densely long villous with hairs nearly 3 mm long, the callus somewhat pointed; awns 7–18 mm long, weakly once geniculate and twisted below, appressed pubescent, at least basally, only tardily deciduous; palea slightly shorter than the lemma; lodicules 2, about 1.8 mm long, elliptic-lanceolate; anthers 1.2–2.5 mm long with an apical tuft of hairs, the pollen sterile.

Sporadically occurring in a wide range of community types and soil types from the foothills to subalpine elevs.; e. Wash. to sc. Mont., s. to Calif., Nev. and Colo. Late June–Aug. (–Sept.).

X *Stiporyzopsis bloomeri* has been shown to consist of a series of sterile hybrids, all of which involve *O. hymenoides* as one parent and various species of *Stipa* as the other parent. These hybrids which collectively constitute this unnatural X *S. bloomeri* taxon are similar enough, regardless of the differences in the *Stipa* parent, to have been regarded as a species in the past. In our area the *Stipa* parentage may include *S. neomexicana* (Thurber) Scribn., *S. speciosa* Trin. & Rupr., *S. thurberiana* Piper, *S. occidentalis* Thurber, *S. columbiana* Macoun, *S. scribneri* Vasey, and *S. pinetorum* M. E. Jones. Careful observations in the field will reveal which species of *Stipa* has entered into the cross. Johnson (1945) intended the name X *Stiporyzopsis bloomeri* to apply only to the *O. hymenoides* X *S. occidentalis* cross.

42. ORYZOPSIS Michx. Ricegrass

Cespitose perennials; culms solid or hollow; sheaths open, mostly at ground level and often appearing partly buried; ligules membranous, truncate to elongate and acute; blades erect, flat or more often involute, non-auriculate; inflorescence a narrow or open, sometimes reduced panicle; spikelets 1-flowered, disarticulating above the glumes; glumes equal or nearly so, broad, obtuse to acuminate, membranous to firm, usually 3- to 5-nerved; lemma often the same length as the glumes or slightly shorter, broad, oval or oblong, nearly terete, indurate, appressed-puberulent to hirsute or glabrous, the callus short and blunt and often bearded with hairs about the same length as those on the lemma body; awn 2–8 (18) mm long, straight or curved, not more than 3 or 4 times longer than the body of the lemma, early deciduous, attached terminally or subterminally; palea subequal to the lemma; lodicules 2 or 3, large, narrowly lanceolate to elliptic-lanceolate or somewhat cuneate; stamens 3; caryopsis permanently enclosed by the lemma and palea; $x = 11, 12, 14$.

A genus of about 20 species distributed in the cool and temp. regions of both hemispheres. (From the Greek *oruza*, rice, and *opsis*, like, alluding to the similarity of the grains of some of the species to unpolished rice.)

The ricegrasses are all edible, but only *O. hymenoides* (Indian ricegrass) is of any importance. It is a dominant species in sandy desert areas where it cures well on the ground. Indian ricegrass becomes an important grass on winter ranges, and the seed has been used for food by the Indians.

Oryzopsis is closely related to the genus *Stipa*. *Oryzopsis webberi* (Thurber) Benth. ex Vasey is here treated as *Stipa webberi* (Thurber) B. L. Johnson because of its close affinities to *S. pinetorum*. Also many intergeneric hybrids have been reported between *O. hymenoides* and several species of *Stipa* (see discussions under *O. hymenoides* and X *Stiporyzopsis bloomeri*).

References:
Johnson, B. L. Cytotaxonomic studies in *Oryzopsis*. Bot. Gaz. 107: 1–32. 1945.
Kam, Y. K., and J. Maze. Studies in the relationships and evolution of supraspecific taxa utilizing developmental data. II. Relationships and evolution of *Oryzopsis hymenoides*, *O. virescens*, *O. kingii*, *O. micrantha*, and *O. asperifolia*. Bot. Gaz. 135: 227–247. 1974.

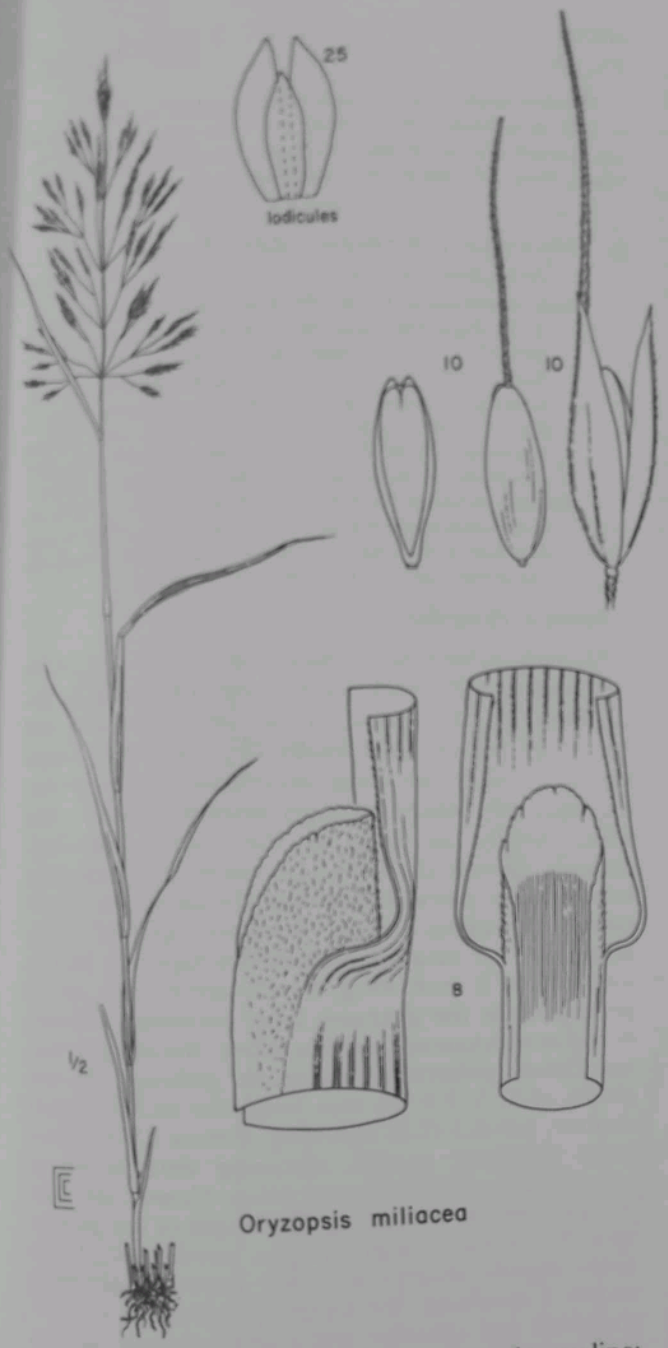
1 Lemmas usually smooth or nearly so, 1.8–3 mm long.
  2 Blades flat, 3 mm wide or more; plants tall, 6–15 dm; leaves mostly cauline; introduced species ..... 1. *O. miliacea*
  2 Blades involute, or if flat less than 2 mm wide; plants mostly smaller, 2.5–7 (9) dm tall; leaves mostly basal; native species ..... 2. *O. micrantha*
1 Lemmas copiously hairy, (2.5) 3–6 mm long.
  3 Pubescence of the lemma of short, appressed hairs; awns flexuous or geniculate; panicles short, 3.5–8 (11) mm long, narrow.
    4 Blades involute-filiform, less than 1.5 mm broad; glumes 3–5 (6) mm long; awn of the lemma 3–6.5 mm long, geniculate ..... 3. *O. exigua*
    4 Blades flat or loosely involute, (3) 5–9 mm broad; glumes 5–7.5 mm long; awn of the lemma 9–14 mm long, flexuous ..... 4. *O. asperifolia*
  3 Pubescence of the lemma of long, silky hairs; awns straight or weakly geniculate.
    5 Panicles (5) 7.5–35 cm long; ligules 1–7.5 mm long.
      6 Panicle branches and capillary pedicels divaricately spreading; awn of the lemma 3–5.5 mm long ..... 5. *O. hymenoides*
      6 Panicle branches erect or ascending; awn of the lemma 7–18 mm long ..... X *Stiporyzopsis bloomeri*
    5 Panicles short, 3–6 (7.5) cm long; ligules 0.2–0.5 (1) mm long; see species no. 1 of next genus ..... *Stipa webberi*

1. Oryzopsis miliacea (L.) Aschers. & Schweinf.

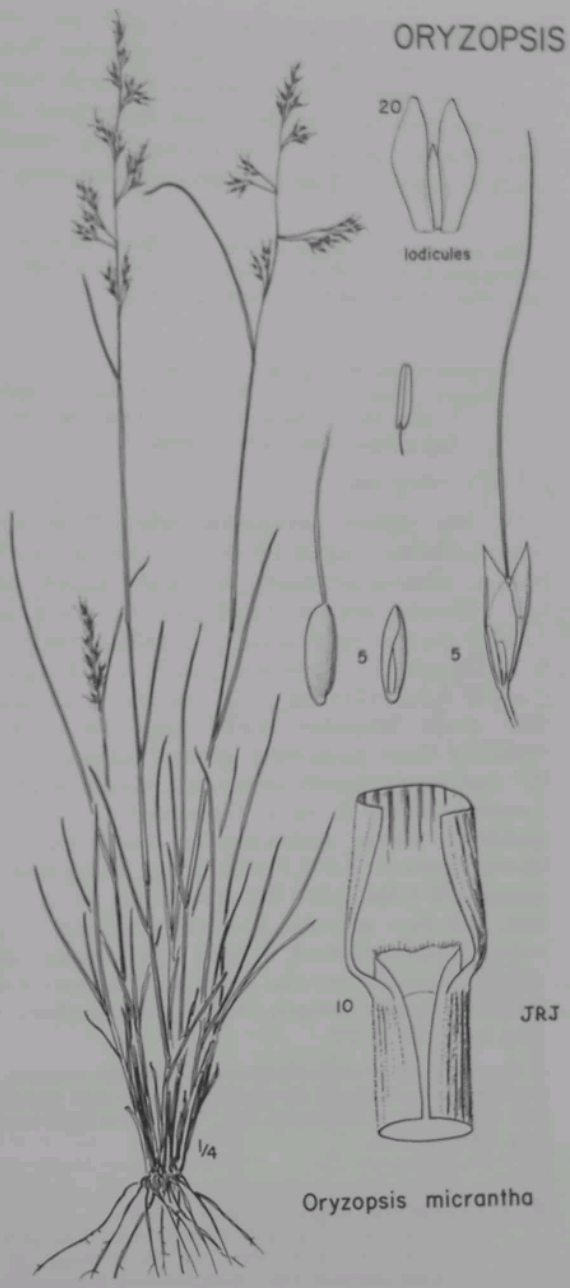
Agrostis miliacea L. Sp. Pl. 61. 1753. *Achnatherum miliaceum* Beauv. Essai Nouv. Agrostogr. 20, 146, 148. 1812. *Urachne miliacea* C. Koch, Linnaea 21: 439. 1848. *Piptatherum miliaceum* Coss. Notes Pl. Crit. 129. 1851. *Oryzopsis miliacea* Benth. & Hook. ex Aschers. & Schweinf. Mém. Inst. Egypt. 2: 169. 1887. *Stipa miliacea* Hoover, Leafl. W. Bot. 10: 340. 1966. (Europe.)

Smilo grass.

Stout perennials; culms 6–15 dm tall, erect from a



Oryzopsis miliacea



Oryzopsis micrantha

decumbent base, glabrous; leaves mostly cauline; sheaths glabrous, persistent, becoming papery; ligules 1.5–3 mm long, rounded to truncate, scaberulous; blades flat, 3–10 mm broad, glabrous, somewhat scabrous on the upper surface; panicles 15–30 cm long, loose, the branches ascending or spreading; glumes broadly lanceolate, acuminate, 3-nerved, minutely scaberulous to glabrous, the first glume 3–4 mm long, the second 2.5–3.5 mm long; lemma 2–3 mm long, oblong-elliptic, 3-nerved, smooth, shiny; awn 2–3.5 (4.2) mm long, straight, early deciduous; palea 2-nerved, same texture as the lemma, subequal; lodicules 3, the larger pair narrow ovate, the smaller one lanceolate; anthers about 1 mm long; $2n = 24$.

Dry to moderately moist disturbed places; introduced into Calif., Nev. (Elko Co.) and Utah from the Medit. region, possibly becoming established in our area.

2. Oryzopsis micrantha (Trin. & Rupr.) Thurber

Urachne micrantha Trin. & Rupr. Mém. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 5(1): 16. 1842. *Oryzopsis micrantha* Thurber, Proc. Acad. Nat. Sci. Philadelphia 1863: 78. 1864. (Sask.)

Little ricegrass.

Densely tufted perennials; culms 2.5–7 (9) dm tall, numerous, hollow, glabrous; leaves mostly basal; sheaths smooth to scaberulous; ligules 0.2–1 (2) mm long, truncate, finely ciliolate; blades involute or if flat mostly less than 2 mm broad, scabridulous; panicle (4.5) 6–14 (20) cm long, narrow, the short branches ascending-appressed or slightly spreading; glumes subequal, 2.7–3.5 (4) mm long, ovate-acute, 3- to 5-nerved, glabrous to minutely scabridulous, greenish below, hyaline above; lemma 1.8–2.8 mm long, oblong-elliptic, usually glabrous, shiny, becom-

ing brownish, indurate, the callus glabrous; awn (2) 4–8 (9.5) mm long, straight or somewhat flexuous, early deciduous; palea subequal to the lemma and the same texture; lodicules 3, the larger pair elliptic-oblanceolate, nearly 1 mm long, the third one smaller, lanceolate; anthers about 1 mm long; $2n$ = 22.

Dry open places from sagebrush foothills to coniferous woodlands at middle elevs., often in sandy soil or on rocky ridges; B.C. to Sask., s. to e. Calif. and Texas. June–early Aug.

3. Oryzopsis exigua Thurber

Oryzopsis exigua Thurber in Wilkes, U. S. Explor. Exped. Bot. 17: 481. 1874. (*Thurber 829*, "1st Camp beyond Mts to Chief's Place," Cascade Mts., Oregon.)

Little ricegrass.

Densely tufted perennials, sometimes forming large bunches; culms 1.5–3.5 (4) dm tall, stiff and hollow; sheaths persisting, becoming papery and finally fibrous, smooth to slightly scabrous; ligules 1.5–3.5 (4) mm long, acute, puberulent; blades involute-filiform, 5–10 cm long, stiffly erect, scabrous; panicle 3.5–8 (11) cm long, narrow, spike-like, the few short branches stiffly appressed-ascending; spikelets short pedicelled; glumes subequal, (3) 4–5 (6) mm long, broadly lanceolate, obtuse to abruptly pointed, faintly 3- to 5- (7)-nerved, scaberulous to glabrous, often anthocyanous, becoming hyaline above; lemma 3.5–5.5 mm long, elongate-elliptic, appressed-hispid; awn 3–6.5 mm long, stout, geniculate, the first segment sometimes twisted, attached subterminally behind a bifid apex; palea slightly shorter than the lemma; lodicules 2, narrowly oblanceolate, slightly longer than 1 mm; anthers 1.5–2 mm long; $2n$ = 22.

Open gravelly or rocky hillsides, ridges and dry meadows, sometimes in open woodlands at subalpine elevs. to near timberline; s. B.C. and s. Alta., s. to Oregon, Nev., Utah and n. Colo. Late June–Aug. (–Sept.).

4. Oryzopsis asperifolia Michx.

Oryzopsis asperifolia Michx. Fl. Boreali-Amer. 1: 51, pl. 9. 1803. *O. aspera* Michx. ex Muhl. Cat. Pl. N. Amer. 11. 1813. *Urachne asperifolia* Trin. Gram. Unifloris & Sesquifloris 174. 1824. (*Michaux*, "Hab. a sinu Hudsonis ad Quebec, per tractus montium.")

Tufted perennials; culms (2) 3–5 (6) dm tall, hollow; sheaths glabrous, sometimes auriculate at apex; ligules 0.2–0.7 mm long, truncate, ciliolate; blades flat to loosely involute, (3) 5–9 mm broad, erect, stiff, often exceeding the culms, scaberulous to hirsute beneath, glabrous above, the blades of the culms much reduced; panicle 3.5–7 (8) cm long, narrow, sometimes reduced to a raceme; glumes subequal, 5–7.5 mm long, broadly ovate, obtuse, mucronate, sometimes truncate and shallowly 3-toothed, 5- to 7-nerved, ciliate apically; lemma 5–7 mm long, broadly fusiform, turgid, shiny, hirsute with fine appressed hairs, the callus densely tufted in upper half; awn 9–14 mm long, flexuous, deciduous; palea slightly shorter than the lemma; lodicules 2, lanceolate, about 5 mm long; anthers 2.7–3.5 mm long; $2n$ = 46, 48.

Wooded slopes, usually under conifers; B.C. to Newfl., s. in the w. U.S. to n. Idaho, Mont., Wyo., ne. Utah (Uinta Mts., n. of Vernal, Uintah Co., *D. Austin s.n.*), Colo., and N.M., and e. to S.D., Minn., Wisc., Ill., Mich., N.Y. and New England. July–Aug.

5. Oryzopsis hymenoides (Roemer & Schultes) Ricker

Stipa membranacea Pursh, Fl. Amer. Sept. 728. 1814; not L. 1753. *Stipa hymenoides* Roemer & Schultes, Syst. Veg. 2: 339. 1817. *Oryzopsis membranacea* Vasey, U.S.D.A. Div. Bot. Bull. 12(2): pl. 10. 1891. *Eriocoma membranacea* Beal, Grasses N. Amer. 2: 232. 1896. *O. hymenoides* Ricker in Piper, Contr. U. S. Natl. Herb. 11: 109. 1906. *Eriocoma hymenoides* Rydb. Bull. Torrey Bot. Club 39: 102. 1912. (*Bradbury*, on the banks of the Missouri River, in 1811.)

Eriocoma cuspidata Nutt. Gen. N. Amer. Pls. 1: 40. 1818. *Milium cuspidatum* Sprengel, Syst. Veg. 1: 251. 1825. *O. cuspidata* Benth. ex Vasey, Grasses U. S. 23. 1883. (*Nuttall*, "On the grassy plains of the Missouri," in 1811.)

Indian ricegrass.

Densely tufted perennials; culms (2) 3–6 (8.5) dm tall, hollow with thick walls; sheaths glabrous to puberulent, partly buried in the sand, persisting and becoming papery and finally fibrous in old clumps; ligules 2.5–7.5 mm long, acuminate, entire, becoming lacerate; blades strongly involute, about 1 mm wide, nearly as long as the culms, numerous, smooth; panicle (5) 7–14 (19) cm long, the capillary branches in pairs, branchlets dichotomous, divaricately spreading, often flexuous; glumes ovate-acuminate or caudate, sometimes tapering into an awn up to 2 mm long, 3- (5)-nerved, the nerves prominent at the greenish base, becoming indistinct in the anthocyanous portion above, the margins hyaline, finely puberulent to nearly glabrous, the first glume (4.5) 5–7.5 (8) mm long, the second slightly shorter, 4.2–6.5 (7.5) mm long; lemma 2.5–4 (5) mm long, fusiform, turgid, maturing dark brown or nearly black, shiny, densely pilose-hirsute, the whitish hairs nearly extending the length of the glumes; awn 3–5.5 mm long, straight, readily deciduous; palea slightly shorter than the lemma; lodicules 3, nearly 2 mm long, the longer pair broadly cuneate, the third one rhombic and slightly shorter; anthers 0.8–1.2 (1.5) mm long with an apical tuft of hairs; $2n$ = 28 + 0 −8B, 48, 65, 130.

Mostly in deserts, sagebrush plains and pinyon-juniper woodlands, often dominating communities in sandy soils, less frequent in gravelly soils, from low valley bottoms to the foothills, but sometimes up to subalpine elevs.; B.C. to Man., s. to Calif., Ariz., N.M. and Texas. May–early July (–Aug.).

Indian ricegrass often forms dense grasslands where it appears to be a subclimax species. It is a nutritious grass that cures well on the ground because of thick-walled culms and numerous, long, involute leaf blades.

Sterile hybrids between *O. hymenoides* and several species of *Stipa* are often found. Johnson (Amer. J. Bot. 32: 599–608. 1945; 47: 736–742. 1960; 49: 540–546. 1962; 50: 228–234. 1963) discussed hybrids of Indian ricegrass and eleven species of *Stipa* that are similar enough to have been collectively included under X *Stiporyzopsis bloomeri*. Some of these sterile hybrids are beautiful grasses with hybrid vigor and promise of being favorable range grasses. They should be treated with colchicine in an attempt to induce chromosome doubling and subsequent fertility.

ORYZOPSIS


5
lodicules
8
12
5
5
5
5
5
1/2
15
lodicules
15
lodicules
JRJ
1/2
12
1/2
Oryzopsis exigua
1/6
12
Oryzopsis asperifolia
1/8
12
Oryzopsis hymenoides