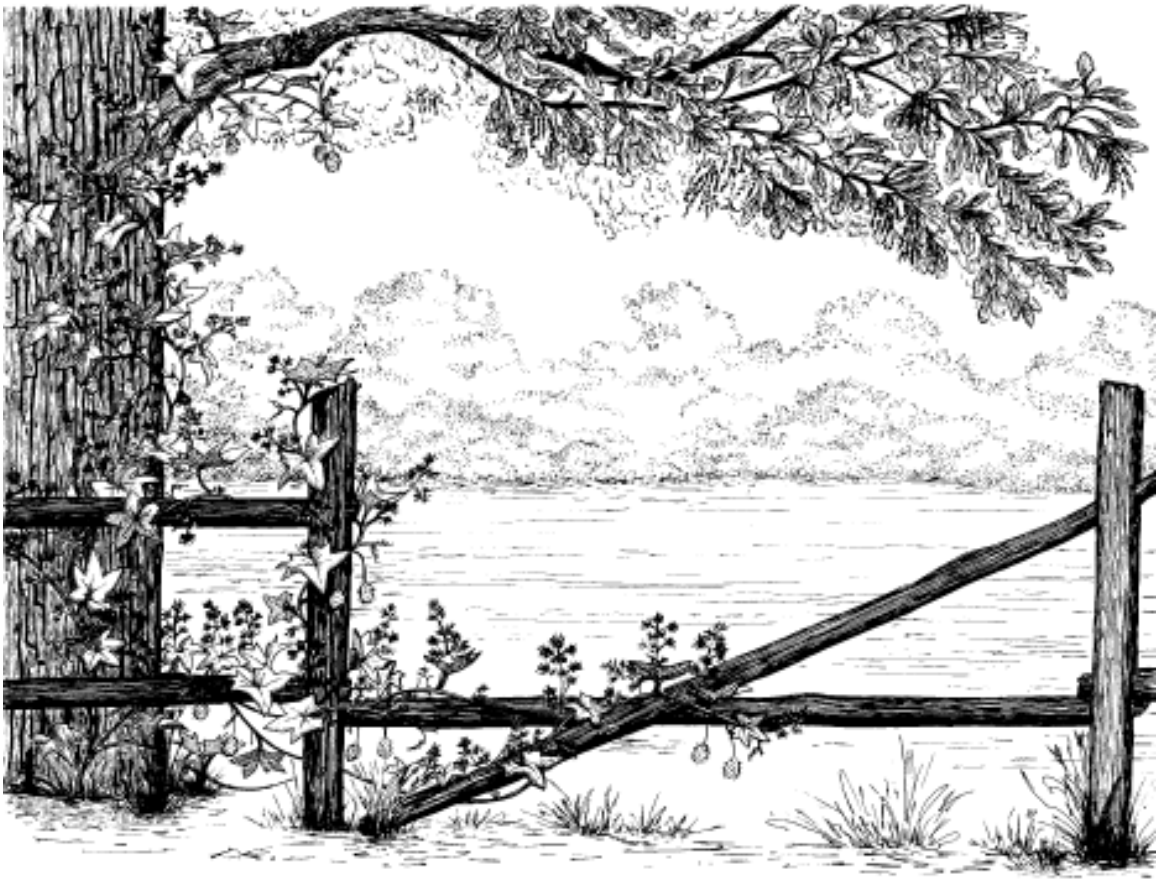
Juncus Rushes

Revised 14 March 2015



JUNCACEAE AL de Jussieu 1789 **RUSH FAMILY** The Rush Family has about 8 genera & 350-440 species of herbs & a few shrubs, mostly of the temperate regions of the Old & New Worlds.

JUNCUS Linnaeus 1753 **RUSH** From Latin name for rushes & similar plants Latin *juncus*; akin to Old Norse *einir,* juniper, Swedish *en*, Latin *juniperus,* juniper, Middle Irish *ain,* reed. *Juncus* is a genus consisting of about 250-300 species of cosmopolitan herbs that are similar to grasses & sedges, but with 3 petaled, lily-like flowers & numerous small seeds. Moist cold stratify or dormant seed, light, with some species highly dormant, wind pollinated. Fruits are capsules with tiny seeds. Attracts ungulates. (Look out for that moose!) Rushes provide excellent nesting cover. In shallow water, some spp create important egg-laying habitat for amphibians. Some species appear to have small delicate white flowers. Seeds produce mucilage when imbibing water. This can be observed in ripened, split pods on dewy mornings. C3.

Juncus are generally considered non-mycorrhizal. There are no commercial mycorrhizal inoculants that work with *Juncus*.

Juncus inflexus, sow at 18-22ºC (64-71ºF) for 2-4 wks, move to +2 to +4ºC (34-39ºF) for 4-6 wks, move to 5-12ºC (41-53ºF) for germination (tchn).

Juncus acuminatus Michaux SHARP-FRUITED RUSH, aka KNOTTY-LEAVED RUSH, TAPERTIP RUSH, (*acuminatus -a -um* Latin acuminate, long-pointed, pointed, tapering to a narrow point, with a long, narrow & pointed tip, from Latin *acumen, acuminis.*) obligate Old subgenus *Septati,* new subgenus *Juncus,* section *Ozophyllum*

Habitat: Lake margins & perennially wet meadows. Stream banks, moist woods, & marshes. Calcareous spring-fed meadows. distribution/range:
Culture: Fourth Corner Nursery
Anaerobic tolerance high. CaCO3 tolerance medium. Intermediate shade tolerance. No salt tolerance. pH 4.4-7.2
Description: tufted; rhizomatous, roots 12" minimum depth; culms sharp, to 0.5-3.0'; leaves; sheaths; inflorescence dichasium; capsules; seeds; N. key features:
Comments: status: phenology: Blooms 7-9. ? seeds per pound. "Fruiting heads often produce leafy offshoots & branches, producing new plants directly." (Ilpin)
"Found uncommonly in boggy places in Sugar River sand areas." (ewf55)
VHFS:

Juncus X alpiniformis Fernald RUSH

Juncus alpinoarticulatus Chaix ALPINE RUSH, aka NORTHERN GREEN RUSH (*alpinoarticulatus -a -um* alpine jointed, alpine form of (*Juncus*) *articulatus*?). see *J alpinus* Subgenus *Septati.*
Includes *J alpinus*.

Juncus alpinus Villars RICHARDSON'S RUSH, (*alpinus -a -um* belonging to the high Alps, alpine, growing in the alpine zone, of the high mountains, of upland or mountainous regions, from Latin *alpinus*, adj, of Alps, of mountains, of alpine regions, or from *alpes*.) obligate Subgenus *Septati*
Habitat: Calcareous pond shores, sand bars & sandy swales.
Description: general form; roots; culms; leaves; sheaths; heads green or brownish flowers; capsules; seeds; N. key features: "var *rariflorus*-1 or several flowers elevated on short pedicels above the others. Var *fuscescens*, flowers sessile or equally short-pedicellate." (Ilpin)
Comments: status: phenology: Blooms 7,8.
VHFS: Includes var *fuscescens* Fern. [*J alpinoarticulatus* Chaix., *J alpinus insignis*, *J richardsonus*]

Juncus articulatus Linnaeus JOINTED RUSH (*articulatus -a -um* joint-, jointed, knuckled, articulated, separating freely as in leaf fall, from Latin *articulus, articuli*, joint, portion of limb or finger between joints.) obligate Subgenus *Septati*
Habitat: In Oregon marshes. Common rush in wetlands & brackish marshes across much of North America. distribution/range:
Culture: Using seed from Cascade Mountains, Ashland, Oregon, 4000 ft, that had been stored dry at 35ºF, germination in 10 days, 90-95ºF day & 70ºF night, constant light, humidity 90%+ with foggers. Bumped plants kept in cattle tanks in a solution of 21-5-20 at 100 ppm N. (Steinfield 2002)
In Kentucky, seeds were cold stratified for 150 days, with germination at alternating temperatures of 19º/15ºC with light. Inferred dormancy is physiological dormancy. (cb03)
Description: 2n = 80.
Comments: 97,000,000 (Hurd & Shaw 1993) seeds per pound.
CC Baskin, 2003, Propagation protocol for production of container *Juncus articulatus* L plants: University of Kentucky, Lexington, Kentucky. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.
DE Steinfeld, 2002, Propagation protocol for production of container *Juncus articulatus* plants (Root Trainer 10 (160 cubic centimeters – 10 cubic inch)): J Herbert Stone Nursery, Central Point, Oregon. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

redo as J arcticus balticus
Juncus balticus Willdenow var **littoralis** Englem [*J arcticus* Willdenow var *littoralis* (Englem) Boivin, *J balticus*] LAKE SHORE RUSH, aka BALTIC RUSH, WIRE RUSH, (*balticus -a -um* of or from the Baltic Sea or the surrounding region, from the coastal area of the Baltic Sea, & *littoralis -is -e* littora'lis (lit-or-AY-lis) of or pertaining to the seashore, found on the seashore, from Latin *littorālis*, better *lītorālis*, from *lītus, lītoris*, classically written *littus, littoris*, shore.) [facw] Old subgenus *Genuini,* new subgenus *Agathryon* section *Juncotypus.*
Habitat: Pannes or shallow dune ponds & moist saline roadsides, desert to sub-alpine zones. distribution/range:

Circumboreal species, from Alaska, all the Canadian provinces, south to Virginia, Arkansas, & northern Mexico. Cook, DeKalb, DuPage, Jo Daviess, Kankakee, Lake, LaSalle, & McHenry counties.
Culture: 7,322,581 (gnaw09), 9,072,022 (gnhmd12), 9,265,305 (gna07), 9,265,306 (gnh09), 9,659,574 (gnamd04; gnhw14), 9,660,574 (gnhbi05), 12,300,000 (wns01) seeds per pound. 109,301,000 (gran) seeds per pound (*the last count may represent math errors*). For solid stand pasture, plant 1-2 lb pls per acre in fall or spring (gran). In diverse seed mixes, use 0.015 to 0.031 lbs pls per acre (gni).

With seed from Glacier National Park, seeds are soaked in water for 2 days to imbibe, placed in linen bags buried between layers of moist sphagnum peat & stratified at 35ºF for 100 days (Luna & Dedekam 2005) Seeds require heat, light & high humidity for germination. Surface sow. Also Fourth Corner Nursery.

Moderately fine to fine textured soils. Basic to neutral soils. In Washington, brackish marshes, tide flats, & wet meadows.

bottom line: Most lots have a significant to strong requirement for dormant seeding, but the extreme seed count gives even slight germination the appearance of a good crop. Best planted when the wetland is accessible immediately after construction. Flipflop species. Germ 38.9, 35, 8.0, sd29.9, r7.0-80 (74)%. Dorm 50.4, 55, na, sd 28.9, r5.0-85 (80)%. Test 36, 32, 30, r24-55 days. (#11)**
Description: Similar to *J effusus*, but strongly rhizomatous, sod forming, medium to tall, 18-36""grass-like" perennial. The rhizomes often produce straight lines of plants. Inflorescence dichasium.
Comments: phenology: Blooms 6,7,8. C3. Uncommon. Saline or alkaline tolerant. Often occurs as a community dominant. Very small seeds are said to be dispersed by wind. Riparian restoration. Seed source nursery plantings, genetic origin DuPage County.
VHFS: [*Juncus arcticus* Willd subsp *ater* (Rydb) Hultén, *J arcticus* Willd subsp *balticus* (Willd) Hyl, *J a* Willd subsp *littoralis* (Engelm) Hultén, *J a* Willd var *gracilis* Hook, *J a* Willd var *littoralis* (Engelm) B Boivin, *J arcticus* Willd var *montanus* (Engelm) SL Welsh, *J a* Willd var *montanus* (Engelm) Balslev, *J ater* Rydb, *J balticus* Willd, *J b* Willd subsp *vallicola* (Rydb) Lint, *J b* Willd var *condensatus* Suksd, *J b* Willd var *eremicus* Jeps, *J b* Willd var *littoralis* Engelm, *J b* Willd var *littoralis* Engelm f *dissitiflorus* Engelm ex Fern & Wieg, *J b* Willd var *melanogenus* Fern & Wieg, *J b* Willd var *montanus* Engelm, *J b* Willd var *vallicola* Rydb, *J breweri* Engelm, *J vallicola* (Rydb) Rydb]

T Luna & S Dedekam, 2005, Propagation protocol for production of container *Juncus balticus* Willd. plants (116 ml (7.0 cu in)):Glacier National Park, West Glacier, Montana. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus biflorus Elliott TWO-FLOWERED RUSH, (*biflorus -a -um* (bye-FLO-rus) blooming in pairs, or having two flowers.) facw Subgenus *Juncus*, section *Graminifolii*.
Habitat: Sandy wet ground, near south end of Lake Michigan. Moist or wet meadows, shores; sandy open, usually acidic soils. distribution/range: Occasional to common in the south ½ of Illinois.
Culture: Moist cold stratify, light. (Code C, D Ken Schaal).
Description: 2.0-3.0'; key features: "As opposed to *Juncus marginatus*, with which this species often occurs, is: more robust with thicker, more branched & more knotty underground stems; found in wetter places." (Ilpin)

"Differs from *J marginatus* in the inflorescence being diffuse & the heads numerous with few flowers in a head. The stamens are persistent, an easily seen characteristic. Very uncommon in shallow bogs in Rockton Township." (ewf55)
VHFS: Variety *andinus* Fern & Grisc has glomerules approximate & inflorescence congested.

Juncus brachycarpus Engelmann SHORT-FRUITED RUSH, (*brachycarpus -a -um* short-fruited, bearing short fruits, from Greek βραχύς, *brakhys*, short, & from καρπός, *karpos,* fruit.) facw Subgenus *Septati*
Habitat: Wet prairies, edges of sloughs, sandy swales, & old fields. distribution/range: Throughout the state except for the northwest counties
Culture: Moist cold stratify, light. (Code C, D Ken Schaal). 12,000,000 (pm02) seeds per pound.
Description: 2.0-3.0'; inflorescence dichasium. N 2n = 44.
Comments: status: phenology: Blooms 6,7,8. Fruiting mid-summer to fall. Seed source nursery production.

Juncus brachycephalus (Engelmann) Buchenau SHORT-HEADED RUSH, aka SMALL-HEADED RUSH, (*brachycephalus -a -um* short-headed, from Greek βραχύς, *brakhys*, short, & κεφαλή, *kephale*, head.) obl Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*.
Habitat: "Calcareous marshes, wet meadows, & wetland shores" (fna). Calcareous shores of shallow ponds,

marly springy sites, calcareous cold water springs, sandy shores. distribution/range:
Culture:
Description: 2n = 80.
Comments: status: phenology: Blooms 6,7,8,9. Fruiting summer to early fall.

"Very uncommon in the shallow bogs in Coon Creek bottom. It differs from *J canadensis* in having a diffuse inflorescence, the heads being smaller & the tails of the seeds shorter. (*J canadensis* var *brachycephalus* Engelm) (ewf55)

Juncus brevicaudatus (Engelmann) Fernald NARROW-PANICLE RUSH, (*brevicaudatus -a -um* short-tailed, from Latin *brevis*, short; little, & *caudatus -a -um* (kaw-DAY-tus) caudate, tailed, with a tail, from the long tipped panicle, from *cauda, caudae (coda, codae*) f, the tail of an animal.) Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*.
N 2n = 80.

Juncus bufonius Linnaeus *IA TOAD RUSH, (*bufonius -a -um* (boo-FO-nee-us) of the color of a toad, pertaining to or like a toad; growing in damp places, from *bufo, bufonis* m., Latin noun, a toad.) facw+ Old subgenus *Poiophylli*, new subgenus *Agathryon* section *Tenageia.*
Habitat: Pond shores, wet sands, wet silty areas, weedy pond shores, sandy, silty shorelines, agricultural wetland seedbanks, compacted soils of paths & lanes. distribution/range: Nearly worldwide.
Description: Annual; 0.3-0.8'; seeds yellowish, widely ellipsoid to ovoid, 0.26-0.49 mm, not tailed; N 2n = 27-37, 58-81, 108-115.
Comments: status: phenology: Blooms 5,6,7,8. Flowering & fruiting spring to early fall. Wetland restoration. Seed count not available, seed source farmed wetlands.

Juncus canadensis J Gray (or J Gay ex LaHarpe, or J Gay) CANADIAN RUSH, aka CANADA RUSH, (*canadensis -is -e* canaden'sis (kan-a-DEN-sis, kan-a-DEN-see) of or from Canada or the north-east USA, of Canadian origin.) obligate Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*.
Habitat: Marshy places, usually in subacid or acid soils (Fernald). Boggy sites, calcareous pond margins, bottom of wet sand quarries. distribution/range:
Culture: Seeds cold stratified for 270 days germinated at alternating temperatures of 30º/20ºC. Seed dormancy is physiological dormancy. (cb03) 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). 4,500,000 (jfn04), 12,000,000 (pm10); 34,923,076 (gnam10) seeds per pound.

culture: Anaerobic tolerance high. CaCO3 tolerance none. Drought tolerance none. pH 4.5-5.9.

bottom line: Limited data shows a strong requirement for dormant seeding, but the extreme seed count gives even ridiculously low germination the appearance of a good crop. Best planted when the wetland is accessible immediately after construction. Germ 15.5, 14, na, sd 11.2, r3.0-30 (27)%. Dorm 75, 74, 74, sd 7.8, r65-87 (22)%. Test 42, 39, 39, r39-47 days. (#5)**
Description: Bunch type rush; roots 12" minimum depth; culms; leaves; sheaths; heads; capsules; seeds; N. key features:
Comments: status: phenology: Blooms Seed source farmed wetlands Normandy, Bureau Co.

"A late flowering rush that is uncommon in boggy areas in Coon Creek bottom." (ewf55) James Gaius Alwill, IDOT Peoria, (personal communication) reports *J canadensis* prospering in a saline/alkaline ditch on I-74 near Rt 78.

CC Baskin, 2003, Propagation protocol for production of container *Juncus canadensis* J Gay ex LaHarpe plants: University of Kentucky, Lexington, Kentucky. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus compressus Jacq. BLACK GRASS, aka ROUND FRUITED RUSH, (*compressus -a -um* Latin compressed, flattened, pressed together.) [FAC] In the past, this was referred to as *J gerardii* Lois. Old subgenus *Poiophylli,* new subgenus *Agathryon*, section *Steirochloa.*
Habitat: Apparently introduced from Europe. Forms blackish-green colonies in summer in ditches & on shoulders along saline /alkaline roadsides. distribution/range:
Culture: Easy by dormant seed.
Description: Seeds light brown, ellipsoid to lunate, 0.35-0.556 mm, not tailed. 2n = 44.

Comments: status: phenology: Blooms 5,6. Flowering & fruiting late spring--early summer.

Juncus compressus along pavement

Juncus diffusisimus Buckley SLIMPOD RUSH, (*diffusisimus -a -um* most or very spread out or wide, Latin superlative adjective from *diffusus -a -um*, diffuse, spreading, & *–isimus*, most.) FACW Subgenus *Septati*
Description: Seeds oblong-ellipsoid, 0.3--0.4 mm, not tailed; body clear yellow-brown; key features:
Comments: status: phenology: Blooms ? Fruiting summer.
Associates: Ethnobotany:
VHFS:

Juncus drummondii E Meyer DRUMMOND'S RUSH, Old subgenus *Genuini*
Habitat: Frequent colonizer of talus & scree slides & disturbed ground in dry subalpine meadows.
distribution/range: Alaska to California & east to the Rockies from Alberta to new Mexico.
Culture: Using seed from Logan Pass, 2032m, 50-80% germination with 5-month outdoor stratification. Potting soil contains time release 13-13-13. Germination outdoors in spring with fluctuating temperatures, in full sun. Rapidly growing seedlings fertilized with 20-20-20, changing to 10-20-20 in August & September. (Hosokawa et al 2004)
Description: key features:
Comments: status: phenology: Blooms ? seeds per pound
VHFS: Vars. *drummondii* & *subtriflorus.*

J Hosokawa, D Wick, & T Luna, 2004, Propagation protocol for production of container *Juncus drummondii* Mey plants (116 ml conetainers): Glacier National Park, West Glacier, Montana. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus dudleyi Wiegand DUDLEY'S RUSH, (*dudleyi* dud'leyi (DUD-lee-eye) honoring William Russell Dudley (1849-1911), first professor of botany & head of the department at Stanford University, & discoverer of *Juncus dudleyi.*) [fac] Old subgenus *Poiophylli,* new subgenus *Agathryon*, section *Steirochloa.*
Habitat: Calcareous fens, wet meadows, wet prairie, moist meadows, & agricultural wetland seedbanks. Damp to dryish calcareous soil. Old fields & pastures, degraded prairies. distribution/range:
Culture: 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). 11,947,368 (gna03); 18,144,000; 32,428,571 (gnh144), 34,892,307 (gnh11); 36,320,000 (jfn04); 39,478,260 (gna10); 51,200,000 (pm 02; aes10); 60,533,333 (gnh02 & gna05); 64,857,141 (gna05& gnh07); 82,545,456 (gna09) seeds per pound.

bottom line: Most lots have a significant to strong requirement for dormant seeding, but the extreme seed count gives even horrible germination the appearance of a good crop. Best planted dormant in wet meadows, or when the wetland is available. Germ 14.2, 9.0, 4.0, sd 15, r0.0-55 (55)%. Dorm 68.4, 76, 71, sd 19.5, r9.0-90 (90)%. Test 38, 40, 42, r22-64 days. (#18).**

Description: 0.5-2.0', leaves one half the stem height.
Comments: Blooms 5,6,7(-10). Wetland restoration, wet rain gardens. Seed source nursery plantings, genetic source Fermi Lab wetlands, Kane County, & farmed wetlands & disturbed wetlands, Shaw Station, Lee County.
"Common on wet prairies & other low places." (ewf55)
Associates: Reported to be deer proof.
ethnobotany: Stems used for weaving small fine mats by Ojibwa (sm32).
VHFS: [*Juncus tenuis dudleyi*]

Juncus effusus Linnaeus *IA COMMON RUSH, aka SOFT RUSH, occasionally known as BULRUSH, (*effusus -a -um* loosely spreading, straggly, pouring forth, from Latin adjective *effusus -a -um,* loose spreading, disheveled.) (*solutus -a -um* unbound, free, not adherent, from Latin adjective *solutus -a -um*.) Obligate Old subgenus *Genuini,* new subgenus *Agathryon* section *Juncotypus.*
Habitat: Seasonally inundated areas, wet meadows, moist to wet habitats. Muddy shores, swales, wet thickets, bogs, & damp open ground (ry64). "Common in wet places" (ewf55) Marshes & prairies. "Swamps & their edges, marshes, moist meadows, & moist or saturated soils, often conspicuous in pasture meadows where it is shunned by grazing animals" (fna). distribution/range:
Culture: 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Seed cold moist stratified for 270 days germinates at alternating temperatures of 30º/20ºC. Germination is greater in light than dark. Seed dormancy is physiologic dormancy. (cp03) "Sow seeds just below moist soil surface at 70ºF for 1 month. Move to 30ºF for 1 month, then bring back to 50F." (ew12) Sow at 18-22ºC (64-71ºF) for 2-4 wks, move to -4 to +4ºC (24-39ºF) for 4-6 wks, move to 5-12ºC (41-53ºF) for germination (tchn). Dormant seed or moist cold stratify, & light. Seed can be stored in fresh water or damp media @ 35º-40° F for 120-270 days & spring seed. Seed may also be fall broadcast for natural stratification. Sowing seed in flats & putting flats in cold frames for 2 months works well for us. Some seed lots produce good greenhouse crops with no pretreatments. Alternating temperatures & light may be necessary for, or improve germination. 4,496,000 (jfn04); 12,788,732 (gna03); 16,000,000 (pm, wns01, ew12, aes10); 17,000,000 (ecs); 18,144,000; 19,721,739 (gnh11); 22,700,000 (gnh14), 28,375,167 (gnh05); 40,000,000; 43,238,095 (gnaen04, gna05); 44,292,682 (gnh02); 53,411,760 (gna07, 08, 11); 55,030,303 (gnh04); 56,750,000 (gna04, gna06); 60,533,331 (gna07); 81,453,000 (gnhen11) seeds per pound. Seed is small & may be difficult to distribute evenly. Some have recommended up to 0.25 lb pls per acre (us97), but 250 seeds per square foot of one species may be excessive, ya think? Use 0.015-0.031 lb pls per acre. Seed, plugs, & bare root materials are readily commercially available. Plugs may sell out by mid-season.
cultivation: Space plants 1.0-1.5'. Wet to moist soil, full sun. Plugs & bare root materials should be planted at the depth they have been growing, on 0.5-1.5' centers. Plants spread slowly. Prefers a few inches of standing water to moist soil. Some wrongly say up to 12" water (us97). Tolerant of some water level fluctuations. Anaerobic tolerance medium. CaCO3 tolerance low. Drought tolerance moderate. Nutrient load tolerance moderate. Salt tolerance low, & noted by AES (2010). Siltation tolerance moderate. Partial to full sun. pH 5.5-7.0
bottom line: Most lots have a significant to strong requirement for dormant seeding, but the extreme seed count gives even slight germination the appearance of a good crop. About 1/3 of lots have germ >20%. Best planted when the wetland is accessible immediately after construction. Flipflop species. Germ 17.4, 10, 0.0, sd 18.3, r0.0-65 (65)%. Dorm 61.9, 70, 70, sd 25.2, r3.0-94 (91)%. Test 36, 37, 37, r13-54 days. (#28)**
Description: Perennial emergent native rush; roots tufted with short rhizomes, 12" minimum depth; culms 1.0-2.5(3.5)' slender stems, green/ brown flower as if on the side of the stem; leaves; sheaths; heads; capsules; seeds amber, (0.3-)0.4-0.5 mm; N 2n = 40, 42. key features:
Description:,
Comments: status: phenology: Blooms 6,7, or May to September. Flowering summer, fruiting summer-fall. Wetland restoration, useful in upper & lower shoreline zones, vegetated swales, & moist rain gardens. Seed source nursery production genetic source remnant wetlands, Shaw Station, Lee Co.
Associates: Habitat for several species of insects. Provides food & cover for songbirds & waterfowl, inc ducks. Seeds are eaten by songbirds & waterfowl. Plants are eaten by small rodents, muskrats, & deer. Provides spawning habitat for sunfish & bluegills. Provides nesting habitat for rails.
Ethnobotany: Stems used for weaving bags, pouches, & mats by Ojibwa (Gilmore 1933).
VHFS: Swink & Wilhelm (1994) cite varieties *pylaei* (LaHarpe) Fern & Wieg & *solutus* Fern & Wieg. Gleason & Cronquist treat *pylaei* (LaHarpe) as a distinct species.

Variety *pacificus* Fern & Weig PACIFIC RUSH is found in moist places, below 8000 feet, from lower California to British Columbia. Using seed collected between June 1st & September 1st & stored in a refrigerator, 80% germination 30 days after sowing. (Young 2001) Young recommends using fresh seed, as germination declines with older seed, & not drying fresh seed, refrigerate, & sow ASAP. Many other varieties are known.

CC Baskin, 2003, Propagation protocol for production of container *Juncus effusus* L plants: University of Kentucky, Lexington, Kentucky. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

B Young, 2001, Propagation protocol for production of container *Juncus effusus* L var *pacificus* Fern & Weig Plants (Leach Tubes): Golden Gate National Parks, San Francisco, California In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus effusus

Juncus ensifolius Wikström DAGGER-LEAF RUSH, (*ensifolius -a -um* with sword like leaves, from *ensis, ensis* m., Latin noun, sword, & *-folius -a -um*, -leaved, from *folium, foli*(*i*) n, leaf.) not rated Subgenus *Ensifolii*
Habitat: Wet habitats. distribution/range: North America; introduced in Europe & East Asia. Primarily w North America, Wisconsin, New York & ne Canada.
Culture: Sow at 20ºC (68ºF), if no germ. in 3-4 wks, move to +4ºC (39ºF) for 2-4 wks (tchn). Available Fourth Corner Nursery.
Description: key features:
Comments: status: phenology:
VHFS:

Juncus filiformis Linnaeus THREAD RUSH, (*filiformis -is -e* filifor'mis (fi-li-FOR-mis) thread-like, shaped like threads.) FACW Subgenus *Genuini*
Habitat:
Culture: Seed cold stratified for 270 days germinated at alternating temperatures 30 / 20ºC with light. Seed dormancy is physiological dormancy. (cb03) Sow at 20ºC (68ºF), if no germ. in 3-4 wks, move to +4ºC (39ºF) for 2-4 wks (tchn).
Description: key features:
Comments: status: phenology:
VHFS:

CC Baskin, 2003, Propagation protocol for production of container *Juncus filiformis* L plants: University of Kentucky, Lexington, Kentucky. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus greenei Oakes & Tuckerman GREENE'S RUSH, (*greenei* after Edward Lee Greene (1843-1915), a churchman, professor of Botany at Berkley, later at the Catholic University of America in Washington, & an associate in Botany at the Smithsonian.) fac Subgenus *Poiophylli*
Habitat: Sand prairies, flat sands, dry non-sandy prairies, & sterile, sandy abandoned fields. "Usually dry, well-drained, sandy soil in pine lands, near lake shores, or among sand dunes & often associated with

disturbance" (fna). distribution/range:
Culture:
Description: Seeds dark tan, ellipsoid to lunate, 0.48-0.65-(0.7) mm, not tailed; N 2n = ca. 80.
Comments: status: phenology: Blooms June-July. Flowering & fruiting summer.
"Rare. Shallow bog in Rockton Township & in the north part of Shirland Township." (ewf55)

Juncus interior Wiegand INLAND RUSH, aka INTERIOR RUSH, (*interior -or -ius* from Latin *interior*, inner, for an inland provenance.) [facu] Old subgenus *Poiophylli,* new subgenus *Agathryon*, section *Steirochloa.*
Habitat: Mesic prairies, railroad sidings, hill prairies. "Dry, often upland sites in prairies, exposed disturbed sites, & ditches in sandy or clayey soils" (fna) distribution/range:
Culture: (Code C, D Ken Schaal). 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). "Sow seeds just below moist soil surface at 70ºF for 1 month. Move to 30ºF for 1 month, then bring back to 50ºF." (ew12) 44,800,000 (pm, ew12) seeds per pound. Also available Fourth Corner Nursery.
cultivation: Space plants 1.0-1.25'.
Description: Seeds tan, ellipsoid to lunate, 0.436-0.73 mm, not tailed; N 2n = 80.
Comments: status: phenology: Blooms ? Flowering & fruiting late spring--early summer.
"Not uncommon on low prairies & occasionally on drier ones." (ewf55)
VHFS: Gleason & Cronquist include this with *J tenuis.*

Juncus lesuerii Bolander SALT RUSH, (*lesuerii* honoring Swiss born paleobotanist & bryologist Charles Leo Lesquereux (1805-1889).) Subgenus *Genuini*
Habitat: Salt marshes near the coast. "Borders of salt or freshwater marshes & usually near dunes along the coast" (fna). distribution/range: San Luis Obispo Co to British Columbia.
Culture: Seeds from Presidia, Ca required no pretreatments (Young 2001).
Description: Rhizomatous; culms sharp stems!; seeds dark amber, oblate to ellipsoid, 0.4--0.7 mm; N. key features:
Comments: status: phenology: Blooms ? Flowering & fruiting summer. Collect seeds September - November.
VHFS: [*Juncus balticus* Willd subsp *pacificus* Engelm, *J lesuerii* var *tracyi* Jepson]
B Young, 2001, Propagation protocol for production of container *Juncus lesuerii* Bol. Plants (Leach Tubes): Golden Gate National Parks, San Francisco, California In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus longistylis Torrey LONG STYLE RUSH, (*longistylis*, long styled) FACW Subgenus *Graminifolii*
Habitat: Moist ground in mountain meadows. distribution/range:
Culture: propagation:
Description: Seeds ovoid, 0.4--0.6 mm, not tailed; 2n = 40. key features:
Comments: status: phenology: Blooms ? Flowering & fruiting summer.
Associates: Ethnobotany:
VHFS:

Juncus marginatus Rostikovius *IA, WI GRASS-LEAF RUSH, (*marginatus -a -um* margined, with a distinct margin, edged, or bordered.) facw Subgenus *Juncus*, section *Graminifolii.*
Habitat: Wet meadows. distribution/range:
Culture: Seeds cold moist stratified for 100 days germinated at alternating temperatures of 25/º with light. Seed dormancy is physiological dormancy. (cb03) Seed count not available.
Description: Rhizomatous; culms 0.75-1.5', sharp stems!; seeds yellow to light brown, fusiform, 0.4--0.7 mm, not tailed; N 2n = 38, 40. key features:
Comments: status: Special Concern in Wisconsin. phenology: Blooms 6,7. Attractive dried seed heads, wetland restoration, cool season, bunching, organic soils. Seed source farmed wetlands.
"Not uncommon. Low prairies, peaty places in Kent Creek bottom, boggy meadow on Rockton road 5 miles north of Rockford." (ewf55)
VHFS:

CC Baskin, 2003, Propagation protocol for production of container *Juncus marginatus* Rostk. plants: University of Kentucky, Lexington, Kentucky. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus mertensianus Bongard MERTEN'S RUSH, (*mertensianus -a -um* after Karl Heinrich *Mertens* (1796-1830), German botanist & naturalist, who explored the west coast of America as part of a Russian expedition, & son of Franz Karl Mertens, after whom *Mertensia* is named. Subgenus *Septati*
Habitat: Wet places & along streams from the montane to the alpine zone. "Fruiting mid summer--fall. Montane to alpine meadows, stream banks, lake margins, & conifer woods" (fna) distribution/range: Alaska to California & east to the Rockies from Alberta to New Mexico. ? seeds per pound
Culture: Seed from Glacier National Park with 5-month outdoor stratification gave 50 – 80% germination. Potting soil contains time release 13-13-13. Germination outdoors in spring with fluctuating temperatures, full sun. Rapidly growing seedlings fertilized with 20-20-20, changing to 10-20-20 in August & September. Overwinter outdoors under insulating foam. (Luna et al 2004)
Description: general form; roots rhizomatous; culms sharp stems!; leaves; sheaths; heads; capsules; seeds ellipsoid, 0.4--0.5 mm, not tailed; body clear yellow-brown; N 2n = 40. key features:
Comments: status: phenology: Blooms ? fruiting mid-summer to fall.
VHFS:

T Luna, J Evans, D Wick, & J Hosokawa, 2004, Propagation protocol for production of container *Juncus mertensianus* Bong plants (116 ml conetainers): Glacier National Park, West Glacier, Montana. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus militaris Bigelow BAYONET RUSH, aka JOINTED BOG RUSH, SOLDIER RUSH, (*militaris -is -e* military, with helmet & also soldier-like, in masses.) obligate Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*.
Habitat: "Mucky bottoms of shallow lakes & rivers, wet shores" (fna) distribution/range:
Culture: propagation:
Description: Seeds obovoid, 0.5--0.6 mm, not tailed; body clear yellow-brown; N 2n = ? key features:
Comments: status: phenology: Blooms ? Fruiting late summer-fall.
Associates: ethnobotany:
VHFS:

Juncus nevadensis S Watson SIERRA RUSH, (*nevadensis -is -e* of, from, or referring to Nevada, USA; or mountains, the Sierra Nevadas of California, or the Sierra Nevada of Spain.) Subgenus *Septati*
Habitat: "Wet banks along margins of streams & lakes, marshes, bogs, sloughs, & wet or boggy prairies" (fna) distribution/range:
Culture: With seed from Lane Co., near Eugene Oregon, flats overwintered outdoors had 80% germination while spring sown untreated seed had 0% germination. Seed requires 90 days cold moist treatment & light. (Bartow 2003) ? seeds per pound
Description: Roots rhizomatous; culms sharp stems!; seeds ellipsoid, 0.4--0.5 mm, not tailed; N 2n = ? key features:
Comments: status: phenology: Blooms
VHFS:

A Bartow, 2003, Propagation protocol for production of container *Juncus nevadensis* S. Watson. plants: Corvallis Plant Materials Center, Corvallis Oregon. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus nodatus Coville STOUT RUSH, (*nodatus -a -um* from Latin *nōdātus,* past participle of *nodo*, I furnish with knots, I tie in a knot, referring to the nodes or *septae* in *Juncus nodatus*.) obl Subgenus *Septati.*
Habitat: Low sandy flats, wet sands & ditch banks near south end of Lake Michigan. distribution/range:
Culture: Moist cold stratify. Small seeds need light to germinate, scant soil cover. (Code C, D Ken Schaal). 12,800,000 (gni) seeds per pound.
Description: 2.0-4.0' key features:
Comments: Blooms 7.

Juncus nodosus Linnaeus JOINT RUSH, aka KNOTTED RUSH, (*nodosus -a -um* full of knots, knotty, gnarled, with conspicuous nodes, jointed, said of roots & stems, from *nōdōsus*, full of knots, knotty.) obl Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*.
Habitat: Alkaline soils, calcareous sandy or marly shores, ditches, & calcareous springy areas.
distribution/range:
Culture: Cold moist stratify 60 days, sow on soil surface (Wade). 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). 12,000,000 (wns01); 25,222,221 (gnam07); 26,705,882 (gnh13); 28,375,000 (gna06); 32,000,000 (pm); 89,178,570 (gnhm11) seeds per pound. Available Fourth Corner Nursery.

bottom line: Limited test data indicate seed can be field sown dormant or spring; non-dormant lots are known. Germ 55.3, 61, na, sd 36.7, r6.0-93 (87)%. Dorm 35.3, 25, 0.0, sd 38.1, r0.0-91 (91)%. Test 45, 40, na, r28-71 days. (#5)**
Description: 6-24",
Comments: Blooms June-August. Seed source nursery plantings, genetic source Kane County & fen in Stark County on Rt 93.

"Rare. In bogs in Rockton Township, in Laona Township west of Yale bridge & in Kent Creek bottom at North Springfield avenue road." (ewf55)

Juncus oxymerus Engelmann POINTED RUSH, (*oxymerus -a -um* having sharp parts, from ancient Greek ὀξυ, *oxy-,* sharp, & μέρος, *meris*, a part.)
Habitat: Wet meadows & lakeshores. "Stream & lake shores, montane meadows & seasonally emergent wetlands" (fna). distribution/range: Northwest USA, west of the Cascades. 100-2000 m; British Columbia; California, Oregon, Washington.
Culture: Available Fourth Corner Nursery.
Description: general form; roots rhizomatous; culms; leaves; sheaths; heads; capsules; seeds obovoid, 0.5 mm, not tailed; N ? key features:
Comments: status: phenology: Blooms ? Fruiting late spring to fall. ? seeds per pound.
VHFS:

Juncus parryi Engelmann PARRY'S RUSH, (*parryi* for Dr. Charles Christopher *Parry*,1823-1890, English-born American botanist & botanical collector.) Subgenus *Genuini*
Habitat: distribution/range:
Culture: Seeds from Crater Lake were sown in flats, flats covered with polyethylene bags & placed in a walk-in cooler for 5 weeks. Excellent germination, estimated 80%, good seedling vigor. Trials were made at 5, 10, & 16 weeks, with no significant differences. Control flats zero germination. (Bartow 2004)

Dyer (2001) experimented with division & found the plant is very sensitive to being planted with the crown buried.
Description: Seeds amber, body 0.6 mm, tails 0.4 mm; key features:
Comments: status: phenology: Blooms ? Flowering & fruiting in summer.

A Bartow, 2004, Propagation protocol for production of container *Juncus parryi* Englem. plants: Corvallis Plant Materials Center, Corvallis Oregon. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

D Dyer, 2001 Propagation protocol for production of plug & transplants of *Juncus parryi* cuttings: Lockeford Plant Material Center, Lockeford, California, In Native Plant Network, URL:http//www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus patens E Meyer SPREADING RUSH, (*patens* spreading, opening out, from Latin *patens, patentis,* open, accessible.) Subgenus *Genuini*
Habitat: Below 5,000 feet in many habitats. "Stream banks, lake or pond shores, ditches, & other wet places in sandy or clayey soils" (fna). distribution/range: Lower California to British Columbia.
Culture: Pretreatment not required. Seed germinates 30 days after sowing (Young 2001) ? seeds per pound.
Description: Roots rhizomatous; culms sharp stems; seeds dark amber, oblate, 0.4--0.5 mm; N. key features:
Comments: status: phenology: Blooms ? Flowering & fruiting in summer.
VHFS:

B Young, 2001, Propagation protocol for production of container *Juncus patens* E May plants (Leach Tubes): Golden Gate National Parks, San Francisco, California In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus pelocarpus E Mey BROWN-FRUITED RUSH, aka JONC À FRUITS BRUNS, (*pelocarpus -a -um* New Latin mud fruit, from ancient Greek πηλός, *pelos,* clay, mud, & καρπός, *karpos,* fruit; dark-fruited in one source.) obligate Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum.*
Habitat: "Shores, peat bogs, sandy soils, pools, occasionally submersed in lakes, rarely in salt water; 0-600 m" (fna). "wet; shores, in shallow water; in sandy, boggy soil" (fh). distribution/range:
Culture: propagation:
Description: Seeds ovoid, 0.3--0.5 mm, not tailed; body clear yellow-brown; N 2n = 40. key features:
Comments: status: phenology: Blooms ? Fruiting late summer - fall.
Associates: Ethnobotany:
VHFS: [*Juncus abortivus* Chapman, *J pelocarpus* var *crassicaudex* Engelm, *J pelocarpus* var *sabulonensis* H St John]

Juncus phaeocephalus Engelmann DUNHEAD RUSH, (*phaeocephalus* dark-headed, from *phaeco*, dark & *kephale*, head.) Subgenus *Ensifolii*
Habitat: Beaches, dunes, & meadows. distribution/range: From Los Angeles County & Santa Rosa Island to Oregon.
Culture: Seed from the Tennessee Valley, California stored dry in a refrigerator required no further treatment. Germinated 21 days after sowing. (Young 2001)
Description: key features:
Comments: status: phenology:
VHFS: [*Juncus phaeocephalus* var *paniculatus* Engelmann]
B Young, 2001, Propagation protocol for production of container *Juncus phaeocephalus* Engelm. plants : Golden Gate National Parks, San Francisco, California In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Juncus scirpoides Lam. ROUND-HEADED RUSH, AKA SCIRPUS-LIKE RUSH, (*scirpoides* like *Scirpus*, bulrush.) facw+ Subgenus *Septati*
Habitat: "Wet sandy soil, salt marshes, lake shores, ditches, meadows, wet woods; 0--1400 m" (fna).
distribution/range:
Culture: propagation:
Description: Seeds oblong, 0.4 mm, not tailed; body clear yellow-brown; key features:
Comments: status: phenology: Blooms ? Fruiting early summer - fall.
"Rare. Boggy places in Coon Creek bottom & a drainage ditch in a low prairie west of Winnebago." (ewf55)
Associates: Ethnobotany:
VHFS: [*Juncus echinatus* Muhl, *J scirpoides* var *compositus* Harper, *J scirpoides* var *genuinus* Buchenau, *J scirpoides* var *macrostemon* Engelmann, *J scirpoides* var *meridionalis* Buchenau]

Juncus stygius Linnaeus var **americana** Buchenau *WI BOG RUSH, aka AMERICAN MOOR RUSH, MOOR RUSH, (*stygius* "Linnaeus in *Lachesis Lapponica*, describing boggy area which "consists chiefly of marshes, here called *stygz*. A divine could never describe a place of future punishment more horrible than this country, nor could the Styx of poets exceed it."" Freckmann Herbarium.)
http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=JUNSTYvAME obligate Subgenus *Alpini*
Habitat: "Wet moss, bogs, & bog-pools" (fna). distribution/range: Wisconsin near the upper peninsula of Michigan.
Culture: propagation:
Description: Perennial; capsules greenish to tan, pseudo-3-locular, ellipsoid, 5.5-9.0x 1.8-2.6 mm; seeds pale yellow, fusiform, body 0.8-1.1 mm, tails 1-1.4 mm; key features:
Comments: status: Endangered in Wisconsin. phenology: Blooms ? Flowering & fruiting mid-to late summer.
Associates: ethnobotany: Stems used for weaving mats by Ojibwa (Reagan 1928).

VHFS: [*Juncus stygius* subsp *americanus* (Buchenau) Hultén]

Juncus supiniformis Engelmann SPREADING RUSH, AKA HAIRY-LEAVED RUSH, (*supiniformis -is -e* New Latin having a prostrate form, from Latin *supinus -a -um*, prostrate, with the face upward, & *-formis -is -e*, New Latin, -shaped, from Latin verb *formo, formare, formavi, formatus*, form, shape, fashion, model.
Habitat: Common in estuarine & freshwater wetland & ditches, which are under water in winter & dry in the summer. "Pond, lake & river shores, marshes, bogs, & ditches; 0-1000 m" (fna). distribution/range: Northwest
Culture: Available Fourth Corner Nursery.
Description: Culms growing horizontally & rooting at the nodes; leaves; sheaths; heads flowers often forming bulbils; capsules; seeds narrowly obovoid to obovoid, 0.6--0.7 mm, not tailed; body clear yellow-brown; N = ca 30, ca 50--60, 2n = ca 112. key features:
Comments: status: phenology: Blooms ? Fruiting mid summer to fall.
VHFS: [*Juncus oreganus* S Watson; *J paucicapitatus* Buchenau]

Juncus tenuis Willdenow PATH RUSH, aka POVERTY RUSH, ROADSIDE RUSH, SLENDER RUSH, (*tenuis, tenuis, tenue* slender, thin, fine, from Latin adjective *tenuis -is -e,* fine, thin, slender, slim.) [facu+] Old subgenus *Poiophylli,* new subgenus *Agathryon*, section *Steirochloa*
Habitat: Shaded compacted paths. Wet to dry soil, compacted soil, especially along woodland paths. In Washington, habitats that are saturated in winter but dry out in summer. "Exposed or shaded sites in soils ranging from sandy to clayey under moist or drier conditions, oftentimes these sites naturally or otherwise disturbed (eg, game or human trails)" (fna). distribution/range: Throughout most of North America & naturalized elsewhere. "*Juncus tenuis* occurs throughout North America. It is particularly abundant in northeastern United States & eastern Canada, although infrequent in the south & west." (fna)
Culture: "No pretreatment considered necessary. May moist cold treat. Very light cover. Tiny seeds. Excellent germination." (mfd 1993). 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Non-dormant, no pretreatments are necessary. Seed may lose viability very quickly, 2-3 years, should be stored at 40ºF & 35% humidity. (Kujawski & Davis 2001) "No pre-treatment needed. Sow seeds on soil surface at 70ºF & water." (ew12) 995,008 (jfn04); 16,000,000 (pm, wns01, ew12); 27,023,810 (gnh13); 29,000,000 (ecs); 29,290,320 (agre06); 32,416,000 (gnh11); 37,833,333 (gna07); 39,478,260 (gna05); 45,400,000 (gni07); 53,411,760 (gna08), 80,533,333 (gnhmr02) seeds per pound. In diverse mixes, use 0.015 lbs pls per acre (gni). Monocultures are not advisable except on microsites. *For paths & walkways, seed 0.25 to 0.50 lb pls per acre.*

cultivation: Space plants 1.0-1.25'. Mesic to dry soils, full sun to part shade. Anaerobic tolerance low. CaCO3 tolerance medium. Drought tolerance low. Fertility requirements low. Salinity tolerance low. Shade tolerance intermediate. pH 4.5-7.0.

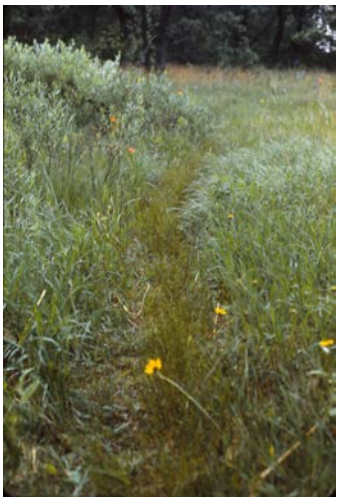
bottom line: Genesis seed test data indicates most lots greatly benefit from dormant seeding or cold moist stratification, but the extreme seed count gives even slight germination the appearance of a good results. Germ 23.8, 19, 6.0, sd 22.7, r2.0-86 (86)%. Dorm 63.9, 69, 88, sd 24, r0.0-88 (88)%. Test 36, 35, 29, r19-63 days. (#25)**
Description: Erect, herbaceous, perennial, native rush; tufted, rhizomes densely branching, roots 6" minimum depth; culms 0.3-2.0', bunching; leaves; sheaths; heads; capsules; seeds tan, ellipsoid to lunate, (0.52-)5.5-0.65(-0.7) mm, not tailed; N 2n = 80 key features:
Comments: status: phenology: Blooms 6,7(-10), (spring to early summer). Tolerates foot traffic, some light vehicle traffic. Seed source nursery production, genetic source Hamilton Twp, Lee Co.

On dewey mornings, the ripe seeds become mucilaginous & the mass is pushed up out of the capsules. The gelatinous mass adheres to passing animals, humans, & vehicles. This may combine ombrohydrochory, dispersal by rain &/or dew, & endozoochory, dispersal on the outside of an animal.

"*J macer* SF Gray Very common; paths, roadsides, fields & open woods. (*J tenuis* Willd) " (ewf55)
VHFS: Variety *williamsii* Fern, widely divaricate & densely secund branches) & *anthelatus* Wiegand (elongate & remotely flowered lateral branches, cited by sw94. Others reduce these to *formae.*

[*Juncus bicornis* Michx, *J bicornis* var *williamsii* (Fern) Victorin, *J macer* Gray, *J macer* f *williamsii* (Fern) FJ Herm, *J macer* var *williamsii* (Fern) Fern, *J tenuis* var *bicornis* (Michx) E Meyer, *J tenuis* var *multicornis* E Meyer, *J tenuis* var *williamsii* Fern]

J Kujawski & KM Davis 2001, Propagation protocol for production of container *Juncus tenuis* plants: National Plant Materials Center, Beltsville, Maryland. In; URL://www.nativeplantnetwork.org (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.



Juncus tenuis in game trail & green house flat

Juncus torreyi Coville *ME, MD, NJ, PA, VT TORREY'S RUSH, (*torreyi* for Dr. John *Torrey*, 1796-1873, a chemist & leading American botanist & with Asa Gray, co-author of *The Flora of North America*.) Facultative wetland Old subgenus *Septati*, new subgenus *Juncus*, section *Ozophyllum*..
Habitat: Ditches, wide range of moist soil habits, seasonally inundated, wet meadows, & upland swamp, tolerant of degraded situations. "Wet sandy shores, edges of sloughs, along slightly alkaline watercourses, swamps, sometimes on clay soils, calcareous wet meadows, & alkaline soils; 0-600 m" (fna).
distribution/range: "Rather common throughout the county in wet places." (ewf55)
Culture: 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). "Sow seeds just below moist soil surface at 70ºF for 1 month. Move to 30ºF for 1 month, then bring back to 50ºF." (ew12) Fall seed or cold moist stratify. Moderate growth rate. 12,300,000 (wns01); 18,144,000 (jfn04); 19,200,000 (aes10); 21,920,000 (ew12); 23,402,062 (gnh14), 25,600,000 (pm01); 25,942,857 (gna04); 33,629,631 (gnh05); 37,833,333 (gnh02, 07); 47,747,473 (gnh10); 48,000,000 (pm); 50,444,443 (gna03); 75,601,511 (gnh11) seeds per pound. In mixes, plant 0.006-0.125 lb pls per acre (us97), or 0.015 to 0.063 lb pls per acre (gni). Commercial availability of seed is improving.

cultivation: Space plants 1.25-2.0'. Appears to self-establish naturally in constructed wetlands. Prefers moist to saturated soils. Tolerates up to 2" of flooding for short periods. Anaerobic tolerance medium. CaCO3 tolerance low. Drought tolerance low. Fertility requirement low. Nutrient load tolerance moderate. Salt tolerance low to none; some tolerance noted by AES (2010). Siltation tolerance moderate. Partial to full sun, shade intolerant. pH 4.5-6.5.

bottom line: Most lots have a significant to strong requirement for dormant seeding, with some totally dormant lots known, but the extreme seed count gives even miniscule germination the appearance of a good crop. Best planted dormant in wet meadows, or when the wetland is accessible immediately after construction. Flipflop species. Germ 18.4, 12, 0.0, sd 22.2, r0.0-90 (90)%. Dorm 60.6, 72, 0.0, sd 30.2, r0.0-94 (94)%. Test 35, 33, 29, r21-64 days. (#19)**
Description: Native, perennial, grass-like herb; rhizomatous, roots 10" minimum depth; culms 1.3-3.0'; leaves; sheaths; spherical heads green to brown; capsules; seeds oblong to ellipsoid, 0.4-0.5 mm, not tailed; body clear yellow-brown; N 2n = 40. key features: Small plants can be confused with *J nodosus*, but *torreyi* has petals shorter & less subulate than sepals.
Comments: status: Possibly Extirpated in Maine. Endangered in Maryland, New Jersey, Pennsylvania, & Vermont. phenology: Blooms July to October, 7,8,9. Fruiting early summer to fall. Wetland restoration, rain gardens, strongly rhizomatous root system useful for erosion control in upper shoreline zone & vegetated swales. Cool season, spreading, aggressive. Inflorescences often viviparous, producing bulblets. Seed source nursery production, & farmed wetlands, Lee County.
Associates: Provides food & cover for muskrats, marsh birds, & waterfowl. Reported as deer resistant. Provides spawning habitat for bluegill & other fish.
VHFS: [*Juncus nodosus* L var *megacephalus* Torr, Fl New York 2: 326. 1843*; J megacephalus* (Torr) AW Wood 1862, not MA Curtis 1835]

Juncus vaseyi Engelmann * WI VASEY'S RUSH, (*vaseyi* after Dr George *Vasey* (1822-1893) (in *Juncus*), a doctor & later botanist for USDA (1889).) facw Subgenus *Poiophylli*
Habitat: "Permanently moist, usually exposed areas including wet meadows, raised sites or margins of bogs, or depressions along sandy lakeshores; 200-1500 m" (fna). distribution/range:
Culture: propagation:
Description: Seeds tan, ellipsoid to lunate, body (0.52--)5.5--0.65(--0.7) mm, tails 0.2--0.5 mm; N 2n = ca. 80 key features:
Comments: status: Special Concern in Wisconsin. phenology: Blooms ? Flowering & fruiting summer--early fall.

"Rare, we having found it only once in a shallow bog in Rockton Township."' (ewf55)

Associates: ethnobotany:
VHFS: [*Juncus greenei* Oakes & Tuckerman var *vaseyi* (Engelmann) B Boivin]

Quando omni flunkus, mortati.

LUZULA Augustine de Candolle 1805 **WOOD RUSH** *Juncaceae Luzula* Lu'zula (LUZ-yoo-la, or LEW-zuh-luh) from *Gramen Luzulae*, or *luxulae*, diminutive of *lux*, light, a pre-Linnaean name for one of the wood rushes, also New Latin, from Italian *luzziola, lucciola*, to shine or sparkle, (*in erba luzziola, erba lucciola,* Adder's-Tongue); alternately Italian *lucciola,* a glow-worm, in reference to the sparkling dew on the species flowers, or in reference to the shining inflorescence in some species. Several species are shiny when covered in dew. A genus of about 80 species, mostly perennials, some annuals, cosmopolitan, with the greatest diversity in temperate Europe & Asia. Perianth as in *Juncus*, white, green, or brown. Seeds plump, ellipsoidal, some species with a raphe, some species remaining attached to the placentae by a fascicle of delicate fibers, some bearing a caruncle or elaiosome. A European species *L luzuloides*, is known for its large elaiosome. Some species are ant dispersed. Formerly *Juncoides*.

Luzula is the larval host of several *Lepidoptera* species including SMOKY WAINSCOT & case-bearers of the genus *Coleophora* including *C antennariella* (feeds exclusively on *L pilosa*), *C biforis* (feeds exclusively on *Luzula*), *C glaucicolella*, *C leucapennis* (feeds exclusively on *Luzula*), *C otidipennella* (feeds exclusively on *Luzula*) & *C sylvaticella* (feeds exclusively on *L sylvatica*).

Luzula nivea & sylvatica, sow at 20ºC (68ºF), if no germ in 3-4 wks, move to -4 to +4ºC (24-39ºF) for 4 wks. *L alpinopilosa*, sow at Max 5ºC (41ºF), germination irregular, often several months. Luzula *luzuloides & ulophylla*, surface sow at 20ºC (68ºF), germination slow (tchn).

Luzula echinata (Small) JF Hermann HEDGEHOG WOODRUSH, (ek-in-AY-tuh)
Habitat: "Bluffs, wooded slopes, alluvial woods, streamsides, under hardwoods & occasionally in clearings; 50-800 m" (fna). distribution/range: Southern Illinois.
Culture: propagation:
asexual propagation:
cultivation:
bottom line:
greenhouse/garden:
Description: Erect perennial; capsules pale to dark brown, obovoid to subglobose, usually shorter than tepals; seeds dark brown, globose, 1.2-1.6 mm; caruncle 0.5-0.6 mm; N 2n = 12. key features: "*Luzula echinata* has knotty rhizomes to 1.5 cm; the bases of the culms are sometimes swollen. Flowers are characterized by stigmas that exceed styles by 2--3 times." (fna)
Comments: status: phenology: Blooms ? Flowering & fruiting spring--early summer.
"Rare. In Rockton Township in an old field in a wet situation & in a near-by open woods." (ewf55)
Associates: Ethnobotany:
VHFS: [*Juncoides echinatum* Small, *Luzula campestris* (L) DC var *echinata* (Small) Fern & Wieg, *L echinata* (Small) FJ Herm var *mesochorea* FJ Herm, *L multiflora* (Ehrh) Lej var *echinat*a (Small) Mohlenbr]

Luzula multiflora (Ehrhart) Lejeune COMMON WOODRUSH, aka WOOD REED, WOODRUSH,
Habitat: "Sparsely scattered in fields, meadows, open woods, ditches & clearings; 50--800 m" (fna).
distribution/range: North America & Eurasia.
Culture: propagation: Greenhouse germination good after 60 days cold moist stratification.
asexual propagation:

cultivation:
bottom line: Dormant seeding is necessary.
greenhouse/garden: 60 days cold moist stratification or dormant seed.

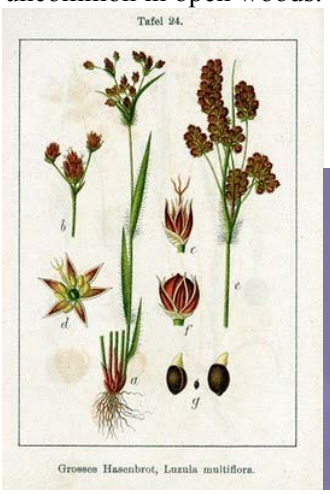
Description: Densely to loosely tufted perennials; leaf blades angular, burgundy & green colored, covered in long hairs; capsules pale to brown, shorter than tepals; seeds 1.1-1.5 mm; caruncle 0.3-0.6 mm; N 2n = 24. key features:

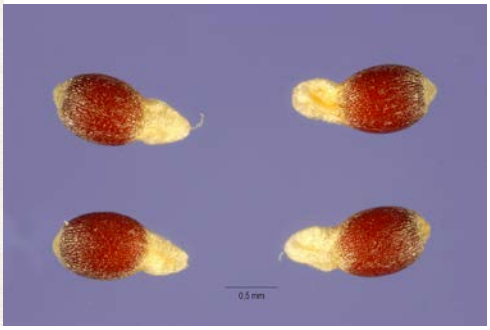
Comments: status: phenology: Blooms ? Flowering & fruiting spring--summer.

Associates: ethnobotany: Plant was used as a ceremonial emetic by the Ramah Navajo (Vestal 1952 in Moerman).

VHFS: Ours is subsp *multiflora*. Species is a variable complex with 6 subspecies, 3 in northern North America. [*Juncus multiflorus* (Ehrhart) Ehrhart, Calam. Gram. Tripet. Linn., no. 127. 1794, not Retzius 1795; *J campestris* (Linnaeus) de Candolle var *multiflorus* Ehrhart]

"Not uncommon in open woods." (ewf55)






Luzula multiflora

End *Juncus* family section.

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)
tchn	tomclothier.hort.net (-4ºC 24ºF 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 & Kesseler 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.