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Rushes of Northcentral New Mexico

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ABSTRACT

Juncaceae, otherwise known as rushes, are grass-like herbs that grow throughout North America in both arctic and temperate regions. The purpose of this monograph is to describe the 2 genera and 24 species of *Juncaceae* growing in northcentral New Mexico. Included is an introduction to the *Juncaceae* Family and the region of interest, reference maps, and a description of the materials and methods used to complete this research. Species description pages provide characteristics of the habit, leaves, flowers, fruit, and medicinal/culinary applications as well as pictures and diagrams. A key to the genera, keys to the species, a glossary, and an appendix with collected specimens are also included to increase ease of identifying plants of the Rush Family.

1. INTRODUCTION: JUNCACEAE FAMILY

Commonly known as the Rush Family, the *Juncaceae* Family contains 9 genera and 350 species. Two of the 9 genera and 118 of the 350 species grow in both arctic and temperate regions, as well as on tropical mountains, in North America. With respect to northcentral New Mexico, 2 genera and 24 species of the *Juncaceae* Family grow in this region (Flora of North America Editorial Committee [FNAEC], 2000).

The grass-like herbs of the *Juncaceae* Family are perennial, with the exception of a few annual plants. Plants of this family usually form horizontal subterranean root systems known as rhizomes and sometimes grow in a caespitose form. With either round or flat culms, the leaves are primarily basal, meaning the leaves grow from the lowest part of the stem (FNAEC, 2000). Sheath margins can be either fused or overlapping and often contain 2 earlike extensions known as auricles at the blade junction (FNAEC, 2000). The blades can be flat or round, glabrous or hairy. Inflorescences exist in a variety of arrangements of either clusters or single flowers (Diggs, Lipscomb, & O'Kennon, 1999). Flowers are perfect and primarily anemophilous, though some species are secondarily entomophilous. Flowers have radial symmetry with similar sepals and petals. The coloration of the perianth ranges from greenish to brownish to purplish-black (FNAEC, 2000). Some species have yellowish perianth parts.

Typically, plants of the *Juncaceae* Family have 3 or 6 linear stamens with persistent anthers and 1 pistil (FNAEC, 2000). The ovaries are superior and tricarpetate with 1 or 3 locules. These plants either have 1 placenta with basal placentation or 3 placentas with either axile placentation or parietal placentation. The ovules are anatropous, and the stigmas are usually longer than the styles. Fruits exist as loculicidal capsules with at least 3 seeds, though some species have many seeds (Martin & Hutchins, 1980). White appendages often adorn one or both sides of the seeds, and embryos are enclosed within the endosperm (Cronquist, A. Holmgren, N. Holmgren, Reveal, & P. Holmgren, 1977).

2. INTRODUCTION: NORTHCENTRAL REGION

The northcentral region of New Mexico includes 7 counties: Taos, Rio Arriba, Sandoval, Santa Fe, San Miguel, Mora, and Colfax. This region is primarily under the Rocky Mountain influence, though some counties contain flora under the Great Basin influence and the Great Plains influence. The Rocky Mountains have both an eastern and a western extension across the state of New Mexico; a plateau approximately 40 miles (56 km) wide separates the two extensions. The drainage pattern across New Mexico is north to south and north to east via the Rio Grande, Cimarron, and Pecos rivers. Glaciation occurred in the northcentral region from the eastern section of the Rio Arriba County to the western sections of the Colfax and San Miguel counties during the Pleistocene epoch (Martin & Hutchins, 1980).

The average annual temperature in New Mexico is approximately 53°F (12°C), and the annual average in the northcentral region is approximately 40°F (4.4°C). Temperatures in New Mexico strongly correlate with the elevation which ranges from 2,876 ft to 13,160 ft (676.6 m to 4,011 m). For every 1000 ft (304.8 m) increase in altitude, the temperature decreases approximately 3°F (~2°C) (Martin & Hutchins, 1980). The correlation between elevation and temperature explains the lower mean annual temperature in the high elevation of the northcentral region. New Mexico receives summer moisture from the Gulf of Mexico, and the average annual rainfall in New Mexico is 15 in (38 cm). The annual average for the upper Sangre de Cristo and Jemez mountains located in the northcentral region is 40 in (101 cm). Winter moisture comes from the Pacific Coast in the form of snow with the mountainous area receiving approximately 300 in (7.6 m) of snow per year. The average growing season ranges from 100 to 220 days, with an extreme mean of 77 days in the Rio Arriba County in northcentral New Mexico (Martin & Hutchins, 1980).

The variations in climate, geography, and topography of New Mexico create a diverse floristic composition. Throughout the years, human habitation has

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influenced the floristic composition through the introduction of invasive species, overgrazing by cattle, and the disruption of natural habitats. Flora in the northcentral region lies between 6,500 ft and 13,000 ft elevation and encompasses four elevational-floristic zones: pinyon-juniper zone (<7,000 ft), mixed conifer zone (7,000-9,000 ft), spruce-fir zone (9,000-12,000 ft), and the alpine-tundra zone (12,000-13,152 ft). Plants of the *Juncaceae* Family span across all four elevational-floristic zones in northcentral New Mexico (Martin and Hutchins, 1980).

3. MATERIALS & METHODS

The creation of this monograph began by selecting a plant family in northcentral New Mexico. Ivey's *Flowering Plants of New Mexico* served as the primary resource for the selection process. Once the Rush Family was chosen for study, a list was generated for all of the species of *Juncaceae* found in northcentral New Mexico. In addition to the species listed in Ivey's *Flowering Plants of New Mexico* (2003), other resources such as the Flora of North America Editorial Committee's [FNAEC] *Flora of North America* (2000) and the herbarium at Fort Burgwin in Taos, NM were utilized to complete the list of rushes found in this region.

Information for the introductions was compiled from Martin & Hutchins's *A Flora of New Mexico* (1980), the FNAEC's *Flora of North America* (2000), and *Intermountain Flora* (1977) written by Cronquist, A. Holmgren, N. Holmgren, Reveal, & P. Holmgren. An additional resource for the introduction to the family was *Flora of North Central Texas*, written by Diggs, Lipscomb, and O'Kennon (1999). The first three texts also served as the primary resources for compiling the descriptions for each species. Information from the USDA was utilized to ensure that information was up to date. The descriptions include the habit, leaves, flowers, and fruit characteristics for that particular species. The comments section of the descriptions provides additional information regarding the growth patterns for that species and accounts for any discrepancies between the resources.

Also included in the descriptions are the medicinal and culinary applications for each species, if available, which were gathered from Moerman's *Medicinal Plants of Native America* and Moerman's *Native American Food Plants*. The terms included in the glossary at the end of this report were referred to as information was compiled from the above resources and condensed into the descriptive pages provided for each species.

Figure 1: Approximate Location of Distributional Reference Areas in New Mexico
Modified from Martin & Hutchins's *A Flora of New Mexico* (1980)

Figure 2: Approximate Boundaries of Major Floristic Influence on New Mexico Vegetation
Modified from Martin & Hutchins's *A Flora of New Mexico* (1980)

4. GENUS: *JUNCUS*²

² Leaves glabrous; sheaths open; capsules many-seeded

Herbs: Plants of the genus *Juncus* are grass-like perennials, though some are annual. The roots are rhizomatous or cespitose (FNAEC, 2000). The stems are round or flattened, arising singly or in clusters (FNAEC, 2000; Martin & Hutchins, 1980).

Leaves: The leaves are divided into a sheath and blade. The sheath is often open, and the blade is flat or channeled (Cronquist et al., 1977). The glabrous leaves are often terete, though sometimes septate and are often auriculate at the apex (FNAEC, 2000; Martin & Hutchins, 1980).

Flowers: Inflorescences vary, often terminal or appearing lateral (Martin & Hutchins, 1980). Inflorescences can be either cymose flowers or 1 to many heads in racemes or panicles. Inflorescences have 2 bracteoles, or the bracteoles are absent altogether. Flowers have 4-6 tepals in each whorl and 3-6 stamens (FNAEC, 2000). Ovary is superior and ordinarily tricarpellate with a short to evident style (Cronquist et al., 1977; Martin & Hutchins, 1980).

Fruit: Capsules are 1-locular or 3-locular and are often septicidal. Seeds are numerous and are ellipsoid to ovoid, sometimes tailed (FNAEC, 2000). The tails may be longer than the body (Cronquist et al., 1977).

Comments: Plants of the genus *Juncus*, known collectively as rushes, were often used in basketry by New Mexico's early natives. These baskets were used for food storage, sieves and strainers, carrying-baskets for transportation, winnowing, etc (Boyce, 1974).

A. *Juncus articulatus*: Joint Leaf rush

Figure 3. *Juncus articulatus*, 28 July 2014
Marilyn Phillips |
rockymountainflora.com

Figure 4. From
Cronquist's et al.
Intermountain Flora
(1977)

Habit: *Juncus articulatus* is a perennial herb. Its roots are rhizomatous, and its stems can reach heights of approximately 10-60 cm (Cronquist et al., 1974; FNAEC, 2000).

Leaves: The leaves are both basal and cauline, reaching lengths of approximately 2-15 cm and expanding into a pair of rounded, somewhat scarious auricles (Martin & Hutchins, 1980). The blades are green to straw-colored (FNAEC, 2000), terete, and have loose sheath margins (Cronquist et al., 1977).

Flowers: Inflorescences are panicles with several to many flowered heads (FNAEC, 2000) ranging in colors

from green to brown to purplish (Cronquist et al., 1977). The perianth is approximately 2-3 mm long. The tepals are ovate to lanceolate; the apex of the outer tepals is acute or acuminate while the apex of the inner tepals is acuminate to obtuse. Flowers have 6 stamens (Martin & Hutchins, 1980).

Fruit: Capsules are chestnut brown, ellipsoid to ovoid (FNAEC, 2000), 3-angled acute, and exceed the perianth (Martin & Hutchins, 1980). Seeds are 0.5 mm in size (FNAEC, 2000) and apiculate in shape (Cronquist et al., 1977).

Comments: *Juncus articulatus*, commonly known as the Joint Leaf rush, can be found in marshy soil near streams. It grows at elevations ranging from 5,000-7,500 ft and flowers in July and August (Martin & Hutchins, 1980). The relation between anther and filament size has varied reports. According to FNAEC's Flora of North America (2000), the anther is equal to the filaments in size; however, Cronquist's et al. Intermountain Flora (1977) suggests that the anthers, ranging from 0.5-0.8 mm long, are shorter than the filaments.

Medicinal/Culinary Applications: None listed.

B. *Juncus arcticus* var. *balticus*: Baltic rush

Figure 5. *Juncus balticus*,
29 June 2018
Matt Lavin |
https://www.flickr.com/photos/plant_diversity/

Figure 6. From Cronquist's
et al. *Intermountain Flora*
(1977)

Habit: *Juncus arcticus* var. *balticus* is a perennial herb. Its roots are rhizomatous (FNAEC, 2000), and its terete stems reach heights of approximately 20-100 cm (Cronquist et al., 1977).

Leaves: The leaves are usually basal (Cronquist et al., 1977), with the leaf sheaths loosely enclosing the stem as brownish sheaths (Martin & Hutchins, 1980).

Flowers: The inflorescences appear lateral, usually densely flowered. The lowest bract of the inflorescence is terete and extends beyond the inflorescence, resembling a continuation of the stem. The perianth is approximately 4-5 mm long (Martin & Hutchins, 1980). The tepals are blackish to light brown in color, lanceolate, and acute to ovate (Cronquist et al., 1977). Flowers have 6 stamens; the anthers, 1.5-2.5 mm in length, are three to five times as long as the filaments (FNAEC, 2000).

Fruit: Capsules are obovoid to ovoid (Martin & Hutchins, 1980). Seeds are approximately 0.6-0.8 mm long and striate in length (Cronquist et al., 1977).

Comments: *Juncus arcticus* var. *balticus*, commonly known as the Baltic rush, can be found in moist soils in stream margins, valleys, canyons, and slopes at elevations ranging from 4,500 ft to 9,000 ft (Martin & Hutchins, 1980). This species flowers from spring to early summer. Common names for this species include Mountain rush and Wire rush. Relevant synonyms for this species include *Juncus balticus* var. *montanus* (as referred to in Martin & Hutchins's *A Flora of New Mexico*, 1980) and *Juncus arcticus* ssp. *littoralis* (as referred to by the USDA, 2019).

Medicinal/Culinary Applications: *Juncus arcticus* var. *balticus* was gathered by the Paiutes and eaten as candy (Steward, 1977 found in Moerman, 2010). The seeds were also used for food, though the characterization of this use remains unspecified. The stems were used by northern Paiutes to make a fermented drink (Fowler, 1989 found in Moerman, 2010).

C. *Juncus bufonius*: Toad rush

Figure 7. *Juncus bufonius*, 14 July 2017
Matt Lavin | https://www.flickr.com/photos/plant_diversity/

Figure 8. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus bufonius* is an annual herb that grows in a cespitose form (FNAEC, 2000). The terete stems can reach heights of 5-30 cm (Cronquist et al., 1977)

Leaves: The leaves are both basal and cauline with blades approximately 0.5-1.0 cm long and 0.2-1.1 mm wide. The leaves are convex on the lower surface and flat on the upper surface (Cronquist et al., 1977).

Flowers: Inflorescences are loose and open, usually reaching to half the total height of the plant. The perianth is approximately 4-6 mm long (Martin & Hutchins, 1980). The tepals are lanceolate and pale green to pale brown in color (FNAEC, 2000). The outer segments are generally a little longer than the inner segments (Cronquist et al., 1977). Flowers have 3-6 stamens (FNAEC, 2000), though rarely 3 (Martin & Hutchins, 1980). The filaments are approximately 1-1.8 mm in length, and the anthers are approximately 0.3-0.8 mm in length (FNAEC, 2000).

Fruit: The capsules are oblong and obtuse-mucronate (Martin & Hutchins, 1980). Capsules are usually shorter than the perianth (Cronquist et al., 1977) and are tan to reddish brown in color (FNAEC, 2000). The yellowish seeds are apiculate and widely ellipsoid to ovoid (FNAEC, 2000), reaching approximately 0.3-0.6 mm in length (Cronquist et al., 1977).

Comments: *Juncus bufonius*, commonly known as the Toad rush, grows in moist soils in a variety of plant communities and at elevations ranging from 6,000 ft to 8,000 ft (Martin & Hutchins, 1980). This species flowers from spring to early fall (FNAEC, 2000).

Medicinal/Culinary Applications: A compound decoction of *Juncus bufonius* was taken by the Iroquois as a dermatological aid and emetic with the intention of cleansing the entire body. This decoction was also taken as a strengthener for athletes and runners (Herrick, 1977 found in Moerman, 1986).

D. *Juncus castaneus*: Chestnut rush

Figure 9. *Juncus castaneus*, 19 July 2015
Jozien | <https://www.inaturalist.org/photos/12888451>

Figure 10. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Juncus castaneus* is a perennial herb. Its roots are strongly rhizomatous (FNAEC, 2000) and its solitary, terete stems can reach heights of approximately 40 cm (Martin & Hutchins, 1980).

Leaves: The leaves are scattered along the stem and are partially cauline (FNAEC, 2000). The sheaths are not auriculate. The blades, which are 3-20 cm in length, appear terete due to their compressed, folded nature (Cronquist et al., 1977).

Flowers: Inflorescences are dense glomerules with 1-5 heads and up to 10 flowers on a single head

(FNAEC, 2000). Primary bracts generally exceed the inflorescence. The perianth is approximately 5-10 mm long (Martin & Hutchins, 1980). The tepals are lanceolate in shape and brown or purplish-brown in color. Flowers have 6 stamens, elongate filaments of approximately 2.5-3.5 mm in length, and anthers of approximately 0.6-1.3 mm in length (FNAEC, 2000).

Fruit: Capsules are oblong, chestnut brown in color (FNAEC, 2000), and much longer than the perianth (Martin & Hutchins, 1980). Seeds are pale yellow in color and are conspicuously long-tailed at either end (FNAEC, 2000). The body of the seeds is approximately 0.6-0.7 mm long and the tails are approximately 0.8-1.1 mm long (Cronquist et al., 1977).

Comments: *Juncus castaneus*, commonly known as the Chestnut rush, grows in wet meadows in the higher mountains at elevations between 11,000 ft to 13,000 ft. This species flowers in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

E. *Juncus dudleyi*: Dudley's rush

Figure 11. *Juncus dudleyi*, 8 August 2018
Na. J. Pilla |
<https://www.flickr.com/photos/135541615@N05/>

Figure 12. From Britton and Brown's *An Illustrated Flora of the Northern United States, Canada and the British Possessions* (1913)

Habit: *Juncus dudleyi* is a perennial herb that reaches approximately 20-100 cm. Its roots are rhizomatous and densely branching (FNAEC, 2000).

Leaves: The leaves are basal, and there are 2-3 leaves per stem. The auricles are leathery, yellowish, and approximately 0.2-0.4 mm in size. The blades are flat, and the sheath margins are turned up and occasionally involute (FNAEC, 2000).

Flowers: Inflorescences are either compact with few flowers or loose with many flowers (up to 80). The primary bract usually exceeds the inflorescence (FNAEC, 2000). The perianth is approximately 3-4 mm long (Martin & Hutchins, 1980), and the flowers have 2 bracteoles (FNAEC, 2000). The tepals are lanceolate and greenish in color, ranging from 4-5 mm in size. Flowers have 6 stamens, filaments approximately 0.8-1.2 mm in length, and anthers approximately 0.6-1 mm in length (FNAEC, 2000).

Fruit: Capsules are tan in color, 1-locular to pseudo-3-locular, and ellipsoid. Seeds are tan to amber in

color and ellipsoid to lunate in shape. The seeds are approximately 0.4-0.7 mm in size (FNAEC, 2000).

Comments: *Juncus dudleyi*, commonly known as Dudley's rush, grows in wet and clay soils in a variety of landscapes such as open meadows, along streams, and in ditches. This species grows at elevations ranging from 6,000 ft to 8,000 ft and flowers from June to September (Martin & Hutchins, 1980). *Juncus dudleyi* is also known as *Juncus tenuis* var. *dudleyi* in some references such as Martin & Hutchins's *A Flora of New Mexico* (1980).

Medicinal/Culinary Applications: None listed.

F. *Juncus drummondii*: Drummond's rush

Figure 13. *Juncus drummondii*, 1 December 2009
Matt Lavin |
https://www.flickr.com/photos/plant_diversity/

Figure 14. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus drummondii* is a perennial herb. Its roots are rhizomatous and densely short-branched (FNAEC, 2000). Its stems are terete and numerous, reaching lengths of approximately 40 cm (Cronquist et al., 1977).

Leaves: The leaves are basal, mostly reduced to sheaths (Cronquist et al., 1977), and often bladeless (Martin & Hutchins, 1980). When blades are present, they are bristle-like and approximately 5 cm long (Cronquist et al., 1977).

Flowers: Inflorescences are loosely compact and appear lateral (Martin & Hutchins, 1980). Individual clusters can have from 1-5 flowers, and the primary bract is generally longer than the inflorescence (FNAEC, 2000). The perianth is approximately 5-7 mm long (Martin & Hutchins, 1980), and the flowers are pedicellate (FNAEC, 2000). The tepals are lanceolate, brown to chestnut brown with a green mid-stripe, and approximately 5-8 mm in size. Flowers have 6 stamens, filaments 0.7-1 mm in length, and anthers 1.1-1.6 mm in length (FNAEC, 2000).

Fruit: Capsules are brown to chestnut brown, 3-locular, and oblate. Capsules are nearly equal in size to the perianth, though sometimes they exceed the perianth in size (FNAEC, 2000). The amber-colored seeds have oblate bodies (Martin & Hutchins, 1980) and white appendages at both ends that equal the body in length (Cronquist et al., 1977).

Comments: *Juncus drummondii*, commonly known as Drummond's rush, primarily grows in wet ground in the higher mountains along streams (Martin & Hutchins,

1980), in meadows, or on exposed slopes (FNAEC, 2000). This species grows at elevations 10,000 ft to 12,000 ft and flowers in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

G. *Juncus filiformis*: Thread rush

Figure 15. *Juncus filiformis*, 27 June 2015

Krzysztof Ziarnik |

https://commons.wikimedia.org/wiki/File:Juncus_filiformis_kz3.JPG

Figure 16. From Ivey's

Flowering

Plants of New Mexico (2003)

Habit: *Juncus filiformis* is a perennial herb. Its roots are rhizomatous, widely creeping, and sparingly branched (FNAEC, 2000). Its stems are filiform and erect, reaching heights of approximately 50 cm (Martin & Hutchins, 1980).

Leaves: The leaves are bladeless (Martin & Hutchins, 1980). The leaf sheaths are clustered at the base and tinged with purple (Cronquist et al., 1977).

Flowers: Inflorescences are loosely congested with mostly 5-10 flowers (FNAEC, 2000). The primary bract is terete and usually as long or longer than the inflorescence (FNAEC, 2000), thereby appearing as a continuation of the stem (Martin & Hutchins, 1980). The perianth is approximately 2.5-3.5 mm long (Martin & Hutchins, 1980). Flowers are both sessile and pedicellate (FNAEC, 2000), each subtended by a pair of broadly ovate bracteoles (Cronquist et al., 1977). The tepals are lanceolate, light brown to green in color, and approximately 2.5-4.2 mm in size. Flowers have 6 stamens, filaments 0.5-0.9 mm in length, and anthers 0.5-0.7 mm in length (FNAEC, 2000).

Fruit: Capsules are tan or greenish in color, obovoid (FNAEC, 2000), and usually do not exceed the perianth (Martin & Hutchins, 1980). The amber colored seeds are not tailed (FNAEC, 2000), irregularly wrinkled, and pointed at both ends (Martin & Hutchins, 1980).

Comments: *Juncus filiformis*, commonly known as the Thread rush, grows in marshy areas along streams, lakes, or in meadow depressions (FNAEC, 2000) at elevations ranging from 8,000 ft to 9,000 ft (Martin & Hutchins, 1980). This species usually flowers from June to August and is often obscured by larger vegetation (Martin & Hutchins, 1980). Though this species is not reported to be found in northcentral New Mexico according to FNAEC's *Flora of North America* (2000), other references such as Martin & Hutchins's *A Flora of New Mexico* (1980) and a

recent reporting on iNaturalist indicate the presence of this species in the region of interest.

Medicinal/Culinary Applications: None listed.

H. *Juncus hallii*: Hall's rush

Figure 17. *Juncus hallii*, 1997

Emerencia G. Hurd |

https://www.fs.fed.us/rm/pubs_int/int_gtr306.pdf

Figure 18. From Cronquist's et al.

Intermountain Flora (1977)

Habit: *Juncus hallii* is a perennial herb. Its roots are rhizomatous and densely short-branched (FNAEC, 2000). Its terete stems are tufted, reaching heights of approximately 10-40 cm (Cronquist et al., 1977).

Leaves: The leaves have basal sheaths that are either bladeless or have bristle-like blades (Cronquist et al., 1977). Auricles are 0.2 mm in size and scarious, with an apex that is acute to rounded in shape (FNAEC, 2000).

Flowers: Inflorescences are loose or congested with 2-7 flowers per inflorescence. The primary bract is usually longer than the inflorescence (FNAEC, 2000). Flowers are pedicellate with ovate bracteoles. The tepals are light brown with a green mid-stripe (FNAEC, 2000), lanceolate, acute or acuminate, and approximately 4-5 mm in length (Cronquist et al., 1977). Flowers have 6 stamens, filaments approximately 0.8 mm in length, and anthers approximately 0.8-1.1 mm in length (FNAEC, 2000).

Fruit: Capsules are brown in color, 3-locular, and oblong-ovoid (FNAEC, 2000). Capsules usually do not exceed the perianth (Cronquist et al., 1977; FNAEC, 2000). The amber seeds are approximately 1 mm long, and the whitish, membranous appendage at the ends of the seeds is about half as long as the body (Cronquist et al., 1977).

Comments: *Juncus hallii*, commonly known as Hall's rush, grows in wet meadows and rocky slopes at upper elevations in the mountains. This species flowers from June to August (Cronquist et al., 1977). Though FNAEC's *Flora of North America* (2000) does not list this species as one that occurs in New Mexico, evidence for the presence of this species in northcentral New Mexico is provided by the USDA (2019) and the collection of this species at the Fort Burgwin Herbarium in Taos, NM. There are no reports for this species on iNaturalist.

Medicinal/Culinary Applications: None listed.

I. *Juncus interior*: Inland rush

Figure 19. *Juncus interior*, 1 October 2005
Patrick Alexander | <http://www.polypliod.net/>

Figure 20. From Britton and Brown's *An Illustrated Flora of the Northern United States, Canada and the British Possessions* (1913)

Figure 21. *Juncus longistylis*, 30 June 2018
Matt Lavin | https://www.flickr.com/photos/plant_diversity/

Figure 22. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus interior* is a perennial herb. Its densely branching rhizomatous roots grow in a tufted form (FNAEC, 2000). Its stems are terete and can reach heights of 1 m (Martin & Hutchins, 1980).

Leaves: The leaves are basal (FNAEC, 2000) and flat to involute (Martin & Hutchins, 1980). The leaf sheaths loosely envelope the stem (FNAEC, 2000). The auricles are tinged with a whitish to purplish color and are membranous (Martin & Hutchins, 1980).

Flowers: Inflorescences are somewhat compact with the primary bract usually shorter than the inflorescence (FNAEC, 2000). The perianth is approximately 3-4 mm long (Martin & Hutchins, 1980), and flowers have 2 bracteoles (FNAEC, 2000). The tepals are greenish in color, lanceolate, and approximately 3.3-4.4 mm in size. The apex of the tepals is acuminate. Flowers have 6 stamens, filaments 0.5-0.9 mm in length, and anthers 0.4-0.6 mm in length (FNAEC, 2000).

Fruit: Capsules are light tan or darker in color (FNAEC, 2000) and obtuse to apiculate at the apex in shape (Martin & Hutchins, 1980). The tan seeds are ellipsoid to lunate, 0.4-0.7 mm in size, and are not tailed (FNAEC, 2000).

Comments: *Juncus interior*, commonly known as the Inland rush or Interior rush, grows widespread throughout the northcentral region of New Mexico in damp to dry ground at elevations ranging from 4,000 ft to 8,000 ft. This species flowers from June to August or September (Martin & Hutchins, 1980). Relevant synonyms for this species include *Juncus interior* var. *arizonicus* and *Juncus interior* var. *neomexicanus*, according to Martin & Hutchins's *A Flora of New Mexico* (1980). FNAEC's *Flora of North America* (2000) does not differentiate these variations from the typical characteristics of *Juncus interior*.

Medicinal/Culinary Applications: None listed.

J. Juncus longistylis: Longstyle rush

Habit: *Juncus longistylis* is a perennial herb. Its roots are rhizomatous and long creeping (FNAEC, 2000) with scattered or clustered terete stems reaching heights of 20-50 cm (Martin & Hutchins, 1980).

Leaves: The leaves are mostly basal (FNAEC, 2000), though some are distinctly cauline (Cronquist et al., 1977). The auricles range from 1-2.5 mm in size, the apex of which is truncate to obtuse. The leaf blades are flat (FNAEC, 2000).

Flowers: Inflorescences are glomerules with each cluster containing up to 12 open or aggregate flowers. The primary bract is usually shorter than the inflorescence (FNAEC, 2000). The perianth segments are approximately 6 mm long (Martin & Hutchins, 1980). The tepals are brown with a green mid-stripe, lanceolate, and 5-6 mm in size (FNAEC, 2000). Margins are scarious (FNAEC, 2000), sometimes papillose (Martin & Hutchins, 1980). Flowers have 6 stamens, filaments 0.5-1 mm in length, and anthers 1.2-2 mm in length (FNAEC, 2000).

Fruit: Capsules are tan, 3-locular, and obovoid (FNAEC, 2000). Capsules are shorter than the perianth (Cronquist et al., 1977). Seeds are ovoid and apiculate (FNAEC, 2000), approximately 0.4-0.6 mm in size (Cronquist et al., 1977).

Comments: *Juncus longistylis*, commonly known as the Longstyle rush, grows in moist soils in mountain meadows (FNAEC, 2000) at elevations ranging from 7,000 ft to 9,500 ft (Martin & Hutchins, 1980). This species flowers from July to September. Though most references list variations of *Juncus longistylis* as separate species, Martin & Hutchins's *A Flora of New Mexico* (1980) does not separate the variants. The variant of interest with regard to this text and the northcentral region of New Mexico is named *Juncus longistylis* var. *longistylis*.

Medicinal/Culinary Applications: None listed.

K. Juncus macrandrus: Long-anthered rush

Figure 23. *Juncus macrandrus*, 20 July 2014

Jane Shelby Richardson |
https://commons.wikimedia.org/wiki/File:Juncus_macrandrus_long-anthered_rush.jpg

Figure 24. From Adam's *Illustrated Flora of the Pacific States* (1940)

Habit: *Juncus macrandrus* is a perennial herb with rhizomatous roots and erect culms (FNAEC, 2000).

Leaves: The leaves are both basal and cauline, with 2 basal leaves and 1-2 cauline leaves. The leaves are light green in color, and the auricles are absent (FNAEC, 2000).

Flowers: Inflorescences are panicles of 5-10 heads which ascend to erect branches. The primary bract is erect. The heads are 3-22 flowered and obovoid to hemispheric in shape. Tepals are dark brown to purplish brown, lanceolate, and approximately 3-4 mm in size. The outer tepals are acuminate, and the inner tepals are acuminate or cuspidate. Flowers have 6 stamens with anthers that are 2.5-3x the length of the filaments (FNAEC, 2000).

Fruit: Capsules are chestnut brown, 1-locular, and oblong. The apex is acuminate proximal to the beak, with the beak slightly exerted. Seeds are obovoid and are not tailed (FNAEC, 2000).

Comments: *Juncus macrandrus*, commonly known as the Long-anthered rush, grows in wet places primarily in montane conifer forests. This species flowers during the summer (FNAEC, 2000). Though the regional map provided by the USDA (2019) indicates that this species is specific to California, the map provided by FNAEC's *Flora of North America* (2000) indicates a broader coverage of this species which includes northcentral New Mexico. On this basis, this report includes *Juncus macrandrus* as a species found in the region of interest. There are no reports for this species in the region of interest on iNaturalist.

Medicinal/Culinary Applications: None listed.

L. *Juncus marginatus*: Grassleaf rush

Figure 25. *Juncus marginatus*, 2019

Donald Cameron |

<https://gobotany.nativeplanttrust.org/species/juncus/marginatus/>

Figure 26. From Britton and Brown's *An Illustrated Flora of the Northern United States, Canada and the British Possessions* (1913)

Habit: *Juncus marginatus* is a perennial herb. Its roots are occasionally tufted and sometimes rhizomatous with short, dense rhizomes (FNAEC, 2000). Its stems are compressed (FNAEC, 2000) and can reach heights of approximately 80 cm (Martin & Hutchins, 1980).

Leaves: The leaves are both basal and cauline. The basal blades are flat, and the cauline blades are reduced. The auricles are rounded and membranous (FNAEC, 2000).

Flowers: Inflorescences are open glomerules with head-like clusters. Each cluster contains approximately 2-10 flowers. The primary bract is shorter than the inflorescence (FNAEC, 2000). The perianth is approximately 3 mm long (Martin & Hutchins, 1980). The tepals are dark brownish, usually with a green mid-stripe, and ovate to lanceolate in shape with an acute apex (FNAEC, 2000). The outer tepals are usually shorter than the inner segments (Martin & Hutchins, 1980). Flowers have 3 stamens, filaments 1.1-2.5 mm in length, and anthers 0.3-1.2 mm in length (FNAEC, 2000).

Fruit: Capsules are brown in color, sometimes dotted with dark spots. The capsules are 3-locular, obovoid to nearly globose in shape, and rounded at the apex (FNAEC, 2000). The seeds are yellow to light brown, striate, and apiculate at the apex (Martin & Hutchins, 1980).

Comments: *Juncus marginatus*, commonly known as the Grassleaf rush, grows in damp or wet ground at elevations ranging from 4,000 ft to 5,000 ft. This species usually flowers from June to September (Martin & Hutchins, 1980). Though the regional map provided by FNAEC's *Flora of North America* (2000) does not indicate that this species occurs in northcentral New Mexico, Martin & Hutchins's *A Flora of New Mexico* (1980) and the USDA (2019) both indicate the presence of *Juncus marginatus* in the region of interest. Furthermore, this species was collected and stored at the Taos Herbarium at Fort Burgwin. There are no reports for this species in the region of interest on iNaturalist.

Medicinal/Culinary Applications: None listed.

M. *Juncus mertensianus*: Mertens' rush

Figure 27. *Juncus mertensianus*, 19 August 2016
Matt Lavin | https://www.flickr.com/photos/plant_diversity/

Figure 28. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Juncus mertensianus* is a perennial herb. Its roots are rhizomatous to caespitose (FNAEC, 2000). Its stems are terete and can reach heights of approximately 40 cm (Martin & Hutchins, 1980).

Leaves: The leaves are basal and cauline, with 1-2 basal leaves and 0-1 cauline leaves (FNAEC, 2000). The auricles are rounded (Martin & Hutchins, 1980), and the apex is rounded to acute (FNAEC, 2000). The sheath margins are scarious (Martin & Hutchins, 1980), and the terete blades are green to straw-colored (FNAEC, 2000).

Flowers: Inflorescences consist of terminal single heads with many flowers (FNAEC, 2000). The primary bract is erect and often barely surpasses the inflorescence (Cronquist et al., 1977). The perianth is approximately 3-4 mm long (Martin & Hutchins, 1980). The tepals are dark purplish brown to black, lanceolate to lance-ovate with an acute apex (FNAEC, 2000). The outer tepals are approximately 2.4-4.9 mm in size, and the inner tepals are slightly shorter. Flowers have 6 stamens with anthers that are ¼ to equal in length to the filaments (Cronquist et al., 1977).

Fruit: Capsules are chestnut brown, 1-locular, and obovoid (FNAEC, 2000). The apex is obtuse to retuse with valves separating at the dehiscence (Martin & Hutchins, 1980). Seeds are clear to yellow-brown (FNAEC, 2000), ellipsoid to apiculate, and not tailed (Cronquist et al., 1977).

Comments: *Juncus mertensianus*, commonly known as Mertens' rush, grows in montane to alpine meadows and along stream banks (FNAEC, 2000) at elevations ranging from 9,000 ft to 11,500 ft (Martin & Hutchins, 1980). This species flowers primarily in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

N. *Juncus mexicanus*: Mexican rush

Figure 29. *Juncus mexicanus*, 1 June 2018
Marilyn Phillips | rockymountainsflora.com

Figure 30. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus mexicanus* is a perennial herb. Its roots are rhizomatous and long-creeping (FNAEC, 2000). Its stems are usually compressed and reach heights of approximately 50 cm (Martin & Hutchins, 1980).

Leaves: The leaves are basal (FNAEC, 2000) with a distinct and somewhat flattened blade (Martin & Hutchins, 1980). Sheaths are yellow to brown, and the auricles are rounded and cartilaginous (Martin & Hutchins, 1980).

Flowers: Inflorescences appear lateral with individual loose clusters containing 5 to many flowers (Martin & Hutchins, 1980). The primary bract is somewhat flattened, extending beyond the inflorescence and appearing as a continuation of the stem (Cronquist et al., 1977). The perianth parts are approximately 4-5 mm long (Martin & Hutchins, 1980). The tepals are usually brown or blackish but can appear greenish to yellow as well (FNAEC, 2000; Martin & Hutchins, 1980). Flowers have 6 stamens, filaments approximately 0.2-0.4 mm in length, and anthers approximately 1.2-2.2 mm in length (FNAEC, 2000).

Fruit: Capsules are mucronate at the apex, and seeds are reticulate (Martin & Hutchins, 1980).

Comments: *Juncus mexicanus*, commonly known as the Mexican rush, grows around springs and in meadows with sandy soils or alkaline soils (FNAEC, 2000). This species grows at elevations ranging from 3,000 ft to 5,000 ft and flowers from July to September (Martin & Hutchins, 1980). Relevant synonyms for this species include *Juncus arcticus* var. *mexicanus* (as referred to in FNAEC's *Flora of North America*, 2000) and *Juncus balticus* var. *mexicanus* (as referred to in Cronquist's et al. *Intermountain Flora*, 1977). This species is distinct from the previously described *Juncus arcticus* var. *balticus*.

Medicinal/Culinary Applications: None listed.

O. *Juncus nodosus*: Knotted rush

Figure 31. *Juncus nodosus*, 23 July 2016
Max Licher | <http://intermountainbiota.org/portal/imagelib/imgdetails.php?imgid=3694034>

Figure 32. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Juncus nodosus* is a perennial herb. Its roots are rhizomatous with swollen nodes (FNAEC, 2000). Its stems are slender and terete, reaching heights of approximately 40 cm (Martin & Hutchins, 1980).

Leaves: The leaves are basal and cauline, with 1 basal leaf and 2-4 cauline leaves. The auricles are membranous to cartilaginous, and the apex of the auricles is rounded (FNAEC, 2000).

Flowers: Inflorescences are panicles of 3-15 spherical heads, though in some cases the inflorescence can have up to 30 heads (FNAEC, 2000; Martin & Hutchins, 1980). The branches are ascending to erect, and the primary bract is erect (FNAEC, 2000). The perianth is approximately 3-4 mm long (Martin & Hutchins, 1980). The tepals are green to light brown (FNAEC, 2000) and lancesubulate with an acuminate apex (Cronquist et al., 1977). Flowers have either 3 or 6 stamens and anthers $\frac{1}{2}$ to equal in length to the filaments (FNAEC, 2000).

Fruit: Capsules are chestnut brown, 1-locular, and lancesubulate (FNAEC, 2000). The capsules often surpass the perianth, and the valves separate at the dehiscence (Cronquist et al., 1977). The seeds are oblong, ellipsoid, or obovoid as well as apiculate (Cronquist et al., 1977; FNAEC, 2000).

Comments: *Juncus nodosus*, commonly known as the Knotted rush, grows in wet ground near lakes, streams, and rivers (FNAEC, 2000) at elevations ranging from 5,000 ft to 7,000 ft. The species typically flowers in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

P. *Juncus parryi*: Parry's rush

Figure 33. *Juncus parryi*, 3 August 2018
Matt Lavin | https://www.flickr.com/photos/plant_diversity/

Figure 34. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus parryi* is a perennial herb that is strongly tufted. Its roots are rhizomatous and densely short-branched (FNAEC, 2000). Its stems are terete and numerous (FNAEC, 2000), reaching heights of approximately 10-40 cm (Cronquist et al., 1977).

Leaves: The leaves are basal, and the scarious auricles have an acute to rounded apex (FNAEC, 2000).

Flowers: Inflorescences are open and 1-3 flowered. The primary bract is terete and generally longer than the inflorescence (FNAEC, 2000), appearing as a continuation of the stem and making the inflorescence appear lateral (Cronquist et al., 1977). Flowers are pedicellate, and the bracteoles are broadly ovate. The tepals are light brown with a green mid-stripe, lanceolate, and have scarious margins. Flowers have 6 stamens, filaments 0.7-1 mm in length, and anthers 1.1-1.6 mm in length (FNAEC, 2000).

Fruit: Capsules are tan in color, 3-locular, narrowly oblong, and distinctly acute (FNAEC, 2000). The capsules usually exceed the perianth. The amber seeds have a whitish appendage at either end that is equal to or a little longer in length than the body of the seed (Cronquist et al., 1977).

Comments: *Juncus parryi*, commonly known as Parry's rush, grows on exposed rocky slopes and stream banks at upper elevations in the mountains (Cronquist et al., 1977). This species primarily flowers in July and August (FNAEC, 2000).

Medicinal/Culinary Applications: None listed.

Q. *Juncus saximontanus*: Rocky Mountain rush

Figure 35. *Juncus saximontanus*, 15 July 2013
Marilyn Phillips | rockymountainsflora.com

Figure 36. From Ivey's *Flowering Plants of New Mexico* (2003)

Habit: *Juncus saximontanus* is a perennial herb with rhizomatous roots (FNAEC, 2000). Its stems are erect, flattened, and reach heights of approximately 30-50 cm (Martin & Hutchins, 1980).

Leaves: The leaves are straw-colored with 1-3 basal leaves and 2-6 cauline leaves. The auricles are either small or absent altogether (FNAEC, 2000; Martin & Hutchins, 1980).

Flowers: Inflorescences are panicles of about 3-20 heads (FNAEC, 2000), though more commonly 10 heads

(Cronquist et al., 1977). The heads are obovoid to globose and contain numerous flowers (FNAEC, 2000). The subtending bracts are generally shorter than the inflorescence. The perianth parts are approximately 2-3 mm long (Martin & Hutchins, 1980). The tepals are light brown to greenish brown and lanceolate (FNAEC, 2000). The outer tepals are longer than the inner tepals (Martin & Hutchins, 1980). Flowers have 6 stamens and anthers that are $\frac{1}{2}$ to equal in length to the filaments (FNAEC, 2000).

Fruit: Capsules are slightly exerted, chestnut brown, and ellipsoid to oblong (Martin & Hutchins, 1980). The seeds are reticulate and can be tailed, though more often not tailed (FNAEC, 2000).

Comments: *Juncus saximontanus*, commonly known as the Rocky Mountain rush, grows in wet meadows at elevations ranging from 6,000 ft to 10,000 ft. This species flowers from June to September (Martin & Hutchins, 1980). Relevant synonyms for this species include *Juncus ensifolius* var. *montanus* (as referred to in Cronquist's et al. *Intermountain Flora*, 1977, and FNAEC's *Flora of North America*, 2000). The name *Juncus saximontanus* occurs in Martin & Hutchins's *A Flora of New Mexico* (1980) and the USDA (2019) online catalogue.

Medicinal/Culinary Application: The Paiutes gathered *Juncus ensifolius* as a food source for their livestock. Because *Juncus saximontanus* is a variation of *Juncus ensifolius* (*Juncus ensifolius* var. *montanus*), one might infer that *Juncus saximontanus* was also gathered as food for livestock (Mahar, 1953 found in Moerman, 2010).

R. *Juncus tenuis*: Path rush

Figure 37. *Juncus tenuis*,
9 July 2017
Matt Lavin |
https://www.flickr.com/photos/plant_diversity/

Figure 38. From Ivey's
*Flowering Plants of New
Mexico* (2003)

Habit: *Juncus tenuis* is a perennial herb that grows in a tufted form. Its roots are rhizomatous and densely branching (FNAEC, 2000). Its stems are few to many and reach heights of approximately 20-60 cm tall (Martin & Hutchins, 1980).

Leaves: The leaves are basal, flexible, and often flattened or involute. The auricles are whitish (Martin & Hutchins, 1980) and scarious with an acute apex (FNAEC, 2000).

Flowers: Inflorescences are loose, many-flowered panicles. The subtending bracts are leaflike and often exceed the inflorescence. The perianth is approximately 3-4 mm long and often green (Martin & Hutchins, 1980). Flowers

have 2 bracteoles. The tepals are green to greenish-brown (Martin & Hutchins, 1980), lanceolate, and scarious along the margins (FNAEC, 2000). The inner tepals and the outer tepals are nearly equal in size. Flowers have 6 stamens, filaments approximately 0.5-0.9 mm in length, and anthers approximately 0.1-0.2 mm in length (FNAEC, 2000).

Fruit: Capsules are tan or light brown, 1-locular to pseudo-3-locular (Cronquist et al., 1977), and ellipsoid or obtuse (FNAEC, 2000). The capsules are nearly equal in size to the tepals. The tan seeds are ellipsoid to lunate and are not tailed (FNAEC, 2000).

Comments: *Juncus tenuis*, commonly known as the Path rush, grows in wet or dry ground in open or partially shaded areas at elevations ranging from 6,000 ft to 8,000 ft. This species flowers from June to September (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: *Juncus tenuis* was used by the Iroquois as an emetic and a form of veterinary aid. A decoction or infusion of the plant was given to athletes to induce vomiting, and an infusion of the plant was given to colts who had eaten too much feed (Herrick, 1977 found in Moerman, 1986).

S. *Juncus torreyi*: Torrey's rush

Figure 39. *Juncus torreyi*,
3 August 2012
Marilyn Phillips |
rockymountainsflora.com

Figure 40. From Ivey's
*Flowering Plants of New
Mexico* (2003)

Habit: *Juncus torreyi* is a perennial herb. Its roots are rhizomatous and have swollen nodes (FNAEC, 2000). Its stems are terete (Cronquist et al., 1977) and can reach heights of approximately 1 m (Martin & Hutchins, 1980).

Leaves: The leaves are both basal and cauline, with about 1-3 basal leaves and 2-5 cauline leaves. The auricles are prominent and have a rounded apex. The terete blades are straw-colored, green, or pink (FNAEC, 2000).

Flowers: Inflorescences are a terminal panicle of numerous heads (Martin & Hutchins, 1980). Each head is many-flowered and greenish-stramineous to medium brown in color (Cronquist et al., 1977). The primary bract is erect to ascending (FNAEC, 2000) and longer than the inflorescence. The perianth is approximately 4-5 mm long (Martin & Hutchins, 1980). The tepals are green to straw-colored, though occasionally reddish in color, and they are lanceolate-subulate (FNAEC, 2000). The outer tepals are longer than the inner tepals (Martin & Hutchins, 1980). Flowers have 6 stamens and anthers that are $\frac{1}{2}$ the length of the filaments (FNAEC, 2000).

Fruit: Capsules equal the perianth or are slightly exerted. The capsules are straw-colored to chestnut brown (FNAEC, 2000), 1-locular, and strongly triquetrous (Cronquist et al., 1977). The seeds are yellow-brown, oblong to ellipsoid, and not tailed (FNAEC, 2000).

Comments: *Juncus torreyi*, commonly known as Torrey's rush, grows in damp or wet ground at elevations ranging from 3,500 ft to 8,000 ft. This species is fairly common and widespread, and it flowers primarily in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

T. Juncus triglumis var. *albescens*:
Northern White rush

Figure 41. *Juncus triglumis*, 19 July 2011
Marilyn Phillips |
rockymountainsflora.com

Figure 42. From
Cronquist's et al.
Intermountain Flora
(1977)

Habit: *Juncus triglumis* var. *albescens* is a perennial herb (FNAEC, 2000). Its roots grow in a caespitose form, and its stems are slender, terete, and can reach heights of approximately 20 cm (Martin & Hutchins, 1980).

Leaves: The leaves are basal, crowding toward the base (FNAEC, 2000; Martin & Hutchins, 1980). The sheaths are auriculate and expand into a pair of broadly rounded auricles. The leaf blades are long and slender as well as hollow and septate-nodulose (Cronquist et al., 1977).

Flowers: Inflorescences are head-like clusters of 1-5 flowers. The primary bract usually does not exceed the inflorescence (Martin & Hutchins, 1980). The perianth is approximately 3-5 mm long. The tepals are often whitish though sometimes more castaneous toward the base (Cronquist et al., 1977). The inner and outer tepals are approximately equal in length (Martin & Hutchins, 1980), and the apex is long acuminate (FNAEC, 2000). Flowers have 6 stamens and filaments that are much longer than the anthers (Martin & Hutchins, 1980).

Fruit: Capsules are included or barely exerted from the perianth and sub-truncate to slightly retuse. Seeds are conspicuously white-tailed at each end (Cronquist et al., 1977), and the tails are nearly as long as the body (Martin & Hutchins, 1980).

Comments: *Juncus triglumis* var. *albescens*, commonly known as the Northern White rush, grows in wet meadows in higher mountains at elevations ranging from 10,000 ft to 13,000 ft. This species generally flowers in July and August (Martin & Hutchins, 1980). Other common names and relevant synonyms for this species include the Three-hulled rush and *Juncus triglumis*. The USDA (2019)

regional map indicates that the other variation of this species, *Juncus triglumis* var. *triglumis*, also occurs in New Mexico. Because the other references do not indicate the presence of this variation in the region of interest, this report only describes the species *Juncus triglumis* var. *albescens*.

Medicinal/Culinary Applications: None listed.

U. Juncus xiphioides: Irisleaf rush

Figure 43. *Juncus xiphioides*,
25 June 2010
David Thornburg |
<http://intermountainbiota.org/portal/collections/individual/index.php?occid=9062518>

Figure 44. From
FNAEC's *Flora of*
North America (2000)

Habit: *Juncus xiphioides* is a perennial herb. Its roots are rhizomatous (FNAEC, 2000). Its stems are compressed, two-edged, and can reach heights of approximately 80 cm tall (Martin & Hutchins, 1980).

Leaves: The leaves are both basal and cauline, with 1-3 basal leaves and 2-6 cauline leaves (FNAEC, 2000). The blades are transversely septate, and the sheaths have membranous margins (Martin & Hutchins, 1980). The auricles are absent (FNAEC, 2000).

Flowers: Inflorescences are panicles or racemes of 20-50 heads, each head containing 3-20 flowers. The primary bract is erect, and the heads are obovoid to globose (FNAEC, 2000). The perianth is approximately 2.5-3.5 mm long (Martin & Hutchins, 1980). The tepals are green to brown or reddish-brown, lanceolate, and acuminate (FNAEC, 2000). Flowers have either 3 or 6 stamens (Martin & Hutchins, 1980) and anthers are 1/2 to equal in length to the filaments (FNAEC, 2000).

Fruit: Capsules are slightly exerted and are chestnut to dark brown. The capsules are 1-locular, oblong or ellipsoid (FNAEC, 2000), and have an acuminate apex (Martin & Hutchins, 1980). Seeds are elliptic to obovate and are not tailed (FNAEC, 2000).

Comments: *Juncus xiphioides*, commonly known as the Irisleaf rush, grows in marshy meadows and streams at elevations ranging from 3,500 ft to 6,000 ft. This species usually flowers from June to August (Martin & Hutchins, 1980). According to FNAEC's *Flora of North America* (2000), this species is closely related to *Juncus ensifolius*. Due to the close relation between the species, the culinary applications for *Juncus ensifolius* are included in this report.

Medicinal/Culinary Applications: *Juncus xiphioides*, due to its close relation to *Juncus ensifolius*, was likely used by the Paiutes as food for livestock (Mahar, 1953 found in Moerman, 2010). The Swinomish also used the bulbs for food (Gunther, 1973 found in Moerman, 2010).

5. GENUS: *LUZULA*³

Habit: Plants of the genus *Luzula* are grass-like perennial herbs. The stems are slender and hollow, generally simple (Martin & Hutchins, 1980).

Leaves: The leaves are usually flat, though sometimes involute (Martin & Hutchins, 1980), and pilose along the margins of the blade (Cronquist et al., 1977). The apex is generally callous (FNAEC, 2000), and the sheaths are closed (Martin & Hutchins, 1980).

Flowers: Inflorescences are spike-like or umbellate (FNAEC, 2000). Flowers are in glomerules, and individual flowers are subtended by bractlets (Martin & Hutchins, 1980). The perianth is composed of 6 tepals which grow in 2 similar sets of 3. Tepals are more or less scarious and usually greenish, brownish, or blackish in color. Flowers have 6 stamens. Ovary is unilocular and tricarpellate with 3 ovules on a basal placenta (Cronquist et al., 1977).

Fruit: Capsules are unilocular and dehiscent at the angles. There are generally 3 relatively large seeds (Cronquist et al., 1977), usually hairless. The caruncle is conspicuous to barely visible (FNAEC, 2000).

Comments: Plants of the genus *Luzula*, known collectively as woodrushes, were used by the Iroquois to increase strength as well as to physically punish one of bewitchment (Herrick, 1977 found in Moerman, 1986).

A. *Luzula comosa*: Pacific woodrush

Figure 45. *Luzula comosa*, 2 August 2011
Max Licher |
<http://intermountainbiota.org/portal/imagelib/imgdetails.php?imgid=2062158>

Figure 46. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Luzula comosa* is a perennial herb. Stolons are absent. Its stems are cespitose (FNAEC, 2000) and can reach heights of 60 cm (Martin & Hutchins, 1980).

Leaves: The leaves are mostly basal (Martin & Hutchins, 1980), though some are cauline (Cronquist et al.,

1977). The blades are flat, long-ciliate on the margins, and hairy near the base (Martin & Hutchins, 1980). The margins also have long, soft, wavy hairs with a callous apex (FNAEC, 2000).

Flowers: Inflorescences are umbellate or sessile glomerules. The branches are ascending and unequal in length (Martin & Hutchins, 1980). Inflorescences can contain about 1-6 glomerules (FNAEC, 2000). The primary bract is usually longer than the inflorescence. The perianth is approximately 3 mm long (Martin & Hutchins, 1980). The tepals are dark brown to pale with clear margins (FNAEC, 2000), acuminate, and mostly 2.5-3 mm long. The inner tepals are a little shorter than the outer tepals (Cronquist et al., 1977). The anthers are equal to or slightly longer than the filaments (FNAEC, 2000).

Fruit: Capsules are greenish to dark brown in color, obovoid or spherical (FNAEC, 2000), and equal to or a little longer than the tepals in length (Martin & Hutchins, 1980). The seeds are red-brown to brown in color and cylindric in shape (FNAEC, 2000). The seeds also have an elongate, whitish caruncle (Martin & Hutchins, 1980) that is approximately 0.3-0.6 mm long (Cronquist et al., 1977).

Comments: *Luzula comosa*, commonly known as the Pacific woodrush, grows in damp soil in mountainous meadows at elevations ranging from 8,000 ft to 12,000 ft. This species flowers from June to August (Martin & Hutchins, 1980). Relevant synonyms for this species include *Luzula campestris* (as listed in Cronquist's et al. *Intermountain Flora*, 1977) and *Luzula multiflora* (as listed in Martin and Hutchins's *A Flora of New Mexico*, 1980).

Medicinal/Culinary Applications: *Luzula comosa* was used by the Navaho-Ramah as a ceremonial medicine and emetic (Vestal, 1952 found in Moerman, 1986).

B. *Luzula parviflora*: Small-flowered woodrush

Figure 47. *Luzula parviflora*, 1 August 2017
Matt Lavin |
https://www.flickr.com/photos/plant_diversity/

Figure 48. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Luzula parviflora* is a perennial herb. Stolons are 5 cm in length or absent entirely (FNAEC, 2000). The roots are composed of short rhizomes (Cronquist et al., 1977). Its stems are loosely cespitose, terete, and can reach heights of 70 cm (Martin & Hutchins, 1980).

³ Leaves pilose; sheaths closed; capsules 3-seeded

Leaves: The leaves are both basal and cauline, with the cauline leaves being much shorter than the basal leaves (Martin & Hutchins, 1980). The basal leaf blade is mostly glabrous, and the sheaths often have long, soft hairs (FNAEC, 2000).

Flowers: Inflorescences are loose, open, and subumbellately pedicellate in form (Cronquist et al., 1977). The branches are slender and often arching or drooping (Martin & Hutchins, 1980). Inflorescences are few to many-flowered, and the primary bract is inconspicuous, often appearing leaflike (FNAEC, 2000). The perianth is approximately 2 mm long (Martin & Hutchins, 1980). The tepals are pale brown to brown and lanceolate with an acute apex. Anthers are often equal to or shorter than the filaments (FNAEC, 2000).

Fruit: Capsules are straw-colored to dark brown to blackish. The capsules are ovoid or spherical (FNAEC, 2000) and generally are longer than the tepals (Martin & Hutchins, 1980). The seeds are brown to red-brown or purple in color and ellipsoid in shape (FNAEC, 2000). The seeds are often shiny (Martin & Hutchins, 1980).

Comments: *Luzula parviflora*, commonly known as the Small-flowered woodrush, grows in damp woods and meadows in the mountains (FNAEC, 2000) at elevations ranging from 8,000 ft to 12,000 ft. This species typically flowers from June to August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

C. *Luzula spicata*: Spiked woodrush

Figure 49. *Luzula spicata*, 1 August 2017
Matt Lavin | https://www.flickr.com/photos/plant_diversity/

Figure 50. From Cronquist's et al. *Intermountain Flora* (1977)

Habit: *Luzula spicata* is a perennial herb. Its stems are densely cespitose, reddish, and have a thick base (FNAEC, 2000). The stems can reach heights of approximately 40 cm (Martin & Hutchins, 1980).

Leaves: The leaves are mostly basal, though some are cauline. The basal leaves are erect, linear, and often flattened or involute. The sheaths are pilose at the summit (Martin & Hutchins, 1980).

Flowers: Inflorescences are panicles of dense, spike-like clusters (FNAEC, 2000). The branches are arching or nodding (Martin & Hutchins, 1980). The individual spikes are several-flowered with sessile flowers (Cronquist et al., 1977). The primary bract is often longer than the inflorescence, appearing leaflike. The perianth is approximately 2-3 mm long (Martin & Hutchins, 1980). The tepals are brown with clear margins or pale throughout and are acuminate. The outer whorl is slightly longer than the inner whorl (Cronquist et al., 1977), and the outer whorl is bristle-pointed. The anthers and filaments are more or less equal in length (FNAEC, 2000).

Fruit: Capsules are pale to dark brown or blackish, obovoid (FNAEC, 2000), and a little shorter than the perianth (Martin & Hutchins, 1980). The apex of the capsules is more or less acute. The seeds are brown and cylindrical-ovoid (FNAEC, 2000). The seeds are either without a caruncle or with a whitish, minute caruncle at the end (Cronquist et al., 1977; Martin & Hutchins, 1980).

Comments: *Luzula spicata*, commonly known as the Spiked woodrush, grows in dry or damp soils in meadows along lakes, on alpine slopes, or other open rocky areas (FNAEC, 2000). The species often grows above the timberline at elevations ranging from 10,000 ft to 12,500 ft. This species usually flowers in July and August (Martin & Hutchins, 1980).

Medicinal/Culinary Applications: None listed.

6. GLOSSARY

Definitions are either a direct or abbreviated form of the definitions provided by Dictionary of Botany (2002), unless otherwise cited as from the Western Australian Herbarium (1998) or Educalingo (2021), and are provided as a reference for readers.

Acuminate: gradually narrowing to a point, as do certain leaves

Acute: having a sharp but not extended point, as do certain leaves

Anemophily: pollination by pollen carried by the wind

Anatropous: describing the form of ovule orientation in the ovary in which the funiculus has lengthened and the ovule turned through 180° so that the micropyle is folded over and lies near the base of the funiculus

Apiculate: having a small, broad point at the apex

Auricles: earlike extension from the base of a leaf or petal

Axile placentation: a form of placentation in which the placentae develop along the fused margins of a unilocular compound ovary

Basal: arising from or positioned at the base (Western Australian Herbarium, 1998)

Basal placentation: a form of placentation, found in ovaries containing only one ovule, in which the placenta develops at the base of the ovary

Bract: a leaflike organ subtending an inflorescence

Bracteole: a leaflike organ subtending a flower in an inflorescence that is itself subtended by a bract

Cespitose: having a tufted form of growth; growing in clusters or tufts

Capsules: any dry dehiscent fruit derived from two or more many-seeded fused carpels

Carpel: the structure that bears and encloses the ovules in flowering plants; normally comprises the ovary, style, and stigma

Caruncle: a horny outgrowth near the hilum of a seed that is formed from the integuments

Cataphyll: synonymous to bud

Cauline: pertaining to the stem, especially applied to leaves arising on the upper part of the stem

Culms: hollow stem of a grass or cereal plant, especially that bearing the flower

Cuspidate: suddenly narrowing to a point, especially said of leaves

Cymose inflorescence: an inflorescence in which the apical tissues of the main stem and laterals lose their meristematic capacity and differentiate into flowers

Decoction: a method of extraction by boiling herbal or plant materials—such as the stems, roots, bark, or rhizomes—in order to obtain the principal components to be used for medicinal or culinary purposes (Educalingo, 2021)

Dehiscence: the splitting open along predetermined lines of plant organs—such as anthers, spore capsules, and fruits—to release their contents; caused often by the gradual drying out of the enclosing walls

Dimerous: describing flowers in which the parts of each whorl are inserted in twos, or multiples of two

Entomophily: pollination by pollen carried by insects

Filiform: having a threadlike form

Glabrous: describing a surface that is devoid of hairs or other projections

Globose/Globular: 3-dimensional shape, spherical or orbicular, circular in outline (Western Australian Herbarium, 1998)

Glomerules: dense, compact clusters of flowers (Western Australian Herbarium, 1998)

Inflorescence: any flowering system consisting of more than one flower

Involute: with the margins inwardly rolled on the upper (adaxial) surface, referring to a leaf or other flat organ (Western Australian Herbarium, 1998)

Lanceolate: narrowing and tapering at both ends

Locules: a cavity within which specialized organs may develop, usually the ovules or pollen grains

Loculicidal: describing fruit dehiscence in which the slits in the pericarp arise along the dorsal structure of each carpel

Mucronate: having a small fine point (a mucro) arising abruptly, usually at the tip

Obtuse: having a blunt or rounded leaf apex

Ovary: swollen basal part of the carpel in angiosperms, which contains ovules

Ovary inferior: other floral organs are inserted below ovary

Ovary superior: other floral organs are inserted above ovary

Ovate: describing an organ, such as a leaf, that is egg shaped, with the broadest part nearest the point of attachment

Ovoid: shaped like an egg

Panicle: a racemose inflorescence in which the flowers are formed on stalks (peduncles) arising alternately or spirally from the main axis

Papillose: a small protuberance on the surface of an organ being an extension of one epidermal cell (Western Australian Herbarium, 1998)

Pariental placentation: a form of placentation in which the placentae develop along the fused margins of a unilocular compound ovary

Pedicel: the stalk attaching individual flowers to the main axis (peduncle) of the inflorescence; it develops in the axil of a bract and its internal structure is typically stem-like

Perennial: growing many years

Perianth: the outer part of a flower, consisting of the calyx (sepals) and corolla (petals)

Petals: modified leaves with a simplified internal structure, having only one vascular bundle; collectively known as “corolla”

Pilose: having soft, long hairs

Pistils: divided into ovary, style, and stigma; organ in center of flower capable of receiving pollen and producing a fruit

Placenta: the tissue by which spores, sporangia, or ovules are attached to the maternal tissue; usually mostly undifferentiated but contains vascular tissue

Placentation: the pattern of attachment of an ovule to the ovary wall by the placenta

Radial symmetry: arrangement of pairs in an organ or organism such that any cut taken through the center divides the structure into similar halves

Reticulate: forming a network or reticulum (Western Australian Herbarium, 1998)

Rhizomatous: underground stem that grows horizontally

Scarious: having a dry membranous appearance, but fairly stiff

Sepals: usually green and hairy, outermost or lowest part of the flower; collectively known as “calyx”

Sessile: unstalked, as a leaf with no petiole or a stigma with no style

Sheath margins: the basal portion of the grass leaf that surrounds the stem

Stamen: male reproductive organ of flowering plant, consists of anther, filament, and connective

Stigma: the preceptive tip of the carpel, which receives pollen at pollination and on which the pollen grain germinates; adapted to catch and trap pollen

Stolon: a long branch that is unable to support its own weight and consequently bends down to the ground

Striate: parallel longitudinal lines or ridges (Western Australian Herbarium, 1998)

Styles: the sterile portion of the carpel between the ovary and the stigma, which may be elongated or feathery, especially in wind-pollinated species, so that the stigma is presented in an effective place for pollination

Tepal: an individual perianth part in flowers that have no distinct calyx and corolla, as occurs in most monocotyledons

Terete: smooth, cylindrical, and tapering (like a grass stem)

Terminal: at the apex or distal end (Western Australian Herbarium, 1998)

Trimerous: describing flowers in which the parts of each whorl are inserted in threes, or multiples of threes

Whorl: arrangement of sepals, petals, leaves, stipules, or branches that radiate from a single point and surround or wrap around the stem

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9. APPENDIX

Figure 51. *Juncus arcticus* var. *balticus*, collected on Bull of Woods Trail by C.F. Keller

Figure 52. *Juncus drummondii*, collected along stream at Fort Burgwin by Madeline L. Payne

Figure 53. *Juncus filiformis*, collected at Fort Burgwin by Meredith Bertram

Figure 54. *Juncus hallii*, collected on Williams Lake Trail by C.F. Keller

Figure 55. *Juncus longistylus*, collected at Questa by Ken E. Rogers

Figure 56. *Juncus marginatus*, collected on Bull of Woods Trail by C.F Keller

Figure 59. *Luzula parviflora*, collected on Bull of Woods Trail by C.F. Keller

Figure 57. *Juncus tenuis*, collected on Brazelton Rd., Taos County by K.R. Epperson

Figure 60. *Luzula spicata*, collected near Williams Lake by C.F. Keller

Figure 58. *Luzula comosa*, collected along Fort Burgwin nature trail by Madeline L. Payne