

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. The keys and descriptions 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/](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.

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Table 1. *Achnatherum occidentale*, *A. nelsonii* var. *nelsonii*, and *A. nevadense*.

Trait	<i>A. occidentale</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

Table 2. 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	_____	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

Table 3. 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 4. Selected traits of Oregon *Agrostis* species and the superficially similar species of *Apera* (*Ap.*) and *Podagrostis*.

	Duration	spreading rhizomes or stolons	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. spicaventi</i>	annual	(annual)				0.5 mm	4 - 7(12) mm		75-100%	1 - 2 mm
<i>P. humilis</i>	perennial	cespitose	narrow	glabrous or sparse	0-0.1(0.2) 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	0-0.3(0.6)	0.1 - 0.3 mm	0 (-1.3 mm)	1.1-1.6 mm		0.4 - 0.8 mm

Table 5. *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 6. Comparison of the “fearsome foursome” of introduced, invasive bentgrasses. (*Agrostis* spp.)

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

Table 7. 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	(410 - 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
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

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	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

Table 8. 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	<i>B. laevipes</i>	<i>B. orcuttianus</i>	<i>B. vulgaris</i>	<i>B. pacificus</i>	<i>B. erectus</i>	<i>B. suksdorfii</i>	<i>B. ciliatus</i>
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 retrorsely 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
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

Trait	<i>B. laevipes</i>	<i>B. orcuttianus</i>	<i>B. vulgaris</i>	<i>B. pacificus</i>	<i>B. erectus</i>	<i>B. suksdorfii</i>	<i>B. ciliatus</i>
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 9. *Bromus carinatus* and *B. sitchensis*.

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>	Notes
Duration	perennial	annual or biennial (to perennial in var. <i>hookerianus</i>)	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	obs.
Ligules (observations)	often more than 4 mm long	rarely as much as 4 mm long	rarely as much as 4 mm long	obs.
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	x
Leaves, width (observations)	often well over 10 mm wide	averaging much less than 10 mm wide	averaging much less than 10 mm wide	obs.
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	obs.
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	obs.
Panicle	open	lax	mostly narrow, erect	x
Panicle length	25 - 35 cm	15 - 40 cm	10-20 (-30) cm	
Panicle branches	spreading to reflexed	spreading	branches erect or ascending	x
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. <i>carinatus</i> , more often patent to declined	erect or ascending	
Panicle branches	mostly longer than the US.	US.	US.	obs.
Panicle branches; spikelets	1-2, borne at their tips	several (sometimes to near base)	several (sometimes to near base)	obs.
Spikelet length	2.2 - 4 cm	2 - 4 cm	2.5 - 4 cm	
Florets/spikelet	3 to 6	6 to 11	6 to 9	x
First glume length	9 - 13 mm	8 - 10 mm	7 - 9 mm	x
First glume veins	3 to 5	3 to 7	3 to 5	
Second glume length	10 - 15 mm	9.5 - 12 mm	9 - 11 mm	
Second glume veins	5 to 7	5 to 9	5 to 7	
Lemma length	12 - 14 mm	12 - 16 (-20) mm	11 - 14 mm	

Trait	<i>B. sitchensis</i>	<i>B. carinatus</i>	<i>B. marginatus</i>	Notes
Lemma veins	7 to 9 (11)	7 to 9	7 to 9	
Lemma veins: 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	

Table 9. *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

Table 10. 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 perennial)	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 veins	obscure	conspicuous
Lemma awn length	(6-) 8-15 mm	4-7 mm

Table 11. *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

Table 12. Traits of Oregon's species of *Bromus* sections *Ceratochloa* plus *B. pacificus* (Pavlick 1995).

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	retrorsely soft pilose to glabrous-scabrous	typically retrorsely 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	lower 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

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>
1st glume length		8 - 10 cm	7 - 9 mm	8 - 12 mm		6 - 8.5 mm
1st glume	3 - 5 veined	3 - 7 veined	3 - 5 veined	(3-)5(-7) veined	3- veined	1 (-3) veined
2nd glume length		9.5 - 12 mm	9 - 11 mm	10 - 13 mm		8 - 11.5 mm
2nd glume	5 - 7 veined	5 - 9 veined	5 - 7 veined	7(-9) veined	5-7 veined	3- veined
lemma length	12 - 14 mm	12 - 16 (-20) mm	11 - 14 mm	12 - 14 mm	12 - 15 mm	10 - 12 mm
lemma veins	7 - 11 veined	7 - 9 veined	7 - 9 veined	9 - 11 veined	7 - 9 veined	
lemma veins		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
lemmas			leathery			
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 BC to CA, TX, Saskatchewan, east of Cascades and Sierras	Pacific coast, Lane Co., OR, to S California	Montana to SE WA, S to CA and TX; 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			

Table 13. Subspecies of *B. hordeaceus*.

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

Table 14. *Bromus inermis* and *B. riparius*.

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

Table 15. *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

Table 16. 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 slightly 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	<u>Steens: 3.3-5.5 mm. WA: (4) 6-6.5 (7) mm</u>	(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. WA: (3.5) 4-5 (5.5) mm</u>	(3.5) 4-5 (6) mm	2.5-3.5 (4) mm	(3) <u>3.8 -5 (5.5)</u> 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. WA: (5.5) 7-8.5 (10) mm</u>	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	equaling, 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

Table 17. Oregon coastal *Calamagrostis*.

Trait	<i>C. nutkaensis</i>	<i>C. canadensis</i> v. <i>langsдорffii</i>	<i>C. stricta</i> ssp. <i>stricta</i>
Habit	Densely cespitose	Rhizomatous (cespitose)	Cespitose, rhizomes usually < 5 cm long
Rhizome length	usually < 3(6) cm	2-15+ cm	< 5 cm
Rhizome thickness	1.5-3 mm	1-3 mm	1-1.5 mm
Ligules	(0.5) 1-4 (5.5) mm	(3)5-8(12) mm	(0.5) 1-3.5(4) mm
Leaf blade width	(2) 4-10 (20) mm	2-7 (11) mm	(1)1.5-2.5(3) mm
Panicle length	(8)12-23(33) cm	(6)9-17 (25) cm	(2)8-10(13) cm
Panicle width	(1.1)2-4.5(9) cm	(1)2-4(8) cm	(0.7)1-2(2.5) cm
Infl. branches	2.7-7(10.5) cm	(2.7)3.5-6(12) cm	(1.4)2-2.5(4) cm
Infl. branches	spikelets usually confined to the distal half	spikelets sparsely to densely concentrated on the distal 2/3	spikelet bearing to below midlength, sometimes to the base
Rachilla prolongation	0.5-1 mm	0.7-1 mm	1-1.5 mm
Spikelets = glumes	4.5-6.5 (8) mm	(3.5)4-4.5(5.2) mm	2-2.5(3) mm
Callus hairs	(1) 2-2.5 (3) mm	(1.5) 3-3.3 (4.5) mm	1-3 mm
Callus hairs vs. lemmas	(20) 50-70%	(50) 100-120 (150)%	(50) 70-80 (100)%
Lemmas	(3) <u>3.8</u> - <u>5</u> (5.5) mm	(2.3)2.5-3(4) mm	2 -3 mm
Lemmas shorter than glumes by	(0.4) 0.8-1.2 (1.9) mm	0.4-2.1 mm	0.1-1.5 mm
Awns, length	1-3 mm	1.2-3.1 mm	1.5-2.5 mm
Awns attached, lower	30-50%	(10) 20-40 (50)%	10-20%
Awns	not exerted	not exerted	equaling, or slightly exerted
Awns	straight, slightly bent	usually straight	usually straight, sometimes bent
Anthers	(1) 2.4-2.6 (3.3) mm	(0.9) 1.2-1.6 (2.6) mm	(1.1)1.2-1.4(1.7) mm

Table 18. Varieties of *Calamagrostis canadensis*.

Trait	<i>C. c. var. canadensis</i>	<i>C. c. var. langsдорffii</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

Table 19. Comparisons of *Calamagrostis koelerioides* to *C. nutkaensis* and *C. rubescens*.

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

Table 20. *Calamagrostis koelerioides* and *C. rubescens*.

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

Table 21. *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

Table 22. *Cortaderia jubata* and *C. selloana*. Data from:

DiTomaso, J.M. and E.A. Healy. 2006. Weeds of California and Other Western States. Univ. California, DANR. Publ. #3488, 1808 pp.

Di Tomaso, Joseph M. 2000. *Cortaderia selloana*. in Bossard, C. C., J.M. Randall, and M. C. Hoshovsky. Invasive Plants of California's Wildlands. University of California Press. Berkeley, CA. Available on-line at <http://www.cal-ipc.org/ip/management/ipcw/pages/detailreport.cfm@usernumber=35&surveynumber=182.php>

(for *C. selloana*) and <http://www.cal-ipc.org/ip/management/ipcw/pages/detailreport.cfm@usernumber=33&surveynumber=182.php?print=y>

(for *C. jubata*)

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)

Table 23. Comparison of *Crypsis alopecuroides*, *C. schoenoides*, and *C. vaginiflora*.

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

Table 24. *Danthonia intermedia* and *Danthonia 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
Calluses of middle florets	longer than wide	about as long as wide
Calluses of middle florets	concave dorsally	convex dorsally

Table 25. *Danthonia* species lemma lengths.

Species	Lemma length	Lemma body length	Lemma teeth length
<i>D. californica</i>	(7)8-14 mm	5-10 mm	(2)4-6(7) mm
<i>D. decumbens</i>	5-6 mm	5-6 mm	short
<i>D. intermedia</i>	7-10 mm	3-6 mm	1.5-2.5 mm
<i>D. spicata</i>	4-5 mm	2.5-5	0.5-2
<i>D. unispicata</i>	9-12 mm	5.5-11 mm	1.5-7 mm

Table 26. Traits of putative subspecies of *Deschampsia cespitosa*. Data from Flora of North America.

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” (in the broad sense?)	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,	3.3-6.3 mm long	1-8 mm long	2-3 mm

Trait	<i>D. c. ssp. beringensis</i>	<i>D. c. ssp. cespitosa</i>	<i>D. c. ssp. holciformis</i>
length			
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

Table 27. *Echinochloa* of Oregon.

Trait	<i>E. colona</i>	<i>E. crus-galli</i>	<i>E. crus-pavonis</i>	<i>E. muricata</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	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

Table 28. *Elymus ciliaris* and *Elymus hirsutus*.

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

Table 29. *Elymus lanceolatus* subspecies.

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		

Table 30. Subspecies of *Elymus elymoides*, and the very similar *E. multisetus*.

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

Table 31. *Elymus wawawaiensis* and *Pseudoregneria spicata*

Trait	<i>Elymus wawawaiensis</i>	<i>Pseudoregneria 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)

Table 32. Parentage of common named *Elymus* hybrids.

Parents \ Hybrids	<i>E. x pseudorepens</i>	<i>E. x saundersii</i>	<i>E. x hansenii</i>
<i>E. lanceolatus</i>	x		
<i>E. trachycaulus</i>	x	x	
<i>E. elymoides</i> & <i>E. multisetus</i>		x	x
<i>E. glaucus</i>			x

Table 33. Major traits of the common *Elymus* hybrids.

	<i>E. x pseudorepens</i>	<i>E. x saundersii</i>	<i>E. x hansenii</i>
Habit	rhizomatous	cespitose	cespitose
Infl. axis disarticulating	no	yes	yes
Spikelets/node	1	1	2
Awns	very short	outcurving	more or less outcurving

Table 34. *Elymus scribneri* and similar things-1 spike/node, divergent awns. (*E. sierrae* has been excluded from Oregon.)

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		

Table 35. Awnless wheatgrasses. *Elymus*, *Pascopyrum*, *Pseudoroegneria*.

Trait	<i>E. lanceolatus</i>	<i>E. repens</i>	<i>E. trachycaulus</i>	<i>E. violaceus</i>	<i>P. smithii</i>	<i>Ps. spicata</i>
Habit	rhizomatous	rhizomatous	cespitose	cespitose	rhizomatous	cespitose
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	0.1-0.4 mm
Leaf width	1.5-6 mm	6-10 mm	2-5(8) mm	3-4 mm	1-4.5 mm	2-6 mm
Spike length	3.5-26 cm	5-15 cm	(4)8-30 cm	5-12 cm	5-17 cm	8-15 cm
Spike width	1.5-6 cm	0.5-1.5 cm	0.5-0.8 cm	0.4-0.7 cm		0.3-0.8(1) cm
Spikelets vs. internodes	1.5-3 times longer				1-3 times longer	1.1-1.5(2) times longer
Internodes, middle, length	3.5-15 mm	4-6(9.5) mm	(4)7-9(12) mm	4-5.5 mm	4.5-11 mm	7-20(25) mm
Glume width	0.7-1.3 mm	1.6 mm	1.8-3.2 mm	1.2-2 mm		0.9-2.2 mm
Glume veins	3-5	3-6, 7-12	3-7	3(5)	3-5 basally, 1 distally	(3)4-5(7)
Glume midvein	straight	straight?	straight?	straight?	curved	straight?
Glumes, keels	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	9-14 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	0-25 mm
Anther length	(2.5)3-6 mm	4-7 mm	(0.8)1.2-2.5(3) mm	0.7-1.3 mm		4-8 mm

Table 36. 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, tips hirsute, hairs to 3 mm	hirsute at tips, hairs to 4 mm	glabrous, rarely glandular, tips with hairs to 5 mm	hairy at the tips, hairs to 4 m
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

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 37. Comparison of some common, easily confused, caespitose 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 *Festuca. 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. occidentalis</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	round, oval, or rounded diamond	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
Location of the	opposite adaxial ribs	opposite adaxial ribs	usually opposite adaxial	opposite adaxial ribs or	opposite adaxial ribs

Characteristics	<i>F. rubra</i> ssp. <i>commutata</i>	<i>F. roemerii</i>	<i>F. idahoensis</i>	Sheep/hard fescues*	<i>F. occidentalis</i>
minor veins closest to midrib			grooves	grooves	
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

Table 38. Three especially confusing subspecies of *Festuca rubra*.

Trait	<i>F. r. ssp. mediana</i>	<i>F. r. ssp. rubra</i>	<i>F. r. ssp. secunda</i>
Plant height	20-30(60) cm	15-90(120) cm	(20)30-70(80) cm
Leaf blades, width	0.7-1.5 mm	1-4 mm	0.7-1.5 mm
Leaf sheaths, cauline	loose or tight	tight	usually loose
Inflorescences	often included in uppermost leaf sheaths	exserted	often included in uppermost leaf sheaths
Glumes, lower, length	2.5-3.2 mm	(2)2.5-3.5(4.5) mm	3.1-4.5 mm
Glumes, upper, length	3.5-4.5(5) mm	3.5-5.5(6) mm	(4.5)5-5.6 mm long
Lemmas, length	4.5-6 mm	(4)5-7(8) mm	5.8-6.6 mm
Lemmas, shape in side view	acuminate		attenuate
Lemma awns	0.5-2 mm	(0.3)1-3.3(5) mm	1-5 mm
Anthers	2.5-3 mm	(2.2)3-4(4.5) mm	2.8-3.9 mm

Table 39. *Glyceria* sections *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

Table 40. *Glyceria* with long spikelets and unlobed lemmas.

Trait	<i>G. borealis</i>	<i>G. leptostachya</i>	<i>G. x occidentalis</i>	<i>G. fluitans</i>
FNA page #	p. 81	p. 85	p. 85	p. 85
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

Table 41. 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	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

Table 42. Differences between our native sweetgrasses.

Trait	<i>H. odorata</i>	<i>H. occidentalis</i>
Alternate name	<i>A. hirtum</i>	<i>A. occidentale</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 43. 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.)
auricle 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	

Table 44. 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>

Table 45. 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 more or less 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

Table 46. Comparison of *Koeleria macrantha* and *Sphenopholis obtusata*, two species with narrow, usually silvery-shiny panicles and dissimilar glumes.

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

Table 47. Comparison of two subspecies of *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 tips	acute, mucronate, or awned	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

Table 48. *Leptochloa fusca* subspecies *fascicularis*, *uninervia*, and *fusca*.

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 tips	acute, mucronate, or awned	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

Table 49. Large *Leymus* species.

Trait	<i>L. racemosus</i>	<i>L. condensatus</i>	<i>L. cinereus</i>
Common name	Mammoth wildrye	Giant wildrye	Great Basin wildrye
Oregon status	not present	very uncommon	common east of Cascades
Habit	strongly rhizomatous	cespitose	cespitose
Foliage	glaucous	[glaucous ?]	green
Culm height	50-100 cm	115-350 cm	70-270 cm
Culm width	8-12 mm	6-10 mm	2-5 mm
Leaves, width	8-20 mm	10-28 mm	3-12 mm
Infl, length	15-35 cm	17 - 44 cm	10-29 cm
Infl, width	10-20 cm	20-60 cm	8-17 cm
Inflorescences	unbranched	branched	unbranched
Spikelets/node	3-8		2-7
Spikelets	sessile	sessile & stalked	
Internodes, length	8-11 mm	3.5-10 mm	4-9 mm
Internodes, surface	hairy, hairs to 1.5 mm	glabrous	
Spikelets	4-6 florets	3-7 florets	3-7
Glumes, length	12-25 mm	6-16 mm	8-18 mm
Glumes, width	to 2 mm	0.5-2.5 mm	0.5-2.5 mm
Glumes	usually > lemmas		
Lemmas, length	15-20 mm	7-14 mm	6.5-12 mm
Lemmas	pubescent proximally glabrous distally	usually glabrous	glabrous or hairy
Lemma awns	1.5-2.5 mm	0-4 mm	0-3 mm
Anthers, length	about 5 mm	3.5-7 mm	4-7 mm

Table 50. *Melica* species rudiments.

Species	Rudiments
<i>Melica aristata</i>	similar to fertile florets, <u>3-4.5</u> mm long
<i>Melica bulbosa</i>	<u>(1.8) 2-3 (3.6)</u> mm long, widest below the middle <u>or cylindrical and of even width throughout, acute or truncate, the longer ones tapered.</u>
<i>Melica fugax</i>	<u>2.5-3.8</u> mm long, tapering
<i>Melica geyeri</i> var. <i>geyeri</i>	3-7 mm long, tapering
<i>Melica harfordii</i>	<u>(3)4- 5(6)</u> mm long, tapering
<i>Melica smithii</i>	4.8-6.5 mm long, tapering
<i>Melica spectabilis</i>	<u>(1)1.5-2.5(3)</u> mm long, acute, sometimes surrounded by a small sterile floret similar in shape to the bisexual florets
<i>Melica stricta</i> var. <i>stricta</i>	<u>(2.2)3.2-4.8(8.1)</u> mm long, acute to acuminate
<i>Melica subulata</i>	<u>(4.4)5-7.3(8)</u> mm long, tapering

Table 51. *Melica* species.

Trait	<i>M. aristata</i>	<i>M. bulbosa</i>	<i>M. fugax</i>	<i>M. geyeri</i>	<i>M. harfordii</i>	<i>M. smithii</i>	<i>M. spectabilis</i>	<i>M. stricta</i>	<i>M. subulata</i>
Culm base bulb-like	no	yes, almost sessile	yes	yes, sessile	no	sometimes	yes, tailed, not sessile	no	yes, sessile
Ligules, fronts	often closed	usually open	usually open	nearly always mechanically split	usually closed	closed unless mechanically split	open	open or closed	often closed
Leaf width	2-6 mm	2-6 mm	1.2-5 mm	2-8 mm	1.5-4.5 mm	5-13 mm	2-5 mm	1.5-5 mm	2-10 mm
Flag leaf vs. infl.	not exceeding	not exceeding	not exceeding	not exceeding	occasionally exceeding	not exceeding	not exceeding	not exceeding	not exceeding
Inflorescence	panicle	panicle	panicle	panicle	panicle	panicle	panicle	raceme-like	panicle
Panicle branches	appressed to ascending	appressed	appressed or spreading	divergent to reflexed	appressed	spreading to reflexed	appressed, sometimes divergent	appressed	appressed to ascending, occ. divergent
Disarticulation vs. glumes	above	above	above	above	above	above	above	below	above glumes
Pedicels	straight	straight	straight	straight	straight	straight	straight	reflexed	straight
Glumes, L vs. spikelet L			< 0.8	< 0.8				0.8-1	
Glumes, lower, L	8.5-11 mm	(4)5.5-10.5 mm	(2.5)3-5(6) mm	3.5-7 mm	4-10 mm	4.5-7 mm	3.5-6.4 mm	(6)9.5-16 mm	4-6(8) mm
Glumes, lower, veins	3 - 5	3-5	1-3	5-9	3-5	1-3	1-3	4-7	1-3
Glumes, upper, L	9-12 mm	(5)6-11(14) mm	(3.5)4.5-7 mm	6-12 mm	5-11.5 mm	6.5-9 mm	5-7 mm	(6)9-16(18) mm	5.5-8(11.5) mm
Glumes, upper, veins	5 - 7	5-7	5	5-11	5-7	3-5	5-7	5-9	3-5
Rachille internodes	normal	normal	swollen when fresh, wrinkled and dull orange-	normal	normal	normal	normal	normal	normal

Trait	<i>M. aristata</i>	<i>M. bulbosa</i>	<i>M. fugax</i>	<i>M. geyeri</i>	<i>M. harfordii</i>	<i>M. smithii</i>	<i>M. spectabilis</i>	<i>M. stricta</i>	<i>M. subulata</i>
			brown when dry						
Rudiment	tapering, like fertile florets	sometimes unlike fertile florets	tapering, like fertile florets						
Rudiment, length	3-4.5 mm	(1.8)2-3(3.6) mm	2.5-3.8 mm	3-7 mm	(3)4-5(6) mm	4.8-6.5 mm	(1)1.5-2.5(3) mm	(2.2)3.2-4.8(8.1) mm	(4.4)5-7.3(8) mm
Lemma length	8-13 mm	(6)7-10(12)	4-7 mm	7.5-12.5 mm	6-16 mm	9.5-12 mm	6-9 mm	6-16 mm	5.5-18 mm
Lemmas, veins	5-7	7-11	4-11	7	9-11	7	5-11	5-9	7-9 mm
Lemmas	obtuse	obtuse	rounded, obtuse, acute	acute to obtuse	obtuse or rounded	acuminate	rounded, obtuse, acute	acute	acuminate
Palea vs. lemma	about 0.75	0.75	+/- 1	+/- 1	+ 0.75	+/- 0.67	+/- 0.67	+/- 0.5	0.5-0.75
Lemma awns, length	(3)5-12 mm	0	0	0	0-3(4) mm	3-10(12) mm	0	0	0
Anthers	2-3 mm	1.5-4 mm	1-2 mm	2.5-4 mm	2.2-4 mm	1.3-2.5 mm	1.5-3 mm	1-2 mm	1.5-2.5 mm

Table 52. Very large bunchgrasses in the tribe Triticeae.

Trait	<i>Leymus cinereus</i>	<i>Leymus condensatus</i>	<i>Leymus racemosus</i>	<i>Psathyrostachys juncea</i>	<i>Thinopyrum ponticum</i>
Common name	Great Basin wildrye	Giant wildrye	Mammoth wildrye	Russian wildrye	Tall wheatgrass
Oregon status	common east of Cascades	very uncommon	not present	not present?	Widely distributed
Habit	cespitose	cespitose	strongly rhizomatous	densely cespitose	cespitose
Foliage	green	glaucous (often?)	glaucous	often glaucous	
Culm height	70-270 cm	115-350 cm	50-100 cm	(20)30-80(120) cm	50-200 cm
Culm width	2-5 mm	6-10 mm	8-12 mm		~3.5 mm with sheath
Ligules, length	1.5-8 mm	0.7-6 mm	1.5-2.5 mm	0.2-0.3 mm	0.3-1.5 mm
Leaves, width	3-12 mm	10-28 mm	8-20 mm	(1)5-20 mm	2-6.5 mm
Infl., length	10-29 cm	17 - 44 cm	15-35 cm	(3)6-11(16) cm	10- 42 cm
Infl, width	8-17 cm	20-60 cm	10-20 cm	0.5-1.7 cm	
Inflorescences	unbranched	branched	unbranched	unbranched	unbranched
Disarticulation	beneath the florets	beneath the florets	beneath the florets	in the rachis	beneath the florets
Spikelets/node	2-7		3-8	(2)3	1
Spikelets		sessile & stalked	sessile		sessile
Spikelets, length	10-29 mm	9-25 mm	12-25 mm	11-18 mm	13-30 mm
Internodes, length	4-9 mm	3.5-10 mm	8-11 mm	3.5-6 mm	9-19 mm
Internodes, surface		glabrous	hairy, hairs to 1.5 mm		
Spikelets, florets	3-7 florets	3-7 florets	4-6 florets	1-2(3) florets	6-12 florets
Glumes, length	8-18 mm	6-16 mm	12-25 mm	(3.5)4.2-9.4 mm	6.5-10 mm
Glumes, width	0.5-2.5 mm	0.5-2.5 mm	to 2 mm	1.5 0 3 mm	
Glumes, veins	0-1(3) veins	0-1(3) veins	1-veined	5-7 veins	5-9 veins
Glumes			usually > lemmas		
Glumes, tips	thin, awl-like	gradually tapered to awns, awn +/- = awned, awns 1.5-2.5 mm body	thin, awl-like	tips truncate to acute, rarely mucronate	tips truncate
Glumes, surface	smooth or scabrous	glabrous, smooth near the base	glabrous at least at the base	scabrous or short-hairy	glabrous
Lemmas, length	6.5-12 mm	7-14 mm	15-20 mm	5.5-7.5 mm	9-12 mm
Lemmas	glabrous or hairy	usually glabrous	pubescent proximally glabrous distally	glabrous or short-hairy	glabrous
Lemma awns	0-3 mm	0-4 mm	1.5-2.5 mm	0.8-3.5 mm	0
Anthers, length	4-7 mm	3.5-7 mm	about 5 mm	2.5-5.1 mm	4-6 mm

Table 53. *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

Table 54. 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 glumes
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

Table 55. Alkali Muhly and Alkali Sacaton, two grasses with open panicles and small spikelets, growing on alkaline soils.

Trait	<i>Muhlenbergia asperifolia</i>	<i>Sporobolus airoides</i>
Common name	Alkali muhly	Alkali sacaton
Oregon range	widespread E of Cascades	Alvord Desert, S Malheur Co.
Habit	rhizomatous	cespitose
Florets per spikelet	2-3	1(-3)
Ligules	membranous	of hairs
Ligules, length	0.1-0.3 mm	0.2-1 mm
Leaf blades, width	1-2.8(4) mm	(1)2-5(6) mm
Inflorescences, length	6-21 cm	(10)15-45 cm
Inflorescences, width	4-16 cm	15-25 cm
Inflorescence branches	usually white	usually light brown
Spikelets, length	1.2- 2.1 mm	1.3-2.8 mm
Glumes, length	equal	unequal

Table 56. The *Phalaris* that resemble *P. aquatica*.

Trait	<i>P. aquatica</i>	<i>P. californica</i>	<i>P. canariensis</i>	<i>P. caroliniana</i>	<i>P. minor</i>
Duration	perennial	perennial	annual	annual	annual
Culms, bases	often swollen	swollen	?		not swollen
Leaves, width	0.5-10 mm	3-12(18) mm	2-10 mm	2-11 mm	3-15 mm
Infl. length	1.5-15 cm	1.5-6 cm	1.5-5 cm	0.5-8(8.5) cm	1-8 cm
Infl. width	1-2.5 cm	1-3 cm	1.5-2 cm	0.8-2 cm	1-2 cm
Glume length	4.4-7.5 mm	5-8 mm	7-10 mm	3.8-6(8) mm	3.5-6.5 mm
Glume width	1.2-1.5 mm	0.9-1.6 mm	2-2.5 mm	0.8-1.5 mm	1.2-3 mm
Glume wing, width	0.2-0.4 mm	0-0.2 mm	to 0.6 mm	0.1-0.5 mm	0.3-0.5 mm
Glume, margins	usually entire	entire to minutely toothed	entire	smooth or scabrous	irregularly toothed or crenate, or entire*
Sterile spikelets#	1(2)	2	2	2	1
Sterile spikelets, length	1-3 mm (if 2, the shorter to 0.7 mm)	1.8-3.5 mm	2-4.5 mm	1.5-2.5 mm	0.7-1.8 mm
Sterile spikelets	[partly] hairy	densely hairy	sparsely hairy	glabrous below, hairy distally	glabrous or nearly so
Terminal floret, length	3.1-4.6 mm	3.5-5 mm	4.5-6.8 mm		2-4 mm
Anthers, length	3-3.6 mm	3-3.5 mm	2-4 mm	1.5-2 mm	1-2 mm

Table 57. Related species, if *P. arundinacea* is split. Only *P. arundinacea* s. str. known in N Am.

Trait	<i>P. rotgesii</i>	<i>P. caesia</i>	<i>P. arundinacea</i> s.str.
author	(Husn.) Baldini	Nees	L.
Glume length	2-3.8 mm	6-7 mm	4-8.1 mm
Sterile florets, length	1-1.5 mm	about 2.5 mm	1.5-2 mm
Bisexual florets, length	2-3 mm	3.5-4 mm	2.5-4.2 mm
Ploidy	diploid	hexaploid	?

Table 58. Strongly rhizomatous wheatgrasses that are awnless or nearly so. (Some *Pseudoroegneria* are awnless).

Trait	<i>Elymus lanceolatus</i>	<i>Elymus repens</i>	<i>Leymus triticoides</i>	<i>Pascopyrum smithii</i>	<i>Pseudoroegneria spicata</i>	<i>Thinopyrum intermedium</i>
Chromosomes	2n = 28	22, 42	2n = 28	2n = 56	2n = 14, 28	2n = 42, 43
Foliage, color		green, glaucous	green	often glaucous	often glaucous	glaucous
Leaves	more evenly distributed	evenly distributed	often basally concentrated	tending to be basally concentrated	evenly distributed ?????	+/- evenly distributed
Leaf width	1.5-6 mm	6-10 mm	3.5-10 mm	1-4.5 mm	2-6 mm	2-8 mm
Spikelets per node	usually 1(2)	1(2)	(1)2(3)-2 at midlength	usually 1 (-2 at lower nodes)	usually 1	1
Glumes, thickness	normal	normal	thick, stiff	normal	normal	very thick, stiff
Glumes, veins	3-5	L: 3-6 U: 5-7	1(3)	3-5 basally, 1 distally	(3)4-5(7)	5-7
Glume midveins	straight	straight	straight	slightly curving to the side distally	straight	straight
Glumes, shape	lanceolate	oblong	subulate	narrowly lanceolate	lanceolate to oblanceolate	oblong
Glumes, tip shape	acute, acuminate	acute	narrowly acute (subulate glumes)	acuminate	acute (to obtuse)	obliquely truncate, obtuse, or acute
Glumes, distinctive traits	50-75% as long as lemmas; tapering from beyond midlength; width at ¾ length = 0.35-1.6 mm	keeled & scabrous near tip, glabrous and rounded near base	tapering from below midlength; narrower at base	50-65% as long as lemmas; tapering from midlength or below; width at ¾ length = 0.15-0.8 mm (lower glumes); wider at base	narrowing beyond midlength	oblong
First rachilla internodes distinctive traits	often longer; narrower; length/width ratio averaging 2.6			0.8-2 mm; 0.5-0.9 mm; length/width ratio averaging 1.8	(7)10-20(28) mm at midlength, lower ones often longer	
Lemmas	glabrous to hairy	glabrous	glabrous, usually smooth and shiny	glabrous to pruinose		glabrous to densely hairy
Lemma awns	0-2 mm	0-4(10) mm	to 3 mm	0-5 mm	0 or to 25 mm	0-mucronate
Anthers, length	(2.5)3-6 mm	4 -7 mm	3-6 mm	2.5-6 mm	4-8 mm	5-7 mm

Table 59. *Phalaris* species.

Trait	<i>P. angusta</i>	<i>P. aquatica</i>	<i>P. arundinacea</i>	<i>P. californica</i>	<i>P. canariensis</i>	<i>P. caroliniana</i>	<i>P. minor</i>	<i>P. paradoxa</i>
Duration	annual	perennial	perennial	perennial	annual	annual	annual	annual
Habit		cespitose, short-rhizomatous	rhizomatous	cespitose	tufted			tufted
Culms, bases		often swollen		swollen	?		not swollen	not swollen
Leaves, width	2-12 mm	0.5-10 mm	5-20 mm	3-12(18) mm	2-10 mm	2-11 mm	3-15 mm	2-5 mm
Inflorescence length	2-20 cm	1.5-15 cm	1-4 cm	1.5-6 cm	1.5-5 cm	0.5-8(8.5) cm	1-8 cm	3-9 cm
Inflorescence width	0.6-1.5 mm	1-2.5 cm		1-3 cm	1.5-2 cm	0.8-2 cm	1-2 cm	+/- 2 cm
Spikelets of 2 kinds ?	no	no	no	no	no	no	no	yes
Glume length	2-6 mm	4.4-7.5 mm	4-8.1 mm	5-8 mm	7-10 mm	3.8-6(8) mm	3.5-6.5 mm	4-8 mm long*
Glume width	0.6-1.1 mm	1.2-1.5 mm	0.8-1 mm	0.9-1.6 mm	2-2.5 mm	0.8-1.5 mm	1.2-3 mm	+/- 1 mm
Glume wing, width	+/- 0.4 mm	0.2-0.4 mm	0-0.2 mm	0-0.2 mm	to 0.6 mm	0.1-0.5 mm	0.3-0.5 mm	0.2-0.4 mm
Glume, margins	irregularly toothed	usually entire	scabrous	entire to minutely toothed	entire	smooth or scabrous	irregularly toothed or crenate, or entire*	single, prominent tooth
Sterile spikelets, #	2	1(2)	2	2	2	2	1	2
Sterile spikelets, length	0.5-1.5 mm	1-3 mm (if 2, the shorter to 0.7 mm)	1.5-2 mm	1.8-3.5 mm	2-4.5 mm	1.5-2.5 mm	0.7-1.8 mm	0.2-0.4 mm
Sterile spikelets	Inconspicuously hairy	[partly] hairy	hairy	densely hairy	sparsely hairy	glabrous below, hairy distally	glabrous or nearly so	often with 1-2 hairs
Terminal floret, length	2-3.8 mm	3.1-4.6 mm	2.5-4.2 mm	3.5-5 mm	4.5-6.8 mm		2-4 mm	2.5-3.5 mm
Terminal floret, width	0.9-1.5 mm	1.2-1.5 mm		1-1.5 mm		2.9-4.7 mm	1-1.8 mm	0.8-1.5 mm
Terminal florets, surface	hairy, especially distally	hairy	hairy distally and on margins	sparsely hairy	densely hairy	0.9-1.8 mm	hairy	glabrous or w/ few short hairs by tip
Anthers, length	0.5-1.3 mm	3-3.6 mm	2.5-3 mm	3-3.5 mm	2-4 mm		1-2 mm	1.5-2.5 mm

Table 60. Differences between native and introduced *Phragmites australis*.

Trait	<i>P. a. ssp. americanus</i>	<i>P. a. ssp. australis</i>
Plant height	1 – 4 m	3 – 6 m
Clonal expansion rate	slow	fast
Stand trait	usually doesn't form monocultures	usually forms monocultures
Rhizome density	low	high
Rhizome color	yellowish	white to light yellow (but they darken after exposed to air)
Rhizome width	usually < 15 mm	usually > 15 mm
Lower stem internode color (spring, summer; remove sheath)	red to chestnut, or green with these colors)	green or tan, yellow, yellow-brown
Lower stem internode color (winter; remove sheath)	light chestnut to light brown or gray	tan
Internodes, dark fungal spots	present or absent	absent
Culm texture (run finger up and down and across culm after removing sheath)	smooth and shiny	ribbed, rough, dull. (Occasionally basal internodes might appear smooth)
Culm cross-sectional shape	almost perfectly round (occasionally slightly compressed)	usually compressed (oval)
Stem flexibility	flexible	rigid
Stem toughness	not tough	tough
Stem density	low	high
Leaf sheaths	fall off in autumn (easy to remove if they stay)	stay on the plant (or basal ones occasionally fall), hard to remove
Leaf color	yellow-green	Inland: dark green to glaucous. Coastal: yellow green to dark green or glaucous
Inflorescence	sparser	denser
Lower glumes, length	(3)3.8-7 mm	2.5 – 4.2(5) mm
Upper glumes, length	5.5-11 mm	4.5-7.5 mm
Lemmas, length	8-13.5 mm	7.5-12 mm
Ligule length (membranous part, middle leaves)	(0.2)0.4-0.9 mm	0.1-0.4 mm
Ligule length – FNA	1-1.7 mm	0.4-0.9 mm

Table 61. *Poa laxa* and *P. glauca* ssp. *rubicola*

Trait	<i>P. laxa</i>	<i>P. glauca</i> ssp. <i>rubicola</i>
FNA page	570	577
Habitat	mesic alpine locations	dry alpine areas
Height	8 – 35 cm	5 – 15 cm
Foliage color	not or slightly glaucous	usually glaucous
Leaf sheaths closed	20 – 33% of length	10 – 20% of length
Rachilla internodes	< 1 mm, smooth, glabrous	to 1.2 mm, smooth to hairy
Lemmas, keels and marginal veins	short- to long-villous	short-villous
Lemmas, lateral veins	glabrous or sparsely short-pubescent	obscure, usually sparsely softly puberulent to short-villous
Lemmas, intercostal regions	glabrous	with at least a few short hairs
Paleas	sparsely scabrous over the keels	keels scabrous, glabrous, or softly puberulent at midlength, intercostal regions glabrous or softly puberulent
Anthers, length	0.8-1.1 mm	(1)1.2-2.5 mm

Table 62. *Poa reflexa* and *P. leptocoma*

Trait	<i>P. reflexa</i>	<i>P. leptocoma</i>
FNA page	538	573
Habitat	subalpine forests, meadows, and low alpine habitats	around lakes and ponds and along streams, subalpine to alpine
Habitat	drier, more disturbed sites	wetter, less disturbed
Duration	shorter-lived	longer-lived
Palea keels	scabrous, usually softly puberulent at midlength	glabrous or pectinately ciliate
Lemma lateral veins	usually sparsely softly puberulent at least on 1 side	glabrous
Panicle branches	smooth (to sparsely scabrous)	usually moderately densely scabrous (to sparsely scabrous)
Ploidy	4X	6X
Anther length	0.6 – 1 mm	0.2 – 1.1 mm (usually shorter)
Glumes	narrowly to broadly lanceolate	subulate to lanceolate (narrower)

Table 63. *Poa palustris*, *P. leptocoma*, and *P. reflexa*.

Trait	<i>P. reflexa</i>	<i>P. leptocoma</i>	<i>P. palustris</i>
FNA page	538	573	574
Habit	densely tufted	loosely tufted (occ. with short, slender rhizomes)	loosely (occ. densely) tufted, often stoloniferous
Leaf sheath closure	33-67%	25-60%	10-25%
Ligules, length	1.5-3.5 mm	1.5-4(6) mm	(1)1.5-6 mm
Leaves, width	1.5-4 mm	1-4 mm	1.5-8 mm
Inflorescence length	4-15 cm	5-15 cm	(9)13-30(41) cm
Panicle branches	spreading to reflexed	spreading to reflexed	spreading at maturity, to slightly reflexed
Panicle branches, angles	sparsely to moderately scabrous	usually moderately densely scabrous (to sparsely scabrous)	densely scabrous
Spikelets, length	4-6 mm	4-8 mm	3-5 mm
Lower glume, veins	1	1	3
Lemmas, length	2.7-4.2(5) mm	3-4 mm	2-3 mm
Lemmas, keels	short-villous to ½- ¾ length	sparsely hairy ¼ - 2/3 length	short-villous
Lemma tips	acute	sharply acute to acuminate	obtuse to acute
Lemma tips, color	bronze-colored or not	often bronze-colored	often bronze-colored

Table 64. Cespitose alpine bluegrasses. * = usually found at lower elevations.

Trait	<i>P. alpina</i>	<i>P. laxa</i> var. <i>baffiana</i>	<i>P. glauca</i> ssp. <i>rupicola</i>	<i>P. pringlei</i>	<i>P. stenantha</i> *	<i>P. suksdorfii</i>	<i>P. lettermanii</i>	<i>P. cusickii</i> *	<i>P. wheeleri</i> *	<i>P. fendleriana</i> var. <i>longiligula</i> *
FNA page	518	570	576	564	592	584	580			
Oregon range	Wallowas	Wallowas	Wallowas	Siskiyou	Wallowas, CR, Cascades, Siskiyou	Wallowas, Cascades	Three Sisters	Wallowas, Cascades, Steens, others	Wallowas, Cascades, Steens, Siskiyou, others	Steens, southern mts
Sheath closure	12 – 30%	20-33%	10-20%	15-33%	10-20(25)%	15-25(33)%	12-25%	33-67%	33-75%	~ 33%
Ligule length	culms: to 4(5) mm	2-4 mm	1-4(5) mm	1-6 mm	2-5 mm	culms: 1-3 mm	1-3 mm	0.5-1.5(2.2) mm	0.5-2 mm	(1.5)1.8-18 mm
	vegetative shoots: 1-2(3) mm					vegetative shoots: 0.5-2.5 mm				
Leaf width	upper: 2-4.5 mm	culm: 1-2(3) mm	0.8-2.5 mm	1.5-3 mm	culm: 1.5-4(5) mm	uppermost blades 1-2 mm	0.5-2 mm	culm: 0.5- 1(1.5) mm	culm: 2-3.5 mm	culm: (0.5)1- 3(4) mm
Inflorescence length	2-6(8) cm	2-8 cm	1-5 cm	1-6 cm	5-18(25) cm	3-6 cm	1-3 cm	2-10(12) cm	5-12(18) cm	2-12(30) cm
Spikelet length	3.9-6.2 mm	4-6 mm	3-7(9) mm	6-8(12) mm	6-10 mm	4.2-7 mm	3-4 mm	3-6(8) mm	5.5-10 mm	(3)4-8(12) mm
Rachilla internodes	0.5-0.8 mm	< 1 mm	to 1.2 mm		1.2-2 mm	1-1.5 mm	< 1 mm	0.8-1.1 mm		(0.4)0.8, 1.1 mm (mine)
Glume length	(2.3)2.7- 3.4(3.6) mm		upper: 2- 3.8(5.2) mm		upper: (3.7)4.1-6.5 mm	(3.3)4.3-5.7 mm		low: 2-4 mm; upper 2.9-5 mm		
Glumes vs. lower lemma	shorter than	shorter or subequal to	shorter than or subequal to			Upper: = / >	both = / >	shorter than	shorter than	shorter
						Lower: = / <				
Calluses	glabrous	glabrous or with sparse webs < ¼ lemma	glabrous	glabrous	glabrous or with a crown of crips to slightly sinuous hairs 0.2-2 mm	glabrous	glabrous	with sparse, diffuse web of soft hairs 1-2 mm long, rarely glabrous	glabrous	glabrous

Trait	<i>P. alpina</i>	<i>P. laxa</i> var. <i>baffiana</i>	<i>P. glauca</i> ssp. <i>rupicola</i>	<i>P. pringlei</i>	<i>P. stenantha</i> *	<i>P. suksdorfii</i>	<i>P. lettermanii</i>	<i>P. cusickii</i> *	<i>P. wheeleri</i> *	<i>P. fendleriana</i> var. <i>longiligula</i> *
Lemma length	3-5 mm	3-4.6 mm	2.5-4 mm	5-8 mm	4-6 mm	4.1-5.8 mm	2.5-3 mm	2.5-4(4.5) mm	3-6 mm	3-6 mm
Lemma keel and marginal veins	short to long villous	short to long villous	short villous	glabrous	short to long villous		glabrous (or rarely proximately sparsely softly puberulent)	glabrous or less often sparsely softly puberulent	glabrous or sparsely softly puberulent to short villous	long villous
Lemma intercostal area	sparsely to moderately short villous	glabrous	at least sparsely crisply puberulent to softly puberulent	glabrous	glabrous or sparsely softly puberulent or hispidulous only near the base, hairs shorter than on keels and and veins		glabrous	glabrous	glabrous or hispidulous, rarely softly puberulent, smooth or finely scabrous	short-pubescent (sparkly) to glabrous
Flowers perfect?	yes		yes	no	yes			no?	no	no?
Anther length	1.3-2.3 mm	(0.6)0.8-1.1(1.3) mm	(1)1.2-2.5 mm	2-4 mm (or 0.1-0.2 and vestigial)	1.2-2 mm	0.8-1.2(1.7) or rarely aborted	0.2-0.8 mm	0.1-0.2 mm or 1.5-2 mm	usually 0.1-0.2 mm long, to 2 mm long	0.1-0.2 or 2-3 mm
Comments	Glumes strongly curved on keel and margins, flat. Spikelets compact. Leaves short.			Leaves can be arching. Culms much longer than leaves.						Blade of flag leaf reduced. Inflorescences narrow, dense, long.

Table 65. Five alpine bluegrasses.

Trait	<i>Poa alpina</i>	<i>Poa laxa</i>	<i>Poa glauca</i> ssp. <i>rupicola</i>	<i>Poa lettermanii</i>	<i>Poa suksdorfii</i>
FNA page	518	570	576	580	584
Known Oregon range	Wallowas	Wallowas	Wallowas	South Sister	Wallowas
Basal branching	intravaginal	mixed, mainly extravaginal or mainly pseudointravaginal, sometimes intravaginal	all or mostly extravaginal	all or mainly intravaginal	all or mainly intravaginal
Leaf sheath closure	12-30%	20-33%	10-20%	15-25%	15-25(33)%
Leaf width	2-4.5 mm	1-3(3) mm	0.8-2.5 mm	0.5-2 mm	1-2 mm
Spikelet length	3.9-6.2 mm	4-6 mm	3-7(9) mm	3-4 mm	4.2-7 mm
Spikelet length/width	1.5-2.5	to 3	2-3		to 3.5(3.8)
Spikelet shape	ovate				lanceolate
Rachilla length	0.5-0.8 mm	less than 1 mm	to 1.2 mm	less than 1 mm	to .5 mm
Glumes length				2.9-3.6(4) mm	(3.3)3.7-5.7 mm
Glumes vs. lemmas	upper glumes subequal to or shorter than lowest lemmas	nearly equaling or slightly longer than adjacent lemmas		usually equaling or exceeding the lowest lemmas, sometimes also equaling or exceeding the upper florets	
Glume shape	broadly lanceolate to narrowly ovate	lanceolate to broadly lanceolate	narrowly to broadly lanceolate	lanceolate to broadly lanceolate	lanceolate
Callus	glabrous	glabrous or with sparse cobwebby hairs usually shorter than ¼ lemma length	glabrous	glabrous	glabrous
Lemma length	3-5 mm	3-4.6 mm	2.5-4 mm	2.5-3 mm	4.1-5.8 mm
Lemma shape	broadly lanceolate	lanceolate to broadly lanceolate	lanceolate to broadly lanceolate	lanceolate	narrowly lanceolate
Lemma keels & margins	short- to long-villous	short- to long-villous	short-villous	glabrous, rarely sparsely puberulent near base	glabrous
Lemma lateral veins	moderately prominent	glabrous or sparsely softly puberulent, obscure	usually sparsely softly puberulent to short-villous, obscure	glabrous	glabrous
Lemma intercostal regions	sparsely to moderately short-villous	glabrous	at least sparsely short-hairy	glabrous	glabrous
Lemma tips	acute	acute	obtuse or acute	acute	acute
Anther length	1.3-.5 mm	0.8-1.1 mm	(1)1.2-2.5 mm	0.2-0.8 mm	0.8-1.2(1.7) mm

Table 66. Four bluegrasses of western Oregon forests, with open panicles, calluses with cobwebby hairs, and short anthers.

Trait	<i>P. marcida</i>	<i>P. laxiflora</i>	<i>P. palustris</i>	<i>P. nemoralis</i>
FNA page	512	538	574	574
Habit	loosely to densely tufted, to short-rhizomatous	loosely tufted to with solitary shoots, long rhizomatous	loosely (to densely) tufted, often stoloniferous	densely tufted
Basal branching	mainly pseudointravaginal	extravaginal	extravaginal or mixed extra- and intravaginal	all or mostly extravaginal
Leaf sheath closure	at least 90%	50-75%	10-25%	10-25%
Ligule length	0.5-2 mm	2-3.5 mm	(1)1.5-6 mm	0.2-0.8(1) mm
Leaf width	1.5-5 mm	3-8 mm	1.5-8 mm	0.8-3 mm
Inflorescence length	5-22 cm	14-30 cm	(9)13-30(41) cm	7-16(20) cm
Floret/spikelet	(1)2(4)	2-4	(1)2-5	(1)2-5
Lower glumes, veins	1	1-3	3	3
Lemma length	3.2-5 mm	3.2-6 mm	2-3 mm	2.4-4 mm
Lemma surface	glabrous, smooth	smooth or sparsely finely scabrous		
Lemma keels & marginal veins	glabrous, smooth	long-villous	short-villous	short-villous
Lemma tips			partly bronze-colored	partly bronze-colored

Table 67. *Poa interior* and two related species.

Trait	<i>P. palustris</i>	<i>P. nemoralis</i>	<i>P. interior</i>
Nativity	introduced (native?)	introduced	native if present
Habitat	mostly riparian or in mesic to wet meadows, rarely subalpine	low elevation forests	rocky forested slopes & mossy rocks to low alpine
Culms	often with lateral shoots arising from leaf axils of the same year's growth	nearly always without lateral shoots arising from leaf axils of same year's growth	nearly always without lateral shoots arising from leaf axils of same year's growth
Culms	sometimes forming broad patches because rooting at lower nodes	only rarely forming broad patches because rooting at lower nodes	only rarely forming broad patches because rooting at lower nodes
Longest ligules, shape	obtuse to acute	truncate	truncate to obtuse
Longest ligules, length	2-8 mm	0.2-0.8 mm	1-3 mm
Uppermost culm leaf blades	longer or shorter than the sheath	longer than the sheath or nearly as long	longer or shorter than the sheath
Rachilla internodes	smooth (rarely hispidulous)	usually with soft hairs (rarely glabrous)	glabrous, minutely scabrous, or hairy
Callus hairs	well developed	sparse	sparse (sometimes absent in alpine zone)
Callus hairs	reaching the lemma tip when stretched out	usually short	not reaching past the lemma middle when stretched out
Lemma length	2-3 mm	2.4-4 mm	2.4-4 mm

Table 68. Subspecies of *Poa cusickii*.

Trait	<i>P. c. cusickii</i>	<i>P. c. epilis</i>	<i>P. c. pallida</i>	<i>P. c. purpurascens</i>
Plant height	10-60(70) cm	20-45 cm	10-40 cm	25-50 cm
Habit	densely tufted	densely tufted	densely tufted	moderately to densely tufted
Vegetative shoots	intravaginal	intra- and extravaginal	intravaginal	mostly extravaginal
Culms	mostly erect	mostly erect	mostly erect	decumbent-based
Culm nodes	0-1, well exerted	1-2, well exerted	0(1), little exerted	1-2, well exerted
Leaf sheaths closed	25-67%	33-75%	25-65%	50-75%
Distal sheaths	3-10 times as long as blades	2-5 times as long as blades	3.6-10 times as long as blades	1.5-6 times as long as their blades
Leaf blades (vegetative shoots), width	0.5-1 mm	0.7-1 mm	0.5-1 mm	mostly 1-2 mm
Leaf blades, cauline, width	less than 1.5 mm	more than 1.5 mm	usually less than 1.5 mm	more than 1.5 mm wide
Leaf blades, cauline	flat, folded, or involute	flat or folded	flat, folded, or involute	flat or folded
Uppermost culm blades, length	(0.5)1.5-5 cm	1.5-5 cm	0.5-2(3) cm	3-6 cm
Inflorescence length	5-10(12) cm	2-7 cm	2-6 cm	4-7 cm
Inflorescence	contracted or loosely contracted	usually contracted	contracted	slightly lax, ovate, loosely contracted
Spikelets per inflorescence	20-100	20-70	10-40	13-50
Panicle branches per node	1-5	2-5	1-3	1-3
Panicle branch length	1.7-4(5) cm	1-3 cm	0.5-1.7 cm	1-3(4) cm
Panicle branches	slender to stout	moderately stout	stout	moderately stout
Panicle branches	moderately to densely scabrous	smooth to sparsely scabrous	moderately to densely scabrous	smooth to moderately scabrous
Spikelets/branch	2-15	1-8	2-5	1-8
Spikelet length	4-10 mm	(3)4-8 mm	4-10 mm	7-10 mm
Calluses	glabrous	glabrous	glabrous	proximal: with short cobwebby hairs distal: glabrous
Lemma length	4-7 mm	3-6 mm	4-7 mm	4-7 mm
Lemmas	glabrous	glabrous	glabrous	proximal: sometimes with soft hairs on keel & veins near base distal: glabrous
Anther length	0.1-0.2 mm or 2-3.5 mm	usually aborted (late)	0.1-0.2 mm*	usually aborted (late)
Elevation	900-9000 ft	6700-11000 ft	6500-9000 ft	5000-9500

*or 2-3.5 mm long, but not in Oregon

Table 69. *Poa* of moist forests in western Oregon.

Trait	<i>P. laxiflora</i>	<i>P. marcida</i>	<i>P. nervosa</i>
FNA page #	538	512	545
Range in OR	Coast Range, W Cascades in Clackamas Co.	NW OR; Coast Range and N Cascades	W Cascades S to Marion Co.; Columbia Gorge
Leaf sheath closure	50-75%	90+%	65-90%
Panicle length	14-30 cm	6-22 cm	8-15 cm
Panicle branches	spreading, drooping	appressed, drooping	spreading
Panicle branch length	(5.5)8-12(15) cm		2.5-8 cm
Spikelet length	2-8 mm	3.5-7 mm	4-7 mm
Florets per spikelet	2-4	(1)2(4)	3-8
Callus	cobwebby hairs	sparse cobwebby hairs	glabrous (to minutely webbed)
Lemma length	3.2-6 mm	3.2-5 mm	3-4.5 mm
Lemma tips	acute	acuminate	acute
Anther length	0.5-1.1 mm	0.5-1.2 mm	2.5-4 mm (or 0.1-0.2 mm)

Table 70. *Poa cusickii* and *P. leibergii*.

Trait	<i>Poa cusickii</i>	<i>Poa leibergii</i>
Leaf width (vegetative)	0.5-2 mm	0.1-1 mm
Leaf width (cauline)	0.5-3 mm	0.1-1 mm
Leaves	tougher, retaining shape	soon withering
Spikelets per panicle	10-100	(1)6-17(22)
Lemmas	glabrous (to scabrous) or with keels and/or marginal veins with hairs on lower third	glabrous (to scabrous)
Culm thickness	0.5-1.8 mm	0.5-0.7 mm
Ligules (vegetative leaves)	0.2-0.5(2.5) mm	(1)2-4 mm
Ligules (cauline leaves)	1-3(6) mm	(1)2-4 mm
Branches per node	1-3(5)	1-2
Branches	erect to steeply ascending	erect to spreading

Table 71. *Poa stenantha*, *P. secunda*, *P. pringlei*, *P. unilateralis* – sheaths mostly open, most shoots sterile, callus glabrous or with more or less straight hairs.

Trait	<i>Poa pringlei</i>	<i>Poa secunda</i>	<i>Poa stenantha</i>	<i>P. unilateralis</i>
FNA page	564	586	592	594
Panicle	dense	contracted	open	dense/contracted
Sexuality	Dioecious	Synoeocious	Synoeocious	Synoeocious
Range	SW OR, inland	widespread	W OR	coastal
Habitat	subalpine and alpine	various	various	coastal bluffs, islands
Ligules, veg shoots	1-2.5 mm	0.5-6(10) mm	2-5 mm	2-6 mm
Ligules, fertile shoots	1-6 mm	0.5-6(10) mm	2-5 mm	2-6 mm
Ligules	colorless, translucent, smooth or scabrous	smooth or scabrous	milky white, smooth or sparsely scabrous	smooth or sparsely scabrous
Ligules, tips	truncate to acute	truncate to acute	acute to acuminate	obtuse to acute
Leaf blade width, vegetative shoots	1.5-3 mm	0.4-3(5) mm	1.5-4(5) mm	1-1.5 mm
Leaf blade width, culm	1.5-3 mm	0.4-3(5) mm	1.5-4(5) mm	2-5 mm
Panicle length	1-6 cm	2-25(30) cm	5-18(25) cm	(1.5)2.3-3.6(4) cm* (2.2)3-9 cm**
Panicle branch length	0.5-1.5(2) cm	(0.5)1-8(10) cm	3-15 cm	0.4-4.5 cm
Spikelet length	6-8(12) mm	(4)5-10 mm	6-10 mm	4.5-7 mm
Glumes	thin, lustrous		dull	
Callus hairs	glabrous	glabrous or with hairs 0.1-0.5(2) mm, crisp or slightly sinuous	usually with hairs 0.2-2 mm long, sometimes glabrous	glabrous or with hairs 0.1-0.2 mm long
Lemma length	5-8 mm	3.5-6 mm	4-6 mm	3-4.5 mm
Lemma surface	smooth or sparsely finely scabrous, glabrous, latera veins moderately prominent, margins glabrous	glabrous or keels and marginal veins softly puberulent to short-villous, intercostal regions smooth or scabrous, glabrous, short-villous, crisply puberulent, or softly puberulent over the basal 2/3, hairs of keels and veins often like those between	keels, marginal veins, and sometimes lateral veins short-to long-villous, hairs extending for ¾ of the keel, intercostal regions glabrous, sparsely puberulent or hispidulous proximally, usually sparsely or moderately densely scabrous distally, the hairs distinctly shorter than those of the keels and veins	glabrous or the keels and marginal veins short-villous to mid-length, intercostal regions sparsely puberulent near the base

Table 72. Subspecies of *Poa pratensis*.

Trait	<i>P. p. ssp. agassizensis</i>	<i>P. p. ssp. angustifolia</i>	<i>P. p. ssp. irrigata</i>	<i>P. p. ssp. pratensis</i>
Habitat	prairies and mountain grasslands		subarctic to boreal, coastal and lowland	diverse
Habitat		dry meadows and forests	low, wet, often sandy ground	various habitats, often mesic, incl. low, wet, sandy ground
Habit	moderately to densely tufted	moderately densely to tensely tufted	moderately densely to loosely tufted,	densely to loosely tufted
Turf-forming ?	no	no	sometimes	often
Shoots	clustered	clustered (intravaginal)	solitary	clustered
Basal branching	intra- and extravaginal	intra- and extravaginal, the intravaginal shoots clustered	mainly extravaginal	intra- and extravaginal
Basal branching ; intravaginal shoots	present	present	absent (or present)	present or absent
Culm height	20-40(50) cm	25-80 cm	8-30(50) cm	8-100 cm
Tiller shoot blades, length	usually less than 15 cm	10-45 cm	usually less than 15 cm	10-45 cm
Tiller shoot blades, width	0.8-2 mm	0.4-1 mm	2-4.5 mm	0.4-4 mm, some narrower than clum blades
Tiller shoot blades, width		0.4-1 mm	some blades 1.5-4.5 mm	some blades 1.5-4.5 mm
Tiller shoots like cauline ?		yes	(yes or no)	yes
Tiller shoot blades	all involute or folded	involute or folded		all flat or some involute
Tiller shoot blades		involute to folded	flat or folded	flat (or folded)
Tiller shoot blades	somewhat firm	somewhat firm		usually soft
Tiller shoot blades, upper surface	sparsely pubescent	sparsely pubescent	usually glabrous	sparsely pubescent
Tiller shoot blades, upper surface	often sparsely hairy	often sparsely and softly hairy	rarely hairy	rarely hairy
Inflorescence length	4-8 cm	4-18 cm	2-10 cm	5-18 cm
Inflorescence shape	ovoid, narrowly pyramidal, or loosely contracted	narrowly pyramidal or loosely contracted	broadly pyramidal, open	broadly pyramidal, somewhat open or contracted
Inflorescence branches per node	2-5		1-2(5)	3-5(7)
Branches	ascending	ascending to spreading	widely spreading	spreading to somewhat reflexed
Branches, length			1.5-6 cm	
Branches, surfaces	smooth or sparsely to moderately densely scabrous	smooth or sparsely to densely scabrous	smooth or sparsely to moderately scabrous	smooth or sparsely to fairly densely scabrous
Branches, surfaces	smooth or almost smooth	more or less scabrous	more or less scabrous	more or less scabrous
Spikelets per branch	several	several to many	4-8	several to many

Trait	<i>P. p. ssp. agassizensis</i>	<i>P. p. ssp. angustifolia</i>	<i>P. p. ssp. irrigata</i>	<i>P. p. ssp. pratensis</i>
Spikelets, shape	lanceolate	narrowly lanceolate	lanceolate to broadly lanceolate	lanceolate to broadly lanceolate
Glume keels	strongly compressed	strongly compressed	distinct	strongly compressed
Glumes, color			often noticeably glaucous (pruinose)	
Upper glumes	shorter than to nearly equaling the lowest lemmas	shorter than to nearly equaling the lowest lemmas	often nearly equaling the lowest lemmas	shorter than to nearly equaling the lowest lemmas
Lower glumes	shorter than the lemmas?	shorter than the lemmas?	often nearly equalling the lowest lemmas	shorter than the lemmas?
Lemmas, length	2-4 mm	2.5-3.5 mm	3-5(6) mm	2.8-4.3 mm
Lemmas, surface	finely muriculate	finely muriculate	finely muriculate	finely muriculate
Palea keels	scabrous, glabrous	scabrous, glabrous	scabrous	scabrous, glabrous
Palea intercostal region	glabrous	glabrous	glabrous	glabrous

Table 73. *Poa humilis* and *Poa thurberiana*.

Trait	<i>P. humilis</i>	<i>P. thurberiana</i>
Glumes	ovate to elliptic	elliptic, narrowly elliptic
Glumes	usually exceeding lemma by 0.2 – 0.4 mm	usually as long as or to 0.1 mm longer than the lemma
Panicles, length	1.5 – 6 cm	(2.5)5-12 cm
Leaf width	0.3 – 0.8(1.5) mm	1 – 3 mm
Flag leaf originates	usually below mid-culm	usually about midculm
Plants, height	< 15 cm	usually > 15 cm
Panicles	narrow even at anthesis	narrow, broader at anthesis
Pales	65 – 75% of lemma length	almost = lemma length
Rachilla prolongation	0 (0.1) mm	0.1 – 0.5 mm
Glume length	1.6 – 2 mm	2 – 2.5 mm

Table 74. Rare *Polypogon* of Oregon.

* = but often flowering the first year.

Trait	<i>Polypogon interruptus</i>	<i>Polypogon fugax</i>	<i>Polypogon viridis</i>
Duration	perennial*	annual	perennial*
Stipes	0.2 – 0.7 mm	0.2 – 1.3 mm	0.2 – 1.3 mm
Glumes, length	2 – 3 mm	1.8 – 2.4 mm	1.5 – 2 mm
Glumes, tip shape	usually slender, tapered, (acute to truncate)	acute to rounded, lobed	obtuse to truncate
Glume lobes/teeth	0(0.1) mm	0.1 – 0.2 mm	0
Glume awns	1.5 – 3.2 mm	0.6 – 3 mm	0
Lemmas	0.8 – 1.5 mm	0.9 – 1.2 mm	~ 1 mm
Lemma awns	1 – 3.2 mm	0 – 2 mm	0
Palea vs. lemma	0.75	0.75 – 1	~1
Anthers	0.5 – 0.7 mm	0.3 – 0.6 mm	0.3 – 0.5 mm
Ligules	2 – 6 mm	2 – 8 mm	to 5 mm
Leaves, width	3 – 6 mm	2 – 11 mm	1 – 6 mm
Pedicels	0	0 – 0.5 mm	0

Table 75. *Puccinellia* of the Oregon Coast.

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, dense
Pedicels; epidermal cells	often tumid distally	often tumid	not 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

Table 76. *Puccinellia* of Oregon east of the Cascades.

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

Table 77. *Setaria parviflora* and *S. pumila*.

Trait	<i>S. parviflora</i>	<i>S. pumila</i>
Bristle length	2 – 12 mm	3 - 8 mm
Spikelet length	2 – 2.8 mm	2 – 3.4 mm
Upper glume length	½ - 2/3 spikelet length	~ ½ spikelet length
Lower lemma	occasionally hard and faintly transversely rugose	not
Duration	Perennial	Annual
Habit	short-rhizomatous	tufted

Table 78. *Sorghum halapense* and *S. bicolor*.

Trait	<i>S. halepense</i>	<i>S. bicolor</i>
Habit	rhizomatous	tufted
Duration	perennial	annual (to short-lived perennial)
Disarticulation	yes	no (or tardy)
Caryopses	not exposed at maturity	exposed at maturity or not
Culms, width	0.4 – 2 cm	1 – 5 cm
Nodes	appressed pubescent	appressed pubescent or glabrous
Leaf width	8 – 40 mm	5 – 100 mm
Panicles	open	open or dense
Sessile spikelets, width	3.8 – 6.5 mm	3 – 9 mm
Pedicels	1.8 – 3.3 mm	1 – 2.6 mm
Glumes	hard	membranous, leathery, hard
Glumes	appressed pubescent	glabrous to densely hairy or pubescent

Table 79. Inland *Spartina*. From FNA, except leaf widths

Trait	<i>S. gracilis</i>	<i>S. pectinata</i>
Rhizomes	whitish	purplish brown or light brown when fresh, drying white
Rhizomes, dried, width	1.5-3.5 mm	4-7 mm
Culms, height	to 1 m	to 2.5 m
Culms, thickness	2-3.5 mm thick	2.5-11 mm thick
Leaf width	2-4 mm	5-15 mm
Upper glume veins	2-3-veined but lateral veins inconspicuous	3-veined
Upper glume lateral veins	both on the same side of the keel	one on each side of the keel
Panicle branches	3 -12	5-50
Panicle branches, length	1.5-8 cm	1.5-15 cm
Glumes	awnless	awned

Table 80. Pacific coastal *Spartina*. Data from Pfauth & Sytsma 1998, except * indicates from Flora of North America. Pfauth, Mary, and Mark Sytsma. 1998, revised 2007. Key to West Coast *Spartina* species based on vegetative characters. Portland State University Lakes and Reservoirs Program Publication. http://cmnbc.ca/files/atlas_files/spartina_vegkey.pdf

Trait	<i>S. alterniflora</i>	<i>S. anglica</i>	<i>S. foliosa</i>	<i>S. densiflora</i>	<i>S. patens</i>
Occurs in states?	WA, OR, CA	WA, CA	CA	CA	BC, WA, OR, CA
Habit	dense stands	dense stands	dense stands	cespitose	dense stands
Height	to 3 m	to 1 m	to 1.5 m	to 1.5 m	to 1.2 m
Rhizomes, texture	fleshy	fleshy	fleshy	(usually none)	thin, wiry
Rhizomes, scales *	not or only slightly overlapping	overlapping	not much overlapping	(usually none)	not overlapping
Internodes	fleshy	fleshy	fleshy	firm	firm
Ridges around stem	2/mm	3/mm	3/mm	2/mm	6/mm
Color	often red at base of young, healthy shoots		always green or white all the way to the base of young, healthy shoots		
Leaves	flat	flat	flat	inrolled	inrolled
Leaves, width at base	4-25 mm	5-12 mm	5-17 mm	4-8 mm	1-4 mm
Leaves, length	20-55 cm	5-40 cm	15-45 cm	12-43 cm	10-50 cm
Leaves, margins *	entire or nearly so	entire or nearly so	entire or nearly so	strongly scabrous	strongly scabrous
Leaves, veins on upper surface	+/- 6/mm	+/- 6/mm	+/- 5/mm	+/- 2/mm	+/- 3/mm
Ligules, length	0.5-2 mm	2-3 mm	1-2 mm	1-2 mm	0.5 mm
Angle between leaf and stem	15°-18°	30°-90°	15°-18°		
Habitat	intertidal mud flats	lower to upper salt marsh	intertidal mud flats and lower salt marsh	lower salt marsh	upper salt marsh
Status	introduced, invasive	introduced, invasive	native to CA	introduced, invasive	introduced, invasive

Table 81. *Thinopyrum* species.

Trait	<i>T. intermedium</i>	<i>T. ponticum</i>
Habit	strongly rhizomatous	densely caespitose
Glume tip	acute to obtuse	truncate
Glumes	definitely keeled (one vein more prominent than others)	weakly keeled (all veins about equally prominent)
Glume veins	1 longer than the others	all about equal in length
Glume, lower, length	4.5-7.5 mm	6.5-10 mm
Glume, upper, length	5.5-8 mm	7-10 mm
Plant height	50-115 mm	50-200+ mm
Ligules, length	0.1-0.8 mm	0.3-1.5 mm
Leaf blade, width	208 mm	2-6.5 mm
Leaf margins	thicker than the veins	narrower than the ribs
Spikelets, length	7.5-10 mm	9-12 mm
Lemmas	glabrous or hairy	glabrous

Table 82. *Trisetum canescens* and *T. cernuum*.

Trait	<i>T. canescens</i>	<i>T. cernuum</i>
Inflorescence	erect or nodding only at the tips	nodding
Most panicle branches	usually spikelet-bearing for their full length (lowermost sometimes not)	usually spikelet-bearing only in the outer 50 – 66(80)% (uppermost sometimes spikelet-bearing throughout)
Panicle branches	ascending to somewhat divergent	spreading or drooping (at least branches of lower 1 – 3 whorls)
Upper glumes	(3) 4-7 mm long	3.5 – 4.5 mm long
Upper glumes, tips	not erose	erose
Upper glume, width	2+ times as wide as lower glumes	usually 2 – 3 times as wide as lower glumes
Lower glume, length	3 – 5+ mm	0.75 – 2.5(3.5) mm
Ligules, length	(1.5) 3-6 mm	1.5-3(3.4) mm
Hairs on rachilla internodes, length	0.7 – 1 mm	1 – 2.5 mm
Upper glumes widest	at or below the middle	at or above the middle
Upper glumes, shape		ovate or obovate
Upper glumes	tapering to the acute tips	rounded to the acuminate tips
Lemma length	7-9 mm	5-6 mm
Paleas	as long as or slightly longer than the lemmas	shorter than the lemmas
Anthers, length	1 – 3 mm	about 1 mm
Leaves	3-4 per culm	2-3 per culm
Spikelets	pedicellate	subsessile to pedicellate

Table 83. Two delicate annual grasses with mostly cauline leaves, very open panicles, and spikelets longer than wide.

Trait	<i>Deschampsia danthonioides</i>	<i>Ventenata dubia</i>
Ligules, length	(0.5)1.5-3(4.7) mm	1 – 8 mm
Leaf blades, width	0.3 – 1.5 mm	0.8 – 2.5 mm
Panicle length	5 – 15(25) cm	(7)15-20 cm
Panicle width	2 – 8 cm	2 – 12 cm
Spikelets, length	4 – 9 mm	9 – 15 mm
Glumes, length	4.8 – 7.5(8.5) mm	Lower 4.5 – 6 mm Upper 6 – 8 mm
Glumes, veins	0 – 3 veins	3 – 9 veins
Lemmas, length	2 – 3(3.5) mm	5 – 7.5 mm
Lemma tips, shape	acute	long acuminate
Lemma awns, length	(4)5-9(10.5) mm, bent	Lower to 4 mm, straight Upper 10 – 16 mm, bent
Lemma awns, arising	near base to about middle of lemma	Lower: from near tip Upper: from middle of back
Anthers, length	0.3 – 0.5 mm	1 – 2 mm

Table 84. Varieties of *Vulpia microstachys*.

	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

Table 85. Three Wild Rice species that may occur in Oregon at some time in the future.

Trait	<i>Z. aquatica</i>	<i>Z. palustris</i>	<i>Z. latifolia</i>
Known from OR?	no	yes	no
Horticultural use	grain, wildlife habitat	grain, wildlife habitat	ornamental
Duration	annual	annual	perennial
Habit	lacking rhizomes	lacking rhizomes	rhizomatous
Ligules, length	5 – 30 mm	3 – 16 mm	10 – 15 mm
Inflorescence branches	all unisexual	all unisexual	middle branches with both staminate and pistillate spikelets
Pistillate infl branches, at maturity	usually spreading or ascending	usually appressed	spreading
Lemmas of pistillate spikelets, texture	flexible and chartaceous	stiff and leathery or hard	
Lemmas of pistillate spikelets, surfaces	dull or somewhat shiny	shiny	
Lemmas of pistillate spikelets, surfaces	with short scattered hairs, these not more dense near tip	glabrous or with lines or short hairs; tips more densely hairy	scabrous
Lemma awns, length	to 10 mm	to 10 mm	15 – 30 mm
Aborted pistillate spikelets, width	0.4 – 1 mm	0.6 – 2 mm	
Seeds, length	6 – 22 mm	6 – 30 mm	~ 10 mm

Table 86. Major wheatgrass synonyms.

Synonym	Accepted Name in This Treatment
<i>Agropyron caninum</i> (in part)	<i>Elymus ciliaris</i>
<i>Agropyron caninum</i> (in part)	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>
<i>Agropyron caninum</i> (in part)	<i>Elymus trachycaulus</i>
<i>Agropyron caninum</i> (in part)	<i>Elymus violaceus</i>
<i>Agropyron caninum</i> ssp. <i>majus</i>	<i>Elymus violaceus</i>
<i>Agropyron caninum</i> var. <i>latiglume</i>	<i>Elymus violaceus</i>
<i>Agropyron dasystachyum</i>	<i>Elymus lanceolatus</i>
<i>Agropyron dasystachyum</i> var. <i>riparium</i>	<i>Elymus lanceolatus</i> ssp. <i>riparius</i>
<i>Agropyron desertorum</i>	<i>Agropyron cristatum</i>
<i>Agropyron elongatum</i>	<i>Thinopyrum ponticum</i>
	<i>Thinopyrum intermedium</i> ssp.
<i>Agropyron glaucum</i>	<i>barbulatum</i>
<i>Agropyron intermedium</i>	<i>Thinopyrum intermedium</i>
<i>Agropyron lanceolatum</i>	<i>Elymus lanceolatus</i>
<i>Agropyron pauciflorum</i>	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>
<i>Agropyron repens</i>	<i>Elymus repens</i>
<i>Agropyron riparium</i>	<i>Elymus lanceolatus</i> ssp. <i>riparius</i>
<i>Agropyron scribneri</i>	<i>Elymus scribneri</i>
<i>Agropyron smithii</i>	<i>Pascopyrum smithii</i>
<i>Agropyron spicatum</i> (in part)	<i>Elymus wawawaiensis</i>
<i>Agropyron spicatum</i> (in large part)	<i>Pseudoroegneria spicata</i>
<i>Agropyron tenerum</i>	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>
<i>Agropyron trachycaulum</i> (in part)	<i>Elymus violaceus</i>
<i>Agropyron trachycaulum</i> (in large part)	<i>Elymus trachycaulus</i>
<i>Agropyron trachycaulum</i> var. <i>latiglume</i>	<i>Elymus violaceus</i>
<i>Agropyron triticeum</i>	<i>Eremopyrum triticeum</i>
<i>Agropyron violaceum</i>	<i>Elymus violaceus</i>
<i>Elymus alaskanus</i>	<i>Elymus violaceus</i>
<i>Elymus alaskanus</i> ssp. <i>latiglumis</i>	<i>Elymus violaceus</i>
<i>Elymus caninus</i> (in part)	<i>Elymus ciliaris</i>
<i>Elymus caput-medusae</i>	<i>Taeniatherum caput-medusae</i>
<i>Elymus cinereus</i>	<i>Leymus cinereus</i>
<i>Elymus condensatus</i>	<i>Leymus condensatus</i>
<i>Elymus flavescens</i>	<i>Leymus flavescens</i>
<i>Elymus glaucus</i> ssp. <i>jepsonii</i>	<i>Elymus glaucus</i> ssp. <i>glaucus</i>
<i>Elymus mollis</i>	<i>Leymus mollis</i> ssp. <i>mollis</i>
<i>Elymus spicatus</i>	<i>Pseudoroegneria spicata</i>
<i>Elymus triticoides</i>	<i>Leymus triticoides</i>
<i>Elymus virescens</i>	<i>Elymus glaucus</i> ssp. <i>virescens</i>
<i>Elytrigia elongata</i>	<i>Thinopyrum ponticum</i>
<i>Elytrigia intermedia</i>	<i>Thinopyrum intermedium</i>
<i>Elytrigia pontica</i>	<i>Thinopyrum ponticum</i>
<i>Elytrigia repens</i>	<i>Elymus repens</i>
<i>Elytrigia spicata</i>	<i>Pseudoroegneria spicata</i>

Synonym**Accepted Name in This Treatment**

Hordeum brachyantherum ssp.
brachyantherum

Hordeum brachyantherum

Hordeum brachyantherum ssp.
californicum

Hordeum brachyantherum

Hordeum californicum

Hordeum brachyantherum

Hordeum geniculatum

Hordeum marinum ssp. *gussoneanum*

Hordeum glaucum

Hordeum murinum ssp. *glaucum*

Hordeum gussoneanum

Hordeum marinum ssp. *gussoneanum*

Hordeum hystrix

Hordeum marinum ssp. *gussoneanum*

Hordeum leporinum

Hordeum murinum ssp. *leporinum*

Hordeum stebbinsii

Hordeum murinum ssp. *glaucum*

Pseudoroegneria spicata (in part)

Elymus wawawaiensis

Pseudoroegneria spicata (in large part)

Pseudoroegneria spicata

Roegneria spicata

Pseudoroegneria spicata

Sitanion ciliatum

Elymus elymoides ssp. *brevifolius*

Sitanion elymoides

Elymus elymoides ssp. *elymoides*

Sitanion hordeoides

Elymus elymoides ssp. *hordeoides*

Sitanion hystrix

Elymus elymoides

Sitanion hystrix var. *californicum*

Elymus elymoides ssp. *californicus*

Sitanion hystrix var. *hordeoides*

Elymus elymoides ssp. *hordeoides*

Sitanion hystrix var. *hystrix*

Elymus elymoides ssp. *elymoides*

Sitanion jubatum

Elymus multisetus

Sitanion longifolium

Elymus elymoides ssp. *brevifolius*

Triticum cylindricum

Aegilops cylindrica

Triticum triunciale

Aegilops triuncialis