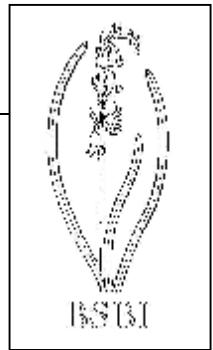


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JUNCUS

A useful account of identification of the British and Irish *Juncus* species, including many useful illustrations, is given by T. A. Cope (1990) A guide to British rushes and woodrushes. In: *A guide to some difficult plants*. Pp 68-89. Wild Flower Society, London.

1. *Juncus tenuis* / *J. dudleyi*

Juncus dudleyi has been recorded from V.cc. 88 and 104, but it may be extinct. It is certainly considerably rarer than *J. tenuis*, which it closely resembles, but could be overlooked. Auricles should be examined on the top 2-3 leaves on flowering stems. The prominent auricles of *J. tenuis* are sometimes damaged.

	<i>Juncus tenuis</i> Willd.	<i>Juncus dudleyi</i> Wiegand
Auricles	Scarious, whitish thin, several times as long as wide (Fig. a)	Cartilaginous yellowish-brown, shorter than wide (Fig. b)
Leaves	About as long as stem	About 1/3 length of stem
Habit	Variable	Taller, more stiffly erect



a



b

Auricles (a) *J. tenuis*, (b) *J. dudleyi*.

Reference Richards, P.W. (1943). *Journal of Ecology* 31: 51-59.

2. *Juncus bufonius* group (*J. foliosus*, *J. ambiguus* and *J. bufonius*)

The three British taxa in this group (Cope & Stace 1978) are readily distinguishable in the field from florets and jizz (Figs. a-c) once known - see key in Stace's *New Flora*. *Juncus bufonius* is by far the commonest throughout the country, occurring in a wide range of habitats. *Juncus foliosus* and *J.*

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ambiguus are significantly under-recorded. All three species can sometimes be found growing close to each other.

Juncus foliosus is a plant of wet ditches, streams, flushes, pond margins, wet pastures etc., in open vegetation. It is a western plant of the Haterno-Lusitanian element of the flora. The distinctive bright shining green colour, the striking dark lines down the tepals and conspicuous broad leaves are distinctive, and the ribbed seeds diagnostic.

Juncus ambiguus is more a halophyte but does occur inland in calcareous habitats. It is likely to be confused with or overlooked as *J. bufonius*, but plants for closer examination can be picked out in the field by the distinctive light brown colour and small clusters of fruits (rather than all flowers spaced out). The best character is the combination of the big blunt fruit and the short blunt inner tepals.



Florets of (a) *J. foliosus* Desf., (b) *J. bufonius* L., (c) *J. ambiguus* Guss.

Reference Cope, T. A. & Stace, C. A. (1978). *Watsonia* 12: 113-120.

Author T. A. Cope, November 1997.

3. *Juncus capitatus* / *J. pygmaeus* / *J. bufonius* agg. / *J. bulbosus*

On the Lizard in Cornwall, *J. pygmaeus*, *J. bufonius* agg. and *J. bulbosus* often grow together in winter-wet hollows and cart tracks. There are two records on the Lizard for *J. foliosus* and one for *J. ambiguus* (Margetts & Spurgin, 1991) but the most common Toad rush in these habitats is *J. bufonius*. *Juncus pygmaeus* is diminutive, often under 5 cm. *Juncus bufonius* and *J. bulbosus* may also be diminutive as they become dwarfed and reddened by the habitat in which they grow. As a result, identification is often difficult even in flower. Vegetatively, when compared with *J. capitatus* and *J. bufonius*, the PROMINENT auricles of *J. pygmaeus* are diagnostic (Fig. e), but good auricles are also present on *J. bulbosus* (Fig. c) and there may be slight auricles on the stem leaves of *J. bufonius* (Figs. a, b).

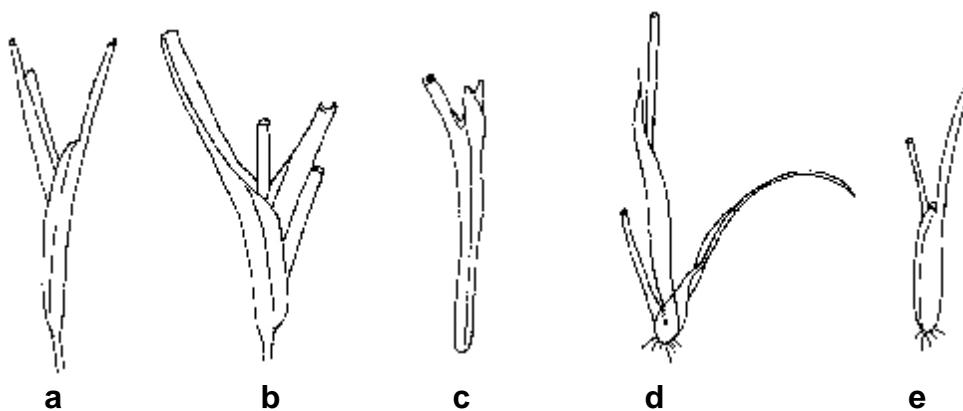
Juncus capitatus is usually a plant of low serpentine outcrops, growing around the edges of the rock where there is water seepage. It is often associated with *Isoetes histrix*, *J. bufonius* and *Radiola linoides*. It may also occur around the margins of winter-wet erosion pans; such pans being marked by the presence of *Allium schoenoprasum*. Though often only 2-5 cm tall, it is very distinctive. The basal leaves are channelled and there are no auricles to the sheaths (Fig. d), there are no stem leaves between the base and the terminal cluster of flowers, and there are bracts below the cluster (Fig. i), with one much longer than the inflorescence and one as long as the inflorescence.

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	<i>J. capitatus</i> Wiegel	<i>J. bufonius</i> agg.
Habit	1-5(-20) cm tall, often turning red in fruit	1.5-35(-50) cm tall, green or brown, sometimes reddish suffused
Leaves	Flattened, not septate, ± channelled	1-5 mm wide, flattened, sometimes inrolled, not septate
Auricles of basal leaves	± Absent (Fig. d)	Rounded to ± absent (stem leaves may have prominent rounded auricles) (Figs. a, b)
Stems	Simple even in large plants; stem leaves absent	Small plants simple and lacking stem leaves, larger plants branched with stem leaves
Inflorescence	Terminal; flowers clustered above 2 leaf-like bracts (Fig. i)	Terminal on small plants, usually with laterals; flowers spaced or clustered
Bracts	Longest bract 4-13 mm long, usually exceeding the inflorescence	Longest bract 2-20 mm long, shorter or longer than the inflorescence, usually shorter than terminal head
Tepals	Outer tepals 3-4.5(-5) mm long, ovate and acuminate, longer than the inner tepals (Fig. h)	Outer tepals 4-7.5 mm long, lanceolate, usually longer than inner tepals (Fig. f)
Bracteoles	None (Fig. h)	2 under each flower (Fig. f)

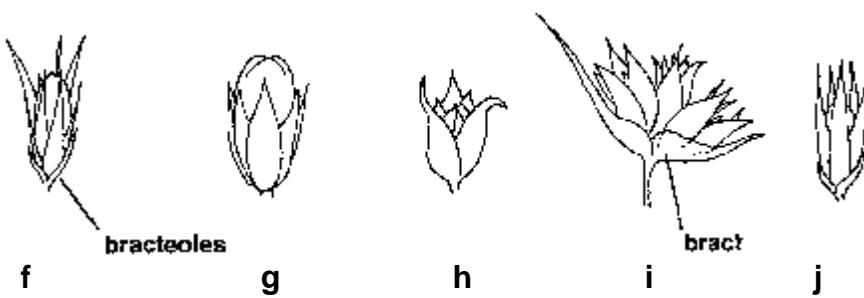
Juncus pygmaeus can show a superficial resemblance to *J. bufonius*, both having capsules that are shorter than the tepals (Figs. f, j). Readily observed distinguishing characters are given in the Table.

Juncus bulbosus is readily distinguished by the small tepals and larger capsule projecting above them (Fig. g).



Auricles of (a, b) *J. bufonius*, (c) *J. bulbosus*, (d) *J. capitatus*, (e) *J. pygmaeus*.

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Capsules (f) *J. bufonius*, (g) *J. bulbosus*, (h, i) *J. capitatus* (i = inflorescence), (j) *J. pygmaeus*.

	<i>Juncus pygmaeus</i> Rich. ex Thuill.	<i>Juncus bufonius</i> agg.
Flowers	Most borne in clusters of 2 or 3	Most borne singly
Flower clusters	Not more than 2 clusters per stem	Several individual flowers on each stem, sometimes in clusters of 2 to 3
Inflorescence	Hardly branched, if at all	Branched, occupying at least half of the total height of the plant, with one flower at fork of each division to the inflorescence
Tepals	Tepals of flowers ± equal (Fig. j)	Outer tepals longer than inner ones (Fig. f)
Auricles	Basal leaf sheaths with auricles (Fig. e)	Basal leaf sheaths without auricles (Fig. a)
Colour	Colour change distinctive as habitat dries - plants go pinkish-red	Diminutive plants go a deep dark red as habitat dries

Juncus capitatus and *J. pygmaeus* are both Red Data Book species and full details of all sites are required. *Juncus capitatus* occurs on The Lizard, in Anglesey and in the Channel Islands, *J. pygmaeus* occurs only on The Lizard. Both could occur elsewhere.

Reference Byfield, A. (1993). Notes on the ecology of *Juncus capitatus* and *J. pygmaeus* on The Lizard: Unpublished m/s produced for BSBI meeting on The Lizard; 20-22 May 1994.

Author R. J. Murphy & T. C. G. Rich, January 1998.

4. *Juncus alpinoarticulatus* / *J. articulatus*

Juncus alpinoarticulatus Chaix is a scarce northern montane species of base-rich mires and flushes and always grows in strongly calcareous conditions. It seems little-known by many botanists and is likely to be significantly under-recorded. It is most likely to be over-looked as a poorly-growing *J. articulatus* L., but has a distinctive blunt fruit and inner tepals.

The best time to identify *J. alpinoarticulatus* is late summer when the capsules are mature. Plants are normally more slender than *J. articulatus* with fewer inflorescences and with branches tending to be erect,

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parallel to the main axis and less spreading (Fig. a). The capsules are dark, very blunt and rounded, with obtuse tepals (Figs. b-d). Those of *J. articulatus* are usually acute and trigonous with acute tepals (see the following account). *Juncus articulatus* var. *nigritellus* (D. Don) Druce (see Sell & Murrell 1996) also has slender inflorescences.

The inner tepals are always rounded, but the outer ones may be shortly mucronate, sometimes acuminate in continental material (Fig. d). Some montane plants of *J. articulatus* also have rather blunt capsules but the tepals are more acute giving the inflorescences a more 'spiky' appearance. The illustration of *J. alpinoarticulatus* in S. Ross-Craig *Drawings of British Plants* is unhelpful.



J. alpinoarticulatus (a) inflorescence, (b, c) fruits, Dumfries, (d) fruit, Alps.

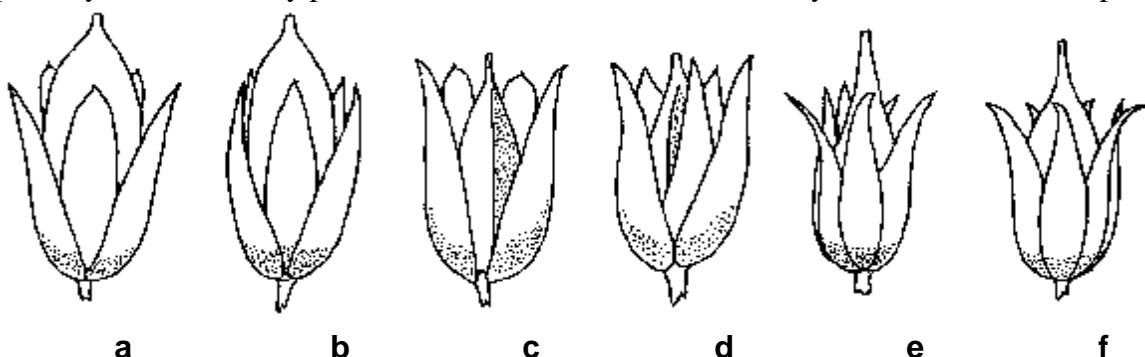
The hybrid between the two (*J. × alpiniformis* Fernald) has been reported from v.cc. 66, 106 and 108, and has poor fertility. It should be looked for where the parents grow together.

Author R. W. M. Corner, November 1997.

5. *Juncus 'surrejanus* (*J. acutiflorus* ' *J. articulatus*)

Juncus × surrejanus should be looked for whenever its parents grow together. It is probably under-recorded. Note both the hybrid and its parents are variable.

Though generally intermediate morphologically, *J. × surrejanus* shows a very wide variation in all characters; data for the hybrid and both parent species are given below (Blackstock & Roberts 1986). Identification can only be tentative until mature inflorescences of all 3 taxa are available at a particular locality. Ripe capsules of *J. acutiflorus* and *J. articulatus* protrude well beyond the perianth segments whilst in the hybrid, if capsules are formed, they hardly exceed the perianth segments. Note that they are partially fertile and may produce some seed, it is not consistently sterile as has been reported.



Fruiting capsules of (a, b) *J. articulatus*, (c, d) *J. × surrejanus* (c has one perianth segment removed to show capsule), (e, f) *J. acutiflorus*.

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	<i>Juncus articulatus</i> L.	<i>J. × surrejanus</i> Druce ex Stace & Lambinon	<i>J. acutiflorus</i> Ehrh. ex Hoffm.
Leaves per stem	Mean 3.7, range 2-8	Mean 3.8, range 2-6	Mean 2.7, range 2-4
Appearance of leaves	Ribbed, dull, soft and curved, strongly compressed	Smooth, somewhat shining, moderately flexible and often curved, subterete or somewhat compressed	Smooth, shining, stiff and straight, subterete
Length of 2 nd leaf from stem apex	Mean 8.8 cm, range 3.0-15.3 cm	Mean 14.0 cm, range 6.2-27.8 cm	Mean 28.7 cm, range 18.0-41.2 cm
No. of heads of flowers per inflorescence	Mean 18, range 3-55	Mean 25, range 3-65	Mean 50, range 11-102
Perianth segments	Mean 2.6 mm long, range 2.3-3.3 mm	Mean 2.7 mm long, range 2.0-3.4 mm	Mean 2.1 mm long, range 1.5-2.5 mm
Length of inner perianth segment relative to outer	Equal	Generally equal, occasionally slightly longer	Greater
Tips of outer perianth segments	Straight	Often straight, sometimes slightly curved outwards	Curved outwards
Length of ripe capsule relative to perianth	Longer (up to 3.5 mm) and protruding	Very little longer and scarcely protruding	Longer (up to 3.0 mm) and protruding
Colour of ripe capsule	Black and shining	Greenish-brown or brown	Brown

Note data for all characters are based on plants collected from populations in north-western Wales.

Reference Blackstock, T. H. & Roberts, R. H. (1986). *Watsonia* **16**: 55-63.

6. *Juncus* ' *diffusus* (*J. effusus* ' *J. inflexus*)

Juncus × *diffusus* is often confused with sterile or partly-sterile *J. inflexus* and its precise distribution is unclear, but it is probably widespread (Stace 1972). It is sometimes easier to pick out plants intermediate in colour between the stiff, dull, greyish *J. inflexus* and the softer, shiny, yellowish-green *J. effusus* from a distance, and these plants can then be investigated in more detail. The following Table is derived from Crackles (1987):

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	<i>Juncus effusus</i> L.	<i>Juncus × diffusus</i> Hoppe	<i>Juncus inflexus</i> L.
Stem	Green, soft, pliable, polished, smooth when fresh with 40-90 striae; pith continuous	Pale green, firm, fairly stiff, dull, slightly grooved 18-45 ridges; pith usually continuous	Grey-green glaucous, firm and stiff, dull, with 12-18 prominent ridges; pith interrupted
Inflorescence	Branches many, short, tawny in fruit when fresh	Branches long, fawn in fruit when fresh	Branches few, long, dark brown in fruit when fresh
Perianth segments	Lanceolate-acute; equal	Lanceolate, some tips subulate; unequal	Narrowly lanceolate, tips subulate; unequal
Capsule	Equalling perianth; chestnut in colour; usually fertile	Undeveloped or shorter than the perianth; variably fertile, often sterile	Longer than perianth; dark brown; fertile (sometimes sterile)

References Crackles, F. E. (1987). *Yorkshire Naturalists' Union Bulletin* **8**: 12-13.
Stace, C. A. (1972). *Watsonia* **9**: 1-11.

7. *Juncus* 'kern-reichgeltii' (*J. effusus* 'J. conglomeratus')

Juncus × kern-reichgeltii Jansen & Wacht. ex Reichg. is difficult to identify as the parents are similar to each other and are both variable, and many of the records are probably errors. It is likely that hybrids are rare (cf. Stace 1972) but they do occur. The best character is the intermediate ridging of the stems and degree of in-rolling shown by the base of the main bract (see Table on page 333). In the field the stems of *J. effusus* are usually smooth when rolled between the lips, but the ridges become more apparent as they dry. The hybrids are apparently fertile (Sell & Murrell 1996) and are often easier to determine in the field where all the variation can be assessed, rather than in the herbarium. They may occur more frequently at altitude where the flowering times overlap more.

It is as well to be aware of the infraspecific taxa before assuming odd plants are hybrids (after Sell & Murrell 1996):

J. effusus L.

var. *effusus*: Inflorescence lax, with suberect to widely divergent branches.

var. *subglomeratus* DC. (var. *compactus* Lej. & Courtois): Inflorescence condensed into a compact, rounded head.

J. conglomeratus L.

var. *conglomeratus*: Inflorescence a compact, rounded head.

var. *subbuliflorus* (Drejer) Asch. & Graebn.: Inflorescence of several stalked heads.

There is also an unnamed variant with lax heads (material in BM).

References Agnew, A. D. Q. (1968). *Watsonia* **6**: 377-388.
Stace, C. A. (1972). *Watsonia* **9**: 1-11.

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8. *Juncus compressus* / *J. gerardii*

Juncus compressus Jacq. and *J. gerardii* Loisel. can be separated using the characters in Stace's *New Flora*, but it is worth drawing attention to the occasional occurrence of *J. compressus* in brackish sites, and the occasional occurrence of *J. gerardii* inland in non-saline areas.

	<i>Juncus effusus</i> L.	<i>Juncus conglomeratus</i> L.
Stem sheathing scales	Black to red-brown at base	Red-brown to olive at base
Stem-ridges at inflorescence	30-60 when dry, smooth when fresh	15-24
Spathe-length	Usually 15-30 cm but variable	Usually 5-15 cm but variable
Bract of second cyme	Not as long, or as long as, split in spathe	Longer than split in spathe
Inflorescence	Diffuse or compact	Almost invariably compacted into globose head
Perianth	Outer whorl of three segments about 0.5 mm longer than inner whorl; perianth segments olive with green or light brown centres	Outer whorl as long as inner whorl; perianth segments with dark red-brown edges, lighter centres
Stamens	Anthers oval, shorter than filaments	Anthers strap-shaped, longer than filaments
Style	Very short or absent	One third as long as ovary
Fruit apex	Retuse or truncate, not apiculate	Truncate, apiculate