

***Noccaea nepalensis*, a new species from Nepal, and four new combinations in *Noccaea* (Brassicaceae)**

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ABSTRACT

The new species *Noccaea nepalensis* is described and illustrated. Its relationships to the Himalayan *N. andersonii* and *N. yunnanensis* are discussed. A critical evaluation of the limits of *Thlaspi* and *Noccaea* supports the recognition of both genera. The new combinations *N. andersonii*, *N. cochlearioides*, *N. flagellifera*, and *N. yunnanensis* are proposed.

RÉSUMÉ

Noccaea nepalensis, une nouvelle espèce du Nepal, et quatre nouvelles combinaisons dans *Noccaea* (Brassicaceae).

MOTS CLÉS

Brassicaceae,
Noccaea,
Thlaspi,
nouveaux taxons,
Nepal,
Himalaya.

L'espèce nouvelle *Noccaea nepalensis* est décrite et illustrée. Ses affinités avec deux autres espèces d'Himalaya, *N. andersonii* et *N. yunnanensis*, sont discutées. Une évaluation critique des limites de *Thlaspi* et *Noccaea* autorise la reconnaissance de ces deux genres. Les combinaisons nouvelles *N. andersonii*, *N. cochlearioides*, *N. flagellifera*, et *N. yunnanensis* sont proposées.

While conducting research for the treatment of Brassicaceae (Cruciferae) for the Flora of Nepal, one collection of *Noccaea* Moench clearly did not belong to any of the known Asian species of the genus. It is described herein as a new species, *N. nepalensis*, to make the name available for that Flora. Furthermore, an evaluation of the limits of *Thlaspi* and *Noccaea* is presented, and four other Himalayan species originally described in *Thlaspi* are transferred to *Noccaea*.

***Noccaea nepalensis* Al-Shehbaz, sp. nov.**

Herba perennis 30-40 cm alta, glabra, glauca. Folia caulina sessilia, oblonga vel ovata, auriculata, 10-25 × 3-10 mm. Racemi fructiferi valde elongati; pedicelli fructiferi 5-12 mm longi, divaricati, recti. Petala sphaulata, purpurea, 4.5-5 × 1.5-2 mm. Fructus anguste oblongo-oblancoelati, glabri, valde angustiseptati, 6-10 × 1.5-2 mm, basi cuneati, apice obtusi; stylo filiformis, 3-4 mm longo.

TYPUS. — Polunin, Sykes & Williams 4199, Nepal, Dozam Kholā, near Simikot, 10,500 ft. [3,200 m],

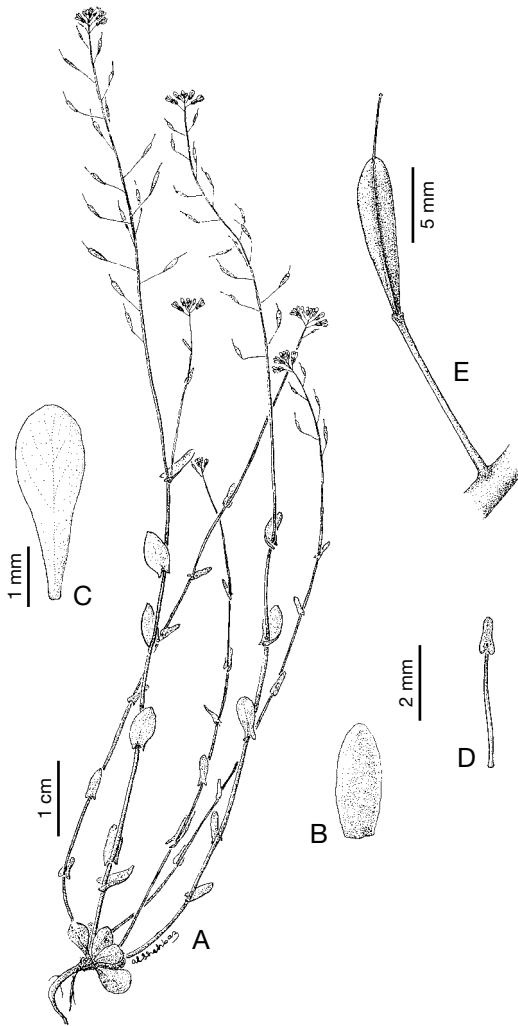


Fig. 1. — *Noccaea nepalensis* Al-Shehbaz: A, plant; B, sepal; C, petal; D, median stamen; E, fruit and fruiting pedicel. (Polunin, Sykes & Williams 4199).

partial shade in mixed forest, 29 May 1952 (holo-, BM!; iso-, E!).

Herbs perennial, 30-40 cm tall, glaucous, glabrous throughout. Stems erect or ascending, simple and several from base, main stem 1-branched below raceme. Basal leaves rosulate; petiole 5-25 mm long; leaf blade spatulate to sub-orbicular, 7-15 × 4-7 mm, base cuneate, margin entire or repand, apex rounded. Cauline leaves 5-7, widely spaced, sessile, oblong to ovate, 10-25 × 3-10 mm, base auriculate, repand or entire, apex

obtuse; auricles 4 × 3 mm. Racemes ebracteate, corymbose, elongated considerably in fruit to 15 cm long. Fruiting pedicels 5-12 mm long, slender, divaricate, straight. Sepals oblong, 2.5-3 × 1-1.2 mm, not saccate, margin white. Petals pale purple, spatulate, 4.5-5 × 1.5-2 mm, apex rounded. Filaments 2.5-3 mm; anthers oblong, 0.7-0.8 mm long. Ovules 8-10 per ovary. Fruit narrowly oblong-oblancheolate, strongly angustiseptate, carinate, widest slightly above middle, 6-10 × 1.5-2 mm, wingless, base cuneate, apex obtuse, apical notch absent or obsolete; style filiform, 3-4 mm long. Seeds dark brown, ovoid, c. 1.2 × 0.6 mm. — Fig. 1.

Noccaea nepalensis, which is known thus far only from the type collection, appears to be most closely related to *N. yunnanensis* (Franch.) Al-Shehbaz and *N. andersonii* (Hook.f. & Thoms.) Al-Shehbaz. It resembles the last species in having oblong anthers 0.7-0.8 mm long and 8-10 ovules per ovary and resembles *N. yunnanensis* in having narrowly oblong-oblancheolate fruits and spatulate petals. *Noccaea nepalensis* is easily distinguished from *N. andersonii* by having stems 30-40 cm tall, petals 4.5-5 × 1.5-2 mm, narrowly oblong-oblancheolate fruits 6-10 × 1.5-2 mm, and filiform styles 3-4 mm long. By contrast, *N. andersonii* is a smaller plant (4-)6-15(-20) cm tall and has petals (5-)6-7 × 2.5-3.5 mm, elliptic fruits 5-8 × 3-4 mm, and stout styles 0.7-1.5 mm long. *Noccaea nepalensis* is readily separated from *N. yunnanensis* by having sepals 2.5-3 mm long, oblong anthers 0.7-0.8 mm long, 8-10 ovules per ovary, wingless and apically obtuse fruits, and filiform styles 3-4 mm long. *Noccaea yunnanensis* has sepals 1.5-2 mm long, ovate anthers 0.4-0.5 mm long, 14-18 ovules per ovary, often apically winged and notched fruits, and stout styles 0.5-1(-1.5) mm long.

The holotype of *Noccaea nepalensis* was annotated by H. HARA as *T. andersonii* and by S.M.H. JAFRI as *T. alpestre* L. (= *N. alpestris* (L.) Kerguelén). The latter is a European species restricted to Austria (JALAS et al. 1996), though it has also been reported to occur in Italy and Yugoslavia (CLAPHAM & AKEROYD 1993) and as far east as European Russia (KOTOV 1979). *Noccaea alpestris* has narrowly obovate fruits

truncate and shallowly notched at the apex, 2-6 ovules per ovary, styles 1-1.5 mm long, and fruiting racemes to 3 cm long, whereas *N. nepalensis* has narrowly oblong-oblancoolate fruits obtuse at apex, 8-10 ovules per ovary, styles 3-4 mm long, and fruiting racemes to 15 cm long.

The limits of *Thlaspi* are controversial, and the genus is traditionally delimited primarily on the basis of having angustiseptate, winged or wingless fruits with few to several seeds per locule, sessile cauline leaves, and simple or no trichomes (SCHULZ 1936). MEYER (1973) divided *Thlaspi* into 12 segregates largely distinguished on the basis of seed-coat anatomy. Extensive molecular data (KOCH & MUMMENHOFF 1993, 2001; MUMMENHOFF & KOCH 1994; MUMMENHOFF & ZUNK 1991; MUMMENHOFF et al. 1997a, 1997b, 2001; ZUNK et al. 1996) provide ample evidence that supports the recognition of several of MEYER's segregates, including *Noccaea*. Moreover, molecular data clearly show that the phylogeny of *Thlaspi* is not congruent with SCHULZ's (1936) sectional classification based on fruit morphology, which exhibits tremendous homoplasy, as lineages in the molecular tree with similar fruit morphology are found among different clades, whereas different fruit types are found in the same clade. MEYER (2001) provided a detailed key that separates all of his previously recognized segregates of *Thlaspi* (MEYER 1973), as well as of related genera.

In addition to their remarkable differences in seed-coat anatomy, species of *Thlaspi* are easily distinguished by their annual habit and striate or coarsely reticulate seeds, while *Noccaea* comprises perennials always with smooth seeds. On this basis, the native Himalayan species of *Thlaspi* should be placed in *Noccaea*, necessitating the following new combinations to make them available for the Flora of Nepal.

Noccaea andersonii* (Hook.f. & Thoms.) Al-Shehbaz, *comb. nov.

Iberidella andersonii Hook.f. & Thoms., J. Proc. Linn. Soc., Bot. 5: 177. 1861. — Type: *Strachey & Winterbottom 11*, India, Kumaon, W Pindari, 1200-16,000 ft. (lecto-, designated by JAFRI 1973, K!).

Noccaea cochlearioides* (Hook.f. & Thoms.) Al-Shehbaz, *comb. nov.

Thlaspi cochlearioides Hook.f. & Thoms., J. Proc. Linn. Soc., Bot. 5: 177. 1861. — Type: *J.D. Hooker s.n.*, Sikkim, 14,000-16,000 ft. (holo-, K!).

Noccaea flagellifera* (O.E. Schulz) Al-Shehbaz, *comb. nov.

Thlaspi flagelliferum O.E. Schulz, Anz. Akad. Wiss. Wien, Math. -Naturwiss. Kl. 63: 98. 1926. — Type: *Weigold s.n.*, China, W. Sichuan, Wa-shan opposite Yadoschou, May 1915 (holo-, W!; iso-, B!).

Noccaea yunnanensis* (Franch.) Al-Shehbaz, *comb. nov.

Thlaspi yunnanense Franch., Bull. Soc. Bot. France 33: 407. 1886. — Type: *Delavay 2077* (listed as 4077 in original publication), China, Yunnan, Yen-tze-hay, Lankong, 3200 m, 1 June 1886 (holo-, P!; iso-, MO!, NY!, P!, US!, W!).

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