New Zealand Rushes: field identification guide.
2nd edition

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Introduction

Rushes (family Juncaceae) are a common component of New Zealand wetland vegetation and species within this family appear very similar. With over 50 species, *Juncus* are the largest component of the New Zealand rushes and are notoriously difficult for amateurs and professionals alike to identify to species level.

This field identification guide and accompanying factsheets have been developed to enable users with a diverse range of botanical expertise to identify *Juncus* to species level. The best time for collection, survey or identification is usually from December to April as mature fruiting material is required to distinguish between species. Factsheets (hyperlinked and available on the NIWA website) developed for each species provide more detailed information on descriptions for both native and exotic species, distribution within New Zealand, habitat, similar species and photographs of key features.

We hope you find the key and factsheets useful and would welcome any feedback via the NIWA website, or to us directly, kerry.bodmin@niwa.co.nz or paul.champion@niwa.co.nz.
Using the field identification guide

In preparing this field identification guide and factsheets we have used everyday language and have kept botanical terms to a minimum. Any technical terms have an alternative, plain English wording and are identified on accompanying photographs or images. Each step of this key involves two choices, each described and illustrated with image(s) of the characteristic in question. It is therefore important to have mature, fruiting material to use this key.

With your specimen in hand, the first part of this key determines if your specimen is indeed a *Juncus* or one of the other three genera in the Juncaceae family present in New Zealand. The second part of the key breaks the genus *Juncus* down into five sections. The third and final part of the key determines species identification and provides a hyperlink to the species factsheet.

Taxonomic treatment of *Juncus* in this key generally follows the family monograph by Kirschner (2002). Species features and descriptions were taken from Kirschner (2002), as well as the New Zealand Flora volume III (Healy & Edgar, 1972).


Key to the genera of Juncaceae

Flowers solitary (one per flowering stem), usually > 5 mm long (pg 6)

Flowers several to many per flowering stem, usually < 5 mm long (pg 7)
**Marsippospermum gracile**
1-3 leaves per shoot, floral bracts < tepals, seed tailed, SI in moist alpine herbfield, also on Auckland and Campbell Islands.

**Rostkovia magellanica**
Many leaves per shoot, floral bracts > tepals, seeds not tailed. SI local in mountainous areas of Fiordland and Otago, also on Stewart, Auckland and Campbell Islands.
Flowers several to many per flowering stem, usually < 5 mm long

Leaves have no hairs (glabrous), seeds many per capsule (pg 8)

*Juncus* (continue using key below)

Leaves with scattered white hairs, seeds 3 per capsule

*Luzula* species (no key to species provided)
Key to sections of *Juncus*

Leaves different from flowering stem (pg 9)

- Leaves with cross walls
- Flower stems round

Flowering stem and leaves both tall and cylindrical, or leaves reduced to a basal sheath (pg 11)

- Flowering stems green
- Stem and leaf tall and cylindrical
- Leaves reduced to brown sheaths at base of flowering stem
Leaves different from flowering stem

Leaves without cross walls (septae) (pg 10)

Leaves with cross walls (septae), hard to see in some species (pg 12)

*Ozophyllum* and *Iridifolii* (Septati)
Leaves without cross walls (septae)

Leaves originate at the base (basal), often broad, grass-like appearance (pg 31)

Graminifolii and Caespitosi

Leaves originate at the base and up the stem, usually narrow, often wiry (pg 63)

Steirochloa and Tenageia (Poiophylli)
Flowering stem and leaves both tall and cylindrical, or leaves reduced to a basal sheath

Leaves tall and round, like flowering stems (pg 37)

*Juncus (Thalassii)*

Leaves reduced to basal sheaths, only flowering stems tall (pg 38)

*Juncotypus (Genuini)*
Key to *Juncus* section *Ozophyllum* and *Iridifolii* *(Septati)*

Capsule > tepals, sometimes capsule = tepals
(pg 13)

Capsule ≤ tepals
(pg 22)
Capsule > tepals, sometimes capsule = tepals

Leaves flat, sword shaped (like an iris) (pg 14)

Leaves round and hollow or bristle-like (pg 15)
Leaves flat, sword shaped (like an iris)

Leaves blue green, capsules in large black globose heads

Leaves not blue-green, flower clusters reddish-green

*Juncus ensifolius*  
*Juncus prismatocarpus*
Leaves round and hollow, or bristle-like

Leaves hollow, cross walls (septae) often obvious externally (pg 16)  
Leaves bristle-like, cross walls only visible internally externally (pg 21)
Leaves hollow, septae often obvious externally

One flower head, flowers 3 – 5 (sometimes 8). Subantarctic Islands only

*Juncus scheuchzerioides*
(note 1 flower head, multiple flowers, 5 flowers here)

Flower heads (clusters) many (>5)
(pg 17)

This plant has 8 flower heads, 3 are circled. Each flower head has multiple flowers, indicated by arrows.
Flower heads (clusters) many (>5)

Capsule tapers to tip (pg 18)

Capsules have a sharp tip (mucronate) (pg 19)
Capsule tapers to tip

*Juncus fockei*

Flower heads 5–20, sparingly branched, capsule >> tepals, capsule golden brown

*Juncus acutiflorus*

Flower heads 30 – 80, much branched, capsule > tepals, capsule red-brown
Capsules have a sharp tip (mucronate)

Capsule flat at top with sharp tip, plant very upright

Capsule sloping to top with sharp tip, plant varies from lax to upright (pg 20)

Juncus microcephalus
Capsule sloping to top with sharp tip, plant varies from lax to upright

Flower heads on wide branching stems to 90° or bending down, tepals blunt hooded, capsule brown

Flower heads on branching stems < 90°, tepals acute without hood, capsule brown to black

*Juncus subnodosus*

*Juncus articulatus*
Leaves bristle-like, cross walls only visible internally

Capsule black, cluster of 3-5 flowers, occasionally 2-3 branched

Capsule yellow-brown, often many branched

*Juncus novae-zelandiae*  
*Juncus bulbosus*
Capsule ≤ tepals

Leaves bristle-like or thread-like (filiform) (pg 23)

Leaves hollow (pg 25)
Leaves bristle-like or thread-like

More than one flower head, rarely one flower head with several flowers 3 – 8, plants usually > 2 cm tall

Flower heads solitary, often single flowered sometimes with 2-3 flowers, plants ≤ 2 cm tall

*Juncus pusillus*
Leaves bristle-like, plants usually >2 cm tall

Many flower heads with 2 - 6 flowers, plants 5 – 15 cm tall

One flower head with 3 – 5 (sometimes 8) flowers, plants 2 - 30 cm tall. Subantarctic Islands only

*Juncus bulbosus*

*Juncus scheuchzerioides*
Leaves hollow

Stem has cross walls below inflorescence (pg 26)

Stem has no cross walls below inflorescence (pg 28)
Stem has cross walls below inflorescence

Flower heads globe shaped with > 30 flowers, leaves bristly

Flower heads with <30 flowers, leaves not bristly (pg 27)

*Juncus brachycarpus*
(Photograph courtesy of Larry Allain, USGS, Wetland & Aquatic Research Center)
Flower heads with <30 flowers, leaves not bristly

Plant green, stiffly erect dense clumps, base of leaf swollen, capsules and tepals 3.5 mm – 4.5 mm long

Plant often reddish, with erect open clumps, capsules and tepals 2.5 mm – 3.5 mm long

*Juncus canadensis*  
*Juncus acuminatus*
Stem has no cross walls below flower head (inflorescence)

Flower heads 1 – 3

*Juncus scheuchzerioides*
(note 1 flower head with five flowers)

Flower heads > 5
(pg 29)

This plant has 8 flower heads, 3 are circled. Each flower head has multiple flowers, indicated by arrows.
Flower heads > 5

Capsule depressed at top with a sharp tip (mucronate)

Capsule tapered to tip (pg 30)

*Juncus microcephalus*
Capsule tapered to tip

Capsule 3.5 mm – 4.5 mm long

*Juncus holoschoenus*

Capsule < 3.5 mm long

*Juncus acutiflorus*
Key to *Juncus* section *Graminifolii* and *Caespitosi*

Leaves flat towards tip, flower head a cluster with each flower stalk originating from a central point (pg 32)

Leaves not flat, usually a single flower head, flower stalks rarely originate from a central point (pg 34)
Leaves flat towards tip, flower head a cluster with each flower stalk originating from a central point

Capsule ~2 mm long

capsule 2.5 mm - 3 mm long (pg 33)

Juncus planifolius
Capsule  2.5 mm - 3mm long

Leaves > 5 mm wide, modified leaf (bract) < flower head

*Juncus lomatophyllus*

Leaves < 5 mm wide, modified leaf (bract) > flower head

*Juncus sonderianus*
Leaves not flat, usually a single flower head, flower stalks rarely originate from a central point

**Tepals ≤ 3 mm**  
(pg 35)

Tepals 3 mm

**Tepals > 3 mm**  
(pg 36)

Tepals 4 mm
Tepals ≤ 3 mm

Plant usually > 10 cm tall, channelled leaves, modified leaf (bract) longer than flower head

**Juncus caespiticius**

Plant usually < 10 cm tall, modified leaf (bract) not conspicuous

**Juncus antarcticus**

(photograph courtesy of R Cole, Department Of Conservation)
Tepals > 3 mm

Plant usually > 10 cm tall, channelled leaves, flower head often more than one cluster, tepals longer than capsule

*Juncus sonderianus*

Plant usually < 10 cm tall, leaves bristle like, flower head usually a single cluster, tepals much longer than capsule

*Juncus capitatus*
Key to *Juncus* section *Juncus* (*Thalassii*)

Flower head one dense cluster, capsules red-brown > 4mm long

*Juncus acutus*

Flower head many clusters, capsules dark brown < 3.5 mm long

*Juncus kraussii*
Key to *Juncus* section *Juncotypus* (Genuini)

all species found in damp pasture or swamp margins

Pith in stem continuous
(pg 39)

Pith in stem interrupted or lacking
(pg 49)
Pith continuous

Flower head a single dense cluster, rarely two clusters (pg 40)

Flower head open, with more than one cluster (pg 41)
Flower head a single dense cluster, rarely two clusters

Stem shiny, modified leaf behind flower head not expanded

**Juncus effusus**

Stem dull, ridged, modified leaf (bract) expanded behind flower head

**Juncus conglomeratus**

Modified leaf (bract) not expanded

Expanded modified leaf (bract)
Flower head open, with more than one cluster

Stems clearly ridged (pg 42)

Stems smooth to touch or ridges >30 (pg 45)
Stems clearly ridged

**Juncus sarophorus**

Stem hard, grey-green to blue-green, ≥ 2 mm diameter

Stem ≤ 2 mm, soft, green to yellow-green (pg 43)
Stem <5 mm, soft, green to yellow-green

Flowers densely clustered at branch tips

Flowers loosely clustered or solitary (pg 44)

*Juncus vaginatus*
(Image courtesy of Tasmanian Herbarium, Threatened Species Section, Department of Primary Industries, Parks, Water and Environment, Tasmania)
Flowers loosely clustered or solitary

Flowers solitary in rows along slender branches, stems ≤ 2 mm wide

*Juncus usitatus*

Flowers loosely clustered, occasionally solitary, stems ≥ 2 mm wide

*Juncus continuus*

(Both images Allan Herbarium, CHR copyright, Landcare Research)
Stems smooth to touch or ridges >30

Pith cobwebby (pg 46)

Pith not cobwebby, stems wiry (pg 48)

Left image: Allan Herbarium, CHR copyright, Landcare Research
Pith cobwebby

Lower flower branches downward pointing

Lower branches point downward

*Juncus effusus*

Lower flower branches upward pointing (pg 47)
Lower flower branches upward pointing

Stem < 4 mm wide and bright green, no sharp tip on modified leaf

\[\text{Image of Juncus continuus}\]

Rounded tip on modified leaf

Stem > 4 mm wide and pale green, long thin point on modified leaf

\[\text{Image of Juncus pallidus}\]

6 mm diameter

Long point on basal modified leaf

\textit{Juncus continuus}
(Allan Herbarium, CHR copyright, Landcare Research)

\textit{Juncus pallidus}
Pith not cobwebby, stems wiry

Flowers clustered at branch tips

**Juncus edgariae**

Flowers evenly distributed on branches

**Juncus pauciflorus**

Image left: Allan Herbarium, CHR copyright, Landcare Research;
Image right: Auckland Museum Herbarium
Pith in stem interrupted or lacking

Pith interrupted
(pg 50)

Pith lacking

*Juncus australis*
Pith interrupted

Flowers grouped at branch ends (pg 51)

Flowers evenly distributed along branches (pg 58)
Flowers grouped at branch ends

Flower head open or a cluster ≥ 10 mm across (pg 52)

Flower head a cluster ≤ 10 mm across, often with smaller clusters above (pg 56)
Flower head open or a cluster ≥ 10 mm across

Stems bright green, capsules ≤ 2 mm long

*Juncus edgariae*

1.5 mm capsule

Stems not bright green, capsules 2-3.5 mm long (pg 53)

3 mm capsule
Stems not bright green, capsules 2-3.5 mm long

Basal sheaths shining red or chestnut brown at base (pg 54)

Basal sheaths very dark red-purple to black or dull brown at base (pg 55)
Basal sheaths shining red or chestnut brown at base

Flower head one or more clusters

**Juncus australis**

Flower head fan-like

**Juncus flavidus**
Basal sheaths very dark red-purple to black or dull brown at base

Stem > 3.5 mm across

Juncus procerus

Stem < 3.5 mm across

Juncus amabilis
Flower head a cluster ≤ 10 mm across, often with smaller clusters above

**Stems > 1.5 mm**

**Stems < 1.5 mm**

*(pg 57)*

*Juncus edgariae*
Stems < 1.5mm

Flowers in 2 or more clusters, capsule ≥ tepals

Flowers in one cluster, capsule slightly < tepals

*Juncus distegus*

*Juncus filicaulis*
Flowers evenly distributed on branches

Basal sheaths dark purple or red-purple to black (pg 59)

Basal sheaths pale to dark brown, or pinkish to red-brown (pg 60)
Basal sheaths dark purple or red-purple to black

Plant < 1 m tall, stem soft, capsule ≥ 2.5 mm

Plant 1 - 2 m tall, stem hard, capsule ≤ 2.5 mm

Juncus inflexus

Juncus sarophorus
Basal sheaths pale to dark brown, or pinkish to red-brown

Stem ridges distinct, base sheaths pink or red-brown (pg 61)

Stem ridges not distinct, base sheaths golden to dark straw brown (pg 62)

Right image: Allan Herbarium, CHR copyright, Landcare Research

Both images: Forest and Kim Starr
Stem ridges distinct, base sheaths pink or red-brown

Stem hard, flowers clustered to solitary, capsule > 2 mm

Stem soft, flowers solitary and evenly spaced, capsule < 2 mm

*Juncus subsecundus*
Both images: Auckland Museum Herbarium

*Juncus usitatus*
Stem ridges not distinct, base sheaths golden to dark straw brown

Stem yellow-green, flowers solitary

Stem grey-green, flowers clustered to solitary

*Juncus ochrocoleus*  
*Juncus polyanthemus*  
(Left image courtesy of Bush Heritage Australia)
Key to *Juncus* sections *Steirochloa* and *Tenageia* (*Poiophylli*) also *Ozophyllum* with indistinct septae

Flowers evenly distributed on branch / branchlets (pg 64)

Flowers clustered into one or more heads (pg 69)
Flowers evenly distributed on branch / branchlets

Flower head 2/3 length of entire plant

Flower heads < ½ length of entire plant (pg 65)

*Juncus bufonius*
Flower head < $\frac{1}{2}$ length of entire plant

- Leaves tough, wiry, reflexed above sheath
- Leaves not reflexed above sheath (pg 66)

*Juncus squarrosus*
Leaves not reflexed above sheath

Leaves with prominent ear-like membranes (pg 67)

Leaves lacking prominent tongue-like auricles (pg 68)
Leaves with prominent ear-like membranes (auricles)

Capsules < tepals

Juncus anthelatus
© Arthur Haines, New England Wild Flower Society

Capsules ≥ tepals

Juncus imbricatus
Leaves lacking prominent tongue-like auricles

Capsules black, tepals clasps the capsule

*Tepals and capsules light brown, tepals arch away from capsule*

*Juncus gerardii*

*Juncus dichotomus*
Flowers clustered into one or more heads

Leaves with prominent ear-like membrane

Leaves without prominent ear-like membrane (pg 70)

*Juncus tenuis*
Leaves without prominent ear-like membrane

Capsules black and shiny

*Juncus novae-zelandiae*

Capsule brown (pg 71)
Capsule brown

Leaves thread-like, plants ≤ 2 cm tall

Leaves bristle-like or narrow, plants > 2 cm tall (pg 72)

*Juncus pusillus*
Leaves bristle-like or narrow, plants > 2 cm tall

Capsule ≥4.5 mm long, capsule < tepals

Capsule 2 – 3 mm long, capsule ≥ tepals

*Juncus homalocaulis*

*Juncus bulbosus*
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