

29. ELYMUS L. Wildrye

Cespitose or rhizomatous perennials, the herbage green or glaucous; culms erect and often tall, often rather coarse, hollow; sheaths open; ligules membranous, from rather short to prominent; blades flat to involute, often strongly striate and stiff, often with well developed auricles; inflorescence typically a spike with spikelets in 2s or 3s at the nodes, sometimes the spikelets solitary or some with 4 or 6 or more, the rachis continuous, or in some disarticulating, the spikelets sessile or sometimes pedicellate; spikelets (1-) 2- to 6- (10) flowered, disarticulating above the glumes and between the florets, the rachilla distorted at the base bringing the florets more or less dorsiventral to the rachis, thus the spikelets do not appear to be 2-ranked; glumes subequal, subulate, narrowly lanceolate or rarely broader, acute to slenderly awned, usually rigid and sometimes indurate and cartilaginous below, sometimes soft, 1- to 5-nerved, the glumes of the contiguous spikelets often parallel and borne in front of the rest of the spikelets simulating an involucre; lemmas about equalling the glumes or longer, rounded on back, faintly 3-nerved, glabrous to pubescent or even soft villous, tapering to a short or long awn, the awns straight or divergent, less frequently awnless; palea well developed, often as long as the body of the lemma; lodicules 2, often very prominent and hairy at the tip; stamens 3, the anthers mostly long; caryopsis linear-oblong, furrowed in back, hairy at the summit, adhering to the palea; $x = 7$.

A genus of about 60 species of arctic and temp. regions of the N. Hemisphere and about 10 species in Chile and Argentina; there are about 20 species in the U.S. (Name from the Greek *elymus*, the ancient Greek name for some kind of millet.)

Many of the species of *Elymus* are fair forage species, some often occurring in dense stands. Some of the rhizomatous species are important in stabilizing shifting sand and are used in binding road embankments.

The genus *Elymus*, as it is traditionally treated, has been found to consist of two phylogenetically distinct elements (Dewey, 1974). The broader-glumed, small-anthered, self-fertilizing, non-rhizomatous species, including *E. canadensis*, *E. virginicus*, and *E. glaucus*, show close genetic affinity to the self-fertilizing species of *Agropyron* and both species of *Sitania*. The normally cross-pollinating, large-anthered, subulate-glumed species, represented by *E. flavescens*, *E. triticoides*, and *E. cinereus* are sometimes referred to the genus *Leymus* Hochst. *Elymus simplex*, *E. salina*, and *E. ambiguus* also belong with these species. They contain a different pair of genomes from the former group. Further genome analysis will be necessary before a revision is made, so we follow the classical treatment here.

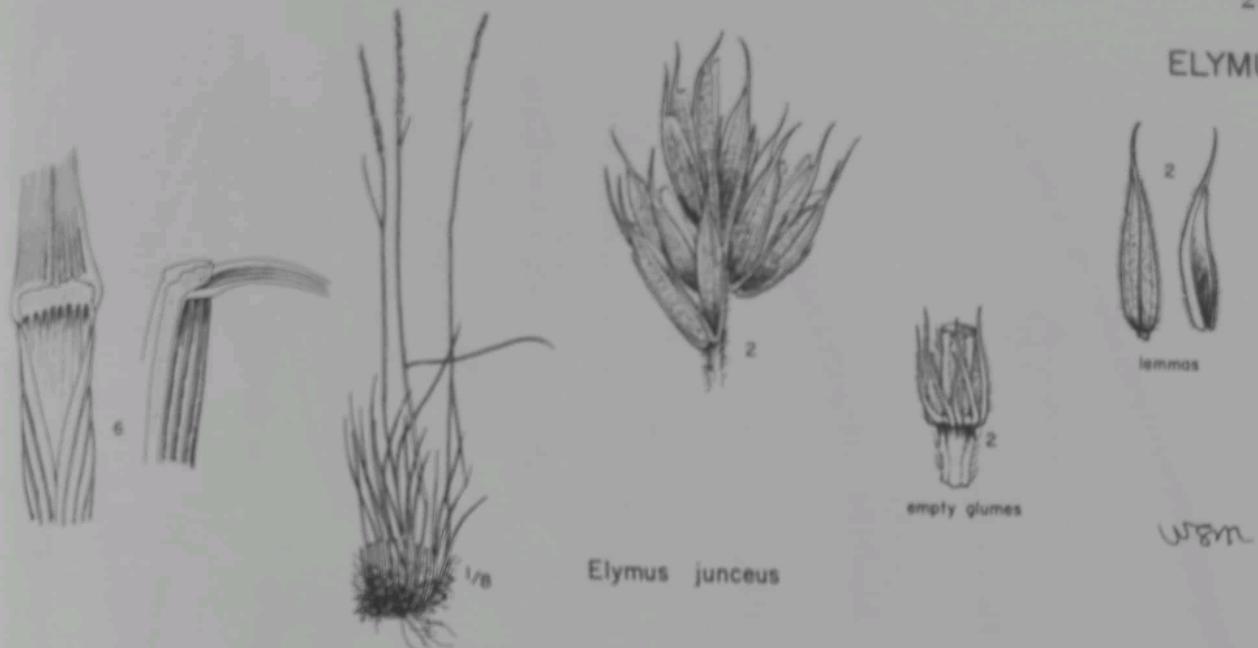
Two sterile hybrids, treated as species of *Elymus* in earlier manuals, are sometimes encountered in our area. These hybrids are of intergeneric origin and are treated as *X Elytostomum avicinatum* (Merr.) Bowden and *X Elytostomum hansenii* (Scribn.) Bowden. They are discussed above following the tribal key to the genera (p. 295).

References:

- Bowden, W. M. Cytotaxonomy of the species and interspecific hybrids of the genus *Elymus* in Canada and neighboring areas. Canad. J. Bot. 42: 547-601, 1964.
 Dewey, D. R. Cytogenetics of *Elymus sibiricus* and its hybrids with *Agropyron tauri*, *Elymus canadensis* and *Agropyron caninum*. Bot. Gaz. 135: 80-87, 1974.

1 Rachis disarticulating at maturity, sometimes tardily so	1. <i>E. junceus</i>
1 Rachis continuous, disarticulation occurring above the glumes.	
2 Rhizomes present, slender, creeping.	
3 Lemmas hirsute to densely villous with long, yellowish or brownish hairs; plants of loose, sandy soils; Snake River Plains to the Columbia Basin	2. <i>E. flavescens</i>
3 Lemmas glabrous, scabrous, or rarely sparsely strigose.	
4 Lemmas awnless or awn-tipped, the awn rarely approaching 2.5 mm in length.	
5 Plants with long creeping rhizomes; glumes (4) 7-11 mm long; spikelets usually paired at a rachis node, sometimes solitary; plants principally of valley bottoms in moist meadows or saline soils; widespread throughout the west	3. <i>E. triticoides</i>
5 Plants mostly with short rhizomes; glumes 1.2-8 (10) mm long or sometimes nearly obsolete; spikelets usually solitary at a rachis node; plants of mt. sides, often in heavy clay soils; sw. Wyo., e. Utah and adjacent Colo., s. to s. Calif., s. Nev. and n. Ariz.	5. <i>E. salina</i>
4 Lemmas with awns 2.5-8 mm long; spikelets mostly solitary at a rachis node; plants of loose sandy soils; entering our area from Wyo. along the Green River in Daggett Co., Utah	4. <i>E. simplex</i>
2 Rhizomes wanting, or if present (in some <i>E. salina</i> and <i>E. cinereus</i>) short and the plants forming clumps and appearing as bunchgrasses.	
6 Glumes subulate, not broadened above the base, the nerves obscure; anthers (3) 4-7.5 mm long.	
7 Spikelets mostly solitary at a rachis node, distant; leaves mostly involute	5. <i>E. salina</i>
7 Spikelets 2 or more per node (often solitary towards the base and apex in <i>E. ambiguus</i>); leaves mostly flat.	
8 Spikes usually slender, 2-5 (6) mm broad; spikelets two per rachis node or solitary towards the base and apex; culms mostly less than 7 dm tall	6. <i>E. ambiguus</i>
8 Spikes thick, (4) 5-12 mm broad; spikelets in 2s or more per rachis node.	
9 Culms usually less than 7 dm tall; blades 1.5-4 mm broad; glumes 3-6.5 (7) mm long; introduced species	1. <i>E. junceus</i>

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- 9 Culms usually more than 7 dm tall; blades 4.5–15 mm broad; glumes 7–16 mm long;
a common native species 7. *E. cinereus*
- 6 Glumes broader, broadened above the base, the nerves evident (except in some *E. virginicus*);
anthers 1.5–3 mm long.
- 10 Awns of the lemmas curving outward at maturity; lemmas scabrous-pubescent .. 8. *E. canadensis*
- 10 Awns of the lemmas straight or nearly so; lemmas glabrous to crisp-puberulent.
- 11 Glumes firm, indurate at the base, the bases bowed out, yellowish; lemmas 6–9 mm
long 9. *E. virginicus*
- 11 Glumes thin, flat, not indurate at the base, parallel; lemmas 8.5–14 mm long 10. *E. glaucus*

1. *Elymus junceus* Fischer

Elymus junceus Fischer, Zap. Obšč. Isp. Prir. Imp. Moskovsk. Univ. 1: 45, pl. 4. 1806. *Psethyronotachys juncea* Nevski in Komarov, Fl. USSR 2: 714. 1934. *E. cretaceus* Zing ex Nevski in Komarov, ibid., as a synonym. (Lower Volga Steppes, U.S.S.R.)

Russian wildrye.

Densely tufted perennials, clothed at the base with remnants of old sheaths that eventually separate into fibers; culms 4–7 (11) dm tall, glabrous or scabrous below the spike; leaves mostly basal; sheaths glabrous; ligules very short, 0.2–1 mm long, truncate, ciliate; blades flat or involute, 1.5–4 mm broad, glaucous, scabrous, the auricles developed; spikes (4) 7–11 (13) cm long and 4–9 (12) mm broad, erect, the rachis disarticulating between the spikelets; spikelets usually 3 or sometimes 2 per node, (0.7) 8–10 mm long, only 2- (3)-flowered; glumes subequal, short, (3) 4–6.5 (7) mm long, subulate, scabrous or short-hairy, often glabrous and shiny at the base; lemmas small, 6.7–8.5 (10) mm long, scabrous to hirsute, 5- to 7-nerved, tapering into an awn 0.5–2 (3) mm long; anthers 4.2–5.2 mm long; $2n = 14$.

Dry sagebrush slopes; recently introduced from n. Asia and becoming naturalized; known from a few localities in Box Elder Co., Utah, Wyo., Sask. and Man. June–July.

2. *Elymus flavescens* Scribn. & Smith

Elymus flavescens Scribn. & Smith in Scribn. U.S.D.A. Div.

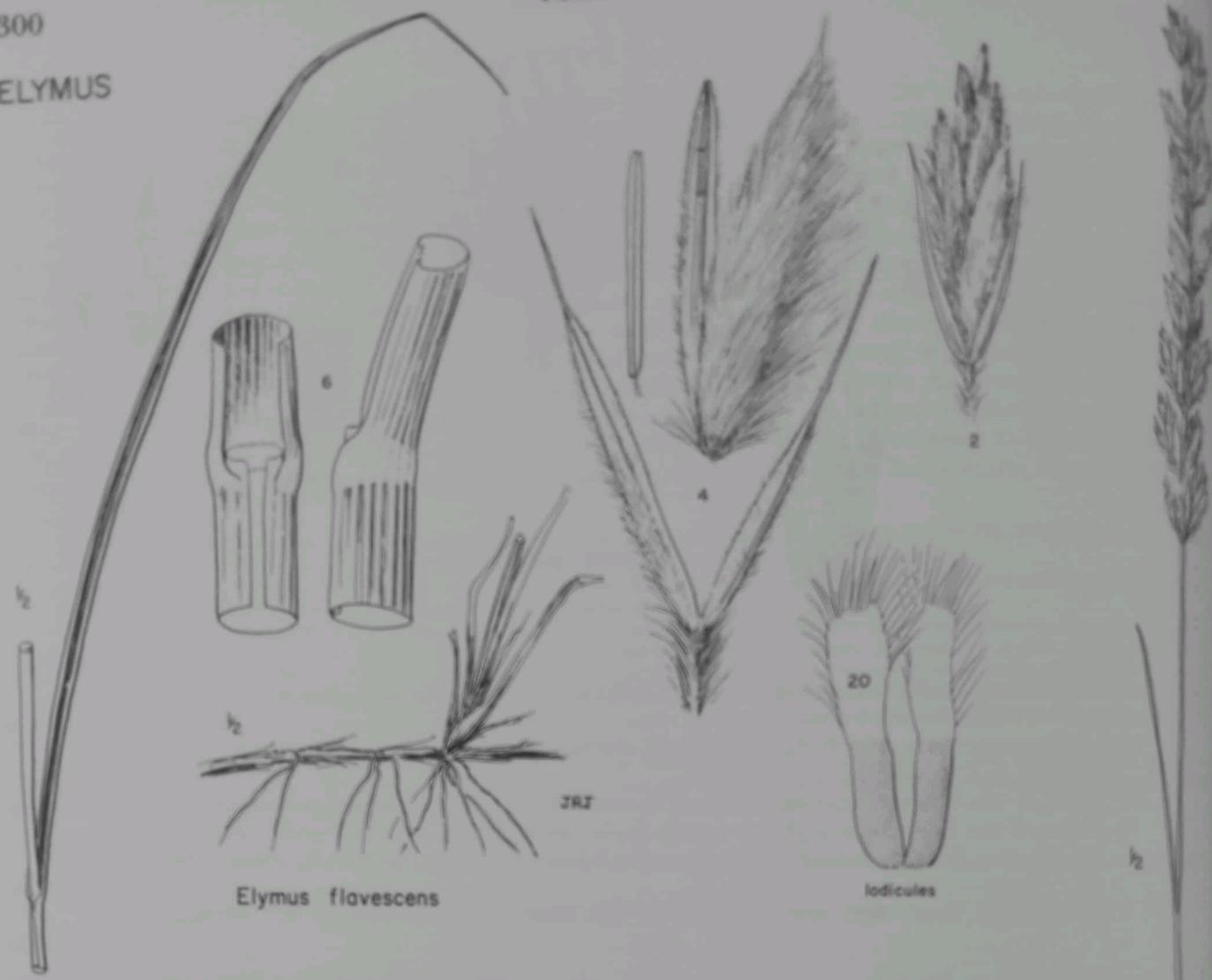
Agrostol. Bull. 8: 8, fig. 1. 1897. *Leymus flavescens* Pilger, Bot. Jahrb. Syst. 74: 6. 1947. (Sukidorf 916, "Dry sandy grounds near Columbus," Klickitat Co., Wash., 11 June 1886.)

E. arenicola Scribn. & Smith in Scribn. U.S.D.A. Div. Agrostol. Circ. 9: 7. 1899. *Leymus arenicola* Pilger, Bot. Jahrb. Syst. 74: 6. 1947. (Leckenby, "in sand dunes along the Columbia River," Suferts, Wash., 25 Nov. 1898.)

Yellow wildrye.

Strongly rhizomatous, usually glaucous perennials arising from vertical rhizomes attached to deep, slender, brown, scaly, horizontal rhizomes, the horizontal rhizomes often extending for considerable distances; plants often forming large clumps, thus appearing as a bunchgrass; culms (4) 7–10 (12) dm tall, densely pubescent below the spike and below each node, the nodes dark; sheaths glabrous; ligules about 0.5–1 mm long, erose-ciliolate; blades involute, 4–6 mm broad, firm, glabrous beneath and usually scabrous on the upper surface, the auricles mostly lacking, the collar and auricle areas dark brown or purple; spikes relatively long, 10–20 (25) cm long, erect or somewhat nodding, compound; spikelets mostly in pairs at each node with one of the pair often pedicellate, overlapping or the lower ones more distant, 10–20 mm long, 3- to 4- (6)-flowered; glumes subequal, 8–11 (15) mm long, narrowly-lanceolate to subulate, nerveless or faintly 3-nerved, usually shorter than the first lemma; lemmas large, 10–15 mm long, strongly 5- to 7-nerved, copiously

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soft-villous to rather sparsely pubescent, the hairs often yellowish or brownish, awnless and sharp-pointed or sometimes with a short awn 0.5–1 (4) mm long; anthers 4–6 mm long; $2n = 28$.

Sand dunes and open sandy flats where often the dominant grass; c. Wash., e. Oregon and the Snake River Plains of Idaho with a disjunct in the Black Hills of S.D. June–Aug.

Elymus flavescens is effective in stabilizing loose, sandy soils.

3. *Elymus triticoides* Buckley

Elymus triticoides Buckley, Proc. Acad. Nat. Sci. Philadelphia 1862: 99. 1863. *E. condensatus* var. *triticoides* Thurber in S. Wats. Bot. Calif. 2: 326. 1880. *Leymus triticoides* Pilger, Bot. Jahrb. Syst. 74: 6. 1947. (Nuttall, "Rocky Mountains.")
E. triticoides var. *pubescens* A. S. Hitchc. in Jepson, Fl. Calif. 1: 186. 1912. (Elmer 3748, Griffin, Ventura Co., Calif., July 1902.)

Beardless wildrye, creeping wildrye.

Glaucous or sometimes green perennials from extensively creeping rhizomes; culms 3–7 (12) dm tall; sheaths glabrous, scabrous or puberulent with spreading hairs; ligules very short, 0.2–0.7 mm long, truncate, erose-ciliolate; blades flat or usually involute, 2.5–5 (7) mm broad, rather stiff, scaberulous, sometimes glabrous below, the auricles well developed and often clasping the culm; spikes relatively short, 3.5–7 (9) cm long, erect, loose and open to rather dense, slender, sometimes compound; spikelets paired or sometimes solitary at each node, 10–16

(18) mm long, 3- to 5- (8)-flowered, greenish, brownish to purple; glumes subequal, (4) 7–10 (11) mm long, narrow to subulate, firm, 1- to 3-nerved, mostly scabrous; lemmas small, 6–9 (10) mm long, often shiny and smooth, glabrous or puberulent, sometimes puberulent apically only, faintly to prominently 5- to 7-nerved, rounded on back or keeled toward the tip, awnless or with a short awn 0.5–2.5 mm long; anthers 3.5–5 mm long, purplish; $2n = 28$.

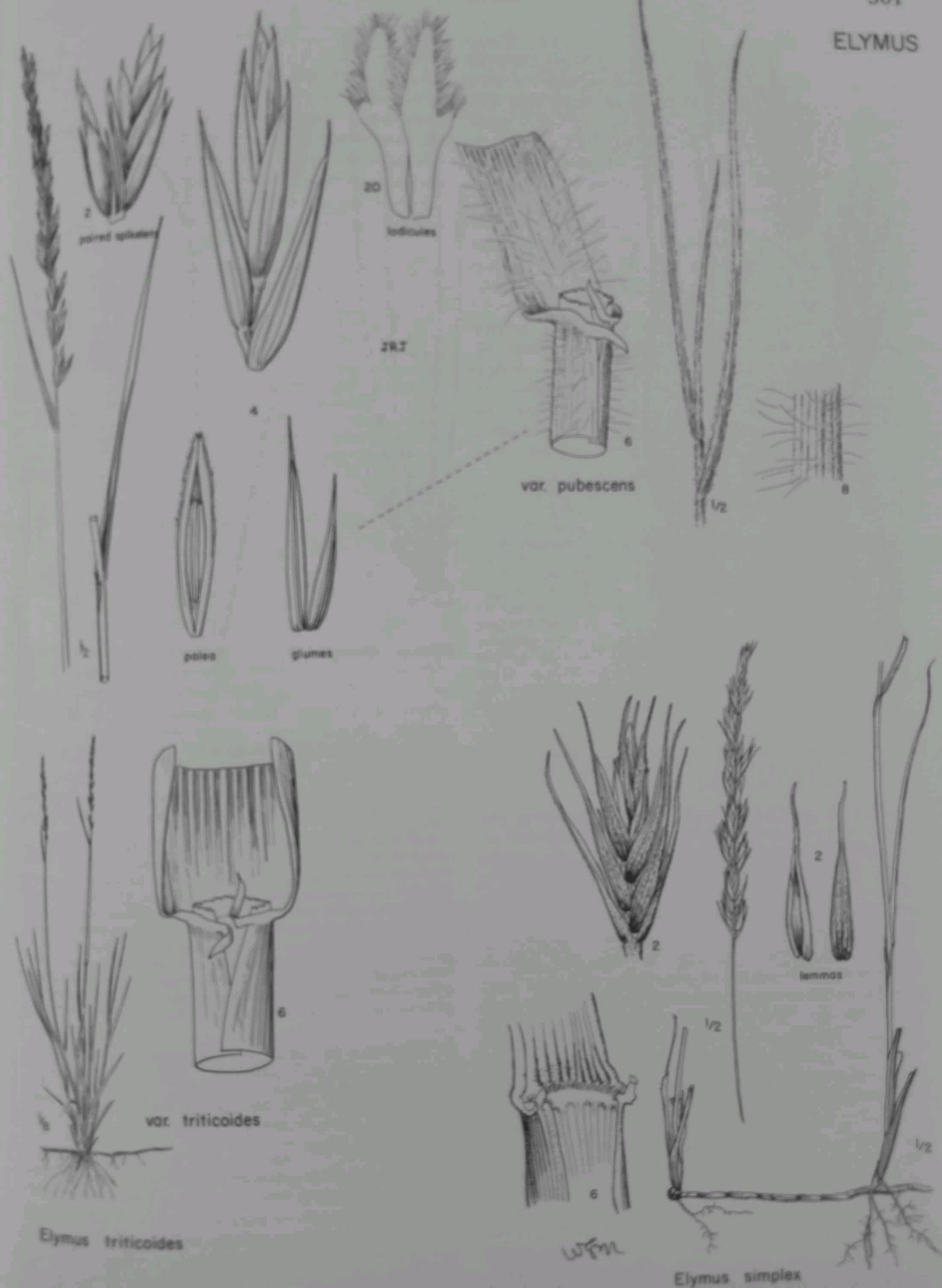
Dry to moist places in valley bottoms, often in saline meadows; Wash. to Mont., s. to Baja Calif., Ariz., N.M. and Trans-Pecos Texas. Late May–Aug.

Beardless wildrye often fails to set seed. Perhaps this is due to the need for the species to be cross pollinated. Large stands may represent plants of a single clone. *Elymus triticoides* is sometimes confused with *Agropyron smithii* when the spikelets occur one at a node. This pitfall will be eliminated if care is taken in observing that *E. triticoides* has exceedingly narrow glumes, and the florets are out of their normal position due to the distorted rachilla that twists about 90°. Two variants seem worthy of recognition and may be separated as follows:

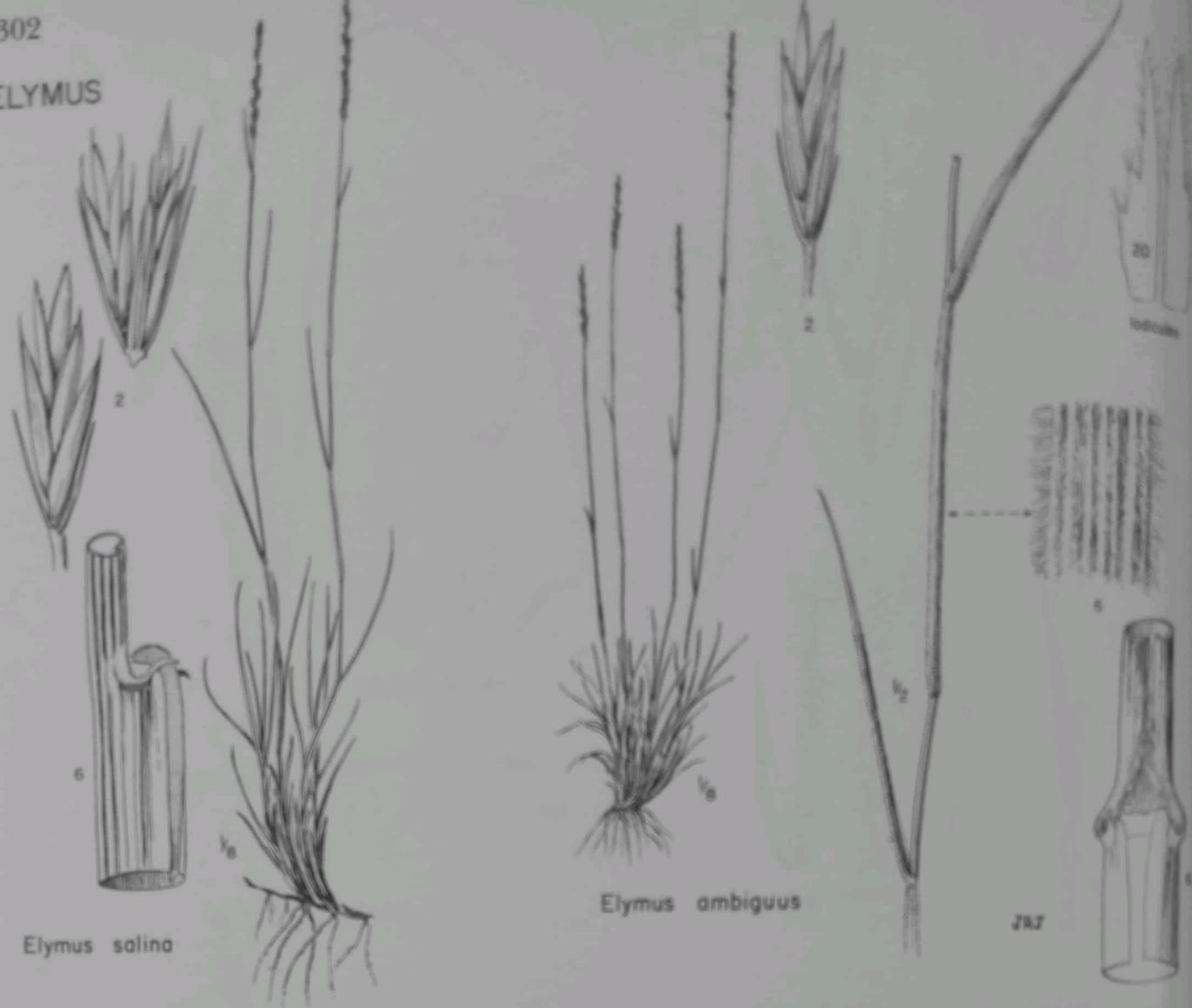
- 1 Plants glabrous or nearly so throughout; range of the species var. *triticoides*
- 1 Plants pubescent throughout, usually with spreading hairs; Wash., Oregon and Nev. var. *pubescens* A. S. Hitchc.

4. *Elymus simplex* Scribn. & Williams

Elymus simplex Scribn. & Williams in Scribn. U.S.D.A. Div. Agrostol. Bull. 11: 57, pl. 17. 1898. *E. triticoides* var. *simplex* A. S. Hitchc. Amer. J. Bot. 21: 132. 1934. (T. A. Williams)



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2334, "banks of Green River," Wyo., 8 July 1897.)

E. simplex var. *luxurians* Scribn. & Williams in Scribn. U.S.D.A. Div. Agrostol. Bull. 11: 58. 1898. (T. A. Williams 2338, Green River, Wyo., 8 July 1897.)

Glaucous perennials from extensive creeping rhizomes, the rhizomes up to 5 m long; culms 4–6 (7) dm tall; leaves mostly basal with only a few on the culm; sheaths glabrous and often anthocyanous at the base; ligules very short, about 0.5 mm long, truncate, ciliolate; blades usually involute or more or less flat, 1–3 mm broad, rather rigid, scabrous or sparsely pilose on the upper surface, the auricles often poorly developed or sometimes to 1 mm long, usually anthocyanous; spikes (6) 8–12 (16) cm long, erect, usually rather slender; spikelets usually solitary or sometimes 2 per node, then 1 sessile and 1 on a short pedicel, especially in the lower part of the spike, sometimes remote and not at all overlapping, but usually slightly overlapping, 11–17 (20) mm long, (3-) 4- to 6- (10)-flowered, the rachilla often elongated and quite visible between the florets; glumes subequal, (5.5) 9–14 (16) mm long, subulate to slightly broader at the base, glabrous to scabrous, sometimes with an extra glume at a one-spikelet node, nearly nerveless or 1- to 3-nerved; lemmas 7.5–9.5 mm long, usually glabrous and shiny-green to minutely puberulent, rarely with a purplish tinge, nerveless below, becoming faintly 5- (7)-nerved

above, tapering into an awn 2.5–8 mm long; anthers 3.6–5 mm long; $2n = 28$.

Moist sandy soils along river banks and sometimes in dryish sands; Utah, along the Green River in Daggett Co., to Wyo. and Colo. June–Aug.

Elymus simplex, as interpreted here, has a rather restricted distribution. Barely entering Utah, it is not otherwise found west of Colorado and Wyoming. Small plants of *E. triticoides* with solitary spikelets are often confused with this species. The type specimens cited above and our collections have spikelets solitary (rarely paired) and awns on the lemmas mostly about 5 mm long. *Elymus simplex* is also confused in herbaria with *E. salina* when it is discovered that *E. salina* usually produces rhizomes. *Elymus simplex* is a grass of sandy bottom lands whereas *E. salina* usually occurs on mountainsides and often in heavy clay soils. Because of the clay soils, *E. salina* is usually collected without rhizomes.

5. *Elymus salina* M. E. Jones

Elymus salina M. E. Jones, Proc. Calif. Acad. Sci. II. 5: 729. 1895. *E. ambiguus* var. *salina* C. L. Hitchc. Univ. Wash. Publ. Biol. 17(1): 558. 1969. (Jones 5447, "Top of Salina Pass, Utah," 16 June 1894.)

Salina wildrye.

Densely tufted perennials, usually bearing short rhizomes; culms 3.5–7 (10) dm tall, glabrous; leaves glabrous, scabrous to pubescent; ligules usually very short, 0.2–0.7 (1.5) mm long, truncate, ciliate; blades flat or usually involute, 2–3 (4) mm broad, often ciliate near the throat, the auricles well developed and often clasping the culm; spikes 5–10 (15) cm long,

2.5-4 (8) mm broad, erect, slender; spikelets usually solitary at each node, somewhat remote, usually slightly overlapping, (9) 12-17 (20) mm long, 2- to 3-flowered; glumes subequal, (1.2) 4-8 (10) mm long, subulate, glabrous to scabrous, sometimes broader at the base and 3-nerved, sometimes with an extra glume at a one-spikelet node; lemmas (7) 8-10.5 mm long, 5-nerved, at least above, glabrous to scabrous, the midnerve and awn scabrous, tapering into a short awn 0.2-2 mm long; anthers 4-6.4-7.5 mm long; $2n = 28, 56$.

Dry slopes, usually in clay or loamy soils, often a dominant grass in the piñon-juniper and Gambel oak communities; sc. Wyo., e. Utah, adjacent Colo. and n. Ariz. (Colorado Plateau), also s. Nev. and s. Calif. June-July.

The name is spelled "salina" in Jones' text and "salinus" in his index. The epithet refers to Salina Pass and the original spelling is maintained here and not considered as a slip of the pen. The type specimen has conspicuous rhizomes as do nearly all of the plants in the isotype collection. Plants collected carefully usually show the presence of rhizomes although in most areas the plants form large tufts and give the appearance of being non-rhizomatous, especially in heavy clay soils. Reports of *E. salina* from Nevada and Idaho are probably based on specimens of *E. ambiguus* var. *salmonis*.

6. *Elymus ambiguus* Vasey & Scribn.

Elymus ambiguus Vasey & Scribn. Contr. U.S. Natl. Herb. 1: 280. 1895. (*Vasey*, Pen Gulch, Colo., in 1884.)
ambiguus var. *salmonis* C. L. Hitchc. Univ. Wash. Publ. Biol. 17(1): 558. 1969. (*Hitchcock & Muhlenberg* 22305, shale cliff, 9 mi. s. of Challin, along e. side of Salmon River, Custer Co., Idaho, 31 May 1962.)

Tufted, soft-pubescent perennials; culms 3-7 dm tall, soft-pubescent towards the base; leaves mostly basal, densely spreading soft pilose; ligules very short, 0.2-0.5 mm long; blades involute or rarely flat, 2-5 mm broad, the auricles usually absent; spikes 5.5-9 cm long, 2-5 (6) mm broad, erect, slender; spikelets paired or solitary at each node, 10-18 mm long, 3- to 5- (10)-flowered; glumes subequal, short, 0.8-6.5 (10) mm long, subulate, scabrous, 1-(3)-nerved; lemmas 6-9 (12) mm long, scabrous or puberulent, at least apically, nerveless below and becoming 5-nerved above, tapering into a short awn 0.5-1.5 mm long; anthers 4-5 mm long; $2n = 28$.

Dry sagebrush slopes at low elev.; (var. *salmonis*) s. Idaho, n. Nev. and w. Utah. Late May-July.

Our plants belong to var. *salmonis* C. L. Hitchc. which is distinct enough to be raised to species rank (E. Jensen, Ph.D. thesis, Utah State University, 1972). The binomial is avoided here in order not to anticipate Jensen's formal publication.

7. *Elymus cinereus* Scribn. & Merr.

Elymus condensatus (var.) *pubens* Piper, Erythea 7: 101. 1899. *E. condensatus* f. *pubens* St. John, Fl. S.E. Wash. & Adj. Idaho 42. 1937. *E. piperi* Bowden, Canad. J. Bot. 42: 592. 1964. *E. cinereus* var. *pubens* C. L. Hitchc. Univ. Wash. Publ. Biol. 17(1): 561. 1969. (*Piper* 2591, "in strong alkali soil near Yakima City, Wash.", 10 July 1897.)
E. cinereus Scribn. & Merr. Bull. Torrey Bot. Club 29: 467. 1902. (*Purpus* 6050, "dry plains, Pahrump Valley," Nye Co., Nev., in 1898.)

Basin wildrye, Great Basin wildrye.

Robust, densely tufted perennials, often forming clumps up to 1 m across, typically without rhizomes, but rarely producing short, thick rhizomes; culms

usually more than 7 dm tall, often as tall as 20 dm, glabrous or more often harshly puberulent, especially so at the nodes; sheaths glabrous to soft hairy with appressed or spreading hairs; ligules relatively long, (1) 2-7 mm, membranous; blades flat or nearly so, 4.5-15 mm broad, firm, strongly nerved, the auricles usually well developed to nearly lacking on some of the leaves; spikes relatively long, (7) 11-20 (23) cm long, 7-12 mm broad, stiff, erect, sometimes becoming compound and branching with up to 6 spikelet bearing nodes on a branch, often interrupted below; spikelets usually 3-6 per node, occasionally only paired, (9) 11-20 mm long, (2-) 3- to 5-flowered; glumes subequal, 7-13 (16) mm long, narrow, nearly subulate, tapered, often as long as the spikelet, scabrous on the angles, sometimes slightly bowed apart at the base; lemmas (7) 8-10 (12) mm long, hirsutulous, rarely glabrous, usually nerveless below, becoming 5- to 7-nerved above, awnless or more often with a short awn up to 5 mm long; anthers (3) 4.5-6.2 mm long; $2n = 28, 56$.

Dry places in valley bottoms, along roadsides, streams and in gullies, among sagebrush to the edges of wooded areas; B.C. to Sask., s. to Calif., n. Ariz. and Colo., reported as far e. as Minn. June-July (-Aug.).

The seeds of Basin wildrye were sometimes used for food by Indians. *Elymus cinereus* is undoubtedly the grass that the old-time cowboys referred to as being stirrup high. Basin wildrye has often suggested the local place name, Ryegrass Flat, as the name is often encountered in our area. It is a coarse grass but nevertheless utilized to some extent by all classes of livestock. It is also important in stabilizing soil and holding embankments. Black sclerotia of ergot (*Cleaveria purpurea*) commonly protrude from the spikelets of this species. If occurring in abundance, this fungus should be considered as an important poisonous species that may cause abortion in animals or even death to adult animals.

Elymus cinereus was lumped with *E. condensatus* Presl in some earlier manuals. *Elymus condensatus* differs in having thicker culms, broader leaves, thicker spikes with more spikelets per node and by being restricted to the coastal area of California. Two varieties of *E. cinereus* have been recognized on the following characters:

- 1 Sheaths glabrous to finely puberulent; blades mostly glabrous to scabrous; the wide ranging plant of our area var. *cinerinus*
- 1 Sheaths with appressed to spreading hairs; blades pubescent; occasionally encountered across the n. part of our area var. *pubens* (Piper) C. L. Hitchc.

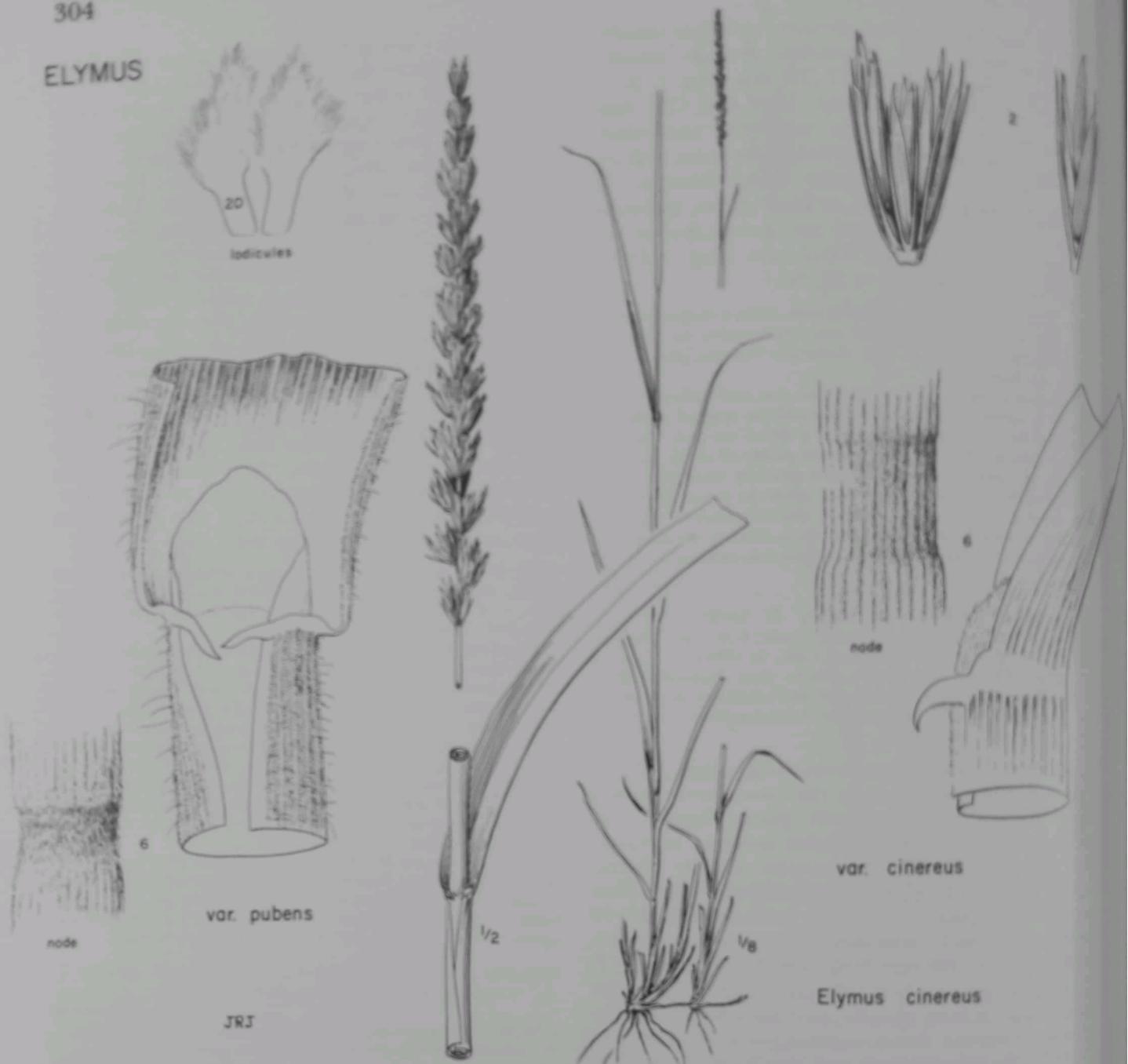
8. *Elymus canadensis* L.

Elymus canadensis L. Sp. Pl. 83. 1753. *Hordeum patulum* Moench, Meth. Pl. Horti Bot. & Agri Marburg. 199. 1794. *Hordeum canadense* Aschers. & Graebner, Syn. Mitteleur. Fl. 2: 745. 1902. *Terrellia canadensis* Lunell, Amer. Midl. Naturalist 4: 228. 1915. *Cleistogenes canadensis* Nevski, Izv. Sada Akad. Nauk SSSR 30: 650. 1932. (Kalm, "Habitat in Canada.")
Sitanion brodiei Piper, Erythea 7: 100. 1899. (*Brodie*, Kellys Orchard, Bishop's Bar, Snake River, Whitman Co., Wash., 7 July 1898.)

Canada wildrye.

Erect, open, tufted perennials; culms 8-15 dm tall; leaves scattered along the culm; sheaths glabrous or sometimes hirsute to pilose; ligules 0.2-1.2 (2) mm long, truncate, ciliolate; blades flat, 3-10 (15) mm broad, scabrous above, the auricles well developed, usually about 1-2 mm long and often clasping the culm; spikes 7-17 (25) cm long, nodding to droop-

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ing, thick or sometimes somewhat open and bristly, interrupted below and crowded above; spikelets 2, 3 or 4 per node, 12–15 mm long (measurement not including the awns), (2-) 3- to 4-flowered, somewhat distant, the rachilla pair plainly visible, about 1 mm long; glumes subequal, relatively long, 10–20 (25) mm, narrow-lanceolate, broadest above the base, 3- to 5-nerved, tapering into a long awn, the body about 10 mm long and the straight awn usually longer, scabrous to somewhat ciliate on the nerves; lemmas 8.5–14 mm long, strongly scabrous-pubescent, 5- to 7-nerved above, gradually tapering into a long, spreading, flexuous, scabrous awn 16–30 (35) mm long; anthers relatively small, 2.5–3 mm long; $2n = 28, 42$.

Streambanks and dry to moist fields and meadows, a common weed along irrigation ditches and roadsides; s. Alaska to N.B., s. to n. Calif., Ariz., N.M., Texas, Mo. and S.C. (June–) July–Aug.

Our plants are extremely variable as to size, width of blades,

degree of nodding of the spikes, crowding of spikelets and spreading of the awns, but the lemmas are mostly noticeably pubescent with prominent nerves above. It seems likely that our plants represent introductions from scattered localities. *Elymus canadensis* frequently grows with *E. virginicus* in the central and eastern states where the two commonly form hybrid swarms. It is unusual that such a robust grass should form such small clumps.

9. *Elymus virginicus* L.

Elymus virginicus L. Sp. Pl. 84. 1753. *E. durus* Hedwig ex Steudel, Nomencl. Bot. ed. 2. 1: 550. 1840, as a synonym. *Hordeum virginicum* M. Schenck, Bot. Jahrb. Syst. 40: 109. 1907. *Terrella virginica* Lunell, Amer. Midl. Naturalist 4: 228. 1915. *Terrella virginica* Nevski, Izv. Bot. Sada Akad. Nauk SSSR 30: 639. 1932. ("Habitat in Virginia.")

E. virginicus var. *submuticus* Hook. Fl. Boreali-Amer. 2: 253. 1840. *E. submuticus* B. B. Smyth & L. C. R. Smyth, Trans. Kansas Acad. Sci. 25: 99. 1913. *Terrella virginica* var. *submutica* Lunell, Amer. Midl. Naturalist 4: 228. 1915. *E. virginicus* f. *submuticus* R. W. Pohl, Amer. Midl. Naturalist 38: 549. 1947. (Drummond, Cumberland House Fort, Sask. in 1829.)



Virginia wildrye.

Tufted perennials; culms 6–12 dm tall; sheaths glabrous, ligules very short, 0.2–0.7 mm long, ciliolate; blades flat, (2) 4–10 mm broad, scabrous on both sides, the auricles well developed, up to 1 mm long or sometimes lacking; spikes 4–12 (16) cm long, erect, rigid, exserted or sometimes slightly included in the upper sheath; spikelets mostly 2 per node, mostly 11–12 mm long, (1-) 4–(5)-flowered; glumes subequal, relatively long, 7–15 (22) mm, firm, narrow-lanceolate or sometimes very narrow, broadest above the base, 2- to 5-nerved, bowed out at the indurate, yellow base, exposing the base of the enclosed florets, ciliolate on the nerves, tapering to an awn tip; lemmas small, 6–9 mm long, glabrous to crisp puberulent, nerveless below, scabrous and becoming 5-nerved above the middle, long-awned or merely awn-tipped in ours with awns only 0.5–2.5 mm long; anthers relatively small, 1.5–3 mm long, very fragile; $2n = 28$.

Mostly along irrigation ditches in our area where it is found in n. Utah; Alta. to Newf., s. throughout the contiguous states, except in Calif. and Nev. July–Sept.

Our plants have glumes and lemmas nearly awnless to short-awned and are referable to the var. *submutica* Hook.

10. *Elymus glaucus* Buckley

Elymus glaucus Buckley, Proc. Acad. Nat. Sci. Philadelphia 1862: 99. 1863. *E. sibiricus* var. *glaucus* Ramaley, Minnesota Bot. Stud. 9: 112. 1894. *Terrilia glauca* Lunell, Amer. Midl. Naturalist 4: 228. 1915. *Cleistogenes glauca* Nevska, Izv. Bot. Sada Akad. Nauk SSSR 30: 648. 1932. (Nuttall, Columbia River, Oregon, 1855.)

E. americanus Vasey & Scribn. ex Macoun, Cat. Canad. Pl. 4: 245. 1888, nomen nudum; Vasey & Scribn. ex Cassidy, State Agric. Coll. Agric. Exp. Sta. Bull. 12: 57. 1890. (Arapahoe Pass, Colo.)

E. glaucus var. *jepsonii* Davy in Jepson, Fl. W. Middle Calif. 79. 1901. *E. glaucus* f. *jepsonii* St. John, Fl. S.E. Wash. & Adj. Idaho 42. 1937. *E. glaucus* subsp. *jepsonii* Gould, Madroño 9: 126. 1947. (Jepson, Napa Valley, Calif.)

Blue wildrye.

Green to glaucous, loose to densely tufted perennials, sometimes short stoloniferous; culms (6) 8–14

dm tall; leaves scattered along the culm; sheaths glabrous, retrorsely puberulent or pilose, the color often purple; ligules short, 0.3–1 mm long, truncate, sometimes slightly involute, 4–12 mm broad, mostly below, the auricles mostly well developed, about 2 mm long and clasping the culm; spikes 6–16 cm long (measurement not including the awns), erect, somewhat loose or interrupted below and overlapping above or dense throughout, long-exserted; spikelets mostly 2 per node, 10–16 mm long, 2- to 3-(4)-flowered; glumes subequal, (6.5) 9–14 (19) mm long, narrow-lanceolate, broadest above the base, 3- to 5-nerved, almost parallel and concealing the base of the enclosed florets, glabrous to scabrous, tapering into a short awn, sometimes slightly indurate at the base but membranous above; lemmas 8.5–12 (14) mm long, 5-nerved above, glabrous to scabrous on the nerves, tapering into a long, slender and mostly straight, rarely spreading awn (10) 14–22 (30) mm long; anthers relatively small, 1.7–3 mm long; $2n = 28$.

Open woods and moist meadows to dry hillsides at middle elev.; common from Alaska to Sask., s. to Calif., n. Ariz. and N.M., less common from Ont. to w. N.Y. and s. to Ark. July–Aug.

Plants of this taxon are often misidentified in herbaria as *Elymus pyramidalis* var. *unilaterale*. *Elymus glaucus* has the *Elymus* characters of 2 spikelets per node, the narrow glumes and the distorted rachilla. The leaf blades are also much broader in blue wildrye. However, there is a bewildering array of variation in this species. Some biotypes seem to cross readily with *Sitanion* while others do not. It seems possible that plants referred to *Elymus glaucus* have had different origins and that we are here dealing with plants of a polyphyletic origin, i.e., some of these look-alikes may have come from different parent combinations than others. The name *X Elystianion hanseaticum* (Scribn.) Bowden has been used for *Elymus glaucus* × *Sitanion hystrix* hybrids. The following variants are recognizable:

1 Sheaths and blades hirsute or pilose with spreading to somewhat retrorse hairs; B.C. to Mont., s. to Calif., Nev. and Idaho var. *jepsonii* Davy

1 Sheaths and blades glabrous to scabrous; range of the species var. *glaucus*

30. *SITANION* Raf. Squirretail

Cespitose perennials; culms mostly erect, hollow; sheaths glabrous to densely villous, open; ligules membranous, short, truncate, entire or lacerate; blades flat and up to 6 mm broad or folded to involute, glabrous or glaucous to pubescent, sometimes densely villous, usually with well developed auricles; inflorescence a spike with (1) 2 (4) sessile spikelets per node, the number often variable throughout the spike, at maturity the rachis readily disarticulating above each node and the rachis segment falling with the spikelet pair, the spreading awns mechanically separating the inflorescence into 1-node units; spikelets borne flatwise to the rachis, 1- to 6-flowered, some of the florets sometimes sterile and the lemma reduced to glume-like structures; glumes subulate to narrowly lanceolate, cartilaginous at the base, 1- to 3-nerved, entire, usually bifid or deeply cleft into 1 to several, scabrous, elongate, straight or flexuous awns, the glume of contiguous spikelets often parallel and borne in front of the rest of the spikelets simulating an involucre; lemmas firm, lanceolate, rounded on back, usually faintly 3- to 5-nerved, the mid-nerves extending into a scabrous, straight or curved awn, the lateral nerves sometimes extended into awn-like bristles, glabrous or scaberulous-pubescent; palea firm, well developed, subequal to the body of the lemma, the 2 nerves sometimes extending into bristles up to 5 mm long; lodicules 2, oblanceolate, often ciliate; stamens 3; $x = 7$.

A genus of 2 or 3 species of w. temp. N. Amer. (Name from the Greek *sitos*, meaning a grain.)

It has been known for some time now that *Sitanion* has very close affinities with *Elymus* and *Agropyron*. The species of *Sitanion* are known to hybridize freely with certain members of these genera, and the sterile hybrids have been named. The putative *Elymus* and

