

SALT RUSH***Juncus lesueurii* Boland**

plant symbol = JULE

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Uses

Ethnobotanic: Coiled basketry prevails in Southern California, with the mottled yellowish brown of *Juncus* rush providing a natural colored and variegated background (Turnbaugh and Turnbaugh 1986). *Juncus* stems are used in the coiled baskets of Southern California basket weavers such as the Cahuilla, Luiseño, Chumash, Diegueño, Agua Caliente, Gabrieliño, Juaneño, Death Valley Shoshone, and Fernandeno (Barrows 1967; Murphy 1959). Chumash baskets, from southern California, are made with *Juncus* stems for the tan color and roots for the black color (Timbrook 1997). The foundation material is made of *Juncus lesueurii* or *Juncus balticus*, and the sewing material is made of *Juncus textilis*.

Rushes are cut off at ground level, or at the length desired. The rush, in its natural state, furnishes a variety of colors; a deep red near the base, lightening

in color upwards passing through several shades of light brown, and ending at the top in a brownish yellow. *Juncus* stems can be bleached in the summer sun for several months to assure a light tan uniform color.

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 has a fetid, disagreeable smell. *Juncus* species are also dyed yellow in an infusion of indigo bush (*Psoralea emoryi*) (Barrows 1967; Merrill 1970).

Other Uses: A wide range of mammal and avian species for food and habitat (Hoag and Zierke 1998) uses *Juncus* species. Waterfowl, songbirds and small mammals such as jack rabbits, cottontail, muskrat, porcupine, and gopher (Martin 1951) eats rush seeds. Rushes help improve habitat for amphibians and spawning areas for fish. Muskrats feed on the roots and rhizomes, and various wetland wading birds find shelter among the stems.

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. The rhizomes form a matrix for many beneficial bacteria, making this plant an excellent addition for wastewater treatment. Rushes tend to be resistant to grazing pressure and fairly unpalatable to cattle, so they tend to increase in species composition in stockwater ponds and troughs.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Rush Family (Juncaceae). *Juncus lesueurii* is a grasslike, perennial, rhizomatous wetland plant. Salt rush has stems that are 3-9 dm tall, stout,

smooth, erect or aching, with a distinctive twist to the stems. The stems arise from stout, creeping rhizomes. The terete leaf sheaths are bladeless, and shining or light brown in color. The inflorescence appears lateral with open branches, the lowest bract cylindric, with many flowers. The capsule is oblong-ovoid, light brown, and three-angled. This species is sometimes confused with *Juncus balticus*, from which it may be distinguished by its longer and usually darker-colored segments.

Distribution

For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment

Adaptation: Salt rush grows in salt marshes or sand dunes along the California coast from Ventura County north to British Columbia. *Juncus lesueurii* can tolerate mild to moderate soil salinity and flooded soil conditions. Often these plants are found on drier or seasonally fluctuating wetland sites (for example, dune swales) and can tolerate periodic drought.

General: *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. *Juncus lesueurii* requires moderate summer watering (irrigation), generally 1 - 4 times per month depending on the absorption rate and water retention capacity of the soil. Salt rush plants may need to have their roots in moist or wet soils. These native plants are especially good for stabilizing or restoring disturbed or degraded areas for erosion and slope control. Salt rush may become invasive.

Live Plant Collections: J. Chris Hoag and Mike Zierke (USDA, NRCS, Plant Materials Center, Aberdeen, Idaho) provided the following information on *Juncus balticus*. Due to their taxonomic and habitat similarity, it is likely that *Juncus lesueurii* establishes in a similar manner. Planting plugs is the surest way to establish a new stand of this species. Plug spacing of 25-30 cm will fill in within one growing season. Fluctuating the water level during the establishment period may speed spread of the rush. Water levels can be managed to enhance spread and control weeds.

- Clip leaves and stems to 15 to 25 cm (6 to 10 inches) before planting; this allows the plant to allocate more energy into root production. Transplants should be planted as soon as

possible in moist (not flooded or anoxic) soils. Plants should be transported and stored in a cool location prior to planting. The roots should always remain moist or in water until planted.

- Soil should be kept saturated after planting. Plants can tolerate 2.5 - 8 cm 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). 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.

Seed Collections:

- The flowering period is late May to August, occasionally to September. Seed ripens in early August. Phenology will change by area, aspect, elevation, and specific site conditions.
- 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 air flow to blow off the chaff. Shaking the hammer milled collection to settle seed to the bottom of the pan can speed up the cleaning process. 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 - 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 (32-38°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 - 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.

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 (Hoag et al. 1995). *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 either enhance or reduce spread as well as control terrestrial weeds.

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.

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. 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.

Traditional Resource Management: Management of *Juncus lesueurii* stands includes the following: ownership of prime basket rush sites, stimulation of new growth through harvesting stalks, periodic burning, and not harvesting when soils are very mucky and likely to be compacted. According to one Northern Diegueño basket weaver, most weavers have favorite collecting areas where the basket rush is plentiful and having characteristics valued by basket weavers (long, flexible, tough stems, deep red

color, access is available and relatively easy). Any *Juncus* stand will have plants that are immature, those which are mature but still in seed, and those which are starting to senesce. The stalks are cut above the rhizomes and roots, leaving plenty of buds to re-grow new shoots. As with other rhizomatous species, harvesting stimulates new growth and maintains the clone in a juvenile or immature growth phase, where productivity is highest. The only harvesting prohibition might be during times of heavy rain or flooding, when deep water and mud make many plants inaccessible.

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

Please check the Vendor Database, expected to be on-line through the PLANTS Web site in 2001 by clicking on Plant Materials.

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