

blade 6–12 mm wide, glabrous. **INFL**: 15–25 cm; branches erect, ascending or spreading. **SPIKELET**: 30–35 mm, strongly flattened; glumes glabrous or scabrous, upper (7.5)9–11(12.5) mm, 5–7-veined; lower (5.5)7–10(11.5) mm, 3-veined; lemma 12–15 mm, strongly keeled, 7–9-veined, awn 4–8 mm; anthers 1–5 mm;  $2n=56$ . Open slopes, meadows; 1200–3100 m. c SNH (Mariposa, Tuolumne cos.); to OR, TX. [*B. polyanthus* var. *paniculatus* Shear] Aug

**B. porteri** (J.M. Coult.) Nash (p. 1435) NODDING BROME Per 32–100 cm. **LF**: ligule 1–2 mm; blade 2–5 mm wide, glabrous or slightly hairy. **INFL**: 6–20 cm, open; branches ascending to nodding. **SPIKELET**: 12–15 mm, not strongly flattened; glumes 3-veined, hairy, sometimes glabrous, lower 5–7 mm, upper 6–10 mm; lemma 7–13 mm, back  $\pm$  rounded, hairy, awn 1.5–3(4) mm; anthers 1.5–3.5(4) mm.  $2n=14$ . Exposed slopes, open woodland; 550–3500 m. NCoRI, s SNH, SCoRI, SnBr, SNÉ; to BC, MB, TX. [*B. anomalus* E. Fourn., misappl.] Jul–Aug

**B. pseudolaevipes** Wagon WOODLAND BROME Per 60–125 cm. **LF**: sheath glabrous or hairy; ligule 0.4–1(2) mm; blade 2–9 mm wide, glabrous, hairy on margin, or hairy throughout. **INFL**: 7.5–20 cm; branches erect to spreading. **SPIKELET**: 15–35 mm, not strongly flattened; glumes scabrous or hairy, lower 4–7 mm, 3-veined, upper 6–9 mm, 5-veined, lemma 10–12.5 mm, back rounded, hairy across back or only on margin, teeth  $< 1$  mm, awn 2–5.5 mm; anthers 3.5–5.5 mm.  $2n=14$ . Shaded or semi-shaded sites in chaparral, coastal-sage scrub, open woodland; 100–900 m. NCoRI, CaRH, SnFrB, SCoRO, SW. Apr–Jul

**B. racemosus** L. (p. 1435) SMOOTH BROME Ann 25–110 cm. **LF**: lower sheaths long-hairy; ligule 1–3 mm; blade 2–5 mm wide. **INFL**: 4–14 cm; narrow, branches  $< 4$  cm, 1 spikelet per branch. **SPIKELET**: 11–18 mm, not strongly flattened, not widening substantially in fr, lemma obscuring most stalks in fr; glumes glabrous, lower 4–6 mm, 3–5-veined, upper 4–7 mm, 5–9-veined; lemma 7–9 mm, 4–5 mm wide, back rounded, glabrous, margin often smoothly curved, veins not strongly raised, teeth  $< 1$  mm, awn 5–9 mm,  $\pm$  equal, from  $< 1.5$  mm below lemma tip; anthers 1.5–3 mm; fr flat or C-shaped in  $\times$ -section.  $2n=28$ . Disturbed areas, roadsides; 60–1850 m. KR, NCoRO, NCoRI, SNF, GV, CCo, SnFrB, SnBr, MP; to BC, e US; native to Eur. May–Jul

**B. richardsonii** Link (p. 1435) RICHARDSON'S BROME Per 47–110 cm; upper st nodes gen glabrous. **LF**: basal sheath densely, short- to medium-hairy, upper sheath glabrous; ligule 1–2 mm; blade 3–9 mm wide. **INFL**: 9–22 cm, open; branches erect to nodding. **SPIKELET**: 24–35 mm, not strongly flattened; glumes glabrous or scabrous, lower 7.1–10 mm, 1(3)-veined, upper (7.8)8.9–11.3(13.2) mm, 3-veined; lemma 9–13.5 mm, margin hairy along lower 1/2 to 3/4, back rounded, sparsely to densely hairy with hairs  $> 0.1$  mm, awn 3–6 mm; anthers (1.2)1.6–2.7(3.4) mm; fr (6.9)7.7–9.7(10.5) mm.  $2n=28$ . Meadows, open woodland; 1200–3600 m. c&s SNH, SCoRO, SnBr, e PR, e DMoj; to AK, WY, w TX, Mex. [*B. ciliatus* var. *r.* (Link) B. Boivin] Jul–Sep

**B. secalinus** L. (p. 1435) RYE BROME Ann 45–100 cm. **LF**: sheath glabrous or sparsely short-hairy; ligule 1–3 mm; blade 4–12 mm wide, hairy. **INFL**: 8–17 cm,  $\pm$  open; branches spreading to ascending, nodding in fr. **SPIKELET**: 12–24 mm, not strongly flattened, widening in fr, many stalks becoming visible as lemma wraps around fr; glumes glabrous, lower 5–7 mm, 3–5-veined, upper 6–9 mm, 5–9-veined; lemma 8–11 mm, 4–5 mm wide, back rounded, glabrous or hairy, veins not strongly raised, teeth  $< 1$  mm, awn (0)3–9.5 mm, from  $< 1.5$  mm below lemma tip; anthers 1.2–2.5 mm; fr U- and V-shaped in  $\times$ -section.  $2n=14,28$ . Open, disturbed areas;  $< 1500$  m. NW, CaR, n&c SN, n SnFrB, SnBr, MP; to BC, e US; native to Eur. May–Jul

**B. sitchensis** Trin. SITKA BROME, ALASKA BROME Per 40–145 cm. **LF**: sheath glabrous; ligule 3–4 mm; blade glabrous or hairy, 1–4 mm wide. **INFL**: 19–36 cm, open; branches ascending, spreading to nodding; lower branches 10–20 cm. **SPIKELET**: 25–41 mm, strongly flattened, keeled; glumes glabrous (hairy), lower 8–11 mm, 3–5-veined, upper 10–13 mm, 5–7-veined; lemma, 12–15 mm, back  $\pm$  rounded, strongly keeled, glabrous, sometimes hairy, awn 5–10 mm; anthers to 6 mm.  $2n=42,56$ . Rocky bluffs, cliffs, meadows, forest edges, disturbed areas;  $< 1670$  m. SW; to AK. Mar–Jun

**B. squarrosus** L. (p. 1435) CORN BROME Ann 10–43 cm. **LF**: sheath hairy; ligule 0.5–2 mm; blade hairy or glabrous, 2.5–10 mm wide. **INFL**: 5–10.5 cm, open, often appearing 1-sided; spikelets 1(2) per branch; 1+ lower branches gen  $>$  spikelets,  $\pm$  wavy. **SPIKELET**: 14–35 mm, not strongly flattened; glumes glabrous, lower 4.5–7 mm, 3–5(7)-veined, upper 6–9.5 mm, 7-veined; florets 7–18; lemma 8.2–11 mm, membranous margin 0.6–0.9 mm wide, back rounded, glabrous or minutely scabrous, teeth  $< 1$  mm, awn 8–11.7 mm, from 1.5+ mm below tip; anthers 0.5–1.6 mm.  $2n=14$ . Open, disturbed areas, roadsides;  $< 1494$  m. MP; to BC, c N.Am; native to Eurasia. Jul

**B. sterilis** L. (p. 1435) POVERTY BROME Ann 25–85 cm. **LF**: sheath hairy; ligule 2–2.5 mm; blade 2–5 mm wide, hairy or glabrous. **INFL**: 10–25 cm, open; lower branches ascending to nodding, upper branches ascending, branches gen  $>$  spikelets (shorter when infl reduced to 1(3) spikelets), simple, lower branches sometimes branched 1  $\times$ ; spikelets 1(3) per branch. **SPIKELET**: 20–35 mm, not strongly flattened; glumes glabrous or scabrous, upper 7.5–21 mm, 3(5)-veined, lower 6–14 mm, 1(3)-veined; florets 6–11; lemma 13–20 mm, back rounded, glabrous to scabrous, teeth 0–22 mm, awn 15–30 mm, straight; anthers 0.5–2 mm.  $2n=42,56$ . Open, disturbed areas;  $< 1100$  m. NW, CaRF, SNF, n SNH, GV, SnFrB, SCoRO, s ChI, SCo, WTR (w Santa Susana foothills), PR (Otay Mtn); to BC, e N.Am; native to Eurasia. Mar–Jun

**B. suksdorfii** Vasey (p. 1435) SUKSDORF'S BROME Per 45–95 cm. **LF**: glabrous; ligule 0.5–2 mm; blade 4–11 mm wide. **INFL**: 6.5–13 cm,  $\leq 2$  cm wide, narrow; branches erect to ascending. **SPIKELET**: 15–30 mm, not strongly flattened; glumes glabrous or sparsely hairy, lower 7–10 mm, 1(3)-veined, upper 8–13 mm, 3-veined; lemma 10–14 mm, back rounded, glabrous to hairy, awn 2–5.5 mm; anthers 2.2–3.5 mm.  $2n=14$ . Rocky slopes, meadows, conifer forest; 1250–3300 m. KR, NCoRH, CaR, SNH, SCoRO, MP; to WA. Jun–Aug

**B. tectorum** L. (p. 1435) CHEAT GRASS, DOWNY CHESS Ann 5–40 cm. **LF**: sheath hairy (sometimes glabrous); ligule 2–3 mm; blade glabrous to hairy, gen long-hairy near base, 1–5 mm wide. **INFL**: 6–22 cm; open; branches spreading to nodding; spikelets 1–14 per branch; branches  $<$  or  $>$  spikelets, 1–5  $\times$  branched. **SPIKELET**: 10–20 mm, not strongly flattened; glumes glabrous to hairy, lower 4–9 mm, 1(3)-veined, upper 7–13.5 mm, 3(5)-veined; florets 3–7; lemma 9–13 mm, back rounded, glabrous to hairy, teeth 1–3 mm, awn 8–18 mm, straight; anthers 0.5–1.3 mm.  $2n=14$ . Open, disturbed areas;  $< 3400$  m. CA; N.Am; native to Eurasia. [*B. t.* var. *glabratus* Spenn.] Invasive. May–Aug  $\diamond$

**B. vulgaris** (Hook.) Shear (p. 1435) COLUMBIA BROME Per 45–110 cm; nodes (3)4–6(7). **LF**: ligule (2)3–6(7) mm; blade 13–25(33) cm, 3–14 mm wide, gen hairy on upper surface. **INFL**: 8–22 cm,  $> 2$  cm wide, open; branches ascending to nodding, glabrous or scabrous. **SPIKELET**: 15–30 mm, not strongly flattened; glumes glabrous or hairy, lower 4–9 mm, 1(3)-veined, upper 5–10 mm, 3-veined; lemma 10–16 mm, margin hairy, back rounded, glabrous to hairy, awn (4)6–11 mm; anthers 2–3.5(4) mm.  $2n=14$ . Shady to open rocky woodland, ravines, meadows;  $< 1900$  m. NW, CaR, n&c SN, CW (exc SCoRI); to BC, MT, WY. May–Aug

## CALAMAGROSTIS REED GRASS

Paul M. Peterson & Jeffery M. Saarela

Per, gen from rhizomes. **ST**: 1–15 dm, gen not branched,  $\pm$  smooth; nodes (1)2–8. **LF**: gen basal and cauline; sheath smooth or scabrous; ligule membranous; blade flat to inrolled. **INFL**: panicle-like, open to dense; branches  $\pm$  drooping to appressed; spikelets ascending to appressed. **SPIKELET**: glumes subequal, gen lanceolate, acute to acuminate, lower gen 1-veined, upper

3-veined; floret 1, breaking above glumes; axis prolonged beyond floret, hairy; callus hairy; lemma < glumes, awned from below middle to near base, tip gen 4-toothed, veins 3–5, awn straight to twisted, bent; palea ± = lemma, thin. ± 265 spp. (incl *Deyeuxia*): cool temp (esp moist montane); some forage value. (Greek: reed grass) [Marr et al. 2007 FNANM 24:706–732] Hybridization, polyploidy (diploids unknown), and asexual seed set contribute to taxonomic difficulty.

1. Awn exerted 1–10 mm beyond glume tips, twisted and bent
2. Panicle open, branches spreading to ascending
  3. Pl from rhizomes; st 5–15 dm; lf blade gen cauline, 3–10 mm wide, flat; coastal, < 500 m . . . . . *C. bolanderi*
  - 3' Pl cespitose, rhizomes 0; st gen 1.2–5.4 dm; lf blade gen basal, 0.2–1.7 mm wide, inrolled to flat; > 1500 m
  4. Lf blade 7–11-veined, tip prow-shaped; infl (4)5.7–8.5 cm; callus hairs 0.3–1.2 mm . . . . . <sup>2</sup>*C. breweri*
  - 4' Lf blade 3–5-veined, tip straight-sided; infl 1.9–5.7(7.5) cm; callus hairs 0.3–0.6 mm. . . . . <sup>2</sup>*C. muiriana*
- 2' Panicle dense, narrow, branches ascending to appressed
  5. Awn 12–15(17) mm, exerted 4–10 mm beyond the glume tips; glumes 8–10 mm. . . . . *C. foliosa*
  - 5' Awn (4.6)5–7.5(9) mm, exerted 1–3 mm beyond the glume tips; glumes 4.5–8 mm
  6. Lf blade with small white-opaque hooks between the veins visible only with magnification, upper surface scabrous; gen on serpentine soils, < 1065 m . . . . . <sup>2</sup>*C. ophitidis*
  - 6' Lf blade without small white-opaque hooks between the veins, upper surface soft-hairy; gen on rocky slopes, sandy soils, 1300–4000 m. . . . . <sup>2</sup>*C. purpurascens*
- 1' Awn incl or occ prolonged < 1 mm beyond glume tips, straight or twisted and bent
  7. Lf blade 0.2–1.7 mm wide; panicle 1.9–8.5 cm; callus hairs sparse
  8. Lf blade 7–11-veined, tip prow-shaped; panicle (4)5.7–8.5 cm; callus hairs 0.3–1.2 mm . . . . . <sup>2</sup>*C. breweri*
  - 8' Lf blade 3–5-veined, tip straight-sided; panicle 1.9–5.7(7.5) cm; callus hairs 0.3–0.6 mm . . . . . <sup>2</sup>*C. muiriana*
  - 7' Lf blade (1.5)2–10(20) mm wide; panicle 4–30 cm; callus hairs abundant or sparse
  9. Panicle ± open, lower branches spreading to ascending
    10. Lf collar gen puberulent or hairy-tufted; callus hairs < 2 mm . . . . . <sup>2</sup>*C. rubescens*
    - 10' Lf collar smooth or scabrous, rarely hairy; callus hairs (1.5)2–3.5(4.5) mm
    11. Glumes 5–7(7.5) mm; sts gen unbranched below with 1–2(3) nodes per st; ligules 1–4 mm, entire, truncate, gen hidden by expanded collar below. . . . . *C. nutkaensis*
    - 11' Glumes 3–4.5 mm; sts gen branched below with (2)3–8 nodes per st; ligules 3–8 mm, irregularly cut, obtuse to acute, not hidden by expanded collar below . . . . . *C. canadensis*
    12. Glumes smooth or scabrous, projections along keel straight, tips acute (acuminate); spikelets 2.5–3.5(4) mm. . . . . var. *canadensis*
    - 12' Glumes scabrous across entire surface, rarely smooth, projections along keel often bent, tips acuminate; spikelets (3.5)4–4.5(5.2) mm. . . . . var. *langsdorfii*
  - 9' Panicle ± dense, narrow, lower branches appressed (occ ascending in *C. rubescens*, *C. stricta*)
    13. Glumes gen < than 3 × longer than wide. . . . . *C. stricta*
    14. Glumes 3–6 mm, gen thick, margin opaque; callus hairs 2–4.5 mm; spikelet axis 1–1.5 mm; longest panicle branches 1.5–9.5 cm. . . . . subsp. *inexpansa*
    - 14' Glumes 2–3(3.5) mm, gen thin, margin ± translucent; callus hairs 1–3 mm; spikelet axis 0.5–1 mm; longest panicle branches 1.5–4 cm . . . . . subsp. *stricta*
  - 13' Glumes gen > 3 × longer than wide
    15. Lf blade with small white-opaque hooks between the veins visible only with magnification. . . . . <sup>2</sup>*C. ophitidis*
    - 15' Lf blade without small white-opaque hooks between the veins
      16. Lf blade gen soft-hairy on the upper surface . . . . . <sup>2</sup>*C. purpurascens*
      - 16' Lf blade smooth or scabrous but not soft-hairy on the upper surface
        17. Awn 4–5.5 mm; lf collar scabrous or smooth; rhizomes 2–6 cm, 2–4 mm thick, stout . . . . . *C. koelerioides*
        - 17' Awn 2–4 mm; lf collar gen puberulent or hairy-tufted; rhizomes 10–20 cm, 1.5–2 mm thick, slender. . . . . <sup>2</sup>*C. rubescens*

***C. bolanderi*** Thurb. (p. 1435) BOLANDER'S REED GRASS Rhizomes present. **ST**: 5–15 dm; nodes gen 4. **LF**: ligule 3–5 mm; blade 3–10 mm wide, flat. **INFL**: 10–25 cm, ± open; lower branches 6–8 cm, spreading. **SPIKELET**: glumes 3–4(5) mm, smooth exc keel, tip scabrous; axis ± 1 mm, hairs 1 mm; callus hairs ± 1 mm, tufted; lemma 2.5–3 mm, scabrous, awned near base; awn (4)5–6 mm, exerted 1–3 mm beyond glume tips, strongly twisted, bent.  $2n=56$ . Peatland, marshes, wet meadows in forest, coastal scrub and prairie; < 460 m. NCo; OR. Jun–Aug ★

***C. breweri*** Thurb. (p. 1435) Cespitose; rhizomes 0. **ST**: 2–5.4 dm; nodes 1–3. **LF**: gen basal; ligule 1.7–4.1(6) mm; blade 0.4–1.7 mm wide, flat or inrolled, 7–11-veined, tip prow-shaped. **INFL**: (4)5.7–8.5 cm, open; lower branches 0.4–3(3.5) cm, ± spreading. **SPIKELET**: glumes 3.1–5 mm, smooth or keel scabrous; axis 1–2 mm, hairs 1–2 mm; callus hairs 0.3–1.2 mm, sparse; lemma 3.4–5.5 mm, awned near base; awn 3.5–5.5 mm, exerted gen (0.5)1–3 mm beyond the glume tips, twisted, bent.  $2n=42$ . Moist woodland, meadows, lake margins, streambanks; 1700–2600 m. KR, n SNH; OR. Jul–Sep

***C. canadensis*** (Michx.) P. Beauv. Cespitose, rhizomes 2–15+ cm, 1–3 mm thick, stout. **ST**: 6–15 dm, gen branched below; nodes (2)3–8. **LF**: sheath glabrous to hairy; collar scabrous, rarely smooth or hairy; ligule 3–8 mm, obtuse to acute, irregularly cut, not hidden by expanded collar below; blade 3–8 mm wide, ± drooping, flat, surfaces scabrous. **INFL**: 10–25 cm, open to dense when young; lower branches 3–8 cm, ± spreading. **SPIKELET**: glumes 3–4.5 mm, smooth or scabrous, gen ± purple; axis 0.5–1 mm, hairs 1.5–3.2 mm; callus hairs 2–3.5(4.5) mm, dense; lemma 2.5–4.5 mm, thin, awned just below middle; awn 1–3 mm, not exerted, gen straight.  $2n=42-66$ . Many forms, vars., subsp. have been attributed to this sp. Some pls set seed asexually.

var. ***canadensis*** (p. 1435) **SPIKELET**: spikelets 2.5–3.5(4) mm; glumes smooth or scabrous along keel, projections straight, tip acute (acuminate). Moist meadows, thickets, peatland, open woodland; 1500–3400 m. KR, CaRH, SNH; Widespread in US. Jul–Sep

var. ***langsdorfii*** (Link) Inman **SPIKELET**: spikelets (3.5)4–4.5(5.2) mm; glumes scabrous across entire surface (smooth), projec-

tions along keel often bent, tips acuminate. Moist meadows, thickets, peatland, open woodland; 1500–3400 m. KR, CaRH, SNH; Mostly w US, Can, Greenland. Jul–Sep

**C. foliosa** Kearney (p. 1435) LEAFY REED GRASS Cespitose. **ST:** 3–6(7) dm, tufted; nodes 2–3. **LF:** gen basal; ligule 4–6 mm; blade 1–2 mm wide, inrolled, upper surface scabrous. **INFL:** 5–12 cm, dense, narrow; lower branches < 4 cm, ascending to appressed. **SPIKELET:** glumes 8–10 mm, scabrous; axis 1.5–4 mm, hairs 2–3 mm; callus hairs 2–3 mm; lemma 5–7(8) mm, awned near base; awn 12–15(17) mm, exserted 4–10 mm beyond glume tips, bent, twisted.  $2n=28$ . Coastal scrub, forest, rock outcrops, crevices, cliffs; < 1250 m. NCo, KR, NCoRO. May–Aug ★

**C. koelerioides** Vasey (p. 1435) Cespitose, rhizomes 2–6 cm, 2–4 mm thick, stout. **ST:** 6–10+ dm, nodes 3–5. **LF:** sheath ± scabrous; scabrous or smooth near collar; ligule 3–7 mm; blade 3–7 mm wide, flat or inrolled, scabrous or smooth. **INFL:** 5–16 cm, gen dense; branches gen < 3 cm, appressed. **SPIKELET:** glumes 4–6 mm, scabrous esp on keel; axis ± 1 mm, hairs 1–2 mm; callus hairs < 2 mm, sparse, tufted; lemma (3.5)4–5.5(6) mm, awned near base; awn 4–5.5 mm, < 1 mm exserted beyond the glume tips or ± = glume tips, stiff, twisted, bent.  $2n=28$ . Meadows, slopes, dry hills, ridges; < 2300 m. NW, CW, PR; to WA, ID, MT, WY. Larger pls like *C. nutkaensis*. Jun–Aug

**C. muiriana** B.L. Wilson & Sami Gray Cespitose; rhizomes 0. **ST:** 1.2–3.4 dm; nodes 1–3. **LF:** gen basal; ligule 0.8–2.5 mm; blade 0.2–0.4 mm wide, inrolled, 3–5-veined, tip straight-sided. **INFL:** 1.9–5.7(7.5) cm, open; lower branches 0.4–2(3.5) cm, ± spreading. **SPIKELET:** glumes 3–4.5 mm, smooth or keel scabrous; axis ± 2 mm, hairs 0.5–1 mm; callus hairs 0.3–0.6 mm, sparse; lemma 2.5–4 mm, awned near base; awn 3.3–6 mm, exserted gen (0.5)1–3 mm beyond the glume tips, twisted, bent.  $2n=28$ . Meadows, lake margins, streambanks; 2480–3900 m. c&s SNH. Jul–Sep

**C. nutkaensis** (J. Presl) Steud. (p. 1435) Cespitose, rhizomes 3–6 cm, 1.5–3 mm thick, stout. **ST:** 6–11(15) dm, gen unbranched below; nodes 1–2(3). **LF:** sheath loosely open at st base; collar smooth; ligule 1–4 mm, truncate, entire, gen hidden by expanded collar; blade 4–10(20) mm wide, flat, upper surface smooth. **INFL:** 12–30 cm, ± open below, narrow above; branches < 5–7+ cm, ascending. **SPIKELET:** glumes 5–7(7.5) mm, smooth to scabrous esp on keel; axis 0.5–1 mm, hairs 0.5–1.2 mm, sparse; callus hairs (1.5)2–2.5(3) mm; lemma 4–5 mm, awned ± near middle; awn 1–3 mm, not exserted, straight or slightly twisted, bent.  $2n=28$ . Wet areas, beaches, dunes, coastal woodland, inland marshes; < 1070 m. NCo, CCo, SnFrB; to AK. May–Aug

**C. ophitidis** (J.T. Howell) Nygren (p. 1435) SERPENTINE REED GRASS Cespitose, often with rhizomes 2–15 cm. **ST:** 5.5–10 dm, clumped; nodes 3–5. **LF:** ligule 2–5.5(7) mm; blade (1.5)2–4 mm wide, gen inrolled, scabrous, with small white-opaque hooks between veins, visible only with magnification. **INFL:** 8–15 cm, ± dense, narrow; branches < 4 cm, gen appressed. **SPIKELET:** glumes (5)6.5–8 mm, scabrous esp on keel, gen pale; axis ± 2 mm, hairs 1–2 mm; cal-

lus hairs < 2 mm; lemma 4.5–6.5 mm, awned near base; awn 5–6.5(8) mm, incl to exserted ± 2 mm beyond the glume tips, twisted, bent.  $2n=28$ . Meadows, seeps, grassland, chaparral, forest, gen on serpentine soils; < 1065 m. s NCoRO, n CCo, n SnFrB. May–Jun ★

**C. purpurascens** R. Br. (p. 1435) Cespitose; rhizomes 1–4 cm. **ST:** 1–8 dm; nodes (1)2–3. **LF:** collar glabrous to short-hairy; ligule 2–6 mm; blade 2–5 mm wide, flat, lower surface smooth, upper gen soft-hairy. **INFL:** 4–15 cm, dense, narrow; branches < 3.5 cm. **SPIKELET:** glumes 4.5–8 mm, scabrous; axis 1–2 mm, hairs 1–2 mm; callus hairs 1–2.5 mm; lemma 3.5–5 mm, awned near base; awn (4.6)6–7.5(9) mm, exserted (0.5)1–3 mm beyond glume tips, twisted, bent.  $2n=28,40–58,84$ . Rocky slopes, grassland, meadows, forest, gen on sandy soils; 1300–4000 m. CaRH, SN, n SNE (Sweetwater Mtns), W&I; to AK, Siberia, Greenland. Some pls set seed asexually. Jul–Sep

**C. rubescens** Buckley (p. 1435) PINE REED GRASS Loosely cespitose; rhizomes 10–20 cm, 1.5–2 mm thick, slender. **ST:** 6–10 dm; nodes 2–3. **LF:** sheath smooth, gen puberulent or hairy-tufted near collar; ligule 3–5 mm; blade 2–5 mm wide, flat, lower surface smooth or scabrous, upper surface scabrous, occ short-hairy. **INFL:** 6–15(25) cm, dense to ± open; branches < 2–4 cm. **SPIKELET:** glumes 4–5 mm, smooth to scabrous esp on keel; axis ± 1 mm, hairs < 2 mm; callus hairs < 2 mm; lemma 3–4 mm, awned near base; awn 2–4 mm, exserted < 1 mm beyond glume tips or ± = glume tips, strongly twisted, bent.  $2n=28,42,56$ . Wooded slopes, montane forest, chaparral, meadows; < 900 m. NCo, NCoRO, CW, n ChI (Santa Cruz Island); to sw Can, Rocky Mtns. Jun–Sep

**C. stricta** (Timm) Koeler Loosely cespitose. **ST:** 2–12 dm. **LF:** sheath smooth; ligule 1–5.5 mm; blade 2–5 mm wide, gen inrolled, lower surface gen smooth, upper surface smooth to scabrous. **INFL:** 5–20 cm, dense, narrow; branches < 1.5–9.5 cm, ascending to appressed. **SPIKELET:** glumes 2–6 mm, smooth to scabrous; axis 0.5–1.5 mm, hairs 1.5–3 mm; callus hairs 1–4.5 mm; lemma 2–5 mm, finely scabrous, awned at or below middle; awn ± = glume tip, gen straight. Subsp. intergrade.

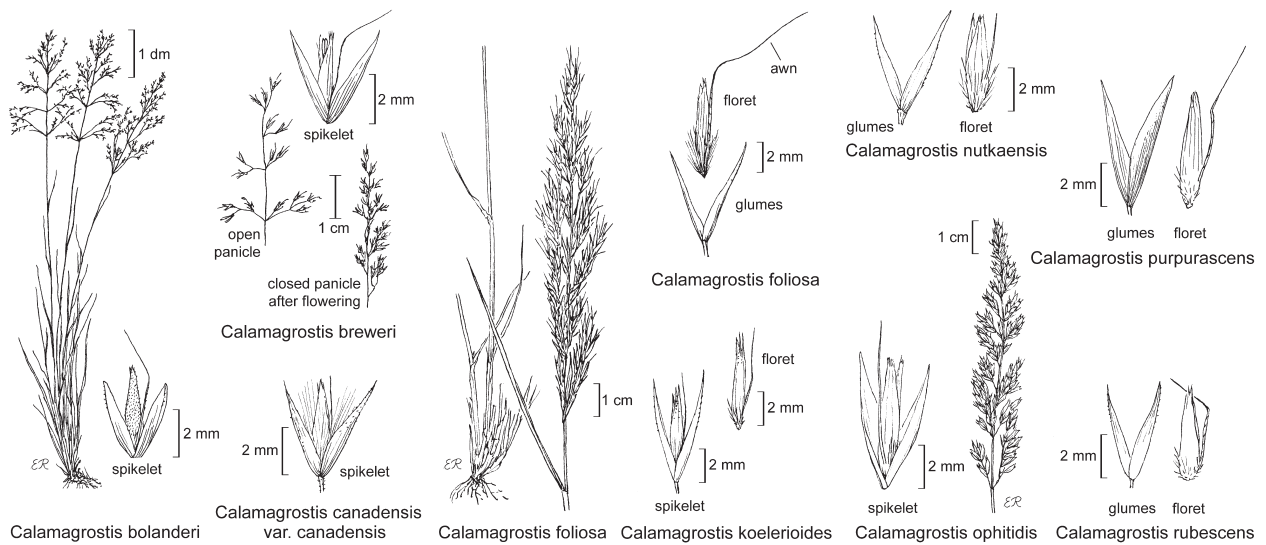
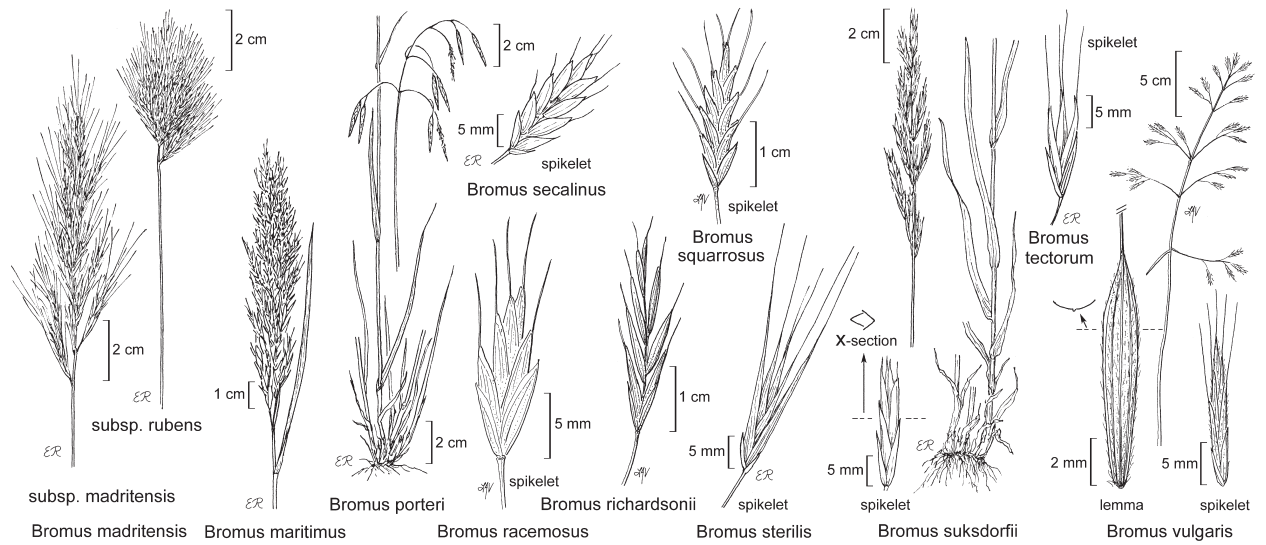
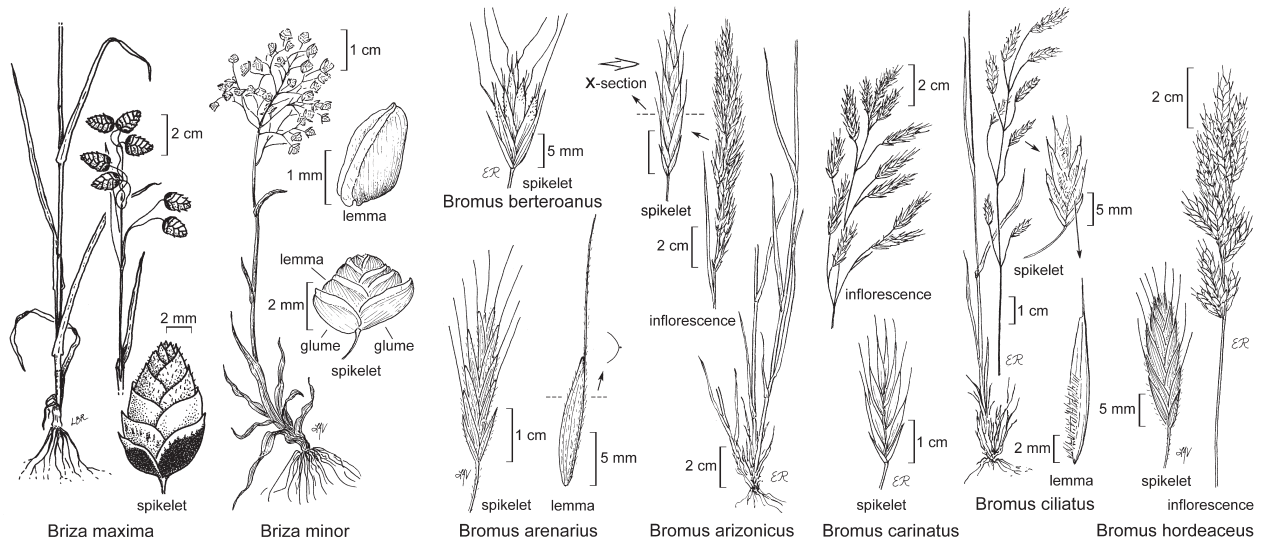
subsp. **inexpansa** (A. Gray) C.W. Greene (p. 1439) **ST:** 4–12 dm. **LF:** ligule 2–5.5 mm; blade flat, strongly scabrous, upper surface gen glaucous. **INFL:** 6–20 cm; longest branches 1.5–9.5 cm. **SPIKELET:** glumes 3–6 mm, gen thick, margin opaque; axis 1–1.5 mm; callus hairs 2–4.5 mm; lemma 2.5–5 mm; awn occ twisted, bent, stiff; anthers gen sterile. Slopes, meadows, coastal marshes; < 3400 m. NW, CaR, n&c SNH, CCo; to AK, ne N.Am, ne Asia. [*C. crassiglumis* Thurber.] Some pls set seed asexually. Jun–Aug ★

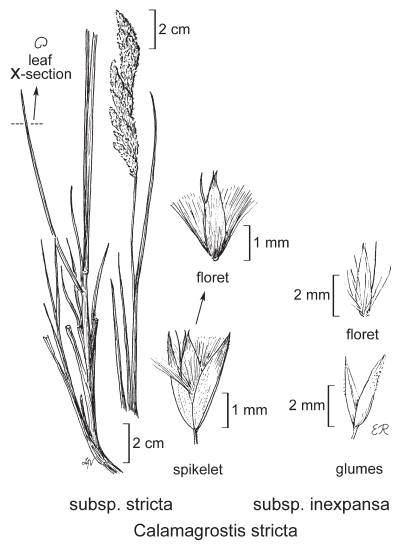
subsp. **stricta** (p. 1439) **ST:** 2–9 dm. **LF:** ligule 1–3.5(4) mm; blade gen inrolled, upper surface smooth to scabrous. **INFL:** 5–12 cm; longest branches 1.5–4 cm. **SPIKELET:** glumes 2–3(3.5) mm, gen thin, margin ± translucent; axis 0.5–1 mm; callus hairs 1–3 mm; lemma 2–3.5 mm; awn straight, slender; anthers gen fertile.  $2n=28,42,56,±70$ . Conifer forest, meadows, slopes; 1500–3350 m. SNH, W&I; to AK, ne N.Am, Eurasia. Jul–Aug

**CENCHRUS SANDBUR**

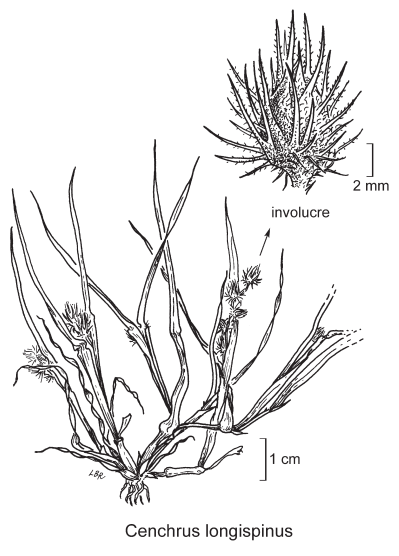
Ann, per. **ST:** 5–100(200) cm, erect or decumbent, gen bent; nodes and internodes gen glabrous; internode solid to spongy. **LF:** basal and cauline; sheath gen smooth; ligule short-hairy or membranous, ciliate; blade flat or folded, margins gen cartilaginous. **INFL:** panicle-like, central axis wavy, with reduced branches bearing burs, each consisting of 1–4(8) ± sessile spikelets gen enclosed by an involucre of flattened or cylindric bristle- or spine-like, ± fused bracts, these gen forming an inner and outer set; involucre and enclosed spikelets falling as 1 unit. **SPIKELET:** ± dorsally compressed; glumes strongly unequal, ovate, lower 1-veined, upper ± = florets, 3–9-veined; florets 2, lower floret sterile or staminate, lemma gen 5-veined, palea gen present, upper floret fertile, lemma thick, ± hard, palea ± = lemma; anthers 3. ± 16 spp.: warm temp Am, Afr, s Asia. (Uncertain. Greek: for millet or Latin for a precious stone) [Stieber & Wipff 2003 FNANM 25:529–535] *C. ciliaris* L. is now treated as *Pennisetum ciliare* (L.) Link.

- 1. Bur with 1 whorl of flattened, fused inner bracts subtended by 1–several whorls of smaller, finer bracts . . . . **C. echinatus**
- 1' Bur with several whorls of flattened spines, these at irregular intervals through body of bur
- 2. Sheaths strongly keeled; bracts 45–75, slender, < 1 mm wide; spikelets 5.8–7.8 mm . . . . . **C. longispinus**
- 2' Sheaths compressed, but not strongly keeled; bracts 8–40, broader at base, 1–3 mm; spikelets 3.5–5.9 mm
- . . . . . **C. spinifex**

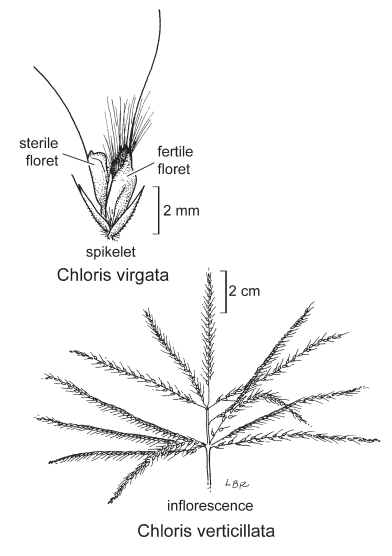




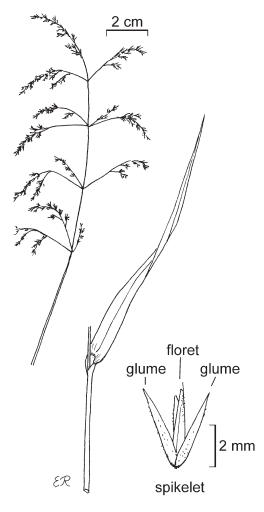
*Calamagrostis stricta*



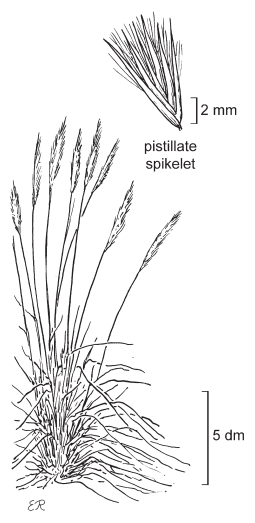
*Cenchrus longispinus*



*Chloris verticillata*



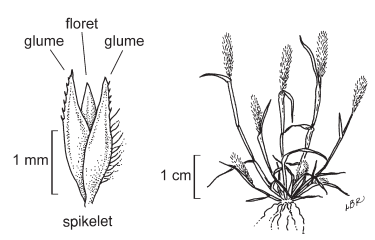
*Cinna latifolia*



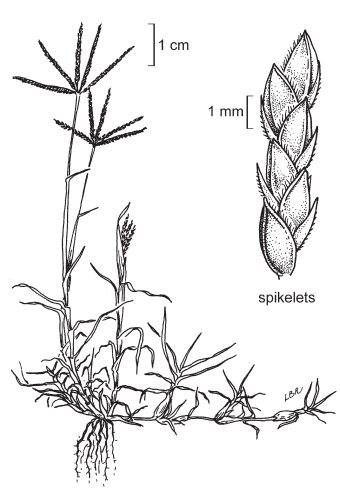
*Cortaderia jubata*



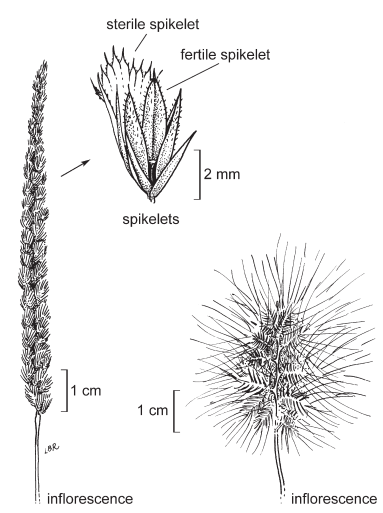
*Crypsis vaginiflora*



*Crypsis alopecuroides*

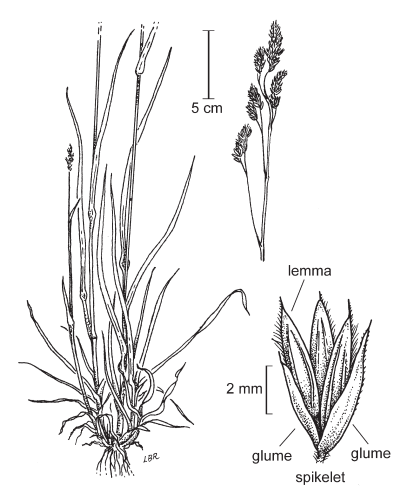


*Cynodon dactylon*



*Cynosurus cristatus*

*Cynosurus echinatus*



*Dactylis glomerata*

# The Jepson Manual

## Vascular Plants of California

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