

GRAMINEAE

Part Deux

GRAMINEAE AL de Jussieu 1789 or POACEAE (R Brown) Barnhart 1895 GRASS FAMILY

ERAGROSTIS to ZIZANIA

Revised 14 July 2015

Eragrostis	Phragmites
Eriochloa	Piptatherum
Festuca	Poa
Glyceria	Puccinellia
Hesperostipa	Schizachyrium
Hierochloë	Secale
Hordeum	Setaria
Hystrix	Sorghastrum
Koeleria	Sorghum
Leersia	Spartina
Leptochloa	Sphenopholis
Leptoloma	Sporobolus
Lolium	Stipa
Melica	Tridens
Muhlenbergia	Triplasis
Oryzopsis	Tripsacum
Panicum	Triticum
Paspalum	Vulpia
Phalaris	Zizania
Phleum	

ERAGROSTIS NM von Wolf 1776 **LOVEGRASS**, *LIEBEGRAS* *Eragrostis* (e-ra-GROS-tis, or er-uh-GROS-tis)

Nathaniel Wolf described *Eragrostis* in 1776 but gave no explanation of the meaning or origin of the name. The apparent explanation of the name is that it is New Latin, from Greek ἔρωσ, ἔρωτος, *eros*, *erotos*, sexual love, & Greek, ἄγρωστις, *agrostis*, *agristidos*, some kind of field grass eaten by mules, variously ascribed to *Triticum repens* (*Elymus repens*) & *Cynodon dactylon* (or an indeterminate herb, a grass, a weed, or couch grass, quitch-grass), similar to Latin *agrostis*, *agrostis*, COUCH GRASS, QUITCH-GRASS, from Old Greek ἀγρός, *agros*, a field, country. The exact meaning of the name & reference to the plant are unclear & unexplained, perhaps an allusion to a grass that ass's enjoyed, or to splendor in the grass, in the least, giving the genus the common name "lovegrass".

Scholars have proposed alternate meanings based on various interpretations of the initial *er-* or *eri-*. In scientific name usage, the prefix *eri-* has been translated as early, spring, earth or field, wool, very, much, hedgehog, & heath. In Greek, *er* is spring, from ἦρ, *er*, the same as ἔαρ, *ear*, the earth.

One source suggests the meaning is from Greek ἦρ, *er*, early & ἄγρωστις, *agrostis*, "wild, referring to the fact that some spp are early weeds of disturbed land. However, *Agrostis* refers to field grass, growing in an ἀγρος, *agros* or field, while ἄγριος, *agrios*, means wild & savage. More appropriately, this could mean early in the field, successional or seasonally.

Using Greek ἔρι, *eri*, a prefix meaning very or much, is the suggestion that the name means many-flowered *Agrostis*. Unfortunately, we know of no botanical Latin term using *eri-* to mean very or much, & we know of only one reference to this usage (as of 8/22/11).

Some scholars interpret *Eragrostis* as from Greek *era*, earth or field. The ancient Greek root ἔρα-, *era-* (in ἔραζε, *eraze*, to earth, towards the earth), in Hellenistic Greek also means 'on the ground'. Charters notes earth or field "makes much more sense since many of the spp of this genus especially the 90 or so from southern Africa are habitants of pastures & fields." 'On the ground' may be a reference to the many spp that are low growing or mat-forming. Type sp is *Eragrostis minor* Host, LITTLE LOVEGRASS, an annual native to Europe, which is erect to decumbent, but often hugs the ground as it grows. It's very possible the name is "earthgrass", & "lovegrass" is a misnomer.

A genus of about 350 spp of grasses resembling the bluegrasses but having flattened spikelets & deciduous lemmas, of temperate & tropical areas. LOVE GRASSES are known to cause seasonal allergic reactions in certain individuals. *E minor* is a C4 grass. $x = 10$. [formerly *Eragrostis* Host.]

Eragrostis curvula, sow at 20°C (68°F) in light, if no germ. in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

ML Charters, 2003-2008, California Plant Names: Latin & Greek Meanings & Derivations *A Dictionary of Botanical & Biographical Etymology*, <http://www.calflora.net/botanicalnames/index.html>

HT Clifford, 1996. *Etymological Dictionary of Grasses*, Version 1.0 (CD-ROM). Expert Center for Taxonomic Identification, Amsterdam, The Netherlands;

EC Jaeger, DSc, 1944, *A Source-Book of Biological Names & Terms*. Charles C Thomas, Publisher, Springfield, Illinois.

PM Peterson, *Eragrostis*, in <http://herbarium.usu.edu/treatments/Eragrostis.htm> (Flora of North America online, grasses, accessed 2009-2011.)

Umberto Quattrocchi *Dictionary of Grasses*.

Nathaniel Matthaeus von Wolf, 1776. *Genera et species Plantarum vocabulis characteristicis definita*. [Kanteri; Marienwerder] Danzig, Germany. 177 pp. (Often listed as *Genera plantarum* or *Genera plantarum vocabulis characteristicis definita*)

earth, n.1 Third edition, November 2010; online version June 2011. <
<http://www.oed.com/view/Entry/59023>>; accessed 23 August 2011. An entry for this word was first included in *New English Dictionary*, 1891.

Eragrostis capillaris (Linnaeus) Nees LACE GRASS, (*capillaris -is -e* fine as hair, hair-like, slender.)
"A common low growing annual of dry places & sandy fields & roadsides." (Fell 1955) $N 2n = 50, 100$.



Eragrostis capillaris

Eragrostis cilianensis (Allioni) Link STINK GRASS, aka *ÉRAGROSTIDE FÉTIDE*, The common name is from the odor of the fresh plant.

"An ill-smelling introduced grass that is common in fields, waste places, on railroad ballast, etc. (*E megastachya* (Koeler) Link)" (ewf55) distribution/range:
 $N 2n = 20$.



Eragrostis cilianensis

Eragrostis curvula (Schrader) Nees WEeping CURVULA, aka BOER LOVE GRASS, WEeping LOVE GRASS, The common name BOER LOVE GRASS refers to the sp southern African nativity.

Habitat: Sandy, low fertility, well drained soils. Full Sun. High drought tolerance. Low salt tolerance. pH 4.5-8.0. distribution/range: Introduced from East Africa, naturalized.

Culture: ☉ Sow at 20°C (68°F) in light, if no germ. in 3-4 wks, move to -4 to +4°C (34-39°F) for 2-4 wks (tchn).

seed counts & rates: 1,482,000 (ecs) seeds per pound.

Description: Short-lived warm-season bunch grass; roots 14" minimum depth; culms to 3'; N 2n = 40, 50.

key features:

Comments: status: Introduced. phenology: Blooms midsummer. Quick to establish.

Associates: Provides some food for large mammals. Moderate cover for birds.

VHFS: Several cultivars are available.



Eragrostis curvula

Eragrostis frankii CA Mey ex Steudel SANDBAR LOVEGRASS, aka ÉRAGROSTIDE DE FRANK, (*frankii* after Joseph C Frank, 1782-1835, German botanist & physician who travelled & collected in the United States.) N 2n = 40, 80. Recently adventive in Ontario, & appears "to be increasingly common in the northeastern United States." (fna)

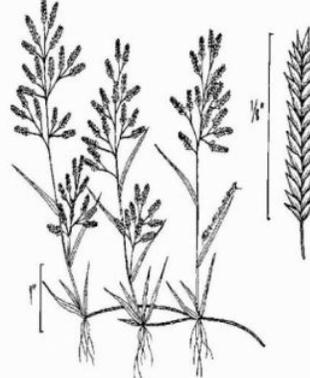
"Common in sandy places." (ewf55) distribution/range:



Eragrostis frankii

Eragrostis hypnoides (Lamarck) Britton, Sterns, & Poggenburg CREEPING LOVE GRASS, aka *ÉRAGROSTIDE HYPNOÏDE*, TEAL LOVEGRASS, (*hypnoides* like moss, resembling Feather-moss, *Hypnum*, from Theophrastus, Modern Latin from Greek ὑπνον, *hypnon*, ‘moss growing on trees’, & *-oides*, like resemble.) Native from southern Canada to Argentina. Annual, mat-forming, $N 2n = 20$. Formerly seen listed in wetland plantings, seemingly counterintuitive.

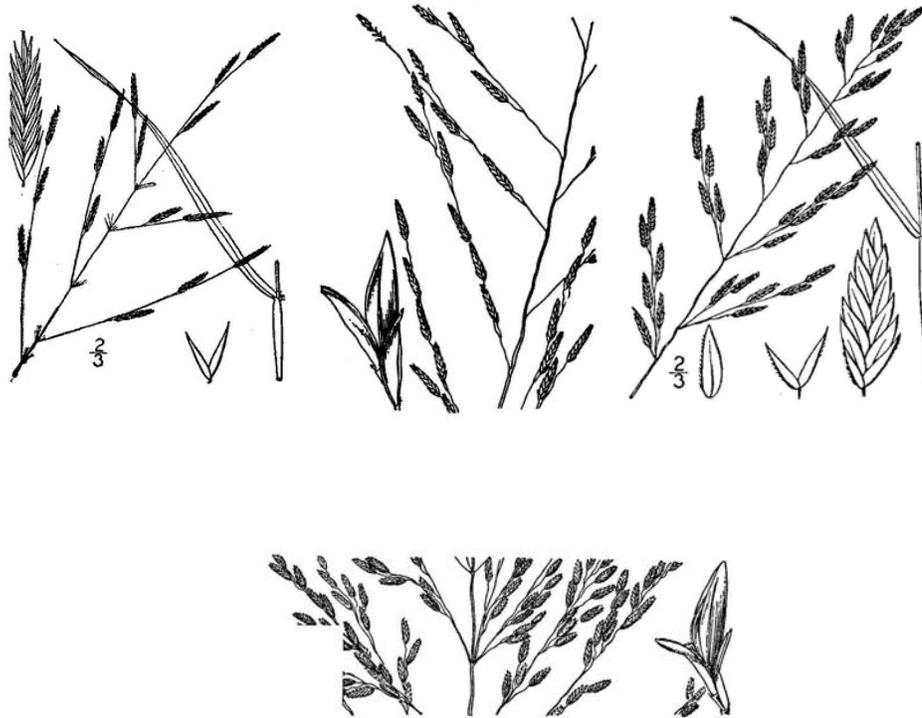
“A rather common mat forming grass that grows on moist, mostly sandy, stream banks.” (ewf55)
distribution/range:



Eragrostis hypnoides

Eragrostis pectinacea (Michaux) Nees ex Steudel CAROLINA LOVE GRASS, aka *ÉRAGROSTIDE PECTINÉE*, LOW LOVE GRASS, SMALL LOVE GRASS, TUFTED LOVE GRASS, (*pectinaceus -a -um* comb-like, combed, for the arrangement of the leaves, or from the one sided spikes.) Native from southern Canada to Argentina. Annual, tufted. $N 2n = 60$.

“A native love grass that is common in fields, on roadsides & in waste places.” (ewf55) distribution/range:



Eragrostis pectinacea

Eragrostis spectabilis (Pursh) Steudel PURPLE LOVE GRASS, aka *ÉRAGROSTIDE BRILLANTE*, TUMBLE GRASS, (from Latin *spectabilis* -is -e, notable, spectacle, that may be seen, worth seeing, notable, remarkable, showy) upl

Habitat: Sandy soils & dry roadsides, often growing with *Leptoloma cognatum*. The seed heads of both spp form tumbleweeds & they can be seen tangled together in a bush or fence row in early fall in sand country.

distribution/range: Native from southern Canada through the United States, Mexico, & Central America to Belize.

Culture: ① "No pretreatment necessary. May be cold moist treated. Light to very light cover. Good germination. Do not over water" (mfd93). ② No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ③ No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

seed counts & rates: 1,830,645 (gnh10), 1,882,157 (gnhe11), 4,480,000 (aes10), 5,159,091 (gnh01), 6,878,789 (gna04) seeds per pound.

bottom line: Seed spring or dormant. $\frac{2}{3}$ of lots are largely nondormant, but $\frac{1}{3}$ of lots are 32-81% dormant & benefit from dormant seeding. Flipflop species, predominantly non to slightly dormant. Germ 69.3, 79.5, na, sd 29.8, r12-97.5 (85.5)%. Dorm 19.3, 0.0, 0.0, sd 29.6, r0.0-81 (81)%. Test 26, 26, 26, r16-38 days. (#10)**

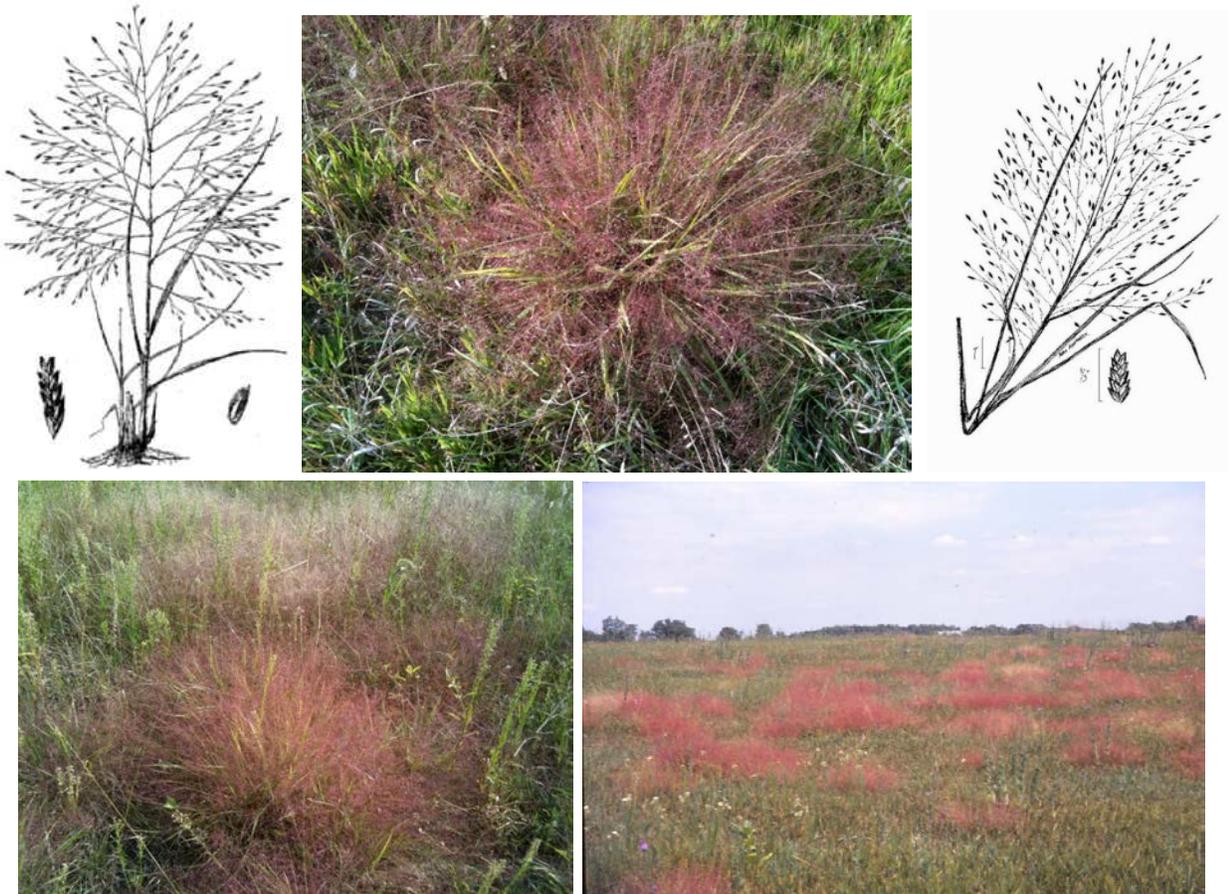
greenhouse & garden: Dry storage only has worked well for us, cold moist stratify (45 days) or dormant seed may benefit some lots. Seeds are very small, light cover. KNO₃ is recommended by some.

Description: Erect, warm-season grass, 0.75-1.5', purple spikes. $2n = 20, 40, 42$.

Comments: status: Native. phenology: Blooms 6-9. In northern Illinois, collect seeds in late August - September. Collect seeds in se Wisconsin in August - October (he99). Landscaping, seeds & plants are sold as an ornamental. Species has great purple color & open, airy structure, & is good as a dry to xeric ground cover, good in rock gardens, dry gardens, & dwarf prairies. Bunching, non-competitive in good soils. Seeds (on tumbleweeds) are dispersed by wind in the fall, accumulating in fencerows & bushes as early as the first week of October. Seed source nursery production genetic source Whiteside Co.

"A conspicuous low growing tumble grass with a definitely purple look. Common on high prairies & in sandy places. Perennial." (ewf55)

Associates: Larval host *Poanes zabulon* ZABULON SKIPPER. Highly deer resistant.



Eragrostis spectabilis, 2nd & 3rd photos with the paler *Leptoloma cognatum*

Eragrostis trichodes (Nuttall) AW Wood SAND LOVEGRASS, aka *CAPIM-AMOROSO-DA-AREIA* (PB), *SANDKÄRLEKSGRÄS* (SW), TALL LOVEGRASS, (*trichodes* like or resembling hair, from Greek *τριχο-*, *τριχ-*, *tricho-*, *trich-*, combining form of *θρίξ*, *thrix*, hair, & *ώδης*, *ώδες*, *odes*, *odes*, like, of the nature of.)

Habitat: Grows best in deep sandy sites, may occur on heavier soils. Dry sand, prairies, & open woods (ecs).

Culture: ①No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②“No pre-treatment needed. Sow seeds on soil surface at 70°F & water.” (ew12) ③Sow at 20°C (68°F) in light, if no germ. in 3-4 wks, move to +1 to +4°C (33-39°F) for 2-4 wks (tchn). Good seedling vigor, establishes quickly.

Storage Behaviour: Orthodox, Long-term storage under IPGRI preferred conditions at RBG Kew, WP.

Oldest collection 22 years;

Thousand Seed Weight: 0.2g. ①0.3; (Cromarty et al 1982); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ②0.28; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ③0.2952; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ④0.04; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ⑤0.2452; (RBG Kew); Seed; *Seed weights reported may include minor covering structures;

Germination ①64% germination; ; germination medium = 1% agar; germination conditions = 16°C, 12/12; (RBG Kew). ②80% germination; ; germination medium = 1% agar; germination conditions = 26°C, 12/12; (RBG Kew). ③38% germination; ; germination medium = 1% agar; germination conditions = 30°C, 12/12; (RBG Kew).

seed counts & rates: 1,300,000 (stock, wns01), 1,440,000 (pm, ew12), 1,626,000 (ecs) seeds per pound. Broadcast 1 lb pls per 15,000 sq ft, or drill 1.5-2.0 pls lbs per acre. Small projects plant 0.5 lb pls per 1000 sq, ft, or 6 pls lbs per acre (pots).

cultivation: Space plants 1.5-2.0. Dry soils, full sun. Tolerant of low fertility. High drought tolerance. Low salt tolerance. pH 5.0-7.8.

bottom line: Limited data suggest this seed can be seeded spring or dormant. Germ 74%. Dorm 5.0%**

Description: Erect, perennial, warm-season, bunching grass, tall, attractive; roots dense deep, fibrous, 16” minimum depth; culms; 1-3’; leaves fine; seed heads 6-12”, open panicle with purple? cast; spikes; N 2n = 40.

key features:

Comments: status: Native. phenology: Breaks spring dormancy 2 weeks earlier than other WSG. Blooms midsummer. Can be planted in solid stand or in mixes. Species is very ornamental, with an open, airy structure, good as specimen plantings, in dry gardens, borders, & short, dry prairies. Great & long lasting fall & winter orangish color. Good for erosion control on sandy sites & range improvement.

Associates: Provides cover for wildlife. Extremely palatable to livestock (*the ice cream of native grasses*), but not tolerant of continuous, close grazing.

VHFS: Commercial varieties are available. Basionym *Poa trichodes* Nuttall.



Eragrostis trichodes, McCune Sand Prairie

ERIOCHLOA Kunth **CUP GRASS** *Eriochloa* from Greek from Greek ἔριον, *erion*, wool, & χλοη, *khloe*, for grass. $x = 9$.

Eriochloa villosa (Thunberg) Kunth [*Paspalum villosum* Thunb] CHINESE CUP GRASS, aka HAIRY CUP GRASS, WOOLLY CUP GRASS, (*villosus -a -um* villo'sus (vil-OH-sus) Latin for with hairs, villous, soft-hairy, softly hairy, shaggy, from the adjective *villōsus -a -um*, shaggy, hairy, rough, from *villus, villi* m., shaggy hair, tuft of hair, & adjectival suffix noting plenitude, abundance, fullness or notable, marked development, prone to.) Weedy annual introduced from eastern Asia. $N 2n = 54$.

October 2005, CUP GRASS appeared on I-88 west of State Route 92, southside, eastbound lane, several populations, also I-80 near Geneseo, Henry Co. There was also a large population in a soybean field, east of the gravel pit on Prophetstown Road, in Whiteside Co. This population moved east along the field in 2007. Also, found along the edge of a cornfield on the north side of Route 30 near Waterman. Reported from two V3 native restorations by Angela Kerber. Found also along an abandoned railroad north of Elmwood, 1990. It may be more common than previously thought, with stands showing on roadsides due to the IDOT reduced mowing policy, from the 2005 drought.

VHFS: [*Paspalum villosum* Thunb]



Eriochloa villosa

FESTUCA Linnaeus **FESCUE** *Festuca* (fes-TOO-ka) New Latin, from Dodonaeus, classical Latin *festūca*, popular Latin *festūcum*, the name for a stalk of grain, stalk, stem, straw; rod for touching slaves in manumission; probably akin to Latin *ferula* giant fennel, or from Celtic *fest*, food or pasturage (Hooker & Arnott). Alternately from the Latin *festuca*, 'stalk', 'stem', or 'straw'—a name used by Pliny for a weed (fna). A large genus, nearly cosmopolitan in temperate areas of about 350 spp, mostly tufted perennial grasses having flat leaves & paniced spikelets with acute pointed or awned flowering scales.

FESCUE nomenclature is confusing due to the taxonomic classification of the scientist, & the classification (or lack there of) used by the seedsmen & horticulturalists. Tracking the ever-changing names of TALL FESCUE is an obsession in itself. The classification used here is largely influenced by seed literature, & stands in independence (or ignorance & confusion) of most authorities.

“The correct generic placement of the introduced species *Schedonorus arundinaceus* (= *Festuca elatior*; = *Festuca arundinacea*; = *Lolium arundinaceum*) and *S pratense* has been disputed. The traditional placement in *Festuca* has been defended by Aiken et al (1997), Darbyshire (1993) transferred them to *Lolium*; and Soreng & Terrell (1998) place them in the genus *Schedonorus*.” (Weakley 2012b)

① *Festuca amethystina*, *gigantea*, *glauca*, & *ovina*, sow at 20°C (68°F), germinates in about two wks; *F pulchella*, *scoparia*, *valesiaca*, sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

SG Aiken, MJ Dallwitz, CL McJanet, & LL Consaul, 1996 onwards. *Festuca* of North America: descriptions, illustrations, identification, & information retrieval. Version: 19th October 2005 <http://delta-intkey.com/festuca/index.htm>

SJ Darbyshire, 1993, Realignment of *Festuca* subgenus *Schedonardus* with the genus *Lolium* (Poaceae). *Novon* 3: 239-243.

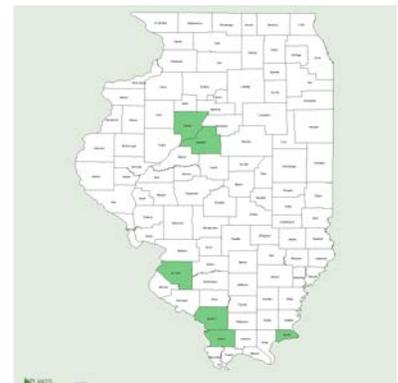
RJ Soreng & EE Terrell, 1997. Taxonomic notes on *Schedonorus*, a segregate genus from *Festuca* or *Lolium*, with a new nothogenus, ×*Schedololium*, and new combinations. *Phytologia* 83: 85-88.

Festuca arundinacea Linnaeus (or Schreber) TALL FESCUE, aka ALTA FESCUE, CAÑUELA ALTA, COARSE FESCUE, ERVA-CORNEIRA, FÊTUQUE ÉLEVÉE, FÊTUQUE ROSEAU(?), MEADOW FESCUE, REED FESCUE, ROHRSCHWINGLE, RYE GRASS, [*F elatior* of sw94, *F elatior arundinacea* of Gleason] (*arundinaceus* -a -um (a-run-di-NAH-kee-us) reed-like, (rush-like?), having a culm like tall grasses, from the Latin, (*h*)*arundo*, (*h*)*arundinis* f a reed, cane, fishing rod, arrowshaft & -*aceus*, resembles, like.) The common name MEADOW FESCUE is generally used with *F pratensis*. Subgenus *Schedonorus* (Beauvois) Peterm.

Habitat: “An introduced perennial forage grass found in pastures & on roadsides.” (ewf55) Good soil in meadows, & pastures, along roadsides, riverbanks, & in waste places. Occurs in all soil textures. **distribution/range:** Native to Europe; adventive in waste ground, scattered in Illinois (m12). It is now cultivated in all but the coldest and most arid parts of North America, and often escapes (Darbyshire fna). Sp is far more common than maps indicate. **Culture:** 10 – 14 days until germination. Medium establishment rate.

seed counts & rates: 205,000 (ecs), 227,000 (gran), 230,000 seeds per pound. For forage, drill 15 - 20 lb pls per acre (Stocks). For pasture, Granite says 8 lb pls drilled per acre in spring. 30-100 lbs seeded alone (ecs). For new lawns seed 10 lbs per 1000, for overseeding existing lawns, use 6 lbs per 1000.

cultivation: Tolerates wet poorly drained sites. Tolerates low fertility, acid, & clay soils. Best growth in fertile soils, will tolerate moist bottomlands. Planted as turf & forage grass.



Moderately coarse to fine soils. Moderate shade tolerant. Moderate drought tolerant. Moderate salt tolerance. Neutral or basic soils, somewhat acid tolerant. pH 5.9-9.0 (6.0-7.0 preferred for lawns)

Description: AGGRESSIVE AS HELL & VERY INVASIVE! Densely-tufted, cool-season, moderately drought-tolerant, tall, perennial, introduced bunchgrass; roots fibrous-rooted, deep (4-5') fibrous root system, which provides better heat & drought tolerance than other cool-season grasses, 12" minimum depth; culms 3-4' tall; leaves blade texture coarse flat leaves, rolled in the bud-shoot; sheaths not compressed, not keeled, glabrous, pale green, reddish to purple at base, split to very near the base with the hyaline margins overlapping; auricles present, 0.5-1.5 mm long, soft, clawlike or blunt, yellow-green to creamy-white collar broad, distinct, glabrous, yellow-green to cream colour; margins thin, dilated & often wavy; ligule membranous, greenish, short, 0.2-0.5 mm, truncate to obtuse, entire; blade 3.0-8.0 mm wide, 10-50 cm long, bright green; upper surface dull, scabrous & prominently ridged; lower surface glossy, smooth & slightly keeled; margins scabrous; heads; spikes; $N 2n = 28, 42, 56, 63, 70$. key features: "This grass is distinguished from *Lolium perenne* by rolled bud-leaves & from *Lolium multiflorum* by the rough leaf-margins & very short truncate ligule." (Nowosad et al 1936)

Comments: status: ♣ phenology: Blooms May to June. ***The following opinions are not those of GNI!*** Coarse grass, but good for places that need a tough stand of grass; withstands hard use. Considered a permanent seeding. Its general utility is poor. Fair for use in shade. Excellent for play areas. Fair for golf fairways. Good for quick cover. Excellent for slopes & terraces. Used for pasture, erosion control, slope stabilization, mine reclamation, waterways, & for coarse turf. Used for forage in central & southern areas of US. Many turf & forage varieties available.

Associates: "It is frequently infected with the endophytic fungi *Neotyphodium coenophialum*, which confers insect & drought resistance to the plant, among other benefits; it also produces ergot alkaloids that are toxic to livestock" (Darbyshire fna).

Must use endophyte-free strains for forage or wildlife plantings. Some say sp has good palatability for livestock & game. (*Yeah, right!, let me tell you about a bridge you might be interested in buying.*) Palatability is best when plants are young, before leaves & stems become coarse. It is not as well suited for forage as other cool-season grasses. TALL FESCUE known to chemically inhibit black walnut, sweet gum, & white ash (Chick & Kielbaso 1998).

VHFS: Current alternate nomenclature includes *Schedonorus arundinaceus* (Schreber) Dumortier (w12, pug13) and *Festuca arundinacea* Schreber (m14). Occasionally listed as *Lolium arundinaceum*.

[*Festuca arundinacea* Schreber, *F elatior* L misapplied, *F elatior* var *arundinacea* (Schreber) Wimmer, *F pratensis* Huds, *Lolium arundinaceum* (Schreber) Darbyshire, *Schedonorus arundinaceus* (Schreber) Dumortier, *S phoenix* (Scop) Holub]

The sp treatment in sw94 has a confusing sentence, referring to the associates of "MEADOW FESCUE" [*F pratensis* [*elatior pratensis* of Gleason] within the discussion of *F elatior*, which they call TALL FESCUE.

Schedonorus has typically been included in *Festuca*, but it is closely related to *Lolium*. Natural fertile hybrids are known from Europe, & several artificial hybrids are available as turf products.

TALL FESCUE IS THE MOST ECOLOGICALLY AND ECONOMICALLY DAMAGING GRASS IN EASTERN NORTH AMERICA. CONVERSION OF TALL FESCUE INTO NATIVE PLANTINGS, AND THE REINVASION OF NATIVE AREAS BY TALL FESCUE ARE MAJOR RESTORATION AND PASTURE MANAGEMENT PROBLEMS! STILL THIS IS THE MOST COMMONLY PLANTED GRASS ON ILLINOIS ROADSIDES. SUPPORT YOUR LOCAL IDOT.

TURF-TYPE TALL FESCUE

Culture: Spring seeding preferred, but fall seeding will also work. Drill 10 lb pls per 1,000 ft sq (stocks). 6-9 lb per 1000 sq ft (lofts)

Description: Growth is slower & leaves are finer textured than forage type tall fescues. Popular choice for drought resistant cool-season lawn. Goes dormant in hot, dry weather, but not as quickly as bluegrass.

LAWN FESCUE

Culture: Alternately, spring or fall sowing, but can germinate in summer. Water to establish & irrigate during summer. Plant 5 pls lbs per 1000 sq ft

Description: Eurasian, slow growing, durable, fine textured, drought tolerant. Slow to establish. Developed for arid West. (pots).



TALL FESCUE

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca brevipila Tracey [Many authorities, inc Mohlenbrock (2014) call this *Festuca trachyphylla* (Hackel) Krajina] HARD FESCUE, AKA SHEEP FESCUE, *FÊTUQUE DRESSÉE À FEUILLES SCABRES* (*brevipilus -a -um* short-hairy, from Latin *brevis*, short, little, & classical Latin *pilus* hair, of unknown origin.)

Native to open forests & forest edges in Europe. distribution/range:

See SCALDIS HARD FESCUE.

N 2N = 42.

VHFS: *Festuca cinerea* auct non Vill, *F duriuscula* auct non L, *F duriuscula* L var *cinerea* auct non (Vill) Krajina, *F longifolia* auct non Thuill, *F michiganica* Alexeev, *F ovina* auct non L, *F ovina* L var *duriuscula* auct non (L) WDJ Koch, *F trachyphylla* (Hack) Krajina, nom illeg.



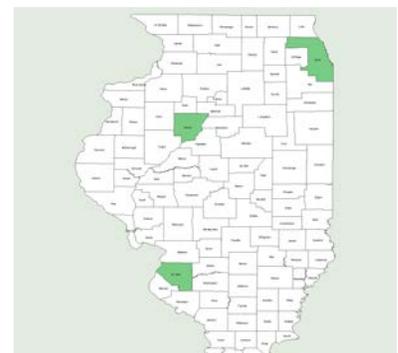
Seed photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca filiformis Pourret HAIR FESCUE, aka FINELEAF SHEEP FESCUE, SLENDER FESCUE, HAIR-LEAVED FESCUE, (*filiformis -is -e* filifor'mis (fi-li-FOR-mis) thread-like, shaped like threads, from *filum, fili* N (2nd n), thread, string & Latin verb *formo, formare, formavi, formatus*, form, shape, fashion, model. *capillatus -a -um* hairy, covered with hair, pubescent, from Latin adjective *capillatus -a -um*, having long hair, in reference to older generation, foreign peoples, boys; hairy; hair-like.)

Habitat: Occasional in lawns. distribution/range: Native to Europe; adventive in disturbed soil; scattered in Illinois, usually around metropolitan areas (m14).

Lawns, disturbed areas; rare, native of Eurasia. May-June. (w12)

May-July.



VHFS: Long known as *Festuca capillata* Lamarck. New nomenclature maintained by m14, w12. Lumped into *F ovina* by some. [*Festuca capillata* Lam, *F ovina* L var *capillata* (Lam) Alefeld, *F tenuifolia* Sibthorp]



Festuca filiformis

Seed photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca longifolia Thuillier HARD FESCUE, (*longifolius -a -um* with long leaves.)

Habitat: Tolerant of most soil conditions except standing water & strongly alkaline soils. Some shade tolerance. Prefers good soils in central & northern latitudes. Moderately coarse to fine soils. Neutral to acidic soils. distribution/range:

Culture: Slow to medium to establish. 550,000 seeds per pound. For turf, drill 4-5 lb pls per 1,000 ft sq in spring or fall (stocks, lofts). For pasture drill 15 - 20 pls lbs per acre. For pasture, Granite recommends 8 lb pls per acre in fall or spring.

Description: Densely tufted, cool-season, long-lived, medium tall perennial bunchgrass with massive fibrous shallow root system.

Comments: Considered a “fine fescue”, shorter than TALL FESCUE. Mature stands are said to be very competitive. More drought tolerant than sod-forming cool-season grasses. Good palatability to livestock & supposedly very good for wildlife. Erosion control mixes & turf grass, used in shade mixes & as a cover crop for native grasses & wildflowers.

VHFS: Nomenclature not recognized in Chicago plant records, m14, w12.

SCALDIS HARD FESCUE was for some time called *F elatior* “Scaldis” in some nursery catalogues & job specs, & is still occasionally seen as that. If it were sp *elatior*, it would be SCALDIS TALL FESCUE, wouldn't it, dipstick? Kelly @ formerly @ Arthur Clesen, Inc. says it is *F brevipila*.



Festuca longifolia

Seed photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca ovina Linnaeus SHEEP FESCUE, aka SHEEP'S FESCUE, (*ovinus -a -um* belonging to sheep, for sheep, sought by sheep, from Latin *ovis* sheep, & *-inus -a -um*, adjectival suffix indicating possession or resemblance.)

Habitat: “*Habitat in Europae collibus apricis aridis vulgatissimum.*” Open woods, roadsides, & dry fields.

Dry poor soils, on top of knobs, in exposed situations; sometimes in pastures & lawns. distribution/range: “An introduced grass which is found in lawns, waste places, roadsides, etc.” (ewf55)

Culture: ☉ Sow at 20°C (68°F), germinates in about two wks (tchn). Some varieties can be slow to establish. Spring or fall seeding.

seed counts & rates: 530,000 (ecs), 680,000 (gran), 980,000 (stock) seeds per pound. Plant 25-30 lbs pls per acre for solid stand, or 10-12 pls lbs as cover crop. Granite recommends for pasture 10 lb pls per acre in fall or spring. Pots (2000) says seed in spring, summer, or fall, small areas 3-5 pls lbs per 1000 sq ft, or 20 pls lbs per acre for reclamation. 25-50 lbs per acre alone. 10 lbs per acre with wildflowers (ecs).

cultivation: Likes moist soils, does well in sandy or gravelly soils. Adapted to central & northern latitudes in US. Moderately coarse to moderately fine soils. Tolerant of variety of soil types & tolerant of partial shade. Moderate shade tolerant. High drought tolerant. No salt tolerance. Neutral soils, some acid tolerance. pH 5.5-7.5.

Description: Cool-season, native-in-part, long-lived, low growing to medium tall, perennial densely-tufted, bunch grass; roots fibrous rooted, 10" minimum depth; culms to 1'(2'), leaves fine, narrow leaves, rolled inward, folded in the bud-shoot; sheaths not compressed, not keeled, finely & densely pubescent, bluish green (lower ones sometimes pinkish at base), glaucous, split with margins generally overlapping; dead sheaths pale brown; auricles absent, or present as rounded cartilaginous thickenings of the margins of the collar; collar indistinct, narrow, glabrous; ligule membranous, very short, less than 0.5 mm, or obsolete, truncate, ciliate; blade closely & permanently folded, bristle-like, about 1 mm in diameter, 5.0-15 cm long, pale, bluish green, glaucous, deeply ridged on upper (inner) surface, glabrous or finely pubescent at base, usually scabrous; margins smooth; heads; spikes; N. key features: Similar to *F longifolia*, but more drought tolerant, more extensive root system, & native to much of North America (?). ①Deep blue-green leaf color. Green almost all year with some water. This sp can be distinguished from *F rubra* by being glaucous, densely tufted, & having blades folded, even under moist conditions.

Comments: status: ♣ phenology: Blooms June to July. Often used as nurse crop in wildflower or warm season grass seedings & as drought tolerant turf grass. Does not make good turf by itself, but makes a dark green alternative lawn. Good for erosion control, slope stabilization, & roadsides. Used in landscaping & reclamation.

VHFS: [*F duriuscula*] There are numerous named varieties that the USDA Plants Database has listed as 17 separate spp or varieties. Several taxa are native to the United States.

WO Howarth, 1925. On the occurrence & distribution of *Festuca ovina* L, *sensu amliss*, in Britain Linn Soc Jour, 47.



Festuca ovina

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image

ssp *duriuscula* is also known as HARD FESCUE, (*duriusculus* -a -um somewhat hard or rough, inclined to be hard, grizzly, from Latin adj *duriusculus*, *duriuscula*, *duriusculum*, harsher; somewhat harsh.)

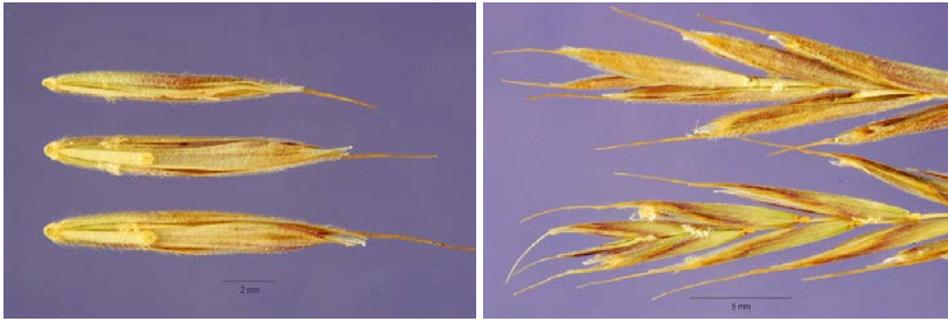
Habitat: Well-drained, infertile soils. Full sun. High drought tolerance. No salt tolerance. pH 5.9-9.0 (6.0-7.0 preferred for lawns) distribution/range:

Culture: 592,000 (ecs) seeds per pound. Plant 25-50 lbs monocultures.

Description: Cv DURAR is tall, cool-season, 6-12"; with strong roots, 10" minimum depth; densely tufted; leaf blades rounded, smooth;

Comments: status: phenology: Blooms June to July. Drought resistant, & good seed yield. 14-30" rainfall. Useful for erosion control on roadsides, ditch banks, & burns.

VHFS: Granite says cv DURAR is SHEEP'S FESCUE.



Festuca ovina duriuscula

Seed photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca ovina* var *glauca BLUE FESCUE, (*ovinus* -a -um for sheep, from Latin *ovis* sheep; *glaucus* -a -um gray, bluish-green or gray, covered with 'bloom', from Latin *glaucus* -a -um bluish- or greenish-gray, from Greek γλαυκός, *glaukos*.)

Habitat: Open woods, roadsides, & dry fields. Full sun. distribution/range:

Culture: Sow at 20°C (68°F), germinates in about two wks (tchn).

seed counts & rates: 25-50 lbs per acre alone. 10 lbs per acre with wildflowers (ecs).

availability: SHEEP FESCUE "AZURE BLUE" under \$10/lb

Description: Ornamental 'bluer' form of SHEEP'S FESCUE; culms 05-2.0'; leaves smooth, blue; N 2n =14. key features:

Comments: status: phenology: Blooms June to July. From seed, there is considerable color variation. For the best blue color, plant plants. Used for ground cover & erosion control.

In the ultimate silliness, someone developed a "green" BLUE FESCUE, called *Festuca glauca* "APRIL GREEN", which looks great planted next to that *Echinacea* that looks like a mum.

VHFS: [*F arvernensis*, *F glauca*] This is sometimes listed as *Festuca glauca*. Many cultivars are available, including ELIJAH BLUE.



Festuca ovina glauca

Seed photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca paradoxa Desvaux CLUSTER FESCUE, aka WOODLAND FESCUE, Subgenus *Subulatae* (Tzvelev) EB Alexeev, sect *Obtusae* EB Alexeev

Habitat: River bottoms. In the se USA, bottomlands, uplands over mafic rock (w12). "Prairies, open woods, thickets, & low open ground" (fna).

distribution/range: Dry or moist woods; occasional in the s ¾ of the state; absent elsewhere except for Iroquois, Jo Daviess, & Will cos (m14).

Pennsylvania west to Wisconsin & Iowa, south to Georgia, Louisiana, east Texas, & Oklahoma.

Culture: propagation:

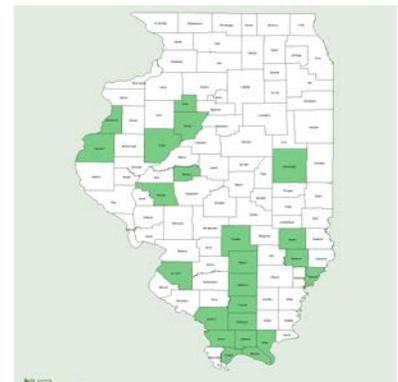
Description: N 2n = unknown. key features: ① Species resembles *F subverticillata*, but its spikelets are more crowded on the branches.

Comments: status: Endangered in Indiana & Pennsylvania. Endangered & extirpated in Maryland. Special Concern in Tennessee. phenology: Blooms

Associates:

ethnobotany:

VHFS: [*Festuca nutans* Biehler, *F shortii* Kunth ex Wood misapplied]

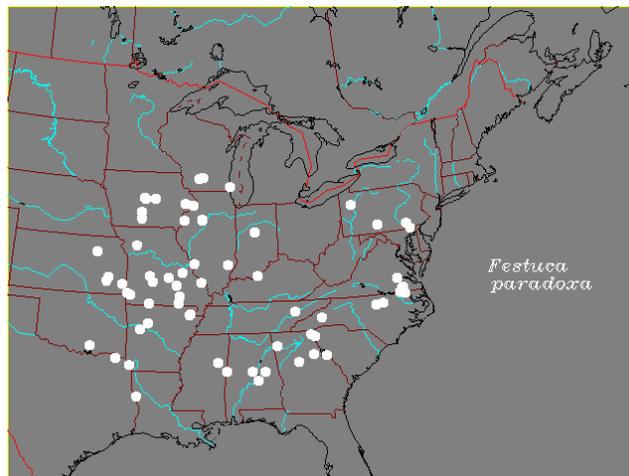
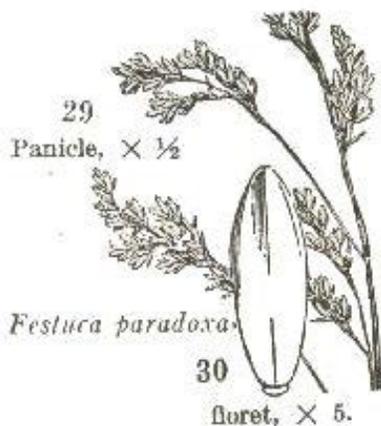


Similar to & sometimes considered a subspecies of *F. subverticillata*.

Inflorescence branches not reflexed at maturity; spikelets clustered, consistently overlapping each other by 1/3 to 1/2 their length on the lower branches; spikelets clavate in bud; upper glume almost as long as or longer than the first lemma.... *F. paradoxa*

Inflorescence branches reflexed at maturity; spikelets often widely separated on the lower branches, sometimes overlapping slightly towards the ends of the branches; spikelets lanceolate in bud; upper glume usually shorter than the first lemma.... *F. subverticillata*

(Aiken et al 1996 onwards)



Festuca paradoxa

Festuca pratensis Hudson MEADOW FESCUE, aka ENGLISH BLUE GRASS, MEADOW RYE GRASS, RYE GRASS, (*pratensis -is -e* (prah-TAYN-sis) of or in meadows, from Latin adjective, *pratensis*, *pratens*, growing or found in meadows, from *pratium*, meadow.) Subgenus *Schedonorus* (Beauv) Peterm

Habitat: Usually found in pastures or fields. **distribution/range:** Native to Europe; adventive in disturbed soil, common; on every co (m14). **Culture:** 230,000 seeds per pound. New lawns seed 10 lbs per 1000, for overseeding established lawns, seed 6 lbs per 1000.

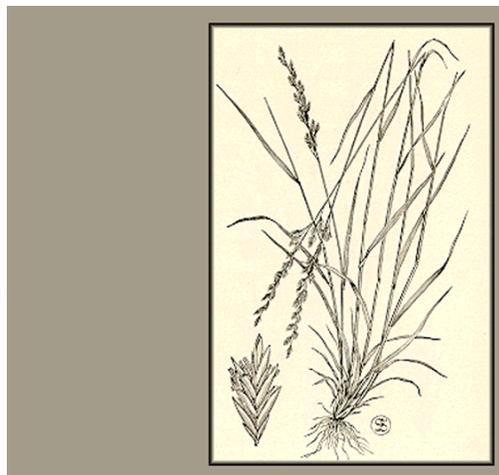
Description: Similar to TALL FESCUE but with long, slender leaves, hardy perennial bunch grass. $2n = 14, 28, 42, 70$.

Comments: ⬛ Considered a permanent seeding. A poor general utility grass. Poor for shade. Excellent for play areas. Poor for golf fairways. Good for ?????????????? Species was once popular for forage. It is not as “productive” or persistent as TALL FESCUE.

VHFS: Current alternate nomenclature includes *Schedonorus pratensis* (Huds) P Beauv. *Festuca pratensis* Huds is used by Mohlenbrock (2014).



[*Festuca elatior* Linnaeus misapplied, *F pratensis* Huds, *F elatior* var *pratensis* (Huds) A Gray, *F pratensis* Huds, *F elatior* misapplied, *Lolium pratense* (Huds) *Schedonorus pratensis* (Huds) Holub, *S pratensis* (Huds) P Beauv]



Festuca pratense

Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image;

Festuca rubra Linnaeus RED FESCUE, aka *FÉTUQUE ROUGE*, (*ruber*, *rubra*, *rubrum* red, ruddy, from Latin *ruber*, *rubr*-, & *rufus* red, ruddy, Latin *ruber*, Greek *erythros* red, Sanskrit *rohita* red, reddish, *rudhira*, red, bloody.)

Habitat: Eurasia. Dry woods, roadsides, & open ground (ecs). In the se USA, roadsides, fields, disturbed areas, pastures, grassy balds; common (w12). **distribution/range:** Disturbed soil, infrequent throughout Illinois (m14). “In our area, this species is considered to be partly native & partly introduced. This species is circumboreal, extending south in North America to GA & MO.” (w12)

Culture: Seed spring or fall. 245,000 (ecs), 500,000 (gran), 615,000 (stocks) seeds per pound. For turf, drill 3 - 5 lb pls per 1,000 ft sq (stocks). Granite says for pasture, plant 10 lb pls per acre in fall or spring. Plant & fertilize in spring or fall, 5 lbs, pls per 1000 sq ft (Pots). 50 lb per acre seeded alone (ecs).

cultivation: Requires little mowing. Shade of central & northern Moderately coarse to moderately fine soils. Needs water, good soil, & regular fertilizing. Moderate to very shade tolerant. Adapted to cool shady areas. Moderate drought tolerance. Moderate salt tolerance. Neutral to acidic soils. Not alkaline tolerant. pH 5.0-8.0 (pH 6.0-7.0 preferable for lawns)

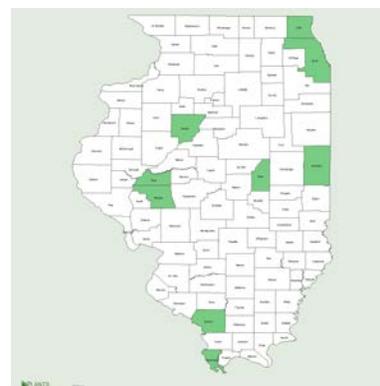
Description: Cool-season, long-lived, medium to tall, perennial sod-forming grass; roots spreading by rhizomes, or short running rootstocks, but frequently showing tufted growth, 12” minimum depth.; culms 1.0-2.0’, can grow to 2.5’ tall; leaves narrow, folded in the bud shoot; sheaths not compressed, not keeled, finely pubescent, split only partway down; dead basal sheaths reddish brown, becoming fibrillose; auricles absent or present as rounded extensions of the collar indistinct, narrow, continuous, glabrous, pale green; ligule membranous, about 0.5 mm long, truncate, entire or ciliolate; blade 1.5-3.0 mm wide, 5.0-15.0 cm long, thick, V-shaped to closely folded & bristle-like, dark green, deeply ridged on upper surface, smooth & slightly shiny on under surface; margins smooth; heads; spikes; N 2n = 28, 42, 56, 70. **key features:** ① *Festuca rubra* can be distinguished from *F ovina* by its dark green color, its habit of spreading, forming an even or somewhat tufted turf, & by its leaves, which are usually open but may close, depending on moisture conditions.

Comments: **status:** **phenology:** Blooms June to July. Used for erosion control & turf, beautiful cool season turf grass, dark green soft grass, attractive planted in mixes or alone. Used in mixes with bluegrass & ryegrass. When unmowed, lays down in cowlick-like whorls.

“Two different distinct types of creeping red fescue exist - *rubra* & *trichophylla*. The *rubra* is called a “strong creeping” type with 56 chromosomes compared to 42 in the other type.”

(www.fescue.com/info/creepingred.html)

“*Festuca rubra* is interpreted here as a morphologically diverse polyploid complex that is widely distributed in the arctic and temperate zones of Europe, Asia, and North America. Its treatment is complicated



US.

by the fact that Eurasian material has been introduced in other parts of the world. In addition, hundreds of forage and turf cultivars have been developed, many of which have also been widely distributed.”

(Darbyshire & Pavlick fna)

Associates: Provides wildlife habitat. Moderately palatable. Red fescue known to chemically inhibit Azalea, barberry, yew, forsythia, flowering dogwood. (Chick & Kielbaso 1998)

VHFS: *F rubra* is a species complex with numerous varieties or subspecies.

Variety *fallax* CHEWING’S FESCUE does not have short running rootstocks.



Festuca rubra

Seed photo Steven Hurst USDA-NRCS PLANTS Database. - Not copyrighted image

Festuca rubra Linnaeus ssp *commutata* Gaudin [new nomenclature *Festuca rubra* L ssp *fallax* (Thuillier) Nyman FLATLEAF RED FESCUE, *FÉTUQUE TROMPEUSE*] CHEWING’S FESCUE, aka RED FESCUE, (*commutatus* -a -um changed or changing, altered, alteration; close to another sp.)

Habitat: Shade tolerant, likes well-drained soils, does well in shade. Well-drained acidic soils (ecs).

distribution/range:

Culture: Spring or fall seeding. 500,000 (ecs), 615,000 (stock) seeds per pound. For turf, 3 - 5 pls lbs per 1,000 ft sq (stock) or 4 lb/1000 (lofts). 50 pounds per acre (ecs). Medium establishment rate.

Description: Cool-season bunch grass, fine-leaved perennial grass; roots; culms 1-2’, or 2-3’; leaves; fine leaves; sheaths; heads; spikes; N. key features:

Comments: status: phenology: Blooms June to July. Primarily used for turf. Useful for erosion control, on slopes, waterway seedings, & reclamation areas. More drought resistant than bluegrass. Slow rate of growth makes it a good choice for low maintenance areas. Not aggressive in mixtures. LeAnn Scott née @ Arthur Clesen Inc says it will fade out in 1-2 years. (*LeAnn is Willard Scott’s first cousin & she will gladly make him available for personal appearances. Her home phone number is...*)

CREEPING RED FESCUE 10-21 days to germinate. 550,000 seeds per pound. New lawn 6 lbs per 1000, overseeding established lawns 3 lbs per 1000. Considered a permanent seeding. Blade texture fine. A

greenhouse & garden: Moist cold stratify or fall plant, small seeds need light to germinate, surface sow or light cover.

Description: Erect, perennial native grass, 1.0-2.0'; graceful, vase-like form, clumping habit, glossy foliage.

N 2n = 42. key features: Resembles *F paradoxa*, but its spikelets are less crowded on the branches.

Comments: status: Native. phenology: Blooms 5,6, May 22. In northern Illinois, collect seeds in late June-early August. Landscaping, cool shaded soils, 6-10" clumps; a good, short-lived, specimen plant in rich, shaded soils, plant a grouping near a path to appreciate the delicate seed heads. This sp will tolerate rich soils, full sun for 1-2 years & then diminish in vigor. In shade, it may be short lived but reseeds, woodland populations may wax & wane. Seed source nursery plantings, genetic source DeKalb Co.

Associates: Deer may not be interested in this plant.

VHFS: Forever and a day known as *Festuca obtusa* Biehler. [*F nutans*, *F subverticillata* (Persoon) EB Alexeev] [*F obtusa* Spreng]



Festuca obtusa

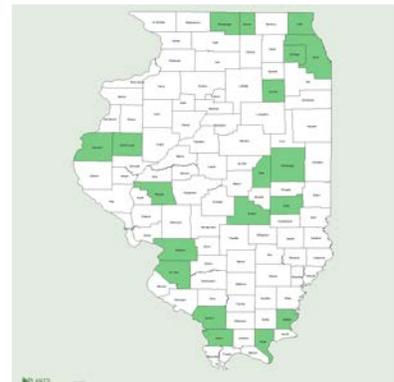
Festuca trachyphylla (Hackel) Krajina HARD FESCUE, aka OVINA FESCUE, SHEEP FESCUE (*trachyphyllus -a -um* with rough leaves, from Greek τραχύς, *trachys*, rough, & Ancient Greek φύλλον, *phyllon*, leaf; in one source as from *trachelos*, neck, & *phyllon* leaf.) Subgenus *Festuca*.

N 2n = 42. Grown as an ornamental or no mow grass. Planted on pipelines, mine tailings, ski slopes, & roadside plantings. distribution/range: Native to Europe; adventive in disturbed areas, not common; scattered throughout the state (m12).

☛ May-June.

VHFS: M14 & w12 maintain *F trachyphylla*. Pug13 uses *Festuca brevipila* Tracey.

[*Festuca cinerea* auct non Vill, *F duriuscula* auct non L, *F duriuscula* L var *cinerea* auct non (Vill) Krajina, *F longifolia* auct non



Thuill, *F ovina* L ssp *trachyphylla* Hack, *F ovina* L var *duriuscula* auct non (L) Koch, *F ovina* subsp *eu-ovina* var *duriuscula* subvariety *trachyphylla* Hack, *F ovina* var *ovina*, *F ovina* var *duriuscula* (L) WDJ Koch]

GLYCERIA R Brown **MANNAGRASS** *Glyceria* (classically gloo-KE-ree-a, or gli-SE-ree-a) New Latin, from Greek *glykis*, *glykeros*, sweet & New Latin *-ia*, referring to the sweet, edible seeds of one sp, which were used in soups; sweet-root in one source, which actually applies to *Glycyrrhiza*. A cosmopolitan genus of chiefly North American perennial paludal or aquatic grasses, about 40 spp, having lemmas very prominently 5 to 9-nerved. Formerly *Panicularia* Fabricius. Some Midwestern spp are placed in *Torreyochloa* GL Church 1949 by some authors. $x = 10$. **Storage Behaviour:** Of 7 known taxa of genus *Glyceria*, 100.00% Orthodox (p/?).

Glyceria borealis (Nash) Batchelder **NORTHERN MANNA GRASS**, aka **BOREAL GLYCERIA**, **BOREAL MANNA GRASS**, *GLYCÉRIE BOREALE*, (*borealis -is -e* (bo-ree-AH-lis) northern, of the North, of the North Wind, from Greek βορέας, *boreas*, Latin *boreas*, *boreae*.)

distribution/range: N $2n = 20$. Rain gardens, tolerates flooding.

“This is in Stephenson Co a few miles from our border but we have not found it in Winnebago Co.” (ewf55)



Glyceria borealis

Glyceria canadensis (Michaux) Trinius **RATTLESNAKE GRASS**, aka *GLYCÉRIE DU CANADA*, **CANADIAN GLYCERIA**, **CANADIAN MANNA GRASS**, **RATTLESNAKE MANNAGRASS**, (*canadensis -is -e* (kan-a-DEN-sis) of or from Canada or the north-east USA, of Canadian origin.)

Habitat: Bogs, marshes, springy places, seepages, & wet meadows. Marshes, swamps, & wet woods.

distribution/range: Known from the wetland formerly known as Leonard Vick’s wetland, Normandy, Bureau Co & Perino’s wetland, Whiteside Co.

Culture: ① No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ② “Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12)

Thousand Seed Weight: 0.482g; ① 0.324; (Mazer 1989); Diaspore; seed plus associated protective structure. ② 0.324; (Mazer 1989); Seed. ③ 0.7972; (RBG Kew); Seed; *Seed weights reported may include minor covering structures

Dispersal: Wind. Diaspore is blown by wind; Method not stated; (Wisconsin State Cranberry Growers Association 2001); Also dispersed by water & via vegetative spread. Diaspore=caryopsis. Also dispersed by man as a contaminant of vine cuttings & sand. (RBG Kew);

seed counts & rates: 1,120,000 (ew12), 1,159,647 (gnam08), 1,184,000 (pm, jfn04, ecs, aes10) seeds per pound.

cultivation: Space plants 1.5-2.0’. Continually wet soils, full sun to partial shade. Low drought tolerance. No salt tolerance. pH 5.0-8.5.

bottom line: Genesis limited test data indicate dormant seeding for field establishment or cold moist stratification for greenhouse production is required in 2/3rds of lots. Flipflop species. Germ 28.8, 12, na, sd 32.3, r0.5-74 (73.5)%. Dorm 51.8, 71.5, na, sd 29.6, r10-74 (65)%. Test 29, 29, na, r28-30 days.**

Description: Native, cool season, bunch grass; roots 16” minimum depth; culms 2-3’; leaves; sheaths; heads purplish; spikes; N $2n = 60$. key features:

Comments: status: Native. phenology: Blooms June to August. Seed source south central Wisconsin.

Associates: Provides food & cover for waterfowl, muskrats, & deer.

ethnobotany: Root used as medicinal plant by Ojibwa (sm32)

VHFS: Basionym *Briza canadensis* Michx. [*G canadensis* var *canadensis*]



Glyceria canadensis

Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

Glyceria grandis S Watson * IN REED MANNA GRASS, aka AMERICAN GLYCERIA, AMERICAN MANNA GRASS, REED MEADOW GRASS, TALL GLYCERIA, TALL MANNA GRASS, (*grandis -is -e* large or big) obl

Habitat: Seasonally inundated areas, drainage ditches. Shallow water & wet meadows (ecs). "Known to us only in Coon Creek slough south of the Rockton-Shirland Road." (ewf55) distribution/range:

Culture: ①No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③"Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds on soil surface at 70°F & water." (ewf12) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

seed counts & rates: 200,000 (wns01), 659,000 (ecs), 1,269,930 (gn03), 1,280,000 (pm, aes10), 1,282,486 (gnh05), 1,327,485 (gna06), 1,333,333 (gna05), 1,440,000 (ew12), 1,750,000 (jfn04), 1,814,000 seeds per pound.

cultivation: Space plants 2.0-3.0'. Permanently wet soils, full sun, or in woodlands.

bottom line: Field establishment best dormant seeded. Genesis test data indicates some lots are non-dormant, but the most lots benefit from dormant seeding or cold moist treatment. As happens with many small-seeded spp, the very high seed count may give the perception of good germination in the greenhouse, but it can easily be improved. Germ 52.4, 40, 40, sd 22.6, r21-91 (70)%. Dorm 29.9, 32, 0.0, sd 28, r0.0-71 (71)%. Test 32, 35, 35, r21-44 days. (#13).**

Description: Native cool-season, tall, erect, glabrous, perennial, bunch grass; (3.0)6.0-9.0'; leaves folded in the bud-shoot; sheaths compressed & keeled, glabrous, smooth or slightly scabrous, closed almost to the top but rupturing easily, pale yellowish green, with conspicuous cross-nerves connecting main veins; auricles absent; collar prominent, glabrous, pale green or yellowish brown, divided by the midrib; ligule membranous, 2.0-5.0 mm long, truncate to acute, abruptly sharp acuminate, entire or slightly undulate; blade 6-15 mm wide, 10-40 cm long, V-shaped or flat with boat-shaped apex, glabrous, pale green, quite scabrous & faintly ridged on the upper surface, smooth or slightly scabrous on the keeled underside; transverse veins numerous & distinct forming a network with longitudinal veins; margins scabrous; the row of motor cells on each side of

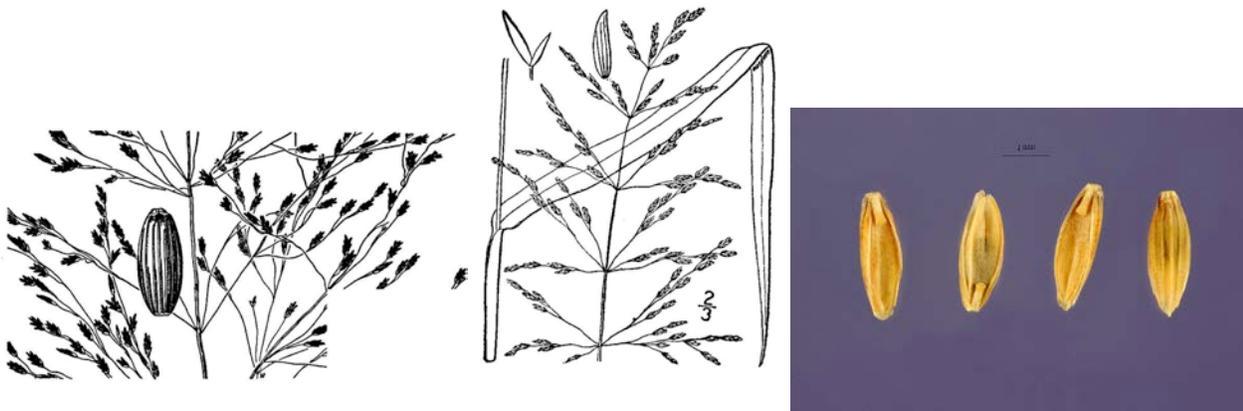
midrib showing as two light lines by transmitted light; $N 2n = 20$. key features: ① “This grass is distinctly yellowish green in colour & the leaves are firm, erect & not conspicuously ridged. The cross-nerves joining the veins, interrupting the air-filled lacunae, are distinct in both sheaths & blades of this sp.” (now36).

Comments: status: Extirpated in Indiana. phenology: Blooms 6,7,8. In northern Illinois, collect seeds in late July. Collect seeds in se Wisconsin in September (he99). Species is useful in wetland restoration, shoreline plantings, & truly wet rain gardens. Original seed source drainage ditches near Van Petten, Lee Co, Green River Lowland.

This sp performed well in some shoreline plantings at Skokie Lagoons, where we learned shoreline plantings are more good basin, bad basin, not good spp, bad spp. It is not a grass for the meek & timid. We have waded crotch deep in water in drainage ditches picking this seed & the culms of this sp were still over our heads.

Associates: Provides food & cover for waterfowl, muskrats, & deer.

VHFS: [*Glyceria maxima* (Hartman) Holmberg ssp *grandis* (S Watson) Hultén, *Panicularia grandis* (S Watson) Nash]. Ours is the widespread variety *G grandis* S Watson *grandis*, GIANT GLYCERIA, aka GIANT MANNAGRASS, *GLYCÉRIE GÉANTE*.



Glyceria grandis

Glyceria melicaria (Michaux) FT Hubbard SLENDER MANNAGRASS, aka MELIC MANNAGRASS, *GLYCÉRIE MELICAIRE*, NORTHEASTERN MANNAGRASS, (*melicarius -a -um* like *Melica*, melic grass, from New Latin, from Italian *melica*, *meliga*, sorghum, modification (influenced by Latin *mel*, honey) of Medieval Latin (*herba medica*, literally, medical herb, from *herba* herb, & *medica*, feminine of *medicus* medical, & *-arius -aria -arium*, adj suffix indicating -belonging to, -having, connection to or possession, pertaining to, having the nature of.)

Habitat: Swamps, wet woods, streambanks. $CaCO_3$ tolerance medium. Full sun. Low drought tolerance. No salt tolerance. pH 4.5-8.0. distribution/range: East & south of Illinois.

Culture:

Description: roots 16" medium depth; $N 2n = 40$ key features:

Comments: status: phenology: Blooms ?

VHFS: [*Panicularia*]



Glyceria melicaria

Glyceria pallida (Torrey) Trinius [new nomenclature may be *Torreyochloa pallida* (Torr) Church or *Puccinellia pallida* (Torr) RT Clausen] PALE MANNA GRASS, aka PALE FALSE MANNA GRASS, (*pallidus* -a -um green(?), pale, wane, pallid, somewhat pallid, somewhat pale, causing paleness, from Latin *pallidus* -a -um, pale, yellow-green, from *palleo*, *pallere*, *pallui*, to be or look pale, fade, become pale.) OBL

Habitat: Shaded swamps. distribution/range:

Culture: 2,000,000 (jfn04) seeds per pound.

Description:

Comments:

VHFS: USDA NRCS PLANTS database has this as *Torreyochloa pallida* (Torr) Church. [*Glyceria pallida* (Torr) Trin, *Panicularia pallida* (Torr) Kuntze, *Torreyochloa pallida* (Torr) Church, *T pallida* (Torr) Church var *pallida*, *Windsoria pallida* Torr]



Glyceria pallida

Glyceria septentrionalis AS Hitchcock FLOATING MANNA GRASS, aka *GLYCÉRIE SEPTENTRIONALE*, NORTHERN GLYCERIA, NORTHERN MANNA GRASS, (*septentrionalis* -is -e Latin, northern, of or pertaining to the north, literally towards the direction of the Great Bear, (or the Plow, the Plough, Plow Oxen.), septentrional, from Middle English, from Latin *septentrionalis*, from *septentriones*, the northern regions, the north wind, the northern heavens, & polar things in general, & -alis -al. *Septentrion* is also from the Latin adjective *septentrio*, singular of *septentriōnēs*, originally *septem triōnēs*, the seven stars of the constellation of the Great Bear, from *septem*, seven, & *triōnes*, plural of *trio*, plough-ox. These were the oxen that turned the celestial mill on its axis, Polaris.) obl

Habitat: Wooded pond margins, upland swamp. Shallow water or very wet soil. "Occasional in sloughs in the Rockton-Shirland sand area, in a prairie slough east of Rockford, & in the Searle Tract slough" (ewf55).

distribution/range:

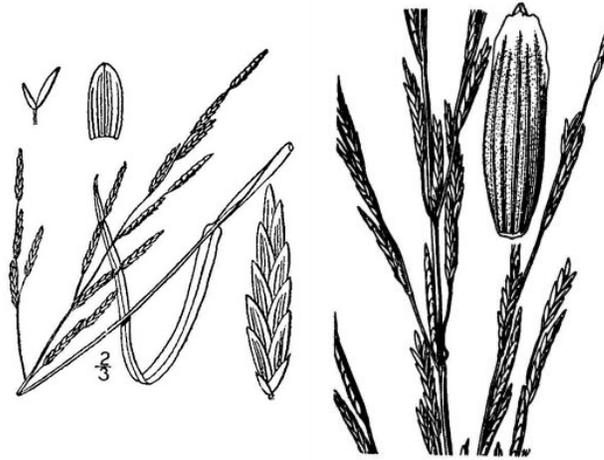
Culture: No treatment. 704,000 (pm11) seeds per pound.

Thousand Seed Weight: 0.338g. (Mazer 1989); Seed. (Kew)

Description: Cool season, perennial, semi-aquatic, native grass; rhizomatous; culms 3.0-5.0'; leaves; sheaths; heads; spikes; N 2n = 40. key features:

Comments: status: phenology: Blooms 6,7,8, or 4-6. In northern Illinois, collect seeds in July. Wetland restoration. Known from a small kettle wetland in Preston's Timber, Greenville Twp, Bureau Co, growing with *Carex tribuloides*.

VHFS: [*Panicularia septentrionalis* (Hitche) EP Bicknell]



Glyceria septentrionalis

Glyceria striata (Lamarck) AS Hitchcock FOWL MANNA GRASS, aka FOWL MEADOW-GRASS, *GLYCÉRIE STRIÉE*, NERVED MANNA-GRASS, RIDGED GLYCERIA, *STRIMGRÖE* (SW), (*striatus -a -um* striated, striped) [facw] (Obligate?)

Habitat: Moist meadows, pastures, & ditches. Wet meadows, wet savannas, wet woodlands, mesic woodland, & upland swamps. **distribution/range:**

Culture: ①“No treatment cold moist treatment, or fall sow. Will germinate with no treatment. Light cover. Very good germination” (mfd93). No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) Some say store in cold water for 3 months (us97). ③“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12)

Storage Behaviour: Orthodox; (RBG Kew);

Thousand Seed Weight: 0.2g; ①0.18508; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.1492; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ③0.1; (Jones & Earle 1966); Caryopsis; Weight refers to seed with 37 % of its outer tissues removed; seed mc not stated, but weight is likely to refer to air-dry seed. ④0.2; (Stevens 1957); Seed; Weight refers to air-dry seeds.

Oil content: 2.1% (Jones & Earle 1966); Entire seed/nut; Moisture content not stated. Average of Protein Content: 22.5% (Jones & Earle 1966); Entire seed/nut; Moisture content not stated. (RBG Kew);

seed counts & rates: 180,000 (wns01 per ounce?), 1,343,195 (gnh02), 1,540,000 (ecs), 1,814,000 (aes10), 1,904,000 (agre07), 2,000,000 (jfn04), 2,043,243 (gnhen11), 2,440,860 (gnha06), 2,467,391 (gna05), 2,560,000 (pm02), 2,880,000 (pn02) seeds per pound. In seed mixes plant 0.06 - 0.50 pls lb per acre (us97). The USDA is a bit high, with such a high seed count, use 0.031 up to 0.125 lb per acre.

availability: Seed is readily available, but not northern Illinois ecotype in large quantities or usually not Midwestern ecotype.

cultivation: Space plants 1.0-1.5'. Wet to moist soils, full sun to shade. Prefers moist to saturated areas. Full shade to partial sun. Anaerobic tolerance high. CaCO₃ tolerance medium. Low drought tolerance. Nutrient load tolerance low to medium. Salt tolerance low to none. Siltation tolerance moderate. pH 4.0-8.0.

asexual propagation: Transplants best planted in spring. Transplants best planted in spring.

bottom line: Genesis seed test data shows an some lots with zero or low dormancy, but most lots require dormant seeding for field establishment or cold moist stratification for greenhouse crops. Flipflop species. Germ 39.1, 35, 26, sd 27.8, r2.0-97 (95)%. Dorm 37.2, 32, 0.0, sd 29.8, r0.0-91 (91)%. Test 32, 31, 28, r15-50 days.**

greenhouse & garden: Good establishment from seed. Needs light to germinate, little or no cover. This seed should be spread on top of the ground. A fine seed, it may be mixed with sand for more even distribution of seed, especially if you wanna rupture a disk or develop a hernia.

Description: Native, cool season, bunch grass with erect leafy shoots; roots from short rootstocks, spreading by short rhizomes; culms 1.5-4.0', but up to 5.7' in some parts of its range; leaves folded in the bud shoot; sheaths flattened or elliptical but not prominently keeled, slightly scabrous, pale green to purple or at least tinged with purple, prominently cross-nerved, closed almost to the summit but splitting easily due to its membranous nature; auricles absent; collar not conspicuous, glabrous, pale, divided by midrib; ligule thin-

membranous, 2.0-4.0 mm long, acute, entire; blade 2.5-5.0 mm wide, 5-25 cm long, flat or V-shaped, abruptly acute & boat-shaped at tip, glabrous, faintly ridged, pale green, not glossy, with the two median lines conspicuous; the younger blades remain folded for some time & arise at a sharp angle from the shoot; margins scabrous, especially towards the apex; heads; spikes green flowers; $N 2n = 20$ [reports of 28 are questionable].
key features: ① “This sp is distinguished from *G grandis* by its narrower leaves, its purple-tinted sheaths, absence of conspicuous cross-nerves in the blades & its lower soil moisture requirement.” (Nowosad et al 1936)

Comments: status: Native. phenology: Blooms 5,6. C3. In northern Illinois, collect seeds in mid-June through July. Collect seeds in se Wisconsin in July - August (he99). Landscaping, wetland restoration, upper shoreline zone, stream bank stabilization, & vegetated swales. Seed source drainage ditches, DeKalb Co.

“Common in wet woods where it is weak & semi-decumbent & the flowers are small & green. Also common in wet open areas where it is upright, grows larger, the flowers are larger & they are purple. This & *G. grandis* are our most beautiful grasses.” (ewf55)

Associates: Provides food for waterfowl, esp ducks, & food for muskrats & deer.

VHFS: Basionym *Poa striata* Lam. [*Glyceria nervata* (Willd) Trin, *Panicularia nervata* (Willd) Kuntze, *Poa nervata* Willd.]



subsp. *stricta*



Glyceria striata

1st photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

HESPEROSTIPA (MK Elias) Barkworth **NEEDLE GRASS** *Hesperostipa* is from Greek *hesperos*, the west, or the direction the sun is in the evening, & the generic name *Stipa*. “Western *Stipa*” is a reference to the North American genus being west of the Eurasian *Stipa*. A small genus of 5 perennial species of grasslands & open woods. *Heterostipa* is seen in Mohlenbrock (2014) & <http://www.illinoiswildflowers.info/index.htm>. Formerly part of a broadly defined *Stipa*. Storage Behaviour: No data available for species. Of 25 known taxa of genus *Stipa*, 88.00% Orthodox(p?), 12.00% Uncertain. (RBG Kew)

Stipa comata Trinius & Ruprecht **NEEDLE AND THREAD**, aka **COMMON SPEARGRASS**, **SPEARGRASS**, **WESTERN SPEARGRASS**, (*comatus -a -um* from Latin *comātus* having long hair, from Latin *coma*, from Greek κόμη, *kome*, hair of the head, also applied to foliage, etc., & to the tail of a comet.)

Habitat: In Michigan, “open sandy often calcareous ground, dune ridges, oak savanna, dry prairies, and along railroads” (rvw11). distribution/range: Dry or loamy soil, usually in prairies, rare; Cook, Kane, Lake, & Winnebago cos (m14). Introduced in Wisconsin. Illinois is near the eastern limit of the species range, with outliers in Indiana, Michigan, New York, & Rhode island.

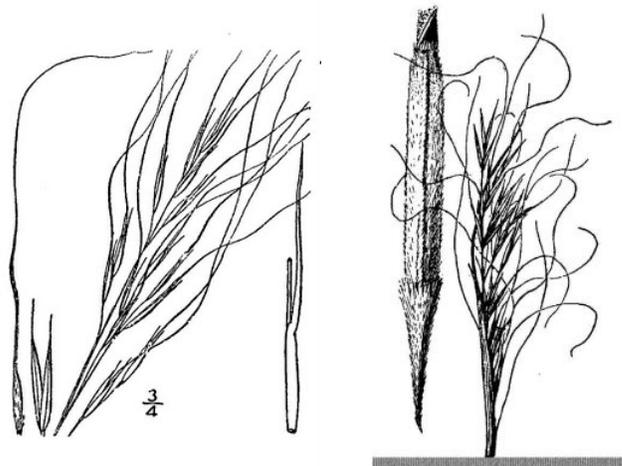
Culture: ①60 days cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (pm09). ②“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 60°F & water.” (ew12)

seed counts & rates: 243,200 (ew12) seeds per pound.

cultivation: Space plants 1.5-2.0' centers. Dry soils, full sun.

Associates: Endomycorrhizal. Species pollen is a mild allergin.

VHSF: New nomenclature is *Hesperostipa comata* (Trinius & Ruprecht) Barkworth. [*Stipa comata* Trinius & Ruprecht]



Stipa comata

Stipa spartea Trinius * OH PORCUPINE GRASS, aka NEEDLE GRASS, (*sparteus -a -um* pertaining to the broom or *Spartium*, broomlike.) upland

Habitat: Mesic, dry, sand, hill prairies & savannas, particularly sandy prairies. Sandy ground or prairie soil. In Michigan, “open sandy often calcareous ground, dune ridges, oak savanna, dry prairies, & along railroads” (rvw11). **distribution/range:** Sandy soil, particularly in prairies; occasional in north $\frac{2}{3}$ of Illinois, nearly absent in south $\frac{1}{3}$ (m14). Central Illinois is at the southern limit of the sp distribution. Sp has the easternmost native distribution of the genus.

Culture: ①“Sow fresh seed for germination the following spring, or late fall sow, or cold moist treat & sow early spring. Prefers cooler soils. Light cover. Fair germination.” (mfd93). ②60 days cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (pm09). Seeds germinate after about 60 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ③“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 60°F & water.” (ew12) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Storage Behaviour: No data available for species. Of 25 known taxa of genus *Stipa*, 88.00% Orthodox(p/?), 12.00% Uncertain. Average 1000 Seed Weight(g): 15.5. ①16.1; (Stevens 1957); Seed; Weight refers to air-dry seeds. ②14.8; (Tilman 1997); Seed (RBG Kew)

seed counts & rates: 10,880 (untrimmed pm, ew12), 24,148 (gnhmtrim02), 24,280 (gnamtrim), 33,600 (aes10), 34,112 (sh94) seed per pound. Seeding rates vary from a few ounces to a pound or more per acre.

cultivation: Space plants 1.5-2.0' centers. Mesic to dry soils. In commercial restorations, plugs are the cost effective way to establish this sp. Even with the awns removed, this sp cannot be drilled, broadcast, or hydroseeded. The long-awned needle-sharp seeds are a commercial restoration pain in the ass.

“*Stipa spartea* Mesic to dry prairie. Blooms mid June; inconspicuous. Harvest last of June; 1st of July. 2'; method #1, blooming 2nd year; but by this method plants short-lived; SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST. Broadcast in '67 with other grasses. Cool-season grass with remarkable quill-like fruit.” (rs ma)

bottom line: Dormant planting by hand is absolutely required. Germ 8.5, 8.0, na, sd 6.1, r1.0-21 (20)%. Dorm 81.8, 80, 70, sd 7.7, r70-91 (21)%. Test 34, 33, 32, r21-47 days. (#11)**

greenhouse & garden: Cold moist stratify or fall plant. Cool soils, successional restoration.

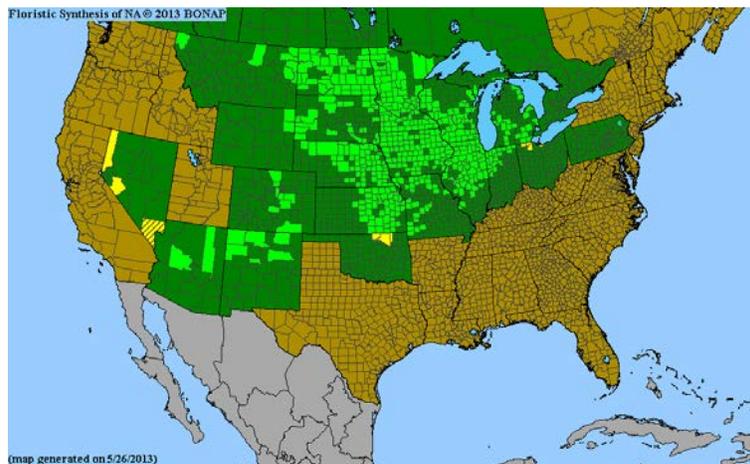
Description: Erect, perennial, bunching, native grass; culms 2.0-3.0'; fruit is a sharp-pointed grain, N 2n = 44, 46. **key features:** ①“It is often confused with needle-&-thread grass, but its leaves are longer generally less rolled, lighter in color, & considerably wider (Goetz 1963). Not really an ID problem in most Illinois cos.

Comments: status: Threatened in Ohio. This sp may be an economic weed in some areas, particularly where cattle or sheep are grazed when the seeds are ripening. phenology: Blooms 5,6. C3. In northern Illinois, collect seeds in mid-June through July. Collect seeds in se Wisconsin in July - August (he99). Landscaping. Cool season, bunching, dried seed heads sharp seeds! Seed source railroad remnants, & sand prairie remnants, Fairfield Twp, Bureau Co & Clinton & Squaw Grove Twps, DeKalb Co.

“Locally abundant on high dry prairies especially the gravelly ones around Rockford. Uncommon elsewhere in the co except in the Sugar River sand area.” (ewf55)

Associates: Attracts game birds, important wildlife food source. Seeds may injure livestock.

VHFS: Basionym *Stipa spartea* Trin. [*Hesperostipa spartea* (Trinius) Barkworth]



Stipa spartea, habit, in bloom with Eric Ingels,

HIEROCHLOË R Brown [or (Gmel) R BR] **HOLY GRASS, SWEET GRASS, VANILLA GRASS, SENECA GRASS** *Hierochloë* from Greek, ἱερός, *hieros*, sacred, holy, & χλόη, *khloë*, young grass or a young green shoot, for the fragrance, similar to Greek *khloos*, light green, referring to the strewing of *H. odorata* before

the doors of churches on festival days. The common name is from the distinctive sweet smell. The fragrance is due to the high coumarin content in the leaves. Coumarin is a precursor to the blood thinner Coumadin or Warfarin. 30 spp of temperate & cold regions. Five spp in northern North America. C3. Some current authors place *Hierochloë* in *Anthoxanthum* Linnaeus 1753 (w12). Older works may list this as *Hierochloa*. [Savastana Schrank, *Torresia* Ruiz & Pavon]

Hierochloë odorata (Linnaeus) Beauvois [A current alternate name is *Anthoxanthum hirtum* (Schrank) Y. Schouten & Veldkamp] SWEETGRASS, aka BUFFALO GRASS, *DUFTMARIENGRAS* (G), *FEUR MOIRE* (Gaelic), *HIÉROCHLOÉ ODORANTE*, HOLY GRASS, INDIAN GRASS, MANNA GRASS, *MYSKGRÄS* (SW), SENECA GRASS, SMELLY VANILLA GRASS, SUMMER SWEET GRASS, VANILLA GRASS, VANILLA SWEET GRASS, *ZEBROVKA* (*ZUBROWKA*) the place where bison graze, *Wicko 'bimucko'si* (Ojibwa), (*odoratus -a -us* (o-do-RAH-tus) scented, odorous, fragrant.) Facultative Wet.

Habitat: Wet meadows, fens, wet savannas, meadows, swales, & shores. SWEET GRASS may persist in seasonally moist road ditches. distribution/range: Meadows; occasional in the n ¼ (½) of Illinois (m14, m??). It is concentrated on abandoned habitation sites on Walpole Island reserve in Ontario. Circumpolar.

Culture: No treatment, can fall plant. ①Plant Guide says cold moist stratification is required. ②“No pretreatment considered necessary. May moist cold treat. Light cover. Fair germination, but once established, spreads by rhizomes” (mfd93). ③30 days cold moist stratification (pm09). No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

seed counts & rates: 110,000 (usda), 611,320 (gnh14), 640,000 (pm), 656,000 (jfn04), 816,000 (aes10), 826,000 (wns01) seeds per pound.

availability: Availability is limited to the extent this sp should never be part of any general seed mix. SWEETGRASS may not set seed every year, with much of the seed being infertile. Seed availability is limited to packets or fractional ounces if available at all. Most seed is used by nurseries “in house” for plant production.

“*Hierochloë odorata* Moist, alkaline prairie. Blooms early May; GOLD. Harvest June. 10”, have tried only a few seed, used method #1 successfully. SEEDLING TRANSPLANT. Highly rhizomatous, so that VEGETATIVE METHODS are strikingly successful. Forms colonies by rhizomes. Desirable for fragrance.” (rs ma)

asexual propagation: Division can be tedious with the delicate rhizomes, but may be easiest way to increase plants. Although delicate, the rhizomes grow with ease.

cultivation: Moist calcareous soils. Humus soils. Extremely cold hardy. Some salt tolerance is noted (aes 2010). Planted colonies in rich mesic soils may be short-lived. Intolerant of bluegrass competition.

bottom line: Most economical from plugs. Limited data indicates dormant seeding is needed. Multiple cycles should be studied. Germ 4.0-22%. Dorm 73-90%. Test 19-29 days. (#2)

Description: Perennial cool-season, native grass; spreads rapidly by slender, white rhizomes, rhizomes & roots forming dense mat beneath the soil surface; culms 1.5-2.0', but generally shorter; leaves fragrant; sheaths; heads open pyramidal panicle, 1.75-4.75" long, with slender branches; spikes three-flowered, stipa often apomictic or infertile; $N 2n = 28, 42, 56$. key features: ①Fragrant when crushed, leaves shiny.

Comments: status: phenology: One of the earliest grasses of the year to flower & set seed, blooming in mid-April. C3. In northern Illinois, collect seeds in late May. Collect seeds in se Wisconsin in June (he99).

Landscaping, fragrant, aggressively rhizomatous in rich soils, calcareous soils. Probably significantly more common than we think. It is a very beautiful grass when flowering. After the seeds stalks are faded or gone, it is unremarkable except for the fragrance. On April 30, 1998, we found a previously unknown local stand, in flower, in Bureau Co along a blacktop that we have traveled for 20 years (the plant was previously unrecorded from Bureau Co, so is everything except corn, soybeans, & bridal wreath). Finding this plant is strictly by being in the right place at the right time in the right year. Although it may be aggressively rhizomatous in a garden, SWEETGRASS will not compete with introduced cool season grasses in a road ditch.

“Stems rise from dead foliage of the preceding year. This foliage may protect basal buds from fire damage in the spring when moisture content of dead foliage is high. But in fall, it is more likely that the buds would be damaged by heat produced when the dried foliage burns.”

www.rook.org/earl/bwca/nature/grass/hierochloe.html

Several years ago, there were rumors of a Northern Plains SWEETGRASS ecotype being researched for commercial release, so if suddenly, someone has a lot of seed for sale at a really cheap price, consider the source as being the northern Great Plains, before introducing a cultivar. This rumor was probably based on

what is known as ABERAVON SWEETGRASS & ABERECHOE SWEETGRASS, which are northern adapted, high-sugar, forage-type *perennial ryes*.

“A conspicuous early grass which is rather common on low prairies & even in damp places along roadsides. Also known in DeKalb, Boone, Ogle & Stephenson cos.” (ewf55)

Associates: ethnobotany: Leaves collected in mid July to September (Jones 1936a). Long leaves used for sewing & weaving bags & baskets by Ojibwa, Pottawatomie, Menominee, & Ottawa (sm32, 33, 23, Whitford 1941). Ojibwa ceremonial, pleasure, & utility plant (den28).

The Native Americans had, in the plants that grew around them, a wide variety of technological, medicinal, culinary, & ceremonial tools. In the Midwest, four sacred plants were used in worship as incense & are still used today. They are sweet grass, sage, cedar, & tobacco. As some Native Americans adopted Christianity, these plants were incorporated into Christian worship.

SWEET GRASS was used as incense, medication, & for purification. SWEET GRASS was burned during ceremonies or rituals to bring the presence of good influences or benevolent powers. These ceremonies include the sun dance. SWEET GRASS was also used as a perfume (a sachet), for basket weaving, & mixed with tobacco for smoking. Clothing was often stored with SWEET GRASS to give the clothes a pleasant odor. SWEET GRASS has been used medicinally for venereal diseases, coughs, sore throats, colds, fevers, windburns, chapping, & healing wounds.

Muhlenbergia filipes Curtis, also known as SWEETGRASS, is handcrafted into baskets in coastal South Carolina.

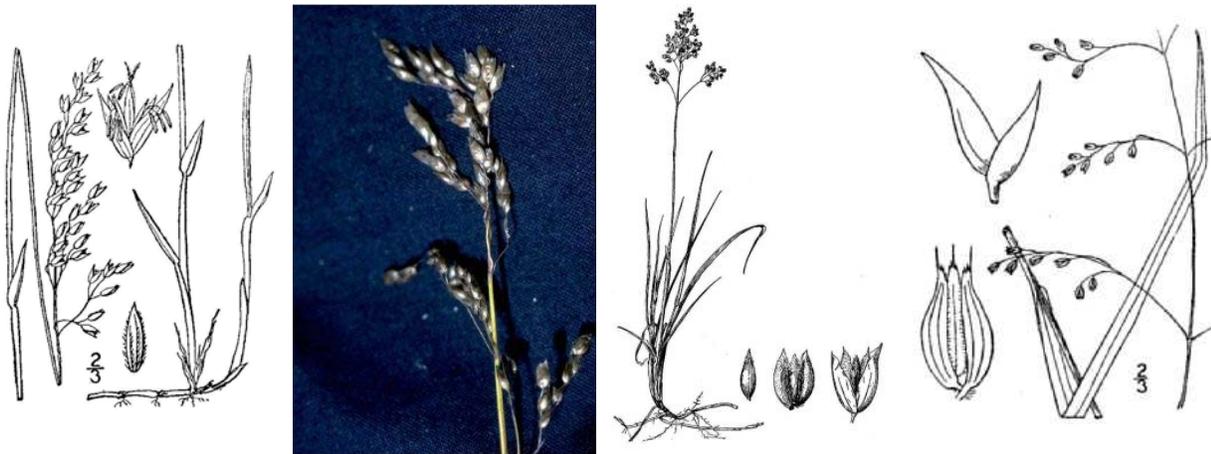
VHFS: According to the USDA (plants.usda.gov) *H odorata* (L) Beauv refers to plants growing in New York & New England. This sp is endangered in Maryland, North Carolina, & Pennsylvania.

Basionym *Poa nitens* Weber. [*Anthoxanthum nitens* (Weber) Y Schouten & Veldkamp, *Hierochloë borealis* Roem & Schult, *H fragrans* (Willd) Roemer & JA Schultes, *H nashii* (Bickn) Kaczmarek, *H odorata* (L) Beauv var *fragrans* (Willd) Richter, *Holcus odoratus* L, *Savastana nashii* Bickn, *S odorata* (L) Scribn, *Torresia odorata* (L) AS Hitchc]

By the above classification, the widespread SWEETGRASS, which occurs in the Midwest is *Hierochloë hirta* (Schrank) Borbás ssp *arctica* (J Presl) G Weim, NORTHERN SWEETGRASS, ALPINE SWEETGRASS.

[*Anthoxanthum hirtum* (Schrank) Y Schouten & Veldkamp ssp *arcticum* (J Presl) G Tucker, *Hierochloë odorata* (L) Beauv ssp *arctica* (J Presl) Tzvelev]

As of June 2005, the Flora of North America committee considers *H hirta* a subsp of *H odorata*.





Hierochloë odorata

1st photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

HORDEUM Linnaeus 1753 **BARLEY** *Hordeum* (HOR-dee-um) New Latin from the ancient Latin name for *H. vulgare*, Barley; akin to Old High German *gersta* barley, Greek *kri*, Albanian *drith*, & probably to Latin *horrere* to bristle; Sanskrit root *ghars*, to rub or grind. Also written in Latin as *ordeum*, *ordeui* n., & archaically as *fordeum*, *fordei* n. The common name is from old English *bærlic*, which originally meant *hordeāceus*, related to or of the nature of barley, from *hordeum*. Some researchers think the original forms of the name & the meanings of the name Beowulf were 'barley wolf', & the character's story was a reference to ancient, annual fertility cycles. $2n = 14, 28, 42$.

Hordeum jubatum Linnaeus FOXTAIL BARLEY, aka FOXTAIL, FOXTAIL GRASS, *LAKKODER* (E), *MÄHNENGERST* (G), *ORGE AGRÉABLE*, *QUEUE D'ÉCUREUIL* (F), *ORGE QUEUE D'ÉCUREUIL* (SWISS F), *ORZO CRINITO* (Swiss I), SKUNKTAIL, SQUIRREL TAIL, SQUIRREL-TAIL BARLEY, SQUIRREL-TAIL GRASS, WILD BARLEY, *A'didamo'wano*, squirrel tail (Ojibwa), (*jubatus -a -um* (classically yoo-BAH-tus, dumbing down to joo-BAH-tus, duh) maned, crested, a loose & much branched tuft or panicle from *juba*, *jubae*, mane of a horse or crest of a helmet, typically in reference to an inflorescence.) Facultative +

Habitat: Typical on saline roadsides & farmed wetlands on moderately moist silty or sandy loam soils. Salt tolerant. distribution/range: Native from eastern Siberia through most of North America & Mexico, introduced into South America, Europe, & central Asia.

Culture: ①No treatment. Further germination pretreatments not sure? (pm) ②“No pre-treatment needed. Sow seeds just below soil surface at 70°F & water.” (ew12) 1

seed counts & rates: 51,200; 192,000 (pm11), 196,800 (ew12), 266,342 (gna04), 352,484 (gnhm11) seeds per pound.

availability: Commercial sources uncertain & erratic, as are those who specify this plant. \$150 per lb nurse crop?? No way!

cultivation: Space plants 1.0-2.0'. Dry soil, full sun.

bottom line: Plant spring or dormant. Genesis limited seed test data indicate little or no dormancy. Germ 87.3, 83, na, sd 6.8, r82-97 (15)%. Dorm 3.7, 0.0, 0.0, sd 5.2, r0.0-11 (11)%. Test 28, 26, na, r21-37 days.**

Description: FRIGGING WEED. Annual, biennial or perennial, bunching, dubiously-native grass. USDA & Ilpin say it is perennial, FNA perennial, sometimes appearing annual; with inconspicuous rhizomes; culms 0.8-2.0'; leaves rolled in the bud-shoot, fine leaved; sheaths not compressed, not keeled, pale green or pink-tinted at base, glaucous, glabrous, the lower generally pubescent; auricles absent or reduced; collar broad, glabrous, pale green, continuous; ligule membranous, 0.5-1.0 mm long, obtuse to truncate, ciliate; blade 2.0-6.0 mm wide, 5.0-12 cm long, erect, tapering gradually to a sharp point, glabrous, light bluish green; upper surface pubescent & prominently ridged; margins slightly scabrous; heads; spikes; $N 2n = 28$. key features: ①“Species is densely tufted. It has long-awned spikelets which make this "one of the most attractive grasses in Illinois. Young inflorescences sometimes are a beautiful rose-purple.” (Ilpin)

Comments: status: phenology: Blooms 5,6,7,8,9. C3. In northern Illinois, collect seeds in mid-June - mid August. Bunching, successional. Badly used as an horribly-expensive, temporary “matrix” in some native seed mixes, to the extent that the nurse crop may cost more than the permanent seeding. Immature seed heads are used in dried arrangements. Useful in landscaping, it is attractive early in the season, highly ornamental, & great in mass

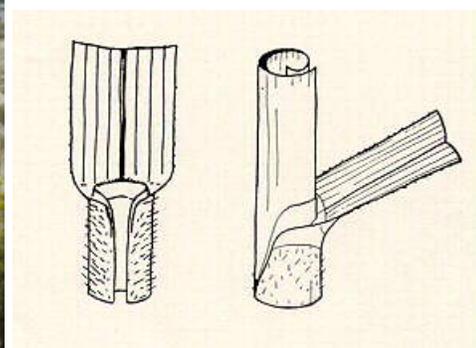
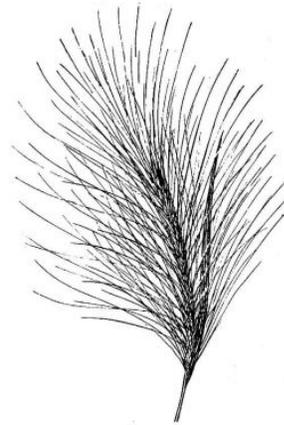
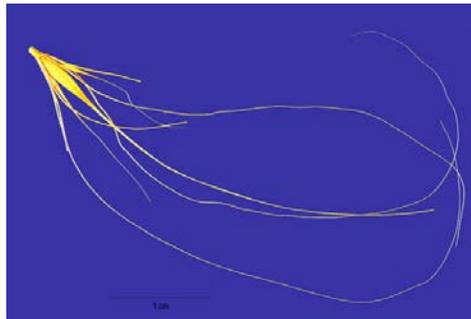
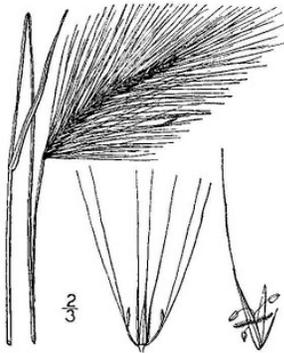
plantings. The nodding spikes sway gracefully with the wind. As an ornamental, it is a Cinderella grass whose beauty soon fades to that of the ugly stepsister. Deadhead as seed ripens & plants become unsightly & potentially harmful. Seed source local roadsides. "In its native range, it is a weedy sp" (fna). "A tufted perennial which flowers in June. It is common on roadsides & in fields." (ewf55)

Associates: The ripe, awned seeds will penetrate your socks & the hair, fur & skin of pets & livestock.

ethnobotany: The pollen is allergenic. The root was used as medicinal plant by Pottawatomie & Ojibwa (sm33, den28). Ojibwa used as medicine for sty on eye (den28).

VHFS: [*Critesion jubatum* (L) Nevski, *Hordeum caespitosum* Scribn ex Pammel, *H jubatum* L subsp *jubatum*, *H jubatum* L var *caespitosum* (Scribn ex Pammel) Hitchc]

In Illinois we have ssp *intermedium* Bowden, INTERMEDIATE BARLEY, & ssp *jubatum*, FOXTAIL BARLEY.



Hordeum jubatum in interstate median

Line drawing of collar area from Nowosad et al 1936, courtesy <http://www.caf.wvu.edu/~forage/library/index.htm>

Hordeum pusillum Nuttall (or Linnaeus) LITTLE BARLEY, aka DVÄRGKORN (SW), MOUSE BARLEY, ORGE NAINÉ (F), VÄIKE ODER (E), (*pusillus* -a -um little, small from classical Latin *pusillus* -a -um, very small, tiny, wee, insignificant, petty, from *pūsus*, *pūsi*, m, boy or little boy (*pusa*, *pusae*, f, little girl), the same base as *pūtus* boy child, same root as *puer*, *pueri*, boy, child; also classical Latin *pusilla* f, a very small person, *pusillum*, *pusilla*, n, a small amount.) FAC

Habitat: Local in waste ground with clay or hardpan soils, nursery plots. Swink & Wilhelm (1994) note it replaces *H jubatum* on the road shoulder to the south of the Chicago region. distribution/range:

Culture: Winter annual or annual.

Storage Behaviour: Orthodox; Storage Conditions: 100% viability following drying to mc's in equilibrium with 15% RH and freezing for approx 4.97 years at -20C at RBG Kew, WP.

Thousand Seed Weight: 3.297g. ①3.3328; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②3.0; (Mazer 1989); Seed. ③3.557; (Baker Seed Herbarium, California); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. (RBG Kew)

Germination ①90% germination; ; germination medium = 1% agar + 101 mg/l potassium nitrate (KNO₃); germination conditions = 15°C, 8/16; (RBG Kew). ②94% germination; pre-sowing treatments = seed sterilised (immersed in 10% Domestos solution for 5 mins); germination medium = 1% agar; germination conditions = 10°C, 8/16; (RBG Kew) ③100% germination; pre-sowing treatments = seed sterilised (immersed in 10% Domestos solution for 5 mins); germination medium = 1% agar; germination conditions = 15°C, 8/16; (RBG Kew).

availability: Sp is not in the native seed trade.

Description: key features: “Smallest & most abundant sp of *Hordeum* in Illinois; It especially has narrower spikes.” (Ilpin) N 2n = 14.

Comments: C3. More common farther south. I have seen this on back roads south of Bloomington, Illinois, but for the first time in Whiteside Co, Illinois in 2004, Hurd Road east of Prairie Hybrids. 2014 nursery mow lanes have 1 tiny colony.

Badly used as an horribly-expensive, temporary “matrix” in some native seed mixes, more inappropriate than the above. Recommended as a cover crop in Ritchie, JC et al, eds 2000, Proceedings of the Second Eastern Native Grass Symposium, November 17-19, 1999. Baltimore, Maryland.

VHFS: Basionym *Hordeum pusillum* Nuttall. [*Critesion pusillum* (Nuttall) A Löve, *H pusillum* Nuttall var *typicum* Hauman, *H pusillum* Nuttall var *pubens* Hitchcock, *H riehlui* Steudel]





Hordeum pusillum

Hordeum vulgare Linnaeus BARLEY, aka COMMON OR GRAIN BARLEY, (*vulgaris -is -e* (vul-GHA-ris) common, vulgar, from Latin *vulgāris*, from *vulgus*, the common people.)

Habitat: Moderately coarse to fine soils. Best in neutral soils, base tolerant, somewhat acid tolerant.

distribution/range:

Culture: 12,500 (gran), 13,600 (usda) seeds per pound. Planted alone, drill 60-100 lb per acre in fall or spring, according to variety. 75-80 lb in spring or fall (star 2002). 90 lb per acre as a grain crop, 30 lb per acre as a nurse crop with native perennials (Ernst Vol 34). Historically, very little barley has been grown in northern Illinois in recent years, making the seed somewhat hard to purchase, but some vendors are keeping a limited amount in stock in season.

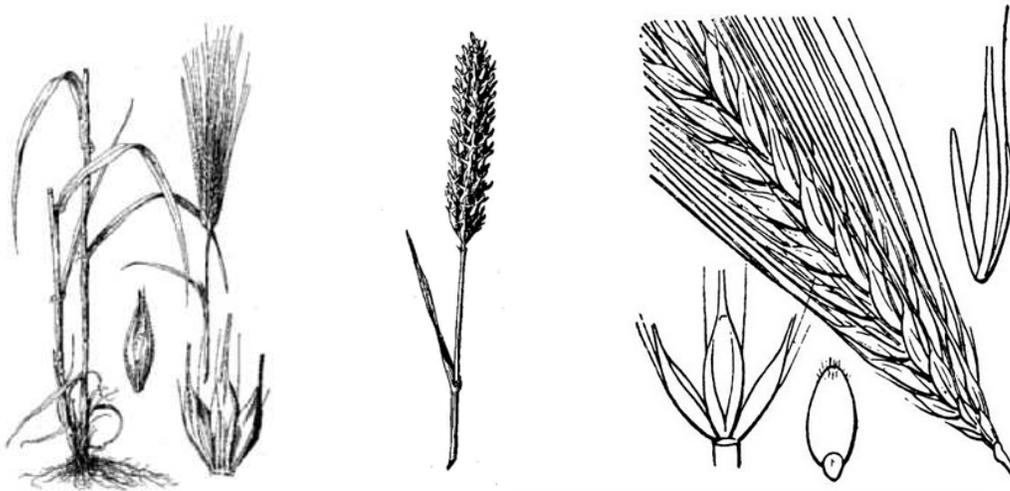
Description: Cool-season, moderately drought tolerant, medium tall to tall annual grass.

Comments: C3. Adapted to wide variety of sites. More productive cover crop on saline or alkaline sites. Easily out competed by establishing perennials. Spring & winter varieties available. More hardy than winter oats, but less hardy than winter wheat. Many commercial varieties available, but not a popular agricultural crop in Illinois.

According to Victor Schaff, S&S Seeds, Carpenteria, CA, BARLEY is one of the best nurse crops, especially a short-stawed variety (personal communication).

Some scholars think BARLEY was domesticated for its value in fermenting, & not as food plant.

VHFS: Variety *trifurcatum* (Schlecht) Alef, BEARDLESS or PEARL BARLEY is also grown in & known from Illinois.



Hordeum vulgare second seed photo is var *trifurcatum*

HYSTRIX Moench **BOTTLE BRUSH** *Hystrix* New Latin, from Latin, porcupine, spiny from Greek from Greek ὑστρίξ, ὑστρίχ-, *hystrix*, *hystrikh-*, porcupine. As well as a grass, it is a genus of terrestrial porcupines that is the type of the family *Hystricidae*. Now part of a broadly redefined *Elymus*, which see.

KOELERIA Persoon **JUNE GRASS, KOELERIA** Georg Ludwig *Koeler*, 1765-1807, of Mainz, a German physician, pharmacist, botany professor, author, & student of the grasses. A cosmopolitan genus of about 35 spp of dry grasslands & rocky soils. x = 7. Formerly *Aira L*

Koeleria macrantha (Ledebour) JA Schultes *KY, LA, OH, PA JUNE GRASS, aka CRESTED HAIRGRASS, *FIN TOFSÄXING* (SW), KOELER GRASS, *KOELERIE ACCRÉTÉ*, MOUNTAIN JUNEGRASS, PRAIRIE JUNE GRASS, (*macranthus -a -um* large-flowered, or with large flowers, from Greek μακρός, *macros*, large, & ανθος, *anthos*, flower.) The common name refers to the month of flowering & fruiting. upl

Habitat: Dry, hill, & sand prairies, sand savannas, sandy soil. distribution/range: Prairies, sandy black oak woods; occasional throughout the state (m12). JUNE GRASS has a very broad distribution, western North America south to Mexico, & widely distributed in temperate Eurasia, especially western Mongolia.

Culture: ①No treatment, cool soils, & light (Butler & Frieswyk 2001, Wick et al 2004, Young 2001). ②Some lots from parts of its range may exhibit physiological dormancy & may benefit from cold moist stratification (Winslow 2002). ③“No pretreatment, or moist cold treatment. Prefers cooler soils: Sow early spring or late fall. Easy from transplants or dry stratified seed. Light cover. Variable: good to poor germination” (mfd93). ④No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (pm09). ⑤No pre-treatment needed, sowing outdoors in the spring is the easiest method, or seeds germinate after about 60 days of cold, moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ⑥“No pre-treatment needed. Sow seeds just below soil surface at 70°F & water.” (ew12) ⑦Sow at 20°C (68°F), if no germ. in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

seed counts & rates: 2,300,000, 2,315,000 (wns01), 2,315,000 (ecs), 2,315,400 (gran), 2,400,000 (pn02, jfn04), 2,562,903 (gnh06), 2,793,846 (gnh02), 2,802,469 (gna04), 2,819,875 (gnh03), 2,900,958 (gna06), 2,967,320 (gna05), 2,992,000 (aes10), 3,000,000 (sh94), 3,200,000 (pm, ew12), 5,710,692 (gnae08), 6,213,568 (agre), 6,400,000 hulled seeds per pound. Establishes easily. Anon (1981) recommends 8-12 lbs per acre (if you have an unlimited budget & can fathom a non-seed-production use for a pure stand of JUNE GRASS from seed). Granite recommends 1-2 lb pls per acre in fall. I recommend Paris in the springtime.

“*Koeleria cristata* Dry, esp sand prairie. Blooms mid June to early July; PLATINUM. Harvest August. 1'; easy by method #1, SEEDLING TRANSPLANT; blooming 2nd year; inflorescence spectacular. A cool-season grass that is not very competitive & gives little fuel, little competition to weeds.” (rs ma)

cultivation: Space plants 1.0-1.5'. Dry soils, full sun to light shade. Moderate to well-drained soils. Coarse, moderately coarse to medium soils. Anaerobic tolerance none. CaCO₃ tolerance high. Drought tolerance high. Fertility requirement medium. Salinity tolerance none, but some tolerance noted by AES (2010). Shade tolerant. Neutral to basic soils. pH 6.0-8.0, or 6.5-8.0. Seedlings are not vigorous, slow to establish, & are subject to damage from wheel & foot traffic. Late spring burns are damaging to JUNEGRASS.

bottom line: Our seed test data show 25% of lots northern Illinois genetic material will significantly benefit from dormant seeding or cold moist stratification. Germ 65.3, 75, 77, sd 25.3, r18-98 (80)%. Dorm 10.8, 0.0, 0.0, sd 16.1, r0.0-51 (51)%. Test 33, 33, 39, r20-44 days. (#24)**

Description: Perennial, cool-season, drought-tolerant, short-lived, bunching, native grass; roots 20" minimum root depth; culms 0.5-2.0'; leaves; basal, flat to inrolled, sharply pointed; sheaths; heads narrow contracted panicles having the appearance of dense spikes, one per stem; spikes pale green to purplish; seed is a grain; N 2n = 14, 28. key features: Though not a problem in the Midwest, JUNE GRASS can be mistaken for *Poa fendleriana* MUTTONGRASS & *Trisetum wolfii* SPIKE TRisetum, but is distinguished by the hairy panicles & smaller spikelets. It differs from the similar *Sphenopholis intermedia*, with less open panicles, & spikelets that disarticulate above the glumes.

Comments: status: Endangered in Kentucky & Ohio. Critically impaired in Louisiana. Extirpated in Pennsylvania. phenology: Blooms 5,6,7. Seed is generally harvested starting around Father's Day. In northern Illinois, collect seeds in 3rd week of June through July. Collect seeds in se Wisconsin in July (Heon et al 1999). Useful in xeric landscaping. Attractive dried seed heads used in fall arrangements. Blooming JUNE GRASS is a great contrast to SPIDERWORT in flower. A blooming stand of *June Grass* is beautiful in its own right. JUNE GRASS is cold, heat, & drought tolerant, medium-lived, but can be very short lived in

average to good soils. Soils with sharp internal drainage are imperative. Good for severely disturbed, sandy or gravelly sites with sharp, internal drainage. Seed sources nursery production & dry prairies, Gold Twp, Bureau Co, Tampico Twp, Whiteside Co, & Taylor Twp, Ogle Co. Wind pollinated, but said to be, in part apomictic. Some populations or ecotypes may naturally produce low viability seed.

This is the “original & cool” cool season prairie grass. It was for years abused & is still badly abused, by being included in mesic mixes or general prairie mixes because it is cool season & because it is *short* & because we have another generation of maroons writing jobs & gullible LA’s believing that the maroons who write seed mixes are smart. It does not matter if JUNE GRASS does not live & we waste a lot of seed, money & time, & we mislead a client. JUNE GRASS needs the sharp, internal drainage of kames & dunes, & zero to little competition.

“An early flowering bunch grass that is most abundant in the sand areas but is also found on the prairies about Camp Grant. (*K gracilis* Pers)” (ewf55)

Associates: Attracts game birds, songbirds, & small mammals. Provides a degree of cover for small mammals & birds. Resumes growth in very early spring, excellent early season forage for livestock & wildlife, good summer forage. It is a key winter forage in parts of North America. Palatable & good forage where the deer & the antelope play (& elk).

JUNE GRASS is generally considered nonmycorrhizal & is easily out competed by endomycorrhizal C4 grasses. Don’t waste seed with improper mix designs. The presence of mycorrhizae may have neutral or positive effects on seedling emergence (Hartnett et al 1994, Wilson & Hartnett 1997). When ever you see *Koeleria* in a mix that is not going on a dune or kame, and has C4 grasses, you should get sick inside.

VHFS: Seen as *Koeleria macrantha* (Ledeb) JA Schultes or *K macrantha* (Ledeb) Spreng. Go figure.

Basionym *Aira macrantha* Ledeb. [*Aira cristata* L, *Koeleria albescens* auct, *K cristata* auct pp, non Pers, *K cristata* Pers var *longifolia* Vasey ex Burt-Davy, *K cristata* Pers var *pinetorum* Abrams, *K gracilis* Pers, *K mukdenensis* Domin, *K nitida* Nutt, *K pyramidata* auct Amer, *K pyramidata* auct pp, non (Lam) Beauv, *K yukonensis* Hultén]

Two spp are native to northern North America, *Koeleria asiatica* Domin, EURASIAN JUNEGRASS, & *K macrantha* (Ledeb) Schult, JUNEGRASS. *K asiatica*, 2n = 28, grows from the Urals east to northern Alaska & northwestern Canada. *K macrantha*, 2n = 14, 28, grows in temperate North America & Eurasia, & is a polymorphic polyploid complex. Some separate the North American plants as *K nitida* Nuttall. *K pyramidata* (Lam) P Beauv, CRESTED HAIRGRASS, 2n = 14, is European.

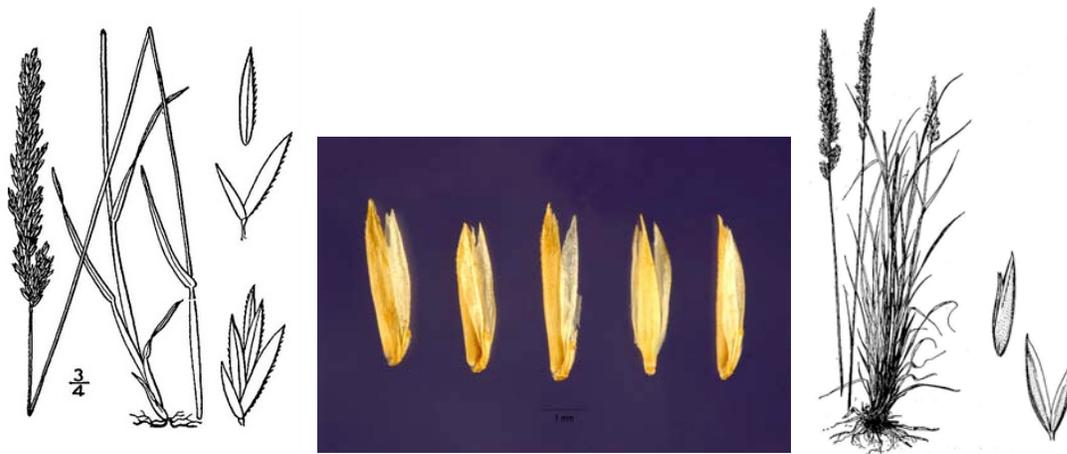
An “improved” variety is/was near release. ‘Barkoel’ is a cool-season turf selection available through Barenbrug USA, PO Box 239, Tangent, OR, 97389, 503.926.5801.

J Butler & C Frieswyk, 2001. Propagation protocol for production of *Koeleria cristata* seeds; Rocky Mountain National Park, Estes Park, Colorado. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 6 March 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

K Simonin, 2000. *Koeleria macrantha*. In: Fire Effects Information System, [Online]. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2007, March 6]

D Wick, J Lapp, & J Evans, 2004. Propagation protocol for production of container *Koeleria macrantha* (Ledeb) Schultes plants (116 ml conetainers), Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 6 March 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

SR Winslow, 2002. Propagation protocol for production of *Koeleria macrantha* seeds; Bridger Plant Materials Center, Bridger, Montana. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 6 March 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.



Koeleria cristata in bloom providing background for *T. ohiensis*

LEERSIA Swartz 1788 **CUTGRASS, FALSE RICE** *Leersia* New Latin, from Johann Daniel *Leers* (1727-1774), German botanist & pharmacist & New Latin *-ia*. About 17-18 spp of tropical & warm temperate areas. $X = 12$. (One source has this as *Leersia* Soland, & base chromosome $X = 6$.)

Leersia lenticularis Michaux *MD, OH **CATCHFLY GRASS, aka OATMEAL GRASS**,
River bottoms and moist woods of the midwestern and southeastern United States (Pyrah in fna).
distribution/range: Low woods, swamps, marshes; occasional throughout the state except for the extreme n cos (m14). Known from pin oak savanna. Mercer Co.

No pre-treatment necessary other than cold, dry stratification (pm09).

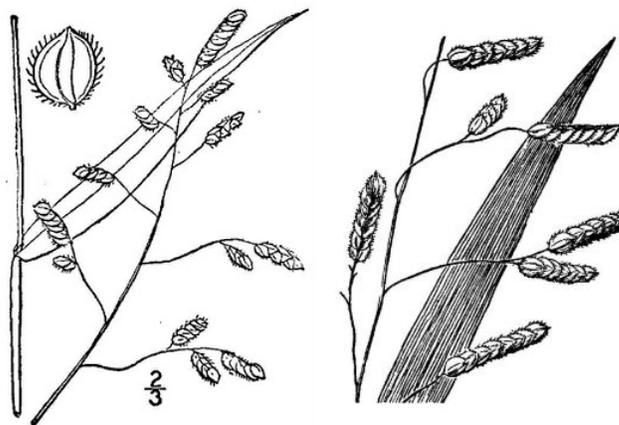
Very limited commercial availability.

$N 2n = 48$.

Endangered in Maryland & Ohio.

“The valves of the *O lenticularis* are said to possess a degree of irritability, & retain small insects; it is more probably the singular construction of the corollas which produces this phenomenon; the insect venturing too far is retained as in a trap the proboscis, & the hooked ciliatures of the valves, assist in ensnaring the intruder” (Nuttall 1818 v1)

VHFS: Basionym *Leersia lenticularis* Michaux. [*Asprella lenticularis* (Michaux) Roemer & Schultes
Homalocenchrus lenticularis (Michx.) Kuntze, *Zizania lenticularis* (Michx) Steudel]



Leersia lenticularis

Leersia oryzoides (Linnaeus) Swartz RICE CUT GRASS, aka CUT GRASS, *LÉERSIE FAUX-RIZ*, RICECUT GRASS, SICKLE GRASS, *VILDRIS* (SW) (*oryzoides* like or resembling Rice) Obligate

Habitat: Seasonally inundated areas, shorelines, wet meadows, borders of sloughs, spring-fed rivulets, open swales, calcareous springy places. Upland swamp, prefers open sunny, moist to saturated soils. In many agricultural wetland soil seedbanks. distribution/range:

Culture: ①The recommended cultural requirements in the literature vary from no treatment to fall seeding, to cold moist stratification, to cold water stratification. ②Prairie Moon (2007-2009) recommends cold dry stratification. No pre-treatment necessary other than cold, dry stratification. ③Seed possesses physiological dormancy requiring 180-270 days cold moist stratification (usda). ④“No pre-treatment needed. Sow seeds just below soil surface at 70°F & water.” (ew12) Low rate of success from field planting.

seed counts & rates: 321,111 (gna05), 336,296 (gnh02), 354,688 (gnh11), 356,777 (gnh01), 360,000 (usda), 380,349 (gnapa04), 397,722 (gnawpa03), 454,000 (wns01), 544,000 (pm02), 583,548 (gnh07), 610,000 (ecs), 698,461 (gnhwa02), 1,028,800 (ew12), 1,512,000 (jfn04, aes10) seeds per pound. In mixes plant 0.031-0.125 pls lbs per acre (gni). Some seed lots may be of low viability. Insist on pls seed.

availability: Seeds, bare root plants, & plugs are becoming readily available.

cultivation: Space plants 1.5-2.0'. Wet soils, full sun to partial shade. Anaerobic tolerance medium. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement medium. Nutrient load tolerance moderate to high, salt tolerance none or low, siltation tolerance moderate. Partial to full sun. Shade intolerant. pH 6.0-7.0 in one source, or pH 5.1-8.8. Some ecotypes may tolerate pH as low as 3.0. Bare root plants & plugs should be installed at same depth they have at which they been growing & on 1-3" centers in spring, to fill in 1-3 years respectively. Seed, bare root plants, & plugs need to be planted in moist soil, not standing water. Young plants do not tolerate submergence for more than 2-3 days. Mature plants tolerate seasonal to long term flooding, up to 8". Mature stands are somewhat tolerant of fluctuating water levels. Plants need to be well rooted & 6" tall before water levels rise, preferably 18" tall.

bottom line: RICE CUT GRASS seed is strongly dormant & requires dormant seeding for field establishment. Germ 10.7, 3.0, 2.0, sd 14.2, r0.0-50 (50)%. Dorm 71.6, 86, 90, sd 28.1, r0.0-92 (92)%. Test 31, 33, 34, r17-41 days.**

greenhouse & garden: We have had fair to terrible results with green house sowing after cold dry storage, so moist cold stratify, early & often.

Scarification of the seed coat after hulling helps in greenhouse production. Hulled *Leersia* seed treated with GA3 germinated in several days in the greenhouse (gni greenhouse records, 2006). There may be germination inhibitors in the husks.

Description: Perennial native wetland grass; roots rhizomatous, 14" minimum depth; culms 1.0-4.0', erect or sprawling; leaves; sheaths; heads greenish white flowers; spikes; chasmogamous & cleistogamous spikelets; N 2n = 48. key features: “Versus *L lenticularis*, this sp' lemmas are papillose all over, as well as ciliate on the keel. Spikelets are oblong, & not round.” (Ilpin)

Comments: status: Native. phenology: Blooms 7,8,9. C3. In northern Illinois, collect seeds in late September - early November. Used as a wetland cover crop, useful in upper shoreline zones, stream bank stabilization,

vegetated swales. Good sediment stabilization capacity. *Caution sharp leaves!!!* Not user friendly! A casual walk through a stand of RICE CUT GRASS in summer in shorts makes your legs look like you had a fight with a bagful of cats & lost. The leaves cut flesh & the stems abrade the skin. One of the first wetland plants to establish. Once established, may become aggressive. Seed source farmed wetlands, riparian wetlands, & drainage ditches, Green River Lowland, Tampico, Lee Co.

“In flat and marshy situations ... the universally diffused ... *Leersia oryzoides*” (Short 1845).

“Common in wet places as in ditches & along streams.” (ewf55)

Associates: Wind pollinated. Larval host for *Ancyloxypha numitor* Least Skipper & *Polites peckius* Peck's Skipper. Seeds & roots are eaten by waterfowl, rails, herons, & muskrats. Birds eat seeds, including Swamp Sparrow, Tree Sparrow, Sora Rail, Canada Goose, & various ducks. Stands of RICE CUT grass provide cover for reptiles, amphibians, insects, crustaceans, & fish. Reported as deer resistant.

VHFS: [*Homalocenchrus oryzoides* (L) Pollich, *Leersia oryzoides* (L) Sw f *glabra* AA Eaton, *L oryzoides* (L) Sw f *inclusa* (Wiesb) Dörf, *Phalaris oryzoides* L] Some authors recognize a form *inclusa* with panicles mostly included inside the sheath, but that the degree of inclusion is probably controlled mostly by maturity.

SC Pierce, S Pezeshki, & MT Moore, 2007. Ditch plant response to variable flooding: a case study of *Leersia oryzoides* (rice cutgrass). *Journal of Soil & Water Conservation*, 62(4):216-225.



Leersia oryzoides

Leersia virginica Willdenow WHITE GRASS, aka *LÉERSIE DE VIRGINIE*, WHITE CUTGRASS, (of or from Virginia. The specific epithet was formerly capitalized.)

Habitat: Wooded floodplains, shaded woodland paths, depressions in morainal (more anal) woodlands. Wooded, moronic (morainic?) depressions. “Frequent in damp woods as west of Roscoe, Kishwaukee Forest Preserve, etc.” (ewf55). Moist places in woods and along stream courses east of the Rocky Mountains (Pyrah in fna).

Culture:

availability: Sp is not in the native seed trade. Extremely limited availability only, one or two vendors nation-wide, with wildly irregular crops, & just not out there most years. Do not specify this in a seed mix unless you like looking like a dufus, or do you need reminded of professional ethics? Knowingly specifying seed that does not exist raises some serious questions of ethics, legality, & competency.

Description: $2n = 48$. key features: ① “Panicle is sparsely branched, the branches with many (approx 10+) spikelets. Lemma is sparsely pilose throughout; glabrous to ciliate on the keel & margins.” (Ilpin)

Comments: Blooms 7-9.

“In flat and marshy situations ... the universally diffused ... *Leersia Virginia*” (Short 1845).

Associates: Larval host *Enodia anhedon* Northern Pearly Eye & Pecks Skipper.

VHFS: [*Asprella imbricata* (Poiret) Roemer & Schultes, *A ovata* (Poiret) Roemer & Schultes, *A virginica* (Willd) P Beauv, *Homalocenchrus ovatus* (Poiret) Kuntze, *H virginicus* (Willd) Britt, *Leersia imbricata* Poiret in Lam, *L oryzoides* (L) Swartz, var *virginica* (Willd) Poiret in Lam, *L ovata* Poiret in Lam, *L virginica* Willd var *ovata* (Poiret) Fern, *L virginica* Willd var *brasiliensis* Ekman] Synonyms after AFVP.

<http://www.florida.plantatlas.usf.edu/Plant.aspx?id=3431>



Leersia virginica

1st photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

LEPTOCHLOA P Beauv SPRANGLETOP

Mohlenbrock (2014) has *L acuminata* (Nash) Mohlenbr as the common adventive SALT MEADOW GRASS of n Illinois.

Leptochloa fusca (Linnaeus) Kunth ssp ***fascicularis*** (Lamarck) N Snow nee ***Diplachne acuminata*** Nash *CT, MA, NY, RI BEARDED SPRANGLE-TOP, aka SALT-MEADOW GRASS, SALTPOND GRASS, SPRANGLETOP, (*acuminatus* -a -um Latin acuminate, long-pointed, pointed, tapering to a narrow point, with a long, narrow & pointed tip, from Latin *acumen*, *acuminis*.)

Habitat: distribution/range: All the lower 48 states except Georgia.

Culture: ?; 907,200 seeds per pound (lhn1990). There are no known commercial sources of this sp. In spite of that, Indiana DOT has had this sp in a wetland mix for 20 years!

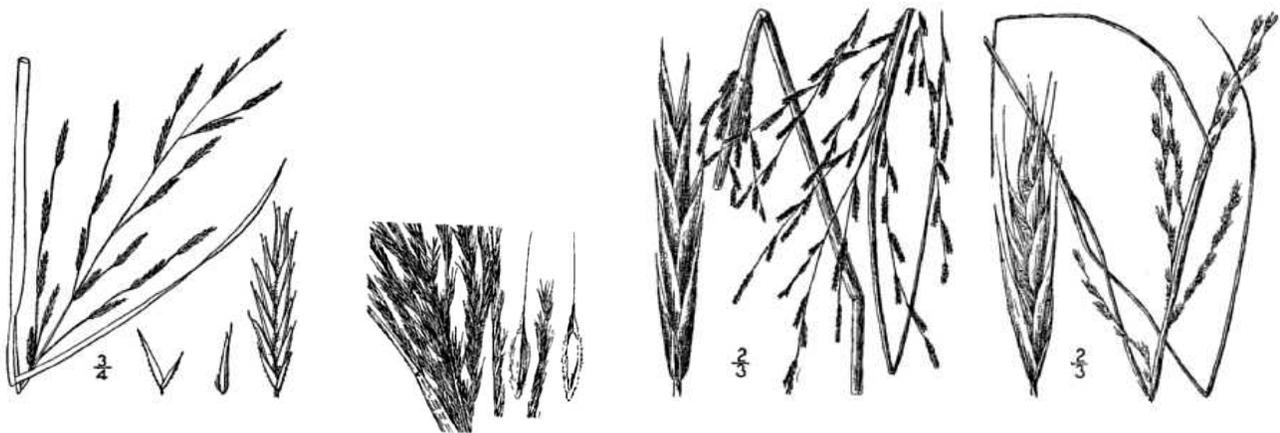
Description:

Comments: status: As recently defined, *D. maritima* is Endangered in Connecticut & New York. Threatened in Massachusetts. *L fascicularis maritima* is Historical in Rhode Island. This taxa is considered weedy or invasive by some authorities (Stubbendieck et al 1994) phenology:

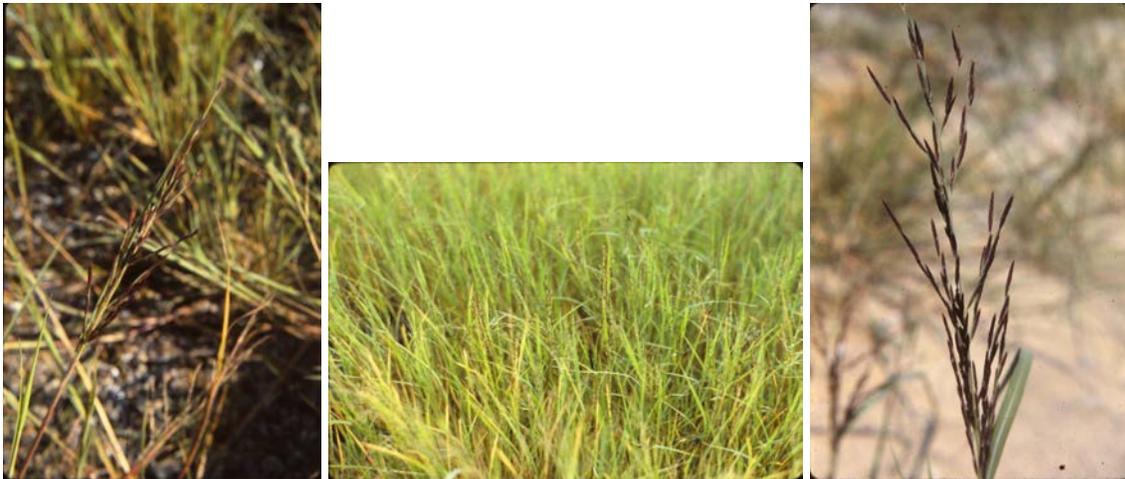
Get Your Programs Here! You Can't Tell A Player Without a Program... This is the grass from alkaline roadsides & intersections formerly referred to as *Leptochloa fascicularis* then as *Diplachne acuminata*. In our area, known to often cohabit with *Puccinellia distans*.

There seemed to be great incentive to harvest this and other saline/alkaline species from roadsides. Those incentives vanished when a friend & landscape contractor was killed by a motorist while installing seed on a DOT road shoulder.

VHFS: [*Diplachne acuminata* Nash, *D fascicularis* (Lam) P Beauv, *Leptochloa acuminata* (Nash) Mohlenbr, *L fascicularis* (Lam) A Gray, *L fascicularis* (Lam) A Gray var *acuminata* (Nash) Gleason, *L fascicularis* (Lam) A Gray var *fascicularis*]



Leptochloa fascicularis 1 & 2, *Diplachne acuminata*, & *D maritima*, respectively.



Leptochloa fusca fascicularis

LEPTOLOMA Chase FALL WITCH GRASS From Greek *leptos*, thin & *loma*, border, alluding to the lemma margins. This genus is represented in North America a single sp. The plants are perennial, with large open panicles on brittle culms, which break off at maturity forming tumbleweeds. Spikelets are one-flowered with a minute first glume. Monotypic genus maintained by m14.

rewrite as *Digitaria cognata*

Leptoloma cognatum (JA Schultes) Chase *PA New nomenclature is *Digitaria cognata* (JA Schultes) Pilger (pugs14, AFVP, fna). FALL WITCH GRASS, aka CAROLINA CRABGRASS, CAROLINA COTTONTOP, WITCH GRASS, (*cognatus* –a -um related to, from Latin *cognātus*, from *co-*, together & *gnātus*, born, from the root *gn-*, *gen-*, *gon-*, to produce.) *Panicoideae*; *Panicodae*; *Paniceae*

Habitat: “In all our sand areas particularly below Camp Grant, on gravel hills & occasionally on dry prairies.” (ewf55) distribution/range:

Culture:

Storage Behaviour: Orthodox; 85% viability following drying to mc's in equilibrium with 15% RH and freezing for approx 2.38 years at -20C at RBG Kew.

Thousand Seed Weight: 0.55g; (RBG Kew); Seed; *Seed weights reported may include minor covering structures.

Germination 85% germination; pre-sowing treatments = seed scarified (covering structure removed); germination medium = 1% agar + 101 mg/l potassium nitrate (KNO₃); germination conditions = 20°C, 8/16; (RBG Kew)

Description: Native, warm-season, short-lived, perennial bunch grass; referred to as an annual (*vide infra*),

roots cespitose, shortly rhizomatous, the rhizomes are short enough some sources say this is without rhizomes; culms 1-2 feet; leaves narrow, generally less than 4 inches long, one side wavy, & the other smooth; sheaths rounded & shorter than the internodes; heads paniculate, panicles are many-branched, open airy, one-third to one-half as tall as the plant. Panicle branches are hairy in the axils; spikes 1-flowered & solitary at the end of a long pedicel; $N 2n = 72$, or 36, or 70 (mostly 72), or $2n = 36$ (Wipff in fna). key features: ① “Species is distinguished from *Panicum* by cartilaginous fertile lemma, & by their ligule, a collarless, hairless scale. Also, it has a diffuse panicle; spikelets 1-flowered, fusiform, at the end of long capillary pedicels. It is highly branched at base. In autumn, panicle turns purplish & breaks entirely off, recalling tumbleweeds.” (Ilpin)
Comments: status: Threatened in Pennsylvania. phenology: Blooms C4.

Leptoloma is one of two short grasses that lend a cast of pink-purple to sand hills & dry roadsides in late summer, the other being *Eragrostis spectabilis*, which usually grows with *Leptoloma*. Very open airy seed heads, much lighter texture & a paler pink-purple than its companion. Seeds (on tumbleweeds) are dispersed by wind in the fall, accumulating in fencerows & bushes as early as the first week of October. It is common to see *Leptoloma* & *E spectabilis* tumbleweeds stranded together. Great in a dwarf prairie.

Associates: Larval host *Hesperia ottoe*, Ottoe Skipper, *Ageneotettix deorum* White-Whiskered Grasshopper feeds on the plant. Upland gamebirds eat the seed. Grazed by domestic livestock, deer, & antelope.

VHFS: Some authorities refer to this as *Digitaria cognata* (JA Schultes) Pilger (pugs14).

Basionym *Panicum cognatum* Schultes 1824; *Panicum divergens* Muhlenberg ex Elliott Dec 1816, non Kunth Jan 1816. [*Digitaria cognata* (JA Schultes) Pilger var *cognata* (JA Schultes) Pilger [superfluous autonym, *Leptoloma cognatum* (Schultes) Chase, *Panicum autumnale* Bosc ex Sprengel, *P autumnale* Bosc ex Sprengel, var. *pubiflorum* Vasey ex LH Dewey, *P cognatum* Schultes, *P divergens* Muhlenberg ex Elliott, *P fragile* Kunth, Revis. Gramin 36 1829, nom illegit, *Panicum nudum* Walter] Mostly after afvp.

<http://wisplants.uwsp.edu/scripts/Detail.asp?Spcode=DIGCOGsCOG>
<http://www.florida.plantatlas.usf.edu/Plant.aspx?id=822>





Leptoloma cognatum



Leptoloma & Eragrostis spectabilis tumbleweeds, respectively, caught in THYME.

LEYMUS Hochst **BEACH RYE**

Elymus arenarius Linnaeus is often placed here.

rewrite as *Leymus*

Elymus triticoides Buckley [new nomenclature is *Leymus triticoides* (Buckley) Pilg.] CREEPING or BEARDLESS WILD RYE,

Habitat: Native farther west in sites which are subirrigated, wet or with 18" rainfall. Coarse to moderately fine soils. Basic to neutral soils. distribution/range: For better or worse, introduced into the Chicago metro area. Native to western USA.

Culture: Do not plant in Illinois! In solid stands, plant 15 lb pls per acre in fall or spring (gran). 51,000 (gran) seeds per pound.

Storage Behaviour: No data available for species. Of 4 known taxa of genus *Leymus*, 100.00%

Orthodox(p/?)

Thousand Seed Weight: 5.01g (RBG Kew); Seed; *Seed weights reported may include minor covering structures

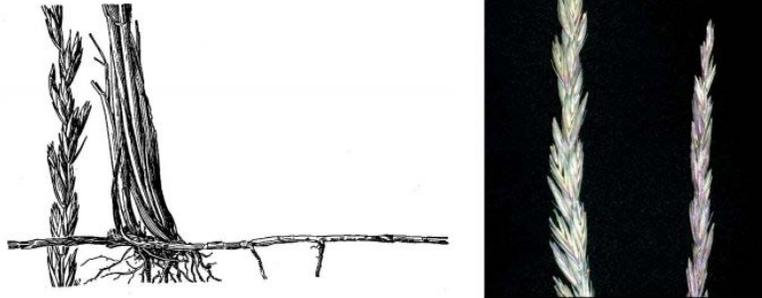
availability: At least one commercial variety is/was in the trade, but availability is spotty, often not available, which for us, is not a bad thing.

Description: Cool-season, long-lived, medium to tall perennial loose sod-former with extensive root system. N 2n = 28.

Fruit morphology description @ <http://data.kew.org/sid/SidServlet?Source=epic&ID=13873&Num=QRm>

Comments: Extremely salt tolerant & very palatable. Useful in saline rangelands & waterfowl areas. Sp was formerly specified by some in Illinois saline roadside mixes. This sp should not be used in Illinois, until we know its invasive potential, maybe after 25-50 years of observation. The restoration community may regret having introduced this plant into metro Chicago.

VHFS: Basionym *Elymus triticoides* Buckley. *Leymus triticoides* (Buckley) Pilg.



Elymus triticoides

Photo Robert H Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

LOLIUM Linnaeus **RYE-GRASS, DARNEL, FESCUE** *Lolium* New Latin, from Latin, for darnel, a weedy annual grass (*Lolium temulentum*, BEARDED DARNEL, POISON RYE GRASS, TARES) with very long awns on the glumes & seeds sometimes considered poisonous that often occurs in grain fields & other cultivated land. *Lolium* seeds are poisonous. Alternately, the toxicity may be due to frequent ergot. Once seen as RAY-GRASS.

Lolium multiflorum Lamarck ANNUAL RYEGRASS, aka ITALIAN RYEGRASS, (*multiflorus -a -um*, many-flowered, with many flowers.)

Habitat: Seeded in meadow, pasture, & erosion control mixes, but seldom persisting for more than one season. Introduced from Europe.

Culture: Establishes quickly & easily. 10 to 14 days to germination. Rapid growth rate.

seed counts & rates: 217,000 (usda, ecs), 227,000 (lhn91), 230,000 seeds per pound. For pasture, plant 25-35 lb pls per acre in spring (gran). 50 lbs seeded alone, or 5-10 lbs as a companion crop (ecs). For a new lawn seed 10 lbs per 1000, for overseeding an established lawn seed 6 lbs per 1000.

For nurse crops use 4-5 lbs spring & 5-10 lbs fall. More seed will compromise the permanent seeding. If this much seed will not hold the soil, use a straw blanket. Some consultants rightly feel this sp is very inappropriate as a nurse crop.

cultivation: Tolerances vary with varieties. Moderately coarse to moderately fine soils. Best adapted to mild winters & cool summers. Tolerates some shade, some traffic, & wide range of soils. Loose fertile to semi-fertile soils. Anaerobic tolerance low. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance high. Shade tolerance intermediate. Neutral, somewhat acid & basic tolerant. pH 5.0-7.9.

Description: Glabrous, tufted, short-lived perennial, similar to *L perenne* & *Festuca elatior* in appearance; roots 8" minimum depth; culms 1-4' tall; leaves rolled in the bud-shoot; sheaths not compressed, not keeled, glabrous, green, pinkish at base, split; margins hyaline & overlapping; auricles present, 1 to 3 mm long, soft, flat & pointed or sometimes blunt or clawlike; collar broad, distinct, continuous, glabrous, pale to yellowish green; margins thin & dilated; ligule membranous, 0.5-2.0 mm long, obtuse, entire; blade 4-7 mm wide, 10-40 cm long, soft, bright green; upper surface dull, prominently ridged; lower surface smooth, glossy & slightly keeled; margins smooth at base, texture is coarse; heads; spikes; N. key features: ① "This sp is distinguished from *L perenne* by its rolled bud-leaves, & from *Festuca elatior* by its smooth leaf-margins, narrower auricles & longer ligule." (now36)

Comments: status: phenology: Blooms May to June. Quick erosion control. Nurse or companion crop to protect native seedlings. May reseed itself. The usual life span is 1 year, but it may persist. General utility is poor. Poor in shade. Good for play areas. Fair for golf fairways. Excellent for quick cover while a permanent seeding develops. Fair for slopes & terraces

VHFS: [*Lolium italicum* A Br, *L multiflorum* Lam ssp *italicum* (A Braun) Volk ex Schinz & R Keller, *L perenne* L var *aristatum* Willd, *L perenne* Linnaeus ssp *multiflorum* (Lam) Husnot.] ANNUAL RYE hybridizes with PERENNIAL RYE, & is included by some as a subsp of PERENNIAL RYE.



Lolium multiflorum

Lolium perenne* Linnaeus ssp *perenne PERENNIAL RYEGRASS, aka COMMON DARNEL, ENGLISH RYEGRASS, (*perennis -is -e* perennial, from Latin *perennis*, adjective, remaining or lasting throughout the year.)

Habitat: Almost exclusively in periodically reseeded meadows & pastures. Medium coarse to medium fine soils. Medium fertility, acid, clay & loamy soil. Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement high. Salinity tolerance low. Shade intolerant. Neutral, somewhat acid & basic tolerant. pH 5.2-7.5 (pH 6.0-7.0 preferred for lawns). Tolerances vary with varieties.

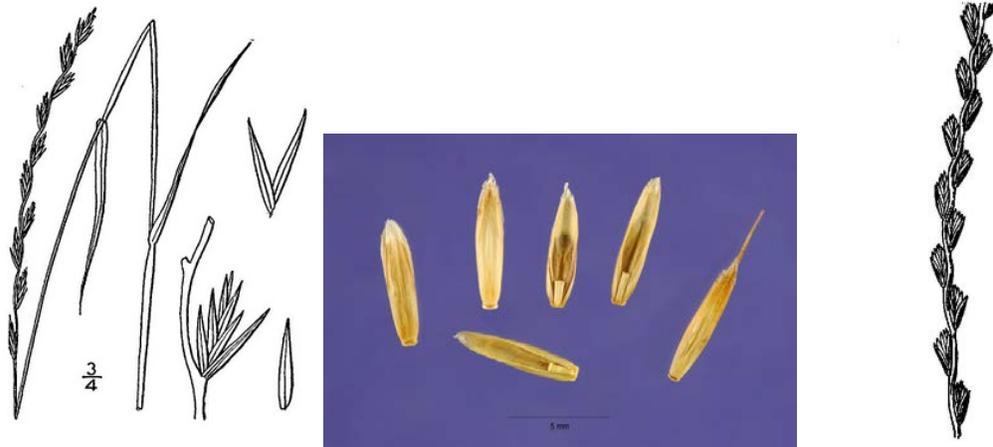
Culture: Establishes quickly & easily. Sow in late spring for summer cover crop. 10 to 14 days to germination. Rapid growth rate. 201,000 to 227,000 (gran), 230,333; 237,000 (ecs), 240,400 (usda) seeds per pound. For pasture, plant 25-35 lb pls per acre in fall (gran). For a new lawn seed, 10 lbs per 1000, for overseeding an established lawn, seed 6 lbs per 1000. Cover crop 1 lb per 1000 sq ft (pots 2000). Seed 50 lb per acre alone (ecs).

Description: Cool-season, short-lived, medium to tall, perennial, entirely glabrous, bunch introduced grass; roots fibrous-rooted, 10" minimum depth; culms 1-2'; leaves folded in the bud shoot; sheaths usually compressed but sometimes almost cylindrical, not keeled, glabrous, pale green, reddish at base, closed or split; auricles small, soft, clawlike; collar narrow, distinct, glabrous, yellowish to whitish green; ligule thin-membranous, 0.5-2.0 mm long, obtuse, toothed near the apex; blade 2.0-6.0 mm wide, 5.0-15 cm long, sharply taper-pointed, keeled, prominently ridged on upper surface, smooth & glossy on lower surface, bright green; margins slightly scabrous; the blade texture is coarse; heads; spikes; N. key features: ①Closely resembles *L multiflorum* & *Festuca elatior*, from which it is distinguished by the folded leaves in the bud-shoot.

Comments: status: phenology: Blooms June to July. Adaptable grass. Needs adequate moisture. Usual life is three years. Excellent palatability, used for pasture & range improvement blends. Extensively bred for turf grass. Fine textured & deep green, it is a fast growing seed used in mixtures & in monocultures. General utility is poor. Poor in shade. Good for play areas. Fair for golf fairways. Excellent for quick cover. Good for slopes & terraces. Good quick cover & nurse grass (for other turf grasses). Perennial rye does not do well in extreme cold or drought conditions.

“An introduced perennial rye grass that is used in lawns & pastures & commonly escapes & persists.” (ewf55)

Associates: Known to chemically inhibit apple, forsythia, flowering dogwood. (Chick & Kielbaso 1998)



Lolium perenne

MELICA Linnaeus **Melic** *Melica* New Latin, from Italian *melica*, *meliga* sorghum, a modification (influenced by Latin *mel* honey) of Medieval Latin (*herba*) *medica*, literally, medical herb, from *herba* herb, & *medica*, feminine of *medicus*, medical. A genus of about 80 spp, north temperate, south Africa & southern South America.

① *Melica ciliata*, dry store seeds for 6 months, then sow at 20°C (68°F), germinates in about two wks.

② *M altissima*, *nutans*, *transsilvanica*, & *uniflora*, Sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

Melica nitens (Scribner) Nuttall ex Piper THREE-FLOWER MELIC, (*nitens*, *nitid-*, *nitida* Latin shining; handsome, from Latin *nitidus*, shining, glittering, bright, polished, clear.)

“A very uncommon grass found by us only on the embankment of the C & NW Ry west of Rockford.” (ewf55) distribution/range:



Melica nitens

Milium effusum, sow at 20°C (68°F), germination slow.

MUHLENBERGIA Schreber 1789 **MUHLY, WIRE PLANT, DROP-SEED GRASS** *Muhlenbergia* New Latin, honoring Gotthilf Heinrich Ernst *Mühlenberg* DD (1753-1815), American German Lutheran minister & pioneer botanist, born in Trappe, Pennsylvania & educated in Halle, Germany, who studied botany & other natural sciences in his spare time, & New Latin *-ia*. He was the first president of Franklin College, published a flora of Lancaster, Pennsylvania, & posthumously, a manuscript on grasses. The accepted spelling for *Carex muehlenbergii* & *Quercus muehlenbergii*, named for the same individual, has recently changed. His second name (or first) is sometimes seen as Henry. A large & diverse genus of about 160 grass spp of North America south to Andean South America, also eastern & southern Asia. Cleistogamous panicles sometimes present in the axils of the lower cauline leaves, enclosed by a tightly rolled, somewhat indurate sheath (Peterson in FNA). The spp groups seem very different. $\times = 10$. Formerly *Dileprium* Michaux. *M richardsonis* is C4.

“The spp of *Muhlenbergia* are of little economic importance. It is said that the spp which inhabit damp ground are useful for hay if cut before the stems become hard, but most spp grow in waste places & are looked upon as weeds. The long rootstocks make them somewhat difficult to destroy; thoro cultivation is the only method of eradication recommended. *M mexicana*, *foliosa*, & *racemosa* are the only spp likely to cause trouble in this state.” (Mosher 1918)



An adventitious Muhly in our backyard

Muhlenbergia bushii Pohl NODDING MUHLY, AKA BUSH’S MUHLY,

Habitat: In the se USA, “wet oak flatwoods, bottomlands, and other moist forests” (w12). distribution/range:

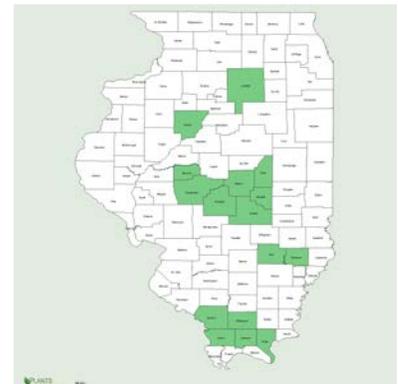
Culture: propagation:

Description: key features:

Comments: status: phenology:

Associates: ethnobotany:

VHFS: [*Muhlenbergia brachyphylla* Bush]



Muhlenbergia bushii

Line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database image not copyrighted.

Muhlenbergia ×curtisetosa (Scribn) Bush (pro sp) [*frondosa* × *schreberi*]

Habitat: distribution/range:

Culture: Propagation:

Description: plant key features:

Comments: status: phenology: Blooms

Associates: ethnobotany:

VHFS:



Muhlenbergia ×curtisetosa

Line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database image not copyrighted.

Muhlenbergia cuspidata (Torrey ex Hooker) Rydberg PRAIRIE SATIN GRASS, aka PLAINS MUHLY, (*cuspidatus -a -um* cuspidate, with a cusp or sharp, stiff, or rigid point, tipped with a sharp rigid point or cusp, from the past participle of the Latin verb, *cuspidare, cuspidavi, cuspidatus*, tip, provide with a point; make pointed.)

In the se USA, dolomite & limestone palisade cliffs” (w12). distribution/range: Rare in Illinois, Champaign, Jackson, & Peoria cos. Species is native north, northwest & southwest of our area, with a few outlier populations in Indiana, Kentucky, Michigan, New York, Ohio, Tennessee, & Virginia (BONAP 2010).

Culture: ①No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Description: Perennial, cool-season, sod-forming grass.

Comments: status: Native. phenology: Blooms Collect seeds in se Wisconsin in October - November (he99). Cleistogamous panicles in the lower sheaths have been found in a plant from Benton Co, Oklahoma (Morden & Hatch 1984, in Peterson in FNA).



Muhlenbergia cuspidata

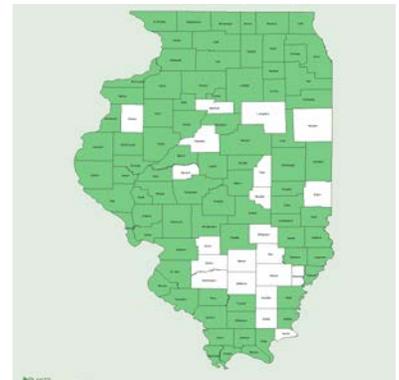
Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 3rd line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database image not copyrighted.

Muhlenbergia frondosa (Poiret) Fernald WIRE STEM-MUHLY, aka COMMON SATIN GRASS, SMOOTH WIRESTEM MUHLY, WIRESTEM MUHLY, (*frondosus -a -um* leafy, leaf-like, leaf-bearing, covered with foliage.)

In the se USA, Moist forests and disturbed areas (w12). distribution/range:

“A late flowering, matted grass which is common on roadsides & in waste places.” (ewf55)

VHFS: [*Muhlenbergia mexicana* of early authors]





Muhlenbergia frondosa

Line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database image not copyrighted.

Muhlenbergia glomerata (Willdenow) Trinius MARSH WILD TIMOTHY, aka BRISTLY MUHLY, MARSH MUHLY, SPIKED MUHLY, (*glomeratus -a -um* glomerate, clustered in a head, club-shaped, from Latin *glomero, glomare*, to form into a sphere, or a rounded heap.) [Obligate]

Habitat: Fens, soils with some humus. In the se USA, “Fens and seeps over mafic (amphibolite) or ultramafic (olivine) rocks” (w12). distribution/range:

Culture: ①No pre-treatment necessary other than cold, dry stratification.

Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ④“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12)

⑤Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

seed counts & rates: 1,600,000 (ew12), 3,600,000 (pm02) seeds per pound.

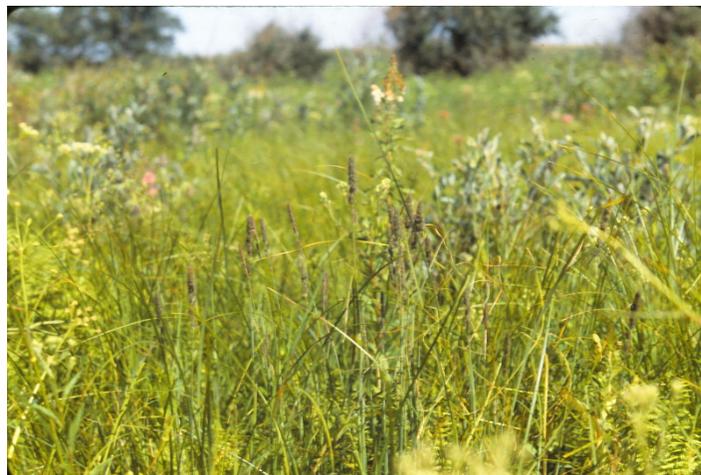
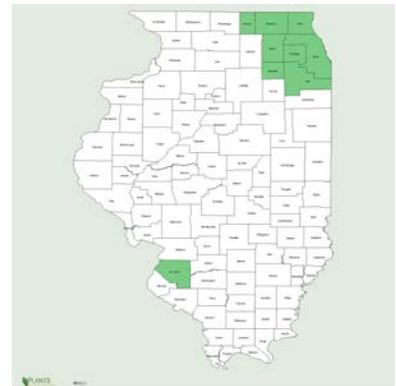
cultivation: Space plants 1.25-2.0’.

Description: Erect, perennial, cool season, sod-forming, grass; culms 1.0-3.0’.

Comments: status: Native. Sensitive in Washington. phenology: Blooms 7,8,9. Collect seeds in se Wisconsin in October - November (he99). “A tall, slender, erect grass answering the Gray’s Manual description of this was found in sand at the edge of a boggy place in Rockton Twp” (ewf55).

Associates:

VHFS: [*Muhlenbergia glomerata* (Willd) Trin var *cinnooides* (Link) FJ Herm, *M racemosa* (Michx) BSP var *cinnooides* (Link) B Boivin]



Muhlenbergia glomerata

Muhlenbergia mexicana (Linnaeus) Trinius LEAFY SATIN GRASS, aka MEADOW MUHLENBERGIA, MEXICAN DROP-SEED, MEXICAN MUHLY, *MEXIKANSKT MUHLYGRÄS* (SW), SATIN GRASS, HAIRY WIRESTEM MUHLY, WIRE STEM-MUHLY, (*mexicanus -a -um* of, from, or pertaining to Mexico, of Mexican origin,.) Facultative wetland

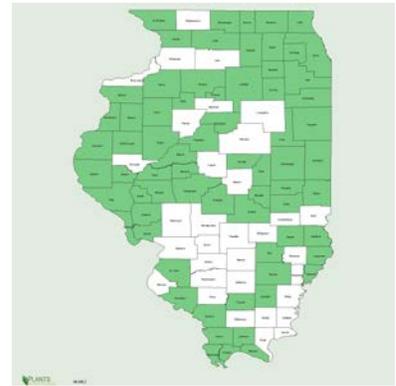
Habitat: Fens, wet savannas, wet woodland edges, mesic woodland.

Common in fields, gardens, & waste places. Forest edges (w12).

distribution/range: In spite of the specific epithet, this grass grows in the United States & southern Canada.

Culture: ①No pre-treatment necessary other than cold, dry stratification.

Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09) ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③Sow at 20°C (68°F), germination slow (tchn).



Storage Behaviour: No data available for species. Of 17 known taxa of genus *Muhlenbergia*, 100.00% Orthodox(p?). (RBG Kew)

Average 1000 Seed Weight(g): 0.358: ①0.1348; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.164; (Mazer 1989); Seed. ③0.776; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. (RBG Kew)

seed counts & rates: 2,272,000 (aes10), 3,978,947 (gnhm12), (4,146,119) gna04), 4,536,000, 5,440,000 (pm), 5,503,030 (gna05) seeds per pound.

bottom line: Dormant seeding for field establishment & cold moist stratification for greenhouse crops are good insurance. The dormancy characteristics are variable, ranging from zero dormancy to 85% dormancy. Hulled seed germinates very well with no treatment (gni2002), but 75% of lots have an absolute requirement for cold moist stratification. Flipflop species. Germ 27.7, 16, na, sd 29.6, r2.0-90 (88)%. Dorm 61.3, 74, 78, sd 28.8, r0.0-85 (85)%. Test 28, 30, na, r19-37 days. (#7)**

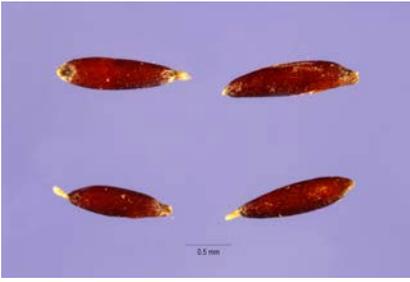
Description: Culms 2-4' long, often branched at the base, rooting at the lower nodes; inflorescence pinkish?

Comments: Blooms 8,9. In northern Illinois, collect seeds in mid-October - mid-November. Collect seeds in se Wisconsin in October (he99). Large wetland restorations only. Plants may become unkempt and ragged looking. Aggressive, abundantly self sows in open, moist ground! Plant only in the back 40, or by that nasty neighbor that complains about your dandelions. Do not let plugs set seed in the greenhouse or nursery holding areas. Production plots should be isolated where the escaping plants can be controlled chemically, or where naturalization is tolerated. Seed source nursery production, with genetic origin Lee & eastern Whiteside cos, & CBG, Cook Co.

“Locally abundant in wet places & on prairies & roadsides” (ewf55).

VHFS: [*Agrostis foliosa* hort ex Roem & Schult, *A lateriflora* var *filiformis* Torr, *A mexicana* L, *Muhlenbergia foliosa* (hort ex Roem & Schult) Trin]





Muhlenbergia mexicana

1st & 2nd line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 3rd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* USDA Natural Resources Conservation Service. Not copyrighted image. 4th line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted. 1st seed photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. 2nd seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

Muhlenbergia racemosa (Michaux) Britton, Sterns, & Poggenburg UPLAND WILD TIMOTHY, aka CREEPING MUHLY, GREEN MUHLY, MARSH MUHLY, SATIN GRASS, WILD TIMOTHY, (*racemosus -a -um* (ra-kay-MO-sus) with flowers in racemes, for the elongated inflorescence. New Latin from *racemus*, the stalk or a cluster of a bunch of grapes, & *-osus, -a, -um*, plenitude or notable development, with a raceme, a cluster of flowers each on their own stalk & arranged along a single central stem.) [upl]

Habitat: Disturbed dry prairies & railroad cinders. distribution/range: Adventive? in Illinois. Sp distribution along the Mississippi & Illinois rivers leads one to question adventive.

Culture ①No treatment or fall plant. No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). ④Germination percentages of GREEN MUHLY in the greenhouse ranged from 18% to 52% 30 days after sowing. Stratification at 39°F (4°C) for 2 to 4 weeks did not seem to affect germination. (Bohnen 1994)

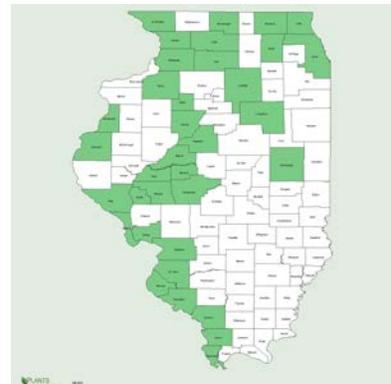
seed counts & rates: 4,536,000 seeds per pound.

Description: 1.0-2.5'

Comments: Blooms 8,9. Collect seeds in se Wisconsin in October - November (he99).

“Frequently abundant in wet places forming dense patches but also common on dry prairies.” (ewf55)

VHFS: [*Agrostis racemosa* Michaux, *Muhlenbergia glomerata* var *ramosa* Vasey]





Muhlenbergia racemosa

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. 2nd line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 3rd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS Wetland flora: Field office illustrated guide to plant spp. USDA Natural Resources Conservation Service. Not copyrighted image.

Muhlenbergia schreberi JF Gmelin # NOX CA NIMBLEWILL, aka DROPSEED, aka DROP-SEED
WIREGRASS, *MUHLENBERGIA DI SCHREBER*, NIMBLEWILL MUHLY,

“Common in yards, gardens, dry woods, etc.” (ewf55) In the se USA,
“bottomland & other moist forests, dry forests, disturbed areas” (w12).

distribution/range:

Culture:

Storage Behaviour: Orthodox; 100% viability following drying to mc's in equilibrium with 15% RH & freezing for 82 days at -20C at RBG Kew.

Thousand Seed Weight: 0.1232g; (RBG Kew); Seed; *Seed weights reported may include minor covering structure

Germination using material from Chicago Botanic Garden. ① 100% germ; pre-sowing treatments = imbibed on 1% agar for 7 weeks at 20°C, then seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 25/10°C, 8/16; (RBG Kew) ② 100% germ; pre-sowing treatments = imbibed on 1% agar for 8 weeks at 25/10°C, then seed scarified (covering structure removed); germ medium = 1% agar + 250 mg/l gibberellic acid (GA3); germ conditions = 25/10°C, 8/16; (RBG Kew)

Comments: Status: B list noxious weed in California.

VHFS: In Britton & Brown (1913) as *Muhlenbergia schreberi* & *M palustris*. Basionyms *Dilepyrum minutiflorum* Michaux, *Muhlenbergia diffusa* Willdenow, & *Muhlenbergia palustris* Lamson-Scribner. [*Anthipsimus gonopodus* Raf, *Cynodon diffusus* (Willd) Raspail, *Dilepyrum minutiflorum* Michx, *Muhlenbergia botteri* E Fournier, *M diffusa* Willd, *M minutiflora* (Michx) Hitchcock, *M palustris* Lamson-



Scribner, *M palustris* Scribn, *M schreberi* JF Gmelin subsp *palustris* (Lamson-Scribner) Lamson-Scribner, *M schreberi* JF Gmelin var *palustris* (Lamson-Scribner) Lamson-Scribner ex BL Robinson, *M schreberi* JF Gmel var *palustris* (Scribn) Scribn]

<http://www.florida.plantatlas.usf.edu/Plant.aspx?id=3035>



Muhlenbergia schreberi

Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 3rd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 4th Line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted.

Muhlenbergia sobolifera (Muhlenberg ex Willdenow) Trinius *ME, NH ROCK SATIN GRASS, AKA BRANCHED MUHLY, CLIFF MUHLY, CREEPING MUHLY, ROCK MUHLY, SPROUT MUHLENBERGIA, (*sobolifer*, *sobolifera* bearing offspring, bearing creeping stems that form roots, or bearing roots)

Habitat: Rocky wooded slopes, rich woodlands. In NY, dry-mesic forested sites of a southern affinity often in rocky soils (nyfa). In New England, cliffs, balds, or ledges, forests, talus & rocky slopes, woodlands; moist forests & woodlands, often on rocky slopes or near cliffs, throughout. In the se USA, “dry wooded limestone slopes, rock outcrops and rocky forests; uncommon” (w12). distribution/range:

Culture: No treatment needed? 4,500,000 (lhn91) seeds per pound.

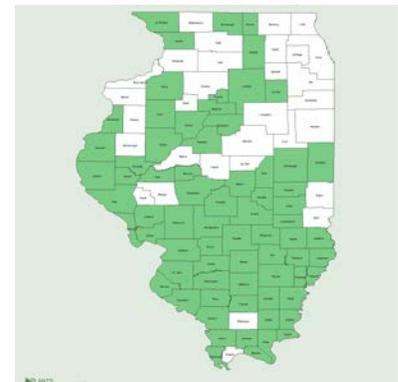
Description:

Comments: Status: Possibly extirpated in Maine. Threatened in New Hampshire. Seed source Illinois River bluffs, Marshall Co.

“Less diffuse & stouter than *M schreberi* & less common. Occasional in dry woods.” (ewf55)

VHFS:

[*Achnatherum soboliferum* (Muhl ex Willd) P Beauv, *Agrostis sobolifera* Muhl ex Willd, *Cinna sobolifera* (Muhl ex Willd) Link, *Podosemum soboliferum* (Muhl ex Willd) Link, *Trichochloa sobolifera* (Muhl ex



Willd) Trin, *Muhlenbergia sobolifera* ssp *setigera* Scribn, *M s* ssp *sobolifera* (Muhl ex Willd) Trin, *M s* var *sobolifera* (Muhl ex Willd) Trin, *M s* (Muhl ex Willd) Trin var *setigera* Scribn, *M s* f *setigera* (Scribn) Deam, *M s* f *sobolifera* (Muhl ex Willd) Trin]

http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=41941



Muhlenbergia sobolifera, Henry, Illinois, 3rd drawing var *setigera*

1st & 3rd line drawings AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted. 2nd Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

Muhlenbergia sylvatica (Torrey) Torrey ex A Gray WOODLAND MUHLY, aka FOREST MUHLY, *MUHLENBERGIE DES BOIS*, WOODLAND DROP-SEED, WOODLAND SATIN GRASS, (*sylvaticus* -a -um of woods, by usage & convention, forest-loving, growing in the wild (the woods as opposed to the field))

In Michigan, “swamps, moist thickets, stream & pond borders, etc., usually in shaded places” (rvw11). In the se USA. ““Upland forests, along creeks & hollows, on rocky ledges derived from sandstone, shale, or calcareous parent materials, moist prairies, & swamps, at elevations from 30-1500 m” (Peterson fna).m distribution/range:

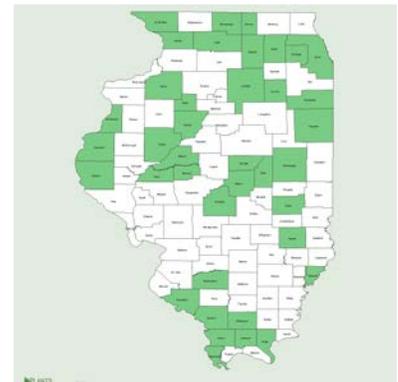
Partial shade, CaCO₃ tolerance low, low water usage.

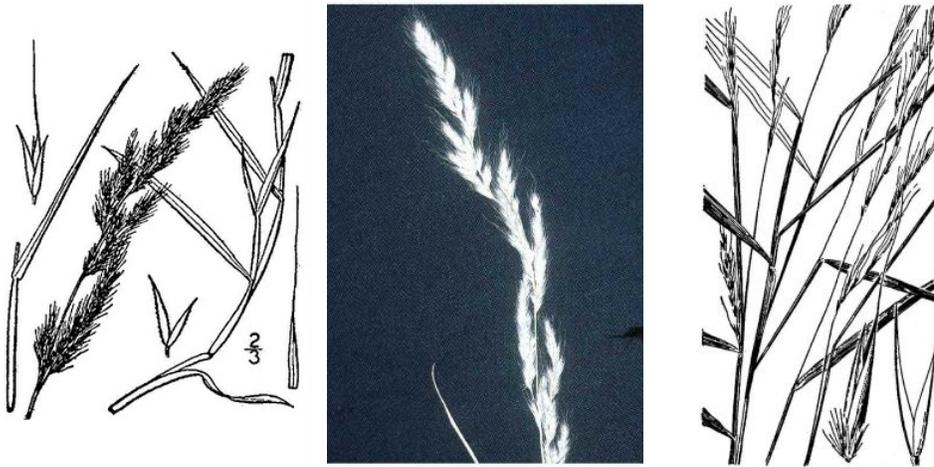
Native perennial grass. N 2n = 40.

“Less common than the above (*M sobolifera*), much like it except that the lemma is awned. Woods & roadsides.” (ewf55)

Blooms July.

VHFS: [*Agrostis diffusa* Muhl, *Agrostis sylvatica* Torr, non Huds, *Muhlenbergia diffusa* Farw, *Muhlenbergia sylvatica* (Torr) Torr ex A Gray f *attenuata* (Scribn) EJ Palmer & Steyer, *M sylvatica* (Torr) Torr ex A Gray f *sylvatica* (Torr) Torr ex A Gray, *M sylvatica* (Torr) Torr ex A Gray var *gracilis* Scribn, *M sylvatica* (Torr) Torr ex A Gray var *robusta* Fern, *M sylvatica* (Torr) Torr ex A Gray var *sylvatica* (Torr) Torr ex A Gray, *M umbrosa* Scribn]

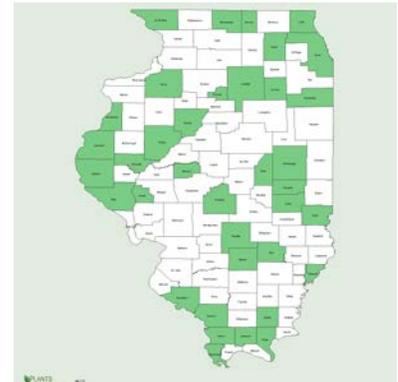




Muhlenbergia sylvatica

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 2nd line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted.

Muhlenbergia tenuiflora (Willdenow) Britton, Sterns & Poggenburg *NH SLIMFLOWER MUHLY, aka MESA MUHLY, *MUHLBERGIE TÊNUE*, SLENDER MUHLY, SLENDER SATIN GRASS, WOODLAND DROP-SEED, Lake Michigan bluff ravines. “Sandy or rocky slopes derived from sandstone, chert, or limestone formations, in mixed hardwood & oak-hickory forests, at elevations of 40-1500 m” (Peterson fne). In Michigan, “usually found on forested dunes, hillsides, & river banks, whether in oak or beech-maple forests” (rvw11). In the se USA, moist forests and disturbed areas, up to at least 1400 meters. (w12). “Usually being found on sandy or rocky slopes derived from sandstone, chert, or limestone formations, in mixed hardwood and oak-hickory forests” (Peterson in fna) distribution/range:



Culture: propagation: ① Cold moist stratify 60 days works well on Lake Co, Illinois seed. Established plants are easily divided by midsummer of their first year. Green house plants will flower the first year.

Description: Plants perennial, rhizomatous forming colonies, not cespitose; cleistogamous panicles not present. $N 2n = 40$.

Comments. Status: Endangered in New Hampshire. Attractive, graceful, ornamental. Said to resemble the Asiatic sp *M curviaristata* (Ohwi) Ohwi.

VHFS: [*Agrostis quitensis* Willd ex Steud, *A tenuiflora* Willd, *Apera tenuiflora* (Willd) P Beauv, *Cinna tenuiflora* (Willd) Link, *Muhlenbergia tenuiflora* (Willd) BS&P ssp *tenuiflora* (Willd) BS&P, *M t* (Willd) BS&P ssp *variabilis* Scribn, *M t* (Willd) BS&P var *tenuiflora* (Willd) BS&P, *M t* (Willd) BS&P var *variabilis* (Scribn) Pohl, *M t* (Willd) BS&P var *variabilis* (Scribn) RW Pohl, *M willdenowii* Trin, *Podosemum tenuiflorum* (Willd) Link, *Trichochloa longiseta* Trin, *T tenuiflora* (Willd) Sweet]



Muhlenbergia tenuiflora

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2nd line drawing AS Hitchcock, (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted.

NASSELLA (Trinius) Desvaux 1846 **Feather Grass** Assumed from Latin *nassa*, a fishing basket with a narrow neck, and *ella*, feminine diminutive suffix. A genus of about 116 species, mostly perennials of South America. Some *Nasella* sp were formerly part of a broadly defined *Stipa*. $x = 7,8$.

ORYZOPSIS Michaux **RICEGRASS, MOUNTAIN RICE** *Oryzopsis* from Greek ὄρυζα, *oryza*, rice, & ancient Greek ὄψις, *opsis*, appearance, resembling, sight, view, for its similarity to rice.

Oryzopsis racemosa (Smith) Ricker *IN, MD, OH [**new nomenclature is *Patis racemosa* (Smith) Romaschenko, PM Peterson & RJ Soreng (as in w12b) or *Piptatherum racemosum* (Smith) Eaton**] **BLACKSEED RICEGRASS, AKA BLACK-FRUIT MOUNTAIN-RICEGRASS, BLACK-FRUITED MOUNTAINRICE, MOUNTAIN RICE, (*racemosus -a -um* (ra-kay-MO-sus) with flowers in racemes, for the elongated inflorescence; New Latin from *racemus*, the stalk or a cluster of a bunch of grapes, & *-osus*, plenitude or notable development, with a raceme, a cluster of flowers each on their own stalk & arranged along a single central stem.)**

Habitat: Usually deciduous woods, less often in open pine woods, & in rocky, mountainous areas. Dune slopes, wooded bluffs & ravines. Rocky woods. Fire adapted. Calcareous wooded slopes above dolomite cliffs, ledges & ravines; rocky, sandy soils. In New York, dry-mesic to mesic often rocky forests. Sometimes but not restricted to areas with high pH soils. Species appears to do best in forested areas with large boulders & rock outcrops. In the se USA, “calcareous woodlands & forests; common” (w11). distribution/range: Quebec & Ontario west to Minnesota & North Dakota, south to Virginia, Kentucky, Missouri, & Nebraska.

Culture: propagation:

Description: $N 2n = 46-48$. key features: ① “The absence of basal blades & the dark, shiny lemmas distinguish it from all other North American *Stipeae*” (fna). ② “Cespitose; upper leaves longer than lower leaves; panicle contracted; awned, dark brown to blackish lemma.” (Ilpin)

Comments: status: Threatened in Indiana, Maryland, & Ohio. phenology: Blooms early to mid August. C3. “We have found this unusual grass only in Ashley Forest Preserve” (ewf55).

Associates: Highly palatable to livestock.

ethnobotany:

VHFS: Basionym *Milium racemosum* Sm. [*Milium racemosum* Sm, *Oryzopsis melanocarpa*, *Patis racemosa* (Sm.) Romasch., PM Peterson & RJ Soreng, *Piptatherum racemosa* Ricker ex AS Hitchcock, *Urachne racemosa* (Sm) Trin] Various *P racemosa* (Smith) Barkworth, or Ricker ex AS Hitchcock, or (Smith) Eaton]



Oryzopsis racemosa

PANICUM Linnaeus 1753 **PANICUM, PANICK-GRASS** *Panicum* New Latin from Latin *panicum*, the name for millet, from *panus* ear of millet, tuft, swelling, inflammation; akin to Latin *panic-*, *panTex* paunch; alternately from Latin *panis*, bread, which some spp are the source of; possibly from Latin *panicula*, in reference to the flowering spike. Wind pollinated. $x = 9$, usually, sometimes 10. Apomixis, polyploidy, dysploidy, & autogamy have produced intergrading forms & microsp.

Panicum sections *Agrostoidea* and *Tenera* have been transferred to the genus *Coleataenia* Grisebach 1879.

Propagation for *P leibergii* & *P oligosanthes*, seed is often sown fresh or with no pre-treatment. “In my experience, cold only treatment is successful. Light to very light cover. Very good germination” (mfd93). Fruit is a small grain. *Panicum* is a very large genus, mostly perennials, primarily of warm climates. Mosher (1918) listed 36 spp in Illinois. The inflorescence is usually a many-flowered panicle. Spikelets have two glumes & a sterile lemma, which are usually strongly unnerved, & a very hard, shiny, fertile lemma & palea enclosing the fruit, which are never nerved (Mosher 1918).

FO Zuloaga, MA Scataglini & O Morrone (2010). A phylogenetic evaluation of *Panicum* sects. *Agrostoidea*, *Megista*, *Prionita* and *Tenera* (*Panicoideae*, *Poaceae*): two new genera, *Stephostachys* and *Sorengia*. Taxon 59:1535–1546

RJ Soreng (2010). *Coleataenia* Griseb (1879): The correct name for *Sorengia* Zuloaga & Morrone (2010) (Poaceae: Paniceae). Journal of the Botanical Research Institute of Texas, 4(2): 691-69

Move to *Coleataenia*?

Panicum anceps Michaux PANIC GRASS, aka BEAKED PANICGRASS, (*anceps* two-edged, two-headed, flattened or compressed) Section *Agrostoidea*

Habitat: “*Hab. in Carolinae herboisis humidis sylvaticus*” (Michaux 1803) distribution/range: Common in southern 1/3; rare to absent elsewhere.

Culture:

Description: key features: ①“It has: 1) stout, scaly root stocks; 2) large (3.0-3.8 mm), curved spikelets. Versus *Panicum agrostoides*, this sp has larger spikelets that are obliquely set above the first glume (so they look “curved”).” (Ilpin)

Comments: status: phenology: Blooms 6-10. C4.

Associates: Moderate food value for waterfowl & upland birds. Leaves might cause photosensitization in livestock (Ilpin).

VHFS: Basionym *Panicum anceps* Michx. Newer nomenclature will be *Coleataenia anceps* (Michaux) Soreng (as in w12b). [*Sorengia anceps* (Michx.) Zuloaga & Morrone]

Panicum capillare Linnaeus WITCH GRASS, aka CAPILLARY PANIC GRASS, OLD WITCHGRASS, *PANIC CAPILLAIRE*, PANICGRASS, TICKLEGRASS, TUMBLE PANIC, TUMBLEWEED GRASS, WITCHES HAIR, WITCHGRASS, (*capillaris -is -e* fine as hair, hair-like, slender.) Section *Capillaria*

Habitat: Waste ground & sunny open areas. Dry soils, as a weed in cultivated soils & meadows.

distribution/range:

Culture:

Description: Native, stout, branching annual with very hairy sheaths & blades; leaves rolled in the bud-shoot; sheaths not compressed, not keeled, conspicuously papillose-hispid between the veins, dull green, split; margins overlapping & hyaline; auricles absent; collar broad, distinct, pubescent, yellowish green; ligule a dense fringe of hairs fused at base, 1.0-2.0 mm long; blade 8.0-15.0 mm wide, 8.0-20 cm long, soft, cordate & keeled at base, sharply taper-pointed at apex, densely short-pubescent on both surfaces with silky hairs; midrib prominent; margins scabrous, papilloseciliate towards base of blade; heads; spikes; N 2n=18. key features: ①“Versus var *occidentale*, this variety has its lowest panicle branches included in the sheath, & slightly shorter grains (1-5 mm) & spikelets (2.0-2.5 mm).” (Ilpin) ②“This sp is distinguished from *P implicatum* by its shorter ligule, broader & longer blades & annual habit. (now36)

Comments: status: phenology: Blooms 7-10. C4.

“A very common annual tumble grass.” (ewf55)

Associates: “Tops may accumulate sufficient nitrates to be harmful to browsers. Also, leaves of this & other *Panicum* might cause photosensitization “ (Ilpin)

VHFS: Variety *occidentale* Rydb has long-exserted panicles & slightly larger spikelets & grains. Ilpin’s comments are confusing, saying the sp is less common than the variety *capillare*, (*which are one & the same*) but the sp, or variety *capillare*, is known from 98 cos & the variety *occidentale* from 2 cos.

[*Panicum barbipulvinatum* Nash, *P capillare* L ssp *barbipulvinatum* (Nash) Tzvelev, *P capillare* L var *agreste* Gattinger, *P capillare* L var *barbipulvinatum* (Nash) RL McGregor, *P capillare* L var *brevifolium* Vasey ex Rydb & Shear, *P capillare* L var *occidentale* Rydb]

Dichotomisflora Group One sp in Illinois, annual plants, smooth throughout, with large spreading panicles 4-16 inches.

Panicum dichotomisflorum Michaux FALL PANICUM, aka KNEE GRASS, SMOOTH PANIC GRASS, SPROUTING CRAB GRASS, *PANIC D'AUTOMNE*, Section *Dichotomisflora*

Habitat: Moist soil, open disturbed woods, early successional wetlands. Low waste areas, ditches, open alluvial soils. Ag fields. distribution/range:

Culture: Rapid growth rate. Medium seedling vigor.

seed counts & rates: 392,000 (usda, ecs), 641,243 (gnae07), 880,000 (gni) seeds per pound.

cultivation: Anaerobic tolerance high. CaCO₃ tolerance high. No drought tolerance. Fertility requirement low. Salinity tolerance medium. Shade intolerant. pH 4.8-7.0

bottom line: Dormant seeding is required; 75% of lots are strongly dormant. Flipflopish species.

Germ 27.1, 21.8, na, sd 20.9, r5.0-71 (66)%. Dorm 56.9, 61.8, 56, sd 25, r13-88 (75)%. Test 24, 24, na, r13-35 days. (#9)**

Description: Annual, bunch grass, entire plant smooth & glabrous; culms 1.0-4.0(-5.0)', somewhat flattened, usually spreading at the base, but sometimes erect, geniculate at the nodes, the nodes often considerably swollen; leaves blades 4.0-20 inches long, 3.0-20 mm wide; sheaths loose, very often purplish; heads; spikes spikelets smooth, 2-3 mm long, usually 2.5 mm; N 2n=36, 54. key features: "with annual habit & extremely short (1/5-1/4 of spikelet) first glume. Var *dichotomisflorum* is separated from other 2 varieties by 1) its larger spikelets (2.4-3.5 mm) & mostly upright culms with upper panicles long-exserted from the sheaths. This variety is similar to var *geniculatum*." (Ilpin)

Comments: status: phenology: Blooms summer. C4. Used as a cover crop in wetland restoration. This is an agricultural weed of economic impact, & is considered invasive in most of the USA.

"In flat and marshy situations" *Panicum dichotomisflorum* Michx as *P geniculatum* Muhl. (Short 1845).

"This sp is usually found in moist ground along ditches & streams, & generally produces a very rank growth. It also occurs as a weed in waste places & cultivated soil, often forming a rank growth after crops have been removed. In such situations it must be regarded as a weed, but is not usually very troublesome as it is an annual & can be easily controlled if thoro cultivation is given the soil & no seed is allowed to form." (Mosher 1918)

"A very common late flowering annual found in fields, waste places, & on roadsides. Our common form is variety *geniculatum* (Wood) Fern" (ewf55)

A USDA website says this is an annual grass that is tolerant of -43°F. Evidently a saber-toothed Pleistocene super annual grass.

Associates: Many spp of wildlife use the seeds & plants for food & cover, including ducks, geese, wild turkey, wasckully wabbits, muskrats, & deer. Leaves might cause photosensitization in livestock.

VHFS: [*Panicum proliferum*]

Variety *geniculatum* (Muhl) Fern has: 1) culms mostly spreading & geniculate; 2) (lower) nodes swollen; 3) inflated sheaths 4) uppermost panicles more or less included at base within the sheaths.

Variety *puritanorum* Svenson has smaller spikelets (1.7-2.3 mm) & narrower leaf blades (to 5 (8) mm). Culms are mostly erect.

Panicum flexile (Gattinger) Scribner SLENDER PANIC GRASS, aka *PANIC FLEXIBLE*, WIRY PANIC GRASS, WIRY WITCHGRASS, (*flexilis -is -e* flexible, pliant, limber, whip-like.) Section *Capillaria*

Habitat: " distribution/range:

Culture:

Description: key features: ① "This is 1 of 5 Illinois spp in Sect. *Capillaria*, with: 1-annual habit; 2-glabrous spikelets; 3-acute first glumes reaching 1/3-1/2 length of spikelets." (Ilpin)

Comments: status: phenology: Blooms 7-10. C4. Leaves might cause photosensitization in livestock.

Associates:

VHFS:

Panicum gattingeri Nash PANIC GRASS, Sect *Capillaria*

Habitat: "Species is distributed on open ground, waste places, alluvial valley soils, in dry, rocky ground, chert, granite, gravelbars, and borders of sloughs" (Ilpin). distribution/range: Species is scattered throughout Illinois; absent from northern 3 tiers of counties.

Culture:

Description: Annual. key features: ①“This is 1 of 5 Illinois spp of Section *Capillaria*, with: 1) annual habit; 2) glabrous spikelets; 3) acute first glumes to 1/2-1/3 l of spikelets.” (Ilpin)

Comments: status: phenology: Blooms 8-10.

Associates:

VHFS:

Panicum hians Elliot New nomenclature is *Steinchisma hians* (Elliott) Nash. PANIC GRASS, aka GAPING GRASS, GAPING PANIC GRASS, (*hians* open, gaping open)

Habitat: Known from a low roadside ditch in southern Illinois. In the se USA, : Stream, pond, and lake shores, low woods, cypress-gum ponds, floodplains, marshes, ditches, seepage slopes” (w12b).

distribution/range:

Culture:

Description: N 2n = 18, 20. key features: “The only sp of *Panicum* in Illinois in which the palea becomes enlarged & indurate, expanding the spikelet at maturity.” (Ilpin) “The large, thickened, pale sterile palea of this species is unique among panicoids of our region; it is one of several characters that has led to the segregation of *Steinchisma* as a genus, or as a subgenus of *Panicum*. The enlargement of the sterile palea causes the spikelet to spread open, or "gape." (w12b).

Comments: status: phenology: Blooms 6-10. C3.5. *Steinchisma* has a photosynthetic pathway intermediate between C3 & C4, “the leaves have Kranz anatomy, but there are fewer organelles than usual in the outer sheath.” (Crins 1991 in Weakley 2007)

Associates:

VHFS: This sp is alternately placed in the genus *Steinchisma* Rafinesque, now recognized as a genus or as a subgenus of *Panicum*, x = 9 or 10. “From the Greek *steinos*, narrow, & *chasma*, yawning, presumably alluding to the gaping glumes & somewhat narrow spikelet when compared to *Panicum*.” [*Panicum hians* Elliot, *Steinchisma hians* (Elliott) Nash]

Panicum implicatum Scribn see **Dichanthelium**

Move to *Coleataenia*?

Panicum longifolium Torrey [new nomenclature *Panicum rigidulum* Bosc ex Nees var *pubescens* (Vasey) Lelong] *IN, MA, MI, OH, RI LONG-LEAVED PANIC GRASS, aka REDTOP PANCIGRASS, (*longifolius -a -um* with long leaves.)

Habitat: Limestone ledge in wooded ravine. In the se USA, “wet sandy or peaty soils of bogs, savannas, pond shores, depression meadows; common” (w12b). distribution/range: Monroe Co. Illinois is at the northwest limit of the sp range.

Culture: ?

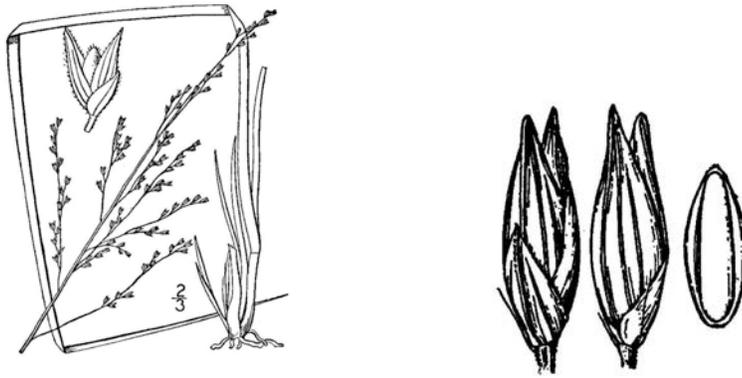
Description: key features: ①“Densely tufted; sheaths keeled, pubescent at junction with blade.” (Ilpin)

Comments: status: Extirpated in Indiana. Threatened in Massachusetts & Michigan. Presumed Extirpated in Ohio. Special Concern in Rhode Island. phenology: Blooms C3.

Associates:

VHFS: Newer nomenclature will be *Coleataenia longifolia* (Torrey) Soreng (as in w12b).

[*Panicum rigidulum* Bosc ex Nees var *pubescens* (Vasey) Lelong] [*Panicum anceps* Mx var *pubescens* Vasey, *P longifolium* Torr, *P longifolium* Torr var *pubescens* (Vasey) Fern, *P longifolium* Torr var *tusketense* Fern]



Panicum miliaceum Linnaeus BROOMCORN MILLET, aka BROOMCORN, HOG MILLET, PANIC MILLET, MILLET COMMUN, (*miliaceus -a -um* pertaining to millet, like millet, *Milium*.) Section *Capillaria*
Habitat: Waste ground & along railroads. distribution/range: Locally in southern 3/5 of state; also in DeKalb Co.

Culture:

Description: N 2n=36, 40, 42, 49, 54, 72. key features: “For Illinois, this sp has the largest spikelets (av lengths = 5 mm), is member of Sect *Capillaria*.” (Ilpin)

Comments: status: phenology: Blooms 6-10. C4. Formerly a widespread forage crop. Usually does not persist.

Associates: Endomycorrhizal. Leaves might cause photosensitization in livestock.

VHFS:

Panicum philadelphicum Bernhardt ex Trinius PANIC GRASS, aka PHILADELPHIA WITCHGRASS, WOODLAND PANIC GRASS, (*philadelphicum -a -um* of or from the Philadelphia region.) Section *Capillaria*

Habitat: distribution/range:

Culture:

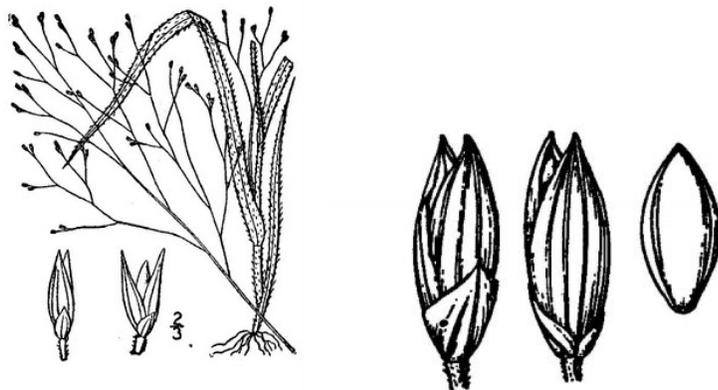
Description: N 2n = 18. key features: ① “This is 1 of 5 Illinois spp of Section *Capillaria*, with: 1) annual habit; 2) glabrous spikelets; 3) acute first glumes to 1/2-1/3 of spikelets.” (Ilpin)

“Not known in the co but found in DeKalb Co very close to our border.” (ewf55)

Comments: status: phenology: Blooms 6-10. C4.

Associates: Leaves might cause photosensitization in livestock.

VHFS:



Panicum philadelphicum

Move to *Coleataenia*?

Panicum rigidulum Bosc ex Nees MUNRO GRASS, aka LONG-LEAVED PANIC-GRASS, REDTOP PANICGRASS, TALL FLAT PANIC-GRASS, (*rigidulus -a -um* rigid, stiff, rather stiff.) FACW Section *Agrostoidea*

Habitat: Generally ditches but also in sandflats both with moist or wet soils. Wet soil of marshes, ditches, & low woods (ecs). distribution/range:

Culture: Growth rate medium. Seedling vigor medium. 10 lbs seeded alone (ecs).

seed counts & rates: 650,000 (jfn04), 796,636 (usda) seeds per pound.

cultivation: Anaerobic tolerance high. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement low. Salinity tolerance low. Shade intolerant. pH 5.0-7.5.

Description: Perennial, bunching grass; roots 6" min depth; culms to 4' tall; N. key features: ① "Species is distinguished by: 1) compressed culms 2) spikelets mostly arranged on one side of the axis of the inflorescence (second) (sic) & by its shiny spikelets. This variety in particular has branched spreading-ascending & shorter (1.8-2.2 mm) spikelets." (Ilpin)

Comments: status: Native. phenology: Blooms late summer.

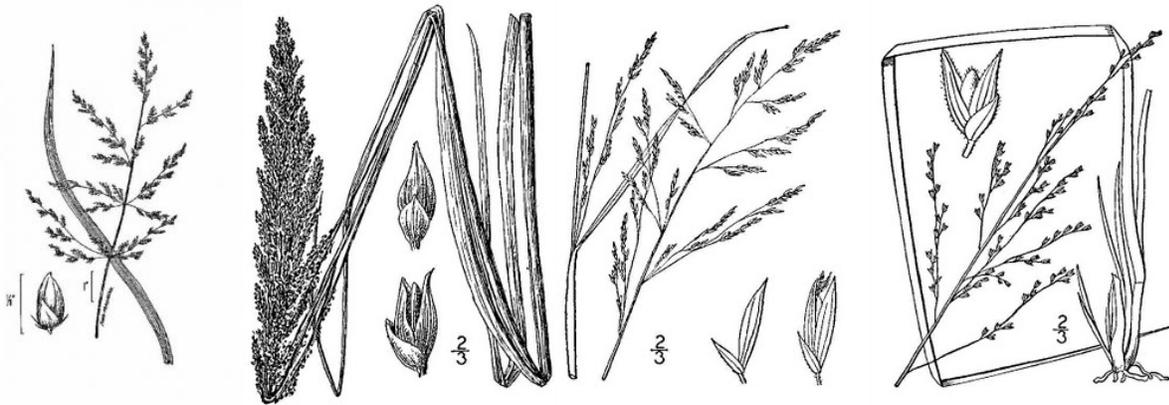
"In flat and marshy situations ..." *Panicum rigidulum* Bosc ex Nees var. *rigidulum* as *Panicum agrostoides* Spreng. (Short 1845).

Associates: Leaves might cause photosensitization in livestock.

VHFS: Newer nomenclature will be *Coleataenia rigidula* (Bosc ex Nees) LeBlond.

Three varieties in Illinois; ① var *elongatum* (Pursh) Lelong, very rare 1 co, ② var *pubescens* (Vasey) Lelong, very rare 1 co, & ③ var *rigidulum*, widespread in south 1/3 of Illinois, absent in nw cos.

Alternately we have the sp & variety *condensum* (Nash) Mohlenbr. "This variety versus type variety, has strongly erect panicle branches & longer (2.3-2.5 mm) spikelets." (Ilpin) [*P longifolium* Torrey, *P stipitatum* Nash]



1) *P rigidulum*. 2,3) var *rigidulum*. 4) var *pubescens*.

Move to *Coleataenia*?

Panicum stipitatum Nash *IL PANIC GRASS, AKA TALL FLAT PANIC GRASS, (*stipitatus* -a -um Modern Latin *stīpitātus*, from Latin *stīpit-*, *stīpes*, log, post, tree-trunk.)

Habitat: Coastal Plains bottomlands. distribution/range: One station in Johnson Co, Illinois. Illinois is at the northwest extent of this sp range.

Culture:

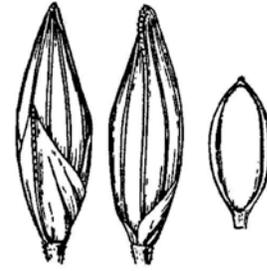
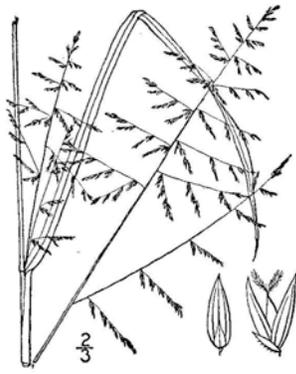
Description: key features: ① "Closely related to *Panicum rigidulum* Bosc but differs by its more diffuse panicles & its short-stipitate grains. Culms often purplish." (Ilpin)

Comments: status: Endangered in Illinois phenology: Blooms 8-10. C3.

Associates:

VHFS: Newer nomenclature will be *Coleataenia stipitata* (Nash) LeBlond.

[*Panicum agrostoides* Spreng var *elongatum* Scribn, *P elongatum* Pursh] Pugs14 lumps this under *P rigidulum* Bosc ex Nees var *elongatum* (Pursh) Lelong.



Panicum stipitatum (*Panicum rigidulum* var *elongatum*)

Panicum virgatum Linnaeus SWITCH GRASS, aka JUNGFRUHIRS (Sw), LIU ZHI JI (Ch), OLD SWITCH PANIC GRASS, PANIC ÉRIGÉ (F), PANIC RAIDE, PANIC VIERGE (F), PANICO VERGATO (It), PRAIRIE SWITCHGRASS, PROSO LOZNOE (R), RUTENHIRSE (G), TALL PANIC GRASS, VITSHIRSS (E), WAND PANIC GRASS, (*virgatus* -a -um (vir-GAH-tus) wandlike, or twiggy, striped, from Latin *virgatus* -a -um, made of twigs, or striped.) fac+ Section *Virgata*

Habitat: Grows in all types of prairie, dry to mesic prairie, roadsides & fields, open woods, dunes, shores, in brackish marshes, & rocky streambeds. “*Habitat in Virginia*” (Linnaeus). distribution/range: 45 of the 48 lower states.

Culture: ①“No pretreatment necessary. May be moist cold treat. Light cover. Excellent germination. Self sows.” (mfd93) ②No pre-treatment necessary other than cold, dry stratification (pm09). ③No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ④“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 70°F & water.” (ew12) ⑤Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Storage Behaviour: Orthodox; Long-term storage under IPGRI preferred conditions at RBG Kew, WP.

Thousand Seed Weight: 1.3g; ①1.122; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②1.8; (Cromarty et al 1982); Seed; Mid-point of 1000 seed weight range 1.5-2.1g; seed mc not stated, but weight is likely to refer to air-dry seed. ③1.42; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ④1.275; (Stevens 1932); Seed; Weight refers to air-dry seed. ⑤0.9; (Tilman 1997); Seed

Germination ①64% germination; ; germination medium = 1% agar; germination conditions = 21°C, 12/12; (RBG Kew). ②80% germination; pre-sowing treatments = imbibed on 1% agar for 8 weeks at 5°C; germination medium = 1% agar; germination conditions = 25°C, 8/16; (RBG Kew)

seed counts & rates: 224,000 (pm), 232,403 (gnhk02), 243,823 (gnh02), 280,000 (cci), 288,000 (pn02, aes10), 334,685 (gnak04), 339,200 (ew12), 348,560 (gna04), 389,000 (stock, gran, wns2001), 390,000, 404,912 (gna05), 453,696 (jfn04) seeds per pound. Drill 3 to 5 pls lbs 0.50 to 0.75” deep in spring. Broadcast 1 lb pls per 4,200 sq ft, or drill 5 pls lbs per acre (stocks). Granite recommends 5-8 lb pls per acre in summer for pasture. Ernst has 8 pls pounds per acre seeded alone.

seed counts & rates: Seed of commercial varieties is always in good supply. Local ecotype seed is always short supply. Seed of short varieties is usually not in short supply. Plugs are in good supply, but may sell out by mid season.

“*Panicum virgatum* General prairie. Blooms late July to mid September; inconspicuous. Harvest October. 4'; easy by all 3 methods, SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST, NISBET DRILL Blooming late 1st year if sown early. Seed viable 3 years. Somewhat coarse for garden use.” (rs ma)

cultivation: Space plants 1.5-2.0. Moist to dry soils, full sun to part shade. Wide variety of sites where moisture is adequate. Said to prefer lower moist sites, but will also grow on dry sand. Best on moderately coarse to moderately fine soils. Clay soil tolerant. Salt tolerant. Shade intolerant. Neutral to basic soils, somewhat acid tolerant. pH 4.5-7.5.

bottom line: Plant spring or dormant, but spring plantings usually develop more successfully because of less weed pressure. Flipflop sp. Germ 72.3, 80, 86, sd 19.8, r23.5-95 (71.5)%. Dorm 13.5, 5.0, 0.0, sd 19.7, r0.0-71 (71)%. Test 25, 26, 29, r13-38 days. (#39).**

greenhouse & garden: No treatment, easy from dry stratified seed, fall planting.

Description: Vigorous warm season, strongly rhizomatous, open sod-forming, tall native grass, leafy; roots long creeping, 12" minimum depth; culms not flattened, to 2.0-6.0'; leaves blades somewhat barbed on margins, with a V-shaped patch of hairs from collar on topside of leaf (ligule), sheaths rounded, reddish to purple at the base; heads; spikes; panicles open, the spikelets long pedicled; N 2n = 18, 21, 25, 30, 32, 35, 36, 54-60, 67-72, 74, 77, 90, 108. key features: ① "Mostly tufted perennial from scaly rhizomes. One of the most robust panicums of Illinois. Perennial with long-pedicelled (sic) spikelets & diffuse habit. Only member of Sect *Virgata* in Illinois." (Ilpin)

Comments: status: phenology: Blooms 7,8,9. C4. In northern Illinois, collect seeds in September. Collect seeds in se Wisconsin in September - October (he99). Attractive dried seed heads. Individual plants increase in clump size through short rhizomes. Some cultivars are aggressive, because most cultivars are chosen for aggressiveness from seed. Winter hardy & drought resistant. Useful in erosion control, soil conservation, land reclamation, pasture, hay, & range improvement. Good on strip mine soils, dikes, & levees, & rain gardens. Some levee & floodplain switch grass plantings tolerated the great Midwest flood of 1993. Now being used for biomass production & carbon sequestration. Interesting in the landscape with its lacy open seed heads with small seeds on end of long slender stems. Numerous selections provide a wide variety of textures & colors. Many ornamental selections are available, most of which are exclusively vegetatively propagated. One could create a substantial & interesting garden of nothing but switchgrass selections. Characteristics & tolerances vary with the agricultural cultivars. A wide-ranging, highly variable taxon.

Some of our local populations, burned annually & fall mowed, are slowly rhizomatous when monitored for 2 decades or more. They have a delightful yellow-gold fall color, which, unfortunately soon fades like falling leaves, or when the jackass road commissioner mows the twp roads.

"In flat and marshy situations ..." (Short 1845).

"A common robust panic grass that is found in all our sand areas & to a less extent on high prairies. Uncommon on gravel prairies." (ewf55)

Aggressive???? *O contraire!*, Mooseface. The BLACKWELL & CAVE-IN-ROCK switch grass cultivars have given this sp a very bad reputation, being selected for ease of establishment from seed, competitive against weeds, & of large stature. If all switch grass is as aggressive as most think, then why do we drive past mile after mile of Eurasian *Bromus*, *Festuca*, & *Poa* instead of mile after mile of *Panicum virgatum*? Why aren't we up to our ass in SWITCH GRASS? The bum rap is from all those 4.5 to 6.0 foot tall, weed-competitive, USDA releases. Our local genetic material is moderately well behaved, thank you, & is short. Seed sources nursery remnants Whiteside Co, & restored prairies, Lee & Whiteside cos & Kane Co (Horlock). Numerous commercial varieties are available, some selections 30" tall.

Bob Horlock was seedsman for The Natural Garden in the 1980s & early 1990s, & an unsung pioneer in this industry. We were fortunate to have a friendly business relationship with Bob during the early years of our nursery. Bob's seeds were collected in DuPage, Kane, & Will cos. We traded seeds back & forth with him, & several of our production plots originate from his collections. Bob passed away in the early 1990s.

Associates: Larval host *Anatryone logan* DELAWARE SKIPPER, *Atrytone arogos* AROGOS SKIPPER, *Polites themistocles* TAWNY-EDGED SKIPPER, & *Poanes viator* BROAD-WINGED SKIPPER.

Attracts birds. Greatly over rated as upland game bird habitat. It certainly does not have the longer season seed production & arthropod production of a mixed prairie seeding or even, heaven forbid, a brome-alfalfa field. Provides dubious nesting cover & modest amounts of food for wildlife. SWITCHGRASS does rebound after flattening by snowfall to provide cover when other grasses remain flattened. Waterfowl eat seeds & young foliage. Marshbirds, shorebirds, upland gamebirds, & songbirds eat seeds. Birds & small mammals go after seed. Attracts meadow voles & other small mammals. Terrestrial furbearers (esp rabbits) & aquatic furbearers (esp muskrats) eat plants & foliage. Reported as deer resistant. Deer eat plants. Provides pasture & hay for large, strong, livestock. Produces abundant summer forage highly palatable & nutritious to livestock & wildlife. Leaves might cause photosensitization in livestock.

Nothing smaller or less determined than a bull bison in rut scenting a receptive cow can move through a stand of CAVE-IN-ROCK SWITCHGRASS, let alone a gamebird chick. If you are planting habitat, do it right. Friends don't let friends plant SWITCHGRASS.

VHFS: No, 'tis not so deep as a *Crataegus* nor so wide as a *Rubus*, but 'tis enough, 'twill serve.

[*Chasea virgata* (L) Nieuwl, *Eatonia purpurascens* Raf, *Ichnanthus glaber* Link ex Steud, *Milium virgatum* (L) Lunell, *M virgatum* var *elongatum* (Vasey) Lunell, *P buchingeri* E Fourn, *P buchingeri* E Fourn ex Hemsl, *P coloratum* Walter, *P giganteum* Scheele, *P glaberrimum* Steud, *P ichnanthoides* E Fourn, *P kunthii* E Fourn, *P pruinolum* Bernh ex Trin, *P virgatum* Roxb ex Steud, *P v* var *breviramum* Nash, *P v* ssp *cubense* (Griseb) Borhidi, *P v* var *confertum* Vasey, *P v* var *cubense* Griseb, *P v* var *diffusum* Vasey, *P v* var *elongatum* Vasey, *P v* var *glaucephyllum* Cassidy, *P v* var *obtusum* Alph Wood, *P v* var *scorteum* Linder, *P v* var *spissum* Linder, *P v* var *thyrsiforme* Linder, *P v* var *virgatum* L]



Panicum virgatum

Last photo by Don Pretzsch, Plant Materials Specialist & BCSWCD District Conservationist

PASCOPYRUM A Löve 1980 **WHEATGRASS** *Pascopyrum* from Latin *pascuum*, *pascui*, pasture, & Greek *πυρος*, *pyros*, wheat. A monotypic genus perennial of c and w North America. *Pascopyrum* is octoploid, derived from *Elymus* & *Leymus*.

Mohlenbrock recognizes the following sp as *Elytrigia smithii* (Rydberg) Nevski, WESTERN WHEATGRASS, Native to the w US; adventive along railroads; occasional in the n ½ of the state, rare in the s ½; synonyms *Agropyron smithii* Rydberg and *Pascopyrum smithii* (Rydberg) A Löve. He also lists *Elytrigia dasystachya* (Hook) A Löve & D Löve WESTERN WHEATGRASS; native to the w US; adventive along

railroads: Cook, DuPage, & Will cos; synonyms *Agropyron smithii* Rydberg var *molle* (Scribn & Smith) Jones, *A dasystachyum* (Hook) Scribn, *Elymus lanceolatus* (Scribn & JG Sm) Gould.

Pascopyrum smithii (Rydberg) A Löve or ***Pascopyrum smithii*** (Rydb) Barkworth & DR Dewey The grass formerly known as ***Agropyron smithii*** Rydberg. WESTERN WHEAT GRASS, aka BLUEJOINT, BLUESTEM, COLORADO BLUESTEM, SMITH BLUEJOINT, WESTERN QUACKGRASS, (*smithii* after Jared Gage Smith (1866-1925), a botanist & agrostologist with the USDA, assistant professor of botany at the College of Hawaii.)
facu-

Habitat: Railroads & waste places, & dry prairies? It does not do well on coarse soils, best in neutral to basic soils. Where native it grows best in bottomland soils, but will grow on heavy upland soils. "Native to sagebrush deserts and mesic alkaline meadows, growing in both clay and sandy soils" (Barkworth in fna).

distribution/range: Occasional in northern 2/3, rare in southern 1/3 of Illinois. Introduced from western North America.

Culture: ① No pre-treatment necessary other than cold, dry stratification (pm09). ② No treatment, seeds are non dormant (bb01).

seed counts & rates: 110,000 (gran, stock), 117,500 (rain) seeds per pound. Seed 10 pls lbs per acre, plant in fall or spring (gran). Broadcast 1 pls lb per 1,800 sq ft. or drill 12-15 pls lbs per acre. 10 lb per acre in fall or spring (ranier)

cultivation: Medium acidity tolerance, medium salinity tolerance.

bottom line: Not recommended in the eastern tall grass prairie. Germ 79%. Dorm 18%. Test 14 days.**

Description: Cool-season, saline-tolerant, moderately drought-tolerant, strongly rhizomatous, sod-former, medium tall, 1-3' (13-24") tall, plants are glaucous; stems bluish green, leaf blades have rough, raised, harsh, veins on upper surface. N 2n = 56. key features: ① "This taxon has lemmas glabrous, scabrous, or pubescent near the base; leaves & culms have a silver-blue cast, & leaves have unique involute margins." (Ilpin)

An allo-octoploid genus of one sp. This sp is probably derived from *Leymus triticoides* X *Elymus lanceolatus*. It is similar to & easily confused with its parents.

(http://herbarium.usu.edu/webmanual/info2.asp?name=Pascopyrum_smithii&type=treatment) Or it may be derived from the hybridization of two tetraploid grasses (N 2n=28), THICKSPIKE WHEATGRASS (*Elymus lanceolatus*) & BEARDLESS WHEATGRASS (*Pseudoroegneria spicata* ssp *inerme*).

Comments: status: Native of western USA. phenology: Blooms 6,7. C3. AGGRESSIVE AS HECK.

Potentially a serious weed in Illinois, but it is a good pasture grass in the Great Plains where it is native, like a drunken cowboy that can't behave in the big city. Drought resistant & winter hardy. Poor erosion control.

Good wildlife value. Used in range seedings & grass waterways, most often in mixtures. Good for xeriscaping. Allelopathic, native further west, adventive our area. Var *molle* (Scribn & JG Smith) Jones is known in northern Illinois (sw94). Several commercial varieties available. Known to hybridize with its very close relative, the dreaded QUACKGRASS *A repens*. My old friend & mentor, the late Jock Ingles pointed out the problems of using this plant in Illinois restorations, while showing me some business campus plantings along the Illinois River, dominated by this grass. In the early- to mid-1980's, some people experimented with WESTERN WHEATGRASS as a seed mix component in the high rainfall Tall Grass Prairie plantings, because it is native (more or less), cool season, & short, & cheap! Just what everyone did want & still wants in a native grass. It is too aggressive in Illinois except in landfill, bio-remediation, & mine reclamation work.

"Doubtfully native. Much used for erosion prevention on cuts & fills. Its color is noticeably bluer than the above (*A repens*)." (ewf55)

Associates: Endomycorrhizal. Moderate forage value. Moderately palatable to livestock & wildlife.

VHFS: [*Agropyron molle* (Scribn & JG Sm) Rydb, *A smithii* Rydb, *A smithii* Rydb var *molle* (Scribn & JG Sm) ME Jones, *A smithii* Rydb var *palmeri* (Scribn & JG Sm) Heller, *Elymus smithii* (Rydb) Gould, *Elytrigia smithii* (Rydb) Nevski, *E smithii* (Rydb) Nevski var *mollis* (Scribn & JG Sm) Beetle]

Variety *molle* (Scribn & Smith) Jones with lemmas short-pilose throughout, is known from Cook, Du Page, & Will counties. [*Agropyron dasystachyum* (Hook) Scribn]

CC Baskin & JM Baskin, 2001, Propagation protocol for production of container *Pascopyrum smithii* (Rydb) A Love plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL:

<http://www.nativeplantnetwork.org> (accessed 25 July 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

D Tirmenstein, 1999. *Pascopyrum smithii*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: [Scribn://www.fs.fed.us/database/feis/](http://www.fs.fed.us/database/feis/) [2007, July 25]



Agropyron smithii

PASPALUM Linnaeus 1759 **PASPALUM, CROWN GRASS, BEADGRASS** *Paspalum* New Latin, from Greek πασπαλος, *paspalos*, millet, for the resemblance of the seeds; probably akin to Greek *pale*, fine meal, dust, from which is derived the word pollen. A genus of mostly perennial grasses chiefly of warm regions having flat leaves & spikelets in several rows on secund spikes. The inflorescence consists of spike-like racemes, which are racemose along main axis. The spikelets are flat on one side & strongly convex on the other. Outside some interest in the restoration industry, *Paspalum* is of limited economic consequences, being uncommon & growing in wetlands & dry sterile, sandy soils. Some *Paspalum* spp are known to cause seasonal allergic reactions in certain individuals. *P scrobilatum* grown especially in India, Africa, & Australasia is said to poison the milk of cows that eat it.

Paspalum setaceum Michaux var ***ciliatifolium*** (Michaux) Vasey. Formerly *Paspalum ciliatifolium* Michx DOWNY LENS GRASS, aka FRINGE-LEAF PASPALUM, HAIRY BEAD GRASS, SAND PASPALUM, SLENDER BEADGRASS, SLENDER CROWN GRASS, THIN PASPALUM, YELLOW SAND PASPALUM, (*ciliatifolius -a -um* fringed leaves.)

Habitat: Disturbed, open-soiled, early successional sand prairies.

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). No treatment, light, kno3, scarifying seed may help.

Storage Behaviour: No data available for species. Of 14 known taxa of genus *Paspalum*, 100.00% Orthodox(p/?). (RBG Kew);

Thousand Seed Weight: 1.3728g; ①1.7848; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.9608; (RBG Kew); Seed; *Seed weights reported may include minor covering structures.

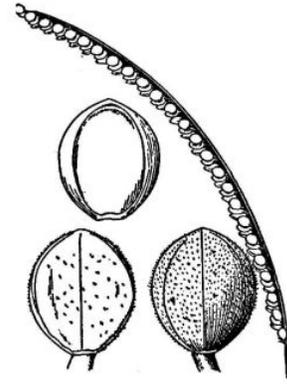
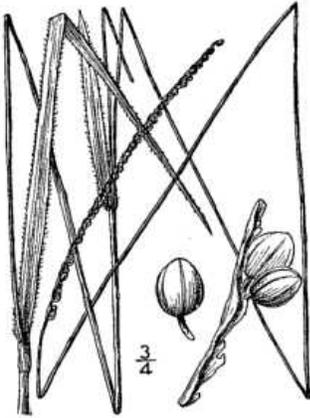
seed counts & rates: 412,346, 560,000 (pm) seeds per pound.

Description: bunching; culms 1.0-2.0', smooth; leaves blades long, thin, 6-15 mm wide, smooth & glabrous on both surfaces or occasionally with a few hairs along the underside midnerve, long ciliate on the margins;

sheaths smooth; heads; spikes racemes single or in pairs, spikelets in pairs, round or oval, 1.8-2.2 mm long, usually smooth & glabrous, nut sometimes with short, appressed hairs, N. key features:
 “*Paspalum stramineum* (Nash) (*P ciliatifolium* Michx. var *stramineum* (Nash) Fern) Found by us only in the sandy area near the C B & Q RR bridge at Killbuck Creek & in Shirland Twp.” (ewf55)

Comments: Blooms 6,7,8,9. Early successional in sand. Sandy soil seed bank sp?

VHFS: Long known as Formerly *Paspalum ciliatifolium* Michaux. [*Paspalum blepharophyllum* Nash, *P ciliatifolium* Michx, *P c* var *brevifolium* Vasey, *P c* var *ciliatifolium* Michx, *P debile* Muhl, *P epile* Nash, *P kentuckiense* Nash, *P latifolium* J Le Conte, *P propinquum* Nash, *P spathaceum* Desv ex Poir]



Paspalum ciliatifolium

PATIS Owhi 1942 **RICEGRASS**

Oryzopsis racemosa is placed in this genus by some authors (w12b), as *Patis racemosa* (Sm) Romasch, PM Peterson & Soreng. [*Piptatherum racemosus* orthographic variant]

PHALARIS Linnaeus **CANARY-GRASS, CANARY-REED, SWORD GRASS** *Phalaris* (fa-LAH-ris) New Latin, from Latin for canary-grass, or Greek name for a grass, from φαλαρίς, *phalaris*, white crested, having a white spot, in reference to the flowers; akin to Greek *phalios* having a white spot. North Temperate, South American, & African (American & European in one source) annual & perennial grasses, primarily of temperate regions, with broad leaves & a dense head or spike of flowers. x = 6,7.

Oddly enough, a lot of the following information is from Anon 1981, which is IDNR by any other name! A lot has changed sine 1981.

Phalaris arundinacea Linnaeus #CT, MA, WA **REED CANARY GRASS, aka ALPISTE ROSEAU (F), CANARYGRASS, CANIÇO-MALHADO (P), CHIENDENT-RUBAN (F), FALARIDE ARUNDINACEA (I), GALPUL (K), GARDENER'S-GARTERS, HIERBA CINTA (SP), KUSA-YOSHI (J), PASTO CINTO (SP), PHALARIS ROSEAU (FC), RIBBON GRASS, ROHRGLANZGRAS (G), RÖRFLEN (SW) ROSEAU (FC), ROSEAU PANACHÉ (F), VARIEGATED GRASS, WILD CANARY GRASS, (arundinaceus -a -um (a-run-di-NAH-kee-us) reed-like, (rush-like?), having a culm like tall grasses, from the Latin, *arundo*, reed, cane, & *-aceus*, resembles, like.)**

Habitat: Fertile moist lowlands, marshy or swampy soils. Grows in up to 2' of water. Survives drought well. Streambanks, lake shores, wet meadows, & marshes. distribution/range: Native to Europe, Asia, & parts of North America, but not northern Illinois. Very aggressive on upland soils in Iowa, along I-80 near LeClaire, & on I-74, Bettendorf.

Culture: ①Sow at max 5°C (41°F), germination irregular, often several months (tchn). Plant in spring, summer, or fall. Matures in less than 90 days. Competitive & aggressive.

Storage Behaviour: Orthodox; Storage Conditions: A few seeds germinate following 16 years storage at room temperature (Harrington 1972); 18% germination after 4 years open storage at room temperature (Comes et al 1978); seeds maintained for 3-5 years in commercial storage conditions (Priestley 1986); long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 5 years.

Thousand Seed Weight: 0.7g; ①1.1912; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.7444015; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ③0.802; (RBG Kew); Seed; *Seed weights reported may include minor covering

structures. ④0.8; (Cromarty et al 1982); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑤0.67; (Grime et al 1981); Germinule; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑥0.83; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑦0.31; (Shipley & Parent 1991); Seed; Dry weight. ⑧0.5; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑨0.815; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑩0.851; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑪1.1; (Stevens 1957); Seed; Weight refers to air-dry seeds. ⑫0.41008; (RBG Kew); Seed; *Seed weights reported may include minor covering structures

Dispersal: Water; Floating in freshwater currents; Direct or experimental observation; (Ridley 1930); Also dispersed by wind. Diaspore=caryopsis+glume. The diaspore is buoyant.

Germination data. ①90% germination; ; germination medium = 1% agar; germination conditions = 25/10°C, 8/16; (RBG Kew). ②90% germination; pre-sowing treatments = seed scarified (covering structure removed); germination medium = 1% agar; germination conditions = 20°C, 8/16; (RBG Kew). ③80% germination; ; germination medium = 1% agar + 101 mg/l potassium nitrate (KNO₃); germination conditions = 23/9°C, 12/12; (RBG Kew). ④96% germination; pre-sowing treatments = seed scarified (no details specified); germination medium = 1% agar; germination conditions = 23/9°C, 12/12; (RBG Kew). ⑤98% germination; pre-sowing treatments = seed scarified (slit seed coat over embryo); germination medium = 1% agar; germination conditions = 23/9°C, 12/12; (RBG Kew)

Subsp *arundinacea*. Storage Behaviour: No data available for species. Of 9 known taxa of genus *Phalaris*, 100.00% Orthodox(p/?)

1000 Seed Weight(g): 0.9092; (RBG Kew); Seed; *Seed weights reported may include minor covering structures,

seed counts & rates: 530,000 (stock), 533,000 (gran), 537,920 (usda), 538,000 (ecs) seeds per pound. Recommended seeding rate 10-12 lbs per acre broadcast. Broadcast 1 bulk lb per 4000 sq ft or drill 6-8 pls lb per acre (stocks). Drill 5-10 pls lbs per acre in fall or spring (gran). 10-14 lbs per acre (ecs).

cultivation: Adapted to poorly drained wetland areas, particularly mucky, sandy loam or silty loam soils. Fairly resistant to drought under cultivated conditions, but becoming more so in “the wild”. Moderately coarse to fine soils. Anaerobic tolerance high. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement high. Salinity tolerance medium. Shade intolerant, but it does invade savannas. pH 5.5-8.0.

Description: Large, robust, erect, cool season, long-lived, sod-forming grass adapted to cool, moist sites; roots very aggressive rhizomatous root system, with long scaly rootstocks, which may crowd out other spp, 14” minimum depth; culms 2-5’; leaves rolled in the bud-shoot; sheaths not compressed, glabrous, smooth, light green or yellow-green; margins membranous & overlapping below; veins distinct & joined by numerous cross-nerves; auricles absent; collar distinct, glabrous, pale green or yellow, continuous, oblique; ligule membranous, white, 2 to 5 mm long, acute to obtuse, entire, erose, lacerate or split, minutely hairy on back; blade 6 to 15 mm wide, 10 to 30 cm long, flat, sharp-pointed, glabrous or rarely very sparsely hairy at base, light green, glaucous, indistinctly ridged on upper surface; midrib prominent below; margins scabrous, slightly ciliate at base; heads; spikes the branches of the panicle are so short they are hidden by the spikelets, giving the appearance of a spike; N 2n = 27, 28 (FOC), 29, 30, 31, 35. key features:

Comments: status: Connecticut invasive, not banned. Massachusetts prohibited. Washington Class C noxious weed. Considered invasive in most of the USA. phenology: Blooms June to July. This was once considered a valuable meadow grass. If you have no ecological conscious, this grass is useful for erosion control & waterways. Probably the premier functional waterway-grass, trapping prodigious amounts of sediment. Utilized for erosion control & protection of shores, banks, & dikes. Can tolerate standing water for extended periods of time. On extremely bad sites, some recommend this be used to provide cover for wetland wildlife, but it will contribute “seed rain” to downstream sites all the way to Louisiana. Some wetland practitioners feel that mitigation sites that have a creek running through will have a perpetual recontamination of *Phalaris* with every flood, & they avoid mitigation in such sites.

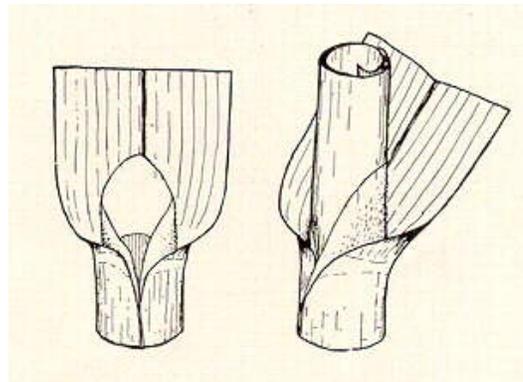
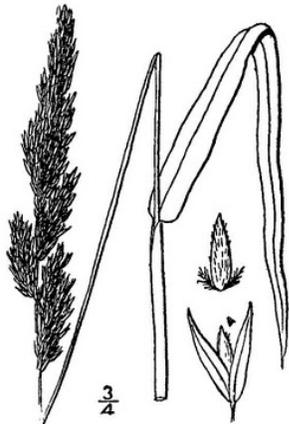
“Common in damp places. The form with white striped leaves is an occasional garden escape.” (ewf55)

REED CANARY grass is probably undergoing ecological release & is now occupying well-drained sites. It is particularly evident on the shoulders & backslopes of Interstate 80 on either side of the Mississippi River, & now moving south down I-74. IDOT’s & IaDOT’s drooling, brain-dead, knuckle-dragging, nepotistic, Neanderthalic mower jockeys will spread it everywhere. (*IaDOT’s mowing program is lightyears ahead of IDOT’s.*) CANARY GRASS is also known to invade mesic savannas.

Associates: Upland gamebirds & songbirds eat seeds & spread them. Aquatic furbearers eat the plants, utilize cover, & use plants to build lodges. Fish use cover (esp. fry & prey spp). Waterfowl utilize cover & eat plants. Good forage producer, medium palatability when actively growing, otherwise poor, fair palatability at 12-15" height. Best quality hay is harvested at pre-boot stage.

VHFS: Variety *picta* Linnaeus [forma *variegata* (Parnell) Druce] (*pictus -a -um* (PIK-tus) Latin adj (literally) painted, colored as if painted, variegated, vividly colored, for the variegated leaves) GARDENER'S GARTERS, aka RIBBON GRASS, *SIDAI CAO*, occasionally appears to escape, but is seldom far from cultivation. It is very aggressive in flowerbeds & should not be planted near choice plants.

[*Arundo colorata* Ait, *Arundo riparia* Salisb, *Calamagrostis variegata* With, *Digraphis arundinacea* (Linn) Trin, *Typhoides arundinacea* (Linnaeus) Moench] After the Flora of Pakistan.



Phalaris arundinacea

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. 2nd Seed photo Miller McDonald, Mark Bennet, Andrew Evans, & Alicia Sites, Department of Horticulture & Crop Sciences, Ohio State University, <http://www.oardc.ohio-state.edu/seedid/search.asp> Line drawing of collar area from Nowosad et al 1936, courtesy <http://www.caf.wvu.edu/~forage/library/index.htm>

PHLEUM Linnaeus **TIMOTHY, CAT'S TAIL, HERD GRASS** *Phleum* New Latin, probably from Greek φλέος, *phleos*, wool-tufted reed, an ancient name for another plant. Temperate region, primarily Eurasian, grasses that have dense oblong or terete spike & long mucronate empty glumes. $x = 7$.

Phleum pratense Linnaeus **TIMOTHY**, aka *CAPIM-TIMÓTEO* (P), **CAT'S TAIL, CAT'S TAIL GRASS, CODA DI TOPO** (I), *COLA DE TOPO* (SP), *FLÉOLE DES PRÈS* (F), *FLEOLO* (I), **HERD GRASS, HERD'S GRASS, KEUNJOAJAEBI** (K), **MEADOW CAT'S TAIL, Ô-AWAGAERI** (J), *PLÉOLE DES PRÈS, PHLÉOLE DES PRÈS, RABO-DE-GATO* (P), *TIMU CAO* (CH), *TIMOSI* (K), *TIMOTHEEGRAS* (G), *TIMOTEJ* (SW), *TIMOTI* (SP), **TIMOTHY, TIMOTHY GRASS, WIESENLIESCHGRAS** (G), (*pratensis* -is -e (prah-TAYN-sis) of or in meadows, from Latin, *pratensis*, adjective, growing or found in meadows, from *pratium*, meadow) The common name probably after Timothy Hanson, 18th century American farmer said to have introduced it from New England to the southern States in 1720 (alternately introduced it from England into the United States in 1720). **HERD GRASS** is after John Herd, who found it growing wild in New Hampshire in 1711. This sp nativity was formerly questioned. **Storage Behaviour:** Of 11 known taxa of genus *Phleum*, 100.00% Orthodox(p/?) (RBG Kew).

Habitat: Easily escaping & invading native meadows, pastures, roadsides, & waste places. In China, grasslands, steppe, forest margins (foc). **distribution/range:** Native of temperate Europe & Russia. "Said to be native here but also often escaping from cultivation." (ewf55)

Culture: ① Aggressive from seed. No treatment needed. Fall seedings grow on warm days late in the season. Growth rate rapid. Seedling vigor high. (Characteristics vary between varieties.) Spreads primarily by seed. Clumps enlarge by tillering.

Storage Behaviour: Orthodox. **Storage Conditions:** No loss in viability after 12 years hermetic storage at -15°C with 60 r.h. (Rincker & Maguire 1979); seeds not damaged from exposure to liquid nitrogen (Stanwood & Bass 1981); average germination change 73.9 to 87%, 20 years storage at -15°C with 60% r.h., 29 seed lots (Rincker 1983); $p50 = 5.7$ years for seeds stored under open storage in a temperate climate (Priestley 1986); no problem for long-term storage under IPGRI preferred conditions; seeds tolerate desiccation to 1.8% mc, LMCL = 3.6%, Cw = 4.75 (Ellis et al 1989); long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 23 years; average germination change 93.5 to 96.4%, mean storage period 12 years, 16 collections.

Average 1000 Seed Weight(g): 0.4. ① 0.324; (RBG Kew); Seed; **. ② 0.5236; (RBG Kew); Seed; **. ③ 0.506; (RBG Kew); Seed; **. ④ 0.3516; (RBG Kew); Seed; **. ⑤ 0.2956; (RBG Kew); Seed;

**Seed weights reported may include minor covering structures.

Germination. ① 85% germ; ; germ medium = 1% agar; germ conditions = 15°C, 8/16; (RBG Kew). ② 85% germ; ; germ medium = 1% agar; germ conditions = 20°C, 8/16; (RBG Kew). ③ 100% germ; ; germ medium = 1% agar; germ conditions = 16°C, 12/12; (RBG Kew). ④ 100% germ; ; germ medium = 1% agar; germ conditions = 23/9°C, 12/12; (RBG Kew). ⑤ 88% germ; ; germ medium = 1% agar; germ conditions = 16°C, 12/12; (RBG Kew)

Additional seed counts and germination results are available at

http://epic.kew.org/searchepic/detailquery.do?requiredPage=1&scientificName=Phleum+pratense*&datasources=ipni&datasources=mc&datasources=kr&datasources=ebbd&datasources=libcat&datasources=pmb&datasources=herbcat&datasources=ecbot&datasources=livcoll&datasources=sid&datasources=sepasal&datasources=efz&categories=names&categories=bibl&categories=colln&categories=taxon&categories=flora&detailDatasource=sid

Average of Oil Content (%): 4.6. ① 4.4; (Jones & Earle 1966); Entire seed/nut; **. ② 4.8; (*ibid.*); Entire seed/nut; **.

Average of Protein Content (%): 20.65 ① 21.9; (*ibid.*); Entire seed/nut; **. ② 19.4; (*ibid.*); Entire seed/nut; **.

**Moisture content not stated. (RBG Kew).

seed counts & rates: 1,163,000 (ecs), 1,163,200 (usda), 1,230,000 to 1,300,000 (gran) seeds per pound. Drill 1 lb pls per acre in fall or spring for pasture (gran). 3-6 lbs alone, 1-3 lbs in mixtures (usda). 4-6 lb per acre, 2-4 lbs with a legume (University of Kentucky). 8 pounds per acre (ecs). 8-10 lbs per acre Penn State.

cultivation: Deep, moderately moist sites. Medium coarse to fine soils. Neutral to acidic soils, somewhat alkaline tolerant. Anaerobic tolerance low. CaCO₃ tolerance high. Drought tolerance low. Fertility requirement medium. Salinity tolerance low. Shade tolerance intermediate. pH 5.0-7.5.

Description: Cool-season, glabrous, short lived?, perennial, introduced, bunch grass; roots shallow, fibrous root system, 10" minimum depth, but most roots are within the top several inches of soil; culms medium tall, 2.5-3.0 feet, with bulbous bases (haplocorms formed from the lowest internodes), leaves rolled in the bud-shoot; sheaths not compressed, glabrous, light green, sometimes purplish at base in young plants, split almost

to base; margins hyaline & edges overlapping to near base; auricles absent; collar broad, distinct, glabrous, light green, continuous; margins sparsely retrorse-ciliate; ligule membranous, white, 1.0-2.5 mm long, obtuse to acute, with distinct notch at either side, otherwise entire or minutely toothed; blade 4.0-12 mm wide, 7.0-25 cm long, flat, sharp-pointed, light green, glabrous; ridges on the upper surface low & rounded; under surface smooth, slightly keeled at base; margins scabrous, retrorsely so at the base; heads; spikes; $N 2n = 42$ (21, 35, 36, 49, 56, 63, 70, 84) Hike! (28, 42 China). key features: ①“Species has spike-like panicle; only one sp is in Illinois; has thickened or bulb-like base” (Ilpin). ②“*Phleum pratense* is sometimes confused with *Agrostis alba* but can be distinguished by its white & more opaque ligule with a notch at either side & without hairs on the back. The presence of cilia on the shoulder & less conspicuous ridging of the upper surface of the blade are also diagnostic.” (now36) ③“The flower heads of timothy may resemble those of the bristly foxtails (*Setaria* spp) & the foxtails (*Alopecurus* spp). The bristly foxtails are annual spp that have a hairy ligule & a less dense flower head, with long bristles surrounding the flowers. The foxtails are a mixture of annual & perennial spp that are smaller in stature & have soft-textured flower heads. These foxtails are often sprawling, & tend to grow in damp soil. Young plants of timothy may resemble those of quackgrass (*Elytrigia repens*) & ORCHARD GRASS (*Dactylis glomerata*). QUACKGRASS may be distinguished by its claw-like appendages (auricles) at the top of the sheath. ORCHARDGRASS leaves are folded in the bud.” (<http://www.oardc.ohio-state.edu/weedguide/singlerecord.asp?id=140>.)

Comments: status: Invasive alien. phenology: Blooms June & early August. Seeds mature late July or early August. C3. JUST SAY NO! One of THE NURSE CROPS FROM HELL. Used in riparian restoration. May be weedy. Seed source commercial sources.

This sp is known to exhibit vivipary, with spikelets changed to leafy tufts.

Most TIMOTHY stems have a haplocorm. The haplocorm forms when the lowest internode enlarges with stored food reserves as the shoots mature. At the late boot to early heading stage, adventitious buds in haplocorms form new tillers.

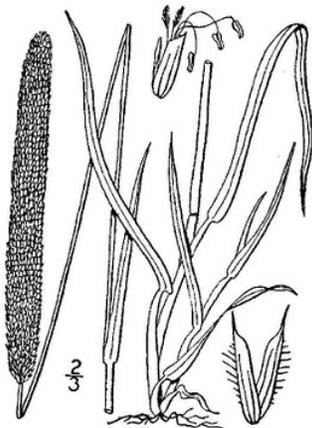
Associates: Endomycorrhizal. Larval host of the aggressive *Thymelicus lineola*, EUROPEAN SKIPPER (SKIPPERLING). Excellent palatability, especially for horses. Commonly planted for pasture or hay. One of the most extensively planted pasture grasses, & the most important hay grass in the US. It is usually grown in combination with alfalfa or clover.

ethnobotany: TIMOTHY is known to cause seasonal allergic reactions in certain individuals.

TIMOTHY is a “prominent cause of hay fever in Illinois” (Ilpin). (<http://www.oardc.ohio-state.edu/weedguide/singlerecord.asp?id=140>.)

VHFS: [*Phleum abbreviatum* (Boissier) Rivas Martinez, *P bertolonii* de Candolle, *P fallax* Janka, *P intermedium* Jord, *P nodosum* L, *P nodosum* L var *pratense* (Linnaeus) Saint-Amans, *P parnassicum* Boiss nom nud, *P pratense* L ssp *nodosum* (L) Arcang, *Phleum p* L var *nodosum* (L) Huds, *P p* L f *bertolonii* (de Candolle) Alefeld, *P p* L f *vulgare* Alefeld, *P p* L subsp *abbreviatum* (Boissier) Molero Mesa & Pérez Raya, *P p* L subsp *bertolonii* (de Candolle) Bornmuller, *P p* L subsp *nodosum* (Linnaeus) Arcangeli, *P p* L subsp *vulgare* Ascherson & Graebner, *P p* L var *abbreviatum* Boissier, *P p* L var *bertolonii* (de Candolle) Woods, *P p* L var *fallax* (Janka) K Richter, *P p* L var *nodosum* (L) Hudson, *P p* L var *stoloniferum* (Host) Neilreich, *P p* L var *typicum* Celakovsky, *P stoloniferum* Host, *Plantinia pratensis* (L) Bubani, *Stelephuros pratensis* (L) Lunell] **Xreference Tropicos**.

FRIENDS DON'T LET FRIENDS PLANT TIMOTHY.





Phleum pratense

Line drawing courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing USDA-NRCS PLANTS Database / Hitchcock, AS (rev. A Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 2nd seed photo Miller McDonald, Mark Bennet, Andrew Evans, & Alicia Sites, Department of Horticulture & Crop Sciences, Ohio State University, <http://www.oardc.ohio-state.edu/seedid/search.asp>

PHRAGMITES Adanson **COMMON REED, DITCH REED** New Latin, from Greek *phragmites* growing in hedges, from *phragma* fence, hedge & *-ites* -ite. Widely distributed reedlike grasses with tall stems & large showy panicles resembling plumes. $x = 12$. [Formerly *Phragmites* Trin]

rewrite as *P australis* (Cavanilles) Trinius ex Steudel

Phragmites communis Trinius REED, aka WILD REED, *Abo'djigun*, "something turned out or over" (Ojibwa), (*communis* -is -e common, universal, general; growing in a society or community, for its colonial habit.)

Habitat: Shores of lakes, streams, ponds, & swamps. Fresh or brackish water up to 2' deep. Also occurs in lowlands. distribution/range: One of the most widely distributed flowering plants.

Culture: First of all, why cultivate? Eradicate instead. ☉ Sow at 22°C (72°F) in muddy compost (tchn).

Anon 1981 says plant in spring or fall. (I think this is echoing the recommendations of those who want to sell more plants. Don't fall plant bareroot wetland materials, ever, any spp.) 1000 roots per acre. (perhaps for bioremediation sites only??)

Description: Colonial, perennial grass, native in part, introduced in part. Good for transpiring lots of water. "Not common. Occasional in prairie sloughs in Grove Creek bottom, in a slough west of Shirland & in Beaver Creek bottom in Boone Co." (ewf55)

Associates: Provides cover for most types of wildlife, one of its limited virtues.

ethnobotany: Ojibwa technology plant (den28)

From Chief Jacob Thomas, with Terry Boyle, 1994, Teachings from the Longhouse, "...He has given the corn, beans, & squash a medicine because they have a living spirit. Years ago, the people always soaked the seed for two days in a container before planting. The medicine *gosdisdén:ni*, used for the plants seeds, is known as *Phragmites* in English. Another medicine, *oságéen:dah* (*Hystrix patula*), or BOTTLE BRUSH GRASS was also used at times. The roots of this plant were boiled & then put into the container of seeds."

VHFS: *Phragmites australis* (Cavanilles) Trinius ex Steudel is the new name for this sp. Ssp *australis* is the introduced European Common Reed.

Ssp. *americanus* Saltonstall, P.M. Peterson & Soreng is the native AMERICAN COMMON REED. Aka *Phragmites americanus* (Saltonstall, P.M. Peterson, & Soreng) A. Haines. In New York, "Rich fens, fresh and brackish marshes, and shrub swamps. Can grow in large stands but these are not as dense as the stands of the introduced *Phragmites australis*." (nyfa) In Illinois known from Peoria Co.

N 2n = 36, 40, 42-59, 72, 84, 96.

Basionym *Phragmites australis* (Cav.) Trin. ex Steud. ssp. *americanus* Saltonstall, P.M. Peterson, & Soreng, Sida 21: 690. 2004. [*P. communis* Trinius var. *communis* in part; *P. communis* var. *berlandieri* (Fournier) Fernald in part]



Phragmites communis, bare root divisions

PIPTATHERUM Palisot de Beauvois **RICEGRASS, PIPTATHERUM** *Piptatherum* Piptather'um (pip-ta-THEER-um) New Latin, from Greek *pipto*, falling, & *αθηρ*, *αθηρος*, *ather*, *atheros*, a barb or an awn, bristle, the beard of an ear of corn. Genus of ca 30 spp, mostly Eurasian. $x = 11, 12$. *Oryzopsis racemosa* is placed in this genus by some authors. See *Oryzopsis* & *Patis*.

POA Linnaeus 1753 **BLUEGRASS, SPEAR GRASS, MEADOW GRASS** *Poa* New Latin, from Greek *πόα*, *poa* grass; akin to Greek *pidax* spring, Lithuanian *pieva* meadow. A cosmopolitan genus of about 500 spp of annual & perennial grasses mainly temperate & boreal areas. Many spp are polyploid & apomitic.

“Remarks. The word *poa* is pure Greek, & signifies pasture or fodder, Linnaeus applied the name to this genus, because it includes the most common pasture grass, & meadow grass. The *Poa pratensis*, aided by the *Agrostis vulgaris*, constitutes most of those beautiful carpets which cover our fields, lawns, & road-sides.” (Eaton 1829)

Poa annua Linnaeus **ANNUAL BLUEGRASS**, aka **ANNUAL MEADOW-GRASS, LOW SPEAR-GRASS, SIX-WEEKS GRASS, SPEARGRASS, WALKGRASS**, (*annuus -a -um* Latin a year, year-old, yearly, annual, lasting a year, within a year.)

Habitat: Roadsides, open woods, & moist, alluvial soil. Cultivated & waste ground, paths, lawns, & barnyards. A weed in turf. distribution/range: Common. Introduced from Eurasia. One of the world's mostwidespread weeds.

Culture: 1,195,680 (usda), 1,196,000 (ecs) seeds per pound. Growth rate rapid. Seedling vigor high. Seed 20-30 lbs per acre seeded alone (ecs).

seed counts & rates: Anaerobic tolerance low. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement low. No salinity tolerance. Shade tolerance intermediate. pH 4.8-8.0.

Description: Low growing, glabrous tufted annual bunch grass, decumbent; roots 3” minimum depth; culms to 4”, some say to 2”; leaves folded in the bud-shoot; sheaths compressed & slightly keeled, glabrous, light green, split part way only; margins membranous & usually overlapping; auricles absent; collar distinct, glabrous, pale green, v-shaped; ligule membranous, white, 1.0-3.0 mm (usually 1.2-1.8 mm) long, acute, entire; blade 1.5-4.0 mm wide, 2.0-8.0 cm long, flat or v-shaped in section at base with sub-acute tip, light green, not glossy, thin, soft, often cross-wrinkled; two distinct light lines may be seen along the midvein by transmitted light; margins glabrous, slightly scabrous towards tip; the blades are widely spreading from the axis of the shoot; heads; spikes; N. key features: ①Non-stoloniferous habit, soft, pale green & generally puckered blades, & white, fairly conspicuous ligules (now36).

Comments: status: phenology: Blooms mid spring. This sp will flower & fruit when trampled & frequently mowed. Winter annual?

Associates: ANNUAL BLUEGRASS is known to cause seasonal allergic reactions in certain individuals.

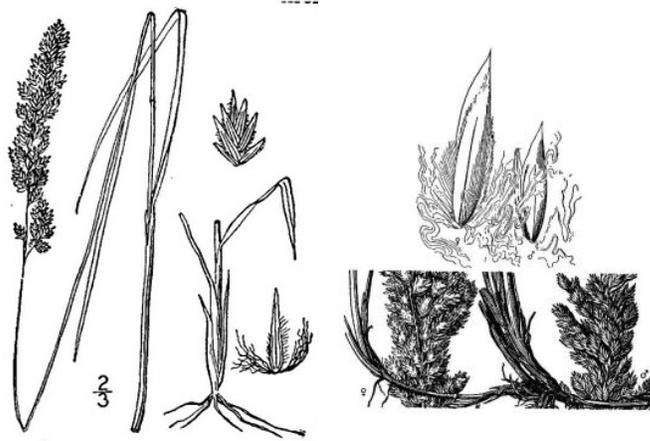
VHFS:



Poa annua

Line drawing of collar area from Nowosad et al 1936, courtesy <http://www.caf.wvu.edu/~forage/library/index.htm>

Poa arachnifera Torr TEXAS BLUEGRASS (*arachnifera* in one source resembling a spider's web.)
 "This has recently appeared on our roadsides & in pastures having been introduced either for forage or for the seeding of new road shoulders." (ewf55)



Poa arachnifera

Poa arida
 Salt tolerant;



Poa arida (right) with *Agropyron repens* (left) highway median

Poa compressa Linnaeus #CT, WI CANADA BLUEGRASS, aka WIRE-GRASS, FLAT-STEMMED MEADOW-GRASS, (*compressus -a -um* compressed, flattened, pressed together.)

Habitat: Dry woods, oldfields. usually on dry, sterile soil in meadows, pastures, & waste places.

distribution/range: Introduced, common. Widely planted for erosion control & forage.

Culture: Growth rate rapid. Seedling vigor low. Vegetative spread rate slow.

seed counts & rates: 2,392,820 (usda), 2,393,000 (ecs) seeds per pound. 25-30 lbs per acre seeded alone (ecs).

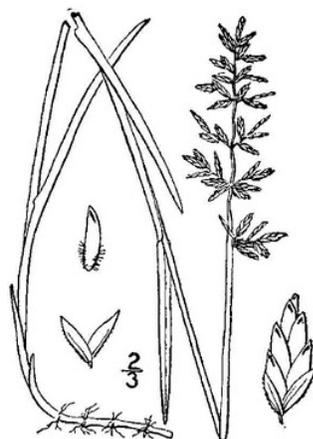
cultivation: Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance medium. Fertility requirement low. Salinity tolerance none. Shade tolerant.

Description: Cool season, bluish-green, flat-stemmed, rhizomatous, introduced perennial grass, forming a loose sod, short, compact; roots creeping rootstocks, 1" minimum depth; culms 7" to 2', leaves folded in the bud shoot; sheaths strongly compressed & sharply keeled, glabrous, green or purple-tinged, usually split to base, the margins being hyaline & not overlapping; auricles absent; collar narrow, glabrous, light green, divided by the midrib; ligule membranous, white, short (0.2-1.2 mm long), truncate or emarginate, entire; blade 2.0-5.0 mm wide, 2.0-10 cm long, flat to slightly V-shaped, sharply keeled below, broadest at base, tapering throughout its length to a boat-shaped tip, glabrous, not ridged, bluish green, somewhat glaucous; margins slightly scabrous; the row of motor cells on each side of the midrib show as two light lines by transmitted light; the short, firm blades make broad angles with the axis of the shoot heads; spikes; N. key features: ① "The leaves of this grass, in contrast to those of *P pratensis* are a pale bluish or glaucous green, rather than a deep green colour, & are never shiny & always glabrous. The ligule is longer, paler & more conspicuous." (now36)

Comments: status: In Connecticut, it is considered potentially invasive & is banned. Invasive by Wisconsin DNR.

phenology: Blooms mid spring. Sometimes used in seeding pastures & lawns.

VHFS:



Poa compressa

Poa palustris Linnaeus *TN FOWL BLUEGRASS, aka *FIENAROLA DELLE PALUDI* (I), FOWL BLUE GRASS, FOWL MEADOW GRASS, FOWL MEADOW-GRASS, MARSH BLUE GRASS, *MJATLIK BOLOTNYJ* (R), *NUMA-ICHIGO-TSUNAGI* (J), *NUNPOAPUL* (K), *PÂTURIN DES MARAIS* (F), *PÂTURIN TARDIF* (F), *POA DE LOS PANTANOS* (SP), *POA-PALUDOSA* (P), *SENGRÖE* (SW), *SUMPFRISENGRAS* (G), SWAMP MEADOW GRASS, *ZE DI ZAO SHU HE* (CH), (*palustris, palustre* (pa-LUS-tris, pa-LUS-tree) of swamps, of marshes, or by extension, growing in bogs, marsh loving, marsh-living, from Latin *paluster -tris -tre*, marshy, boggy) facw+

Habitat: Marshes, wet thickets, & upland swamps. Meadows & moist open areas from low to medium elevation. "Not unusual in low meadows & other damp areas." (ewf55). distribution/range: North America, northern Europe & Asia.

Culture: ① No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ② No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③ Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). No treatment, light. Moderate growth rate. Seedling vigor medium. No vegetative spread rate.

Storage Behaviour: Orthodox?; Storage Conditions: "The species has been shown to form a short-term persistent soil seed bank, with seeds surviving in the soil for >1 year, but <5 years (Thompson et al 1997). Unfortunately maximum longevity of the seeds in the soil was not stated in the available data. As such,

although it is likely that the taxon exhibits orthodox storage behaviour, the possibility that its seeds survive for <2 years in the soil and may be intermediate or recalcitrant cannot be entirely ruled out.” (RBG Kew);

Thousand Seed Weight: 0.183g. ①0.172; (Mazer 1989); Diaspore; seed plus associated protective structure. ②0.1756; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ③0.172; (Mazer 1989); Seed. ④0.2; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑤0.247; (bsh); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑥0.13; (Stevens 1957); Seed; Weight refers to air-dry seeds.

Germination data available. Germination ①100% germination; ; germination medium = 1% agar; germination conditions = 25/10°C, 8/16; (RBG Kew). ②95% germination; pre-sowing treatments = imbibed on 1% agar for 4 weeks at 15°C; germination medium = 1% agar; germination conditions = 25/15°C, 8/16; (RBG Kew). ③95% germination; pre-sowing treatments = imbibed on 1% agar for 4 weeks at 20°C; germination medium = 1% agar; germination conditions = 20/10°C, 8/16; (RBG Kew).

seed counts & rates: 1,000,000 (wms01), 2,080,000 (aes10), 2,177,008 (jfn04), 2,624,277 (gnhens02), 2,684,023 (gnh13), 2,718,563 (gna07), 2,882,540 (gna04), 3,156,000 (gran), 3,436,363 (gnhe12) seeds per pound. Plant 3 lb pls per acre in fall or spring for pasture (gran).

cultivation: Best in moderate to medium fine textured soils. Useful in irrigated pastures. Humus soils. Anaerobic tolerance medium. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance low. Shade tolerance intermediate. pH 4.9-7.5, neutral to basic soils.

bottom line: For field establishment plant spring or dormant. Seed test data indicate most lots are non-dormant. Germ 91, 93, 80, sd 6.5, r80-98.5 (18.5)%. Dorm 0.0, 0.0, 0.0, sd 0.0, r0.0%. Test 23, 24, 24, r21-25 days.**

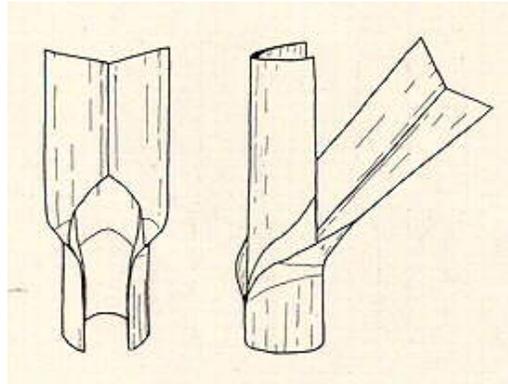
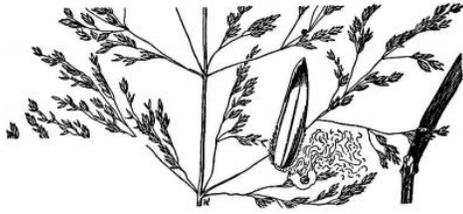
Description: Cool-season, native, bunchgrass, forming loose tufts; from short root stocks, 12” minimum depth; culms produces a few leafy shoots to 4’; leaves folded in the bud-shoot; sheaths compressed & keeled, glabrous, slightly scabrous, green, split nearly to base with margins overlapping part of the way; margins scarious; auricles absent; collar distinct, glabrous, pale green, V-shaped; ligule membranous, 1.5-3.5 mm long, acute, entire or often toothed; blade 2-4 mm wide, 7-15 cm long, flat or slightly V-shaped, keeled, broad at base, tapering to tip, slightly scabrous, pale green, not ridged but showing two light lines along midrib which are more distinct near the tip than at the base of blade; margins minutely hairy, retrorsely so at base; heads; spikes; N 2n = 28, 30, 32, 35, 42, 56, 84. key features: ①Long acute ligule, compressed & keeled sheaths, & broad truncate-based blades, which stand erect or ascending on the shoots. ②“Swamp Meadow-grass is distinguished from *Poa nemoralis* by its longer ligules, from *Poa trivialis* by its smooth leaf-sheaths and blunt ligules, and from *Poa pratensis* by its longer ligules and the absence of rhizomes” (fop).

Comments: status: Endangered in Tennessee. phenology: Blooms 5,6,7. In northern Illinois, collect seeds in late June- early July. Collect seeds in se Wisconsin in September (he99). Useful as quick cover in wetland restoration & detention basins. Medium to tall, cool-season, weakly sod-forming, bunch grass, perennial, stoloniferous. Genetic source Kane Co.

Associates: Provides food & cover for wildlife. Palatable to all classes of livestock.

VHFS: [*Paneion triflorum* Lunell, *Poa crocata* Mx, *P eyerdamii* Hultén, *P fertilis* Host, *P glauca* var *crocata* (Michx) ME Jones, *P janczewskii* Zapal, *P palustris* var *strictula* (Steud) Hack, *P rotundata* Trin, *P triflora* Gilib, nom inval, *P serotina* Ehrh, *P serotina* Ehrh ex Hoffm, *P strictula* Steud]





Poa palustris

1st & 2nd Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Line drawing A. S. Hitchcock, (rev. A. Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC. 1950. USDA-NRCS PLANTS Database, image not copyrighted. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Line drawing of collar area from Nowosad et al 1936, courtesy <http://www.caf.wvu.edu/~forage/library/index.htm>

Poa pratensis Linnaeus KENTUCKY BLUEGRASS, aka JUNE GRASS, (*pratensis -is -e* (prah-TAYN-sis) of or in meadows, from Latin *pratensis -is -e*, adjective, growing or found in meadows, from *pratum*, meadow.)

Habitat: Considered invasive in most of the USA. Common in pastures, meadows, roadsides, & lawns. Most of the turf areas of the temperate United States. **distribution/range:** Sp is commonly cultivated for lawns & pasture, & is a major forage species in cooler regions of North America. Native of USA in a small part, a subsp with a limited range.

Culture: Seed spring or fall. Germination in 14 to 28 days, some varieties in 10 to 28 days. Growth rate moderate. Seedling vigor low. Vegetative spread rate rapid. Considered slow to germinate & establish.

seed counts & rates: 1,389,840 (usda), 1,390,000 (ecs), 2,177,000 (gran), 2,200,000 (stock) seeds per pound. For pasture drill 12-20 lb per acre, for turf drill 3 lb per 1000 sq ft (stocks). For new lawn seed 4 lbs per 1000, for overseeding established lawns seed 2 lb per 1000. Granite says 2-3 lb per acre in fall or spring for pasture. Arthur Clesen says 4-5 lb per 1000 sq ft. Seed 25-50 lb alone (ecs).

cultivation: Does best on good soils with adequate moisture. Likes sun, some shade tolerance, but turf grasses & trees do not peacefully co-exist. Moderately coarse to fine soils. Anaerobic tolerance low. CaCO₃ tolerance high. Drought tolerance low. Fertility requirement high. Salinity tolerance low. Shade intolerant. Neutral soils, some acid & base tolerance. pH 5.0-8.4.

Description: Cool-season, long-lived, medium tall, dark green, leafy perennial dense sod-former from creeping rootstocks; shallow root system with vigorous rhizomes, 10" minimum depth; culms 1-2'; leaves folded in the bud-shoot; sheaths compressed but not sharply keeled, glabrous, green, closed when young but later split with margins sometimes overlapping; auricles absent; collar medium broad, usually ciliate, yellowish green, slightly divided by the midrib; ligule membranous, very short (0.2 to 0.6 mm long), truncate, entire to finely ciliate, puberulent on back; blade 2 to 5 mm wide, 5 to 40 cm long, usually V-shaped, tightly folded in dry weather, keeled below, parallel-sided & abruptly narrowed to a boat-shaped tip, sometimes minutely pubescent, not ridged, deep green, sometimes shiny on under surface, not glaucous; margins scabrous; the row of motor cells on each side of the midrib shows as two light lines by transmitted light; the long blades forming almost right angles with the axis of the shoot; heads; spikes; N. **key features:** ① "*Poa pratensis* is distinguished from *P compressa* by the deeper green colour of its foliage, by the longer, parallel-sided blades, which are sometimes puberulent towards the base, & by the shorter ligule. This grass, when growing in dry situations, has its narrow blades closely folded & might easily

be confused with *Festuca rubra*. The absence of ridges on the inner surface when the blade is unfolded will distinguish it.” (now1936)

Comments: status: *Ssp alpigena* (Fries ex Blytt) Hiitonon, ALPINE MEADOW GRASS, is a native subsp & is endangered in Hew Hampshire. phenology: Blooms May to June. Needs well drained soil with adequate moisture. Rhizomes are concentrated in top 2” of soil. Forms a good sod when grown alone, but performs well in a mix. Renews growth in early spring, matures in late summer, with vigorous fall regrowth. Not drought tolerant, dormant in hot dry months. Tolerates cold winters well. Highly palatable & nutritious to livestock & wildlife, but grazing yield is low compared to other pasture grasses. KENTUCKY BLUEGRASS goes dormant during hot dry periods. Used for pasture improvement, land reclamation, & turfgrass. An excellent general utility grass. Poor for shade areas. Good for play areas. Good for fairways. The characteristics of the grass vary with the variety. Some cultivars are shade tolerant or quicker to germinate.

“Introduced as a pasture grass but also probably native in our area.” (ewf55)

Associates: *Poa pratensis* known to chemically inhibit Azalea, barberry, yew, forsythia, flowering dogwood (Chick & Kielbaso, 1998).

Bluegrass is known to cause seasonal allergic reactions in certain individuals.



Poa pratensis



Poa sylvestris A Gray *NY WOODLAND BLUE GRASS, aka FOREST BLUEGRASS, (*sylvester, sylvestris, sylvestris*, of woods or forests.) fac

Habitat: Mesic woodland. “Common in woods, as Lovsee woods northeast of Roscoe.” (ewf55). “Mainly at low elevations in woodlands, especially in riparian zones” (Soreng in fna). distribution/range:

Culture: Fresh seed, light. Growth rate moderate. Seedling vigor low. No vegetative spread rate.

Storage Behaviour: Orthodox; 95 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 3 weeks at -20C at RBG Kew, WP.

Thousand Seed Weight: 0.1844g; (RBG Kew); Seed; *Seed weights reported may include minor covering structures

Germination data available. 95 % germination; ; germination medium = 1% agar; germination conditions = 25/10°C, 8/16; (RBG Kew) (Material provided by Chicago Botanic Garden.)

seed counts & rates: 800,000 (usda) seeds per pound.

availability: Sp is not in the native seed trade.

cultivation: Anaerobic tolerance high. CaCO₃ tolerance low. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerant. pH 5.9-7.0.

Description: Cool season, moderately long-lived, perennial, bunching, native grass; roots 8” minimum depth; culms 1.5-2.5(-3.0)”; N 2n = 28. key features:

Comments: status: Endangered in New York. phenology: Blooms 5,6,7. In northern Illinois, collect seeds in June.

VHFS: No synonyms!



Poa sylvestris

1st Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

Poa trivialis Linnaeus # NOX DAE, MD, NH, NJ, PA, VA, WV ROUGH BLUEGRASS, aka *ESPIGUILLA* (SP), *GEMEINES RISPENGRAS* (G), *KÄRRGRÖE* (SW), *KEUNSAEPOAPUL* (K), *MJATLIK OBYKNOVENNYJ* (R), *Ö-SUZUMENO-KATABIRA* (J), *PÂTURIN COMMUN* (F), *POA-COMUM* (P), *POA COMÚN* (SP), *POA COMUNE* (I), *ΠΟΑ Η ΚΟΙΝΗ* (GR), *PU TONG ZAO SHU HE* (CH), *RELVÃO* (P), ROUGH MEADOW GRASS, ROUGH-STALK BLUEGRASS, ROUGH STALKED BLUEGRASS, ROUGH-STALKED MEADOW-GRASS, *WALDBEWOHNENDES RISPENGRAS* (G), (see also <http://www.plantnames.unimelb.edu.au/Sorting/Poa.html#trivialis>) (*trivialis* -is -e common, ordinary, wayside, of crossroads, from *trivium*, a place where three ways meet; a crossroads, “the gutter”, the breeding place of course manners.)

Habitat: Introduced, considered invasive in some areas. Wet meadows, moist woods, & roadsides. Rich soils in wet meadows, ditches, & cultivated fields. Uncommon except where recently seeded. **distribution/range:** Native of sw Asia & Europe, where native moist places, grassy places on slopes. Widely planted for erosion control & forage.

Culture: Growth rate moderate. Seedling vigor high. No vegetative spread rate.

http://epic.kew.org/searchepic/detailquery.do?jsessionid=70BBC6D5FFD00EC2A29B0623DA96ACAA?requiredPage=1&scientificName=Poa+trivialis*&datasources=ipni&datasources=mc&datasources=kr&datasources=ebbd&datasources=libcat&datasources=pmb&datasources=herbcat&datasources=ecbot&datasources=livcoll&datasources=sid&datasources=sepsal&datasources=efz&categories=names&categories=bibl&categories=colln&categories=taxon&categories=flora&detailDatasource=sid

Storage Behaviour: Orthodox;

Thousand Seed Weight: 0.1g;

Germination

Seed 23-30 lbs per acre alone (ecs). As a shade nurse crop, 5-15 lbs per acre. As a cover crop in severe circumstances where stability is an issue, 15-20 lbs per acre.

cultivation: Anaerobic tolerance low. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement medium. No salinity tolerance. Shade tolerant. pH 4.8-7.5

Description: Cool-season, bright green, moderately long-lived, perennial, introduced, bunch grass; roots 12" minimum root depth; culms 1-2' occasionally 3'; leaves folded in the bud-shoot; sheaths compressed & sharply keeled, generally scabrous, green or purple tinted, split part way only; auricles absent; collar broad, distinct, glabrous, divided by the midrib; ligule membranous, 2 to 3 mm long, acute, entire or ciliate; blade 2 to 4.5 mm wide, 7.0-15 cm long, flat, tapering from the base to the tip which is narrowly boat-shaped, yellowish green, slightly retrorsely scabrous on upper surface, glossy & keeled on lower surface; median lines not prominent; margins scabrous; heads; spikes; N. key features: ① "This grass resembles a few other spp of *Poa* but may be distinguished by its scabrous sheath & the glossy under-surface of the blade." (Nowosad et al 1936)

Comments: status: This taxon is considered weedy or invasive in some parts of its range or under certain applications (Uva et al 1997). Noxious weed in several states.

phenology: Blooms June to July. Sp is occasionally used as a savanna and woodland nurse crop or shaded erosion control sp.

Associates: Provides food & cover for wildlife.

VHFS: Several commercial varieties are available.

Poa trivialis subsp. *trivialis* N 2n = 14, 28.

Poa trivialis subsp. *sylvicola* (Gussoni) H Lindberg N 2n = 14. [*Poa sylvicola* Gussoni, Enum. Pl. Inarim. 371. 1854; *P trivialis* var *sylvicola* (Gussoni) Hackel]

TROPICOS lists 35 named subsp, vars, & forms. [*Poa ariguensis* Steud, *P callida* Rydb, *P maullinica* Phil, *P modesta* Phil, *P pichinchensis* Hack, *P stolonifera* Hall ex Muhlenb, *P trachyphylla* Hack, *P t* Hack ex Sodiro, *P trivialis* var *filiculmis* Scribn ex Beal, *P t* var *woronowii* (Roshev) Grossh, *P woronowii* Roshev]



Poa trivialis

PSEUDOROEGNERIA

Agropyron spicatum Pursh *MI [New nomenclature this will be *Pseudoroegneria spicata* (Pursh) A Löve ssp *spicata*.] BLUEBUNCH WHEATGRASS, (*spicatus* -a -um (spee-KAH-tus) spike-like, with flowers disposed on a spike, spicate, bearing a spike, from Latin *spicatus*, past participle, *spico*, *spicare*, -, *spicatus*, provide spikes, provide ears, like wheat or corn (in an Old World corn sense). *Spica* (singular) is the star in the head of wheat in the hand of the constellation Virgo. What's your sign?)

Habitat: distribution/range: Formerly (?) northern Michigan, northern Great Plains & intermontane west.

Culture: Growth rate rapid. Seedling vigor medium. Vegetative spread rate none. Slow seed spread rate. 125,680 (usda cv) seeds per pound.

cultivation: Adapted to coarse to fine textured soils. Anaerobic tolerance none. CaCO₃ tolerance high. Drought tolerance high. Fertility requirement low. Salinity tolerance low. Shade intolerant. pH 6.6-8.4.

Comments: Probably extirpated in Michigan. This is a common forage grass in the west. Several commercial varieties are available.

VHFS: [*Agropyron spicatum* Pursh, *A spicatum* Pursh var *pubescens* Elmer, *Agropyron vaseyi* Scribn & JG Sm, *Elymus spicatus* (Pursh) Gould, *Elytrigia spicata* (Pursh) DR Dewey, *Roegneria spicata* (Pursh) Beetle]



Agropyron spicatum

Seed photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted images

PUCGINELLIA Parlatore **ALKALAI GRASS, GOOSEGRASS** *Puccinellia* Benedetto Luigi *Puccinelli*, 1808-1850, Italian botanist & professor, director of the Botanical Gardens of Lucca. A genus of about 80 (120) north temperate spp. Many spp are halophytic. Polypoidy, selfing, & hybridization. $x = 7$. See *Glyceria* in part.

Puccinellia distans (Jacquin) Parlatore, or as *Puccinellia distans* (Wahlb.) Parl. **ALKALIGRASS**, aka **EUROPEAN ALKALAI GRASS, GEMEINER SALZSCHWADEN (G), GRÄTT SALTGRÄS (SW), JIAN MAO (CH), NORTHERN SALTMARSH GRASS, REFLEXED SALTMARSH-GRASS, SLENDER ALKALI GRASS, WEEPING ALKALI GRASS.** (*distans* dis'tans (DIS-tans) distant, separate, remote, far apart, by usage straggly, from *distans*, (gen), *distantis*, adj distant; separate.)

Habitat: Adventive on salty roadsides, especially regularly salted curves, hills, & intersections. In China, saline moist grassy places, field banks, river valleys, lowland saline abandoned meadows; 100–2000 m (foc).

distribution/range: Introduced from Europe.

Culture: 1,200,000 (ecs, gran) seeds per pound. Plant 4 lb pls per acre in fall or spring for pasture. (gran). Seed 2-3 lb per thousand per Brad James @ TriCo Stockdale (2003 personal communication).

Storage Behaviour: Orthodox; Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 3 years. (RBG Kew).

Thousand Seed Weight: 0.2g; ①0.3072; (RBG Kew); Seed; ** ②0.26776; (RBG Kew); Seed; ** ③0.28; (Grime et al 1981); Germinule;***. ④0.2; (Barclay & Earle 1974); Caryopsis; ***. ⑤0.2952; (RBG Kew); Seed; **. ⑥0.1484; (RBG Kew); Seed; **. ⑦0.2036; (RBG Kew); Seed; ***.

Seed weights reported may include minor covering structures. * Seed mc not stated, but weight is likely to refer to air-dry seed.

Germination data available; ①100 % germ; ; germ medium = 1% agar; germ conditions = 21°C, 12/12; (RBG Kew). ②92 % germ; ; germ medium = 1% agar; germ conditions = 23/9°C, 12/12; (RBG Kew). ③100 % germ; ; germ medium = 1% agar; germ conditions = 21/11°C, 12/12; (RBG Kew).

Oil content: 3.2%. (Barclay & Earle 1974); Entire seed/nut; Moisture content not stated. (RBG Kew).

Salt tolerance. Plant Type: hyhal; Photosynthetic Pathway: C3. RBG Kew).

cultivation: Adapted to moist, or periodically moist, saline soils. Able to tolerate periodic flooding & shallow water tables. Best in medium to fine soils. Full sun. Basic to neutral soils.

Description: Cool-season, short to medium tall, 6-16", perennial, sod-forming, (bunch in granite) with strong shallow, fibrous root system. $N 2n = 28, 42$.

Comments: status: phenology: Blooms June. C3. Moderately palatable. Excellent for cover & erosion control on saline soils. Turf grass. Seed source commercial production.

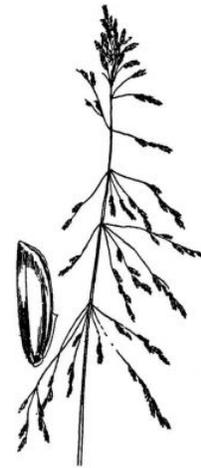
Spontaneous populations occur on most IDOT intersections, salted curves & hills, & cloverleaf exit & entrance ramps. It is widely used in turf & roadside seedings. Species seems to appear spontaneously in the above situations, but IDOT's drooling, brain-dead, knuckle-dragging, nepotistic, Neanderthalic mower jockeys spread it everywhere.

VHFS: Ssp *haptiana* (Trin ex Krecz) WE Hughes, HAUPTIAN ALKALIGRASS, is native to Alaska.

"Fults" is a selection that persists on sandy sites. It produces a dark green sod, does well in lawns & roadsides. "Salty" is also available.

[*Atropis distans* (Jacquin) Grisebach, *A distans* var *limosa* Schur, *Festuca distans* (Wahlb.) Kunth, *Glyceria distans* (Jacq) Wahlenb, *Poa distans* Jacq, *Puccinellia capillaris* (Lilj) Jansen, *P limosa* (Schur) Holmb, *P retroflexa* subsp *borealis* Holmb, *P sevangensis* Grossh]

"The Linnaean name *Poa distans* is a later homonym of *Poa distans* Jacq. Although Linnaeus based his name on a specimen collected by Jacquin there is no evidence to link this specimen with the name *Poa distans* Jacq. Although the Linnaean epithet is illegitimate in *Poa*, it is perfectly acceptable in *Glyceria* and so *Glyceria distans* is taken as the basionym of *Puccinellia distans*." (fop)



Puccinellia distans

SCHIZACHYRIUM Nees **LITTLE BLUESTEM** *Schizachyrium* from the Greek *schizo*, to split, & *achyron*, chaff, referring to the divided lemma. Approximately 60 spp, annual & perennial, mostly tropical & subtropical grasses. Nine spp are native to north America north of Mexico. *Schizachyrium* differs from *Andropogon* & *Bothriochloa* in having only one rame per peduncle (usually), cupulate tips of the rame internodes, convex lower glumes, & the presence of veins between the keels of the lower glumes. $x = 10$.

Schizachyrium scoparium (Michaux) Nash Formerly *Andropogon scoparius* Michaux **LITTLE BLUESTEM**, aka **BROOM**, **BROOM BEARDGRASS**, **BROOM BEARD GRASS**, **BROOM BLUESTEM**, **BROOM GRASS**, **BROOMSEdge**, **BUNCHGRASS**, **COASTAL LITTLE BLUESTEM**, **EASTERN LITTLE BLUESTEM**, **NEW MEXICO LITTLE BLUESTEM**, **PINEHILL BLUESTEM**, **PRAIRIE BEARD GRASS**, **PRAIRIE BEARDGRASS**, **PRÄRIEGRÄS** (SW), **SCHIZACHYRIUM À BALAIS**, **SEACOAST BLUESTEM**, **SMALL FEATHERGRASS**, **WIREGRASS**, (*scoparius* -a -um broom or sweeper, broom-like, brush-like, from Latin *scoparius*, sweeper, broom, a sweeper, from Latin

scopae, scoparum f plural, a besom, broom, for the many stramineous culms resembling broom straws, or for the resemblance of tufts of stems to a crude broom.) Facultative Upland (-)

Habitat: Probably the most abundant of all native grasses, native to 45 states, (occurs in 45 or 46 of the lower 48 states, depending on the source). Mesic, dry, hill, gravel, & sand prairies, dry savannas, occasionally in wetlands. sandy or prairie soils, open woods, dry clearings, uplands or lowlands. Dry to mesic sp.

Culture: Established best by seed. ①No pre-treatment necessary other than cold, dry stratification (pm09). No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ②“No pre-treatment needed. Sow seeds on soil surface at 70°F & water.” (ew12) ③Sow at 20°C (68°F), germination slow. Also, sow at 20°C (68°F), germinates in less than two wks (tchn). No treatment works well, cold moist stratify may help some seed lots with slightly improved & uniform germination for plant production. You can fall plant for germination in April-May, but spring planting is far superior. In spring, plant from April to early June.

Kew data as *Andropogon scoparium*. (Accessed 7/31/14)

Storage Behaviour: Orthodox; Of 11 known taxa of genus *Andropogon*, 100.00% Orthodox(p/?) (Kew RBG).

Thousand Seed Weight: 1.1g; ①1.9; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ②0.6; (Jones & Earle 1966); Caryopsis; Weight refers to seed with 25 % of its outer tissues removed; seed mc not stated, but weight is likely to refer to air-dry seed. ③0.898; (Mazer 1989); Seed. ④0.898; (Mazer 1989); Diaspore; seed plus associated protective structure.

Average of Oil Content (%): 7.2; (Jones & Earle 1966); Entire seed/nut; Moisture content not stated.

Average of Protein Content (%): 33.8; (Jones & Earle 1966); Entire seed/nut; Moisture content not stated.

Kew data as *Schizachyrium scoparium*. (Accessed 7/31/14)

Storage Behaviour: Orthodox. Storage Conditions: Dry seeds (mc not reported) survive overnight in liquid nitrogen (Pence 1991a)

Average 1000 Seed Weight (g): 1.5 ①1.248; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②1.8388; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ③1.592; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ④1.8; (Tilman 1997); Seed. ⑤1.0; (Cromarty et al 1982); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed.

Germination. ①95% germ; pre-sowing treatments = imbibed on 1% agar for 8 weeks at 5°C, then seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 20°C, 8/16; (RBG Kew). ②90% germ; pre-sowing treatments = seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 20°C, 8/16; (RBG Kew).

seed counts: 140,800 (pn02, jfn04), 140,800-260,000 (sh94), 144,000 (aes10), 190,400 (ew12), 200,686 (gna04), 216,190 (gnh03), 229,514 (gnh03), 234,262 (wignh03), 237,883 (gnia05), 238,000 (appl04), 240,000 (pm02), 245,871 (gna04), 260,000 (cci, anon 1981, stock, gran, wns01), 284,016 (gna03), 296,778 (gna03), 308,739 (gna06), 308,844 (gnak06) seeds per pound. (Some of these counts are based on widely available cultivars.)

seeding rates: Seed 2.5-4.5 lbs pls per acre in April or May (some heretic says double when broadcasting, but, **WHERE'S THE SCIENCE?**) *0.50-0.75" deep in the arid southwest* (cci). 14-20 lbs pls per acre broadcast or 8-15 lbs pls per acre drilled. (Anon 1981). Broadcast 1 lb pls per 3000 sq ft. or drill 8 lb pls per acre. (Stocks catalog, math by Enron). Granite says drill 3-4 lb pls per acre for pasture in spring or summer (in Utah!). Some recommend up to 75% little bluestem in dry to mesic short grass mixes, or 50/50 mix of LITTLE BLUESTEM & SIDE OATS GRAMMA in dry & dry mesic plantings. USDA (1997) says in mixes 1-6 lb pls per acre. In small plantings, seed @ 1 lb pls per 1000 ft sq or reclamation seedings at 20 pls lbs per acre (pots). Genesis recommends monocultures spring planting 12 pls lb per acre in *in situ* corn belt soils & 20 pls lbs per acre in reconstructed, bulldozer-smear, urban soils. If there is no establishment maintenance, plant 20-25 lbs pls / ac.

“Andropogon scoparius Mesic to dry. Blooms mid August to mid September; STAMENS MAROON. Harvest October. 3'; culture as above, successful by ALL METHODS. Flowers 1st year; but not sod-forming. Has best fall color of any prairie plant. Warm season grass.” (rs ma)

cultivation: Space plants on 1.0-1.5' centers. Mesic to dry soils, full sun to light shade. Intolerant of wetlands or sub-irrigated sites (gran). Best in coarse to moderately fine soils. Anaerobic tolerance none. CaCO₃ tolerance high. Drought tolerance high. No inundation tolerance. Nutrient load tolerance low. Salt tolerance none,

but some tolerance noted (aes10). Siltation tolerance low. Shade intolerant, full sun. Neutral to basic soils, wide pH range of 5.5-8.4.

bottom line: Plant spring or dormant, but spring plantings develop more readily due to less weed pressure. Germ 62.9, 64, 58, sd 19.2, r22-96 (74)%. Dorm 25, 24.5 6.0, sd 18.9, r0.0-64 (64)%. Test 27, 27, 27, r14-47 days. (#62)**

greenhouse & garden: No treatment works well, cold moist stratify may help some seed lots with slightly improved & uniform germination for plant production. You can fall plant for germination in April-May, but spring planting is far superior. In spring, plant from April to early June.

Description: Perennial tufted, warm season, leafy, bunch grass, medium height 2.0-4.0'; moderately drought tolerant with deep fibrous root system; fine leaves, new shoots have flat bluish basal leaves, somewhat folded along the midrib, awn spirally twisted & bent. N 2n = 40.

Comments: Blooms 8,9,10. C4. In northern Illinois, collect seeds in mid-September - late October. Collect seeds in se Wisconsin in October - November (he99). The seeds mature & are firm while the stems are still green & sappy, making mechanical harvesting very time sensitive. Combine too early & not all the good seed knocks off; too late & some good seed always blows away. Landscaping, a handsome bunchgrass, deep rooted & drought tolerant, but works well in dry rain gardens. Local genetic material has summer foliage in many shades of green, green-blues, & even coppery-purple. Russet-red (rich orange) fall & winter color, with "every color of the flame" (pots). LITTLE BLUESTEM dominated plantings are striking landscapes in the fall & winter. Attractive silvery seed heads good in dried arrangements, the silky seeds appearing to glow when backlit. Moderately aggressive, self-sows in bare soils, decreases under grazing pressure. Useful for improving rangelands. Numerous branched vertical roots help stabilize soil helping control erosion. Seed source nursery production from genetic source Nachusa Grasslands, Nachusa Twp, Lee & Taylor Twp, Ogle counties, plus on farm remnants, Tampico Twp, Whiteside Co, a remnant near Normandy, Greenville Twp, Bureau Co, & sandy remnant, Lee Co. Sold as pure live seed. Fruit is a hairy grain.

LITTLE BLUESTEM is a minor player in some wetlands where it may only be evident during radical drought years. Even if it seems unnecessary, include this in wetland seedings. Floyd Swink said it belonged in wetland plantings, & do you think you're smarter than Floyd? I don't think so.

"Among the most predominant of the *Gramineae*, on the rich, dry, and rolling prairies."

Schizachyrium scoparium (Michx.) Nash as *Andropogon scoparium* Michx. (Short 1845). ("*scoparium*")

"Half the size of BIG BLUESTEM & much more slender. It often grows in large patches & is usually in dry places on high prairies, on sand & in dry open woods." (ewf55)

Associates: Larval host for the AROGOS & MESKE'S SKIPPER; host *Atrytonopsis hianna* DUSTED SKIPPER; *Hesperia ottoe* OTTOE SKIPPER, *Hesperia leonardus* LEONARD'S SKIPPER, *Hesperia metea* COBWEB SKIPPER, *Hesperia sassacus* INDIAN SKIPPER, *Nastra lherminier* SWARTHY SKIPPER, & *Polites origines* CROSSLINE SKIPPER. Attracts upland game birds, songbirds, & small mammals. Provides nesting cover for upland birds, including quail. Upland game birds, songbirds, & small mammals eat seeds. Deer eat leaves & stems, but also reported as deer resistant. Good palatability & nutrition to livestock & wildlife. Occasionally infected with smut, *vide infra*.

VHFS: With the exception of northeast Illinois & IDOT, for better or worse, this grass is placed in *Schizachyrium* Nees. "In *Andropogon*, the lower glumes of the sessile spikelets are flat or concave & the rame internodes are not cupulate, whereas *Schizachyrium* has convex glumes & rame internodes with strongly cupulate apices" (fna).

S scoparium is a wide-ranging sp with considerable variation, some of it clinal. The Midwest has the widespread, highly variable, variety *scoparium*. "It is the most variable of the varieties recognized within *S. scoparium*, with morphological features that vary independently & continuously across its range, coming together in distinctive combinations in some regions. Some of these phases have been named as varieties, or even spp, but they have proven to be untenable taxonomic entities when plants from throughout the range of the sp are considered." (JK Wipff in fna) Varieties *divergens* (Hack) Gould (recorded from Wisconsin), & *stoloniferum* (Nash) Wipff are also recognized.

LITTLE BLUESTEM has an open-pollinated, outcrossing breeding system. The further populations are apart, the more genetically different they are. (Huff 2006)

Sub species include *Schizachyrium scoparium* subsp *divergens*, *S s* subsp *littorale*, *S s* subsp *neomexicanum*, *S s* subsp *scoparium*.

Basionym *Andropogon scoparius* Michaux 1803. At least 50 synonyms as species, subspecies, varieties, subvarieties, & forms are known.



Andropogon scoparius, remnant, & 1st year seeding of production plot



production plot & specimen growing in St Peter's sandstone



Andropogon scoparius with smut(?), Whiteside Co, 2009 & Morocco, Indiana, 2012

Last photo courtesy of Alyssa A Nyberg, The Nature Conservancy, Kankakee Sands Office.

SECALE Linnaeus 1753 **RYE** *Secale* New Latin, from Latin name for rye; or from Celtic *segal*, from *sega*, a sickle. A genus of 3 spp of cereal grasses native to the Mediterranean region & western Asia, having the 2-flowered spikelets in a dense spike, the lemma tipped with a long awn, & the empty glumes one-nerved. $X = 7$.

Secale cereale Linnaeus CEREAL RYE, aka *CENTEIO* (P), *CENTENO* (SP), *HEI MAI* (CH), *HOMIL* (K), *RÂG* (SW), *RAI-MUGI* (J), *ROGGEN* (G), RYE, *SEGALE* (I), *SEIGLE* (F), *SIEGLE CULTIVÉ* (FC), ΣΙΚΑΛΗ, ΣΙΚΑΛΙ, (GR), ΣΙΚΑΛΙΣ Η ΣΙΤΗΡΑ, ΣΙΚΑΛΙΣ Ι ΣΙΤΙΡΑ, (GR) *żyto* (PO), (*cerealis* -is -e pertaining to Ceres, the goddess of agriculture, daughter of Saturn and Vesta, by extension, related to farming or agriculture; grain bearing, from *Cerealis*,

Cerealis, *Cereale*, adj, of or associated with Ceres, suitable for festival of Ceres; of wheat.

Habitat: Does well in coarse soils, better in moderately coarse to moderately fine soils. Introduced from Eurasia.

Culture: Easy to establish & may aggressively spread to surrounding sites. 18,000 (gran), 18,080 (aes10) seeds per pound. Monoculture plant 90 lb per acre in fall or spring (gran).

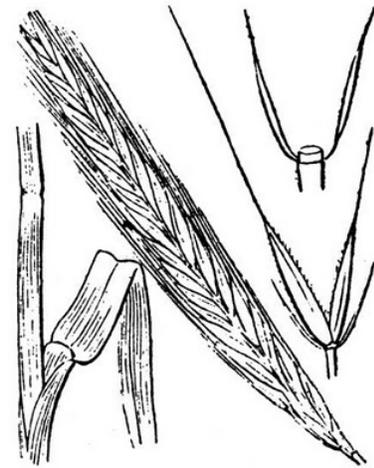
Description: Cool-season, drought-tolerant, tall, annual, introduced grass, very adaptable. $2n = 14, 21, 28$.

Comments: Often used for quick cover or as a soil binder while perennial spp are establishing. In Canada used for the production of rye whiskey. Take two fingers 2X daily. For crop purposes in northern Illinois, plant between September 25 & October 15, earlier risks Hessian fly damage (pre-climate-change dates). Seed source commercial sources.

Secale cereale is often specified as a nurse crop for late fall native seedings. It is dangerously allelochemical & inhibits the growth of many other plants. WINTER RYE'S only "advantage" is its ability to germinate about one week later than WINTER WHEAT. One week's growth does not provide a nurse crop or erosion control. This does not justify the use of this sp as a nurse crop for natives when WINTER WHEAT, REGREEN, or a straw blanket will work.

WINTER RYE. Tolerant of poor soils. Sow in fall, overwinters as a seedling, to 4' in spring. 2 lbs per 1000 ft sq (pots). As green manure, till under before stems get stiff (three nodes).

VHFS: Basionym *Secale cereale* Linnaeus 1753. [*Frumentum secale* EHL Krause, var *cereale* (Linnaeus) EHL Krause, *Secale montanum* Guss, nom inq, *S strictum* (C Presl) C Presl, *Triticum cereale* (L) Salisb]



Secale cereale

SETARIA Palisot de Beauvois 1807 **FOXTAIL GRASS, BRISTLY FOXTAILS, BRISTLY FOX-TAIL GRASS**

Setaria New Latin, from *saeta*, *saetae*, bristle, & and *-arius -a -um*, adj suffix indicating -belonging to, -having, pertaining to. About 110-140 spp of tropical & warm temperate regions. $x = 9$. *Setaria* known to chemically inhibit *Populus* spp. (Chick & Kielbaso 1998) *Setaria faberi*, *S geniculata*, *S italica*, *S verticillata* are C4 grasses.

Setaria glauca (Linnaeus) Palisot de Beauvois [new nomenclature *Setaria pumila* (Poiret) Roemer & JA Schultes subsp *pumila*] #NOX MA YELLOW FOXTAIL, aka *JIN SE GOU WEI CAO*, PALE PIGEON GRASS, PIDGEON GRASS, PIGEON GRASS, YELLOW BRISTLE GRASS, *SÉTAIRE GLAUQUE*, (*glaucus -a -um* gray, bluish-green or gray, covered with 'bloom', from Latin *glaucus -a -um*, bluish- or greenish-gray, from Greek *glaucus*, γλαυκός.)

Habitat: Waste places, cultivated ground, & over-grazed pastures. distribution/range: Common

Culture:

Description: Semi-erect fibrous- rooted, introduced annual(?) / perennial grass; culms; leaves rolled in the bud-shoot; sheaths much compressed, sharply keeled, glabrous, pale green or frequently tinged with purple & red towards base or on the veins, split, loose; hyaline margins sometimes overlapping; auricles absent; collar; narrow, distinct, continuous, glabrous, pale green, purplish or reddish; ligule a fringe of short hairs 1 mm long or less, fused at base; blade 4.0-10 mm wide, 5.0-30 cm long, flat, V-shaped towards base, keeled, soft drooping, taper-pointed, not ridged but midrib prominent, slightly scabrous, light green; upper surface slightly glaucous & bearing long, twisted & flexuous hairs near base; margins smooth or slightly scabrous; heads;

spikes; N. key features: ① Distinguished from *S viridis* by the flexuous, twisted fringe of short hairs 1 mm long or less, fused at base end hygroscopic hairs at the base of the blade & by the absence of cilia on the flattened sheath.

Comments: status: Introduced, naturalized. Prohibited in Massachusetts. phenology: Blooms 6-10. C4. Associates: Human food: cereal. Animal food: fodder (as birdseed). Animal food: forage. Vertebrate poisons: mammals (Kingsbury). Weed: potential seed contaminant.

VHFS: Basionym *Panicum pumilum* Poir. [*Chaetochloa glauca* (L) Scribn, *C lutescens* (Weigel) Stuntz, *Panicum glaucum* L, *P imberbe* var *pumilum* (Poir) Nees, *P pumilum* Poir, *Setaria glauca* (L) P Beauv, *S glauca* auct non (L) P Beauv, *sensu* Vickery, *S glauca sensu* Vickery, *S glauca* var *pumila* (Poir.) Asch. & Graebn, *S glauca* var *pumila* (Poir.) Podp, *S lutescens* (Weigel) FT Hubbard]



Setaria glauca (*S pumila*)

Setaria italica (Linnaeus) P Beauv. ITALIAN MILLET, aka *ALMOREJO* (SP), *CAPIM-VERDE* (PB), DWARF SETARIA, *DZO* (K), FOXTAIL BRISTLE GRASS, FOXTAIL MILLET, GERMAN MILLET, GIANT SETARIA, GREEN BRISTLE GRASS, GREEN FOXTAIL, GREEN FOXTAIL MILLET, *GRÜNE BORSTENHIRSE* (G), HUNGARIAN MILLET, ITALIAN MILLET, *KAVELHIRS* (SW), *KOLBENHIRSE* (G), *KOLVHIRS* (SW), *MJO* (SC), *MJO DE ITALIA* (SP), *MJO MENOR* (SP), *MILHO-PAINÇO* (P), *MILHA-VERDE* (P), *MILLET D'ITALIE* (F), *MILLET DE OISEAUX* (F), *MOHA* (SP), *PANICO* (I), *PANIZO* (SP), *PETIT MIL* (I), *SÉTAIRE D'ITALIE*, *SÉTAIRE D'ITALIE* (F), *SÉTAIRE ITALIENNE*, *SETÁRIA-VERDE* (PB), *SÉTAIRE VERTE* (F), WILD FOXTAIL MILLET, (*italicus* -a -um Italian, of Italian origin.) More common names at <http://www.plantnames.unimelb.edu.au/Sorting/Setaria.html#italica> .

Native of Eurasia. Cultivated as a grain in China (6000 BP or 2700BC) & Stone Age Europe. Closely related to & possibly derived from *S viridis* through cultivation.

Storage Behaviour: Orthodox; Thousand Seed Weight: 2.3g; Oil content:5.0%

Setaria italica (L.) P.Beauv. cv. 'Otsuchi 10' Thousand Seed Weight: 2.2088g

“A rather common escape from cultivation.” (ewf55)

VHFS: [*Chaetochloa italica* (L) Scribn, *Panicum italicum* L, *Setaria italica* (L) P Beauv var *metzeri* (Körn) Jáv, *S italica* (L) P Beauv var *stramineofructa* (FT Hubb) LH Bailey]

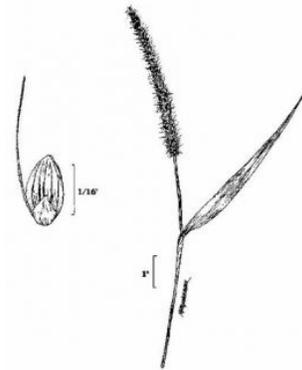




Setaria italica

Setaria verticillata (Linnaeus) Palisot de Beauvois BRISTLY FOX-TAIL, aka HOOKED BRISTLEGRASS, *SÉTAIRE VERTICILLÉ*, (*verticillatus -a -um* verticillate, whorled, from Latin *verticillus*, adjective, the whirl of a spindle, & *-atus*, adjectival suffix for nouns, possessive of or likeness of something with, shaped, made.) Introduced, naturalized. “Not common, being only occasionally found in vacant lots & on roadsides.” (ewf55)

VHFS: [*Chaetochloa verticillata* (L) Scribn, *Panicum verticillatum* L, *Setaria carnei* Hitchc, *S decipiens* Schimp ex Nyman, *S verticillata* (L) P Beauv var *verticillata*]



Setaria verticillata

Setaria viridis (Linnaeus) Palisot de Beauvois GREEN FOXTAIL, aka BOTTLE GRASS, COMMON FOXTAIL, GIANT GREEN FOXTAIL, GREEN BRISTLE-GRASS, GREEN FOXTAIL, (*viridis -is -e* Latin green (general green), fresh, young, vigorous.)

Habitat: Common weed of waste places, cultivated fields, & gardens. distribution/range:

Culture:

Description: Coarse, annual, introduced grass; roots minimum depth; culms semi-erect & branching from the base; leaves rolled in the bud-shoot; sheaths cylindrical or slightly compressed, not keeled, glabrous but sometimes sparse-appressed pubescent, light green or tinged with purple towards base, split; margins pubescent with hairs about 1 mm long (where the margins overlap the inner one is glabrous) auricles absent; collar broad, distinct, continuous, yellowish green or tinged with red, pubescent along base. ligule a fringe of hairs 1 to 2 mm long, fused at base, with the longer hairs towards the edges; blade 4 to 10 mm wide, 5 to 20 cm long, flat, not keeled, gradually tapering to a sharp tip, not ridged but midvein prominent, glabrous, green, scabrous; margins serrulate-scabrous; heads; spikes; N. key features: ①“*S viridis* is readily distinguishable from *S lutescens* by the ciliate margins of the sheath & absence of twisted hairs at the base of the blade. The ligule is longer, the sheath is not compressed & is of firmer texture than in *S lutescens*.” (now1936) ②“Culms are branched from the base, usually geniculate. Var *viridis* has: 1) culms to 75 cm tall; 2) blades to 12 mm

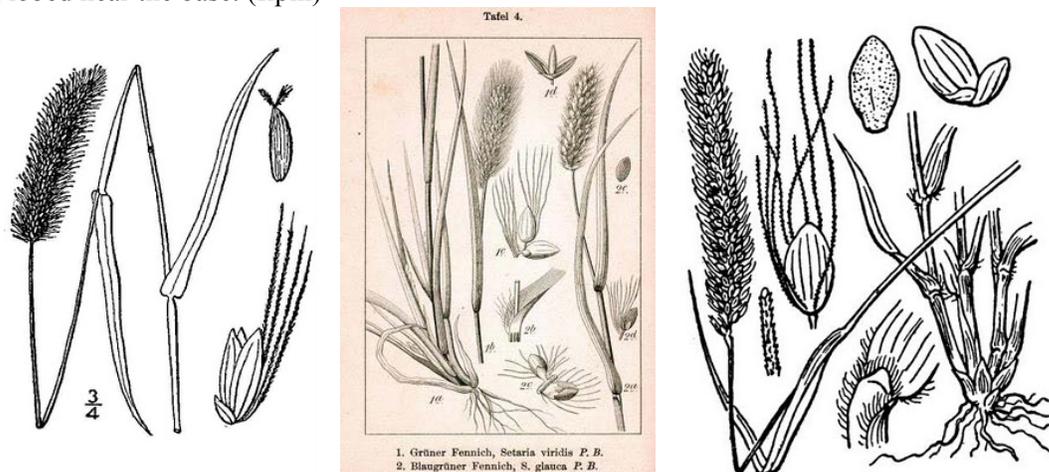
broad, & an unlobed panicle. Versus *S. lutescens*, this sp has smaller spikelets, longer bristles, deeper green leaf-blades that are straight & not half-twisted. (Ilpin)

Comments: status: phenology: Blooms 6-9. C4.

Associates: Endomycorrhizal. Ilpin says this is nitrogen fixing? Economic weed.

VHFS: [*Chaetochloa viridis* (L) Scribn, *Panicum viride* L]

Variety *major* (Gaudin) Pospichal has: 1) culms 1.5-2.5 m tall; blades to 25 mm broad; panicle appearing lobed near the base. (Ilpin)



Setaria viridis

SORGHASTRUM Nash **INDIAN GRASS** *Sorghastrum* New Latin, an inferior sort of *Sorghum*, from Italian *sorgo*, perhaps from (assumed) Vulgar Latin *Syricum* (*granum*), from Latin *Syricum*, neuter of *Syricus*, Syrian, & *granum* grain, & *-astrum*, a Latin suffix indicating an inferior sort, a poor imitation, a wild type. A genus of 18-20 spp of mostly of tropical & subtropical America, two African spp, four in northern North America. Closely related to *Andropogon*, but spikelets are in panicles. x = 10.

Sorghastrum nutans (Linnaeus) Nash **INDIAN GRASS**, aka **FAUX-SORGHO PENCHÉ** (FC), **INDIANGRÄS** (SW), **YELLOW INDIAN GRASS**, **WILD SORGHUM**, **WOOD GRASS**, (*nutans* nodding, from Latin *nuto*, *nutare*, to nod or sway.) Facultative Upland (+)

Habitat: Native in most grassy native communities, hill & sand prairies, dry, mesic, & wet prairies. Prairies, open woods, roadsides, fields, dry slopes.

Culture: ① “No pretreatment considered necessary. May moist cold treat. Light cover. Excellent germination.” (mfd93). ② No pre-treatment necessary other than cold, dry stratification (pm09). No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③ “No pre-treatment needed. Sow seeds just below soil surface at 70°F & water.” (ew12) ④ Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Growth rate moderate to rapid. Seedling vigor medium. Vegetative spread rate slow to moderate. Spreads by seed, somewhat aggressively to the point of being invasive in some plantings.

Storage Behaviour: Orthodox; 80% viability following drying to mc's in equilibrium with 15% RH and freezing for approx 1.34 years at -20C at RBG Kew, WP.

Thousand Seed Weight: 2.0g; ① 2.3296; (RBG Kew); Seed; **. ② 1.9016; (RBG Kew); Seed; **. ③ 2.6; (Cromarty et al 1982); Seed; Mid-point of 1000 seed weight range 2.3-2.9g; ***. ④ 2.1; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ⑤ 1.3; (Earle & Jones 1962); Caryopsis; Weight refers to seed with 53 % of its outer tissues removed; ***. ⑥ 1.458; (Mazer 1989); Seed. ⑦ 2.264; (RBG Kew); Seed; **. ⑧ 2.4184; (RBG Kew); Seed; **. ⑨ 1.838; (RBG Kew); Seed; **. ⑩ 1.7; (Blaney & Kotanen 2001); Seed; stored dry in freezer after collection then weighed. ⑪ 2.28; (Tilman 1997); Seed.

Germination data available; ① 75 % germ; pre-sowing treatments = seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 15°C, 8/16; (RBG Kew). ② 80% germ; pre-sowing treatments = seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 20°C, 8/16; (RBG Kew).

Oil content: 5.6% (Earle & Jones 1962); Entire seed/nut; Moisture content not stated.

Average of Protein Content: 26.9%; (Earle & Jones 1962); Entire seed/nut; Moisture content not stated.

**Seed weights reported may include minor covering structures.

*** seed mc not stated, but weight is likely to refer to air-dry seed.

seed counts & rates: 132,000 (wns01), 132,800-175,000 (sh94), 132,800 (pn02, aes10) 136,256 (jfn04), 164,800 (ew12), 168,000 (gnh01), 168,400; 174,720 (usda), 170,000 (cci, gran), 175,000 (lhn, anon81, stock, ecs), 175,357 (gna03), 180,517, (gna05), 200,000 (agre12), 192,000 (pm), 214,657 (gnhk03), 224,697 (gnaaes04), 302,400 (lhn), 320,000 (gni) seeds per pound. Drill 1/4 to 1/2" deep in April to May, 4 to 6 pls lbs / acre for dry western pastures. Anon 1981 recommends 10-15 lbs acre broadcast. Broadcast 1 lb pls per 2,000 sq ft, or drill 10 pls lbs per acre (stocks). Granite lists 6 lb pls per acre for pasture in spring. In mixes plant 2.5 to 6.0 pls lbs per acre (usda 1997).

Sorghastrum nutans General prairie. Blooms late August to mid September; STAMENS YELLOW. Harvest October. 5'; easy by methods #1 & #2, SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST, NISBET DRILL. Often blooming late 1st year. Warm-season grass. One of the best grasses for fuel & weed competition. Decorative." (rs ma)

cultivation: Space plants 1.5-2.0; centers. Mesic to dry soils, full sun to partial shade. Adapted to wide range of soil textures, coarse to fine, growing where moisture is adequate. Clay soil tolerant. Tolerant of poor drainage. Performs well on well drained bottomlands, but also does well on sandy soils. Prefers mesic prairie zone. No tolerance of inundation in urban restorations. Nutrient load tolerance low. Siltation tolerance low to moderate. Anaerobic tolerance low. CaCO₃ tolerance high. Drought tolerance medium. Fertility requirement low. Salinity tolerance medium. Shade intolerant, full sun. Neutral to acidic to basic soils, wide pH range. pH 5.0-7.8. Some characteristics may vary with the variety.

bottom line: Plant spring or dormant, but spring plantings develop more successfully because of less weed pressure. Flipflop species. Germ 41.1, 40, 14, sd 28.5, r2.0-95 (93)%. Dprm 48.7, 48, 47, sd 28.4, r0.0-87 (87)%. Test 23, 23, 19, r17-37 days. (#39).**

greenhouse & garden: Most easily established from seed. No treatment, can fall plant or sow late April to June. Moist cold stratify may help with some lots. Successional restoration, easy from cold dry stratified seed. The following vary with the variety

Description: Tall, warm-season, long-lived perennial, bunching, sod-forming, native grass, 4.0- 7.0'; individual plants increase by short scaly rhizomes; hairy nodes on stems, leaf sheath with long hairs near collar, deeply notched "horn-like: ligule; N 2n = 20, 40, 80.

"A tall graceful grass that is common in much the same places as big bluestem." (ewf55)

Comments: status: Endangered in Maine. Special Concern in Rhode Island. This taxon is considered weedy or invasive in some parts of its range or under certain applications (SWSS 1998). phenology: Blooms 8,9. In northern Illinois, collect seeds in mid-September - early October. Collect seeds in se Wisconsin in October (he99). Attractive dried seed heads, landscaping, erosion control. Useful for soil stabilization on slopes. Good erosion control but develops over 2 years. Foliage slows run off. One of the more attractive grasses when in seed, with golden plume-like, bending seed heads, above the burnished leaves. "When in bloom it is one of most beautiful of our native grasses, with its graceful bronze-colored panicles & bright yellow anthers" (Mosher 1918). Seedheads picked before the seeds are fully ripe are good in dried arrangements. Attractive reddish-yellow fall & winter color. Aggressive, self sows beyond the planted area. Soil forming, decreases under grazing. Seed sources nursery plantings from genetic source Lake Co, & remnant hill prairie at Depue, Illinois on the south facing bluff of the Illinois River.

Short recognized both *Andropogon ciliatum* Ell. and *A. nutans* L. as species, both are synonyms of *Sorghastrum nutans* (L.) Nash. "Among the most predominant of the *Gramineae*, on the rich, dry, and rolling prairies" *Sorghastrum nutans* (L.) Nash as *Andropogon ciliatum* Ell. and *A nutans* L (Short 1845).

"A tall graceful grass that is common in much the same places as big bluestem." (ewf55)

Economically important for erosion control, ornamental plantings, revegetation, wildlife habitat, & animal forage.

Some commercial varieties commonly used in northern Illinois are very short, quite hairy, pale green, & only vaguely resemble local stock.

Debearded seed is a product that is more free flowing than typical seed. Debearding is not necessary for drilling, broadcasting, or hydroseeding. Debearded seed is a value added product, & obviously more expensive. Debearded grass seeds may dehydrate quicker than other seed, & have problems arising from

mechanical damage. But, as my father said, INDIAN GRASS flows like shit through a tinhorn anyway, so why deheard this sp?

This is the second grass spp to establish in mesic restorations, after CANADA WILD RYE. When planted with BIG BLUESTEM, INDIAN GRASS is successional & will decline in the restoration. INDIAN GRASS will soon seed into the areas adjacent to most plantings, with prevailing fall winds even crossing IDOT rights of way, as Rts 6 & 34, adjacent to Center Prairie. Big Blue & Indian are the heart & soul of the tall grass prairie (pots).

Associates: Larval host *Amblyscirtes hegon*, PEPPER & SALT SKIPPER. Good habitat grass & cover for birds, songbirds, & small mammals. Attracts upland gamebirds, songbirds, marshbirds, muskrats go for roots, good nesting cover. One of most important native forages, highly palatable & very nutritious. Excellent forage for livestock & wildlife, used for pasture & hay. Reported to be deer resistant. Walnut tolerant.

VHFS: Many commercial varieties are available. Some characteristics, such as pH, height, vigor, seed count, &c, may vary with the commercial variety.

Basionym *Andropogon nutans* Linnaeus 1753. [*Andropogon albescens* E Fournier ex Hemsley, *A avenaceus* Mx, *A ciliatus* Elliott, Sketch Bot S Carolina 1: 144 1816, non Thunberg 1784, *A confertus* Trinius ex E Fournier, *A linnaeanus* (Hackel) Lamson-Scribner & Kearney ex Lamson-Scribner & CR Ball, Bull Div Agrostol, USDA 24: 40 1901, nom illegit, *A nutans* Linnaeus, *A nutans* L var *avenaceus* (Mx) Hackel in Alph de Candolle, *A nutans* L var *linnaeanus* (Hackel) Hackel, in Alph de Candolle, Monogr Phan 6: 531 1889, nom inadmiss, *Chalcoelytrum nutans* (L) Lunell, *Chrysopogon avenaceus* (Mx) Bentham, *C nutans* (L) Bentham, *C nutans* (L) Bentham var *avenaceus* (Mx) Trelease ex Branner & Coville, *C nutans* (L) Bentham var *linnaeanus* (Hackel) C Mohr, Bull Torrey Bot Club 24: 21 1897, nom inadmiss, *Digitaria nutans* (L) Beetle, *Holcus nutans* (L) Kuntze ex Stuckert, *H nutans* (L) Kuntze ex Stuckert, var *avenaceus* (Mx) Hackel, in Stuckert, *Rhaphis nutans* (L) Roberty, *Sorghastrum avenaceum* (Mx) Nash, in Britt, *S linnaeanum* (Hackel) Nash, in Small, Fl SE US 66, 1326. 1903, nom illegit, *S nutans* subsp *pellitum*, *S pellitum* (Hack.) Parodi, *Sorghum avenaceum* (Mx) Chapman, *S nutans* (L) Gray, *S nutans* (L) Gray subsp *avenaceum* (Mx) Hackel, in Martius, *S nutans* (L) Gray subsp *linnaeanum* Hackel, in Martius, Fl Bras 2(3): 276. 1883, nom inadmiss, *S nutans* (L) Gray subvar *avenaceum* (Mx) Roberty, *S nutans* (L) Gray, var *genuinum* Hackel, in Martius, Fl Bras 2(3): 274. 1883, nom inadmiss. *Trichachne nutans* (L) BR Baum,]

“.... Below the hill grows a field of high Indian grass that changes color with the seasons: go to see it in the fall, late September, when it has gone red as sunset, when scarlet shadows like firelight breeze over it & autumn winds strum on its dry leaves sighing human music, a harp of voices.”

-----The Grass Harp, Truman Capote





Sorghastrum nutans

SORGHUM Moench **SORGHUM, MILO, JOHNSONGRASS, BROOM CORN** Latinization of the Italian name for the plant *sorgo*, *sorgho*, meaning obscure, perhaps from (assumed) Vulgar Latin *Syricum* (*granum*), from Latin *Syricum* (neuter of *Syricus* Syrian) & *granum* grain. 25 spp of *Sorghum* are mostly native to tropical & subtropical regions of the Eastern Hemisphere, but one is native to Mexico. Two have been introduced into the North America, one invasive. Some spp are grown as forage, even in temperate regions, although they produce cyanogenic compounds. SORGHUMS resemble INDIAN CORN (as opposed to BROOM CORN & CHICKEN CORN), but have leaves saw-toothed on their edges & have spikelets in pairs on a hairy rachis. *Sorghum bicolor* is widely cultivated, being used as a grain, for syrup, & as a flavoring for beer. X = 10.

Sorghum halepense (Linnaeus) Persoon #NOX KY, IL, IN, etc. JOHNSON GRASS, aka ALEPPO GRASS, ALEPPO MILLETGRASS, ALEPPOHIRSE (G), CAÑOTA (SP), CUBA GRASS, EGYPTIAN MILLET, EGYPTIAN-GRASS, EVERGREEN MILLET, FALSE GUINEA-GRASS, GRASS SORGHUM, HERBE DE CUBA, HIERBA JOHNSON (SP), JOHNSONGRAS (AK), MEANS GRASS, MEANS-GRASS, MILLET-GRASS, MOROCCO MILLET, OGRÁSDURRA (SW), SHI MAO (CH), SORGANA (I), SORGHO D'ALEP, SORGO DE ALEPO (SP), WILDE MOHRENHIRSE (G), ZACATE JOHNSON, (*halepensis* -is -e of Aleppo, (Beroea, Syria) a leading city of north Syria, on the caravan route between the Euphrates & the Mediterranean. Beroea was made a Macedonian city by Seleucus Nicator between 301 & 281 BC. It was sacked by Chosroes in AD. 540.) The common name is after Colonel William Johnson, who introduced this sp to his fertile river bottom farm in Alabama around 1840.

Habitat: Waste ground, cultivated ground, along roads & railroads. distribution/range: Originally native to the Mediterranean, but exact range is obscure. This sp is more common in the southern ½ of Illinois, but is known from Henry, Peoria, & Marshall cos. It is so far unknown in our area & experience, but suspicious plants have been seen on I88 near I80 & in the Chicago Metro Storage Conditions: area.

Culture?: Growth rate rapid. Seedling vigor high. Vegetative spread rate rapid. Rapid seed spread rate.

Storage Behaviour: Orthodox; Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 11 years; germination change 100 to 95%, 10 years, 1 collection

Thousand Seed Weight: 5.0g;

Germination data available;

Oil content:3.8%

Further info available at <http://data.kew.org/sid/SidServlet?Source=epic&ID=21920&Num=Lo1>

cultivation: Adapted to coarse, medium, & fine textured soils. Anaerobic tolerance low. CaCO₃ tolerance low. Drought tolerance low. Fertility requirement medium. Salinity tolerance low. Shade intolerant. pH 5.0-7.0.

Description: Perennial, tall coarse grass with stout rhizomes; $2n = 20, 40$, several dysploid counts also reported. key features: Plants perennial, rhizomatous; spikelets disarticulating at maturity; caryopses not exposed at maturity. "Culms are up to 2 m tall; blades are 10-20 mm broad; awn of fertile lemma is 10-15 mm long. Species is smaller than *S X alnum*." (Ilpin) "*Sorghum halepense* with its white leaf vein, wide leaves, & reddish seedhead is distinguished from (1) eastern gamagrass (*Tripsacum dactyloides*), which has flowers in a spike rather than a loose panicle; (2) switchgrass (*Panicum virgatum*), which has no white vein & a greenish-yellow seedhead; 3) big bluestem (*Andropogon gerardii*) & Indiangrass (*Sorghastrum nutans*) which both have narrower leaves & usually lack a prominent vein." (www.inhs.uiuc.edu/chf/outreach/VMG/johnggrass.html)

Comments: status: Noxious weed in Kentucky, Illinois, & Indiana, plus 16 other states. See plants.usda.gov for a complete list. This plant is weedy & invasive. phenology: Blooms 6-10. C4. 119,280 (usda) seeds per pound.

Economically important as animal forage, secondary genetic relative of sorghum, poisonous to mammals, and as a weed of economic significance.

Associates: Allergenic. Allelopathic. ☠ "After a frost, leaves have prussic acid. Also, during hot dry season, develops prussic acid; may also cause nitrate poisoning or photosensitization. HCN is especially high in 1) dark green, short growth; 2) second growth; 3) right before pollination." (Ilpin) Under certain circumstances this species tissues contain hydrocyanic acid & are a positive danger to livestockstock.

VHFS: Basionym *Holcus halepensis* Linnaeus 1753. [*Andropogon halepensis* (L (Brotero), *A miliaceus* Roxburgh, *A sorghum* Brotero, *Blumenbachia halepensis* (L) Koeler, *Holcus halepensis* L, *Milium halepense* (L) Cavanilles, *Rhaphis halepensis* (L) Roberty, *Sorghum miliaceum* (Roxb) Snowden]

"The forage known as JOHNSON GRASS is a selection of *Sorghum halepense*. It introgresses with grain sorghum (*S. bicolor*) where both species grow together." (foc)



Sorghum halepense



SPARTINA Schreber **CORDGRASS, MARSHGRASS, SALTGRASS** *Spartina* (spar-TEEN-a) New Latin, from Greek σπάρτιον, *spartion*, rope, cord, possibly for the resemblance of the creeping rhizomes to a rope; or Greek *spartion*, ESPARTO GRASS, akin to Greek *speira* spiral. The spikes do resemble small ropes to even the unimaginitive. Alternately from Greek σπάρτινη, *spartine*, "a cord made from *spartes*", *Spartium junceum* L, Spanish Broom, referring to the toughness of the leaves. A small genus of 16 (15-17) spp grasses occurring chiefly in salt marshes & interior (usually saline) wetlands of Europe & North & South America, & North Africa, & having stiff culms, panicked spikelets, & flowers with three glumes. Several spp have become serious weeds threatening local ecosystems when established beyond their native ranges. Locally established in China. Wind pollinated. Native spp are self-incompatible. Fruits are grains. $\times = 10$.

Formerly *Limnetis* Richard or *Trachynotia* Michaux.

"All but *S pectinata* are considered hydrophylic & should be either sown as soon as they are collected in late summer (seed will germinate immediately, or if temperatures have cooled, in spring) or kept sealed

under refrigeration until spring. Code A (*) (Cullina 2008) In older references & seed catalogs, it has been noted that *S pectinata* was double dormant & needed warm moist stratification followed by cold moist stratification. When this protocol was initiated, germination typically occurred during warm moist stratification. Other sources noted that the seed should be soaked in water & stored cold, hinting around the point that drying was harmful. Our experience with Illinois seed & seed from other Midwestern states indicates *Spartina* seed is non-dormant, but it has a short shelf life when dry stored in woven poly bags. For almost twenty years, the industry has been dancing around the fact that *S pectinata* seed is hydrophylic & needs stored in sealed plastic containers under refrigeration until planting.

Some job specifications are now being written with a requirement that *Spartina pectinata* & *Sporobolus heterolepis* seed be no more than 6 months old. With *Spartina* being harvested in September to October, this limits its seeding season from November to no later than April. Duh! Many growers do not clean, test, & release new crop seed until February, creating problems with the proposed spec. Appropriate specifications would include something like “*Spartina pectinata* & *Sporobolus heterolepis* seed shall have been cleaned, stored in ziplocks, & immediately placed in cold storage (34-36°F) in a manner to maintain maximum viability prior to seeding” or “*Spartina pectinata* & *Sporobolus heterolepis* seed shall have been cleaned and stored in a manner consistent with recalcitrant seeds that maintains maximum viability prior to seeding.”

Spartina pectinata Link (or Bosc ex Link) (seen as Lind?) *WA PRAIRIE CORD GRASS, aka CORD GRASS, FRESHWATER CORD GRASS, *PRÆRIEMARSKGRÄS* (SW), SLOUGH GRASS, *SPARTINE PECTINÉE*, TALL MARSHGRASS, (*pectinatus -a -um* (pek-ti-NAH-tus) comb-like from the one sided spikes.) Facultative wetland (+)

Habitat: Marshes, wet & mesic prairies; wet savannas, wet ditches. Moist ground along roads, marshes, shores, wet prairies, swamps. Sandy shores & floodplains. Wet meadow conditions, saturated soils to seasonally 3” standing water. “On the Atlantic coast, it grows in marshes, sloughs, and flood plains, being a common constituent of ice-scoured zones of the northeast and growing equally well in salt and fresh water habitats. In western North America, it grows in both wet and dry soils, including dry prairie habitats and along roads and railroads.” (Barkworth in fna). On some dry, saline/alkaline roadside verges in northern Illinois, this sp has persisted for several decades. It also occurs in remnant dry sand prairies.

Culture: ① “Moist cold treatment, or no treatment. Light cover. Fair, but reliable germination” (mdf93). No pre-treatment necessary other than cold, dry stratification (pm09). ② No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③ “Sow seeds just below moist soil surface at 70°F for 1 month. Move to 35°F for 1 month, then gradually raise temps.” (ew12) ④ Sow at 22°C (72°F) in muddy compost for 6 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, then allow temperatures to raise gradually (tchn). No treatment, saturated soils, viability in some seed lots will be low, *Spartina* germinates readily when sown on warm, moist wet soil. Cold moist stratified seed is not necessary. Growth rate rapid. Seedling vigor medium. Vegetative spread rate rapid.

Storage Behaviour: Orthodox; Storage Conditions: 91% viability following drying to mc's in equilibrium with 15 % RH & freezing for 19 days at -20C at RBG Kew, WP.

Thousand Seed Weight: 33.46g; ① 2.9864; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ② 0.71; (Shiple & Parent 1991); Seed; Dry weight. ③ 96.6828; (RBG Kew); Seed; *Seed weights reported may include minor covering structures.

Germination data available. 91 % germ; pre-sowing treatments = seed scarified (covering structure removed); germ medium = 1% agar; germ conditions = 25/10°C, 8/16; (RBG Kew)

Salt Tolerance Plant Type: hyhal; Photosynthetic Pathway: C4? (RBG Kew)

“Seed: Seeds germinate readily in wet soil, and seedlings develop rapidly (Weaver 1954). Varying germination results have been reported. Two greenhouse studies, both with optimum germination temperatures (86°F [30°C] day, 68°F [20°C] night), reported germinations of 70-91% (Eddleman & Meinhardt 1981) & 41% (Shiple & Parent 1991). Seedling survival was high after 4 weeks of moisture stress conditions, although a reduction in growth rates did occur (Eddleman & Meinhardt 1981).” (Walkup 1991)

seed counts & rates: 105,600 (pm02), 106,000 (ecs), 110,000 (wns01), 144,000 (pn02), 146,926 (gnabp07), 167,465 (gnh02), 167,465 (gn03), 167,689 (ecs11), 173,130 (kaste10), 176,448 (gna04), 179,200 (ew12), 204,229 (gnia05), 210,918 (gna11), 252,000 (jfn04), 252,800 (aes10), 2,520,000 (old published count) seeds per pound. In mixes plant 0.125 to 0.25 pls lbs per acre.

“*Spartina pectinata* Moist prairie. Blooms early July to late August; STAMENS CREAM. Harvest late October. 5'; method #1, SEEDLING TRANSPLANT; though viability is low. Growth rapid, plants grow

fast & bloom late 1st year; highly rhizomatous, soon form colonies; good for erosion control in ditches.” (rs ma)

cultivation: Plant plugs & bare root material at the same depth it had been growing, 2-5”±, on 1.0-3.0’ centers, in April or May. Plugs are preferred for establishment, since in the past, some (many) seed lots had low viability, & bare-root divisions from some sources are minimally small. Young transplants work best (us97) as opposed to pot bound second year plants. New plants require rich, moist soil to establish & maintain stands. In an odd contrast, many remnant populations are on sloping, well-drained, often sandy sites, the plants having ‘climbed’ up from now farmed or filled wetlands. Tolerant of clay soils. Tolerant of seasonal flooding. Nutrient load tolerance moderate to high. Siltation tolerance moderate. Anaerobic tolerance high. CaCO₃ tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none (usda) or low to moderate; tolerance noted by AES (2010). Shade intolerant, full sun. pH 6.0-8.5 (usda) or 4.7-7.8.

bottom line: Field sowing in spring is best because of weed pressure, even though many lots are significantly dormant. Curbstone data indicates some seed may germinate the second or third growing season. Flipflop species. Germ 31.7, 20.0, 14, sd 22.8, r11-86 (75)%. Dorm 56.5, 63, 80, sd 23.9, r2.0-82 (80)%. Test 23, 29, na, r19-52 days. (#11:0)**

greenhouse & garden: Viability in some seed lots will be low, due to empty seed or insect damaged seed. Most lots benefit from cold moist stratification. Warm moist treatment is not necessary. *Spartina* germinates readily when sown on warm, moist wet soil.

Description: Perennial warm-season, native grass, 3.0-6.0(7.0)'; strongly rhizomatous; 2n = 40, 40+1, 80 [42, 72, 84 (Mobberly 1956)]

Comments: status: Sensitive in Washington. phenology: Blooms 6,7,8. C4. In northern Illinois, collect seeds in mid-September through October. Collect seeds in se Wisconsin in September - October (he99). Attractive dried seed heads, nice pale gold-brown fall color. Useful in landscaping, moist rain gardens, wetland restoration, & long term erosion control, with aggressive sod-forming root system. Useful in upper shoreline zones, streambank stabilization, upland slope stabilization, & vegetated swales. Annual burning is said to stimulate seed production. Said to compete with REED CANARY GRASS when established. Seed source wet ditches & wet prairie remnants, Green River Lowland, Shaw Station, Lee Co, Illinois River wetlands, Ottawa, LaSalle Co, & CBG, Cook Co.

USDA (1997) noted some lots of this sp’ seed have low viability. Insect damage aside (usually clearly visible), the plants are self-incompatible. Being aggressively rhizomatous, many wild stands are undoubtedly composed of one genetic individual, which would be incapable of producing a significant percentage of viable seed.

Short recognized both *Spartina cynosuroides sensu* Short, &c., non (L) Roth (1806) and *Spartina polystachya sensu* Short (1845), non (Michx) Beauv as species. Both are synonyms of *S. pectinacea* Link, and were noted as “In flat and marshy situations ... the universally diffused ...” (Short 1845).

“A common tall growing marsh grass which is most frequent in wet places in prairie areas.” (ewf55)

Associates: Provides good wildlife cover. Attracts small mammals, songbirds, gamebirds, good nesting cover, especially marsh wrens. Waterfowl eat rootstocks & seeds. Marshbirds, shorebirds, & songbirds eat seeds. Canada geese, mallards, & other ducks eat plants. Aquatic furbearers, esp. muskrats, eat rootstocks & plants. Deer & rodents eat young tender growth, older growth not readily grazed.

Remnant populations vary widely in flower production between years. When seed is formed, much is often insect damaged. Insect damaged seed is easily noted by the exit hole near the base of each seed. (Flower beetles??)

ethnobotany: The pollen of this sp may cause hay fever.

VHFS: [*Spartina cynosuroides* Hitchc f *major* St.-Yves, *S cynosuroides* Hitchc var *aureo-marginata* W Irving, *S cynosuroides* Hitchc var *michauxiana* (Hitchc) St.-Yves, *S michauxiana* AS Hitchc, *S michauxiana* AS Hitchc var *suttiei* Farw, *S michauxiana* AS Hitchc var *tenuior* Farw, *S pectinata* Bosc ex Link var *suttiei* (Farw) Fern, *S pectinata* Bosc ex Link f *pectinata* Link, *S pectinata* Bosc ex Link f *variegata* Vict]

CJ Walkup, 1991, *Spartina pectinata*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2014, August 4].

DG Mobberley, 1956. Taxonomy & distribution of the genus *Spartina*. Iowa State Coll J Sci 30:471-574;



Spartina pectinata

2nd photo by Jock Ingels.

SPHENOPHOLIS Scribner **WEDGEGRASS** *Sphenopholis* from Greek σφήν, *sphene*, wedge, & φολίς, φολιδ-, *pholis*, *pholid-*, scale, for the upper glumes, referring to broadly ovate or wedge-shaped second glume. A genus of 5-6 annual & perennial grasses of North America. $x = 7$.

Sphenopholis intermedia (Rydberg) Rydberg **SLENDER WEDGE GRASS**, aka *SPHENOPHOLIS INTERMÉDIAIRE*, (*intermedius -a -um* intermediate between two forms, as in shape or color, indicating that a sp was halfway between two other spp in regard to one or more characteristics; a space between two parts; or in reference to a hybrid being intermediate between its parents.) fac

Habitat: Wet meadows, moist woods, & moist prairie agricultural wetlands. Species has a tendency to be a greenhouse & plant holding area weed.

Culture: ① Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Fall plant, light. Abundantly self-sows.

Storage Behaviour: Orthodox p. Storage Conditions: 100% viability following drying to mc's in equilibrium with 15% RH and freezing for 1 month at -20°C at RBG Kew, WP.

Average 1000 Seed Weight(g): 2.8; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. (RBG Kew).

Germination ① 100% germ; ; germ medium = 1% agar; germ conditions = 25/10°C, 8/16; (RBG Kew).

② 78% germ; ; germ medium = 1% agar; germ conditions = 25°C, 8/16; (RBG Kew).

seed counts & rates: 4,365,385 (gnh15), 4,536,000, 4,544,000 (aes10), 4,961,237 (gnh02), 8,000,000 (gn) seeds per pound.

availability: Sp is not in the native seed trade. "Alas poor Yorick, I knew him well." Currently unavailable as seed or plants as of 2010, 2011, &c. *Yu ta hey*. Listed by AES.

cultivation: "Prefers damp to wet, seasonally wet, & clay soils" (aes10)

bottom line: If you can find it in a farmed wetland or for sale, dormant seed for for insurance , as 1/3 of lots may be 50% dormant. Germ 68.5-77%. Dorm 0.0-50%. Test 21-34 days.** (#5)

Description: Short-lived perennial, early successional native grass, 1.5-2.5', panicle loose, $2n = 14$. "It differs from *Koeleria macrantha*, with which it is sometimes confused, in its more open panicles & in having spikelets that disarticulate below the glumes." (fna)

Comments: Blooms 5,6,7. In northern Illinois, collect seeds in late June- early July. Wetland restoration, bunch type, cool season, short-lived. Seed source formerly nursery production, genetic source farmed wetland SE Whiteside Co.

If you propagate this species it will become a nursery & greenhouse weed. Do not let it go to seed in flats. Appears to be an early-successional, seed bank sp in some wetland soils, wildly successful for several years, then quickly declining. Seeds are readily dispersed by wind.

VHFS: At one time known as *S obtusata* (Michaux) Scribn var *major* (Torr) Erdman.

[*Eatonia intermedia* Rydb, *Koeleria truncata* var *major* Torr, *Koeleria pensylvanica* [as "pennsylvanica"] var *major* (Torr) Torr, *Reboulea pensylvanica* [as "pennsylvanica"] var *major* (Torr), *Eatonia pensylvanica* [as "pennsylvanica"] var *major* (Torr) A Gray, *Sphenopholis pallens* subsp *major* (Torr) Scribner, *S pallens* var *major* (Torr) Scribner ex BL Rob, *S obtusata* var *major* (Torr) Erdman, *S intermedia* Rydb Rydb var *pilosa* Dore in McNeill & Dore, *S intermedia* var *macranthera* B Boivin, *S obtusata* (Michx) Scribn var *major* (Torr) Erdman, *Vilfa alba* Buckley non (L) Adanson (1763), nec P Beauv]



Sphenopholis intermedia

Sphenopholis obtusata (Michaux) Scribner *ME, NH, NY, OH, RI, VT PRAIRIE WEDGE GRASS, aka BLUNT SPHENOPHOLIS, PRAIRIE WEDGEGRASS, *SPHENOPHOLIS OBTUS*, (*obtusatus -a -um* blunt, dull, obtuse.) fac

Habitat: Sand prairie, woods & prairies.

Culture: No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (Heon et al 1999) No treatment, light. 200,000 (aes10) seeds per pound.

Storage Behaviour: No data available for species. Of 1 known taxa of genus *Sphenopholis*, 100.00% Orthodox(p?). (RBG Kew)

Thousand Seed Weight: 0.537g. Average 1000 Seed Weight(g): 0.537. ①0.9832; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.09; (Stevens 1957); Seed; Weight refers to air-dry seeds.

availability: Sp is not in the native seed trade.

Description: Erect native bunch grass, 0.5-1.5'; panicle dense & spikelike; $2n = 14$.

Comments: status: Possibly Extirpated in Maine. Endangered in New Hampshire, New York, & Vermont. Threatened in Ohio. Special Concern in Rhode Island. phenology: Blooms 6,7. In northern Illinois, collect seeds in June. Collect seeds in se Wisconsin in August (he99). Cool season, bunch type. Known from the native landscape at John Deere Silvis.

VHFS: Basionym *Aira obtusata* Michaux. [*Aira obtusata* Michx, *S obtusata* (Michx) Scribn fo *obtusata*, *S o* (Michx) Scribn fo *purpurascens* (Vasey ex Rydb & Shear) Waterf, *S o* (Michx) Scribn var *lobata* (Trin) Scribn *S o* (Michx) Scribn var *pubescens* (Scribn & Merr) Scribn, *S o* (Michx) Scribn subsp *lobata* (Trin) Scribn, *S o* (Michx) Scribn subsp *pubescens* (Scribn & Merr) Scribn, *S o* (Michx) Scribn var *lobata* (Trin)

Scribn ex BL Rob, *S o* (Michx) Scribn var *major* (Torr) Erdman, *S o* (Michx) Scribn var *obtusata*, *S o* (Michx) Scribn var *pubescens* (Scribn & Merr) Scribn ex BL Rob]



Sphenopholis obtusata

Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

Sphenopholis nitida (Biehler) Scribner SHINY WEDGEGRASS,

“Uncommon in Kent Creek bottom at Fannan’s Crossing & in the bottom land woods on Kishwaukee River in this & in Boone Co.” (ewf55 as *Sphenopholis nitida* (Spreng) Scribn)



Sphenopholis nitida

SPOROBOLUS R Brown 1810 **DROPSEED, RUSHGRASS** *Sporobolus* New Latin *spora*, akin to Greek σπορά, σπορος, *spora*, *sporos*, seed, the act of sowing, spore, as in *speirein* to sow, strew, & from βάλλω, *ballo*, to cast, to throw, literally the seed thrower; related to sprout, spore. Wind pollinated. Fruit is a grain (kk)? The fruits differ from most grasses, being utricles or achenes, with the pericarp free from the seed, becoming mucilaginous when moist in most spp, or remaining dry & partially adherent to the seed, in *S heterolepis* & *S clandestinus*. The seeds are sometimes forcibly ejected when the mucilaginous pericarp dries, hence the genus name. (*Calamovilfa* also has fruits with a free pericarp.) About 160 spp of annuals & perennials of tropical, subtropical, & warm-temperate regions of the New & Old World. In all US states except Alaska. Too bad Sarah Palin, maybe you could have shot some from a plane. x = 9.

“GENUS VI. SPOROBOLUS. R. Brown.

Spikelets one or rarely two-flowered, in a contracted or open panicle, paleæ longer than the unequal glumes; stamens two or three; grain a globular utricule, containing a loose seed, deciduous.” (Lapham)

Sporobolus airoides (Torrey) Torrey ALKALAI SACATON (*airoides* airo'ides (air-OH-i-dees) resembling HAIR GRASS, *Aira*, from Greek αἰρα-οειδής, *aira-ooides*, from αἰρα, *aira*, for a crop weed & and -οειδής, *-ooides*, adjective suffix for nouns: like, resemble.)

Habitat: Western alkaline prairies, fine textured soils. Not native to the TallGrass Prairie, but occasionally specified in Midwest erosion control seedings.

Culture: No treatment. ①Seeds must undergo an afterripening period of several months for good germination (Aldon 1975). ②Seed stored at 50°F and 50% RH, direct field seeded with drill late winter early spring; 90% emergence within several weeks of irrigation (Esquivel 2001). ③Seed dormancy is physiological dormancy. Germination occurs at 35°D/20°N C alternating temperature cycle (bb02).

④Guidelines for establishing ALKALI SACATON from seed on harsh sites:

Plant when soil moisture is at least 14% or higher

Plant when probabilities for weekly precipitation are greatest and soil temperatures will be near 86 degrees Fahrenheit (30°C)

Use large seeds at least 1 year old.

Saturate the planting site just prior to planting.

Cover seed with about 1/2 inch (13 mm) of mulch to keep conditions moist and dark

If rainwater does not deposit at least 6 mm of rain within the first 5 days, rewater to bring the soil to saturation.

⑤Storage Behaviour: Orthodox; Storage Conditions: 94% viability following drying to mc's in equilibrium with 15% RH and freezing for 9 years at -20°C at RBG Kew, WP.

Thousand Seed Weight: 0.26g; ①0.26; (Felfoldi 1980); Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. ②0.2692; (RBG Kew); Seed; *Seed weights reported may include minor covering structures

Germination ①94% germ; pre-sowing treatments = seed scarified (pericarp excised from along proximal to distal ridge above embryo); germ medium = 1% agar; germ conditions = 30°C, 8/16; (RBG Kew).

Salt Tolerance Plant Type: psamm; Photosynthetic Pathway: C4. (RBG Kew);

A seed-storage study in Utah reported 99% germination in alkali sacaton seeds that were stored in an open, unheated, uncooled warehouse for 7 years (Johnson 2000).

seed counts & rates: 1,758,000 (gran), 2,000,000 (cci) seeds per pound. 615,909 seeds per kg (Esquivel 2001). Drill 1/2" when soils are warm (in the arid west). Drill 2-3 pls lbs per acre in late summer for pasture (gran). Easy to establish. Small projects plant 0.25 lb pls per acre; or 6 pls lbs per acre for reclamation (pots).

cultivation: Does best on deep, moist, fine-textured soils, but will persist on coarser soils on drier sites. Moderately coarse to fine soils. Will do well on saline or sodic soils. Basic to neutral soils.

Description: Perennial, warm-season, coarse, perennial bunch grass, culms medium tall to tall, 2-5; with extensive fibrous root system; bluish foliage; light airy seed heads; N 2n = 80, 90, 108, 126.

Comments: Tolerant of flooding, medium palatability when green; attractive grass, ornamental. Good stabilization for blowing sand. Commercial varieties available.

Economically important as erosion control, revegetation, animal fodder & forage, & as a potential seed contaminant.

Associates: Provides valuable cover for birds & small mammals. Water movement in floodplains distributes the seed.

VHFS: Basionym *Agrostis airoides* Torrey. [*Sporobolus airoides* (Torr.) Torr, *S airoides* subsp *airoides*, *S airoides* var *airoides*, *S airoides* var *minor* (Vasey) Beetle, *S airoides* subsp *regis* (IM Johnst) Wipff & SD Jones, *S airoides* var *wrightii* (Munro ex Scribn) Gould]

EF Aldon 1975. Establishing ALKALI SACATON on harsh sites in the Southwest. *Journal of Range Management*. 28(2): 129-132.

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Sporobolus airoides* Torr. plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL:

<http://www.nativeplantnetwork.org> (accessed 5 August 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

RG Esquivel, 2001. Propagation protocol for production of field-grown *Sporobolus airoides* (Torr)Torr plants; Natural Resources Conservation Service- James E. "Bud" Smith Plant Materials Center, Knox City, Texas. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 5 August 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

KA Johnson, 2000. *Sporobolus airoides*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2014, August 5].



Sporobolus airoides

Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image.

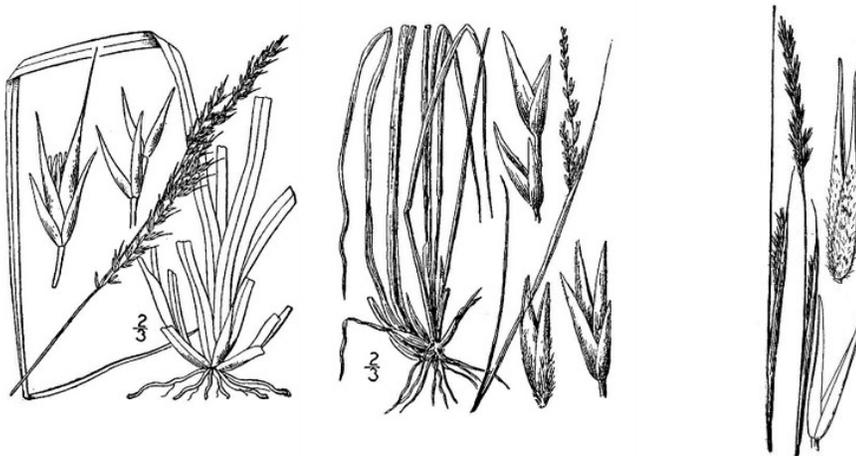
Sporobolus clandestinus (Sprengel) Hitchcock HIDDEN DROPSEED, (*clandestinus -a -um* clandestin'us (klan-des-TIE-nus) concealed, hidden, from *clandestinus*, *clandestina*, *clandestinum*, adj, secret, hidden, concealed, clandestine; acting, done, made secretly or silently; often referring to hidden, invisible flowers.)

Habitat: distribution/range:

“This perennial dropseed resembles in general aspect the above (*S asper*) except that it is more slim. The pubescent lemma is distinctive. We have found it only in the dune area west of Shirland.” (ewf55)

“Pericarps loose, but neither gelatinous nor slipping from the seeds when wet (fna).”

VHFS: *Sporobolus clandestinus* (Biehler) AS Hitchcock



Sporobolus clandestinus

Sporobolus compositus (Poiret) Merrill var **compositus** * CT, ME, RI, VT ROUGH DROPSEED, aka COMPOSITE DROPSEED, LONGLEAF DROPSEED, *SPOROBOLUS RUDE*, (*asper -era -erum* (AS-pir, AS-pir-a, AS-pir-um) rough, sharp to the touch, from Latin *asper*, *asper*, adjective, rough, in reference to the surface texture.) upl

Habitat: Railroad prairies, roadsides, disturbed prairies, in dry, often sandy soil. distribution/range: General range centered on the Plains, east to ne USA.

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 70°F & water.” (ew12) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). No treatment.

seed counts & rates: 480,000 (pm, ew12, spoasp40l68 agrecol), 500,000 (gnhe14), 549,637 (gnm11), 591,917 (gnam08) seeds per pound.

cultivation: Space plants 1.0-1.5' centers. Dry soils, full sun to partial shade.

bottom line: Plant spring or dormant, but some lots are have significant dormancy (23-77%). Flipflop sp. Germ 58.1, 61, na, sd25.5, r21-99 (78)%. Dorm 32.9, 31, 31, sd 23.5, r0.0-77 (77)%. Test 36, 37, na, r20-50 day**

Description: Culms 1.5-3'; N 2n = 54, 88, 108. key features:

Comments: status: Special Concern in Connecticut & Rhode island. Endangered in Maine & Vermont.

phenology: Blooms 9-10. C4. Collect seeds in se Wisconsin in October - November (he99). The pericarps are gelatinous & slip from the seed when wet.

According to Swink & Wilhelm (1994), this plant has the ecology of an invasive & is increasing in the Chicago region. In our area, weedy dropseeds are starting to dominate some disturbed rural roadsides and interstate medians. It is a beautiful grass, with good fall color, but this one is best left alone. ISTHA perhaps.

“A grass of dry soil which is common in our sand areas & also on high prairies & the sandy prairies in the Camp Grant area” (ewf55).

VHFS: Sp was forever known as *Sporobolus asper* (Michx) Kunth. In more current treatments, this sp complex is called *Sporobolus compositus* (Poirot) Merrill. Variety *compositus* is the most widespread. This sp has an autogamous breeding system, creating a difficult assemblage of forms. Spreading by rhizomes helps maintain unique character combinations in local populations. (Riggins 1977)

[*Sporobolus asper* (Mx) Kunth, *S asper* (Mx) Kunth var *asper*, *S asper* (Mx) Kunth var *hookeri* (Trin) Vasey, *S asper* (P Beauv) Kunth var *hookeri* (Trin) Vasey, *S asper* (P Beauv) Kunth]

R Riggins, 1977. A biosystematic study of the *Sporobolus asper* complex (*Gramineae*). Iowa State J Res. 51:287-321.



Sporobolus asper

Sporobolus cryptandrus (Torrey) A Gray *CT, NH, PA SAND DROPSEED, (*cryptandrus* -a -um with hidden stamens or anthers, from Latin *crypta*, from Greek κρύπτη, *krypte*, vault, from κρυπτός, *kryptos*, hidden, concealed & modern Latin -*andrus*, from Greek -ανδρος -*andros*, adj ending, from άνδρ-, *andr*-, stem of άνήρ, *aner*, man.) facu-

Habitat: Disturbed sand prairies, & open sand savannas. Dry sandy flats along the Mississippi River. Loess hills & pahas. Infrequent on exposed limestone soils. Characteristic of very sandy soils, often disturbed soils. Sandy black oak woods. Dry sandy soils, but west performs well on medium textured soils. Thrives on sandy sites. distribution/range: Occasional in northern 1/3 & western cos, absent elsewhere.

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (Heon et al 1999) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Growth rate moderate. Seedling vigor low. Vegetative spread rate none. Spreads rapidly from seed.

seed counts & rates: 1,636,036 (gnae08), 2,000,000 (agrecol07), 3,200,000 (pm), 4,000,000; 4,090,090 (gnabm06), 4,184,331 (gnh02), 5,072,626 (gnam09), 5,298,000 (gran), 5,300,000 (stock), 5,600,000 (cci, ecs), 5,600,080 (usda), 6,872,727 (gnhh12) seeds per pound. Drill 0.50" deep in fine textured soils 0.5 pls lbs per acre for pasture. Broadcast 1 pls lb per acre or drill 0.5 pls lb per acre. (stocks) Establishes easily. Granite says 1 lb pls per acre in late summer alone. Small projects seed 0.25 pls lbs per 1000 ft sq, or for reclamation plant 6 pls lbs per acre (Pots 2000).

cultivation: Best in coarse to moderate soils. Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance high. Fertility requirement low. Salinity tolerance medium. Shade intolerant. Neutral soils, acidic & basic tolerance, pH 6.6-8.0

bottom line: Dormant seeding is best, with 50% of lots significantly dormant (20% to 64%). Germ 56.8, 66.5, na, sd 26.4, r6.0-85 (79)%. Dorm 32.3, 21.5, na, sd 28.2, r4.0-89 (85)%. Test 32, 32, na, r27-36 days.**

greenhouse & garden: No treatment, moist cold stratification may help.

Description: Warm-season, medium tall, perennial bunching native grass, very drought tolerant; roots 18" minimum root depth; culms 1-4', all the culms in a stand curve the same direction; leaves; sheaths with transparent margins; auricles; collar ring of short stiff hairs around leaf collar; ligule; blade flat & about 1/8 wide, blades have finely toothed margins, leaf blade below inflorescence is normal to the stem; heads; spikes; N. key features: ① "Species has tufted or solitary culms sheaths densely villous; panicles enclosed in the sheaths for varying lengths, panicles open." (Ilpin)

Comments: status: Endangered in Connecticut. Threatened in New Hampshire. Rare in Pennsylvania.

phenology: Blooms June - August. C4. Collect seeds in se Wisconsin in October - November (Heon et al 1999). Very good for reclamation & erosion control of sandy land. Will out perform sand love grass on hot, dry sandy sites, & may become aggressive on these sites. Useful for erosion control on these sites. Establishes quickly from seed. Quickly colonizes vacant sandy land, palatability low, fair winter forage. May be short-lived. Seed source native stands DeKalb Co.

"Common in all sand areas, for that reason called sand drop-seed. Easily recognized by the tuft of hairs at the top of the sheath." (ewf55)

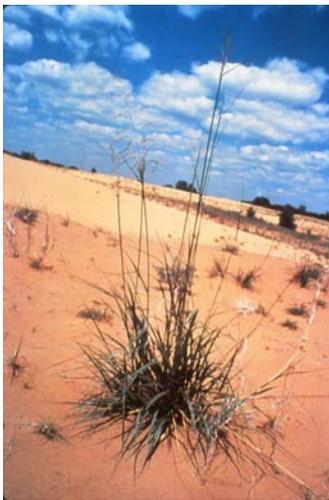
"12. SPOROBOLUS CRYPTANDRUS, Gray.

SYN.—*Agrostis cryptandra*, Torrey. *Vilfa cryptandra*, Torr.

Leaves flat; panicle pyramidal, terminal, partly inclosed, the axils hairy, the upper glume lanceolate, rather acute, twice the length of the lower one, as long as the nearly equal paleæ, sheaths strongly bearded at the throat. Perennial: grows in sandy soil, two to three feet high, flowering in August." (Lapham)

Associates: Granite notes good palatability to livestock & wildlife, but sp is considered an invader in Midwest, where livestock prefer it less than other grasses. Provides food & cover for wildlife. SAND DROPSEED increases on sites that are overgrazed during the summer.

VHFS: [*Agrostis cryptandra* Torr]





Sporobolus cryptandrus

1st photo by Don Pretzsch

Sporobolus heterolepis (A Gray) A Gray *CT, KY, MA, MI?, NY, NC, OH, PA PRAIRIE DROPSEED, aka NORTHERN DROPSEED, NORTHERN PRAIRIE DROPSEED, *SPOROBOLUS À GLUMES*, (variably scaled, from Greek *heter-* *heteros*, variable, different, not-alike, & *lepid-*, *lepis* scale, flake, small plate, capsule.) facu-
Habitat: Mesic to dry prairies, uplands occasionally dominant in wet mesic prairies on the south side of Chicago. Dry soil, rocky prairies, dry open ground. distribution/range: Occasional in n. 1/2 Illinois, rare south.

Culture: Seed must be allowed to fully ripen for good germination. Easy from fully ripe, dry stratified seed, which should remain sealed in cold storage until sown. ①“No pretreatment necessary. May moist cold treat. Light cover. Variable, very good to fair germination” (mfd93). ②No pre-treatment necessary other than cold, dry stratification. It is beneficial to store the seed in ziplocks in the refrigerator until sown. (pm09). ③Flood et al (2001) recommends cold moist stratification for 90 – 120 days @ 34-36° F & germination at 70-80° days & 65-75° nights. ④“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 70°F & water.” (ew12) ⑤Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Growth rate moderate. Seedling vigor medium. Vegetative spread rate none. Occasionally volunteers, but does not freely self sow.

seed counts & rates: 174,000 (lhn91), 174,000-224,000 (shirley), 197,391 (gnh02), 199,473 (gna04), 223,590 (gna03), 224,000 (pn02, jfn, aes10), 232,701 (gna05), 240,000 (ew12), 256,000 pm, 272,154 (gnhk02), 481,000 (wns01), 1,200,000 (usda, ecs) seeds per pound. Anon 1981 recommends 4-6 lbs per acre (but this is cost prohibitive, & this sp is very slow from seed).

availability: Plugs may be in seasonal short supply. Quarts & gallons are limited & are best contract grown. Seed is in moderately good supply, but any particular ecotype may be limited.

“*Sporobolus heterolepis* General prairie. Blooms August; inconspicuous. Harvest October September 21. 2 1/2'; method #1, blooming 1st year if planted early. Best by SEEDLING TRANSPLANT, but a few emerge with SPRING BROADCAST & FALL BROADCAST. The most ornamental of all our grasses, suitable for formal gardens.” (rs ma)

cultivation: Space plugs 1.25-1.5' centers, larger plants 1.5-2.0'. Anaerobic tolerance none. CaCO₃ tolerance low. Drought tolerance medium. Fertility requirement medium. Salinity tolerance none. Shade tolerant intermediate. pH 6.0-7.2.

bottom line: Warm season grasses are best field sown in spring because of weed pressure, although seed test data indicate most lots benefit or strongly require dormant seeding. The fact that this sp may be recalcitrant may cloud the dormancy issues as recalcitrancy has clouded the growing of many native spp for decades. Germ 41.8, 42, 28, sd 22.8, r2.0-95 (93)%. Dorm 32.6, 29, 0.0, sd 22.4, r0.0-72 (72)%. Test 35, 36, 27, r21-48 days.**

greenhouse & garden: Easy from seed, moist cold stratify 60+ days or dormant seed in an unheated coldframe. For insurance, have prop stock germ tested before planting untreated seed in greenhouse (TZs are of no value here). Bottom heat helps, successional restoration.

Description: Fine-textured, ornamental, warm season clump-type, long-lived perennial, native grass; culms to 2.0-3.0'; 12" minimum root depth; leaves medium green, fine textured & hair-like; fruits without a loose

pericarp is noted in FNA. This is the only *Sporobolus* sp noted as such in FNA. I call shotgun on the new genus name, *Zevonus*, after Warren Zevon. $N 2n = 72$. key features: ①“Tufted with erect wiry culms. Involute leaves a specific identifier. Conspicuous large clumps of handsome, narrow, almost hair-like blades, which are mostly basal & curl or arch backwards. Long exerted, open panicles, purple to blackish.” (Ilpin)

Comments: status: Endangered in Connecticut, Kentucky, Maryland, North Carolina, & Pennsylvania. Special concern in Michigan? Threatened in New York & Ohio. phenology: Blooms 8-9. C4. In northern Illinois, collect seeds in mid September through mid October. Collect seeds in se Wisconsin in September - October (he99). There is a tendency to pick this dropseed too early; the seeds must be toasty-brown ripe for the highest viable seed. Slow growing & slow to establish from seed. In flower beds with rich organic soils & regular foliar feeding, well spaced plants become large significantly quicker. Attractive, aromatic dried seed heads stripped of seed are great filler in dried arrangements. Landscaping, specimen plants, massed plantings, green hummocks in spring & summer, fall & winter adding a graceful, flowing texture. Forms a ground cover when planted on 1.0-1.5' centers. Large plants are attractive where the foliage can trail down a ledge, as a rug juniper might (*vide infra*). Occasional plants have an attractive reddish (burnt orange) fall cover. The inflorescences are aromatic, some liken the smell to hot buttered popcorn, sunflower seeds, cilantro, or coriander, while the rare individual is totally alienated by the odor. Seed source nursery production plots, original material from Green River Lowland, Lee Co, & CBG Cook Co.

Western & northern ecotypes are not as robust as northern Illinois materials. We have found a clump north of Ohio, Illinois that is 4 feet in diameter. Russell Kirt, College of DuPage retired, liked to plant a *Baptisia leucophaea* seed in every dropseed plug he planted at the college.

“Among the most predominant of the *Gramineae*, on the rich, dry, and rolling prairies. ... Among these, I believe, the *Vilfa*, before mentioned, is a general favorite, both for grazing and for hay” *Sporobolus heterolepis* A. Gray as *Vilfa heterolepis* A. Gray (Short 1845).

“Rather common on high prairies but not on sand.” (ewf55)

Associates: Provides food & cover for wildlife. Attracts songbirds, small mammals, important food source. Upland gamebirds, songbirds, & small mammals eat seeds. Deer eat plants. Eat the deer, venison makes great chili. Walnut tolerant.

VHFS: [*Sporobolus heterolepis* Gray, *Vilfa heterolepis* A Gray]

RM Flood, G Blessman, & DJ Horvath, 2001. Propagation protocol for production of container *Sporobolus heterolepis* (Gray) Gray plants (1+0 container plugs), Illinois Department of Natural Resources - Mason State Nursery, Topeka, Illinois. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 2 August 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.





Sporobolus heterolepis

Last photo I74 Peoria, by James Bubulcus Alwill.

Sporobolus neglectus Nash *CT, ME, MD, MA, NH, NJ PUFFSHEATH DROPSEED, aka SHEATHED DROPSEED, SMALL DROPSEED, SMALL RUSHGRASS, HYPHENS NOT WITHSTANDING, *SPOROBOLÉ NÉGLIGÉ*, (*neglectus -a -um* Latin neglected or overlooked.)

Habitat: distribution/range:

Culture:

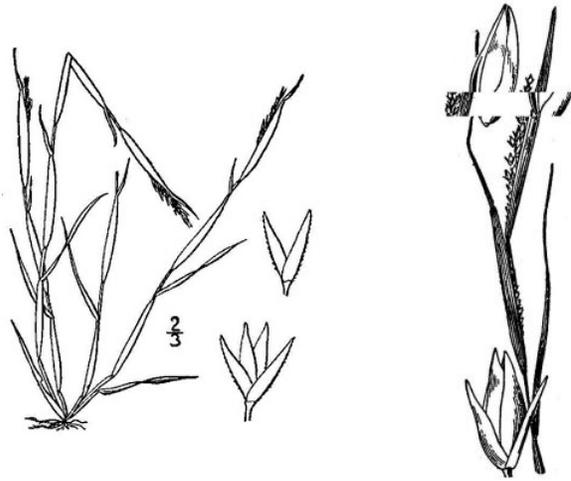
Description: Tufted delicate annual grass; roots minimum depth; culms 10-45 cm; $N 2n = 36$. key features: ①“*Sporobolus vaginiflorus* is very similar to *S neglectus*, but it differs in having strigose lemmas, sheaths that are sparsely hairy towards the base & usually, longer spikelets (Peterson, Hatch, & Weakly in fna). “Like *S vaginiflorus*, but with smaller spikelets. Species has contracted panicle. (Ilpin)

Comments: status: Special Concern in Connecticut. Possibly Extirpated in Maine. Endangered & Extirpated in Maryland. Endangered in Massachusetts, New Hampshire, & New Jersey. phenology: Blooms 9-10. Often with *S vaginiflorus* & overlooked because of that (Ilpin). Sounds convenient & fishy.

“Common on the high prairies on Owen Twp & uncommon on River road south of Cherry Valley but not found on the sandy prairies about Camp Grant where *S vaginiflorus* is common. This & the next (*S vaginiflorus*) are annual; the other spp being perennial.” (ewf55)

Associates:

VHFS: [*Sporobolus vaginiflorus* (T&G) Wood var *neglectus* (Nash) Scribn]



Sporobolus neglectus

Sporobolus vaginiflorus (Torrey ex A Gray) Alph W Wood NORTHERN RUSH GRASS, aka POVERTY DROPSEED, POVERTY GRASS, *SPOROBOLUS ENGAINÉ*, (*vaginiflorus* -a -um New Latin with a sheath & a flower, or flower in a sheath.)

Habitat: Glades, barrens, open disturbed sites, commonly with sandy to sandy-clay soils. Cherty openings in woodlands. In & around our nursery, it grows along the sandy edge of limestone drives & blacktop roads.

distribution/range:

Culture:

Description: Tufted, delicate annual native grass; flowers; $N 2n = 54$. key features: “& short, usually contracted, panicles. However, this sp has larger spikelets. Cespitose, culms erect to spreading similar (sic) to *S neglectus* in annual habit” (Ilpin).

Comments: status: This sp is considered weedy or invasive in parts of its range (Stubbendieck et al 1994).

phenology: Blooms 9-10. C4. This tiny delicate grass grows along many rural roads right on the edge of the blacktop. It seems to be becoming more common on rural roads, or perhaps we are simply becoming more aware of the plant. Once you learn the plant, it has a 30-mile per hour *gestalt*.

“Common in the sandy areas especially those around Camp Grant.” (Fell 1955)

Associates:

VHFS: The variety *vaginiflorus* is the more wide ranging. Variety *ozarkanus* (Fernald) Shinnars grows in the central & southeastern United States, & is elevated to sp status by some authors. This latter variety is known from one co (Clay) in southern Illinois, & is considered introduced. Ilpin notes it may be of hybrid origin. According to Weakly (2007) *S ozarkanus*, *S neglectus*, & *S vaginiflorus* are a poorly understood complex.

[*Sporobolus vaginaeflorus* orthographic variant, *S vaginiflorus* (Torr ex Gray) Wood var *inaequalis* Fern]





Sporobolus vaginiflorus

STEINCHISMA Rafinesque 1830 **GAPING PANIC GRASS** “From the Greek *steinos*, narrow, & *chasma*, yawning, presumably alluding to the gaping glumes & somewhat narrow spikelet when compared to *Panicum*.” Genus of 6 perennial grasses of s North America, Central America, & South America.

Panicum hians Elliot is placed here by some authors as *Steinchisma hians* (Elliott) Nash. “The large, thickened, pale sterile palea of this species is unique among panicoids of our region; it is one of several characters that has led to the segregation of *Steinchisma* as a genus, or as a subgenus of *Panicum*. The enlargement of the sterile palea causes the spikelet to spread open, or "gape." (w12b).

STIPA Linnaeus **BUNCHGRASS, NEEDLEGRASS, FEATHERGRASS, LONG-AWNED GRASS, OAT GRASS, PORCUPINE GRASS, SLEEPYGRASS, SPEARGRASS** *Stipa* (STY-pah, or STEE-pah) New Latin, from Latin *stupa*, *stuppa* coarse part of flax, tow, Greek *tuppe* tow, fibre. Also Middle English *stupe*, *stuppe*, from Latin *stupa*, *stuppa* coarse part of flax, tow, from Greek *styppe*; perhaps akin to Greek *styphein* to contract, be astringent, Sanskrit *stuka* tuft of hair; alternately from Latin *stipa*, a foot-stalk, referring to the stipitate fruit A large widely distributed genus of tufted annual & perennial grasses having a one-flowered spikelet & lemma terminating in a long twisted or bent awn. 150 spp in temperate areas of both hemispheres. Genus is wind pollinated. *S tenacissima* (*Nassella tenuissima*) is ESPARTO GRASS, which was/is used to make cordage. *Stipa robusta* (*Achnatherum robustum*) or SLEEPY GRASS, of the southwestern United States & northern Mexico causes a deep sleep in horses or sheep that feed on it. The grass is infected with an *Acremonium* endophyte producing the alkaloid lysergic acid amine.

According to current usage, *Stipa* is Eurasian, & the new local genus name, in part, is *Hesperostipa* (MK Elias) Barkworth.

The genus *Stipa sensu lato* is divided by some into *Hesperostipa* (5 spp in North America), *Achnatherum*, *Piptochaetium* & *Nassella* (also Mexico & Texas?) (both in South America, with *Stipa* applying to ca 150 Eurasian & North African spp). *Hesperostipa* is from the Greek *hesperos*, the west, or where the sun is in the evening, & the generic name *Stipa*. Perennial, cespitose, 5 spp in genus, 4 in North America north of Mexico. X = 11

“Not a single sp of this genus is useful in agriculture” (Mosher 1918).

Move to *Nassella*?

Stipa viridula Trinius GREEN NEEDLE GRASS, AKA FEATHER BUNCHGRASS, *FLECHILHA* (PB), GREEN NASELLA, GREEN NEEDLEGRASS, (*viridulus -a -um* rather green, somewhat green, greenish.)

Habitat: Edges of woods and along railroad near pond (m14). Rare, known from Kane & McHenry cos.

Culture: ①60 days cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (pm09). ②“Fall plant or cold stratify for 2 to 3 months for best results. Sow seeds just below the soil surface at 60°F & water.” (ew12) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Storage Behaviour: No data available for species. Of 3 known taxa of genus *Nassella*, 100.00% Orthodox(p/?) (Kew RBG).

seed counts & rates: 120,000 (ew12) seeds per pound.



cultivation: Space plants 1.25-1.5' centers. Dry soils, full sun.

Economically important in erosion control, revegetation, & animal fodder & forage.

VHFS: Basionym *Stipa viridula* Trinius. New nomenclature is *Nasella viridula* (Trinius) Barkworth. [*Stipa nuttalliana* Steud, *S. parviflora* Nutt ex Steud, *S. viridula* Trin]



Stipa viridula

TRIDENS Roemer & JA Schultes 1817 **TRIDENS, TRIODIA, REDTOP, FLUFFGRASS** *Tridens* Latin *tres*, three, & *dens*, tooth, referring to the three shortly excurrent veins of *Tridens flavus*, the type sp. Fourteen perennial spp native to the Americas. $x = 10$

TRIODIA For *Triodia* New Latin, probably from Greek, meeting of three roads, from *triodos*, point where three roads meet (from *tri-* three & *hodos* way, road) & *-ia -y*; perhaps from the three nerved lemmas. *Triodia* is Australian, (& in some older taxonomies, also American) perennial grasses having long narrow leaves & florets with prominently 3-nerved lemmas. *Triodia* is best considered endemic to Australia. Several spp form dense almost impassable growths with stiff, sharp-pointed leaves tips, high in silica, which break off in the skin, leading to infections.

Tridens flavus (Linnaeus) AS Hitchc *NJ (in part) FALSE RED TOP, aka GREASE GRASS, GREASY GRASS, PURPLE TOP, PURPLE TOP TRIDENS, RED TOP, TALL RED TOP, (*flavus -a -um* bright, almost pure yellow; pure, pale yellow, from Latin *flavus*, yellow, reference unclear) Does any one else wonder why FALSE RED TOP has a sp name meaning yellow? The common name GREASE GRASS comes from the greasy feel of the fresh inflorescence & the gray stain it leaves on your hands. A stand of this sp in fruit has an open purplish cast to it, hence the common name. upl

Habitat: Disturbed sand prairies, sandy roadsides, fields & edge of woodlands. distribution/range: Rare in northern 1/3 of Illinois, but becoming more common in nw Illinois. A common roadside grass from Mason Co south. It was first discovered in Canada in 1976. This sp may be invasive & moving northward. Remember, global warming does not exist!

Culture: ①60 days cold moist stratification (pm09). ②Cold moist stratification (Davis 2001, Grabowski 2001) Cool season grasses must be eliminated & seedbed must be firm. Some recommend cultipacking after no till drilling. Growth rate moderate. Seedling vigor high. Vegetative spread rate none. Spreads rapidly from seed.

Storage Behaviour: No data available for species. Of 2 known taxa of genus *Tridens*, 100.00%

Orthodox(p/?). (RBG Kew)

Thousand Seed Weight: 1.044g. ①1.13844; (RBG Kew); Seed; *Seed weights reported may include minor covering structures. ②0.95; (Stevens 1932); Seed; Weight refers to air-dry seed.

seed counts & rates: 465,000 (usda, ecs) seeds per pound. Drill 10-15 pbs lbs in spring or broadcast 20 to 25 pbs lbs per acre (usda, but consider the source).

cultivation: Well adapted to shallow, droughty, infertile soils. Adapted to coarse, medium, & fine textured soils. Anaerobic tolerance low. CaCO₃ tolerance low. Drought tolerance high. Fertility requirement low. Salinity tolerance said to be none, but it thrives on roadsides? Shade intolerant. pH 4.5-6.5. This species seems to tolerate a late spring mowing quite well, heading out in late August.

bottom line: Limited test data indicate significant benefit from dormant seeding. Germ 64%. Dorm 32%. Test 24 days.**

Description: Warm-season, bunching, grass, 3.0-4.0'; culms upright, smooth, round but flattened below, tuft forming; thick, short rhizomes, 10" minimum root depth; leaf blades flat, long, tapering to narrow point, smooth, white midrib prominent, rough margins, distinct line perpendicular to midrib on underside, underside glossy, rolled in bud; auricles absent; ligule a ring of hairs, very short; sheaths flattened or keeled; panicle, terminal, open, often drooping when mature, oval to pyramidal, purple to dark purple sometimes almost black, usually covered with an oily or grease-like substance; $N 2n = 40$. key features: ① "Versus *Tridens strictus*, this sp has a very open, loose panicle; most Illinois material with purple, rather than yellow spikelets. As seed matures, inflorescence branches & culm top secrete a sticky substance that darkens on exposure to air & dust; will leave a greasy black streak when handled." (Ilpin)

Comments: status: Native. phenology: Blooms 6,7,8,9. C4. In northern Illinois, collect seeds in October. Ornamental, creating an attractive purple-haze in late summer. Some authorities see this as a potential roadside alternative to TALL FESCUE. It has seemed benign in degraded areas & roadsides, but is becoming somewhat invasive on our farm, infesting some older plantings, & becoming more prominent along northern Illinois' roadsides. Individual plants may be short-lived, but stands persist by seeding.

Associates: Larval host *Cercyonis pegala* COMMON WOOD NYMPH BUTTERFLY. Plant is cyanogenetic.

VHFS: Mohlenbrock (19??) lists *f cuprea* Fosc. M14 *f flavus* & *f cupreus*.

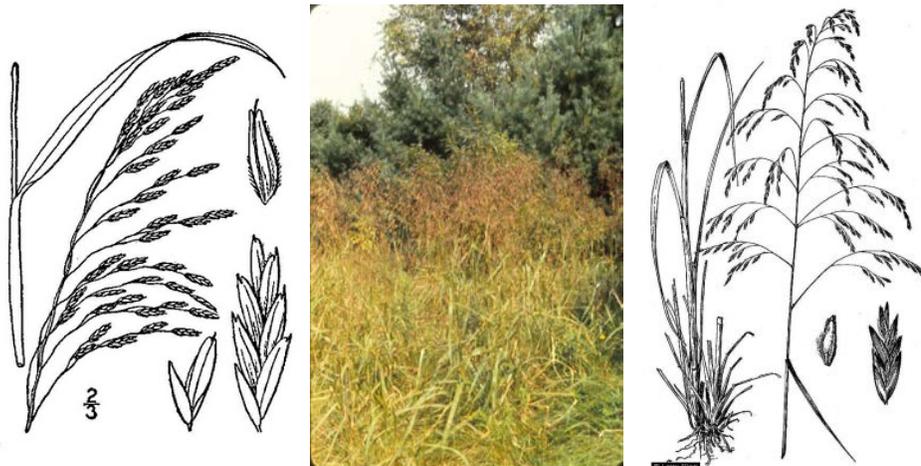
Illinois has the widespread variety *flavus*, with nodding panicles. Variety *chapmanii* (Small) Shinners, CHAPMAN'S REDTOP, is more southern & endangered in New Jersey. [*Tridens chapmanii* (Small) Chase, *T chapmanii* (Small) Bush]

Basionym *Poa flava* Linnaeus. [*Cynodon carolinianus* (P Beauv) Raspail, *Eragrostis tricusps* Trin, *Festuca quadridens* Poir, *F purpurea* Schreb ex Steud, *F flava* (L) F Muell, *Panicum festucoides* Poir, *Poa arundinacea* Poir, *P caeruleascens* Michx ex Kunth, *P flava* L, *P quinquefida* Pursh, *P seslerioides* Michx, *Sieglingia seslerioides* var *intermedia*, *S seslerioides* (Torr) Scribn, *Tricusps caroliniana* P Beauv, *T flava* (L) FT Hubb, *T novae-boracensis* P Beauv, *T quinquefida* (Pursh) P Beauv ex G Don, *T seslerioides* Torr, *T s* var *flexuosa*, *T s* var *pallida*, *Tridens flavus* f *cupreus*, *T f* var *aristatus*, *T quinquefidus* (Pursh) Roem & Schult, *T seslerioides* (Torr) Nash, *Triodia cuprea* J Jacq, *T coeruleascens* Desv, *T festucoides* (Poir) Desv, *T flava* f *cuprea*, *T flava* (L) Smyth, *T f* var *aristata*, *T novaeboracensis* Desv, *T seslerioides* (Torr) Benth ex Vasey, *T s* var *aristata*, *Uralepis cuprea* (Jacq) Kunth, *U tricusps* (Trin) Steud, *Windsoria poiformis* Nutt, *W seslerioides* (Torr) Eaton]

Cf above & <http://florida.plantatlas.usf.edu/Plant.aspx?id=3403>

KM Davis & JL Kujawski 2001. Propagation protocol for production of container *Tridens flavus* (L) AS Hitchc plants (Container plugs), Beltsville - National Plant Materials Center, Beltsville, Maryland. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 8 March 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

JM Grabowski, 2001. Propagation protocol for production of *Tridens flavus* (L) AS Hitchc plants; Coffeeville - Jamie L Whitten Plant Materials Center, Coffeeville, Mississippi. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 8 March 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.





Tridens flavus

Tridens strictus (Nuttall) Nash LONGSPIKE TRIDENS, aka SPIKE TRIODIA, LONGSPIKE FLUFFGRASS, is known from 4 downstate cos & Peoria Co.

$2n = 40$. key features: ① Versus *Tridens flavus*, it has a very contracted, almost spikelike panicle. (Ilpin)



Tridens strictus

Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image

TRIPLASIS Palisot de Beauvois 1812 **Sandgrass** A genus of two spp of eastern & central North America south to Mexico & Costa Rica that is probably elated to *Tridens* (3 spp in older works). Terminal purple-flowered panicles & cleistogamous narrow panicles in the axils of the leaves. There are additional cleistogamous spikelets reduced to a single large floret at the bases of the lower sheaths. The culms break at the nodes bearing these cleistogenes with the ripe seed remaining attached to the internode. The foliage of both spp has a sour taste. One sp is known from Illinois.

Formerly *Diplocea* Rafinesque 1818, *Merisachne* Steudel 1854, & *Uralepis* Nuttall 1818. Quattrocchi calls this *Uralepis* Nuttall. $x = 10$. (Umberto Quattrocchi, CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms ...)

Triplasis purpurea (Walter) Chapman *NH, MN PURPLE SANDGRASS, aka PURPLE TRIPLASIS, SANDGRASS,

Habitat: Prairie, plains, meadows, pastures, & savannahs. In Tampico Twp, sp is growing in sparse cover on a high dune degraded sand prairie pasture with a history of fire & no cattle for 15 years. "A sand grass that we have found only in dune sand near Yale bridge over Sugar Creek north of Shirland." (ewf55) "Species is distributed in sandy soil; occurs with *Eragrostis trichodes*, *Ammophila breviligulata*, & *Calamovilfa longifolia* var *magna*; restricted to sandy soils; found in sand dunes & flats along Mississippi & other rivers; indicates a habitat of pure or nearly pure sand" (Ilpin). "Sandy shores & low dunes; blowouts & cut banks inland. Old culms tend to disarticulate at the nodes into short segments (the internodes), each with a reduced fruiting inflorescence in the swollen sheath." (rvw11). In Minnesota, it is an early successional sp that thrives only where there is open sand & some disturbance. distribution/range: Only in the northern ¾ of Illinois. Known from LeBahn's Sand Prairie in Gold Twp & discovered in our Cow Pasture in 2012.

Low water requirements, full sun, dry soils, sandy, sandy loam, medium loam, clay loam, clay soils.

Description: Plants annual (summer annual) & tufted or perennial & occasionally rhizomatous; $2n = 40$. key features: ① "This is only Illinois sp; has villous which are 3-nerved, awned lemma at 3-4 mm long; among grasses, this sp has an acid taste" (Ilpin). ② "It is difficult to distinguish SAND GRASS from other grasses until its purplish spikelets are produced. At that time, it can be readily identified by the fine white hairs along the veins of its lemmas (fertile outer scales) & the even longer white hairs along the keels of its paleas (fertile inner scales). This grass also has tufts of white hair at the bases of its leaf blades -- this is a trait that it shares in common with *Eragrostis* spp. (LOVE GRASSES)" (Hilty).



Comments: status: Endangered in New Hampshire. Special Concern in Minnesota. phenology: Blooms 8-10. C4. Spikelets & foliage have an attractive purple fall color.

Associates: Seeds are probably eaten by songbirds. The upper part of the panicle is wind pollinated while the lower spikelets remain in the sheaths & are self-fertile. The plants tend to break apart at the nodes, scattering seeds in the wind like a tumbleweed.

VHFS: Plants of northern North America belong to *Triplasis purpurea* (Walter) Chapm var *purpurea*.

[*Aira purpurea* Walter, *Diplocea barbata* Raf, *Festuca purpurea* (Walter) F Mueller, *Merisachne drummondii* Steudel, *Sieglingia purpurea* (Walter) Kuntze, *Tricuspis purpurea* (Walter) A Gray, *Uralepis purpurea* (Walter) Nuttall]



Triplasis purpurea, LeBahn's Sand Prairie, Gold Twp, 1981

TRIPSACUM Linnaeus **GAMAGRASS, GAMMAGRASS, SESAMEGRASS** *Tripsacum* New Latin, from Greek *tripsis*, rubbing, friction, resistance to rubbing, possibly from Greek *tribein*, to rub, referring to the smooth joints, or *τριβω*, *tribo*, to grind, application uncertain. A genus of about 12 spp of coarse perennial grasses of

the southern United States & South America having androgynous spikes with the 2-flowered staminate spikelets above & the pistillate below with the latter embedded in the joints of the rachis. $x = 9$.

Tripsacum dactyloides (Linnaeus) Linnaeus *MA, NY, PA EASTERN GAMMA GRASS, aka BULLGRASS, FAKAHATCHEE GRASS, GAMA GRASS, NORTHERN GAMA or GAMMA GRASS, SESAME GRASS, (*dactyloides* finger-like, or resembling *Dactylis*, ORCHARD GRASS; from Greek δακτυλος, *daktylos*, meaning finger, & -οειδης, *-oeides*, a suffix for nouns meaning like or resemble, perhaps for resemblance of the male flowers to the inflorescence of *Dactylis*, orchard grass.) fac+

Habitat: Mesic prairies, low ground, usually in moist, heavy soils. "Moist soil in swamps or along ditches & streams" (Mosher 1918). Swamps & wet shores. distribution/range: A rare adventive in our area (Bureau & Henry cos.), native south (Peoria Co) & west of our area, southern $\frac{2}{3}$ of Illinois, & southern Iowa. Throughout eastern $\frac{1}{2}$ of US.

Culture: ① Fall plant or moist cold stratify required. 60 days cold moist stratification. Seeds need a cold, moist period followed by a warm, moist period followed by a 2nd cold, moist period, or sow outside & allow 2 years for germination. Best planted outdoors in the fall. (pm09). Growth rate rapid. Seedling vigor low. Vegetative spread rate moderate. Spreads slowly by seed.

② USDA treating instructions are "The seeds must first be stratified (exposed to cold, wet conditions) for 8 weeks before spring sowing. Seed may be purchased stratified from commercial growers. To stratify artificially, place the seeds in a burlap bag until the bag is about half full. Soak this in a 1% solution of fungicide for 10-12 hours. Afterwards, drain the seeds & seal them, along with the sack, in a plastic bag. Store them this way for 8 weeks at 35-45°F. Stratification may also be achieved by planting in the fall after November 1, but before frost is in the soil." (usda Plant Fact Sheet)

seed counts & rates: 5,920 (pm), 5,968, 6,000 (stock), 7000 (ecs), 7200, 7300, 7400 (usda), 8,000 (aes10) seeds per pound. Broadcast 1 pls lb per 2000 ft sq, or drill 10-12 pls lbs per acre in rows (stocks). 8-10 lbs per acre for solid stand (ecs). 1st year seedlings may be subject to frost heaving. A limited amount of stratified seed is commercially available annually.

cultivation: Adapted to coarse, medium & fine textured soils. Anaerobic tolerance low. CaCO₃ tolerance none. Drought tolerance low. Fertility requirement high. Salinity tolerance none. Shade intolerant. pH 5.1-7.5.

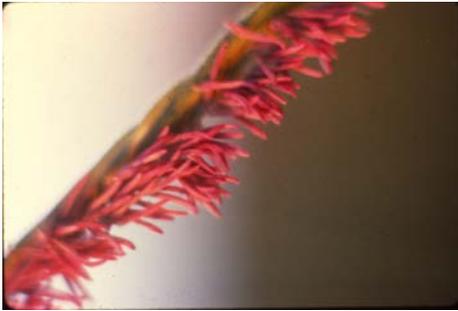
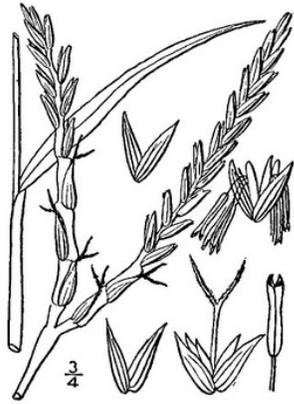
bottom line: Dormant seeding is recommended. A limited amount of stratified seed is commercially available annually from major growers. Germ 26.3, 21, na, sd 11.3, r16-42 (26)%. Dorm 54, 50, na, r47-65 (18)%. Test na.**

Description: Warm season, perennial, tall grass growing in large clumps, 3.0-6.0', occasionally 9' tall in parts of its range, 1-4' diameter, entire plant glabrous; roots minimum depth 20"; flowers monoecious, staminate spikelets at the end of the spike & pistillate spikelets at the base; $2n = 40$, or $2n = 36, 54$, or 72 .

Comments: status: Native. Endangered in Massachusetts & Pennsylvania. Threatened in New York. This sp is also considered invasive in parts of its range (SWSS 1998). phenology: Blooms 6,7,8. In northern Illinois, collect seeds of local adventive plants in September. Landscaping, sometimes used as an ornamental grass, great specimen plants. Dried seed heads are interesting in fall arrangements, but the ripe inflorescence soon disintegrates. The seedless stalks are a good substitute for ting-ting in dried floral arrangements. A perennial close relative of corn, with inflorescence of 1-3 spikes with female flowers (the "ear") on bottom & male flowers (the "tassel") on top. One of most productive hay grasses in USA, more productive than other native perennial warm season grasses. With careful management, it regrows vigorously after grazing or haying. A highly resilient grass. We have two colonies, one $\frac{3}{4}$ mile sw of Zeahring along the railroad spur to Ladd, & the other in the north intersection of Illinois Rts 92 & 78, southeast corner, on IDOT land. The IDOT population has survived regrading the intersection & 35 years of drooling, brain-dead, knuckle-dragging, nepotistic, Neanderthalic mower jockeys since it was discovered in 1979.

Associates: Excellent forage, palatable & nutritious to livestock. Provides food & cover for wildlife.

VHFS: [*Coix dactyloides* Linnaeus, *Tripsacum dactyloides* (L) L var *occidentale* Cutler & Anders]



Tripsacum dactyloides

1st photo by Don Pretzsch, 3rd photo, Don's back yard

TRITICUM Linnaeus 1753 **WHEAT, WINTER WHEAT, SPRING WHEAT, SUMMER WHEAT, AWNED WHEAT, AWNLESS WHEAT** *Triticum* New Latin, from Latin, *triticum*, *triticum*, 2nd N, wheat, from the past participle *tritrus* -a -um, rubbed or ground, referring to the preparation of the grain for food; from Latin *tero*, *terere*, *trivi*, *tritrus*, to rub, wear away, wear out, tread; cf *trituro*, I thresh. A genus of about 25 wild & domesticated spp of cereal grasses including the wheats & distinguished by the 2- to 5-flowered flattened spikelets in a terminal cylindrical spike with a flexuous rachis. $x = 7$.

“ ‘Spring wheat’ & ‘winter wheat’ refer to the growing season. Spring wheat is planted in the spring & harvested in the summer of the same year; winter wheat is planted in the fall & harvested the following summer. “Hard wheat” & “soft wheat” are terms used to describe wheats with flinty or mealy endosperm, respectively. Flinty endosperm has a higher protein content & is harder than mealy endosperm. At the sp level, soft wheat refers to *T aestivum*; hard wheat refers to *T durum*. Within *T aestivum*, endosperm type also is graded as either soft or hard; it is never as hard (flinty) as in *T durum*.” (fna)

Triticum aestivum Linnaeus **WHEAT**, aka **BREAD WHEAT, COMMON WHEAT, SOFT WHEAT**, (*aestivus* -a -um Latin of summer, flowering in summer.)

Habitat: Moderately coarse to moderately fine soils. Neutral soils, some base & acid tolerance.

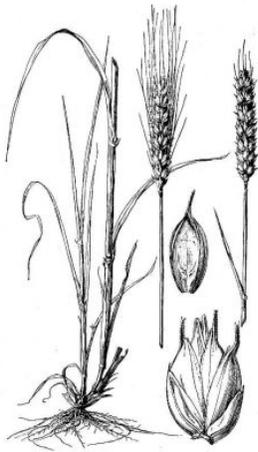
Culture: For nurse crop with natives, plant 10 lbs per acre. For nurse crop with native seeds to be planted later in the year, use 90 lbs per acre. (pm11) Alone plant 60-100 lb per acre in fall or spring (gran). For a crop, drill 100-110 lbs per acre, 1 to 1.25 inches deep. In northern Illinois crop plantings, do not plant before the third week of September to avoid Hessian flies (*This is pre-global warming timing*).

Description: Cool-season, drought tolerant, tufted, bunch, medium tall to tall annual grass, adapted to most planting conditions in US. $N 2n = 42$.

Comments: Moderately competitive to establishing perennials. Cover crops must be mowed. Moderately palatable. Both winter & spring varieties available. Most widely cultivated temperate zone grass. 100+

varieties available. Commonly used as a nurse crop or for erosion control, but cultivated for bread flour, pastry-grade flour, Oriental-style soft noodles, & cereals.

WINTER WHEAT, Fall plant, overwinters as a seedling providing winter soil stabilization. For a green manure, turn plants under before going to seed. Plant 2 lbs per 1000 ft sq for cover crop (pots).



Triticum aestivum

Triticum aestivum* X *Elytrigia elongata REGREEN, aka REGREEN STERILE HYBRID WHEAT,

Habitat: Best on moderately coarse to moderately fine soils, will also work on coarse & fine soils. Neutral to basic soils, some acid tolerance.

Culture: Regreen requires light to germinate, so not drill deeply! "ReGreen cover crop seeds will usually germinate in 10-90 days, even under good conditions germination may be erratic. Normally will only germinate with light so surface sow. Sow ReGreen cover crop seeds on the surface of a Peaty seed sowing mix at about 20°C. (B&T)

11,000 (granite, wind river), 12,000 (ranier, landmark) seeds per pound. For nurse crop with native seeding, plant 10 lbs per acre (prairie moon 2011-14, Oregon Fish & Wildlife), 15 lbs per acre (Urice 2001), or 5 lbs/ac hydroseeded (Kern (1994). Los Alamos National Laboratory engineering standards list Regreen or Quickguard seeded at 7-10 lbs per acre with the perennial mix. Minnesota Board of Water & Soil uses 16 lbs per acre as part of an Upland Temporary mix. The Center for Environmental Excellence recommends 30 lbs/ac as a cover crop. Plant 10-40 lb per acre in fall or spring (granite). 20-40+ lbs per acre (ranier). 40 lbs per acre (11 seeds per ft sq) (Bishop 1995). B&T World Seeds recommends 10 lb (4.54 kg) per acre. Santa Clara Valley Water District recommends a Regreen monoculture at 50 lbs per acre. Comstock Seed recommends 10-40 lb/ac fall or spring. Pacific Coast Seed recommends 45 kg/ha seeded alone.

We have seen 23 pls lbs per ac used in a diverse grass, forb, shrub mix in Lawrence Kansas. (source this)

Quickguard, a sterile Triticale (*Triticum aestivum* x *Secale cereale*) is often specified interchangeably with Regreen in many western seeding projects. (Seeded at 8-15 lbs per acre, 13,000 seeds/lb (granite)).

ReGreen & Quickguard are both mycorrhizal.

Description: Cool-season, drought tolerant, tall. Annual or short-lived perennial bunch grass, highly adaptable. 53.8 lb per bushel.

Comments: Sterile hybrid-cross between wheat & tall wheat grass. Developed as a cover crop & soil stabilizer. Germinates & establishes readily, but plants do not persist or reseed. Good choice for short-term cover. Will be completely out-competed by more desirable spp. Reported to have, and in our experience does have, a multi-year shelf life (Sharps) when stored as recommended by the Travelling Wilburys (put it in a cool dry place).

Regreen is also a type of turf paint & a golf course green seed blend. But how many gallons per acre?

VHFS: *Elytrigia elongata* is know known as *Thinopyrum ponticum* (Podp.) Z-W Liu & R-C Wang (or *T. ponticum* (Podp) Barkworth & DR Dewey) TALL WHEATGRASS, aka EURASIAN QUACKGRASS (rather insidious sounding).

-----Original Message-----

From: owner-prairie@mallorn.com [<mailto:owner-prairie@mallorn.com>] On Behalf Of Tom Schneider Sent: Friday, October 13, 2000 12:12 PM To: prairie@mallorn.com

Subject: Prairie Seeding Cover Crops

Does anyone have experience using a ReGreen as a cover crop? It is a winter wheat/slender wheatgrass hybrid that is supposedly good as a cover crop. In the one application I have observed it appears to have had a negative impact upon native grasses relative to adjacent areas where a cover crop was not used. So I'm interested in others experience with this particular product and any recommendations for appropriate cover crop. It may well be that the ReGreen was planted at too heavy a rate as this was the first use at the facility. However, the stark contrast between cover crop and no cover crop areas is concerning us. I can provide some background on why we need a cover crop in this particular application. We are working on a large landfill. The vegetative cover is going to be warm-season grasses. But as we know they can take a while to get established. In the meantime we need some cover crop to reduce erosion off the facility. We are trying to blend our stormwater requirements with our desire to have a native plant cover on the landfill. The ReGreen worked very well to establish quickly with a fall seeding and provide erosion control. However the lack of success for the native grasses is concerning. Any information you can provide would be greatly appreciated.

-- Tom Schneider, Fernald Project Manager

Ohio EPA

Office of Federal Facilities Oversight

tschneid@offo2.epa.state.oh.us <http://offo2.epa.state.oh.us/FERNALD/fernalld.htm>

I've not specifically used ReGreen but would think it was probably the seeding rate. Neither the wheat or slender wheatgrass causes any allelopathic problems. Cover crops I've used are:

Wheat @ 40 lbs per acre

Oats @ 32 lbs. per acre

millet @ 8 lbs. per acre

annual ryegrass @ 8 lbs. per acre

milo or grain sorghum at 8 - 10 lbs. per acre

Jef Hodges

<http://www.hort.net/lists/prairie/oct00/msg00040.html>

Maria Urice, 2001, Effects of annual rye and regreen cover crops on soil erosion and prairie establishment in roadsides under construction. IaDOT Project Number: 90-00-LRTF-115.

<http://iowalivingroadway.com/ResearchProjects/90-00-LRTF-115.aspx>

Gene Bishop, 1995, Effectiveness of annual and perennial grasses and legume species for early emergence and erosion control. TN Plant Materials -39 August 1995.

http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/capmctn390895.pdf

Carole Kern, 1994, Hydro-seeding vs drilling; regreen vs timothy/perennial rye & mulched; vs unmulched for establishment of warm-season grasses. IaDOT Project Number: 90-00-LRTF-404

<http://iowalivingroadway.com/ResearchProjects/90-00-LRTF-404-94.aspx>

http://b-and-t-world-seeds.com/cart_print.asp?species=ReGreen%20%28tm%29%20cover%20crop&sref=86943

<http://www.comstockseed.com/Inventory/Cereal%20Grains.htm>

<http://www.sharpseed.com/seeds.php?id=217&catID=2&sID=16>

<http://www.valleywater.org/uploadedFiles/Programs/BusinessInformationPermits/Permits/TemporaryErosionControl.pdf?n=2552>

http://r.search.yahoo.com/_ylt=A0SO81SZHDRU2psADKtXNyoA;_ylu=X3oDMTE0dDFxYW4yBHNIYwNzcgRwb3MDNTAEY29sbwNncTEEdnRpZANttUU2OTdfMQ--/RV=2/RE=1412730137/RO=10/RU=http%3a%2f%2fengstandards.lanl.gov%2fspecs%2f32_9219R1.doc/RK=0/RS=Oi0sOTeEAqsB_XJ7CSLR_vGGy60-

<http://library.state.or.us/repository/2009/200909181629225/index.pdf>

Triticum aestivum X Secale cereale TRITICALE, or TRITICOSECALE.

Habitat: Best on moderately coarse to moderately fine soils, will also work on coarse & fine soils. Neutral soils, some basic & acid tolerance

Culture: 13,000 (gran) seeds per pound. Plant 60-100 lb per acre in fall or spring (gran).

Description: Cool-season, drought-tolerant, tall, annual grass, adapted to most of USA.

Comments: Hybrid-cross between common wheat & cereal rye. Extremely good forage producer & highly palatable. Desirable when maximum forage is needed while slower perennials are developing. Many spring & winter varieties available.



X Triticosecale

Photo by Leo Michels - Source: <http://www.imagines-plantarum.de/> Public domain image

Triticum durum Desfontaines DURUM WHEAT, aka MACARONI WHEAT, HARD WHEAT, (*durus -a -um* hard, from Latin *durūs*, hard.)

Grown as spring wheat in the Great Plains & Canada, winter wheat in Mexico. Grown for Macaroni-type pastas, semolina, bulghur, flat breads, & pita. $N 2n = 28$.



Triticum durum

Uniola Linnaeus (formerly including *Chasmanthium* Link) SEA OATS, SPRANGLE GRASS, SPIKE GRASS
Uniola New Latin, from Latin *unione glumarum*, united bracts, referring to the spikelets; alternately from Late Latin, a kind of plant, probably from *unio* oneness, unity, union; or from the diminutive of Latin *unus*, one, for the many flowers in one spike. (*Unio* also means a large pearl.) $x = 10$.

VULPIA KC Gmelin RAT'S TAIL FESCUE One would assume this was Latin, of foxes, from *vulpes -is*, a fox, akin to Greek *alopex* fox, Armenian *alues* fox, Sanskrit *lopasa* jackal, fox, Lithuanian *vilpis* wildcat, but it is not. You will even find such a reference in the unregulated & unreviewed information on the Internet. But, this genus is named in honor of Johann Samuel Vulpius, 1760-1840 (or 1846), German chemist, physicist, pharmacist & amateur botanist of Pforzheim (or Baden). A genus of 23-30 (25, 30) annual, rarely perennial spp of open habitats, primarily of temperate Europe & especially the Mediterranean. Most spp, including the North American spp, are weedy, cleistogamous annuals, usually having one anther per floret. Commonly adventive. *V bromoides* & *V myuros* are weed spp of economic impact. Sterile intergeneric hybrids with *Festuca* & *Lolium* are known. $C3$. $x = 7$. $2n = 14, 28, \& 42$. 2, 4, 6 ploid.

Vulpia octoflora (Walter) Rydberg *NH, VT SIX WEEKS FESCUE, aka EIGHT FLOWERED FESCUE, PULLOUT GRASS, SIX WEEKS GRASS, (having eight flowers) facu-

Habitat: Disturbed sands "Common in the sand areas." (ewf55). distribution/range: Scattered throughout state.

Culture: ① Fresh seed. ② Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 1,800,000 (wns) seeds per pound.

Description: Diminutive annual grass in disturbed, somewhat open sands. The sp has inflorescence appearing racemose, lower glume 3.5-4.5 mm long, awns 3.5-5.5 mm long. $N 2n = 14$.

Comments: status: Endangered in New Hampshire & Vermont. This grass is also considered invasive in parts of its range (Stubbendieck et al 1994). phenology: Blooms May to July. C3. In northern Illinois, collect seeds in June. Early successional, annual. Quite inconspicuous. Miniscule grass, easily over looked even when looking for it. One of our smallest native grasses. We usually see this grass along sandy farm lanes or the edge of gravel roads in sand country. It tolerates no competition.

VHFS: [*Festuca octoflora* Walt]

Var *glauca* (Nutt) Fern has inflorescence densely spicate, lower glume 1.5-3.0 mm long, awns absent or up to 2 mm long. Var *tennella* (Willd) Fern, SLENDER EIGHT FLOWERED FESCUE has inflorescence loosely spicate, lower glume 2.5-4.0 long, awns 1-3 mm long, & is endangered in New Hampshire.

Variety *tennella* is included in variety *glauca* by some. Robert I Lonard in fna recognizes vars. *octoflora*, *glauca*, & *hirtella* (Piper) Henrard, noting they are not satisfactory & in some regions, they are indistinct. The USDA maps *octoflora* & *glauca* from Illinois.



Vulpia octoflora along dirt road with *Koeleria* & *Cassia fasciculata*

ZIZANIA Linnaeus **WILD RICE, CANADA RICE, INDIAN RICE, WATER RICE** *Zizania* Wild Rice New Latin, from Late Latin *zizanium*, *zizania*, -ae, darnel, cockle, from Greek ζιζάνια, *zizania*, plural of ζιζάνιον, *zizanon*, an injurious weed growing in grain, probably *Lolium tementulum*, bearded darnel, cf. Sumerian *zizân*, wheat. "In the "Parable of the Sower" from the New Testament (Matthew 13:18-23), the darnel (*tares*) is a harmful plant, which is difficult to distinguish from wheat prior to maturity. The darnel is called *zizania* in the original Greek text. A similar use of darnel is found in Matthew 13:24."

(<http://www.rook.org/earl/bwca/nature/grass/WIP/zizania.html>)

Small genus of 4 sp (6 taxa) of tall, annual & perennial, monoecious grasses of eastern North America & eastern Asia (1 sp) having long flat leaves & ample panicles of one-flowered spikelets. $x = 15$.

Zizania texana Hitchcock, TEXAS WILDRICE, is known from the headwaters of the San Marcos River, in San Marcos, Texas.

Zizania latifolia (Grisebach) Turcz ex Stapf ASIAN WILDRICE “The rhizomes and basal parts of the culms of *Z latifolia* are edible, and become swollen when infected with the fungus *Ustilago esculenta* Henn. The infection also prevents the plants from flowering and fruiting. If infected plants were introduced into North America, the fungus might also infect the native species of *Zizania* and likewise prevent their flowering (Terrell and Batra 1982), a possibility that should be strenuously resisted. Plants of *Z latifolia* should not be brought into North America. Many states do not permit importation of plants of *Z latifolia* from another state without examination by a state-approved plant pathology laboratory.

New Zealand has designated *Z latifolia* a prohibited plant because it “displaces all species by its dense growth, blocks drainage and access to water, and increases the chance of flooding. It forms dense colonies in swampy areas, thus affecting productive farm land” (Environment Walkato 2002–2007). (Terrell fna) Sp is introduced in Hawaii.

Environment Walkato, 2002–2007. Regional Pest Management Strategy. Walkato Regional Council, Hamilton East, New Zealand. <http://www.ew.govt.nz/policyandplans/rpmsintro/rpms2002/operative5.2.7.htm/>;

EE Terrell & LR Batra, 1982. *Zizania latifolia* & *Ustilago esculenta*, a grass-fungus association. Econ. Bot. 36:274–285

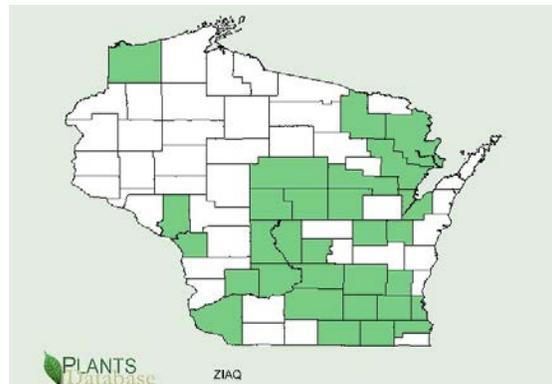
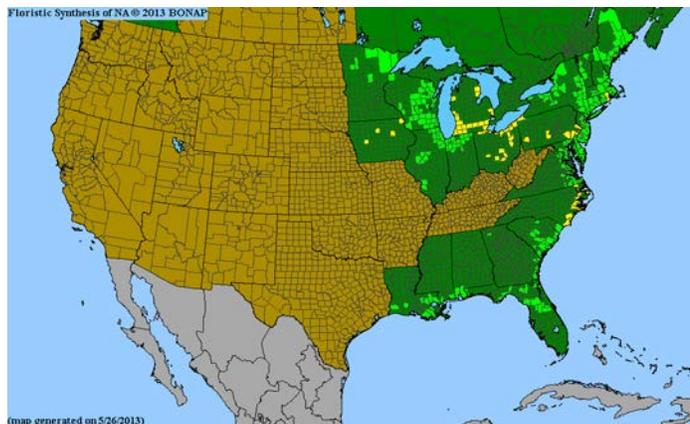
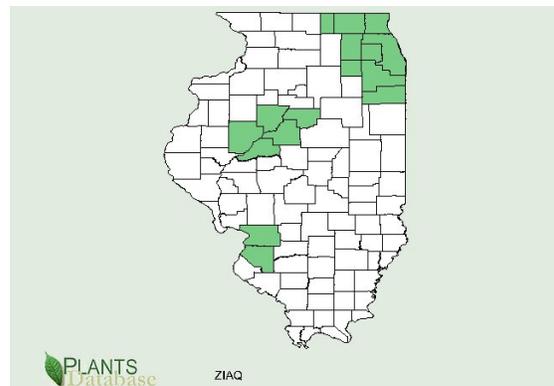
In metro Chicago area restoration projects, Wild Rice is routinely included in “emergent” seed mixes & specified to be installed with a drill. It cannot succeed by this method! It is stupid.

reorganize as *Zizania aquatica* Linnaeus and *Zizania interior* (Fassett) Rydberg?? Cf w12, m14, bonap, pug13.

Zizania aquatica Linnaeus WILD RICE, aka ANNUAL WILD RICE, INDIAN WILD RICE, *ZIZANIE À FLEURS BLANCHES VARIÉTÉ À FLEURS BLANCHE*, SOUTHERN WILDRICE, *ZIZANIE AQUATIQUE*, Shallow water, not common; scattered in Illinois, except for the s cos.
 N 2n = 30.
 Threatened in Michigan & Ohio. Rare in Pennsylvania.
 Special Concern in Rhode island. June- Sept.

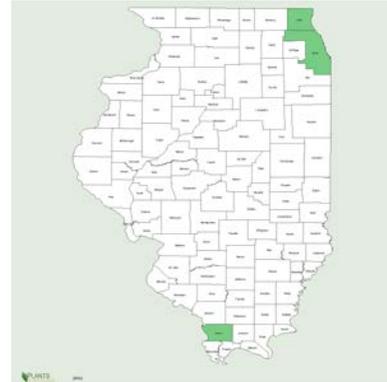
Var *brevis* Fassett, ESTUARINE WILDRICE, is known from the St Lawrence River.

[*Zizania aquatica* L var *subbrevis* B Boivin, *Z palustris* L]

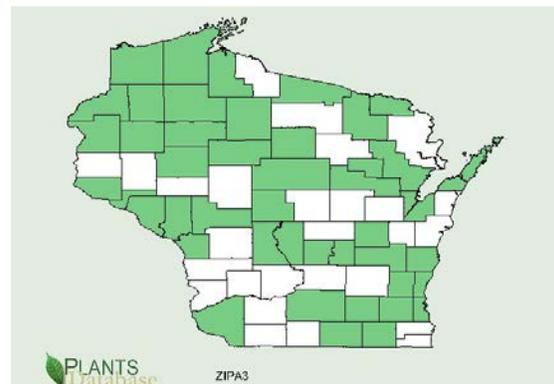
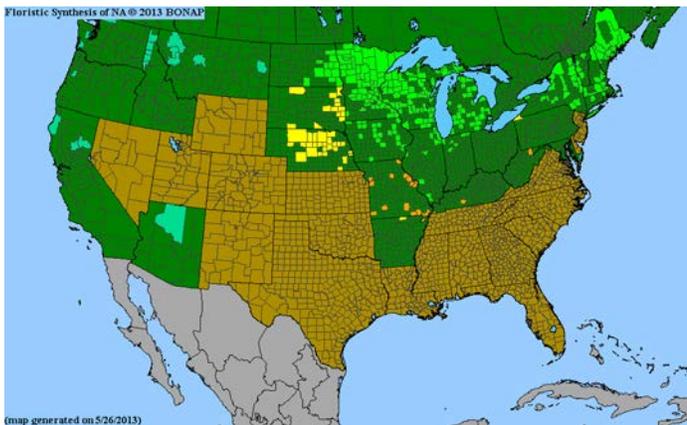


Zizania interior (Fassett) Rydberg Wild Rice,
Shallow water, very rare: Cook, Lake, & Union cos.

N 2n = 30.
June Sept.



Z. palustris is said to be the commonly harvested species. Seeds subject to ergot infection. Terrell (fna) & W12 has this as *Zizania palustris* Linnaeus var *palustris*, NORTHERN WILD-RICE, aka *ZIZANIE DES MARAIS*, *FOLLE AVOINE*, *RIZ SAUVAGE*, and *Zizania palustris* Linnaeus var. *interior* (Fassett) Dore, INTERIOR WILD-RICE. M14 as *Zizania interior* (Fassett) Rydberg, with its synonyms [*Zizania aquatica* L var *interior* Fassett, *Z. palustris* L var *interior* (Fassett) Dore]



Zizania aquatica Linnaeus *MI, OH, PA ANNUAL WILD RICE, aka BLACKBIRD OATS, CANADIAN RICE, *FOLLE AVOINE*, INDIAN WILD RICE, MARSH OATS, SQUAW RICE, WATER OATS, WILD RICE. Ojibwa, Menomini & Cree *manomin*, (*manoomin*), good berry; alternately a contraction of *manitou*, spirit & the suffix *-min*, seed, noting the sacred & important character of the seed. *Manoominike Giizis* is the moon of the wild rice harvest. (*aquaticus* -a -um aquatic, of water, living in or growing by water; living in water, from Latin *aquaticus*, living in water, or full of water, watery, as opposed to *aquatilis*, living under water.)

Habitat: Marshes, shallow ponds, lakeshores, & slow moving stream borders in mud bottoms, shallow water; not common. Fresh water streams, lakes, ponds, sloughs with soft mud bottoms. Tidal & non-tidal marshes at least 1' deep. distribution/range: Rare, Cook, Lake, Union cos.

Culture: ①Seed must be kept moist. At maturity, this sp seed has over 40% moisture content & dies in a few days if air dried (Sauer 1993). ②Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the wet soil surface at 40°F. (ew11) ③Wet seed must be planted 1-3" deep, shallower in mineral soils & deeper in peat soils, & immediately flooded. Fall planting is preferred, as the seed requires 90 days of cold storage 33 to 35° F in water to break dormancy. Germination begins at 42°F (7°C) with optimum germination at 64-70°F. Once established & a seed crop is produced, it may self-sow. Growth rate rapid. Seedling vigor high. Vegetative spread rate none.

Wild Rice must be sown into standing water or planted as above. It is really, really stupid to include this sp in mixes with orthodox seeds. Its use in Midwestern emergent mixes is largely erroneous. Requires clean, very slowly moving water, with little wave action & nonfluctuating water levels. It is of little or no value (or at best, mixed value) in restoration in a typical Chicago-metro urban context.

seed counts & rates: 5354 (gnhw14), 11,000 (ecs), 11,340 (usda), 11,349 (gnh07), 70,400 (jfn04, ew12) seeds per pound. Recommended seeding rate 50-100 lbs/acre broadcast (Anon 1981). 2 bushels per acre or thinner (Wildlife 2002). 25 lb per acre in late winter in standing water (ecs). One bushel of WILD RICE is approximately 25 pounds (Jim @ Wildlife Nursery, personal communication).

cultivation: Space plants on 1.25-1.5' centers. Difficult to establish on clay soils or subsoils. It likes a soft, boggy bottom & consistent water level. Flooding & fluctuating water levels at the wrong time will kill it by uprooting seedlings. Waterlevel from 6" to 3'. In very clean water it may grow in up to 8 feet of water. Anaerobic tolerance high. CaCO₃ tolerance low. Drought tolerance none. Fertility requirement medium. Salinity tolerance low. Shade intolerant. pH 6.4-7.4. Water hardness 22 to 300 ppm calcium carbonate & pH 5.0 to 8.0.

bottom line: Seed is very hydrophilic. Dormant seeding or CMS (cold water stored) seed in spring & flooding the seed immediately is absolutely required. (Required storage conditions give rise naturally to cold moist stratification.) Seeds can be scattered in shallow water & the sediment slightly disturbed with a light rake & flooded immediately. Seed cannot dry out or be drilled! Germ 36.6, 24, na, sd 27.2, r11-88 (77)%. Dorm 50, 57, na, sd 23.2, r6.0-73 (67)%. Test 21, 26, na, r7-30 days.**

Description: Native, annual bunch grass 6.0-10'. The sp has pistillate lemma scabrous, slenderly nerved, aborted spikelets up to 1 mm broad, subulate, tapering into the awn. 6" minimum root depth. N 2n = 30.

Comments: status: Threatened in Ohio. Rare in Pennsylvania. Variety *aquatica* is threatened in Michigan.

phenology: Blooms July to September. Incredibly beautiful & very interesting in flower. The sp use in 99.999% of wetland restoration projects in the metro-Chicago region is questionable. Carp uproot seedlings & muskrats tear up the plants & eat the roots. There are reports of wild rice growing in intermittently flooded ditches along highways.

"Commonly attributed to the co but we have not been able to find it. We know of it in Piscasaw Creek in Boone Co." (ewf55)

A local colony between Tampico & Rock Falls, in 2007 & 2008, had all plants killed by summer high water. The colony recovered from the seed bank & returned in 2009 & 2010. The colony is in a spring-fed wetland in a very old, abandoned meander of Rock River. The plants in the upper reaches have stable water levels & usually reach maturity, while the plants in the lower reaches frequently are killed by late spring floodwaters backing up from the river.

Associates: Larval host for *Pero morrisonaria* MORRISON'S PERO MOTH & *Poanes viator* BROAD-WINGED SKIPPER. Provides food for wood ducks, black ducks, & muskrats. Waterfowl, marsh birds, shorebirds, & songbirds eat seeds.

ethnobotany: Seeds available in September (stalks tied about 2 weeks earlier to prevent seed dispersal). Species was widely used as food by Ojibwa, Menominee, Pottawatomie, Sauk-Fox, Kickapoo, Winnebago, Dakota, Assiniboin, Ottawa, Algonkin, Iroquois, & Huron. Dried & stored for winter use. Yarnell writes that in 1964 it was only known (possibly) from Kettle Cave in Ohio, but not elsewhere, in spite of the fact that seeds survive intact after burning. The seed you buy in the grocery store has been parched & will not grow, but I bet an RE would approve it.

Densmore (1928) lists *Zizania palustris*, differing by larger seeds & seed heads.

VHFS: The variety *interior* Fassett has pistillate lemma glabrous, broadly nerved, aborted spikelets 1.5-2.0 mm broad, linear, abruptly tapering into the awn.

www.hort.purdue.edu/newcrop/afcm/wildrice.html





Zizania aquatica

Isaiah 40:6 The voice said, Cry. And he said, What shall I cry? All flesh is grass, and all the goodness thereof is as the flower of the field: King James Version.

Curbstone* as in one who conducts business in the street.
 Selected grass sources are in the main bibliography in the closing section.
 End of Grass part 2.

“The secret of creativity is knowing how to hide your sources.” Albert Einstein.

Endnotes & abbreviations. The following math functions violate Abbey’s 1st Law, which see.
 ++ The listed numbers are seed count mean, seed count median, seed count mode, seed count standard deviation, seed count max, seed count min, seed count range.
 ** The listed numbers are Germ mean, germ median, germ mode, germ standard deviation, germ range (range); Dorm mean, dorm median, dorm mode, dorm standard deviation, dorm range (range); Test mean, test median, test mode, test range. (#germ test : tz etc)

Reference abbreviations May 04 2014

- CEPPC California Exotic Pest Plant Council
- CIPC California Invasive Plant Council
- SEPPC Southeast Exotic Pest Plant Council
- SWSS Southern Weed Science Society
- RBG Kew RBG Kew, Wakehurst Place
- aes10 (AES 2010)
- afvp (Atlas of Florida Vascular Plants)
- anef (Angelo & Boufford: Atlas of New England flora)
- apl (Applewood)
- asfg (Audubon Society Field Guide)
- wade (Alan Wade, nd, various years, 95, &c)
- bsh (Baker Seed Herbarium, California)
- bb02 (Baskin & Baskin 2002, 2001, &c.)
- nlb05 Britton 1905
- cb03 (CC Baskin 2003, 2001, &c.)
- crfg California Rare Fruit Growers
- csvd (Currah, Smreciu, & Van Dyk 1983)
- tehn tomclothier.hort.net (-4°C 24°F stratification being corrected)
- cu00 (or cu02, &c, Cullina 2000, 2002, 2008)
- nd91 (Norm Deno, 1991, 1993)
- den28 (Densmore 1928)
- do63 (Dobbs 1963)

mfd93 (Mary Fisher Dunham 1993)
dh87 (Dirr & Heusser 1987)
drwfp (Directory of Resources on Wildflower Propagation)
ecs (Ernst Conservation Seeds catalog)
ew12 (Everwilde 2012) also ew11
ewf55 (Egbert W Fell 1955)
ewf59 (Egbert W Fell 1959)
fh (Robert W Freckmann Herbarium)
fna (Flora of North America project)
foc (Flora of China online)
fop (Flora of Pakistan online)
gni (Genesis Nursery, Inc)
gc63 (Gleason & Cronquist 1963, 1991)
gran (Granite Seeds)
he99 (Heon et al 1999)
hk83 (Hartman & Kester 1983)
hpi (Hill Prairies of Illinois
(Hilty website)
Ilpin (Illinois Plant Information network)
jf55 (Jones & Fuller 1955)
jlh (JL Hudson, Seedsman, (if the phone doesn't ring its me))
kpw (Kansas Prairie Wildflowers)
krr (Kenneth R Robertson)
lbj (Lady Bird Johnson Wildflower Center Native Plant Information Network)
m14 (Mohlenbrock 2014) also m86, m99, m02, m05, m06, &c
mbg (Missouri Botanic Garden)
msue (Michigan State University Extension)
nae Native American Ethnobotany (Moerman, University of Michigan Dearborn)
now36 (Nowosad et al 1936)
nyfa (New York Flora Atlas)
orghp (Ontario Rock Garden Hardy Plant Society)
ppc (Philips Petroleum Company)
pots (Plants of the Southwest 2000)
pm09 (Prairie Moon 2009) also pm02, pm11, &c
pnnd (Prairie Nursery no date)
pph (Prairie Propagation Handbook)
ppi (Prairie Plants of Illinois)
psdg (Plants of South Dakota Grasslands)
pug13 (plants.usda.gov accessed 2013, 2014)
oed Oxford English Dictionary online
rain (Ranier Seeds)
rrn97 (Reeseville Ridge Nursery 1997)
rvw11 (Reznicek et al 2011)
rs ma (Ray Schulenburg Morton Arboretum)
rhs Royal Horticultural Society
sh94 (Shirley Shirley 1994) & don't call me Shirley
sk08 (Stuppy & Kessler 2008)
sm23 (Smith 1923) also sm32, sm33, sm28, &c.
sw79 (Swink & Wilhelm 1979)
sw94 (Swink & Wilhelm 1994)
tlp (Time Life Perennials)
tlw (Time Life Wildflowers)
tpg The Prairie Garden
uconn (UConn Plant Database)
us97 (USDA 1997)
w12b (Weakley Nov 2012) also w07-12

wfatp (Vance & Vance 1979)
wfn (Wildflowers of Nebraska)
wfnp (Wildflowers northern prairies)
ws92 (Wilhelm & Swink 1992)
w73 (Alphonso Wood 1873)
ry64 (Richard Yarnell 1964)
yy92 (Young & Young 1992)
Reliquum etiam non scriptum est.