

Conspectus Tables Comparing Selected Oregon Grasses

These tables were prepared by the *Carex* Working Group for use in writing identification keys and descriptions of Oregon grasses for the Oregon Flora Project. Additional tables will be posted in the future. The identification keys and descriptions for Oregon grasses will be posted by the Oregon Flora Project.

Much of the data in the tables came from the Flora of North America (<http://herbarium.usu.edu/webmanual/>). Additional information came from observations of specimens, from Hitchcock et al.'s *Vascular Plants of the Pacific Northwest*, Volume 1, from the *Jepson Manual of the Higher Plants of California*, from more specialized sources, and from observations by *Carex* Working Group members.

These tables are working documents produced for our use. We hope you find them useful, but sometimes you will not find the comparison you want. You will find occasional questions and blank cells in the tables. Perhaps we will be able to come back and fix them some day.

Achnatherum occidentlis, *A. nelsonii*, and their hybrid *A. nevadense*

Trait	<i>A. occidentalis</i>	<i>A. nelsonii</i> var. <i>nelsonii</i>	<i>A. nevadense</i>
Leaf blades, width	0.5 – 3 mm if flat, or 0.1 – 0.8 mm if convolute	(0.5) 1.2 – 5 mm, flat	1 – 3 mm, involute
Collars	sometimes with tufts of hairs in the corners, usually with them in var. <i>californicum</i>	lacking tufts of hairs	lacking tufts of hairs
Panicle width	0.5 – 1.5 cm	0.8 – 2 cm	0.4 – 1.5 cm
Glume length	6 – 15 mm	6 – 12.5 mm	7 – 14 mm
Lower glume ½ width (keel to margin)	var. <i>californicum</i> : 0.6 – 0.8 mm	0.7 – 1.1 mm	
Callus, length	0.8 – 1.2 mm	0.2 – 1 mm	0.5 – 0.7 mm
Callus, dorsal border between glabrous and hairy parts	narrowly acute	acute	obtuse
Lemma apex hairs	longer than basal awn hairs in var. <i>californicum</i> , shorter in var. <i>pubescens</i>	longer than basal awn hairs	
Palea length vs. lemma length	40 – 60%	30 – 67%	50 – 75%
Palea hairs	often extending beyond tips	usually not extending beyond tips	extending well beyond tips
Caryopses, length	4 – 6 mm	3 – 4(4.2) mm	3 – 5.5 mm

Traits distinguishing *A. nevadense* and the three subspecies of *A. occidentale*. Note that *A. o. ssp. occidentale* has not been confirmed as occurring in Oregon, though it has been reported many times.

Trait	<i>A. nevadense</i>	<i>A. occidentale</i> ssp. <i>californicum</i>	<i>A. occidentale</i> ssp. <i>occidentale</i>	<i>A. occidentale</i> ssp. <i>pubescens</i>
Apical hairs of lemmas	appear longer than the lowermost awns hairs *	appear longer than the lowermost awn hairs *	similar to the lowermost awn hairs	similar to the lowermost awn hairs
Awns, hairs on first segment	look untidy	look untidy	look tidy	look tidy
Awns, hairs on first segment	lengths varied; angle with awn varied	lengths varied; angle with awn varied (or scabrous)	always pilose	gradually and evenly becoming shorter towards the first geniculation
Boundary between the glabrous and hairy part of the callus	rounded to acute	narrowly acute	narrowly acute	narrowly acute
culm internodes	usually pubescent below the nodes	glabrous or pubescent throughout (sometimes densely pubescent)	glabrous	puberulent to pubescent
paleas	longer; 50- 75% as long as the lemmas	shorter; 40–60% as long as the lemmas	shorter; 40–60% as long as the lemmas	shorter; 40–60% as long as the lemmas
Awns, terminal segments	scabrous to glabrous	usually scabrous or glabrous	usually pilose	usually scabrous or glabrous
Culm thickness	0.8–1.2 mm	0.5–2 mm	0.3–1 mm	0.8–1.3(2) mm
Glumes	<u> </u>	usually green	often purplish	usually green
Awns, length	20–30 mm	18–55 mm	15–42 mm	24–50 mm

* –a few of the basal awn hairs may be as long as those of the top of the lemma, but most are shorter

Traits differentiating *Achnatherum hendersonii* from *A. wallowaense* according to the treatment in Flora of North America, with observations by the *Carex* Working Group that differ from the FNA description indicated by “**CWG.**”

Trait	A. hendersonii	A. wallowaense
Culms, height	10 – 35 cm	(10)15 – 40(45) cm
Culms, thickness	0.3 – 0.9 mm	0.5 – 0.7 mm
Culms	pubescent below the nodes, glabrous or sparsely puberulent elsewhere	glabrous CWG: pubescent below the nodes
Basal leaf sheaths	completely or mostly glabrous, margins sometimes ciliate distally	glabrous
Ligules, length	0.4 – 1 mm	basal 0.8 – 1.3 mm upper to 1.6 mm
Ligules, texture	hyaline	membranous
Ligules, shape	rounded	truncate to broadly acute
Leaf blades	tightly folded to convolute CWG: conduplicate	tightly valvate to involute CWG: conduplicate
Leaf blades, diameter	to 1 mm	0.5 – 0.8 mm
Leaf blades, dorsal surfaces	scabrous	scabridulous
Leaf blades, ventral surface	pubescent*	hairy, sometimes densely hairy, hairs shorter than 0.05 mm*
Panicles, length	4 – 12 cm	(4)5 – 13(15) cm
Panicles, width	2 – 5 cm	to 10 cm
Panicle branches	straight, appressed to strongly ascending	divergent, flexuous
Panicle branches, longest	2 – 7 cm long	2 – 10 cm long
Glumes, tip shape	lower: obtuse upper: rounded to obtuse	obtuse to acute
Lower glumes, length	3.5 – 5.5 mm	3.5 – 7 mm
Lower glumes, width	1 – 1.5 mm	0.8 – 1.3 mm
Lower glumes, veins	5	5(7)
Upper glumes, length	3.5 – 5.5 mm	3 – 6.5 mm
Upper glumes, veins	5	3 CWG: 3 – 7
Florets, length	3.5 – 4.5 mm CWG: 4 – 5.2 mm	3 – 5.5 mm
Florets, thickness	1 – 1.5 mm CWG: 1 – 1.6 mm	1 – 1.5 mm
Florets, shape	laterally compressed CWG: laterally compressed, sometimes terete	terete CWG: laterally compressed, sometimes terete
Calluses, length	0.3-0.5 mm CWG: 0.3 – 0.6 mm	0.1-0.2 mm CWG: (0.1)0.3 – 0.5 mm
Awns, length	6-10 mm	5 – 11 mm
Paleas, length	about 3 mm long	2.8 – 4.5 mm
Anthers, length	about 2.5 mm CWG: 1.4 – 2	1.6 – 1.8 mm CWG: 1.4 – 2.4 mm
Anthers	penicillate	not penicillate CWG: penicillate
Caryopses, length	2.5 – 4 mm	2 – 4 mm
Roots:	with sheaths that separate from stele	CWG: with sheaths that separate from stele

* pubescent = covered with short, soft hairs; bearing any kind of hairs (Harris & Harris 1994), bearing hairs (trichomes) of any sort (Hitchcock et al. 1969).

Table _____. Selected traits of Oregon *Agrostis* species and the superficially similar species of *Apera* (*Ap.*) and *Podagrostis*.

	Duration	spreading	Inflorescence	Callus hairs	Callus hair L	Rachilla	Awns	Palea	Palea vs. lemma	Anthers
<i>A. capillaris</i>	perennial	rhizomes or stolons	open	0 or few	0 - 0.1 mm	0	0 - 2 mm	0.6 - 1.2(1.4) mm	50+%	0.8 - 1.3 mm
<i>A. castellana</i>	perennial	rhizomes	somewhat condensed	abundant	0.3 - 0.6 mm	0	0 - 5 mm long	0.6 - 1.1 mm	50 - 67%	1 - 1.5 mm
<i>A. densiflora</i>	perennial	cespitose	dense	abundant	to 0.3 mm	0	0 or to 3.5 mm	0.3 - 0.7 mm		0.5 - 2 mm
<i>A. exarata</i>	perennial	cespitose	dense	sparse to abundant	to 0.3 mm	0	0 to 3.5 mm	0 - 0.5 mm		0.3 - 0.5 mm
<i>A. gigantea</i>	perennial	rhizomes	open	0 to few	0 - 0.5 mm	0	0 (or 0.4 - 1.5(3)) mm	0.7 - 1.4 mm	50 - 60%	1 - 1.4 mm
<i>A. hallii</i>	perennial	rhizomes	open	abundant, conspicuous	(0.8)1 - 2 mm	0	0	0 or tiny	~0%	1.5 - 2.3 mm
<i>A. hendersonii</i>	annual	(annual)	narrow, dense??	abundant	to 0.7 mm	0	(5)8 - 10 mm	0 or tiny	~0%	0.4 - 0.7 mm
<i>A. howellii</i>	perennial	cespitose	very open	abundant	to 0.3 mm	0	4 - 6 mm	0 or tiny	~0%	1 - 1.3 mm
<i>A. idahoensis</i>	perennial	cespitose	open	sparse	to 0.3 mm	0	0	0 to 0.2 mm		0.3 - 0.6 mm
<i>A. microphylla</i>	annual	(annual)	narrow, dense	abundant	to 0.5(1) mm	0	3.5 - 8 mm	0 to 0.2 mm		0.4 - 0.5 mm
<i>A. oregonensis</i>	perennial	cespitose	open	sparse	to 0.2 mm	0	0 (to 2 mm)	0 to 0.2 mm		0.5 - 1.2 mm
<i>A. pallens</i>	perennial	rhizomes	dense to open	sparse	0.3(1) mm	0	0 or 0.5 - 2.5(4) mm	0 to 0.2 mm		0.7 - 1.8 mm
<i>A. perennans</i>	perennial	cespitose	somewhat condensed	abundant	to 0.3 mm	0	0 (or to 2 mm)	0 to 0.1 mm		0.4 - 0.9 mm
<i>A. scabra</i>	ann/per	cespitose	very open	sparse	to 0.2 mm	0	0 - 3 mm	0 to 0.3 mm		0.4 - 0.8 mm
<i>A. stolonifera</i>	perennial	stolons	somewhat condensed	sparse	to 0.5	0	0 (or to 1 mm)	0.7 - 1.4 mm	>40%	0.9 - 1.4
<i>A. variabilis</i>	perennial	cespitose (to rhizomatous)	dense	sparse to abundant	to 0.2 mm	0	0 (or to 1(2.8) mm)	0.2 - 0.4 mm		0.4 - 0.7(1) mm
<i>Ap. interrupta</i>	annual	(annual)				0.2 - 0.6 mm	(4)6 - 7(16) mm		75-100%	0.3 - 0.5 mm
<i>Ap. spica-venti</i>	annual	(annual)				0.5 mm	4 - 7(12) mm		75-100%1	1 - 2 mm
<i>P. aequalvis</i>	perennial	rhizomes	open	0 or sparse	0 - 0.1 mm	0.5 - 1.9 mm	0	2 - 3 mm	>50%	0.8 - 1.3 mm
<i>P. humilis</i>	perennial	cespitose	narrow	glabrous or sparse	0 - 0.5 mm	0 - 0.15 mm	0 (-1.3 mm)	0.9 - 1.6 mm	67-75%	0.4 - 0.7(1) mm
<i>P. thurberiana</i>	perennial	short rhizomes	open	minutely bearded	0	0.1 - 0.3 mm	0 (-1.3 mm)	1.1 - 1.6 mm		0.4 - 0.8 mm

Agrostis exarata and the similar coastal and annual Agrostis.

Trait	<i>Agrostis pallens</i>	<i>A. densiflora</i>	<i>A. exarata</i>	<i>A. microphylla</i>	<i>A. hendersonii</i>
Page			651 (FNA)	661 (FNA)	658 (FNA)
Duration	Perennial	Perennial	Perennial, fl 1 st yr	annual	annual
Habit	rhizomatous	cespitose (growing up out of sand?)	cespitose (or short rhizomatous)	solitary culms or tufted	solitary culms or tufted
Plant height	10 – 70 cm	9 – 85 cm ??	8 – 100+ cm	Jeps: 8 – 45 cm	Jeps: 6 – 70 cm
Sheaths			smooth or sl scabrous	glabrous or pubescent	smooth
Upper sheaths				usually inflated	
Ligules, length	coast: 1 – 3 mm, firm. overall: 1 – 6 mm	1 – 4.8(7.5) mm long Jepson: 1.5 – 2 mm	(1)1.7-8(11.2) mm Jepson: 2.5 – 4 mm	1.4 – 4.5 mm 1 – 3(5) mm, H&C	0.5 – 5 mm Jeps: 4 – 6 mm
Leaf length			4 – 15 cm	3 – 15 cm	1 – 4.5 cm
Leaf width	1 – 6 mm (1 – 3 mm at the coast)	2 – 10 mm	2 – 7 mm (-10, H&C)	0.7 – 2.5(3.6) mm (0.5)1 – 2 mm – H&C	0.5 – 1(2) mm Jeps: 1 – 2 mm (lower)
Panicle length	5 – 20 cm	2 – 10 cm	(3)5 – 30 cm	Jeps: 2 – 12 cm	1 – 5 cm
Panicles	exserted from upper leaf sheaths	exserted or enclosed by flag leaf sheath	usually exserted, rarely enclosed		
Panicle, lower branches	2 – 5 cm long	to 1.5 cm long	1 – 2(4) cm long	0.3 – 1.5 cm long	0.5- 2.5 cm long
Glume length	coast: to 3 mm long overall: 2.5 – 3 mm	Jeps: 2 – 3 mm	1.5 – 3.5 mm to 4.5(5) in H&C	2.5 – 5 mm (3)3.5 – 4.2, H&C	5 – 7 mm
Glume awn length			to 1 mm	to 1.5 mm	to 2 mm
Glume backs	slightly scabrous on keel	fine-scabrous throughout	+/- glabrous except for scabrous keel		
Callus hairs length	coast: 0.2 – 0.5 mm	minute	to 0.3 mm	to 0.5(1) mm	to 0.7 mm
Callus hairs	sparse	usually dense	sparse to abundant (sl. bearded, H&C)	dense – FNA sparsely bearded, H&C)	abundant
Lemma length		Jeps: 1.5 - 2	1.2 – 2.2 mm (to 2.5 mm, H&C)	1.5 – 2.3 mm scarcely 2 mm long – H&C	2.5 – 4 mm
Lemma teeth, length			no more than 0.12 mm	0.1 – 0.5 mm	0.2 – 1.5 mm
Awns, length	0, rarely to 0.5(2.7) mm	0 – 3.5 mm	0 – 3.5 mm -5(6) in H&C	3.5 – 8 mm CWG: 2.2 – 4.5 mm	(5)8 – 10 mm
Paleas, length	0 – 0.2 mm	0.3 – 0.7 mm Jepson: 0.5 – 0.7	FNA: 0 – 0.5 mm H&C: -0.5(0.7) Jepson +/- 0.3 mm	0 – 0.2 mm, thin 0 – 0.3 mm – H&C Jeps: 0	0 or short (to 0.9 mm in <i>A. aristiglumis</i>)
Lodicules, length	0.3 (to 0.5 mm at coast)	ca. 0.4 mm	0.3 – 0.5 mm	scarcely 0.2 mm	
Anthers, length	(0.7)1 – 2 mm	0.5 – 2 mm Jeps: +/- 0.5 mm	0.3 – 0.6 mm -0.7 in H&C	0.4 – 0.6 mm Jeps: +/- 0.5 mm	0.4 – 0.7 mm Jeps: +/- 0.5 mm

Table _____. Comparison of the “fearsome foursome” of introduced, invasive bentgrasses.

Trait	<i>A. capillaris</i>	<i>A. castellana</i>	<i>A. gigantea</i>	<i>A. stolonifera</i>
Rhizomes	present	present	present	absent
Stolons	present sometimes	absent	absent	present
Culms	10–75 cm	30–80 cm	20–120 cm tall	8–60 cm tall
Ligules	0.3–2 mm long	0.5–3 mm long	basal: 1–4.5 mm upper 2–7 mm	basal 0.7–4 mm upper 3–7.5 mm
Ligules	shorter than wide	shorter than wide	longer than wide	longer than wide
Inflorescence after anthesis	open	contracted	open (contracted in shade)	contracted
Panicles			8–30 cm long	3–20 cm long
Panicles	stiffly erect	lax	erect	
Branches	spikelet- bearing in distal half	spikelet-bearing in distal third	spikelet-bearing to the base (except in shade)	spikelet-bearing to the base (at least some)
Branch length, lower branches	1.5–7 cm long	3–9 cm long	4–9 cm long	2–6 cm long
Adjacent pedicels	divergent	not divergent		
Callus hairs	glabrous or with few hairs to 0.1 mm long	many hairs to 0.6 mm long	sparse hairs to 0.5 mm long	sparse hairs to 0.5 mm long
Lemma surface	glabrous	glabrous or hairy in lower half	glabrous	glabrous
Lemma awns	rare, to 2 mm long	common, to 5 mm long	rare, if present 0.4– 1.5(3) mm	rare, if present to 1 mm long

Differences between our native sweetgrasses.

Trait	<i>Anthoxanthm hirtum</i>	<i>Anthoxanthum occidentale</i>
Synonym	<i>Hierochloë odorata</i>	<i>Hierochloë occidentalis</i>
Flag leaves, length	0.5 – 3 cm	(2)3 – 13.5 cm long
Leaf blades, width	2.5 – 5.5 mm	(3)5 – 15 mm
Inflorescence	more dense	more open
Glumes	longer than the florets	as long as or slightly shorter than the florets
Lemma tips	acute, entire	rounded, shallowly bilobed
Lemmas	rather uniformly pubescent over the back and margins	only puberulent over the back, but papillose-ciliate along the margins
Leaf blades of clum	rarely as much as 5 cm long	averaging at least 10 (to 40) cm long
Fertile lemmas, length	2.9 – 3.5 mm	3.5 – 4.5 mm

Table 1. Traits helpful in distinguishing certain small, weedy bromes (genus *Bromus*). *Bromus hordeaceus* (formerly *B. mollis*) is distinguished from these species by its spikelets that are usually longer than their pedicels. Hairy lemmas are indicative of *B. hordeaceus*, but that species can sometimes have glabrous lemmas. In the species below, many of the pedicels are longer than the spikelets. Data from Flora of North America and Hitchcock & Cronquist 1969. Leaf sheath hairiness is less helpful than we had hoped.

Trait	<i>B. arenarius</i>	<i>B. arvensis</i>	<i>B. commutatus</i>	<i>B. japonicus</i>	<i>B. racemosus</i>	<i>B. secalinus</i>	<i>B. squarrosus</i>
Lower leaf sheaths	densely retrorsely pilose	dense, soft, appressed hairs	densely hairy, hairs stiff, often retrorse	usually densely hairy	densely hairy, hairs stiff, often retrorse	glabrous or loosely pubescent and glabrate	densely pilose
Panicle length	(4)10 - 15 cm	11 - 30 cm	7 - 16 cm	10 - 22 cm	4 - 16 cm	5 - 23 cm	7 - 20 cm
Panicle width	4 - 7 cm	4 - 20 cm	3 - 6 cm	4 - 13 cm	2 - 3 cm	2.5 - 12 cm	4 - 8 cm
Panicle branches				often with more than 1 spikelet			usually with 1 spikelet
Spikelet L (excluding awns)	10-20 mm	10- 25 mm	10-20 (-30) mm	20-40 mm	10-20 (-30) mm	10-20 (-30) mm	20-40 mm
Rachilla internodes			1.5-2 mm long		1-1.5 mm long		
Rachilla internodes, floret bases	concealed at maturity	concealed or exposed at maturity	concealed or exposed at maturity	concealed at maturity	concealed at maturity	exposed at maturity	concealed at maturity
Lower glumes, length	7 - 10 mm	4 - 6 mm	5 - 7 mm	4.5 - 7 mm	4 - 6 mm	4 - 6 mm	4.5 - 7 mm
Upper glumes, length	8 - 12 mm	5 - 8 mm	6 - 9 mm	5 - 8 mm	4 - 7 mm	6 - 7 mm	6 - 8 mm
Lemmas (excluding awn)	19-11 (13) mm long	7 - 9 mm	8-11.5 mm long	7-9 mm long	6.5-8 mm long	6.5-8.5 (-10) mm long	8-11 mm long
Lemma awns arise	1.5 mm or more below lemma apex	more or less than 1.5 mm below lemma apex	less than 1.5 mm below lemma apex	1.5+ mm below lemma apex	less than 1.5 mm below lemma apex	less than 1.5 mm below lemma apex	1.5+ mm below lemma apex

Trait	<i>B. arenarius</i>	<i>B. arvensis</i>	<i>B. commutatus</i>	<i>B. japonicus</i>	<i>B. racemosus</i>	<i>B. secalinus</i>	<i>B. squarrosus</i>
Lemma awns	10–16 mm long	6 - 11 mm	(0) 3–10 mm long	8–13 mm long	(0) 3–10 mm long	(0) 3–10 mm long	8–13 mm long
Lemma awns	straight or weakly spreading	straight	straight	strongly spreading at maturity, flat & twisted at base	straight	straight or flexuous	spreading at maturity, sometimes flat & twisted
Lemma margins, at maturity	not inrolled	inrolled or not	inrolled or not	not inrolled	not inrolled	inrolled	not inrolled
Lemma margin	rounded	slightly angled	bluntly angled above middle	slightly angled above middle	rounded, above middle	evenly rounded	strongly angled above middle
Lemma hyaline margins			scabrous or pubescent	hyaline, 0.3–0.6 mm wide	scabrous, rounded	scabrous to puberulent	hyaline, 0.6–0.9 mm
Palea			at least 1 mm shorter than lemma		slightly shorter than or at least 1 mm shorter than lemma	only slightly shorter than lemma	
Caryopses	thin, weakly inrolled	weakly to strongly inrolled	thick and strongly inrolled, or not	thin, weakly inrolled or flat	thin, weakly inrolled or flat	thick, strongly inrolled	thin, weakly inrolled or flat
Anther length	0.7 - 1 mm	2.5 - 5 mm	0.7–1.7 mm long	1–1.5 mm long	1.5–3 mm long	1–2 mm long	1–1.3 mm long

Select perennial Bromes of Oregon

All species have entire lemma tips and lemma awns arising less than 1.5 mm below the lemma tips.

Trait	B. laevipes	B. orcuttianus	B. vulgaris	B. pacificus	B. erectus	B. suksdorfii	B. ciliatus
FNA p.	209	211	216	218	218	218	222
Nodes	3 – 5(6)	2 – 4	(3)4 – 6(7)	(5)6 – 8	(1)2 – 3	2 – 3(4)	(3)4 – 7(8)
Nodes	pubescent	pubescent	usually pilose	pubescent	usually glabrous, rarely pubescent	glabrous	pubescent or the lower nodes sometimes glabrous
Internodes	usually glabrous, often hairy below nodes	glabrous to pubescent, hairier below nodes	glabrous	usually glabrous, sometimes pubescent near nodes	usually glabrous, rarely pubescent	glabrous or puberulent just below the nodes	glabrous
Sheaths	glabrous (to pubescent near throat)	sparingly to densely pilose, hairs 2 – 4 mm, occ. glabrous	pilose or glabrous	pilose (midrib not abruptly narrowed just below collar)	glabrous or pilose	glabrous	basal: usually retroresely pilose (or glabrous); upper glabrous, throats glabrous or pilose
Auricles on basal leaves	absent or vestigial	absent	absent	absent	absent	absent	sometimes present
Ligules	2 – 4.2 mm	1 – 3 mm	2 – 6 mm	2 – 4 mm	to 1.5 mm	to 1 mm	0.4 – 1.4 mm
Ligules	glabrous	usually glabrous (to pilose)	glabrous, obtuse or truncate	glabrous, truncate, erose, lacerate	glabrous, truncate, lacerate	glabrous, truncate	usually glabrous (or pilose)
Leaf blades, width	4 – 10 mm	3 – 12 mm	to 14 mm	6 – 16 mm wide	2 – 6 mm	4 – 8 (14) mm	4 – 10 mm
Panicles	10 – 20 cm	7 – 13.5 mm	10 – 15 mm	10 – 25 cm	10 – 20 cm	6 – 14 cm	10 – 20 cm
Panicles	open, nodding	open	open	open, nodding	erect, contracted	erect, contracted	open, nodding
Branches	ascending to spreading, often drooping	erect, ascending and appressed to slightly spreading	ascending to drooping	ascending, spreading, or drooping	erect or ascending	erect or ascending	ascending, spreading, or drooping
Spikelets	23 – 35 mm	20 – 40 mm	15 – 30 mm	20 – 30 mm	15 – 30 mm	15 – 30 mm	15 – 25 mm
Florets	5 – 11	3 – 9(11)	(3)4 – 9	(4)6 – 10	5 – 8(12)	(3)5 – 7	4 – 9

Trait	B. laevipes	B. orcuttianus	B. vulgaris	B. pacificus	B. erectus	B. suksdorfii	B. ciliatus
Glumes	glabrous, sometimes scabrous	usually glabrous (to scabrous or pubescent)	glabrous or pilose	pubescent	glabrous	glabrous or sparsely pubescent	glabrous
Lower glume	6 – 9 mm long	5 – 9 mm long	5 – 8 mm long	6 – 8.5 mm long	7 – 9 mm long	7 – 11 mm long	5.5 – 7.5 mm
Lower glume veins	3	1(3) -- or 3(1)?	1(3)	1(3)	1	1(3)	1(3)
Upper glume	8 – 12 mm	7 – 11 mm	8 – 12 mm	8 – 11.5 mm	9 – 11 mm	9 – 12 mm	7.1 – 8.5 mm
Upper glume veins	5 (7)	3(5)	3	3 (not mucronate) 3(5) -- CWG	3	1(3)	3 (not mucronate)
Lemma L	12 – 16	9 – 16 mm	8 – 15 mm	10 – 12 mm	10 – 13(15)	12 – 15 mm	9.5 – 14 mm
Lemma backs	sparsely pilose, pubescent, or scabrous	usually pubescent, sometimes glabrous or scabrous	sparsely hairy or glabrous	pubescent	glabrous or sparsely pubescent	pubescent or nearly glabrous	glabrous, sometimes scabrous
Lemma margins	densely pilose, at least on lower half	pubescent or scabrous	usually coarsely pubescent, sometimes glabrous	more densely pubescent than backs	glabrous or sparsely pubescent	pubescent or nearly glabrous	conspicuously hirsute on lower ½ - 2/3
Lemma margins	hairier	same +/- same	hairier or same	hairier hairs longer but same kind	same	same or hairier	hairier
Lemma tips	acute to obtuse, lobes < 1 mm long	obtuse, entire	subulate to acute	acute	subulate to acute	obtuse	obtuse to acute
Lemma awns	4 – 6 mm long	(4)5.5 – 8 long	(4)6 – 12 mm long	3.5 – 7 mm long	5 – 7 mm long	2 – 5 mm long	3 – 5 mm long
Anthers	3.5 – 5.5 mm long	3 – 5 mm long	2 – 4 mm long	2 – 4 mm long	4 – 6.5 mm long	2 – 3.5 mm long	1 – 1.4 mm long
Special	glumes & lemmas often with bronze-tinged margins				introduced, not persistent		

Table 1. *Bromus carinatus* and *B. sitchensis*. (*B. marginatus* = *B. carinatus* var. *marginatus*)

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>
Duration	perennial	annual or biennial (to perennial in var. hookerianus)	perennial
Culm height	40 - 130 cm	50 - 100 cm	60 - 120 cm
Leaf sheaths	glabrous to sparsely pilose	retroscarsely soft pilose to glabrous-scabrous	typically retroscarsely pilose throughout but varying from densely pilose to pilose only at the throat
Auricles	usually 0	usually present	usually present
Ligules (observations)	often more than 4 mm long	rarely as much as 4 mm long	rarely as much as 4 mm long
Ligule length (books)	3 - 4 mm	2-3 (- 4) mm long	2 - 3.5 mm
Ligule	lacerate, glabrous or hairy	lacerate or erose, mostly glabrous	Erose, sparsely hairy
Leaf blade width	(5 -) 8 - 15 mm	3 - 6 mm	6 - 12 mm
Leaves, width (observations)	often well over 10 mm wide	averaging much less than 10 mm wide	averaging much less than 10 mm wide
Leaf blade length	20 - 40 cm long	10 - 30 cm	15 - 25 cm
Leaf blade pubescence	sparsely pilose on upper or both sides	sparsely pilose on both sides (mostly) to glabrous	sparsely pilose to pubescent on one or both sides or all glabrous
Leaves, thickness	thin	tending to be thick and tough	tending to be thick and tough
Leaf veins	veins 1/3 - 1/4 as broad as the area between them	at least 1/3 as wide as the area between	at least 1/3 as wide as the area between
Panicle	open	lax	mostly narrow, erect
Panicle length	25 - 35 cm	15 - 40 cm	10 - 20 (-30) cm
Panicle branches	spreading to reflexed	spreading	branches erect or ascending
Lower panicle branches	2-4 lower branches up to 20 cm long, weak, spreading or patent, often drooping, w/ 1 - 3 spikelets near tips	ascending, spreading, or, in var. carinatus, more often patent to declined	erect or ascending
Panicle branches	mostly longer than the US.	US.	US.
Panicle branches; spikelets	1 - 2, borne at their tips	several (sometimes to near base)	several (sometimes to near base)
Spikelet length	2.2 - 4 cm	2 - 4 cm	2.5 - 4 cm
Florets/spikelet	3 to 6	6 to 11	6 to 9
First glume length	9 - 13 mm	8 - 10 mm	7 - 9 mm
First glume nerves	3 to 5	3 to 7	3 to 5

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>
Second glume length	10 - 15 mm	9.5 - 12 mm	9 - 11 mm
Second glume nerves	5 to 7	5 to 9	5 to 7
Lemma length	12 - 14 mm	12 - 16 (-20) mm	11 - 14 mm
Lemma nerves	7 to 9 (11)	7 to 9	7 to 9
Lemma nerves: prominence	conspicuous at least on distal half	obscure	typically distinct
Awn length	5 - 10 mm	(6 -) 8 - 15 mm	4 - 7 mm
Anthers	up to 6 mm	0.5 - 4.5 mm	1 - 4 mm
2n =	42, 56	56	56
Habitat	cliffs, meadows, and partial shade, and along ocean edge, road verges, and other disturbed sites	coastal prairies, grass balds, openings, chaparral, plains, open oak and pine forests	open slopes, balds, shrublands, meadows, and open pine forests, in montane and subalpine zones

Features distinguishing *Bromus carinatus* from *B. marginatus*.

Trait	<i>B. carinatus</i> var. <i>carinatus</i>	<i>B. carinatus</i> var. <i>marginatus</i>
Duration	annual (to [rtrmmos;])	perennial
Height	3 - 10 dm	8 - 12 dm
Leaf width	3 - 6 mm	6 - 12 mm
Auricles	absent	usually present
Panicle length	15 - 40 cm	10 - 20 (-30) cm
Panicle branches	spreading (to reflexed)	ascending to erect
Lemma nerves	obscure	conspicuous
Lemma awn length	(6-) 8 - 15 mm	4 - 7 mm

Bromus diandrus, *B. sterilis*, and *B. tectorum*.

Trait	<i>Bromus diandrus</i>	<i>Bromus sterilis</i>	<i>Bromus tectorum</i>
Spikelets, length	25 - 70 mm	20 - 35 mm	10 - 20 mm
Glumes, lower, length	15 - 25 mm	6 - 14 mm	4 - 9 mm
Glumes, lower, veins	1 - 3	1(3)	1
Glumes, upper, length	25 - 35 mm	10 - 20 mm	7 - 13 mm
Glumes, upper, veins	3 - 5	3(5)	3 - 5
Lemmas, length	20 - 35 mm	14 - 20 mm	9 - 12 mm
Lemmas, veins	7	7(9)	5 - 7
Lemma awns, length	30 - 65 mm	15 - 30 mm	10 - 18 mm
Anthers, length	0.5 - 1 mm	1 - 1.4 mm	0.5 - 1 mm

Subspecies of *B. hordeaceus*. (*B. h. ssp. hordeaceus* and *B. h. ssp. pseudothominei* have been identified in Oregon, but a large proportion of the plants are intermediate and there is no ecological separation between the two. We do not recognize these subtaxa in Oregon.)

Trait	<i>B. h. ssp. hordeaceus</i>	<i>B. h. ssp. molliformis</i>	<i>B. h. ssp. pseudothominei</i>	<i>B. h. ssp. thominei</i>
Lemmas, length	(7)8 – 11 mm	(7)8 – 11 mm	6.5 – 8(9) mm	6.5 – 7.5 mm
Lemmas, surface	usually pilose or pubescent	pubescent	usually glabrous	pubescent or glabrous
Awns, width at base	more than 0.1 mm	less than 0.1 mm		
Awns	straight, erect	often divaricate or recurved at maturity	straight, erect	sometimes divaricate at maturity
Culms, length	(3)10 – 70 cm	15 – 25(60) cm	(3)10 – 70 cm	2 – 16 cm
Panicles, length	(3)5 – 10 cm	to 10 cm	to 10 cm	1 – 3 cm
Panicles, # of spikelets	usually more than 1	usually more than 1	usually more than 1	often reduced to 1
Caryopses, relative length	shorter than paleas	shorter than paleas	usually as long as paleas	shorter than paleas
Habitat	various	various	various	sands of lakes and ocean

***Bromus inermis* and *B. riparius*.** It is possible that *B. riparius* has been planted for erosion control in Oregon.

Trait	<i>B. inermis</i>	<i>B. riparius</i>
Lemma awns	0 – 3 mm long	4 – 8 mm long
Habit	short to long rhizomatous, culms single or few together	cespitose to short rhizomatous, culms forming distinct clumps
Basal leaf sheaths	eventually decaying into straight fibers	readily decaying, reticulate-fibrillose, producing a thatched appearance
Palea keels	with cilia present along the lower $\frac{3}{4}$ to the entire length	with cilia only along the upper $\frac{2}{3}$ to upper $\frac{1}{2}$
Leaf blade margins	smooth to minutely scabrous	hairy
Hairs of leaf blade margins	if present, not robust and not conspicuously widened at the base	robust and conspicuously widened at the base

Bromus sitchensis* and *B. pacificus

Trait	<i>B. sitchensis</i>	<i>B. pacificus</i>
Glumes	glabrous or scabrous	pubescent
Lower glumes	3 – 5-veined	1(3)-veined
Upper glumes	5 – 7-veined	3-veined
Glumes		not mucronate
Lemmas, length	12 – 14(15) mm	10 – 12 mm
Anthers, length	to 6 mm	3 – 4 mm
Leaves	usually glabrous, to hairy	hairy
Leaves, width	2 – 9 mm	6 – 16 mm

Traits of Oregon's species of *Bromus* sections *Ceratochloa* plus *B. pacificus* (Pavlick 1995, *Bromus* L.).

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>	<i>B. maritimus</i>	<i>B. polyanthus</i>	<i>B. pacificus</i>
Duration	perennial	annual or biennial	perennial	perennial	perennial	perennial
culm height		50 - 100 cm	60-120 cm	22 - 70 cm	60-120 cm	60 - 170 cm
culm pubescence			puberulent or pubescent		glabrous to puberulent	pubescent nodes & glabrous internodes (sometimes pubescent near nodes)
sheaths	glabrous to sparsely pilose	retroresely soft pilose to glabrous-scabrous	typically retroresely pilose throughout but ranging from densely pilose to pilose only at the throat	mostly glabrous or scaberulous, sometimes slightly pubescent at summit	mostly glabrous and smooth, sometimes puberulent, pubescent or sparsely pilose	pubescent
ligule length	3-4 mm	2-3 (-4) mm long	2 - 3.5 mm	1 - 6 mm	2 - 2.5 mm	2 - 4 mm
ligule	obtuse	obtuse	obtuse	acute or obtuse	obtuse	truncate
ligule	lacerate, glabrous or hairy	lacerate or erose, mostly glabrous	erose, sparsely hairy	erose, densely hairy to merely ciliolate	erose, glabrous	
blade width	2 - 9 mm	3 - 6 mm wide	6 - 12 mm	usually 6 - 8 mm		6 - 16 mm
blade length	20 - 40 cm	10 - 30 cm	15 - 25 cm			
blade pubescence	sparsely pilose on upper or both sides	sparsely pilose on both sides (mostly) to glabrous	sparsely pilose to pubescent on one or both sides or all glabrous	glabrous to scabrous	scabrous to glabrous, rarely puberulent-pubescent near collar	pubescent on upper surfaces, glabrous on the lower
panicle	open	lax	mostly narrow, erect	narrow, dense		nodding, open
panicle length	25 - 35 cm	15 - 40 cm	10-20(-30) cm	9 - 20 cm	15 - 25 cm long	10 - 25 cm
panicle branches	lower ones spreading or drooping, to 20 cm long	lowr ones patent to declined	branches erect or ascending	with short, erect branches	erect, ascending, or spreading	ascending, spreading, or drooping branches
lower panicle branches	1 - 3 spikelets near the tips					
spikelet length		2 - 4 cm	2.5 - 4 mm	3 - 4 cm	3 - 3.5 cm long	2 - 3 cm
florets/spikelet			6 to 9		7 - 11 flowered	
glumes	glabrous or scabrous		scabrous to pubescent	pubescent	smooth or scabrous	pubescent
1st glume length		8 - 10 cm	7 - 9 mm	8 - 12 mm		6 - 8.5 mm
1st glume	3 - 5 nerved	3 - 7 nerved	3 - 5 nerved	(3-)5(-7) nerved	3-nerved	1 (-3) nerved
2nd glume length		9.5 - 12 mm	9 - 11 mm	10 - 13 mm		8 - 11.5 mm
2nd glume	5 - 7 nerved	5 - 9 nerved	5 - 7 nerved	7(-9) nerved	5-7 nerved	3-nerved
lemma length	12 - 14 mm	12 - 16 (-20) mm	11 - 14 mm	12 - 14 mm	12 - 15 mm	10 - 12 mm
lemma nerves	7 - 11 nerved	7 - 9 nerved	7 - 9 nerved	9 - 11 nerved	7 - 9 nerved	

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>	<i>B. maritimus</i>	<i>B. polyanthus</i>	<i>B. pacificus</i>
lemma nerves		obscure	typically distinct	distinct		
lemma pubescence	mostly glabrous or scabrous, sometimes hirtellous, sometimes very sparsely pilose along the margins	mostly pubescent, varying to scabrous in var. <i>hookerianus</i>	pubescent on margins and back or on margins only or glabrous	more or less uniformly antrorsely pubescent to pilose	glabrous-scabrous	pubescent on back and more densely so on the margins
lemma margins		with revolute margins having hyaline borders (broad hyaline borders in var. <i>hookerianus</i>) that are often upwardly recurved		often with bronze hyaline borders	with broad, sometimes purplish hyaline margins	
awn length	5 - 10 mm	(6-)8-15 mm	4 - 7 mm	(2-)4-7 mm	4 - 8 mm long	3.5 - 7 mm
anthers	up to 6 mm	0.5 - 4.5 mm	1 - 4 mm	2 - 4 mm		2 - 4 mm
2n =	42, 56	56	56	56	56	28
Range	along coast from SE Alaska to Washington (????)	var. <i>carinatus</i> mainly west of Cascades/Sierras,	N central B.C. to California, Texas, Saskatchewan, east of Cascades and Sierras	Pacific coast, Lane Co., OR, to S California	Montana to SE Washington, S to California and Texas; E 1/3 of Oregon	along coast, SE Alaska to Oregon
Habitat	bluffs, cliffs, meadows, partial shade, along ocean edge, road verges, other disturbed sites	coastal prairies, grass balds, openings, chaparral, plains, open oak and pine forests	open slopes, grass balds, shrublands, meadows, and open pine forests, in montane and subalpine zones	coastal sands	open slopes and meadows in the mountains	moist thickets, openings, ravines, along coast
elevation, N			350-2200 m			
elevation, S			1500 - 3300 m			

Oregon *Calamagrostis*, not including distinctive *C. breweri* or *C. howellii*.

Trait	<i>C. purpurascens</i>	<i>C. tweedyi</i>	<i>C. tacomensis</i>	<i>C. koelerioides</i>	<i>C. rubescens</i>	<i>C. nutkaensis</i>	<i>C. canadensis</i>	<i>C. stricta</i>
Upper leaf surfaces	densely (rarely sparsely) longish hairy	smooth to scabrous (to sparsely hairy)	usually smooth, to slightly scabrous	smooth or sparsely hairy	smooth, scabrous, sparsely hairy	smooth or sl scabrous, to sparsely hairy	strongly scabrous (rarely smooth or w/ scattered hairs)	usually scabrous, rarely smooth or puberulent
Collars	scabrous, hairy	smooth	smooth or sl scabrous	usually scabrous (or smooth)	hairy (rarely glabrous)	smooth	usually scabrous, rarely smooth or hairy	usually smooth (to scabrous, pubescent)
Ligules	(1/5)2-4(9) mm	(1)3.5-6(8) mm	(3) 3.5 – 5.5 (6) mm	(1.5) 2 – 4.5 (7) mm	(2) 3 – 5 (6) mm	(0.5) 1 – 4 (5.5) mm	(1) 3 – 8 (12) mm	(0.5) 1 – 5.5 (6) mm
Leaf blade width	2 – 5(6) mm	(2)3-8(13) mm	(1.5) 2 – 2.5 (4) mm	(2) 2.5 – 4.5 (8) mm	(1) 2 – 5 (8) mm	(2) 4 – 10 (20) mm	2 – 8 (11) mm	(1) 1.5 – 5 (6) mm
Infl. branches	1.3 – 3.5 cm	(0.2)2.4 – 6.7(7.7) cm	(2)2.3 – 4(6) cm	(1.1)2.8 – 4(6) cm	(1.2)2 – 4(10) cm	2.7 – 7(10.5) cm	2.7 – 6(12) cm	1.4 – 5(9.5) cm
Spikelets = glumes	(4.5) 5.5-6.5 (8) mm	(4.5) 5.5-8 (9) mm	(4) 6 – 6.5 (7) mm	(4) 4.5 – 6 (7) mm	(3) 4 – 4.5 (5.5) mm	4.5 – 6.5 (8) mm	2 – 4.5 (5.2) mm	2 – 4(5) mm
Callus hairs	(0.9) 1.2-1.5 (2.4) mm	0.8 – 1 mm	(1.2) 2 (2.5) mm	1.5 – 2 mm	(0.5) 1 – 1.5 (2.5) mm	(1) 2 – 2.5 (3) mm	(1.5) 2 – 3.5 (4.5) mm	(1) 1.5 – 3 (4.5) mm
Callus hairs vs. lemmas	20 – 40(60)%	20 – 30%	(30)40 – 50(60)%	30 – 40%	20 – 50 (70)%	(20) 50 – 70%	(50) 90 – 120 (150)%	(50) 70 – 90 (130)%
Lemmas	(3.5) 4-4.5 (5) mm	(4) 4.5 – 6.5 (7.5) mm	<u>Steens: 2.8 – 4.1 mm.</u> WA: (3.5) 4 – 5 (5.5) mm	(3.5) 4 – 5 (6) mm	2.5 – 3.5 (4) mm	(3) 3.8 – 5 (5.5) mm	2 – 3.1(4) mm	2 – 4 (5) mm
Lemmas shorter than glumes by	(0) 1 – 2.5 mm	0 – 1.5 mm	(0.5) 1.5 – 2 (3) mm	0.5 – 1.5 mm	(0.5) 1 – 2 mm	(0.4) 0.8 – 1.2 (1.9) mm	0 – 2.1 mm	0.1 – 1.5 mm
Awns, length	(4.5) 6-7 (9) mm	6 – 8 mm	<u>Steens: 4 – 5.5 mm.</u> WA: (5.5) 7 – 8.5 (10) mm	4 – 5.5 mm	2.8 – 3.5 (4.5) mm	1 – 3 mm	0.9 – 3.1 mm	1.5 – 2.5 mm
Awns attached, lower	10-30%	20 – 30%	10 – 30%	10 – 20%	20% (rarely higher)	30 – 50%	(10) 20 – 50 (70)%	10 – 20%
Awns	usually exserted	exserted more than 2 mm	Steens: exserted 1-2+ mm. WA: more than 2 mm	exserted, sometimes barely so	exserted	not exserted	usually not exserted	equalling, or slightly exserted
Awns	bent	bent	strongly bent	bent	bent	straight, slightly bent	usually straight	straight or bent
Anthers	(1.3) 1.7-2.5 (2.9) mm	2 – 3.5 mm	(1) 2 – 3 (3.5) mm	2 – 3.5 mm	(1)1.3 – 2 (2.6) mm	(1) 2.4 – 2.6 (3.3) mm	(0.8) 1.2 – 1.6 (2.6) mm	(0.9) 1.2 – 1.8 (2.4) mm

Varieties of *Calamagrostis canadensis*

Trait	<i>C. c. var. canadensis</i>	<i>C. c. var. langsdorffii</i>
Spikelets, length	2.5 – 3.5(4) mm	(3.5)4-4.5(5.2) mm
Glumes	glabrous or scabrous only in part of the surface	usually scabrous over the entire surface
Keels – scabers	straight, though angled at the base	hairlike, often bent as well as angled at the base
Glume tips	usually acute, rarely acuminate	distinctly acuminate
Leaf blades, width	(2)2.5 – 5(8) mm	(2)3 – 7(11) mm
Panicle branches, length	2.9 – 4.5(5.7) cm	(2.7)3.5-6 cm
Glumes	rounded to broadly keeled	keeled
Callus hairs, length	(1.7)2.5-2.9(3.1) mm	(1.5)3-3.3(4.5) mm

***Calamagrostis koelerioides* and *C. nutkaensis*, which intergrade in SW Oregon.**

Trait	<i>C. koelerioides</i>	<i>C. nutkaensis</i>
FNA page	721	724
Leaf blade width	(2) 2.5 – 4.5 (8) mm	(2) 4 – 10 (20) mm
Infl. branches	(1.1)2.8 – 4(6) cm	2.7 – 7(10.5) cm
Callus hairs	1.5 – 2 mm	(1) 2 – 2.5 (3) mm
Callus hairs vs. lemmas	30 – 40%	(20) 50 – 70%
Awns, length	4 – 5.5 mm	1 – 3 mm
Awns attached, lower	10 – 20%	30 – 50%
Awns	exserted, sometimes barely so	not exserted
Anthers	2 – 3.5 mm	(1) 2.4 – 2.6 (3.3) mm

***Calamagrostis koelerioides* and *C. rubescens*.** It is possible that these two are conspecific, but in Oregon they do not grow together.

Trait	<i>C. koelerioides</i>	<i>C. rubescens</i>
Collars	usually scabrous (or smooth)	hairy (rarely glabrous)
Spikelets = glumes	(4) 4.5 – 6 (7) mm	(3) 4 – 4.5 (5.5) mm
Lemmas	(3.5) 4 – 5 (6) mm	2.5 – 3.5 (4) mm
Lemmas shorter glumes	0.5 – 1.5 mm	(0.5) 1 – 2 mm
Awns, length	4 – 5.5 mm	2.8 – 3.5 (4.5) mm
Anthers	2 – 3.5 mm	(1)1.3 – 2 (2.6) mm
Apparent range in Oregon	SW OR	Cascades and east

***Calamagrostis tacomensis* and the two species it has been confused with most often – in Washington. *Calamagrostis sesquiflora* has not been observed in Oregon, but grows in coastal Alaska and British Columbia.**

Trait	<i>C. tacomensis</i>	<i>C. purpurascens</i>	<i>C. sesquiflora</i>
Leaf blades, upper surface	usually slightly scabrous, rarely smooth, glabrous, or sparsely hairy	usually densely long-hairy, rarely sparsely hairy	smooth or slightly scabrous, glabrous or sparsely hairy
Awns, length	(5.5) 7 – 8.5 (10) mm	(4.5) 6 -7 (9) mm	(5.4) 7 – 11 (13) mm
Inflorescence branches, length	(2) 2.3 – 4 (6) cm	1.3 – 3.5 cm	1.5 – 3 (4) cm
Glumes	keels smooth or sparsely scabrous on the distal half	usually scabrous, rarely scabrous on the keels only	keels scabrous for their whole length, sometimes the surfaces also scabrous
Leaf width	(1.5) 2 – 2.5 (4) mm	2 – 5 (6) mm	(2) 3 – 7 mm
Callus hairs vs. lemma hairs	(30) 40 – 50 (60)%	20 – 40 (60)%	10 – 40%
Glume tips	not twisted	not twisted	usually twisted distally
habitat	drier, usually		wetter, usually

Two species of Pampas Grass, *Cortaderia*.

Trait	<i>C. jubata</i>	<i>C. selloana</i>
Tussock height at maturity (excluding flowering culm)	1 – 1.5 meters	2 – 4 meters (“dwarf” cultivars exist)
Leaves – habit	ascending to horizontally spreading	mostly erect to ascending
Leaves – color	bright green	bluish green
Leaf sheaths (hairs long, appressed, silky, separated)	definitely to sparsely hairy (examine several)	glabrous to +/- sparsely hairy
Leaf tips	appear broader, less coiled	appear narrower, more coiled, “bristly”
Culms – height above tussock	1 – 2 meters	Female: 0 – 1 meter Male: 0 – 2 meter
Inflorescence – color, immature	deep violet	Female: white Male: white to violet
Inflorescence – color, mature	pinkish to dingy tan	Female: white, cream Male: white, pinkish tan
Inflorescence – panicle branches	purplish or dark	green or straw-colored
Inflorescence – rachilla color [table said this, but I think that’s an error -- CHECK]	purplish or dark	Female: green or straw-colored male: green, straw-colored, sometimes purplish or dark near spikelet base
Anthers	absent	Female: absent Male: present
Glumes	typically with dark purple midvein	Female: white Male: white, or sometimes purplish near but with white midvein
Florets per spikelet	3 – 5	Female: 5 – 7 Male: 3 – 5
Callus	to 0.6 mm long	to 1 mm long
Lemma length including awn	10 – 13 mm	Female: 15 – 20 mm Male: 10 – 13 mm
Awn-like tips (during early anthesis)	mostly exserted 0 – 5 mm from the lemma hairs	Female: mostly exserted 5 – 12 mm longer than lemma hairs Male: same, but hairs are very short
Lemma tips	acute or with a definite short taper to awn or tapering gradually to awn	tapering so gradually to awn that it’s hard to know where the awn begins
Awn itself	less than 1, usually less than 0.5 mm long	usually 2 – 5 mm long (may be broken)

Crypsis

Trait	<i>C. alopecuroides</i>	<i>C. schoenoides</i>	<i>C. vaginiflora</i>
Plant height	(3)5 – 75 cm	2 – 75 cm	1 – 30 cm
Culm branching	usually not branched above base	often branched above base	usually profusely branched above base
Sheaths	glabrous	glabrous or ciliate near the top	ciliate on the margins
Collars	glabrous	glabrous	hairy
Leaf length	5 – 12 cm	2 – 10 cm	1 – 5 cm
Leaf width	1.2 – 2.5 mm	2 – 6 mm	1 – 3 mm
Leaf blades	not disarticulating	not disarticulating	disarticulating
Panicle length	1.5 – 6.5 cm	0.3 – 4(7.5) cm	0.3 – 1.5(3.5) cm
Panicle width	0.4 – 0.6 cm	0.5 – 0.6(1.5) cm	0.3 – 0.6(1) cm
Panicles	length 7 – 8 X width	length 1 – 5 X width	length 1 – 5 X width
Panicles	usually completely exerted from sheath	bases usually enclosed in upper leaf sheath	mostly enclosed in upper leaf sheath
Spikelets	1.8 – 2.8 mm	2.7 – 3.2 mm	2.5 – 3.2 mm
Glumes, lower	1.2 – 2 mm long	1.8 – 2.3 mm long	~ 3 mm long
Glumes, upper	1.4 – 2.4 mm	2.2 – 2.7 mm long	~ 3 mm long
Lemmas, length	1.7 – 2.5 (2.8?) mm	2.4 – 3 mm	~ 3 mm long
Anthers, length	0.5 – 0.6 mm	0.7 – 1.1 mm	0.5 – 0.9 mm
Caryopses, length	0.7 – 1.1 mm	~ 1.3 mm	1.3 – 1.7 mm

Danthonia intermedia and *D. spicata*.

Trait	<i>D. intermedia</i>	<i>D. spicata</i>
Culms, at maturity	not disarticulating	disarticulating
Older leaf tips	not curling	often curling
Spikelets, length	11 – 15 mm	7 – 15 mm
Lemma bodies, length	3 – 6 mm	2.5 – 5 mm
Lemma backs	glabrous	usually pilose
Lemma awns	6.5 – 8 mm long	5 – 8 mm long
Seeds, length	1.5 – 2 (2.3) mm	(2) 2.3 – 3 mm long

Traits of putative subspecies of *Deschampsia cespitosa*, straight out of Flora of North America. In Oregon we find some plants typical of these subspecies, but many more individuals that cannot be placed comfortably in any one subspecies. Therefore, we are not recognizing subspecies in Oregon.

Trait	<i>D. c. ssp. beringensis</i>	<i>D. c. ssp. cespitosa</i>	<i>D. c. ssp. holciformis</i>
Author of subspecies	(Hultén) W.E. Lawr.		(J. Presl) W.E. Lawr.
Synonym as species	<i>D. beringensis</i>	<i>D. cespitosa</i>	<i>D. holciformis</i>
Range in OR	coastal (salt marsh?)	widespread?	coastal marshes, sandy soils
Habit	loosely cespitose	densely cespitose	cespitose
Color	often glaucous	not glaucous	sometimes glaucous
Culm height	(15)70 – 140 cm	(7)35 – 150 cm	5 – 125 cm
Ligule length	4.5 – 13 mm	2 – 8 mm	3 – 4.3 mm
Leaf blades, length	5 – 12 cm	5 – 25 cm	15 – 30 cm
Leaf blades, width (when flat)	2 – 4 mm	1.5 – 3.5 mm	1 – 4 mm
Panicles, length	9 – 40 cm	8 – 30 cm	10 – 25 cm
Panicles, width	8 – 30 cm	4 – 30 cm	3 – 8 cm
Panicles, shape	open, pyramidal	open, nodding, pyramidal	dense, narrow
Panicle branches	divergent	usually divergent	appressed to ascending
Panicle branches	scabridulous to scabrous	usually scabridulous or scabrous, sometimes smooth	scabridulous to densely scabrous
Spikelets, length	4.5 – 8 mm	2.5 – 7 mm	5.5 – 8 mm
Spikelets, color	greenish		often purplish?????
Spikelets, arrangement	not to somewhat overlapping	not to slightly overlapping	usually strongly overlapping
Glumes	from exceeding to exceeded by the distal floret	subequal to the distal floret	usually exceeded by the distal floret
Glumes, color	(usually green to hyaline?????)	(usually green to hyaline?????)	usually purple over half their area
Glume, length	usually 5+ times width	often less than 5 times width	
Lower glume, length	4.3 – 7 mm	2.5 – 5 mm long	4.6 – 5.8 mm
Lower glume, midvein	smooth or scabridulous distally	smooth or scabridulous distally	scabrous distally
Upper glume, length	4.4 – 7.5 mm	2 – 6 mm	4.5 – 5.6 mm
Callus hairs, length	0.7 – 1.6 mm		1 – 2.3 mm
Lemmas, length	3 – 5(7) mm	2 – 4 mm long	3.8 – 4.5 mm
Lemma tips	4-toothed or bifid		
Lemmas, color	usually mostly green	sometimes purple proximally, the purple part usually less than ½ the surface area	often purplish over more than ½ their area
Lemma awns, length	3.3 – 6.3 mm long	1 – 8 mm long	2 – 3 mm
Lemma awns	straight to weakly bent	straight or bent	straight to slightly bent
Lemma awn attachment	within the proximal 1/3 of the lemma	usually near the base (sometimes at middle)	attached near or slightly above the middle
Anthers, length	(1.5) 1.9 – 2.5 mm	1.5 – 2 mm	1.5 – 3 mm

***Echinochloa* of Oregon.**

Trait	<i>E. colona</i>	<i>E. crus-galli</i>	<i>E. crus-pavonis</i>	<i>E. muricata</i> var. <i>microstachya</i>
Oregon status	not persisting	common	not persisting	uncommon
Panicle branches	not branched	branched (usually)	branched	branched (usually)
Panicle branch length	0.7 – 2(4) cm	1.5 – 10 cm	to 14 cm	2 – 8 cm
Hairs on panicle branches	1.5 – 2.5 mm long	to 5 mm long	short	to 3 mm long
Spikelet length	2 – 3 mm	2.5 – 4 mm	2.5 – 3.5 mm	2.5 – 3.8 mm
Lemma awns	absent	absent or present	absent or present	absent or present
Lemma lawn length	0	0 – 50 mm	0 – 3 – 10(15) mm	0 – 6 mm (to 10 mm in var. <i>muricata</i>)
Palea of lower floret	well developed, > 1.5 mm long, almost as long as the lemma	well developed, > 1.5 mm long, almost as long as the lemma	well developed (absent or < 1 mm long in var. <i>macra</i>)	well developed, > 1.5 mm long, almost as long as the lemma
Upper lemma, shape	elliptic	broadly ovate to elliptic	narrowly elliptic	broadly obovoid or orbicular
Upper lemma, tip of leathery part	rounded	rounded	rounded	acute to acuminate
Fertile lemma with withering, well-differentiated tip	yes	yes (set off by a line of hairs)	yes (NOT set off by a line of hairs)	no

***Elymus ciliaris* and *E. hirsutus*, which have ciliate lemma margins.**

Trait	<i>E. ciliaris</i>	<i>E. hirsutus</i>
Spikelets per node (most nodes)	1	2
Glumes, width	wider	0.7 – 1.5 mm
Lemma cilia	along entire lemma margin	along distal 2/3 of the lemma margin
Palea	65 – 80% as long as the lemma	about as long as the lemma
Palea tips	broad, rounded	narrow

Subspecies of *Elymus elymoides*, and *E. multisetus* which may be just another subspecies really.

Trait	<i>E. e. ssp. brevifolius</i>	<i>E. e. ssp. californicus</i>	<i>E. e. ssp. elymoides</i>	<i>E. e. ssp. hordeoides</i>	<i>E. multisetus</i>
Culms, length	25 – 65(77) cm	8 – 40 cm	15 – 45 cm	10 – 20 cm	15 – 65 cm
Culms	erect	erect to decumbent	erect to decumbent	erect	erect to ascending
Leaf blade outer surface	usually puberulent, sometimes glabrous	usually glabrous, sometimes puberulent	usually puberulent, sometimes glabrous	glabrous or puberulent	usually puberulent
Spikes, length	7 – 20 cm	3 – 10 cm	4 – 15 cm	3 – 6 cm	5 – 20 cm
Spikes	usually exerted	often partly included	exserted or partly included		
Spikelets/node (usually)	2	2	2	3	2(4)
Fertile florets/spikelet	(1)2 – 4(5)	(1)2 – 4(5)	(1)2 – 4(5)	central: 2 lateral: none	1 – 3?
Spikelets, comments	lowermost floret functional	lowest 1 – 2 florets sterile and glume-like	lowest 1 – 2 florets sterile and glume-like	those in central position usually with 2 fertile florets, lateral ones with sterile florets, often glume-like	lower florets sterile & glume-like in 1 or both spikelets
Symmetry at each node	symmetrical	asymmetrical	asymmetrical	symmetrical,	?
Plane of symmetry at node	between the 2 spikelets	N/A	N/A	through the central spikelet	?
Spikelets that seem to have 3+ glumes	0	1	1	2	?
Glume awns	50 – 125 mm	15 – 40(70) mm	35 – 85 mm	15 – 50 mm	(8)25 – 90 mm
Glumes	entire	all entire	1+ split in 2 or 3	usually entire	split in 3 – 9
Glumes/spikelet, apparent	2	3, often, in 1 of them	3, often, in 1 of them	3, usually, in 2 of them	3++
Lemma awns	50 – 120 mm	25 – 70 mm, usually exceeding those of the glumes	25 – 75 mm, usually exceeded by those of the glumes	15 – 30 mm (on fertile florets)	(10)20 – 110 mm
Lemma awns, width at base	~ 0.4 mm	~ 0.4 mm	~ 0.4 mm	~ 0.4 mm	~ 0.2 mm (0.3 mm)
Palea veins	not (or rarely) extended as bristles	often extended as bristles	extended as bristles	with or without distinct bristles	usually extending as bristles, 1 mm
Habitat	wide range, low to subalpine	mid-montane to alpine	desert and shrub-steppe, often in disturbed sites	dry, rocky, often shallow soils, esp. in <i>Artemisia rigida</i> – <i>Poa secunda</i> communities	dry rocks, open woods & plains, less arid than <i>E. elymoides</i> or sympatric with it

The subspecies of *Elymus lanceolatus* seem to form a morphological continuum that parallels differences in substrate preferences (hairy in sand to glabrous in clay). They are much less satisfying than we wish, though extremes are striking.

Trait	<i>E. l. psammophilus</i>	<i>E. l. lanceolatus</i>	<i>E. l. riparius</i>
Substrate	usually sandy soils	clay, sand, loam, and rocky soils	usually clay soils, mesic habitats
Elevation (N. Am.)	100 – 3200 ft.	200 – 5400 ft.	3000 – 6000 ft.
Lemma surface	densely hairy, hairs flexible, to 1 mm long or longer	Lemmas hairy, hairs stiff, less than 1 mm long (not scabrous)	Lemmas glabrous, sometimes scabrous distally, lemma margins sometimes hairy toward base
Culm height	20 – 95 cm	60 – 130 cm	22 – 60 cm
Spike length	4 – 26 cm	10 – 22 cm	6 – 10 cm
Internodes, length	3.5 – 13 cm	7 – 15 cm	3.5 – 10 mm
Internodes	hairy at least distally	smooth, scabrous, or hairy distally	glabrous, sometimes scabrous
Spikelets, length	9 – 31 mm	10 – 28 mm	10 – 17 mm
Paleas	hairy between keels, keels hairy proximally		

Awnless wheatgrasses, *Elymus*.

Trait	<i>E. lanceolatus</i>	<i>E. repens</i>	<i>E. trachycaulus</i>	<i>E. violaceus</i>	<i>P. smithii</i>
Habit	rhizomatous	rhizomatous	cespitose	cespitose	rhizomatous
Ligule length	0.1 – 0.5 mm	0.25 – 1.5 mm	0.2 – 0.8 mm	0.5 – 1 mm	about 0.1 mm
Leaf width	1.5 – 6 mm	6 – 10 mm	2 – 5(8) mm	3 – 4 mm	1 – 4.5 mm
Spike length	3.5 – 26 cm	5 – 15 cm	(4)8 – 30 cm	5 – 12 cm	5 – 17 cm
Spike width	1.5 – 6 cm	0.5 – 1.5 cm	0.5 – 0.8 cm	0.4 – 0.7 cm	
Glume width	0.7 – 1.3 mm		1.8 – 3.2 mm	1.2 – 2 mm	
Glume veins	3 – 5	3 – 6, 7 – 12	3 – 7	3(5)	3 – 5 basally, 1 distally
Glume midvein	straight	straight?	straight?	straight?	curved
Glumes	often asymmetrically keeled, keels straight	keeled distally, keels inconspicuous and smooth proximally	flat or asymmetrically keeled their full length	flat or equally keeled their full length	
Glume margins	+/- equal	uneven	equal	unequal	
Glume vs. lemma	50 – 75% as long		75 – 100+% as long	75 – 100+% as long	
Lemma length	7 – 12 mm	8 – 12 mm	6 – 13 mm		6 – 14 mm
Lemma surface	glabrous to long hairy	glabrous	glabrous	glabrous to pubescent	glabrous to hairy????
Lemma awns length	to 2 mm	0 – 4(10) mm	0 – 5 mm	(0)0.5 – 3 mm	0.5 – 5 mm
Anther length	(2.5)3 – 6 mm	4 – 7 mm	(0.8)1.2 – 2.5(3) mm	0.7 – 1.3 mm	

Elymus scribneri and similar things – 1 spike/node, divergent awns

Trait	<i>E. scribneri</i>	<i>E. sierrae</i>	<i>E. wawawaiensis</i>	<i>Pseudoroegneria</i>
Culms	15 – 35(55) cm	20 – 50 cm	(15)50 – 130 cm	30 – 100 cm
Culms	prostrate to strongly decumbent	prostrate or decumbent and geniculate	erect	
Sheaths	glabrous or pilose	glabrous	basal: glabrate	
Leaves	involute	flat	involute when dry	involute when dry
Leaf width	1.5 – 4 mm	1 – 5 mm	1.75 – 5 mm	2 – 6 mm
Spikes, length	3.5 – 10 cm	5 – 15 cm	5 – 20 cm	8 – 15 cm
Spikes, width	0.8 – 1.2 cm, excl. awns	0.7 – 1.2 cm, excl. awns	2.5 – 3 cm incl. awns	3 – 8(10) cm excl. awns
Internodes, length	2.5 – 5(7) mm	5 – 15 mm	5 – 12 mm	7 – 20(25) mm
Internodes, width	0.5 – 1 mm	0.2 – 0.5 mm	0.3 mm (0.2 mm thick)	0.3 – 0.8(1) mm
Internodes, margins	scabrous	scabrous	glabrous	scabrous
Spikelets, length	9 – 15 mm	15 – 20 mm	10 – 22 mm	8 – 22(25) mm
Spikelets, width	6 – 12 mm		2 – 8.5 mm	
Spikelets, orientation	appressed to ascending	ascending to divergent		appressed to sl. divergent
Rachilla internodes	0.8 – 1.3 mm			
Rachilla internodes	scabridulous	glabrous (scabridulous)	glabrous	scabridulous (glabrous?)
Disarticulation	initially at rachis internodes, later beneath florets	above glumes, beneath florets	above glumes, beneath florets	above glumes, beneath florets
Glumes, length	4 – 9 mm	6 – 9 mm	4 – 10 mm	6 – 13 mm
Glumes, width	0.5 – 1 mm	0.7 – 1 mm	0.5 – 1.3 mm	0.9 – 2.2 mm
Glumes, veins	3 – 5	[3 – 5(6)]	1 – 3	(3)4 – 5(7)
Glumes, surface	mostly glabrous, midveins scabrous	glabrous	glabrous	glabrous, or veins scabrous
Glume awns, length	12 – 30 mm, divergent	3 – 10 mm	0 – 6 mm	(acute)
Lemmas, length	7 – 10 mm	12 – 16 mm	6 – 12 mm	9 – 14 mm
Lemmas, surface	glabrous to scabridulous	glabrous to scabridulous	glabrous to scabridulous, margins often sparsely pubescent proximally	glabrous, maybe sparsely puberulent on margins at base
Lemma awns, length	15 – 30 mm	15 – 30 mm	9 – 28 mm	0 – 25 mm
Lemma awns, shape	divergent	arcuately diverging to strongly recurved	strongly divergent	strongly divergent
Anthers	1 – 1.6 mm	2 – 3.5 mm	3.5 – 6 mm	4 – 8 mm
Habitat	open subalpine and alpine regions	slopes & ridgetops	coulees and reaches of rivers	
Elevation	2500 – 3200 m	2100 – 3400		

Pseudoroegneria spicata* and the similar *Elymus wawawaiensis

Trait	<i>Elymus wawawaiensis</i>	<i>Pseudoroegneria spicata</i>
Glumes, shape	narrower	wider
Glumes, shape	narrowly lanceolate	lanceolate to oblanceolate
Glumes	stiff	less stiff
Glume veins	1 – 3	(3)4 – 5(7)
Glume tips, shape	[acuminate??]	[truncate to acuminate??]
Spikelet spacing	shorter internodes	longer internodes
Spikelet spacing	more overlapping	less overlapping
Chromosome number	2n = 28	2n – 14, 28
Polyploid type	allotetraploid	autotetraploid (and diploid)

Weedy annual *Eragrostis*

Trait	<i>E. mexicana</i> ssp. <i>virescens</i>	<i>E. lutescens</i>	<i>E. pilosa</i> var. <i>pilosa</i>	<i>E. pectinacea</i> var. <i>pectinacea</i>	<i>E. cilianensis</i>	<i>E. minor</i>
FNA p.	78	78	81	81	83	85
Saucer-like glands, general	no?	yes	no	no	yes	yes
Glands; leaf blades	none	bases with glandular pits; margins lack glands	none	none	with glands; lower surfaces sometimes glandular	with glands
Glands; leaf sheaths	none	elliptical glandular pits	none	none		sometimes glandular on midveins
Glands, culms	none	sometimes w/ elliptical, yellowish, glandular pits below nodes	few or none	none	sometimes with saucer-like glands below the nodes	sometimes with a ring of glandular tissue below nodes
Glands; inflorescences	none	present on axis and branches	none	none	usually present on pedicels	usually with distal ring of saucer-like glands on pedicels
Glands, spikelets	none	none	none	none	usually 1 – 3 saucer-like glands on keels	occasionally 1 – 2 saucer-like glands on keels
Culms, length	10 – 130 cm	(2)6 – 25 cm	8 – 45(70) cm	10 – 80 cm	15 – 45(65) cm	10 – 45 cm
Leaf sheaths	tips and collars with hairs to 4 mm, papillose-based	sparsely hairy at the throat, hairs to 2 mm	mostly glabrous, apices hirsute, hairs to 3 mm	hirsute at apices, hairs to 4 mm	glabrous, rarely glandular, tips with hairs to 5 mm	hairy at the apices, hairs to 4 mm
Ligules	0.2 – 0.5 mm, ciliate	0.2 – 0.5 mm, ciliate	0.1 – 0.3 mm, ciliate	0.2 – 0.5 mm	0.4 – 0.8 mm, ciliate	0.2 – 0.5 mm, ciliate
Leaf blades, width	2 – 7(9) mm	1 – 3 mm	1 – 2.5(4) mm	1 – 4.5 mm	(1)3 – 5(10) mm	1 – 3(4) mm
Panicle length	(5)10 – 40 cm	4 – 10(15) cm	4 – 20(28) cm	5 – 25 cm	(3)5 – 15(20) cm	4 – 20 cm
Panicle width	(2)4 – 18 cm	0.5 – 2 cm	2 – 15(18) cm	3 – 12(15) cm	2 – 8.5 cm	2.2 – 8(10) cm
Primary branches	3 – 12(15) cm		1 – 10 cm	0.6 -8.5 cm	0.4 – 5 cm	0.5 – 6 cm
Primary branches	solitary to whorled, appressed or diverging to 80 degrees	alternate, usually appressed, occasionally diverging to 30 degrees	diverging 10 – 80(110) degrees, capillary, whorled on lowest 2 nodes	appressed or divergent to 80 degrees, solitary or paired at lowest 2 nodes	appressed or diverging 20 – 80 degrees	diverging 20 – 100 degrees

Trait	<i>E. mexicana</i> ssp. <i>virescens</i>	<i>E. lutescens</i>	<i>E. pilosa</i> var. <i>pilosa</i>	<i>E. pectinacea</i> var. <i>pectinacea</i>	<i>E. cilianensis</i>	<i>E. minor</i>
Pulvini	glabrous	glabrous	glabrous or hairy	glabrous or sparsely hairy	glabrous or hairy	glabrous or hairy
Pedicels	1 – 6(7) mm	1.4 – 10 mm	(2)3.5 – 6(10) mm	1 – 7 mm	0.2 – 3 mm	1 – 4 mm
Pedicels	almost appressed to narrowly divergent, stiff	appressed to divergent	appressed or divergent	appressed, rarely diverging to 20 degrees	stout, straight, stiff, usually divergent, rarely appressed	stiff, straight, divergent
Spikelets, length	(4)5 – 10(11) mm	3.6 – 7.5 mm	0.6 – 1.4 mm	3.5 – 11 mm	6 – 20 mm	4 – 7(11) mm
Spikelet width	0.7 – 1.4 mm	1.2 – 2 mm	0.6 – 1.3 mm	1.2 – 2.5 mm	2.5 – 4 mm***	< 2 mm 1.1 – 2.2 mm
Spikelet shape	ovate to linear-lanceolate	narrowly ovate	linear-oblong to narrowly ovate	linear-oblong to narrowly lanceolate	ovate-lanceolate	narrowly ovate
Spikelets, color	gray-green to purplish	light yellowish, occasionally mottled with reddish-purple	gray	gray, yellowish-brown, or dark reddish-purple	gray, greenish	mostly reddish-purple to greenish, occasionally grayish
Florets/spikelet	5 – 11(15)	6 – 11(14)	(3)5 – 17	6 – 22	10 – 40	7 – 12(20)
Disarticulation	acropetal	acropetal	acropetal	acropetal	below the florets, rachillas persistent	acropetal
Shorter (lower) glume			less than ½ as long as lower floret	more than ½ as long as lower floret		
Lower glumes	0.7 – 1.7 mm		0.3 – 0.6(0.8) mm	0.5 – 1.5 mm	1.2 – 2 mm	0.9 – 1.4 mm
Upper glumes			0.7 – 1.2 mm	1 – 1.7 mm	1.2 – 2.6 mm	1.2 – 1.6 m
Lemmas, length	1.2 – 2.4 mm	1.5 – 2.2 mm	1.2 – 1.8 mm	1 – 2.2 mm	2 – 2.8 mm	1.4 – 1.8
Paleas, length	1 – 2.2 mm	1.2 – 2 mm	1 – 1.6 mm	1 – 2 mm	1.2 – 2.1 mm	1.3 – 1.7 mm
Paleas		persistent	tardily deciduous, rachillas persisting longer than paleas	persistent	falling with lemmas	persistent
Anthers	purplish	purplish	purplish	purplish	yellow	reddish brown
Caryopses, shape	ovoid to rectangular-prismatic, laterally compressed	pear-shaped except slightly flattened ventrally	obovoid to prism-shaped, ventral surfaces flat	pear-shaped, slightly laterally compressed	globose to broadly ellipsoid	ellipsoid, not grooved
Caryopses, side opposite embryo	grooved	rounded to flat	rounded to flat	rounded to flat	rounded to flat	rounded to flat

Table 3. Comparison of some common, easily confused, cespitose fescues occurring at low to mid elevations. Characteristics listed for Sheep/Hard Fescues are a composite of the traits of the common introduced grasses sold under the names Sheep and Hard Fescues. They are mainly cultivars of *F. trachyphylla* and *F. valesiaca*.

Characteristics	<i>F. rubra</i> ssp. <i>commutata</i>	<i>F. roemerii</i>	<i>F. idahoensis</i>	Sheep/Hard Fescues	<i>F. idahoensis</i>
Origin	Eurasia via New Zealand	Native (west of Cascades)	Native (east of Cascades)	Eurasia	Native
Range	Widespread	West of Cascade Range and Sierra Nevada	East of Cascade Range and Sierra Nevada	Widely planted in dry and high-altitude habitats	Western North America
Habitat (moisture)	Moderate to somewhat dry grassland	Moderate to dry grassland	Dry to xeric grassland	Dry to xeric grassland	Dry forest
Leaf sheaths	Reddish to brown and shredding to fibers	paler, tan to brown, remaining relatively intact	paler, tan to brown, remaining relatively intact	paler, tan to brown, remaining relatively intact	Pale
Leaf sheath margins	Fused; sheaths closed	overlapping; sheaths open	overlapping; sheaths open	overlapping; sheaths open	Overlapping, sheaths open
Leaf color	Green	blue, sometimes green	blue, sometimes green	blue or green	Green
Leaves spin between fingers?	No (or with angles that can be felt)	No (or with angles that can be felt)	Yes	No (or with angles that can be felt)	No, or with angles
Leaf shape in cross section	Rounded diamond, broadest by main lateral veins	oval or rounded diamond, broadest by main lateral veins	round to hexagonal	rounded diamond, broadest by main lateral veins	Triangle or diamond
Leaf sclerenchyma band width	Bands < 2X as broad as thick	bands > 2X as broad as thick	bands > 2X as broad as thick, sometimes continuous	bands > 2X as broad as thick, sometimes continuous	Bands < 2X as broad as thick
Leaf sclerenchyma band number	5 or more	3 or more	5 or more, or fused because very broad	5 or more, or fused because very broad	5 or more
Outer (abaxial) leaf surface	Slightly ribbed	smooth or slightly ribbed	usually slightly ribbed	smooth or slightly ribbed	Ribbed
Number of veins	7 or more	5 – 9, usually 7	usually 5	5 – 9 (or more)	5 – 7

Characteristics	<i>F. rubra</i> ssp. <i>commutata</i>	<i>F. roemeri</i>	<i>F. idahoensis</i>	Sheep/Hard Fescues	<i>F. idahoensis</i>
Location of the minor veins closest to midrib	Opposite adaxial ribs	opposite adaxial ribs	usually opposite adaxial grooves	opposite adaxial ribs or grooves	Opposite adaxial ribs
Hairs on inner (adaxial) surface	Few, short	few and short (north) or many and long (south)	many, long	variable but most often many and short	Variable, medium
Maximum number of culms	Moderate to many	few	few	many	Very few
Inflorescence	Somewhat condensed to open	open	open	condensed to very condensed	Very open
Inflorescence pedicels	Often shorter than spikelets	often longer than spikelets	often longer than spikelets	shorter than pedicels	Longer than spikelets
Lowest inflorescence branch	Usually ascending, may droop	spreading to reflexed	spreading to reflexed	ascending	Reflexed
Lemma body length	4.8 – 5.6mm	6 – 8 (0 8.2)	6.0 – 8.0 mm	4.0 – 5.5 (-5.8) mm	4.5 – 5.6
Longest lemma awns	1 – 3.2 mm 0 to ½ lemma body	2.1 – 3.5 mm < to about = lemma body	< to about = lemma body	0 to < lemma body	4.3 – 8 mm > lemma body
Ovary apex	Glabrous	Glabrous	Glabrous	Glabrous	Pubescent

Glyceria with short, roundish spikelets (section *Hydropoa* and *Striatae*)

Trait	<i>G. grandis</i>	<i>G. canadensis</i>	<i>G. striata</i>	<i>G. elata</i>
Lemma tips	almost flat	prow-shaped	prow-shaped	prow-shaped
Anthers	3	2	2	2
Glume veins	reaching tips (1 or both glumes)	not reaching tips	not reaching tips	not reaching tips
Glumes		tapering from below midlength	narrowing from midlength or above	narrowing from midlength or above
Glume tips	acute	narrowly acute (< 45 degrees)	acute (=> 45 degrees) to rounded	obtuse to rounded
Leaf blades, width	4.5 – 15 mm	3 – 8 mm	2 – 6 m wide	6 – 15 mm wide
Anthers, length	0.5 – 1.2 mm	0.4 – 0.5 mm	0.2 – 0.6 mm	0.5 – 0.8 mm
Culms	8 – 12 mm	2.5 – 5 mm	1.5 – 3.5 mm thick	2.5 – 8 mm thick
Lower glume, L	1 – 2.3 mm	0.6 – 2.4 mm	0.5 – 1.2 mm	0.7 – 1.5 mm
Upper glume, L	1.5 – 2.7 mm	1.5 – 2.5 mm	0.6 – 1.2 mm	1 – 1.5 mm
Lemma, length	1.8 – 3 mm	1.8 – 4 mm	1.2 – 2 mm	1.7 – 2.2 mm
Lodicules	wholly to partially connate	free	free	free
Hila	ovoid to oblong	punctate or linear	punctate or linear	punctate or linear
Caryopses, L	1 – 1.5 mm	1.5 – 2 mm	0.5 – 2 mm	0.8 – 1.5 mm

***Glyceria* with long spikelets and unlobed lemmas.** One other Oregon *Glyceria*, *G. declinata*, has long spikelets. Its lemmas have a strong tooth (sometimes one on each side) near the tip of the lemma and are otherwise crenate near the tip. Its branches are more upright than those of the species below.

Trait	<i>G. borealis</i>	<i>G. leptostachya</i>	<i>G. x occidentalis</i>	<i>G. fluitans</i>
Lemma surface	smooth or minutely scabrous	scabridulous to scabrous	scabridulous	scabrous
Lemma length	2.7 – 5.4 mm	2.5 – 4.5 mm	2.4 – 5.9 mm	5.2 – 8 mm
Lemma apex	entire or almost so	crenulate	usually slightly lobed or irregularly crenate	usually entire
Anther length	0.4 – 1.5 mm	0.3 – 0.9 mm	0.6 – 1.6 mm	1.5 – 3 mm
Lower glumes, L	1.2 – 2.2 mm	0.6 – 2.1 mm	1.1 – 2.8 mm	1.3 – 3.9 mm
Upper glumes, L	2 – 3.8 mm	1 – 1.5 mm	2.9 – 3.7 mm	2.7 – 5 mm

Grasses with their spikelets sunken into the inflorescence axis.

Traits	<i>Aegilops cylindrica</i>	<i>Aegilops triuncialis</i>	<i>Hainardia cylindrica</i>	<i>Lolium rigidum</i>	<i>Lolium sp.</i>	<i>Parapholis incurva</i>	<i>Scribneria bolanderi</i>
FNA page	263	265	689	454	454	687	689
Glumes/spikelet (except terminal spikelet)	2	2	1	1		2	2
Spikelet orientation to the axis	tangential	tangential	radial	radial	radial	tangential	tangential
Glume awns	lower: 6 – 9 mm upper: 30 – 60 mm	lower: 15 – 60 mm upper: 25 – 80 mm	0	0	0	0	0
Fertile florets/spikelet	3 – 5	2 – 7	1(2)	2 – 8(11)	(2)5 – 9+	1	1
Lemma awns	lower: 0.1 – 0.5 mm apical: (2)4 – 8 mm	0 – 10 mm	0	0(10) mm	0(8)	0	2 – 4 mm long
Spikelet length	fertile: 9 – 12 mm	lower: 7 – 13 mm upper: 7 – 9 mm	5 – 8 mm	5 – 18 mm	5 – 22 mm	4.5 – 7.5 mm	(3)4 – 7 mm
Glume length	fertile apical 7 – 9 mm	lower: 6 – 10 mm upper: 6 – 8 mm		4 – 40(30) mm	4 – 20(30) mm		
Lemma length	lower 9 – 10 mm	lower: 7 – 11 mm	4 – 6 mm	3 – 8.5(10.5) mm	3 – 8.5(10.5) mm		
Inflorescence width	3 mm	4 – 5 mm					1 – 2.5 mm
Disarticulation	at base of inflorescence, secondarily at rachis nodes	at base of inflorescence	at the rachis nodes	above the glumes, beneath the florets	above the glumes, beneath the florets	at the rachis nodes	above the glumes, beneath the florets
Glumes	rigid, thick	rigid, thick	rigid, thick	somewhat tough	not tough	leathery, stiff	leathery
Spike shape	straight	straight	straight	straight to zig-zag	straight to zig-zag	often curved	straight
Spike length	2.2 – 12 cm	2.2 – 6 cm	8 – 25 cm	3 – 30 cm	3 – 30 cm	1 – 15 cm	(2)4 – 11 cm

Small weedy *Hordeum* with erect spikes.

Trait	<i>H. pusillum</i>	<i>H. depressum</i>	<i>H. marinum</i> ssp. <i>gussoneanum</i>	<i>H. murinum</i> (3 ssp.)
aruricle length	0	0	0 or to 0.3mm long	to 8 mm long
Glumes alike?	no	yes	yes	
Glumes, inner ones of lateral spikelets widened above base	yes	no	no	
Glumes, width of inner ones of lateral spikelets	0.8 – 1.8 mm wide	usually less than 0.7 mm wide	usually less than 0.7 mm wide	
Pedicels of lateral spikelets	less than 1 mm long, curved	about 1 mm long, straight	about 1 mm long, straight	
Lemma awns of lateral spikelets	to 1.8 mm long, rarely absent	absent or to 1 mm long	3 – 8 mm long	20 – 50 mm long
Glumes		slender	rather stout,	wide?
Glumes	straight	ascending to suberect	curved outward from the base and +/- spreading	

Subspecies of *Hordeum murinum*

Trait	<i>H. m. ssp. murinum</i>	<i>H. m. ssp. leporinum</i>	<i>H. m. ssp. glaucum</i>
Central spikelets	sessile to subsessile	pedicellate	pedicellate
Lemmas of central florets	subequal to those of lateral florets	subequal to or shorter than those of the lateral florets	subequal to or shorter than those of the lateral florets
Lemma awns of central florets	longer than those of the lateral florets	much shorter than those of the lateral florets	about as long as those of the lateral florets
Paleas of lateral florets	almost glabrous	scabrous on lower half	distinctly pilose on lower half
Anthers of central vs. lower florets	similar in length	similar in length	distinctly different in length
Anthers of central florets	0.8 – 1.4 mm long	0.9 – 3 mm long	0.2 – 0.6 mm long
Anthers of lateral florets	0.8 - 1.4 mm long	1.2 – 3.2 mm long	1.2 – 1.8 mm long
Plants	winter annuals	winter annuals	summer annuals
Culm height	30 – 60 cm	30 – 110 cm	15 – 40 cm
Leaves	green	green	glaucous
Spike color	green	green at anthesis, often +/- purple just before maturity	sometimes glaucous, often brownish when mature
Anthers	gray to yellow	gray to yellow	more or less covered with purple spots
Rachillas of lateral spikelets	about 0.15 mm long, pale	about 0.25 mm long, pale	about 0.3 mm long, yellow

Subspecies of *Hordeum murinum*, the cheat sheet.

	Central spikelet sessile (or nearly so)	Central spikelet pedicellate
Lemma of central floret subequal to those of lateral florets	<i>H. m. ssp. murinum</i>	<i>H. m. ssp. glaucum</i>
Lemma of central floret much shorter than those of lateral florets		<i>H. m. ssp. leporinum</i>

Comparison of *Koeleria macrantha* and *Sphenopholis obtusata*, two species with narrow, usually silvery-shiny panicles.

Trait	<i>Sphenopholis obtusata</i>	<i>Koeleria macrantha</i>
Disarticulation	below glumes	above glumes
Florets / spikelet	2 – 3	2 – 4
Glumes	= or < lowest floret	= or > lowest floret
Callus	glabrous	glabrous or hairy
Paleas	< lemmas	= or > lemmas
Ligules, length	(1)1.5 – 2.5 mm	0.5 – 2 mm
Ligules	erose ciliate	membranous
Leaves, width	(1)2 – 8 mm	0.5 – 3(4.5) mm
Spikelets, length	2.2 – 3.6 mm	2.5 – 6.5 mm
Upper glumes, length	1.5 – 2.5 mm	2.5 – 5 mm
Upper glumes, shape	rounded to truncate	acute
Lower lemmas, length	1.9 – 2.8 mm	2.6 – 6.5 mm
Lemmas, surface	usually scabridulous distally or upper ones glabrous	usually glabrous, sometimes scabrous, especially on keels
Anthers, length	0.2 – 1 mm	1 – 2.5(3) mm

Leptochloa fusca

Trait	<i>L. f. ssp. fascicularis</i>	<i>L. f. ssp. uninervia</i>
Uppermost blades	often exceeding the panicles	not exceeding the panicle
Leaf blades	glabrous or scabrous	usually densely scabrous on both surfaces
Inflorescence width	4 – 22 mm	(0.5) 3 – 18 mm
Inflorescence	usually partially enclosed in the uppermost leaf sheath	usually completely exerted from the uppermost leaf sheath
Lower glumes, length	2 – 3 mm	1 – 2.6 mm
Upper glumes, length	2.5 – 5 mm	1.8 – 2.8 mm
Lemmas	smoky white, often with a dark smudge on the basal half	light brown, dark green, or lead-colored, usually without a basal dark spot
Lemmas	lanceolate	
Lemma apices	acute, mucronate, or awned (bifid, I think)	usually truncate or obtuse, rarely broadly acute, sometimes bifid, sometimes mucronate
Anthers	1 – 3	3
Anthers, length	0.2 – 0.5 mm	0.2 – 0.6(1) mm
Caryopses	0.8 – 2 mm	1 – 1.5 mm

***Leptochloa fusca. Leptochloa f. ssp. fusca* does not appear to live in Oregon.**

Trait	<i>L. f. ssp. fascicularis</i>	<i>L. f. ssp. uninervia</i>	<i>L. f. ssp. fusca</i>
Uppermost blades	often exceeding the panicles	not exceeding the panicle	not exceeding the panicle
Leaf blades	glabrous or scabrous	usually densely scabrous on both surfaces	scabrous or glabrous
Inflorescence width	4 – 22 cm	(0.5) 3 – 18 cm	2 – 20 cm
Inflorescence	usually partially enclosed in the uppermost leaf sheath	usually completely exerted from the uppermost leaf sheath	sometimes partially included in uppermost leaf sheaths
Spikelets, length	5 – 12 mm	5 – 10 mm	6 – 14 mm
Lower glumes, length	2 – 3 mm	1 – 2.6 mm	1.9 – 3(4.9) mm
Upper glumes, length	2.5 – 5 mm	1.8 – 2.8 mm	3 – 4.7(5.5) mm
Lemmas, color	smoky white, often with a dark smudge on the basal half	light brown, dark green, or lead-colored, usually without a basal dark spot	light brown to dark green
Lemmas, basal spot	often present	usually lacking	lacking
Lemma apices	acute, mucronate, or awned (bifid, I think)	usually truncate or obtuse, rarely broadly acute, usually notched and mucronate	obtuse, acute, or acuminate, sometimes bifid
Anthers	1 – 3	3	3
Anthers, length	0.2 – 0.5 mm	0.2 – 0.6(1) mm	0.5 – 2.7 mm
Caryopses	0.8 – 2 mm	1 – 1.5 mm	1.6 – 2.3 mm

Muhlenbergia filiformis* and *M. richardsonis

Trait	<i>M. richardsonis</i>	<i>M. filiformis</i>
Duration	perennial	annual (often appearing perennial)
Habit	rhizomatous	tufted, often rooting at lower nodes
Culms, internodes	usually nodulose (occasionally smooth), scabrous	glabrous, smooth or scabridulous
Culms, below nodes	puberulent or nodulose	glabrous, not nodulose
Leaf blades, width	0.5 – 4.2 mm	0.6 – 1.6 mm
Inflorescences, length	1 – 15 cm	1.6 – 6 cm
Inflorescences, width	0.1 – 1.7 cm	0.2 – 0.5 cm
Pedicels	0.2 – 2 mm	1 – 3 mm
Glumes	acute, sometimes mucronate	rounded to subacute
Lemmas, surfaces	glabrous, tips minutely scabrous	appressed-pubescent on the margins and midveins, hairs < 0.3 mm, tips minutely scabrous
Anthers, length	0.9 – 1.6 mm	0.6 – 1.2 mm
Anthers	yellow to purplish	purplish
2x =	40	18

Oregon *Muhlenbergia* with open panicles.

Trait	<i>M. asperifolia</i>	<i>M. uniflora</i>	<i>M. minutissima</i>
Range	east of Cascades	introduced to coast	SE Oregon
Habitat	moist, alkaline meadows	bogs	moist, alkaline sites
Duration	perennial	perennial but appearing annual	annual
Leaf blades, width	1 – 2.8(4) mm	0.8 – 2 mm	0.8 – 2 mm
Ligules, length	0.2 – 1 mm	0.5 – 1.5 mm	1 – 2.6 mm
Spikelets, length	1.2 – 2.1 mm	1.3 – 2.1 mm	0.8 – 1.5 mm
Glume length	0.6 – 1.7 mm	0.4 – 1.3 mm	Lower 0.5 – 0.8 mm Upper 0.6 – 0.9 mm
Glumes, shape	equal	equal	Upper broader than lower
Lemmas, length	1.2 – 2.1 mm	1.2 – 2 mm	0.8 – 1.5 mm
Lemmas, color	somewhat gray	dark purplish to gray	brownish to purplish
Lemmas, surface	glabrous, usually smooth, occasionally minutely scabrous near the tips	glabrous	glabrous or the midveins and margins appressed-pubescent
Lemma tips	acute	acute to obtuse	obtuse to subacute
Anthers, length	1 – 1.3 mm	0.6 – 0.9 mm	0.2 – 0.7 mm

Puccinellia of the Oregon Coast (assuming that *P. nuttalliana* doesn't occur there – but it does!)

Trait	<i>P. pumila</i>	<i>P. nutkaensis</i>	<i>P. nuttalliana</i>
FNA number	14	20	19
Abundance at coast	regular	regular	rare (Tillamook County, 1918)
Culms, length	8 - 40 cm	10–90 cm	10 – 100 cm
Leaves		usually evenly distributed along stem	either concentrated at the base or distributed along the culms
Leaf blades (when flat)	1–3 mm wide	1.5–6 mm wide	1 – 4 mm wide
Panicles, lower branches	ascending to descending	usually erect to ascending, occasionally spreading to descending	erect to descending
Pedicels	smooth or with a few scattered scabrules	sparsely to densely scabrous	uniformly scabrous
Pedicels; epidermal cells	often tumid distally	not tumid	often tumid
Spikelets	4–9 mm long	3.5–12 mm long	3.5 – 9 mm long
Lower glumes	1.4- 2 (4) mm long	1–1.6 mm long	0.5 – 1.5 m long
Lemmas	2.5–4.6 mm long	(2.2) 3–4.5 (5) mm long	(2)2.2 – 3(3.5) mm long
Lemmas, apical margins	usually smooth, occasionally with a few scattered scabrules	uniformly and densely scabrous	uniformly and densely scabrous
Lemmas, apical margins	entire	irregularly serrate or erose	entire
Anthers, length	0.5 – 1.2 mm	0.6 – 2 mm	0.5 – 1.4 mm

Puccinellia of Oregon east of the Cascades

Trait	<i>P. lemmonii</i>	<i>P. distans</i>	<i>P. nuttalliana</i>
FNA #	13	17	19
Culms	5 – 40 cm	5 – 60 cm	10 – 100 cm
Ligules	0.8 – 2.2 mm	0.8 – 1.2 mm	1 – 3 mm
Leaf blades (if flat)	1.2 – 1.9 mm wide	1 – 7 mm wide	1 – 4 mm wide
Spikelets, length	3.5 – 8 mm	2.5 – 7 mm	3.5 – 9 mm
Lower glumes	0.7 – 1.5 mm	0.4 – 1.3 mm	0.5 – 1.5 mm
Upper glumes	1.8 – 3 mm	0.9 – 1.8 mm	1 – 2.8 mm
Lemmas	2.4 – 4 mm	1.5 – 2 (2.2) mm	(2) 2.2 – 3 (3.5) mm
Lemmas	glabrous, sometimes with a few hairs near the base, principally along the veins	glabrous or sparsely hairy on the lower half, principally along the veins	glabrous or sparsely hairy on the lower half, principally along the veins
Lemma backs	rounded or keeled distally	rounded	rounded
Lemma midveins	often slightly scabrous and prominent in distal half	obscure	obscure, smooth
Lemma midveins	often extending to the margins	not extending to the margins	Not extending to the margins
Lemma apex margins	smooth to scabrous, entire, not white	hyaline and often yellowish, uniformly and densely scabrous	uniformly and densely scabrous
Lemma apex	acute	widely obtuse to truncate	acute to obtuse
Anther length	1 – 2 mm	0.4 – 0.8 mm	0.6 – 2 mm

Table 1. Varieties of *Vulpia microstachys*. This species exhibits great variability. Much of it is phenotypic, depending on fertility and moisture of the soil. Hairiness of glumes and lemmas can result from a single gene with simple dominance. Heterozygous individuals have been studied. Recognizing these differences at any taxonomic level seems useless.

	Glumes smooth or scabrous	Glumes pubescent
Lemmas smooth or scabrous	var. <i>pauciflora</i> (Scribn. ex Beal) Lonard & Gould	var. <i>confusa</i> (Piper) Lonard & Gould
Lemmas pubescent	var. <i>microstachys</i>	var. <i>ciliata</i> (A. Gray) Lonard & Gould