SPECIES PLANTARUM

FLORA OF THE WORLD

Part 7. JUNCACEAE 2: Juncus subg. Juncus

compiled by Jan Kirschner
CONTENTS

Contributors iv
Species Plantarum Committee vi
Introduction vii
Preface viii

Juncus 1

subg. Juncus 5
  sect. Juncus 5
  sect. Graminifolii 27
  sect. Caespitosi 57
  sect. Stygiopsis 74
  sect. Iridifolii 135
  sect. Ozophyllum 151

Appendix 271
Maps 273
Index 326
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vi
INTRODUCTION

*Species Plantarum* aims to provide in concise format, and with standardised data fields, basic taxonomic information on the vascular plants of the world, including accepted names and synonyms with bibliographic data, types of names, keys and descriptions from family to varietal levels, geographical distributions, ecological information and other related matters, and to publish it in both hard copy and electronic form.

The format of the *Species Plantarum* is based on that of *Flora of Australia*, with some departures made necessary by the different scale of the project. Initially at least, the series is being edited and published for the Species Plantarum Project and IOPI by the Australian Biological Resources Study (ABRS), producers of *Flora of Australia*.

Treatments are contributed on a voluntary basis. Each part of *Species Plantarum* is intended to provide a complete account of a family, subfamily, large genus or other related taxonomic group. While treatments of small families may be shorter, it is intended that contributions will, in general, cover at least 50 to 100 species. The taxonomy adopted is that of the author, although the family delimitations recommended are initially those of R.K. Brummitt, *Vascular Plant Families and Genera* (1992). The order of taxa within families, genera and species in the *Species Plantarum* is intended to reflect natural relationships, so far as this is possible in a linear sequence.

Maps are provided for each species, or in those cases where infraspecific taxa are recognised, for each of the terminal taxa. Distribution maps are based on those in R.K. Brummitt, *World Geographical Scheme for Recording Plant Distributions* ed. 2 (2001), and the 'countries' adopted are those of Level 3 and 4 of that work. Description of distribution follows the same work, with a two-digit code for regions and a three-letter code for the 'country'. Upper case letters for the 'country' indicate native distribution; lower case letters indicate that the taxon is only present in that 'country' as an introduced and naturalised plant. If a taxon is extinct in a 'country', this is indicated by a dagger. Distribution of species as cultivated plants is not included.


A separate part, *Introduction to the Series*, provides a history of the project, a glossary, guide for contributors and key to the conventions used in describing distribution. These resources will also be available on the World Wide Web, initially through the ABRS site (currently http://www.anbg.gov.au/abrs/flora/sppplant/sppplant.htm) with links from the IOPI site (currently http://life.csu.edu.au/iopi/iopihome) and others.

A.E. Orchard
Canberra
July 2002
This volume is the second of a three-part treatment of the Juncaceae.

The co-operative monographic study was completed in the period 1997 to 2000, under grant no. 206/97/0936 of the Czech National Grant Agency. Almost all the current experts in the taxonomy of the family kindly participated in the project, and their expertise covered both the centres of taxonomic diversity and the most intricate groups in the family. The monograph thus presents the cumulative knowledge of the Juncaceae at this time. Some groups received special attention and their accounts represent new revisions (e.g., *Luzula* sect. *Atlantercae*, sect. *Alpinae*, subg. *Pterodes*) or recent revisions were incorporated (e.g., *Juncus* sect. *Caespitosi*, in part, and *Juncus* sect. *Juncus*). The project benefited from an important coincidence: the Juncaceae have been included in recent volumes of important regional or continental floras, either published in 1999 or 2000, or prepared for publication; the authors of several regional accounts participated in our project (including those from *Flora of North America*, *Flora of China*, *Flora of Australia* and *Flora Neotropica*). Despite this, some groups or sections still require a thorough revision in future, and a number of questions remain unanswered, particularly in *Luzula* sect. *Luzula* in China and Japan, *Juncus* sect. *Stygiopsis* and *Juncus* sect. *Juncotypus*.

While the text represents the combined work of many authors, the final version was prepared by JK, and he accepts responsibility for any errors or missing data.

In addition to the authors and advisers, many other botanists participated in solving numerous problems with old literature, nomenclatural problems and geographical distribution. I would like to express my thanks for their generous help. Invaluable technical assistance was provided by Ms Věra Matějovičová. Dr R.K. Brummitt of Kew, the Secretary of the *Flora of the World* project, showed unfailing interest, and without his support the present volumes would never have come into being.

Jan Kirschner
Pruhonice
July 2002
7. JUNCUS

Juncus L., Sp. Pl. 1: 325 (1753)

Cephaloxys Desv., J. Bot. (Desvaux) 1: 321 (1809), nom. illeg.  
Juncus repens Michx.  
Tristemon Raf., Fl. Tellur. 4: 32 (1838), nom. illeg.  
T: not designated.  

Perennial or rarely annual herbs, caespitose to rhizomatous, seldom mat-forming, totally glabrous, smooth or papillose. Stem erect, procumbent or ascending, terete to compressed. The most basal leaves usually lacking blade or blade much reduced (cataphylls); fully developed leaves alternate, basal and/or cauline, flat (flat side facing stem), not septate, or flat with raised margins and enlarged cells on adaxial surface, or terete either solid or hollow and with or without septa, or laterally flattened (arranged perpendicular to stem) and imperfectly septate; sheaths open, rarely closed and later split, often with distinct auricles at the junction to blade. Bracts leaf-like or reduced. Inflorescence compound, often decompound, cymose or racemose, often anthelate, sometimes congested, or flowers borne singly in drepania with or without a pair of bracteoles below each flower. Flowers bisexual, rarely unisexual; usually trimerous, rarely dimerous. Tepals usually 6, entire, equal or unequal, persistent, green, stramineous, castaneous to blackish, smooth or scabrid, narrowly ovoid to linear lanceolate. Stamens (2–) 3–6, exserted or not so; filaments filiform or flattened; anthers linear to oblong; connective indistinct or slightly apiculate. Ovary sessile; style almost absent to very long; stigmas (2–) 3, filiform, twining, papillose, of variable length and colour. Capsule unilocular, trisepitate or perfectly trilocular; seeds many, usually ellipsoid to ovoid; outer seed-coat tight and hyaline to loose, scarious, smooth to reticulate, forming one apical and one basal whitish appendages or not so; inner seed-coat brown, castaneous or yellowish, ±smooth to reticulate. x = 10 (many additional secondary basic numbers exist, ranging from x = 9 to x = 25 at least, the role of agmatoploidy being unknown).

A genus of c. 315 species, almost cosmopolitan, much rarer in the tropics, with major centres of diversity in W North America, the Mediterranean, the Sino-Himalayan region, the Far East, South Africa and Australasia. Of rather marginal economic importance.

KEY TO SUBGENERA AND SECTIONS

1 Inflorescence racemose, with the pair of floral bracteoles absent; flowers usually in heads or clusters, rarely borne singly (subg. Juncus) sect. 1. Juncus (p. 5)

2 Leaves terete, stem-like, pungent, basal, not septate; vascular bundles scattered over most of T.S.; lower bract apparently forming a prolongation of stem

2: Leaves flat, compressed, canaliculate or if terete then usually septate, not stem-like, basal or cauline; vascular bundles usually in subepidermal position; lower bract usually not appearing as a stem prolongation

3 Leaves unitubulose or pluritubulose, perfectly septate; if pluritubulose (not bitubulose) and imperfectly septate, then terete, or flattened but then not arranged perpendicular to stem sect. 6. Ozophyllum (p. 151)

3: Leaves flat or with raised margins, not septate, or bitubulose and septate, or laterally compressed and pluritubulose and imperfectly septate (then arranged perpendicular to stem), if unitubulose and perfectly septate then with anthers distinctly exserted

4 Annuals sect. 3. Caespitosi (p. 57)

4: Perennials

5 Anthers distinctly to at least partly exserted from perianth in later stages of flowering sect. 4. Stygiopsis (p. 74)

5: Anthers not exserted

6 Most of inflorescence not fertile, of golden-coloured feather-like branchlets sect. 4. Stygiopsis (J. ochraceus) (p. 74)

6: Inflorescence usually fully fertile, not of the above appearance

7 Leaves laterally compressed, pluritubulose, imperfectly septate, arranged perpendicular to stem sect. 5. Iridifolii (p. 135)

7: Leaves dorsiventrally compressed or ±canaliculate, not septate, arranged with adaxial flat side facing the stem

8 Seeds with two distinct appendages [Sino-Himalayan region] sect. 4. Stygiopsis (p. 74)

8: Seeds without appendages, or if appendages present then W North America

1: Inflorescence cymose, with a pair of floral bracteoles present below each flower; flowers usually borne singly or in loose groups (subg. Agathryon [subg. Poiophylli]) sect. 7. Tenageia*

9 Annuals sect. 7. Tenageia*

9: Perennials

10 Inflorescence seemingly lateral (pseudolateral); lower inflorescence bract terete, erect, seeming to be a continuation of stem; basal leaves bladeless; cauline leaves ±absent; sterile shoots terete, stem-like sect. 9. Juncotypus*

10: Inflorescence obviously terminal; lower bract flat, canaliculate or terete, not appearing as a continuation of stem; at least some basal or sub-basal leaves with a well developed blade; sterile shoots not stem-like

11 Cauline leaves terete; leaf epidermal cells of the same size; pith of astericiform cells sect. 10. Forskalina*

11: Cauline and/or basal leaves flat to canaliculate; leaf blade with at least some cells of adaxial epidermis enlarged, and margins with thin sclerenchymatous strands); inner part of leaves of chlorenchyma, rarely with air channels, not of astericiform cells sect. 8. Steirochloa*

* Sections included in Part II of the Juncus treatment.
JUNCACEAE (*Juncus*)

**Subg. 1. JUNCUS**

**Sect. 1. JUNCUS**

*Juncus* L. sect. *Juncus*


Perennials, tall, rigid. Leaves basal, terete, non-septate, pungent; leaf tip sclerenchymatous, sharp-pointed; medulla of rounded cells; vascular bundles scattered over most of T.S.; auricles absent. Stomata in longitudinal furrows. Lower bract apparently forming a prolongation of stem. Inflorescence terminal. Flowers in heads; floral bracteoles absent; peduncles ± incrassated. Stamens 6, rarely 3. Seeds with distinct outer seed-coat forming two appendages or rarely appendages inconspicuous.

1 Rhizome short; plants densely caespitose; shoots intravaginal

2 Inner tepals with a wide scarious apical part but not notched

3 Capsule 4–6 mm, with 80–120 seeds; apex conical to obtuse

4 Capsule dark brown; apex pyramidal

5 Capsule pale (rarely dark) brown; apex conical to obtuse

6 Capsule trigono-ovoid or narrowly so, pale brown; apex usually attenuate or pyramidal

7 Capsule not or slightly exceeding tepals; apex obtuse or abruptly attenuate; anthers up to 2.5 times as long as filaments

8 Seed-coat forming two small but conspicuous appendages; capsule substantially longer than wide, trigono-ellipsoidal to obovoid

9 Seed-coat tight; appendages inconspicuous; capsule broadly trigono-ellipsoidal to almost globular

1 Rhizome short; plants densely caespitose; shoots intravaginal

2 Inner tepals with a wide scarious apical part but not notched

3 Capsule 2.5–4 mm, with 25–75 seeds; apex conical to pyramidal; if capsule obtuse, inflorescence of several separate dense groups of heads

4 Capsule pale (rarely dark) brown; apex conical to obtuse

5 Capsule dark brown; apex pyramidal

6 Capsule trigono-ellipsoidal to obovoid, dark brown to castaneous brown; apex usually obtuse

7 Seed-coat forming two small but conspicuous appendages; capsule substantially longer than wide, trigono-ellipsoidal to obovoid

8 Seed-coat tight; appendages inconspicuous; capsule broadly trigono-ellipsoidal to almost globular

1 Rhizome short; plants densely caespitose; shoots intravaginal

2 Inner tepals with a wide scarious apical part but not notched

3 Capsule 4–6 mm, with 80–120 seeds; apex conical to obtuse

4 Capsule dark brown; apex pyramidal

5 Capsule pale (rarely dark) brown; apex conical to obtuse

6 Capsule trigono-ovoid or narrowly so, pale brown; apex usually attenuate or pyramidal

7 Capsule not or slightly exceeding tepals; apex obtuse or abruptly attenuate; anthers up to 2.5 times as long as filaments

8 Seed-coat forming two small but conspicuous appendages; capsule substantially longer than wide, trigono-ellipsoidal to obovoid

9 Seed-coat tight; appendages inconspicuous; capsule broadly trigono-ellipsoidal to almost globular
1. Juncus acutus L., Sp. Pl. 325 (1753)


Map: S.Snogerup, Willdenowia 23: 36, fig. 3 (1993).

Perennials, densely caespitose; shoots intravaginal; rhizome abbreviated. Young plants often with some vegetative shoots. Inflorescence of various forms, composed of many (1–) 2–4-flowered often confluent heads. Lower two bracts leaf-like, 3–25 (–40) cm long, including the (2–) 3–6 (–10) cm long sheath; middle bracts with broad amplexicaul base; upper bracts shorter that perianth, ovate, usually brownish-membranous. Tepals ±equal; inner tepals with prominent, scarious apical auricles, notched. Stamens 6, slightly shorter than or equalling tepals. Capsule (3–) 4–6 mm long, with 80–120 seeds; apex subconical to obtuse. Seeds ellipsoidal to narrowly ovoid, c. 20–25-striate, light brown with darker tips; outer seed-coat distinct; appendages distinct, ±equal.

The large, mostly coastal, very disjunct distribution includes the Mediterranean and the Near East, South Africa, Atlantic Islands and NW Africa, Pacific coast of N America from Mexico to Nevada, and temperate South America. Introduced to Australasia. Two subspecies are recognized.

Capsule with conical apex, light to dark brown; inflorescence usually condensed 1a. subsp. acutus

Capsule with obtuse to subconical apex, usually dark brown; inflorescence usually lax 1b. subsp. leopoldii

1a. Juncus acutus L. subsp. acutus


Juncus acutus var. decompositus Guss., Enum. Pl. Inarim. 345 (1854); Juncus acutus subsp. decompositus (Guss.) Arcang., Comp. Fl. Ital. 715 (1882). T: [Italy] Inarime Is [Ischia], 1812, Thomas; syn: FI, n.v.


Stem 50–150 cm tall, rigid, 2–4 (–6) mm in diam.; leaves (10–) 30–80 (–120) cm long, 1.5–4 mm in diam. Inflorescence 5–15 × 3–7 cm, usually dense, almost sphaerical, rarely lax, elongated or wide, with (10–) 50–100 (–200) heads. Tepals (2.8–) 3.5–4 (–4.5) mm long, usually equal, oblong, with broad hyaline margins; outer tepals slightly cymbiform, basally ±keeled, obtuse, with a mucro up to 0.3 mm long. Anthers 1.5–1.8 (–2.0) mm, 2.5–4 times as long as filaments; style 0.5–0.8 mm long; stigmas 1.5–2 mm long. Capsule 4–6 mm long, spheroidal to ovoid, conical above, glossy, stramineous to dark brown, trisepate; mucro very short. Seeds 0.8–1.1 mm long, or 1.8–2.5 mm long including appendages. 2n = 48, fide Snogerup, Willdenowia 23: 37 (1993). Figs 37, 38.


Stem (50–) 80–150 (–200) cm tall, usually 1.5–2.5 (–6) mm in diam.; leaves 40–100 cm long, 1.5–3 mm in diam.; sheaths wide, up to 25 cm long. Inflorescence 5–30 (–40) × 2.5–6 (–8) cm, lax or rarely congested, with (10–) 35–100 (–250) heads; heads often densely aggregated into large groups. Tepals 2.2–3.7 mm long; outer tepals inserted slightly below the inner, oblong with broad hyaline margins; inner tepals cymbiform with small distal auricles; mucro up to ±large groups. Anthers 1.4–1.8 mm long, (2–) 2.5–4 times as long as filaments. Style 0.6–1.3 mm long; stigmas 1.5–2.5 mm long. Capsule (3–) 3.5–5 mm long, obovoid, usually castaneous to dark or rarely light brown, basally lighter, trilocular or when ripe triseptate; apex usually obtuse; mucro 0.2–0.6 mm. Seeds 0.7–0.8 (–0.9) mm long, or 1.1–1.4 mm long including appendages. 2n = 48, fide S.Snogerup, Wildenowia 23: 39 (1993). Fig. 38.

Large disjunct distribution range: Atlantic Islands, NW African Coast and Iberian Peninsula, South Africa, temperate South America, W coast of Mexico, California and Nevada, Bermuda. 12: POR, SPA. 20: EGY, LBY, MOR. 21: CNY, CVI, MDR. 27: CPP, LES, NAM, NAT, OFS. 28: ASC. 76: ARI, CAL, NEV. 79: MXN. 81: BER. 84: BZS. 85: AGE, AGS, AGW, CLN, CLS, JNF, URU. Coastal sandy habitats, salt marshes and inland saline or marshy habitats, from sea level to 1400 m (in South Africa). Map 175 [the map includes intermediates between the subspecies in the Azores and Iberian Peninsula].


Rare intermediates between the subspecies are known from SW Europe, Libya and Egypt, and Azores [e.g., Egypt, Ain Murun, Ascherson S13 (CAI, G, K, M, W, WU)]. Occurrence in NW Africa, Spain and Portugal may be a result of a relatively recent introduction.


JUNCACEAE (Juncus)


Map: S.Snogerup, Willdenowia 23: 43, fig. 6 (1993).

Perennials, 50–100 cm tall, densely caespitose; shoots intravaginal; rhizome short. Stem rigid, usually 2–4 mm in diam. Basal leaves 2–6, 25–100 cm long, 1.5–3.0 mm in diam. Lower two bracts leaf-like, pungent, 4–15 (–20) cm long, including 2–4 (–7) cm long sheath, shorter than inflorescence; middle bracts without blades, base broad, amplexicaul; bracts subtending heads shorter than flowers. Inflorescence 5–20 (–40) × 2–7 cm, lax to ±dense, of 10–50–200 usually 2–3-flowered heads. Flowers hermaphrodite. Tepals 2.5–3.0 mm long, shorter than inflorescence; middle bracts ±without blades, base broad, amplexicaul; bracts below heads non-herbaceous, amplexicaul, ovate, light brown, pointed. Inflorescence lax, of various forms, with 8–200 heads, with usually even upper bracts possessing small laminas. Flowers light brown. Tepals equal or subequal, oblong with broad hyaline margins; outer tepals with small distal scarious wings; inner tepals with broad hyaline margins; outer tepals with small distal scarious wings; inner tepals with...
Figure 39. *Juncus littoralis*. A, base of culm and inflorescence; B–D, inflorescences; E, two-flowered head; F, flower; G, tepals with stamens; H, flower with ripe fruit; I, capsule; J, seeds. (A. Naftolsky13455, HUJ, LD; B–D, H, K, L, S.Snogerup, cult. nos. 1727, 1697, 1702, LD; E–G, S.Snogerup s.n., 24 May 1957, LD). Scale bars: A–C = 10 cm; D = 1 cm; E, H = 3 mm; F, G, J = 1 mm; I = 2 mm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 41, fig. 5 (1993).
Figure 40. *Juncus heldreichianus* subsp. *heldreichianus*. A, stem with depauperate inflorescence from young tussock; B, C, I, inflorescences; D, flower head; E, tepals with stamens; F, flower with ripe fruit; G, capsule; H, seeds. (A, S.Snogerup, cult. no. 2637, LD; B, G, S.Snogerup, cult. no. 1784, LD; C, E, I, H.Runemark & S.Snogerup 6566, LD; D, S.Snogerup & Bothmer 31749, LD; F, H, H.Runemark & Bentzer 29945, LD). Scale bars: A–C = 10 cm; D, F = 5 mm; E, G = 2 mm; H = 1 mm; I = 1 cm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 45, fig. 7 (1993).
prominent scarious distal auricles, notched; tepals and bracts usually brown to reddish brown, punctulate-striulate. Stamens 6, \(\frac{3}{4}–\frac{4}{5}\) as long as tepals. Capsule 2.8–4 (–4.5) mm long, ovoid to spheroidal, light to dark brown; apex conical to obtuse; seeds 40–75. Seeds obliquely ovoid, c. 20–25-striate; seed-coat distinct.

From Greece, Aegean area and Turkey to N Iran, Caucasus and Turkmenistan. Two subspecies are known.

Capsule usually with conical apex; inflorescence elongated, usually of numerous small heads

3a. subsp. heldreichianus


Stem 40–100 (–150) cm tall, rather rigid but usually compressed and ±arcuate, usually 1.5–2.5 mm in diam.; leaves (10–) 40–100 (–150) cm long, 1.5–3 mm in diam. Inflorescence 10–40 × 3–5 cm, lax, elongated, with (10–) 40–100 (–200) heads; heads sometimes in several clusters. Lower bract 6–40 cm long, including a sheath (2–) 4–6 (–10) cm long, usually shorter than inflorescence; second lowest bract 3–7 cm long, including sheath (1–) 2–3 (–5) cm long; middle bracts often with small pungent laminas. Heads (1–) 2–5 (–8)-flowered. Tepals 3–4 mm long; outer tepals slightly cymbiform, not or little keeled basally, obtuse, mucronate. Anthers 1.5–2.2 mm long, 5–8 times as long as filaments; style 0.8–1.5 mm long; stigmas 1.5 mm long. Capsule 3–4 (–4.5) mm long, up to 1.5 times as long as tepals, ovoid or rarely subospheroidal; apex conical or rarely obtuse or slightly angular; mucro very short. Seeds 0.8–0.9 mm long, or 1.0–1.5 mm long including appendages; appendages slightly unequal. 2n = 48, fide S.Snogerup, Wildenowia 23: 44 (1993). Fig. 40.

Greece, Aegean area, W, C and S Turkey, Cyprus. 13: GRC, KRI, TUE. 34: CYP, TUR. Sand dunes, sandy places, salt and freshwater marshes, along streams, from sea level to 1700 m. Map 177.


Stem 30–70 cm tall, rigid, erect, usually 1.5–2.5 mm in diam.; leaves (10–) 20–45 cm long, 1.5–3 mm thick. Inflorescence 4–10 × 2–5 cm, lax, with 8–30 well separated heads. Lower bract 3–7 (–15) cm, including a sheath 1.5–2.5 cm long, longer or slightly shorter than inflorescence; second lowest bract usually inconspicuous, 1.5–4 cm long, including sheath 1–2 cm long; middle bracts usually with no or only small laminas. Heads (3–) 4–5 (–8)-flowered. Tepals 2.5–3.5 mm long; outer tepals cymbiform, keeled and thickened by spongy tissue basally, obtuse, with mucro 0.1–0.3 mm long. Anthers 1.4–2.0 mm long, 4–8 times as long as filaments; style 1–1.5 mm long; stigmas 1–1.5 mm long. Capsule 2.8–3.5 mm long, equaling or slightly exceeding tepals, spheroidal with obtuse or shortly conical apex; mucro c. 0.2 mm long. Seeds 0.75–0.8 mm long, or 1.2–2.0 mm long including appendages; appendages conspicuously unequal. Fig. 41.
Figure 41. *Juncus heldreichianus* subsp. *orientalis*. **A, B, I**, inflorescences; **C**, flower head; **D**, flower; **E**, tepals and pistil; **F**, flower with ripe fruit; **G**, capsule; **H**, seeds. (**A, Hewitt 258, E; B–E, I, Secmen & al. 3442, LD; F–H, Secmen & E.Leblebici 3076, LD**). Scale bars: **A, B = 10 cm; C = 5 mm; D, F = 3 mm; E, G = 2 mm; H = 1 mm; I = 1 cm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 47, fig. 8 (1993).
From Turkey (C and E Anatolia) and Syria to N Iran, Caucasus and Middle Asia. 32: TKM, TZK. 33: TCS. 34: IRN, LBS, TUR. Permanently or seasonally wet places, slightly to strongly saline habitats, known from sites between 800–1700 m. Map 178.


Perennials, 80–150 (–200) cm tall, densely caespitose; shoots intravaginal; rhizome short. Stem 2–4 (–6) mm in diam. Basal leaves up to 10, 25–110 cm long, 2–4 mm in diam.; leaf sheaths broad, basally brown, forming a thick cover around the base. Lower two bracts leaf-like, pungent, with longer one 8–25 (–40) cm long including a 4–8 cm long sheath, usually shorter than inflorescence; middle bracts small, amplexicaul, with small pointed blade; head bracts shorter than flowers, ovate, acuminate. Inflorescence (13–) 20–40 × (2–) 5–10 (–15) cm, ± lax, often storied, of (60–) 200–500 or more (1–) 2–4 (–6)-flowered heads. Tepals 2.2–3.0 mm long, equal or with the inner ones slightly longer; margin scarious; outer tepals slightly broader apically; mucro to 0.2 mm long; inner tepals oblong, obtuse, distally widely bordered silvery hyaline and cucullate, not or slightly notched. Bracts and tepals ± conspicuously red punctulate-striulate. Stamens 6, 2/3–3/4 as long as tepals; anthers 1.1–1.7 mm long, (2.5–) 4–6 times as long as filaments; style 1–1.5 mm long; stigmas 1.5–2.5 mm long. Capsule 2.5–3 mm long, exceeding tepals, trigono-ovoidal to spheroidal, abruptly contracted to (0.1–) 0.3–0.6 mm mucro, dark brown, trilocular, 25–35-seeded. Seeds 0.6–0.8 × 0.25–0.35 mm, or 0.85–1.5 mm long including appendages, narrowly ovoid, c. 20-striate; appendages ± unequal. Fig. 42.

Middle East from Socotra and Saudi Arabia to Iran. 24: SOC. 34: IRN. 35: GST, OMA, SAU, YEM. Along streams, saline habitats, most often between 600–1000 m, rarely to 2500 m. Map 179.

24. SOCOTRA: Adhein, 950 m, Gwynne 194 (BM). 34. IRAN: Bandar-Abbas, 35 km from Senderk to Araghin Deb-e-Ziaraton, 1000 m, V.Mozaffarian 44488 (LD). 35. GULF STATES: Fujairah Emirate, between Khatt and Dibla, Western 19 (E). OMAN: Mascate, P.M.R.Aucher-Eloy 5475 (K); Amlah near Ibri, Nadi al Ayn, 500 m, Whitcombe 71 (E); Yangul, H.W.Lawton 2274 (BM). SAUDI ARABIA: Khaybar, Zeller 16403 (BM); Popov 71/64 (BM); Bashawat Shimran, Al-Sheik 528E (CAI). YEMEN: Dhamar, 10 km W, Wood 2986 (BM, K).

5. Juncus maritimus Lam., Encycl. 3: 264 (1789)
Figure 42. *Juncus socotranus*. A, B, inflorescences; C, detail of inflorescence; D, flower; E, tepals with stamens; F, flower with ripe fruit; G, capsule; H, seeds. (A, Popov 71/64, BM; B–E, Popov GP/SO/256, BM; F–H, Zeller 16403, BM). Scale bars: A, B = 10 cm; C, F = 5 mm; D, E = 3 mm; G = 2 mm; H = 1 mm. Drawn by B. Johnsen. Reproduced with permission from S. Snogerup, *Willdenowia* 23: 50, fig. 10 (1993).
**Juncus maritimus var. atlanticus J.W.White, J. Bot. 52: 19 (1914).**  
T: Great Britain, Isles of Scilly, Great Ganinick, J.W.White; syn: BRISTM, n.v., NMW.  


Perennials, 50–100 cm tall; rhizome creeping, up to 8 mm in diam., with internode length variable; intravaginal shoots usually lacking. Stem usually 1.5–2 mm thick, rigid. Leaves (10–) 25–80 cm long, 1–3 mm in diam. Lower two bracts leaf-like, with broad sheaths, (7–) 10–25 (–40) cm long, including sheath 2.5–4 cm long, usually exceeding inflorescence; middle bracts with blade reduced to small mucro; bracts subtending heads shorter than flowers, amplexicaul, apiculate. Inflorescence (4–) 10–20 × (2–) 3–5 (–8) cm, usually lax; rarely contracted to one or a few large clusters, with 20–100 (–200) heads. Heads (1–) 2–6+ flowered. Tepals with membranous margins, 3–4 mm long; outer tepals longer, ovate, cymbiform, acute, with mucro 0–0.3 mm long; inner tepals narrowly elliptic, with ±broader margins apically, obtuse. Stamens 6 (rarely 3), c. 2/3 as long as tepals; anthers 0.8–1.2 mm long, 1.5–2 (–2.5) times as long as filaments; style 1–1.5 mm long; stigmas 1–2 mm long. Capsule 2.5–3.5 mm long, equalling or slightly exceeding tepals, trigono-ovoid, obtuse or abruptly attenuate, with mucro 0.3–0.6 mm long, trilocular; seeds 60–100. Seeds 0.6–0.7 mm long, 0.8–1.2 mm including appendages, obliquely ovoid, c. 25-striate; appendages unequal, white.


Figure 43. *Juncus maritimus*. A, rhizome with a row of stems; B, C, inflorescences; D, flower head; E, flower; F, tepals; G, one-flowered head (right) and flower in fruit; H, capsule; I, opened capsule; J, seeds. (A, A.Strid & al. 24277, LD; B, D-J, S.Sngerup 1445, LD; C, E.M.Sennen 5432, LD). Scale bars: A–C = 10 cm; D, G = 3 mm; E, F, H, I = 2 mm; J = 1 mm. Drawn by B.Johnsen. Reproduced with permission from S.Sngerup, *Willdenowia* 23: 53, fig. 12 (1993).
Perennials, (50–) 75–150 cm tall; rhizome creeping, branched, to 10 mm in diam., with internode length variable. Culms rigid, usually 2–5 mm thick. Leaves 25–110 cm long, 1.5–3 mm thick. Lower two bracts leaf-like, 5–25 cm long, including a sheath 2–5 cm long, shorter than to much exceeding the inflorescence; middle bracts small; bracts subtending heads much shorter than flowers, ovate, amplexicaul, cuspidate. Inflorescence 5–40 × 2–5 cm, lax, usually elongated, with (20–) 50–150 (–300) heads. Heads (1–) 2–4 (–6)-flowered. Tepals 3.5–5 mm long, equal or outer ones ± longer; margins broad, scarious; outer tepals narrowly ovate, acute or obtuse; inner tepals oblong, obtuse, with margins ± expanded apically. Stamens 6, 2/3–3/4 as long as tepals; anthers (1.0–) 1.5–2.0 (–2.5) mm long, 3–6 times as long as filaments; style 0.7–1.2 mm long; stigmas 1–1.5 mm long. Capsule 3.5–5 mm long, conspicuously exceeding or rarely equalling tepals, narrowly trigono-ovoid, trilocular, usually straw-brown; apex trigonous, tapering, sometimes abruptly contracted; mucro to 0.5 mm; seeds usually 70–90. Seeds 0.6–0.7 mm long, or 0.9–1.8 mm long including appendages, 0.2–0.3 mm broad, narrowly obliquely ovoid, 20–25-striate; appendages equal or subequal. 2n = 46, 48, fide S.Snogerup, Willdenovia 23: 57 (1993).

Fig. 44.


13. ITALY: Sicilia, Noto, Avola, G.Bianca 283 (FI).
24. CHAD: Oasis Tekro, J. Hutchinson 2 (BM).
26. ZAMBIA: Mazabuka, Kafue R., van Rensburg 2501 (K).
27. SOUTHERN AFRICA: Cape Province, Taung, MacDonald 76/2 (NBG); Cape Province, Richmond, Leopold’s Vlei, H. Bolus 13838 (BOL).


T: South Africa, George Dist., Notsinakama R., Jan 1839, C. Krauss; lecto: G-BOIS, fide S. Snogerup, Willdenovia 23: 57 (1993); iso: M.

Perennials, c. 40–130 (–200) cm tall; rhizome creeping, short-noded, densely branched. Leaves terete, 20–100 cm long. Lower two bracts leaf-like with wide sheaths, usually exceeding inflorescence; middle bracts narrowly ovate, amplexicaul, acuminate, often with a small, distinct lamina; bracts subtending heads ovate, shorter to ± equalling flowers, scarious. Inflorescence usually lax, rarely consisting of a few clusters. Flowers dark. Tepals ± unequal; outer tepals longer, with base and midrib herbaceous, with margins scarious, ovate, cymbiform, keeled, with scarious margin slightly broader distally, very fragile; mucro 0.1–0.3 mm long; inner tepals oblong, subobtuse to obtuse. Anthers shorter than tepals. Capsule 2–2.5 (–3) mm long, trigono-obovoid to trigono-ellipsoidal, usually obtuse, brown to castaneous at least in apical part. Seeds with very short unequal appendages. Disjunct in three areas: Southern Africa, along the S and SE coast to Mozambique; Australia, Tasmania and New Zealand; and temperate South America. There are three subspecies.

1. Dioecious, with functionally unisexual flowers; inflorescence broad
2. Capsule exceeding perianth; inflorescence elongated
3. Capsule equaling perianth; inflorescence broad
Figure 44. *Juncus rigidus*. A, rhizome and young inflorescence; B, C, inflorescences; D, flower head; E, flower; F, tepals with stamens; G, flower with ripe fruit; H, capsule; I, seeds. (A, Dahlgren & P.Lassen 140-22, LD; B, D–F, S.Snogerup & al. 2827, LD; C, L.Boulos s.n., 16 Dec 1964, CAI, LD; G, H, J, M.Zohary & Yehoudai 721, LD). Scale bars: A–C = 10 cm; D, E, G = 3 mm; F, H = 2 mm; I = 1 mm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 56, fig. 14 (1993).
7a. Juncus kraussii Hochst. subsp. kraussii


Intravaginal shoots absent. Lower bract 5–20 (–40) cm long, including a sheath 1.5–4 cm long. Inflorescence 5–20 × 3–7 (–10) cm, lax, usually broad but sometimes elongated by subdivision in two parts, rarely congested to a few clusters, with 50–1000 heads. Heads 2–6-flowered. Most flowers functionally unisexual, male smaller than female; female flowers with rudimentary filaments; male flowers with degenerating ovary and reduced stigmas. Tepals 2.5–3 (–4) mm long. Stamens 6, c. 2/3 as long as tepals; anthers 1.3–1.6 mm long, 3.5–6.5 times as long as filaments; style 0.4–0.75 mm long; stigmas 1.0–1.3 (–1.8) mm long. Capsule 2–2.5 (–3) mm long, equalling or exceeding tepals by up to 0.5 mm, trilocular with distinct placental wings centrally; mucro 0–0.3 mm; seeds usually 25–35. Seeds 0.7–0.8 mm long, or 0.8–0.9 mm long including appendages, 0.35–0.4 mm broad, 20–25-striate, with transverse striae inconspicuous, c. 20 per longitudinal field; appendages small, unequal. Fig. 45.

Along the S and SE coast of southern Africa from the Cape to Mozambique. 26: MOZ.


27. SOUTH AFRICA: Cape Provinces, Milneston, Nov 1914, [Anonymous] 9164 (NBG); Cape Town, H.Bolus 4811 (BOL); Cape Provinces, Uitenhage, C.F.Ecklon & C.Zeyher 3 (LD); KwaZulu Natal, Umtamvuna, R.G.Strey 7116 (K, PRE); Zululand, Mtungini, Mogg 5869 (K, LD); Free State, Thaba Nchu, Roberts 2918 (PRE).


Intravaginal shoots sometimes present. Lower bract 4–40 cm long, including sheath 1.5–2.5 (–4) cm. Inflorescence 6–25 × 2.5–6 cm, usually elongated, sometimes conspicuously bipartite, with 50–400 heads. Heads 3–6 (–10)-flowered. Most flowers hermaphrodite, rarely some functionally female. Tepals 2.2–2.8 (–3.3) mm long. Stamens 6 (rarely 3), rarely in some flowers all rudimentary; anthers 0.7–1.2 mm long, 1.3–2.5 times as long as filaments; style 0.25–0.5 mm long; stigmas c. 1.5 mm long. Capsule 2–2.5 mm long, equalling or exceeding tepals by up to 0.5 mm, trigono-ellipsoidal, acute to obtuse, glossy castaneous, trilocular with distinct placental wings centrally; mucro up to 0.3 mm long; seeds usually 15–20 (–25). Seeds dark brown with one blackish blunter end, 0.6–0.8 (–0.9) mm long, or 0.7–1.0 mm long including appendages, 0.3–0.4 mm broad, ellipsoidal to obliquely ovoid, (20–) 25–30-striate, with transverse striae inconspicuous; appendages small, unequal. Fig. 45.
Figure 45. *Juncus kraussii* subsp. *kraussii*. A, inflorescences of male individual; B, head of male individual; C, male flower; D, inflorescences of female individual; E, F, female flowers at different stages; G, seed. *Juncus kraussii* subsp. *australiensis*. H, rhizome; J, K, inflorescences; L, flowers in early flower and fruit; M, hermaphrodite flower and tepals with stamens; N, capsule; O, seeds. (A–C, C.F.Ecklon & C.Zeyher Junc. 3, LD; D, F, C.F.Ecklon & C.Zeyher Junc. 4, LD; E, G, E.Schelpe 4516, BM; H, J–M, S.Snogerup, cult. nos. 3519, 3521, LD; N, O, F.Müller s. n., LD). Scale bars: A, D, H, J, K = 10 cm; B, E, L = 3 mm; C, F, M, N = 2 mm; G = 1 mm; O = 0.5 mm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 60, fig. 16 (1993).
Coastal areas and rarely at inland saline sites of SW, SE and S Australia: Northern Territory, South Australia, Queensland, Tasmania, Victoria, Western Australia; and both main islands and Chatham Island of New Zealand. 50: NSW, NT, QLD, SOA, TAS, VIC, WAU. 51: NZN, NZS, CTM. Salt marshes, mangrove swamps, coastal sands, river banks, rarely lake shores. Map 183.


Intravaginal shoots absent. Cataphylls 3–5, pale brown, with uppermost 2–10 cm long, sometimes with a short lamina. Lower bract (3–) 9–20 (–60) cm long, including a sheath 2–6 cm long. Inflorescence (3–) 8–12 × (1.5–) 3.5–5 cm, usually ±dense, with flowers in (15–) 75–200 (–c. 1000) heads. Heads (1–) 3–8 (–10)-flowered. Tepals 2.5–3.5 mm long. Stamens 6 (rarely 3), c. 2/3 as long as tepals; anthers rarely well preserved in fruiting flowers, 0.8–1.7 mm long, 1.5–3 times as long as filaments; style 0.2–0.5 mm long; stigmas 1–1.5 mm long. Capsule 2.5–3 mm long, about equalling tepals, trigono-ellipsoidal to trigono-obovoid, obtuse to acute, light brown to glossy castaneous, trilocular; mucro up to 0.3 mm long; seeds usually 20–25. Seeds 0.7–0.9 mm long, or 0.8–1.2 mm long including appendages, 0.3–0.4 mm broad, ellipsoidal to obliquely ovoidal, dark brown, c. 25-striate; appendages small, unequal. Fig. 46.

Restricted to temperate South America. 84: BZL, BZS. 85: AGS, CLS, URI. Probably only on coastal habitats, often maritime sands. Map 184.


T: [USA, Texas] ’Galveston island auf feuchtem Muschelsand’, 4 Apr 1846, Römer; holo: B, destroyed.


Perennials, (15–) 50–150 (–230) cm long; rhizome creeping, stout, with internodes usually short; intravaginal shoots absent. Cataphylls 2–5, to 10 cm long; blade tiny. Leaves 40–125 cm long, 1.5–4 mm in diam. Lower bract (2–) 5–20 (–90) cm long, including a sheath 1.5–3 (–5) cm long; middle bracts small, amplexicaul, with blade ±absent; bracts subtending heads considerably shorter than flowers. Plant gynodioecious, with female and ±hermaphrodite clones. Inflorescence (2–) 5–20 (–45) × 3–6 (–12) cm, usually lax, ±broad; heads (15–) 30–100 (–200), 2–8 (–25)-flowered. Tepals 2.2–3.5 mm long, subequal, with margins scarios; outer tepals ±narrowly ovate, with base keeled, distally scarios margins slightly broader and mucro up to 0.3 mm long; inner tepals oblong, obtuse, with scarios part broad near apex. Stamens 6, equalling tepals or slightly shorter, rudimentary in pistillate flowers;
Figure 46. *Juncus kraussii* subsp. *austerus*. A, rhizome with several culms; B, inflorescence; C, head in late bud stage; D, flower and pistil; E, inner tepal with stamen; F, flower with ripe fruit; G, opened capsule; H, seeds. (A, C–E, C. Osten 21788b, S; B, F–H, C. W. H. Mosén 3502, S). Scale bars: A, B = 10 cm; C, F = 3 mm; D, E, G = 3 mm; H = 1 mm. Drawn by B. Johnsen. Reproduced with permission from S. Snogerup, *Willdenowia* 23: 64, fig. 19 (1993).
Figure 47. *Juncus roemerianus*. A, plant base and inflorescence; B, C, inflorescences; D, female head; E, flowers and tepals of female individual; F, hermaphrodite flower in fruit; G, tepals of hermaphrodite flower with stamens; H, capsule of female flower; I, seeds; J, hermaphrodite flower in fruit and capsule. (A, C–H, J, D.Persson, 25 Jul 1978, LD). Scale bars: A, B = 10 cm; C = 5 cm; D, J = 3 mm; E–H = 2 mm; I = 0.5 mm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, *Willdenowia* 23: 66, fig. 21 (1993).
anthers 1.4–1.7 (–2.0) mm long, 5–7 times as long as filaments; stigmas 1.5–2.5 mm long. Capsule in hermaphrodite flowers 2.5–3 mm long, in pistillate flowers 3–5 mm long, ±exceeding tepals, broadly trigono-ellipsoidal, obtuse, light to dark brown, glossy, trilocular with thick placentas; mucro 0.1–0.3 mm long. Seeds 0.5–0.7 mm long, or 0.6–0.8 mm long including appendages, 0.3–0.4 mm broad, ±ellipsoidal, yellowish brown, c. 25-striate; appendages indistinct or with one to 0.1 mm long. Fig. 47.

Endemic to S and SE coast of USA, from Texas and Louisiana to Virginia; Bahamas and Bermuda in the Caribbean. 77: TEX. 78: ALA, DEL, FLA, GEO, LOU, MSI, NCA, SCA, VRG. 81: BAH. Salt marshes and stabilized coastal sands, in large stands in upper part of tidal pools. Map 185.


T: USA, California, Camp Cady, Mohave River, *Cooper*; holotype probably MO, n.v.


Perennials, (40–) 50–80 (–100) cm tall, densely caespitose; rhizome short-noded, branching. Intravaginal shoots present. Cataphylls 2–4 (–5), to 10 cm long. Leaves 15–60 cm long, including sheaths up to 10 (–25) cm long, (1.5–) 2–3 mm in diam., striate. Lower bract leaf-like, thin, (2.5–) 6–22 cm long, including a sheath 1.8–4 cm long; middle bracts with large sheath and small lamina; bracts subtending heads usually shorter than flowers. Inflorescence (3–) 4–15 × (1–) 1.5–3 (–5) cm, with 3–20 (–25) heads. Heads (1–) 4–8 (–12)-flowered. Tepals 5–6.5 mm long, subequal, later with thick spongy bases; outer tepals aristate with arista to 1 mm long, with distal margin scarious and to 0.5 mm wide; inner tepals oblong, with broad distal thin fragile scarious wings, ±emarginate. Stamens 6, 2/3–3/4 as long as tepals; anthers (2.2–) 2.5–3.5 mm long, (2.5–) 5–7 times as long as filaments; style 1.5–2 mm long; stigmas 2.5–3.5 mm long. Capsule 4–5.5 mm long, ±exceeding tepals, trilocular, thick-walled, ovoid, ±trigonous, attenuate, acute to obtuse, straw-brown; mucro inconspicuous; seeds c. 60–70. Seeds 0.9–1.1 mm long, or 1.5–1.9 mm long including appendages, 0.4–0.6 mm broad, ellipsoidal to ovoid, c. 25-striate; appendages short, ±unequal. Fig. 48.

Endemic to California and Nevada, USA. 76: CAL, NEV. Saline and brackish marshes, in desert valleys on soils with high salinity. Map 186.


**Hybrids**

**Juncus acutus** L. × *J. heldreichianus* T.Marsson ex Parl.

Usually a moderate-sized plant. Inflorescence slightly elongate, capsules often light coloured with a long conical tip, appearing unfilled. Seed set irregular, from 0% up to at least 30% in the best developed capsules. Pollen almost 100% staining. Found repeatedly in Greece.


**Juncus acutus** L. × *J. littoralis* C.A.Mey.

Usually a tall plant forming large tussocks. Inflorescence and flowers like those of *J. littoralis*. Capsules differently developed; the large ones with a conical top. Seed set
Figure 48. Juncus cooperi. A, young plant in first flower; B, C, J, inflorescences; D, head in onset of flowering; E, flower; F, dissected flower; G, flower with opened fruit, apices of inner tepals collapsed; H, capsule; I, seeds. (A, C–F, H–J, S.Riebe, S.Snogerup, cult. nos. 4166, 4165, LD; G, S.Snogerup 3440, LD). Scale bars: A–C = 10 cm; D, E, G = 5 mm; F = 3 mm; H = 2 mm; I = 1 mm; J = 2 cm. Drawn by B.Johnsen. Reproduced with permission from S.Snogerup, Willdenowia 23: 70, fig. 23 (1993).
irregular, from 0% to c. 50% in the best developed capsules. Pollen almost 100% staining. Found in Italy, Greece and Israel.

34. ISRAEL: Acre Plain, Qishon R., 12 Apr 1925, Smoly (HUJ, S, W)

\textit{Juncus heldreichianus} T.Marsson ex Parl. × \textit{J. littoralis} C.A.Mey.

In habit like moderately tall \textit{J. heldreichianus}. Inflorescence variable, often with long ±erect branches and dense groups of heads. Capsules small and blunt, dark above. Most seeds degenerated, good seeds often few, but in the best capsules at least up to 30%. Pollen 80–95% staining and of normal form. Found in Greece.


\textit{Doubtful names:}


\textbf{Sect. 2. GRAMINIFOLII}


Probably a synonym of \textit{Juncus acutus} L. subsp. \textit{acutus}.


*T*: *Juncus dregeanus* Kunth

Perennials, caespitose or rhizomatous; stems terete to slightly compressed, with leaf blade flat and not differentiated dorsiventrally, without septa. Flowers in compound to decompound anthelate inflorescences of 1 to many flower heads; individual flowers in the axil of a floral bract; bracteoles absent. Seeds with or without appendages, usually reticulate.

A section of 22 species with centres of diversity in W North America, southern Africa and the Australasian region, extending to South America, Turkey and the Far East. It may not be monophyletic.

1. Seeds with two appendages at least 0.2–0.4 mm long

2. Anthers c. 0.9–1.5 mm long, slightly longer than filaments; style longer than 1 mm; auricles lacking or subacute, to 0.7 mm long

   20. *J. regelii*

3. Seeds without appendages or with a whitish apex to 0.1 mm long

4. Anthers 1.8–2.6 mm long, usually 2–3 times as long as filaments; style c. 0.6 mm long; auricles at least 1 mm long

   21. *J. howellii*

5. Plants dwarf, to c. 5–6 cm tall, mat-forming; leaves to 0.5 mm wide in the middle

   18. *J. antarcticus*

6. Plants at least medium-sized, at least 10 cm tall, densely to ±loosely caespitose, not mat-forming; leaves wider than c. 0.8 mm

7. Inner tepals acuminate to subulate-acuminate, usually 3.8–5.0 mm long

   22. *J. repens*

8. Inner tepals obtuse, subobtuse or subacute, sometimes mucronate, 2.4–3.0 (–3.5) mm long

9. Auricles present, 0.5–3.0 mm long

   25. *J. marginatus*

10. Auricles absent

11. Longer tepals at least 3.0 mm long; inner tepals usually slightly shorter than the outer ones; capsule ±shorter than perianth; leaves usually 0.8–3.0 mm wide

   13. *J. dregeanus*

12. Longer tepals up to 2.3 (–2.8) mm long; inner tepals as long as or longer than the outer ones; capsule ±exceeding perianth; leaves usually 2.5–6 mm wide

   19. *J. planifolius*

13. Stamens 3; if in some flowers stamens 4–6 then triandrous flowers predominating

14. Plants at least medium-sized, at least 10 cm tall, densely to ±loosely caespitose, not mat-forming; leaves wider than c. 0.8 mm

15. Inner tepals acuminate to subulate-acuminate, usually 3.8–5.0 mm long

16. Style c. 0.2 mm long; stem either creeping and rooting (with leaf rosettes 5–10 cm apart), or floating with leaf rosettes evenly spaced along stem, or ±loosely caespitose with densely branched short rhizome; capsule linear to lanceolate in outline

   22. *J. repens*

17. Style 0.4–0.5 mm long; plants densely caespitose with a short rhizome, with stem erect; leaves basal and cauline; capsule oblong-ovoid

   24. *J. filipendulus*

18. Stamens 3 or in a minority of flowers only 3–5

19. Capsule narrowly prismatic-pyramidal, gradually narrowing, 4.5–5.5 mm long, much exceeding perianth [Turkey]

20. Capsule ellipsoid to subglobose, retuse, truncate, obtuse or ±abruptly narrowing, up to 4.5 mm long, shorter than or equalling or exceeding perianth (and then apex rounded to retuse) [Not in Turkey]

21. Anthers at least 1.5–2 times as long as filaments

22. Leaves (5–) 9–13 (–15) mm wide

23. Leaves up to 5 (–6) mm wide, usually much narrower

24. Capsule usually distinctly exceeding perianth

25. Seeds c. 0.4 mm long; outer seed-coat tight, distinctly reticulate [Pacific North America]

   27. *J. covillei*

26. Seeds c. 0.7 mm long; outer seed-coat loose, shining, faintly reticulate [Russian Far East and Japan]

   28. *J. prominens*
JUNCACEAE (*Juncus*)

12: Capsule usually shorter than or equalling perianth

14: Capsule 2.7–3.1 mm long  
15: Plants densely caespitose; rhizome short or indistinct; tepals with a smooth central band; auricles distinct, 1.2–2.5 mm long

15: Plants loosely caespitose; rhizome creeping-ascending; tepals with a scabrid (papillose) central band; auricles absent or short (to 1 mm long) or up to 2 mm long

16: Style 1.3–1.9 mm long; tepals usually with castaneous or translucent-brownish margins

16: Style 0.5–1.0 mm long; tepals with broad or narrow scarious (less often membranous) margins

17: Auricles 1–2 mm long; tepals pale, greenish or pale brownish; basal leaves not exceeding 1/2 of stem; stem usually longer than 20 cm

17: Auricles absent or up to 1 mm long; tepals deep castaneous-brown; basal leaves usually exceeding 2/3 of stem; stem usually 10–20 cm long

10: Anthers shorter than filaments or ±equalling them

18: Rhizome ascending-creeping, distally loosely branched and gradually changing in stem; leaves usually ±regularly distributed along stem; all tepals linear-lanceolate, acuminate, with a smooth central band

18: Rhizome short, densely branched, or creeping-ascending but then not gradually changing in stem; leaves entirely or mostly in a basal rosette; tepals lanceolate to ovate-lanceolate, at least some of them not acuminate (i.e., subacute and mucronate or obtuse), central band scabrid (papillose) or almost smooth

19: Longest tepals c. 1.5–1.8 mm long; capsule c. 2 mm long, exceeding perianth

19: Longest tepals longer than 1.9 mm; capsule at least 2.4 mm long, shorter than or equalling perianth

20: Capsule 3.5–4.5 mm long; tepals 4.0–5.2 mm long

20: Capsule to 3 mm long; tepals 2.4–4.2 mm long

21: Style 0.4–0.8 mm long; tepals 3.7–4.2 mm long

21: Style 0.2–0.4 mm long; tepals 2.4–3.5 mm long

22: Leaves c. 5–8 mm wide in the middle; lower bract distinctly shorter than inflorescence

22: Leaves 0.8–3.5 mm wide in the middle, lower bract usually ±equalling inflorescence or longer

23: Capsule dark golden brown to red-brown; inner tepals usually slightly longer than outer ones, to 3.0 mm long [Australasian region]

23: Capsule usually blackish brown; outer tepals usually longer than the inner ones, c. 3.0–3.5 mm long [Southern and East Africa]


Perennials, 30–40 (–50) cm tall, loosely caespitose, robust; rhizome creeping, branched, with internodes 1–3 cm long, c. 3 mm in diam.; sterile shoots/stolons short. Stem erect or ascending, compressed. Cataphylls c. 1–3, to 5–8 cm long, with base brownish-purplish. Cauline leaves 3–6, dense, usually to 10–13 cm long, flat to V-shaped, (2.5–) 4.0–6.0 (–8.0) mm wide; margins smooth; apex acute. Lower bract leaf-like, c. 1–3 cm long, shorter than inflorescence. Inflorescence decompound, sometimes supra-decompound, much branched, anhelaete; branches erecto-patent, diffuse, of numerous 2–6-flowered echinate heads c. 3–5 mm wide. Capitulum bracts ovate-acuminate, aristate, to 2 mm long, ±scarious. Tepals ±unequal, linear-lanceolate, acuminate, subaristate, greenish, sometimes suffused reddish, smooth; outer tepals shorter, 2.4–2.8 mm long; inner tepals c. 2.7–3.5 mm long, margins narrow, paler green or purplish. Stamens 6, rarely 3–5; anthers c. 0.8–0.9 mm long; filaments c. 0.3 mm long, flat; style not easy to distinguish from distal part of capsule, to c. 0.5 mm long; stigmas c. 1.0 mm long. Capsule trigonous, unilocular, narrowly prismat-pyramidal, elongated, to c. 4.5–5.5 mm long, much exceeding perianth, very gradually narrowing into style, pale brown. Seeds 0.6–0.7 mm long, pale brown, faintly reticulate; appendages absent.

Restricted to C and S Turkey. 34: TUR. Wet places, mostly along, or even in streams. Map 187.

34. TURKEY: Gediz, Murat Dag, 1400 m, P.H.Davis 36712 (E); Icel, Giosna [Gözne], 800 m, W.Siehe 196 (W); Afyon, Sultan Dag, 1500 m, J.F.N.Bornmüller [It. Anatol. 3] 5614 (W); Adana, 18 km N of Kamisli, 1400 m, Sorger 7729-7 (W); 7 km W of Fetiye, 5 Jun 1977, H.Woldrinf E12 (L).


T: Ostafrikanisches Waldgebiet, West-Usambara, 1400–1600 m [Tanzania, W Usambara Mtns], A.Engler 1060; syn: B, destroyed; A.Engler 1409; syn: B, destroyed.

Perennials, 25–40 (–60) cm tall, loosely caespitose; rhizome creeping-ascending; stolons absent; stems ascending, rooting, with internodes short; cataphylls absent. Leaves only basal, mid-green, 12–20 (–40) cm long, (3–) 5–8 (–12) mm wide near base, ±flat to channelled; sheaths closed, to 2 cm long, later split, usually tinged reddish, with margins colourless or whitish, c. 0.1 mm wide; auricles absent; leaf apex subulate. Stems terete, ±smooth, leafless. Lower bract subherbaceous, c. 1.0–4.0 cm long, shorter than inflorescence. Inflorescence ±ereect, anhelaete; main branches usually 5–10, (1–) 2–6 (–8) cm long, ±smooth; secondary branches subdistal; upper bracts blackish-brown, scabrid (papillose), subtending hemispherical (1–) 3–7 (–10)-flowered heads; uppermost bracts c. one per flower, c. 3 mm long, ±triangular, brownish. Tepals ±unequal; outer tepals lanceolate, carinate, acuminate, c. 2.4–2.7 mm long, dark brown, often scabrid on midrib, with margins narrow and indistinct; inner tepals ovate-lanceolate, broader, c. 2.5–2.8 × c. 1.0 mm, obtuse, dark brown, with margins broad, membranous. Stamens 6; anthers 0.5–0.8 mm long; filaments 0.6–0.7 mm long; style c. 0.2 mm long; stigmas ±reddish, patent-contorted, c. 0.6–0.9 mm long; long papillose. Capsule oblong-ovoid, subtrigonic, ±abruptly contracted in an apiculate apex, c. 1.9–2.5 mm long, shorter than to subequalling perianth, shiny, red-brown above. Seeds ±ovoid, paler brown, 0.4–0.5 mm long including a short whitish apex, c. 0.3 mm wide, faintly reticulate to almost smooth; appendages ±absent.

Confined to a very limited area in the Usambara Mtns and the Pare Mtns, Tanzania. 25: TAN. Boggy places, along streams in open mountain forest. Map 188.

25. TANZANIA: Lushoto, Magamba, Mkuzi R., c. 1750 m, P.J.Greenway 9664 (S); Lushoto, between Mkuzi and Kifungilo, B.B.Drummond & Hemsley 2214 (K); Pare, Mtonto, P.J.Greenway 6548 (K).

Closely related to J. lomatophyllus of southern Africa but having very short style and stigmas, smaller flowers and, on average, substantially narrower leaves. The third original specimen cited, Usambara, Mlato [Mlalo] Holst 334a (W), is a Juncus inflorescence. It may belong to J. engleri but tepals are longer than those in the rest of the material. Buchenau himself listed the specimen with a question mark. Another unnumbered gathering from the same locality [Holst s.n. (PR)] represents Juncus oxycarpus.

T: in promontorio bona spi' [Cape Peninsula], Bergius; holo: B, destroyed.


T: Cape, Kirstenbosch, Table Mountain, Skeleton Ravine, 11 Oct 1931, R.S.Adamson 247; holotype: BOL.


Perennials, c. (15–) 35–80 cm tall, robust; rhizome creeping, leafy distally, to c. 4 mm in diam.; stolons often present, long, leafy. Leaves in basal rosette, usually bluish green, rarely pale green, c. 10–20 cm long, (5–) 9–13 cm wide, ±flat, base often purplish; sheaths closed, later split, short; margins hyaline, 0.1–0.2 mm wide; apex subulate. Stem thick, rigid, ±smooth to papillose. Lower bract herbaceous, c. 1.0–3.5 cm long, much shorter than perianth, usually dark castaneous; capsule segments c. 1.4 mm wide. Seeds ±brown, ovoid, c. 0.4–0.6 mm long, 0.3 mm wide; apex whitish apiculate; surface faintly reticulate. Beak c. 1.5 mm long; stigmas red, c. 2 mm long, exserted. Capsule trilocular, ±ovoid, ±shorter than perianth, usually dark castaneous; capsule segments c. 1.4 mm wide. Seeds ±brown, ovoid, c. 0.4–0.6 mm long, 0.3 mm wide; apex whitish apiculate; surface faintly reticulate. Fig. 49.

Widespread from SW Cape to Transvaal (Northern Provinces) in South Africa, also found in Zimbabwe and S Mozambique. Introduced in New Zealand. 26: MOZ, ZIM. 27: CPP, LES, NAT, SWZ, TVL. 51: nzs. Along streams, shores of ponds and reservoirs, permanently wet mountain habitats. Map 189 (secondary distribution not shown).


JUNCACEAE (*Juncus*)


Perennials, c. (10–) 15–25 (–45) cm tall, densely (rarely loosely) caespitose; rhizome usually short, vertical; stolons absent. Leaves basal, (5–) 10–20 (–28) cm long, filiform to narrowly linear, often ±dilated (to 5 mm) and hyaline-bordered at base, otherwise 0.8–1.5 (–3.0) mm wide, slightly canaliculate to subinvolute; sheaths initially closed, later split, with apex acute; auricles absent. Stem leafless, ±smooth. Lower bract narrow, leaf-like, usually 2.5–7 cm long, longer or seldom shorter than inflorescence. Inflorescence usually subcorymbous, a regular head of 1–10 subsessile clusters, often with 1–3 (–5) clusters or groups of clusters pedunculate; peduncles short, c. 0.5–3.0 cm long; clusters at first hemispherical, later subglobose, c. 0.7–1.1 cm wide (groups of clusters to 2 cm wide); upper bracts c. 3.5 mm long, subaperturate, ±scabrid. Sepals ±unequal; outer tepals lanceolate, acuminate, subaristate, carinate, c. 3.0–3.5 mm long, with central band prominent, sometimes scabrid, rarely pale; inner tepals ovate-lanceolate, subobtuse, c. 2.7–3.0 mm long, with margins broad, membranous. Stamens 3–6; anthers 0.4–0.5 mm long; filaments 0.6–0.8 mm long; style c. 0.2 (–0.3) mm long; stigmas patent, recurved, to c. 1 mm long. Capsule 3-locular, trigonous ovoid to subglobose, ±obtuse to subacute, c. 2.2–2.6 mm long; mucro c. 0.1 mm long; capsule segments c. 1.4–1.6 mm wide, shiny, casaneous-brown to blackish brown, ±shorter than perianth. Seeds ovoid, pale brown, faintly transversely reticulate, c. 0.3–0.5 × 0.25–0.35 mm; apex whitish apiculate.

East Africa from S Sudan and Ethiopia to Cape Province, South Africa, and Cameroon. Edges of streams, swamps, and wet mountain areas in woodlands and grasslands. Two subspecies are recognized.

Stamens 3 or 4–6; seeds (0.25–) 0.30–0.35 (–0.40) mm long; tepals pale brown to dark brown

**13a. subsp. dregeanus**


Capitulum bracts scarious. Tepals pale brown, brown or dark brown. Stamens 3 or 4–6. Seeds c. (0.25–) 0.30–0.35 (–0.40) mm long.

**13b. subsp. bachitii**


Capitulum bracts scarious. Tepals pale brown, brown or dark brown. Stamens 3 or 4–6. Seeds c. (0.25–) 0.30–0.35 (–0.40) mm long.
Confined to, and widely distributed in, S and E South Africa from SW Cape to Transvaal. Naturalised in the North Island of New Zealand. A wide range of wet habitats from sea level to the mountains, mostly along streams and in seepage areas.  


The type of *J. diaphanus*, the H.Bolus 188* specimen, evidently a (major) part of the holotype, annotated by Buchenau before the time of publication of his study (1875), originally in herb. O.W.Sonder, nowadays in S, in all likelihood represents a pallid, hexandrous, ±broad-leaved *Juncus dregeanus*. The plant may well be perennial, although its base is more slender than in the typical form. In its general habit, it also approaches plants described as *J. sonderianus*. Another rather aberrant form was described as *J. mollifolius*. It differs in its flaccid leaves and slender stems and, most notably, in a more loosely caespitose growth; in all the more substantial characters it is identical with *J. dregeanus* s. str., only the seed size is at the upper limit. It might represent a third subspecies of *J. dregeanus* but further study is needed. 


In the mountains of the NE, E, and W-C parts of South Tropical Africa.  

25. KENYA: Mt Elgon, 3800 m, H.Granvik 140 (LD); Mt Kenya, 3125 m, O.Hedberg 2005 (LD); Aberdare Range, W part of the Nyeri track, 3070 m, O.Hedberg 1599 (LD). TANZANIA: Kilimanjaro, 2700 m, Volkens 1309 (BM, K). UGANDA: Ruwenzori, Mobuku Valley, 3250 m, O.Hedberg 752 (LD); Muhavura – Mgahinda saddle, 3050 m, Purseglove 2205 (K). 

Plants from the southernmost part of the subspecies' range usually have slightly paler perianth; otherwise they correspond to the typical plants from the north.  


Perennials, 11–35 cm tall, caespitose; rhizome shortly ascending, many-headed; stolons absent. Leaves basal and subbasal (densely inserted to 5 cm up the stem), mid-green to pale green, 5–17 cm long, c. (1.5–) 2–5 (–7) mm wide; margins partly hyaline-bordered; apex acute;
Figure 50. *Juncus dregeanus* subsp. *bachitii*. A, habit; B, closed sheath; C, leaf section; D, flower and bract; E, style and stigmas; F, capsule; G, seed. (A, D, E, *Fries 1189*, K; B, C, F, G, *Brenan & P.J.Greenway 8218*, K). Scale bars: A = 3 cm; B = 2 cm; C, E, F = 1 mm; D = 2 mm; G = 0.1 mm. Drawn by E.M.Stones. Reproduced by kind permission of the Board of Trustees of the Royal Botanic Gardens Kew, from *Fl. Trop. E Africa*, Juncaceae, p. 5, fig. 1 (1966).
sheaths closed, later split, base green; auricles ±absent. Lower bract leaf-like, c. 1.5–3.5 cm long, usually exceeding inflorescence. Inflorescence usually congested, a globose head of 1–3 (–12) usually 6–12-flowered clusters, or 1–3 clusters shortly pedunculate. Tepals subequal; outer tepals lanceolate, carinate, acuminate-aristate, c. 3.7–4.2 mm long, greenish or pale brown to castaneous-brown, with central band often greenish, ±scabrid; inner tepals ovate-lanceolate, ±obtuse, sometimes shorter than the outer; margins membranous, broad. Stamens 6; anthers 0.5–0.7 mm long; filaments 0.6–0.8 mm long; style 0.4–0.8 mm long; stigmas to c. 1 mm long, suberect. Capsule ±ovoid, trigonous, subacute, apiculate, c. 2.5–3.0 mm long, shorter than perianth, pale greenish brown to castaneous; macro to c. 0.2 mm long. Seeds ovoid, pale brown, 0.4–0.5 × c. 0.3 mm, faintly reticulate; apex whitish apiculate; appendages absent.

Restricted to S Cape, South Africa, with the most common occurrence in the vicinity of Port Elizabeth. Introduced in New Zealand. 27: CPP, 51: znz. Wet sandy places, seepage areas, along streams. Map 192 (secondary distribution not shown).

27. CAPE PROVINCE: Riversdale, Droogvlakke, c. 150 m, J.Mair 3400 (K); Port Elizabeth, Cape Recife, 24 Dec 1813, W.J.Burchell 4386 (BOL, K, W); Port Elizabeth, T.C.E.Fries, T.Norlindh & H.Weimarck 163 (BOL, LD); Port Elizabeth, T.C.E.Fries, T.Norlindh & H.Weimarck 210 (LD); Port Elizabeth, F.Paterson 2318 (BOL).


The relatively high variability, occasional sterility and the intermediate character supports the hypothesis expressed by Obermeyer, in A.A.Obermeyer, J.Lewis & R.B.Faden, Fl. S. Afr. 4/2: 85 (1985), that J. sonderianus may be of hybrid origin, of J. dregeanus and J. lomatophyllus parentage. The sample T.C.E.Fries & al. 210 is closer to J. lomatophyllus while W.J.Burchell 4386 is similar to typical J. dregeanus. The problem requires a field study.


T: Cape bonaee spe[i] [Cape of Good Hope], C.P.Thunberg [8702]; lecto: UPS, fide A.A.Obermeyer, in A.A.Obermeyer, J.Lewis & R.B.Faden, Fl. S. Afr. 4/2: 83 (1985); probable iso: LD.


Perennials, c. 12–35 (~80) cm tall, loosely to densely caespitose; rhizome thin, short vertical or elongated ascending; stolons absent. Leaves only basal, variable in length and width, usually 15–25 (~35) cm long, narrow, c. 0.7–2.0 (~3.0) mm wide in the middle, ±dilated at base (to 6 mm wide), flat to canaliculate or involute; sheath initially closed, later split, narrowly hyaline-bordered; auricles usually present, narrow, obtuse, sometimes ±absent (often not visible on older plants); margins smooth; apex subulate. Lower bract narrow, leaf-like, 1.5–5.0 (~12) cm long, usually shorter, rarely longer than inflorescence. Capitulum ±ovoid, ±castaneous-brown, c. 0.55–0.60 (~0.75) mm long, faintly reticulate; seeds ±ovoid, ±castaneous-brown, c. 0.55–0.60 (~0.75) mm long, faintly reticulate; appendages absent. Fig. 49.

Widespread in SW Cape, distributed in S Cape and reaching S KwaZulu Natal (Transkei). Introduced to St Helena (specimens not seen) and Australia. 27: CPP, NAT. 28: sth [?]. 50: nsw, tas. In a variety of (seasonally) wet habitats, ditches and paths, along streams and near pools, and often also on grassy slopes. Map 193 (secondary distribution not shown).
A very variable species, exhibiting variation in some features ±constant in other taxa (e.g., the length of rhizome). The characters used for discrimination of the numerous taxa believed to be distinct from the typical *J. capensis* (names listed in the above synonymy) mostly concern the richness and shape of inflorescence, size of flowers and general growth. The common intermediates between the ecotypic forms and other morphological extremes show that all the morphotypes belong to a single, variable species.

### 16. Juncus caespiticius

**E.Mey., in J.G.C.Lehmann, Pl. Preiss.** 2: 47 (1846)


**Perennials,** (5–) 10–55 cm tall, densely caespitose; rhizome short; stolons absent. Leaves basal, ±leafy; stolons absent. Leaves basal, 5–18 (–29) cm long, canaliculate but almost terete near bases. Lower bract 2–11 cm long, narrow, subequalling inflorescence or longer than it. Inflorescence anathelate or umbelloid, rarely ±congested, of 1–10 (–20) hemispherical to cup-shaped 2–10 (–20)-flowered clusters c. 5–7 mm wide. Capitulum bracts ±ovate-lanceolate, stramineous to castaneous, to c. 2.5 mm long. Tepals ±unequal; outer tepals shorter or equalling inner ones, lanceolate, carinate, acuminate to acute, 1.5–3.0 mm long, pale castaneous-brown with paler ±minutely papillose to smooth midrib; inner tepals subobtuse, ±ovate, c. 2.4–3.0 mm long, broadly membranous-bordered. Stamens 6; anthers 0.4–0.8 mm long; filaments 0.4–0.6 mm long; style 0.2–0.4 mm long; stigmas 0.6–0.8 mm long. Capsule ovoid to elliptoid, subacute to ±obtuse, subtrigonous, c. 2.5 mm long, trilocular, smooth, dark golden brown to red-brown, shorter than or equalling outer tepals. Seeds broadly ovoid, 0.4–0.6 × c. 0.35 mm, pale brown, faintly reticulate; appendages absent.

Widely distributed in southern Australia and New Zealand. 50: NSW, SOA, TAS, VIC, WAU. 51: NZN, NZS. In damp, sandy places, often in swampy, brackish ground. Map 194.


New Zealand plants from less wet habitats sometimes have subcongested to almost globular inflorescences, and were described as var. *bracteatus*. Western Australian plants often have small flowers (tepals c. 1.5 mm long) but the plants are still as robust as in eastern Australia.

### 17. Juncus meianthus


*J. gracilis* R.Br., *Prod. 259* (1810), nom. illeg., non Roth (1787) nec Sm. (1800) T: *M'* [=Ora Meridionalis]; [Western Australia], King George III's Sound, *R.Brown [Bennett 5782]*; holotype: BM; iso: K.

**Perennials,** (6–) 10–25 (–30) cm tall, loosely caespitose; rhizome long, ±vertical, distally ±leafy; stolons absent. Leaves basal, 5–18 (–29) cm long, canaliculate but almost terete near bases.
JUNCACEAE (Juncus)


apex, 0.4–1.0 mm wide; apex acute; auricles absent. Lower bract filiform, 0.3–1.5 cm long, shorter than or rarely longer than inflorescence; capitulum bracts scarious, to c. 2 mm long, scabrid on midrib. Inflorescence umbelloid to rarely anthelate, of 1–10 (–20) heads; heads 2–8-flowered, c. 4–5 mm wide. Tepals unequal, ±narrowly ovate; outer tepals (1.0–) 1.2–1.5 mm long, acute to broadly-acute, mucronate, without hyaline margins; inner tepals 1.3–1.8 × 1.0 mm, rounded-obtuse, with broad whitish margins. Stamens 6, rarely 3 or 4; anthers (0.4–) 0.6–0.8 mm long; filaments 0.4–0.7 mm long; style 0.2–0.5 mm long; stigmas 0.3–0.8 mm long, pale yellow. Capsule ellipsoid to ovoid, subobtuse, shortly mucronate, dark golden brown to red-brown near apex, 1.5–2.0 mm long, distinctly longer than perianth. Seeds broadly ovoid, 0.4–0.6 mm long, 0.2–0.3 mm wide, pale castaneous, faintly reticulate; appendages absent. Fig. 51.

Endemic in Western Australia. 50: WAU. In damp places. Map 195.

The number of stamens is usually 6, but occasionally varies from 3 to 6 on the same plant. A few plants appear intermediate between this and J. planifolius, which may suggest hybridisation. Outer tepals are always narrower and less obtuse than the inner ones, which have broad whitish margins.

T: Campbell’s Island, 1200 ft, J.D.Hooker 1623; lecto: K, fide E.Edgar, in L.B.Moore & E.Edgar, Fl. New Zealand 2: 69 (1970); iso: BM, MEL s.n., NSW s.n., UPS.
T: New Zealand, Castle Hill Basin, Broken River, T.Kirk; holo: WELT11170; iso: K [as T.Kirk 630].
Illustration: J.D.Hooker, Fl. Antarct. 2(1): pl. 46 (1844).

Perennials, 1–5 (–12) cm tall, dwarf, loosely caespitose, turf-forming; rhizomes thin, c. 1 mm in diam., vertical and ascending, branched or many-headed; stolons ±absent. Leaves basal and sub-basal, ±flat to canaliculate, distally canaliculate to subinvolute, almost terete near apex, to 2–3 cm long, c. 0.5–0.9 mm wide near base; margins ±smooth and narrowly hyaline; apex ±obtuse to subobtuse, rarely minutely mucronate; sheaths loose, open, c. 4–8 mm long, with margins distinct, membranous; auricles absent. Bracts ±ovate, acuminate, pale castaneous-brown to brownist scarious, 2–6 mm long, shorter than or equalling inflorescence. Inflorescence terminal, c. 1 cm long, of a 2–10-flowered head; flowers on pedicels to c. 1.2 mm long. Tepals ±equal, 2.5–3.5 mm long, usually dark castaneous-brown, with a paler brownish-membranous border or unbordered, acute to acuminate; outer tepals ±lanceolate, carinate, 3-veined; inner tepals ovate-lanceolate. Stamens 3, rarely to 6; anthers 0.5–0.7 mm long; filaments 1.0–1.2 mm long; style c. 0.2 mm long; stigmas c. 0.6–0.8 mm long. Capsule narrow-ellipsoid, ±triangular, subtrigonous, subabruptly narrowing into a short micro, c. 2.8–3.1 mm long, golden brown to very dark red-brown, usually darker near apex, shorter than or equalling perianth. Seeds broadly ovoid, pale brown, 0.4–0.6 × 0.35 mm, distinctly transversely reticulate; appendages absent. Fig. 51.

In Australia (Tasmania, Victoria and New South Wales), and New Zealand (North, South, Stewart and subantarctic Islands). 50: NSW, TAS, VIC 51: ATP, NZN, NZS. Boggy ground, mostly at altitudes above 500 m but down to sea-level in southern New Zealand and associated islands. Map 196.

JUNCACEAE (Juncus)

T: 'J. D.' [Port Jackson; Insula Van Diemen]; [New South Wales] Port Jackson, R.Brown [Bennett 5786]; lecto: BM; designated here; iso: DBN, K, NSW [The other original syntype from Tasmania, Table Mountain [Mt Wellington], R.Brown; orig. syn: BM, belongs to J. caespiticosus. The lectotype is a more mature plant on the type herbarium sheet].
Juncus planifolius var. tenellus Benth., Fl. Austral. 7: 126 (1878). T: Australia, Mt M’Ivor, F.Mueller s.n.; syn: K.
Map: R.E.Brooks & C.E.Clemants, 41 al

Perennials, (6–) 15–50 (–70) cm tall, densely caespitose; rhizome short; stolons absent; cataphylls absent. Leaves basalt; sheaths open, pale brownish, usually suffused reddish; auricles absent; blades to c. 20 (–30) cm long, (1.5–) 2.5–6.0 (–11) mm wide, flat; apex acute. Lower bract leaf-like, to c. 10 cm long, shorter than inflorescence. Inflorescence usually diffuse, rarely subcongested, 2–12 cm long, anthelete, of 3–20 (rarely to 70) hemispherical (3–) 5–12 (–30)-flowered clusters c. 5–7 mm in diam.; peduncles slightly scabrid to smooth. Capitulum bracts lanceolate, acute, castaneous, paler towards margins. Tepals subequal or inner longer, (1.4–) 1.8–2.3 (–2.8) mm long; outer tepals carinate, castaneous to reddish brown, acute, usually with paler and thicker central band; inner tepals ovate-lanceolate, obtuse to ±acute, ±castaneous-brown, often with greenish later brownish central band; margins broad, membranous. Stamens 3 (rarely 4–6); anthers c. 0.4–0.5 mm long; filaments to c. 1.0 mm long; style 0.2–0.3 mm long; stigmas 0.4–0.5 mm long. Capsule ellipsoid to narrowly trigonous-ovoid, c. 2.0–2.5 mm long, golden brown to castaneous-brown, shiny; apex subobtuse, shorter than or ±equalling perianth, subabruptly narrowed into a mucro 0.3–0.5 mm long. Seeds ±ovoid, c. 0.35–0.50 × 0.20–0.25 mm, pale brown, distinctly transversely reticulate; appendages absent. Fig. 51.

A species with a wide disjunct distribution. It is native in SW Australia, New Zealand, Chile and Juan Fernández Is., introduced in Hawaiian Is., Ireland and Oregon, USA. 10: i.e.


50. NEW SOUTH WALES: Botany Bay, Jan 1908, J.L.Boorman (NSW 19897, NY, W). T: 'J. D.' [Port Jackson; Insula Van Diemen]; [New South Wales] Port Jackson, R.Brown [Bennett 5786]; lecto: BM; designated here; iso: DBN, K, NSW [The other original syntype from Tasmania, Table Mountain [Mt Wellington], R.Brown; orig. syn: BM, belongs to J. caespiticosus. The lectotype is a more mature plant on the type herbarium sheet].

T: Washington State, Mt Paddock, W.Suksdorf 678 [at Juncus falcatus]; holo: W.
Perennials, c. 15–55 cm tall, loosely caespitose; rhizome long, creeping, usually with long internodes; stolons present. Stem slightly compressed, papillose. Cataphylls absent or 1–2, dull brownish, to c. 3 cm long; basal leaves few. Cauline leaves 1–3; lower leaves c. 10–25 cm long; upper leaves with blade 4–7 cm long, c. 1.5–2.5 (–4.0) mm wide; sheaths narrow, with a very narrow membranous margin; auricles ± absent or linear, subacute, to 0.5–0.7 mm long; apex subulate. Lower bract reduced, c. 0.5–2.0 cm long, ± shorter than inflorescence; middle bracts lanceolate, acuminate, to c. 6 mm long, scarious. Inflorescence a single sessile head (rarely up to 3–4 heads), globose, rarely hemispherical, 8–15 (–30)-flowered, with other heads on peduncles to c. 5 cm long. Tepals ± equal, 4.5–5.3 (–5.7) mm long, usually abaxially scabrid; outer tepals sometimes slightly longer, lanceolate, acute or subacute, bright castaneous, with central band green or later stramineous; inner tepals ovate-lanceolate, obtuse, broadly bordered, with margins membranous. Stamens 6; anthers 0.9–1.5 mm long; filaments 0.7–1.2 mm long; style c. 1.0–1.4 mm long; stigmas 1.5–2.5 mm long. Capsule ± ovoid, trilocular, trigonous, ± truncate with a short mucro, ± equalling perianth, c. 3.5–4.5 mm long. Seeds ± ellipsoid, ± pale brown, c. 0.5–0.7 × c. 0.2 mm long, or 1.4–1.8 mm long including two appendages each 0.5–0.6 mm long, ± smooth; outer seed-coat ± loose. Fig. 52.

Pacific North America from British Columbia and Alberta in SW Canada to California. 71: ABT, BRC. 73: IDA, MNT, ORE, WAS, WYO. 76: CAL, NEV, UTA. Wet meadows, boggy slopes, seepage areas, in the mountains above 1000 m. Map 198.


T: USA, California, Trinity Co., N of Carryville, summit of Scotts Mtns, 24 Aug 1936, J.T.Howell 12750; holo: USNA; iso: CAS.


Perennials, 20–30 cm tall, loosely caespitose; rhizome creeping, long; stems slightly compressed, loosely tufted or spaced. Cataphylls 0–2, loose, brownish, to c. 7 cm long; basal leaves 2–4. Cauline leaves 2–3, flat, 12–15 (–30) cm long, 2–4 mm wide; sheaths ± loose; margins membranous; auricles scarios, oblong, obtuse, 1–2 (–3) mm long. Lower bract reduced, to c. 3 cm long, much shorter than inflorescence; margins papillose-serrulate. Inflorescence decompound, anhelate, loose, c. 4–9 cm long, of (2–) 3–9 hemispherical 3–8 (–10)-flowered heads c. 10–15 mm wide. Tepals subequal; outer tepals usually slightly shorter, ovate-lanceolate, 5.2–6.4 mm long, with central band pale green bordered deep castaneous and distally scabrid; apex acuminate, dark; margins membranous to brownish-scarious, broad, subabruptly narrowing (apex obtuse or mucronate), sometimes forming very short auricles. Stamens 6; anthers 1.8–2.6 mm long; filaments 0.5–1.0 mm long; style c. 0.6 mm long. Capsule trilocular, obovoid; apex subobtuse, subabruptly narrowing in a short mucro, c. 3.5–4.8 mm long, shorter than perianth, tan. Seeds ± ellipsoid, 0.5–0.7 × c. 0.25 mm long, conspicuously reticulate, brown; appendages distinct, 0.2–0.4 mm long each. Fig. 53.

Endemic in the mountains of California, Oregon and Washington; an occurrence in Idaho requires confirmation but is possible. 73: ?IDA, ORE, WAS. 76: CAL. Moist meadows and open damp places in the mountains. Map 199.

76. CALIFORNIA: Plumas Co., Butterfly Valley, W of Keddie, L.S.Rose 66068 (AAU); Siskiyou Co., Bear Springs area, c. 1600 m, W.J.Ferlatte 2109 (UC); Siskiyou Co., Parks Cl Road, c. 1.5 km N of Trinity Co. border, c. 2100 m, 23 Jul 1986, W.J.Ferlatte (UC); Lassen National Park, Hat Cl, c. 2100 m, H.Bailey & V.Bailey 2908 (UC).

22. Juncus repens Michx., Fl. Bor.-Amer. 1: 191 (1803)

JUNCACEAE (Juncus)


Perennials, heteromorphic; one form caespitose (in drier places) with one to several stems 5–15 cm tall, each with 1–4 (–8) flower heads; in wet sites and shallow water prostrate with creeping and rooting stems and leaf rosettes developing 5–10 cm apart along the stem; when floating then with remote rosettes. Rhizome sometimes present, densely branched. Stems compressed, 0.8–2.0 mm in diam., up to 50 cm long, internodes 5–10 cm long. Leaves in dense rosettes, 2–15 cm long, 1–4 mm wide, flat; blades not distinctly separated from sheaths 0.5–1.5 cm long; margins scarious; auricles rounded to acutish, to 0.5 (–0.8) mm long. Lower bract leaf-like; floral bracts broadly lanceolate, mucronate, 1–2 mm long. Inflorescence an anthela of 2–8 conical to hemispherical 2–20-flowered heads 7–13 (–20) mm in diam. Tepals unequal, green or slightly reddish; outer tepals 2.8–4.2 mm long, scarious towards margins; inner tepals longer (3.5–) 4.0–5.0 mm long, subulate; margins distinct, narrow, involute, scarious. Stamens 3; anthers 0.3–1.0 mm long, at first as long as filiform filaments, after dehiscence only 1/7 length; style c. 0.2 mm long; stigmas c. 0.4 mm long. Capsule trilocular, linear to lanceolate in outline, trigonous, truncate to retuse, 2.5–3.5 mm long, 0.7–1.1 mm wide, shorter than inner tepals; base thin-walled and hyaline; apex thicker, stramineous to golden-brown. Seeds oblique, ovoid, apiculate, c. 0.3 × 0.15 mm, finely rugose, castaneous; appendages absent.


79. MEXICO: Tabasco, W of Huimanguillo, B.Barlow 30/133 (BM, MEXU, UC, WIS).


T: L’Amerique méridionale, L.Née s.n.; holo: G.


Perennials, 5–30 cm tall; rhizome creeping, ascending, gradually changing in stem, rooting, branched, 0.7–1.5 mm in diam.; internodes to 3 cm, with scarious scale-leaves to 1.5 cm long. Cataphylls absent or 1–3, scarious, to 2 cm long, with blade to 3 mm long; cauline leaves 5–15, ±remote, 3–12 cm long, 1–7 mm wide, gradually changing to sheaths 0.5–3 cm long, with or without scarious margins; auricles absent. Lower bract leaf-like, to 9 cm long; floral bracts scarious, to 5 mm long. Inflorescence anthela, of 1 (–) 5–40, (3–) 5–10-flowered heads on thin peduncles 0.2–0.3 mm in diam., proliferation sometimes present. Tepals ±equal, 2.2–4.0 (–5.0) mm long, linear to lanceolate, acuminate, green, later castaneous to light brown; margins scarious, narrow. Stamens 3; anthers 0.5–1.0 mm long, much shorter than 2 mm filaments; style c. 0.5 mm long; stigmas 1.5–2.0 mm long. Capsule 3-septate, ellipsoid-trigonal, 2.0–3.5 mm long, 1.0–1.5 mm wide, ±equalling perianth, thin-walled. Seeds ellipsoid, apiculate, c. 0.4 × 0.2 mm, reticulate, castaneous; appendages absent. Fig. 54.
Found in the Andes from Colombia to Chile and Argentina; and reportedly disjunctly in Sierra Nevada, California [see J.Jokerst, *Fremontia* 14(2): 22–23 (1986)], but material not seen. 76: CAL(?). 83: BOL, CLM, ECU, PER. 85: AGW, CLN, CLC. Bogs, wet meadows, swamps, ditches.  

**83. BOLIVIA:** Cochabamba, Ayopayo, Independencia, 3045 m, Baar 362 (GOET).  
**ECUADOR:** Carchi, El Pun-Tucán, 3000 m, E.Asplund 4768 (C); Carchi, El Pun-Tucán, 3600–3700 m, F.W.Pennell & E.P.Killip 6547 (GH, NY, PH, US).  
**ECUADOR:** Carchi, El Pun-Tucán, 3000 m, E.Asplund 14894 (C, G, K, LL, NY, S, UC, UPS, US).  
**PERU:** Huamachuce, Hacienda Cochabamba, 3200 m, López Miranda 1483 (NY, UC, US).  
**ARGENTINA NORTHWEST:** Tucumán, Chicligasta, Estancia Santa Rosa, 3600 m, 11 Jan 1927, S.B.Buckley 763 (LP).  
**ARGENTINA SOUTH:** Río Negro, Bariloche, Camino al Tronador, frente al lago Mascar de, S.Crespo & E.R.Guaglianone 2114 (BAB); Chubut, Cushamen, Lago Esperanza, Pobl. Cárdenas, 550 m, A.Johnson 612 (SI).  
**CHILE CENTRAL:** Maule, Talca, Vilches Alto, Gardner & al. 4431 (K); Talcahuano, Ramuncho, J.Hutchinson 231 (K). 


**25. Juncus marginatus** Rostk., *De Junco* 38 (1801)  
**Luzula angustifolia** Poir., *Encycl.*, Suppl. 3: 530 (1813).  
**Luzula juncoides** Poiret., *Encycl.*, Suppl. 3: 535 (1813).  


Perennials, 40–100 (–130) cm tall, caespitose; rhizome short, rarely to 5–6 cm, densely branched, 2–4 mm diam.; stolons absent. Stems sometimes bulbous-based, slightly compressed, 0.5–3.0 mm diam., smooth. Cataphylls absent; basal leaves 2–5 per stem; sheaths to 9 cm long; blade 10–30 (–45) cm long, 1–5 mm wide, flat, usually with prominent abaxial midrib and two distinct adaxial veins; cauline leaves similar to basal ones, distally shorter; auricles 0.5–1.0 (–3.0) mm long, rounded. Lower bract leaf-like, as long as or shorter than inflorescence; floral bracts lanceolate, acute, scarious, ±as long as tepals or shorter. Inflorescence compound, anthelate, 4–15 × 2–10 cm; main branches to 10 cm long, to 1 mm diam., of (5–) 10–40 (–200) ±hemispherical (1–) 3–9 (–20)-flowered heads 5–7 mm wide, stramineous to dark brown. Tepals unequal, ±brown with green midstripe; outer tepals lanceolate, obtuse to acute, (1.8–) 2.0–2.8 (–3.2) mm long, with margins scarious; inner tepals longer, lanceolate, 2.4–3.0 (–3.5) mm long, obtuse to acute, with margins scarious, inflexed and forming a little cap when young. Stamens 3, sometimes slightly exserted; anthers 0.3–1.0 (–1.2) mm long, shorter than to rarely ±equaling 1.0–1.5 (–2.5) mm filaments; style c. 0.1 (–0.3) mm long; stigmas ±equaling perianth, round in T.S., 2.0–2.5 mm long, 1.8–2.0 mm wide, 3-septate, dehiscing apically, dark brown, glossy. Seeds narrowly and obliquely ellipsoid, apiculate, 0.5–0.6 × 0.15–0.2 mm, reticulate, yellow-brown; appendages absent. 2n = 40, fide N.A. Harriman, in Á. Löve, *Taxon* 28: 406 (1979); 2n = 38, fide S. Snogerup, *Bot. Not.* 116: 150 (1963). Fig. 54.

Disjunctly in E part of North America, from SE Canada to the S USA; in Central America from Mexico to Costa Rica; in Cuba and Bermuda in the Caribbean; in S America Venezuela, widespread from SE Brazil to Paraguay, Uruguay and Argentina. 72: NSC, ONT, QUE. 73: COL, ORE. 74: ILL, IOW, KAN, MIN, MSO, NEB, OKL, SDA, WIS. 75: CNT, INI, MAI, MAS, MIC, NWH, NWJ, NWY, OHI, PEN, RHO, VER, WVA. 76: ARI, CAL. 77: NWY, TEX. 78: ALA, ARK, DEL, FLA, GEO, KTY, LOU, MRY, MSI, NCA, SCA, TEN, VRG, WDC. 79: MNC, MXE, MXG, MXS, MXT. 80: BLZ, COS, GUA, HUA, HON, NIC. 81: BER, CUB. 82: VEN. 84: BZL, BZS. 85: AGÉ, AGS, AGW, PAR, URU. Moist to wet sandy, peaty, or clayey soils, usually in open areas including bogs, shores, marshes, and ditches.  Map 203.
JUNCACEAE (Juncus)


Perennials, 8–18 (–29) cm tall; rhizome long, creeping; stoloniform, c. 1.0–1.7 mm thick, with remote scarious-stramineous scales. Stem slightly compressed, ±rigid, minutely papillose distally. Cataphylls 0–2, greenish to brown; basal leaves 2–5, c. 6–13 (–20) cm long; cauline leaves 1–3, shorter, margins papillose at least distally; sheath margins scarious; auricles usually ±absent, less often developed, scarious, to 1 mm long. Lower bract leaf-like or pale brownish, 1–5 cm long, equalling or exceeding inflorescence. Inflorescence usually a single, semiglobose–globose c. 2–8-many-flowered dark castaneous terminal head, or composed of 2 (–4) shortly pedunculate clusters of 2–15 flowers. Tepals ±equal or outer ones slightly longer, ovate-lanceolate, finely papillose; outer tepals with narrow scarious to membranous margins, ±acute, deep to dark castaneous brown to dark brown, with central band green to paler brown, ; inner tepals ±obtuse to subacute, with broader scarious margins. Stamens 6. Capsule trilocular, ±broadly obovoid, ±truncate to retuse at apex, 3.5–4.5 mm long, shorter than or ±equalling perianth, dark castaneous-brown. Seeds ±obliquely ovoid, c. 0.5–0.7 × c. 0.3 mm; outer seed-coat not tight, usually shining, slightly reticulate; appendages absent. 2n = 38, *fide* R.L.Taylor & G.A.Mulligan, *Fl. Queen Charlotte Isl.* 2: 44 (1968).

Widely distributed in W North America, Australia and Tasmania. Reports of the occurrence in Japan probably refer to *J. prominens*. Two subspecies are recognized, with intermediates rarely observed (e.g., *W.S.Cooper 28-11, 2875*).

Anthers much longer than filaments; style c. 0.8–1.0 mm long 26a. subsp. *falcatus*

Anthers ±as long as filaments; style c. 0.5 mm long 26b. subsp. *sitchensis*

26a. *Juncus falcatus* E.Mey. subsp. *falcatus*


Leaves c. 1.5–3.0 mm wide. Tepals (3.5–) 4.3–5.5 (–6.0) mm long. Anthers 1.0–1.3 mm long, much longer than 0.4–0.7 mm long filaments; style c. 0.8–1.0 mm long; stigmas c. 1.5–2.0 mm long.  Fig. 51.

Disjunctly in California and in Australia (New South Wales, Victoria and Tasmania). 50: NSW, TAS, VIC. 76: CAL. Mostly coastal, in wet depressions among dunes, wet flats. Reports from Japan refer to the closely related *J. prominens*. Map 204.

Illustration: E.Hultén, Fl. Alaska 288, fig. 9 (1968).

Leaves c. 1.0–2.5 mm wide. Tepals 4.0–5.2 mm long. Anthers 0.8–1.3 mm long, about as long as 0.7–1.1 mm long filaments; style c. 0.5 mm long; stigma c. 1.0 mm long.


Perennials, c. 10–25 cm tall, very loosely caespitose; rhizome long, creeping; stolons 1.2–1.5 mm in diam. Cataphylls 0–2, brown to pale brownish; basal leaves 2–5, 8–13 (~20) cm long, 1.2–2.5 mm wide; sheaths loose; auricles absent or scarious, subacute, 0.3–0.8 mm long; cauline leaves 2–4, with margins papillose. Lower bract narrow, leaf-like, to c. 5 cm long, shorter than or exceeding inflorescence. Inflorescence usually umbelloid, of (1–) 2–4 (~6) obconical to semiglobose 3–7-flowered clusters; peduncles to c. 3 cm long, distinctly papillose, sometimes abbreviated. Tepals ±broadly lanceolate, subequal; outer tepals slightly longer, 3.0–4.2 mm long, papillose. Stamens 6. Capsule trilocular, oblong-ovoid, c. 3.5–4.5 mm long, usually truncate to retuse, distinctly exceeding perianth. Seeds obliquely ovoid, apiculate, c. 0.4 × 0.2–0.25 mm, brown; outer seed-coat thick, distinctly reticulate; appendages absent. 2n = 38, fide S.Snogerup, Bot. Not. 116: 150 (1963).

Perianth of North America and adjacent area, from British Columbia to California. Two varieties are recognized. The differences between the two varieties usually are rather weakly correlated, and they may not deserve recognition at the varietal rank.

Perianth and capsule dark brown; capsule much exceeding perianth

Perianth pale brown, capsule brown to pale brown; capsule slightly exceeding perianth
27a. Juncus covillei Piper var. covillei

Outer tepals acute to mucronate; inner tepals rounded; tepal central band greenish to brown, bordered dark castaneous-brown; tepal margins membranous to translucent-brownish. Anthers 0.9–1.4 mm long; filaments 0.5–0.8 (–1.0) mm long; style 0.8–1.0 mm long; stigmas c. 1.5 mm long. Capsule dark brown, truncate, mucronate, much exceeding perianth. 2n = 36, fide R.E.Brooks & C.E.Clemants, *Fl. N. Amer.* 22: 229 (2000). Fig. 55.

Coastal and low montane areas from S British Columbia to California. 71: BRC. 73: IDA, MNT, ORE, WAS. 76: CAL. Coastal habitats and wet sites around lakes. Map 206.


Frequently and erroneously reported from Japan, due to a misidentification of *J. covillei* with *J. prominens*.


Outer tepals acute to mucronate; inner tepals obtuse to subacute; tepal central band greenish to straw-brown, bordered pale brown; tepal margins membranous to scarious-brownish, broad. Anthers 0.9–1.2 mm long; filaments c. 0.5 mm long; style (including the base of young capsule mucro) c. 1.0 mm long; stigmas c. 1.5 mm long. Capsule truncate to retuse, light brown to brown. Fig. 55.

Occupying a similar range as that of the type variety but extending to higher altitudes. 71: BRC. 73: IDA, MNT, ORE, WAS. 76: CAL. Along streams, lake shores, wet sites. Map 207.

76. CALIFORNIA: Sierra Nevada, Fresno Co., North Fork Kings R., Balch Camp, c. 400 m, Taylor 9196 (UC); San Bernardino Co., Lake Arrowhead, 1500 m, I.W.Clokey 5140 (UC); Trinity Co., Trinity Center, 28 Aug 1936, J.T.Howell 12770 (UC); Eel R., Thorne 35098 & Everett (NSW, RSA).


Perennials, c. 20–35 (–50) cm tall, loosely caespitose; rhizome long, creeping to ascending, c. 1.5 mm diam. Cataphylls 0–2, brown; basal leaves 2–4, with margins papillose; sheaths loose; auricles usually present, scarious, subacute, to c. 1 mm long. Lower bract short, leaf-like, to c. 3 cm long, usually shorter than inflorescence. Inflorescence umbelloid, of (1–) 2–4 (–5) ±semiglobose dark 3–8-flowered heads; peduncles to c. 4 cm long, papillose, rarely abbreviated. Tepals subequal, papillose, 3.5–4.5 mm long; outer tepals slightly longer, ±acute to mucronate; inner tepals obtuse to rounded; central band greenish to pale brown, bordered deep castaneous; margins translucent-brownish, rarely scarious. Stamens 6; anthers c. 1.0–1.4 mm long; filaments
0.6–0.9 mm long; style to c. 0.8 mm long; stigmas c. 1.5 mm long. Capsule trilocular, broadly obl-long-ovoid, 3.6–4.4 mm long, obtuse to truncate, mucronate, dark castaneous-brown, exceeding perianth or slightly so. Seeds obliquely narrowly ovoid, c. 0.7 × 0.35 mm; outer seed-coat not tight, shining, faintly reticulate, pale brown; appendages absent.

Confined to Kuril Is., Komandor Is. and Japan. 31: KAM, KUR. 38: JAP. Wet grassy slopes, margins of woods, along streams. Erroneously reported from Washington, a record which is actually J. covillei. Map 208.


38. JAPAN: Hokkaido, Hidakas, Shizunai, 2 Jul 1974, M.Furuse 6078 (BM); Hokkaido, Mt Tokachi, U.Faurie 7208 (BM); Hokkaido, Hidaka, Shoya, 3 Sep 1933, H.Hara (S).

Juncus prominens approaches J. falcatus in seed characters but its capsules are longer than the perianth, and tepals are up to c. 4 mm long. Together with J. falcatus and J. covillei, it forms a complex group.


Perennials, c. 20–45 cm tall, loosely caespitose; rhizome horizontal, creeping, to c. 2 mm diam., with internodes 0.5–5 cm long; stolons present. Stem erect, slightly compressed, ±papillose. Cataphylls 1–3, brownish, usually 1.5–4 cm long. Basal and sub-basal leaves several, c. 5–25 (–30) cm long, (1–) 3–5 (–6) mm wide, flat; cauline leaves 1–3, shorter and narrower; margins papillose-serrulate; apex subulate; sheaths with narrow scarious or membranous margins; auricles absent or up to 0.5–0.8 mm long, subacute, scarious. Lower bract leaf-like or reduced, brownish, 1–4 cm long, much shorter than inflorescence. Inflorescence usually 3–10 cm long, decom pound, of (2–) 3–8 (–12) cup-shaped to hemispherical, (4–) 5–8 (–10)-flowered heads on peduncles usually 2–8.5 cm long. Capitulum bracts pale castaneous, to 6 mm long. Tepals subequal, deep castaneous to ±brown; outer tepals often slightly shorter, lanceolate, acute; inner tepals subovate, mucronate, 5–6 mm long, with central band green becoming pale brown, narrow, slightly papillose; margins brownish and narrowly membranous. Stamens 6; anthers 1.6–2.8 mm long; filaments 0.4–0.6 (–0.8) mm long; style (including young mucro) 1.3–1.9 mm long; stigmas to 3.5 mm long. Capsule trilocular, elongated-ovoid, ±truncate, c. 3.5–4.5 mm long including 0.4 mm muco, pale castaneous, shorter than perianth. Seeds narrowly ovoid, c. 0.5–0.6 × 0.25 mm, apiculate, brown, distinctly reticulate; appendages absent. 2n = 40, fide R.E.Brooks & C.E.Clemants, Fl. N. Amer. 22: 226 (2000). Fig. 56.

Pacific North America, from British Columbia to California and Nevada. 71: BRC. 73: IDA, ORE, WAS. 76: CAL, NEV. Wet ground in mountain meadows, to 3300 m. Map 209.

76. CALIFORNIA: San Luis Obispo Co., Price Canyon, R.F.Hoover 9172 (UC); Siskiyou Co., 1879, C.B.Bradley (UC); Inyo Co., Rock Ck Lake basin, c. 3300 m, 6 Aug 1940, F.W.Peterson (UC); Nevada Co., Trout Laboratory, Sage Hen bog, 2100 m, J.Langenheim 4419 (UC). NEVADA: Esmeralda Co., the White Mtns, Chiatovitch Ck, 2300 m, V.Duran 2765 (UC).


T: New Mexico, near the Copper Mines, Bigelow.
Figure 56. *Juncus orthophyllus*. A, habit; B, cauline leaf sheath; C, auricles; D, perianth; E, seed. Scale bars: A = 2 cm; B = 2 mm; C, D = 1 mm; E = 0.5 mm. Drawn by J.R. Janish. Reproduced with permission, from C.L. Hitchcock, A. Cronquist, M. Ownbey & J.W. Thompson, *Vasc. Pl. Pacif. Northw.* 1: 204 (1969). © University of Washington Press.
JUNCACEAE (Juncus)


Perennials, c. 20–35 (–55) cm tall, loosely caespitose; rhizome long, creeping, to 1.5 mm in diam., with internodes long; stolons ascending. Stem subterete to slightly compressed, usually ±papillose. Cataphylls 1–2, dull brownish, to c. 5 cm long; basal leaves few; cauline leaves 2–3, blades flat, c. 3–14 cm long (upper shorter), 1.5–2.5 mm wide; margins often papillose; apex subulate; sheaths narrow, with broad membranous margins; auricles distinct, 1.0–2.0 mm long, broadly obtuse or truncate. Lower bract reduced, pale brownish-subherbaceous, c. 1–2 cm long, shorter than inflorescence. Inflorescence of (1–) 2–4 (–7) subcongested or variably pedunculate cup-shaped to ±hemispherical (2–) 4–7-flowered heads (if heads congested then compound heads to 15-flowered); peduncles to 5–6 cm long, usually shorter. Upper bracts ovate, acuminate, to 6 mm long, ±scarios. Tepals subequal, ovate-lanceolate, conspicuously broadly membranous-bordered; outer tepals subacute; inner tepals subobtuse and often mucronate, c. 4.5–6.0 mm long, with central band green becoming pale castaneous or ±stramineous. Stamens 6; anthers 1.1–1.7 mm long; filaments 0.6–1.0 mm long; style 0.7–0.9 mm long; stigmas 1.5–2.5 mm long. Capsule trilocular, narrowly ovoid-trigonous, ±equalling perianth, c. 3.5–4.8 mm long, castaneous-brown above, obtuse to subtruncate; mucro to 0.3 (–0.5) mm long. Seeds oblong, c. 0.50–0.65 × c. 0.25 mm, indistinctly reticulate; appendages ±absent or inconspicuous. 2n = 40, fide Å.Löve & D.Löve, Taxon 30: 849 (1981). Fig. 57.


71. ALBERTA: Craigmyle, A.H.Brinkman 765 (W); Edmonton, White Mud Ck, G.H.Turner 1492 (W).
73. COLORADO: El Paso Co., J.Ewan 15205 (W); Moffat Co., W.A.Weber 14384 (W).
74. NORTH DAKOTA: Dawson, Buffalo Lake, O.A.Stevens 109 (W).
76. ARIZONA: Coconino Co., D.J.Pinkava 6236 (W).


Perennials, c. 20–90 cm tall, densely caespitose; rhizome short; stolons absent. Stem ±terete, smooth. Erect. Cataphylls 0–2, to c. 5–10 cm long, loose, pale greyish-brownish, often with pinkish tinge; margins membranous, broad, scarious, auriculate; blade reduced to mucro. Basal leaves 2–5, light brown, up to 45 cm long, c. 1–3 mm wide, flat. Cauline leaves 1–3, c. 8–15 cm long, to 2 mm wide; margins papillose-serrulate; sheaths with narrow scarious margins; auricles oblong, obtuse to truncate, c. 1.2–2.5 mm long, scarious. Lower bract ±stramineous to greenish, to c. 4 cm long, with a filiform apex, much shorter than inflorescence. Inflorescence ±loose, usually 7–20 cm long, of paniculate appearance, of c. 5–25 obconical 2–5 (–7)-flowered pale heads on usually branched peduncles of variable length. Capitulum bracts scarious, to c. 4 mm long. Tepals ±equal or inner slightly longer, lanceolate, 4.2–5.5 mm long; outer tepals acute; inner tepals subacute or subobtuse and mucronate; central band smooth, distinctly veined, pale green, becoming pale castaneous or ±stramineous; margins very broad, scarious. Stamens 6; anthers 1.7–2.6 mm long; filaments
Figure 57. *Juncus longistylis*. A, habit; B, auricles; C, perianth and stamen; D, capsule; E, seed. Scale bars: A = 2 cm; B, D = 2 mm; C = 5 mm; E = 0.5 mm. Drawn by J.R. Janish. Reproduced with permission, from C.L. Hitchcock, A.Cronquist, M.Ownbey & J.W. Thompson, *Vasc. Pl. Pacif. Northw.* 1: 200 (1969). © University of Washington Press.
JUNCACEAE (*Juncus*)

0.5–0.9 mm long; style 0.8–1.5 mm long; stigmas to 3.0–3.5 mm long. Capsule trilocular, narrowly obovoid, c. 3.4–4.5 mm long including a mucro 0.4–0.7 mm long on a truncate top, pale brownish, shorter than or ±equalling perianth. Seeds ±ovoid, c. 0.4–0.6 × 0.2–0.3 mm, brown, distinctly regularly reticulate; appendages absent.

Confined to SW United States (Arizona, Nevada and California). 76: ARI, CAL, NEV. Wet sandy or gravelly sites along streams, marshy ground, up to c. 2500 m. Occurrence in NW Mexico is possible. Map 211.


Doubtful taxa


T: Cape, between Vanstadensberg and Bethelsdorp, 1830, *J.F. Drège 1604b* p.p. [some gatherings with *Juncus dregeanus*]; holo: P; iso: B [destroyed, but picture deposited at W], G, S, W.

*Juncus singularis* Steud., treated as the only member of subg. *Singulares* by Buchenau, remains unclear. The absolute match in all floral and fruit characters between the original material of *J. singularis* and *J. capensis* strongly supports the conclusion of A.A.Obermeyer, *in* A.A.Obermeyer, J.Lewis & R.B.Faden, *Fl. S. Afr.* 4/2: 83–84 (1985) that *J. singularis* should be included in the widespread and variable *J. capensis*. The exceptional leaf characters (a distichous arrangement of leaves and the round T.S.), however, are unknown in other groups of the sect. *Graminifolii*. The fact that plants with the latter characters have been collected only once, by *J.F.Drège* in 1830, in a few specimens, suggests that these plants may be accounted for as a rare mutation of *J. capensis*.


T: not designated [no specimen quoted in the protologue, S Africa].

R.S.Adamson, *in* R.S.Adamson & T.M.Salter, *Fl. Cape Pen.* 165 (1950), wrote: ‘Recorded once 30 years ago at Kirstenbosch’]. According to the description, the plant might represent a form of *J. sonderianus*.

Sect. 3. CAESPITOSI

*Juncus* sect. *Caespitosi* Cout., *Bol. Soc. Brot.* 8: 90 & 104 (1890)


T: *Juncus capitatus* Weigel

Annuals, dwarf to small, 1–15 (~30) cm tall. Leaves basal, canaliculate or rarely ±flat or ±terete, non-septate, acute; auricles absent, marginal; sclerenchyma absent. Lower bract inconspicuous or leaf-like. Inflorescence terminal, usually of 1–7 subseessile to pedunculate 1–12 (~20)-flowered heads; floral bracteoles absent; peduncles not incrassate. Seeds subglobose to oblong-ellipsoid, minutely apiculate, reticulate to ±smooth; appendages absent.

A section of 16 usually delicate annual species centred in Southern Africa and W North America; only a single species, *J. capitatus*, is not confined to either of the two areas. The evolution towards annuality might have taken place in two (or maybe three) areas independently but the section *Caespitosi* represents a very pragmatic solution (see also B.J.Értter, *Mem. New York Bot. Gard.* 39: 34–39 (1986).
1 Stamens 6

2 Tepals usually longer than 6 mm, yellowish stramineous

42. J. scabriusculus

3 Outer tepals longer than the inner but of ±equal shape, narrowly linear-triangular to linear-lanceolate, elongated-acuminate, usually slightly recurved; flower heads globose, of echinate appearance

44. J. stenopetalus

4 Tepals usually shorter than 6 mm, usually at least partly (distally) with darker coloration

32. J. capitatus

5 Inner tepals distinctly longer than the outer [South Africa]

43. J. obliquus

6 Outer tepals ±shorter than the inner or subequal, with inner usually broader and more obtuse, ± lanceolate to ovate-lanceolate, not distinctly acuminate nor recurved; flower heads cup-shaped, hemispheric or globose

33. J. triformis

7 Anthers shorter than filaments; style shorter than 0.2 mm; longer tepals shorter than 3 mm

45. J. rupestris

8 Capsule usually longer (to 1.5 times) than perianth

41. J. hemiendytus

9 Capsule shorter to slightly longer than perianth

38. J. capillaris

10 Seeds 0.5–0.8 mm long

11 Bract single

40. J. uncialis

11: Bracts 2–10

12 Inner tepals distinctly longer than the outer [South Africa]

43. J. obliquus

13 Inner tepals ±equalling the outer [W North America]

39. J. bryoides

13: Style reduced, less than 0.1 mm long; anthers to 0.3 mm long; flowers single per stem; seeds smooth to faintly reticulate

14 Capsule at least the distal part) dark reddish (to blackish) when ripe; flowers almost always trimerous

35. J. kelloggii

14: Capsule pale, pale greenish to light reddish or pinkish; flowers dimerous or trimerous

41. J. hemiendytus


Annuals, (2–)3–9–15 cm tall, caespitose; rhizome absent. Cataphylls few, ±membranous. Leaves basal, usually 3–4–(–6) cm long, linear, ±canaliculate, c. 0.5 mm wide; sheaths with broad membranous margins; apex acute; auricles absent. Lower bracts 1–2, herbaceous, with the longer usually 0.8–1.2 (–4.0) cm long, overtopping inflorescence; middle bracts ±membranous, ±as long as the respective heads. Inflorescence composed of 1–2 (–4) usually 3–7 (–12)-flowered ±hemispherical heads, with one sessile, and the others on subequal peduncles c. 1–1.5 cm long. Flowers cleistogamous, rarely chasmogamous, usually trimerous. Tepals unequal; outer tepals longer, 3.0–4.5 (–6.0) mm long, oblong-ovate, keeled, long-acuminate, with midrib greenish to pale brown and broad membranous margins; inner tepals usually 2.2–3.6 (–4.0) mm long, ±subacute, mucronate, membranous. Stamens 3, (2–3) as long as tepals; anthers c. 0.2–0.5 (–0.6) mm long; filaments (0.6–) 0.8–1.3 mm long; style 0.3–0.5 mm (rarely to 1 mm) long; stigmas c. 1 mm long. Capsule broadly ovoid to ±ellipsoid, c. 1.7–2.2 mm long, much shorter than perianth, subobtuse, ±mucronulate, trilocular, ±castaneous-brown. Seeds ±obliquely ovoid, 0.25–0.35 mm long, c. 0.2 mm wide, pale brown, apiculate; appendages absent, transverse reticulation slight, ±rectangular. 2n = 18, *fide* S.Snogerup, *Bot. Not.* 116: 149 (1963). Fig. 58.


Annuals, (2–) 5–12 (–17) cm tall, caespitose. Stem erect, leafless; basal leaves to 5 cm long. Flowers (1–) 2–8, usually trimerous, occasionally dimerous; bracts 2–10, ovate to broadly lanceolate, acute, unpigmented or castaneous, 0.7–2.4 mm long. Tepals linear to lanceolate, (1–) 1.9–4.5 mm long, (0.3–) 0.5–1.1 mm wide; inner tepals usually 0.2–0.8 mm longer (rarely subequal or shorter) than the outer, (acute–) acuminate to attenuate, erect to recurved, with central band remaining green or turning pale to dark reddish. Stamens (2–) 3, 1.5–3.1 mm long; anthers often somewhat sagittate–based, (0.6–) 1–2.2 mm long, c. 1.25–3 times filament length; style (0.5–) 0.9–3.2 mm long; stigmas 0.5–2.5 mm long, often reddish. Capsule (globose–) ovoid to ellipsoid or oblong, (1.1–) 1.6–2.5 (–2.9) mm long, 0.5 times tepal length or sometimes subequal or rarely longer, usually pale to dark reddish. Seeds to 6 (–8) per row and c. 35 (–50) per capsule, variable in size and shape even in the same capsule, subglobose to ellipsoid, 0.3–0.8 mm long, usually apiculate and umbonulate, distinctly ridged or lightly ridged (but then seeds at least 0.5 mm long). 2n = c.36, fide B.J.Ertter, Mem. New York Bot. Gard. 39: 27 (1986).

Fig. 59.

Endemic to the Sierra Nevada and foothills, and San Diego Co., California, United States. 76: CAL. On shallow soil and seepage at the edges of granite outcrops, sandy stream beds, 50–2500 m. Map 213.


A variable species with the extremes sometimes recognized as separate species (J. megaspermus is based on high altitude samples). A complete intergradation between the extremes was observed by B.J.Ertter, Mem. New York Bot. Gard. 39: 45 (1986).
Figure 58. *Juncus capitatus*. A, habit; B, inflorescence; C, flower; D, outer tepal; E, inner tepal; F, H, capsule; G, seed; I, stem T.S.; J, leaf T.S. (*A–I, Fleischer, 12 Aug 1875, KRA*). Scale bars: A = 5 cm; B = 5 mm; C–F, H = 2 mm; G = 0.5 mm; I, J = 1 mm. Drawn by T.Szynal. Reproduced with permission, from T.Szynal & J.Mądalski, *Atlas Fl. Polsk. 2/2*: 123 (1931).
JUNCACEAE (*Juncus*)


Annuals, 2–12.5 cm tall. Stem erect, leafless, (0.1–) 0.2–0.7 (–0.8) mm thick; basal leaves to 4 cm long. Flowers 1–7, commonly trimerous; bracts 2–8, round to acutely ovate, unpigmented or castaneous-brown at centre, 0.7–2.4 mm long; pedicels 0.4–2.2 (–2.5) mm long. Tepals narrowly lanceolate to ovate or oblong, (1.5–) 2.2–4.6 mm long, 0.5–1.4 mm wide, subequal or the inner longer, (rounded–) obtuse to acuminate, ±erect, straight, with central band remaining green or turning reddish. Stamens 3 (–5), 1.7–3.7 mm long; anthers 0.9–3.2 mm long, 1–4 times filament length; style (0.9–) 1.4–4.0 mm long; stigmas 1.3–4.0 mm long, white. Capsule globose to ellipsoid or oblong, (1.5–) 2–4.5 mm long, 0.5 mm longer or shorter than tepals, light to dark reddish or maroon, not contrasting strongly with tepals. Seeds to 12 per row and c. 150 per capsule, ovoid, 0.35–0.45 mm long, usually umbonulate, sometimes apiculate as well, smooth or faintly reticulate.

Endemic in California, United States. A rare plant almost confined to Sacramento Valley and adjacent foothills. Edges of temporary pools. Two varieties are recognized.

Flowers (1–) 2–7; bracts usually castaneous-brown at centre

Flowers usually solitary, rarely 2; bracts usually unpigmented

34a. *Juncus leiospermus* var. *leiospermus*


Flowers (1–) 2–7; bracts 2–8, round to acutely ovate, usually castaneous-brown at centre, 1–2.4 mm long; pedicels 0.5–2.2 (–2.5) mm long. Tepals narrowly to broadly lanceolate, with inner usually longer than the outer by up to 0.7 mm, acute to acuminate, rarely obtuse; central band usually turning reddish with darker red or brown or black at the sides and apex. Capsule ovoid to ellipsoid or oblong, to 0.5 mm shorter (less often to 0.3 mm longer) than tepals, (1.6–) 2–3.8 mm long. 2n = 32, *fide* B.J.Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986). Fig. 59.

Rare plant in the northern Sacramento Valley, California, United States. 76: CAL. Edges of temporary vernal pools and swales, 180–960 m. Map 214.


T: California, Butte Co., Honcut, 1 May 1982, *L.Ahart* 3402; holo: NY; iso: CAS, MO etc.


Flowers 1 (–2); bracts 2 (–3), rounded to obtusely ovate, usually unpigmented, sometimes brown at base, 0.7–1.3 mm long; pedicels 0.4–0.9 mm long. Tepals lanceolate to ovate or oblomg, subequal, with inner to 0.3 mm longer than the rounded outer ones, obtuse to acuminate; central band remaining green with a black apex or turning reddish. Capsule globose to ovoid to ellipsoid, (1.5–) 2.5–4.5 mm long, subequal to (sometimes to 0.5 mm longer than, rarely to 0.5 mm shorter than) tepals. Fig. 59.

Only known from Butte Co., California. 76: CAL. Edges of vernal pools, 50–100 m. Map 215.

76. CALIFORNIA: Butte Co., Honcut, Peter Ahart Ranch, *L.Ahart* 1692 (B, CAS, CDA, CHSC, K, UC); Butte Co., Honcut, Peter Ahart Ranch, *L.Ahart* 2238 (CAS, F, MICH, NY, PH, SACT, TEX, UTC).

T: USA, California, San Francisco, Turk Station, 22 Apr 1866, A.Kellogg s.n.; holo: MO; iso: GH, US.


Annuals, 1–5.5 (–6.5) cm tall. Stem erect, leafless, 0.1–0.3 mm thick; basal leaves to 2.5 cm long. Flowers 1–4, almost always trimerous; bracts 2–5, ovate to lanceolate, obtuse to more frequently acute, reddish-brown at least below, occasionally with a herbaceous midrib, 1–2.5 mm long, rarely tepaloid and to 4 mm long; pedicels 0.3–0.6 mm long. Tepals acute to acuminate, (1.5–) 2.0–3.2 mm long, 0.4–1.0 mm wide, with inner to 0.2 mm longer or 0.4 mm shorter than outer; central band soon turning dark reddish-brown to black at least distally. Stamens (2–) 3, 1.2–1.8 mm long; anthers 0.3–0.5 mm long, 1/3–1/2 filament length; style 0.2–0.5 mm long, subequal to the tepals, differing by up to 0.3 mm, usually soon turning dark reddish, similar in color to the tepals. Seeds to 7 per row and c. 50 per capsule, ovoid, 0.4–0.55 mm long, apiculate, distinctly ridged. 2n = c. 34, *fide* B.J. Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986). Fig. 60.

Widely distributed along the Pacific coast of North America, from British Columbia, Canada, to California, United States. 71: BRC, 73: ORE, WAS; 76: CAL. Sandy to clayey soil in a variety of habitats, such as vernal pools, seepage areas, depressions in fields and meadows, from near sea level to 800 m. Map 216.

71. **BRITISH COLUMBIA**: Vancouver Is., Oak Bay, 18 Jun 1902, Diehl (POM).


76. **CALIFORNIA**: Humboldt Co., Fort Seward, J.P. Tracy 4431 (JEPS, UC, WTU); Lake Co., S of Kelseyville, J.T. Howell 18033 (CAS, GH, MIC, MO); Santa Cruz Co., NW of Boulder Ck, B.J. Ertter & J.L. Strachan 3333 (CAS, CHR, CHSC, GH, MO, NY, ORE, PRE, RM, SFSU, TEX, UTC, WTU).


Annuals, 0.7–5.5 (–6.5) cm tall. Stem erect, leafless, 0.1–0.3 mm thick; basal leaves to 1.5 cm long. Flowers 1 (–2), usually trimerous; bracts two, rounded to acutely ovate, usually unpigmented, sometimes brown-flecked or reddish at the base, 0.4–1.6 mm long; pedicels 0.3–0.6 mm long. Tepals broadly lanceolate, acute to acuminate, 1.6–3 (–4.2) mm long, 0.4–0.6 mm wide, subequal or differing by up to 0.2 mm (in some populations the long-acuminate outer tepals up to 1 mm longer than the inner); central band dark-tipped but otherwise remaining pale yellow-green and only slowly turning reddish. Stamens 2–3, 0.9–1.4 mm long; anthers 0.3–0.5 mm long; style 0.2–0.4 mm long; stigmas 0.6–1.1 mm long, white. Capsule obovoid to elliptic, subequal to the tepals, differing by up to 0.3 mm, 1.3–2.9 mm long, remaining pale greenish or turning light reddish above as the seeds ripen. Seeds to 8 per row and c. 40 per capsule, globose-ovoid, 0.3–0.4 mm long, sometimes apiculate, distinctly ridged. 2n = 32, *fide* B.J. Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986). Fig. 60.

Endemic in California, United States. 76: CAL. Wet sandy soils of seepage areas on sandstones, temporarily wet depressions, vernal pools, 300–1600 m. Map 217.

T: USA, California, Riverside Co., Kenworthy Forest Station, 26 Jun 1979, B.J. Ertter & J.L. Strachan 2971; holo: NY; iso: CAS, F, GH, K, MICH, MO, OSC, PH, RSA, SD, TEX, UC, US, UTC, WTU.


Annuals, 0.8–5 (–6.3) cm tall. Stem erect, leafless, 0.1–0.2 mm thick; basal leaves to 2.2 (–2.5) cm long. Flowers 1–4 (–7), usually dimerous; bracts 2–4 (–8), ovate, acute, usually unpigmented, sometimes reddish-brown at base, 0.6–1.5 mm long, rarely tepaloid to 2 mm long; pedicels 0.1–0.5 mm. Tepals ±broadly lanceolate, acute or acuminate, (1–) 1.9–2.9 mm long, 0.4–0.6 mm wide, subequal, rarely differing by 0.1 mm; central band pale green with pinkish edges and dark tip, sometimes darker reddish throughout. Stamens 2 (–3), 0.8–1.2 mm long; anthers 0.3–0.4 mm long, c. 1/2 filament length; style to 0.3 mm long; stigmas 0.2–0.7 mm long, white. Capsule (obovoid) elliptic to narrowly oblong, (1.5–) 1.9–2.9 mm long, usually equaling or exceeding tepals by up to 0.9 mm, rarely to 0.3 mm shorter, usually pink-tinged. Seeds to 7 per row and c. 30 per dimerous capsule, oblong to ovoid, (0.3–) 0.35–0.55 mm long, often both apiculate and umbonulate, distinctly ridged. 2n = 34, *fide* B.J. Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986).  
Fig. 60.

Along the Pacific coast of North America from Oregon and Idaho, United States, to N Baja California, Mexico. 73: IDA, ORE. 76: CAL, NEV. 79: MEX. Seepage areas at the edge of outcrops, depressions in meadows, usually on bare moist granitic sand, 300–3090 m. Map 218.


NEVADA: Elko Co., Independence Mtns, NNW of Saval Ranch, A. Tiehm 5392 (NY); Humboldt Co., Santa Rosa Mtns, SE of Canyon Ck Summit, B.J. Ertter 4322 (CAS, CIC, NY, UTC).

79. MEXICO NW: Baja California Norte, Sierra San Pedro Mártir, between San Felipe Desert and Los Emes, I.L. Wiggins 9884 (DS, MICH, UC, US).


Annuals, 0.9–5.5 (–6) cm tall. Stem erect, leafless, 0.1–0.3 mm thick; basal leaves to 2.2 cm long. Flowers 1–2 (–3), dimerous or trimerous; bracts 2–4, ovate, acute, usually reddish-brown below, (0.4–) 0.8–1.5 mm long, rarely tepaloid to 2.5 mm long; pedicels 0.3–0.6 mm long. Tepals acuminate to attenuate, (1.3–) 1.8–2.8 mm long, 0.4–0.6 mm wide, with inner to 0.5 mm longer than outer especially at anthesis; central band dark reddish to black at least at the top and sides, sometimes almost throughout. Stamens 2–3, 0.9–1.5 mm long; anthers 0.3–0.4 mm long, c. 1/2 filament length; style 0.1–0.3 mm long; stigmas 0.4–0.6 mm long. Capsule globose to obovoid (ellipsoid), (1–) 1.2–2 (–2.2) mm long, usually 1/2–3/4 tepal length (sometimes equal, rarely slightly longer by 0.2 mm), most often remaining pale greenish with a dark red or black apex, sometimes gradually turning dark red throughout. Seeds 2–3 per row and 4–9 per capsule, elliptic-ovoid, 0.5–0.8 mm long, often both slightly apiculate and umbonulate, faintly ridged. 2n = 36, *fide* B.J. Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986).  
Fig. 60.
JUNCACEAE (Juncus)

Known only from W United States, from the Sierra Nevada, California, and Steins Mtns, Oregon. 73: ORE. 76: CAL. Moist bare flats, short turf, mossy patches in meadows, seepage areas on rock outcrops, stream banks, 1200–3200 m. Map 219.


Annuals, 0.3–2 (–2.5) cm tall. Stem erect, leafless, 0.1–0.2 mm thick; basal leaves to 0.9 cm long. Flower 1, mainly trimerous; bracts (1–) 2, ovate (–lanceolate), ±acute, usually unpigmented, sometimes brownish at base, 0.3–0.9 mm long; pedicels to 0.2 mm long. Tepals lanceolate to acutely oblong, (1–) 1.2–2.3 (–2.8) mm long, 0.4–0.6 mm wide, subequal or inner to 0.2 mm longer, acute to acuminate, incurved over the capsule; central band narrowly tapering, not reaching the apex. Stamens (2–) 3 (–4), 0.5–0.9 mm long; anthers 0.15–0.25 mm long, c. 1/3–1/2 filament length; style lacking or at most 0.1 mm long; stigmas 0.2–0.3 mm long. Capsule ovoid to ellipsoid, (0.7–) 1.0–1.9 mm long, shorter than the tepals by 0.1–0.7 mm, pale reddish. Seeds to 8 per capsule, ovoid to globose, somewhat apiculate or umbonulate, 0.3–0.5 mm long, smooth or faintly reticulate. 2n = c. 38, fide B.J.Ertter, Mem. New York Bot. Gard. 39: 27 (1986). Fig. 61.
W United States and NW Mexico, from Oregon, Idaho, and Colorado to Baja California Norte. 73: COL, IDA, ORE. 76: CAL, NEV, UTA. 79: MXN. Damp usually sandy habitats, such as seepage areas near rock outcrops, swales in meadows, 650–3600 m. Map 220.


40. Juncus uncialis Greene, Pittonia 2: 105 (1890)
Annuals, 0.8–3.2 (–4) cm tall. Stem erect, leafless, (0.1–) 0.2–0.4 (–0.5) mm thick; culms not dilated just below flower; basal leaves to 2.2 cm long. Flowers single, mostly trimerous; bract solitary, broadly truncate, completely enwrapping culm, unpigmented, 0.25–0.9 mm long; pedicels to 0.5 mm long. Tepals ±lanceolate, (1.7–) 2.1–3.8 (–5.3) mm long, 0.6–0.9 mm wide, subequal or inner to 0.3 (–0.7) mm shorter or rarely to 0.3 mm longer than outer, usually ±acute, erect to recurved, sometimes slightly incurved; central band usually remaining green, occasionally turning reddish. Stamens 2–3, 1.2–2 (–3) mm long; anthers 0.3–0.5 (–0.8) mm long, c. 1/3 filament length; style 0.1–0.3 mm long; stigmas 0.4–1.3 mm long, white. Capsule ovoid to ellipsoid, subequalling the tepals or shorter by up to 0.5 mm,
(1.2–) 1.8–3.2 (–4) mm long, remaining greenish or more commonly turning reddish to deep maroon and then strongly contrasting with tepals. Seeds to 12 per row and c. 140 per capsule, ±ovoid, 0.3–0.4 mm long, sometimes apiculate or umbonulate, smooth or faintly reticulate. 2n = 32, *fide* B.J.Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986). Fig. 61.

Endemic to W United States; it is centred in California and Oregon, marginally reaching Nevada. 73: ORE. 76: CAL, NEV. Muddy edges of vernal pools, 45–1700 m. Map 221.


T: USA, California, Trinity Co., NE side of the Trinity Alps, Big Flat, 21 Jul 1937, J.T.Howell 13213; holo: CAS; iso: DS, GH, MICH, NY, RSA, UC, US.


Annuals, (0.2–) 0.3–3.6 cm tall. Stem erect, leafless, 0.1–0.5 mm thick; basal leaves to 1.8 cm long. Flowers 1, usually dimerous. Tepals ±lanceolate, (0.8–) 1.9–3 (–3.5) mm long, 0.5–1.2 mm wide, all equal or inner shorter, rounded to acute, usually recurved or erect; central band usually turning reddish. Stamens 2 (–3), (0.7–) 1–1.8 mm long; anthers (0.2–) 0.3–0.7 mm long, 1/3 filament length to almost equal; style 0.1–0.4 mm long; stigmas 0.3–1 mm long, white. Capsule obovoid to ellipsoid or oblong, (1–) 1.9–3.5 mm long, slightly less than to 1.5 times tepal length, usually turning reddish at maturity, not contrasting strongly with the tepals. Seeds to 12 per row and c. 70 per dimerous capsule, ovoid to oblong, 0.3–0.55 mm long, often apiculate, sometimes umbonulate as well, smooth or faintly reticulate.

Along the Pacific coast of the United States, from southernmost Washington, Oregon, Idaho and Utah to S California. Vernally moist depressions, streambeds and swales, usually on clayey soils. Two varieties are recognized.

Bracts 1–2; stem 0.1–0.3 mm in diam., not dilated below flower; capsule often exceeding perianth 41a. var. hemiendytus

Bracts absent; stem 0.2–0.5 mm in diam., dilated below flower; capsule usually not exceeding perianth 41b. var. abjectus

41a. *Juncus hemiendytus* var. hemiendytus


Culms not dilated below the flower. Bracts 1–2, rounded to obtusely ovate (~acute), not completely sheathing culm, unpigmented, seldom brownish near the base, to 2 mm long (occasionally greatly reduced or lacking), rarely tepaloid to 5 mm long; pedicels to 0.3 mm long. Capsule usually 1–1.5 times tepal length, usually turning reddish at maturity. Seeds to 12 per row, 0.3–0.5 mm long, smooth or faintly reticulate. 2n = 32, *fide* B.J.Ertter, *Mem. New York Bot. Gard.* 39: 27 (1986). Fig. 61.

Throughout the range of the species, from Washington to California. 73: IDA, ORE, WAS. 76: CAL, NEV, UTA. Usually on damp clay, 400–300 m. Map 222.


Culms dilated at the base of the flower. Bracts lacking. Capsule most often slightly less than but sometimes to 0.5 mm longer than tepals, often turning brick-red at maturity. Seeds to 10 per row, 0.4–0.55 mm long, faintly reticulate. Fig. 61.

From C Idaho and C Oregon to N Nevada and California, United States. 73: IDA, ORE. 76: CAL, NEV.


42. Juncus scabriusculus Kunth, Enum. Pl. 3: 354 (1841)
Illustration: F.G.P.Buchenau, Monogr. Junc. Cap, pl. 6, fig. 2, 3 (1875).

Annuals c. 5–25 (~35) cm tall, slender to robust, single-stemmed to caespitose. Leaves only basal, flat to ±folded, c. (4–) 8–14 (~21) cm long, (0.3–) 0.8–1.8 (~2.4) mm wide; base dilated; margins hyaline; apex acute; auricles absent. Lower bracts few, straw-membranous (rarely distally subherbaceous), with midrib distinct, ovate-lanceolate, (3.5–) 4.5–6.0 (~7.0) mm long, shorter than flower clusters. Inflorescence of usually 1–2 (~5) cup-shaped (1–) 2–7 (~10)-flowered pale stramineous clusters, with one sessile, and the others on erect, ±smooth peduncles to 3.5 cm lng. Tepals subequal or inner longer, c. (5.5–) 6.0–8.0 mm long; inner tepals ±subacute; outer tepals ±acute to ±mucronate; central band thicker, stramineous, scabrid to ±smooth; margins broad, yellowish membranous. Stamens 6, shorter than perianth; anthers c. (0.8–) 1.5–4.1 mm long, longer than 0.5–1.0 (~1.5) mm filaments; style 2.3–2.8 mm long; stigmas 0.8–2.0 mm long. Capsule narrowly oblong-trigonous, trilocular, ±obtuse above, submucronate; c. 3.5–4.5 mm long, ±castaneous-brown, shining, shorter than perianth. Seeds ±oblong-ovoid, apiculate, c. 0.4–0.5 mm long, c. 0.2–0.25 mm wide, pale brown to brown, with distinct transverse reticulation; appendages absent.

Restricted to a small area in southwestern Cape, South Africa. 27: CPP. Open, damp sandy areas at low altitudes. Map 224.

27. CAPE PROVINCE: SW Cape, Malmesbury, Rondelevi, W of Preekstoel, E.Esterhuysen 34715 (BOL, K, S); Witels Kloof, Sandberg, L.Hugo 672 (K, NBG); Cape Flats, R.S.Adamson 213 (NBG); R.S.Adamson...


Annuals, 2–4 (–6) cm tall, dwarf, slender. Leaves basal, filiform, usually 1–2 cm long, canaliculate; base ±dilated with broad membranous margins, ±purplish; inner leaves with sheath-like base; margins membranous; auricles absent. Stem filiform, smooth, 0.1–0.2 mm in diam. Lower bracts ovate to narrowly lanceolate, brownish membranous to brown, 1.5–2.5 (–3.2) mm long, shorter than inflorescence; lowermost bract often ±erect. Inflorescence a single (very rarely 2) pseudolateral or terminal 1–5-flowered head to 6 mm diam. Tepals unequal; outer tepals subacute to mucronate; inner tepals longer, 2.2–2.6 mm long, ovate, obtuse, usually ±involute above, pale castaneous brown; central band and/or margins darker; midrib smooth to ±scabrid. Stamens 3, much shorter than perianth; anthers 0.3–0.4 (–0.6) mm long; filaments (0.4–) 0.5–0.7 mm long; style 0.2–0.3 mm long; stigmas c. 0.5 mm long, patent-recurved, not exserted. Capsule oblong-obovoid, subtrigonous, subobtuse, ±mucronate, c. 1.5 mm long, shorter than perianth, pale brown to brown. Seeds ovoid, c. 0.3 × 0.2 mm, pale brown, inconspicuously reticulate; appendages absent.

A rare endemic of the Cold Bokkeveld Mtns, Cape, South Africa. 27: CPP. Wet sands. Map 225.


Annuals, usually 7–11 (–17) cm tall, caespitose, yellowish green. Leaves basal, c. 3–9 cm long, ±flat, 0.5–2.5 mm wide; apex ±rugose and acute; base with membranous margins and often purplish central part; auricles absent. Stems ±smooth to scabrid. Lower (inflorescence) bract ±herbaceous, c. 1–3 cm long, ±equalling inflorescence or shorter; capitulum bracts linear-lanceolate, acute, ±equalling capitulum. Inflorescence of 1 sessile and 0–5 pedunculate heads; heads globose, echinate, usually 3–8 (–12)-flowered, 0.9–1.5 cm in diam. Peduncles scabrid, flowers on pedicels to 1 mm long. Tepals unequal to subequal, with outer longer, rigid, narrowly linear-triangular to linear-lanceolate, elongated-echinate, carinate, slightly recurved near apex, 4.2–6.0 (–6.5) mm long, usually pale straw-brown with castaneous-brown tip and margins distally; margins ±translucent to stramineous; midrib pale straw-brown, scabrid. Stamens 6, much shorter than perianth; anthers (0.9–) 1.5–2.0 mm long; filaments (0.2–) 0.3–0.6 mm long; style (1.0–) 1.5–2.0 mm long; stigmas ±erect, (0.7–) 1.5–2.0 mm long. Capsule trigonous-ovoid, c. 2.5–3.0 mm long, including a beak to 0.5 mm long, subacute, straw-brown to castaneous-brown, much shorter than perianth. Seeds
±ovoid, c. 0.6–0.7 × 0.30–0.35 mm, apiculate at both ends, ±brown, distinctly transversely reticulate; appendages absent.

A rare endemic of Worcester district, Cape, South Africa. 27: CPP. Wet sandy patches, to 650 m. Map 226.

27. CAPE PROVINCE: Bains Kloof, R.H.Compton 18645 (NBG-SAM); Bains Kloof, F.R.Schlechter 9129 (L, NSW, S).

45. Juncus rupestris Kunth, Enum. Pl. 3: 344 (1841)


T: South Africa, Cape, Kamiesberge, Eselsfontein, J.F.Drège 2471a; syn: BOL, G, K, LD, PR, S.


Annuals, usually 5–15 cm tall, delicate, caespitose. Leaves basal, filiform, canaliculate, to c. 3–5 cm long; base with dilated membranous margins, often purplish; apex acute, often scabrid; auricles absent. Stem and peduncles distinctly scabrid (with elevated papillae), to c. 0.3 mm in diam. Inflorescence bract short, membranous or leaf-like, usually 2–6 mm long; middle bracts brownish membranous, c. 1.5–2.0 mm long. Inflorescence terminal, usually of umbellate appearance, composed of 1 basal and (0–) 1–7 (–10) pedunculate heads; heads 1–4-flowered cup-shaped; peduncles usually 1.0–3.5 cm long, some with a single secondary branchlet. Tepals equal or inner longer and outer narrower and acute; inner tepals subobtuse with involute membranous margins, c. 2.2–2.7 mm long, castaneous-brown with a greenish midrib; central band rigid, scabrid. Stamens 6; anthers c. 0.3–0.4 mm long; filaments 0.5–0.6 mm long; style very short, to 0.2 mm long; stigmas 0.4–0.5 mm long, recurved-patent (often contorted and head-like), reddish, with very long papillae. Capsule subglobular to ±ovoid, trilocular, subobtuse, ±mucronate, slightly shorter than perianth, c. 1.4–1.8 mm long, ±castaneous, shining. Seeds subglobular-ovoid, apiculate, c. 0.35 × 0.25 mm, pale brown to brown, finely reticulate; appendages absent.

Endemic to the Cape, South Africa. 27: CPP. Damp sands, seepage areas, to c. 1300 m. Map 227.


T: South Africa, Cape, Namaqualand, Kamiesberge, Leliefontein, J.F.Drège 18410 (BOL); S Cedergberg, Krom R Klooif, E.Esterhuysen 34158 (BOL); Calvina, Lokenburg, Themeda Valley, 1100 m, J.P.H.Acoks 17421 (K); Nieuwoudville, Papkuilsfontein Farm, D.N.Ehlen 897 (NBG); Simonstown, Redhill, R.H.Adamson 437 (NBG); Fisch Hoek Valley, Weloy Doy 3400 (BOL, K); Noordhoek Vlei, M.R.Levyns 641 (NBG); Fremt Hoek, F.R.Schlechter 9224 (K, NSW); Stellenbosch, R.H.Compton 15313 (NBG).

A distinct species showing limited variation. Plants with long stigmas and anthers longer than filaments, described as J. schlechteri and sometimes understood as an aberrant J. cephalotes Thunb., are better classified as a part of the wide variation range of J. cephalotes Thunb.
flowered. Tepals unequal; outer tepals ovate-lanceolate, c. 2.4–2.9 mm long, ±acute to mucronate; inner tepals longer, ovate, obtuse, c. 3.5–4.7 mm long; margins membranous, often involute; central band distally ±pinkish, often blackish-purple near tip; base whitish pale straw-brown; central part densely covered with elevated papillae. Stamens 6; anthers c. 1.4–1.7 mm long; filaments 0.4–0.6 mm long; style c. 1.5 mm long; stigmas 0.5–1.2 mm long, colourless to reddish, ±exserted. Capsule narrowly oblong-ovoid, subtrigonous, ±trilocular, c. 2.5 mm long including mucro c. 0.2 mm long, acuminate to acute, shorter than perianth, pale straw-brown. Seeds ovoid, apiculate, c. 0.6 × 0.3 mm, brown, with distinct longitudinal ridges and fine dense transversal reticulation.

Restricted to a small area in Northern Cape, South Africa. 27: CPP. Wet sandy areas, seepage places near rocks, along streams, to c. 1600 m. Map 228.

27. CAPE PROVINCE: the Kameiesberg, Leliefontein, 18 Dec 1936, R.S.Adamson 1488 (BOL).

A taxon closely related to Juncus cephalotes. Although recently included in the latter [A.A.Obermeyer, in A.A.Obermeyer, J.Lewis & R.B.Faden, Pl. S. Afr. 4/2] its specific status is retained here. It is characterized by an extremely dense, distinctly elevated papillosity of stems and central part of the tepals, and pale colour. Plants with this character combination are confined to Northern Cape; the rich material of J. cephalotes, in spite of great variation, does not exhibit the dense papillosity (stems of the latter are only scabrid with papillae lower, irregularly scattered to subdense). There are two gatherings from Northern Cape [Namaqualand, farm Kliphoek, C.Reid 1317 (BOL); Calvina district, farm Vondelingfontein, C.Reid 1344 (BOL)] that differ from the typical Juncus pictus by plant colour and (partly) their general habit. They may represent a variation limit of Juncus pictus, a limit otherwise difficult to characterize due to ±scanty material.

47. Juncus cephalotes Thunb., Prodr. Pl. Cap. 66 (1794)


Annuals (2–) 8–13 (–30) cm tall, caespitose, scabrid. Leaves basal, c. 1.5–8 cm long, filiform to flat, usually 0.8–2.0 mm wide; base often purplish with margins dilated, membranous; apex acute. Stem ±grooved, scabrid with ±evenly scattered to dense low papillae. Lower bract usually membranous, rarely partially herbaceous, usually to 1 (–4) cm long, shorter than inflorescence; capitulum bracts membranous, to c. 3 mm long. Inflorescence of 1 sessile and (0–) 1–6 (–10) hemispheric to ±globose usually (1–) 3–8 (–15)-flowered heads; peduncles to 3.5 (–4.5) cm long, scabrid. Tepals ±equal to unequall, outer ±lanceolate; inner tepals usually longer, ovate-lanceolate, subacute to mucronate, c. 3.5–4.5 mm long; margins ±membranous; median part pale greenish to straw-brown, scabrid, with most of the area between margins and centre usually blackish purple to dark castaneous-brown. Stamens 6; anthers 1.2–1.7 mm long; filaments 0.4–0.6 mm long; style 1.0–2.3 mm long; stigmas (1.5–) 2.5–4.5 mm long, red, exserted. Capsule oblong-ovoid, subacute to subacuminate, c. 2.3–2.8 mm long including micro 0.2–0.4 mm long, shorter than perianth, usually pale brown. Seeds ±ovoid, apiculate, c. 0.3–0.4 × 0.2 mm, pale brown to brown, distinctly reticulate. Fig. 49.

Endemic to SW Cape, South Africa. 27: CPP. Wet sands, flat sandy or clayey shores of temporary pools, seepage areas, usually near sea level. Map 229.

27. CAPE PROVINCE: Cape Town, Table Mtn, C.F.Ecklon 901 (K, S); Bredasdorp, Appelskraal, J.P.Stokoe 9395 (BOL, NBG); Cape Flats, R.S.Adamson 219 (K); Cape Flats, Crawford, R.S.Adamson 332 (BOL); Cape Peninsula, Olifantabosch, G.Lewis 1762 (NBG); Kenilworth Station, M.R.Levyns s.n. (BOL); Kommetje, M.R.Levyns [as R.S.Adamson 227] (BOL).

Extremely variable in size, from juvenile forms with single-flowered heads to tall plants. It also varies in the inner/outer tepal length ratio; in many cases inner tepals elongate with age but sometimes young plants also have unequal tepals. In general, characters previously used to distinguish numerous taxa in the material of *J. cephalotes* are the most variable ones (size, number of flowers and capitula etc.).

**Doubtful species**


T: Namibia, Garries, M.K.Dinter 4254; holo: B, probably destroyed; the plant not located in SAM, herbarium Dinter.

Equated with *J. bufonius* by A.A.Obermeyer, in A.A.Obermeyer, J.Lewis & R.B.Faden, *Fl. S. Afr.* 4/2: 76 (1985), although the type was not seen by her. The description does not exclude *J. bufonius* but the latter was a species surely known to Poellnitz.

**Sect. 4. STYGIOPSIS**


JUNCACEAE (Juncus)


Perennials, rhizomatous or densely caespitose; leaf blade flat, canaliculate, subterete to terete, unin-, bi- or pluritubular, imperfectly or perfectly sepalate. Inflorescence reduced to a simple flower or a single terminal head, or a terminal head with several to many heads; floral bracteoles absent. Tepals often white or whitish, or dark castaneous-brown. Stamens terete, uni-, bi- or pluritubular, imperfectly or perfectly septate. Inflorescence reduced to a simple flower, or a single terminal head, or with several to many heads; floral bracteoles absent. Tepals often white or whitish, or dark castaneous-brown. Stamens terete, uni-, bi- or pluritubular, imperfectly or perfectly sepalate. Inflorescence reduced to a simple flower or a single terminal head.

Majority of partial inflorescences completely sterile, composed of a single flower or a single terminal head, or an inflorescence with several to many heads; floral bracteoles absent. Tepals often white or whitish, or dark castaneous-brown. Stamens terete, uni-, bi- or pluritubular, imperfectly or perfectly sepalate. Inflorescence reduced to a single flower or a single terminal head, or a terminal head with several to many heads; floral bracteoles absent. Tepals often white or whitish, or dark castaneous-brown. Stamens terete, uni-, bi- or pluritubular, imperfectly or perfectly sepalate. Inflorescence reduced to a single flower or a single terminal head.
Flower head pseudolateral, 1–3-flowered, or terminal, 1 (–3)-flowered, sometimes with 1–2 one-flowered branches, and then whole inflorescence 2–4-flowered

Tepals brown, deep castaneous brown or dark brown

Capsule much exceeding perianth, retuse, truncate, obtuse to subacute, 4–8 mm long; seed appendages at least 0.4 mm long

Outer tepals obtuse, 2.5–3.3 mm long; anthers 0.3–0.4 (–0.6) mm long; style 0.3–0.4 (–0.7) mm long

Outer tepals acute to subacute, 5–6 mm long; anthers 0.6–0.9 mm long; style 0.8–1.7 mm long

Capsule equalling perianth, if (slightly) exceeding it, then acuminate, up to 4 (–4.5) mm long; seed appendages absent or minute, less than 0.1 mm long

Inner tepals distinctly longer than outer (to 3.5 mm long); style c. 0.5 mm long; auricles 0.5–1.2 mm long

Inner and outer tepals of ±equal length (if inner longer, then longer than 4 mm); style longer than 0.8 mm, or if style c. 0.5 mm long, then auricles minute

Leaves filiform, non-septate, bitubular; inflorescence 1-flowered

Anthers longer than filaments; flower shortly pedicellate; lower bract ±equalling flower; style 1.0–1.7 mm long

Anthers shorter than filaments; flower sessile; lower bract exceeding flower; style 0.5–0.7 mm long

Leaves subterete, septate, unitubular; flowers usually 2–3, or if flower single, then sessile and tepals longer than 4 mm

Anthers shorter than filaments

Anthers longer than filaments

Stigmas pale yellow; anthers twice as long as filaments; flowers often proliferating

Stigmas reddish; anthers 3–4 times as long as filaments; flowers not proliferating

Tepals whitish or stramineous-whitish or stramineous, sometimes pale greenish or suffused purplish

Stamens not exserted; capsule much exceeding perianth (by 1.5 mm or more)

Stamens conspicuously to slightly exserted; capsule ±equalling or slightly exceeding perianth

Rostrum c. 2 mm long; inflorescence of one sessile flower and 1–2 lateral one-flowered branches, with a secondary branchlet often present

Rostrum up to 0.8 mm long; inflorescence of a single terminal flower or 2–3-flowered terminal head, sometimes with a single lateral one-flowered branch present, with secondary branch absent

Tepals 4.5–6.0 mm long; style 1.5–2.5 mm long; anthers 2.5–3.5 mm long

Tepals to 3.8 mm long; style to 1.8 mm long; anthers to 1.5 mm long

Cauline leaves bract-like, with sheaths enclosing bulbils (later proliferating)

Cauline leaves not bract-like; sheaths not enclosing bulbils, later not proliferating

Anthers 0.8–1.3 mm long; inflorescence usually 2–3-flowered; lateral branches absent; capsule 4–6 mm long

REFERENCES FOR J. biglumis

REFERENCES FOR J. longirostris

REFERENCES FOR J. biglumoides

REFERENCES FOR J. uniflorus

REFERENCES FOR J. bryophilus

REFERENCES FOR J. duthiei

REFERENCES FOR J. harae

REFERENCES FOR J. rhotangensis

REFERENCES FOR J. stygius

REFERENCES FOR J. luzuliformis

REFERENCES FOR J. longistamineus

REFERENCES FOR J. trichophyllus

REFERENCES FOR J. maximowiczii
### JUNCACEAE (*Juncus*)

17: Anthers 0.5–0.8 mm long; inflorescence usually 1-flowered; lateral branches sometimes present; capsule 3.0–4.5 mm long

**102. J. potaninii**

4: Flower head terminal, usually (2–) 3–10 (~25)-flowered

18 Tepals brown, dark brown or purplish castaneous-brown

19 Leaves unitubular, indistinctly septate; stamens long exserted; anthers 1.3–2.6 mm long; style 1.5–2.5 mm long; bracts (4–) 6–8 (~10) mm long

**73. J. przewalskii**

18: Tepals white, yellowish white or whitish-stramineous

19: Leaves bitubular, not septate; stamens ±equalling tepals; anthers 0.5–1.0 mm long; style c. 0.3–0.5 mm long; bracts 3.5–4.5 mm long

**68. J. triglumis**

18: Tepals white, yellowish white or whitish-stramineous

20 Bract-like leaves on upper part of stem 2–4; their sheaths enclosing bulbils, later proliferating, plantlet-bearing; inflorescence usually (1–) 3-flowered

**66. J. trichophyllus**

20: Bract-like leaves on upper part of stem 0–1; sheaths not enclosing bulbils, not proliferating; inflorescence usually more than 4-flowered

21 Stigma capitate, pin-like, lobes not developed or very short, to 0.2–0.4 mm long

22 Lower bract castaneous-membranous, similar to other bracts, not exceeding inflorescence; stem not grooved; bract-like leaf present on upper part of stem

**63. J. cephalostigma**

22: Lower bract with a leaf-like tip exceeding inflorescence, stem deeply grooved; upper cauline leaf absent

**64. J. brachystigma**

21: Stigma with three distinct spreading or erect lobes at least 0.5 mm long

23 Leaves (when dry) with transverse septa visible externally

24 Lower bract leaf-like, much exceeding inflorescence; uppermost leaf exceeding inflorescence; plants slender; tepals stramineous

**52. J. chrysocarpus**

24: Lower bract not leaf-like, nor exceeding inflorescence; uppermost leaf not reaching inflorescence; plants robust; tepals white

**58. J. allioides**

23: Leaves not septate, or septa weak, not visible externally even when leaves dry

25 Lower bract with leaf-like or acicular tip overtopping inflorescence

26 Leaves X- or Y-shaped in T.S. (plants with one flower head usually rare in populations of plants with two heads)

**49. J. khasiensis**

26: Leaves terete (sometimes grooved) or V-shaped in T.S.

27 Leaves unitubular

28 Auricles distinct, to 1.7 mm long; plants loosely caespitose; rhizomes slender, creeping; seed appendages 0.7–1.2 mm long

**59. J. membranaceus**

28: Auricles absent; plants densely caespitose; rhizome short; seed appendages 0.1–0.4 mm long

**69. J. leucomelas**

27: Leaves bitubular or pluritubular

29 Loosely caespitose; stems borne singly or in loose groups, not in dense clumps

**62. J. spectabilis**

30 Leaves pluritubular

30: Leaves bitubular

31 Auricles membranous; rhizomes stout; upper cauline leaf absent

**65. J. kingii**

31: Auricles brown; rhizomes filiform; upper cauline leaf present in some plants

**70. J. benghalensis**
29: Densely caespitose; stems in dense clumps or groups

32: Capitulum bracts whitish to scarious (one-headed inflorescence rarely found in populations of plants with several flower heads)

32: Capitulum bracts pale brown to brown

33: Capsule (including rostrum) 4.4–4.8 mm long; upper cauline leaf present

33: Capsule (including rostrum or mucro) less than 4 mm long; upper cauline leaf absent or present

34: Style 0.4–0.8 mm long; anthers 1.1–1.3 mm long

34: Style usually longer than 0.8 mm; anthers 1.5–2.5 mm long

35: Auricles reddish-brown; style usually 0.8–1.2 mm long; plants to 8 cm tall

35: Auricles scarious; style usually 1.3–1.8 mm long; plants 6–19 cm tall

25: Bracts all similar, not leaf-like, all ±shorter than inflorescence

36: Leaves bitubular to pluritubular

37: Bracts scarious to stramineous

37: Bracts dark brown to pale brown

38: Style 2.0–2.5 mm long; stigmas 0.6–0.8 mm long; upper cauline leaf usually 1

38: Style 0.5–0.8 mm long; stigmas 0.8–2.0 mm long; upper cauline leaf absent

36: Leaves unistular

39: Auricles brown, conspicuous; stigmas stout, 0.3–0.6 mm long

39: Auricles scarious, conspicuous or minute; stigmas thin, 0.6–2.0 mm long

40: Densely caespitose; rhizomes creeping; leaves glaucous-green

40: Loosely caespitose; rhizome short; leaves ±mid-green

41: Basal leaves 1–2; cauline leaves 2–3; auricles 1.2–1.7 mm long; anthers 1.2–2.2 mm long

41: Basal leaves absent; cauline leaf single; auricles minute; anthers 2.5–2.8 mm long

3: Flower heads two to many, each with more than 3 flowers

42: Leaves septate, tubular or pluritubular

43: Tepals white, cream, stramineous or green

44: Tepals ±green; proliferating flowers mixed with normal ones in flower heads; normal flowers do not set seeds

44: Tepals white, cream or stramineous; flowers normally developed; seed set normal

45: Heads usually 2–3-flowered [N America, Europe, S Siberia and Russian Far East]

45: Heads usually 4–12-flowered [Sino-Himalaya]

46: Inflorescence usually of 3 or more heads; leaves stout

46: Inflorescence usually of 1–2 heads; leaves filiform

43: Tepals brown to deep castaneous-brown
47 Plants densely caespitose, with short rhizomes; style 3–4 mm long
47: Plants loosely caespitose, usually with creeping rhizomes; style up to 3 mm long
48 Anthers longer than filaments
49 Inflorescence usually of 7–9 flower heads
49: Inflorescence of 1–3 (–4) heads
50 Inflorescence usually of two unequally peduncled heads; tepals 5–9 mm long
50: Inflorescence of 1–3 congested heads; tepals to 5.5 mm long
48: Anthers shorter than or equalling filaments
51 Cauline leaves (4) 5–8 mm wide (usually flat, sometimes V-shaped)
51: Cauline leaves 1–4, rarely to 5 mm wide, usually subterete or V-shaped
52 Auricles elongated, oblone, (1–) 2–3 mm long; lower bract base spathe-like, inflated; tepals 6.5–13 mm long
52: Auricles absent to short, obtuse, to 1 mm long; lower bract base narrow, not inflated; tepals usually 4.5–6.5 mm long
53 Capsule to 5 mm long, shorter than perianth
53: Capsule 6 mm or longer, exceeding perianth
54 Anthers ± equalling filaments
54: Anthers distinctly shorter than filaments
55 Cauline leaves 2–4, inserted evenly along stem; auricles distinct, broad, to 1 mm long
55: Cauline leaves 0–2 (–3), only sub-basal or in lower half of stem, rarely one higher; auricles ± absent
42: Leaves not septate, flat and grass-like or 1–4-channelled (V-, Y- or X-shaped in T.S.)
56 Flowers white, yellowish or ± stramineous
57 Leaf blade flat, grass-like
58 At least some leaves 10–15 mm wide; anthers equalling or slightly longer than filaments
58: Leaves up to 5 mm wide; anthers conspicuously shorter than filaments
59 Auricles developed, c. 0.5 mm long, obtuse, stramineous to brownish
59: Auricles absent
60 Inflorescence of 6–21 flower heads; tepals whitish, suffused pink, to 3.5 mm long
60: Inflorescence of 1–5 flower heads; tepals cream or stramineous-white, not pinkish, 3.5–5.3 mm long
61 Inflorescence apparently lateral; flower heads dense; leaf margin proximally papillose
61: Inflorescence appearing terminal; flower heads loose, divaricate; leaf margin smooth
57: Leaf blade canalicate or deeply 3–4-grooved (V-, Y- or X-shaped in T.S.)
62 Leaves robust, canalicate above (V-shaped in T.S.); flower heads usually 3 or more; capsule to 4.7 mm long; seeds (including appendages) to 1.2 mm long
48 J. concinnus
62: Leaves filiform, deeply 3–4-grooved (Y- or X-shaped in T.S.); flower heads usually 2; capsule 4.9 mm or more; seeds (including appendages) over 1.7 mm long

56: Flowers brown, castaneous brown or light brown

63 Plats (40–) 60–100 cm tall; inflorescence of 4–18 flower heads

65: Flower heads usually 2–3 (–5); anthers 1.5–2.4 mm long; rhizome creeping; plants loosely caespitose

65: Flower head usually single, rarely 2; anthers to 1.3 mm long; rhizome short or ±ascending; plants densely or ±loosely caespitose

56: Plants 1–30 (–50) cm tall; inflorescence of 1–3 (–5) heads

64 Anthers c. twice as long as filaments

64: Anthers shorter than or subequalling filaments

65: Style short, 0.5–1.0 (–1.5) mm long; stigmas to 2.5 mm long; plants usually 3–8 cm tall

66 Style 1.5–2.5 mm long; stigmas 3–4 mm long; plants usually 10–15 cm tall


Perennials, 11–35 cm tall, caespitose; rhizomes very short, usually not creeping. Cataphylls usually 1–3, pale, chaffy. Cauline leaves up to 3, evenly spaced, 3.5–21 cm long, 0.8–2.5 (–3.2) mm wide; blade pluritubular, canaliculate above, V-shaped in T.S., not sepalate; tip obtuse; auricles conspicuous, with free parts 0.5–1 mm long, transparent or whitish-membranous. Lower bract leaf-like, equalling longest peduncle or sometimes exceeding inflorescence; capitulum bracts membranous, whitish-pinkish, usually 5–8 mm long. Inflorescence of (1–) 3–9 (–18) unequally peduncled 6–14 (–17)-flowered capitula 0.7–1.3 in diam. Tepals lanceolate, acute, unequal; outer tepals keeled below, 2.1–4 mm long; inner tepals longer, usually 3.5–5.2 mm long, shining, whitish or pale stramineous. Stamens 6; anthers 1–1.5 mm long, usually completely exserted at maturity; filaments 2.8–5.7 mm long; ovary 1.1–2.6 mm long; style 1.1–1.8 mm long; stigmas 0.7–1.1 mm long. Capsule narrowly ovoid-trigonal, 2.6–4.0 (–3.5) mm long, contracted into short beak 0.6–0.9 (–1.5) mm long, whitish. Seeds 0.6–0.7 mm long, or 0.7–1.2 mm long with two ±unequal appendages.

W, C, & E Himalaya, from Himachal Pradesh, Garhwal and Kumaon to Bhutan, Arunachal Pradesh and adjacent regions of SW China (Sichuan, Yunnan, Tibet). 36: CHC, CHT, EHM, NEP, WHM. In a variety of habitats, from open woodlands, damp rocky slopes to road banks and drier subalpine slopes, 1980–4720 m. Map 230.

49. J. khasiensis

91. J. giganteus

87. J. milashanensis

86. J. amplifolius

91. J. giganteus

88. J. nepalicus

89. J. minimus

88. J. nepalicus
JUNCACEAE (Juncus)

36. CHINA: Sichuan, Tahsiangling, 2600 m, H.Smith 10207 (BM, S, UPS); Yunnan, E of Likiang, above Duinaoko [Duinaoko], 2900–3100 m, H.Handel-Mazzetti 3470 (E, S, WU). TIBET: Kongbo, Mira La, Nyang Chu, 3500–3900 m, F.Ludlow, G.Sherriff & G.Taylor 6031 (BM); Tongkyuk, Tsango Valley, 2900 m, F.Kingdon-Ward 12105 (BM).

40. EAST HIMALAYA: Bhutan, Upper Mo Cha, Gasa Dzong, 2800 m, J.Sinclair & D.G.Long 5023 (K). NEPAL: Chomro to Gandrung, 2250 m, Barclay & Synge 2411 (K); Marsiandi Valley, 2600 m, D.G.Lowndes 1407 (BM).

Very variable, but usually easily recognized by its inflorescence of several to many small white heads. Forms with a single head can be distinguished from small forms of J. membranaceus by the non-tubular leaves and lack of slender, elongate rhizomes.


40. EAST HIMALAYA: Sikkim, below Kyangnosla, 3120 m, D.G.Long & H.J.Noltie 77 (E); Bhutan, above Gortsam, 3510 m, H.J.Noltie 136 (E). ASSAM: Khasi Hills, 1600–1900 m, C.B.Clarke 45656 a, b (BM, K, S).


Perennials, 12–20 cm tall, loosely caespitose; rhizome short; stolons absent. Cataphylls 1 or 2, pale, chaffy. Cauline leaf single, sub-basal; blade filiform with 3 or 4 deep grooves, to 10 cm long, 0.4–0.7 mm wide, Y- or X-shaped in T.S.; pith solid, not septate; auricles very short, 0.1(–0.6) mm long. Lower bract leaf-like, half length to equaling inflorescence. Inflorescence of (1–)2 (–5) unequally peduncled 3 (–6)-flowered capitula 0.8–1.1 cm in diam.; secondary peduncle stiffly erect so capitula superposed. Tepals narrowly lanceolate, acute, subequal or with outer ones shorter (3.5–4.5 mm long) than inner ones (4–4.9 mm long), pale stramineous. Stamens 6; anthers (1.3–)1.7 mm long, exserted from tepals; filaments 4.0–4.5 mm long; stigmas 1–1.7 mm long. Capsule narrowly ellipsoid, tapered into persistent style, exceeding tepals, total length 4.9–5.7 mm, golden brown. Seeds 0.8–0.9 mm long, or 1.7 (–2.4) mm long including two unequal appendages.


Similar to J. concinnus, but differs in its filiform, deeply grooved leaves, and commonly bears two flower heads.


Perennials, 12–20 cm tall, loosely caespitose; rhizome short; stolons absent. Cataphylls 1 or 2, pale, chaffy. Cauline leaf single, sub-basal; blade filiform with 3 or 4 deep grooves, to 10 cm long, 0.4–0.7 mm wide, Y- or X-shaped in T.S.; pith solid, not septate; auricles very short, 0.1(–0.6) mm long. Lower bract leaf-like, half length to equaling inflorescence. Inflorescence of (1–)2 (–5) unequally peduncled 3 (–6)-flowered capitula 0.8–1.1 cm in diam.; secondary peduncle stiffly erect so capitula superposed. Tepals narrowly lanceolate, acute, subequal or with outer ones shorter (3.5–4.5 mm long) than inner ones (4–4.9 mm long), pale stramineous. Stamens 6; anthers (1.3–)1.7 mm long, exserted from tepals; filaments 4.0–4.5 mm long; stigmas 1–1.7 mm long. Capsule narrowly ellipsoid, tapered into persistent style, exceeding tepals, total length 4.9–5.7 mm, golden brown. Seeds 0.8–0.9 mm long, or 1.7 (–2.4) mm long including two unequal appendages.

81
long, whitish. Capsule ellipsoid-ovoid, acuminate, rostrate, 3.5–5.5 mm long; rostrum exceeding perianth. Seeds ellipsoid, 0.6–0.7 × c. 0.2 mm, or c. 1.1–1.6 mm long including two appendages 0.3–0.5 mm long.


36. CHINA SOUTH-CENTRAL: Sichuan, Tahsingling, 2700 m, H.Smith 10208 (UPS); Yunnan, Deqin Xian, Meili Xueshan, Suola, 3700 m, S.K.Wu & al. 193125 (KUN, TI); Yunnan, Zhongdian, Haba Shan, 3717 m, [anonymous: ACE] 329 (E); Yunnan, S of Zhongdian, 3215 m, [anonymous: ACE] 1603 (E). 40. EAST HIMALAYA: Sikkim Lachen, J.D.Hooker (K); Bhutan, Thimphu, Ragyo, N of Paro, 3450 m, H.J.Noltie 89 (E).

Closely related to J. concinnus but leaves flat.


Perennials, with stout creeping rhizomes. Stems stiffly erect, 20–73 cm tall. Basal leaves 1–2 (–4), to 30 cm long. Cauline leaves up to 3 near base and sometimes 1 on upper part; blade to 32 cm long, 0.8–2.2 mm wide, semi- to subcylindrical, ±canaliculate above, unitubular, septate; septa nearly always visible externally; auricles conspicuous, obtuse, with free part c. 3 mm long, pale brown, membranous. Lower bract erect, leaf-like, usually exceeding inflorescence. Inflorescence terminal, branched, of 2–7 (–13) hemispheric 7–12 (–16)-flowered capitula 1.2–1.8 cm diameter; capitula 1–2 subsessile, others on thick stiff peduncles up to 3 (–5) cm long. Tepals lanceolate, acute; outer tepals 4.8–6.5 mm long, usually shorter than inner ones (5.3–6.7 mm long), whitish or pale stramineous. Stamens 6, partly to completely exserted; anthers linear, 2.4–3.5 mm long, cream; filaments 4–6 mm long; ovary ellipsoid, 2.1–3.6 mm long, gradually tapered into style 2.1–3.6 mm long; stigmas stout, twisted, 1.0–1.6 mm long. Capsule broadly ellipsoid-trigonal, sometimes slightly curved, orange-brown, (4.0–) 4.4–6.2 mm long; mucro 0.3–1.8 mm long. Seeds 0.5–0.7 mm long, or 2.0–2.5 mm long including two subequal appendages.

Confined to E Himalayan region, from Nepal to Bhutan and SE Tibet. 36: CHT. 40: EHM, NEP. Alpine grasslands, wet ravines, open subalpine scrub, 2300–4300 m. Map 233.

36. TIBET: Shoka, Tsangpo Valley, 3200 m, F.Ludlow, G.Sherriff & G.Taylor 7151 (BM, E, UPS). 40. EAST HIMALAYA: Sikkim, Domang, 3250 m, 10 Aug 1943, J.Pradham (K); Sikkim, Dzongri, 4200 m, C.B.Clarke 26008 (K); Sikkim, Lachen, 4500 m, J.D.Hooker & J.J.Thomson (K); Sikkim, Tongla, 3200 m, J.S.Gamble 8427 (K); Sikkim, Yakla, 3200 m, C.B.Clarke 9878 (UPS); Bhutan, Dochong La, 3080 m, J.Sinclair & D.G.Long 4771 (E). NEPAL: Ghunsa, 3500 m, [anonymous: KEKE] 619 (E, KATH); Khokim, 3100 m, J.F.Dobremez 1583 (BM); Daman, 2400 m, J.F.Dobremez 809 (BM).

Reported from Kumaon, India, but material not located, and the occurrence unlikely. In its inflorescence like a very robust J. concinnus, but easily distinguished by its septate, unitubular leaves.

52. Juncus chrysocarpus Buchenau, Bot. Jahrb. Syst. 6: 201 (1885)

T: Sikkim, Islumbo, C.B.Clarke; syn: S; Sikkim, Jongri, 15 Oct 1875, C.B.Clarke 25963; syn: UPS; Sikkim, Jongri, 15 Oct 1875, C.B.Clarke 25974; syn: BM; Sikkim, Yakla, C.B.Clarke; syn: K, W.

Perennials, loosely caespitose; stems distant, 10–26 cm tall; rhizome slender, creeping. Cauline leaves usually 2, inserted ⅓ and ⅔ way along stem, with up to 2 basal leaves (to 25 cm long) sometimes also present; blades filiform, evenly tapered to acute apex, deeply ridged, canaliculate, unitubular (±bitubular near apex), closely and regularly septate; septa usually visible at least when dry; upper leaf usually overtopping inflorescence, to 14 cm long, under 1 mm wide; auricles conspicuous, with free part 0.5–1.0 × 0.5 mm. Lowest bract
JUNCACEAE (Juncus)

ridged, extended into leaf-like erecto-patent point 1–2× length of capitulum. Inflorescence a single (occasionally 2 or 3) 3–15-flowered capitulum. Tepals ±unequal; outer tepals 4.2–6.4 mm long; inner tepals 4.7–7 mm long, narrowly lanceolate, acute, ridged, stramineous. Stamens 6; anthers partly exserted at anthesis, 1.9–3.5 mm long; filaments 2.9–6 mm long; ovary ellipsoid, 2.5–3.5 mm long, gradually tapered into style 1.8–3 mm long; stigmas erect, 1.0–1.5 mm long. Capsule widely ovoid- to ellipsoid-trigonal, golden-brown, shining, 4.9–5.8 × 3–3.5 mm, abruptly contracted; mucro 0.5–2.0 mm long. Seeds c. 0.8 mm long, or c. 2.2 mm long including two subequal appendages.

Confined to the East Himalaya, from E Nepal to Bhutan and adjacent Tibet. 36: EHM, NEP. Moist open patches, especially on rocks and trees in *Rhododendron* woodlands; along streams, 2400–4420 m. Map 234.

40. EAST HIMALAYA: Sikkim, Mom Lapcha to Phedang, 3800 m, 26 Jul 1992, [anonymous: ESIK] 747 (E); Bhutan, below Darkey Sang Tso, 3690 m, 3960 m, H.J.Noltie 105B (E); above Gortsam, 3350 m, 10 Aug 1991, H.J.Noltie 134 (E). NEPAL: Chitre, between Basantpur and Door Pani, 2720 m, [anonymous: KEKE] 51 (E, K, KATH); E Nepal, between Baroya Khimty and Thakma Khola, 2500–3000 m, H.Hara, H.Kurosawa & T.Tuyama 193 (BM, TI).

Related to *J. grisebachii* but more slender; leaves filiform, and usually bearing only a single head.


Perennials, 15–33 cm tall, loosely caespitose; rhizomes slender, creeping. Cataphylls 1–2; cauline leaves 2–3 (–4), flat, grass-like, to 23 cm long, (1.8–) 3.0–4.5 (–5.2) mm wide, gradually tapered to acute apex, with upper one usually overtopping inflorescence; margins sometimes narrowly membranous, usually distinctly papillose in proximal part; papillae patent; veins conspicuous beneath; sheaths often reddish, without auricles. Lower bract erect, leaf-like, greatly exceeding inflorescence; middle bracts pale stramineous, equalling capitulum. Inflorescence apparently lateral of 1–4 unequally peduncled (2–) 4–12-flowered hemispheric capitula 0.9–2 cm in diam.; flowers ±erect, shortly pedicelled. Tepals lanceolate; outer tepals acute, 4.1–7.5 mm long with midrib usually greenish; inner tepals broader, usually longer, sometimes blunt, 4.9–7.5 mm long, pale stramineous. Stamens 6; anthers 1.8–2.5 mm long, usually at least partly exserted; filaments (3.4–) 4–6 mm long; ovary narrowly ovoid, inflated, gradually tapered into a 1.5–2 mm long style; ovary including style 6.5–9.5 mm long, stramineous; stigmas 0.3–1.5 mm long. Capsule usually sterile, narrowly ovoid, tapered into persistent style, long-exserted from tepals, total length to 1.2 cm, pale stramineous. Ripe seeds not seen; appendages present.

In the broader E Himalayan region, from E Nepal to upper Burma, SW China (Sichuan, Yunnan, Tibet). 36: CHC, CHT. 40: EHM, NEP. 41: BMA. Rocky slopes, stony pastures, margins of open woodlands, 1830–4000 m. Map 235.

36. CHINA SOUTH-CENTRAL: Yunnan, Mengkong/Nu Jiang [Salween] divide, Shidsaru [Schidsaru] Tibet valley, H.Handel-Mazzetti 9705 (S, W); Yunnan, Lichiang Range, 3850–4150 m, G.Forrest 6380 (BM, E). TIBET: Doshing La, 3850 m, F.Kingdon-Ward 13970 (BM). 40. EAST HIMALAYA: Sikkim, Choobanja, *King's collector* s.n. (K); Darjeeling, below Kalapokri, 7 Oct 1876, J.S.Gamble s.n. (K). NEPAL: Simbua Khola, below Taeram, 3400 m, S.Crawford & al. [KEKE] 820 (K); Gopte Ural, 3500 m, J.F.Dobremez 1621 (BM); Nepal, Lamjoo, 5500 m, Lall Dhwoj 0251A (BM). 41. BURMA: NE Upper Burma, 3500 m, G.Forrest 24877 (K); North Triangle, Tama Bun, 2900 m, F.Kingdon-Ward 21441 (BM).

Similar to *J. crassistylus*, but much smaller, more slender. For differences from *J. hydrophilus* see below.

T: Sikkim, Prek Chhu Bridge below Bakhim, 2300 m, 27 Jul 1992, [anonymous: ESIK] 771; holo: E; iso: K.


Perennials, 32–40 cm tall, loosely caespitose; stoloniferous; stolons short, slender (under 1 mm diam.), dark brown, covered with remains of old cataphylls. Cataphyll single, 0.7–4 cm long; basal leaves lacking; cauline leaves 3–4, evenly spaced, flat, grass-like, longest 14–17 cm long, 2–3 mm wide; sheaths 2.5–4.0 cm, reddish-brown, lacking auricles. Non-flowering shoots 3-leaved; blades shorter than stems, grass-like, tapering gradually to acute apex; margins extremely narrowly hyaline, smooth; midrib prominent beneath. Lower bract shorter than inflorescence; blade bristle-like; sheathing base narrowly membranous. Inflorescence usually of a single anthela with 3 (–5) heads, appearing terminal; heads loose, 4–9-flowered, c. 1.5 cm in diam.. Tepals unequal; outer tepals 3.5–5.0 × 0.8–1.4 mm, narrowly lanceolate, acute, keeled, cream; inner tepals 4.0–5.3 × 0.9–1.0 mm, similar in shape, cream. Stamens 6; anthers exserted, 1.4–2.5 mm long, pale yellow, narrowly oblong; filaments exceeding tepals; ovary 5.0–6.5 mm long including style, 1.0–1.5 mm wide, stramineous, very narrowly ovoid, gradually tapered into beak-like style to 1.5 mm long; stigmas 0.5–1.0 mm long, ±spreading. Capsule c. 6.0 × 1.8 mm, very narrowly ovoid, stramineous, shining. Ripe seeds unknown; appendages present. Fig. 62.

Endemic to the E Himalaya, extending from E Nepal to C Bhutan. 40: EHM. On wet cliffs with running water in oak-blue pine forest zone, 2300–3510 m. Map 236.


Similar and related to *J. clarkei* but more slender, with lower bract and cauline leaves shorter, not exceeding inflorescence; anthers distinctly exserted. Also characterized by earlier flowering time (July to early August).


T: China, Yunnan, Tsang-chan, 3500 m, 20 Aug 1887, P.J.M.Delavay 2656; holo: P; iso: TI.

Illustration: A.Camus, *Notul. Syst. (Paris)* 1(10): 282; fig. 19 (1910) as *J. crassifolius* [spalm.].

Perennials, 30–60 cm tall, robust, loosely caespitose; rhizomes long, creeping, covered with brownish scales, stout, 2–3 mm thick; stolons present. Stem erect, terete, 2–5 mm thick. Cataphylls 1–2, purplish-brown; leaves flat, grass-like; basal leaves 1–2, shorter than upper cauline leaves, 3–10 cm long including sheath, 1–1.5 cm wide; sheath 2–5 cm long; cauline leaves 2–4, 10–30 cm long, 1–2 cm wide; leaf margin broad-membranous, often ±serrulate; auricles obliquely ±absent. Lower bract leaf-like, exceeding inflorescence, 10–15 cm long, 3–6 mm wide, flat, grass-green. Inflorescence anthelate, 3–10 cm long, with 2–4 main branches and 1 to several secondary ones, of 3–8 subglobose 5–20-flowered heads 1–2 cm wide, subtended by several bracts, yellowish white; bracts of heads lanceolate to ovate-lanceolate, 3–15 mm long, 1.5–4 mm wide; sheath-like bract on peduncle membranous, lanceolate, 0.5–0.8 cm long. Flowers 6–8 mm long, 2–3 mm wide; pedicels 1.5–6.0 mm long. Tepals lanceolate; inner tepals 3.5–5.0 mm long, 0.8–2.5 mm wide; outer tepals 3.0–4.0 mm long, 0.8–2.4 mm wide, yellowish white. Stamens 6, ±not exserted, 2.6–3.3 mm long; anthers slightly longer than filaments, linear-elliptic, 1.4–1.8 mm long; filaments 1.2–1.5 mm long; style 1.3–1.5 mm long; stigmas 0.5–0.7 mm long; ovary ovoid-trigonous, 1.6–1.9 mm long, 0.8–1.0 mm wide. Capsule unilocular, oblong-obovoid, strigose, acute, subabruptly contracted in a short mucro, 4.2–6.5 (–8) mm long, pale castaneous-brown, usually exceeding perianth. Seeds ovoid, 0.6–0.8 × 0.3–0.4 mm, 2.4–3.0 mm long including two appendages c. 0.8–1.1 mm long; outer seed-coat very loose.

Confined to Yunnan, SW China. 36: CHC. Banks of streams, grasslands, thickets and slopes in Abies forests, above 2000 m. Map 237.

36. CHINA: Yunnan, Dali Shi, Diancang Shan, Zhonghe Temple – Ximatang, 3200 m, S.K.Wu & al. 103138 (KUN, TI); Yunnan, Lushui Xian, Pianma – Pianma Pass – Lushui, 3200 m, S.K.Wu & al. 103173 (KUN, TI);
Figure 62. *Juncus spumosus*. A, habit; B, inflorescence; C, partial inflorescence; D, bract; E, flower; F, ovary; G, fruit; H, immature seed. *Juncus hydrophilus*. I, habit; J, inflorescence; K, partial inflorescence; L, bract; M, flower; N, ovary; O, fruit. (A–H, H. Noltie 122, E; I–O, ESIK 771, E). Scale bars: A = 10 cm; B = 4 cm; C, K = 2 mm; D–G, L–N = 3 mm; H = 1 mm; I = 10 cm; J = 1 cm; O = 2 mm. Drawn by M. Bates. Reproduced by kind permission of the Trustees of the Royal Botanic Garden Edinburgh, from Noltie, *Edinburgh J. Bot.* 51: 140, fig. 2 (1998).
Recently, a new species of the group of *J. crassistylus* and *J. amplifolius* was discovered in the Xiaojin region, Sichuan, China. F. Miyamoto and H. Ohba call it *Juncus hamulus* (the description submitted to *J. Jap. Bot*); it is characterized by brown tepals with a hook-like appendage near the tip, long stigmas, long-creeping rhizomes, and leaves 1.5–7 mm wide.


T: China, Yunnan, Lijiang Prefecture, Yulong Shan, N of Camellia Temple, 3040 m, 11 Oct 1990; [anonymous: CLD] 1122; holo: E; iso: GH, PE, TI.


Perennials, 9.5–15 cm tall, caespitose; rhizomes short, curved. Cataphylls shining, to 3.5–5 cm long, striate, dull, brown at base; apex truncate, mucronate. Vegetative shoots bearing a single erect leaf, usually to 15 cm long. Cauline leaf single; sheath short; auricles truncate, very short (c. 0.2 mm); blade exceeding inflorescence, c. 0.9 mm wide, canaliculate, bitubular, weakly septate, with septa not visible externally. Lower bract with filiform blade shorter than inflorescence. Inflorescence 4–8 cm long, anethelate, branched to 4 orders; branches slender, ascending; flowers replaced by 3.5–6 mm long cylindrical heads of spirally inserted bracts, with each bract subtending a plantlet; bracts 1.2–1.4 mm long, narrowly ovate, acute, keeled, chaffy, stramineous; plantlets composed of several scales with dark brown bases; upper scales bearing small green filiform blades. Fertile flower (only one developed in the material) with unequal tepals; outer tepals 4 × 1.4 mm, lanceolate, acute, concave, stramineous, with margins whitish-hyaline and midrib 3-veined; inner tepals 5 × 1.5 mm. Stamens 6; filaments c. 3.4 mm long; anthers not seen. Capsule 3.5 × 1.8 mm, narrowly ellipsoid, gradually tapered into beak c. 0.7 mm long, stramineous shining. Fig. 63, 64.

Only known from Yunnan, China. 36: CHC. The only population grows in damp slopes in an open oak/pine woodland. The species is known from the type collection only. Map 238.

Related to *J. ochraceus* but cauline leaf single, inflorescence 'heads' smaller, with fewer, smaller and acute (not acuminate) bract-like structures.


T: Sikkim, 3800 m, J.D. Hooker *Juncus* 9; holo: K; iso: S, UPS.


Perennials, 8–28 cm tall, caespitose; rhizomes short. Cataphylls short, pale brown; leaves mostly basal and sub-basal, filiform, usually to 20–23 cm long, grooved, canaliculate, bitubular, septic; septa not visible externally; auricles obtuse, membranous, pale brown, c. 0.3 mm long. Lower bract filiform, usually to 2–3 cm long, shorter than inflorescence. Inflorescence branched, dense, to 12 cm long, with majority of partial inflorescences non-fertile and composed of pedicellate feather-like fascicles of narrowly lanceolate aristate, golden-brown sterile bracts. Fertile flowers usually inconspicuous, situated at base of partial inflorescences, occasionally predominating. Tepals lanceolate, acute or mucronate, equal, 3.3–4.2 mm long, stramineous. Stamens 6, shorter than tepals; filaments 1.2–1.5 mm long; anthers 1.3–2 mm long, often twisted; ovary widely ellipsoid, 1.4–2.7 mm long, abruptly contracted into style 1.8–2 mm long; stigmas erect, twisted, 1.4–2.7 mm long. Capsule widely ovoid-trigonal, c. 2.4 × 1.5 mm, abruptly contracted; mucro c. 1.8 mm. Seeds not developed even in almost ripe capsules.

Restricted to the E Himalaya from C Nepal and Bhutan to Darjeeling and adjacent regions of China. 36: CHC, CHT. 40: IND, EHM, NEP. Moist open ground and shingle along streams and roadbanks, 1220–3660 m. Map 239.
**JUNCACEAE (Juncus)**

Figure 64. *Juncus fimbristyloides*. A, flower opened out; B, sterile head; C, bract of sterile head; D, plantlet; E, capsule; F, leaf T.S. *Juncus deosaicus*. G, flower opened out; H, leaf T.S.; I, ovary. (A–F, CLD 1122, E; G–I, Hussain & al. 940659, E). Scale bars: A, C–E, G, I = 1.7 mm; B = 3 mm; F, H = 0.5 mm. Drawn by L.Olley. Reproduced by kind permission of the Trustees of the Royal Botanic Garden Edinburgh, from Noltie, *Edinburgh J. Bot.* 55: 42, fig. 2 (1998).
JUNCACEAE (Juncus)

36. CHINA SOUTH-CENTRAL: Yunnan, Tsang Shan, Dali, Longquan Peak, 2520 m, [anonymous: CLD] 1289 (E, K). TIBET: Di Chu Gorge, 2600 m, F.Kingdon-Ward 19466 (BM, E). 40. INDIA: Darjeeling, 2250 m, C.B.Clark 26277 (K, UPS). EAST HIMALAYA: Bhutan, 1 km S of Tongsia, 2250 m, A.C.Grierson & D.G.Long 19466 (BM, TI); Bhutan, Chompa, near Kori La, 2356 m, R.Pradhan & T.Wangdi 6902 (E); Sikkim, Keydangthan, 1220 m, R.Pradhan, Norbu & Naku 170 (E). NEPAL: Ghansa Khola, Kyapra to Pheri, 3330 m, [anonymous: KEKE] 351 (E, K); Dhawalagiri Zone, Myagdi, 2190 m, Mikage & al. 952228 (E).

Juncus tratangensis represents a form with perfect flowers, occasionally occurring in the populations of J. ochraceus. Not even the developed flowers, however, yield any seed, and the reproduction of the species seems to be exclusively vegetative. Both the morphology of the bract-like structures and the nature of reproduction require further study.


Rhynchospora mairei H.Lév., Cat. Pl. Yunnan 80 (1916), n.v. T: China, Yunnan, 1910, [collector not given]; holo: E.


Perennials, 5–60 cm tall, densely caespitose; rhizome short. Stems erect, terete, 0.5–1.2 mm thick. Cataphylls 2–3, loose, brown to castaneous, shining. Basal leaves 1–2, terete, unitubular, septate; septa usually visible externally, 2–20 cm long; apex obtuse; cauleine leaf single, rarely absent, inserted about the middle of stem, with conspicuous sheath; blade 0.5–1.5 (–4) cm long; sheaths 0.8–3 cm long; auricules large, brownish, obtuse, 0.7–1.4 mm long. Bracts lanceolate to ovate lanceolate, 0.5–1.3 cm long, 1.5–5 mm wide, ribbed and shortly aristate; lower bract as long as flowers or slightly longer, stramineous or brown.

Inflorescence a terminal dense subglobose 10–25-flowered head. Flowers 0.8–1.3 cm long, with pedicels 0.5–5 mm long. Te palis equal, lanceolate, 4.7–6 (–7.6) mm long, 1–1.5 mm wide, subacute, ivory white or sometimes with brownish apex. Stamens 6, exserted, 6–8 mm long; anthers linear elliptic, white, 2–2.5 (–3.0) mm long, shorter than 4–5.5 mm long filaments; style 1.5–2.5 mm long; stigmas (0.5–) 0.8–1.1 mm long, with lobes stout; ovary 2.5–3 mm long, 0.5–0.8 mm wide, ivory white. Capsules ellipsoid-trigonal, 4.0–5.3 (–6.9) mm long, incl. a c. 1 mm long exserted rostrum, 1.4–1.8 mm wide, pale. Seeds brown, 0.8–1.0 mm long, 0.25–0.3 mm wide, c. 1.7–2.2 mm long including c. 0.4–0.5 mm long appendages. Fig. 65.

India (Kumaon, Punjab), Nepal, Sikkim, Bhutan and China (Tibet, Sichuan, Yunnan, Hubei, Shaanxi). 36: CHC, CHT. 40: EHM, NEP, IND, WHM. On scree slopes and along streams, bogs, damp turf, above 2500 m. Map 240.


Illustration: S.M.H.Jafri, Fl. Pakistan 138: 24, fig. 6 (1981).

Perennials, usually (8–) 12–30 (–42) cm tall, loosely caespitose; rhizome slender, ±creeping. Cataphylls 0–1, pale brownish-membranous to purplish; basal leaves 1–2 (–4), usually to 10 cm long (sterile shoots with longer leaves, to 25 cm). Cauline leaves 2–3, length variable, with upper ones usually to 6–10 cm including sheath, ±canaliculate at base, unitubular, remotely septate; septa ±not visible externally; tip ±acute to subobtuse; auricles 1.2–1.7 mm long, obtuse. Lower bract entirely scarious or base herbaceous, stramineous to suffused pale brownish, ovate-acuminate, c. 1.0–1.5 cm long, equalling, or sometimes exceeding inflorescence; other bracts scarious-stramineous, ±ovate-lanceolate, with distinct veins, ±equalling inflorescence. Inflorescence a single (5–) 8–15 (–25)-flowered head usually 1.0–1.8 cm in diam.; pedicels c. 1–2 mm long. Tepals ±equal, 4.0–5.3 mm long, ±whitish to pale stramineous, obtuse to acute. Stamens 6, ±exserted; anthers 1.2–2.0 (–2.2) mm long; filaments 2.5–3.0 × 1.2–1.9 mm long; stigma 1.5–2.0 mm long. Capsule obovoid to ellipsoid, acuminate, mucronate, 5.5–6.5 mm long including c. 0.5–1.5 mm mucro, brown to castaneous-brown, shining. Seeds c. 0.6 × 0.2–0.3 mm, or 2.5–3.0 mm including seed-coat; appendages subequal, 0.7–1.0 and 0.8–1.2 mm long. n = 60, P.N.Mehra & S.K.Sachdeva, Cytologia 41: 31–53 (1976), n.v.

From E Afghanistan to Himalayan parts of Himachal Pradesh and Uttar Pradesh, India, and SW Tibet. 32: TAD. 34: AFG. 36: CHT. 40: PKH, WHM. Reported from Nepal, Sikkim and Yunnan but material not seen. Damp rocky habitats, alpine valleys above 2700 m. Map 241.

34. AFGHANISTAN: Konar, Barg-i-Matal, 2160 m, T.F.Hewer 1406 (K); Nuristan, Rangul Valley, 2600 m, W.Theisinger 1432 (BM).
36. TIBET: Kullu, Jäschke (WU).
40. PAKISTAN: Swat State, Swat R., Kalam, R.J.Rodin 5614 (K); Nuristan, Rangul Valley, 2600 m, W.Thesiger 1432 (BM); Chitral, Laspur (Harchin), Bowes Lyon 30 (BM). WEST HIMALAYA: Garhwal, Jelandu Ko Gadh, J.F.Duthie 151 (K); Baltistan, Shagarthang Valley, J.F.Duthie 12110 (WU); Kashmir, Musjid Valley, 4200–4400 m, J.F.Duthie 13281 (WU); Himachal Pradesh, Lahul, Udaipur, 2850 m, R.McBeath 2267 (E); Kumaon, Katti Valley, in Byans, 4600 m, J.F.Duthie 612 (E).

Closely allied to J. allioides but anthers shorter; cauline leaves acute to subobtuse, septa externally ±not visible, and rhizomes slender, creeping, so plant not tufted.


Juncus hoffmeisteri

Juncus concinnus var. turbidus

Juncus allioides

Juncus glaucoturgidus


Similar to J. allioides, but stems and leaves stouter; leaves glaucous, septa not visible externally; bracts broader.


T: [not indicated in 1839; in 1840 given as] in Emodi montibus ad Shalma, J.F.Royle; lecto: LIV, designated here; isoelecto: K, LE, W.


Perennials, 8–32 cm tall, densely to loosely caespitose; rhizomes short-noded or ascending. Cataphylls up to 4, sometimes aristate, to 3 cm long, tightly encircling stem, castaneous, shining; sterile shoots with single leaf to 15 (–18) cm long; cauleine leaves usually 2, stiffly erect, usually inserted 1/2 and 2/3 way along stem; lower leaf blade cy lindric, sometimes flattened, to 10 cm long, to 1.4 mm wide, slightly grooved to deeply canaliculate, not septate, reaching at least base of upper leaf, sometimes exceeding in florescence, gradually tapered to subacute apex; upper leaf with long slightly inflated sheath and short bristle-like blade to 2 cm long; auricles conspicuous, oblong, blunt, free part to 0.9–1.3 mm long, often brown. Lower 2 bracts subequal, equalling capitulum, lanceolate, dark castaneous, shining. Inflorescence hemispheric, 4–11-flowered, to 1.7 cm in diam.; pedicels of lower flowers to 3 mm long. Tepals lanceolate, subacute or inner blunt, ±equal, 4.5–5.6 mm long, ±white or reddish-brown. Stamens 6; anthers 2.0–2.9 mm long, usually completely exerted; filaments (2.2–) 4.2–5.2 mm long; ovary (1.5–) 2.2–2.5 mm long, abruptly contracted into 2.0–2.5 mm style; stigmas stout, short, erect, c. 0.3–0.6 mm long. Capsule ellipsoid-trigonous, 3.0–3.3 mm long, dark brown, shining; mucro 0.7–1.1 mm long (style with mucro c. 3 mm). Seeds pale brown, 0.7–0.8 × 0.3–0.4 mm; appendages ±unequal, 0.2–0.3 mm and c. 0.1–0.2 mm long. Fig. 65.

Garhwal, Nepal, East Himalaya, N Burma and SW China. 36: CHC, CHT. 40: EHM, NEP, WHM. 41: BMA. Scree and rocky slopes, open alpine heathland, damp flushes and Rhododendron scrub, usually between 3100 and 4600 m. Reported from North-Central China and Qinghai, but material not seen during this study. Map 243.

36. CHINA: Tibet, N of Pagri [Phari], Kang Me, 8 Aug 1882, King's collector s.n. (BM); Sichuan, Ta-tsien-lu [Kangding], Yulingkong, Gomba La, 3700 m, H.Smith 10724 (S, UPS); Yunnan, Zhongdian, Wensui to Xiang Chen, W side of Da Xue Shan pass, [Anonymous: ACE] 1851 (E); Yunnan, Zhongdian, Napa Hui, 3966 m, [Anonymous: ACE] 188 (E).

40. WEST HIMALAYA: India, Uttar Pradesh, Mussorie, Kidar Kantha, 3850 m, J.R.Drummond 22795 (K). NEPAL: between Tamo La and Sinion La, 4025 m, [Anonymous: ACE] 677 (E, K, KATH); Rambrong, Lamjung, 4150 m, J.D.A.Stainton, W.R.Sykes & R.H.J.Williams 6124 (UPS). SIKKIM: Jongri, 4150 m, C.B.Clarke 26146 (K); Sikkim, Lachen, 3850 m, 20 Jun 1849, J.D.Hooker (K, LD). BHUTAN: Upper Mo Chu, Timuzam, W of Laya, 4150 m, J.Sinclair & D.G.Long 5234 (K).

41. BURMA: Kachin State, North Triangle (Tama Bum), 3500 m, F.Kingdon-Ward 21018 (BM, p.p.).

Superficially similar to slender forms of J. allioides or J. membranaceus but differs in non-septate leaves and tightly sheathing castaneous cataphylls. Very similar to J. cephalostigma from which it differs in being more robust, with longer stigmas.

The isotype of J. tanguticus (G.Giraldi 7242) represents a plant very close to J. leucanthus. The main differences found between the typical J. leucanthus and the original material (incl. four paratypes) of J. tanguticus are: the lower cauleine leaf almost sub-basal, straw-brown cataphylls ±castaneous at base in the latter, the lower cauleine leaf inserted in, or just below, the middle of stem; cataphylls dark castaneous in the former. The differences may be accounted for as extremes of the variation range of J. leucanthus, which we adopted above,
Figure 66. *Juncus glaucoturgidus*. A, habit; B, flower; C, ovary; D, stigma; E, capsule. *Juncus bryophilus*. F, habit; G, flower; H, ovary; I, stigma; J, capsule; K, seeds. (A–E, ESIK 572, E; F, ESIK 698, E; G–K, J.Sinclair & D.G.Long 5217b, E). Scale bars: A = 3 cm; B, C, E = 5 mm; F = 1 cm; G, H, J = 1.7 mm; D, K = 1 mm; I = 1.5 mm. Drawn by M.Bates. Reproduced by kind permission of the Trustees of the Royal Botanic Garden Edinburgh, from Noltie, *Edinburgh J. Bot.* 51: 133, fig. 1 (1998).
or as a result of hybridization between *J. leucanthus* and *J. przewalskii*. Both these species, moreover, have white-flowered and reddish-brown-flowered forms. A part of the original material of *J. tanguticus* undoubtedly represents *J. przewalskii*. Further study is needed.


T: Tibet, Gyantse, 1904, H.J.Walton 69; holo: BM; iso: K, photo E.

Perennials, 17–26 cm tall, loosely caespitose; rhizomes creeping, thin; stems terete, c. 0.8–1.2 mm in diam. Cataphylls 1–2, brownish; margins distinct, castaneous-translucent; blade short, acicular. Basal leaves 1–2. Cauline leaf single, sub-basal, inserted in lower 1/4 of stem, 2–5 cm long, to 0.8 mm wide, subterete, striate, pluritubular (up to three longitudinal septa), imperfectly septate; apex obtuse; sheaths 2–3 cm long, dilated above, with distinct castaneous-membranous margins; auricles distinct, ±obtuse to truncate, c. 1 mm long, castaneous. Inflorescence bracts several, ovate-lanceolate, acute, castaneous-brownish, 0.7–1.0 cm long, one of them often leaf-like, with a dilated brownish sheath and short to c. 1 cm long blade slightly overtopping inflorescence, erecto-patent. Inflorescence a single c. 10–13-flowered terminal head; pedicels to 1.5–2 mm long. Tepals ±equal, oblong-ovate, ±cucullate at apex, c. 5.7–6.5 mm long, cream-white, keeled or 3-veined. Stamens 6, exserted; anthers 2.2–2.8 mm long; filaments to c. 0.7–1.5 mm long; stigmas 2–3 mm long; ovary c. 2.5 mm long. Young capsule distinctly mucronate, shorter than perianth, unilocular. Seeds not seen.

Known only from Tibet. 36: CH. Ecology unknown. Map 244.


T: China, Yunnan, Tseku on Mekong, Monbeig 43; syn: S.


Perennials, 6–20 cm tall, densely caespitose; rhizomes short. Cataphylls 1 or more, shortly aristate, tightly encircling stem, pale- to orange-brown; basal leaves 1 (–3). Cauline leaves usually 2, with lower one sub-basal and upper one 2/3 way along stem. Lower leaf blade linear, to 8 cm long, 0.6–1.0 mm wide, cylindric, grooved above, sometimes also beneath, non-septate; apex ±acute. Upper leaf with conspicuous, slightly inflated, often brownish sheath and short bristle-like blade to 0.8 cm long; auricles obtuse, free part c. 0.2 mm long, transparent, membranous, sometimes not visible. Lower 2 bracts subequal, lanceolate, ribbed when dry, scarcely exceeding capitulum, usually pale brown. Inflorescence hemispheric, 5–9-flowered, to 1.2 cm diameter, with flowers shortly pedicellate. Tepals narrowly lanceolate, ±equal, 4.4–5 mm long, ±white. Stamens 6; anthers 1.8–2.5 mm long, at least partly exserted; filaments 4.5–4.4 mm long; ovary ellipsoidal, 2.3–2.8 mm long, abruptly contracted into 2.5–2.7 mm style; stigma capitate, pin-like, with exceedingly short lobes. Capsule broadly ellipsoid-trigonoous, stramineous to brown, 2.3–2.8 mm long; macro 0.9–1.2 mm long. Seeds c. 0.8 mm long; appendages short, c. 0.1–0.3 mm long.

East Himalaya, C and E Nepal, Sikkim, Bhutan, N Burma, China (Tibet, Yunnan). 36: CHC, CHT. 40: EHM, NEP. 41: BMA. Wet rocks, rocky meadows, 3350–4540 m. Map 245.
JUNCACEAE (Juncus)


41. BURMA: Kachin State, North Triangle (Tamu Bum), 3500 m, F.Kingdon-Ward 21018 (BM p.p.).

Very close to J. leucanthus, but more slender and with capitate stigma.

64. Juncus brachystigma Sam., in H.Handel-Mazzetti, Symb. Sin. 7: 1236 (1936)

T: China, Yunnan, Ngulukö [Nguluke], Ndwolo, 20 Jul 1914, H.Handel-Mazzetti 4259; lecto: WU, designated here; isolecto: W.


Perennials, 2–17 cm tall, densely caespitose; rhizomes very short. Cataphylls 1 or more, apiculate, brown. Cauline leaf usually 1 (–3), sub-basal, with upper 2/3 of stem leafless; blade 0.2–5.0 cm long, to 0.8 mm wide, obtuse, canaliculate above and beneath, with up to 4 other shallower grooves, sometimes appearing bitubular in T.S.; auricles very short, with free part absent or c. 0.1 mm long. Lower bract ±equalling capitulum, or extended into aristate point to 3 cm long. Inflorescence 4–13-flowered, 0.7–1.0 (–1.4) cm diam.; pedicels short. Tepals narrowly lanceolate, ±equal, (3.0–) 3.5–3.9 (–4.5) mm long, ±white. Stamens 6; anthers finally completely exserted, 0.8–1.6 mm long; filaments elongating, c. 3–4 mm long; ovary ellipsoid, (0.9–) 2.2–2.8 mm long, abruptly contracted into exserted (0.9–) 1.3–1.8 (–2.8) mm style; stigmas up to 0.4 mm long, spreading or almost indistinct. Capsule castaneous, very shortly stipitate, narrowly ellipsoid, c. 3 mm long; mucro exserted, c. 0.8 mm long. Seeds brown, c. 0.3 mm wide, 0.5–0.7 mm long, or c. 0.9–1.1 mm including two appendages 0.1–0.2 mm long. Fig. 65.

In C Nepal, Sikkim, Bhutan, N Burma and China (Tibet, Yunnan). CHC, CHT. EHM, NEP. BMA. Wet, usually calcareous rocks, damp patches amongst scrub, stony slopes, usually between 3050 and 5000 m. Map 246.


40. EAST HIMALAYA: Sikkim, Na-tut, 26 Aug 1882, King’s collector s.n. (K); Rookah, 3200 m, King’s collector s.n. (K). NEPAL: Sabhe Khola, 4300 m, D.G.Louder 1208 (BM); Tsetrong, Nimjung, 4150 m, J.D.A.Stainton, W.R.Sykes & R.H.J.Williams 6160 (BM, E).

41. BURMA, Imaw Bum, 3850–4150 m, F.Kingdon-Ward 3612 (E).

Similar to J. cephalostigma in its capitate stigma, but differs in lacking cauline leaf, and in lower bract extended into a leaf-like point.

65. Juncus kingii Rendle, J. Bot. 44: 45 (1906)

T: Tibet, N of Pagri [Phari], Kang-me, 3 Aug 1882, King’s collector s.n.; lecto: BM, designated here; isolecto: K.


Perennials, (6–) 13.5–35 cm tall, with stems single, distant, stiffly erect; rhizomes stout, creeping, long-noded. Cataphylls sheathing, with upper ones with setaceous points, whitish-brown, dull. Cauline leaf single, stiff, erect, linear; tip obtuse, usually ½ of stem length, semicircular to cylindrical in T.S., canaliculate, bitubular, with thin membranous longitudinal septum and weak transverse septa (septa not visible externally), to 1.7 mm wide; auricles rounded, with free part 0.8 × 0.9 mm, stramineous, membranous. Lower bract extended into leafy point at least twice capitulum length. Inflorescence 8–13 (–24)-flowered, 1.4–2.0 cm diam. Tepals narrowly lanceolate, acute, ±equal, 4.7–6.7 mm long, creamy white. Stamens 6; anthers completely exserted at maturity, 1.7–2.5 mm long; filaments elongating, to c. 5–6 mm

95
long; ovary ellipsoid, 2.0–4.2 mm long; style 1.3–2.7 mm long; stigmas 1.0–2.2 mm long. Capsule ellipsoid-trigonous, 3.0–4.1 mm long, abruptly contracted into partly exserted 1.5–2 mm mucro. Seeds orange-brown, to 0.3 mm wide, 0.6–0.8 mm long, or c. 0.9–1.0 mm including two subequal appendages c. 0.1–0.2 mm long.

From W Nepal to Sikkim, Bhutan, China (Tibet, Yunnan, Sichuan, Qinghai). 36: CHC, CHQ, CHT. 40: EHM, NEP. Wet meadows, along streams, stony slopes amongst scrub, 3600–4750 m. Map 247.


Superficially similar to J. allioides, but distinguished by the elongate lower bract, creeping rhizomes, and lack of upper stem leaf.


Perennials, 3–14 cm tall, caespitose; rhizome short, branched, clump-forming. Stems erect, terete, slender. Cataphylls stramineous to pale castaneous, later fibrous; basal leaves 0–2, filiform, bitubular, 0.5–1 cm long, c. 0.2–0.5 mm in diam. Cauline leaves 2–3, some inserted in upper part of stem, filiform, bract-like, 0.2–1.5 cm long; sheaths brown, enclosing small dark bulbils developing into plantlets; auriicules oblique truncate, to c. 0.2 mm long, membranous or brownish. Bracts 2, navicular-lanceolate, 3–4 mm long, 1–1.5 mm wide, reddish-brown, shorter than perianth. Inflorescence reduced to a single terminal head with 1–3 (–5) flowers, yellowish white; bract lanceolate, pale brown; lowest bracts shorter than flower. Flowers 4–6 mm long, 0.7–0.9 mm wide; pedicels 0.8–1.3 mm long. Tepals narrowly ovate-lanceolate, acute, unequal; outer tepals shorter, 2.5–3.2 mm long, 0.7–0.9 mm wide; inner tepals to 3.3–3.7 mm long, ivory white. Stamens 6, exserted, 2.2–3.2 mm long; anthers linear elliptic, white, 0.8–1.5 mm long, shorter than 1.7–2.2 mm filaments; style 0.8–1.8 mm long; stigmas ±capitate, 0.2–0.3 mm long; ovary ellipsoid, 2.5–3.0 mm long, 0.8–1 mm wide, white. Capsule ellipsoid-trigonous, 2.6–3.1 mm long, 1.3–1.5 mm wide, with mucro to 0.5 mm long, brown, exceeding perianth, usually sterile. Seeds unknown. Fig. 65.

Confined to Nepal, Sikkim and Bhutan. 40: EHM, NEP. Wet flushes, boggy pool margins, mossy rocks, above 3500 m. Map 248.

40. EAST HIMALAYA: Sikkim [precise locality unknown], King’s collector (K); Bhutan, Wangdi Phordrang District, Tintatso, 4300 m, F.Miyamoto 9361739b (TI). NEPAL: Koshi Zone, Sankhuwa Sabha District, Cha Ding Kharka–Khongma, 3900 m, M.Minaki & al. 9020862a (TI); Bagmati Zone, Rasuwa District, Kharka–Pati Kharka, 3650 m, F.Miyamoto & al. 9410194 (TI); Sagarmatha zone, Solukhumbu District, Pike, 3820 m, F.Miyamoto & al. 950059 (TI); Kauma, 3540 m, [Anonymous: EMKA] 294 (E); Sankhuwa Sabha District, opposite Shipton La, N side of Barum Khola, 4200 m, [Anonymous: EMKA] 653 (E).

A peculiar species notable for having dark bulbils in the axils of branch-like cauline leaves. According to the material available, it has ±sterile capsules.


Perennials, 5–16 (–30) cm tall, densely caespitose; rhizome short. Stems erect, terete with several shallow grooves. Cataphylls 1–2, apiculate, reddish-brown. Leaves 2–3, basal and sub-basal, pluritubular at base, bitubular near apex, linear, 1–5 cm long; apex obtuse, reaching c. \( \frac{1}{3} \) of stem; sheaths 1–4 cm long, often castaneous; auricles curved, acute, to c. 0.9 mm long. Lower bracts lanceolate to ovate, subequal, castaneous, not exceeding capitulum, usually 4–6 mm long. Inflorescence a single hemispherical 3–10-flowered head. Pedicels 0.5–2 mm long. Tepals ±lanceolate, subequal, 3–5 mm long, 0.7–0.9 mm wide, ivory-white. Stamens 6, exserted, 4–6 mm long; anthers linear elliptic, white, 1.2–2.0 mm long; filaments 2.5–4.2 mm long; style 0.5–0.8 mm long; stigmas 0.8–2.0 mm long; ovary 2–4 mm long, white. Capsules narrowly ellipsoid-trigonous, 3.8–5.0 mm long, 2–2.5 mm wide, with rostrum 0.6–1.0 mm long, castaneous-brown. Seeds oblong-ovoid, ochraceous, 0.6–0.8 \( \times \) 0.2–0.3 mm, or c. 2.0–2.4 mm long including two appendages 0.6–1.1 mm long.

Pamir and W Himalaya to S China. 32: TZK. 36: CHC, CHT. 40: EHM, NEP, WHM. Marshy places, streamsides, above 3000 m. Map 249.

36. CHINA: Sichuan, Kangding, Tapahshan, 4200 m, H.Smith 1131 (KYO, S, UPS); Yunnan, Linchhang Valley, G.Forrest 2148 (P). TIBET: Kiala, J.A.Soulié 960 (P).

40. EAST HIMALAYA: Bhutan, Byakar, Bumtang Chu, 2750 m, A.J.C.Grierson & D.G.Long 1762 (K); Wangdi Phodrang District, Tintaso, 4000 m, F.Miyamoto 9361583 (TI).

NEPAL: Near Balangra Pass, O.Polunin & al., 2574 (L, P, UPS); Tilicho, Barclay & Synge 2610 (K).

WEST HIMALAYA: Punjab, Lahul, Serchu, 14000 ft., W.N.Koelz 2100 (S); Kumaon, Marto li, R.Chand 711 (L); Kashmir, Deosai, C.B.Clarke 29824 (K).

68. Juncus triglumis L., Sp. Pl. 328 (1753)
a subspecies [e.g., South Siberia, Chita, Darasun R., 7 Jun 1920, G.Stukov (BM, LE)]. The complex is in need of a revision.

Tepals blackish brown to pale brown; bracts usually brown; capsule usually longer than 4.5 mm, usually distinctly exceeding perianth; plants most often 7–15 cm tall; lower flower not or slightly remote

68a. subsp. triglumis

Tepals pale straw-brown to stramineous; capsule usually c. 4.0–4.5 mm long, scarcely exceeding perianth; plants taller, to 30 cm; lower flower often slightly remote

68b. subsp. albescens

68a. *Juncus triglumis* L. subsp. *triglumis*


*Juncus gontscharovii* Schischk., *n.v.


Plants most often 7–15 cm tall. Bracts usually brown to dark brownish, rarely pale brownish, oblong-ovate, obtuse, 3.5–4.5 mm long; apex scarious, ±equalling perianth. Lower flower not or slightly remote. Tepals blackish brown to pale brown, (3.5–) 4.0–5.0 (–5.5) mm long; style c. 0.4–0.5 mm long; stigma c. 0.8 mm long. Capsule c. 4.5–6.0 mm long, usually distinctly exceeding perianth. Seeds 0.8–0.9 × c. 0.25 mm, with two subequal appendages c. 0.7–1.0 mm long each. 2n = c.120, c.130,

N Europe and mountains of C and S Europe, the Caucasus, Middle Asia, the Himalayas, Arctic and mountainous Siberia, Mongolia, N China, Tibet, Japan, Russian Far East, Greenland, Alaska and N Canada; disjunctly in the more southerly regions of United States. Map 250.

A very variable taxon. Plants from the Far East and SE Siberia often show some features of subsp. *albescens*; similar plants are found as far to the west as in the Altai. The most striking variation is found in the Himalayas [Snogerup, *in K.H.Rechinger, Fl. Iranica* 75: 26 (1971); H.J.Noltie, *Fl. Bhutan* 3/1: 269 (1994)].

10. GREAT BRITAIN: Scotland, Aberdeen, 3 km NNW of Glas Maol, S.Snogerup & B.Snogerup 10745 (LD).


98
JUNCACEAE (Juncus)


Plants usually 10–30 cm tall. Bracts usually brown or pale brown at base, with margins and distal half scarious, with lower bract equalling or exceeding inflorescence, acute, often with long mucro, usually 4–13 mm long. Lower flower of ten ±remote. Tepals pale straw-brown to ±scarious or stramineous with pale brown centre, c. 3.5–4.5 mm long; style c. 0.3–0.4 mm long; stigmas c. 0.6–0.8 mm long. Capsule usually c. 4.0–4.5 mm long, scarcely exceeding perianth. Seeds c. 0.6–0.7 × 0.2–0.3 mm, with two subequalex appendages (0.4–) 0.5–0.8 mm. 2n = 132, fide Á.Löve & D.Löve, Taxon 30: 849 (1981).


T: [In 1839 not indicated, in 1840 given as:] India, Kunawur ad Soongnum, J.F.Royle; holo: LIV; iso: K, W.


Perennials, 3–15 (–19) cm tall, densely caespitose; rhizomes very short. Cataphylls reddish-brown. Cauline leaves usually 2, sub-basal, with upper part of stem leafless; blades linear, to 5.5 cm long, to c. 1 mm wide, reaching c. ½ way up stem, unitubular, canaliculate; apex subacute; sheaths with membranous margins gradually tapered into blade; auricles lacking. Lower bract leafy, to twice length of capitulum, 1.0–2.5 cm long. Inflorescence a single terminal capitulum, 5–10-flowered. Tepals ±white, narrowly lanceolate, subacute, equal, (4.6–) 5.2–6.4 mm. Stamens 6; anthers completely exserted at maturity, linear, (1.8–) 2.0–2.9 mm long; filaments 3.0–5.5 mm long; ovary ellipsoid-trigonous, (2.3–) 3.0–3.8 mm long; style 1.3–2.9 mm long; stigmas 0.5–1 mm long. Capsule ovoid to broadly ellipsoid, 2.6–3.0 mm long, with 0.8–1.5 mm mucro. Unripe seeds c. 0.4–0.5 mm long; appendages unequal, c. 0.1–0.2 mm and c. 0.3–0.4 mm.

Sino-Himalayan region from Kashmir and Nepal to C China. 36: CHC, CHN, CHT. 40: EHM, NEP, WH. Damp grassy places, on sand by rivers, moraines, 3200–4800 m. Map 252.


40. EAST HIMALAYA: Sikkim, Chakalung La, Rohmoo 331 (E). NEPAL: Dojam Khola, Suli Gola, 4500 m, O.Polunin, W.R.Symes & R.H.J.Williams 2276 (UPS); Kali Gandaki Valley, Hinko cave, 3200 m, Barclay & Synge 2283 (K).

Similar to J. benghalensis in leaf like lower bract, but differing in always having upper stem leaf, leaf sheaths lacking auricles, longer anthers and densely caespitose growth.

99
JUNCACEAE (Juncus)

70. Juncus benghalensis Kunth, Enum. Pl. 3: 360 (1841)
T: 'Benghalia inferior' [=error], N.Wallich 3480a; syn: B, n.v. [photo: E], BM, K, W [fragment and a drawing].


Perennials, 5–24 cm tall, with single slender stems from thin creeping, long-noded rhizomes. Cataphylls 1 or more, whitish-brown. Cauline leaves usually 2 (–3); lower leaf basal, filiform, acute, canaliculate, bitubular, to 10 cm long, c. 0.7 mm wide; upper leaf usually present; blade to 8 cm, sometimes overtopping inflorescence; sheath long, sometimes slightly inflated and brown-tinged; auricles conspicuous, oblong, obtuse, with free part 0.7–1.2 mm long, usually brown. Lower bract developed into leaf-like point to 2.5 cm long. Inflorescence a single (2–) 4–11-flowered capitulum. Tepals cream-white to dirty white, narrowly lanceolate, subacute, equal, 4.0–5.8 (–6.5) mm long. Stamens 6; anthers very narrow, (1.7–) 2.2–3.3 mm long, exserted at maturity; filaments up to c. 5 mm long; ovary ellipsoid, 2.0–3.5 mm long; style 1.4–2.0 mm long; stigmas erect, (0.3–) 0.6–1.4 mm long. Capsule shortly stipitate, narrowly ellipsoid-trigonous, shorter than tepals, 2.6–4.0 mm long, tapered into 0.6–1.0 mm mucro. Seeds c. 0.6 mm long, or to 1.2 mm including two appendages.

A common Sino-Himalayan species centred to the East Himalaya. It occurs from Swat, Pakistan, and Kashmir to Sichuan and Yunnan. Reported from Gansu, China, but specimens not located. 36: CHC, CHT. 40: EHM, NEP, PAK, WHM. River and stream banks, damp grasslands, damp gravelly banks and roadsides in Abies/Rhododendron forest, wet cliffs, sandy moraines, 2900–4570 m. Map 253.

T: China, Sichuan, Taofu [Dawu], Haitzeshan, 4200 m, H.Smith 11312 (S, UPS); Tibet, Kongbo, Deyang La, 4200 m, F.Ludlow, G.Sherriff & H.H.Elliott 14325 (BM, E, UPS); Yunnan, Diqing, N of Napa Hai, 3910 m, [Anonymous: KEG] 1383 (E).

Perennials; stems 1.5–8 cm, setaceous, densely caespitose; rhizomes very short, stout, covered with dark brown scales. Leaves bitubular, filiform; leaf sheaths with conspicuous, often reddish-brown auricles; upper stem leaf present or absent; basal stem leaf with dark purplish-brown sheath. Bracts castaneous, with lowermost often with leaf-like point exceeding inflorescence. Inflorescence a single (1–) 2–4-flowered capitulum. Tepals 3.0–4.5 × 1 mm, oblong, obtuse, initially white, becoming suffused dark purplish. Stamens 6; anthers 1.5–2 mm long; filaments up to 3.5–4.5 mm long, exceeding tepals at maturity; style 0.7–1.2 mm long; stigmas c. 0.5 mm long, spreading. Capsule 2.5–3 × 1.5–2 mm, oblong-ellipsoid, abruptly contracted into 1.0–1.5 mm mucro. Seeds 0.6–0.7 mm long, with minute appendages less than 0.1 mm long.
A rare, probably overlooked, species recorded from Nepal, Sikkim, Tibet and Sichuan, China. 36: CHC, CHT. 40: EHM, NEP. Shallow, damp soils on moraines, above 4250–5020 m. Map 254.

36. TIBET: SW of Lhozak [Lhozhag, Garbo] Valley junction, 4420 m, Dickoré 9816 (E); Tsangpo – Subansiri Pass, 5000 m, Dickoré 9952 (E). 40. EAST HIMALAYA: Sikkim, Chaunr ixiang, foot of East Rathong Glacier, 4550 m, [Anonymous: ESIK] 375 (E); SE side of Lasha Chhu, below Sebu La, 4700 m, D.G.Long & H.J.Noltie 383 (E). NEPAL: Gosainkund Lake, 4250 m, T. de Haas 2252 (BM); rocks N of Gosainkund Governmental House, 4500 m, T. de Haas 2222 (BM); Lau, 4600 m, Yon 243 (BM).

Close to J. benghalensis, especially in its bitubular leaves, the usually long, leaf-like lowest bract and the conspicuous leaf-sheath auricles, but differing in its very dwarf stature (inflorescence sometimes reduced to 1 or 2 flowers) and its short, branched rhizomes giving rise to dense clumps, rather than having stems borne singly and spreading by very slender rhizomes.


T: Yunnan, zwischen Dischaoping und Boli’tin von Yungbei [Yongsheng], 2600–3000 m, 30 Jun 1914, H.Handel-Mazzetti 3359; holo: W.


Perennials, 10–38 cm tall, loosely caespitose; rhizome thin, creeping, 0.3–0.7 mm across. Stem erect, terete. Cataphylls 3–6, 1.6–4.0 cm long, stramineous, dull; basal leaves absent. Cauline leaf single, inserted in upper half of stem, terete, unitubular, usually exceeding stem, 10–21 cm long, 1.0–1.5 mm wide; sheath 1.0–3.0 cm long, grass-green; auricles very short, obtuse. Bracts 3–5, with lower one shorter than the flowers, lanceolate, 7–9 mm long, 3.4–4.3 mm wide, light brown. Inflorescence a terminal semiglobose, 5–20-flowered head 1.0–2.0 cm wide; flower bract lanceolate, 3.0–9.0 mm long, 0.7–4.3 mm wide, light brown. Flowers 6.5–9.5 mm long, 2.0–2.5 mm wide; pedicels 0.8–2.4 mm. Tepals ±equal, lanceolate, acute, 4.8–5.5 mm long, 1.2–1.5 mm wide, ivory-white. Stamens 6, long exserted, 7.3–8.7 mm long; anthers linear-elliptic, 2.5–2.8 mm long, ivory-white; filaments 4.8–6.0 mm long; style 2.3–3.5 mm long; ovary obovoid-trigonous, 2.5–4.0 mm long, 1.0–1.4 mm wide. Seed unknown. Fig. 68.

Only known from Yunnan, China. 36: CHC. On grassland slopes, above 3400 m. Map 255.

36. CHINA SOUTH-CENTRAL: Yunnan, Yangbi, around Cangshan, 3800 m, S.K.Wu & al. 475 (KUN, TI); Yunnan, Y. Cheng Kang, Snow Range, 3400 m, Yu 1961 (PE).

Juncus concolor is similar to J. allioides, J. cephalostigma, J. glaucoturgidus, J. leucanthus and J. trachyphyllus, but it apparently differs in having a stoloniferous rhizome, no basal leaf, and stramineous basal sheath.


Perennials, 3–28 cm tall, densely caespitose; rhizome short, densely branched. Stem erect, terete, 0.2–0.5 mm thick. Cataphylls 1–3, pale castaneous, to c. 3 cm long; basal and sub-basal leaves 1–3, unitubular, indistinctly septate, 2–11 cm long, 0.6–1.0 mm in diam. Cauline leaf 1, inserted in upper 1/2–1/4 of stem; blade reduced, 0.5–2 cm long, thin; sheaths tight, c. 1.5–2.5 cm long, with dark castaneous margins, sometimes entirely castaneous; auricles obtuse to truncate, 0.5–1.3 mm long, dark castaneous or distally scarious. Bracts ovate, ±acute, (4–) 6–8 (~10) mm long, deep castaneous-brown, usually with paler to
Figure 68. *Juncus concolor*. A, habit; B, inflorescence; C, outer tepal and stamen; D, inner tepal and stamen; E, ovary; F, ovary T.S.; G, auricle; H, lower part of stem T.S.; I, upper part of stem T.S.; J, cauline leaf T.S. (A–J, Wu & al. 475, T1). Scale bars: A = 4 cm; B, G = 5 mm; C, D, E = 2.5 mm; F = 1 mm; H–J = 0.6 mm. Drawn by F.Miyamoto. Reproduced with permission, from F.Miyamoto & H.Ohba, *J. Jap. Bot.* 74: 73, fig. 1 (1993).
scarious margins and distal part, equalling inflorescence. Inflorescence a single terminal hemispherical (3–) 5–7 (–10)-flowered head 7–17 mm wide. Pedicels 0.5–1 mm long. Tepals ovate-lanceolate, subacute, 4.5–6.5 mm long, 1–1.5 mm wide, usually dark purplish-castaneous; margins paler to scarious, of variable width, or rarely tepals entirely ivory-white. Stamens 6, long exserted, 5–8 mm long; anthers linear-elliptic, white, 1.3–2.6 mm long; filaments 3.7–4.4 (–7) mm long; style 1.5–2.5 mm long; stigma s 0.5–0.8 mm long; ovary 2–3 mm long, 0.8–1.1 mm wide, brown or yellowish white. Capsule unilocular, rostrate, narrowly obovoid-trigonal, acuminate, c. 4.5–6.0 mm long including rostrum, 1.5–2 mm wide, castaneous-brown, shining; rostrum 1.0–1.5 mm long, exceeding perianth. Seeds ellipsoid, 0.5–0.8 × 0.25–0.3 mm, brown, or c. 2.0–2.5 mm long including two subequal appendages 0.3–0.6 mm long. Fig. 69.

W and C China: Tibet, Gansu, Sichuan and Yunnan. 36: CHC, CHN, CHT. On alpine scree or grassland slopes, usually above 4000 m. Map 256.

36. CHINA NORTH-CENTRAL: Gansu, Lapuleng, 3800 m, Wang 5844 (KUN). CHINA SOUTH-CENTRAL: Sichuan, Kangding, Taposhan, west range, 4200–4400 m, H.Smith 11198 (S, UPS); Sichuan, Tsipula, 4200 m, H.Smith 3051 (UPS); Sichuan, Daosheng, around Gongga Shan, Beiyu, 4200–4580 m, S.K.Wu & al., 1546 (KUN, TI); Yunnan, Yangzhe watershed, E slopes of Likiang Snow Range, J.F.Rock 5265 (B); Likiang, N peak of Likiang Snow Range, J.F.Rock 10576 (BM); Lichiang Range, G.Forrest 2917 (BM); Atuntze [Deqin], Chitoyangou, 4200 m, Yu 9743 (KUN); Zhongdian, Haba shan, 3950 m, Zhongdian Team 1792 (KUN). TIBET: Kham, Pass Chuntshao [Bolo], G.N.Potanin (S).

A part of the original material of J. tanguticus (see J. leucanthus) belongs to J. przewalskii.


Perennials, 6–19 cm tall, caespitose; rhizome very short. Stem erect, terete. Cataphylls 2–3, loose, brown; basal leaves bitubular, grooved on both adaxial and abaxial sides, 2–11 cm long; leaf sheath 1–4 cm long. Cauline leaves absent, sometimes single, inserted in lower or upper part of stem, linear, 1.5–3.0 cm long, not exceeding inflorescence; auricles obtuse, 0.7–1.0 mm long. Lower bract exceeding inflorescence, accicular-lanceolate, 0.5–1.5 cm long, 1–2 mm wide, brownish green. Inflorescence a single terminal hemispherical head, usually 3–7-flowered, 1.0–1.5 cm wide; flower bracts lanceolate, 2–4 mm long, 0.5–2 mm wide, brown. Flowers 4–8 mm long, 6–12 mm wide; pedicels 0.3–0.5 mm long. Tepals =equal, lanceolate, subacute, 3–6 mm long, 1.7–1.7 mm wide, white, later whitish-stramineous. Stamens 6, exserted, 5.8–8.8 mm long; anthers linear-elliptic, white, (1.2–) 1.8–2.5 mm long, twice as long as 4.0–6.1 mm filaments; style 1.3–1.8 mm long; stigmas 0.6–0.8 mm long. Capsule unilocular, narrowly obovoid-trigonal, acuminate, rostrate, 3.0–4.0 mm long incl. 0.6–1.1 mm rostrum, 1–1.5 mm wide, castaneous-brown, shining. Seeds [the Bhutan specimen] ellipsoid, 0.5–0.6 × 0.2 mm, or c. 0.8 mm including two minute appendages c. 0.1 mm long.

Nepal, East Himalaya (Bhutan) and Yunnan, China. 36: CHC. 40: EHM, NEP. Alpine scree slopes and banks, above 3000 m. Map 257.

36. CHINA SOUTH-CENTRAL: Yunnan, Zhongdian Xian, Haba Xueshan, Haba Hai, 4500 m, S.K.Wu & al. 103080 (KUN, TI); Gongshan Xian, SW of Gongshan, Gaoligong Shan, 2600 m, S.K.Wu & al. 103193 (KUN, TI). 40. NEPAL: Bagmati Zone, Rasuwa District, NW of Dobato, 3400 m, Hass 2162A (BM); Bagmati Zone, Rasuwa District, Paldol Base Camp-a Kharka, 4300 m, F.Miyamoto & al. 9410163 (TI); Bagmati Zone, Solukhumbu District, Beni Kharka–Sarkari Pati, 3970–3350 m, H.Ohba & al. 8581282 (TI); Solukhumbu District, Najing Ding-Chalem Kharka, 3100 m, F.Miyamoto & al. 9580140 (TI); Koshi Zone, Sankhuwa Sabha District, Khongma–Sano Pokhari, 3800 m, M.Minaki & al. 9020641 (TI). EAST HIMALAYA: Bhutan, Phajudin Limpere, 4 Nov 1914, R.E.Cooper 3513 (BM).

The leaf anatomy and anther length distinguish J. sherei from similar species (J. gonggae, J. benghalensis and J. brachystigma).

T: China [China South-Central], Sichuan, Daocheng District, Mt Gonggashan, 4300 m, 25 Aug 1996, S.K.Wu & *al.* 1551; holo: KUN; iso: TI.


Perennials, 4–20 cm tall, densely caespitose; rhizome short. Stem ±erect, terete, grooved. Cataphylls 1–3, brown. Leaves basal and subbasal, 1–2, bitubular, canaliculate, 1.5–10 cm long; sheaths 0.5–2 cm long, stramineous, with leaves of sterile shoots with several grooves, 1.2–15 cm long. Cauline leaf absent or single, linear, 3–5 cm long; auricles obtuse, 0.5–0.7 mm long, ±scarious. Lower bract equalling or slightly exceeding inflorescence, linear-lanceolate, 4–10 mm long, 0.5–1.0 mm wide, light brown. Inflorescence a terminal 3–8-flowered head; flower bracts lanceolate, 1.5–2.0 mm long, 0.5–0.8 mm wide, light brown. Flowers proliferating or not so, sometimes mixed in an inflorescence; normal flowers on pedicels 0.4–0.6 mm long. Tepals ±equal, lanceolate, subacute, 3.0–3.5 mm long, 0.8–1.1 mm wide, ±white. Stamens 6, exserted, 4.5–5.0 mm long; anthers linear, white, 1.2–1.3 mm long; filaments 3.8–4.0 mm long; style 0.4–0.8 mm long; stigmas 0.5–0.7 mm long. Capsule unilocular, ±ovoid-trigonous, acuminate, 2.9–3.0 mm long, 1.0–1.2 mm wide, castaneous-brown, slightly exceeding perianth. Proliferating flowers 3–5 mm long, stamens and capsules usually abortive, with inner perianth segment changed into propagules 3.0–4.5 mm long. Seeds ellipsoid, apiculate, brown, 0.5–0.6 mm long; appendages ±absent. Fig. 70.

Known from the type locality in Sichuan, SW China. 36: CHC. On banks and scree slopes, above 3500 m. Map 258.

*Juncus gonggae* is similar to *J. modicus* but differs by short anthers and the grooved leaves. The plants often have proliferating flowers. In the section *Stygiopsis*, proliferation has been known in *J. trichophyllus*, *J. harae* and *J. dongchuanensis*. *Juncus trichophyllus* differs from *J. gonggae* in having axillary bulbils on cauline leaves.


T: China, Sichuan, Daocheng District, Mt Gonggashan, 4300 m, 21 Aug 1996, S.K.Wu & *al.* 1540; holo: KUN; iso: TI.


Perennials, 7–20 cm tall, densely caespitose; rhizome short. Stem erect, terete, scabrous. Cataphylls 1–3, brownish; basal leaves terete, grooved, scabrous, 2–4-tubular, 4–10 cm long; sheath 1.0–3.5 cm long, stramineous. Cauline leaf 1, terete, with an adaxial groove, 1.5–7.0 cm long, not exceeding inflorescence; auricles absent. Lower bract subterete, exceeding or equalling inflorescence, 0.8–1.2 cm long, 2.0–3.5 mm wide. Inflorescence a single terminal hemispherical head, 5–15-flowered, 0.8–1.5 cm wide, or rarely heads two with lateral one on peduncle 1.0–1.5 cm long; sheath-like bract present; flower bracts membranous, lanceolate, 3–4 mm long; capitulum bracts lanceolate-ovate, 4–7 mm long, 1.5–3.0 mm wide, light brown. Flowers 0.7–1.0 cm long; pedicels 0.8–1.0 mm long. Tepals subequal; inner tepals slightly longer, 4.5–5.5 mm long, 1.0–1.4 mm wide, ±white, lanceolate, acute to subacute; outer tepals 4–5 mm long, 0.9–1.0 mm wide. Stamens 6, exserted, 9–10 mm long; anthers linear, white, 2.5–3.8 mm long; filaments 6.5–7.2 mm long; style 2.0–2.5 mm long; stigmas 0.6–0.8 mm long. Capsule unilocular, ovoid-trigonous, acuminate, 4.4–4.8 mm long, 1.2–1.5 mm wide, with rostrum exceeding perianth. Seeds ellipsoid, apiculate, 1.5–1.8 mm long; appendages ±absent. Fig. 71.

Known from Gonggashan, Sichuan, SW China. 36: CHC. On alpine scree slopes, above 4000 m. Map 259.

*Juncus trachyphyllus* is similar to *J. allioides* and *J. glaucoturgidus* but differs in having scabrid leaves and stems and adaxially grooved basal leaves. The scabrid leaves (under
Figure 70. *Juncus gonggae*. A, habit of plants with normal inflorescence; B, habit of plants with proliferating inflorescence; C, normal inflorescence; D, normal and proliferating inflorescence; E, proliferating inflorescence; F, outer tepal and stamen; G, inner tepal and stamen; H, capsule; I, capsule T.S.; J, auricle; K, stem T.S.; L, sterile leaf T.S.; M, basal leaf T.S.; N, proliferating flower. (A–N, S.Wu & al. 1551, KUN). Scale bars: A, B = 2 cm; C, D, E, N = 5 mm; F, G, H, J = 2.5 mm; I = 1 mm; K, L, M = 0.5 mm. Drawn by F.Miyamoto. Reproduced with permission, from F.Miyamoto, H.Ohba & S.K.Wu, *J. Jap. Bot.* 72: 163, fig. 1 (1997).