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# A Synopsis of the South American *Neuontobotrys* (Brassicaceae)

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**ABSTRACT.** Five species of *Neuontobotrys* (Brassicaceae) are recognized, and a key to the species and typification of the genus are presented. A new species, *N. elloanensis*, is described and illustrated from Chile, and its distinguishing characters from nearest relatives are given. The new combinations *N. linearifolia*, *N. deserticola*, and *N. robusta* are proposed.

**RESUMEN.** Se reconocen cinco especies de *Neuontobotrys* (Brassicaceae) y se presenta una clave para las especies y la tipificación del género. Se describe e ilustra una especie nueva de Chile, *N. elloanensis*, y se presentan los caracteres que la distinguen de sus parientes más cercanos. Se proponen las siguientes combinaciones nuevas: *N. linearifolia*, *N. deserticola* y *N. robusta*.

**Key words:** Argentina, Bolivia, Brassicaceae, Chile, *Eremodraba*, *Neuontobotrys*, *Sisymbrium*.

Schulz (1924) segregated *Neuontobotrys* O. E. Schulz (Brassicaceae) from *Sisymbrium* L. and treated it as a monotypic genus based on the Chilean *Sisymbrium linifolium* Philippi. He (Schulz, 1932) added another Chilean species, *N. berningeri* O. E. Schulz, and the genus included two species until the present (Appel & Al-Shehbaz, 2003). Schulz (1924, 1936) distinguished *Neuontobotrys* from *Sisymbrium* by having nearly veinless instead of prominently veined fruit valves. However, the fruit valves in the type species of *Neuontobotrys* have a distinct midvein. Unconvinced by Schulz's delimitation of *Neuontobotrys*, Baehni and Macbride (1937) and Macbride (1938) reduced the genus to synonymy of *Sisymbrium*.

Based on molecular studies and critical evaluation of morphology (Warwick et al., 2002; Warwick & Al-Shehbaz, 2003), *Sisymbrium* is now believed to be primarily restricted to the Old World, with only one species, *S. linifolium* (Nuttall) Nuttall, native to North America. As presently delimited by these authors, *Sisymbrium* includes only about 40, primarily herbaceous, species with long and linear fruits, 3-veined valves, strongly 2-lobed stigmas, yellow flowers, petals well differentiated into blade

and claw, and pinnately divided, non-fleshy lower leaves.

*Neuontobotrys* includes species of subshrubs (rarely perennial herbs) with oblong-linear or short linear fruits, entire stigmas, yellow petals turning reddish in age, leathery fruit valves with a distinct midvein, petals undifferentiated into blade and claw, and undivided fleshy leaves. It also differs from the shrubby South American taxa placed by Schulz (1924, 1936) and Romanczuk (1981, 1982) in *Sisymbrium* and other genera by the strongly recurved or reflexed fruiting pedicels and thick-leathery fruit valves. *Eremodraba* O. E. Schulz resembles *Neuontobotrys* in the orientation of fruiting pedicels and in having short fruits, but this genus consists of glabrous annuals with papery and veinless valves, nonfleshy leaves, and yellow petals not turning red (Al-Shehbaz, 1990).

As cited below, the type of *Neuontobotrys* is *Sisymbrium linifolium* Philippi, but the species epithet is a later homonym of *S. linifolium* (Nuttall) Nuttall (Torrey & Gray, 1838). According to Greuter et al. (2000: Art. 58, p. 88), the species and its date of publication in *Neuontobotrys* should be attributed to Schulz (1924) and the name should be cited as *N. linifolia* Schulz (not as *N. linifolia* (Philippi) Schulz). However, the epithet *linifolia* is illegitimate, and the earliest legitimate epithet is *linearifolia*, a new name proposed by Kuntze (1898) in his transfer of the species to *Hesperis* L., as *H. linearifolia* Kuntze. Therefore, the type species of *Neuontobotrys* should be *N. linearifolia*, and the new combination is proposed below.

## KEY TO THE SOUTH AMERICAN SPECIES OF *NEUONTOBOTRYS*

- 1a. Leaves broadly ovate to narrowly lanceolate, auriculate at base; at least some trichomes branched.
- 2a. Leaves entire, narrowly lanceolate, 1–2 mm wide; sepals 3–3.5 mm long; petals 4.5–5 mm long, sparsely pubescent outside; anthers 0.9–1 mm long . . . . . 4. *N. elloanensis*
- 2b. Leaves dentate, broadly ovate to ovate-lanceolate, 4–10(–20) mm wide; sepals 4–5.5 mm long; petals 6–8 mm long, glabrous on outside; anthers 1.7–2.7 mm long . . . . .  
. . . . . 5. *N. deserticola*

- 1b. Leaves linear to oblong-linear, not auriculate or rarely minutely auriculate (*N. berningeri*); trichomes exclusively simple or absent.
- 3a. Fruits (2-)2.8-4.5(-5.5) cm × 2-2.5 mm; seeds 2-2.5 × 1-1.5 mm, distally winged; leaves flat, 3-10(-13) mm wide; sepals 6-9 mm long; petals 10-15 × 3-4 mm; plants glabrous . . . . . 3. *N. robusta*
- 3b. Fruits 1-2 cm × 1-1.5 mm; seeds 0.6-0.9 × 0.4-0.5 mm, wingless; leaves subterete, 1-1.5 mm wide; sepals 3-4 mm long; petals 4-7 × 0.8-1.2 mm; plants pilose with simple trichomes.
- 4a. Raceme 10- to 20-flowered; style slender, 1-2.5 mm long; stigma narrower than style; petals 4-5.5 mm long; leaves not auriculate . . . . . 1. *N. linearifolia*
- 4b. Raceme 20- to 40-flowered; style stout, to 1 mm long; stigma distinctly wider than style; petals ca. 7 mm long; coarser leaves minutely auriculate . . . . . 2. *N. berningeri*

**1. *Neuontobotrys linearifolia*** (Kuntze) Al-Shehbaz, comb. nov. Basionym: *Hesperis linearifolia* Kuntze, Revis. Gen. Pl. 3(2): 6. 1898. Based on *Sisymbrium linifolium* Philippi, Anal. Mus. Nac. Chile, sect. 2 Bot. 8: 2. 1891, non (Nuttall) Nuttall in Torrey & A. Gray, Fl. N. Amer. 1: 91. 1838. *Neuontobotrys linifolia* O. E. Schulz, Pflanzenreich IV. 105(Heft 86): 176. 1924. TYPE. Chile. Tarapacá [Región I]: Cuesta de Jaiña, en los límites del valle Pampa del Tamarugal, 17 Mar. 1885, C. Rahmer s.n. (lectotype, designated here, SGO-49250; isotype, SGO-63214).

*Distribution.* Endemic to Chile (Región I).

*Representative specimens.* CHILE. **Región I (Tarapacá):** Dept. Tarapacá, Cord. Quebrada de Quipisca, Noasa, Werdermann 1115 (B, BM, CAS, E, F, GH, K, MO, UC).

Kuntze (1898) indicated that the species, as *Hesperis linearifolia*, occurs in Argentina (Cerro Morro), but I have not yet seen any material of it from that country. See earlier discussion on the basionym of this species.

**2. *Neuontobotrys berningeri*** O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 11: 392. 1932. TYPE: Chile. Pacha-Aico, 15 Apr. 1927, C. Troll 3327 (lectotype, designated here, B; isotypes, B, M).

*Distribution.* Endemic to Chile (Región I).

Schulz (1932) cited three syntypes under this species, of which two, not housed at B (*Berninger* 370, 397) and whose whereabouts are unknown to me, were not available for this study. One of the

two sheets of *Troll* 3327 at B includes a complete plant, line drawings of floral parts, and annotation of the species name with Otto Schulz's handwriting. This sheet is taken as the lectotype.

**3. *Neuontobotrys robusta*** (Chodat & Wilczek) Al-Shehbaz, comb. nov. Basionym: *Sisymbrium robustum* Chodat & Wilczek, Bull. Herb. Boissier, ser. 2, 2: 290. 1902. TYPE: Argentina. Mendoza: Vallée du Rio Atuel, 2000-2100 m, Jan.-Feb. 1897, E. Wilczek 450 (holotype, G).

*Distribution.* Endemic to Argentina (Prov. Mendoza, Neuquén, and San Juan).

Although Chodat and Wilczek (1902) did not cite any collections under *Sisymbrium robustum*, I agree with Boelcke (1961) and Romanczuk (1981, 1982) that the above collection represents the type material. It is the only specimen annotated as such with Chodat's handwriting, and it is deposited at G, where the other Chodat types are housed (Staffleu & Cowan, 1976).

The species is distinctly more robust and with larger flowers and fruits (see key) than the remaining species of *Neuontobotrys*, but the overall generic characters discussed above apply very well to it.

**4. *Neuontobotrys elloanensis*** Al-Shehbaz, sp. nov. TYPE: Chile. Región II (Antofagasta): Prov. El Loa, NE of Calama, along the road from near Chiu Chiu to Caspana, ca. 46 km from its turnoff from the Calma-Chiu Chiu road, arid scrubland, 22°20'36"S, 68°15'30"W, 3500 m, 10 Apr. 1994, C. M. Taylor & A. Pool 11552 (holotype, MO). Figure 1.

Suffrutex 10-17 cm alta, pilis dendriticis; caules multiramosi, superne glabri et glauci. Folia caulina anguste lanceolata, 4-13 × 1-2 mm, carnosa, sessilia, auriculata. Racemi ebracteati, 6-10-flori; pedicelli fructiferi valde reflexi vel semicirculariter recurvati, 3-5 mm longi. Petala initio lutea, mox rubescentia, lineari-oblancoolata, 4.5-5 × 0.5-0.7 mm; ovula 12-14. Fructus oblongo-lineares, 6-8 × ca. 1 mm; stylus 0.8-1 mm longus; semina ovidea, uniseriata, 0.9-1 × 0.6-0.8 mm.

Plants subshrubs, woody at base; trichomes dendritic throughout, 0.1-0.2 mm long; stems 10-17 cm long, erect to ascending, few from base, many-branched above, sparsely pubescent below, glabrous and glaucous above. Leaves all cauline, narrowly lanceolate, 4-13 × 1-2 mm, fleshy, becoming leathery upon drying, moderately pubescent, gradually becoming sparsely pubescent upward, base minutely auriculate, margin entire, apex acute, auricles to 1 × 0.5 mm. Raceme ebracteate, 6- to 10-flowered; fruiting pedicels 3-5 mm long,

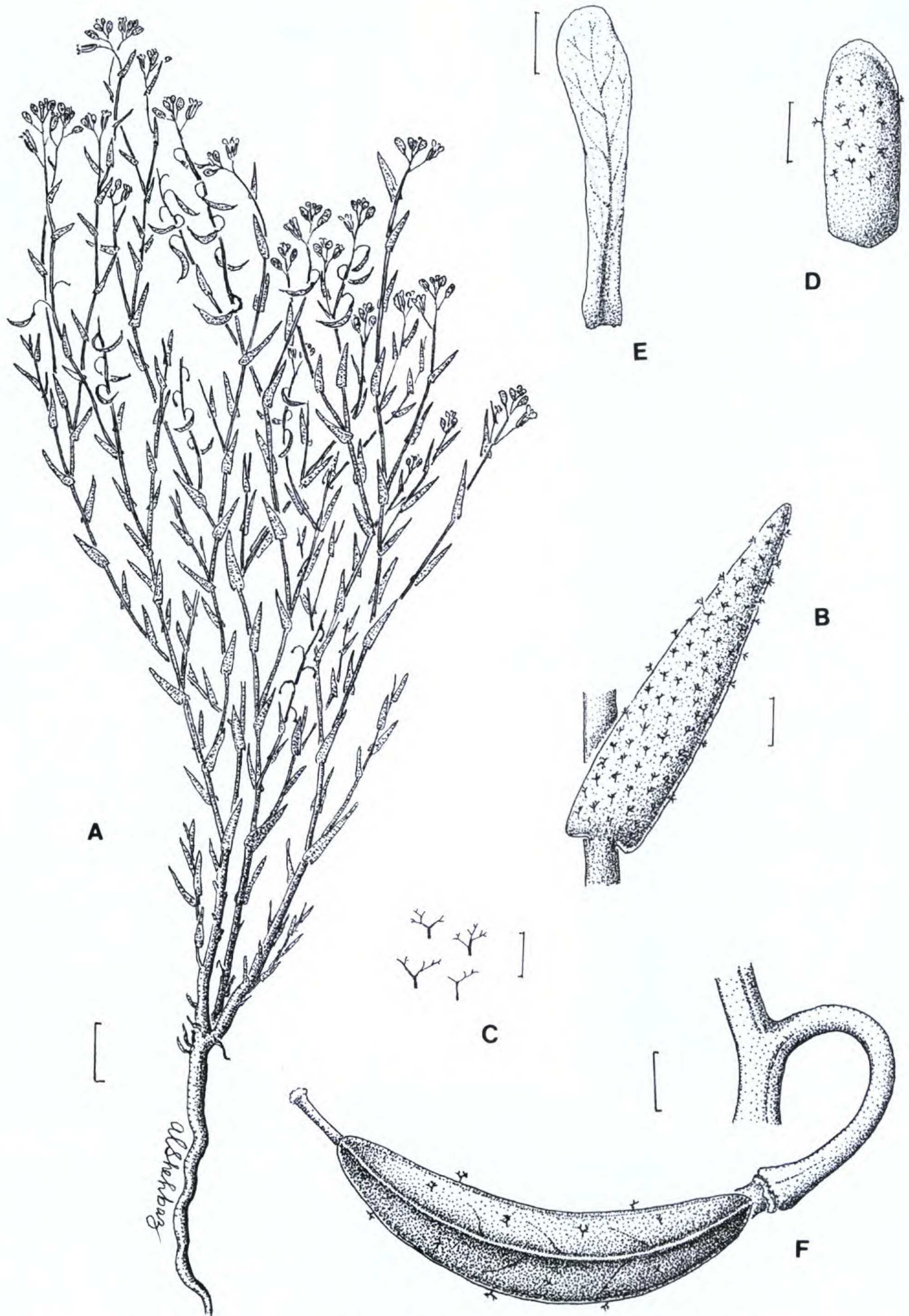


Figure 1. *Neuontobotrys elloanensis* Al-Shehbaz. —A. Plant. —B. Cauline leaf. —C. Trichomes. —D. Sepal. —E. Petal. —F. Fruit and fruiting pedicel. Drawn from the holotype, *Taylor & Pool 11552* (MO). Scale: A = 1 cm, B, D–F = 1 mm, C = 0.1 mm.

glabrous, strongly reflexed or recurved and forming half a loop. Sepals narrowly oblong, 3–3.5 × 0.5–0.7 mm, moderately pubescent; petals yellow, soon turning reddish with age, linear-oblong, 4.5–5 × 0.5–0.7 mm, sparsely pubescent outside; filaments 2.5–3 mm long; anthers oblong-linear, 0.9–1 mm long; ovules 12 to 14 per locule. Fruits oblong-linear, 6–8 × ca. 1 mm, not torulose; valves thick, leathery, with a prominent midvein; gynophore 0.1–0.2 mm long; style slender 0.8–1 mm long; seeds ovoid, brown, uniseriate, 0.9–1 × 0.6–0.8 mm.

*Neuontobotrys elloanensis*, which is known only from the type gathering, is easily distinguished from its nearest relative, *N. deserticola*, by having entire, narrowly lanceolate leaves to 2 mm wide and smaller petals (4.5–5 mm long) sparsely pubescent outside. By contrast, *N. deserticola* has dentate, broadly ovate to ovate-lanceolate leaves 4–10(–20) mm wide and larger petals (6–8 mm long) glabrous outside.

**5. *Neuontobotrys deserticola*** (Philippi) Al-Shehbaz, comb. nov. Basionym: *Cardamine deserticola* Philippi, Anal. Univ. Chile 81: 86. 1892. TYPE: Chile. "Deserto Atacama ad fontem Acerillos," Oct. 1877, *O. Villanueva 1606* (holotype, SGO-63889).

*Sisymbrium philippianum* I. M. Johnston, Rev. Chil. Hist. Nat. 33: 26. 1929. Syn. nov. Based on *Sisymbrium amplexicaule* Philippi, Fl. Atac. 8: 10. 1860, non A. Gray, U.S. Explor. Exped. Wilkes, Bot. XV. 61. 1854. TYPE: Chile. Atacama: Pajonal, [23°46'S, 3170 m], *R. A. Philippi s.n.* (lectotype, designated here, SGO-49243).

**Distribution.** Argentina (Prov. Catamarca, Jujuy, and Salta), Bolivia (Depto. Potosí), and Chile (Región II and III).

**Representative specimens.** ARGENTINA. **Catamarca:** Antofagasta de la Sierra, Los Nacimientos, *Cabrera et al. 31862* (MO). **Jujuy:** Susquesiente Cauchori y Catua, *Cabrera et al. 22544* (SI). **Salta:** Salar de Gallego, Camino a Luca-huasi, *Cabrera 8882* (F, GH). BOLIVIA. **Potosí:** Prov. Nor Lipes, Chiguana, *Asplund 3031* (S, UPS). CHILE. **Región II (Antofagasta):** San Pedro, near river Loa, *Zöllner 8842* (MO, US). **Región III (Atacama):** Depto. Copiapó, Cord. Rio Figueroa, Cl. Paredones, *Werdemann 968* (B, CAS, F, GH, MO, UC).

Although the type of *Neuontobotrys deserticola* consists of three racemes and lacks the lower parts of the plant, it is indistinguishable in every aspect of flower, fruit, and indumentum from plants of *Sisymbrium amplexicaule* Philippi. In fact, Schulz (1924) was the first to point out this similarity but failed to unite the two species.

Muñoz-Pizarro (1960) cited two sheets, SGO-49242 and SGO-49243, as the type of *Sisymbrium amplexicaule*. The latter specimen, which is the most complete and consists of four plants all collected from one locality, is designated herein as the lectotype. The other sheet, SGO-49242, has five fragments each collected from a different place, and it is impossible to assign any of these fragments to a given locality.

As delimited by Kuntze (1898), *Hesperis intricatissima* (Philippi) Kuntze included two species that differ substantially in every morphological aspect except for fruit size and orientation. In order to simplify the complicated nomenclature of these two species, they are designated herein as "sp. A" and "sp. B." One species (sp. A), which is the basionym of *H. intricatissima*, is a glabrous annual originally described as *Draba intricatissima* Philippi and now recognized as *Eremodraba intricatissima* (Philippi) O. E. Schulz (Schulz, 1924; Al-Shehbaz, 1990). The second of Kuntze's (1898) species (sp. B) is a pubescent perennial or subshrub corresponding to *Sisymbrium amplexicaule* Philippi. Schulz (1924) mishandled the nomenclature of Kuntze's (1898) *H. intricatissima* in four ways. First, he excluded the material based on sp. A to *Eremodraba*, but maintained the epithet "intricatissima" in *Sisymbrium* for sp. B. Second, he called the species *Hesperis intricatissima* Kuntze, instead of *H. intricatissima* (Philippi) Kuntze, even though Kuntze (1898) cited the basionym *D. intricatissima* and did not treat the plant as a new species. Third, Schulz (1924, 1928, 1932) overlooked Reiche's (1896) earlier transfer of *D. intricatissima* (sp. A) to *Sisymbrium*. Finally, although Johnston (1929) correctly interpreted the nomenclature of sp. B and proposed the name *S. philippianum* I. M. Johnston to replace the later homonym *S. amplexicaule* Philippi, Schulz (1932) continued to use *S. intricatissimum* for sp. B and placed *S. philippianum* in its synonymy.

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#### Literature Cited

Al-Shehbaz, I. A. 1990. The South American *Eremodraba* (Brassicaceae). Ann. Missouri Bot. Gard. 77: 602–604.

- Appel, O. & I. A. Al-Shehbaz. 2003. Cruciferae. Pp. 75–174 in K. Kubitzki (editor), Families and Genera of Vascular Plants 5. Springer-Verlag, Berlin, Heidelberg.
- Baehni, C. & J. F. Macbride. 1937. Remarques sur les Cruciferae-Sisymbrieae. *Candollea* 7: 291–296.
- Boelcke, O. 1961. Nota sobre *Sisymbrium robustum* Chod. et Wilcz. *Bol. Soc. Argent. Bot.* 9: 387–392.
- Chodat, R. & E. Wilczek. 1902. Contributions à la flore de la République Argentine. *Bull. Herb. Boissier, Sér. 2.* 2: 281–296.
- Greuter, W., J. McNeill, F. R. Barrie, H. M. Burdet, V. Demoulin, T. S. Filgueiras, D. H. Nicolson, P. C. Silva, J. E. Skog, P. Trehane, N. J. Turland & D. L. Hawksworth (editors). 2000. International Code of Botanical Nomenclature (Saint Louis Code). *Regnum Veg.* 138.
- Johnston, I. M. 1929. A new Chilean plant and some nomenclatorial changes. *Rev. Chilena Hist. Nat.* 33: 25–27.
- Kuntze, O. 1898. *Revisio Genera Plantarum*. Vol. 3, part 2. Arthur Felix, Leipzig.
- Macbride, J. F. 1938. Cruciferae. *Field Mus. Nat. Hist., Bot. Ser.* 13: 937–983.
- Muñoz-Pizarro, C. 1960. Las Especies de Plantas Descritas por R. A. Philippi en el Siglo XIX. Ediciones de la Universidad de Chile, Santiago.
- Reiche, C. 1896. *Flora de Chile*, Vol. 1. Imprenta Cervantes, Santiago.
- Romanczuk, M. C. 1981. Novedades en el género *Sisymbrium* (Cruciferae) y sinopsis de las especies Patagónicas. *Parodiana* 1(1): 1–29.
- . 1982. El género *Sisymbrium* (Cruciferae) en la Argentina. *Darwiniana* 24: 75–156.
- Schulz, O. E. 1924. Cruciferae–Sisymbrieae. Pp. 1–388 in A. Engler (editor), *Pflanzenreich IV* 105(Heft 86). Verlag von Wilhelm Engelmann, Leipzig.
- . 1928. Beiträge zur Kenntnis der Flora von Chile. *Notizbl. Bot. Gart. Berlin-Dahlem* 10: 460–472.
- . 1932. Cruciferae variaae. *Notizbl. Bot. Gart. Berlin-Dahlem* 11: 389–392.
- . 1936. Cruciferae. Pp. 227–658 in A. Engler & H. Harms (editors), *Die Natürlichen Pflanzenfamilien*, Ed. 2. 17B. Verlag von Wilhelm Engelmann, Leipzig.
- Stafleu, F. A. & R. S. Cowan. 1976. *Taxonomic Literature*, Vol. 1: A–G. Bohn, Scheltema & Holkema, Utrecht.
- Torrey, J. & A. Gray. 1838. *A Flora of North America*, Vol. 1, part 1. Wiley & Putnam, New York.
- Warwick, S. I. & I. A. Al-Shehbaz. 2003. Nomenclatural notes on *Sisymbrium* (Brassicaceae). *Novon* 13: 265–267.
- , ———, R. A. Price & C. Sauder. 2002. Phylogeny of *Sisymbrium* (Brassicaceae) based on ITS sequences of nuclear ribosomal DNA. *Canad. J. Bot.* 80: 1002–1017.