

MOUNTAIN RUSH

Juncus arcticus Willd. ssp.
littoralis (Engelm.) Hultén
Plant Symbol = JUARL

Contributed by: USDA NRCS Idaho Plant Materials Program



Mountain rush. Photo by Derek Tilley, USDA-NRCS.

Alternate Names

Common Alternate Names: Arctic rush, Baltic rush

Scientific Alternate Names: *J. balticus*

Uses

Ethnobotanic: Coiled basketry prevails in southern California, with the mottled yellowish brown of rush providing a natural colored and variegated background (Turnbaugh and Turnbaugh 1986). Rush stems are used in the coiled baskets of southern California and Mexican Indian basketweavers, such as the Cahuilla, Luiseño, Chumash, Diegueño, Agua Caliente, Gabrieliño, Juaneño, Death Valley Shoshone, and Fernandeno (Barrows 1967; Murphey 1959). Chumash baskets, from southern California, are made with *rush* stems for the tan color and

roots for the black color (Timbrook 1997). The foundation material is made of mountain rush and the sewing material is made of basket rush (*J. textilis*).

The Cahuilla, Diegueño, Luiseño, and Chumash dye the mature rushes black by steeping them for several hours in an infusion of either horned sea-blite (*Suaeda calceoliformis* or bush seepweed (*Suaeda moquinii*)). This dye is very penetrating and the color is durable, but it has a fetid, disagreeable smell. *Juncus* species are also dyed yellow in an infusion of indigo bush (*Psorothamnus emoryi*) (Barrows 1967; Merrill 1970).

The early sprouts of mountain rush were sometimes eaten raw by the Snuqualmi of Washington (Gunther 1973). *Juncus* shoots were eaten raw, roasted in ashes, or boiled by Maidu, Luiseño, and others (Strike 1994). Owens Valley Paiute ate the seeds.

Other Uses: Wildlife habitat and food, erosion prevention, sediment retention, basketry, food, tatami mats, and nutrient transformation. Mountain rush has nitrogen-fixing capabilities. They are useful for stabilization and revegetation of disturbed areas. These plants can be invasive.

Juncus species are used by a wide range of mammal and avian species for food and habitat (Hoag and Zierke 1998). Rush seeds are eaten by waterfowl, songbirds, small mammals, jack rabbits, cottontail, muskrat, porcupine, quail, and gopher (Martin 1951). Rushes help improve habitat for amphibians and spawning areas for fish. Muskrats feed on the roots and rhizomes of soft rush, and various wetland wading birds find shelter among the stems.

Cattle generally do not graze rushes, because they have low palatability. Cattle will graze mountain rush late in the season after more palatable plants are eaten. Rushes provide the following conservation uses; erosion control, sediment accretion and stabilization, nutrient uptake and transformation, wildlife food and cover, restoration and creation of wetland ecosystems, and wastewater treatment applications. The rhizomatous nature, nitrogen fixation capabilities, dense root system, and phenotypic plasticity to flooding and drought stress provide high soil and slope stabilization capabilities, particularly in areas with flooded soils or fluctuating hydrology. Rushes are resistant to grazing pressure and are fairly unpalatable to cattle, so they tend to increase near stock water ponds. The rhizomes form a matrix for many beneficial bacteria, making this plant an excellent addition for wastewater treatment.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: Rush Family (Juncaceae). Mountain rush, also known as Baltic rush, is a perennial, rhizomatous, wetland plant. Rushes are grasslike, usually tufted herbs with terete leaves. The leaf sheaths are clustered at the base, 2-15 cm (0.75 to 6 in) long, multi-colored from red to light to dark brown, and bladeless. The lowest bract of the mountain rush inflorescence is round and 2 to 20 cm (0.75 to 8 in) long. This bract appears to be a continuation of the stem. The inflorescence forms a loose to compact panicle of 10 to 50 flowers up to 6 cm long. Flowers are greenish or brownish, sessile to pedicellate, each subtended by a pair of hyaline-scarious bracts. Tepals are 3.5 to 5 mm (0.1 to 0.2 in) long. The 6 stamens have anthers 1.5 to 2.5 mm (0.06 to 0.1 in) long. The fruit is a capsule. The seed are brownish red and about the size of ground pepper approximately 0.6 to 0.8 mm (0.02 to 0.03 in) long.

Distribution:

Mountain rush is widespread throughout temperate regions in the northern hemisphere. It occurs throughout California to Alaska, eastern North America, and Eurasia. Mountain rush is the most widespread and common rush found in the Great Basin and dry Intermountain regions. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Mountain rush is often found in wetland habitats, but will grow in any standing water to seasonally dry places, at elevations generally below 2,200 m (7,200 ft).

Adaptation

Juncus species can tolerate shade and flooded, anoxic soil conditions, at least periodically. They can also tolerate mild to moderate soil salinities and alkaline to calcareous soils. Often these plants are found on drier or seasonally fluctuating wetland sites (for example, desert playas) and can tolerate seasonal drought.

Establishment

Juncus species may be planted from bare rootstock or seedlings from container stalk or directly seeded into the soil. Bare rootstock or seedlings are preferred revegetation methods where there is moving water.

Live Plant Collections:

Planting plugs (either from the greenhouse or wild transplants) is the surest way to establish a new stand of this species. Plug spacing of 25-30 cm (10 to 12 in) will fill in within one growing season. Soil should be kept from saturated conditions up to 8 cm (3 in) of standing

water. Fluctuating water levels during the establishment period may speed spread. Water levels can be managed to enhance spread and control weeds.

To collect wild plants, no more than 1/4 of the plants in an area should be collected. If a section no more than 0.09 m² (1 ft²) is removed from a 0.4 m² (4 ft²) area, the plants will grow back into the hole in one good growing season. A depth of 15 cm (6 in) is sufficiently deep for digging plugs. This will leave enough plants and rhizomes to grow back during the growing season.

Clip leaves and stems to 15 to 25 cm (6 to 10 inches). This allows the plant to allocate more energy into root production. Transplants should be planted as soon as possible in moist (not flooded) soils. Plants should be transported and stored in a cool location prior to planting. Plugs may be split into smaller units, generally no smaller than 6 x 6 cm (2.4 x 2.4 in), with healthy rhizomes and tops. The important factor in live plant collections is to be sure to include a growing bud in either plugs or rhizomes. Weeds in the plugs should be removed by hand. Soil can either be left on the roots of harvested material or removed. For ease in transport, soil may be washed gently from roots. The roots should always remain moist or in water until planted.

Soil should be kept saturated after planting. Plants can tolerate 2.5 to 8 cm (1 to 3 in) of standing water as long as the level fluctuates over the growing season. Allow roots to become established before flooding soils if possible. Ideally, plants should be planted in late fall just after the first rains (usually late October to November). This enables plant root systems to become established before heavy flooding and winter dormancy occurs. Survival is highest when plants are dormant and soils are moist.

Fertilization is very helpful for plant growth and reproduction. Many more seeds are produced with moderate fertilization.

Management

Hydrology is the most important factor in determining wetland type, revegetation success, and wetland function and value. Changes in water levels influence species composition, structure, and distribution of plant communities. Water management is absolutely critical during plant establishment, and remains crucial through the life of the wetland for proper community management. *Juncus* species can tolerate periods of drought and total inundation. It is important to keep transplanted plugs moist, not flooded, until roots are established. Water levels can then be managed to enhance or reduce spread as well as control terrestrial weeds.

Rushes are perennial, rhizomatous plants. In most cases, they will out-compete other species within the wetland

area of the site, eliminating the need for manual or chemical control of invasive species.

Muskrats have evolved with wetland ecosystems and form a valuable component of healthy functioning wetland communities. Muskrats use emergent wetland vegetation such as *Juncus* species for hut construction and for food. Typically, an area of open water is created around the huts. Muskrat cleared areas increase wetland diversity by providing opportunities for aquatic vegetation to become established in the open water and the huts provide a substrate for shrubs and other plant species. Muskrats opening up the dense stands of emergent vegetation also create habitat for other species.

Traditional Resource Management: According to one Northern Diegueño basket weaver, most weavers have favorite collecting areas where the *Juncus* is plentiful, long, tough, deeply colored with red, or simply nearby. Any *Juncus* stand will have plants that are immature, mature but still in seed, and those starting to senesce. Plants can be harvested during any month or season. The stalks are cut above the rhizomes and roots, leaving plenty of buds to re-grow new shoots. As with other rhizomatous species, harvest stimulates new growth and maintains the clone in a juvenile or immature growth phase, where productivity is highest. Attempts at harvesting during times of heavy rain or flooding are likely to fail, as deep water and mud make plants inaccessible.

Pests and Potential Problems

Juncus species tend to be fairly resilient to insect and disease problems. Aphids may feed on the stems, but rarely cause significant damage. If an insect or disease problem is encountered in the greenhouse, treatment options may be limited by cultural constraints if these plants are to be used by Indian basket weavers. *Juncus* culms are split with the mouth to process basketry materials; therefore, an unusually high degree of human exposure and risk occur with plants designated for ethnobotanic use.

Environmental Concerns

Mountain rush is native to western North America. It can spread under favorable conditions but does not pose any environmental concern to native plant communities.

Seeds and Plant Production

For mountain rush near Aberdeen, Idaho, the flowering period is late May to August, occasionally to September. Seed ripens in early August. Phenology will differ with plant growing in different areas, and for different *Juncus* species. Seed may be collected by hand, using a pair of hand shears, or with a gas-powered handheld seed harvester. The tiny, black seeds are easily lost from the capsules when collecting by hand. Be careful to keep capsules upright before putting in collection bag. Use paper sacks when collecting seeds for this species. To

clean the seed, run the collection through a hammer mill to break up debris and knock the seeds loose. Use a 1/20 inch screen on the top and a solid sheet on the bottom of the seed cleaner. Adjust the airflow to blow off the chaff. The cleaning process can be speeded up by shaking the hammer milled collection to settle seed to the bottom of the pan. The top portion of the chaff can then be discarded and the seed-rich mixture that is left in the bottom can be run through the seed cleaner.

Seed germination in greenhouse

Seeds need light, moisture and heat for germination. Soaking the seeds in water for 1 to 7 days will decrease the time the seed takes to sprout. To grow seeds, place on soil surface and press in lightly to assure good soil contact. Do not cover the seed. Soil should be kept moist. Greenhouse should be kept hot (32 to 38°C). Seeds begin to germinate in approximately 1 week. Maintain soil moisture until plants are to be transplanted. Seedlings cannot withstand long periods without water while growing in the greenhouse. Plants are ready in 100 to 120 days to come out as plugs. By planting seeds in August, plugs are ready to plant in soil by November. These plants are very small; growing plants to a larger size will result in increased revegetation success.

Cultivars, Improved, and Selected Materials (and area of origin)

There are no cultivars, improved, or selected materials of mountain rush. Common wildland collected seed is available from commercial sources (Native Seed Network).

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Citation

Stevens, M., Hoag, C., Tilley, D., and L. St. John. 2012. Plant Guide for mountain rush (*Juncus arcticus* ssp. *littoralis*). USDA-Natural Resources Conservation Service, Aberdeen Plant Materials Center. Aberdeen, Idaho 83210.

Published October 2012

Edited: 05dec2000 jsp; 20may2003ahv; 06aug2001 jsp; 13sep2012djt; 13sep2012ls; 16sep2012gm

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