

GRASSES OF MONTANA

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POACEAE (GRAMINAE)

Annual or perennial, usually monoecious herbs. **Stems** terete, rarely flattened. **Leaves** basal and often cauline, alternate, linear, parallel-veined, entire, composed of a lower sheath enclosing the stem and a flat, inrolled, or folded blade. **Inflorescence** terminal, consisting of spikelets arranged in usually open to spike-like panicles, less commonly racemes or solitary spikes. **Flowers** often bisexual; each enclosed by a lemma and palea; petals and sepals reduced to 1-6 small translucent scales (lodicules); stamens 1--6, ovary superior with 1--3 stigmas. **Fruit** a caryopsis, rarely an achene (as in *Eragrostis* and *Sporobolus*).

The Poaceae includes about 10,035 species and 668 genera (Stevens, 2001 onward), making it one of the largest flowering plant families. Poaceae is distributed world-wide from deserts to tropical rain forests and from coastal saline areas to alpine and arctic tundra. It is one of the most economically important plant families and includes rice, wheat, barley, rye, corn, millet, and sorghum, as well as many forage, ornamental, and turf species. Poaceae is distinguished from other monocots by small flowers that are each enclosed by a lemma and palea. The flower, lemma, and palea comprise the grass floret. Florets alternate along opposite sides of a rachilla to form the grass spikelet, which is delimited by a basal pair of glumes (lemma-like but sterile bracts). Grasses show outstanding morphological diversity in the architecture of seed dispersal. Seeds may be dispersed by the fruit only (*Eragrostis* and *Sporobolus*), the floret, the entire spikelet, with a section of the inflorescence, or with the entire inflorescence. The structures aiding dispersal of the grass fruit, whether fruits or entire inflorescences, are taxonomically useful for identifying genera. This treatment is derived from local and regional floras (Barkworth et al., 2003 and 2007; Cronquist et al., 1977; Gould, 1975; Gould and Shaw, 1983; Hitchcock, 1937 & 1951; Lesica, 2002; Booth, 1950; Dorn, 1984; McGregor, 1986). Grass genera and tribes are distinguished in part by whether they are cool (C3) or warm season (C4 photosynthesis; Clayton and Renvoize 1986; Gould and Shaw 1983; Jacobs and Everett, 2000; Soderstrom et al. 1988; Stebbins and Crampton 1961; Tzvelev 1989; Kellogg 2001). We seldom use the taxonomic ranks of subspecies and varieties because many of these infraspecific taxa have neither geographical nor ecological integrity. If a phenotype is pronounced or aligns with ecology or geogeography, we tend to distinguish it as a species in this treatment.

Key to the traditional groups of grass genera

1. Spikelets dorsally compressed so that the dorsal surface of the glumes and lemmas are flat, rounded and rarely keeled, the glumes or lowest lemma are more or less flat and sandwich the innermost (uppermost) floret and obscure it in side view even when under a lens; disarticulation below the glumes, at least the spikelet is the unit of dispersal; each spikelet with one fruit-producing (plump) terminal floret above one sterile (reduced) or staminate (hollow) floret 2.
 1. Spikelets laterally compressed so that the glumes and lemmas are often keeled, the glumes and all the lemmas are more or less folded in half (keeled) along the midrib, the florets are generally splayed out and easily seen in side-view with a naked eye or lens; disarticulation often above the glumes; each spikelet with one or more fruit-producing (plump) floret, sometimes with sterile or staminate floret mostly above but sometimes below the fruit-producing floret 3.
 2. Inflorescences of paired spikelets, one sessile and the second pedicellate (the pedicellate spikelet often reduced to a sterile floret or a small glume, or rarely entirely absent); glumes hard or bony in texture; fertile lemmas membranous, much thinner in texture than the glumes; awns usually present (sometimes early deciduous) and borne from the fertile lemmas
Andropogoneae
 2. Inflorescences usually without paired spikelets; glumes leafy or papery in texture, the first glume often reduced to absent; fertile lemmas hard and bony in texture, much thicker in texture than the glumes; awns when present borne from glumes or sterile lemmas
Panicaceae
 3. Growth habit of stout reeds, mostly 2--3 m tall; leaf blades often 2 cm wide or wider; inflorescences dense plume-like panicles; ligule mostly of hairs
Phragmites
 3. Growth habit of slender herbs, usually <2 m tall; leaf blades much <2 cm wide; inflorescences not dense plume-like panicles; ligules various 4.
4. Inflorescences of single terminal bilateral (2-sided or distichous) spikes; both glumes present and often awn-like; spikelets attached laterally to main rachis (sides of lemmas face the main inflorescence rachis) [*Elymus condensatus* and *Elymus flavescens* of this tribe commonly develop a panicle rather than a spike, but each panicle branch is spike-like in having sessile spikelets arranged in a two-sided fashion]
Triticeae

4. Inflorescences of racemes or open to spike-like panicles, or of laterally or digitately arranged spikes; if a single terminal bilateral spike, then only the second glume present (excepting the terminal-most spikelet) and never awn-like and the spikelets attached edge-wise (dorsally) to main rachis 5.
5. Spikelets arranged in secund lateral or digitate spikes; ligule of hairs (but *Schedonnardus* with a membranous one); mostly one fertile floret per spikelet **Chlorideae**
5. Spikelets arranged in spikes, racemes, or panicles, if secund (e.g., *Beckmannia* in tribe Aveneae or *Dactylis* in tribe Poeae) then panicle branches not in discrete linear arrays of spikelets; ligules and florets various 6.
6. 1 floret per spikelet 7.
6. >1 floret per spikelet (including sterile or rudimentary florets) 12.
7. Glumes absent, vestigial, or forming a small cup; riparian or emergent aquatic grasses **Oryzeae**
7. Glumes well developed; usually other than emergent aquatic grasses 8.
8. Floret bearing a tripartite awn; ligule of hairs **Aristida**
8. Floret unawned or bearing a single undivided awn; ligule various 9.
9. Lemma tightly rolled around palea and enclosed fruit, hardened or bony at maturity and much thicker in texture than glumes, the lemma thus appearing as the hard seed coat; lemma awned from the tip although the awn is early deciduous in some species **Stipeae**
9. Lemma not tightly rolled around palea and enclosed fruit, membranous at maturity and of the same texture as the glumes, the lemma thus not appearing as the hard 'seed' coat; lemma unawned, awned from the back, or awned from the tip 10.
10. Ligule partially or entirely a fringe of hairs, the hairs as long or longer than a sometimes-present basal membranous portion **Eragrosteae**
10. Ligule entirely membranous, but often toothed or split, or with a very short rim of hairs along the larger basal membranous portion 11.
11. Lemmas distinctly 3-nerved, or 1-nerved (as in some species of *Muhlenbergia* and all species of *Sporobolus*); if present, the long-awn is borne from the tip of lemma; tips of glumes surpassing the tip(s) of the floret(s) or not; spikelets disarticulating above glumes; ligule membranous or hairy; inhabiting dry or saline sites (some *Muhlenbergia* inhabit wet sites) and flowering during mid- to late-summer (C4 grasses); stems and leaves wiry or tough textured, some species occasionally more fragile and easily broken **Eragrosteae**
11. Lemmas indistinctly many-nerved (3-nerved in some species of *Alopecurus*); if present, the long-awn is borne from the back of lemma (*Beckmannia*, *Cinna*, and *Hierochloa* are very short-awned from near the tip; *Apera* only is with long-awn from tip); tips of glumes surpassing the tip(s) of the floret(s); spikelets disarticulating below or above glumes; ligule always membranous; inhabiting usually wet sites or flowering during the earlier part of summer (C3 grasses); stems and leaves never wiry or tough **Aveneae**
12. Plants dioecious, the staminate spikelets exerted well above basal leaves, the pistillate spikelets not; collar often with conspicuous long straight hairs; ligule fringed with fine teeth; rhizomes well developed and woody; older leaves usually stiff and pungent at tips, conspicuously distichous especially in fresh condition **Distichlis**
12. Plants mostly with bisexual spikelets but if rarely dioecious, then not with the arrangement above; collar hairless or with soft curly hairs; ligule various; rhizomes various but not woody; older leaves soft or wiry but not pungent at tips and not distichously arranged 13.
13. Ligule with a conspicuous fringe of hairs or a basal membrane fringed with hairs as long as the membrane 14.
13. Ligule entirely membranous or with a very short fringe of hairs on the larger membranous portion 15.
14. Glumes as long as the lowest (1st) floret and usually as long or longer than all florets; lemmas indistinctly many-nerved; lemma-awn somewhat flattened dorsally and distinctly twisted, and arising from just below the distinctly bifid apex of the lemma **Danthonia**
14. Glumes shorter than the lowest (1st) floret, if longer, then the lemmas distinctly 3-nerved; lemma-awn, if present, slender, round in cross-section, not distinctly twisted, and not arising from just below a distinctly bifid apex of the lemma **Eragrosteae**
15. Lemmas awned from at least the lower two-thirds of the back; if awnless, then one or both glumes longer than the florets; disarticulation either above or below the glumes **Aveneae**

15. Lemmas awned from the tip or nearly so, often from between two small teeth; if lemmas awnless, then both glumes shorter than the florets; disarticulation always above the glumes 16.

16. Venation of lemmas prominent (rib-like and parallel); tips of lemmas often (but not always) broadly rounded to truncate (*Melica subulata* and *Schizachne* have pointed lemma tips); leaf sheaths closed to the throat or nearly so at least on young leaves; unit of dispersal is the floret (*Torreyochloa* of the tribe Poeae could key here but the margins of the leaf sheath overlap – they are not fused into a solid cylinder) **Meliceae**

16. Venation of lemmas rarely prominent; tips of lemmas commonly pointed (*Puccinellia*, *Torreyochloa*, and some *Poa* species have blunt lemma tips); margins of leaf sheath overlapping, except in the genus *Bromus* (*Bromus* differs from Meliceae in having hairy lemmas and a unit of dispersal that includes the fruit attached to the palea) **Poeae**

Andropogoneae

1. Plants monoecious (staminate and pistillate spikelets on the same plant); pistillate spikelets on a lateral woody cob and staminate spikelets in a terminal panicle; cultivated corn or maize **Zea**

1. Plants with bisexual spikelets 2.

2. Inflorescences apparently of racemes or spikes (spikelet pairs are arranged as spikes) positioned either digitately or laterally at the end of the main stem and/or lateral branch **Andropogon**

2. Spikelet pairs arranged in diffuse panicles 3.

3. Pedicellate spikelets completely absent; leaf sheath with distinct flaps of tissue (auricles) projecting upward from the top of the leaf sheath at the junction with the leaf blade **Sorghastrum**

3. Pedicellate spikelets well developed and staminate; sheath not bearing auricles of any kind **Sorghum**

Aveneae

1. Spikelets with one floret (if glumes are strongly ribbed, see *Ventenata*) 2.

1. Spikelets with two or more florets 10.

2. Spikelets oval, flat, arranged in a contracted panicle of numerous secund spikes **Beckmannia**

2. Spikelets longer than broad; panicles diffuse or contracted, but if contracted and spike-like, then spikelets not oval in outline 3.

3. Glumes long-awned, the awn longer than body of glume **Polypogon**

3. Glumes awnless or short-awned 4.

4. Sterile lemmas appearing as one or two scales subtending and usually adhering to fertile lemma **Phalaris**

4. Sterile lemmas not present, no scale-like structures subtending and adhering to fertile lemma 5.

5. Inflorescence a compact cylindrical spike, the main rachis not visible without removal of spikelets 6.

5. Inflorescence open to contracted but not a compact cylindrical spike 7.

6. Glumes united at base, unawned or minutely awned and then not abruptly so; lemmas awned; disarticulation below glumes **Alopecurus**

6. Glumes separate to base, abruptly short-awned; lemmas awnless; disarticulation above glumes **Phleum**

7. Florets with a tuft of hairs from base, the hairs 1/4 to as long as the lemma **Calamagrostis**

7. Florets not hairy at base or hairs short 8.

8. Glumes about 4 mm long and equaling lemma; lemma usually short-awned from tip; disarticulation below glumes **Cinna**

8. Glumes usually <4 mm long and exceeding the lemma; lemma awnless or awned from back; disarticulation above glumes 9.

9. Lemmas long-awned, the awn 5--10 mm long and arising from the upper third of the lemma; palea firm, evidently 2-nerved **Apera**

9. Lemmas awnless or short-awned, the awn <4.5 mm long and arising from below the upper third of lemma; palea thin membranous, not evidently 2-nerved **Agrostis**

10. Lemmas awnless or awn-tipped 11.

10. Lemmas awned or at least one lemma in each spikelet bearing an awn 17.
11. Spikelets with one well-developed floret above 1 or 2 scale-like reduced lemmas *Phalaris*
11. Spikelets with >1 well-developed floret, whether staminate or bisexual 12.
12. Second glume widest above the middle, about twice as wide as the first glume; disarticulation below glumes *Sphenopholis*
12. Second glume widest at about midpoint, not greatly different from first glume; disarticulation above glumes (in the genus *Holcus*, disarticulation occurs both above and below the glumes) 13.
13. Leaf sheaths velvety hairy; disarticulation above and below the glumes (though the glumes usually fall after the florets); glumes hairy on veins; lemmas hairless and shiny *Holcus*
13. Leaf sheaths not velvety hairy; disarticulation above glumes; glumes and lemmas various 14.
14. Spikelets about as broad as long and with 3 florets; panicle pyramidal, the lower branches much longer than those above *Anthoxanthum*
14. Spikelets longer than broad, with 2 or more florets; panicle open or contracted and spike-like 15.
15. Spikelets 1 cm long or longer; panicle open and diffuse *Avena*
15. Spikelets much <1 cm long; panicle contracted and spike-like 16.
16. Rachilla prolonged above the upper floret and appearing as a tuft of hairs *Trisetum*
16. Rachilla prolonged but lacking the tuft of hairs *Koeleria*
17. Glumes 1.5--2.0 cm long or longer; panicle open and diffuse; annuals *Avena*
17. Glumes much <1.5 cm long, if >1 cm long, then panicle contracted; annuals and perennials 18.
18. Lemmas uniformly awned within each spikelet 19.
18. Lemmas not uniformly awned within each spikelet, often one or more of the lemmas unawned, or else one lemma with a bent awn and another lemma bearing a straight awn 23.
19. Lemmas awned from near base or up to midpoint 20.
19. Lemmas awned from above the middle 22.
20. Spikelets 11--15 mm long, usually with 3--5 florets *Helictotrichon*
20. Spikelets 4--5 mm long, usually with 2 florets (occasional specimens of *Calamagrostis purpurascens* with two florets per spikelet will key out here, but they differ from *Deschampsia* by having lemmas with conspicuous callus hairs 21.
21. Spikelets ovoid to oblong, 3.5--5 mm; ligules blunt, never acute, 2.5--5 mm; plants perennial *Vahlodea*
21. Spikelets lanceolate, 2--4 mm; ligules acute, 5--10(12) mm; plants annual or perennial *Deschampsia*
22. Ligule hairy; awn of lemma flat twisted and emanating from between two narrow and widely spaced teeth of the bifid apex *Danthonia*
22. Ligule membranous; awn of lemma hair-like and bent and emanating from just above the middle of the lemma back *Trisetum*
23. The second glume 2x as long and as wide as the first glume and completely enfolding and hiding the much shorter cluster of 3 florets; of the three florets per spikelet, the lower two are awned from the back and enfold the hairless and unawned uppermost floret *Anthoxanthum*
23. Second glume not 2x as long and as wide as first glume or no completely enclosing and hiding the cluster of three or fewer florets 24.
24. Spikelets about as broad as long, bronze-colored, with 3 florets; lower two florets distinctly hairy, awned from a deeply bifid apex; uppermost (fertile) floret shiny or hairless and unawned *Anthoxanthum*
24. Spikelets distinctly longer than broad, not bronzed-colored, with 2 or more florets; upper-most florets bearing an awn 25.
25. Spikelets with 2 florets, the lowermost unawned, the uppermost with a short hooked awn; herbage velvety-hairy; disarticulation below glumes *Holcus*

25. Spikelets with 2--4 florets, all of which bear an awn none of which is hooked; herbage not velvety hairy; disarticulation above glumes (or tardily below) 26.

26. Glumes prominently many veined; callus at base of spikelet and the upper floret well developed; first floret awned from tip with a straight awn; second and possibly third florets awned from back with long bent awns, the lemma tips bifid with each of the two tips bearing a hair-like projection; spikelet with lowest persistent floret ultimately disarticulating and rendering naked wiry pedicels and inflorescence branches *Ventenata*

26. Glumes smooth to weakly veined; callus lacking at base of spikelet and florets; first floret awned from middle or below with a long bent awn; second floret unawned or usually with a shorter or straighter awn; the lemma tip single-pointed and not bearing a hair-like projection; glumes remaining attached to the soft and pliable pedicels and inflorescence branches *Arrhenatherum*

Chlorideae

1. Lateral spikes 5--15 cm long, about 1 mm thick, not appressed to the main inflorescence rachis; spikelets closely appressed to the rachis of the lateral spike; unit of dispersal is the entire inflorescence *Schedonnardus*

1. Lateral or digitate spikes <8 cm long, >4 mm thick, appressed or not to the main rachis; spikelets divergent from the lateral spike rachis; unit of dispersal is a lateral spike, a spikelet, or a floret 2.

2. Stoloniferous sodgrass; plants dioecious; pistillate spikelets fascicled among leaves; staminate spikelets arranged on lateral second spikes; the unit of dispersal a cluster of several pistillate spikelets that coalesce into a single burr formed from the fused hardened glumes *Buchloe*

2. Bunchgrasses, if with stolons then the inflorescence comprises digitately arranged second spikes; plants not dioecious; all spikelets arranged along lateral (or digitate) spikes; unit of dispersal other than a burr 3.

3. Spikelets with 4 or more bisexual (well-developed) florets 4.

3. Spikelets with 1 bisexual (well-developed) floret 5.

4. Lemmas usually with hairs along veins, at least basally, the tips often with toothed margins; second spikes (in the sole MT species) arranged mostly laterally *Leptochloa*

4. Lemmas veins glabrous, the tips with smooth margins (entire); second spikes (in the sole MT species) arranged mostly digitately *Eleusine*

5. Stem height 4 dm or more tall; lateral spikes ascending to upwardly appressed to the main inflorescence rachis; rhizomes well-developed *Spartina*

5. Stem height under 4 dm tall; lateral spikes divergent from the main inflorescence rachis; rhizomes absent to weakly developed (bunched or mat/sod-forming grasses) 6.

6. Inflorescences of lateral spikes; plants not bearing stolons *Bouteloua*

6. Inflorescences of digitate spikes; plants bearing stolons *Cynodon*

Eragrosteae

1. Spikelets with only 1 floret 2.

1. Spikelets with 2 or more florets 6.

2. Callus hairs about one-half as long as lemma; stems 6--15 dm tall; rhizomes well-developed; a grass of sandy soils *Calamovilfa*

2. Callus hairs, if any, much <one-half as long as lemma; stems often <6 dm tall; rhizomes, if any, short and slender; grasses of various substrates 3.

3. Lemmas awned, the awn >1 mm long *Muhlenbergia*

3. Lemmas awnless or only awn-tipped, ≤0.5 mm long 4.

4. Ligule membranous or short-fringed; fruit enclosed in lemma and palea, commonly other than bunchgrasses (except *M. cuspidata* and *M. montana*) *Muhlenbergia*

4. Ligule long-hairy; fruit falling free of lemma and palea or enclosed within them; bunchgrasses 5.

5. Inflorescence a dense cylindrical spike-like panicle; plants with a mat-forming habit; unit of dispersal is the spikelet *Crypsis*

5. Inflorescence an open to somewhat contracted panicle, if densely contracted then because it is partially or entirely enclosed in a leaf sheath; plants erect, not with a mat-forming habit; unit of dispersal is an individual fruit (technically an achene) *Sporobolus*

6. Spikelets in open panicles, these raised well above the leaves; stems distinctly bunched *Eragrostis*

6. Spikelets in contracted panicles, mostly concealed in leafy clusters; stems bunched to more commonly mat-forming *Munroa*

Meliceae

1. Callus prominently and densely long-hairy; lemma awns 10--15 mm long *Schizachne*

1. Callus hairless or with very fine, short hairs; lemmas awnless or with an awn <5 mm long 2.

2. Lemmas with 3 prominent veins (not including the marginal ones); florets 2--3 and widely spaced so that the rachilla is readily visible *Catabrosa*

2. Lemmas with 5 or more prominent veins (not including the marginal ones); florets 4 or more and closely spaced so that the rachilla is hidden 3.

3. Lemma veins prominent and equally spaced; second glume 1-veined; rhizomes well-developed; florets <4 mm long; riparian sites *Glyceria*

3. Lemma veins conspicuous but not equally spaced; second glume 5--7-veined; rhizome not well-developed, but stem base bulbous (except for *Melica smithii*); florets greater than 6 mm long; dry sites *Melica*

Oryzae

1. Monoecious annuals; pistillate spikelets positioned above the staminate spikelets; lemmas of pistillate spikelets awned; staminate spikelets with 6 stamens; ligules mostly >5 mm long *Zizania*

2. Perennials with bisexual florets; lemmas unawned; stamens 3; ligules ≤1 mm long *Leersia*

Paniceae

1. Spikelets enclosed in a hard spiny burr of fused bristles *Cenchrus*

1. Spikelets not enclosed in a hard spiny burr, bristles absent or not united and then only subtending spikelets 2.

2. Inflorescences of slender digitate second spikes; ligules completely membranous *Digitaria*

2. Inflorescences not of second spikes; ligules mostly of hairs 3.

3. Spikelets subtended by several to many bristles (sterile branches) that often exceed the spikelet in length *Setaria*

3. Spikelets not subtended by bristles or sterile branches 4.

4. Ligule absent; veins of second glumes and sterile lemmas bearing stiff coarse hairs *Echinochloa*

4. Ligule a conspicuous fringe of hairs; veins of second glumes and sterile lemmas hairless or bearing soft hairs 5.

5. Plants annual or perennial, **not** developing a rosette of short, broad basal leaves during the cool season; plants flowering in the warm season only *Panicum*

5. Plants perennial, developing a rosette of short, broad basal leaves during the cool season; plants flowering during the cool season and warm season; cleistogamous spikelets commonly produced on small axillary inflorescences during the late summer and fall *Dichanthelium*

Poeae

1. Inflorescences of terminal spikes or contracted second panicles, all or most spikelets sessile or nearly so 2.

1. Inflorescences of racemes or open panicles, all or most spikelets distinctly pedicellate, if spikelets are mostly sessile (as in *Puccinellia* or some *Poa*), then they are not arranged in a second fashion 6.

2. Inflorescence a two-ranked (bilateral or distichous) spike; spikelets oriented edgewise to rachis (back or front of lemma faces the main inflorescence rachis); first glume absent on all but the very terminal spikelet (this is because the main inflorescence rachis assumes the protective cover otherwise provided by the first glume) *Lolium*

2. Inflorescence a second spike-like or contracted panicle; spikelets not oriented edgewise to rachis (side of lemma faces the main inflorescence rachis); both glumes present 3.

3. Spikelets dimorphic (of two distinct morphologies), one sterile and of empty flattened lemmas, the other fertile and with 1--2 florets **Cynosurus**
3. Spikelets not dimorphic (all appearing nearly identical); sterile lemmas, if any, in the same spikelets as the fertile lemmas 4.
4. Leaf sheaths strongly keeled; disarticulation above glumes; perennials forming large tussocks **Dactylis**
4. Leaf sheaths not keeled; small annuals (*Poa secunda* and related species might be keyed out here because of the subtly secund aspect of the inflorescence, but they are perennial bunchgrasses, not small annuals; if so, go to couplet 6) 5.
5. Disarticulation below glumes; lemmas prominently nerved, with a blunt tip **Sclerochloa**
5. Disarticulation above glumes; lemmas inconspicuously nerved, with an awn-tip **Vulpia**
6. Tips of lemmas are transformed into juvenile leaf blades, florets irregular, not bilaterally symmetrical, the florets replaced by small vegetative bulbs whereby each floret vegetatively propagates a new plant 7.
6. Tips of lemmas not transformed into juvenile leaf blades, florets bilaterally symmetrical, the florets not vegetatively propagating new plants 8.
7. Plants of low elevation mostly disturbed settings, common throughout MT **Poa bulbosa**
7. Plants of high elevation alpine settings, known as yet from only Glacier National Park **Festuca viviparoides**
8. Tip of lemma blunt or truncate or nearly so, the edges ragged; veins of lemmas parallel; spikelets very often sessile or nearly so, closely appressed to the subtending rachis 9.
8. Tip of lemma pointed, with smooth edges, or if with ragged edged tips (as in *Poa*), then spikelets conspicuously pedicellate; veins of lemmas converging toward a pointed apex; spikelets sessile to distinctly pedicellate, but in any case diverging away from the subtending rachis 10.
9. Stems bunched; veins of lemmas mostly 3--5 and obscure; ligules mostly ≤ 3 mm long; leaf blades folded or inrolled, or if flat then usually 1--3 mm wide; plants of alkaline habitats **Puccinellia**
9. Stems strongly rhizomatous; veins of lemmas mostly 7--9 and prominent, raised from the surface; ligules ≥ 3 mm long; leaf blades flat, mostly 4--15 mm wide; plants of mostly fresh water habitats **Torreyochloa**
10. Callus of floret with conspicuously long hairs, the hairs about 1/5 as long as the lemma; lemmas awnless; stems arising from standing water and about 1 cm in diameter at water level **Scolochloa**
10. Callus of floret hairless, short hairy, or with a cobwebby hairs; lemmas with or without awns; plants of dry sites or at least not growing in standing water, stems much < 5 mm in diameter towards the base 11.
11. Leaves prominently veined particularly on the inner surface; plants dioecious and forming thick coarse bunches, each stem bearing numerous old leaf sheaths from the previous seasons, dry mountain habitats **Leucopoa**
11. Leaves not prominently and deeply veined on the inner surface; plants not dioecious, or if so (as in some species of *Poa*), then leaves with at most two median lines on the upper surface; individual stems not bearing numerous old leaf sheaths from the previous seasons; habitats various 12.
12. Lemmas awnless; leaves usually flat or folded, sometimes inrolled, but in any case the leaf tips prow-like or abruptly contracted to a pointed apex; leaves with a prominent median venation on upper surface 13.
12. Lemmas awned or awn-tipped; Leaves mostly flat or rolled on drying and the tips not prowlike, gradually tapering to a pointed apex; leaves without a prominent whitish, parallel venation 14.
13. Floret 1; glumes minute; lemmas 3-nerved **Phippsia**
13. Florets 2 or more per spikelet; glumes the same size as the individual lemmas; lemmas 5-nerved **Poa**
14. Lemmas keeled and tightly overlapping, nerves prominent on back; lemma awn arising from slightly below the very tip of lemma; leaf sheaths closed, at least initially; ligule not bilobed, the ligule not conspicuous from a side view of leaf; the palea and attached fruit are the unit of dispersal **Bromus**
14. Lemmas rounded on back and not tightly overlapping (rachilla often slightly visible from side view), not prominently nerved; lemma awn arising from the very tip of lemma; leaf sheaths open; ligule often bilobed, cleft in the middle, the individual ligule lobes conspicuous from a side view of leaf (if not bilobed, as in *Festuca pratensis* and *F. arundinacea*, then auricles of leaf blade are well developed); the floret is the unit of dispersal 15.
15. Plants annual; spikelets generally in a secund arrangement **Vulpia**
15. Plants perennial; spikelets not in a distinctly secund arrangement 16.

16. Auricles at junction of leaf sheath and blade conspicuous, well-developed; leaf blades flat, mostly >3 mm wide; stems mostly >1 m tall, lemmas awnless or awn-tipped *Schedonorus*
16. Auricles at junction of sheath absent; leaf blades mostly inrolled or flat but then typically <3 mm wide; stems of various height; lemmas usually with an awn >2 mm long, less commonly awnless *Festuca*

Stipeae

1. Floret generally oval in outline (short and squat); awn deciduous, usually 1--4 times longer than lemma; callus short and blunt *Oryzopsis*
1. Floret generally linear in outline (long and cylindrical); awn persistent, usually several to many times longer than lemma; callus sharp-pointed *Stipa*

Triticeae

1. Spikelets mostly 1 per node, if 2 per node, then glumes and lemmas aligned in the same plane and the midribs of each in alignment 2.
1. Spikelets mostly >1 per node, if 1 per node then lemmas out of alignment with glume, which is most evident by the midribs of glumes being out of alignment with those of lemmas 6.
2. Plants perennial; native or introduced forage species (if glumes are small, very narrow, and tapered to a sharp point, and the backs of the lemmas are out of alignment with the backs of the glumes, go to *Elymus*) *Agropyron*
2. Plants annual; introduced crops or grasses of disturbed settings 3.
3. Glume and lemmas with an asymmetrical midrib that curves to the side; the tip of the glumes blunt and often notched to one side of the midrib 4.
3. Glume and lemmas with a symmetrical midrib; the tip of the glumes gradually tapering into an awn-tip 5.
4. Inflorescence nearly cylindrical; the single spikelet per node embedded into the thickened inflorescence rachis; rachis disarticulating such that the unit of dispersal is a spikelet embedded in the inflorescence rachis *Aegilops*
4. Inflorescence not cylindrical; the single spikelet per node not embedded into the inflorescence rachis; rachis not disarticulating and the unit of dispersal is typically the grain (i.e., fruiting heads don't shatter) *Triticum*
5. Spikelets appressed to the main rachis and diverging at an angle of much <45°; plants typically >5 dm tall; glumes and lemmas soft or papery in texture at maturity; lemmas with conspicuously ciliate margins *Secale*
5. Spikelets diverging from the main rachis at an angle of much greater than 45°; plants usually <4 dm tall; glumes and lemmas hardened and burr-like at maturity; lemmas lacking ciliate margins *Eremopyrum*
6. Spikelets 3 per node and with 1 floret per spikelet; the lateral 2 spikelets at a node pedicellate and sterile or staminate, the central spikelet sessile and fertile (except 6-row *Hordeum vulgare* where all three spikelets are sessile and produce a grain) *Hordeum*
6. Spikelets mostly in groups of 2 per node, but if 3 or more, then all spikelets fertile and with often >1 floret per spikelet *Elymus*

Aegilops L., Goatgrass

Annual bunchgrasses. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** a 2-sided but cylindrical spike. **Spikelets** one per node, partially to completely embedded within the rachis, usually comprising several florets; glumes broad and asymmetrical, usually awned by extension of the eccentric midrib. **Lemmas** similar to glumes; palea well developed. **Disarticulation** below the glumes; unit of dispersal the spikelet and internode of the adjacent inflorescence rachis.

A cool season genus of about 23 species native from the Mediterranean region to central Asia with four species introduced into N. America.

Aegilops cylindrica Host [= *Triticum cylindricum* Ces., Pass. & Gibbelli] Jointed goatgrass Annual bunchgrass. **Stems** 2.5--5 dm tall. **Leaves:** blades 2--5 mm wide. **Inflorescence** a cylindrical spike, 5--15 cm long. **Spikelets** 8--14 mm long, glumes asymmetrical, awnless to awned especially on the distal-most spikelets. **Lemmas** awnless to awned especially on the distal-most spikelets. Disturbed settings including in and around crop fields where wheat is commonly cultivated. Introduced throughout the U.S. except in the southeast.

Aegilops can introgress with cultivated wheat, *Triticum aestivum* to form a hybrid between referred to as *Aegilotriticum sancti-andreae* (Degen) Soó; collected in Chouteau co.

Agropyron Gaertn., Wheatgrass

Rhizomatous to bunched perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** a terminal 2-sided spike with mostly one spikelet per node. **Spikelets** each with >1 fertile floret; glumes often broad and aligned with subtending floret. **Lemmas** unawned or awned from the tip. **Disarticulation** above or below glumes; dispersal unit the floret or sometimes a cluster of florets.

As traditionally circumscribed, *Agropyron* comprises about 100 northern hemisphere cool season species, of which about 14 are native to North America and about 8 are introduced from Eurasia. *Agropyron* here includes all perennial wheatgrasses native and introduced on the North American continent that have mostly 1 spikelet per node and several florets per spikelet and broad glumes that are aligned with the subtending lemmas (Cronquist et al. 1997). The key below is provided to assist in the identification of species that have been traditionally referred to *Agropyron* in North America. The hybrid *Agrositanion saxicola* (Scribn. & J.G.Sm.) Barkworth & D.R.Dewey, a hybrid of *Elymus elymoides* and *Pseudoroegneria spicata*, collected in McCone and Sanders Counties, is similar to *Agropyron scribneri*. This hybrid has an erect habit and a non-shattering or tardily disarticulating spike, and a habitat in disturbance-prone settings rather than in the mountains, in contrast to *A. scribneri*. The divergent-awns from the glume tips are distinctive and these are as long as those of the lemma. The spikelets are mostly one per node and have glumes with a small second awn-tip in a manner similar to the glumes of *Elymus elymoides*.

1. Internodes of the main rachis <1/4 the length of the spikelets, the spikelets diverging at a wide angle from the main rachis (40--80°) *A. cristatum*
1. Internodes of main rachis >1/2 the length of the spikelets, the spikelets diverging at very acute angles from the main rachis (<30°) 2.
2. Glumes and often the lemmas blunt or flat at the tip, or if pointed, then the glumes and lemmas thick and rigid, resisting bending; plants usually glaucous; margins of at least lower leaf sheaths lined with hairs (ciliate); cultivated forage grasses with heavy rigid stems 3.
2. Glumes and lemmas usually pointed and often awned; lemmas pliable and easily bent; plants greenish or occasionally glaucous; margins of at least lower leaf sheaths not lined with hairs; stems flexible and often hollow 4.
3. Lemmas distinctly hairy *A. intermedium* var. *trichophorum*
3. Lemmas not hairy *A. intermedium* var. *intermedium*
4. Rhizomes lacking or very short; bunchgrasses 5.
4. Rhizomes present; grasses usually not bunched but creeping 7.
5. Glumes long-awned (12 mm or more), the awns of the glumes widely divergent or outwardly curving; stems prostrate to strongly decumbent; inflorescence rachis disarticulating at maturity *A. scribneri*
5. Glumes awnless, or only awn-pointed, or glumes with a short straight awn (<10 mm); stems erect; inflorescence rachis continuous, not disarticulating at maturity 6.
6. Most inflorescence internodes >10 mm long; glume length ≤length of internode of adjacent rachis; lemmas with widely divergent awns, or awnless *A. spicatum*
6. Most inflorescence internodes <10 mm long; glume length ≥length of internode of adjacent rachis internodes; lemmas awnless or with straight awns (rarely with divergent awns) *A. trachycaulum*
7. Awns of lemmas 5--12 mm long, strongly divergent or curved outward *A. albicans*
7. Awns of lemmas lacking or rarely >5 mm long and then straight 8.
8. Glumes and lemmas hairy with long white hairs; awnless or nearly so *A. intermedium* var. *trichophorum*
8. Glumes hairless or nearly so; lemmas hairless or hairy; awned or awnless 9.
9. Blades mostly flat, lax, (3.5)4--11 mm wide, green, not rigid *A. repens*
9. Blades mostly inrolled, rigid, up to 5 mm wide, green or glaucous, often stiff and upwardly directed 10.
10. Lemmas prominently hairy, hairs easily visible without magnification *A. dasystachyum* var. *dasystachyum*
10. Lemmas hairless or short-hairy 11.
11. Glumes rigid, narrowly long-tapering to a narrow sharp-pointed tip, the distal half of the glume usually with just the single mid-vein *A. smithii*

11. Glumes flexible, widest at or above the base and shortly tapering from the mid-portion to an acute tip, the distal half of the glume usually with >1 evident vein

A. dasystachyum var. *riparium*

Agropyron albicans Scribn. & J.G.Sm. [*Agropyron griffithsii* Scribn. & J.G.Sm., *Elymus albicans* (Scribn. & J.G. Sm.) A. Löve] Montana wheatgrass Rhizomatous sometimes bunched perennial. **Stems** often glaucous, 3.5--8.0 dm tall. **Leaves:** blades 2--4 mm wide, often stiff and inrolled; sheaths and collar often hairy. **Inflorescence** 3--15 cm long, rachis continuous, internodes generally <10 mm long. **Spikelets** 10--29 mm long, appressed to the main rachis, with 4--9 florets, glumes shorter than spikelet, with a broad base, narrowly tapering to a point or short awn. **Lemmas** hairy, with a divergent awn 5--15 mm. Open dry shrub steppe vegetation. Mainly the Pacific Northwest and northern Rocky Mountain regions.

An ephemeral hybrid between *Agropyron spicatum* and *A. dasystachyum*. This species is much like thickspike wheatgrass but with awned glumes and lemmas and perhaps with more of a bunchgrass growth habit.

Agropyron cristatum (L.) Gaertn. [*Agropyron desertorum* (Fisch. ex Link) Schult.] Crested wheatgrass Perennial bunchgrass. **Stems** mostly 3--8 dm tall. **Leaves:** blades 2--9 mm wide, often open but becoming inrolled upon drying, leaf sheaths and collar hairless. **Inflorescence** 2.5--7(--11) cm long, rachis continuous, the internodes 0.5--2.5 (--5) mm long. **Spikelets** 6--11(--16) mm long, widely divergent from the main rachis; florets mostly 2--8 per spikelet, glumes shorter than florets, narrow and tapering to an awn-tip. **Lemmas** hairless, awn-tipped or with awns to 5 mm long. Open dry sites at middle to low elevations. Introduced and cultivated throughout much of N. America except in the southeast.

Standard and Fairway crested wheatgrass are two common cultivars where Standard is less leafy and has narrower (lanceolate) flowering spikes and seed heads compared to Fairway.

Agropyron dasystachyum (Hook.) Scribn. & J.G.Sm. [*Elymus lanceolatus* (Scribn. & J.G.Sm.) Gould] Thickspike wheatgrass Rhizomatous perennial. **Stems** usually glaucous, 3.5--8.0 dm tall. **Leaves:** blades 2--5 mm wide, often stiff and somewhat inrolled, leaf sheaths and collar often hairy. **Inflorescence** 3--15 cm long, rachis continuous, internodes generally <10 mm long. **Spikelets** 10--29 mm long, appressed to the main rachis, florets mostly 4--9, glumes shorter than florets, broadest above the base and shortly tapering to an acute tip. **Lemmas** sparsely to densely hairy, awn-tipped or with an awn up to 5 (--10) mm. Open dry sites at lower elevations. Throughout the western half of N. America and eastward in southern Canada.

Distinguished from *A. smithii* by little other than glumes rendered short because of the lack a long-tapering tip. *Agropyron dasystachyum* var. *riparium* (Scribn. & J.G. Sm.) Bowden, streambank wheatgrass, differs from thickspike by hairless to lightly scabrous lemmas and growing in more mesic habitats usually in more clayey soils. This variety is widely seeded in MT. Thickspike wheatgrass, however, varies in the degree of hairiness and also inhabits wet sites, including the edges of stock ponds and ephemeral streams. The distinction of streambank wheatgrass is thus questionable.

Agropyron intermedium (Host.) Beauv. [*Elymus hispidus* (Opiz) Melderis, *Thinopyrum intermedium* (Host.) Barkworth & Dewey, *Agropyron elongatum* Host., *Thinopyrum ponticum* (Podp.) Barkworth & Dewey] Intermediate wheatgrass Rhizomatous or bunched perennial. **Stems** few to extensively bunched, 0.5--1.5 m tall. **Leaves:** blades 4--12 mm wide, firm, flat or rolled upon drying, leaf sheaths often with ciliate margins. **Inflorescence** (6--12)--30 cm long, rachis continuous, thick and somewhat concave on the side toward the spikelet, the internodes generally 10 or more mm long. **Spikelets** (10--14)--32 mm long, appressed to the main rachis, florets mostly 6--12 per spikelet, glumes shorter than florets, thick and blunt or notched, rarely pointed. **Lemmas** blunt to pointed, sometimes with a minute awn. Open dry disturbed sites especially in pastures and along roads and trails. A forage grass and soil stabilizer that has introduced throughout much of western N. America and sporadically eastward.

Populations of *A. intermedium* that are well over 1 m tall, strongly bunched, non-rhizomatous, and perhaps flowers during late summer are referred to *Agropyron elongatum* (tall wheatgrass). Populations of *A. intermedium* with hirsute lemmas are referred to as pubescent wheatgrass, *Agropyron intermedium* var. *trichophorum* (Link) Halac. (or *Thinopyrum intermedium* (Host.) Barkworth & Dewey ssp. *barbulatum* (Schur.) Barkworth & Dewey). These distinctions may refer to selectively bred cultivars and don't really hold up over broad geographical scales. All of these grasses require frequently disturbed ecologies and thus founder events may play a role in local differentiation.

Agropyron repens (L.) Beauv. [*Elymus repens* (L.) Gould; *Elytrigia repens* (L.) Nevski] Quackgrass Rhizomatous perennial. **Stems** slender, 0.7--1.1 m tall. **Leaves:** blades 4--11 mm wide, flat, lax to ascending, sheaths often with retrorse soft hairs. **Inflorescence** 5--13 cm long, rachis continuous, slender, the internodes <10 mm long. **Spikelets** 9--16 mm long, appressed to the rachis, florets 3--7 per spikelet, glumes shorter than florets, tapering to an awn tip. **Lemmas** tapering to an awn-tip (rarely unawned) or with an awn usually about 5 (--10) mm long. Moist disturbed settings especially around lawns, in gardens, along roadsides, and riparian areas from lower to middle elevations. Introduced throughout N. America excepting the very southeast.

Agropyron repens occasionally has large glumes like those of *A. trachycaulum* but broad lax leaf blades and extensive rhizomatous stands don't suggest the bunchgrass *A. trachycaulum*, which has ascending leaf blades.

Agropyron scribneri Vasey [*Elymus scribneri* (Vasey) M.E. Jones] Scribner's wheatgrass Perennial bunchgrass. **Stems** prostrate to strongly decumbent, 2--4 dm long. **Leaves:** blades 2--4 mm wide, flat to commonly inrolled, sheaths and collar usually hairless. **Inflorescence** 3.5--8.0 cm long, rachis slender and disarticulating at maturity, the internodes much <10 mm long. **Spikelets** 11--15 mm long, appressed to the main rachis, florets 3--6 per spikelet, glumes shorter than florets, tapering to an awn 12--18 mm long. **Lemmas** tapering to an awn 15--25 mm long, the awns strongly divergent at maturity. On exposed slopes especially in the subalpine to alpine. Mostly throughout the western U.S.

Some specimens from Deerlodge and Beaverhead cos. appear to be hybrids between *A. scribneri* (disarticulating rachis, decumbent stems) and *A. trachycaulum* (large glumes).

Agropyron smithii Rydb. [*Elymus smithii* (Rydb.) Gould; *Pascopyrum smithii* (Rydb.) Löve] Western wheatgrass Rhizomatous perennial. **Stems** mostly hairless and usually glaucous, 3.5--8.0 dm tall; blades 2--5 mm wide, often stiff and inrolled, sheaths and collar often hairless. **Inflorescence** 3--15 cm long, rachis continuous, the internodes generally <10 mm long. **Spikelets** (sometimes 2 per node) 10--29 mm long, appressed to the main rachis, florets mostly 4--9 per spikelet, glumes shorter than to as long as florets, rigid and gradually long-tapering from the base to a narrow sharp tip (the acuminate tip is often slightly curved). **Lemmas** awn-tipped or with an awn up to 5 (--10) mm. Open dry settings, often where historically disturbed. Throughout much of N. America except in the southeast.

Resembling *Agropyron dasystachyum* in morphology and ecology but differing in long-tapered glume tips.

Agropyron spicatum (Pursh) Scribn. & Smith [*Elymus spicatus* (Pursh) Gould; *Pseudoroegneria spicata* (Pursh) A.Löve; also known as *Agropyron inerme* Scribn. & Smith]. Bluebunch wheatgrass (state Grass of MT) Perennial bunchgrass. **Stems** 3--9 dm tall. **Leaves:** blades 1--3 mm wide, flat to rolled, sheath and collar often hairless. **Inflorescence** 4--20 cm long, rachis continuous, internodes generally >10 mm long. **Spikelets** 10--15(--26) mm long, appressed to the main rachis, florets mostly 3--7 per spikelet, glumes shorter than florets, awnless or short-awned. **Lemmas** hairless to inconspicuously hairy, with a divergent awn up to 2 cm long, rarely awnless. Open dry vegetation to open understory. Throughout much of western N. America and rarely elsewhere.

Specimens lacking lemma awns ("inerme") are likely reclamation cultivars. *Agropyron arizonicum* Scribn. & Smith, native to the southwestern U.S., has been cultivated in Gallatin co. and has a flexuous rather than straight inflorescence rachis, as well as leaf blades 4--6 mm wide. A hybrid population of *Agropyron spicatum* and *Elymus elymoides* is referred to as *Agrositanion saxicola* (see notes under *Agropyron*). A robust form of *A. spicatum* called *Elymus wawawaiensis* J.R. Carlson & Barkworth might have been introduced into west central MT as the cultivar 'Secar' (Barkworth et al. 2007). It grows on shallow rocky soils and has a "vigorous" growth habit, and "more imbricate spikelets and narrower, stiff glumes" compared to *Agropyron spicatum*.

Agropyron trachycaulum (Link) Malte [*Agropyron subsecundum* (Link.) A.S. Hitchcock; *Elymus trachycaulus* (Link) Gould; *Agropyron caninum* (L.) P.Beauv.]. Slender wheatgrass Perennial bunchgrass. **Stems** erect to sometimes decumbent, 3--10 dm tall (long). Leaf blades 3--8 mm wide, flat to rolled, ascending, leaf sheath and collar often hairless. **Inflorescence** 5--20 cm long, rachis continuous, the internodes generally <10 mm long. **Spikelets** (9--12--18) mm long, appressed to the main rachis, florets mostly 3--7 per spikelet, glumes often nearly as long or longer than florets, glumes awn-tipped to long awned. **Lemmas** awn-tipped or sometimes with a straight awn up to 20 mm long. Open dry sites at lower elevations to the subalpine but ecologically confined to disturbance-prone settings. Throughout much of N. America except in the southeast.

Agropyron trachycaulum var. *unilaterale* is a tall form of Slender wheatgrass in which most lemmas have awns up to 40 mm. *Agropyron trachycaulum* var. *latiglume* is common in alpine and subalpine habitats in the mountains of western MT and is distinguished by its short inflorescences with closely overlapping spikelets (caused by relatively short internodes). Occasional specimens of *A. trachycaulum* from Glacier National Park bear a panicle of spikelets, reminiscent of species of *Elymus*, most notably *Elymus flavescens*. In the Tendoy Mts. of Beaverhead co., *Agropyron trachycaulum* inhabits alkaline meadows. These specimens are similar to *Agropyron albicans*, which is also common in the Tendoy, but the glumes are clearly those of slender wheatgrass.

***Agrostis* L., Bentgrass**

bunched or rhizomatous annuals and perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescences** of diffuse to contracted panicles. **Spikelets** with 1 floret; glumes commonly <2.5 mm, nearly equal or the first slightly shorter, both with mostly a distinctive scabrous midvein. **Lemma** translucent and enclosed by glumes, awnless or with a slender awn; palea weakly developed or at least mostly enclosed in the floret. **Disarticulation** above the glumes; unit of dispersal the floret.

A cool season genus possibly 200 species, 26 of which occur in N. America. Populations and specimens of *Agrostis oregonensis* and *A. stolonifera* have been observed with spikelets morphing into vegetative bulblets possibly in response to infection. Such specimens might not be readily distinguished as *Agrostis* but the small glumes with scabrous margins remain diagnostic.

1. Palea evident, nearly half to as long as the lemma 2.
 1. Palea absent or <a third as long as the lemma 4.
2. Rhizomes or stolons not present *A. humilis*
 2. Rhizomes or stolons present 3.
3. Panicle branches bearing spikelets only on the outer half, not along the basal one-half of the rachis; inflorescence rachises remaining open after anthesis; ligules 0.5--2.0 mm long *A. capillaris*
 3. Panicle branches bearing spikelets for the entire length, from base to tip; inflorescence rachises usually closing or distinctly ascending after anthesis; ligules 2--7 mm long *A. stolonifera*
4. Rhizomes long and slender; anthers 1.0--1.2 mm long *A. pallens*
 4. Rhizomes absent; anthers shorter than 1 mm long 5.
5. Lemma awned, the awn abruptly bent at about the middle *A. mertensii*
 5. Lemma unawned or with a short straight awn 6.
6. Panicle branches contracted, at least some branches bearing spikelets for the entire length 7.
 6. Panicle branches open, bearing spikelets only on the outer half of the rachis (the lower one-half of rachis near the stem not bearing spikelets) 8.
7. Plants slender, alpine; blades 5 cm or shorter and 1--2 mm wide *A. variabilis*
 7. Plants stout; low to medium altitudes; blades 8--10 cm long and 1--6 mm wide *A. exarata*
8. Panicle branches long and slender, spreading horizontally at maturity, the branches again branched above the middle; leaves stiff, scabrous *A. scabra*
 8. Panicle branches usually somewhat upright, the branches again branched below the middle; leaves lax, not scabrous 9.
9. Plants of high mountain meadows, 1--3 dm tall; spikelets about 1.5--2 mm long *A. idahoensis*
 9. Plants of medium to low altitudes wet areas, usually >3 dm tall; spikelets 2--3 mm long *A. oregonensis*

Agrostis capillaris L. [*Agrostis tenuis* Sibth] Colonial bentgrass Rhizomatous perennial. **Stems** decumbent at base, 3--5 dm tall. **Leaves:** blades 1.5--4.0 mm wide, ligules 0.5--2.0 mm long. **Inflorescence** a diffuse panicle 5--15 cm long. **Spikelets** 2.0--2.1 mm long. **Lemmas** 1.8--2.0 mm long, awnless; palea about one-half as long as the lemma. Disturbance-prone settings from mostly northwestern MT. Introduced throughout much of N. America except in most central states and provinces.

This species goes by the names of colonial, Rhode Island, or common bentgrass.

Agrostis exarata Trin. Spike bentgrass Perennial bunchgrass with short rhizomes. **Stems** 2--10 dm tall. **Leaves:** blades mostly 2--8 mm broad, ligules 0.5--2.0 mm long. **Inflorescence** a contracted panicle 5--20 cm long. **Spikelets** 2--3 mm long. **Lemmas** 1.2--2.0 mm long, awnless or with a short delicate awn; palea minute to absent. Moist sites including stream sides. Throughout much of N. America.

Similar to *Agrostis pallens* but differing by anthers 0.2--0.3 mm long and leaves clustered basally.

Agrostis humilis Vasey [*Agrostis thurberiana* A.S. Hitchcock, *Podagrostis humilis* (Vasey) Björkam, *Podagrostis thurberiana* (A.S. Hitchcock) Hultén] Low bentgrass or alpine bentgrass Perennial bunchgrass occasionally with short rhizomes. **Stems** 0.7--1.5(--5) dm tall. **Leaves:** blades mostly basal, 0.5--1.0 mm wide, ligules 0.5--4.0 mm long. **Inflorescence** a contracted panicle 1--3(--5) cm long. **Spikelets** 1.7--2.0 mm long. **Lemmas** 1.7--1.9 mm long, awnless to short-awned; palea about two-thirds as long as lemma. Alpine and subalpine meadows, or dry mountain meadows at lower elevations. Throughout western N. America and sporadically elsewhere.

Agrostis humilis is placed in *Podagrostis* (Barkworth et al. 2007) because of a prolonged rachilla, short awn from the lemma base, and conspicuous palea. These traits are all found in species of *Agrostis*, however. The first two of these are poorly developed in MT specimens. The florets of *A. humilis* have consistently large and conspicuous paleas, which differs in the ecologically and morphologically similar *A. mertensii* and *A. variabilis*. *Agrostis thurberiana* is a taller statured form of *Agrostis humilis* (up to 0.5 m tall) that grows in the mountains below the subalpine zone.

Agrostis idahoensis Nash Idaho bentgrass Perennial bunchgrass. **Stems** 2--3 dm tall. **Leaves:** blades 1--2 mm wide, ligules 1--4 mm long. **Inflorescence** an open panicle 4--6 cm long. **Spikelets** 1.6--2.0 mm long. **Lemmas** 1.4--1.9 mm

long, awnless; palea absent. Moist meadows and other grassy sites in open to closed montane understory and subalpine to alpine zones. Throughout western N. America.

Agrostis mertensii Trin. [*Agrostis borealis* Hartm.] Arctic bentgrass or Northern bentgrass Perennial bunchgrass. **Stems** 1--4 dm tall. **Leaves:** blades 1--3 mm wide, ligules 1--3 mm long. **Inflorescence** 5--15 cm long, of narrow but open panicles. **Spikelets** 2.5--3.0 mm long. **Lemmas** 2.4--2.8 mm long, bearing a straight or bent awn, 2.5--3.0 mm long, from above the middle; palea absent or minute. Alpine rocky slopes. Throughout all of Canada, New England, and AK, south along the Rocky Mountains, and disjunct in central Appalachia.

Agrostis mertensii is most similar to *A. variabilis* but readily distinguished by its lemma bearing an awn.

Agrostis oregonensis Vasey Oregon bentgrass Perennial bunchgrass. **Stems** 3--5 dm tall. **Leaves:** blades mostly basal, 2--4 mm wide, ligules 1--6 mm long. **Inflorescence** an open panicle 6--12 cm long. **Spikelets** 2.5--3.0 mm long. **Lemmas** 2.5--3.0 mm long, awnless; palea absent to minute. Moist meadows at middle elevations. Very western N. America extending east to ID, MT, WY.

Agrostis pallens Trin. [*Agrostis diegoensis* Vasey] Dune bentgrass Perennial bunchgrass with long and slender rhizomes. **Stems** 6--8 dm tall. **Leaves:** blades 2--6 mm wide, ligules 1--6 mm long. **Inflorescence** a contracted to somewhat open panicle, 7--11 cm long. **Spikelets** 3.0--3.5 mm long. **Lemmas** 2.2--2.5 mm long, awnless or with an apiculate awn; palea lacking or minute. Meadows; collected in Beaverhead co. Very western N. America extending east to ID, MT.

Similar to *A. exarata* but differing by anthers 1.0--1.3 mm long, leaves positioned more on the stem than at the base, and an inflorescence that ranges from spicate to narrowly open.

Agrostis scabra Willd. Rough bentgrass Perennial bunchgrass. **Stems** 2--7 dm tall. **Leaves:** blades 1--2 mm wide, scabrous, ligules 1--5 mm long. **Inflorescence** an open diffuse panicle 1--3 dm long. **Spikelets** 2.0--2.2 mm long. **Lemmas** about 1.5--2.0 mm long, awnless or with an awn up to 4 mm long; palea minute or absent. Open moderately disturbed sites including roadsides at all elevations. Throughout nearly all of N. America.

Agrostis rossiae Vasey, Ross bentgrass, a WY endemic from around hot springs in Yellowstone National Park, differs in its annual growth form, contracted panicles, and shorter stature (<2 dm tall).

Agrostis stolonifera L. [*Agrostis gigantea* Roth, *Agrostis palustris* Hudson, *A. alba* L. var. *palustris* (Hudson) Persoon, *Agrostis alba* auct. non L., *A. stolonifera* L. var. *major* (Gaudin) Farw.] Creeping bentgrass or Redtop Rhizomatous perennial or stoloniferous sod grass often forming dense mats or patches. **Stems** decumbent at base, 2--12 dm tall. **Leaves:** blades 2--6 mm wide, ligules 2--7 mm long. **Inflorescence** a mostly diffuse panicle 5--30 cm long, sometimes contracting after anthesis. **Spikelets** 2.0--2.5 mm long (up to 10 mm long if infected). **Lemmas** 2.0--2.2 mm long, awnless or rarely minutely awned from the back; palea up to two-thirds as long as lemma. Wet meadows, stream sides, roadsides, pastures, and lawns from low to middle elevations. Introduced throughout all of N. America.

Agrostis stolonifera is considered a lawn pest when it forms dense colonies capable of competing with Kentucky bluegrass. *Agrostis gigantea* is an introduced perennial that differs by a strongly rhizomatous growth habit lacking stolons, culms 20--120 cm tall, panicles 8--30 cm long with the longest lower panicle branches 4--9 cm long, and spikelets and panicle branches tending to be reddish-tinted. *Agrostis stolonifera* produces stolons but not rhizomes, has culms 8--60 cm tall, panicles 3--20 cm long with the longest lower panicle branches 2--6 cm long, and spikelets and panicle branches tending to be straw-colored. *Agrostis gigantea* supposedly has a greater ecological predilection to more extreme climates including hot summers, cold winters, and drought. Both species are tentatively treated under *Agrostis stolonifera* because the presence of stolons or rhizomes covaries with no other convincing morphologies.

Agrostis variabilis Rydb. Mountain bentgrass Perennial bunchgrass. **Stems** 1--2 dm tall. **Leaves:** blades 1--2 mm wide, ligules 1--3 mm long. **Inflorescence** a contracted panicle 2--6 cm long. **Spikelets** 2.0--2.3 mm long. **Lemmas** 1.8--2.1 mm long, awnless; palea absent. Alpine and subalpine meadows. Throughout much of western N. America.

Agrostis variabilis is similar to *A. mertensii* and *A. humilis* in having a small-statured bunchgrass habit in subalpine to alpine settings. *Agrostis variabilis* is readily distinguished from *A. humilis* by its florets that lack paleas and from *A. mertensii* by lacking lemma awns.

Alopecurus L., Foxtail

Bunched to rhizomatous perennials and annuals. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescences** a cylindrical compact spike-like panicle. **Spikelets** with 1 floret; glumes fused at the base. **Lemma** short to long awned; palea well developed. **Disarticulation** below glumes; unit of dispersal the spikelet.

A cool season genus of about 35 species distributed in temperate northern hemisphere, eight of which occur in N. America.

1. Panicle ovoid; glumes densely woolly over entire surface *A. magellanicus*
1. Panicle cylindrical; glumes hairy mostly on the veins 2.
2. Spikelets 4--6 mm long; anthers 2--4 mm long; leaf blades often >4 mm wide; perennials 3.
2. Spikelets 2--4 mm long; anthers up to 1 mm long; leaf blades often <4 mm wide; annuals and perennials 4.
3. Awns straight, included in or barely extending (up to 2 mm) beyond glumes; lemma obliquely truncate; strongly rhizomatous grasses forming large diffuse patches; leaf blades scabrous on upper surface *A. arundinaceus*
3. Awns bent, extending >2 mm beyond glumes; lemma acute; well-developed bunchgrass not producing rhizomes (some stems may root at lower nodes); leaf blades smooth on upper surface *A. pratensis*
4. Awns from about the middle of lemma, extending slightly to 1 mm beyond glumes *A. aequalis*
4. Awns from the lower third of lemma, extending well beyond 1 mm past the glumes 5.
5. Anthers 0.3--0.5 mm long; glumes 2--2.5(--3.0) mm long; annuals *A. carolinianus*
5. Anthers 1.2--2.2 mm long; glumes 2.0--3.5 mm long; perennials *A. geniculatus*

Alopecurus aequalis Sobol. Stream or Shortawn foxtail Perennial bunchgrass, occasionally a winter annual. **Stems** 2--6 dm tall. **Leaves:** blades 2--5 mm broad. **Inflorescence** a cylindrical panicle 2--6 cm long, 4--5 mm in diameter. **Spikelets** 1.9--2.1 mm long, glumes silky along the veins. **Lemmas** awnless or awn extending up to 1 mm beyond lemma tip, arising from or just below the middle of the lemma. Stagnant water, stream sides and flood banks, and wet meadows at most elevations. Throughout most of N. America excepting much of the southeast.

Alopecurus arundinaceus Poir. Creeping meadow foxtail. Rhizomatous perennial. **Stems** 1--2 m tall, 1-several from nodes of rhizomes. **Leaves:** blades 6--14 mm wide, ligule 2--5 mm long. **Inflorescence** a cylindrical panicle 4--10 cm long, 7--10 mm in diameter. **Spikelets** 4.0--5.5 mm long; glumes silky mostly from along marginal and midrib veins. **Lemmas** with awn from base but extending only to tip of lemma and rarely beyond. Hay meadows, along ditches, alkaline seeps, and wet meadow at low to middle elevations. Introduced throughout the northern Great Plains and Rocky Mountain regions.

Similar to *Alopecurus pratensis* but *A. arundinaceus* has broader and more scabrous (silica-rich) leaf blades. Cultivar releases of this species (e.g., "Garrison Creeping Foxtail") may have enhanced the widespread distribution of this no-longer-desirable hay grass.

Alopecurus carolinianus Walter Carolina foxtail. Annual (and winter annual) bunchgrass. **Stems** 1--3 dm tall. **Leaves:** blades 2--4 mm wide. **Inflorescence** a cylindrical panicle 1--3 cm long, <5 mm in diameter. **Spikelets** 2.5--3.0 mm long; glumes silky along the keel and marginal veins. **Lemmas** with an awn from the base and extending 2--3 mm past tip of lemma. Moist disturbed areas, wet meadows and seep areas at low to moderate elevations. Throughout most of the U.S. and adjacent southwestern Canada.

A co-occurrence with *Psilocarphus brevissimus* (Asteraceae) suggests this species is common to low swales in dry settings.

Alopecurus geniculatus L. Water foxtail. Perennial bunchgrass. **Stems** 1--3 dm tall. **Leaves:** blades 2--4 mm wide. **Inflorescence** a cylindrical panicle 1--3 cm long, <5 mm in diameter. **Spikelets** 1.8--2.1 mm long; glumes silky along the keel and marginal veins. **Lemmas** with an awn from the base and extending 2--3 mm past tip of lemma. Moist disturbed areas, wet meadows, and muddy and gravelly banks at low to moderate elevations. Throughout most of N. America excepting much of the southeastern U.S. and northcentral Canada.

The difference between *Alopecurus geniculatus* and *A. carolinianus* may involve little other than the robust perennial growth form of the former. *Alopecurus geniculatus* may have a much more distinct and larger bunched habit compared to *A. carolinianus*.

Alopecurus magellanicus Lam. [*Alopecurus alpinus* J.E. Smith, *Alopecurus borealis* Trin.] Boreal alopecurus, Alpine foxtail. Rhizomatous perennial. **Stems** few-bunched, 2--10 dm tall. **Leaves:** blades 2--6 mm broad. **Inflorescence** a dense ovoid panicle 1.5--4.0 cm long, >1 cm in diameter. **Spikelets** 3--4 mm long; glumes silky over entire surface. **Lemmas** with an awn extending 2.5--3.0 mm beyond lemma tip, emanating from the middle. Moist montane to subalpine meadows and in hot spring areas. Throughout all of Canada and the northern Rocky Mountain region of the U.S.

Dense stands of this species are distinctive because the ovoid inflorescences are subtended by a flag leaf that is angled and oriented uniformly in the same direction throughout a population.

Alopecurus pratensis L. Meadow foxtail. Perennial bunchgrass. **Stems** 3--10 dm tall. **Leaves:** blades 3--8 mm wide. **Inflorescence** a cylindrical panicle 3.5--8.0 cm long, 5--10 mm in diameter. **Spikelets** 5--6 mm long; glumes silky

along the keel and marginal veins. **Lemmas** awned from near the base, awn extending 3--4 mm beyond lemma tip. Disturbed moist sites like roadsides and often in seasonally inundated settings (e.g., margins of reservoirs). Throughout most of N. America excepting the much of the very south.

Andropogon L., Bluestem

Bunched or rhizomatous perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** terminating lateral stem branches with one to several spikes (of spikelet pairs). **Sessile spikelet** bisexual; pedicellate spikelet rudimentary to well developed and staminate. **Lemmas** hardened and dorsally compressed; palea well developed. **Disarticulation** below the glumes; unit of dispersal the floret cluster.

With about 120 species distributed worldwide in mainly warm temperate and tropical climates, 13 species occur in North America mainly in the southeast. Typically in grasslands and open understory but in MT *Andropogon* is warm season and most common and diverse along roadsides and similar disturbed settings. In keeping with McGregor et al. (1986), *Andropogon* includes the genera *Bothriochloa* Kuntze and *Schizachyrium* Nees.

1. Hairs of rachis and pedicels mostly longer than 3 mm; glumes mostly yellowish; awn of fertile lemma mostly 4--7 mm long, straight; rhizomes prominent *A. hallii*

1. Hairs of rachis and pedicels 3 mm or less long; glumes mostly purplish or greenish; awn of fertile lemma bent, mostly 9--18 mm long; rhizomes short or absent 2.

2. Racemes or spikes of spikelet pairs clustered at the tip of the stem, lateral inflorescences absent; pedicellate spikelet borne on a pedicel that is flattened and grooved on both sides, membranous in the groove and easily punctured with a dissecting needle *A. ischaemum*

2. Racemes or spikes of spikelet pairs clustered at the tips of stem and lateral branches; pedicellate spikelet borne on a pedicel that is not flattened or strongly grooved, pedicel hard or tough textured throughout 3.

3. Stem branches terminating in a single spike of spikelet pairs; pedicellate spikelet much smaller than the sessile spikelet, mostly 1--3 mm long; leaf sheath keeled *A. scoparius*

3. Stem branches terminating in at least several mostly digitately arranged spikes of spikelet pairs; pedicellate spikelet similar in size to the sessile spikelet, usually >5.5 mm long; leaf sheath not keeled *A. gerardii*

Andropogon gerardii Vitman. Big bluestem Perennial bunchgrass. **Stems** 1--2 m tall, often glaucous, sometimes with short rhizomes. **Leaves:** blades 5--10 mm wide, ligule 1.0--2.5 mm long with a fringe of hairs. **Inflorescence** 4--16 cm long, internodes 3--6 mm long, whitish hairy at nodes and along margins of internodes, the hairs to 3 mm long. **Spikelets:** sessile and pedicellate spikelets 6--11 mm long; glumes mostly purplish, acute. **Lemmas:** fertile lemma 4--6 mm long, awn (6)10--18 mm long, bent. Along roadsides and similarly disturbed settings in eastern MT. Throughout most of N. America except in the very western tier of states and provinces.

Andropogon gerardii, along with *Andropogon hallii*, *Bouteloua hirsuta*, *Buchloe dactyloides*, *Dichanthelium wilcoxianum*, *Muhlenbergia cuspidata*, and *Stipa spartea*, represent the only grass species occurring in Montana that could be of Great Plains origin.

Andropogon hallii Hack. Sand bluestem Perennial bunchgrass bearing extensive rhizomes. **Stems** 1--2 m tall, often glaucous. **Leaves:** blades 3--10 mm wide, ligule 2.0--4.5 mm long with a fringe of hairs. **Inflorescence** 5--7 cm long, internodes 4--6 mm, densely whitish hairy at nodes and along margins of internodes, the hairs 3--5 mm long. **Spikelets:** sessile and pedicellate spikelets 7--10 mm long; glumes mostly yellowish, acute. **Lemmas:** fertile lemma 4--5 mm long, awn 4--7 mm long, straight. Along roadsides and similarly disturbed settings in eastern MT. Throughout most of N. America in the central tiers of provinces and states.

Plants intergrading between *Andropogon gerardii* and *A. hallii* may have well-developed rhizomes but with hairs on inflorescence rachis <3 mm long, glumes mostly purplish, and lemma awns 10 mm long or longer.

Andropogon ischaemum L. [*Bothriochloa ischaemum* (L.) Keng] Yellow bluestem Perennial bunchgrass. **Stems** 6--10 dm tall, leaf sheaths not keeled. **Leaves:** blades 1--3 mm wide; ligule 0.5--1.5 mm long with a fringe of hairs. **Inflorescence** with numerous (2--8) racemes or spikes, each about 3--7 cm long, terminating the main stem in an apparently digitate arrangement. **Spikelets:** rachis and pedicels silky hairy along margins; sessile spikelets 3--4.5 mm long, glumes purplish to greenish, acute. **Lemmas:** fertile lemma with an awn 9--17 mm long; pedicellate spikelet about as large as the sessile spikelet. Roadsides; collected in Lake co. Introduced in southern U.S.

Andropogon scoparius Michx. [*Schizachyrium scoparium* (Michx.) Nash] Little bluestem Perennial bunchgrass occasionally with short rhizomes. **Stems** 3--10 dm tall, often red or rust colored when mature; sheaths flattened and keeled. **Leaves:** blades 2--5 mm wide; ligule 1--3 mm long. **Inflorescence** with numerous lateral branches each bearing a single spike 3--6 cm long; rachis and pedicels long hairy along margins. **Spikelets:** sessile spikelets 6--8 mm long,

glumes purplish to greenish, acute. **Lemmas:** fertile lemma 4--6.5 mm long, with an awn 5--13 mm long; pedicellate spikelet reduced to a small glume 1--3 mm long. On gravelly, rocky, and sandy soils especially in overgrazed rangelands and roadside. Throughout most of N. America except at extreme northern latitudes.

Anthoxanthum L., Hornwort

Bunched to sometimes single-stemmed perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to contracted panicle. **Spikelets** with 3 florets; at least the first glume as long as the floret cluster. **Lemmas** of first and second floret staminate and awnless or awned from the back, third floret fruit-bearing; palea enclosed in the floret. **Disarticulation** above glumes; unit of dispersal a floret cluster.

A cool season genus of about 50 temperate species from the North and South Hemispheres, seven of which occur in N. America. The well-known sweetgrass genus *Hierochloa* R. Br. is included in *Anthoxanthum*.

1. Inflorescence an open pyramidal panicle; glumes subequal in size and shape; the lower two staminate lemmas awnless or essentially so **A. hirtum**

1. Inflorescence a contracted spicate panicle; 1st glume distinctly shorter and narrower than 2nd; the lower two staminate lemmas with an awn 3--5 mm long **A. odoratum**

Anthoxanthum hirtum (Schrank) Schouten & Valdkamp [*Hierochloa odorata* (L.) P.Beauv., *Hierochloa hirta* (Schrank) Borbas ssp. *arctica* (Presl) G.Weim.] Northern sweetgrass Perennial bunchgrass with creeping rhizomes. **Stems** 1--few bunched, 3--10 dm tall. **Leaves:** blades 2--6 mm wide. **Inflorescence** a pyramidal panicle 4--12 cm long. **Spikelets** 3--6 mm long. **Lemmas** the first two larger and more hairy than the glabrous uppermost floret (which is concealed by the lower two), unawned or with an awn up to 0.5 mm long. Wet meadows from low to high elevations especially in western MT. Throughout the U.S., including AK, but not in the southeast.

Anthoxanthum odoratum L. Sweet vernalgrass Perennial bunchgrass. **Stems** 3--6 dm tall. **Leaves:** blades 3--7 mm wide. **Inflorescence** a contracted panicle 2--9 cm long, about 10 mm in diameter. **Spikelets** 8--10 mm long. **Lemmas** the first two awned, hairy, and concealing the third or uppermost glabrous and unawned lemma. Roadside and similarly disturbed sites. Introduced throughout N. America excepting many of the central states and provinces.

Apera Adans., Silkybent

Bunched to single-stemmed annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted spike-like panicle. **Spikelets** with one floret; glume with a scabrous midvein. **Lemma** with a well-developed awn emanating from near the tip. **Disarticulation** above glumes; dispersal unit the floret.

A cool season genus of three species from Europe and adjacent Asia, two of which have been introduced into North America. Sometimes included in the genus *Agrostis*.

Apera interrupta (L.) P.Beauv. [*Agrostis interrupta* L.] Dense silkybent or longawn bentgrass Annual bunchgrass. **Stems** few-bunched, 1.5--4.0 dm tall. **Leaves:** blades 0.5--1.0 mm wide. **Inflorescence** a contracted panicle 2--8 cm long. **Spikelets** 1.7--2.0 mm long. **Lemmas** 1.5--1.9 mm long, awned from the upper two-thirds with a slender awn 5--9 mm long; palea about as long as the lemma. Disturbed moist settings including depressions where water collects and lake margins at moderate elevations. Sporadic but introduced throughout N. America except in the central tier of provinces and states and in the southeast.

Aristida L., Threeawn

Bunched annuals and perennials. **Leaf blades** generally inrolled and ascending, sheaths with overlapping margins; ligule a fringe of hairs. **Inflorescence** an open to contracted panicle. **Spikelets** with one floret; second glume longer than the first glume and floret. **Lemma** tip bearing a tripartite awn; palea enclosed in floret. **Disarticulation** above the glumes; dispersal unit the floret.

A warm season genus of over 250 tropical to warm temperate species of which 29 are native to North America and mostly in arid regions. *Aristida* is classified into Aristideae, a tribe superficially similar to Stipeae except for the ligule hairy, tripartite awn, and warm season physiology.

Aristida purpurea Nutt. [*Aristida longiseta* Steud., *Aristida purpurea* var. *longiseta* (Steud.) Vasey, *A. fendleriana* Steud., *Aristida purpurea* var. *fendleriana* (Steud.) Vasey] Purple threeawn Perennial bunchgrass. **Stems** 1.5--4 dm tall. **Leaves:** blades curly to straight, 1--2 mm wide; ligules hairy, 0.3--0.5 mm long. **Inflorescence** a contracted panicle 6--25 mm long. **Spikelets** 10--18 mm long excluding awns; first glume one-half the length of the second. **Lemma** 9--15

mm long (including awn column), gradually tapering into the tripartite awn, awn segments 2--5 cm long. Open dry often shrub-steppe settings and on various soils. Throughout much of western two-thirds of N. America.

Aristida purpurea var. *fendleriana* is distinguished by lemma awns about 20--40 mm long, whereas *Aristida purpurea* var. *longiseta* has lemma awns 40--100 mm long. Leaf blades vary from congested basally to distributed along the stem, but these forms don't covary with awn length except that short curly basal leaf blades co-occur with shorter lemma awns, but not always. Both forms can be found at a single site, however.

Arrhenatherum P.Beauv., Oatgrass

Bunched perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescences** a contracted panicle. **Spikelets** with 2 florets; glumes 1 nerved. **Lemma** of staminate (first) floret awned, lemma of fertile (second) floret short- to long-awned; palea well developed. **Disarticulation** above glumes; dispersal unit the floret cluster.

A cool season genus of about six species native to the Mediterranean region; one species introduced into N. America.

Arrhenatherum elatius (L.) Presl Tall oatgrass Perennial bunchgrass. **Stems** 4--12 dm tall, base of stem not enlarged or bulbous. **Leaves:** blades 5--9 mm wide. **Inflorescence** a contracted panicle, 12--30 cm long, the branches short and verticillate. **Spikelets** 8--10 mm long. **Lemmas** 8--9 mm long, lowermost with a twisted bent awn 1--1.6 cm long, occasionally the upper floret with an awn. Mountain meadows, rangeland, pastures, and roadside ditches, and sometimes cultivated. Introduced throughout much of N. America.

MT specimens belong to subsp. *elatius* because they lack densely hairy nodes and the swollen basal internodes, in contrast to the subsp. *bulbosum* (Willd.) Schubl. & G. Martens. "Weed-free" hay may be spreading this grass because it seems abundant where horse use is common, even in some backcountry mountain meadows.

Avena L., Oat

Bunched annuals and perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 2--4 florets; glumes 9--11 nerved. **Lemmas** long awned from back; palea well developed; disarticulation above glumes. **Dispersal unit** the individual florets.

A cool season genus of about 29 species native to temperate regions of north Africa, Europe, and Asia. Some species cultivated or colonizing and widely distributed. Six species occur in N. America. *Avena sterilis* L., animated oat, is occasionally cultivated near Billings for its large spikelets used in dry arrangements. *Avena barbata* Pott ex Link, slender oat, may occur in MT and would be distinguished from *Avena fatua* by long lemma teeth tapering into a small hair-point and capillary curving pedicels that would render a very open arrangement of the spikelets along each branch. Although many oatgrasses used to be classified in the tribe Aveneae, they are no longer recognized as a group (Barkworth 2003 & 2007). Some phylogenetic evidence (Soreng et al. 1990) suggests that Aveneae characters such as large glumes combined with awned lemma backs or dimorphic florets often mark groups of closely related species.

1. Lemmas hairy to essentially hairless, with a twisted bent awn; callus of lemma ring-like and conspicuously hairy; Spikelets usually with 3 florets

A. fatua

1. Lemmas hairless and awnless or awn straight; callus of lemma inconspicuous; spikelets usually with 2 florets

A. sativa

Avena fatua L. Wild oat Annual bunchgrass. **Stems** 5--10 dm tall. **Leaves:** blades 5--10 mm wide. **Inflorescence** an open panicle. **Spikelets** 20--25 mm long, usually with at least 3 florets. **Lemmas** hairless to most often long hairy, with a twisted bent blackish awn 3--4 cm long and a conspicuously hairy callus. In and around cultivated fields, roadsides, and pastures at low to moderate elevations. Introduced throughout most of N. America.

Avena sativa L. [*Avena fatua* var. *sativa* (L.) Hausskn.] Common oat Cultivated annual bunchgrass. **Stems** 5--10 dm tall. **Leaves:** blades 5--10 mm wide. **Inflorescence** an open panicle 10--25 cm long. **Spikelets** 17--22 mm long, usually with 2--3 florets. **Lemmas** hairless, awnless or with a straight whitish awn 0.1--3.0 cm long, with an inconspicuous hairless callus. Escaping cultivation at margins of fields and along roadsides and similarly disturbed settings. Introduced throughout most of N. America.

Beckmannia Host, Sloughgrass

Bunched annuals and perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted panicle. **Spikelets** ovate, with 1 floret; glumes 1 nerved, strongly laterally compressed. **Lemmas** minutely awned from near tip; palea well developed. **Disarticulation** below glumes; dispersal unit the spikelet.

A cool season genus of two species native to temperate regions of the northern hemisphere, and one occurs in N. America.

Beckmannia syzigachne (Steudel) Fernald American sloughgrass Annual bunchgrass. **Stems** few-many-bunched, 1--8 dm tall. **Leaves:** blades 4--10 mm wide. **Inflorescences** a contracted secund panicle 5--30 cm long. **Spikelets** circular, strongly laterally flattened, 2.5--3.0 mm long. **Lemmas** with an apiculate tip (approaching a very short awn in some spikelets). Wet meadow, along ditches, streams, and lake banks, often rooted below water level. Throughout most of N. America except in the southeast.

Bromus L. Brome

Single-stemmed to bunched perennials and annuals. **Leaf blades** generally flat and lax, sheath margins mostly fused; ligule membranous. **Inflorescence** an open to contracted panicle, rarely a raceme. **Spikelets** with several-many florets; glumes weakly to strongly keeled. **Lemmas** often hairy and strongly keeled, prominently veined, awned from a bifid apex; palea fused to the fruit. **Disarticulation** above glumes; dispersal unit the floret or caryopsis and palea.

A cool season genus of at least 100 species mostly in temperate regions world-wide, of which 52 occur in North America and 28 of these are native. *Bromus* is more closely related to the tribe Triticeae and thus has been segregated as tribe Bromeae (e.g., Barkworth et al. 2007). *Bromus latiglumis* (Shear) A.S. Hitchcock [*Bromus altissimus* Pursh], earlyleaf brome, might be found in northeastern MT where it would be distinguished from other perennial bunched native brome-grasses by its culms with 9 to 20 nodes, leaf sheath densely pilose in the region of the collar and throat, and auricles 1--2.5 mm long on most lower leaves.

- | | |
|--|-----------------------|
| 1. Plants annual, including winter annuals | 2 |
| 1. Plants perennial | 8 |
| 2. Lemmas gradually tapered into 2 narrow teeth; awn >10 mm long; first glume 1-veined | 3 |
| 2. Lemmas somewhat rounded at tip, awnless or with an awn usually <10 mm; first glume 3- to --5-veined | 4 |
| 3. Lemma body (without awn) 9--12 mm long | <i>B. tectorum</i> |
| 3. Lemma body (without awn) 20--35 mm long | <i>B. diandrus</i> |
| 4. Spikelets awnless or with awn up to 1 mm long; florets inflated and appearing like the rattles in the tail of a rattle snake | <i>B. briziformis</i> |
| 4. Spikelets awned, the awn 2 mm long or longer; not inflated | 5 |
| 5. Lemma usually completely wrapping around the fruit, at least at the base, often rounded and well separated from others (rachilla of spikelet often visible); palea equal in length to the lemma | <i>B. secalinus</i> |
| 5. Lemma usually not wrapping around the fruit, often flattened laterally and tightly overlapping the adjacent lemmas; palea distinctly shorter in length than the lemma (except in <i>B. hordeaceus</i>) | 6 |
| 6. Panicle narrow, the branches short and ascending; pedicels mostly shorter than spikelets | <i>B. hordeaceus</i> |
| 6. Panicle more open; pedicels much longer than the spikelets | 7 |
| 7. Spikelets usually 5--10 mm wide; lemmas 5--7 mm wide, diamond-shaped in outline when flattened; spikelets borne mostly singly from branch ends; awns curved outward >90 degrees | <i>B. squarrosus</i> |
| 7. Spikelets <6 mm wide; lemmas 4--5 mm wide, elliptic in outline when flattened; awns straight or curved outward, <90 degrees; spikelets often several from branch ends | <i>B. japonicus</i> |
| 8. Rhizomes prominent; panicle branches ascending to erect | <i>B. inermis</i> |
| 8. Rhizomes not well-developed; panicle branches spreading or nodding to drooping (except <i>B. carinatus</i>) | 9 |
| 9. Spikelets strongly laterally compressed or flattened; lemmas sharply folded along the prominent keel; 1 st glume 3- to 5-veined, 2 nd glume 5--9 veined | <i>B. carinatus</i> |
| 9. Spikelets weakly compressed or not laterally flattened; lemmas broadly rounded on back; 1 st glume 1- to 3-veined, 2 nd glume 3- to --5-veined | 10 |
| 10. Inflorescences spreading and ascending, ligules 2--6 mm long; lemma awns mostly >5 mm long | <i>B. vulgaris</i> |
| 10. Inflorescences distinctly drooping, ligules 0.5--2.0 mm long; lemma awns mostly <5 mm long | 11 |
| 11. Lemmas hairy along margins and sometimes over the lower back; glumes not hairy except sometimes at midvein; first glume usually 1-veined; leaf blades usually >5 mm wide | <i>B. ciliatus</i> |

11. Lemmas usually evenly hairy over the entire back, more densely so near the base towards the margins; glumes usually hairy; first glume mainly 3-veined; leaf blades usually ≤ 5 mm wide

B. porteri

Bromus briziformis Fisch. & C.A.Mey. Rattlesnake brome Annual bunchgrass. **Stems** 15--50 cm. **Leaves:** blades 2--5 mm wide. **Inflorescence** an open panicle or raceme 4--12 cm long. **Spikelets** 9--14 mm long, appearing inflated, with 5 to 9 florets. **Lemmas** awnless or awn-tipped. Roadside, edges of crop fields, parking lots, and pastures. Introduced throughout most of N. America except in the southeast and some central provinces and states.

Bromus carinatus Hook. & Arn. [*Bromus marginatus* Nees ex Steud., *B. polyanthus* Scribn. ex Shear] Mountain brome Perennial bunchgrass. **Stems** 50--100 cm. **Leaves:** blades 6--12 mm wide. **Inflorescence** an open panicle at anthesis, up to 10 cm long. **Spikelets** 17--22 mm long with 5 to 10 florets. **Lemmas** with an awn 8--17 mm long. Open understory and adjacent meadows in the mountains. Throughout much of the western half of N. America and disjunct in the New England region.

Bromus carinatus is distinguished from other perennial bromes by its strongly keeled lemmas that are gray-green distally and often straw-colored basally with no purplish pigment. *Bromus marginatus* indistinctly differs from *B. carinatus* by having lemma awns 4--7 mm long, and *B. polyanthus* has glabrous lemmas and leaf sheaths (that latter at least in the vicinity of the throat). *Bromus aleutensis* Trin. ex Griseb. (Aleut brome) may occur in northwestern MT and would be distinguished from *B. carinatus* by its lower inflorescence branches that measure up to 20 cm long and bear 1 to 3 spikelets distally and stems 3--7 mm thick. *Bromus carinatus* in contrast has lower inflorescence branches <10 cm long that bear 1 to 5 spikelets variously positioned along the branch and stems that are <4 mm thick. *Bromus catharticus*, rescue grass, may occur in MT; it has lemma awns <3.5 mm long or lemmas with 9 to 13 prominent veins.

Bromus ciliatus L. Fringed brome Perennial bunchgrass. **Stems** 70--100 cm. **Leaves:** blades 7--10 mm wide. **Inflorescence** an open panicle 15--25 cm long. **Spikelets** 9--13 mm long with 5 to 8 florets. **Lemmas** with a straight awn 3--4 mm long. Open to closed montane understory. Throughout most of N. America excepting much of the southeast.

Very similar to *B. porteri* in the drooping panicle and generally montane understory habitat. *Bromus richardsonii* Link. is reported from south-central MT and is very similar to *B. ciliatus* except that the backs of the upper lemma surfaces are hairy, the 2nd glumes are 9--11 mm long, and the anthers are ca. 2 mm long, while *B. ciliatus* has glabrous upper lemma surfaces, 2nd glumes ca. 7.0--8.5 mm long, and anthers ca. 1.0--1.4 mm long.

Bromus diandrus Roth [*Bromus rigidus* Roth] Ripgut brome Annual bunchgrass. **Stems** 40--90 cm. **Leaves:** sheaths sparsely to densely long-soft-hairy; blades 2--5 mm wide. **Inflorescence** 8--30 cm, open, drooping. **Spikelets** strongly compressed with 3 to 9 florets; glumes keeled, generally glabrous; lower 8--16 mm long, 1-veined; upper 10--18 mm long, 3-veined. **Lemma** body 20--25 mm long, back rounded, densely silky-hairy, teeth 3--5 mm long, thread-like; awn 14--22 mm, bent, twisted below middle. Disturbed sites, partial shade, open understory, edges of buildings, and rocky sites; collected in Gallatin and Missoula cos. Introduced throughout most of western and southern N. America.

Bromus hordeaceus L. [*Bromus mollis* L.] Soft brome Annual bunchgrass. **Stems** 20--80 cm. **Leaves:** blades 2--3 mm wide. **Inflorescence** a narrow panicle 3--10 cm long. **Spikelets** 8--13 mm long with 5 to 7 florets. **Lemmas** with a straight awn 6--10 mm long. Disturbed sites especially gravelly roadsides, lots, and loose steep rocky sites. Introduced throughout much of N. America.

Bromus inermis Leyss. [*Bromus inermis* Leyss. ssp. *pumpellianus* (Scribn.) Wagnon *B. inermis* var. *pumpellianus* (Scribn.) C.L. Hitchc., *B. inermis* var. *purpurascens* (Hook.) Wagnon, *B. pumpellianus* Scribn.] Smooth brome Rhizomatous perennial. **Stems** 30--130 cm. **Leaves:** blades 4--12 mm wide, often with a "W" wrinkle about halfway along the leaf blade. **Inflorescence** a narrow panicle 7--18 cm long. **Spikelets** 15--30 mm long, with 8 to 15 florets. **Lemmas** awnless, ≤ 2 mm long when lemmas glabrous or 3--10 mm long when lemmas hairy. Roadsides, pastures, meadows, and grasslands from low to middle montane elevations. Introduced throughout most of N. America, whereas native populations (*Bromus pumpellianus*) occur at higher latitudes and elevations through much of Canada and the Pacific Northwest region of the U.S.

Native populations are referred to *Bromus pumpellianus* or *Bromus inermis* var. *purpurascens*, Pumpelly's brome, which occupies generally montane rather than low elevation settings. They differ from introduced populations (*B. inermis* in the strict sense) by having hairs on the leaf sheaths, leaf blades, and lemmas, ligules 1.2--5 mm long, and lemma awns 3--10 mm long. *Bromus inermis* in the strict sense has hairless leaf sheaths and blades, ligules 0.5--1.0 mm long, lemmas often awnless or awn-tipped. The covariation of these morphologies and ecology is not evident in MT.

Bromus japonicus Thunb. Japanese brome Annual bunchgrass. **Stems** 20--60 cm. **Leaves:** blades 2--4 mm wide. **Inflorescence** an open panicle 10--20 cm long, the branches drooping to one side and at least some flexuous, each branch bearing several spikelets. **Spikelets** 8--13 mm long, with 5 to 11 florets. **Lemmas** broad; awn 2--6 mm long,

straight to curved downward at maturity. Roadsides, pastures, overgrazed sagebrush steppe, sites with strongly fluctuating water levels, and other open disturbed dry sites. Introduced throughout nearly all of N. America.

This is perhaps the most common annual brome found throughout MT. *Bromus berterioanus* Colla [*B. trinii* Desv.], Chilean chess, is reported to grow in MT (Barkworth et al. 2007). It would be identified as *B. japonicus* (or *Bromus squarrosus*) but the lemma awns in *B. berterioanus* are geniculate and strongly twisted at the base. *Bromus japonicus* is sometimes included under *B. arvensis*, but see notes under *B. secalinus*.

Bromus porteri (J.M.Coulter) Nash [*Bromus anomalus* Rupr. ex Fourn. misapplied] Porter or nodding brome Perennial bunchgrass. **Stems** 30--90 cm. **Leaves:** blades 3--5 mm wide. **Inflorescence** an open panicle 6--10 cm long. **Spikelets** 15--20 mm long, with 5 to 11 florets. **Lemmas** hairy with an awn (1)2--3 mm long. Open to closed montane understory, sometimes at edges of forested sites. Throughout much of the western one-half of N. America.

Bromus porteri is a northern form of the Texas endemic *B. anomalus* and is very similar to *B. ciliatus* but differs by its distinctly hairy glumes and lemmas.

Bromus secalinus L. Chess or rye brome. Annual bunchgrass. **Stems** 30--60 cm. **Leaves:** blades 4--8 mm wide. **Inflorescence** a nodding panicle 7--12 cm long. **Spikelets** 10--15 mm long, with 5 to 8 florets. **Lemmas** with a straight or down-curved awn 10--20 mm long. Disturbed sites, roadsides, and overgrazed rangelands. Introduced throughout most of N. America.

Bromus secalinus can be distinguished from the more common *B. japonicus* by having spikelets with lemmas distinctly separated enough to render the rachilla visible, distinctly twisted and erect awns, hairless to nearly hairless leaf sheaths, and stem bases ca. 2--3 mm diameter. *Bromus arvensis* L., field brome, is reported from MT and is distinguished from *B. secalinus* by its purplish tinged spikelets, anthers 2.5--5.0 mm long, and lower leaf sheaths with soft appressed hairs. *Bromus commutatus* Schrader is reported from MT (Dorn 1984). It is distinguished by lemmas with straight awns and spikelets born from straight spreading pedicels.

Bromus squarrosus L. Corn brome Annual bunchgrass. **Stems** loosely bunched, 40--60 cm. **Leaves:** blades 2--4 mm wide. **Inflorescence** an open panicle 10--20 cm long, the branches short, not secund, each bearing one spikelet, at least some flexuous. **Spikelets** 10--16 mm long, with 7 to 12 florets. **Lemmas** broad with a flattened awn 2--6 mm long, bending outward at maturity. Disturbed sites especially roadsides. Introduced generally across southern Canada and northern U.S.

This species is very similar to *B. japonicus* but is distinguished by lemmas with distinctly hyaline margins (up to 0.9 mm broad), which render a miniature rattlesnake-tail appearance to the spikelet.

Bromus tectorum L., Cheatgrass, downy brome Annual bunchgrass. **Stems** 20--50 cm. **Leaves:** blades 2--4 mm wide. **Inflorescence** an open, often nodding panicle 2--15 cm long. **Spikelets** 10--17 mm long, with 3 to 6 florets. **Lemmas** 9--12 mm long, gradually tapered into two narrow teeth; awn straight or twisted, 12--20 mm long. Roadsides, overgrazed rangeland and sagebrush steppe, and open dry understory. Throughout most of N. America.

Poorly developed plants may be as small as 4 cm and have a single spikelet. *Bromus rubens* L., red brome, has been reported from Montana (Invaders Database: <http://invader.dbs.umt.edu/>) and is similar to *B. tectorum* except for the short erect pedicels that render an erect congested panicle.

Bromus vulgaris (Hook.) Common or Columbia brome Perennial bunchgrass. **Stems** 80--100 cm. **Leaves:** blades 5--10 mm wide. **Inflorescence** an open, nodding or drooping panicle 7--15 cm long. **Spikelets** 2.0--2.5 mm long, with 5 to 7 florets. **Lemmas** with a straight to twisted awn 12--18 mm long. Montane grasslands and open understory. In N. America mainly along the western tiers of provinces and states.

Distinguished by its conspicuous ligule >2 mm long and inflorescences of ascending to erect spikelets, which are glabrate and with tightly clasping lemmas (i.e., the florets are not conspicuously splayed out laterally).

Bouteloua Lag., Grama

Bunched or matted perennials or annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a panicle with 1-many short lateral secund spikes. **Spikelets** with 1 fruit-bearing floret and 1--2 rudimentary spikelets. **Lemma** distinctly 3-nerved, awned; palea mostly enclosed in floret. **Disarticulation** above glumes or below; unit of dispersal the floret or a lateral spike of spikelets.

A genus of about 40 species centered in the deserts of southern United States and Mexico and in Central and S. America; 19 of these occur in N. America.

1. Plants annual; stems several in a bunch, sprawling to erect
1. Plants perennial; stems many in a bunch, nearly always erect

B. barbata
2.

2. Lateral spikes numbering 20--50 or more on a single stem, mostly oriented in a downward direction; disarticulation below glumes, the unit of dispersal is a lateral spike of spikelets
B. curtipendula
2. Lateral spikes numbering 1--10 on a single stem, divergent and not generally oriented in a downward direction; disarticulation above glumes, the unit of dispersal is a floret 3.
3. Rachis of a lateral spike projecting beyond the terminal spikelets; black gland-based hairs present on at least the second glume; callus of sterile lemma not hairy
B. hirsuta
3. Rachis of a lateral spike not projecting beyond the terminal spikelets; clear gland-based hairs on the second glume or absent; callus of sterile lemma densely hairy
B. gracilis

Bouteloua barbata Lag. Sixweeks grama Annual bunchgrass. **Stems** 1--4 dm long. **Leaves:** blades 1--2 mm wide, often curled. **Inflorescence** of 4--7 second lateral divergent spikes, each 1--2 cm long and with 25--45 spikelets. **Spikelets** 3--4 mm long. **Lemmas** hairy and with an awn to 2 mm long, disarticulating from the spikelet, rudimentary florets 1--2. Open dry disturbed sites, probably ephemeral; collected in Gallatin and Carbon cos. Throughout southwest N. America.

Bouteloua curtipendula (Michx.) Torr. Sideoats grama Perennial bunchgrass with scaly rhizomes. **Stems** 4--7 dm long. **Leaves:** blades 2--6 mm wide, somewhat curled. **Inflorescence** of 20--50 second lateral downward-oriented spikes, each 1--2 cm long and with 3--6 spikelets. **Spikelets** 4--5 mm long. **Lemmas** essentially hairless, awn-tipped, these falling with the lateral spike of spikelets; rudimentary florets 1. Open dry rocky slopes and open understory often where *Yucca glauca* is common. Throughout much of N. America.

Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths Blue grama Perennial bunchgrass or sodgrass. **Stems** 2--5 dm long. **Leaves:** blades 1--2 mm wide, often curled. **Inflorescence** of 1--4 second lateral divergent spikes, each 2.0--4.5 cm long and with 50--80 spikelets, each lateral rachis terminated by a spikelet, **Spikelets** 4.0--5.5 mm long, second glume essentially hairless or with clear gland-based hairs. **Lemmas** essentially hairless, short-awned, these disarticulating from the spikelet; rudimentary florets 1, densely hairy. Open dry shrub-steppe vegetation and open understory. Throughout much of N. America except at extreme northern latitudes and in much of the southeast.

Bouteloua hirsuta Lag. Hairy grama Perennial bunchgrass or sodgrass. **Stems** 1--6 dm long. **Leaves:** blades 1--2 mm wide, somewhat curled. **Inflorescence** of 1--4 second lateral divergent spikes, each 2.5--3.5 cm long and with 30--50 spikelets, each lateral rachis not terminated by a spikelet. **Spikelets** 4.5--5.5 mm long, with black gland-based hairs on second glume, Lemmas essentially hairless, short-awned, these disarticulating from the spikelet; rudimentary florets 1, densely hairy. Expected in southeastern MT (McGregor et al. 1986). Throughout much of the U.S. except in the extreme west and some of the most eastern states.

Buchloe Engelm., Buffalograss

Stoloniferous, matted, dioecious or occasionally monoecious perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule hairy. **Inflorescence** of two kinds, the staminate a panicle with 1--4 short lateral second spikes, each with 6--12 spikelets with 2 florets, the pistillate a burr-like cluster of 3--5 spikelets fascicled among leaves. **Spikelets** with 1 floret, the second glume becoming hardened and bony in texture and forming the burr-like covering. **Lemma** distinctly 3-nerved, awnless; palea enclosed in floret. **Disarticulation** above glumes in staminate inflorescence or below glumes in pistillate inflorescence; unit of dispersal a 3--5 spikelets enclosed in a burr-like covering.

A warm season genus of 1 species native to prairie regions of central N. America. The genus *Buchloe* has been included within *Bouteloua* (Colombus, 1999) but limited taxon sampling and weakly resolved phylogenetic groupings suggest more evidence is needed.

Buchloe dactyloides (Nutt.) Engelm. [*Bouteloua dactyloides* (Nutt.) J.T.Columbus]. Buffalograss. Perennial sodgrass with creeping stolons. **Stems** 0.4--1.0 dm tall; leaf blades 1.0--1.5 mm wide, curly. **Inflorescence** staminate and pistillate (dioecious), staminate of 1--3 second lateral divergent spikes, each 8--15 mm long and with 10--15 spikelets, pistillate of 4--5 spikelets clustered into a short burr-like head or enclosed in sheathing leaf bases, this falling entire. **Spikelets** 4--6 mm long. **Lemmas** fused 2--5 together into a burr-like structure. Disturbance-prone open dry sites including pastures, roadsides, and lawns. Throughout much of central N. America.

Calamagrostis Adans., Reedgrass

Bunched to rhizomatous perennials. **Leaf blades** generally flat and lax or inrolled and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to contracted panicle. **Spikelets** with 1 floret (sometimes 2 in *C. purpurascens*); glumes with a scabrous keel. **Lemmas** long to short awned, with a conspicuously bearded callus; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of over 100 species in cool temperate regions in both hemispheres, 25 of which occur in N. America. *Calamagrostis epigejos* (L.) Roth, bushgrass or chee reedgrass, a tall introduced rhizomatous perennial with callus hairs much longer than the subtended floret, might be found southwestern MT because it is known albeit rarely from reseeded rangeland and roadsides in adjacent areas of ID and WY.

1. Mature panicle open and diffuse, the branches >2 cm long, the main inflorescence rachis plainly visible through young spikelets (before callus hairs of lemmas begin to unfold at fruit maturity), ligule with a deeply cut jagged margin, glume midrib scabrous *C. canadensis*
1. Mature panicle contracted, the branches mostly <2 cm long, the main inflorescence rachis hidden or nearly so even by young spikelets with callus hairs of lemmas still concealed, ligule not deeply cut, glume midrib smooth 2.
2. Awns bent when mature, usually protruding outside of the glumes 3.
2. Awns straight or nearly so, not bent, usually hidden inside glumes 7.
3. Awns longer than the glumes and exerted beyond them 4.
3. Awns not longer than glumes, but exposed by projecting between them 5.
4. Leaf blades mostly basal, usually inrolled, 2--5 mm wide, prominent veins of inner (upper) surface distinctively lined with short straight hairs *C. purpurascens*
4. Leaf blades basal and from the stem, flat, 6--10 mm wide, inner (upper) surface glabrous *C. tweedyi*
5. Collar of leaf sheath or at least some of them covered with dense short hairs; stems loosely bunched *C. rubescens*
5. Collar of leaf sheath hairless; stems often solitary or tightly bunched 6.
6. Callus and rachilla hairs abundant and about 1/2 as long as the lemma; stems often solitary to few-bunched and connected by long rhizomes *C. montanensis*
6. Callus and rachilla hairs scant and about 1/3 as long as lemma; stems generally tightly bunched and bearing short and thick rhizomes *C. koelerioides*
7. Rhizomes very short; stems densely bunched *C. scopulorum*
7. Rhizomes long; stems scattered to loosely bunched *C. stricta*

Calamagrostis canadensis (Michx.) P.Beauv. [*C. canadensis* (Michx.) P. Beauv. var. *langsdorffii* (Link) Inman] Bluejoint reedgrass Perennial rhizomatous bunchgrass. **Stems** 6--11 dm tall. **Leaves:** blades mostly 3--10 mm wide. **Inflorescence** an open panicle 7--35 cm long. **Spikelets** 4--5 mm long. **Lemmas** with an awn extending at most <1 mm beyond lemma tip, callus hairs nearly as long as the lemmas. Middle to high elevations in mountain meadows and open understory, often along streams or lake margins. Throughout much of N. America except in much of the southeast.

The broad green leaf blades combined with the diffuse inflorescences comprising soft green to purplish-tinged spikelets (with glumes diverging to expose the floret inside) are characteristics of this species. Regardless, *Calamagrostis canadensis* might still be confused with *C. rubescens* or *C. stricta*. The mostly greenish spikelets, deeply cut ligule, and scabrous glume midribs should distinguish *C. canadensis*. *Calamagrostis canadensis* var. *macouniana* (Vasey) Stebbins is known from a Ravalli co. collection and is characterized by its diffuse inflorescence with sparse and diminutive spikelets. Given that *C. canadensis* intergrades with some of the species below, the formal recognition of such morphological variants seems unjustified.

Calamagrostis koelerioides Vasey Fire reedgrass Perennial rhizomatous bunchgrass. **Stems** 7--10 dm tall. **Leaves:** blades 2--4 mm wide. Inflorescence a contracted panicle 8--12 cm long. **Spikelets** 4.5--5.5 mm long. **Lemma** with a bent awn barely surpassing the glumes, callus hairs mostly <1/2 the length of lemma. Montane understory. The very western states of the U.S. and extending east to MT, WY.

Calamagrostis montanensis Scribn. ex Vasey Plains reedgrass Rhizomatous perennial. **Stems** single to few-bunched, 2--5 dm tall. **Leaves:** blades 2--3 mm broad. **Inflorescence** a contracted panicle 5--10 cm long. **Spikelets** 3.5--6.0 mm long. **Lemma** with a bent awn barely if at all surpassing the glume tips, callus hairs one-half to two-thirds as long as lemma. Mostly moderately disturbed settings in open dry shrub steppe vegetation from low to middle elevations. Generally in the northcentral states of provinces of N. America.

Without inflorescences this species might be mistaken for *Agropyron dasystachyum* or *A. smithii* but the conspicuous ligule >2 mm long and lack of wheatgrass clasping auricles readily distinguish plains reedgrass from the wheatgrasses. This grass is typically <0.5 m tall in dry settings whereas the similar *Calamagrostis stricta* is >0.5 m tall in wet settings (e.g., roadside ditches, meadows, etc.).

Calamagrostis purpurascens R.Br. Purple reedgrass. Perennial rhizomatous bunchgrass. **Stems** 2--7 dm tall. **Leaves:** blades 2--5 mm wide. **Inflorescence** a contracted panicle 3--8 dm long. **Spikelets** mostly 6--7 mm long. **Lemmas** with a bent awn surpassing glumes by 2--4 mm, callus hairs <one-third the length of lemma. Dry mountain meadows to subalpine and alpine slopes. Throughout much of N. America but mostly absent from the eastern half of the U.S.

Calamagrostis rubescens Buckley. Pine reedgrass. Rhizomatous perennial. **Stems** 6--10 dm tall. **Leaves:** blades 2--5 mm wide. **Inflorescence** a contracted panicle 4--15 cm long. **Spikelets** 4.0--4.5 mm long. **Lemmas** with a bent awn barely surpassing if at all the glume tips, callus hairs >1/2 the lemma length, sometimes less. Montane understory often of spruce and fir forests. Throughout much of western N. America.

Calamagrostis scopulorum M.E.Jones. Ditch reedgrass. Perennial rhizomatous bunchgrass. **Stems** 5--8 dm tall. **Leaves:** blades 5--7 mm wide. **Inflorescence** a contracted panicle 6--12 cm long. **Spikelets** 6--7 mm long. **Lemma** with a slender straight awn not surpassing the lemma tip, callus hairs >1/2 as long as the lemma. Dry understory at middle elevations. Throughout the Rocky Mountain states in the U.S.

This species is similar to *Calamagrostis purpurascens* in having a robust bunched growth habit but it occurs at lower elevations, has short and mostly straight lemma awns, and scabrous (not hairy) veins along the upper surface of the leaf blade.

Calamagrostis stricta (Timm) Koeler [*C. inexpansa* A. Gray and *C. neglecta* (Ehrh.) Gaertn.] Northern reedgrass Perennial rhizomatous bunchgrass. **Stems** loosely bunched, 5--10 dm tall. **Leaves:** blades mostly 2--5 mm wide. **Inflorescence** a contracted panicle 6--15 cm long. **Spikelets** 3.5--5.0 mm long. **Lemma** with a slender straight awn barely surpassing lemma tip, callus hairs >1/2 the length of lemma. Stream sides, gravel benches, wet meadows, and seasonally inundated settings such as roadside ditches. Throughout much of N. America except in the southeast.

Calamagrostis tweedyi (Scribn.) Scribn. ex Vasey Tweedy's reedgrass Perennial rhizomatous bunchgrass. **Stems** 4--8 dm tall. **Leaves:** blades 6--10 mm wide. **Inflorescence** a contracted panicle 8--15 cm long. **Spikelets** mostly 6--7 mm long. **Lemma** with a bent awn surpassing glume tips by 4--7 mm, callus hairs extending <one-third the length of the lemma. Montane understory; collected in Mineral and Ravalli cos. WA, ID, MT.

The broad green leaf blades combined with the bunched habit are characteristic of this species.

Calamovilfa (A.Gray) Hack. ex Scribn. & Southworth, Sandreed

Rhizomatous perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a contracted to open panicle. **Spikelets** with 1 floret; glumes enclosing the floret. **Lemma** with 1 distinct vein and awnless, callus with hairs one-half as long as lemma; palea usually enclosed by the lemma. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of about five species native to N. America.

Calamovilfa longifolia (Hook.) Scribn. Prairie sandreed Rhizomatous perennial often bunched or in patches. **Stems** 6--15 dm tall. **Leaves:** blades 3--8 mm wide, wiry. **Inflorescence** a narrow to open panicle 15--40 cm long. **Spikelets** 4--6 mm long. **Lemmas** with a long hairy callus. Mostly in open dry moderately disturbed settings at lower elevations. Throughout southern Canada and northern U.S. and south to NM.

Catabrosa P.Beauv., Whorlgrass

Stoloniferous creeping perennials. **Leaf blades** generally flat and lax, sheaths with fused margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with well-spaced florets; glumes weakly 1-veined. **Lemmas** prominently 3-veined, awnless; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of two species in the Northern Hemisphere and S. America inhabiting marshes and shallow standing to slow-moving water. *Catabrosa* is more closely related to *Puccinellia* than to *Melica* (Soreng et al. 1990). It is keyed out with *Melica* because of the leaf and spikelet morphology mentioned in the keys to groups of grasses.

Catabrosa aquatica (L.) P.Beauv. Brookgrass or Water whorlgrass Stoloniferous perennial. **Stems** creeping and rooting at basal nodes, 1--11 dm long. **Leaves:** blades 5--14 mm wide, often wrinkled, ligule 1--8 mm long. **Inflorescence** an open panicle 7--28 cm long. **Spikelets** 2.0--3.5 mm long, with 2--3 florets. **Lemmas** blunt-tipped and prominently ribbed. Wet meadows, edges of lakes, springs, and slow running streams from low to middle elevations. Throughout much of N. America but generally absent from the eastern half of the U.S.

Cenchrus L., Sandbur

Spreading decumbent annuals and perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule hairy. **Inflorescence** a spike. **Spikelets** fused into a spike of burrs, where each burr envelopes 1--8 spikelets (the burrs are derived from fused sterile branches). **Lemmas** with acute apices, awnless, hard-textured if fruit-bearing; palea enclosed by lemma. Disarticulation below the glumes; unit of dispersal the burr or cluster of spikelets.

A warm season genus of about 16 mostly American tropical species and these are mostly annuals of disturbed sites. Seven of these occur in North America.

Cenchrus longispinus (Hack.) Fernald Mat sandbur Annual bunchgrass. Stems decumbent, 18--60 cm long. **Leaves:** blades 3--6 mm wide, ligule a fringe of hairs 1--2 mm long. **Inflorescences** a spike of burrs, with each burr enclosing 1--3 spikelets. **Spikelets** 6--8 mm long, glumes acute, the first 2--3 mm long, the second 4--6 mm long. **Lemmas:** fertile lemma with an acute tip. Open dry to moist sites in disturbance-prone settings. Throughout nearly all of the U.S. and sporadically in southern Canada.

Cinna L., Woodreed

Bunched to single-stemmed perennials. **Leaf blades** flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open drooping panicle. **Spikelets** with 1 floret; glumes with a scabrous keel; glumes with a scabrous midrib. **Lemmas** with a well-developed hairless callus, usually long awned; palea enclosed by lemma. **Disarticulation** below glumes; unit of dispersal the spikelet.

A cool season genus of four species of N. and S. America with one species (*Cinna latifolia*) occurring also in Eurasia. All inhabit moist understory.

1. Inflorescence a dense panicle, the branches ascending to erect at maturity; stems commonly bulbous-based; second glume 3-veined, usually 4.5--6.0 mm long *C. arundinacea*

1. Inflorescence an open panicle, the branches lax to drooping at maturity; stems not bulbous-based; second glume usually 1-veined, mostly 2.5--4.0 mm long *C. latifolia*

Cinna arundinacea L. Stout woodreed Rhizomatous perennial. **Stems** 8--17 dm tall. **Leaves:** blades 6--15 mm wide, ligules 3--9 mm long. **Inflorescence** a contracted panicle 15--45 cm long. **Spikelets** 4.5--5.5 mm long. **Lemma** with an awn 0.5--1.5 mm long born from the upper half. Reported from Sheridan co. (McGregor, et al., 1986). Sporadic but only locally common throughout the eastern two-thirds of the N. America.

Cinna latifolia (Trevis. ex Goepp.) Griseb. Drooping woodreed Rhizomatous perennial. **Stems** 6--15 dm tall. **Leaves:** blades 7--17 mm wide, ligules 3--7 mm long. **Inflorescence** an open but drooping panicle, 12--40 cm long. **Spikelets** 3--4 mm long. **Lemmas** with an awn about 1 mm born from the upper half. Montane understory. Throughout much of N. America but absent from the southcentral and southeastern states.

Crypsis Aiton, Pricklegrass

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a dense cylindrical spike-like panicle. Spikelets with 1 floret; glumes enclosing the floret. **Lemma** with 1 distinct vein, awnless; palea enclosed in lemma. **Disarticulation** below glumes; unit of dispersal the spikelet.

A warm season genus of about eight species native to the Mediterranean region to northern China. Three species have been introduced into N. America.

Crypsis alopecuroides (Piller & Mitterp.) Schrad. [*Heleochloa alopecuroides* (Piller & Mitterp.) Host ex Roemer] Foxtail pricklegrass Annual bunchgrass or in large patches. **Stems** 1--3 dm tall. **Leaves:** blades 1--3 mm wide, ligule about 1 mm long. **Inflorescence** a cylindrical spike-like panicle 1--6 cm long, 2.5--4.0 mm wide. **Spikelets** 2.0--2.5 mm long. **Lemmas** 1.5--2.5 mm long. Sandbars and banks of the large rivers. Introduced primarily in the western U.S.

Crypsis schoenoides (L.) Lamark [*Heleochloa schoenoides* (L.) Host ex Roemer], Swamp pricklegrass, an annual exotic bunchgrass, may eventually be found in eastern MT. It would have an ovoid inflorescence 5--9 mm wide that remained partially enclosed by the leaf sheath and lemma 2.5--3.0 mm long. This is in contrast to *Crypsis alopecuroides* with its narrower inflorescence usually extending beyond the uppermost leaf sheath.

Cynodon Rich., Bermudagrass

Matted, stoloniferous perennials. **Leaf blades** flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** of 2-several digitately arranged secund spikes. **Spikelets** closely appressed and bearing one floret. **Lemma** 3-nerved, awnless. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of about nine species native to the Old World tropics, seven of which have been introduced into N. America.

Cynodon dactylon (L.) Pers. Bermudagrass. Stolonerous mat- or sod-forming perennial. **Stems** 1--4 dm tall. **Leaves:** blades 2--4 mm wide, ligule hairy, less the 1 mm long. **Inflorescence** of 3--6 digitately arranged secund spikes, the branches 3--5 cm long. **Spikelets** 2--3 mm long, with 1 floret, sometimes with vestigial florets. **Lemmas** 2--3 mm long. Frequently disturbed sites, roadsides, lawns, and reclaimed areas; collected in Missoula co. Introduced in North America mainly in the U.S. excepting some northcentral states.

Cynosurus L., Dogstail grass

Single-stemmed to bunched perennials and annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted secund panicle. **Spikelets** dimorphic, a sterile spikelet paired with a fertile spikelet, sterile spikelets with numerous flat lemmas, the fertile with fewer florets. **Lemmas** rounded on back, inconspicuously veined, awned or awn-tipped; palea well developed. Disarticulation above glumes; unit of dispersal the floret.

A cool season genus of about eight species native mostly to the Mediterranean area and adjacent Asia. Two species have been introduced into N. America.

Plants perennial; inflorescence <1 cm thick; lemmas awnless or very short awned
Plants annual; inflorescence >1 cm thick; lemmas with an awn 5--15 mm long

C. cristatus
C. echinatus

Cynosurus cristatus L. Crested dogstail. Perennial bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 1--2 mm wide. **Inflorescence** a contracted secund panicle 4--11 cm long, usually <1 cm wide. **Spikelets** 4--7 mm long, the fertile ones with 2--5 florets. **Lemmas** 3--5 mm long, mostly awn-tipped. Creeksides draining hot springs, expected along roadsides similarly disturbed settings, occasionally a pasture grass; collected in Ravalli co. Introduced mainly in eastern and western N. America.

Cynosurus echinatus L. Spiny dogstail. Annual bunchgrass. **Stems** 3--9 dm tall. **Leaves:** blades 3--10 mm wide. **Inflorescence** a contracted secund panicle 2--4 cm long, usually >1 cm wide. **Spikelets** 7--12 mm long, the fertile ones with 1--4 florets. **Lemmas** with an awn 5--15 mm long. Forest edges, along roads, in grain fields, and similarly disturbed open sites. Introduced mainly in the very western states and provinces of N. America and throughout much of the eastern U.S.

Dactylis L., Orchardgrass

Bunched perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins and dorsally keeled; ligule membranous. **Inflorescence** a contracted secund panicle. Spikelets with 3--6 florets. **Lemma** keeled and inconspicuously veined, awnless or awn-tipped; palea enclosed in lemma. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of one or perhaps several species native to cool temperate regions of Eurasia and Africa. One species has been introduced into N. America.

Dactylis glomerata L. Orchardgrass Perennial bunchgrass, commonly forms tussocks. **Stems** 8--20 dm tall. **Leaves:** blades 4--8 mm wide, ligules 3--9 mm long. **Inflorescence** a contracted secund panicle 4--20 cm long. **Spikelets** 5--8 mm long. Lemmas 4--6 mm long. Open meadows and open understory where moderately disturbed, including road and trailsides, as well as in lawns. Introduced throughout most of N. America.

Danthonia DC., Oatgrass

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a contracted to open but sparsely flowered panicle. **Spikelets** with several to many florets; glumes enclosing the florets. **Lemma** tapering to a bifid tip and bearing a flattened twisted awn from between the two teeth; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of 20 species distributed mainly in temperate regions of Europe, North Africa, and the New World. North America harbors seven native and one introduced species. *Danthonia* is classified into Danthoneae, a cool season grass tribe superficially similar to the Aveneae group except for the hairy ligules.

1. Spikelets 1 per stem, rarely 2 or 3; plants 30 cm tall or less; sheaths at least near the throat conspicuously long-hairy with spreading or downward oriented gland-based hairs 2--4 mm long

D. unispicata

1. Spikelets usually 3 to many, if as few as 2--3 then the plants taller than 30 cm; sheaths hairless to hairy and then the hairs usually <2 mm long 2.
2. Raceme open, lateral branches wide-spreading; glumes widely open and exposing the florets inside (similar to *D. unispicata* in this last trait) *D. californica*
2. Panicle or raceme contracted, lateral branches appressed-ascending; glumes tightly enclosing the florets 3.
3. Lemmas hairless on back, hairy only along the margins and callus *D. intermedia*
3. Lemmas hairy over the back and margins 4.
4. Glumes 17--22 mm long; lemmas 10--15 mm long, not tightly clasping each other because the callus of each is longer than it is wide *D. parryi*
4. Glumes 12 mm long or shorter; lemmas <5 mm long, tightly clasping each other because the callus of each is shorter than it is long *D. spicata*

Danthonia californica Bol. California oatgrass Perennial bunchgrass. **Stems** 3--10 dm tall. **Leaves:** blades 2--4 mm wide, sheaths and collar hairless to hairy, ligule 1.0--1.5 mm long. **Inflorescence** a raceme 3--6 cm long, with usually 2--4 spikelets. **Spikelets** 15--25 mm long, with 5--7 florets. **Lemmas** not tightly enfolded by the glumes, 7--10 mm long, hairless except along margins, with awns 8--11 mm long. Sporadic but locally common in open dry meadows, shrub steppe, and open understory. Throughout most of western N. America.

Danthonia californica is a taller-statured version of *D. unispicata* with slightly more and larger spikelets in each inflorescence.

Danthonia intermedia Vasey Timber oatgrass. Perennial bunchgrass. Stems 1--5 dm tall. **Leaves:** blades 1--4 mm wide, sheaths essentially hairless and collar hairy, ligule 0.5--0.7 mm long. **Inflorescence** a contracted panicle or raceme 3--6 cm long, with 4--10 spikelets. **Spikelets** 11--15 mm long, with 4--7 florets. **Lemmas** tightly enfolded by the glumes, 3--6 mm long, hairless except along margins, with awns 6--8 mm long. Dry mountain meadows at middle to high elevations. Throughout all of western North America and across southern Canada.

This is the most common *Danthonia* in MT and is readily distinguished from the similar *D. parryi* by its leaves folded along the midrib and glumes 15 mm or less long.

Danthonia parryi Scribn. Parry's oatgrass Perennial bunchgrass. **Stems** 3--7 dm tall. **Leaves:** blades 2--3 mm wide, sheaths essentially hairless and collar usually hairy; ligule 0.5--1.0 mm long. **Inflorescence** a contracted panicle or raceme 3--7 cm long, with 4--10 spikelets. **Spikelets** 17--22 mm long, with 4--6 florets. **Lemmas** tightly enfolded by glumes, 7--10 mm long, long-hairy over the entire back, with awns 12--14 mm long. Dry mountain meadows. NM north to AL, SK.

Aside from the larger glumes and more densely hairy lemmas, it's the flat leaves distinguish this species from the more common *D. intermedia*.

Danthonia spicata (L.) P.Beauv. ex Roem. & Schult. Poverty oatgrass Perennial bunchgrass. **Stems** 3--6 dm tall. **Leaves** 1--3 mm wide, sheaths essentially hairless to hairy and collar usually hairy; ligule 0.5--1.0 mm long. **Inflorescence** a contracted panicle or raceme 3--5 cm long, with 5--10 spikelets. **Spikelets** 10--15 mm long, with 4--7 florets. **Lemmas** tightly enfolded by glumes, 3--5 mm long, sparsely but uniformly hairy on back except at the tip, with awns 5--8 mm long. Dry mountain meadows. Throughout nearly all of N. America.

The florets of *Danthonia spicata* tightly clasp each other, are usually <5 mm long, and have a short callus and conspicuous but sparse hairs over the backs of the lemmas. This contrast to those of *D. intermedia*, which are not strongly clasping, are usually >5 mm long, and have a long callus (longer than wide) and conspicuous hairs concentrated along the margins (usually lower margins) and not on the backs of the lemmas. The tightly clasping nature of the floret cluster of *Danthonia spicata* is probably due to the small basal callus of each floret. In the other species of *Danthonia*, the callus is longer than wide and effectively separates the florets enough so that they don't tightly clasp each other.

Danthonia unispicata (Thurb.) Munro ex Macoun Onespike oatgrass Perennial bunchgrass. **Stems** 15--30 cm tall. **Leaves:** blades 1--2 mm wide, sheath at least near the throat densely long-hairy, the hairs wide-spreading and 2--4 mm long, collar also long-hairy; ligule 0.2--0.5 mm long. **Inflorescence** with mostly 1 spikelet, rarely 2 or 3. **Spikelets** 14--24 mm long, with 4--9 florets. **Lemmas** 7--11 mm long, hairless on the back, sparsely hairy along margins, with awns 7--12 mm long. Open understory and shrub steppe from middle to subalpine elevations. Throughout much of the western half of N. America.

Deschampsia P.Beauv., Hairgrass

Bunched perennials and annuals. **Leaf blades** generally flat or inrolled and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to contracted panicle. **Spikelets** with mostly 2 florets, the rachilla hairy; glumes nearly equal and enclosing the florets. **Lemmas** uniformly awned from below the middle; palea enclosed in lemma. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 30 species in temperate regions of the northern hemispheres, of which seven are native to N. America. *Deschampsia atropurpurea* is now treated under the genus *Vahlodea*.

1. Plants annual; spikelets 7--9 mm long, the glumes narrowly tapering to a point, the lemma awns distinctly bent; leaves very few, short, and withering by anthesis *D. danthonioides*

1. Plants perennial; spikelets <7 mm long, the glumes broadly tapering to a point, the lemma awns straight; leaves ample, forming a basal tuft, and persisting past anthesis 2.

2. Panicle narrow, the branches appressed to the main rachis; glume mostly green, purplish distally *D. elongata*

2. Panicle open, the branches spreading; glume mostly purplish, whitish to golden distally

D. cespitosa

Deschampsia cespitosa (L.) P.Beauv. Bunched hairgrass Perennial bunchgrass. **Stems** 3--10 dm tall. **Leaves:** blades mostly 1.5--3.0 mm wide, ligules 2--10 mm long. **Inflorescence** an open panicle 8--25 cm long. **Spikelets** 3.5--6.0 mm long, glumes purplish but distally straw- or silvery-colored. **Lemmas** 2--5 mm long. Montane to alpine meadows, in open dry understory to moist alpine meadows. Throughout N. America except in the southeast.

Deschampsia danthonioides (Trin.) Munro Annual hairgrass Annual bunchgrass. **Stems** 1.5--4.0 dm tall. **Leaves:** blades 1.0--1.5 mm wide, withering by anthesis, ligules 2--3 mm long. **Inflorescence** a contracted to open panicle, 5--20 cm long. **Spikelets** 6.5--9.0 mm long, glumes gradually tapering to a sharp-pointed tip. **Lemmas** 1.5--3.0 mm long. Regularly disturbed settings in open dry montane understory. Throughout all of western N. America and sporadically in the eastern U.S. (Appalachia).

Deschampsia elongata (Hook.) Munro Slender hairgrass Perennial bunchgrass. **Stems** 2--8 dm tall. **Leaves:** blades 1--2 mm wide, ligules 3--8 mm long. **Inflorescence** a contracted panicle 5--25 cm long, the branches appressed to the main rachis. **Spikelets** 4--7 mm long, glumes pale green but distally purplish-colored. **Lemmas** 2--3 mm long. Open to closed montane understory. Throughout all of western N. America and sporadically in the eastern U.S. (Appalachia).

Dichanthelium (Hitchc. & Chase) Gould, Rosette grass

Bunched perennials. **Leaf blades** generally flat and ascending (vegetative leaves forming rosettes), sheaths with overlapping margins; ligule hairy. **Inflorescence** a diffuse open panicle, panicle branches occasionally clustered among leaves during the fall bear self-pollinating spikelets. **Spikelets** with one fertile floret; glumes unequal in length, the first shorter than half the length of the spikelet. **Lemma** with a blunt apex, awnless, hard-textured if fruit-bearing; palea enclosed in floret. **Disarticulation** above the glumes; unit of dispersal the floret.

A cool season genus with about 72 species mostly from warm temperate regions of North and Central America but with a center of diversity in the southeastern United States.

1. Spikelets 1.5--2 mm long; the larger second glume often purplish at maturity (the spikelet thus rendered mostly dark in color); ligule 2--6 mm long *D. acuminatum*

1. Spikelets 2--4 mm long; the larger second glume usually greenish at maturity (the spikelet thus predominantly green in color); ligule 0.5--3 mm long 2.

2. Stem leaves mostly 5--15 mm wide, upper surface glabrous, lower surface hairy; spikelets mostly 2.5--4 mm long, 1.5--2.5 mm wide; ligule 1--3 mm long *D. oligoanthes*

2. Stem leaves mostly 2--5 mm wide, upper and lower surfaces hairy; spikelets mostly 2--2.5 mm long, 0.5--1.2 mm wide; ligule 0.5--1.0 mm long *D. wilcoxianum*

Dichanthelium acuminatum (Sw.) Gould & C.A. Clark subsp. *sericeum* (Schmoll) Freckmann & Lelong [*Dichanthelium lanuginosum* (Elliot) Gould var. *sericeum* (Schmoll) Spellensb.] Pacific panicgrass Perennial bunchgrass. **Stems** 10--30 cm tall. **Leaves:** blades 5--10 mm wide, usually <8 times longer than wide, ligule 2--6 mm long. **Inflorescence** an open panicle 3--8 cm long. **Spikelets** 1.5--2 mm long; glumes hairy, first 0.5--0.75 mm long, second 1.5--2 mm long. **Lemmas:** fertile lemma blunt, globe-like. Often forming dense stands on wet soils around edges of hot springs. Although this species is Throughout most of N. America, subsp. *sericeum* is more narrowly confined to the U.S. in the Rocky Mountain states, UT, CO, WY, ID, MT.

Many subspecies of this species are distinguished. *Dichanthelium acuminatum* subsp. *fasciculatum* (Torr.) Gould potentially occurs along the southern and eastern tier of MT cos. and is distinguished by longer stems that measure 30--100 cm and longer leaf blades usually >8 times longer than wide.

Dichanthelium oligoanthes (Schult.) Gould subsp. ***scribnerianum*** (Nash) Freckmann & Lelong [*Panicum scribnerianum* Nash] Scribner's rosettegrass Perennial bunchgrass. **Stems** 2--5 dm tall, usually spreading. **Leaves:** blades 5--15 mm wide, mostly hairless; ligule 1--3 mm long. **Inflorescence** an open panicle 3--9 cm long. **Spikelets** 2.7--4.2 mm long; glumes hairless to sparsely hairy, first 1--1.2 mm long, second 2.5--3 mm long. **Lemmas:** fertile lemma blunt, spherical. Disturbed sites and open understory. Throughout most of North America except at extreme northern latitudes.

Subspecies *oligoanthes*, which is distributed more in the eastern and southern part of N. America, differs from variety *scribnerianum* by having ligules mostly >2 mm long and an abaxial leaf blade surface that is uniformly hairy.

Dichanthelium wilcoxianum (Vasey) Freckman [*Panicum wilcoxianum* Vasey] Fall rosette grass Perennial bunchgrass. **Stems** 1--2 dm tall, usually spreading. **Leaves:** blades 2--5 mm wide, distinctly hairy; ligule to 1 mm long. **Inflorescence** an open panicle 2--5 cm long. **Spikelets** 2.4--3.2 mm long; glumes conspicuously hairy, first 1--1.2 mm long, second 2.5--3 mm long. **Lemmas:** fertile lemma blunt, spherical. Open dry disturbed settings; collected in Carter and Custer cos. Throughout most central states and provinces in N. America.

Digitaria Haller, Crabgrass

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy or membranous. **Inflorescence** of digitately or almost digitately arranged, secund spikes. **Spikelets** with one fertile floret; glumes unequal in length, the first shorter than half the length of the spikelet. **Lemma** with a blunt apex, awnless, hard-textured if fruit-bearing; palea enclosed in floret. **Disarticulation** above the glumes; unit of dispersal the floret.

A warm season genus of about 300 species throughout temperate and tropical regions of the world of which 29 occur in North America, 18 of the as natives.

1. Spikelets 1.5--2.0 mm long; first lemma and second glume with glandular hairs; fertile lemma dark brown at maturity; stem nodes hairless

D. ischaemum

1. Spikelets 2.8--3.0 mm long; first lemma and second glume hairless to occasionally hairy but then lacking glandular hairs; fertile lemma light brown at maturity; stem nodes hairy

D. sanguinalis

Digitaria ischaemum (Schreb.) Schreb. ex Muhl. Smooth crabgrass Annual bunchgrass. **Stems** 18--45 cm long, mostly decumbent, nodes hairless. **Leaves:** blades 3--5 mm wide, ligules 1--2 mm long, membranous, throat hairy. **Inflorescence** of 2--7 digitately or almost digitately arranged secund spikes, 3--9 cm long. **Spikelets** 1.5--2 mm long, ovate; first glume very short, about 0.2 mm long, the second glume 1.5--2.0 mm long, with glandular hairs. **Lemmas:** fertile lemma ovate, dark brown at maturity. Disturbance-prone sites such as roadsides and in lawns. Introduced throughout nearly all of N. America except at the extreme northern latitudes.

Digitaria sanguinalis (L.) Scop. Hairy crabgrass Annual bunchgrass. **Stems** 30--60 cm long, decumbent and rooting at lower nodes, nodes hairy. **Leaves:** blades 4--7 mm wide, ligules 1--2 mm long, membranous, throat sparsely hairy. **Inflorescence** of 7--10 digitately or almost digitately arranged secund spikes, 8--12 cm long. **Spikelets** 2.8--3.0 mm long, narrowly ovate; first glume very short, about 0.3 mm long, the second glume 1--2 mm long, without glandular hairs. **Lemmas:** fertile lemma narrowly elliptic, light brown at maturity. Disturbance-prone sites such as roadsides and in lawns. Throughout nearly all of N. America except at the extreme northern latitudes.

Digitaria ciliaris (Retz.) Koeler, reported from southcentral MT (Barkworth et al. 2003), is very difficult to distinguish from *D. sanguinalis*.

Distichlis Raf., Saltgrass

Strongly rhizomatous dioecious perennials. **Leaf blades** generally flat and ascending, relatively stiff, short-tipped, and distichously arranged, sheaths with overlapping margins; ligule hairy. **Inflorescence** a raceme or contracted panicle. **Spikelets** with 5--15 florets; glumes faintly veined. **Lemma** many-veined, awnless. **Disarticulation** above glumes; unit of dispersal is the floret.

A warm season genus of seven species that grow on alkaline or saline soils in the New World and Australia. Two species occur in North America. *Distichlis* is classified in tribe Aeluropodeae, a group of strongly rhizomatous, dioecious, and warm season grasses.

Distichlis spicata (L.) Greene [*Distichlis stricta* (Torr.) Rydb.] Saltgrass Rhizomatous perennial. Stems 1--4 dm tall. **Leaves:** blades 2--5 mm wide, stiff and pungent-tipped. **Inflorescence** a contracted panicle or raceme, the staminate inflorescence well exerted above leaves and the pistillate inflorescence 1--6 cm long and typically clustered among leaves, the two types of spikelets superficially similar, although the staminate averaging more florets than the pistillate. **Spikelets** 10--17 mm long, with 5--16 florets. **Lemmas:** 4--6 mm long, thin-textured in the staminate spikelet. Alkali flats and less commonly in shrub steppe at lower elevations. Throughout much of N. America.

Echinochloa P.Beauv., Cockspur grass

Robust annuals and perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule absent (a pigmented rim) or hairy if present. **Inflorescence** a contracted second panicle. **Spikelets** with one fertile floret; glumes unequal in length, the first shorter than half the length of the spikelet. **Lemma** with an acute apex, sometimes hairy, awnless, hard-textured if fruit-bearing; palea enclosed in floret. **Disarticulation** above the glumes; unit of dispersal the floret.

A warm season genus of possibly 50 species widespread in warm temperate to tropical regions throughout the world. Five or possibly six of these are native to N. America.

Echinochloa crus-galli (L.) P.Beauv. [*E. muricata* (P.Beauv.) Fernald] Barnyardgrass Annual bunchgrass. **Stems** 1--12 dm long, few- to many-bunched, usually sprawling to ascending. **Leaves:** blades 5--25 mm wide, ligule absent or represented by a pigmented rim. **Inflorescence** a contracted second panicle 5--22 cm long. **Spikelets** 2.5--4.5 mm long (excluding awns); first glume 1.0--1.5 mm long, second glume 2.5--4.5 mm long, gradually tapering to a sharp-pointed tip, with stiff coarse hairs along veins. **Lemmas:** sterile lemma like second glume and with an awn 0.5--20 mm long; fertile lemma globe-like, acute-tipped. Regularly disturbed settings such as cracks in sidewalks and parking lots, in lawns, along roadsides, and around cultivated fields. Introduced and native throughout most of N. America.

Echinochloa muricata (rough barnyardgrass) is distinguished from *E. crus-galli* by having a slender acuminate hairless tip of the fertile lemma, which happens to be the common morphology among MT specimens of *Echinochloa*. The abruptly contracted hairy tip of the fertile lemma, which supposedly distinguishes *Echinochloa crus-galli*, is found in relatively few specimens and mostly from Custer, Missoula, and Toole cos. These lemma tip morphologies don't covary with other traits (e.g., length or abundance of hairs on the inflorescences branches). *Echinochloa frumentacea* Link ("billion-dollar grass") has been cultivated in Gallatin co. and is distinguished from *E. crus-galli* by having pale green spikelets lacking awns on the sterile lemma and inflorescence rachises that are at most sparsely hairy.

Eleusine Gaertn., Goosegrass

Annual and perennial bunchgrasses. **Leaf blades** generally flat and ascending, sheaths with overlapping margins (dorsally keeled); ligule membranous. **Inflorescence** a panicle of generally digitately arranged second spikes. **Spikelets** with 2--15 florets; glumes similar to lemmas. **Lemma** distinctly 3-nerved, awnless; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of nine species, eight native to Africa and one to S. America. Three species have been introduced into N. America.

Eleusine indica (L.) Gaertn. Indian goosegrass. Annual bunchgrass. Stems 3--9 dm tall. **Leaves:** blades 3--7 mm wide. **Inflorescence** of 4--15 second spikes, most of them digitately arranged, the branches 5--16 cm long. **Spikelets** 4--7 mm long, with 5--7 florets. Lemmas 3--4 mm long. Regularly disturbed settings such as roadsides, vacant lots, and lawns. Introduced throughout much of the southern portion of North America.

Eleusine is reported to be sporadic throughout MT (Barkworth et al. 2003). It is apparently rare as only one MT collection has been recorded.

Elymus L.

Rhizomatous or bunched perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a terminal bilateral spike with generally >1 spikelet per node. **Spikelets** each with >1 fertile floret; glumes often narrow and not aligned with subtending floret. **Lemmas** unawned or awned from the tip; disarticulation above or below glumes. **Dispersal unit** the floret or sometimes a cluster of florets.

As traditionally circumscribed, *Elymus* comprises about 60 cool season species from temperate regions of the world, mostly from the northern hemisphere but about 10 species occur in southern S. America. Over a dozen species are native to North America. *Elymus* traditionally includes all perennial wheatgrasses native and introduced in N. America that have 2 or mostly 2 spikelets per node. Those species of *Elymus* with 3 (or more) spikelets per node are distinguished from *Hordeum* by the presence of >1 fertile floret per spikelet. Species of *Elymus* with mostly 1 spikelet per node can be distinguished from *Agropyron* by having very narrow sharp-pointed glumes and florets that are turned 90° relative to the glumes. Such a definition conflicts with some genetic data that are useful to plant breeders. The key

below is provided to identify MT species that have been traditionally referred to *Elymus* in N. America. The tendency to lump the perennials into a "catch-all" *Elymus* (e.g., Dorn 1984) does not reflect species relationships any better than does the traditional wheatgrass classification (e.g., Cronquist et al. 1977). Species of *Elymus* with the "SH" genome (see) arose via hybridization from *Pseudoroegneria* ("S" genome) and *Hordeum* ("H" genome) and are distinct from *Elymus* species containing other genomes (e.g., Barkworth and Dewey 1985; Kellogg 1989; Helfgott and Mason-Gamer 2004; Liu et al. 2008). Much more evidence is needed, however, before a comprehensive taxonomy can be settled involving the species traditionally assigned to *Agropyron* and *Elymus*.

1. Plants commonly in large clumps to 1 m in diameter; stems usually well >1 m tall; spikelets mostly three or more per node; blades usually >10 mm wide; ligule usually >2 mm long 2.
1. Plants not clump forming or in clumps much <1 m in diameter; stems usually <1 m tall; spikelets mostly two per node (sometimes 2--3 spikelets per node in *Elymus junceus*); blades usually <10 mm wide; ligule usually <2 mm long 3.
2. Lemmas hairless; stems hairless; spikes >1.5 cm thick, often with secondary branches; leaf blades 15--35 mm wide, mostly >15 mm wide *E. condensatus*
2. Lemmas sparsely to distinctly hairy; stems lightly hairy generally at least near the nodes; spikes <1.5 cm thick, with no secondary branches; leaf blades 5--15 mm wide, mostly <15 mm wide *E. cinereus*
3. Stems not bunched or only very loosely so; rhizomes well developed, usually long, slender, and creeping (rarely short as in *E. ambiguus*) 4.
3. Stems usually bunched (occasionally single stemmed in *Elymus glaucus*); rhizomes absent or very short and not conspicuous 7.
4. Lemmas conspicuously long-hairy, the hairs dense and long 5.
4. Lemmas hairless to lightly hairy, the hairs very short, often sparse 6.
5. Lemmas awnless or awn to 1 mm long; auricles absent or poorly developed; lemma hairs about 2 mm long, very dense and obscuring the lemma surface *E. flavescens*
5. Lemma awns up to 6 mm long; auricles usually present; lemma hairs about 1 mm long, not so dense as to obscure the surface of the lemma *E. innovatus*
6. Stems 2.5--12 mm thick, 1--3 m tall; spikelets 2--6 per node; lemmas hairy *E. angustus*
6. Stems 1--3 mm thick, about 1 m or less tall; spikelets mostly 2 per node; lemmas glabrous *E. triticoides*
7. Rachis fragile and breaking at maturity under very slight pressure, the florets and spikelets remaining attached to the rachis joints (compare also *E. junceus* with its tardily disarticulating rachis) 8.
7. Rachis continuous or disarticulating with force; the florets disarticulating above the glumes 9.
8. Awns of glumes and lemmas 20--100 mm long, the glumes often becoming divided distally into two or three segments; fertile florets 1--4 per spikelet *E. elymoides*
8. Awns of glumes and lemmas 4--20 mm long, the glumes never becoming divided distally into segments; fertile florets not developing (plants sterile) *E. macounii*
9. Awns of lemmas 20--35 mm long, strongly curved outward; the inflorescence spike drooping at maturity, seldom erect *E. canadensis*
9. Awns of lemmas much <20 mm, also straight or only slightly curved outward; the inflorescence spike always erect at maturity 10.
10. Glumes narrowly tapering imperceptibly from the base into an awn-tip, with only 1 distinct vein; the inflorescence rachis disarticulating at nodes but requiring mechanical disturbance to do so *E. junceus*
10. Glumes broadest above the base, with 3--5 distinct veins, awn distinct from body of glume; the inflorescence rachis remaining solid and never shattering with age even with mechanical disturbance 11.
11. Basal 1 mm of glume bony, round in cross-section, not green, outwardly curving; spikelets 10--13 mm long; lemmas 6--9 mm long *E. virginicus*
11. Basal 1 mm of glume not bony, flattened, greenish, and not outwardly curved; spikelets 12--20 mm long; lemmas 9--14 mm long *E. glaucus*

Elymus angustus (Trin.) Pilg. Altai wildrye Rhizomatous perennial bunchgrass, mostly cultivated. **Stems** 1--3 m tall. **Leaves:** blades 6--15 mm wide, usually flat. **Inflorescence** 15--35 mm long, the rachis continuous and erect.

Spikelets 2--6 per node, 17--25 mm long; glumes narrow, gradually tapering from the base to a narrow pointed tip, about as long as 1st lemma, veins not evident or with a single vein. **Lemmas** mostly 2--3 per spikelet, densely hairy, awnless or with a short awn to 2.5 mm long. Cultivated and escaped around crop fields (Gallatin and Fallon cos.). Introduced as a cultivated plant and escaping mainly in southwestern Canada.

This species is very similar to *E. cinereus* except that its growth habit is mostly single-few-stemmed and the inflorescence is less compact with the longer internodes such that spikelet clusters are separate from each other.

Elymus canadensis L. Canada wildrye Perennial bunchgrass. **Stems** 8--15 dm tall. **Leaves:** blades 4--12 mm wide, usually flat. **Inflorescence** 7--19 cm long, the rachis continuous and usually drooping. **Spikelets** mostly 2 (rarely more) per node, 12--16 mm long (excluding awns), glumes 3--5-veined, tapering to an awn up to 12 mm long. **Lemmas** mostly 3--4 per spikelet, short hairy, tapering gradually into an awn up to 3.5 cm long, the awns divergent and curved. Most common along road cuts where likely introduced for soil stabilization. Throughout much of N. America.

Elymus cinereus Scribn. & Merr. [*Leymus cinereus* (Scribn. & Merr.) A.Löve] Basin wildrye Perennial bunchgrass. **Stems** 1--2 m tall, forming large bunches or tussocks. **Leaves:** blades 7--12 mm wide, usually flat. **Inflorescence** 8--22 cm long, the rachis continuous and erect. **Spikelets** mostly 3 (sometimes more) per node, 11--15 mm long; glumes narrow, gradually tapering from the base to a narrow pointed tip, about as long as 1st lemma, veins not evident or with a single vein. **Lemmas** mostly 3--5 per spikelet, sparsely short hairy, awnless or with a short awn to 5 mm long. Open shrub steppe to open montane understory, in theory near seeps, as well as moderately disturbed sites such as along rural roads subject to little disturbance (e.g., grading, spraying, etc.). Mainly throughout much of the western half of N. America.

Elymus condensatus J.Presl [*Leymus condensatus* (J.Presl) A.Löve] Giant wildrye Perennial bunchgrass. **Stems** 1--3 m tall, forming large patches in which may be found short rhizomes,. **Leaves:** blades up to 30 mm wide, usually flat. **Inflorescence** 15--50 cm long, the rachis continuous and erect. **Spikelets** mostly >three per node, about 15 mm long; glumes narrow, gradually tapering from the base to a narrow pointed tip, about as long as or longer than the first lemma, veins not evident or with a single vein. **Lemmas** usually about five per spikelet. usually hairless, awnless to short-awned. Frequently disturbed settings, mine tailings; collected in Stillwater co. Western N. America in BC, AL, CA.

Elymus elymoides (Raf.) Swezey [*Sitanion hystrix* (Nutt.) Smith] Squirreltail Perennial bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 1--5 mm wide, flat to folded. **Inflorescence** 4--14 cm long, the erect rachis readily disarticulating at maturity. **Spikelets** usually 2 per node (rarely 1 or 3), 11--14 mm long; glumes gradually tapering from the base to a narrow acute tip, often bifid, rarely trifid, distinctly 1--2 veined, imperceptibly tapering into 1 or 2 awns that are 2--11 cm long. **Lemmas** mostly 2--6 per spikelet, hairless to hairy, tapering into an awn 2--10 cm long. Open dry shrub steppe as well as in moderately disturbed sides such as along gravel back roads. Throughout most of the western half of N. America.

This species often hybridizes readily to other species of *Elymus* or *Agropyron*. See notes under *Agropyron spicatum* where *Agrositanion saxicola*, a hybrid between *Ag. spicatum* and *Elymus elymoides*, is diagnosed.

Elymus flavescens Scribn. & J.G.Sm. [*Leymus flavescens* (Scribn. & J.G.Sm.) Pilg.] Yellow wildrye Rhizomatous perennial. **Stems** solitary to few-bunched, 6--10 dm tall. **Leaves:** blades 3--6 mm wide, inrolled. **Inflorescence** 10--22 cm long, the rachis continuous and erect. **Spikelets** mostly 2 per node, 10--20 mm long; glumes narrow, faintly 3-nerved, tapering to an awn-tip. **Lemmas** mostly 2--5 per spikelet, copiously long-hairy, awnless or awn-tipped. Sand dunes and adjacent sandy soils, collected in Beaverhead and Madison cos. Pacific Northwest region in AL, WA, OR, ID, MT, UT.

Elymus glaucus Buckley Blue wildrye Perennial bunchgrass. **Stems** few-bunched, 6--13 dm tall. **Leaves:** blades 5--12 mm wide, flat. **Inflorescence** 6--16 cm long, the rachis continuous and erect. **Spikelets** usually 2 per node, 12--20 mm long; glumes distinctly broadest in the lower half, with 3--5 veins, the base mostly greenish, not indurate, distally tapering to a short awn or awn-tip. **Lemmas** mostly 2--4 per spikelet, essentially hairless, with a straight awn 10--20 mm long. Dry montane meadows and open understory. Throughout much of N. America but absent from some central states and eastern provinces and states.

Elymus innovatus Beal [*Leymus innovatus* (Beal) Pilg.]. Downy ryegrass Rhizomatous perennial. **Stems** 5--10 dm tall. **Leaves:** blades 3--6 mm wide, inrolled. **Inflorescence** 6--14 cm long, the rachis continuous and erect. **Spikelets** mostly 2 per node, 10--20 mm long; glumes gradually tapering from the base to a very narrow pointed tip, mostly 1-nerved, tapering to an awn-tip. **Lemmas** mostly 2--4 per spikelet, distinctly hairy, bearing an awn 1--6 mm long. Resembling *E. flavescens* but the lemmas are less conspicuously hairy and bear a distinct awn. Moderately disturbed settings such as along stream banks of the North Fork of the Sun River (border area of Teton and Lewis & Clark cos.). Throughout southern and western Canada, as well as AK, south along the Rocky Mountain states to CO.

Elymus junceus Fisch. [*Psathyrostachys juncea* (Fisch.) Nevski] Russian wildrye Perennial bunchgrass. **Stems** few to many-bunched, 5--10 dm tall. **Leaves:** blades 2--7 mm wide, flat to inrolled. **Inflorescence** erect, 6--12 cm long; the inflorescence rachis disarticulating at maturity. **Spikelets** 2--3 per node, 8--11 mm long; glumes gradually tapering from the base to a very narrow pointed tip, 1-veined. **Lemmas** 2--3 per spikelet, distinctly short-hairy, tapering to an awn-tip or awn that is <4 mm long. Introduced for forage and reclamation, sometimes escaping, possibly not long persisting. Introduced throughout many of the central states and provinces, as well as OR, AK.

Elymus macounii Vasey [*Agrohordeum macounii* (Vasey) Lepage, *Elyhordeum macounii* (Vasey) Barkworth & D.R.Dewey]. Macoun's wildrye or barley. Perennial bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 2--5 mm wide, flat to inrolled. **Inflorescence** 5--10 cm long, the erect rachis disarticulating at maturity. **Spikelets** 2 per node (sometimes evident by just 3 glumes at a node), 12--15 mm long; glumes narrow, 1--3-veined, tapering to a short-long awn. **Lemmas** 1--2 per spikelet, hairless, tapering to an awn 4--10 mm long. Open dry moderately disturbed sites at lower elevations. Throughout most of northern and western N. America and absent mostly from eastern U.S.

This species is a hybrid formed by the crossing of *Agropyron trachycaulum* and *Hordeum jubatum*. Similar to *Elymus glaucus* but the glumes are very narrow and usually 1(--3)-nerved, the inflorescence rachis disarticulates, and the species occupies typically non-montane disturbance-prone settings.

Elymus triticoides Buckley [*Leymus triticoides* (Buckley) Pilg.] Beardless wildrye Rhizomatous perennial. **Stems** 0.5--1.0 m tall. **Leaves:** blades 3--8(--10 in cultivation), flat to inrolled, somewhat stiff. **Inflorescence** 5--14 cm long, the rachis continuous and erect. **Spikelets** mostly 2 per node, 10--18 mm long; glumes linear and with a very narrow pointed tip, 1-veined, tapered to mostly an awn tip. **Lemmas** 3--8 per spikelet, mostly hairless, tapered to an awn-tip or short awn that is <3 mm long. Dry montane meadows where disturbance is somewhat regular (overgrazing). Throughout much of the western half of N. America.

Elymus triticoides is superficially very similar to *Agropyron smithii* but has mostly 2 spikelets per node each with very narrow linear glumes that are characteristic of *Elymus* as traditionally characterized. In addition, the florets are twisted about 90° out of alignment with the glumes, which further distinguishes *Elymus* from *Agropyron* in the traditional sense.

Elymus virginicus L. Virginia wildrye. Perennial bunchgrass. **Stems** 8--13 dm tall. **Leaves:** blades 5--12 mm wide, flat. **Inflorescence** 6--12 cm long, the rachis continuous and erect. **Spikelets** usually 2 per node, 10--13 mm long; glumes distinctly broadest in the lower half, with 3--5 veins, the base yellowish, distinctly indurate, distally tapering to a short awn or awn-tip. **Lemmas** mostly 2--4 per spikelet, essentially hairless, bearing a straight awn 10--20 mm long. Shady moist understory settings at lower elevations. Across southern Canada and over most of the eastern two-thirds of the U.S.

Eragrostis von Wolf., Lovegrass

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** usually an open panicle. **Spikelets** with 3-many florets; glumes shorter than lemmas. **Lemma** with 3 distinct veins, awnless; palea well developed and sometimes persistent. **Disarticulation** above glumes; unit of dispersal the achene.

A warm season genus of about 350 species native to temperate and tropical regions of the world, of which 25 occur in N. America. *Redfieldia flexuosa* (Thurb.) Vasey, blowout grass, occurs in adjacent WY and the Dakotas and is superficially similar to *Eragrostis* except that it is a perennial rhizomatous native of sand dunes and sites prone to wind scouring, the stems are 5--7 dm tall, and the inflorescence is a very diffuse panicle mostly 30--35 cm long.

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|--|-----------------------|
| 1. Spikelets <1.5 mm wide, lower glumes 0.3--0.6 mm long, lemmas with inconspicuous lateral veins | <i>E. pilosa</i> |
| 1. Spikelets >1.5 mm wide, lower glumes >0.5 mm long, lemmas with conspicuous lateral veins | 2. |
| 2. Nodes of stems, keel of lemmas and glumes, or panicle branches bearing raised glands with central depressions; pedicels mostly <4 mm long, which render spikelets congested within the panicle | 3. |
| 2. Nodes of stems, keel of lemmas and glumes, or panicle branches not bearing glands of any sort; pedicels mostly 4--10 mm long, which render spikelets diffused throughout an open panicle (except in <i>E. hypnoides</i>) | 4. |
| 3. Spikelets mostly 2.5 mm or more wide; glands prominent on keel of most lemmas | <i>E. cilianensis</i> |
| 3. Spikelets mostly 2.0 mm wide or less; glandular depressions mostly on panicle branches and leaves | <i>E. minor</i> |
| 4. Stems spreading horizontally and rooting at nodes, forming mats; panicles 1--3 cm long | |
| 4. Stems upright or at least not rooting at nodes or forming mats | <i>E. hypnoides</i> |
| | 5. |

5. Panicles 5--25 cm long; lemmas 1--2.2 mm long; fruits brownish; native
 5. Panicles 10--40 cm long; lemmas 1.6--3 mm long; fruits light brown to white; cultivated

*E. pectinacea**E. tef*

Eragrostis cilianensis (All.) Vign. ex Janchen Stinkgrass Annual exotic bunchgrass. **Stems** spreading to ascending, 1--4 dm long. **Leaves:** blades 1--3 mm wide. **Inflorescence** a contracted to open panicle 7--15 cm long. **Spikelets** 6--10 mm long. **Lemmas** about 10--30 per spikelet. Inhabiting disturbed areas along roadsides, pastures, and fields generally on well-drained soils. Introduced throughout all of N. America.

The generally disagreeable odor is emitted from the glandular bumps on the leaves and inflorescences.

Eragrostis hypnoides (Lam.) Britton, Sterns & Poggenb. Teal lovegrass Annual bunchgrass. **Stems** spreading, 1--3 dm long. **Leaves:** blades 1--3 mm wide. **Inflorescence** a contracted to open panicle 2--5 cm long. **Spikelets** 5--8 mm long. **Lemmas** about 7--20 florets. Mud flats, gravel and sand bars, and sandy banks mostly along the Yellowstone and Missouri Rivers in MT. Throughout most of N. America.

Eragrostis minor Host [*Eragrostis poacoides* Beauv. ex Roem. & Schult., *E. eragrostis* P.Beauv.] Little lovegrass Annual exotic bunchgrass. **Stems** spreading, 0.5--3 dm long. **Leaves:** blades 1--3.5 mm wide. **Inflorescence** an open panicle 5--12 cm long. **Spikelets** 4--8 mm long. **Lemmas** 10--19 per spikelet. Frequently disturbed settings such as cracks in or along sidewalks, driveways, and parking lots, and along roads and railroad tracks. Introduced throughout most of N. America.

Superficially like *Eragrostis pectinacea* except that in addition to bearing some raised glands, *E. minor* also has short pedicels (<4 mm) that render a congested inflorescence, which contrasts to the open diffuse inflorescence of *E. pectinacea*. The generally disagreeable odor is emitted from the glandular bumps on the leaves and inflorescences.

Eragrostis pectinacea (Michx.) Nees ex Steud. [*E. diffusa* Buckley] Tufted lovegrass Annual bunchgrass. **Stems** 1--5 dm long. **Leaves:** blades 2--3 mm wide. **Inflorescence** an open panicle 5--20 cm long. **Spikelets** 5--8 mm long. **Lemmas** 6--12 per spikelet. Sporadic in MT and known from disturbed sites including sandy or gravelly banks of the Yellowstone and Big Horn Rivers. Throughout most of N. America.

Eragrostis pilosa (L.) P. Beauv. India lovegrass Annual bunchgrass. **Stems** 1--5 dm tall. **Leaves:** blades 1--4.5 mm wide. **Inflorescence** an open panicle 5--25 cm long. **Spikelets** 3.5--10 mm long. **Lemmas** 5--17 per spikelet. Roadsides, railroad embankments, edges of gardens and cultivated fields; collected in Yellowstone co. Throughout most of N. America.

Eragrostis tef (Zuccagni) Trotter Teff Annual exotic bunchgrass. **Stems** 25--60 cm tall. **Leaves:** blades 2--5.5 mm wide. **Inflorescence** an open panicle 10--40 cm long. **Spikelets** 4--11 mm long. **Lemmas** 7--16 per spikelet. Rarely escaping cultivation in vicinity of crop fields; collected in Gallatin co. Introduced in N. America and known otherwise from SC.

Eremopyrum (Ledeb.) Jaubert & Spach, False wheatgrass

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a bilateral terminal spike with short internodes. **Spikelets** one per node and diverging at a wide angle, with several florets; glumes smaller than lemmas. Lemma awnless to awn-tipped; palea enclosed by lemma. **Disarticulation** below the glumes; unit of dispersal the burr-like spike of spikelets.

A cool season genus of possibly 10 species principally of the Mediterranean region, three of which occur in N. America.

Eremopyrum triticeum (Gaertn.) Nevski [*Agropyron triticeum* Gaertn.] Annual wheatgrass Annual exotic bunchgrass. **Stems** erect to somewhat spreading, 1.5--3.0 dm tall. **Leaves:** blades flat to inrolled, 2--6 mm wide. **Inflorescence** 1--2 cm long; the inflorescence rachis continuous. **Spikelets** one per node, 8--12 mm long, very crowded and diverging at wide angles (40--80°), the internodes 1/10 - 1/8 the length of the spikelets; glumes and lemmas becoming hardened or bony in texture at maturity. **Lemmas** tapering to an awn-tip. Roadsides, gravel pits, margins of garbage dumps, and other regularly disturbed settings with sandy or gravelly soils where competition with other grasses is minimal. Introduced throughout much of western N. America except at the extreme northern latitudes.

This grass resembles a diminutive form of crested wheatgrass.

Festuca L., Fescue

Bunched perennials. **Leaf blades** generally inrolled and ascending, sheaths with overlapping margins; ligule membranous and bilobed. **Inflorescence** a contracted to open panicle. **Spikelets** with several to many florets, these

often not tightly overlapping; glumes smaller than lemmas. **Lemma** rounded on back and with an inconspicuous venation, awned or awn-tipped; palea mostly enclosed in floret. **Disarticulation** above glumes; dispersal unit the floret.

A cool season genus of possibly 500 species in warm to cold temperate and sub-boreal regions of the world, with possibly 37 native to N. America. The broad- and fine-leaved *Festuca* species have been resolved into sister lineages (Torrecilla and Catalán 2002). The broad-leaved lineage includes species of *Leucopoa* and *Lolium*, as well as *Festuca arundinacea* and *F. pratensis*, for example. The fine-leaved lineages include the species of *Vulpia* and the remaining species of *Festuca* (e.g., *F. rubra*, *F. idahoensis*, etc.). The segregation of *Leucopoa*, *Lolium*, *Schedonorus* (including *Festuca arundinacea* and *F. pratensis*), and *Vulpia* is now well supported by phylogenetic evidence. Distinguishing among *Festuca* species relies to a large degree on micromorphologies that are not readily useable and thus not adopted in this treatment (Darbyshire and Pavlick, 2007).

- | | |
|--|------------------------|
| 1. Spikelets with an irregular symmetry, comprising small vegetative bulb-like plants | <i>F. viviparoides</i> |
| 1. Spikelets with bilaterally symmetrical | 2 |
| 2. Awns of lemma 0--2 mm long (if awns <2 mm long and plants <35 cm tall, go to couplet 7) | 3 |
| 2. Lemmas with awns often much longer than 1.5 mm long | 5 |
| 3. Auricles of sheath conspicuous and well-developed; leaf blades flat, mostly >3 mm wide; stems mostly about 1 m tall or taller see genus <i>Schedonorus</i> | |
| 3. Auricles of sheath absent; leaf blades mostly inrolled or flat but then <3 mm wide; stems of various height | 4 |
| 4. Leaf margins smooth or minutely scabrous, basal leaf blades distinctly tapering distally; new basal sheaths green, old basal sheaths with white veins contrasting against dark inter-veins and bearing a hard, persistent, short blade; lemmas averaging 5--6 mm long | <i>F. viridula</i> |
| 4. Leaf margins strongly scabrous; basal leaf blades not distinctly tapering distally; new basal sheaths reddish or purplish, old basal sheaths light colored with a deciduous blade appearing to be grazed off; lemmas averaging 8--9 mm long | <i>F. campestris</i> |
| 5. Stems averaging <35 cm; panicles mostly <10 cm long, generally narrow; spikelets with mostly 2 to 4 florets | 6 |
| 5. Stems averaging 40--100 cm; panicles mostly 10--20 cm long, generally open; spikelets with mostly 5 to 7 florets | 7 |
| 6. Stems densely short hairy below the panicle, the epidermis dark purplish; exposed alpine tundra | <i>F. baffinensis</i> |
| 6. Stems not hairy below the panicle, epidermis greenish; montane to alpine | <i>F. idahoensis</i> |
| 7. Rhizomes well developed; stems not bunched or bunched with decumbent bases; basal leaf sheaths dark-brown or reddish, prominently nerved, ultimately shredding into persistent fibers | <i>F. rubra</i> |
| 7. Non-rhizomes bunchgrasses with erect stems; basal leaf sheaths green, or if reddish or purplish, then not shredding into persistent fibers | 8 |
| 8. Leaf blades flat, lax, 3--10 mm wide; ligules not distinctly bilobed | <i>F. subulata</i> |
| 8. Leaf blades inrolled, stiff, about 1 mm wide; ligules distinctly bilobed | 9 |
| 9. Awns as long or longer than the lemmas; pedicels and inflorescence branches spreading or drooping; lemmas scabrous on the upper half | <i>F. occidentalis</i> |
| 9. Awns shorter than the lemmas; pedicels and inflorescence branches stiff and ascending; lemmas scabrous at most in the upper third | 10 |
| 10. New basal leaf sheaths green; old leaf blades remaining on old sheaths; leaf blades smooth-edged or weakly scabrous; stems usually averaging <1 m | <i>F. idahoensis</i> |
| 10. New basal leaf sheaths reddish or purplish; old leaf blades disarticulating from old sheaths; leaf blades with strongly scabrous edges; stems averaging close to 1 m | <i>F. campestris</i> |

Festuca baffinensis Polunin Baffin fescue Perennial bunchgrass. **Stems** 10--20 cm. **Leaves:** blades ca. 1 mm wide, inrolled. **Inflorescence** a narrow panicle 1--3 cm long, the peduncle hairy and usually pigmented with a dark purplish color. **Spikelets** 4--7 mm long with 3 to 4 florets. **Lemmas** with an awn tip or awn ≤ 2.5 mm long. Alpine meadows. Circumpolar south to UT, CO.

This species is barely distinct from the short-statured, high elevation forms of *Festuca idahoensis* and is arbitrarily distinguished by the hairy and usually dark pigmented peduncle.

Festuca campestris Rydb. [*Festuca hallii* (Vasey) Piper, *F. scabrella* Torr. ex Hook] Rough fescue Perennial bunchgrass. **Stems** 60--100 cm. **Leaves:** blades 1--2 mm wide, inrolled to partially flattened, distinctly scabrous; old

leaf sheaths persistent in tuft. **Inflorescence** a narrow panicle 5--15 cm long. **Spikelets** 8--12 mm long, with 4 to 6 florets. **Lemmas** awnless or awn-tipped. Grasslands; valleys to montane. BC to SK, ON, south to OR, ID, MT, CO.

Differing from *Festuca hallii*, plains rough fescue, which occurs mostly to the north in Canada, by spikelets with few florets and glumes that overtop the distal-most florets. Such "oatgrass" spikelets in MT rough fescue do not segregate geographically. Most MT specimens lack the "oatgrass" spikelet morphology. The few specimens that have them come from western MT, and these don't otherwise differ from the more common forms of *Festuca campestris*.

Festuca idahoensis Elmer Idaho fescue Perennial bunchgrass. **Stems** 10--80 cm. **Leaves:** blades 1 mm wide, inrolled. **Inflorescence** an open panicle 2--20 cm long, the peduncle glabrous and usually greenish in color. **Spikelets** 5--10 mm long, with 3 to 7 florets. **Lemmas** with an awn tip or awn ≤ 5 mm long. Grasslands, meadows at all elevations. Throughout western N. America except at extreme northern latitudes.

On drier sites and at high elevations this species is short-statured and distinguished as *Festuca brachyphylla* Schult. & Schult. f. [*Festuca ovina* L. var. *brevifolia* (R. Br.) S. Watson], alpine fescue, *Festuca minutiflora* Rydb., small flower fescue, or *Festuca saximontana* Rydb., Rocky Mountain fescue. Such segregates are distinguished by highly overlapping traits mostly involving sizes and patterns of coloration of spikelets, florets, lemma awns, and leaf-blade. *Festuca rubra* differs by a loosely bunched rhizomatous habit, moist loamy habitats, and reddish tinged leaf sheaths with prominent whitish nerves. *Festuca idahoensis* is non-rhizomatous, strongly bunched, and grows in open rocky dry sites. Occasional specimens might best be assigned to either *F. idahoensis* or *F. rubra* using morphology and ecology. *Festuca ovina*, sheep fescue, is introduced from Europe and rare in N. America because it is no longer used in seed trade. It differs from *F. idahoensis* by technical characters involving leaf sclerenchyma patterns, leaf blades with 1 to 3 indistinct ribs (vs 1 to 5 distinct ribs), and anthers 1.4--2.6 mm long (vs 2.4--4.5 mm).

Festuca occidentalis Hook. Western fescue Perennial bunchgrass. **Stems** 40--100 cm tall. **Leaves:** blades 1 mm wide, smooth to slightly scabrous. **Inflorescence** an open, often drooping panicle 5--12 cm long. **Spikelets** 6--9 mm long, with 3 to 5 florets. **Lemmas** with a slender, flexuous awn 4--12 mm long. Moist soils of forest understory, along streams, lakes; valleys to subalpine. Very western N. America and extending east into MT, WY, SD, to MI, ON.

The long awns and drooping panicle are distinctive, the latter often inferred from herbarium specimens by the arching inflorescence rachis and the arrangement of spikelets that are all swept to one side.

Festuca rubra L. Red fescue Perennial bunchgrass or not with well-developed, slender rhizomes. **Stems** 20--80 cm tall. **Leaves:** blades 1.0--1.5 mm wide, inrolled; lower sheaths reddish or brown, becoming fibrous in age. **Inflorescence** a loosely contracted panicle 7--15 cm long. **Spikelets** 6--8 mm long, with 4 to 7 florets. **Lemmas** with an awn 1--3 mm long. Grasslands, meadows; valleys, montane. Throughout nearly all of N. America, both native and introduced from Eurasia.

Indigenous to northern MT [*F. rubra* ssp. *arctica* (Hack.) Govor., *F. rubra* ssp. *vallicola* (Rydb.) Pavlick] but naturalized elsewhere from lawn plantings. The predilection of *F. rubra* for moist loamy soils may help distinguish this species from *F. idahoensis*. *Festuca rubra* generally has reddish stem bases >1 mm in diameter and distinctly whitish-veined. The veins persist as strands after the sheath lamina has disintegrated. Stem bases are decumbent and occur as single or loosely bunched stems interconnected by rhizomes. Distinctly bunched stems, however, occur sporadically and *F. rubra* then differs from *F. idahoensis* only by stem thickness and ecological setting.

Festuca subulata Trin. Bearded fescue Perennial bunchgrass. **Stems** loosely bunched, 60--100 cm. **Leaves:** blades 4--10 mm wide, flat. **Inflorescence** an open panicle with drooping branches, 8--25 cm long. **Spikelets** 7--10 mm long with 3 to 5 florets. **Lemmas** with an awn 5--15 mm long. Open forest, riparian woodlands; valleys, montane. Throughout most of western N. America and extending east into SD.

The broad leaf blades and open panicles are very characteristic of this species.

Festuca viridula Vasey Greenleaf fescue Perennial bunchgrass. **Stems** 40--80 cm. **Leaves:** blades 1.5--2.0 mm wide, flat. **Inflorescence** an open panicle 6--15 cm long. **Spikelets** 8--11 mm long, with 3 to 7 florets. **Lemmas** unawned or awned to 1.5 mm. Grasslands, meadows; subalpine, alpine. BC to CA, NV, MT.

This species might be characterized as a slender form of *Festuca campestris* except that the persistent, older leaf sheaths do not have abscised blades but rather taper to highly reduced blades which are commonly hardened into a claw-shape, a feature unique to this species.

Festuca viviparoidea Krajina ex Pavlick [*Festuca ovina* L. var. *vivipara* L.; *Festuca vivipara* (L.) Sm. misapplied] Northern fescue, viviparous fescue. Perennial bunchgrass. **Stems** 10--25 cm. **Leaves:** blades ca. 1 mm wide. **Inflorescence** a narrow panicle 3--5 cm long. **Spikelets** of variable length depending on number and size of the vegetative bulblets. **Lemmas** uncommon, sometimes awn-tipped. Alpine turf; collected in Glacier co. AK to Greenland south to BC, MT, WY; Asia.

Glyceria R. Br., Mannagrass

Rhizomatous perennials. **Leaf blades** generally flat and lax, sheaths with fused margins; ligule membranous. **Inflorescence** an open and diffuse or contracted panicle. **Spikelets** with mostly 3-many florets; glumes 1-veined. **Lemma** with 5--9 prominent evenly spaced veins; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 35 species native to temperate and arctic regions, mostly aquatic zones, mostly of the Northern Hemisphere. North America includes about 13 native and 3 introduced species.

1. Panicle narrow, the branches ascending; spikelets round in cross-section, 8 mm long or longer, usually with 8--12 florets (rarely as few as 5 florets); lemmas 3--4 mm long; ligules mostly 5--13 mm long ***G. borealis***

1. Panicle open, the branches spreading; spikelets laterally flattened, <8 mm long, usually with 3--7 florets (rarely as many as 8 florets); lemmas <3 mm long; ligules mostly 1--7 mm long 2.

2. Spikelets 4--7 mm long (rarely as short as 3 mm long); glumes with mostly acute tips and the midrib prominent to the tip, first glume mostly 1.5--2.5 mm long; lemma tips somewhat flat; ligules often 5--7 mm long (sometimes as short as 3 mm long); at least some leaf blades 6 mm wide or wider (if margins of leaf sheaths overlap, check *Torreyochloa pallida*) ***G. grandis***

2. Spikelets 2--4 mm long (rarely as long as 5 mm long); glumes with mostly rounded ends and the midrib not extending to the tip, first glume <1.5 mm long (and often no >1 mm long); lemma tips prow-shaped; ligules mostly 1--5 mm long (rare as long as 6 mm long); leaf blades 2 mm wide or wider 3.

3. Leaf blades, at least some if not most, 6 mm wide or wider; ligules 2--6 mm long; stems mostly about 1 m tall or more ***G. elata***

3. Leaf blades 2--5 mm wide; ligules 1--4 mm long; stems 3--10 dm tall ***G. striata***

Glyceria borealis (Nash) Batchelder. Northern mannagrass or small floating mannagrass Rhizomatous perennial. **Stems** 0.8--1.5 m tall. **Leaves:** leaf blades 2--5 (7) mm wide, ligules 5--11 mm long. **Inflorescence** a narrow panicle 20--45 cm long, branches ascending. **Spikelets** 8--15 mm long, round in cross-section. **Lemmas** 8--12 per spikelet. Wet meadows and along stream and lake margins. Sporadic throughout much of N. America although absent in the southeast.

The many long florets per spikelet render a very distinctive appearance to the cylindrical spikelet. In some specimens, however, the florets can be splayed out laterally slightly obscuring the cylindrical spikelet construction.

Glyceria elata (Nash ex Rydb.) M.E.Jones. Tall mannagrass Rhizomatous perennial. **Stems** 1--2 m tall. **Leaves:** blades 6--10 mm wide, ligules 2--6 mm long. **Inflorescence** an open panicle 15--30 cm long, the branches spreading and often drooping. **Spikelets** 3--5 mm long, laterally compressed. **Lemmas** 2--7 per spikelet. Wet areas along streams and lake margins. Throughout N. America.

Most similar to *Glyceria grandis* but the very short glumes have rounded ends devoid of the midrib. The larger glumes of *Glyceria grandis*, in contrast, have mostly acute tips with the prominent midrib extending all the way to the very tip.

Glyceria grandis S. Watson. American mannagrass Rhizomatous perennial. **Stems** 1--2 m tall. **Leaves:** blades 2--12 mm wide, ligules mostly 5--7 mm long. **Inflorescence** an open diffuse panicle, 20--40 cm long, the branches spreading and often drooping. **Spikelets** 3--7 mm long, laterally compressed. **Lemmas** 2--7 (rarely 8) per spikelet. Banks of streams and along lake margins. Throughout most of N. America excepting many southeastern states.

Torreyochloa pallida var. *pauciflora* (pale false mannagrass) may be confused with *Glyceria grandis*. *Torreyochloa pallida* has sheath margins that overlap (they are fused in *Glyceria*) and the ligules are confined mostly to the front of the leaf blade (in *Glyceria* the ligules often wrap and fuse around the stem). The spikelets of *Torreyochloa pallida* are distinctly broad and the lemmas have a black band that delimits the hyaline tip from the greenish lemma body. In addition, the lemma tip of *T. pallida* is broad and in the plane of the main lemma body. The glumes of *Torreyochloa pallida* are rounded, devoid of a midrib towards the tip, and much shorter than the first lemma. In *Glyceria grandis*, the lemma tip is greenish or with an inconspicuous narrow hyaline tip and the entire lemma tip is contracted from the main lemma body to give the entire lemma body including the tip a scoop-shape. The glumes of *Glyceria grandis* are mostly acute, with a midrib extending to the tip, and are about half as long as the first lemma.

Glyceria striata (Lam.) Hitchc. Fowl mannagrass. Rhizomatous perennial. **Stems** often bunched, 0.3--1.0 m tall. **Leaves:** blades 2--5 mm wide, ligules 1--4 mm long. **Inflorescence** an open panicle, 10--20 cm long, branches spreading but if ascending then the tips drooping. **Spikelets** 2--4 mm long. **Lemmas** 2--7 florets per spikelet. Common along lake shores and in wet meadows. Throughout most of N. America.

Very similar to *Glyceria elata* except in having a shorter stature and narrower leaves.

Helictotrichon Besser ex Schult. & Schult. f., Alpine spikeoat

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted panicle. **Spikelets** with mostly 3--6 florets; glumes nearly enclosing the florets. **Lemma** awned from the middle, the awns twisted and bent; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of 30--40 species mostly Eurasian and African. Two species occurs in N. America usually in dry montane meadows or high latitude grasslands. Although phylogenetic evidence suggests that *Helictotrichon* comprises disparate species, genetic samples have been few and so the traditional circumscription of *Helictotrichon* is tentatively maintained.

Helictotrichon hookeri (Scribn.) Henr. [*Avenua hookeri* (Scribn.) Holub] Spikeoat Perennial bunchgrass **Stems** 2--4 dm tall. **Leaves:** the larger blades (2-)3--4 mm wide, flat to folded along midrib. **Inflorescence** a contracted panicle 2--11 cm long. **Spikelets** 11--15 mm long. **Lemmas** 3--5, uniformly awned. Northern plains and middle to high elevation montane meadows and open understory. NM north to northwestern Canada, east to QC.

High elevations populations of *H. hookeri* approach *H. mortonianum* from the southern Rocky Mountains in having short inflorescences and spikelets with 2 florets but they differ in having wider leaves. *Helictotrichon* is often confused with *Danthonia* species but the membranous ligule and awn originating from the middle of the back of the lemma of *Helictotrichon* differ from the hairy ligule and nearly terminal awn of *Danthonia*.

Holcus L., Velvetgrass

Bunched perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted to open panicle. **Spikelets** with 2 florets; glumes enclosing the florets. **Lemma** of lower floret unawned and fruit bearing, upper lemma staminate and with a hooked awn; palea well developed. **Disarticulation** below glumes and tardily above the glumes; unit of dispersal the spikelet or floret.

A cool season genus of 8 species native to Europe and Africa; one species occurs in MT and establishes in lawns and along roadsides in moist setting in the western portion of the state.

Holcus lanatus L. Common velvetgrass Perennial bunchgrass. **Stems** covered with dense soft hairs, 3--8 dm tall, often decumbent and rooting at nodes. **Leaves:** blades 4--8 mm wide. **Inflorescence** a contracted panicle 8--15 cm long, opening up at or after anthesis. **Spikelets** 3.5--4.5 mm long. **Lemmas** 2 per spikelet. Frequently disturbed sites, pastures, roadsides, croplands; collected in Ravalli co. Throughout much of N. America excepting the very north central provinces.

Hordeum L., Barley

Bunched perennials and annuals. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a two-sided terminal spike with short internodes. **Spikelets** exactly 3 per node and with one floret each, the lateral two pedicellate and sterile and the central one sessile and fertile (all three fertile at a node in six-row barley, *Hordeum vulgare*); glumes awn-like or generally so. **Lemma** unawned or awned from the tip; palea enclosed in floret. **Disarticulation** above glumes; dispersal unit the floret (or fruit).

A cool season genus of about 32 species mostly native to Eurasia but 5 native to N. America and 10 to S. America. Mostly inhabiting frequently disturbed settings. *Hordeum leporinum* Link [*H. murinum* L. ssp. *leporinum* (Link) Arcang.], hare barley, is very common in adjacent states and is expected to occur in MT. It differs from *H. geniculatum* by having lateral spikelets with well-developed staminate florets, glumes of central spikelet with ciliate margins, and well developed auricles mostly >1 mm long.

1. Plants perennial; awns slender

2.

1. Plants annual awns stout

3.

2. Glume-awns 30--80 mm long; inflorescence spike lax, 5--12 cm long, nearly as broad as long when mature and fresh; common to dry often disturbed sites

H. jubatum

2. Glume-awns <30 mm long; inflorescence spike erect, 2--6 cm long, cylindrical; plants mostly of meadow or riparian sites

H. brachyantherum

3. Leaf blades mostly 6--15 mm wide; rachis not disarticulating at maturity; awns of lemmas >4 cm long or lacking; cultivated barley; escaping roadside or near crop fields

H. vulgare

3. Leaf blades <6 mm wide; rachis readily disarticulating at maturity; awns of lemmas ≤4 cm long; not cultivated and common to disturbed settings often on alkaline soils

4.

4. Glumes of central spikelet 2 times wider at the middle than at the base

H. pusillum

4. Glumes of central spikelet awn-like, not distinctly wider above the base

H. geniculatum

Hordeum brachyantherum Nevski. [*Hordeum jubatum* L. ssp. *intermedium* Bowden, *Hordeum caespitosum* Scribn. ex Pammel] Meadow barley Perennial bunchgrass. **Stems** 2.5--6.0 dm tall. **Leaves:** lower blades and sheaths usually hairless, blades flat to folded, 1--3 mm wide. **Inflorescence** erect, 2--6 cm long; the inflorescence rachis disarticulating. **Spikelets** the 2 laterals sterile, the pedicel 0.5--1.0 mm long; glumes awn-like, 7--15 mm long (rarely to 30 mm). **Lemmas:** fertile lemma 7--8 mm long. Montane meadows and along streams. Throughout much of western N. America and sporadically in eastern states and provinces.

Hordeum caespitosum (*H. jubatum* ssp. *intermedium*), intermediate barley, is an alleged hybrid between *H. brachyantherum* and *H. jubatum*. This hybrid is similar to meadow barley in its erect inflorescence and predilection to wet meadow settings. With awns 20--30 mm long (instead of <20 mm long), this hybrid is more similar to foxtail barley (*H. jubatum*). The ecological and inflorescence similarity of intermediate and meadow barley suggest these two might be the same.

Hordeum geniculatum All. [*Hordeum marinum* Huds. ssp. *gussonianum* (Parl.) Thell.] Mediterranean barley Annual bunchgrass. **Stems** few bunched, often bent at nodes on dried specimens, 1--4 dm tall. **Leaves:** lower blades and sheaths usually hairy, blades flat, 2--4 mm wide. **Inflorescence** erect, 1--3 cm long; rachis disarticulating. **Spikelets:** the 2 laterals sterile, the pedicel 0.5--1.0 mm long; glumes awn-like, 8--15 mm long. **Lemmas:** fertile lemma 5.0--6.5 mm long. Frequently disturbed settings, alkaline soils; collected in Carter and Custer cos. Introduced in western N. America and sporadic in some eastern states.

Very similar to *H. glaucum* Steudel, which may occur in MT and would be distinguished from *H. geniculatum* by having hairless lower leaf sheaths, a fertile floret in all three spikelets, pedicels of the lateral spikelets that measure 1.5--3 mm long, and a rachilla projection that is stout rather than bristle-like.

Hordeum jubatum L. Foxtail barley. Perennial bunchgrass. **Stems** 2--7 dm tall; lower blades and sheaths usually hairless, less commonly hairy, blades flat, lax, 2--5 mm wide. **Inflorescence** lax, 5--12 cm long, rachis disarticulating at maturity. **Spikelets** the 2 laterals sterile, the pedicel 0.5--1.5 mm long; glumes awn-like, 25--75 mm long. **Lemmas:** fertile lemma 6--8 mm long. Common in frequently disturbed open dry sites (e.g., roadsides, trail sides, pastures, vacant lot, and overgrazed rangeland), including area of high salinity. Throughout nearly all of N. America.

Hordeum pusillum Nutt. Little barley Annual bunchgrass. **Stems** 1--3 dm tall; lower sheaths and blades hairless to hairy, blades flat, 1--4 mm wide. **Inflorescence** erect, 2--7 cm long, rachis disarticulating at maturity. **Spikelets:** the 2 laterals staminate, the pedicel 0.5--1.0 mm long; glumes awn-like but distinctly broad above the base, 8--14 mm long. **Lemmas:** fertile lemma 5--7 mm long. Open dry disturbed sites especially where water intermittently stands (e.g., depressions in pastures, rangeland, and roadsides). Throughout the U.S., BC, AL.

Little barely was cultivated as a grain crop by some of the early N. American civilizations from 800--100 BC (Mann 2005).

Hordeum vulgare L. [*Hordeum distichon* L.] Common barley, Six-row and two-row barley Annual (winter or spring) bunchgrass. **Stems** 5--12 dm tall. **Leaves:** lower sheaths and blades usually hairless, blades flat, 6--15 mm wide. **Inflorescence** erect, 6--12 cm long, rachis not readily disarticulating at maturity. **Spikelets** all fertile in 6-row barley, the laterals sterile in 2-row barley, pedicel about 0.5 mm long; glumes awn-like though slightly broadened above the base, 8--15 mm long. **Lemmas:** fertile lemma 8--12 mm long, the awns of some varieties of barley are >4 cm long, while other varieties lack such an awn. Cultivated grain crop, escapes not persisting. Introduced and escaping throughout nearly all of N. America.

Six-row barley is derived from two-row barley, the result of a single gene mutation. Two-rowed barley has uniform grain size and is preferred for malt. Six-row barely produces grains of unequal size and varying in germination rates such that malt from such grain is of lower quality. Two-row barley is used for brewing Michelob whereas six-rowed barley for Budweiser. Beardless or hooded barley (a variety often cultivated for hay because it lacks lemma-awns) is distinctive in that the awn is transformed into a trifurcate lamina.

Koeleria Pers., Junegrass

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted spike-like to somewhat open panicle. **Spikelets** with 2--4 florets; glumes somewhat enclosing the florets. **Lemma** awnless or with a very short awn <1 mm long; palea very well developed. **Disarticulation** above glumes; unit of dispersal the floret or fruit.

A cool season genus of about 35 species native open dry steppe vegetation in temperate and arctic regions of N. America and Eurasia. Two species are native to N. America.

Koeleria macrantha (Ledeb.) Schult. [*K. cristata* auct. non Pers. p.p., *K. nitida* Nutt., *K. pyramidata* auct. non (Lam.) P.Beauv. p.p.] Prairie Junegrass Perennial bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 1--3 mm wide. **Inflorescence** a contracted to occasionally open pyramidal panicle 4--11 cm long. **Spikelets** 4--5 mm long. **Lemmas** 2--4 per spikelet. Low to middle elevations in sagebrush steppe, dry montane meadows, and other open dry sites with generally high native cover (indicative of infrequent disturbance). Throughout nearly all of N. America excepting some very southeastern states and very northwestern provinces.

Leersia Sw., Cutgrass

Rhizomatous perennials. **Leaf blades** generally flat and lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with one floret; glumes lacking. **Lemma** awnless; palea well developed and equal in size and texture to the lemma. Disarticulation above the glumes; dispersal unit the floret.

A cool season genus of about 17 species inhabiting marshy or mesic woodland habitats in temperate and tropical regions throughout the world. Five species occur in N. America.

Leersia oryzoides (L.) Sw. Rice cutgrass Rhizomatous perennial. **Stems** 8--16 dm tall, solitary to bunched, often rooting at nodes. **Leaves:** blades 7--14 mm wide, sheaths retrorsely scabrous, ligules truncate, 0.8--1.0 mm long. **Inflorescence** an open panicle 10--25 cm long. **Spikelets** 4--5 mm long. **Lemma** bristly, palea equaling lemma and tightly clasped within it. Sporadic along fresh-water lake and stream margins. Widespread but only locally common throughout most of N. America except at extreme northern latitudes.

Leptochloa P.Beauv., Sprangletop

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a panicle with many short lateral secund spikes. **Spikelets** with 4--6 florets; glumes similar in size to lemmas. **Lemma** distinctly 3-nerved, short-awned; palea enfolded by floret. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of about 32 species centered in warm temperate and tropical regions of the world. Ten species occur in N. America, eight of them as natives.

Leptochloa fusca (L.) Kunth subsp. *fascicularis* (Lam.) N.Snow Bearded sprangletop Annual bunchgrass. **Stems** 1--4 dm tall. **Leaves:** blades 2--4 mm wide. **Inflorescence** a panicle of secund lateral spikes but these often congested in leaf sheaths and adjacent leaf blades. **Spikelets** 4--7 mm long. **Lemmas** 5--7 per spikelet, hairy, awn-tipped. Open dry and regularly disturbed settings including roadsides. Throughout nearly all of the U.S. and sporadically across S. Canada.

MT specimens have inflorescences overtopped by a rosette of leaves, and thus appear stunted.

Leucopoa Griseb., Spike fescue

Bunched perennials. **Leaf blades** flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a spike-like panicle. **Spikelets** with several to many florets; glumes similar in size to lemmas. **Lemma** keeled and inconspicuously veined, unawned; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 10 species in temperate Eurasia and one native to N. America. The native N. American species is found in the drier montane settings.

Leucopoa kingii (S.Watson) W.A.Weber. [*Festuca kingii* (S.Watson) Cassidy, *Hesperochloa kingii* (S.Watson) Rydb.] Spike fescue Perennial bunchgrass. **Stems** 3--5 dm tall. **Leaves:** blades 3--7 mm wide, sheaths of older leaves very persistent. **Inflorescence** a spike-like panicle 9--19 cm long, the branches appressed to the main rachis. **Spikelets** 6--10 mm long. **Lemmas** 3--7 per spikelet, unawned to slightly awn-tipped. On well drained rocky slopes in the mountains, particularly in open dry understory, steppe, or sparsely vegetated slopes. Generally throughout the western half of the U.S.

The bunched and robust stem bases are reminiscent of *Festuca campestris*. *Leucopoa* is distinguished by its broader leaf blades that do not abscise from the old leaf sheaths, deeply furrowed inside surface of leaf blades, and new leaf sheaths that are generally straw-colored.

Lolium L., Ryegrass

Bunched to single-stemmed annuals to short-lived perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a bilateral or two-sided terminal spike. **Spikelets** turned edgewise to the rachis, with several to many florets; glumes both present on the terminal spikelet, all lateral spikelets

with one glume. **Lemma** often keeled and inconspicuously veined, unawned to short-awned; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about five species native to temperate Eurasia. All of these have been introduced into N. America, often in seed mixes intended for lawn establishment. *Lolium* is most closely related to *Schedonorus*, which justifies the narrow circumscription of *Festuca* to include only the narrow-leaved perennial species (Darbyshire 1993).

- | | |
|--|----|
| 1. Glumes \geq length of floret-cluster; spikelets with <10 florets; annuals | 2. |
| 1. Glumes < length of floret-cluster; spikelets with <10 or >10 florets; annuals to perennials | 3. |

2. Lemmas usually much <8 mm long and without any keel, circular in cross-section such that each lemma does not nest within the next lower one on the same side of the rachilla ***L. temulentum***

2. Lemmas usually 8 or more mm long and laterally flattened, at least distally keeled, elliptic in cross-section and each lemma is nested within the next lower one on the same side of the rachilla ***L. persicum***

3. Lemmas often with >9 per spikelet, most with awns >1 mm long; most of the large leaves tending to be 3--8 mm broad ***L. multiflorum***

3. Lemmas with \leq 9 spikelets, awnless or barely awn-tipped; most of the larger leaves tending to be <4 mm wide (but sometimes up to 6 mm broad) ***L. perenne***

Lolium multiflorum Lam. [*Lolium perenne* L. var. *multiflorum* (Lam.) Husnot] Italian or annual ryegrass Biennial to short-lived perennial bunchgrass. **Stems** 2--15 dm tall, often single-stemmed in lawn settings. **Leaves:** blades 3--6 mm wide. **Inflorescence** 15--40 cm long. **Spikelets** 10--30 mm long, glumes about as long as an individual floret. **Lemmas** often 10--20 per spikelet, keeled, at least the upper ones with an awn 5--15 mm long. Regularly disturbed sites, roadsides, and newly planted lawns. Introduced throughout much of N. America.

Very similar to *Lolium perenne* and intermediate forms exist.

Lolium perenne L. Perennial ryegrass Perennial bunchgrass. **Stems** 3--15 dm tall. **Leaves:** blades 2--5 mm wide. **Inflorescence** 5--25 cm long. **Spikelets** 7--19 mm long, glumes about as long as an individual floret. **Lemmas** mostly 5--9 per spikelet, keeled, awnless or awn-tipped. Regularly disturbed sites, roadsides, trailsides, and newly planted lawns. Introduced throughout much of N. America.

Lolium persicum Boiss. & Hohen. ex Boiss. Persian ryegrass Annual bunchgrass. **Stems** 1--4 dm tall. **Leaves:** blades 2--6 mm wide. **Inflorescence** 10--25 cm long. **Spikelets** 10--26 mm long, glumes about as long as the spikelet length. **Lemmas:** 4--9 per spikelet, with a slender flexuous awn 5--15 mm long. Regularly disturbed settings. Introduced along the southern tier of Canadian provinces and sporadically south into mainly NY, MT, ND, WY, CO.

Lolium temulentum L. Darnell ryegrass Annual bunchgrass. **Stems** 6--9 dm tall. **Leaves:** blades 2--10 mm wide. **Inflorescence** 10--30 cm long. **Spikelets** 10--25 mm long, glumes about as long as the spikelet length. **Lemmas:** 5--10 per spikelet, awnless or awned to 15 mm long. Frequently disturbed sites; collected in Gallatin co. Introduced throughout much of N. America.

Melica L., Melicgrass

Bunched to single-stemmed perennials. **Leaf blades** generally flat and lax to ascending, sheaths with fused margins; ligule membranous. **Inflorescence** a raceme or contracted panicle. **Spikelets** with mostly 2--4 florets; glumes mostly 3--5-veined. **Lemma** with prominent parallel veins, unawned to awned; palea well developed but enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret

A cool season genus of about 80 species native to most temperate regions of the world. About 19 species occur in N. America.

- | | |
|---|--------------------------|
| 1. Lemmas awned; leaf blades 6--12 mm wide; stems not having corms at base | <i>M. smithii</i> |
| 1. Lemmas awnless or only awn-pointed; leaf blades 1.5--10 mm wide; corms present | 2. |

- | | |
|---|---------------------------|
| 2. Lemmas gradually tapering to a narrowly pointed tip; leaf blades 2--10 mm wide | <i>M. subulata</i> |
| 2. Lemmas blunt or abruptly tapered to a narrow tip; leaf blades 1.5--5 mm wide | 3. |

3. Pedicels short, stiff, straight; glumes from 1/2--2/3 as long as to equaling the spikelets; ligules 2--6 mm long; corms closely clustered ***M. bulbosa***

3. Pedicels, or at least some, slender, twisted or curved; glumes usually <1/2 as long as the spikelets; ligules 0.1--2 mm long; corms separated by short rhizomes ***M. spectabilis***

Melica bulbosa Geyer ex Porter & J.M.Coult. Oniongrass Perennial bunchgrass **Stems** 3--8 dm tall, often few-bunched each from a corm base. **Leaves:** leaf blades 2--5 mm wide, ligules 2--6 mm long. **Inflorescence** a narrow panicle or raceme 10--30 cm long, the pedicels stiff, erect, mostly bearing 1 or 2 spikelets. **Spikelets** 12--20 mm long. **Lemmas:** 4--7 per spikelet, awnless. Montane dry meadows, rocky slopes, and open understory. Throughout much of the western half of N. America.

Melica bulbosa is similar to *M. spectabilis* in sometimes having clustered sterile florets at the end of the spikelet.

Melica smithii (Porter ex A.Gray) Vasey Smith's melicgrass Perennial bunchgrass **Stems** 6--10 dm tall, from a slender base. **Leaves:** blades 6--12 mm wide, ligules 2--4 mm long. **Inflorescence** a narrow panicle or raceme 10--30 cm long, branches solitary, spreading or bent downwards. **Spikelets** 12--18 mm long. **Lemmas:** 3--5 per spikelet, with a 2--8 mm awn borne from the tip. Open to closed montane understory. Throughout many of the states and provinces along the Canada-U.S. border.

The leaves of this species are on average about 1 cm broad. *Melica smithii* and *M. subulata* might be confused with the genus *Bromus* (e.g., *Bromus porteri*) because all concerned occur in montane meadow and understory settings, have a similar stature, and also have closed leaf sheaths. The lemmas of *Melica* are either glabrous, prominently veined, or have an awn originating from very near the lemma tip. *Bromus* lemmas are typically hairy, less prominently veined, and the awn originates from the back of a bifid lemma tip.

Melica spectabilis Scribn. [*Melica subulata* (Griseb.) Scribn. var. *pammelii* (Scribn.) C.L.Hitchc.] Purple oniongrass Perennial bunchgrass **Stems** 6--10 dm tall, loosely bunched each from a corm base. **Leaves:** blades 2--5 mm wide, ligules 1--2 mm long. **Inflorescence** a narrow panicle 5--25 cm long, the branches slender and twisted. **Spikelets** 10--18 mm long. **Lemmas:** 4--8 per spikelet, awnless. Open montane slopes and meadows. Throughout the western U.S. and southwestern Canada.

In addition to the twisted and sometimes abruptly curved pedicels, the purplish bands on the lemmas of *M. spectabilis* cover much more surface area from base to tip, whereas these purplish bands in *M. bulbosa* are narrow and more confined to the lemma apex.

Melica subulata (Griseb.) Scribn. [*Melica subulata* (Griseb.) Scribn. var. *pammelii* (Scribn.) C.L. Hitchc.] Alaska oniongrass Perennial bunchgrass **Stems** 6--12 dm tall, loosely bunched or in patches, most stems from a corm base. **Leaves:** blades 2--10 mm wide, ligules 1--4 mm long. **Inflorescence** a narrow panicle or raceme 10--25 cm long, with few branches. **Spikelets** 10--20 mm long. **Lemmas:** 4--8 per spikelet, mostly awned-tipped. Open montane slopes and understory. Sporadic throughout western North America.

This species may be mistaken for small individuals of *Bromus inermis*. However, the onion-like base to the stem readily distinguishes *Melica* from *Bromus*. Also, *Bromus inermis* rarely has a spikelet as small as those of this species.

Muhlenbergia Schreb., Muhly

Bunched perennials and annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to sometimes contracted or spike-like panicle. **Spikelets** with 1 floret, rarely with 2; glumes shorter than lemma or enclosing the floret. Lemma with 3 (rarely 1--2) distinct veins, awnless or awned, sometimes with a long-hairy callus; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of about 155 species centered in tropical and temperate regions of the Americas. A total of 70 mostly native species occur in N. America. *Muhlenbergia mexicana* (L.) Trin., wirestem muhly, is common just west of Lolo Pass in ID and might be eventually found in MT. It is a native rhizomatous perennial similar to *Muhlenbergia glomerata* or *M. racemosa* but with glumes measuring only 3--4 mm long including the awn-tip. The similar MT *Muhlenbergia* species have glumes mostly 4--8 mm including the awns that are about as long as the lemma body. A specimen of *Muhlenbergia montana* (Nutt.) Hitchc. is deposited in the MONT herbarium with the note "Collected in Montana but location unknown. G.F.Payne 1951" This perennial bunchgrass is marked by loose spicate panicles where each spikelet bears a lemma that is long-awned (10--20 mm) and longer than the subtending glumes, and the upper glume is distinctly three-toothed.

- | | |
|--|-----------------------|
| 1. Plants annual, mostly weakly rooted and completing life cycle in six weeks or so | 2. |
| 1. Plants perennial, robust bunchgrasses or strongly rhizomatous, roots not attaching to pulled-up stems | 3. |
| 2. Panicles narrow, <4 cm long; glumes not hairy; lemmas 1.5--3.0 mm long | <i>M. filiformis</i> |
| 2. Panicles open, mostly 10--20 cm long; glumes lightly hairy; lemmas 1.0--1.5 mm long | <i>M. minutissima</i> |
| 3. Bunchgrasses, stem bases with knotty bulbous nodes, the basal most covered with scaly sheaths | <i>M. cuspidata</i> |

3. Rhizomatous grasses with single to bunched stems often forming extensive patches; rhizomes extensive, scaly, and branching 4.
4. Panicles open when fully extended from leaf sheath, the spikelets on long slender pedicels *M. asperifolia* 5.
4. Panicles narrow, contracted, or spike-like when fully extended, the spikelets on short pedicels 5.
5. Leaf blades 2 mm wide or less, usually short and inrolled; lemmas about twice as long as glumes; anthers 1.0--1.5 mm long; stems below nodes roughened with undulations, bumps, or cross-corrugations *M. richardsonis* 6.
5. Leaf blades mostly >3 mm wide, flat; lemmas barely as long as or shorter than the glumes; anthers mostly <1.0 mm long; stems below nodes smooth 6.
6. Hairs of the lemma callus almost or fully as long as the lemma, the hairs 2--3 mm long; lemmas with an awn 3--8 mm long *M. andina* 7.
6. Hairs of the lemma callus <half the length of lemma, the hairs 0.2--1.5 mm long; lemmas awn-tipped or (as in *M. mexicana*) with an awn up to 6 mm long 7.
7. Lower stem internodes terete (round in cross-section) and tending to be covered by leaf sheaths, when exposed they are lightly hairy and with a dull texture; stems unbranched or branching only at base; ligules 0.2--0.6 mm long; anthers 0.8--1.5 mm long; lemma lightly hairy at the base and up the margins *M. glomerata* 7.
7. Lower stem internodes often compressed (elliptical in cross-section) and tending to be exposed, often glabrous and shiny in texture; stems commonly branching from above-ground nodes; ligules 0.6--1.5 mm long; anthers 0.4--0.6 mm long; lemma lightly hairy at base only *M. racemosa*

Muhlenbergia andina (Nutt.) Hitchc. Foxtail muhly Perennial bunchgrass with well-developed rhizomes. **Stems** 3--8 dm tall, often loosely bunched. **Leaves:** blades 2--4 mm wide, ligule about 1 mm long. **Inflorescence** a spike-like panicle 5--13 cm long. **Spikelets** 2.5--3.5 mm long. **Lemmas** with an awn 3--9 mm long, callus hairs as long as the lemma. Damp but often well-drained soils. Throughout much of the western half of the U.S. and southwestern Canada.

Muhlenbergia asperifolia (Nees & Meyen ex Trin.) Parodi. Scratchgrass Perennial bunchgrass with slender rhizomes. **Stems** 1--5 dm tall, spreading to erect and sometimes aggregated into patches. **Leaves:** blades 1--3 mm wide, ligule about 1 mm long. **Inflorescence** an open panicle 5--20 cm long. **Spikelets** 1--2 mm long. **Lemmas** usually 1, rarely 2, per spikelet, awn-tipped, callus hairs very short to lacking. Damp and often alkaline soils along streams and low areas in pastures. Throughout most of southern Canada and the U.S. except in the southeast.

Muhlenbergia cuspidata (Torr. ex Hook) Rydb. Plains muhly Perennial bunchgrass. **Stems** 2--4 dm long, the area below the stem node smooth and without small bumps, stem bases hard, scaly, and bulb-like. **Leaves:** blades mostly 2--3 mm wide, ligule about 1 mm long. **Inflorescence** a narrow panicle 5--12 cm long. **Spikelets** 2.5--3.5 mm long. **Lemmas** slightly hairy often towards the base only, awnless or awn-tipped, callus hairs very short or lacking. Short grass prairie and occasionally sagebrush steppe on moderately disturbed setting including road cuts. Throughout the eastern flanks of the Rocky Mountains from NM to AL and east through southcentral Canada and sporadically to the very eastern U.S.

Differs from *M. richardsonis* by a bunched growth form and erect stems that remain straight in dried herbarium specimens. Isolated stems in herbarium collections of *Muhlenbergia cuspidata* have greenish leaf blades 2--3 mm wide, stems that are straight in line above and below stem nodes, stem regions below the nodes that are hairy and with uniform parallel veins, and blunt ligules <1 mm long. Isolated stems in herbarium collections of *Muhlenbergia cuspidata* will have narrower grayish green leaf blades, stems that are often distinctly bent at nodes, stem regions below the nodes that are hairless or nearly so and with veins rendered wavy by transverse connections, undulations, or bumps, and acute ligules >1 mm long.

Muhlenbergia filiformis (Thurb. ex S. Watson) Rydb. Pullup muhly Annual bunchgrass. **Stems** 5--18 cm tall. **Leaves:** blades 0.5--1.5 mm wide, ligule 1--2 mm long. **Inflorescence** a spike-like panicle 2--6 cm long. **Spikelets** 2.0--2.5 mm long. **Lemmas** awnless or awn-tipped, callus hairs very short or lacking. Moist well-drained soils, around hot springs, and edges of montane meadows. Throughout most of the western half of the U.S. and into BC.

Muhlenbergia glomerata (Willd.) Trin. Spiked muhly Perennial bunchgrass with well-developed woody rhizomes. **Stems** loosely bunched and often in patches, 3--9 dm tall, branching mostly at ground level, internodes lightly hairy and with a dull texture. **Leaves:** blades 2--6 mm wide, ligule <1 mm long. **Inflorescence** a contracted panicle 3--11 cm long. **Spikelets** 4--6 mm long. **Lemmas** lightly hairy at the base and up the margins, awn-tipped or rarely short-awned, callus hairs short to absent. On regularly disturbed well drained soils including road cuts. Throughout the northern half of the U.S. and across southern Canada and north to NWT.

Muhlenbergia minutissima (Steud.) Swallen. Annual muhly Annual bunchgrass. **Stems** 5--39 cm tall. **Leaves:** blades 1--2 mm wide, ligule about 1 mm long. **Inflorescence** an open panicle 5--15 cm long. **Spikelets** 1.0--1.5 mm long. **Lemmas** unawned to awn-tipped, callus hairs few to absent. Open dry to moist sites on well drained soils; collected in Gallatin co. Sporadic throughout western U.S.

Muhlenbergia racemosa (Michx.) Britton, Sterns & Poggenb. Marsh muhly Perennial bunchgrass with well-developed rhizomes. **Stems** loosely bunched and often in patches, 3--8 dm tall, often branching above ground level, internodes with a polished and shiny texture. **Leaves:** blades 2--6 mm wide, ligule about 0.5--1.5 mm long. **Inflorescence** a contracted panicle 3--15 cm long. **Spikelets** 4--6 mm long. **Lemmas** lightly hairy at base only, awn-tipped or rarely short-awned, callus hairs short to absent. Open dry to moist or alkaline sites on well drained soils. Across southern Canada and throughout most of the U.S excepting many east and southeast states.

Muhlenbergia richardsonis (Trin.) Rydb. Mat muhly Perennial bunchgrass with well-developed rhizomes. **Stems** decumbent and often mat-forming, 5--25 cm tall, rough with small bumps just below the nodes, bases slender just like the more distal portions of the stem. **Leaves:** blades mostly 1--2 mm wide, ligule about 1--2 mm long. **Inflorescence** a narrow contracted panicle 2--12 cm long. **Spikelets** 2--3 mm long. **Lemmas** not hairy, awn-tipped, callus hairs short to absent. Open dry to moist sites often on well drained and somewhat disturbed soils from low to montane elevations. Throughout western N. America and extending eastward across southern Canada and the northern U.S.

Differing from *M. cuspidata* by lemmas that are slightly hairy perhaps only at the base (see *M. cuspidata* for further notes).

Munroa Torr., False buffalograss

Bunched to matted annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a strongly contracted panicle, a cluster of spikelets almost hidden in a fascicle of leaves. **Spikelets** with 3--4 florets; glumes as long as florets. **Lemma** with 3 distinct veins, short-awned; palea enclosed in floret. **Disarticulation** below glumes; unit of dispersal the inflorescence and associated leaf cluster.

A warm season genus of five species from the Americas, with one native to N. America and the others to S. America.

Munroa squarrosa (Nutt.) Torr. False buffalograss Annual bunchgrass. **Stems** often mat-forming, 3--10 cm tall. **Leaves:** blades 1.5--2.5 mm wide, clustered at nodes, the throat with stiff hairs to 2 mm long, ligule a fringe of hairs 0.5--1.0 mm long. **Inflorescence** a cluster of spikelets concealed among leaf sheaths. **Spikelets** 6--8 mm long. **Lemma** 3--5 per spikelet, awn-tipped. Sporadic in open dry and regularly disturbed sites such as long roadsides and anthills. Throughout much of the western half of the U.S. and southcentral Canada.

Oryzopsis Michx., Ricegrass

Bunched perennials. **Leaf blades** generally flat and lax or ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a raceme to an open or contracted panicle. **Spikelets** with one plump floret; glumes enclosing the floret. **Lemma** hardened at maturity and enveloping the floret, with a deciduous awn, callus not sharp but usually distinctly hairy; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

As traditionally circumscribed this genus comprises about cool season 20 species native to cool temperate regions of the world, of which about half occur in N. America. *Oryzopsis* should be included in *Stipa* except for *Oryzopsis asperifolia* and *O. micrantha* have not been formally transferred to that genus (see notes under *Stipa*).

1. Lemmas covered with long silky hairs that extend beyond the tip of the lemma, with a straight to weakly bent awn; panicle branching dichotomous (or not) *O. hymenoides*

1. Lemma glabrous or covered with short appressed hairs that don't extend beyond the lemma tip, with a straight or bent awn; panicle branching not dichotomous 2.

2. Panicle open, branches wide-spreading to bent downward; lemmas glabrous; awn straight

O. micrantha.

2. Panicle narrow, contracted, the branches short and erect or appressed; lemmas hairy; awn bent 3.

3. Glumes 6--8 mm long; awn mostly 5--10 mm long, sinuous or gradually bent; stems spreading or prostrate; leaf blades flat, mostly 5--9 mm wide *O. asperifolia*

3. Glumes 3.5--5.0 mm long; awn mostly 3--5 mm long, sharply bent; stems erect; leaf blades inrolled, about 1.5 mm wide *O. exigua*

Oryzopsis asperifolia Michx. [*Urachne asperifolia* (Michx.) Trin.] Roughleaf ricegrass Perennial bunchgrass. Stems 2--6 dm tall, erect to widely spreading. **Leaves:** blades mostly 5--9 mm wide, scabrous, ligules 0.5--1.0 mm long. **Inflorescence** a raceme or narrow panicle 3--11 cm long. **Spikelets** 6--8 mm long. **Lemmas** sparsely hairy, with a deciduous awn 6--12 mm long. Dry meadows and open understory. Across northern U.S., throughout the Rocky Mountain States, and across much of Canada excepting the extreme northern latitudes.

Spreading stems from a leaf bunch that includes broad green leaf blades are distinctive to this species, as are the large spikelets that superficially approximate those of cultivated rice. This species is the sole representative of *Oryzopsis* in the Flora of North America (Barkworth et al. 2007).

Oryzopsis exigua Thurb. [*Piptatherum exiguum* (Thurb.) Dorn; *Stipa exigua* (Thurb.) Columbus & J.P. Smith] Little ricegrass Perennial bunchgrass. **Stems** 1.5--3.5 dm tall. **Leaves:** blades 0.5--1.5 mm wide, scabrous, ligules 1--3 mm long. **Inflorescence** a raceme or narrow panicle 3--7 cm long. **Spikelets** 3.5--4.5 mm long. **Lemmas** mostly hairless, with a deciduous bent awn 4--6 mm long. Dry open montane understory. Throughout much of western N. America.

This species is distinguished from the superficially similar *Oryzopsis micrantha* by its shorter and contracted panicles that bear larger spikelets (4--5 mm) with more persistent and bent awns.

Oryzopsis hymenoides (Roem. & Schult.) Ricker ex Piper [*Achnatherum hymenoides* (Roem. & Schult.) Barkworth; *Stipa hymenoides* Roem. & Schult.] Indian ricegrass Perennial bunchgrass. **Stems** 3--6 dm tall. **Leaves:** blades about 1 mm wide (because they are typically inrolled), usually smooth, ligules mostly 1--2 mm long. **Inflorescence** an open panicle 10--20 cm long. **Spikelets** 5--6 mm long. **Lemmas** densely long-hairy, with a deciduous awn 4--6(--9) mm long. Open dry exposed sites on a diversity of substrates including sandy and gravelly soils. Throughout western and central U.S. and the southwestern portion of Canada.

A form of *Oryzopsis hymenoides* having a contracted panicle with non-dichotomous branching is referred to as *Oryzopsis bloomer* (Bolander) Ricker [*Stipa bloomeri* Bolander; *Achnatherum xbloomeri* (Bolander) Barkworth], which was collected in a frequently disturbed site in Yellowstone co. coexisting with *Stipa viridula* and *O. hymenoides* (presumably a hybrid between these two). It is a large bunch grass 1.0--1.3 m tall with a narrow or spicate panicle but has spikelets like those of *O. hymenoides*. *Oryzopsis contracta* (B.L.Johnson) Schltr. [*Achnatherum contractum* (B.L.Johnson) Barkworth; *Stipa contracta* (B.L.Johnson) W.A.Weber], contracted ricegrass, is a perennial bunchgrass very similar to *O. hymenoides* and differs primarily in having dichotomous inflorescence branches where one branch is usually about half the length of the other. It has perhaps shorter lemmas (up to 3.5 mm versus up to 4.5 mm long) with longer awns (up to 9 mm versus up to 6 mm long). *Oryzopsis contracta* is of possible hybrid origin between *O. hymenoides* and *O. micrantha* and was collected in Beaverhead co. and otherwise in western and central WY and northern CO (Shechter and Johnson, 1966 and 1968).

Oryzopsis micrantha (Trin. & Rup.) Thurb [*Piptatherum micranthum* (Trin. & Rup.) Barkworth] Littleseed ricegrass Perennial bunchgrass. **Stems** 3--8 dm tall. **Leaves:** blades 1.0--2.5 mm wide, smooth, ligules 1--2 mm long. **Inflorescence** a narrow to open panicle 5--20 cm long. **Spikelets** 3.0--3.5 mm long. **Lemmas** hairless to sparsely hairy, with a deciduous straight awn 5--8 mm long. Moist meadows, stream banks, and understory. Throughout much of western and central U.S. and southwestern Canada.

Oryzopsis micrantha can have a contracted panicle during early stages of growth, and thus appear similar to *O. exigua*. However, the lemmas of *O. micrantha* are often glabrous and bear a straight awn.

Panicum L., Panicgrass

Bunched or rhizomatous perennials and annuals. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** of diffuse open panicles. **Spikelets** with one fertile floret; glumes unequal with the first much short than the second glume, which is as long as the lemmas. **Lemmas** usually rounded on back, awnless, hard-textured if fruit-bearing; palea enclosed in floret. **Disarticulation** above the glumes; unit of disarticulation the floret.

A warm season genus of about 500 species distributed mostly throughout the warmer regions of the world with about 50 species in N. America.

1. Plants perennial, rhizomatous; stems erect, and typically >1 m tall; sheaths hairless; glumes and lemmas keeled; ligules 3.0--8.0 mm long *P. virgatum*

1. Plants annual, without rhizomes; stems sprawling to ascending and stems usually <1 m long; sheaths glabrous or covered with glandular-based hairs; glumes and lemmas usually not keeled; ligules 0.5--3.0 mm long 2.

2. Spikelets 5.0--5.5 mm long, first glume about 2/3 as long as spikelet

P. miliaceum

2. Spikelets 2.0--3.0 mm long, first glume <1/2 as long as spikelet

3.

3. Stems and leaves conspicuously hairy with long spreading hairs; first glume acute, generally $>1/3$ as long as the length of the floret; leaf sheaths not compressed

P. capillare

3. Stems and leaves glabrous or nearly so; first glume blunt, rounded, sometimes acute, generally $<$ one-third as long as the length of the floret; leaf sheaths more or less compressed

P. dichotomiflorum

Panicum capillare L. Witchgrass Annual bunchgrass. **Stems** sprawling or spreading, 1--6 dm long. **Leaves:** blades 5--14 mm wide, sheath densely to lightly covered with glandular-based hairs, ligules a short fringe of hairs, 0.5--1.3 mm long. **Inflorescence** an open panicle 15--25 cm long. **Spikelets** 2--3 mm long, first glume 1.0--1.8 mm long, second glume 2.0--3.0 mm long. **Lemmas:** sterile lemma not keeled, fertile lemma blunt, yellowish at maturity. Along roadsides, railroad tracks, sidewalks, and in lawns. Widespread in N. America except at extreme northern latitudes.

Panicum dichotomiflorum Michx. Fall panicgrass Annual bunchgrass. **Stems** spreading to ascending, 3--10 dm long. **Leaves:** blades 4--15 mm wide, sheath glabrous, ligules a short fringe of hairs, 1.0--1.5 mm long. **Inflorescence** an open panicle 15--25 cm long. **Spikelets** 2.5--3.5 mm long, first glume 0.5--1.0 mm long, second glume 2.0--3.0 mm long. **Lemmas:** sterile lemma not keeled, fertile lemma blunt, yellowish at maturity. Frequently disturbed sites (railroad yard); collected in Missoula co. Throughout most of N. America.

Panicum miliaceum L. Broomcorn millet Annual bunchgrass **Stems** robust and ascending, 3--10 dm tall. **Leaves:** blades 7--14 mm wide, sheath densely to lightly covered with glandular-based hairs; ligule a fringed membrane 2.0--3.0 mm long. **Inflorescence** an open panicle 12--22 cm long. **Spikelets** 5.0--5.5 mm long, first glume 2.5--3.5 mm long, second glume 5.0--5.5 mm long. **Lemmas:** sterile lemma not keeled; fertile lemma blunt, straw-colored to burnt orange at maturity. Recently disturbed settings such as graded roadsides and sometimes cultivated and escaped but probably not long persisting. Introduced throughout most of North America except at extreme northern latitudes.

Panicum virgatum L. Switchgrass Perennial bunchgrass with well-developed rhizomes. **Stems** 6--15 dm tall. **Leaves:** blades 2--10 mm wide, sheath essentially hairless; ligule a fringed membrane 3--5 mm long. **Inflorescence** an open panicle 12--40 cm long. **Spikelets** 3.5--4.0 mm long, first glume 3.0--3.5 mm long, second glume 3.5--4.5 mm long, distally keeled. **Lemmas:** sterile lemma distally keeled, fertile lemma blunt, light greenish at maturity. From disturbance-prone settings especially roadsides and similar sites. Throughout much of N. America except for the very western and northern tier of states and provinces.

Phalaris L., Canarygrass

Bunched to single-stemmed annuals and perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted panicle. **Spikelets** with 3 florets, the lowest two scale-like and sterile; glumes enclosing the florets. **Lemma** awnless; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 22 species, 11 of which occur in N. America.

1. Glume keels not winged; inflorescence a contracted panicle mostly 10--40 cm long; plants perennial with rhizomes, stems commonly >1 m; spikelets 4--5 mm long, the lowest two florets comprising minute hairy scales

P. arundinacea

1. Glume keels winged, the wings 0.2--1.0 mm wide; inflorescence a dense ovoid spike mostly 1.5--5.0 cm long; plants annual, stems <6 dm tall; spikelets 6--8 mm long, the lowest two florets comprising well-developed hairless scales

P. canariensis

Phalaris arundinacea L. Reed canarygrass Rhizomatous perennial. **Stems** mostly 9--20 dm tall, forming dense stands. **Leaves:** blades 6--18 mm wide, ligules 4--10 mm long. **Inflorescences** a contracted panicle 8--35 cm long. **Spikelets** 4--7 mm long. **Lemmas** with one hairless seed-bearing floret and two lower sterile florets that are each a minute scale covered with long hairs. Riparian and wetland habitats mostly at lower to middle elevations throughout the state. Common throughout N. America excepting some of the southeast.

Although a widespread and abundant colonizer of wetlands, this species was collected in MT by Lewis & Clark (Phillips, 2003).

Phalaris canariensis L. Annual canarygrass Annual bunchgrass. **Stems** 3--8 dm tall. **Inflorescence** a dense ovoid panicle 2--5 cm long, 1.5--2.0 cm wide. **Spikelets** 7--9 mm long. **Lemmas** with one lightly hairy seed-bearing floret subtended by two hairless sterile florets or scales. An ephemeral that sporadically germinates from seed that falls from bird feeders and such, sometimes in lawns. Introduced throughout much of North America.

Phalaris aquatica L. is reported from Flathead and Ravalli cos. (Barkworth et al. 2007). It is very similar to *P. canariensis* except for a perennial habit, an inflorescence that is a cylindrical spike generally 5--15 cm long, spikelets

with generally one sterile floret or two unequal-sized sterile florets, and predilection for disturbed soils subject to seasonal flooding.

Phippsia (Trin.) R.Br., Icegrass

Bunched perennials. **Leaf blades** generally flat and spreading to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted panicle. **Spikelets** with one floret; glumes minute. **Lemma** usually keeled and inconspicuously veined, unawned; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of one species native to boreal and alpine regions of the Northern Hemisphere.

Phippsia algida (Sol.) R.Br. Icegrass Perennial bunchgrass. **Stems** 3--12 cm tall. **Leaves:** blades 0.5--2.5 mm wide. **Inflorescence** 1--2 cm long. **Spikelets** 1--2 mm long. **Lemmas** hairless, awnless. On wet alpine gravelly soils; collected in the Beartooth Mountains from Carbon and Stillwater cos. Throughout much of Canada and the northern Rockies in the U.S.

Phleum L., Timothy

Bunched annuals and perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a cylindrical spicate panicle. **Spikelets** with 1 floret; glumes nearly equal, awn-tipped. **Lemmas** awnless; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 15 species native to temperate regions world-wide, seven of which occur in N. America.

1. Panicle ovate-cylindrical, up to 3 times longer than wide; upper leaf sheath inflated, very loosely surrounding the stem; plants usually under 5 dm tall; stem base not bulbous *P. alpinum*

1. Panicle long-cylindrical; much >3 time longer than wide; upper leaf sheath not inflated, tightly surrounding the stem; plants usually much >5 dm tall; stem base bulbous *P. pratense*

Phleum alpinum L. Alpine timothy Perennial bunchgrass. **Stems** 2--5 dm tall, not bulbous at base. **Leaves:** blades 4--7 mm wide, sheath subtending the inflorescence inflated, ligules 1--4 mm long. **Inflorescence** 1--6 cm long and 5--13 mm wide. **Spikelets** 3.0--4.5 mm long. **Lemmas** 2.0--2.5 mm long. Common in mountain meadows, open understory, and subalpine to alpine. Throughout most of Canada and at the western U.S.

Phleum pratense L. Timothy Perennial bunchgrass. **Stems** 5--14 dm tall, bulbous at the base. **Leaves:** blades 5--9 mm wide, sheath subtending inflorescence not inflated. **Inflorescence** 6--12 cm long and 5--8 mm wide. **Spikelets** 3--4 mm long. **Lemmas** 2.5--2.0 mm long. Mountain meadows, pastures, rangeland, and along roadsides and trails at middle to higher elevations. Introduced throughout most of North America.

Phragmites Adans., Reed

Rhizomatous and stoloniferous perennial reeds. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a plumose panicle. **Spikelets** with several florets; glumes about the dimensions of the lemma. **Lemma** tapering to a narrow apex, glabrous and awnless, the rachilla with long silky hairs; palea well developed. Disarticulation above the glumes; unit of dispersal the floret.

A cool season genus of three species, one in S. America, one in Asia, and one in temperate regions throughout the world. *Phragmites* is classified into Arundinae, a cool season grass tribe that includes tall, robust perennial reed-like grasses (over 2 m tall) with hairy ligules, stout rhizomes, and inflorescences of dense terminal plumose panicles (e.g., *Arundo* and *Cortaderia* are included in this tribe).

Phragmites australis (Cav.) Trin. ex Steud. [*Phragmites communis* Trin.] Common reed Rhizomatous perennial. **Stems** 1.5--3.5 m tall, forming dense stands. **Leaves:** blades 2--4 cm wide, flat; ligules hairy, 3--6 mm long. **Inflorescence** a plumose panicle 15--32 cm long. **Spikelets** 11--14 mm long, with 3--8 florets, the florets covered by silky hairs from the rachilla; glumes shorter than the florets. **Lemmas** hairless, with an awn-like tip. Margins of ponds, marshes, and river flood plains. Throughout nearly all of North America.

This is the largest native MT grass and the plume-like panicle can persist into the winter and is valued for winter bouquets. MT populations comprise only the N. American native *P. australis* subsp. *americanus* Saltonstall, P.M. Peterson & Sorong (Saltonstall et al. 2004). This subspecies is distinguished from an introduced subspecies (subsp. *australis*) by ligules 1.0--1.7 mm (versus 0.4--0.9 mm in the introduced subspecies), loose leaf sheaths that are shed in the fall (versus tightly adherent persistent leaf sheaths), green stems with maroon nodes (versus yellow nodes), and larger glumes, the second of which ranges 5.5--11 mm (versus 4.5--7.5 mm).

Poa L., Bluegrass

Rhizomatous, sod-forming, or bunched perennials and annuals. **Leaf blades** generally flat or folded and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to contracted panicle. **Spikelets** with several to many florets, glumes about the dimensions of the lemma. **Lemma** keeled or rounded on back, inconspicuously veined, blunt-tipped and awnless. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 500 species worldwide and about 60 in N. America where they inhabit mainly boreal and montane regions. Morphologically divergent species of *Poa* can be very similar to one another. Some species can be so morphologically variable as to blur species distinctinos (e.g., high elevation forms of *Poa secunda* converging with *Poa pattersonii*).

1. Second glume broadest just above the middle because of a broadening of the translucent margin in this region; annuals with no remains of old leaf sheaths; stems mostly <20 cm tall; inflorescences of open panicles usually much <6 cm long *P. annua*

1. Second glume broadest at or towards base with no expansion of the width of any translucent margin; perennials with the remains of old leaf sheaths evident; stems most commonly longer than 20 cm tall (except *Poa lettermanii*); inflorescences of open to closed panicles but usually not short (<6 cm long) and open (except *Poa alpina*) 2.

2. Spikelets becoming small vegetative bulbs at maturity, the bulbs dark purple at base; individual glumes and lemmas are asymmetrical because they are actually minute leaf blades with growth involving twisting and turning; plants not setting seed but rather reproducing from these vegetative spikelet-bulbs; base of stem bulbous *P. bulbosa*

2. Spikelets not becoming small vegetative bulbs at maturity, spikelets not distinctly dark purple at base; individual glumes and lemmas are bilaterally symmetrical and not appearing as minute leaf blades; plants setting seed and not reproducing from vegetative spikelet-bulbs; base of stem usually not bulbous 3.

3. Stems single to loosely bunched or sod-forming, rhizomes present 4.

3. Stems tightly bunched, rhizomes absent 10.

4. Stems flattened, 2-edged, often basally decumbent, nodes of stem usually distinctly but subtly bent and banded with a conspicuously dark band set off from the green stem by a straw-colored band, leaf blades mostly from stem and few if any basal, the pedicels and inflorescence branches are conspicuously and often densely scabrous *P. compressa*

4. Stems cylindrical or nearly so, usually erect and straight, nodes not consistently bent and banded, leaf blades mostly basal and few from the stem, the pedicels and inflorescence branches not conspicuously or densely scabrous. 5.

5. Lemma base or callus (adjacent rachilla) with tangled cobwebby hairs 6.

5. Lemma and callus (adjacent rachilla) lacking cobwebby hairs 7.

6. Lemmas 2--4 mm long, often hairless or scabrous between veins; dry to moist sites often associated with lawns and other cultivated settings but also escaping cultivation and inhabiting open dry sites (e.g., sagebrush steppe) as well as sometimes the edges of riparian sites or meadows *P. pratensis*

6. Lemmas 4--6 mm long, hairy between veins at least on lower half; mountain meadows mostly at or above timberline *P. arctica*

7. Lower and older leaf sheaths hairy to densely scabrous; lemmas and glumes strongly keeled and often well separated on long rachilla internodes, in flower the plumose stigma branches may be common but no stamens (anthers or filaments) will be evident (plants are pistillate); ligules mostly <2 mm long; plants of mostly dry understory settings in western MT *P. wheeleri*

7. Lower and older leaf sheaths without hairs; lemmas and glumes often tightly overlapping but if well separated on long rachilla internodes then they are not keeled (i.e., they are rounded on the back); in flower the plumose stigmas co-occur with evident stamens (anthers or filaments); plants are bisexual); ligules usually well >2 mm long; plants either of alpine or subalpine settings or of open dry or saline sites 8.

8. Lemmas 4--6 mm long, conspicuously hairy on the sides and evident without having to remove the subtending glumes or other lemmas; panicle open and the spikelets laterally compressed and the glumes and lemmas distinctly keeled; plants of alpine meadows *P. arctica*

8. Lemmas 3--4 mm long, not conspicuously hairy on the sides, any lemma hairs are visible only after removing subtending glumes and other lemmas; panicle mostly contracted, but sometime an open panicle in high mountain settings, spikelets dorsally compressed, but if the glumes and lemmas are splayed out laterally they are always with rounded backs (i.e., not keeled); plants of mostly low elevation open dry or saline sites, but also sometimes up to high subalpine and rarely alpine sites 9.

9. Stems usually single or loosely bunched, rhizomatous, plants often glaucous, panicle contracted, basal leaves not tightly bunched into a small tuft but diffuse and borne from base to the lower stem regions, of low elevation dry-site or saline settings particularly in the eastern two-thirds of the state *P. arida*

9. Stems tightly bunched, rarely with rhizomes (but if so, then tightly bunched), plants mostly greenish, basal leaves diffuse or most commonly tightly bunched into a small tuft, panicle contracted to open, of highly variable habits but mostly dry sites from low to high elevations *P. secunda*

10. Spikelets dorsally compressed, rounded in cross-section or the keels of lemmas and glumes lacking or faint, florets tightly overlapping each other when the spikelet is closed, or florets well separated from each other on long rachilla internodes when the spikelet is open, the terminal and subterminal florets project well beyond the lower florets, a feature that is evident when the spikelet is closed or open *P. secunda*

10. Spikelets laterally compressed, narrowly elliptic in cross-section, lemmas and glumes folded along the midrib and the keels thus very distinct, florets splayed out laterally such that individual lemmas are exposed and the lemma keel is readily visible at least in the upper half, the terminal and perhaps subterminal florets are often reduced in size and mostly concealed or rendered inconspicuous by the overlapping lower florets 11.

11. Lemmas with long cobwebby hairs at base or on callus (sometimes just distinguishable in *P. interior*) 12.

11. Lemmas lacking cobwebby hairs 18.

12. The lower glume distinctly narrower than the second glume and characteristically arched or sickle-shaped, diverging at an angle distinct from that of the second glume; lemma with cobwebby hairs only the keel base or perhaps to the very base of the marginal veins; spikelets <4 mm long *P. trivialis*

12. The lower glume not distinctly narrower than the second glume, very similar to the second glume especially in width and the angle it diverges from the main axis of the spikelet; lemma with cobwebby hairs on at least the lower keel and marginal veins; spikelets often >4 mm long 13.

13. Lower panicle branches 1--2 at a node and very slender or capillary and bearing spikelets only towards the very distal ends, anthers <1 mm long 14.

13. Lower panicle branches often >2 at a node or not distinctly slender or not necessary bearing spikelet towards the distal ends, anthers often >1 mm long 15.

14. Lemmas 2--3 mm long, marginal veins distinctly hairy; panicle branches smooth, the lower ones often oriented downward at maturity; glumes nearly equal in length; dry and often disturbed sites (e.g., steep slopes) in open montane forest settings up to the subalpine *P. reflexa*

14. Lemmas 3--4 mm long, marginal veins lacking dense hairs; panicle branches usually scabrous and ascending at maturity; glumes distinctly unequal in length; moist meadows and riparian sites and usually in subalpine and alpine settings *P. leptocoma*

15. Stems mostly (3-)4--12 dm tall, loosely bunched, frequently producing stolons; ligule 1.5--6.0 mm long; panicle mostly 13--30 cm long *P. palustris*

15. Stems 2--3(--4) dm tall, tightly bunched, not producing stolons; ligule 0.5--5.5 mm long; panicle mostly 5--15 cm long 16.

16. Second glume usually 2--3 mm long; panicles mostly 3--15 cm long; ligules 0.5--1.5 mm long; at and below alpine regions *P. interior*

16. Second glume usually 3.0--4.5 mm long; panicles mostly 2--5 cm long; ligule 1.0--5.5 mm long; alpine regions 17.

17. Flowering stems arising from a mat of leaves, branching (tillering) occurring at or below ground level and contained within the subtending leaf sheath, anthers mostly 0.6--1.2 mm *P. pattersonii*

17. Flowering stems arising from bunched stems with few if any basal leaves, branching (tillering) occurring just above ground and rupturing subtending leaf sheaths; anthers mostly 1.2--2.5 mm *P. glauca*

18. Lemmas lacking hairs or sometimes sparsely hairy on lower surface or with a scabrous midvein 19.

18. Lemmas conspicuously hairy on keel, marginal veins, or both, shorter hairs sometimes between veins 20.

19. Lemmas 2--3 mm long, glumes as long as the floret cluster (oat-like spikelets); anthers about 0.5 mm long; stems mostly <1 dm tall; leaf blades persistent on leaf sheath even on older leaves; on rocky alpine slopes and ridges at the highest elevations *P. lettermanii*

19. Lemmas 4--6 mm long, glumes shorter than subtending florets; anthers 2--3 mm long; stems mostly >1 dm tall; leaf blades commonly deciduous from persistent sheaths especially on old leaves; common from open subalpine forests to low elevations in open dry-site shrub-steppe settings *P. fendleriana*

20. Leaf blades mostly 2--5 mm wide; panicle open to loosely contracted, the lower branches often divergent or drooping 21.

20. Leaf blades mostly 1--2 mm wide; panicle mostly contracted to rarely somewhat open 22.

21. Panicle mostly 2--7 cm long, pyramidal, usually about as long as broad, erect; leaves mostly basal; plants of high montane settings *P. alpina*

21. Panicles mostly 5--20 cm long, loosely contracted to open, usually longer than broad and drooping and secund; leaves distributed along the lower stem regions; plants of low elevation to low montane settings *P. stenantha*

22. Inflorescences of predominantly greenish spikelets congested into thick (1--2 cm wide) and short (2--7 cm long) spikes; bunchgrasses bearing many basal leaves >5 cm in length *P. fendleriana*

22. Inflorescences of predominantly purplish spikelets loosely arranged into slender (<1 cm wide) inflorescences (sometimes >7 cm long); bunchgrasses bearing few if any basal leaves mostly <5 cm in length 23.

23. Flowering stems arising from a mat of leaves, branching (tillering) occurring at or below ground level and contained within the subtending leaf sheath, anthers mostly 0.6--1.2 mm *P. pattersonii*

23. Flowering stems arising from bunched stems with few if any basal leaves, branching (tillering) occurring just above ground and rupturing subtending leaf sheaths; anthers mostly 1.2--2.5 mm *P. glauca*

Poa alpina L. Alpine bluegrass Perennial bunchgrass. **Stems** 1--3 dm tall. **Leaves:** blades 2.0--4.5 mm wide, ligules 2--4 mm long. **Inflorescence** a pyramidal panicle 3--7 cm long. **Spikelets** 4.0--6.5 mm long. **Lemmas** strongly keeled and uniformly hairy. Mostly subalpine to alpine or montane open understory. Higher latitudes in N. America, and throughout the Intermountain, Rocky Mountain, and Pacific Northwest regions.

Poa alpina is distinguished by basal leaf blades that are usually <5 cm long and up to 5 mm wide combined with a pyramidal panicle mostly <7 cm and strongly compressed spikelets up to 6.5 mm long. Most likely confused with montane forms of *Poa secunda* with open panicles, but *Poa alpina* always has lemmas that are conspicuously hairy and distinctly folded (keeled) along the midrib. Potentially confused with high elevation forms of *Poa fendleriana* but the conspicuously hairy lemmas and relatively few basal leaf blades up to 4.5 mm wide (without the many persistent old leaf sheaths) will distinguish *Poa alpina* from *Poa fendleriana*.

Poa annua L. Annual bluegrass Perennial bunchgrass. **Stems** usually decumbent, 0.5--2.0 dm long. **Leaves:** blades 1--3 mm wide, ligules 0.5--3 mm long. **Inflorescence** usually a pyramidal panicle 2--6 cm long. **Spikelets** 3--5 mm long. **Lemmas** distinctly keeled, conspicuously hairy at least at base along the midrib. Lawns, pastures, roadsides, and generally moist disturbed sites. Introduced throughout all of N. America.

The second glume that is distinctly broad at or above the middle due to the hyaline (translucent) margins is distinctive of *Poa annua*. The annual *Poa bolanderi* occurs in ID just over the west central border of MT and differs by having larger inflorescences 4--16 cm long, glumes that are tapered from the base into a narrow tip, and lemma bases bearing cobwebby hairs.

Poa arctica R.Br. [*Poa grayana* Vasey, *P. arctica* R.Br. ssp. *grayana* (Vasey) A.Löve & D.Löve & Kapoor] Arctic bluegrass Rhizomatous perennial. **Stems** 2--6 dm tall. **Leaves:** blades 2--5 mm wide, basal, ligules 2--7 mm long. **Inflorescence** an open pyramidal panicle 4--12 cm long. **Spikelets** 5--8 mm long. **Lemmas** with cobwebby hairs at base, conspicuously hairy on keel and margin veins at least on the lower half. Alpine to subalpine. At higher latitudes in N. America, and throughout the Intermountain and, Rocky Mountain regions, and much of the Pacific Northwest.

Similar to an alpine form of *Poa pratensis* but not sod forming and with larger lemmas bearing many more hairs on either side of the midrib.

Poa arida Vasey [*Poa glaucifolia* Scribn. & T.A. Williams] Plains bluegrass Rhizomatous perennial sometimes loosely bunched. **Stems** 2--6 dm tall. **Leaves:** blades 2--4 mm wide, mostly on stem towards stem base, ligules 2--4 mm long. **Inflorescence** usually a narrow panicle, less commonly open, 5--11 cm long. **Spikelets** 4--7 mm long. **Lemmas** lightly hairy on the keel and marginal veins. Shrub steppe and similar open dry sites. Primarily of the Great Lakes and Great Plains regions, and east slope of the Rocky Mountains.

Poa arida is similar to and co-occurs with *Poa secunda*. Both have a bunched habit (albeit loosely in *Poa arida*), long narrow inflorescences, and a predilection to open dry settings. The spikelets of both *Poa arida* and *Poa secunda* are dorsally compressed or at least the lemmas have rounded backs (see notes under *Poa secunda*). *Poa arida*, however, lacks the dense basal leaf bunch characteristic of most forms of *Poa secunda*, has a rhizomatous growth habit,

and thicker stems (e.g., about 2 mm in diameter). Forms of *Poa arida* with open panicles have been referred to as *Poa glaucifolia*.

Poa bulbosa L. [*Poa bulbosa* subsp. *vivipara* (Koel.) Arcang.] Bulbous bluegrass Perennial bunchgrass. **Stems** 2--6 dm tall, with a bulbous base. **Leaves:** blades 1.0--2.5 mm wide, mostly basal, ligules 1--3 mm long. **Inflorescence** a contracted panicle, 3--10 cm long. **Spikelets** 4--15 mm long. **Lemmas** usually transformed into small vegetative bulbs, hairy along veins. Roadsides, trailsides, open dry sites. Introduced throughout most of the U.S. Sometimes seeded in open range to compete with less desirable colonizing grasses.

Bulbous bluegrass has distinctive spikelets that are transformed into small vegetative bulbs. When these are few or lacking, bulbous bluegrass could be confused with *Poa fendleriana*. The bulbous stem bases and growth in disturbed settings distinguish such *Poa bulbosa* from *Poa fendleriana*, the latter of which is a native bunchgrass of open dry generally undisturbed vegetation.

Poa compressa L. Canada bluegrass Rhizomatous perennial. **Stems** 2--5 dm tall, wiry and flattened, nodes often distinctly bent and banded with contrasting lighter and darker bands. **Leaves:** blades 1.5--4.0 mm wide, from stem, rarely basal, ligules 1--3 mm long. **Inflorescence** generally a narrow panicle 2--8 cm long. **Spikelets** 3--6 mm long. **Lemmas** with cobwebby hairs at very base. Roadside, road cuts, trailside, along ditches, and on open slopes and other open site with a combination of moisture and regular moderate disturbance. Introduced throughout most of North America.

This species is distinguished by its wiry stems with banded and bent nodes, the lower of which are distinctly exposed from the leaf sheath rendering this node character all the more distinctive. In age, the leaf sheaths become straw-colored, which contrast to the greenish stems immediately below. The scattered stems typically lack basal leaves and all leaf blades along the stem are usually similar in length. The usually narrow panicle has branches that are ridged longitudinally and these ridges are strongly lined with scabrous hairs.

Poa fendleriana (Steud.) Vasey [*Poa cusickii* Vasey, *P. epilis* Scribn., *P. xnematophylla* Rydb.] Muttongrass Perennial bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 1--3 mm wide, ligule 1--6 mm long. **Inflorescence** a contracted panicle 2--11 cm long. **Spikelets** 4--8 mm long. **Lemmas** mostly without hairs in MT except at base, keeled. Shrub-steppe to montane understory to open subalpine and alpine settings. Throughout the western half of N. America.

A common early flowering bunchgrass in the sagebrush steppe but later flowering at higher elevations. The persistent old leaf sheaths from which the leaf blades uniformly abscised and from which the relatively slender flowering stems arise is a fairly consistent feature of this species and is reminiscent of the persistent leaf sheaths of *Festuca campestris*. *Poa fendleriana* is tentatively circumscribed here to include *Poa cusickii* (Cusick's bluegrass). These two species are very similar in ecology, geography, and morphology, including the form of apomixes, the short dense inflorescences, and persistent leaf sheaths. A high elevation form referred to as *Poa epilis* is distinguished by lacking hairs on the lower lemma surfaces and having flat leaves scattered along the stem. Most MT populations of *Poa fendleriana* have lemmas with few hairs regardless of elevation. The basal leaf bunch is sometimes lacking at low elevations just as it is in alpine settings. The existence of *Poa xnematophylla*, of hybrid origin between *Poa fendleriana* and *Poa cusickii*, suggests that *Poa cusickii* may be the same as *Poa fendleriana*.

Poa glauca Vahl [*P. rupicola* Nash ex Rydb., *Poa glauca* Vahl ssp. *rupicola* (Nash ex Rydb.) W.A.Weber] Timberline bluegrass. Perennial bunchgrass. **Stems** 1--2 dm tall. **Leaves:** blades mostly 1.0--2.5 mm wide, ligules 1--4 mm long. **Inflorescence** a narrow panicle 2--8 cm long. **Spikelets** 4--6 mm long. **Lemmas** covered with few hairs or hairy to sometimes cobwebby on keel and marginal veins. Alpine and subalpine settings. Throughout the Rocky Mountain regions and at higher latitudes in N. America.

This species is difficult to distinguish from *Poa pattersonii* but in addition to the characters given in the key the lemmas of some specimens of *P. glauca* tend to be covered with few if any hairs (the variant referred to as *P. glauca* ssp. *rupicola*), in contrast to the generally more hairy lemmas of *P. pattersonii*.

Poa interior Rydb. [*Poa nemoralis* L. ssp. *interior* (Rydb.) W.A.Weber] Inland bluegrass Perennial bunchgrass. **Stems** 1--5 dm tall. **Leaves:** blades 1--3 mm wide, ligules 1--2 mm long. **Inflorescence** a narrow panicle 4--15 cm long. **Spikelets** 3--5 mm long. **Lemmas** mostly glabrous but with cobwebby hairs at very base. Montane grassy slopes and open forest to occasionally alpine. Throughout much of N. America especially at higher latitudes or elevations.

Poa interior represents a smaller-statured higher-elevation form of *Poa palustris* and perhaps is adapted to drier settings.

Poa leptocoma Trin. Bog or marsh bluegrass. Perennial bunchgrass. **Stems** 2--10 dm tall. **Leaves:** blades 1--4 mm wide, ligules 2--4 mm long. **Inflorescence** a loosely contracted panicle, 5--15 cm long, the branches slender and capillary. **Spikelets** 4--7 mm long. **Lemmas** hairy mostly along midrib and to some degree along the marginal veins, keeled. Moist alpine and subalpine meadows. Sporadic throughout western N. America.

This species is very similar to *Poa reflexa* in having delicate inflorescence branches and lemmas with cobwebby hairs. The characters listed in the key to species, especially including the scabrous inflorescence branches and moister habitat, should help to distinguish *Poa leptocoma* from *Poa reflexa*. *Poa leptocoma* may have a more robust and taller stature than *P. reflexa* perhaps because it is a hexaploid, in contrast to the tetraploid *P. reflexa*.

Poa lettermanii Vasey Letterman's bluegrass Perennial bunchgrass. Stems 2--10 cm tall. **Leaves:** blades 0.5--2.0 mm wide, ligules 1--3 mm long. **Inflorescence** a contracted panicle 1--3 cm long. **Spikelets** 3--4 mm long. **Lemmas** hairless, keeled. Alpine ridges and ledges. Throughout western N. America.

This very small-statured ground-hugging species is a high-elevation wind-swept inhabiting form of *Poa fendleriana* (e.g., the short spicate panicle and essentially hairless lemmas). The glumes tend to be as large as the floret cluster in a spikelet, which renders an "oatgrass" spikelet.

Poa palustris L. Fowl bluegrass Perennial bunchgrass, often stoloniferous. **Stems** loosely bunched, 4--10 dm tall. **Leaves:** blades 2--8 mm wide, ligules 2--5 mm long. **Inflorescence** an open panicle 13--30 cm long. **Spikelets** mostly 3--4 mm long. **Lemmas** mostly hairless but with cobwebby hairs at very base, strongly keeled. Meadows and open ground at low to middle elevations. Native and introduced throughout N. America excepting parts of the southeast.

This species may be sometimes confused with *Poa pratensis*, but its inflorescence has many more and smaller spikelets that are much more diffusely arranged on the open panicle and the lemmas are not so hairy excepting the cobwebby hairs just at the very lemma base. Also, basal leaves are few and more on the stem in a manner similar to *Poa compressa* and in contrast to *Poa pratensis*.

Poa pattersonii Vasey [*Poa abbreviata* R.Br. ssp. *pattersonii* (Vasey) A.Löve & D.Löve & Kapoor] Patterson's bluegrass Perennial bunchgrass. **Stems** 1--2 dm tall. **Leaves:** blades 0.5--2.0 mm wide, ligules 1--5 mm long. **Inflorescence** a contracted panicle 2--5 cm long. **Spikelets** 4--6 mm long. **Lemmas** keeled, densely hairy to cobwebby on keel and marginal veins. Alpine meadows and ridges or other open exposed sites. Throughout most of western N. America.

Poa pattersonii may have spikelets with glumes and lemmas lacking a keel, similar to those of *Poa secunda* and *Poa arida*, but this is occasional. *Poa pattersonii* would then be distinguished from *Poa secunda* by its lemmas with distinctly hairy keels and marginal nerves and often cobwebby lemma base and callus (close inspection of such specimens should reveal distinctly keeled lemmas that contrast to those of *Poa secunda* with rounded backs). *Poa laxa* Haenke ssp. *banffiana* Soreng, the Banff bluegrass, is recorded from MT in Fergus and Flathead Counties, but these specimens lie intermediate between *Poa pattersonii* (small anthers) and *Poa glauca* (tillers rupturing the subtending leaf sheath) and thus further weaken the distinction between *P. pattersonii* and *P. glauca*.

Poa pratensis L. [*Poa pratensis* L. ssp. *agassizensis* (B.Boivin & D.Löve) R.L.Taylor & MacBryde, *Poa pratensis* L. ssp. *alpigena* (Fr. ex Blytt) Hiitonen] Kentucky bluegrass. Perennial rhizomatous sodgrass. **Stems** 1--8 dm tall. **Leaves:** blades 2--4 mm wide, mostly basal, ligules 1--2 mm long. **Inflorescence** an open pyramidal panicle, 3--13 cm long. **Spikelets** 4--6 mm long. **Lemmas** with a cobwebby base and generally hairy along the mid and margin veins. Low to high elevations in open vegetation, roadsides, dry meadows, lawns, and riparian habitats. Introduced and native and a fairly aggressive colonizer that is common throughout all of N. America especially at more northern latitudes or higher elevations.

Poa pratensis is one introduced species that can most readily immigrate into fairly undisturbed native dry-site vegetation (e.g., sagebrush steppe) at high abundance. The spikelets of *Poa pratensis* though arranged in a small open panicle are relatively large and congested and in this regard are very different from smaller spikelets that are more diffusely arranged in *Poa palustris*, with which *Poa pratensis* may be confused. Specimens having smooth rather than scabrous panicle branches are referred to ssp. *alpigena* if of alpine regions and ssp. *agassizensis* if not of alpine regions.

Poa reflexa Vasey & Scribn. ex Vasey Nodding bluegrass Perennial bunchgrass. **Stems** few-bunched, 2--4 dm tall. **Leaves:** blades 2--4 mm wide, ligules 1.5--3.5 mm long. **Inflorescence** a nodding open panicle 5--13 cm long, the branches delicate and capillary, the lowermost often oriented downward. **Spikelets** 4--6 mm long. **Lemmas** with a cobwebby base, hairy on keel and especially along the marginal veins. Moderately disturbed settings in the mountains, including road cuts, steep slopes with loose soil, and open understory. Western N. America in the Rocky Mountain and Intermountain regions.

Poa reflexa is very similar to *Poa leptocoma* and in addition to the key characters *Poa reflexa* tends to inhabit drier settings than *Poa leptocoma*. *Poa paucispicula* Scribn. & Merr. would key out here because of the small spikelets with usually hairy marginal veins of the lemmas and smooth panicle branches. *Poa paucispicula* (recorded from Carbon, Deerlodge, Park, and Ravalli cos.) differs only in having slightly less hairy lemma veins and shorter (1--2 cm) lower panicle branches that may not reflex at anthesis. This morphology suggests *Poa paucispicula* is intermediate between *Poa reflexa* and *Poa leptocoma*. Given that the last two are distinguished often with difficulty, segregation of a third species seems unwarranted.

Poa secunda J.Presl [*Poa ampla* Merr., *P. canbyi* (Scribn.) Howell, *P. gracillima* Vasey, *P. juncifolia* Scribn., *P. nevadensis* Vasey ex. Scribn., *P. sandbergii* Vasey, *P. scabrella* (Thurb.) Benth. ex Vasey, and *P. secunda* ssp. *juncifolia* (Scribn.) Soreng] Sandberg bluegrass Perennial bunchgrass. **Stems** 2--12 dm tall. **Leaves:** blades 1--3 mm wide, ligules 1--5 mm long. **Inflorescence** a contracted to open panicle mostly 7--24 cm long. Spikelets 6--10 mm long. Lemmas hairless or scabrous to short-hairy, rounded on back. Shrub steppe vegetation and generally in open dry and saline settings throughout the state from low to high elevations. Western and northern N. America.

Poa secunda includes *Poa juncifolia*, which traditionally was distinguished by a growth form involving branching above ground level and thus rupturing leaf sheaths and spikelets with glabrous lemmas. *Poa ampla* is included here and traditionally distinguished by glaucous stems and leaves, flat leaf blades scattered along the stem instead of concentrated at the base, and a predilection to gravelly well drained soils along or near riparian settings. *Poa gracillima* (Slender bluegrass) is an ecotype of mountain meadows and forest understory and distinguished by an open panicle. At montane elevations, *Poa secunda* produces open panicles and rhizomes with higher frequency, as if *Poa arida* was being reconstituted perhaps by hybridization of *Poa secunda* with sympatric *Poa arctica* (which produces rhizomes). These rhizomatous *Poa secunda* specimens are not *Poa arida* because they retain a tightly bunched habit. Herbarium collections of rhizomatous *Poa secunda* come from mountain meadows and explicitly indicate a rarity that suggests hybrid progeny of limited local abundance. In spite of the high morphological variation of *Poa secunda*, the spikelet morphology remains distinctly uniform and is otherwise found only in *Poa arida* and rarely in *Poa pattersonii* (see comments under that species). The lemmas and glumes of *Poa secunda* have rounded backs (i.e., not keeled). When not receptive to pollen, the spikelet is tightly closed in a dorsally compressed manner. In this case, the spikelet is nearly cylindrical in cross-section, and the long narrow terminal floret with its acute apex protrudes distinctively through the clasping lower lemmas, which are typically broader and blunter. When the lemmas are splayed out laterally during pollen reception, the dorsal compression of the spikelet is evident only in the rounded backs of the lemmas. *Poa secunda* can have the persistent leaf sheaths from which the blades have uniformly abscised, as in *Poa fendleriana*. The non-keeled spikelets arranged in long slender spicate panicles should distinguish *Poa secunda* from *Poa fendleriana*, which often grow in sympatry and flower together during the early summer in shrub-steppe settings. The spikelet morphology of *Poa secunda* is somewhat similar to that of *Puccinellia nuttalliana*, but the spikelets of the latter are firmly appressed to very scabrous pedicels and inflorescence branches. *Poa secunda* has few if any scabrous hairs.

Poa stenantha Trin. [*Poa macroclada* Rydb.] Northern bluegrass Perennial bunchgrass. **Stems** 3--6 dm tall. **Leaves:** blades 2--4 mm wide, ligules 2--5 mm long. **Inflorescence** a nodding panicle 5--16 cm long. **Spikelets** 7--9 mm long. **Lemmas** hairy on veins, keeled. Wet mountain meadows; collected in Deer Lodge co. Pacific Northwest region, CO, and UT.

Poa stenantha is apparently similar to *P. secunda*, from which it is distinguished by its leaf blades that tend to be flat (not folded) and >2 mm wide, lemmas that are strongly folded along the keel and that are glabrous between the main veins, and callus hairs when present that are longer than 0.2 mm. A form of *Poa stenantha* with open panicles and glabrous lemma calluses is called *Poa macroclada*, which occurs in the U.S. Rocky Mountain portion of the distribution of *P. stenantha*.

Poa trivialis L. Rough bluegrass Perennial rhizomatous. **Stems** loosely bunched, 4--10 dm tall, often decumbent and rooting at nodes. **Leaves:** blades 2--5 mm wide, lax, somewhat scabrous, ligules 3--10 mm long. **Inflorescence** an oblong open panicle 8--25 cm long. Spikelets 3--5 mm long. **Lemmas** 2.5--3.5 mm long, with a cobwebby base, keeled. Moist disturbed settings. Introduced throughout much of N. America.

This species is very similar to *Poa palustris* in habitat, habit, and inflorescence and spikelet morphology. The sickle-shaped or curved first glume that is conspicuously narrower than the second glume is distinctive to *Poa trivialis* and distinguishes it from the similar *Poa palustris*.

Poa wheeleri Vasey [*Poa nervosa* (Hook.) Vasey var. *wheeleri* (Vasey) C.L. Hitchc.] Wheelers bluegrass Perennial bunchgrass sometimes with short rhizomes (i.e., widely diverging tillers). **Stems** 4--7 dm tall, erect, sheaths glabrous to more commonly short hairy or scabrous. **Leaves:** blades 2.0--3.5 mm wide, ligules 0.5--2.0 mm long. **Inflorescence** an open panicle, often nodding, 5--11 cm long. **Spikelets** 6--9 mm long. **Lemmas** 3--6 mm long, hairless or scabrous. Open to closed montane understory. Throughout western N. America.

Poa wheeleri could be confused with *Poa pratensis* but the lemmas lack cobwebby hairs and indeed the lemmas of *Poa wheeleri* are commonly hairless or nearly so. This feature is conspicuous because the lemmas are often not tightly overlapping at anthesis. This renders the lemma readily visible from base to tip, and their large size, being strongly folded along the midrib keel, and the often very greenish coloration additionally readily distinguishes *Poa wheeleri*. That the populations of this species are mostly pistillate means that at anthesis many plumose stigma branches will be visible with no evidence of stamens (filaments or anthers).

Polypogon Desf., Rabbitsfoot grass

Bunched annuals and perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a cylindrical spike-like panicle. **Spikelets** with 1 floret; glumes long-awned and enclosing the floret. **Lemma** awnless; palea well developed. **Disarticulation** below glumes; unit of dispersal the spikelet.

A cool season genus of about 18 pantropical to warm temperate species and eight of these occur in N. America.

Polypogon monspeliensis (L.) Desf. Annual rabbitsfoot grass Annual bunchgrass. **Stems** erect to decumbent, 1--5 dm tall. **Leaves:** blades 4--6 mm wide. **Inflorescence** a dense spike-like panicle, 2--15 cm long, tawny yellowish to whitish when mature. **Spikelets** 2.0--2.5 mm long excluding the awns, glumes with awns 5--10 mm long. **Lemmas** 1.0--1.5 mm long, awned from near the tip with a delicate awn no longer than the lemma. Disturbed places with moist soil including shady stream and ditch banks. Introduced throughout N. America excluding a very east-central portion.

Puccinellia Parl., Alkaligrass

Bunched to single-stemmed perennials. **Leaf blades** flat to inrolled and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open or contracted panicle. **Spikelets** with several to many florets, glumes similar in dimensions to lemma. **Lemma** usually keeled and distinctly parallel veined, tip blunt or truncate and with usually ragged edges, unawned; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A northern hemisphere cool season genus of about 120 species, of which 30 occur in N. America mostly in open settings on alkaline and gravelly substrates, often coastal or interior along gravelly banks and beaches.

1. Lemmas 2 mm or less long, broadly rounded or at least blunt-tipped; anthers 0.5--0.8 mm long; lower panicle branches oriented downward at maturity *P. distans*

1. Lemmas mostly >2 mm long, blunt-tipped to acute; anthers 0.7--1.8 mm long; lower panicle branches upright or ascending 2.

2. Inflorescence 5--10 cm long; lemmas acute, midvein extending to the tip through the otherwise hyaline margin; leaves mostly in a short basal bunch, blades tending to be ≤ 2 mm wide *P. lemmonii*

2. Inflorescence 10--20 cm long; lemmas blunt-tipped to acute, midvein ending before the hyaline marginal end of the lemma; leaves distributed along stem, not in a basal bunch, blades tending to be >2 mm wide *P. nuttalliana*

Puccinellia distans (Jacq.) Parl. Weeping alkaligrass Perennial bunchgrass. **Stems** 1--5 dm tall. **Leaves:** blades 2--4 mm wide, flat or inrolled. **Inflorescence** a pyramidal panicle 5--18 cm long. **Spikelets** 3--6 mm long. **Lemmas** 1.5--2.0 mm long, with a blunt tip. Alkaline and saline substrates. Introduced throughout N. American but generally absent from the southeast region.

The small florets that measure mostly <2 mm long also tend to have a conspicuous hyaline lemma tip compared to the other two species in MT. This exotic is commonly misidentified as *Puccinellia nuttalliana* but the open panicle of spikelets with small (ca. 2 mm long) blunt florets is distinctive of *P. distans*.

Puccinellia lemmonii (Vasey) Scribn. Lemmon's alkaligrass Perennial bunchgrass. **Stems** 1.5--3 dm tall. **Leaves:** blades 1--2 mm wide, mostly inrolled. **Inflorescence** a pyramidal panicle 3--17 cm long. **Spikelets** 4--7 mm long. **Lemmas** 2.5--4.0 mm long, with an acute tip. Moist meadows, alkaline soils; collected in Beaverhead co. Along the western corridor of states within the U.S.

The hyaline (translucent) lemma tip is bisected by conspicuously darker pigmented midrib. This color contrast renders a superficially awn-tipped appearance of the lemma.

Puccinellia nuttalliana (Schult.) Hitchc. [*Puccinellia airoides* (Schult.) S.Watson & J.M.Coult., *P. cusickii* Weath.] Nuttall's alkaligrass Perennial bunchgrass. **Stems** 3--7 dm tall. **Leaves:** blades 1--3 mm wide, becoming inrolled at maturity. **Inflorescence** an open pyramidal panicle 10--30 cm long. **Spikelets** 4--8 mm long. **Lemmas** 2.2--3.0 mm long, with a blunt tip. Moist alkaline soils. Throughout N. American but generally not in the southeast region.

If specimens identified to *Puccinellia nuttalliana* lack conspicuously scabrous pedicels and inflorescence branches, then *Poa secunda* might be the correct identity of the specimen in hand.

Schedonnardus Steud., Tumblegrass

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a panicle with several long lateral secund spikes. **Spikelets** closely appressed to the rachis, with 1 floret; glumes narrow. **Lemma** distinctly 3-nerved, awnless or awn-tipped; palea enclosed in floret. **Disarticulation** below glumes; unit of dispersal is the entire inflorescence.

A warm season genus of 1 species distributed over a broad latitudinal range of N. America and also in Argentina.

Schedonnardus paniculatus (Nutt.) Trel. Tumblegrass. Perennial bunchgrass Stems ascending, 1--4 dm long. **Leaves:** blades 1--2 mm wide, ligule 1.0--1.5 mm long. **Inflorescences** of 5--10 secund lateral divergent spikes, each 5--15 cm long and with 10--20 spikelets. **Spikelets** 3--4 mm long. **Lemmas** 1 per spikelet, 2--4 mm long. Disturbed areas including overgrazed rangeland, prairie dog towns, lawns, and shoulders of roads and railroad tracks. Throughout central and southwestern N. America.

Schedonorus P.Beauv., Broadleaf fescue

Bunched perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 4--20 florets, glumes similar in dimension to lemmas. **Lemma** rounded on back and weakly veined, unawned. **Disarticulation** above the glumes; unit of dispersal the floret.

A cool season Eurasian genus with three species all of which are established in N. America, where they have been introduced as mainly forage grasses. Although these species have traditionally been included within *Festuca*, phylogenetic evidence suggests they are most closely related to *Lolium* (Darbyshire, 1993).

1. Lemmas mostly awn-tipped to awn 4 mm long, lemma margins, midrib, or back usually scabrous especially distally; auricles ciliate, with at least 1 or 2 hairs along the margins of the auricle; panicle branches at the lowest node usually paired, the shorter with 1--13 spikelets, the longer with 3--19 spikelets

Schedonorus arundinaceus

1. Lemmas unawned or with an awn-tip to 0.2 mm long, lemma margins, midrib, and back usually smooth, sometimes slightly scabrous distally; auricles glabrous; panicle branches at the lowest node 1 or 2, if paired the shorter with 1--2(3) spikelets, the longer with 2--6(9) spikelets

Schedonorus pratensis

Schedonorus arundinaceus (Schreb.) Dumort. [*Festuca arundinacea* Schreb., *Lolium arundinaceum* (Schreb.) S.J.Darbyshire, *Schedonorus phoenix* (Scop.) Holub] Tall fescue Perennial bunchgrass sometimes with short rhizomes. **Stems** mostly 9--15 dm tall. **Leaves:** blades 5--12 mm wide, flat. **Inflorescence** a contracted panicle 10--30 cm long. **Spikelets** 9--15 mm long, with mostly 4--8 florets. **Lemmas** awn-tipped or awn up to 4 mm long. Moist meadows and along ditch banks and irrigated fields. Introduced throughout most of N. America.

Schedonorus pratensis (Huds.) P.Beauv. [*Festuca pratensis* Huds., *Lolium pratense* (Huds.) S.J.Darbyshire] Meadow fescue Perennial bunchgrass. **Stems** mostly 5--10 dm tall. **Leaves:** blades 3--7 mm wide, flat. **Inflorescence** a contracted, erect to nodding, panicle 10--23 cm long. **Spikelets** 6--9 mm long, with 4--9 florets. **Lemmas** awnless. Moist meadows and pastures at lower elevations. Introduced throughout all of N. America.

Schizachne Hack., False melic

Bunched to single-stemmed perennials. **Leaf blades** flat and ascending, sheaths with overlapping fused; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 3--6 florets; glumes with mostly 3--5 faint veins. Lemmas with 7 prominent veins; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of one species native to temperate N. America and East Asia.

Schizachne purpurascens (Torr.) Swallen False melic Perennial bunchgrass. **Stems** loosely bunched and connected by short rhizomes, 3--8 dm tall. **Leaves:** blades 2--5 mm wide, often flat and lax, ligule 1.0--1.5 mm long. **Inflorescence** an open panicle 7--13 cm long, branches in pairs or single, drooping, bearing 1--2 spikelets. **Spikelets** 11--16 mm long, with 4--5 florets. **Lemmas** 8--12 mm long, with hairs on callus about one-quarter the length of lemma, awned from between two apical teeth, the awn 9--15 mm long. Open understory settings. Throughout the Rocky Mountain region and generally the northern latitudes of N. America.

Because of the long awn arising from the backside of a bifid lemma tip, *Schizachne purpurascens* is potentially misidentified as a perennial *Bromus* (e.g., *Bromus ciliatus*). The lemma callus with a tuft of hairs 3--4 mm long, the main lemma surface that is completely hairless, and a ligule fuses into a solid cylinder around the stem readily distinguish *Schizachne* from *Bromus*. *Schizachne* has a conspicuous palea that separates from the tight clasp of the lemma during fruit maturation so as to expose the long-ciliate raised veins of the palea.

Sclerochloa P.Beauv., Hardgrass

Bunched annuals and perennials. **Leaf blades** generally flat and spreading, sheaths with overlapping margins; ligule membranous. **Inflorescence** a dense spike-like secund raceme or panicle. **Spikelets** with 3--5 florets; glumes similar to lemmas. **Lemma** usually keeled and distinctly parallel veined, with a blunt apex, unawned; palea well developed. **Disarticulation** below glumes; unit of dispersal the spikelet.

A monotypic cool season genus native to southern Europe and northern Africa.

Sclerochloa dura (L.) P. Beauv. Common hardgrass Annual prostrate bunchgrass. **Stems** about 1 dm tall, spreading. **Leaves:** blades with prow-like tips, 1--2 mm wide. **Inflorescence** a contracted secund panicle or raceme 1--5 cm long. **Spikelets** 6--10 mm long, with usually 3 florets. **Lemmas** with prominent parallel venation and a blunt tip. Sporadic and possibly ephemeral on disturbed soils along roadsides, parking lots, and driveways. Sporadically introduced throughout most of N. America.

Scolochloa Link., Rivergrass

Perennial rhizomatous reeds. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 3--4 florets, glumes similar to lemmas. **Lemma** usually keeled and distinctly parallel veined, unawned but with an acute tip; palea enclose in floret. **Disarticulation** above glumes; unit of dispersal is the floret.

A cool season genus of one species Throughout the northern hemisphere.

Scolochloa festucacea (Willd.) Link Common rivergrass Perennial rhizomatous aquatic. **Stems** 10--20 dm tall. **Leaves:** blades 5--11 mm wide, ligule 4--8 mm long **Inflorescence** an open panicle 15--26 cm long. **Spikelets** 7--11 mm long, with 5--9 florets. **Lemmas** 4--9 mm long, each with a distinctly hairy callus. Peatlands, swamps, and near lake outlets; collected in Flathead co. Throughout the northwest region of N. America.

Superficially similar to *Schedonorus arundinaceus* (*Festuca arundinacea*) but in aquatic settings and with thick stems at water level 6--8 mm in diameter and borne from stout rhizomes, and with conspicuous hairs born from the lemma callus. Like *Schizachne*, the two raised palea veins of *Scolochloa* are distinctively lined with ciliate hairs.

Secale L., Rye

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a two-sided terminal spike with short internodes. **Spikelets** 1 per node and each with several florets; glumes almost awn-like and short. **Lemma** with distinctively scabrous veins; palea enclosed in floret. Disarticulation below the glumes; unit of dispersal the spikelet and subtending internode of the inflorescence rachis.

A cool season genus of about 3 species distributed in temperate Eurasia; two species introduced into N. America.

Secale cereale L. Cereal rye. Annual bunchgrass. Stems 0.5--1.5 m tall. **Leaves:** blades flat, 6--12 mm wide. **Inflorescence** 6--12 cm long, rachis readily disarticulating at maturity. Spikelets 14--18 mm long, mostly with 2 florets, glumes narrow and linear. **Lemmas** distinctly keeled, the margins conspicuously pectinate-ciliate, awn 20--40 mm long. Occasionally planted or colonizing roadsides and fields. Introduced throughout most of N. America.

Secale is known to increase in abundance in wheat producing areas after successive years of drought. *Triticale* is a hybrid between *Secale cereale* and *Triticum aestivum* that may occasionally be found. This hybrid is like *Secale* in having lemma margins that are distinctly pectinate-ciliate, but like *Triticum* in its wide asymmetrically keeled glumes.

Setaria P.Beauv., Bristlegrass

Bunched annuals. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a terminal spicate panicle with sterile green to yellowish bristles subtending the spikelets. **Spikelets** with one fertile floret; glumes unequal, the first much shorter than the second. **Lemma** rounded on back, awnless, hard-textured if fruit-bearing; palea enclosed in floret. **Disarticulation** below the glumes; unit of dispersal the spikelet.

A warm season genus of about 140 mostly from tropical Africa, Asia, and S. America, of which 27 occur in N. America.

1. Bristles retrorsely barbed (angled backward), inflorescence easily clinging to clothes or fur *S. verticillata*
1. Bristles antrorsely barbed (angled forward), inflorescence not clinging to clothes or fur 2.

2. Fruiting lemma coarsely corrugated; margins of sheaths hairless except at throat; longest bristles 5--9 mm long and often golden-yellow to straw-colored especially distally; ligule 1 mm long or less *S. pumila*
2. Fruiting lemma smooth or very finely corrugated; margins of sheaths conspicuously hairy; longest bristles 9--12 mm long and often green to purplish-pigmented, not often straw-colored; ligule usually >2 mm long 3.

3. Inflorescence a cylindrical spike-like panicle 1--9 cm long; disarticulation below glumes, the fertile lemma mostly enclosed inside the spikelet *S. viridis*
3. Inflorescence a lobed spike-like panicle 20--30 cm long; disarticulation above glumes, the fertile lemma falling free from the spikelet *S. italica*

Setaria italica (L.) P.Beauv. Foxtail bristlegrass Annual cultivated bunchgrass. **Stems** 8--10 dm long. **Leaves:** blades 8--28 mm wide, sheaths ciliate along margins, ligule 1--2 mm long. **Inflorescence** a usually nodding spike-like panicle 15--30 cm long, longest sterile bristles 9--12 mm long, antrorsely barbed. **Spikelets** 2.8--3.2 mm long. **Lemmas** reticulately veined but not conspicuously transversely corrugated. Frequently disturbed site; collected in Big Horn and Power River cos. Introduced sporadically throughout all of N. America excepting the Intermountain Region.

Setaria pumila (Poir.) Roem. & Schult. [*Setaria glauca* (L.) P.Beauv., *S. lutescens* (Weigel) F.T.Hubbard] Yellow foxtail Annual bunchgrass. **Stems** 1.5--6.0 dm long. **Leaves:** blades 5--9 mm wide, sheaths hairless, ligule <1 mm long. **Inflorescence** an erect spike-like panicle 5--15 cm long, sterile bristles 4--7 mm long, antrorsely barbed. **Spikelets** 2.5--3.0 mm long. **Lemmas** strongly corrugated at maturity. Disturbed sites including in and around cultivated fields. Introduced throughout N. America.

Setaria verticillata (L.) P.Beauv. Hooked bristlegrass Annual bunchgrass. **Stems** 1--5 dm long. **Leaves:** blades 5--12 mm wide, sheaths usually hairy at throat; ligule 1.0--1.5 mm long. **Inflorescence** an erect to nodding spike-like panicle 5--13 cm long, sterile bristles 4--7 mm long, retrorsely barbed. **Spikelets** 2.0--2.5 mm long. **Lemmas** reticulately veined but not conspicuously transversely corrugated. Disturbed sites along roads and pastures and in lawns. Introduced throughout N. America excepting the very southeast.

Setaria viridis (L.) P.Beauv. Green bristlegrass Annual bunchgrass. **Stems** 1--4 dm long. **Leaves:** blades 3--10 mm wide, sheaths ciliate along margins, ligule 1.0--1.5 mm long. **Inflorescence** an erect to nodding cylindrical panicle 3--15 cm long, longest sterile bristles 8--12 mm long, antrorsely barbed. **Spikelets** 1.5--2.2 mm long. **Lemmas** reticulately veined but not conspicuously transversely corrugated. Regularly disturbed settings such as along roadsides, pastures, and ditches. Introduced throughout nearly all of N. America.

Sorghastrum Nash, Indiangrass

Bunched perennials, with or without rhizomes. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a contracted panicle. **Spikelets** paired, one sessile the other pedicellate, the sessile seed bearing, the pedicellate mostly absent and represented by only the naked pedicel; glumes rounded on back and completely enveloping the florets. **Lemma** inconspicuous, with a deciduous awn; palea also inconspicuous. **Disarticulation** below the glumes; unit of dispersal the spikelet pair.

A warm season genus of about 18 subtropical to tropical American and African species. Three species occur in N. America mostly in the southeast.

Sorghastrum nutans (L.) Nash. Indiangrass Perennial bunchgrass with short rhizomes. **Stems** 1--2 m tall. **Leaves:** blades 5--10 mm wide, ligule 2--7 mm long, membranous. **Inflorescence** a contracted panicle, 15--30 cm long; rachis and pedicels long hairy along margins. **Spikelets** 5--8 mm long, glumes straw colored, acute. **Lemmas** with a bent awn 10--18 mm long. Escaping from cultivation in Yellowstone co. and reported from reclamation area in Rosebud co. (John Rumely, personal communication). Throughout central and eastern N. America.

Sorghum Moench, Sorghum

Rhizomatous perennials or robust annuals. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a dense panicle. **Spikelets** paired, one sessile the other pedicellate, the sessile seed bearing, the pedicellate at least staminate; glumes rounded on back and completely enveloping the florets. **Lemma** thin-textured, with a deciduous awn; palea inconspicuous. **Disarticulation** below the glumes; unit of dispersal the spikelet pair.

A warm season genus of about 25 warm season species mostly from the Old World but with two native to Mexico and Central America. Two species have been introduced into N. America. Young growth often generates cyanide.

1. Plants perennial from stout rhizomes; panicles open and diffuse; disturbed sites
2. Plants annual, non-rhizomatous; panicles dense; cultivated

S. halepense
S. bicolor

Sorghum bicolor (L.) Moench [*S. vulgare* Pers.]. Grain sorghum Annual cultivated bunchgrass. **Stems** 0.5--1 m tall. **Leaves:** blades 3--5 cm wide, ligules membranous but densely covered with hairs, 1--5 mm long. **Inflorescence** a dense panicle 10--30 (60) cm long, rachis and pedicels short hairy. **Spikelets** 4--9 mm long, glumes purplish at maturity. **Lemmas** unawned or with an awn 5--20 mm long, bent and early deciduous. Cultivated mostly for forage (e.g., milo and sorgo), occasionally as an ornamental, rarely escaping; collected in Broadwater and Missoula cos. Escaping cultivation throughout much of the U.S. and eastern Canada.

Sorghum halepense (L.) Pers. Johnsongrass Rhizomatous perennial **Stems** 1--1.5 m tall. **Leaves:** blades 10--15 mm wide, ligule membranous with a short fringe of hairs, 2--4 mm long. **Inflorescence** an open and diffuse panicle 15--35 cm long, rachis short hairy, pedicels long hairy along margins. **Spikelets** 4.0--6.5 mm long, glumes purplish to greenish-yellow, acute, hairless or nearly so. **Lemma** unawned or with an awn 8--13 mm long, twisted and bent, readily deciduous. Frequently disturbed sites; collected in Gallatin co. Introduced throughout much of N. America excepting most of Canada.

Spartina Schreb., Cordgrass

Rhizomatous perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** a panicle with several lateral second spikes, the spikes often closely appressed to the main inflorescence rachis. **Spikelets** with 1 floret; glumes unequal, the first much shorter than the second. **Lemma** distinctly 3-nerved, awnless or awn-tipped; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A warm season genus of about 16 species centered in warm temperate regions of N. America, Europe, and Africa. Seven species occur in N. America.

1. Second glume 10--20 mm long, including the awn, greatly exceeding the lemma in length; lateral spikes 5--15 cm long; plants robust, generally 1--3 m tall; leaf blades mostly >5 mm wide *S. pectinata*
2. Second glume 7--9 mm long, awnless or awn-tipped, only barely exceeding the lemma in length; lateral spikes 2--5 cm long; plants generally <1 m tall; leaf blades mostly ≤5 mm wide *S. gracilis*

Spartina gracilis Trin. Alkali cordgrass Rhizomatous perennial **Stems** 4--8 dm tall. **Leaves:** blades 3--5 mm wide, ligule 1.0--1.2 mm long. **Inflorescences** of 4--8 second lateral spikes often appressed to the main rachis, each 3--4 cm long and with 20--30 spikelets. **Spikelets** 7--9 mm long, with one floret, glumes awnless or awn-tipped. **Lemmas** distally smooth. Alkaline seeps and meadows. Throughout western and north central N. America.

Spartina pectinata Bosc ex Link. Prairie cordgrass Rhizomatous perennial **Stems** 10--20 dm tall. **Leaves:** blades 3--5 mm wide, ligule 2--3 mm long. **Inflorescences** of 8--15 second lateral spikes often appressed to the main rachis, each 3--4 cm long and with 20--30 spikelets. **Spikelets** 10--20 mm long, with one floret, glumes short-awned. **Lemmas** distally scabrous. Along streams, marshes, and sloughs, often where alkaline. Throughout much of N. America excepting the very southwest and southeast.

Sphenopholis Scribn., Wedgescale

Bunched annuals and perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted panicle. **Spikelets** with 2--3 florets; glumes unequal, the second broadly obovate or wedge-shaped. **Lemma** awnless; palea enclosed in floret. **Disarticulation** below glumes; unit of dispersal mainly the spikelet.

A cool season genus of about six species native to N. America.

1. Panicle branches loose and not spike-like, spikelets commonly born from pedicels >1 mm long and thus not strongly fascicled or aggregated; 2nd glume broadest just below the apex *S. intermedia*
1. Panicle branches contracted and often spike-like, spikelets commonly born from pedicels <1 mm long and thus strongly fascicled and aggregated; 2nd glume distinctly broadest about the apex *S. obtusata*

Sphenopholis intermedia (Rydb.) Rydb. Slender wedgescale or wedgegrass. Perennial bunchgrass. **Stems** 3--10 dm tall. **Leaves:** blades flat, 2--6 mm wide. **Inflorescence** nodding open panicle, 7--20 cm long. **Spikelets** 2.5--4.0 mm long; second glume typically broadest below the tip. **Lemmas** 2--3 mm long. Wet site inhabiting, often in disturbance-prone settings. Sporadic throughout most of N. America.

Sphenopholis obtusata (Michx.) Scribn. Prairie wedgescale or wedgegrass. Perennial bunchgrass. **Stems** 3--10 dm tall. **Leaves:** blades flat, 2--6 mm wide. **Inflorescence** an erect, dense, panicle with spicate branches, 7--20 cm long. **Spikelets** 2.5--3.5 mm long; second glume broadest right near the tip. **Lemmas** 2--3 mm long. Wet to dry site inhabiting but usually where water is at least intermittently abundant. Throughout most of N. America.

Sporobolus R.Br., Dropseed

Bunched perennials and annuals. **Leaf blades** generally flat and ascending to lax, sheaths with overlapping margins; ligule hairy. **Inflorescence** an open to contracted panicle, often partially or entirely enclosed in the leaf sheath. **Spikelets** with usually 1 floret; glumes unequal, the first 1/2 as long as the second. **Lemma** with 1 distinct vein, awnless

or awned, callus sometimes long-hairy. **Disarticulation** above the glumes; unit of dispersal the fruit, sometimes the floret.

A warm season genus of about 160 species mainly centered in warm temperate regions of the New World, of which 27 occur in N. America. *Sporobolus flexuosus* (Thurb. ex Vasey) Rydb. is reported from west central MT (Barkworth et al. 2003). This species is distinguished from *S. cryptandrus* by having spreading pedicels and reflexed secondary branches of the inflorescence, rendering a very open panicle. The attachment point of the secondary branch is hairy and the entire panicle has a subovate outline because the lower branches are no longer than the branches in the middle of the inflorescence.

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| 1. Plants annual; panicle up to 4 cm long, usually partially enclosed in the leaf sheath or spathe | <i>S. neglectus</i> |
| 1. Plants perennial; panicle >4 cm long, exposed or variously enclosed in the leaf sheath or spathe | 2. |
| 2. Panicle diffuse and usually fully exposed (not much enclosed by the leaf sheath), panicle dimensions about as long as wide; stems bases decumbent, hardened and woody | <i>S. airoides</i> |
| 2. Panicle contracted or open but then much longer than wide, usually partially enclosed in the leaf sheath; bases of stems erect, but if decumbent, then not hardened and woody | 3. |
| 3. Spikelets 2.5 mm long or shorter | <i>S. cryptandrus</i> |
| 3. Spikelets 3 mm long or longer | <i>S. compositus</i> |

Sporobolus airoides (Torr.) Torr. Alkali Sacaton. Perennial bunchgrass often forming broad tussocks. **Stems** 4--8 dm tall. **Leaves:** blades 2--4 mm wide, throat with long hairs. **Inflorescence** a diffuse panicle 10--40 cm long, not much enclosed in leaf sheath. **Spikelets** 2.0--2.5 mm long. **Lemmas** 1.5--2.5 mm long. On moderately alkaline soils and moderately disturbed open dry vegetation, including road and trailsides. Throughout much of central and western N. America.

Sporobolus compositus (Poir.) Merr. [*Sporobolus asper* (P.Beauv.) Kunth] Composite dropseed Perennial bunchgrass. **Stems** 3--8 dm tall. **Leaves:** blades 2--4 mm wide, throat with a tuft of hairs. **Inflorescence** a contracted panicle 5--15 cm long, mostly enclosed in leaf sheath. **Spikelets** 4--6 mm long. **Lemmas** 3--6 mm long. Disturbance-prone settings on a diversity of soils; collected in Carter co. Sporadic throughout most of N. America.

Sporobolus heterolepis (A.Gray) A.Gray, prairie dropseed, occurs in the adjacent Dakotas and is distinguished from *S. compositus* by spikelets having at least one glume as long as or longer than the lemma and an open panicle usually entirely exerted from the leaf sheath.

Sporobolus cryptandrus (Torr.) A.Gray Sand dropseed Perennial bunchgrass. **Stems** 2--8 dm tall. **Leaves:** blades 2--5 mm wide, throat with a conspicuous tuft of whitish hairs. **Inflorescence** a contracted to open panicle 8--20 cm long, partially enclosed in leaf sheath. **Spikelets** 2.0--2.5 mm long. **Lemmas** 1.4--2.5 mm long. Generally occurring in disturbed settings and rarely in sagebrush steppe, common along roadsides and there conspicuous because of inflorescences each enclosed in an arcuate leaf sheath. Throughout most of N. America.

Sporobolus neglectus Nash Puffsheathed dropseed Annual bunchgrass. **Stems** 1--4 dm tall. **Leaves:** blades 1--2 mm wide, throat with a tuft of hairs. **Inflorescence** a narrow panicle 1--4 cm long, partially enclosed in leaf sheath. **Spikelets** 2--3 mm long. **Lemmas** 1.5--2.9 mm long. Sporadic in open dry disturbed sites. Throughout much of N. America excepting the Intermountain Region and the very southeast.

The annual *Sporobolus vaginiflorus* (Torrey) Wood, poverty dropseed, is known from adjacent ID and differs from *S. neglectus* by spikelets usually >3 mm long and hairy lemmas.

Stipa L., Needlegrass

Bunched perennials. **Leaf blades** generally flat and ascending to lax, sheaths with overlapping margins; ligule membranous. **Inflorescence** a raceme to an open or contracted panicle. **Spikelets** with one plump to cylindrical floret; glumes enveloping the floret. **Lemma** hardened at maturity and enveloping the floret, with a deciduous to persistent awn, callus blunt to sharp but usually distinctly hairy; palea enclosed in floret. **Disarticulation** above the glumes; unit of dispersal the floret.

Traditionally *Stipa* included about 100 cool season species native to temperate and subtropical regions throughout the world with about 30 N. American species. For the tribe Stipeae (including *Oryzopsis* and *Stipa*), genetic and other evidence strongly suggests that morphology is a poor predictor of phylogenetic relationships (cf. Jacobs et al. 2000; Barkworth et al. 2008; Romaschenko et al. 2008, 2011; Ciadella et al. 2010; Seberg et al. 2010). It is clear that the many species of Stipeae represent a recent widespread diversification in mostly open dry settings where most species retain the ability to interbreed with at least one close relative. Species of tribe Stipeae are best treated as belonging to a single genus, *Stipa*. However, this has not been done here because two species of *Oryzopsis* in Montana (*O. asperifolia*

and *O. micrantha*) have not been formally placed into *Stipa*.

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| 1. Awn plumose (feathery), with divergent dense whitish hairs in lower portion | 2. |
| 1. Awn smooth, scabrous, or with appressed hairs in lower portion | 3. |
| 2. Ligules 2--6 mm long (especially of upper leaves), conspicuous | <i>S. thurberiana</i> |
| 2. Ligules 1 mm or less long, inconspicuous | <i>S. occidentalis</i> |
| 3. Lemmas mostly >8 mm long, glumes 1.5--4 cm long | 4. |
| 3. Lemmas <8 mm long; glumes 1.5 cm or shorter | 5. |
| 4. Lemmas 8.5--14(--17) mm long, with white to brownish hairs even or patchily distributed, sometimes glabrous immediately above the callus, awns mostly 60--105 mm long; glumes mostly 15--25 mm long | <i>S. comata</i> |
| 4. Lemmas 15--25 mm long, with brownish hairs usually patchily distributed, awns 90--190 mm long; glumes mostly 25--45 mm long | <i>S. spartea</i> |
| 5. Panicle open, the branches spreading and spikelets borne only toward the branch tips | <i>S. richardsonii</i> |
| 5. Panicle narrow or contracted, the branches short and appressed, bearing spikelets toward the base | 6. |
| 6. Lemmas densely hairy, the hairs spreading and 1--3 mm long; awn arising between two terminal lemma teeth; leaves <1 mm wide | <i>S. pinetorum</i> |
| 6. Lemmas hairless or with short appressed hairs ≤1 mm long or lemmas not toothed; leaves mostly 1--5 mm wide | 7. |
| 7. Tufts of hair usually present at junction of leaf sheath and blade and at lower panicle nodes; mostly plains and foothills; florets at maturity mostly >1 mm thick, the tip differentiated from the awn in color and texture; palea glabrous and <one-half as long as lemma | <i>S. viridula</i> |
| 7. Tufts of hair lacking at junction of leaf sheath and blade and at lower panicle nodes; mostly in montane meadows. florets at maturity <1 mm thick, the tip not differentiated from the awn in color and texture; palea either hairy or >1/2 as long as lemma or both | 8. |
| 8. Lower leaf sheaths conspicuously hairy | <i>S. nelsonii</i> |
| 8. Lower leaf sheaths hairless or nearly so | 9. |
| 9. Awns mostly ≤2 cm long; lemmas 4--5 mm long; palea well over half as long as lemma; glumes mostly <9 mm long; leaf blades generally 0.5--2 mm wide | <i>S. lettermanii</i> |
| 9. Awn mostly >2 cm long; lemmas 5.5--7 mm; palea mostly half as long as lemma or less; glumes 9--10 mm long; leaf blades generally 2--5 mm wide | <i>S. nelsonii</i> |

Stipa comata Trin. & Rupr. [*Hesperostipa comata* (Trin. & Rupr.) Barkworth; *Stipa curtiseta* (A. S. Hitchcock) Barkworth, *Hesperostipa curtiseta* (Hitchc.) Barkworth, *Stipa spartea* Trin. var. *curtiseta* A.S. Hitchcock, *Stipa comata* var. *intermedia* Scribn. & Tweedy *Hesperostipa comata* ssp. *intermedia* (Scribn. & Tweedy) Barkworth] Needle-and-thread Perennial bunchgrass **Stems** 3--7 dm tall. **Leaves:** blades 2--4 mm wide, hairy or hairless at throat region, ligule 3--6 mm long. **Inflorescence** a contracted to sometimes open panicle 15--32 cm long. Spikelets 16--35 mm long. **Lemmas** evenly to unevenly whitish hairy, with an awn 6.5--22 cm long. Open dry settings including sagebrush steppe with high native plant cover as well as well-grazed rangelands and along secondary roads. Throughout N. America excepting the very southeast.

The density, cover, and degree of whiteness of the lemma hairs are so variable as to render *Stipa comata* indistinct from *Stipa curtiseta*. Intermediate needle-and-thread, *Stipa comata* ssp. *intermedia*, is known from a few specimens in Gallatin, Madison, and Silver Bow cos. and is marked by a distinctively straight and relatively short terminal awn segment (less than 8 cm). Few if any characters covary with such an awn, however. For example, MT specimens of intermediate needle-and-thread taken by mid-summer flowering have inflorescences partly included within the subtending leaf sheath even though this entity is diagnosed as having completely exerted panicles.

Stipa lettermanii Vasey [*Achnatherum lettermanii* (Vasey) Barkworth] Letterman's needlegrass Perennial bunchgrass. **Stems** 3--6 dm tall. **Leaves.** blade 0.5--2.0 mm wide, essentially hairless at throat region, ligule 3--4 mm long. **Inflorescence** a contracted panicle 10--15 cm long. Spikelets 7--9 mm long. **Lemmas** with dense appressed hairs, awn 1--2 cm long. Open understory at middle to high elevations. Sporadic over much of western N. America.

Stipa nelsonii Scribn. [*Stipa columbiana* Macoun; *Achnatherum nelsonii* (Scribn.) Barkworth; *Stipa williamsii* Scribn.] Columbia needlegrass Perennial bunchgrass. **Stems** 3--8 dm tall. **Leaves:** blades 2--5 mm wide, hairless at throat region, sheaths conspicuously hairy or glabrate, ligule 1--2 mm long. **Inflorescence** a contracted panicle 10--30 cm

long. Spikelets 8--12 mm long. **Lemmas** appressed hairy, with an awn 2--4 cm long. Open dry settings, including mountain big sagebrush steppe, at middle elevations in the mountains. Throughout the Rocky Mountain and Intermountain regions.

Stipa nelsonii may have hairless or hairy stems and leaf sheaths, although hairless forms are most common in MT. *Stipa nelsonii* can be very difficult to distinguish from *Stipa viridula*. *Stipa nelsonii* grows in the mountains whereas *Stipa viridula* grows at lower elevation often in open shrub steppe settings. This general ecological difference may help distinguish these two along with morphology. The bony-textured tip of the floret of *Stipa viridula*, supposedly characteristic of the genus *Nassella*, is distinct from that of *Stipa nelsonii* (an *Achnatherum*), where the beak of the floret is not set off in coloration and texture from the main body of the floret.

Stipa occidentalis Thurb. [*Achnatherum occidentale* (Thurb.) Barkworth ssp. *pubescens* (Vasey) Barkworth] Western needlegrass or Pubescent western needlegrass Perennial bunchgrass. **Stems** 2--4 dm tall. **Leaves:** blade 2--3 mm wide, hairless to somewhat hairy near the throat, ligule 0.5--1.0 mm long. **Inflorescence** a narrow contracted panicle 10--15 cm long. **Spikelet** 5--8 mm long. **Lemmas** appressed hairy, with an awn 3--4 cm long that is plumose in the lower portion. Sagebrush steppe and other open dry settings in the mountains. Throughout much of western N. America.

Stipa pinetorum M.E.Jones [*Achnatherum pinetorum* (M.E.Jones) Barkworth] Pine needlegrass Perennial bunchgrass. **Stems** 1--3 dm tall. **Leaves:** blades 0.5--0.8 mm wide, essentially hairless at the throat, ligule <0.5 mm long. **Inflorescence** a contracted panicle 10--14 cm long. **Spikelet** 8--10 mm long. **Lemmas** with dense spreading long hairs, with an awn 15--20 mm long. Open to closed dry understory at middle elevations; collected in Gallatin co. Throughout most of western N. America.

Stipa richardsonii Link [*Achnatherum richardsonii* (Link) Barkworth] Richardson's needlegrass Perennial bunchgrass. **Stems** 4--8 dm tall. **Leaves:** blades 1--2 mm wide, scabrous near the throat, ligule <0.5 mm. **Inflorescence** an open panicle 10--15 cm long. **Spikelets** 7--8 mm long, pendant. **Lemmas** appressed hairy, with an awn 1.5--3.0 cm long. Open dry settings and open montane understory, including mountain big sagebrush steppe. Throughout the northern Rocky Mountain region.

Stipa spartea Trin. [*Hesperostipa spartea* (Trin.) Barkworth] Porcupinegrass Perennial bunchgrass. **Stems** 7--11 dm tall. **Leaves:** blade 3--5 mm wide, essentially hairless at throat, ligule 2--6 mm long. **Inflorescence** a contracted panicle 15--25 cm long. **Spikelet** 25--45 mm long. **Lemmas** unevenly brownish hairy, with a stout awn 10--20 cm long. Sporadic in open dry settings at low elevations. Throughout most of central and northern N. America.

Stipa thurberiana Piper [*Achnatherum thurberianum* (Piper) Barkworth] Thurber's needlegrass Perennial bunchgrass. **Stems** 4--7 dm tall. **Leaves:** blades 1--2 mm wide, essentially hairless at the throat, ligule 3--6 mm long. **Inflorescence** a contracted panicle 5--16 cm long. **Spikelets** 10--15 mm long. **Lemmas** with appressed hairs, awn 3--5 cm with plumose hairs on the lower portion. Sagebrush steppe and understory of pine forests; collected in Gallatin and Park cos. Throughout much of western N. America.

Known to hybridize with *Oryzopsis hymenoides*, the generally purplish glumes and long ligule may be the only characters distinguishing *Stipa thurberiana* from *S. occidentalis*.

Stipa viridula Trin. [*Nassella viridula* (Trin.) Barkworth] Green needlegrass Perennial bunchgrass. **Stems** 5--10 dm tall. **Leaves:** blades 1--2 mm wide hairy at the throat, ligules 1--2 mm long. **Inflorescence** a contracted panicle 7--14 cm long. **Spikelets** 9--12 mm long. **Lemmas** appressed hairy, with an awn 2.0--3.5 cm long. Sagebrush steppe and other open dry sites at lower elevations especially east and south of the continental divide. Throughout N. America except generally in the eastern portion of the continent.

The generally whitish-tipped floret with a bony texture contrast to the color and texture of the adjacent awn and a zone of abscission between the two renders a tardily disarticulating awn. Such a floret tip and awn weakly distinguishes *Stipa viridula* from the morphologically similar *S. nelsonii*.

Trisetum Pers., Oatgrass

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a contracted to sometimes open panicle. Spikelets with 2(--4) florets; glumes enveloping the florets. **Lemma** with a bent awn from the middle, rarely awnless; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of about 75 species widespread in temperate and boreal regions of the northern hemisphere, of which eight occur in N. America.

1. Lemmas awnless, merely awn-tipped, or with a short straight awn 2.
1. Lemmas with a well-developed awn that is curved or bent 3.

2. Awn absent or up to 2 mm long but then not surpassing the tip of lemma *T. wolfii*
 2. Awn 4--6 mm long and well surpassing the tip of lemma *T. orthochaetum*
3. Both glumes about equal in length and width; panicle spike-like, the individual branches usually obscure *T. spicatum*
3. First glume distinctly narrower than second glume and often shorter; panicle open to contracted, but in any case at least the lower inflorescence branches are distinct 4.
4. Most panicle branches spikelet bearing their entire length; panicles narrow and nodding only towards the tip; upper glume widest at or below the middle and tapering to the tip, first glume 3--5 mm long *T. canescens*
4. Most panicle branches spikelet bearing only towards the branch ends; panicles open and completely nodding or drooping; upper glume widest above the middle and rounded to the tip; first glume 1--3 mm long *T. cernuum*

Trisetum canescens Buckley Tall trisetum. Perennial bunchgrass. **Stems** loosely bunched, 4--10 dm tall. **Leaves:** blades mostly 5--9 mm wide. **Inflorescence** a loosely contracted to open panicle 10--25 cm long, the lower branches with clusters of spikelets distinctly set off from rest of inflorescence. **Spikelets** 7--9 mm long. **Lemmas** 2--4 per spikelet, awns 7--13 mm long, bent, from upper one-half of lemma. Middle to high elevation forest understory. Common throughout western N. America.

Trisetum flavescens (L.) P. Beauv. has been cultivated in Gallatin co. and is very similar to *T. canescens* except that the spikelets are mostly with 4 florets and arranged in dense yellowish panicles.

Trisetum cernuum Trin. Nodding trisetum. Perennial bunchgrass. **Stems** 6--10 dm tall. **Leaves:** blades 6--12 mm wide. **Inflorescence** an open lax panicle 10--30 cm long, the branches often drooping. **Spikelets** 8--11 mm long. **Lemmas** 2--3 per spikelet, awns 8--13 mm long, bent, from upper half of lemma. Open to closed mountain understory. Common throughout western N. America.

Trisetum orthochaetum Hitchc. Hybrid false oat or Bitterroot trisetum. Perennial bunchgrass. **Stems** few to a bunch, 0.8--1.1 m tall; leaf blades 2--7 mm wide. **Inflorescence** a contracted and somewhat nodding panicle 13--20 cm long. **Spikelets** 7--9 mm long. **Lemmas** mostly 2--3, awns 4--6 mm long, straight, from upper half of lemma. Boggy meadows near the edge of forests; collected in Missoula and Glacier cos. Endemic to MT.

Trisetum orthochaetum is possibly a hybrid between *T. canescens* and *T. wolfii*.

Trisetum spicatum (L.) K.Richt. Spike trisetum Perennial bunchgrass. **Stems** 1.5--5.0 dm tall. **Leaves:** blades 1.5--3.0 mm wide. **Inflorescence** a spicate panicle 10--25 cm long. **Spikelets** 7--9 mm long. **Lemmas** 2--4 per spikelet, awn 5--7 mm, bent, from upper half of lemma. Mostly montane to subalpine understory. Common throughout western N. America.

Trisetum wolfii Vasey. Wolf's trisetum Perennial bunchgrass. **Stems** loosely bunched, 5--9 dm tall. **Leaves:** blades 4--6 mm wide. **Inflorescence** a contracted panicle 10--40 cm long. **Spikelets** 5--7 mm long. **Lemmas** generally 2 per spikelet, awns absent. Open grasslands, wet meadows, and edges of forests in the western MT. Common throughout western N. America.

Because of the absence of lemma awns, this species is superficially similar to *Koeleria macrantha* (prairie junegrass), except that it has other *Trisetum* characteristics, including the well-developed hairs along the prolonged rachillas. Both *Koeleria* and *Trisetum* have a characteristic silvery-greenish-purplish patterning to the coloration of the glumes and lemmas, thus rendering further similarity between *T. wolfii* and *K. macrantha*. *Trisetum wolfii* otherwise is similar to *Trisetum spicatum* excepting its awnless lemmas.

Triticum L., Wheat

Bunched annuals. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** a two-sided terminal spike with short internodes. **Spikelets** 1 per node, each with several florets; glumes asymmetrical, broad. **Lemma** asymmetrical and broad, awnless or with a long awn; palea well developed. **Disarticulation** above the glumes; unit of dispersal the fruit.

A cool season genus of about 25 species native to temperate Eurasia, three of which are cultivated and escaped in N. America.

Triticum aestivum L. Common wheat Annual cultivated bunchgrass. **Stems** 5--12 dm tall. **Leaves:** blades 5--15 mm wide, flat. **Inflorescence** 5--12 cm long, rachis continuous. **Spikelets** 1 per node, 10--14 mm long excluding awns, with 3--5 florets, glumes asymmetrically keeled, broad and blunt, often notched at the tip. **Lemmas** broad, also

asymmetrically keeled, awned or awnless. Introduced and cultivated. Escaping or planted for soil stabilization throughout all of N. America, but then not long persisting.

Torreyochloa Church, False mannagrass

Rhizomatous perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 4--7 florets, glumes similar to lemmas. **Lemma** rounded on back and with prominent parallel venation, apex blunt and awnless; palea well developed. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of two N. American and two Asian species all of cold, wet, non-saline settings.

Torreyochloa pallida (Torr.) Church var. ***pauciflora*** (J. Presl) J.I.Davis [*Puccinellia pauciflora* (J.Presl) Munz] Pale false mannagrass Rhizomatous perennial aquatic. **Stems** 4--7 dm tall. **Leaves:** blades 1--3 mm wide, mostly remaining flat. **Inflorescence** an open panicle 6--12 cm long. **Spikelets** 4--7 mm long. **Lemmas** hairless or scabrous, with a blunt tip. Alkaline and fresh water aquatic, often at higher elevations, primarily in western MT. Throughout western N. America.

Very similar to *Glyceria grandis* except *Glyceria* has prominent ligules that wrap and fuse around the stem to form a solid cylinder, like the subtending leaf sheath. In *Torreyochloa*, the ligule is limited largely to the front (inside) of the leaf blade. The margins of the leaf sheath are overlapping rather than fused. Also, the lemma tips of *Torreyochloa* are broad and the hyaline distal margin is delimited from the green lemma body by a black band (see comments under *Glyceria grandis*).

Vahlodea Fr., Hairgrass

Bunched perennials. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to somewhat contracted panicle, drooping to erect. **Spikelets** ovoid, 2-flowered; glumes enveloping the florets. **Lemma** with a straight or bent awn arising from the upper half and slightly exerted from the glumes, rachilla hairs long; palea enclosed in floret. **Disarticulation** above the glumes; unit of dispersal the floret.

A circumboreal monotypic cool season genus of montane, alpine, and subarctic settings; disjunct in southern S. America.

Vahlodea atropurpurea (Wahlenb.) Fr. ex Hartm. [*Deschampsia atropurpurea* (Wahl.) Scheele] Mountain hairgrass Perennial bunchgrass **Stems** few-bunched, 2--6 dm tall. **Leaves:** blades 4--6 mm wide. **Inflorescence** a contracted to open panicle 4--8 cm long. **Spikelets** 5.5--6.0 mm long, distal portion of glumes purplish. **Lemmas** 2 per spikelet, awned from near the middle. Alpine to subalpine meadows. Throughout most of Canada and generally the Pacific Northwest region of the U.S.

Vahlodea atropurpurea, formerly *Deschampsia atropurpurea*, represents a distinct lineage apart from *Deschampsia* and close relatives (Chiapella 2007; Chiapella and Zuloaga 2010).

Ventenata Koeler, North Africa grass

Bunched annuals. **Leaf blades** generally inrolled and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle. **Spikelets** with 2--3(--4) florets; glumes enveloping the florets. **Lemmas** dimorphic, the lowermost staminate and with straight awn, the upper seed-bearing and with a bent awn; palea well developed. **Disarticulation** above and below glumes; unit of dispersal the floret.

A cool season genus of about five species from the Mediterranean region, one of which is introduced into N. America.

Ventenata dubia (Leers) Coss. & Durieu. Ventenata or wiregrass Annual bunchgrass. **Stems** few-bunched, 5--7 dm tall. **Leaves:** blades 1--3 mm broad. **Inflorescence** an open panicle, 2--4 dm long, only the very distal branch ends bearing spikelets. **Spikelets** 6--10 mm long, mostly with 3 florets, callus of spikelet well developed, glumes distinctly ribbed or veined. **Lemmas:** the lowest persistent and with a straight awn and staminate, the upper lemmas fertile and with a bent and twisted awn, readily disarticulating; callus bearded. Sporadic in MT along roadsides and pastures and range with a significant disturbance history. Introduced and of sporadic or ephemeral occurrence in the Pacific Northwest region and also in east central N. America.

Locally abundant populations can be ephemeral and not detected in subsequent years. The prominently ribbed glumes of *Ventenata* are distinctive. During the late season, this grass will have spikelets bearing only the single basal persistent floret with a terminal straight awn. This partial spikelet obscures its oatgrass affinities. Regardless, the many-ribbed glumes and the stiff and wiry inflorescence branches and pedicels that persist after the spikelets have disarticulated are diagnostic of *Ventenata*.

Vulpia C.C.Gmel., Annual fescue

Bunched annuals. **Leaf blades** generally inrolled to flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open to usually contracted secund panicle with appressed branches, rarely a raceme. **Spikelets** with several florets; glumes similar in dimension to lemmas, sometimes distinctly shorter. **Lemma** rounded and smooth on back, awn-tipped to long-awned; palea enclosed in floret. **Disarticulation** above glumes; unit of dispersal the floret.

A cool season genus of 30 species native to Eurasia, northern Africa, and North and S. America, six of which occur in N. America (three introduced). The treatment below follows Cronquist et al. (1977), which lists the many names of *Vulpia* that are now considered synonyms of the species listed below.

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| 1. Lower glumes <one-half the length of the upper glumes | <i>V. myuros</i> |
| 1. Lower glumes one-half or more the length of the upper glumes | 2. |
| 2. Panicle branches 1--2 per node; spikelets with 4--17 florets; rachilla internodes 0.5--0.7 mm long; awn of the lowermost lemma in each spikelet 0.3--9 mm long | <i>V. octoflora</i> |
| 2. Panicle branches 1 per node; spikelets with 1--8 florets; rachilla internodes 0.6--1.2 mm long; awn of the lowermost lemma in each spikelet 2--20 mm long | 3. |
| 3. Panicles narrow, the branches oriented upward or ascending, the branches and pedicels all lacking axillary callus thickenings | <i>V. bromoides</i> |
| 3. Panicles open, the branches (at least the lower ones) and sometimes the spikelets oriented outward or downward; the branches with callus thickenings in the axil (i.e., base of branch) | <i>V. microstachys</i> |

Vulpia bromoides (L.) Gray [*Festuca bromoides* L.] Brome fescue Annual bunchgrass. **Stems** 1--3 dm tall. **Leaves:** blades 1 mm wide. **Inflorescence** a narrow panicle 2--8 cm long. **Spikelets** 6--8 mm long. **Lemmas** with an awn 6--11 mm long. Disturbed dry sites in the Cabinet Mts. (Sanders co.) and the National Bison Range (Lake co.). Sporadic throughout much of N. America excluding the northcentral region.

Distinguished from *Vulpia myuros* a longer first glume.

Vulpia microstachys (Nutt.) Munro [*Festuca microstachys* Nutt.]. Small fescue Annual bunchgrass. **Stems** 2--4 dm tall. **Leaves:** blades 1 mm wide. **Inflorescence** an open panicle 5--10 cm long. **Spikelets** 5--7 mm long. **Lemmas** with an awn 5--8 mm long. Shrub steppe vegetation as well as disturbed sites and collected in Missoula co. Introduced throughout western N. America.

Vulpia myuros (L.) C.C.Gmel. [*Vulpia megalura* (Nutt.) Rydb., *Festuca megalura* Nutt., *Vulpia myuros* (L.) K. C. Gmelin var. *hirsuta* Hack.] Rat-tail fescue Annual bunchgrass. **Stems** 2--6 dm tall. **Leaves:** blades 1 mm wide. **Inflorescence** a narrow panicle 7--20 cm long. **Spikelets** 5--8 mm long. **Lemmas** with an awn 5--12 mm long. Frequently disturbed sites in open dry shrub steppe vegetation. Introduced in open disturbed sites throughout most of N. America excepting the northcentral region.

The very short first glume is distinctive of this species.

Vulpia octoflora (Walter) Rydb. [*Festuca octoflora* Walter, *Vulpia octoflora* var. *glauca* (Nutt.) Fernald, *Vulpia octoflora* var. *hirtella* (Piper) Henr.] Sixweeks fescue Annual bunchgrass. **Stems** 0.8--3.0 dm tall. **Leaves:** blades 1--2 mm wide. **Inflorescence** a narrow panicle 2--8 cm long. **Spikelets** 6--10 mm long. **Lemmas** awn-tipped or with an awn 1--7 mm long. Open dry disturbed sites usually with some history of overgrazing. Throughout all N. America.

Spikelet may be paired, one sessile and the other pedicellate. Three varieties are weakly distinguished and in MT perhaps the most distinctive is var. *hirtella* with its scabrous lemmas, which contrast to glabrous lemmas in var. *octoflora*; var. *glauca* has spikelets 4--6.5 mm (vs 5.5--13) and first-lemma awns 0.3--3 mm (vs 2.5--9).

Zea L., Maize

Bunched annuals and perennials. **Leaf blades** generally flat and lax to ascending, sheaths with overlapping margins; ligule hairy. **Inflorescence** dimorphic, the staminate terminal and comprising several to many digitately arranged spikes, the pistillate axillary and sessile on thick woody cobs densely covered with leaves. **Spikelets** with one fertile floret; glumes enveloping the florets, at least in the staminate spikelets. **Lemmas** rounded on back, awnless; palea enclosed in floret. **Disarticulation** below the glumes; unit of dispersal the inflorescence and spikelet.

A warm season genus of 3 species native to Mexico and Central America. One of which occurs in N. America.

Zea mays L. maize, corn Annual monoecious bunchgrass. **Stems** few-bunched, 1--3 m tall. **Leaves:** blades up to 1 dm wide; ligule membranous, 5--10 mm long. **Inflorescence:** staminate in a terminal panicle of digitately arranged spikes,

pistillate a woody cob enclosed in leafy bracts and located in the axils of the main stem. **Spikelets:** staminate spikelets distinctly paired as one sessile and one pedicellate, pistillate bearing long styles (known as silk). **Lemmas** thin textured to inconspicuous. Rarely found outside of cultivation and then near crop fields. Different varieties and races are grown for grain and forage throughout most of N. America especially in more southern latitudes.

Zizania L., Wildrice

Annual and perennial reeds. **Leaf blades** generally flat and ascending, sheaths with overlapping margins; ligule membranous. **Inflorescence** an open panicle with pistillate spikelets along the uppermost branches and staminate ones along the lowermost. **Spikelets** with one floret; glumes absent. **Lemma** of pistillate flower awned; paleas large and equal in size and texture to the lemmas. Disarticulation above glumes; unit of disarticulation the floret and fruit.

A cool season genus of four species inhabiting marshy habitats and widespread in temperate N. America and eastern Asia, three of which occur in N. America.

Zizania palustris L. Northern wildrice Annual reeds. **Stems** scattered or in dense stands, rooting in mud, 1--3 m tall; sheath essentially hairless, collar hairy, ligule membranous, 10--15 mm long. **Leaves:** blades 1--4 cm broad. **Inflorescences** of large open panicles, 4--6 dm in length, the lower branches bearing pendulous staminate spikelets, the upper bearing appressed-ascending pistillate spikelets. **Spikelets:** staminate 6--8 mm long, pistillate 10--15 mm long (to 20 mm long in fruit), nearly round in cross-section, glumes of both spikelet types minute and consisting of a small cup just below point of disarticulation. **Lemmas** of pistillate spikelet hispid toward tip and tapered to an awn 6--40 mm long. Lemmas of staminate spikelets thin-textured and ephemeral. Marshes, lakes, and stream in fresh flowing water at lower elevations; often planted for waterfowl use. Throughout much of N. America especially at northern latitudes.

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