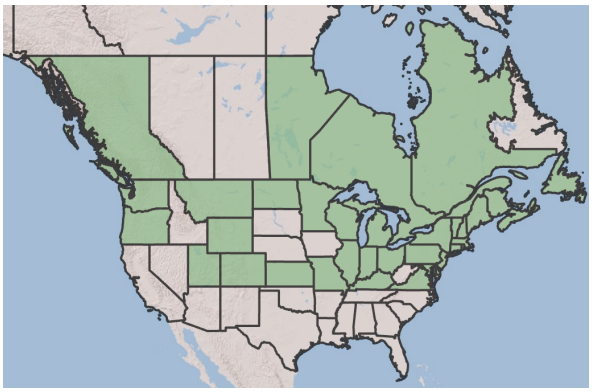
Plant Propagation Protocol for *Juncus gerardii*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2022/JUGE.pdf*
Spring 2022

North America Distribution



Washington State Distribution

Source: USDA Plants Database, accessed May 22, 2022[11]

TAXONOMY	
Plant Family	
Scientific Name	Juncaceae
Common Name	Rush Family
Species Scientific Name	
Scientific Name	*Juncus gerardii* Loisel
Varieties	*Juncus gerardii* var. *gerardii* Loisel. *Juncus gerardii* Loisel. var. *pedicellatus* Fernald
Sub-species	NA
Cultivar	NA
Common Synonym(s)	NA
Common Name(s)	Saltmeadow Rush, Saltmeadow Rush, Black Needle Rush, Blackgrass, Gerald's rush, Mud Rush[6]
Species Code (as per USDA Plants database)	JUGE
GENERAL INFORMATION	
Geographical range	Distributed along the Pacific Northwest, New England, and Midatlantic coasts, with small populations spread out in the interior United States where conditions permit.[6] See maps above for the range of distribution in North America and Washington State
Ecological distribution	*Juncus gerardii* inhabits estuarine wetlands and meadows, salt marshes and inland waterlogged pastures.[4,5,6] J. gerardii is more prolific in the upper,

	less-saline regions of salt marshes[11], though it can be very salt tolerant.[4] This species can also be found in ancient salt pans.[4]
Climate and elevation range	*Juncus gerardii* occupies a narrow band of land about 1 meter above sea level, as J. gerardii prefers the upper, less-inundated reaches of salt marshes[13], and most salt marshes are, at most, about 1 meter above sea level[8]. This species prefers a wet, though not waterlogged, brackish environment[4] and a temperate, oceanic climate[6].
Local habitat and abundance	This species grows prolifically in brackish salt marshes which are periodically inundated by high tide events[5, 13]. Common associates of *Juncus gerardii* include *Carex lyngbyei* (Lyngbye's sedge), *Schoenoplectus tabernaemontani* (Great Bulrush), *Agrostis stolonifera* (Creeping Bentgrass), *Malus fusca* (Oregon Crabapple), and the other kind of brackish rush found in Puget Sound salt marshes, *J. balticus* (Baltic Rush)[11]; *Distichlis spicata* (Saltgrass) is another common associate found in more disturbed sites[3].
Plant strategy type / successional stage	*Juncus gerardii* is an aggressive competitor within the brackish, landward portions in salt marshes[3]. Bare, disturbed ground is usually first colonized by *Distichlis spicata* (Saltgrass) due to the extremely saline nature of exposed earth in salt marshes (the lack of shade leads to increased evaporation and salt deposition)[3]. As *D. spicata* grows over the disturbed area, shading increases and salinity decreases, eventually leading to an invasion of the brackish-adapted *J. gerardii*[3]. As such, one could consider *J. gerardii* a climax species in the upper portions of salt marshes
Plant characteristics	*Juncus gerardii* is a grass-like (graminoid), rhizomal perennial[5]. Bunches of 1-3 stems shoot up each year, with each stem being 25-75 cm long[4]. Leaves are basal, originating near or at the base of each stem[5]. Fruits and flowers are located at the very end of each inflorescence (portion of the stem supporting the reproductive parts of the plant)[5]. Both the flowers and resultant fruits are dark brown to blackish, with the fruits being egg shaped[5]. The longevity of *J. gerardii* is not documented in the literature, though the stems of a different *Juncus* species, *J. roemerianus*, can last up to four years[7]. This species can form large mats of rhizomes where conditions permit[4], though the longevity of rhizomes is not documented in the literature.

PROPAGATION DETAILS	
Propagation of a Closely Related Rush Species (Juncus balticus) from Seed as Described by Luna[10] (All information sourced from Luna unless noted otherwise)	
Ecotype	Iceberg Lake in Glacier National Park (Northern Rockies), 2200 m elevation
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	160 ml (7.0 cu.in) containers
Time to Grow	10 months
Target Specifications	A seedling with a firm root plug and multiple leaves
Propagule Collection Instructions	Most Juncus species ripen during the fall and summer, while *J. gerardii* flowers and produces seed from May to August[6]. Each seed capsule contains many small seeds, which are dispersed by wind once the seed capsules crack open. One can tell that the capsules of *J. gerardii* are ripe when they turn dark brown or blackish[6]. Mature capsules can be harvested by hand by stripping the inflorescence of seed of the capsules. Ripe capsules will shatter or release seed when disturbed, so it is advised to keep the seed heads upright while removing them and to place them into paper bags to minimize seed loss.
Propagule Processing/Propagule Characteristics	There are millions of tiny seeds per kilogram of seed capsules. The longevity of *Juncus gerardii* seeds is not documented in the literature, though it is known that *Juncus gerardii* seeds do not require stratification to germinate[9].
Pre-Planting Propagule Treatments	Luna calls for stratification of the *Juncus balticus* seeds, though it is documented elsewhere that *J. balticus* and *J. gerardii* do not require stratification to germinate[9]. Luna calls for a hammermill to crack open any stubborn seed capsules. After breaking open the seed capsules, an office fan can be used to blow (winnow) the lighter seeds away from the heavier seed coatings
Growing Area Preparation / Annual Practices for Perennial Crops	Sunshine mix #2 (a type of commercially-produced medium) should be used, with controlled release fertilizer incorporated into the growing medium; exactly how much or what kind of fertilizer is not specified. The protocol set out by Luna specifically calls out for 160 ml (7.0 cu.in) containers; the shape of

	the containers is not specified. The seedlings are germinated and undergo active growth in a greenhouse.
Establishment Phase Details	Seeds should be sown on the surface and should not be buried, as they require light to germinate. A little grit can be sprinkled over the seeds and the medium to prevent the small seeds from moving.
Length of Establishment Phase	1 month
Active Growth Phase	Luna does not give many details on the active growth phase, only that the seedlings remain well watered and are trimmed when needed. This is understandable to a degree, as the fertilizer is pre-applied in the form of an extended release fertilizer, with no need for extra fertilizer application during the active growth phase.
Length of Active Growth Phase	3 months
Hardening Phase	Again, Luna does not give many details here, only that the seedlings be moved outside the greenhouse in late summer as a form of hardening.
Length of Hardening Phase	3 months
Harvesting, Storage and Shipping	Seedlings can be overwintered outside. No extra details are given on how the seedlings should be stored or shipped.
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	No information is given on outplanting performance by Luna
Other Comments	This protocol for propagating from seed is based off of a propagation protocol for *Juncus balticus*, as a protocol for *J. gerardii* could not be found. While *J. balticus* and *J. gerardii* are closely related species, one should be wary of taking the protocol above as a set of hard rules as opposed to a general outline of how propagating *J. gerardii* from seed might look like. Nursery practitioners are advised to experiment with what works best for their local circumstances. It should be noted that while *J. gerardii* grows from rhizomes, the current information on propagating members of *Juncus* vegetatively is greatly lacking. All current sources on the subject either mention in passing that it can be done[6, 10], or give little to no information on how to actually grow *Juncus* species from rhizomes in a nursery setting[1, 2, 12]. Nursery practitioners are encouraged to try planting portions of *J. gerardii* rhizome in medium-filled containers and to experiment to see what works and what doesn't when it comes down to propagating *J. gerardii* (and other *Juncus* species) vegetatively.

INFORMATION SOURCES	
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Other Sources Consulted	NA
Protocol Author	Quinn Matthew Habedank
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Note: This propagation protocol template was modified by J.D. Bakker from that available at http://www.nativeplantnetwork.org/network/SampleBlankForm.asp