

The Jepson Manual: Vascular Plants of California, Second Edition
Supplement III
December 2015

In the pages that follow are treatments that have been revised since the publication of the *Jepson eFlora*, Revision 2 (December 2014).

The information in these revisions is intended to supersede that in the second edition of *The Jepson Manual* (2012). Generic treatments include species descriptions for taxa that were not included in the second edition of *The Jepson Manual* (2012).

The revised treatments, as well as errata and other small changes not noted here, are included in the *Jepson eFlora* (<http://ucjeps.berkeley.edu/IJM.html>).

For a list of errata and small changes in treatments that are not included here, please see:
http://ucjeps.berkeley.edu/JM12_errata.html

Citation for the entire *Jepson eFlora*: Jepson Flora Project (eds.) [year] *Jepson eFlora*,
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Summary of changes made in Revision 3 of the *Jepson eFlora*, December 2015

POLEMONIACEAE

Eriastrum erterae newly described, added, as native

Eriastrum rosamondense newly described, added, as native

Linanthus bernardinus newly described, added, as native

CYPERACEAE

Carex cyrtostachya newly described, added, as native

Carex orestera newly described, added, as native, replacing *Carex albonigra*

Carex xerophila newly described, added, as native

Plants called *Carex albonigra* in TJM2 are *Carex orestera*; *Carex albonigra* is not in California.

JUNCACEAE

Juncus bulbosus added, as naturalized

Juncus dichotomus added, as naturalized

Juncus elliotii added, as naturalized

Juncus trilocularis newly described, added, as native, replacing *Juncus brachyphyllus*

POLEMONIACEAE PHLOX FAMILY

Robert Patterson, family description, key to genera

Annual, perennial herb, shrub, vine. **Leaf:** simple or compound, cauline (or most basal), alternate or opposite; stipules 0. **Inflorescence:** cymes, heads, clusters, or flower 1; bracts in involucre or not. **Flower:** sepals generally 5, fused at base, translucent membrane generally connecting lobes, torn by fruit; corolla generally 5-lobed, radial or bilateral, salverform to bell-shaped, throat often well defined; stamens generally 5, epipetalous, attached at ≥ 1 level, filaments of ≥ 1 length, pollen white, yellow, blue, or red; ovary superior, chambers generally 3, style 1, stigmas generally 3. **Fruit:** capsule. **Seed:** 1–many, when wetted swelling or not, gelatinous or not. 26 genera, 314 species: America, northern Europe, northern Asia; some cultivated (*Cantua*, *Cobaea* (cup-and-saucer vine), *Collomia*, *Gilia*, *Ipomopsis*, *Linanthus*, *Phlox*). [Porter & Johnson 2000 *Aliso* 19:55–91] *Leptodactylon* moved to *Linanthus*. — Scientific Editors: Robert Patterson, Thomas J. Rosatti.

ERIASTRUM

Sarah De Groot, David Gowen & Robert Patterson

Glabrous to woolly, glandular or not. **Stem:** generally erect. **Leaf:** cauline, alternate, generally pinnate-lobed or simple; lobes generally linear or lanceolate. **Inflorescence:** head-like, bracted, generally densely woolly; bracts leaf-like; flowers sessile. **Flower:** calyx lobes unequal, generally woolly; corolla radial or bilateral, funnel-shaped to salverform; stamens equal or not, anthers generally sagittate, pollen white or blue; style included or exerted. **Seed:** 1–several per chamber. 18 species: western North America. (Greek: woolly star) [Harrison 1972 *Brigham Young Univ Sci Bull, Biol Ser* 16:1–26] *Eriastrum ertterae*, *Eriastrum rosamondense* described since TJM2 (Gowen 2013 *J Bot Res Inst Texas* 7: 21–24). Apparently more undescribed variation; genus being revised. Key to species by David Gowen, Sarah De Groot.

1. Perennial herb *E. densifolium*
2. Corolla 20–37 mm
 3. Corolla 20–25 mm, lobes 1/3–1/2 corolla; leaves glabrous to subglabrous; coastal dunes, San Luis Obispo, Santa Barbara cos. subsp. *densifolium*
 - 3' Corolla 25–37 mm, lobes \pm 1/3 corolla; leaves woolly; Santa Ana River drainage, sw San Bernardino Co. subsp. *sanctorum*
- 2' Corolla < 20 mm
 4. Leaves strongly recurved, blade wider at base than tip, lobes spine-tipped — East of Sierra Nevada, Mojave Desert subsp. *mohavense*
 - 4' Leaves not recurved, blade generally equally wide at base, tip, generally not spine-tipped
 5. Bracts generally 5–9 lobed; inflorescence generally terminal, 10–20 flowered; leaves subglabrous to \pm canescent subsp. *austromontanum*
 - 5' Bracts generally (0)3–5(7)-lobed; inflorescences generally terminal and axillary, 1–10(15)-flowered; leaves \pm canescent to woolly subsp. *elongatum*
- 1' Annual (occasionally short-lived perennial herb)
 6. Stamens attached at or just below corolla sinus, corolla 11–24 mm *E. pluriflorum*
 7. Plant \pm open; leaves thread-like; corolla generally salverform, tube + throat generally $> 2 \times$ lobes; chaparral, grassland, savanna, woodland, pine forest subsp. *pluriflorum*
 - 7' Plant generally dense, occasionally cespitose; leaves linear; corolla narrowly funnel-shaped, tube + throat generally $\leq 2 \times$ lobes; open sandy flats, deserts subsp. *sherman-hoytia*
 - 6' Stamens attached well below corolla sinus, if higher, corolla < 15 mm
 8. Stamens exerted $> 1/2$ length of corolla lobes
 9. Corolla lobes bright yellow *E. luteum*
 - 9' Corolla lobes white, lavender, or variously blue
 10. Corolla generally bilateral; stamens generally unequal *E. eremicum* subsp. *eremicum*
 - 10' Corolla \pm radial (or bilateral from unequal sinuses in *Eriastrum sapphirinum*), stamens generally equal
 11. Stamens exceeded by tips of corolla lobes; corolla lobes < 4 mm *E. filifolium*

- 11' Stamens equaling to exceeding tips of corolla lobes (almost equaling to exceeding in *Eriastrum sapphirinum* subsp. *dasyanthum*); corolla lobes ≥ 4 mm
12. Corolla tube $> 3 \times$ throat, tube + throat generally $\geq 1.5 \times$ lobes; plants \pm not glandular; Central Coast, n South Coast Ranges (Monterey, San Benito cos.) *E. virgatum*
- 12' Corolla tube $< 3 \times$ throat, tube + throat generally $\leq 1.5 \times$ lobes; plants often glandular; s Sierra Nevada Foothills, Southwestern California (except Channel Islands), w Desert *E. sapphirinum*
13. Flowers 3+ per cluster; corolla lobes dark to royal blue, pale blue, or white; calyx, bracts occasionally \pm glandular, woolly subsp. *dasyanthum*
- 13' Flowers 1–3 per cluster; corolla lobes bright blue to lavender; calyx, bracts glandular, \pm woolly to subglabrous subsp. *sapphirinum*
- 8' Stamens included or exerted $< 1/2$ length of corolla lobes
14. Anthers included
15. Upper leaves, bracts generally pinnate-3–7-lobed; inflorescence many-flowered, densely bracted, densely woolly *E. abramsii*
- 15' Upper leaves, bracts entire, pinnate-1–4-lobed, or palmate-5-lobed; inflorescence few-flowered, few-bracted, \pm woolly
16. Corolla 5–7 mm; seeds (1)2–4 per chamber
17. Corolla white with blue tint or streaks; anthers just at sinus *E. erterrae*
- 17' Corolla white; anthers not reaching sinus *E. hooveri*
- 16' Corolla ≥ 7 mm, white, pink, lavender, or light blue; seeds 1(2) per chamber
18. Stamens 1.5–2 mm, filaments $\pm 2 \times$ anther; corolla lobes narrowly elliptic, $\pm 3 \times$ longer than wide *E. brandegeae*
- 18' Stamens 0.5–1.5 mm, filaments $\pm =$ anther; corolla lobes widely elliptic, $\pm 2 \times$ longer than wide *E. tracyi*
- 14' Anthers exerted
19. Stamens unequal; corolla lobes generally > 1.25 mm wide
20. Corolla generally 6–9 mm; stem wiry; plants erect or spreading, generally subglabrous; leaves generally 1–3-lobed near base; East of Sierra Nevada, Desert *E. diffusum*
- 20' Corolla 9–14 mm; stem generally not wiry; plants erect, woolly-hairy to occasionally subglabrous; leaves entire or 1–7-lobed near base; High Sierra Nevada, Great Basin Floristic Province, n Desert Mountains *E. wilcoxii*
- 19' Stamens equal; corolla lobes generally ≤ 1.25 mm wide
21. Plant minutely glandular-hairy *E. sparsiflorum*
- 21' Plant \pm glabrous to woolly-hairy or woolly, generally \pm not glandular
22. Corolla lobes pale yellow to white *E. harwoodii*
- 22' Corolla lobes pale blue to pink
23. Corolla generally < 7 mm, corolla lobes without spot *E. rosamondense*
- 23' Corolla ≥ 7 mm, corolla lobe base generally with maroon spot, occasionally faint *E. signatum*

Species descriptions for taxa that were not included in the second edition of *The Jepson Manual* (2012) are provided below.

***E. erterrae* LIME RIDGE ERIASTRUM D. Gowen**

NATIVE

Annual. **Stem:** 1.5–20(25) cm. **Leaf:** 9–30 mm, linear, entire or 3-lobed at base, \pm glabrous to woolly. **Inflorescence:** few-flowered, -bracted. **Flower:** corolla 5–7 mm, \pm salverform, white with pale blue tint or streaks, tube 2.9–3.4 mm, throat 0.8–1.3 mm, lobes 2 mm, elliptic-acute; stamens attached 2 mm below sinus, 1.5–2.5 mm, reaching the sinus or just beyond. **Seed:**(1)2–4 per chamber. Hard packed sand at edge of chaparral; < 300 m. e SnFrB (Lime Ridge). Jun {CNPS list}

***E. rosamondense* D. Gowen ROSAMOND ERIASTRUM**

NATIVE

Annual. **Stem:** 2–8(11) cm. **Leaf:** 4–15 mm, widely-linear, usually entire, \pm glabrous to woolly. **Inflorescence:** few-flowered, -bracted. **Flower:** corolla 5–6(7) mm, \pm narrowly funnelform, pale blue, tube 2.5–3.3 mm, throat 0.2–0.8 mm, lobes 2 mm, elliptic-acute (tips sometimes rounded); stamens attached 1 mm below sinus, 2–2.5 mm, exerted $< 1/2$ corolla lobe. **Seed:**(1)2–4 per chamber. Hard packed sandy cryptogamic soil among low hummocks with dry pools; < 710 m. w DMoj (Rosamond Dry Lake area). May {CNPS list}

LINANTHUS

Robert Patterson & J. Mark Porter

Annual, perennial herb, subshrub. **Stem:** generally erect, generally branched from base. **Leaf:** cauline, alternate or opposite, entire or lobes 3–9, pinnate or palmate, linear to narrow-lanceolate or spoon-shaped. **Inflorescence:** open or dense clusters or cyme or flower 1; bracts leaf-like; flowers sessile or not. **Flower:** corolla funnel-shaped, salverform, or bell-shaped; stamens attached at 1 level, included or exerted, pollen yellow. **Fruit:** capsule, valves 3(4). **Seed:** generally many, when wet gelatinous to not. 25 species: western North America. (Greek: flax flower) [Porter & Johnson 2000 *Aliso* 19:55–91] Other taxa in TJM (1993) moved to *Leptosiphon*. *Linanthus bernardinus* described since TJM2 (Fraga & Bell 2012 *Aliso* 30: 97–102).

1. Perennial herb, subshrub; leaf lobes sharp-tipped
2. Leaves opposite, pinnate-3-lobed; corolla lobes 5–6; capsules generally 4-valved — San Jacinto Mountains *L. jaegeri*
- 2' Leaves generally alternate, palmate- or pinnate-3–many-lobed; corolla lobes 5; capsules generally 3-valved
3. Corolla salverform, lobes 9–18 mm, generally pink; 0–1500 m *L. californicus*
- 3' Corolla funnel-shaped, lobes 7–10 mm, white or pink; 1700–4000 m *L. pungens*
- 1' Annual; leaf lobes not sharp-tipped
4. Corolla generally open evening (if open daytime then limb > 10 mm wide); calyx membrane wider than lobes; corolla lacking red marks near throat
5. Calyx glandular-hairy *L. jonesii*
- 5' Calyx hairy or not, not glandular
6. Calyx 4–5 mm, hairy adaxially *L. arenicola*
- 6' Calyx 8–14 mm, glabrous adaxially
7. Corolla tube without hairy pads where stamens attached *L. bigelovii*
- 7' Corolla tube with hairy pads where stamens attached *L. dichotomus*
8. Corolla closed daytime, open evening; California except Modoc Plateau subsp. *dichotomus*
- 8' Corolla open daytime, evening; n San Francisco Bay Area, North Coast Ranges subsp. *meridianus*
- 4' Corolla open daytime, limb generally < 10 mm wide; calyx membrane generally narrower than lobes (if wider then corolla with red marks near throat)
9. Leaves alternate (opposite or ± alternate in *Linanthus concinnus*)
10. Leaf linear to thread-like; corolla lobes yellow *L. filiformis*
- 10' Leaf oblong, lanceolate, or narrowly oblanceolate; corolla lobes white
11. Plant < 3 cm, stem not glandular; calyx membrane ciliate; Desert Mountains (Little San Bernardino Mtns), w Sonoran Desert *L. maculatus*
- 11' Plant > 3 cm, stem glandular; calyx membrane not ciliate; s High Sierra Nevada, Great Basin Floristic Province, Mojave Desert
12. Corolla throat with 2 purple marks below lobes, tube and throat exerted from calyx *L. campanulatus*
- 12' Corolla throat lacking purple marks, tube and throat included in calyx *L. inyoensis*
- 9' Leaves opposite (or ± alternate in *Linanthus concinnus*)
13. Membrane ± not connecting calyx lobes; corolla tube inconspicuous
14. Stem thread-like, openly branched at base; calyx lobes with purple marks at base *L. bellus*
- 14' Stem not thread-like, compactly branched; calyx lobes without purple marks at base
15. Corolla bell-shaped, lobes white, base with 2 red marks *L. demissus*
- 15' Corolla funnel-shaped, lobes blue-purple or white, base with 1–2 purple marks *L. parryae*
- 13' Membrane connecting calyx lobes; corolla tube conspicuous
16. Leaf lobes 0; corolla lobe tips fine-toothed *L. dianthiflorus*
- 16' Leaf lobes deep; corolla lobe tips ± entire
17. Calyx membrane much wider than lobes — San Gabriel Mountains *L. concinnus*
- 17' Calyx membrane as wide as lobes
18. Corolla lobes with 2 purple marks at base, 1 in each sinus; Peninsular Ranges, Desert *L. orcuttii*
- 18' Corolla lobes with 1 reddish mark at base, in center of each lobe; San Bernardino Mountains
19. Corolla tube maroon to purple *L. bernardinus*
- 19' Corolla tube yellow *L. killipii*

Species descriptions for taxa that were not included in the second edition of *The Jepson Manual* (2012) are provided below.

L. bernardinus Fraga & D.S. Bell PIONEERTOWN LINANTHUS

NATIVE

Annual, glandular-hairy. **Stem:** 1.5–9 cm. **Leaf:** lobes 1.5–7(10) mm, linear. **Inflorescence:** cluster of 2–3 flowers or flower 1; flower ± sessile. **Flower:** calyx 5–7 mm, membrane as wide as lobes, corolla funnel-shaped, tube 6–14 mm, maroon to purple, throat 2–3 mm, white, lobes 4–8 mm, whitish or lavender-pink, base with 1 reddish mark; stamens included. **Fruit:** < calyx, ellipsoid. **Seed:** 2–10 per chamber, slightly gelatinous when wet. Joshua tree or pinyon-juniper woodland, mixed scrub, in gravelly granitic soils; 1100–1550 m. e SnBr (Sawtooths). Mar–May {CNPS list}

CYPERACEAE SEDGE FAMILY

S. Galen Smith, except as noted

Annual, perennial herb, often rhizomed or stoloned, often of wet open places; roots fibrous; monoecious, dioecious, or flowers bisexual. **Stem:** generally 3-sided, generally solid. **Leaf:** generally 3-ranked; base sheathing, sheath generally closed, ligule generally 0; blade (0 or) linear, parallel-veined. **Inflorescence:** spikelets generally arranged in head-, spike-, raceme-, or panicle-like inflorescences; flower generally sessile in axil of flower bract, enclosed in a sac-like structure (perigynium) or generally not. **Flower:** unisexual or bisexual, small, generally wind-pollinated; perianth 0 or generally bristle like; stamens generally 3, anthers attached at base, 4 chambered; ovary superior, chamber 1, ovule 1, style 2–3-branched. **Fruit:** achene, 2–3 sided. ± 100 genera, 5000 species: especially temperate. [Gilmour et al. 2013 Kew Bull 68:85–105] Difficult; taxa differ in technical characters of inflorescence, fruit. In *Carex* and *Kobresia*, what appear to be individual pistillate flowers in fact are highly reduced inflorescences (whether or not the same applies to staminate flowers is still under debate). In some other works (e.g., FNANM) these are called spikelets, and they are treated as being arranged in spikes. Here and in TJM (1993), what appear to be individual pistillate flowers are called pistillate flowers in *Carex* (and they are treated as being arranged in spikelets), but spikelets in *Kobresia* (and they are treated as being arranged into spikes). Though internally inconsistent, the approach here is consistent with traditional usage, and reflects a preference for character states that may be determined in the field. Molecular, morphological, and embryological evidence indicates that *Eriophorum crinigerum* is to be segregated to a new genus, as *Calliscirpus criniger* (A. Gray) C.N. Gilmour et al., along with a second, newly described species, *Calliscirpus brachythrix* C.N. Gilmour et al. (Gilmour et al. 2013); key to genera modified by Peter W. Ball to include *Calliscirpus*. —Scientific Editors: S. Galen Smith, Thomas J. Rosatti, Bruce G. Baldwin.

CAREX SEDGE

Peter F. Zika, Andrew L. Hipp & Joy Mastrogiuseppe

Perennial herb, cespitose to loosely cespitose to rhizomed with internodes > 1 cm; generally monoecious. **Stem:** generally sharp-3-angled, generally solid. **Leaf:** 3-ranked, generally glabrous except generally scabrous on midrib, margin; sheath closed, back (blade side of stem) green, ribbed, front (non-blade side of stem) generally thin, translucent, sometimes cross-wrinkled or flat, forming generally U-shaped mouth at top, sometimes extending above blade as a fragile sleeve-like "contraligule" (especially Groups 7, 11), sometimes disintegrating to a ladder- or lattice-like network or fringe of veins ("leaf sheath fronts fibrous"). **Inflorescence:** spikelets generally several to many, in spike, raceme, panicle, or head-like arrangement, each 1–many-flowered, generally unisexual, or bisexual, then staminate flowers distal to pistillate ("staminate/pistillate"), pistillate distal to staminate ("pistillate/staminate"), or otherwise, generally subtended by spikelet bract, lowest subtended by inflorescence bract, occasionally some additional pistillate spikelets on lateral shoots from basal nodes ("basal spikelets"); flowers subtended by flowering bract ("scale" in other literature, especially for pistillate). **Flower:** unisexual; perianth 0. **Staminate flower:** stamens generally 3. **Pistillate flower:** enclosed by sac-like structure (perigynium, abbreviated to "peri" here), occasionally next to bristle-like axis; style 1, stigmas 2–3(4), exerted. **Fruit:** 2–3(4)-sided, enclosed in peri, stalked or not, style base generally not persistent; perigynium body 2–3(4)-sided or round, often with marginal ribs, some with additional veins, papillate or not (determined at 20×), abruptly narrowed at base into stalk or not; perigynium beak abaxial flap (suture) prominent or generally inconspicuous or 0, tip open, often notched. ± 2000 species: worldwide; important components of peat, forage. (Latin: cutter, from sharp leaf, stem edges) [Wilson et al. 2007 J Bot Res Inst Texas 1:69–77; Zika et al. 1998 Madroño 45:261–270] Difficult because of many species, morphologic and genetic variation, minute key characters. Perigynium around fully mature fruit needed for identification (long-persistent perigynium often atypical). Many herbarium specimens have immature peri, which lead to misidentification. 2-styled plants with perigynium ± flat adaxially, curved abaxially are planoconvex; perigynium curved ± equally on both surfaces are biconvex. Perigynium walls said to be translucent are easily punctured and/or do not completely conceal fruit within. Perigynium beaks generally measured from point of inflection, where perigynium margin changes from convex to concave, to its tip, but in a few taxa it is measured from fruit top to beak tip ("measured from fruit top" for those taxa). Perigynium (and fruit) shapes including beak; perigynium (and fruit) "body" excludes beak. Mid to late season shoots often atypical in shape, color of inflorescence, bracts, peri. Number of perigynium given is per spikelet. Actual hybrids probably less frequent than reports of hybrids. *Carex pityophila* Mack, native to southern Rocky Mountains, reported from SnBr, but is distinct; plants from SnBr warrant a new species. In TJM (1993), *Carex cephalophora* Willd. misappl. to plants belonging instead to *Carex mesochorea* Mack. (Group 9), native to eastern United States, collected in SCo (Los Angeles Co.) in 1929 and in ScV (Butte Co.) in 2010. *Carex molesta* Mack. ex Bright (Groups 11A,G), native to eastern United States, an historical urban weed, *Carex leavenworthii* Dewey an urban weed. *Carex cyrtostachya*, *Carex orestera*, and *Carex xerophila* described since TJM2. Plants called *Carex albonigra* in TJM2 are *Carex orestera*; *Carex albonigra* not in California.

Key to Groups

1. Plant hairy at least in part (check sheaths, blades, perigynium) **Group 1**
 2. Leaves hairy; perigynium hairy or glabrous **Group 2**
 2' Leaves glabrous; perigynium hairy **Group 2**
 1' Plant completely glabrous throughout
 3. Inflorescence 1 terminal spikelet **Group 3**
 3' Inflorescence generally \geq 2 spikelets
 4. Stigmas 3; fruit 3-angled
 5. Inflorescence bract sheath \geq 6 mm **Group 4**
 5' Inflorescence bract sheath $<$ 5 mm
 6. Perigynium inflated at least near beak **Group 5**
 6' Perigynium not inflated **Group 6**
 4' Stigmas 2; fruit lenticular
 7. Pistillate and staminate flowers on different stems (unisexual stems) **Group 7**
 7' Pistillate and staminate flowers on same stem (bisexual stems)
 8. Terminal spikelet(s) generally staminate; lateral spikelets pistillate (rarely tips staminate) **Group 8**
 8' Terminal and lateral spikelets all a mix of staminate and pistillate flowers
 9. Spikelets each with staminate flowers above pistillate flowers (often easiest to see in terminal spikelet;
 look for remnants of stamens) **Group 9**
 9' Spikelets each with pistillate flowers above staminate flowers
 10. Perigynium not winged (occasionally thin-edged above); stem generally solid; cespitose or rhizomed **Group 10**
 10' Perigynium winged; stem hollow; cespitose **Group 11**

Note:

The keys to Groups 1, 2, 4, and 6 have been modified from the second edition of *The Jepson Manual* (2012) and are included below.

Group 1: Sheaths and/or blades hairy

1. Plants dioecious
 2. Spikelets 1–4; plant loosely cespitose; fruit \ll perigynium body *C. scabriuscula*
 2' Spikelet generally 1; plant rhizomed; fruit \pm = perigynium body *C. scirpoidea* subsp. *pseudoscirpoidea*
 1' Plants monoecious
 3. Leaf blades glabrous, sheaths hairy at least at mouth
 4. Perigynium glabrous; leaves 1.5–23 mm wide
 5. Longer teeth of perigynium beak 1.5–3.3 mm, curved *C. atherodes* (2)
 5' Longer teeth of perigynium beak $<$ 0.5 mm, straight
 6. Plant rhizomed; leaves 8–23 mm wide; perigynium abruptly narrowed to beak *C. amplifolia*
 6' Plant cespitose; leaves 1.5–5.5 mm wide; perigynium gradually narrowed to beak
 7. Distal lateral spikelets arching or drooping, 0.7–3.5(–6) mm between perigynium at mid-spikelet;
 proximal staminate flower bract awns 0.5–5 mm; pistillate flower bracts, including awns, (2.2)3–4.8(–
 6.8) mm, awns (0–)0.5–2.2(–3.1) mm *C. cyrtostachya*
 7' Distal lateral spikelets erect or ascending, 0.3–0.6(–1.2) mm between perigynium at mid-spikelet;
 proximal staminate flower bract awns 0 (0.3–0.5 mm); pistillate flower bracts, including awns, 1.7–
 3.2(–3.7) mm, awns 0–0.3(–2) mm *C. mendocinensis* (3)
 4' Perigynium hairy; leaves 1.5–8 mm wide
 8. Plant rhizomed; often in standing water --> see couplet 5
 8' Plant cespitose; upland or damp ground, rarely in standing water
 9. Pistillate flower bract face hairy; lowest inflorescence bract sheath $<$ 5 mm; spikelets, upper 1/2 of
 perigynium dark purple; talus, 2600–3900 m *C. congdonii* (2)
 9' Pistillate flower bract face glabrous; lowest inflorescence bract sheath 20–30 mm; spikelets, perigynium
 green to gold or pale brown; moist ground, often on serpentine, 150–1600 m *C. mendocinensis* (3)
 3' Leaf blades hairy, sheaths hairy or glabrous
 10. Plant long-rhizomed; sheath fronts occasionally fibrous
 11. Perigynium sparse-hairy on main veins or glabrous; longer teeth of perigynium beak 1.5–3.3 mm *C. atherodes* (2)

- 11' Perigynium dense-hairy; longer teeth of perigynium beak 0.2–1.4 mm
12. Perigynium gradually narrowed to long beak; fruit << perigynium body; leaf sheaths white, not red-dotted, not fibrous; mature spikelets 8–10 mm wide *C. sheldonii*
- 12' Perigynium ± abruptly narrowed to beak; fruit ± = body; leaf sheaths often red-dotted, fibrous; mature spikelets 4–7 mm wide
13. Leaf blades inrolled to triangular-channeled, 0.7–2(2.2) mm wide, those of vegetative shoots especially prolonged into curled, thread-like tips; midvein of leaf, inflorescence bract a low, rounded, inconspicuous keel at least toward base *C. lasiocarpa*
- 13' Leaf blades flat or folded into an M-shape except at base and near tip, (2)2.2–4.5(6) mm wide, not prolonged into thread-like tips; midvein of leaf, inflorescence bract a prominent, sharp keel *C. pellita*
- 10' Plant caespitose to loosely so, forming clumps; sheath fronts not fibrous
14. Lowest inflorescence bract sheath < 5 mm; terminal spikelet staminate; not on serpentine
15. Perigynium glabrous, face strongly 5-veined; pistillate flower bracts glabrous; stem brown (red-brown) at base *C. whitneyi*
- 15' Perigynium hairy, face faintly 0–10 veined; pistillate flower bracts hairy near tips; stem red to purple at base
16. Pistillate flower bracts dark purple with 1–5 pale brown, strong veins; spikelets dark; perigynium > pistillate flower bracts, purple on upper 1/2 of body, gradually narrowed above; talus, 2600–3900 m *C. congdonii* (2)
- 16' Pistillate flower bracts with 1 weak vein in wide central green zone; spikelets light; perigynium < or > pistillate flower bracts, green to dark brown (dark purple) on upper 1/2 of body, generally abruptly narrowed above; moist or wet sites, 1200–2600 m *C. sartwelliana*
- 14' Lowest inflorescence bract sheath > 5 mm; terminal spikelet staminate or staminate and pistillate; generally on serpentine
17. Perigynium generally glabrous (sparse-hairy toward tip); leaf blade glabrous or sparsely hairy at base; basal leaves 1.5–5.5 mm wide *C. mendocinensis* (3)
- 17' Perigynium hairy; leaf blade hairy; basal leaves occasionally > 7 mm wide
18. Pistillate flower bracts obovate to wide-elliptic, red-brown or ± purple, midrib green; perigynium purple-splotched; on serpentine, < 600 m, North Coast, Klamath Ranges, Outer North Coast Ranges, n Central Coast (Marin, Santa Cruz cos.), San Francisco Bay Area, Outer South Coast Ranges *C. gynodynamis*
- 18' Pistillate flower bracts elliptic to elliptic-obovate, green or pale red-brown, midrib green; perigynium green or gold-green to pale brown, occasionally red-dotted but not purple-splotched; often on serpentine, 60–1200 m, North Coast Ranges (Mendocino, Lake cos.), Cascade Range, n&c Sierra Nevada *C. hirtissima*

Group 2: Perigynium hairy

1. Flower stems all unisexual, either staminate or pistillate
2. Flower stems staminate
3. Flower stem base scaly, not fibrous; spikelets 1–4; anthers 2–2.8 mm *C. scabriuscula* (2)
- 3' Flower stem base ± fibrous, scaly or not; spikelet 1; anthers 3.1–4.5 mm
4. Leaf sheath front occasionally hairy, not coarse-veined, fine-red-dotted; ligule occasionally longer than wide *C. scirpoidea* subsp. *pseudoscirpoidea* (2)
- 4' Leaf sheath front glabrous, coarse-veined, generally not red-dotted; ligule wider than long *C. serpicicola* (3)
- 2' Flower stems pistillate
5. Perigynium flat except over relatively small fruit, perigynium veins strong on lower 1/2 (obscure if dark purple) *C. scabriuscula* (2)
- 5' Perigynium plump, filled by fruit, perigynium veins 0 or short, weak on lower 1/2
6. Spikelets generally 1 (2, overlapped), oblong-cylindric; mature stems stiffly erect *C. scirpoidea* subsp. *pseudoscirpoidea* (2)
- 6' Spikelets 2–4, lowest generally well-separated or obvious, generally elliptic-ovate to ± spheric; mature stems weak, drooping *C. serpicicola* (3)
- 1' Some or all flowering stems bisexual, with both staminate and pistillate flowers

7. Stigmas 4, warty, not plumose, at 15×; fruit base 4-angled; leaf sheath mouth V-shaped; leaves ± sickle-shaped — Klamath Ranges, North Coast Ranges *C. concinnoides*
- 7' Stigmas 3, fine-plumose at 15×; fruit base 3-angled; leaf sheath mouth U-shaped; leaves straight (except *Carex brevicaulis* sickle-shaped)
8. Basal spikelets present
9. Perigynium with 12–20 strong veins at least to midbody; pistillate flower bracts generally prominently 3–5-veined
10. Leaves pale blue-green or glaucous; perigynium stalks ± = beaks; perigynium bodies barrel-shaped; leaves generally papillate abaxially at 40× *C. brainerdii*
- 10' Leaves green, not glaucous; perigynium stalks 1.5–2 × beaks; perigynium bodies obovoid; leaves not papillate or papillate only on veins abaxially at 40×
11. Some basal spikelets on generally arching, long, slender stalk > 10 cm; perigynium ≤ 2.3 mm wide; perigynium stalks ≤ 2.2 mm; coastal moist forest, openings *C. globosa*
- 11' All basal spikelets on stiffly erect stalks < 8 cm; perigynium ≤ 1.9 mm wide; perigynium stalks ≤ 1.6 mm; inland dry forest, savannah, chaparral *C. xerophila*
- 9' Perigynium with 2 strong veins, veins otherwise 0 or faint; pistillate flower bracts prominently 1(3)-veined
12. Inflorescence bracts on taller (non-basal) stems inconspicuous, scale-like, < inflorescence; old leaves occasionally persisting as shredded fibrous tufts; perigynium 1.5–2.1 mm wide; coastal dunes, headlands, North Coast, Central Coast *C. brevicaulis*
- 12' Inflorescence bracts on taller (non-basal) stems prominent, leaf-like, generally ≥ inflorescence; old leaves not persisting as shredded fibrous tufts; perigynium 1–1.7 mm wide; North Coast, Central Coast, and elsewhere
13. Perigynium 2.3–3.1 mm, beak 0.4–0.8 mm, teeth 0.1–0.2 mm; stems generally spreading or arching, ± smooth except near inflorescence; plant loosely cespitose; rhizomes slender *C. deflexa* var. *boottii* (2)
- 13' Perigynium 3.1–4.5 mm, beak 0.7–1.7 mm, teeth 0.2–0.4 mm; stems generally ascending, scabrous; plant loosely to densely cespitose; rhizomes stout *C. rossii*
- 8' Basal spikelets 0
14. Staminate spikelets 2–3
15. Stems 10–50 cm; dry uplands, Siskiyou Co. *C. halliana* (2)
- 15' Stems 60–180 cm; wet soil, Siskiyou Co. and elsewhere
16. Plants cespitose (*Carex spissa* cespitose to rhizomed); perigynium sparse-hairy, sharp-3-angled or 2-edged, generally fine-red-dotted; springs, seeps, streambanks, generally not in standing water, often on serpentine; Central Coast, Outer South Coast Ranges, South Coast
17. Perigynium sharp-3-angled, lanceolate, gradually narrowed to long beak ± 2 mm; lateral spikelets with 15–45 perigynium; generally on serpentine; Outer South Coast Ranges (Monterey, San Luis Obispo cos.), Peninsular Ranges *C. obispoensis* (2)
- 17' Perigynium often ± flat, 2-edged, or strongly inflated, but not 3-angled, obovoid, abruptly narrowed to beak ± 0.5 mm; lateral spikelets with 150–300 perigynium; on serpentine or not; Central Coast, South Coast *C. spissa*
- 16' Plants rhizomed; perigynium dense-hairy, plump, not sharp-3-angled or 2-edged, green or dark-purple-splotched; often emergent in shallow water, not on serpentine; widespread
18. Leaf blades inrolled to triangular-channeled, 0.7–2(2.2) mm wide, those of vegetative shoots especially prolonged into curled, thread-like tips; midvein of leaf, inflorescence bract a low, rounded, inconspicuous keel at least toward base *C. lasiocarpa*
- 18' Leaf blades flat or folded into an M-shape except at base and near tip, (2)2.2–4.5(6) mm wide, not prolonged into thread-like tips; midvein of leaf, inflorescence bract a prominent, sharp keel *C. pellita*
- 14' Staminate spikelet 1 (except *Carex triquetra*, *Carex obispoensis* with 1–2 upper lateral spikelets occasionally staminate/pistillate, but not entirely staminate)
19. Spikelets 1, terminal *C. filifolia*
20. Longest pistillate flower bracts (except awns) generally < 2.5 mm, generally << perigynium; perigynium body generally abruptly narrowed to beak 0–0.4 mm; fruit 1.6–2.4 mm var. *erostrata*

- 20' Longest pistillate flower bracts (except awns) generally > 3 mm, generally \geq perigynium; perigynium body \pm gradually narrowed to beak 0.1–0.8 mm; fruit 2.2–3 mm var. *filifolia*
- 19' Spikelets > 1, terminal and lateral
21. Lateral spikelets generally < 1 cm; mouth of leaf sheath fine-toothed
22. Rhizomes short, plants loosely caespitose; perigynium 1–1.4 mm wide *C. deflexa* var. *boottii* (2)
- 22' Rhizomes elongate, plants generally scattered; perigynium 1.5–2.2 mm wide
23. Pistillate flower bracts, lower staminate flower bracts green, red, or purple with white margin 0.4–0.8 mm wide; terminal spikelet staminate on taller inflorescences; stems bisexual; High Cascade Range *C. inops* subsp. *inops*
- 23' Pistillate flower bracts, lower staminate flower bracts dark purple with white margin 0.1–0.2 mm wide; terminal spikelet on taller inflorescences staminate, pistillate, or pistillate/staminate; stems unisexual or bisexual; Klamath Ranges *C. serpenticola* (3)
- 21' Lateral spikelets generally > 1.5 cm; mouth of leaf sheath entire or fine-ciliate
24. Plant rhizomed; leaf blade smooth; often in pumice — Klamath Ranges, High Cascade Range *C. halliana* (2)
- 24' Plant caespitose; leaf blade smooth, scabrous, or minute-papillate; not in pumice
25. Perigynium hairs obvious, not sparse
26. Perigynium lanceolate, \pm gradually narrowed to beak \pm 2 mm; generally on serpentine; Outer South Coast Ranges (Monterey, San Luis Obispo cos.), Peninsular Ranges *C. obispoensis* (2)
- 26' Perigynium elliptic, abruptly narrowed to beak < 1 mm; not on serpentine; Central Coast, South Coast, s Channel Islands, Transverse Ranges, Peninsular Ranges *C. triquetra*
- 25' Perigynium hairs 0 or occasionally inconspicuous, sparse
27. Spikelets \leq 60 mm; perigynium, pistillate flower bract green to brown, occasionally red-marked; generally on serpentine *C. mendocinensis*
- 27' Spikelets \leq 32 mm; perigynium, pistillate flower bract red-brown to dark purple, or green, marked with red-brown to dark purple; generally not on serpentine
28. Peri, at least distally on faces, with sparse, spreading-ascending, short, stiff, stout hairs or bristles; flower bract midvein distal margin scabrous to ciliate *C. fissuricola*
- 28' Perigynium faces generally glabrous or with sparse, spreading to appressed, generally long, soft, thin hairs; flower bract midvein, margin glabrous *C. luzulina*

Group 4: Stigmas 3; inflorescence bract sheath \geq 6 mm

1. Plant rhizomed
2. Perigynium inflated; style persisting on fruit; stem base spongy-thickened; leaf sheaths, lower leaf blades with well-developed brickwork pattern of crosswalls *C. utriculata*
- 2' Perigynium not inflated; style breaking off near fruit; stem base not spongy-thickened; leaf sheaths, lower leaf blades without well-developed brickwork pattern of crosswalls
3. Stigmas 2–3 (generally an even mix on a stem), ripe fruit lenticular or 3-angled; serpentine wetlands, Klamath Ranges *C. hassei*
- 3' Stigmas 3, ripe achenes 3-angled; various (including serpentine) wetlands or meadows, Klamath Ranges and elsewhere
4. Perigynium beak distinct or indistinct, 0.5–1.5 mm; leaves green, not glaucous
5. Stem base red or purple; perigynium abruptly narrowed to distinct beak; lower leaves on flowering stems reduced to bladeless sheaths *C. californica*
- 5' Stem base brown; perigynium gradually narrowed to indistinct beak; lower leaves on flowering stems well developed *C. luzulina* (4)
- 4' Perigynium beak indistinct, < 0.5 mm; leaves glaucous
6. Perigynium beak bent to 1 side; perigynium obovate, veins generally strong; leaves flat or folded; serpentine fens; Klamath Ranges, Inner North Coast Ranges *C. klamathensis*
- 6' Perigynium beak straight; perigynium elliptic, veins weak or 0; leaves channeled; coastal peatland, not on serpentine; North Coast (Mendocino Co.) *C. livida*
- 1' Plant caespitose to loosely so (*Carex spissa* caespitose to rhizomed)
7. Perigynium beak teeth spreading, generally curved, 1.3–2.8 mm *C. comosa*

- 7' Perigynium beak teeth 0 or erect, straight, < 1 mm
8. Terminal spikelet generally pistillate/staminate
9. Pistillate flower bracts white; perigynium 1.3–2.3 mm *C. tiogana* (2)
- 9' Pistillate flower bracts red-brown or purple; perigynium 3–5.5 mm
10. Perigynium plump, 0.9–2 mm wide
11. Perigynium not papillate, ovate to lanceolate *C. luzulina* (4)
- 11' Perigynium papillate, wide-elliptic to ovate *C. serratodens*
- 10' Perigynium flat, 1.7–3.5 mm wide
12. Lateral spikelets pistillate, larger with < 50 perigynium *C. heteroneura*
- 12' Lateral spikelets generally pistillate/staminate, larger with > 60 perigynium *C. mertensii*
- 8' Terminal spikelet generally staminate or staminate/pistillate (pistillate/staminate)
13. Wider leaves 9–20 mm wide; stems often weak, leaning
14. Perigynium gradually narrowed to indistinct beak; spikelets erect or spreading
15. Perigynium 4.3–6.5 mm, 20–32-veined, not red-dotted; inflorescence bract sheaths inflated; fruit stems often prostrate; coastal forest, not on serpentine, < 900 m *C. hendersonii*
- 15' Perigynium 2.5–4.3 mm, finely 8–10-veined, occasionally red-dotted; inflorescence bract sheaths not inflated; fruit stems erect or ascending; openings, mixed-evergreen forest, disturbed wet places, often on serpentine, 60–1200 m *C. hirtissima*
- 14' Perigynium abruptly narrowed to distinct beak; spikelets erect to spreading or drooping
16. Spikelets 1–3 cm, dark purple; perigynium < 30, margins flat; leaves green; 1900–3100 m *C. luzulifolia* (2)
- 16' Spikelets 3–20 cm, green; perigynium generally > 75, margins not flat; leaves blue-green, at least when young; < 1200 m
17. Perigynium body elliptic, 1.1–1.5 mm wide; stem base red to purple; pistillate spikelets 5–8 mm wide *C. pendula*
- 17' Perigynium body obovate, 1.5–2.5 mm wide; stem base brown; pistillate spikelets 7–12 mm wide *C. spissa*
- 13' Wider leaves generally 1–8 mm wide; stems erect or leaning
18. Spikelets ± sessile, erect; inflorescence bracts ± stiff, ascending or spreading; perigynium green to ± yellow or brown
19. Perigynium body lanceolate, gradually narrowed to indistinct beak *C. lemmonii* (2)
- 19' Perigynium body elliptic to ovate or obovate, abruptly narrowed to distinct beak *C. viridula* subsp. *viridula*
- 18' Spikelets stalked, erect or arching to drooping; inflorescence bracts ± weak, spreading; perigynium white, green, brown, red-brown, or purple
20. Perigynium beak distinct, ≤ 0.5 mm, or indistinct
21. Perigynium 1.3–2.3 mm, 0.4–0.9 mm wide; pistillate flower bract white *C. tiogana* (2)
- 21' Perigynium 3–5.5 mm, 0.9–2 mm wide; pistillate flower bract red-brown or dark purple
22. Perigynium body ovate to lanceolate, gradually narrowed to indistinct beak *C. luzulina* (4)
- 22' Perigynium body obovate to wide-elliptic, abruptly narrowed to distinct beak *C. raynoldsii*
- 20' Perigynium beak distinct, generally > 0.5 mm
23. Pistillate spikelets (15)20–60 mm, linear; perigynium beak ciliate on inner side of teeth
24. Distal lateral spikelets arching or drooping, 0.7–3.5(–6) mm between perigynium at mid-spikelet; proximal staminate flower bract awns 0.5–5 mm; pistillate flower bracts, including awns, (2.2–)3–4.8(–6.8) mm, awns (0–)0.5–2.2(–3.1) mm *C. cyrtostachya*
- 24' Distal lateral spikelets erect or ascending, 0.3–0.6(–1.2) mm between perigynium at mid-spikelet; proximal staminate flower bract awns 0 (0.3–0.5 mm); pistillate flower bracts, including awns, 1.7–3.2(–3.7) mm, awns 0–0.3(–2) mm *C. mendocinensis*
- 23' Pistillate spikelets generally ≤ 20 mm, oblong; perigynium beak generally not ciliate on inner side of teeth, but beak margins and outer side of teeth generally with spreading, stiff bristles
25. Perigynium faces, at least near beak, with sparse, spreading-ascending, short, stiff, bristles; pistillate flower bract margins ciliate distally *C. fissuricola*
- 25' Perigynium faces generally glabrous (or with sparse, weak hairs); pistillate flower bract margins glabrous
26. Perigynium flat margin > 1/2 fruit width; perigynium 1.7–2.5 mm wide; inflorescence bract sheath expanded toward shallow-U-shaped mouth (1.8)2–3 mm wide *C. luzulifolia* (2)

- 26' Perigynium flat margin 0 or $< 1/2$ fruit width; perigynium 0.9–2 mm wide; inflorescence bract sheath not (or \pm) expanded toward shallow Y- or V-shaped mouth 0.6–2 mm wide
27. Perigynium beak tip to fruit tip < 1.5 mm; lowest spikelet stalk generally exserted < 10 mm; pistillate flower bracts white, green, gold, or red-brown to dark purple, margin white *C. lemmonii* (2)
- 27' Perigynium beak tip to fruit tip ≥ 1.5 mm; lowest spikelet stalk exserted > 10 (> 5) mm; pistillate flower bracts generally red-brown to dark purple *C. luzulina* (4)

Group 6: Stigmas 3; inflorescence bract sheath < 6 mm; perigynium not inflated

1. Perigynium beak teeth curved, 1.3–2.8 mm *C. comosa*
- 1' Perigynium beak teeth 0 or inconspicuous, straight, 0–1 mm
2. Leaves 8–23 mm wide; lateral spikelets often with > 100 perigynium
3. Stem brown at base; upper 2–4 spikelets staminate; sheaths, perigynium red-dotted *C. spissa*
- 3' Stem \pm red or \pm purple at base; uppermost spikelet staminate; sheaths, perigynium not red-dotted
4. Plant rhizomed; perigynium beak 0.7–1.1 mm *C. amplifolia*
- 4' Plant caespitose; perigynium beak 0.5 mm *C. pendula*
- 2' Leaves < 8.5 mm wide; lateral spikelets with < 70 perigynium
5. Plant long-rhizomed; perigynium beak 0–0.5 mm; leaves glaucous; perigynium papillate
6. Perigynium abruptly narrowed to distinct beak
7. Perigynium beak straight, beak, upper body often minute-serrate or bristly; moist mountain meadows over dolomite, 2800–3400 m, White and Inyo Mountains (White Mtns) *C. idahoensis* (3)
- 7' Perigynium beak bent to side, beak, upper body not minute-serrate, not bristly; serpentine fens, 450–900 m Klamath Ranges, Inner North Coast Ranges *C. klamathensis*
- 6' Perigynium tapered to indistinct beak
8. Spikelets nodding; roots with dense felt-like hairs *C. limosa*
- 8' Spikelets erect or ascending; roots without dense felt-like hairs
9. Pistillate flower bracts prominently awned; sheaths fibrous; terminal spikelet pistillate/staminate *C. buxbaumii*
- 9' Pistillate flower bracts awnless; sheaths not fibrous; terminal spikelet staminate *C. livida*
- 5' Plant caespitose to loosely so; perigynium beak $<$ to > 0.5 mm; leaves green or glaucous; perigynium papillate or not
10. Spikelets green to gold, pistillate flower bracts without dark purple or black
11. Perigynium 1.3–2 mm, beak 0.2–0.4 mm; pistillate flower bracts blunt or mucronate; 3100–3350 m, c High Sierra Nevada (Mono Co.) *C. tiogana*
- 11' Perigynium 4.5–7.3 mm, beak 0 or 1.9–2.8 mm; pistillate flower bracts long-awned; < 1800 m, Klamath Ranges, Sierra Nevada
12. Terminal spikelet staminate; lateral spikelets 2–4, generally nodding, dense; perigynium rounded, > 25 , ribs 3, veins 13–21, beak 1.9–2.8 mm, teeth prominent, 0.3–0.9 mm *C. hystericina*
- 12' Terminal spikelet staminate flowers above pistillate; lateral spikelet 1, erect, not dense; perigynium 3-angled, 1–5, ribs 3, veins 0, beak 0, teeth 0 *C. tompkinsii*
- 10' Spikelets darker than green to gold, pistillate flower bracts at least partly dark brown to dark purple or black
13. Terminal spikelet staminate (some species variable, keying here or at 13')
14. Perigynium ascending, $\leq 1/2$ filled by fruit; lower spikelets often nodding on drooping stalks *C. spectabilis*
- 14' Perigynium spreading, $> 1/2$ filled by fruit; lower spikelets generally erect
15. Perigynium body ovate to widely elliptic, beak 0.3–1 mm, teeth generally bristly, 0.2–0.5 mm; < 1800 m, often on serpentine *C. serratodens* (2)
- 15' Perigynium body elliptic to obovate, beak 0.1–0.5 mm, teeth 0 or smooth to bristly, < 0.2 mm; 1800–3200 m, not on serpentine
16. Lateral spikelets $<$ terminal; perigynium 2–3 mm *C. idahoensis* (3)
- 16' Lateral spikelets \geq terminal; perigynium 3.5–4.5 mm *C. raynoldsii*
- 13' Terminal spikelet pistillate or pistillate/staminate (or staminate/pistillate/staminate in some *Carex helleri*)
17. Perigynium flat, $< 1/2$ filled by fruit, generally not papillate (\pm papillate near beak)

18. Lateral spikelets spreading or drooping, often > 2 cm, generally pistillate/staminate, basal flowers with remnant filaments *C. mertensii*
- 18' Lateral spikelets generally erect or ascending, generally < 2 cm, generally pistillate
19. Lower pistillate flower bracts acuminate, awns generally 0.5–2 mm; perigynium elliptic to obovate; stem 5–40 cm *C. helleri*
- 19' Lower pistillate flower bracts acute to acuminate, awns < 0.5 mm or generally 0; perigynium ovate to ± round or obovate; stem 25–100 cm *C. heteroneura*
- 17' Perigynium plump, > 1/2 filled by fruit, papillate or not
20. Perigynium ovate to widely elliptic, generally 3–5 mm *C. serratodens* (2)
- 20' Perigynium elliptic to obovate, generally 2–3 mm
21. Perigynium green to olive, obvious, strongly contrasting with, not hidden by shorter, darker pistillate flower bracts *C. stevenii*
- 21' Perigynium yellow to dark brown to dark purple, hidden by or not contrasting with pistillate flower bracts
22. Perigynium upper body, beak not minute-serrate or bristly; pistillate flower bracts oblong or lanceolate to widely elliptic, tips not bristly *C. orestera*
- 22' Perigynium upper body, beak minute-serrate or bristly; pistillate flower bracts obovate to widely elliptic, tips or awns bristly or not *C. idahoensis* (3)

Species descriptions for taxa that were not included in the second edition of *The Jepson Manual* (2012) are provided below.

***C. cyrtostachya* Janeway & Zika ARCHING SEDGE (Groups 1, 4)**

NATIVE

Cespitose. **Stem:** 20–132 cm. **Leaf:** glabrous to scabrous; blade (1.3–)1.5–4.5(–6) mm wide; sheath glabrous to scabrous, front green to whitish, often red- or purple-dotted. **Inflorescence:** distal lateral spikelets erect or ascending, 10–60 mm, linear to narrowly cylindrical, 0.3–0.6(–1.2) mm between perigynium at mid-spikelet; proximal inflorescence bract blades < to > inflorescence, sheath 8–40 mm; pistillate flower bract with green midrib, pale membranous margins suffused with reddish or golden brown, ciliate distally, awns (0–)0.5–2.2(–3.1) mm. **Fruit:** 1.9–2.7 mm, 1.1–1.6 mm wide; perigynium (3.2–)3.8–5.8 mm, 1.1–1.8 mm wide, glabrous, green, aging brown, occasionally with inconspicuous red or purple dots, loosely enclosing fruit, beak (0.5–)0.7–1.4 mm, often ciliate on or between teeth. Wet meadows, marshes, seasonally wet outcrops, seeps, swales, riparian margins, floodplain terraces; 600–1350 m. n SN (Butte, El Dorado, Yuba cos.). This is the entity about which was stated, in a note under *Carex mendocinensis* in TJM2, "open-flowered plants in northern SNH with large perigynium may be distinct, need study" (note that the distribution now is n SN, not n SNH). May–Aug {CNPS list}

***C. orestera* Mack. (Group 6) BOULDER SEDGE**

NATIVE

Cespitose. **Stem:** 10–30 cm. **Leaf:** blade 2.5–5 mm wide, gray-green. **Inflorescence:** generally head-like; terminal spikelet staminate at base, pistillate above; pistillate flower bract ± = perigynium, oblong or lanceolate to widely elliptic, dark purple, margin, tip ± white, obtuse to mucronate. **Fruit:** 1.3–2 mm, 0.7–1.3 mm wide, < perigynium body; perigynium not obvious in inflorescence, 2.5–3.4 mm, 1.3–2 mm wide, plump, papillate above, dark purple, beak 0.1–0.5 mm. $2n=52$. Wet or ± dry rocky slopes, bowls, snow-melt channels, summits; 3000–4200 m. c&s SNH, W&I; to western Canada, Colorado. Assigned to *Carex albonigra* in TJM2, but said there to differ from the Rocky Mountain plants and therefore needing study; under the new circumscription, *Carex albonigra* comes no closer to CA "than the San Francisco Mountains of Coconino County, Arizona, 600 km to the east of the White Mountains." Jul–Aug

***C. xerophila* Janeway & Zika (Group 2) CHAPARRAL SEDGE**

NATIVE

Densely to loosely cespitose. **Stem:** 9.5–35 cm. **Leaf:** blade 1.7–3.8 mm wide, green, not glaucous, not papillate or papillate only on veins abaxially at 40×; basal sheaths red to dark purple. **Inflorescence:** staminate spikelet 12–21 mm, 2–3 mm wide; pistillate spikelets 1–3, basal stiffly erect on stalk < 8 cm; pistillate flower bract green, margin, tip dark purple, acute to mucronate. **Fruit:** 2–2.5 mm, 1.4–2.0 mm wide, brown; perigynium 1–5, 3.4–4.9 mm, 1.4–2.1 mm wide, strong veined, body obovoid, stalk 2× beak, beak 0.5–0.9 mm. Dry gabbro or serpentine soils in open forest, scrub, thicket edges, chaparral, often with *Hesperocyparis macnabiana*; 450–

770 m. n SN. Plants keying here from SnGr and SnBr at 1900–2400 m, with perigynium stalk \leq beak, beak 1–1.3 mm, warrant treatment as a new species. Mar–Jun

JUNCACEAE RUSH FAMILY

Peter F. Zika, except as noted

Annual, perennial herb generally from rhizomes. **Stem:** round or flat. **Leaf:** generally basal; sheath margins fused, or overlapping and generally with 2 ear-like extensions at blade junction; blade round, flat, or vestigial, glabrous or margin hairy. **Inflorescence:** head-like clusters or flowers 1, variously arranged; bracts subtending inflorescence 2, generally leaf-like; bracts subtending inflorescence branches 1–2, reduced; bractlets subtending flowers generally 1–2, generally translucent. **Flower:** generally bisexual, radial; sepals and petals similar, persistent, scale-like, green to brown or \pm purple-black; stamens generally 3 or 6, anthers linear, persistent; pistil 1, ovary superior, chambers generally 1 or 3, placentas 1 and basal or 3 and axile or parietal, stigmas generally $>$ style. **Fruit:** capsule, loculicidal. **Seed:** 3–many, generally with white appendages on 1 or both ends. 7 genera, 440 species: temperate, arctic, and tropical mountains. [Kirschner 2002 Species Plantarum: Fl World, vols. 6–8 (Juncaceae). ABRs] Flowers late spring to early fall. —Scientific Editors: Douglas H. Goldman, Bruce G. Baldwin.

JUNCUS RUSH

Rhizome 0 or generally with scale-like leaves. **Stem:** generally cylindric or flat. **Leaf:** blade well developed and cylindric or flat, occasionally closely resembling stem, or reduced to small point; crosswalls generally present; appendages generally present at blade-sheath junction. **Inflorescence:** generally terminal, appearing lateral when pushed aside by inflorescence bract; bractlets 0–2. **Flower:** sepals, petals similar; stamens generally 3 or 6(2); pistil 1, ovary chambers 1–3, placentas axile or parietal, stigmas generally 3(2). **Seed:** many. 315 species: worldwide, especially northern hemisphere. (Latin: to join or bind, from use of stems) [Ertter 1986 Mem New York Bot Gard 39:1–90] All species with leaf crosswalls may have leaves, stems swollen, deformed by sucking insects. Fruiting time given instead of flowering time. Plants included in TJM2 as *Juncus brachyphyllus* now treated in California as a new species, *Juncus trilocularis* (Zika 2012 Rhodora 114:309–329); *Juncus bulbosus*, *Juncus dichotomus*, and *Juncus elliotii*, only noted as naturalized in TJM2, now fully treated.

Key to Groups

1. Annual generally $<$ 10 cm; roots fine, fibrous; leaves narrow, generally inrolled, generally $<$ 1 mm wide **Group 1**
1' Perennial herb; plant generally larger in all respects; roots coarse or rhizomes present; leaves narrow or wide, inrolled to flat or cylindric
2. Inflorescence bract cylindric, resembling continuation of stem; inflorescence appearing lateral **Group 2**
2' Inflorescence bract not cylindric, not resembling continuation of stem, or if so then channeled along inner side; inflorescence appearing terminal
3. Leaf blade generally cylindric or nearly so; crosswalls generally complete **Group 3**
3' Leaf blade flat or wiry; crosswalls incomplete or 0
4. Leaf blade iris-like, flattened, oriented with edge toward stem (at least from middle to tip), crosswalls generally incomplete **Group 4**
4' Leaf blade wiry or grass-like, if flattened then oriented with flat side toward stem, crosswalls 0
5. 2 bractlets subtending flower; leaves slender, generally $<$ 1.3 mm wide, generally wiry or channeled; flowers 1 or in clusters **Group 5**
5' 1 bractlet subtending flower; leaves broader, generally 2–7 mm wide, flat; flowers in clusters **Group 6**

Note:

The keys to Groups 3 and 5 have been modified from the second edition of *The Jepson Manual* (2012) and are included below.

Group 3: Perennial herb; leaf blades with regular crosswalls, generally tubular, scarcely flattened

1. Plant matted, submerged, early leaves hair-like; stem capillary
2. Fruit tip blunt or truncate, 2–3.5 mm; sepals \geq petals; petal tips blunt *J. bulbosus* (2)
- 2' Fruit tip acute or acuminate, 3.5–6.1 mm; sepals \leq petals; petal tips acute to acuminate *J. supiniformis* (3)
- 1' Plant not matted, generally not submerged; leaves and stem generally wider

3. Most or all flowers with 3 stamens
4. Plant long-rhizomatous; inflorescence dense, clusters 1–3(5), > 20-flowered *J. bolanderi*
- 4' Plant caespitose; inflorescence open, clusters > 5, < 15-flowered
5. Fruit generally ≤ perianth
6. Root tubers 0; perianth ≥ 2.6 mm; fruit > 2.5 mm *J. acuminatus*
- 6' Roots with some oblong tubers near tips; perianth ≤ 2.5 mm; fruit < 2.3 mm *J. elliotii*
- 5' Fruit > perianth
7. Perianth 3.4–5.4 mm; inflorescence bulblets occasionally present; fruit dark *J. supiniformis* (3)
- 7' Perianth 2.3–3.2 mm; inflorescence bulblets 0; fruit pale *J. diffusissimus*
- 3' Most or all flower with 6 stamens
8. Leaf, stem surfaces conspicuously wrinkled *J. rugulosus*
- 8' Leaf, stem surfaces smooth
9. Rhizome nodes tuberous
10. Sepals > petals; inflorescence bracts spreading; fruit ± = perianth; inflorescence clusters generally 1–1.5 cm wide *J. torreyi*
- 10' Sepals ± = petals; inflorescence bracts ascending; fruit > perianth; inflorescence clusters generally < 1 cm wide *J. nodosus*
- 9' Rhizome tubers 0
11. Anthers > filaments
12. Inflorescence clusters 1–3
13. Perianth white to pink or ± green *J. chlorocephalus*
- 13' Perianth ± brown-black *J. mertensianus* (2)
- 12' Inflorescence clusters generally > 5
14. Fruit abruptly narrowed to beak; fruit generally ≤ perianth *J. nevadensis* var. *nevadensis*
- 14' Fruit gradually tapered to beak; fruit generally > perianth
15. Petals generally blunt, tips hooded; fruit generally dark brown to black *J. articulatus* subsp. *articulatus* (2)
- 15' Petals acuminate, bristle-tipped; fruit light brown to red or dark red *J. dubius*
- 11' Anthers ≤ filaments
16. Inflorescence clusters generally > 5; fruit > perianth; inflorescence bulblets occasionally present; stem occasionally rooting at nodes
17. Fruit tip blunt or truncate below style; leaf with ≥ 1 cylindrical air chamber in ×-section *J. bulbosus* (2)
- 17' Fruit tip acute or acuminate below style; leaf with 1 cylindrical air chamber in ×-section
18. Inflorescence clusters > 10; perianth 1.9–3.1 mm; pale petal margins wide, flat, tips generally blunt, hooded *J. articulatus* subsp. *articulatus* (2)
- 18' Inflorescence clusters < 10; perianth 3.4–5.4 mm; pale petal margins narrow, generally inrolled, tips acuminate *J. supiniformis* (3)
- 16' Inflorescence clusters generally 1–3; fruit generally ≤ perianth; inflorescence bulblets 0, stem not rooting at nodes
19. Fruit abruptly tapered to distinct beak; leaves ± to strongly flattened, hollow, blue-green; stem with 1–3(4) heads; n North Coast *J. nevadensis* var. *inventus*
- 19' Fruit generally notched or truncate, ± beakless; leaves tubular, hollow, green; stem with 1(2) heads; montane
20. Perianth generally < 2.8 mm; perianth brown, stiff; inflorescence bract narrow, generally not sheathing; Southwestern California *J. duranii*
- 20' Perianth generally > 3.1 mm; perianth ± purple-black, not stiff; inflorescence bract wide, generally sheathing; not Southwestern California *J. mertensianus* (2)

Group 5: Perennial herb; leaf blades wiry or slightly flattened and channeled, < 1.3 mm wide

1. Perianth black-striped, tips blunt, hooded, incurved; anthers >> filaments; rhizomatous; coastal salt marshes *J. gerardi* subsp. *gerardi*
- 1' Perianth green, brown, or red, tips acute or acuminate, not incurved or hooded; anthers < to > filaments; caespitose; inland wetlands
2. Leaf sheath appendages stiff, thick, plastic-like, rounded, shiny, ± yellow *J. dudleyi*

- 2' Leaf sheath appendages not stiff, thin, rounded to acuminate, dull, white or translucent
3. Fruit chambers 3, partitions straight, united except at tip
4. Sepals \pm = petals; style 0.1–0.2 mm; anthers < filaments; perianth with thick, darker brown stripes, pale margins broad; inflorescence generally compact *J. confusus*
- 4' Sepals > petals; style (0.3)0.4–0.8 mm; anthers > filaments; perianth generally green or light brown, pale margins narrow; inflorescence open *J. trilocularis*
- 3' Fruit chamber 1, partitions concave, separated except at base
5. Fruit ridged, truncate or notched; perianth green or with thick dark brown stripes *J. occidentalis*
- 5' Fruit ridges 0 or obscure, fruit rounded or acute; perianth green or \pm red, pale brown in age
6. Leaf sheath appendages generally rounded, \pm opaque below, 0.2–0.6 mm; bractlets acuminate, generally bristle-tipped; stem with 2–6 strong ridges per side
7. Bractlets acute to blunt, not bristle-tipped; inflorescence bracts \pm hardened; seed 0.3–0.4 mm; Inner North Coast Ranges *J. dichotomus*
- 7' Bractlets acuminate, generally bristle-tipped; inflorescence bracts soft; seed 0.4–0.7 mm; Desert Mountains *J. interior*
- 6' Leaf sheath appendages generally acute to acuminate, \pm translucent, generally 1–8 mm until late in season when generally smaller or absent; bractlets generally acute to blunt; stem with or without strong ridges per side; widespread
8. Stem with 2–6 strong ridges per side; fruit < 2.5 mm, < 75% perianth; inflorescence generally orange-red; flower < internodes [*J. anthelatus*]
- 8' Stem with 0–1 strong ridges per side; fruit generally > 2.5 mm, > 75% perianth; inflorescence generally green; flower generally > internodes *J. tenuis*

Species descriptions for taxa that were not included in the second edition of *The Jepson Manual* (2012) are provided below.

***J. bulbosus* L. BULBOUS RUSH (Group 3)**

NATURALIZED

Perennial, matted if submerged when young, cespitose, 1–30 cm; rhizome short, thick or knobby, fragile. **Stem:** nodes often rooting, forming new plantlets; erect flowering-stems emergent or appear as water recedes. **Leaf:** early submerged leaves < 20 cm, hair-like; sheath appendages 1–2 mm, membranous; cauline blades generally < stem, cylindric, \geq 1 cylindrical air chamber in \times -section, generally crosswalls complete. **Inflorescence:** lowest bract < inflorescence; clusters generally 3–16, 3–15-flowered. **Flower:** perianth parts 1.8–3.7 mm, petals \leq sepals, ovate to lanceolate, dark; stamens generally 6, filaments \geq anthers. **Fruit:** > perianth, oblong, tip blunt or truncate, 2–3.5 mm. **Seed:** 0.4–0.6 mm, ovoid, ends pointed; appendages minute.

Marshes, ponds; < 100 m. NCo (Mendocino Co.); introd. OR to BC, e North America, Australasia; native to Eur, n Africa. Jun–Aug

***J. dichotomus* Elliott DICHOTOMOUS RUSH (Group 5)**

NATURALIZED

Perennial herb, cespitose, 25–60(100) cm. **Stem:** 2–6 strong ridges per side, base often pink. **Leaf:** sheath appendages 0.2–0.6 mm, generally rounded, \pm opaque below; blade with flat side toward stem, 0.5–1.2 mm wide, soft, crosswalls 0. **Inflorescence:** open; lower bracts leaf-like, generally > inflorescence; branches unequal; flowers solitary, generally < internodes, on 1 side of the branches; bractlets 2 per flower, generally acute, reduced inflorescence bracts somewhat thickened and hardened. **Flower:** perianth parts 3.3–4.5 mm, \pm equal, lanceolate, acuminate, \pm spreading in fruit; stamens 6, filaments > anthers. **Fruit:** generally < perianth, ellipsoid, blunt or acute; chamber 1, partitions incomplete. **Seed:** 0.3–0.4 mm, oblong; appendages minute, blunt. Marshes; < 200 m. NCoRI (Shasta Co.); e North America, C.Am; introd. South America, New Zealand. Jun–Jul

***J. elliotii* Chapm. ELLIOTT'S RUSH (Group 3)**

NATURALIZED

Perennial, loosely cespitose, 30–80 cm; rhizome short, some roots with oblong tubers near tips. **Leaf:** sheath appendages 1.0–4 mm, rounded; blade cylindric, crosswalls complete, inconspicuous. **Inflorescence:** lowest bract < inflorescence; branches spreading; clusters generally 25–75, 2–10-flowered. **Flower:** perianth segments 1.7–2.5 mm, \pm equal, narrowly acuminate, light brown or red to greenish; stamens generally 3, filaments > anthers. **Fruit:** \pm = perianth, dark brown; chamber 1. **Seed:** 0.4–0.5 mm; appendages minute. Disturbed wet ground; < 300 m. SnFrB (Alameda Co.); native to c North America. Jun–Jul

J. trilocularis Zika FOOTHILL RUSH (Group 5)

NATIVE

Perennial herb, caespitose, 30–50 cm. **Stem:** stiff, stout, weakly grooved. **Leaf:** ± basal; sheath appendages conspicuous, membranous; blade with flat side toward stem, much exceeded by stem, stiff, spreading, crosswalls 0. **Inflorescence:** open; lowest bract = to generally > inflorescence; branches ascending; flowers 1, many. **Flower:** perianth parts 4–5.5 mm, long-acuminate, sepals > petals; stamens 6, anthers > filaments. **Fruit:** ± = petals, widely oblong, ± 3-angled; chambers 3. **Seed:** ± twisted; appendages minute. $2n=80$. Meadows moist in spring, washes; 300–1600 m. KR, CaRH, SNF, n SNH, MP; to Washington, Idaho, Nevada. Segregated taxonomically from *Juncus brachyphyllus* Wiegand, now treated in a more restricted sense to include only plants of central and midwestern United States (east of Rocky Mountains). Jun–Jul