

NEW SPECIES OF *JUNCUS* (JUNCACEAE) FROM THE SINO-HIMALAYA

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Three new species of *Juncus* (Juncaceae) are described: *Juncus fimbristylloides* from China (Yunnan), *Juncus deosaicus* from Pakistan and *Juncus tobdenii* from India (Sikkim).

Keywords. China, *Juncus deosaicus*, *Juncus fimbristylloides*, *Juncus tobdenii*, Pakistan, Sikkim.

INTRODUCTION

Several interesting undescribed species of *Juncus* have been collected on recent expeditions to the Himalaya and China.

***Juncus fimbristylloides* Noltie, sp. nov. Figs 1B, 2E–J.**

A *J. ochraceo* characteribus sequentibus differt: culmi folium unum tantum ferentes; rhizomata brevia, curvata, caespites densos duos formantia; inflorescentia laxior, ramis longioribus; capita vegetativa modificata minora (c.2.5–5mm) bracteis paucioribus (usque ad 20, ad invicem plus quam 30), bracteis minoribus (1.2–1.5mm ad invicem 2.7–3mm), acutis (non tenuiter acuminatis).

Culms and non-flowering shoots densely tufted. *Rhizomes* short, curved, forming dense, hard clumps. *Vegetative shoots* bearing a single, erect leaf. *Culms* 9.5–15cm, terete; bases of cataphylls dark brown, shining, the uppermost closely clasping the culm, to 3.5–5cm, striate, dull, brown, apex truncate, mucronate; culm leaf single, inserted about middle of culm, sheath short, auricles truncate, very short (c.0.2mm), blade exceeding inflorescence, c.0.9mm wide, deeply channelled on upper surface, bi-tubular, weakly septate, septa not visible externally. *Inflorescence* 4–8cm, anthelate, branched to 4 orders, branches slender, ascending, inflorescence bract with filiform blade shorter than inflorescence. *Flowers* replaced by short cylindrical heads (3.5–6mm long) of spirally inserted bracts, each bract subtending a plantlet; bracts 1.2–1.4mm, narrowly ovate, acute, keeled, chaffy, straw-coloured; plantlets composed of several scales with dark brown bases, the upper ones bearing small, green, filiform blades. *Fertile flower* (only one seen): tepals 6, in 2 unequal whorls; the outer 4 × 1.4mm, lanceolate, acute, concave, straw-coloured, margins whitish-hyaline, midrib 3-veined; the inner 5 × 1.5mm, otherwise similar. *Stamens* 6; filaments c.3.4mm, anthers not seen. *Capsule* 3.5 × 1.8mm, narrowly ellipsoid, gradually tap-

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FIG. 1. A, *Juncus tobdenii* Noltie (EENS 209), habit. B, *J. fimbriatylloides* Noltie (CLD 1122), habit. C, *J. deosaicus* Noltie (Hussain et al. 940659), habit. All $\times 0.6$.

ered into beak c.0.7mm, straw-coloured, shining; stigma lobes not seen. *Seeds* not developed.

Type: China, Yunnan, Lijiang Prefecture, Yulong Shan ridge, N of Camellia Temple, 3040m, 11 x 1990, *CLD* 1122 (holo. E; iso. PE, TI, GH).

Related to *J. ochraceus* which it resembles in having a large proportion of the flowers replaced by peculiar vegetative-reproductive ('viviparous') structures superficially resembling a cyperaceous spikelet. The vegetative structures (called 'turiones' by Buchenau, 1906) are composed of spirally inserted glume-like bracts, each of which subtends a small plantlet. In the case of this, the only known gathering, only a single, bisexual flower is present on one specimen; all other flowers on all other 22 inflorescence-bearing culms have been transformed into vegetative structures. Even if a higher proportion of fertile flowers were present (as is sometimes seen in *J. ochraceus* – see Noltie, 1994a), the present taxon could not be assigned to any known species. Known only from the type collection, growing on damp earth banks in oak/pine forest. Probably best placed in subgenus *Alpini*.

***Juncus deosaiicus* Noltie, sp. nov. Figs 1C, 2K–M.**

A *J. himalensis* inflorescentiis compactis, floribus multo minoribus, et lobis stigmatibus longis differt.

Culms and vegetative shoots loosely tufted, spreading by slender rhizomes. *Rhizomes* c.1.2mm diameter, covered in pale brown, chaffy scales. *Leaves* of vegetative shoots almost equalling culms, slender, c.0.7mm wide, very acute, unitubular, channelled above, margins of channel minutely rough, hyaline, septate, septa c.6mm apart, not visible externally. *Leaf sheaths* reddish brown near base, bases persisting as weak fibres; margins papery, reddish brown, apex \pm truncate, auricles scarcely produced, c.0.5mm. *Culms* 15–22cm, terete; cataphylls short, reddish brown; culm leaves 1–2, sub-basal, and usually one inserted about or above middle; upper culm leaf with conspicuous reddish brown sheath, blade sometimes exceeding inflorescence. *Inflorescence* of (1–)2(–3) very congested, 3–5-flowered heads on short (3–8mm) peduncles, appearing as a single head. *Inflorescence bract* leaf-like, slender, very acute, erect, overtopping the inflorescence, 2–9cm, base membranous, reddish brown, the other bracts glume-like, brown. *Tepals* 6, dark reddish brown, greenish white at base, extreme apex hyaline; the outer narrowly lanceolate, finely acuminate, concave, keeled, 5.3–5.5 \times 0.7–1.1mm; the inner oblong-lanceolate, acuminate, 4.5–5 \times 1–1.2mm. *Ovary* narrowly ovoid, 2–2.5mm, gradually tapered into style; style c.2mm; stigma lobes erect, pale brown, 4–4.3mm. *Stamens* 6; filaments 1.2–1.5mm; anthers exceeding filaments, 2.5–2.9mm, cream. *Fruit* and seeds not seen.

Type: Pakistan (N Area), Deosai Plains, 0–9km beyond top of Satpara Valley, 35°06'N, 75°33'E, 3900m, 19 viii 1994, *Hussain, Lowe, Muqarrab & Springate* 940659 (holo. E, iso. CAL).

This species can be placed in subgenus *Alpini*, closest to *J. himalensis* Klotzsch. It

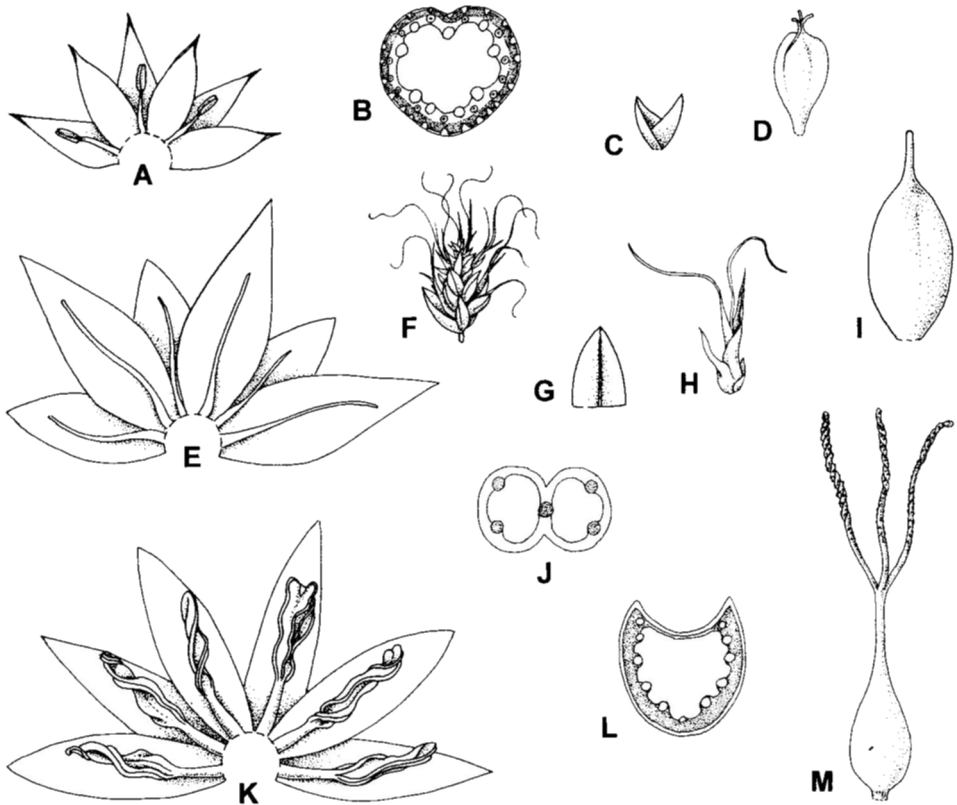


FIG. 2. A–D, *Juncus tobdenii*: A, flower opened out ($\times 5$); B, t.s. leaf ($\times 14$); C, bracteoles ($\times 5$); D, ovary ($\times 5$). E–J, *J. fimbristylloides*: E, flower opened out ($\times 5$); F, sterile head ($\times 2.5$); G, bract of sterile head ($\times 5$); H, plantlet ($\times 5$); I, capsule ($\times 5$); J, t.s. leaf ($\times 14$). K–M, *J. deosaicus*: K, flower opened out ($\times 5$); L, leaf t.s. ($\times 14$); M, ovary ($\times 5$).

also superficially resembles *J. amplifolius* A. Camus, from which it differs greatly in its leaf morphology (tubular rather than flat).

***Juncus tobdenii* Noltie, sp. nov. Figs 1A, 2A–D.**

A *J. inflexo* differt habitu multo tenuiore, caulibus viridibus (haud glaucis), staminibus 3 (non 6), filamentis antheras excedentibus, capsulis quam tepalis brevioribus. A *J. effuso* habitu multo tenuiore, medulla interdum interrupta, ovarii apice in rostrum breve angustato (non retuso vel truncato) recedit.

Rhizome linear, condensed, culms and leaves tufted in dense rows. *Leaves* culm-like, inserted on rhizome. *Culms* 5–26.5cm (to insertion of inflorescence), terete, with a single shallow groove, very slender (0.7–1mm diameter), continued as erect bract 4–6cm, apex very acute; cataphylls striate, chaffy, yellowish brown and shining at base, the uppermost 2–3cm, apex truncate, aristate. *Pith* of culms and leaves interrupted or continuous. *Inflorescence* pseudolateral, anthelate, lax, branched to 2(–3)

orders, longest primary branch to 7–9mm, 9–35-flowered. Each flower subtended by a pair of widely ovate, papery, reddish brown bracteoles c.0.9 × 0.8mm. *Tepals* 6, subequal, reddish brown, shining, midribs greenish; the outer narrowly lanceolate, finely acuminate, concave, 2.4–3 × 0.5–0.7mm; the inner 2.5–2.7 × 0.6–0.7mm, similar to outer but flatter and with broader green midrib. *Ovary* 1.8–2mm, trigonous, faces ± oblong, concave, c.1mm wide, abruptly narrowed into short (0.3–0.4mm) beak; stigma lobes recurved, c.0.2mm. *Stamens* 3, included; filaments 1–1.4mm, reddish brown; anthers shorter than filaments, c.0.6mm, cream. *Capsule* c.2.6 × 1.1mm, dark brown, shining, apiculate (apiculus c.0.2mm). *Seeds* oblong-ellipsoid, 0.5 × 0.3mm, orange-brown, dark at base.

Type: India, Sikkim, Yakche, N of Lachung, 27°43'17"N, 88°45'02"E, 3105m, 14 vii 1996, Long & Noltie (EENS) 209 (holo. E; iso. BSHC, TI, PE, GH, CAL).

Other specimens seen. India, Sikkim, Lachen, 9000ft, 3 viii 1849, Hooker s.n. (K); Yakla, 10,000ft, 20 x 1869, C.B. Clarke 9935 (K).

This species, belonging to subgenus *Genuini*, is interesting in combining characters of *J. inflexus* L. and *J. effusus* L.; it is much more delicate than either and has the apiculate ovary of the former, but like the latter has flowers with three stamens. In the EENS and Hooker specimens the pith is interrupted, whereas in the Clarke one it is continuous. This combination of characters is reflected in the determinations on the old specimens: both were initially determined as *J. glaucus*, the Clarke one was redetermined as *J. effusus* 'fide Buchenau', and the Hooker one as *J. effusus* by Hooker, who noted on the sheet the three stamens and interrupted pith.

The type collection came from an interesting gravelly marsh and was growing with *J. inflexus*, *Kobresia laxa* Nees (the first Sikkim record of this predominantly W Himalayan species since Hooker's collections), and *Eleocharis yunnanensis* Sven. (recorded here for the first time outside Yunnan). Only with this new material was it clear that we were dealing with a new taxon; the old material was rather inadequate and in the *Flora of Bhutan* (Noltie, 1994b), the Hooker specimen was referred to *J. inflexus* and the Clarke one to *J. effusus*. This raises the question as to whether *J. effusus* occurs in the E Himalaya. Unfortunately the only other specimen is in Calcutta and cannot readily be checked; if it is correctly named, it could possibly be an introduction as the locality is the very disturbed Tiger Hill (Darjeeling). An immature specimen, with inadequate basal parts, from E Nepal (EMAK 721) possibly belongs to *J. tobdenii*, having flowers with three stamens.

This rush is named after Tashi and Wangyal Tobden of Gangtok, who actively support the conservation efforts to preserve Sikkim's rich flora and fauna, and were extremely helpful to David Long and myself on the Edinburgh Expedition to Northern Sikkim in July 1996.

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