

Wheatgrasses and Wildryes on AOSA/SCST Exam List

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What's on the exam?



Nomenclature

- In the past 40+ years there has been many changes in scientific names.
- Example: tall wheatgrass

Agropyron to Elymus to Elytrigia to Thinopyrum

- Lesson learned – when using older seed identification literature always check GRIN for synonyms.

Common Name	Current Scientific Name	Synonyms
Standard Crested Wheatgrass	<i>Agropyron desertorum</i>	---
Canada Wildrye	<i>Elymus canadensis</i>	<i>Sitanion hystrix</i>
Thickspike Wheatgrass	<i>Elymus lanceolatus</i> subsp. <i>lanceolatus</i>	<i>Agropyron dasystachyum</i> <i>Agropyron lanceolatum</i> <i>Elytrigia dasystachya</i>
Quackgrass	<i>Elymus repens</i>	<i>Agropyron repens</i> <i>Elytrigia repens</i>
Slender Wheatgrass	<i>Elymus trachycaulus</i> subsp. <i>trachycaulus</i>	<i>Agropyron tenerum</i> <i>Agropyron trachycaulum</i>
Virginia Wildrye	<i>Elymus virginicus</i>	---
Western Wheatgrass	<i>Pascopyrum smithii</i>	<i>Agropyron smithii</i> <i>Elymus smithii</i> <i>Elytrigia smithii</i>
Russian Wildrye	<i>Psathyrostachys juncea</i>	<i>Elymus junceus</i> <i>Elymus desertorum</i>
Beardless Wheatgrass Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i>	<i>Agropyron spicatum</i> <i>Elymus spicatus</i> <i>Elytrigia spicata</i>
Tall Wheatgrass	<i>Thinopyrum ponticum</i>	<i>Agropyron elongatum</i> <i>Elytrigia elongata</i> <i>Thinopyrum elongatum</i>

Key points for this group:

- Rachilla length and width is dependent upon floret position within the spikelet.
 - Lower florets rachilla usually shorter & thicker.
 - Upper florets rachilla usually longer & thinner
- Floret length can be dependent upon floret position within spikelet.
 - Lower florets longer. Upper florets shorter.
- Awns, hairs, and tips of lemma and palea are often removed during conditioning.
- Characters within a species can be variable.
- Some species are known to hybridize.

Florets

LATERALLY COMPRESSED & BOAT-SHAPED

Agropyron desertorum

standard crested wheatgrass

Floret: Compressed laterally; boat-shaped.

Lemma: 5 – 9 mm long; keeled; glabrous.

Awn: +/- short awned.

Palea: Concavity deep V-shaped; keel hairs stout and widely spaced.

Sinus: U-shaped.

Rachilla: Flared at apex.

Callus: Uniformly narrow across entire width.



Florets

**DORSAL-VENTRALLY COMPRESSED
GLUMES PERSISTENT**



Elymus virginicus Virginia wildrye

Glumes: Persistent, remaining attached to basal floret.

Floret: Dorsal-ventrally compressed; +/- asymmetrical in outline.

Lemma: 6 – 10 mm long; tapering to a narrow base; dull, coarsely granular, +/- scabrous to hirsute near apex; slightly indented above callus.

Awn: 5 – 25 mm long, straight, scabrous.

Palea: Mostly longer than lemma; smoothly concave; glabrous or minutely pubescent at apex; keels rolled inward, flattened near apex; apex obtuse, truncate, shallowly notched.

Sinus: V-shaped.

Rachilla: Glabrous or hirsute.

Callus: Thickest at mid-point.

Florets

**DORSAL-VENTRALLY COMPRESSED
LEMMAS USUALLY HAIRY**



Elymus canadensis Canada wildrye

Floret: Dorsal-ventrally compressed;
asymmetrical in outline

Lemma: 8 – 15 mm long, tapering to a
narrow base; dull, coarsely granular,
sparsely long pubescent especially on sides
or uniformly villous, nerves prominent.

Awn: 10 – 50 mm long, divergent.

Palea: tapering to a notched apex; sparsely
pubescent; keels rolled inward and
flattened near apex; keel hairs with broad
base.

Sinus: U-shaped.

Rachilla: Mostly glabrous.

Callus: Thickest at mid-point, appearing
pointed; glabrous or short pubescent on
the ends.

[=*Sitanion hystrix* (Nutt.) J. G. Sm.]



Elymus lanceolatus* subsp. *lanceolatus
thickspike wheatgrass

Floret: Dorsal-ventrally compressed; +/- asymmetrical in outline

Lemma: 7 – 12 mm long; moderately hairy, hairs stiff, shorter than 1 mm.

Awn: +/- short awned.

Palea: Sub-equal to lemma; smooth or minutely pubescent; apex truncate or with shallow notch; keels rolled inward and flattened in lower half; keel hairs long and closely spaced.

Sinus: V-shaped to narrowly U-shaped.

Rachilla: Broad, villous.

Callus: Thickest at mid-point; hairs continuous across width or confined to the ends.

[=*Agropyron dasystachyum* (Hook.) Scribn.; *A. lanceolatum* Scribn. & J. G. Sm.]



Psathyrostachys juncea

Russian wildrye

Floret: Dorsal-ventrally compressed; asymmetrical in outline.

Lemma: 5.5 – 7.5 mm long; lance shaped; coarsely granular, glabrous to pubescent throughout, hairs 0.3 – 0.8 mm.

Awn: Lemma sharply pointed or weakly awned up to 3.5 mm.

Palea: Concave, densely pubescent and scurfy; keels strongly in-rolled; keel hairs fine.

Sinus: U-shaped.

Rachilla: Mostly long and slender; divergent from floret; glabrous to short pubescent.

Callus: Uniformly thick across entire width.

[=*Elymus junceus* Fisch.; *E. desertorum* Kar. & Kir.]

Comparison



Comparison



Florets

**DORSAL-VENTRALLY COMPRESSED
LEMMAS USUALLY GLABROUS**



Pseudoroegneria spicata

beardless/bluebunch wheatgrass

Floret: Dorsal-ventrally compressed; **symmetrical** in outline.

Lemma: 9 – 14mm long; linear oblong; **glabrous**; **nerves visible near apex**.

Awn: +/- awned 0 – 25 mm, **divergent**.

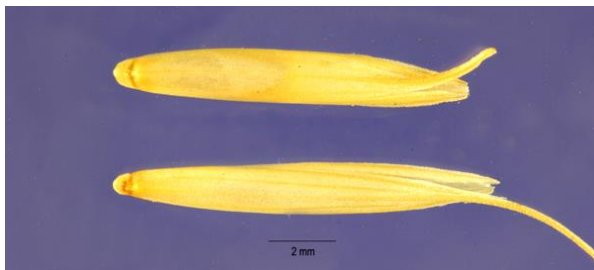
Palea: Deeply concave; **glabrous**, **lustrous**; keel hairs short and closely spaced.

Sinus: V-shaped to narrowly U-shaped.

Rachilla: Mostly **long and slender** except for basal florets; fine brown line around apex rim; **finely pubescent**.

Callus: Thickest at mid-point; hairs at ends.

[=*Agropyron spicatum* (Pursh) Scribn. & J. G. Sm., *Elymus spicatus* (Pursh) Gould; *Elytrigia spicata* (Pursh) D. R. Dewey]



Thinopyrum ponticum tall wheatgrass



Floret: Dorsal-ventrally compressed; asymmetrical in outline.

Lemma: 9 – 12 mm long; obtusely pointed; slightly narrowed at base; markedly exceeding the tip and sides of palea in upper 1/3; dull, glabrous.

Awn: Short awned.

Palea: Broad and obtuse; concavity broad and shallow or with slight longitudinal crease near base; dull, scruffy, sparsely pubescent; keel hairs closely spaced, fine, long, uneven; margins not visible at base.

Sinus: V-shaped to narrowly U- shaped.

Rachilla: Glabrous or with very short hairs; short, thick and flaring at apex or long and strap shaped; sides strongly divergent

Callus: Thickest at mid-point.

[=*Agropyron elongatum* auct. nonn., *Elytrigia elongata* auct. nonn., *Thinopyrum elongatum* auct. nonn.]

Comparison



Comparison

Lemma rounded
across back and
strongly nerved in
upper third



Beardless or Bluebunch wheatgrass

Tall wheatgrass

Lemma rounded
in lower half and
keeled in upper
half; such that
florets will
usually not lay
flat on surface
when lemma
side is down

Florets

**DORSAL-VENTRALLY COMPRESSED
LEMMAS USUALLY GLABROUS
CHALLENGING TO SEPARATE**



Elymus repens quackgrass

Floret: Dorsal-ventrally compressed; symmetrical in outline

Lemma: 8 – 12 mm long; glabrous, lustrous, +/- scabrous distally; with bulge above callus.

Awn: Un-awned to awns 0.2 – 4 mm, straight.

Palea: Smoothly concave or longitudinally ridged in lower half; glabrous or sparsely pubescent; keel hairs short with broad base, sometimes curved, not closely spaced; apex truncate, obtuse or with broad shallow notch, not folded at apex.

Sinus: U-shaped.

Rachilla: Not concealed by lemma margins; sides parallel or only slightly divergent in basal florets; glabrous to scabrous.

Callus: Thickest at mid-point; glabrous or with a few hairs near callus ends.

[=*Agropyron repens* (L.) P. Beauv., *Elytrigia repens* (L.) Desv. ex Nevski]



Pascopyrum smithii western wheatgrass

Floret: Dorsal-ventrally compressed; +/- asymmetrical in outline.

Lemma: 6 – 14 mm long; dull, coarsely granular, sparsely stout hispid; indented over callus.

Awn: Un-awned or short awned.

Palea: Smoothly concave; longitudinally grooved in lower half; dull, coarsely granular, scurfy and sparsely pubescent; apex deeply V-notched, deeply folded; keel hairs irregular in length, longer and finer than in *E. repens*.

Sinus: V-shaped to slightly U-shaped.

Rachilla: Thick, sides divergent, short pubescent; base partially concealed by margins of lemma.

Callus: Thickest at mid-point, hairs usually confined to ends.

[=*Agropyron smithii* Rydb., *Elymus smithii* (Rydb.) Gould]



Elymus trachycaulus* subsp. *trachycaulus

slender wheatgrass

Floret: Dorsal-ventrally compressed; asymmetrical in outline.

Lemma: 6 – 13 mm long; rounded back; glabrous, usually smooth near base, often scabrous distally over the veins.

Awn: Apex of lemma acute or awned to 40 mm, straight to slightly curved.

Palea: Sub-equal to lemma; flat to sometimes longitudinally grooved; apex truncate to V-notched; glabrous and lustrous, sometimes minutely pubescent on upper portion; keel hairs fine, close together.

Sinus: V-shaped to nearly U-shaped.

Rachilla: Villous, sides divergent, not appressed to palea, fine brown line around apex rim.

Callus: Thickest at mid-point; hairs continuous across width of callus.

[=*Agropyron tenerum* Vasey; *A. trachycaulum* (Link) Malte ex H. F. Lewis]

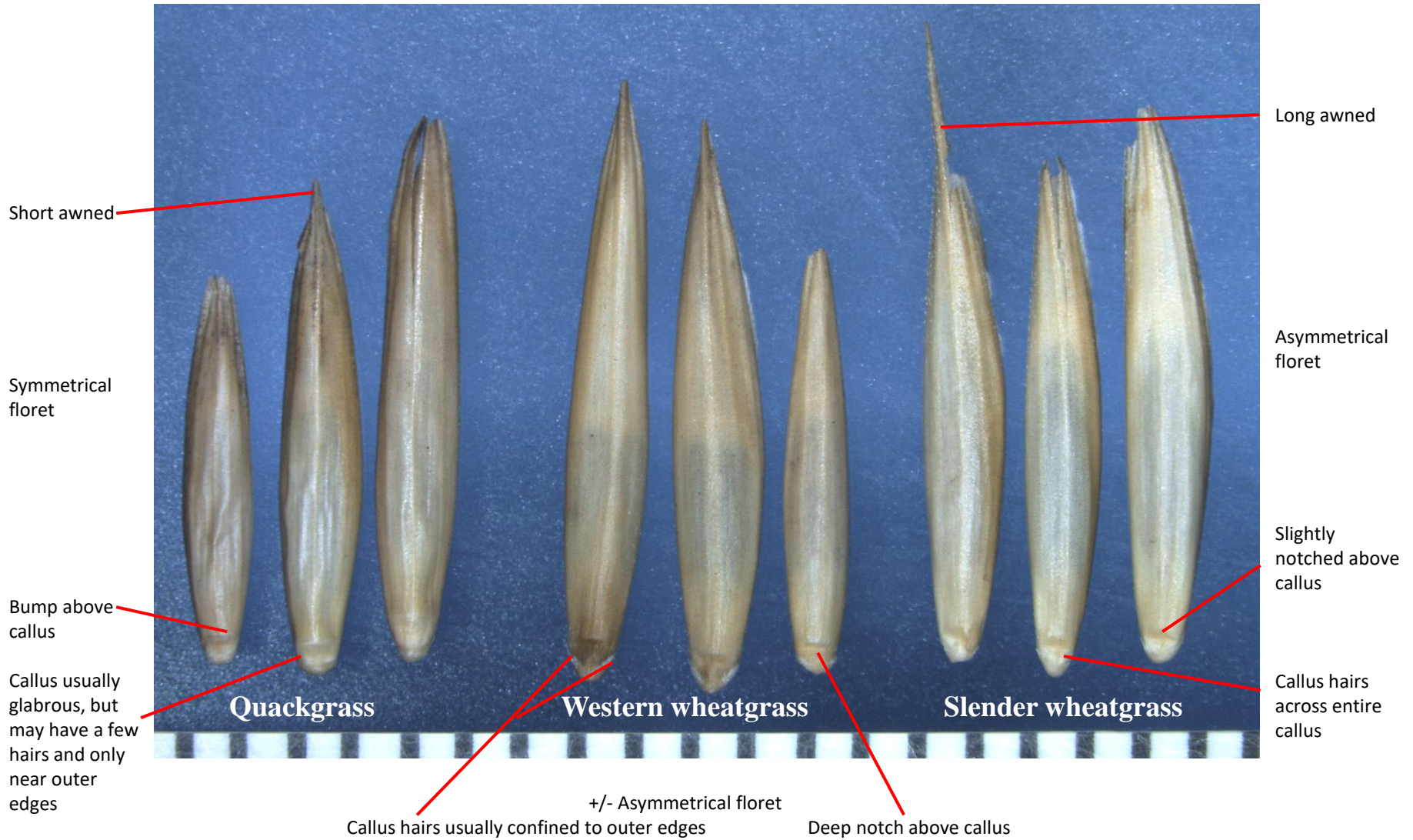
Comparison

Palea keel hairs irregular lengths, longer and finer than *E. repens*

Palea with longitudinal groove



Comparison



Photographs are by Jim Effenberger & Deborah Meyer unless otherwise noted.

References

Dahlberg, R. C. 1914. Identification of the seed of species of *Agropyron*. J. Agri. Res. 3:275-282.

Henry, H. H. 1927. The seeds of quack grass and certain wheat grasses compared, J. Agri. Res. 35(6):537-546.

Meyer, D. J. L. and J. Effenberger 2021. Basic guide to the identification of wheatgrass, wildrye, and squirreltail florets: *Agropyron*, *Elymus*, *Leymus*, *Pascopyrum*, *Psathyrostachys*, *Pseudoroegneria*, and *Thinopyrum*. Available on-line at analyzeseeds.com.