 at the ends of rather erect branches or many (never all) solitary, mostly grayish brown to stramineous, 6–24 mm long, 3–4 mm thick.

SCALES: Thin, most very scabrous, margins prominently lacerate and ciliate with long contorted hairs, wholly reddish to orange-brown to partly or wholly straw-colored, often with numerous reddish raised cells, 3–4 mm long, 2–3 mm wide; the apex notched 0.3–0.5 mm deep; midrib firm, scabrous, excurrent as a 0.5–2 mm long awn that is straight, irregularly bent, or some in the same spikelet markedly contorted. Note: The marginal cilia and awns are often worn off late in the season.

FLOWERS: **Perfect**; **perianth bristles** (4) 6 (8), retrorsely spinulose, brown, equal to much shorter than the achene; **stamens** 2–3; **styles** all bifid or bifid and trifid in the same spikelet.

ACHENES: 2-angled or some in same spikelet obscurely trigonous and dorsally keeled, smooth, shiny, gray-brown to dark brown, 2–3 mm long (including the 0.2–0.4 mm-long apiculus), 1.2–1.7 mm wide, more or less hidden by the scale when mature. Fruiting: June–September.

HABITAT AND DISTRIBUTION: Marshes, shores, fens, springs, washes, and floodplains from sea level to 2680 m elevation. Often emergent in water to 1 m deep, usually growing with *Typha* spp. Tolerant of salts and alkali. Locally common in the Intermountain Region. Distributed from southern Alaska to Nova Scotia, south to California, Texas, and North Carolina, Mexico, and east Pacific islands.

SIMILAR SPECIES: *Schoenoplectus acutus* is easily confused with *S. tabernaemontani* and *S. heterochaetus*. In addition to the differences given in the key, *S. tabernaemontani* differs in that the scales of its spikelets are usually less scabrous, more often uniformly orangish brown, usually without minute reddish raised cells, and its inflorescences are sometimes with all spikelets solitary. *S. heterochaetus* differs in that its spikelets are all solitary, styles all trifid, achenes all prominently 3-angled (in the Intermountain

Region some achenes of *S. acutus* are dorsally keeled but not prominently 3-angled), and perianth bristles 4 (rarely 5). Probable interspecific hybrids among *S. acutus*, *S. tabernaemontani*, and *S. heterochaetus* are common in eastern North America but rare in the Intermountain Region. *Schoenoplectus acutus* also can be mistaken for *S. californicus*, which has only 2–4 perianth bristles that are dark red-brown, strap-like, and with blunt (not sharp-pointed) hairs.

S. acutus var. *occidentalis* has bifid and trifid styles in the same spikelet, some often obscurely 3-angled (dorsally keeled) achenes. It is widespread in western North America. *S. a.* var. *acutus*, with styles all bifid and achenes all 2-angled, occurs in midwestern and northeastern North America and in Washington.

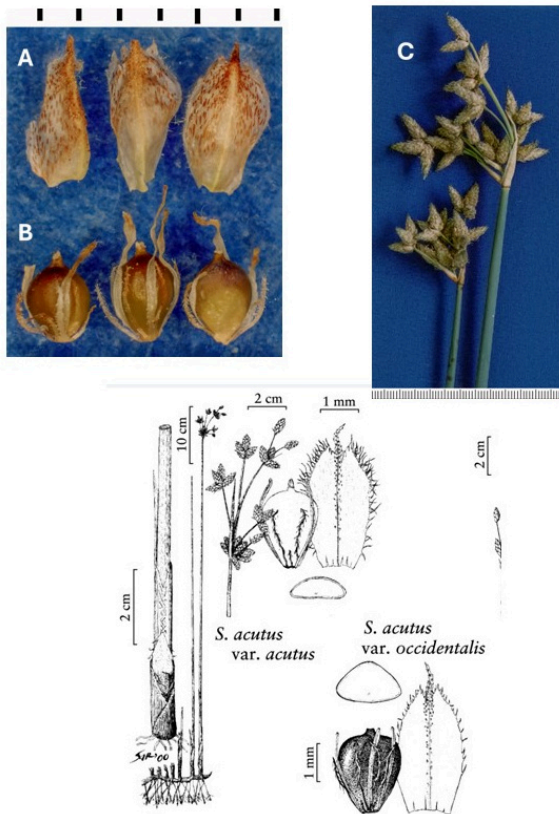


Figure 53. *Schoenoplectus acutus*. (A) Scales, (B) achenes with attached bristles and filaments, (C) inflorescences. Photos: E.G. Hurd. Drawings: S.A. Reznicek (Smith 2002c).

Schoenoplectus americanus

(C.H. Persoon) Volkart ex Schinz & Keller

Olney's three-square bulrush, American bulrush, Chairmaker's bulrush

SYNONYMS: *Scirpus americanus* Persoon, *S. chilensis* Nees & Meyen ex Kunth, *S. olneyi* A. Gray

PLANT HABIT: Stout **perennials**, forming colonies of scattered culms from long rhizomes; **culms** erect or arched, sharply triangular, sides usually deeply concave throughout, rarely nearly flat, usually very soft, dark green, 0.4–2.5 m tall, 3–10 mm thick.

LEAVES: 1–4, all basal, not crowded, less than half the culm length; **sheaths** not ventrally splitting or leaving fibers, lower sheaths bladeless; **blades** 1–3, V-shaped near the base, mostly triangular and laterally flattened distally, smooth, the uppermost much shorter than to about equaling its sheath (rarely 1.5 times longer), 2–20 cm long, 2–8 mm wide.

INVOLUCRAL BRACTS: Proximal **bract**, erect, V-shaped, acute at the tip, green, appearing as a continuation of the culm, about one-third as long as the inflorescence, 1–6 (10) cm long; distal bracts 1–2, scale-like, inconspicuous.

INFLORESCENCES: Compact head, sessile, appearing lateral on the culm; **spikelets** 2–20, ovoid or oblong, acute to obtuse apically, 5–15 mm long, 3–5 mm thick.

SCALES: Broadly ovate, 3–4 mm long, 2–3 mm wide, thin, smooth, hyaline, orangish red to purple-brown or straw-colored, often with linear spots, margins often minutely ciliate; apex shallowly notched 0.1–0.4 mm deep; mucro or awn sparsely spinulose, straight to bent, not contorted, longer or shorter than the notch.

FLOWERS: **Perfect;** **perianth bristles** (2) 5–6 (7), often unequal, retrorsely spinulose, brown, one-half to about equaling the achene; **stamens** 3; **styles** bifid or bifid and trifid in the same spikelet.

ACHENES: Obovoid, lenticular or obscurely trigonous, smooth, brown at maturity, 1.8–2.8 mm long including the 0.1–0.3 mm beak, 1.3–2 mm wide. Fruiting: June–September.

HABITAT AND DISTRIBUTION: Mineral-rich or brackish marshes, shores, fens, and springs from sea level to 2200 m elevation. Often emergent in water and alkali tolerant. Widespread but less common than *S. pungens* throughout the Intermountain Region. Southern British Columbia to Nova Scotia, south to California, and Florida; Mexico to South America.

SIMILAR SPECIES: *Schoenoplectus pungens*: Besides the differences given in the key, the culms of *S. pungens* often have nearly flat sides, the inflorescence has up to 5 (rarely 10) spikelets, leaf blades and involucral bracts are longer, scale tips are more deeply notched and the excurrent midribs longer.

Schoenoplectus americanus was long called *Scirpus olneyi*. Probable hybrids of *S. americanus* and *S. pungens* occasionally occur.

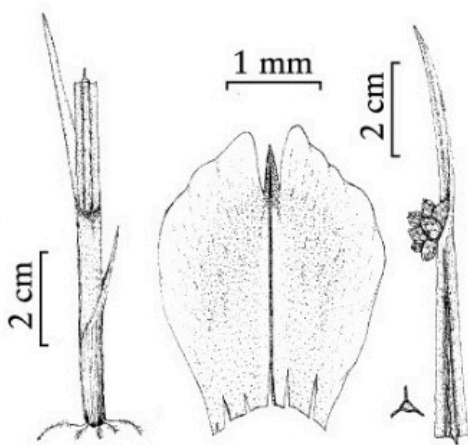


Figure 54. *Schoenoplectus americanus*. (A) Scales, (B) achenes, some with attached bristles and filaments, (C) inflorescences, (D) cross section of a stem. Photos: E.G. Hurd. Drawings: S.A. Reznicek (Smith 2002c).

Schoenoplectus californicus (C.A. Meyer) Soják

California bulrush, Giant bulrush, Tule

SYNONYMS: *Scirpus californicus* (C.A. Meyer) Steudel

PLANT HABIT: Stout **perennial**, forming large colonies from long, robust rhizomes 10–15 mm in diameter; **culms** bluntly triangular throughout, or nearly cylindric and becoming obscurely triangular near the inflorescence, firm and not easily crushed between the fingers, 1–4 m tall, 4–10 mm thick.

LEAVES: 3–4, basal; **sheaths** one-sixth of culm length, fronts ventrally hyaline and splitting leaving coarse fibers; **blades** 0–1, nearly flat, smooth, up to 2 cm long and 2 mm wide, about half the sheath length.

INVOLUCRAL BRACTS: Main bract usually erect, stiff, margins often scabrous, 1–8 cm long, sometimes resembling a continuation of the culm, shorter than the inflorescence.

INFLORESCENCES: Panicle-like and open with third level branching; branches arched and flexible, 21 cm long; **spikelets** 25–150 or more, solitary or in clusters of 2 or more at the branch tips, 5–11 mm long, about 3 mm thick.

SCALES: Oval, orangish brown with numerous short, linear reddish spots, 2.5 mm long, 2 mm wide, smooth except for the thick, sparsely scabrous midrib, margins minutely ciliate, apex rounded, shallowly notched 0.1–0.2 mm deep; awn not contorted, bent outward, about 0.3–0.5 mm long.

FLOWERS: **Perfect:** **perianth bristles** 2–4, strap-shaped or trigonous with blunt tips, edges fringed, dark reddish brown, equaling the achene; **stamens** 3; **styles** all bifid.

ACHENES: Ovoid to obovoid, lenticular, smooth, gray-brown, 1.8–2.2 mm long (including the 0.2 mm long beak), 1.3 mm wide. Fruiting: spring–summer.

HABITAT AND DISTRIBUTION: Fresh to brackish water, marshes and shorelines from sea level to about 1400 m elevation. Often emergent and salinity tolerant. In the Intermountain Region, known only from along the Colorado River in southernmost Nevada. California to Florida; Mexico to South America, West Indies, Pacific Islands.

SIMILAR SPECIES: Easily confused with *Schoenoplectus tabernaemontani* and *S. acutus*, both of which have completely cylindric culms and (4) 6–8 perianth bristles with sharp-pointed hairs.

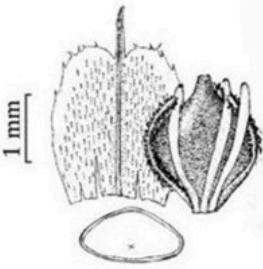


Figure 55. *Schoenoplectus californicus*. (A) Inflorescence, (B) achenes. Photos: (A) G. Carr (Oregon Flora), (B) C. Ritchie (USDA ARS Plants.usda.gov). Drawings: S.A. Reznicek (Smith 2002c).

***Schoenoplectus pungens* (Vahl) Palla**
var. *longispicatus* (Britton) S.G. Smith

Common threesquare, Chairmaker's rush, Threesquare

SYNONYMS: *Scirpus pungens* Vahl

PLANT HABIT: Colonial **perennial** with somewhat scattered culms from long, scaly, often vertical **rhizomes** from 1–6 mm in diameter; **culms** erect to somewhat arching, sharply triangular, smooth, the sides nearly convex to concave proximally, concave to flat distally, dark to yellowish green, 0.1–2 m tall, 1–6 mm thick.

LEAVES: All basal; **sheaths** fronts membranous, often splitting and leaving fibers, lower sheaths bladeless; **ligules** bifid; **blades** 2–6, V-shaped in cross section near the base, trigonous to laterally flattened near the apex, smooth or margins spinulose; the uppermost blade 1–5 times as long as its sheath, 5–75 cm long, 2–9 mm wide.

INVOLUCRAL BRACTS: Main **bract** erect, trigonous proximally, 1–20 cm long, appearing as a continuation of the culm, 3–7 times as long as the inflorescence; upper 1–2 bracts usually inconspicuous, shorter than the spikelets, resembling enlarged scales with awns one-third of the bract length.

INFLORESCENCES: Compact, sessile head or solitary spikelet appearing lateral on the culm; **spikelets** 1–5 (rarely to 10), 5–23 mm long, 3–5 (7) mm thick.

SCALES: Broadly ovate, smooth or the lighter midrib with a few spinules, margins minutely ciliate when young, bright (sometimes very dark) brown to straw-colored, often with linear spots, 3.5–6 mm long, 2–3 mm wide; apex notched 0.5–1 mm deep; awn irregularly bent, sparsely spinulose, not contorted, 0.5–2.5 mm long, equaling to exceeding the notch.

FLOWERS: **Perfect;** **perianth bristles** 4–8 (usually 6), slender to stout, often unequal, retrorsely spinulose, brown, rudimentary to equaling the achene and firmly attached to it; **stamens** 3; **styles** all trifid in the Intermountain Region.

ACHENES: Broadly obovoid to ovoid, lenticular or unequally trigonous, smooth, brown when mature, (2) 2.5 (3.5) mm long (includes the 0.1–0.5-mm apiculus or beak), 1.3–2.3 mm wide. Fruiting: May–August.

HABITAT AND DISTRIBUTION: Fresh or brackish marshes, shores, streams, springs, shallow lakes, and fens from sea level to 2400 m elevation. Often emergent in water and tolerant of alkali. Widespread and common in the Intermountain Region. South-central Alaska to Labrador and south to California and Florida; Mexico, South America, West Indies, Europe, Australia, and New Zealand.

SIMILAR SPECIES: *Schoenoplectus pungens* was long erroneously called *Scirpus americanus*. Besides the differences given in the key, *S. americanus* culm sides are usually deeply concave throughout, and the inflorescence may consist of 20 spikelets. *Bolboschoenus maritimus*, which often occurs with *S. pungens* in salty places, has minutely pubescent scales (the hairs often worn off), some leaves attached to the culm above the basal leaves, leaf blades with keeled midribs and often spinulose margins, culms often scabrous on the angles,

culm bases with durable corms, ligules absent, and bristles not firmly attached to the achenes.

Plants of *Schoenoplectus pungens* in the Intermountain Region have styles mostly or all trifid and achenes often obscurely 3-angled and may be called *Schoenoplectus pungens* (Vahl) Palla var. *longispicatus* (Pers.) S.G. Smith. *Schoenoplectus pungens* (Vahl) Palla var. *badius* (J. Presl & C. Presl) S.G. Smith with dark chestnut scales and trigonous or biconvex achenes has been collected in southeastern Oregon.

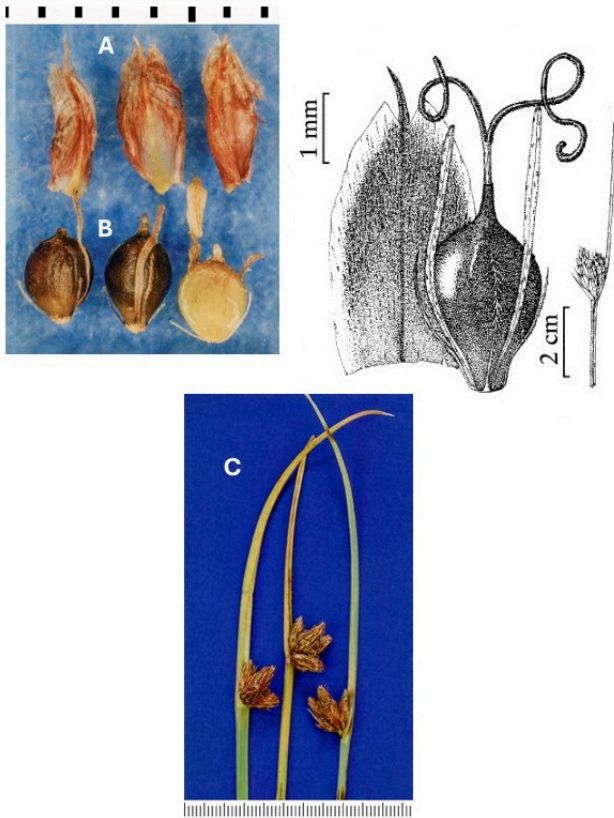


Figure 56. *Schoenoplectus pungens* var. *longispicatus*. (A) Scales, (B) achenes with filaments and bristles attached, (C) inflorescences. Photos: E.G. Hurd. Drawings: E. Zimmerman (Smith 2002c).

Schoenoplectus subterminalis (Torrey) Soják

Swaying bulrush, Water bulrush, Water clubrush

SYNONYMS: *Scirpus subterminalis* Torrey

PLANT HABIT: Slender **perennials** to about 1 m tall, forming mats from long, slender rhizomes to 1 mm in diameter, tubers sometimes present, plants usually submerged except for emergent inflorescences or entirely submerged and without inflorescences; **culms** slender, subcylindric, 20–80 (150) cm long and to 1 mm thick, flaccid if submerged with the distal portion floating, or rarely terrestrial with culms firm and erect.

LEAVES: 3–20 or more; **sheaths** smooth, less than half the stem height, fronts sometimes splitting leaving delicate fibers that often separate and resemble the blades; submerged **blades** flaccid, filiform to narrowly ribbon-like and floating; erect **blades** firm and C-shaped in cross-section proximally and elliptic distally, 0.2–1 mm wide, 1.5–6 dm long, longer than the sheaths but difficult to distinguish from them.

INVOLUCRAL BRACTS: Solitary, erect, prominent, sheathless, appearing as a continuation of the culm, apex acute, 7–60 mm long, greatly exceeding the inflorescence.

INFLORESCENCES: A solitary, erect **spikelet**, oblong to oblong-cylindric, few to many-flowered, upper slender portion consists of staminate flowers, light brown, 5–15 mm long, 3–7 mm wide.

SCALES: Ovate to lanceolate, thin and almost hyaline, smooth, pale brown, midrib region firm and greenish when young, margins sometimes minutely ciliate; apex not notched but with a minute mucro, greenish, 4–6 mm long, 1.5 mm wide.

FLOWERS: **Perfect;** **perianth bristles** 6, retrorsely spinulose, brown, shorter than to about as long as achene (including the beak); **stamens** 3; **styles** trifid.

ACHENES: Obovoid, markedly trigonous, smooth, pale to dark brown, 2.5–3.5 mm long (including the prominent 0.3–0.8 mm long beak), 1.5–1.7 mm thick. Fruiting: July–August.

HABITAT AND DISTRIBUTION: Shallow water in fresh oligotrophic lakes and streams from sea level to 2300 m elevation. Rare or local in most of its range. In the Intermountain Region it is known from Fremont, Valley, and Elmore Counties in Idaho, and from a single Utah report. Collections have also been made in Dolores and San Juan Counties, Colorado, near the southeastern border of Utah. The species is disjunct in western and eastern North America: In the West from southeastern Alaska and British Columbia south to northern Idaho and northern California; in the East from Minnesota to Labrador and south to Missouri, South Carolina and the Florida panhandle.

SIMILAR SPECIES: *Eleocharis acicularis* (when aquatic, robust, and without inflorescences): Leaf blades absent. Note: In delicate aquatic forms of *S. subterminalis*, the leaves are often difficult to distinguish from the culms, and in *Eleocharis acicularis*, the culms may closely resemble leaves.

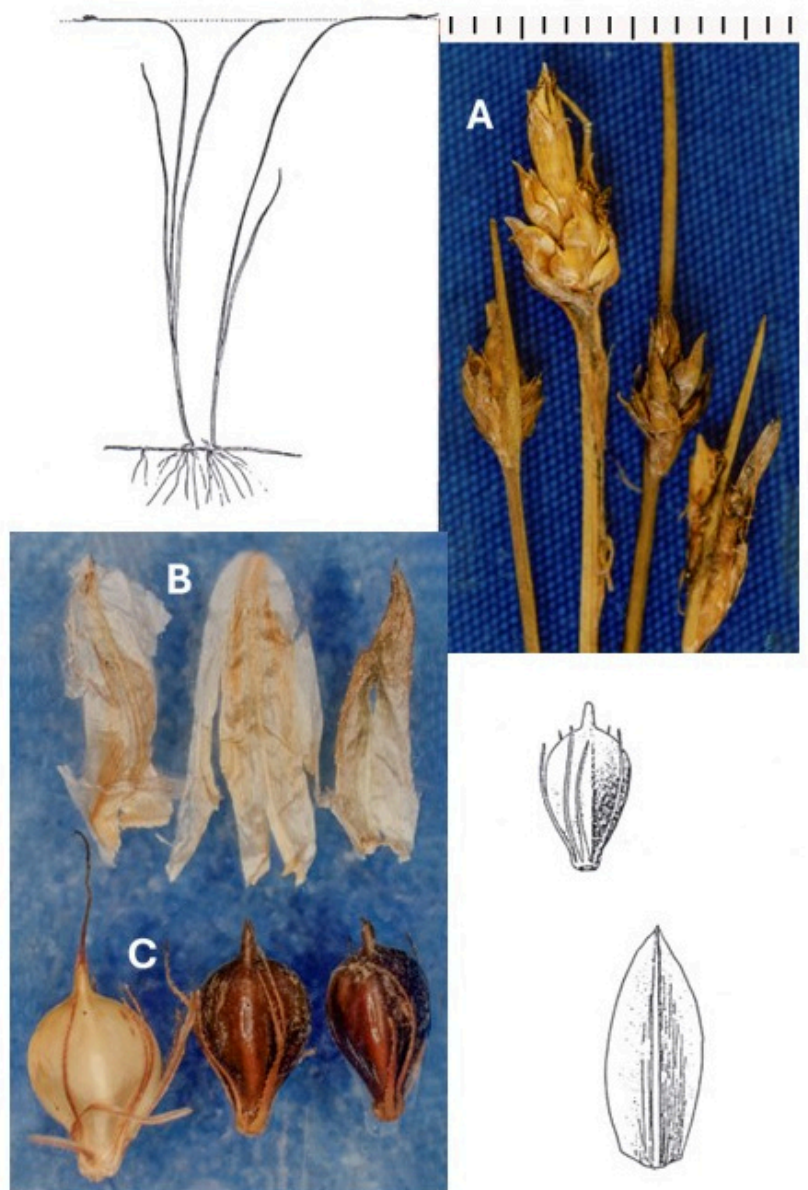


Figure 57. *Schoenoplectus subterminalis*. (A) Inflorescences, (B) scales, (C) achenes with bristles attached. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Schoenoplectus tabernaemontani

(C.C. Gmelin) Palla

Softstem bulrush, Great bulrush

SYNONYMS: *Schoenoplectus validus* (Vahl) A. Löve & D. Löve, *Scirpus lacustris* L. subsp. *tabernaemontani* (C.C. Gmelin) A. Löve & D. Löve, *S. tabernaemontani* (C.C. Gmelin), *S. validus* Vahl

PLANT HABIT: Stout **perennials** that form large, dense colonies from long, robust **rhizomes** 3–10 mm in diameter; **culms** cylindric, soft (usually easily crushed between the fingers and flattened when pressed), 0.5–2 (3) m tall, 2–10 mm thick.

LEAVES: 3–4, all near the base; **sheath** fronts hyaline and splitting, often leaving fibers; **blades** 1–2, C-shaped to flat in cross-section, smooth or the margins minutely scabrous, 2–200 mm long, 1–4 mm wide, shorter than the sheaths.

INVOLUCRAL BRACTS: Main **bract** usually erect, appearing as a continuation of the culm, C-shaped to subterete, margins sometimes scabridulous, 1–8 (10) cm long.

INFLORESCENCES: Panicle-like, open to compact, branched 2–4 times; branches flexible, 15 (25) cm long; **spikelets** 15–200, usually solitary or in clusters of 2–4 (7), ovoid to oblong ovoid, obtuse to acuminate at the apex, reddish brown, 3–17 mm long, 2.5–4 mm thick.

SCALES: Oblong-ovate, thin, margins ciliate (woolly) with fairly short, contorted hairs, scabrous on the awn and midrib and sometimes on the flanks, uniformly dark to pale orange-brown, sometimes straw-colored, midrib often paler or green, 2–3.5 mm long and 1.5–2 mm wide; apex notched about 0.3 mm deep, mucro or awn straight or bent, not contorted, 0.2–0.8 mm long.

FLOWERS: **Perfect;** **perianth bristles** 6, retrorsely spinulose, brownish, about equaling the achene; **stamens** 3 with straplike filaments; **styles** bifid or a few trifid in the same spikelet.

ACHENES: Broadly ovoid, plano-convex, lenticular, rounded distally, smooth, brown, 1.5–1.8 mm long (including 0.2–0.4 mm apiculus or short beak), 1.2–1.7 mm wide. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Fresh to brackish marshes, shores, stream bars, fens, bogs, and disturbed places from sea level to 2400 m elevation. Often emergent in water to 1 m deep. Distributed nearly worldwide, occurs in all North American provinces and states. Widespread in the Intermountain Region.

SIMILAR SPECIES: *Schoenoplectus acutus*: Besides the differences given in the key, the spikelet scales of *S. acutus* are usually much less scabrous and the margins have longer cilia. *S. heterochaetus*: Spikelet scales are mostly longer (3–4 mm) and their apices are more deeply notched (mostly 0.5–1 mm deep).

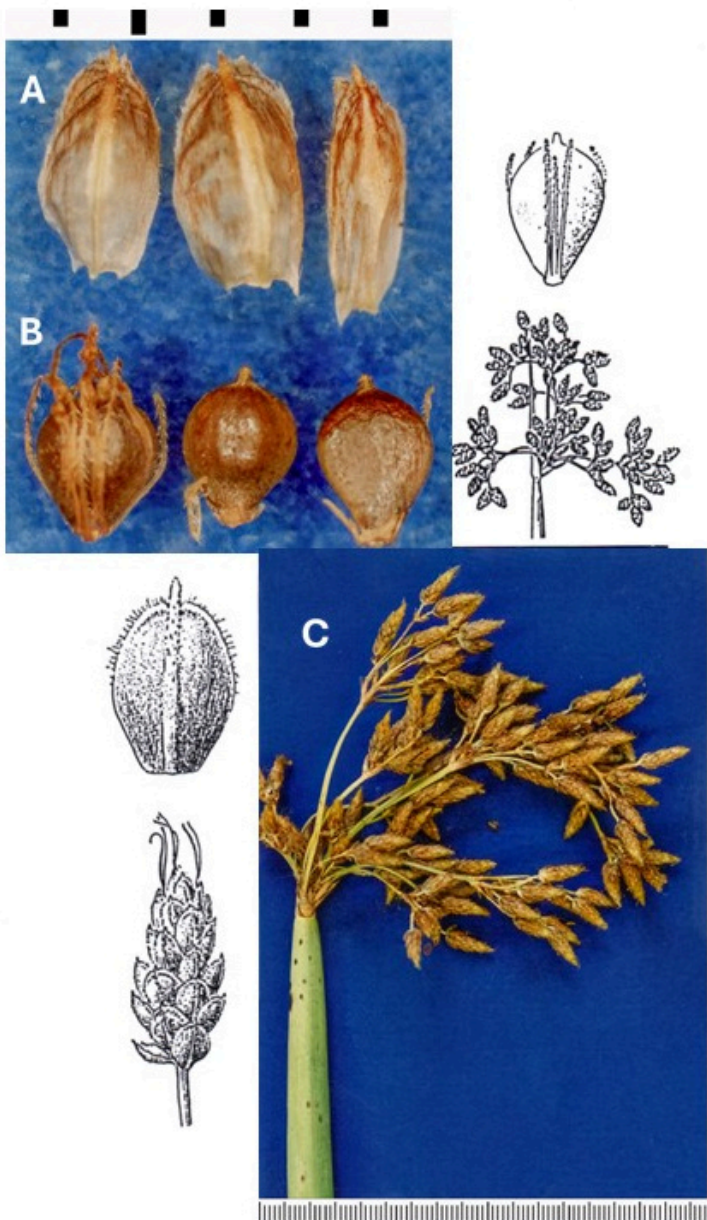


Figure 58. *Schoenoplectus tabernaemontani*. (A) Scales, (B) achenes— left with bristles, (C) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock 1969).

Schoenus L.

Blackhead sedge, Bogrush

Cespitose **perennials**, rhizomatous; **culms** stiff, erect, terete; **leaves** mostly basal, ligules lacking; blades rolled, cylindrical; **involucral bracts** 1–2, spreading to erect, leafy, unequal, apex acute, longest to 8 cm; **inflorescence** terminal, sometimes appearing lateral, capitate; **spikelets** 10–25, clustered, flattened, purple to black; **scales** 3–8, 2-ranked, purple to black; basal scales empty; distal scales each subtend a flower; **flowers** 5–8, perfect and staminate; stamens 3; style trifid, deciduous; bristles 0–6, smooth to scabrous, shorter than to exceeding the achene; **achene** trigonous, tubercle lacking.

A genus of about 80 species, primarily in tropical and warm temperate regions. Predominantly in Australia and New Zealand. A few species in Africa, Eurasia, and the western Hemisphere; one in North America.

See Figure 59.

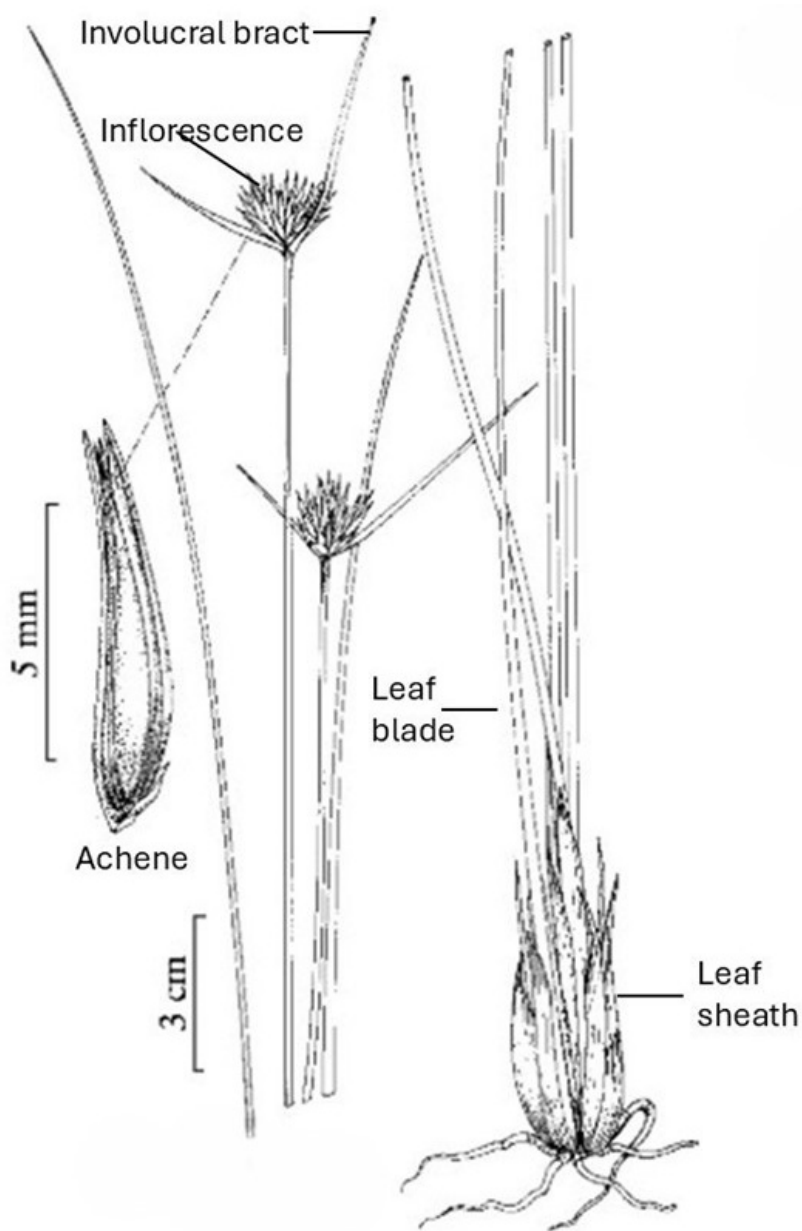


Figure 59. *Schoenus* morphology. Drawings: Y. Wilson-Ramsey (Tucker 2002c).

Schoenus nigricans L.

Black bogrush, Black sedge

PLANT HABIT: **Perennial**, densely cespitose, wiry; **culms** stiff, glabrous, terete to rounded-trigonal, hollow to spongy with air cavities, 20–70 cm tall, less than 1 mm wide; **rhizomes** short or absent.

LEAVES: Basal, erect, stiff, some nearly equaling the culms; **sheaths** shiny, brown to black, wider than the blades; **blades** smooth to scabrid, rolled, margins entire to slightly serrate, 10–40 cm long, 1–2 mm wide.

INVOLUCRAL BRACTS: 1–2, leaflike, oblique to erect, unequal, stiff, apex acute, green to dark brown, 0–6 (8) cm long, 1–1.5 mm wide.

INFLORESCENCES: Terminal, unbranched head, ovoid, dense, 1–2 cm in diameter; **spikelets** 10–25, flattened, ellipsoid, dark purple or black; rachilla deciduous.

SCALES: 2-ranked; basal scales (2–3) empty; fertile scales (3–8) oblong, somewhat sheathing, acuminate, scabrous distally.

FLOWERS: **Perfect**; **perianth bristles** 6, plumose, deciduous, exceeding the achene; **stamens** 3; **styles** trifid.

ACHENES: Ovoid, somewhat trigonal, apex obtuse, white, glossy, smooth to slightly reticulate, 1–2 mm long, 0.9–1.2 mm wide. Fruiting: August–September.

HABITAT AND DISTRIBUTION: Uncommon. Grasslands, marshes, peat bogs, and hot springs from sea level to 2000 m, often in alkaline or calcareous soils. Death Valley and southern California Mountains, central and southern Nevada (Clark and Nye Counties), New Mexico, Texas, Florida, Mexico, Eurasia, north Africa, Australia.

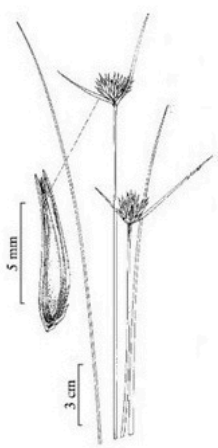
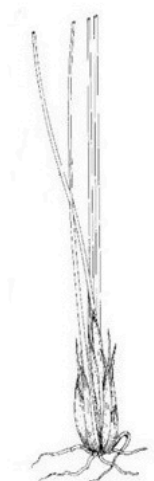


Figure 60. *Schoenus nigricans*. (A) Culms with inflorescences, (B) Inflorescence. Photos: T. Draper (CalPhotos). Drawings: Y. Wilson-Ramsey (Tucker 2002c).

Scirpus L.

Bulrush, Tule

Plants leafy **perennials**, rhizomatous or not; **culms** single or clumped, somewhat trigonous, solid, unbranched, 30–200 cm tall; **leaves** basal and cauline or strictly cauline, 3-ranked; sheaths closed, mostly ligulate; blades well-developed, flat or V-shaped, smooth, margins and midrib smooth or scabrous, lower surface keeled; **involucral bracts** usually 3, mostly spreading, leaflike, smooth or with scabrous margins and midribs; **inflorescences** compound cymes, mostly terminal, sometimes axillary in 1–3 distal leaves; **spikelets** numerous, oblong or subglobose, small, less than 3.5 (5) mm diameter; **scales** 10–50, spirally arranged, uniform in length, glabrous, lacking keels, shortly awned or mucronate from an obtuse apex, each subtending a flower, deciduous; **flowers** perfect; perianth bristles 0–6, straight or curled, smooth or retrorsely barbed, white or brown, 0–8 mm long, shorter to longer than the achene, usually persistent; stamens 1–3; filaments often persist and may be confused with the bristles, but they are thicker and do not taper; styles mostly trifid or rarely bifid, linear, base persistent as the achene beak; **achene** trigonous, biconvex or plano-convex, minutely papillose, apiculate or short-beaked, mostly pale brown, 0.6–1.8 mm long.

A genus of about 35 species worldwide, primarily in North America, Eurasia, Australia and the Pacific Islands. Widespread in the Intermountain Region. Seeds of these species are easily transported by water and animals, including humans. Interspecific hybrids have elongated inflorescences, low fertility, and the achenes are often empty.

See Figure 61.

Key to Intermountain *Scirpus* species

1. Inflorescence diffuse, spikelets clustered in small, distinct floral heads; scales mucronate.
Scirpus microcarpus p. 144
1. Inflorescence more compact, spikelets undistinguishable in dense globose clusters at least 1 cm thick; scales tapered at the apex, the midrib extending as an awn.
Scirpus pallidus p. 146

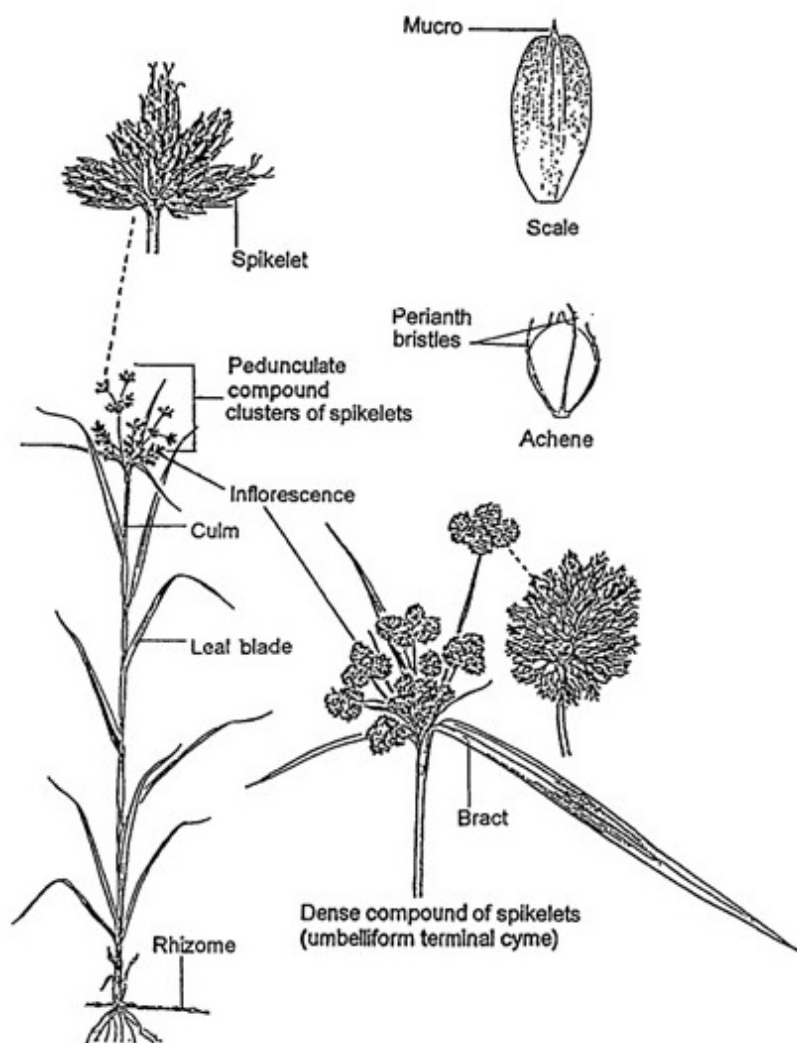


Figure 61. *Scirpus* morphology. Drawings: J.R. Janish (Hitchcock et al. 1969).

Scirpus microcarpus J. Presl & C. Presl

Panicled bulrush, Red-tinge bulrush, Smallfruit bulrush

SYNONYMS: *Scirpus microcarpus* var. *longispicatus* M. Peck, *S. m.* var. *rubrotinctus* (Fernald). M.E. Jones, *S. rubrotinctus* Fernald, *S. sylvaticus* L. var. *digynus* Boeckeler

PLANT HABIT: Coarse, leafy-stemmed **perennials** arising singly or few together from stout, reddish, creeping **rhizomes** with prominent nodes; **culms** erect, obscurely triquetrous to semi-terete, smooth to scabrous above, 6–17 dm tall, 6–20 mm thick near the base.

LEAVES: Several, distributed along the stem; **sheaths** hyaline ventrally below the mouth, tinted with reddish-purple dots; **blades** grasslike, wide, flat, margins scabrous, 1.5–6 dm long, 6–20 mm wide, often surpassing the culms.

INVOLUCRAL BRACTS: 2–5, spreading, leaflike, unequal, sheathless, green to black or red basally, the longest 1–3 dm long, 2–5 mm wide, often surpassing the inflorescence.

INFLORESCENCES: Terminal, compound umbelliform terminal cymes, spreading, flexuous, 8–15 cm wide; rays divaricate or ascending; **spikelets** numerous, sessile in small, pedunculate clusters of 2–18, oval, small, pale brown to grayish brown, 2–6 (8) mm long, 1.2–3.5 mm wide.

SCALES: Spirally arranged, oblong, apex acute to truncate-mucronate, largely hyaline and cellular reticulate, blackish, especially distally, or greenish black with a green or pale, ill-defined to prominent midstripe, 1–2.3 mm long, 0.8–1.2 mm wide, deciduous.

FLOWERS: **Perfect;** **perianth bristles** 4–6, stout, straight or curved, minutely and sparsely retrorsely barbellate, brownish, slightly surpassing the achene, rarely exerted beyond the scale; **stamens** 2; 1.2 mm long; **styles** bifid for one-half to two-thirds their length.

ACHENES: Broadly ovoid to obovoid, lenticular, smooth, pale brownish or creamy white, commonly 0.7–1.6 mm long, 0.8–1.0 mm wide, including the short stylar apiculus. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Wet soil, marshes, streambanks, pond and lake margins, canals, and meadows from sea level to 2900 m elevation. Southern Canada, south through the western United States, especially at higher elevations, eastward to New England; Mexico, eastern Asia. Widespread in the Intermountain Region.

SIMILAR SPECIES: *S. cyperinus* has a grayish white, somewhat cottony appearance at maturity due to the long perianth bristles and has a more northern distribution.

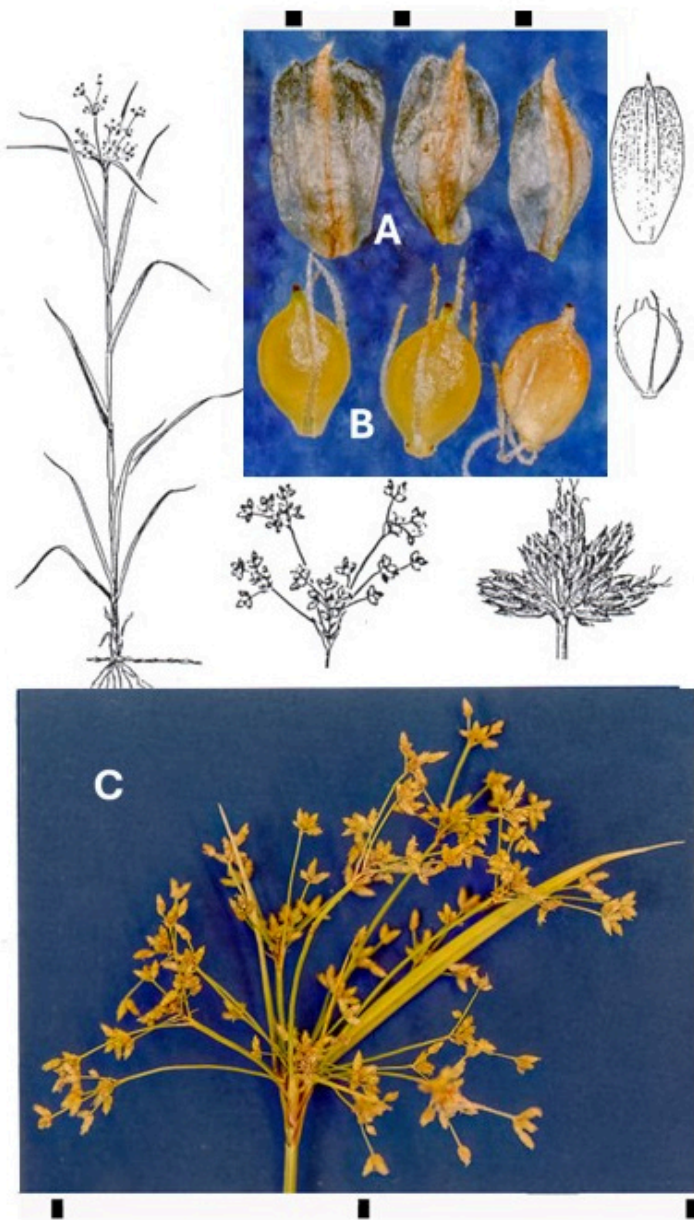


Figure 62. *Scirpus microcarpus*. (A) Scales, (B) achenes with attached bristles, (C) inflorescence. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Scirpus pallidus (Britton) Fernald

Pale bulrush, Cloaked bulrush

SYNONYMS: *Scirpus atrovirens* Willdenow var. *pallidus* Britton

PLANT HABIT: Coarse, robust, leafy-stemmed **perennials** from short, stout **rhizomes**; **culms** loosely clustered, erect, triquetrous, solid, smooth, 4–18 dm tall, 0.5–1 cm thick.

LEAVES: Several, cauline; **sheaths** hyaline just below the V-shaped mouth, greenish or pale; **blades** flat with scabrous margins, 20–55 cm long, 6–18 mm wide.

INVOLUCRAL BRACTS: 2–4, spreading, leaflike, unequal, sheathed or sheathless, bases green, margins green to brown, the longest often more than 10 cm, exceeding the inflorescence.

INFLORESCENCES: Terminal, compound, umbelliform cyme with dense, round to oblong clusters of spikelets to 1 cm thick, sessile or on ascending or drooping rays up to 10 cm long; **spikelets** mostly ovoid, greenish-brown or blackish, 3–4.5 mm long, about 1.5 mm wide.

SCALES: Spirally arranged, ovate-elliptic, tapered at the apex, glabrous, hyaline and cellular-reticulate, light brown, greenish black on the upper margins, midrib prominently thickened and excurrent as a short awn, usually 1.5–3 mm long, including the 0.5-mm awn, 1–1.5 mm wide.

FLOWERS: **Perianth bristles** mostly 6, stout, straight or curved, minutely and retrorsely barbellate above the middle, tan to reddish brown, equaling or often shorter than the achene, enclosed within the scale, persistent. **Stamens** 2; anthers about 1 mm long; **styles** trifid.

ACHENES: Oblong obovoid, unequally trigonous, abruptly tapered toward the apex, base somewhat cuneate, pale brown to stramineous or whitish, 0.8–1.2 mm long, 0.5–0.8 mm wide including the minute stylar apiculus. Fruiting: June–August.

HABITAT AND DISTRIBUTION: Wet areas, pond and ditch banks, marshes, and stream edges from sea level to 2900 m elevation. Southern Canada, south through the western and midwestern United States. Scattered throughout the Intermountain Region, but absent from Nevada. It may hybridize with *S. atrovirens*, which it resembles.

SIMILAR SPECIES: *S. microcarpus* has a diffuse inflorescence with the spikes clustered in smaller, distinguishable heads, and mucronate scales.

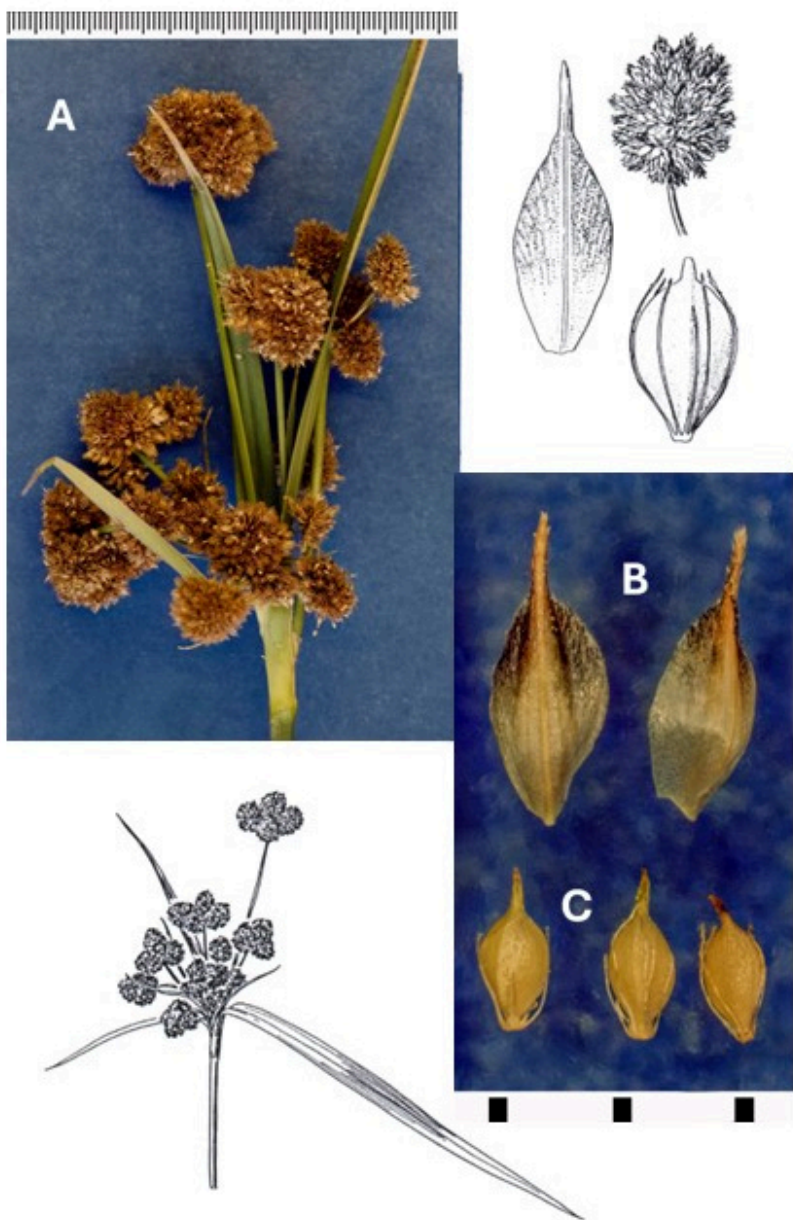


Figure 63. *Scirpus pallidus*. (A) Inflorescence, (B) scales, (C) achenes with some bristles attached. Photos: E.G. Hurd. Drawings: J.R. Janish (Hitchcock et al. 1969).

Trichophorum Persoon

Bulrush, Clubrush, Trichophore

Perennial clumping plants; **rhizomes** present or lacking; **culms** trigonous or terete,

10–50 cm or taller; **leaves** basal or subbasal; sheaths ligulate, not fibrous, mostly bladeless or distal sheaths with linear blades to 10 mm long, 1 mm wide; **inflorescence** 1, terminal; **spikelet** 1; **involucral bracts** generally 1, about as long as spikelet, scale-like, suberect, apex mucronate or short awned; **scales** 3–9, spirally arranged, each subtending a flower; **flowers** few, perfect; perianth bristles 0–6, smooth to scabrous, whitish, shorter than to about 20 times as long as the achene; stamens 3; styles trifid, linear, base persistent; **achenes** ovoid, trigonous or plano-convex, minutely apiculate, brown.

A circumpolar and circumboreal genus of nine species, six in North America. Occurs in North America, the Andean mountains, and tropical mountains of southeast Asia.

See Figure 64.

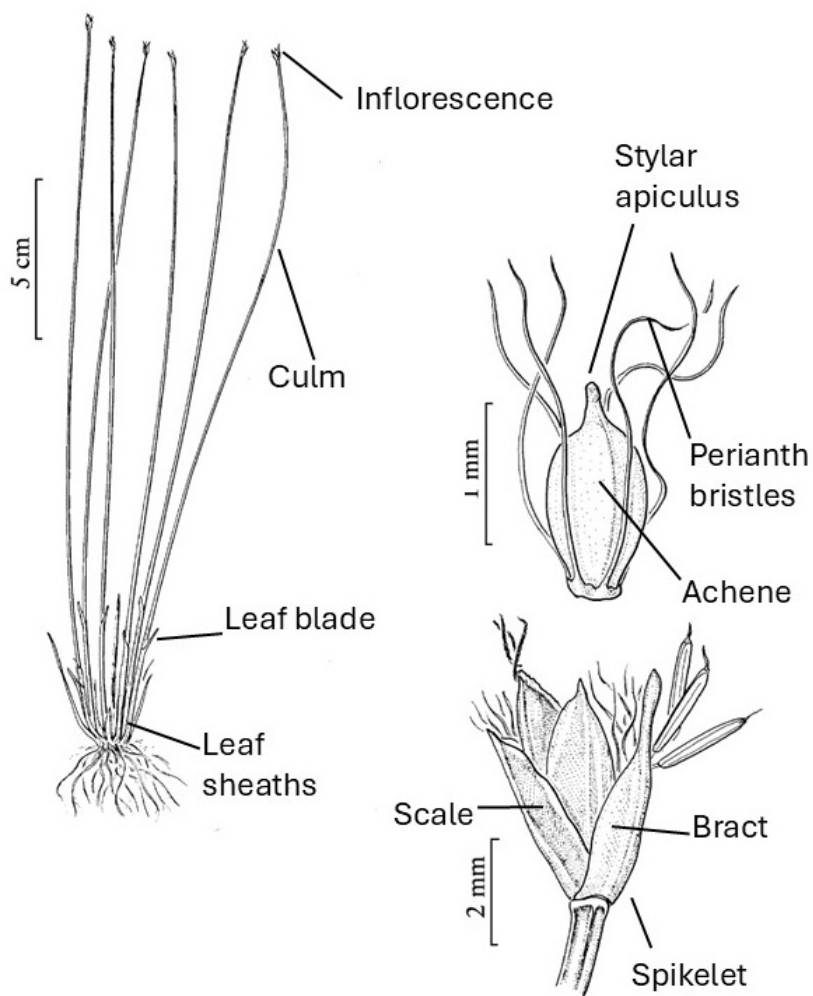


Figure 64. *Trichophorum* morphology. Drawings: J. Myers (Crins 2002).

Trichophorum cespitosum (L.) Hartman

Tufted bulrush, Deerhair bulrush, Tufted clubrush

SYNONYMS: *Scirpus bracteatus* Bigelow, *S. cespitosus* L.

PLANT HABIT: Very densely tufted **perennial**; **rhizomes** short or lacking; **culms** erect, slender, stiff, subterete, smooth, unevenly ribbed, 1–5 dm tall, about 1 mm thick, covered at the base by persistent leaf sheaths.

LEAVES: Basal leaves bladeless, reduced to several scalelike, shiny, grayish or brown **sheaths**; upper leaf borne toward the base, **blade** short to rudimentary, channeled, light green, (1.5) 4–6 (8) mm long, shorter than the culms.

INVOLUCRAL BRACTS: Light to medium brown, deciduous, 3.3–4.5 mm long, prominently nerved with a broad, blunt awn, subequal to or exceeding the spikelet.

INFLORESCENCES: A terminal, solitary **spikelet**, oblong, 3–9 flowered, light to medium brown or stramineous, 3.3–7 mm long, 1.2–3 mm wide.

SCALES: Lanceolate, mucronate to acute at the tip, awnless, mostly hyaline-scarious, reddish or light to dark brown, 2–3 mm long, 1–1.2 mm wide.

FLOWERS: **Perianth bristles** 6, smooth to scabrous, white or distally brownish, up to twice as long as the achene and often exerted at maturity, deciduous before the achene; **stamens**; 3, anthers 1.5–2.6 mm; **styles** trifid.

ACHENES: Broadly obovoid with a short, dark, stylar apiculus, unequally trigonous with blunt angles, smooth, medium to dark brown at maturity, about 1.5 mm long, less than 1 mm wide. Fruiting: July–August.

HABITAT AND DISTRIBUTION: Sphagnum bogs, fens, marshes, and peaty meadows from sea level to 3400 m; circumboreal, extending south in North America to North Carolina, western Oregon, western Montana, the Sawtooth Mountains of central Idaho, and the Uinta Mountains of Utah.

SIMILAR SPECIES: Similar to the genus *Eleocharis* in having a small, solitary, terminal spike but differing in having an involucre bract, rudimentary leaf blade, stylar apiculus, and lacking a tubercle capping the achene.

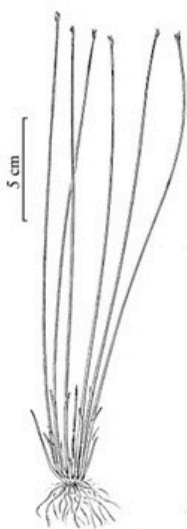
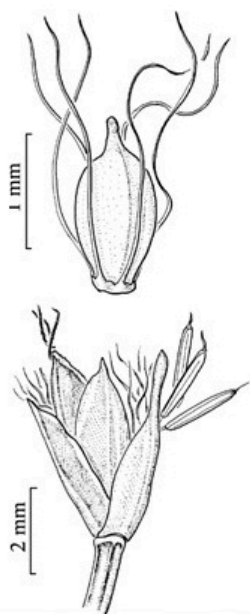


Figure 65. *Trichophorum cespitosum*. (A) Spikelet with partially detached involucre, (B) scales, (C) achenes with bristles attached, (D) culms with terminal inflorescences. Photos: E.G. Hurd. Drawings: J. Myers (Crins 2002).

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Terms commonly used to describe Cyperaceae species

Abaxial — The side of a structure facing away from the axis that bears it (e.g., the lower side of a leaf); opposite of adaxial.

Achene — A small, dry, thin-walled, one-celled, one-seeded, indehiscent fruit from a superior ovary with a single closed carpel. The seed is attached to the pericarp at one point.

Acuminate — Gradually tapered to a long, narrow tip.

Acute — Sharp-pointed, the tip forming an angle of less than 90 degrees; the margins near the tip are linear.

Adaxial — The side of a structure facing toward the axis that bears it (e.g., the upper side of a leaf); opposite of abaxial.

Amphicarpic — Plants that produce seeds above and below ground.

Androgynous — Having staminate flowers above the pistillate flowers in the same inflorescence. In the Cyperaceae, the staminate flowers are above the pistillate flowers.

Angiosperm — The flowering plants. Plants that produce ovules enclosed in an ovary.

Annual — A plant that germinates, flowers, and sets seed during a single year or growing season and then dies.

Anther — The pollen-bearing portion of the stamen.

Anthocyanin — Water-soluble flavonoid pigments formed in the vacuoles of plant cells that vary in color depending on pH and other factors.

Antorse — Directed forward or upward, often referring to hairs or barbs.

Apiculate — Ending abruptly in a short, pointed tip.

Arachnoid — With hairs that are cobwebby or long, white, and usually tangled.

Attenuate — Very gradually tapering or prolonged to a narrow point; more gradual than acuminate.

Awn — A hair- or bristle-like appendage at the apex of a structure (e.g. spikelet scales of the Cyperaceae).

Axil — The angle between the axis of a stem and any organ arising from it (e.g. a leaf petiole)

Axis — The main stem, stalk, or culm of a plant. The main structure (e.g., of the root, stem, or inflorescence) around which organs of the plant develop.

Basal — Toward the base, proximal, or arising from the base.

Barbellate — Finely barbed or with short, stiff hairs.

Beak — A firm, prolonged appendage or projection, especially of a fruit or seed.

Biennial — A plant that completes its life cycle in two years, usually flowering and setting seed the second year.

Bifid — Deeply two-cleft, two-lobed, or two-branched, usually at the apex. The two parts are usually equal.

Bifurcate — Divided into two forks or branches.

Blade — The broad and usually flat, expanded part of a leaf.

Bract — A modified or specialized leaf subtending a flower, inflorescence, or part of an inflorescence.

Bristle — A sharp, stiff, usually straight, hairlike structure (e.g., modified perianth parts in some Cyperaceae).

Bulbil — A small bulblike vegetative reproductive structure produced by some plants in the axils of the leaves or in place of flowers.

Capitate — Headlike; an inflorescence with a head or dense cluster of usually sessile flowers; a rounded stigma like the head of a pin.

Carpel — The fertile leaf of an angiosperm that bears the ovules; one or more carpels form the pistil.

Cauline — Of or on the stem.

Cellular-reticulate — With small pits or compartments forming a network (referring to a surface).

Cellular-roughened — With small pits or compartments, the surface uneven.

Cespitose — Growing in low, dense tufts; clumped or clustered.

Chaffy — Having a thin, dry, membranous texture; descriptive of papery scales or bracts.

Channeled — Marked with one or more deep longitudinal grooves.

Ciliate — With a fringe of hairs along the margin.

Circumboreal — Occurring throughout the northern latitudes of the Northern Hemisphere.

Compound leaf — A leaf with two or more distinct leaflets.

Concave — With the surface bowed inward as the inside of a bowl (opposite of convex).

Confluent — Merging together; blending into one.

Connective — Part of the stamen that connects the anther cells (pollen sacs). It is distinct from the filaments but sometimes referred to as the filament extension.

Convex — With the surface bowed outward as the outside of a bowl (opposite of concave).

Convolute — Overlapping structures (e.g., the petals and sepals in a flower bud rolled lengthwise and arranged such that each one overlaps the next (appearing like a closed umbrella).

Cosmopolitan — Occurring worldwide; belonging to the world; not local.

Cross-rugulose — Slightly wrinkled laterally.

Culm — The stem of a grass or grasslike plant.

Cuneate — Wedge-shaped and tapering gradually with the narrow end at the point of attachment forming an angle less than 90°.

Cylindric — Having the form of a cylinder; tubular or rod-shaped.

Cyme — A determinate inflorescence or flower cluster, often flat or convex-topped in which the central or the terminal flower opens first, followed successively by axillary buds below the central flower.

Cymose — Bearing cymes or cymelike (see cyme).

Deciduous — Not persistent; falling off seasonally.

Decumbent — With a prostrate or curved base and an erect or ascending tip. Stems that spread horizontally with the apex growing upwards.

Decurrent — Leaf or stipule bases that continue downward along the stem as wings or lines.

Deltoid/deltate — Shaped somewhat like an equilateral triangle.

Diffuse — Loosely or widely branching and spreading.

Dioecious — Bearing staminate (male) and pistillate (female) flowers on different plants; with male and female plants (see monoecious).

Disarticulate — Separating from a pre-existing point of articulation or an abscission joint at maturity.

Distal — Toward or at the tip or end furthest from the point of attachment (opposite of proximal or basal end).

Distichous — Arranged in two vertical ranks.

Divaricate — Widely divergent or spreading from the axis.

Divergent — Gradually spreading from the axis.

Dorsal — Pertaining to the back, or upper surface relative to leaves (adaxial).

Dorsiventrally flattened — Front (ventral) and back (dorsal) surfaces flattened.

Elliptic — With the form of a flattened circle, widest in the center and with the ends equal and rounded.

Embryo — The rudimentary plant within a seed.

Emergent — Rising from or standing in water.

Endosperm — Food storage tissue of a seed.

Erose — With margins finely and irregularly toothed or eroded.

Excurrent — Running through to the apex and beyond, as a midrib projecting beyond an apex (e.g., the midrib of some bracts).

Exserted — Projecting beyond the containing structure.

Filament — Threadlike; the stalk of the stamen that supports the anther; generally fine or threadlike.

Filiform — Threadlike; long, slender.

Flaccid — Weak, limp, lax.

Floret — A small flower; a single flower within an inflorescence as in the spikelet of grasses or sedges.

Floriferous — Bearing flowers.

Glabrous — Smooth, without hairs or scales.

Hirtellous — Minutely hirsute (minutely stiff or coarse hairs).

Hyaline — Thin and translucent or transparent.

Hypogynous — With the sepals, petals, and stamens inserted below the pistil and free from it.

Indurate — Hard (*Indurated*—Hardened).

Inflorescence — A flower-bearing branch or network of branches.

Involucel — A secondary involucre as at the secondary branch base in a compound umbel.

Involucre — A whorl of separate or united bracts or leaves subtending a flower or an inflorescence.

Involute — Rolled inward toward the upper side; usually refers to leaves or bracts.

Keel — A projecting longitudinal ridge or rib along the midrib of a leaf, bract, or petal; like the keel of a boat.

Lacerate — With the margins irregular, appearing to have been torn. The margins are more deeply shredded than described for erose.

Lamella — A thin, flattened layer, scale or membrane.

Lamellar — Consisting of thin layers.

Lanceolate — Lance-shaped; narrowly ovate, broadest toward the base, and tapering to the apex, several times as long as broad (3:1 or greater).

Lenticular — In the shape of a lentil or biconvex lens; circular in cross-section.

Lustrous — Shining, having luster.

Membranaceous (membranous) — Thin, soft, pliable, and often almost translucent.

Midrib — The center or main rib of a leaf or other structure; the main vascular bundle and support structure; the continuation of the petiole that runs the full length of the leaf.

Midstripe — The area along the midrib or the middle of a leaf, bract, or scale.

Monoecious — With staminate (male) and pistillate (female) flowers borne on the same plant.

Mucro — A short, abrupt tooth-like tip.

Mucronate — Tipped with a short, sharp, stiff point or mucro.

Mucronulate — Diminutive of mucronate, tipped with a very short, stiff point.

Nerve — A simple or unbranched vascular bundle in a leaf, bract, or another flat organ, often visible on the surface (see vein).

Node — The point on the stem where leaves, branches, and inflorescences originate; a joint on a stem; the point on an axis that bears other structures.

Nodose — With knobby or knotty swellings.

Nodulose — Diminutive of nodose; provided with minute knobs or knots.

Ob — Latin prefix, meaning in a reverse direction; the opposite condition relative to the remainder of the word.

Ob lanceolate — Lanceolate, but with the narrowest part toward the base.

Oblique — An asymmetrical leaf that is larger on one side of the midrib than the other.

Obliquely cleft — An opening with the sides unequal or slanting.

Obovate — Ovate but attached at the narrow end (two dimensional).

Obovoid — A three-dimensional figure, obovate in outline.

Obsolete — Rudimentary, scarcely detectable, or completely lacking.

Obtuse — Blunt to almost rounded at the end, forming an angle of 90 to 180 degrees.

Orbicular — Circular or nearly so in outline (two dimensional); globose, spherical (three dimensional).

Ovary — The expanded lower portion of the pistil (gynecium) that contains the ovule(s) or seeds and becomes the fruit.

Ovate — Flat and having the outline of an egg; broadest toward the base (two dimensional).

Ovoid — An egg-shaped object ovate in outline.

Ovule — The structure within the ovary of a flower that becomes a seed after fertilization.

Panicle — An indeterminate inflorescence whose primary axis bears branched secondary axes, a compound raceme or corymb.

Paniculiform — With the form of a panicle.

Papillose — Bearing minute rounded or fingerlike projections.

Pedicel — The stalk of a single flower in an inflorescence or flower cluster.

Peduncle — The lower, unbranched stalk of a solitary flower or inflorescence (flower cluster). It is distinct from the rachis of an inflorescence.

Perennial — A plant that lives more than two growing seasons.

Perfect — A flower with functional stamens and pistils.

Perianth (tepals) — Collective terms for the calyx (sepals) and corolla (petals), especially when they are indistinguishable, incomplete, or modified.

Perigynium — (plural = *perigynia*) — An inflated saclike structure enclosing the ovary (achene) of female flowers and fruits in *Carex*.

Pistil — The female (seed bearing) structures of a flower, consisting usually of an ovary and one or more styles and stigmas.

Pistillate flower — A female flower with one or more pistils, but no fertile stamens.

Plano-convex — Flat on one surface or side, rounded on the opposite side.

Proximal — Toward the base or basal (opposite of distal); toward the point of origin or attachment.

Puberulent — Minutely pubescent; the hairs barely visible to the naked eye.

Pubescent — Covered with downy hairs.

Punctate — Dotted with depressions or translucent glands.

Punctulate/punctulate — Minutely punctate, diminutive of punctate.

Rachilla — The axis of the spikelet in grasses and some Cyperaceae.

Rachis — A central or main elongated axis of an inflorescence or a compound leaf.

Ray — A stalk, a pedicel or a peduncle within an umbel.

Reticulate — In the form of a network (describes a surface).

Retorse — Bent or turned abruptly backward or downward (recurved); pointing away from the apex.

Rhizomatous — Bearing rhizomes (see rhizome).

Rhizome — A creeping, perennial, usually horizontal underground stem from which roots and shoots emerge.

Rhombic — Diamond shaped, an equilateral parallelogram.

Rib — A primary or prominent vein (vascular bundle) of a leaf, bract, or other structure.

Rudimentary — Imperfectly developed, usually minute; vestigial.

Rufous — Reddish brown.

Rugose — Deeply wrinkled.

Rugulose — Slightly rugose, finely wrinkled.

Scabrous or scabrid — Rough or harsh to the touch due to the presence of very short, stiff hairs or short, sharp projections.

Scaberulous — slightly or minutely scabrous.

Scale — In Cyperaceae: Small, thin, reduced and rudimentary leaves arranged spirally or distichously on the rachilla of the spikelets and subtending the florets (some may be empty).

Scarious — Thin, dry, membranous, and chaffy in texture, not green.

Septate — Divided by one or more transverse partitions.

Sessile — Without a stalk, attached directly at the base.

Sheath — The basal portion of the rush, sedge, or grass leaf that forms a tubular cover surrounding the stem.

Spicate — An inflorescence arranged in the form of or resembling a spike.

Spike — An unbranched, elongate, indeterminate inflorescence with sessile (stalkless) or subsessile flowers along the rachis maturing from the base upwards. In the Cyperaceae the inflorescence may be an aggregation of spikelets or a single spikelet.

Spikelet — A small spike or a secondary spike in a compound inflorescence.

Stamen — The male reproductive component of a flower, consisting of an anther and a filament.

Staminate flower — A male flower with one or more stamens (no pistils).

Stigma — The usually sticky pollen-receptive surface of the pistil where the pollen germinates; usually a small head at the apex of the style but may be sessile on the ovary.

Stipitate — Provided with a stalk-like base that is not a pedicel, peduncle or petiole.

Stramineous — Straw-colored (tan or light brown).

Striate — Striped with fine parallel longitudinal lines, furrows or ridges.

Stylar apiculus — The basal part of the style that may remain to cap the achene as a small point following loss of the distal portion of the style.

Style — A slender stalk that connects the stigma and the ovary through which the pollen tube grows following fertilization.

Sub — Latin prefix, meaning under or below; almost, or not quite.

Subumbellate — A modified umbel with flowers arising from slightly different points. The inflorescence appears clustered, rather flat, and even topped.

Swale — A hollow, or depression, especially one in a wet marshy area.

Temperate — Having a moderate or mild climate.

Tempals — Units of an undifferentiated perianth; the sepals and petals are similar and not easily distinguished.

Terete — Cylindrical and somewhat circular in cross section.

Terrestrial — A plant growing with its shoot in the air and its root system in soil; not aquatic.

Tooth — A small projection at the sheath apex in some *Eleocharis* species.

Trifid — Three-branched or lobed; divided into three parts.

Trigonous — Three-angled in cross section with the angles obtuse.

Triquetrous — Triangular in cross section with three acute, sharp, or projecting angles.

Truncate — Cut squarely across at the apex or base.

Tuber — The thickened branch of an underground stem or root (then referred to as a root tuber).

Tubercle — A small wart-like projection or swelling; this describes the basal part of the style capping the achene in some members of the Cyperaceae.

Tufted — Growing in tufts or clumps; cespitose.

Umbel — An inflorescence (flower cluster) in which three to many nearly equal pedicels (stalks) radiate from a nearly common point (simple umbel) at the top of the peduncle.

Umbellate — Bearing umbels; umbel-like.

Umbelliform — In the form of an umbel; having the form, but not the structure of an umbel.

Vascular — Pertaining to the conducting tissues of vascular plants (phloem for food and xylem for water).

Vasculated — Containing plant conducting tissues.

Vein — Conducting tissue in plants; visible as threadlike structures or strands in leaves and flower parts (see nerve).

Ventral — Pertaining to the abaxial or lower surface of a leaf or other structure.

Villose — Pubescence with long, soft, weak, often bent or curved, but not matted hairs.

Index of Scientific Names

Accepted names are in bold; synonyms lead to the species they refer to.

Amphiscirpus	18	Cyperus strigosus	52
Amphiscirpus nevadensis	20	Cyperus washingtonensis	44
Bolboschoenus	22	Dulichium	54
Bolboschoenus fluviatilis	24	Dulichium arundinaceum	56
Bolboschoenus glaucus	26	Eleocharis	58
<i>Bolboschoenus maritimus</i> subsp. <i>fluviatilis</i>	24	Eleocharis acicularis	62
Bolboschoenus maritimus subsp. <i>paludosus</i>	28	<i>Eleocharis acicularis</i> var. <i>bella</i>	64
<i>Carex</i>		<i>Eleocharis acicularis</i> var. <i>minima</i>	64
<i>Carex bipartita</i>	112	Eleocharis bella	64
<i>Carex elynoides</i>	110	Eleocharis bolanderi	66
<i>Carex myosuroides</i>	110	<i>Eleocharis calva</i>	72
<i>Carex simpliciuscula</i>	112	Eleocharis coloradoensis	68
Cladium	30	<i>Eleocharis disciformis</i>	82
Cladium californicum	32	Eleocharis engelmannii	70
<i>Cladium mariscus</i> var. <i>californicum</i>	32	<i>Eleocharis engelmannii</i> var. <i>detonsa</i>	70
Cyperaceae	14	<i>Eleocharis engelmannii</i> var. <i>monticola</i>	
Cyperus	34	Eleocharis erythropoda	72
<i>Cyperus acicularis</i>		<i>Eleocharis fernaldii</i>	84
Cyperus acuminatus	38	Eleocharis flavescens var. <i>flavescens</i>	74
<i>Cyperus alterniflorus</i>	48	<i>Eleocharis flavescens</i> var. <i>thermalis</i>	74
<i>Cyperus aristatus</i>	50	Eleocharis macrostachya	76
<i>Cyperus arundinaceus</i>	56	<i>Eleocharis monticola</i>	70
Cyperus bipartitus	40	<i>Eleocharis monticola</i> var. <i>levisita</i>	
<i>Cyperus cupreus</i>	44	<i>Eleocharis montevidensis</i> var. <i>bolanderi</i>	66
Cyperus difformis	42	<i>Eleocharis montevidensis</i> var. <i>disciformis</i> ..	82
Cyperus erythrorhizos	44	<i>Eleocharis montevidensis</i> var. <i>parishii</i>	
Cyperus esculentus	46	Eleocharis obtusa	78
<i>Cyperus esculentus</i> var. <i>heermannii</i>		<i>Eleocharis obtusa</i> var. <i>ellipsidalis</i>	
<i>Cyperus esculentus</i> var. <i>leptostachyus</i>		<i>Eleocharis obtusa</i> var. <i>gigantea</i>	
<i>Cyperus halei</i>	44	<i>Eleocharis obtusa</i> var. <i>jejuna</i>	
<i>Cyperus hansenii</i>	52	Eleocharis palustris	80
<i>Cyperus inflexus</i>	50	Eleocharis parishii	82
<i>Cyperus latiflorus</i>		<i>Eleocharis pauciflora</i>	84
<i>Cyperus niger</i> var. <i>rivularis</i>	40	<i>Eleocharis pauciflora</i> var. <i>fernaldii</i>	
<i>Cyperus occidentalis</i>	44	<i>Eleocharis pauciflora</i> var. <i>suksdorfiana</i>	88
<i>Cyperus rivularis</i>	40	<i>Eleocharis parvula</i> var. <i>anachaeta</i>	
Cyperus schweinitzii	48	<i>Eleocharis parvula</i> var. <i>coloradoensis</i>	
<i>Cyperus schweinitzii</i> var. <i>uberius</i>		<i>Eleocharis perlonga</i>	76
Cyperus squarrosus	50	Eleocharis quinqueflora	84
<i>Cyperus stenolepis</i>	52	<i>Eleocharis quinqueflora</i> subsp. <i>fernaldii</i> ...	84
		<i>Eleocharis quinqueflora</i> var. <i>suksdorfiana</i>	88

<i>Eleocharis rostellata</i>	86	<i>Schoenoplectus</i>	122
<i>Eleocharis rostellata</i> var. <i>congdonii</i>	86	<i>Schoenoplectus acutus</i>	126
<i>Eleocharis rostellata</i> var. <i>occidentalis</i>		<i>Schoenoplectus acutus</i> var. <i>acutus</i>	
<i>Eleocharis smallii</i>	80	<i>Schoenoplectus acutus</i> var. <i>occidentalis</i> ..	126
<i>Eleocharis suksdorfiana</i>	88	<i>Schoenoplectus americanus</i>	128
<i>Eleocharis thermalis</i>	74	<i>Schoenoplectus bergsonii</i>	
<i>Eleocharis xyridiformis</i>	76	<i>Schoenoplectus californicus</i>	130
<i>Elyna bellardii</i>	110	<i>Schoenoplectus fluviatilis</i>	24
<i>Eriophorum</i>	90	<i>Schoenoplectus glaucus</i>	26
<i>Eriophorum altaicum</i> var. <i>neogeum</i>	94	<i>Schoenoplectus heterochaetus</i>	
<i>Eriophorum angustifolium</i>	92	<i>Schoenoplectus pungens</i>	132
<i>Eriophorum angustifolium</i> subsp.		<i>Schoenoplectus pungens</i> var. <i>badius</i>	
<i>angustifolium</i>	92	<i>Schoenoplectus pungens</i> var.	
<i>Eriophorum chamissonis</i>	94	<i>longispicatus</i>	132
<i>Eriophorum chamissonis</i> var. <i>aquatile</i>		<i>Schoenoplectus saximontanus</i>	120
<i>Eriophorum gracile</i>	96	<i>Schoenoplectus subterminalis</i>	134
<i>Eriophorum latifolium</i> var.		<i>Schoenoplectus tabernaemontani</i>	136
<i>viridicarinatum</i>	100	<i>Schoenoplectus validus</i>	136
<i>Eriophorum leucocephalum</i>	98	<i>Schoenus</i>	138
<i>Eriophorum polystachion</i>	92	<i>Schoenus albus</i>	
<i>Eriophorum russolum</i> subsp. <i>rufescens</i>	94	<i>Schoenus nigricans</i>	140
<i>Eriophorum scheuchzeri</i>	98	<i>Scirpus</i>	142
<i>Eriophorum viridicarinatum</i>	100	<i>Scirpus acicularis</i>	62
<i>Fimbristylis</i>	102	<i>Scirpus acutus</i>	126
<i>Fimbristylis puberula</i>	104	<i>Scirpus americanus</i>	128
<i>Fimbristylis spadicea</i>	106	<i>Scirpus ardea</i>	96
<i>Fimbristylis thermalis</i>	106	<i>Scirpus atrovirens</i>	146
<i>Hemicarpha</i>	116	<i>Scirpus atrovirens</i> var. <i>pallidus</i>	146
<i>Hemicarpha micrantha</i>	116	<i>Scirpus bergsonii</i>	120
<i>Hemicarpha subsquarrosa</i>	116	<i>Scirpus bracteatus</i>	150
<i>Isolepis</i>	116	<i>Scirpus californicus</i>	130
<i>Isolepis subsquarrosa</i>	116	<i>Scirpus campestris</i>	28
<i>Kobresia</i>	108	<i>Scirpus cespitosus</i>	150
<i>Kobresia bellardii</i>	110	<i>Scirpus chamissonis</i>	94
<i>Kobresia bipartita</i>	112	<i>Scirpus chilensis</i>	128
<i>Kobresia myosuroides</i>	110	<i>Scirpus coloradoensis</i>	68
<i>Kobresia simpliciuscula</i>	112	<i>Scirpus cyperinus</i>	144
<i>Lipocarpha</i>	114	<i>Scirpus flavescens</i>	74
<i>Lipocarpha aristulata</i>	116	<i>Scirpus fluviatilis</i>	24
<i>Lipocarpha micrantha</i>	116	<i>Scirpus glaucus</i>	26 72
<i>Mariscus</i>		<i>Scirpus lacustris</i> subsp. <i>tabermontani</i>	
<i>Mariscus californicus</i>	32	<i>Scirpus leucocephalus</i>	98
<i>Mariscus schweinitzii</i>		<i>Scirpus maritimus</i> var. <i>fluviatilis</i>	24
<i>Mariscus stenolepis</i>	52	<i>Scirpus maritimus</i> var. <i>paludosus</i>	28
<i>Mariscus strigosus</i>	52	<i>Scirpus micranthus</i>	
<i>Pycnus rivularis</i>	40	<i>Scirpus microcarpus</i>	144
<i>Schoenoplectiella</i>	118	<i>Scirpus microcarpus</i> var. <i>longispicatus</i>	144
<i>Schoenoplectiella saximontana</i>	120	<i>Scirpus microcarpus</i> var. <i>rubrotinctus</i>	

<i>Scirpus nevadensis</i>	20	<i>Scirpus rubrotinctus</i>	144
<i>Scirpus obtusus</i>	78	<i>Scirpus saximontanus</i>	120
<i>Scirpus olneyi</i>	128	<i>Scirpus scheuchzeri</i>	98
<i>Scirpus pacificus</i>	28	<i>Scirpus spadiceus</i>	106
<i>Scirpus pallidus</i>	146	<i>Scirpus subsquarrosus</i>	116
<i>Scirpus paludosus</i>	28	<i>Scirpus subterminalis</i>	134
<i>Scirpus palustris</i>		<i>Scirpus sylvaticus</i> var. <i>digynus</i>	144
<i>Scirpus pauciflorus</i>	84	<i>Scirpus tabernaemontani</i>	136
<i>Scirpus puberulus</i>	104	<i>Scirpus validus</i>	136
<i>Scirpus pungens</i>	132	<i>Trichophorum</i>	148
<i>Scirpus quinqueflorus</i>	84	<i>Trichophorum cespitosum</i>	150
<i>Scirpus rostellatus</i>	86	<i>Trichophorum palustre</i> var. <i>calvum</i>	72

Index of Common Names

Alkali bulrush (<i>Bolboschoenus maritimus</i> subsp. <i>paludosus</i>)	28	Cloaked bulrush (<i>Scirpus pallidus</i>)	146
American bulrush (<i>Schoenoplectus americanus</i>)	128	Clubrush (<i>Trichophorum</i> spp.)	148
Awned flatsedge (<i>Cyperus squarrosus</i>)	50	Colorado spikerush (<i>Eleocharis coloradoensis</i>)	68
Awned halfchaff sedge (<i>Lipocarpus aristulata</i>)	116	Common spikerush (<i>Eleocharis palustris</i> , <i>Eleocharis macrostachya</i>)	80 76
Bald spikerush (<i>Eleocharis erythropoda</i>)	72	Common threesquare bulrush (<i>Schoenoplectus pungens</i> var. <i>badius</i> , <i>S. p.</i> var. <i>longispicatus</i>)	132
Bayonet grass (<i>Bolboschoenus maritimus</i> subsp. <i>paludosus</i>)	28	Common tule (<i>Schoenoplectus acutus</i>)	126
Beaked spikerush (<i>Eleocharis rostellata</i>)	86	Confusing spikerush (<i>Eleocharis macrostachya</i>)	76
Bearded flatsedge (<i>Cyperus squarrosus</i>)	50	Cottongrass (<i>Eriophorum</i> spp.)	90
Bearded nutgrass (<i>Cyperus squarrosus</i>)	50	Cottonsedge (<i>Eriophorum</i> spp.)	90
Beautiful spikerush (<i>Eleocharis bella</i>)	64	Creeping spikerush (<i>Eleocharis palustris</i>)	80
Bellard bog sedge (<i>Kobresia myosuroides</i>)	110	Deerhair bulrush (<i>Trichophorum cespitosum</i>)	150
Bellard kobresia (<i>Kobresia myosuroides</i>)	110	Delicate spikerush (<i>Eleocharis bella</i>)	64
Black bogrush (<i>Schoenus nigricans</i>)	140	Dense cottongrass (<i>Eriophorum scheuchzeri</i>)	98
Black sedge (<i>Schoenus nigricans</i>)	140	Dulichium (<i>Dulichium</i> spp.)	54
Blackhead sedge (<i>Schoenus</i> spp.)	138	Dwarf spikerush (<i>Eleocharis coloradoensis</i>)	68
Blunt spikerush (<i>Eleocharis obtusa</i>)	78	Engelmann's spikerush (<i>Eleocharis engelmannii</i>)	70
Blunt spikesedge (<i>Eleocharis obtusa</i>)	78	False nutsedge (<i>Cyperus strigosus</i>)	52
Bog sedge (<i>Kobresia</i> spp.)	108	Few-flowered spikerush (<i>Eleocharis quinqueflora</i>)	84
Bogrush (<i>Schoenus</i> spp.)	138	Fewflowered spikesedge (<i>Eleocharis quinqueflora</i>)	84
Bolander's spikerush (<i>Eleocharis bolanderi</i>)	66	Fimbristyle (<i>Fimbristylis</i> spp.)	102
Bulrush (<i>Amphiscirpus</i> spp., <i>Schoenoplectiella</i> spp., <i>Schoenoplectus</i> spp., <i>Scirpus</i> spp., <i>Trichophorum</i> spp.)	18 118 122 142 148	Fimbry (<i>Fimbristylis</i> spp.)	102
California bulrush (<i>Schoenoplectus californicus</i>)	130	Flatsedge (<i>Cyperus</i> spp.)	34
California sawgrass (<i>Cladium californicum</i>)	32	Fringed style (<i>Fimbristylis</i> spp, <i>F. spadicea</i>)	102 106
Chairmaker's bulrush (<i>Schoeoplectus americanus</i>)	128	Giant bulrush (<i>Schoenoplectus americanus</i>)	128
Chairmaker's rush (<i>Schoenoplectus pungens</i> var. <i>badius</i> , <i>S. p.</i> var. <i>longispicatus</i>)	132	Great bulrush (<i>Schoenoplectus tabernaemontani</i>)	136
Chamisso's cottongrass (<i>Eriophorum chamissonis</i>)	94	Green-keeled cottongrass (<i>Eriophorum viridicarinatum</i>)	92
Chufa flatsedge (<i>Cyperus esculentus</i>)	46	Hairy fimbry (<i>Fimbristylis puberula</i>)	104
		Halfchaff sedge (<i>Lipocarpus</i> spp.)	114

Hardstem bulrush (<i>Schoenoplectus acutus</i>)	126	Schweinitz flatsedge (<i>Cyperus schweinitzii</i>)	48
Hemicarpha (<i>Lipocarpa</i> spp.)	114	Sedge family (Cyperaceae)	14
Hot springs fimbry (<i>Fimbristylis thermalis</i>)	106	Sharpscale bulrush (<i>Schoenoplectiella saximontana</i>)	120
Kobresia (<i>Kobresia</i> spp.)	108	Shealt cottongrass (<i>Eriophorum scheuchzeri</i>)	98
Many-spiked cottongrass (<i>Eriophorum angustifolium</i> subsp. <i>angustifolium</i>)	92	Short-pointed flatsedge (<i>Cyperus acuminatus</i>)	38
Marisque (<i>Cladium</i> spp.)	30	Simple bog sedge (<i>Kobresia simpliciuscula</i>)	112
Naked-stemmed bulrush (<i>Shoenoplectus</i> spp.)	122	Simple kobresia (<i>Kobresia simpliciuscula</i>)	112
Narrowleaf cottonsedge (<i>Eriophorum angustifolium</i> subsp. <i>angustifolium</i>)	92	Slender bulrush (<i>Schoenoplectus heterochaetus</i>)	
Needle spikerush (<i>Eleocharis acicularis</i>)	62	Slender cottongrass (<i>Eriophorum gracile</i>)	96
Needle spikesedge (<i>Eleocharis acicularis</i>)	62	Slender cottonsedge (<i>Eriophorum gracile</i>)	96
Nevada bulrush (<i>Amphiscirpus nevadensis</i>)	20	Slender flatsedge (<i>Cyperus bipartitus</i>)	40
Nutgrass (<i>Cyperus</i> spp.)	34	Slender spikerush (<i>Eleocharis acicularis</i>)	62
Olney's threesquare bulrush (<i>Schoenoplectus americanus</i>)	128	Smallflower halfchaff sedge (<i>Lipocarpa micrantha</i>)	116
Pale bulrush (<i>Scirpus pallidus</i>)	146	Small-flowered hemicarpha (<i>Lipocarpa micrantha</i>)	116
Pale spikerush (<i>Eleocharis flavescens</i> var. <i>flavescens</i> , <i>E. macrostachya</i>)	74 76	Small-flowered bulrush (<i>Lipocarpa micrantha</i>)	116
Panicled bulrush (<i>Scirpus microcarpus</i>)	144	Smallfruit bulrush (<i>Scirpus microcarpus</i>)	
Parish's spikerush (<i>Eleocharis parishii</i>)	82	Softstem bulrush (<i>Schoenoplectus tabernaemontani</i>)	136
Pretty spikerush (<i>Eleocharis bella</i>)	64	Spikerush (<i>Eleocharis</i> spp., <i>E. macrostachya</i>)	58 76
Red-tinge bulrush (<i>Scirpus microcarpus</i>)	144	Spikesedge (<i>Eleocharis</i> spp., <i>E. erythropoda</i> , <i>E. palustris</i>)	58 72 80
Redroot flatsedge (<i>Cyperus erythrorhizos</i>)	44	Strawcolored cyperus (<i>Cyperus strigosus</i>)	52
Redroot nutgrass (<i>Cyperus erythrorhizos</i>)	44	Strawcolored nutgrass (<i>Cyperus strigosus</i>)	52
Redrooted spikerush (<i>Eleocharis erythropoda</i>)	72	Streamside flatsedge (<i>Cyperus bipartitus</i>)	40
River bulrush (<i>Bolboschoenus fluviatilis</i>)	24	Sukdorf's spikerush (<i>Eleocharis suksdorfiana</i>)	88
Rocky Mountain bulrush (<i>Schoenoplectiella saximontana</i>)	120	Swaying bulrush (<i>Schoenoplectus subterminalis</i>)	134
Rough sand sedge (<i>Cyperus schweinitzii</i>)	48	Tall cottongrass (<i>Eriophorum angustifolium</i> subsp. <i>angustifolium</i>)	92
Rusty cottongrass (<i>Eriophorum chamissonis</i>)	94	Tapertip flatsedge (<i>Cyperus acuminatus</i>)	38
Salt marsh bulrush (<i>Bolboschoenus maritimus</i> subsp. <i>paludosus</i>)	28		
Sawgrass (<i>Cladium</i> spp.)	30		
Scheuchzeri's cottongrass (<i>Eriophorum scheuchzeri</i>)	98		
Schweinitz cyperus (<i>Cyperus schweinitzii</i>)	48		

Tassel cottongrass (<i>Eriophorum viridicarinatum</i>)	100	Tule bulrush (<i>Schoenoplectus acutus</i> , <i>S. validus</i>)	126 136
Thinleaf cottonsedge (<i>Eriophorum viridicarinatum</i>)	100	Twig-rush (<i>Cladium</i> spp.)	30
Three-way sedge (<i>Dulichium arundinaceum</i>)	56	Umbrella sedge (<i>Cyperus</i> spp.)	34
Threesquare (<i>Schoenoplectus</i> spp., <i>S. americanus</i> , <i>S. pungens</i> var. <i>badius</i> , <i>S. p.</i> var. <i>longispicatus</i>)	122 128 132	Variable flatsedge (<i>Cyperus difformis</i>)	42
Torrey's spikerush (<i>Eleocharis rostellata</i>)	86	Walking sedge (<i>Eleocharis rostellata</i>)	86
Trichophore (<i>Trichophorum</i> spp.)	148	Water bulrush (<i>Schoenoplectus subterminalis</i>)	134
Tuberous bulrush (<i>Bolboschoenus</i> spp., <i>B. glaucus</i>)	22 26	Water clubrush (<i>Schoenoplectus subterminalis</i>)	134
Tufted bulrush (<i>Trichophorum cespitosum</i>)	150	White cottongrass (<i>Eriophorum scheuchzeri</i>)	98
Tufted clubrush (<i>Trichophorum cespitosum</i>)	150	White cottonsedge (<i>Eriophorum scheuchzeri</i>)	98
Tule (<i>Schoenoplectus californicus</i> , <i>Scirpus</i> spp.)	130 142	Yellow nutgrass (<i>Cyperus esculentus</i>)	46
		Yellow nutsedge (<i>Cyperus esculentus</i>)	46
		Yellow spikerush (<i>Eleocharis flavescens</i> var. <i>flavescens</i>)	74