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## Nomenclatural Notes on *Sisymbrium* (Brassicaceae)

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**ABSTRACT.** Recent molecular studies, combined with critical evaluation of morphology, support a revision of the generic placement of five species of *Sisymbrium* (Brassicaceae). *Sisymbrium aculeolatum* and *S. afghanicum* (formerly in *Neotorularia*) and *S. linifolium* (formerly in *Schoenocrambe*) should be maintained in *Sisymbrium*. A new name, *Erucastrum austroafricanum*, is proposed to accommodate the transfer of *S. thellungii* to *Erucastrum* and to avoid the creation of a latter homonym. A new combination, *E. supinum*, is proposed to transfer *S. supinum* to *Erucastrum*.

**Key words:** Brassicaceae, *Erucastrum*, *Neotorularia*, *Schoenocrambe*, *Sisymbrium*.

*Sisymbrium* L. is a large and heterogeneous genus of about 96 species (Warwick et al., 2002). It was divided by Schulz (1924, 1936) into 14 sections, but as indicated by Al-Shehbaz (1988) and Warwick et al. (2002) these sections are artificially delimited, and the genus is polyphyletic. Based on recent analysis of ITS DNA sequence data (Warwick et al., 2002), *Sisymbrium* species split into two major groups: Old World *Sisymbrium* (including *Sisymbrium aculeolatum* Boissier, *S. afghanicum* Gilli, and *S. linifolium* (Nuttall) Nuttall ex Torrey & A. Gray) and New World *Sisymbrium* (along with most genera of the tribe Thelypodieae). Two Old World species, *S. supinum* L. and *S. thellungii* O. E. Schulz, fell within the tribe Brassiceae. The ITS sequence data, combined with critical evaluation of morphology, support revision of the generic placement of these five species of *Sisymbrium*.

*SISYMBRIUM ACULEOLATUM* BOISSIER AND *S. AFGHANICUM* GILLI

*Sisymbrium aculeolatum* (Afghanistan, Iran, Pakistan, Sinai) and *S. afghanicum* (Afghanistan and Pakistan) were originally described by Boissier (1842) and Gilli (1955), respectively. They were transferred to *Torularia* (Cosson) O. E. Schulz by

Schulz (1924) and Hedge (1968), respectively, and eventually to *Neotorularia* Hedge & Léonard (Léonard, 1986). The two species are morphologically similar to *Sisymbrium* in flower, fruit, and trichome morphology, but they differ from all other species of *Neotorularia* by having non-torulose fruits and an indumentum consisting exclusively of simple trichomes. By contrast, all other species of *Neotorularia* have distinctly torulose fruits and branched trichomes (Appel & Al-Shehbaz, 2002). These differences are substantial and consistent with the exclusion of these two species from *Neotorularia* and their placement within *Sisymbrium*.

*SISYMBRIUM LINIFOLIUM* (NUTTALL) NUTTALL EX TORREY & A. GRAY

This species, which is restricted to the western United States and adjacent Canada, was originally described as *Nasturtium linifolium* Nuttall (Nuttall, 1834) and moved to *Sisymbrium linifolium* (Torrey & Gray, 1838). It was later placed in *Schoenocrambe* Greene (Greene, 1896) as the generic type and maintained in that genus (Rollins, 1982, 1993). Several authors (Payson, 1922; Schulz, 1924; Al-Shehbaz, 1973) indicated that *Schoenocrambe linifolia* (Nuttall) Greene is morphologically very similar in habit, leaves, and flowers to the Eurasian *Sisymbrium polymorphum* (Murray) Roth and retained it in *Sisymbrium*. Both species are perennials with finely divided lower leaves, entire upper leaves, two-lobed stigmas, and yellow flowers. Results from ITS sequence data (Warwick et al., 2002) support the placement of this species in *Sisymbrium* as a sister taxon to *S. polymorphum* within the Old World *Sisymbrium* clade. Morphological and molecular sequence data, therefore, support the maintenance of this species in *Sisymbrium*. As for the other species recognized by Rollins (1982, 1993) in *Schoenocrambe*, they should be retained in *Thelypodopsis* Rydberg until further studies prove otherwise.



*SISYMBRIUM THELLUNGII* O. E. SCHULZ

This South African species was originally described as *Brassica pachypoda* Thellung (Thellung & Schintz, 1912). It was excluded from *Brassica* L. by Schulz (1919) and was renamed as *Sisymbrium thellungii* because the transfer of *B. pachypoda* to *Sisymbrium* would have created a latter homonym of *S. pachypodum* Chiovenda. Schulz (1924) created the superfluous new combination *S. pachypodum* (Thellung) O. E. Schulz & Thellung. Morphologically, it is an anomaly in *Sisymbrium* because it has conduplicate cotyledons (Schulz, 1924; Marais, 1970; Al-Shehbaz, pers. obs.), a feature restricted to the tribe Brassiceae (Al-Shehbaz, 1985; Gómez-Campo, 1980, 1999; Anderson & Warwick, 1999). Results of the ITS sequence data (Warwick et al., 2002; Warwick & Sauder, unpublished data) showed that *S. thellungii* fell within the tribe Brassiceae in a clade that included the African *Erucastrum abyssinicum* (A. Richard) R. E. Fries, *E. griquense* (N. E. Brown) O. E. Schulz, and *E. strigosum* (Thunberg) O. E. Schulz. Morphological and molecular data, therefore, support the assignment of *S. thellungii* to the genus *Erucastrum*. However, the older specific epithet, *pachypoda*, cannot be used in *Erucastrum* C. Presl because of the existence of the earlier homonym *E. pachypodum* (Chiovenda) Jonsell (Jonsell, 1976). Similarly, the epithet *thellungii* cannot be used in *Erucastrum* because of the existence of *E. thellungii* O. E. Schulz (Schulz, 1916). The following new name in *Erucastrum* is proposed.

***Erucastrum austroafricanum*** Al-Shehbaz & Warwick, nom. nov. Replaced name: *Brassica pachypoda* Thellung, in Thellung & Schinz, Vierteljahrsschr. Nat. Ges. Zürich 56: 257. 1911 (1912), non *Erucastrum pachypodum* (Chiovenda) Jonsell, Bot. Not. 129: 127. 1976. *Sisymbrium thellungii* O. E. Schulz, Pflanzenr. IV. 105 (Heft 70): 83. 1919, non *Erucastrum thellungii* O. E. Schulz, Bot. Jahrb. 54, Beibl. 119: 54. 1916. TYPE: South Africa. Transvaal, Pretoria, 1904, R. Leendertz 416 (lectotype, designated here, Z).

In his original description of *Brassica pachypoda*, Thellung (in Thellung & Schinz, 1912) cited three syntypes, of which the most complete specimen is designated herein as the lectotype. Both *B. pachypoda* and *Sisymbrium thellungii* were based on the same type collections.

*SISYMBRIUM SUPINUM* L.

This European species was described by Linnaeus (1753) and has been maintained in *Sisymbrium* in numerous accounts (e.g., Schulz, 1924; Ball, 1993; Jalas & Suominen, 1994). An examination of the seeds of *S. supinum* showed that the cotyledons are slightly conduplicate. As indicated above, conduplicate cotyledons are restricted to the tribe Brassiceae. A re-evaluation of the overall morphology revealed that *S. supinum* is very similar to *Erucastrum gallicum* (Willdenow) O. E. Schulz, a member of the tribe Brassiceae. Both have fully bracteate inflorescences, pinnately divided leaves, and slightly beaked fruits. Results from the phylogenetic analysis of ITS DNA sequence data (Warwick et al., 2002; Warwick & Sauder, unpublished data) showed that *S. supinum* fell within the tribe Brassiceae in a clade with *Diploaxis eruroides* (L.) DC. and *D. cossoniana* (Reuter ex Boissier) O. E. Schulz. This is similar to *E. gallicum*, where chloroplast DNA studies showed that *E. gallicum* formed a clade with *D. eruroides*/*D. cossoniana* (Warwick & Black, 1993). *Erucastrum gallicum* ( $n = 15$ ) is an allopolyploid derived from *D. eruroides*/*D. cossoniana* ( $n = 7$ ) as the female parent and *E. nasturtiifolium* (Poiret) O. E. Schulz ( $n = 8$ ) as the male parent (Warwick & Black, 1993; Warwick & Anderson, 1997; Warwick & Wall, 1998). Unfortunately, reliable chromosome counts for *S. supinum* do not exist (Jalas & Suominen, 1994). Morphological data support the assignment of *S. supinum* to *Erucastrum* rather than *Diploaxis* DC. as the latter characteristically has biseriate seeds and ebracteate inflorescences. The following new combination in *Erucastrum* is proposed.

***Erucastrum supinum*** (L.) Al-Shehbaz & Warwick, comb. nov. Basionym: *Sisymbrium supinum* L., Sp. Pl. 2: 657. 1753. TYPE: Herb. Linn. 836.12 (lectotype, designated by Jarvis & Jonsell (2002: 72), LINN).

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