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Novelties and Notes on Miscellaneous Asian Brassicaceae

Ihsan A. Al-Shehbaz

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.
ihsan.al-shehbaz@mobot.org

ABSTRACT. *Draba bartholomewii* (Brassicaceae), a new species from Qinghai, China, is described and illustrated. The monotypic genera *Coelonema* and *Nesocrambe* are reduced to the synonymy of *Draba* and *Hemicrambe*, respectively. The new combinations *Alyssum dahuricum*, *Draba draboides*, *Hemicrambe socotrana*, *Lepidium coronopus*, and *Pegaeophyton purii* are proposed.

Key words: *Alyssum*, Asia, Brassicaceae, *Coelonema*, *Dilophia*, *Draba*, *Hemicrambe*, *Lepidium*, *Nesocrambe*, *Pegaeophyton*, *Ptilotrichum*.

Delimitation of genera of Brassicaceae (Cruciferae) is a well-known problem, and 125 of the 337 genera recognized by Appel and Al-Shehbaz (2003) are monotypic, with about an additional 100 containing two to four species (oligotypic). Molecular studies (see review by Koch et al., 2003) have clearly demonstrated that the vast majority of monotypic genera are indistinguishable from and nested within larger genera. Upon a critical re-evaluation of morphology, two monotypic genera, *Coelonema* Maximowicz and *Nesocrambe* A. G. Miller, are reduced herein to synonymy of other genera well established on the basis of morphological and molecular grounds (Koch & Al-Shehbaz, 2002; Koch et al., 2003; Warwick & Black, 1997; Gómez-Campo, 1999).

The present paper deals with the description of a new species of *Draba*, as well as nomenclatural adjustments in the genera *Alyssum* L., *Draba* L., *Hemicrambe* Webb, *Lepidium* L., and *Pegaeophyton* Hayek & Handel-Mazzetti.

ALYSSUM VERSUS *PTILOTRICHUM*

Although most authors place *Ptilotrichum* C. A. Meyer in the synonymy of *Alyssum* (e.g., Dudley,

1964; Ball & Dudley, 1993; Zhou et al., 2001; Appel & Al-Shehbaz, 2003), a few others (e.g., Rebenskaya, 1994; Czerepanov, 1995) maintain both genera. As indicated by Zhou et al. (2001), the characters used to distinguish *Ptilotrichum* from *Alyssum* (e.g., white vs. yellow flowers, edentate vs. dentate filaments, and 1-seeded vs. 2- or 3-seeded locules) are unreliable and found within *Alyssum* excluding *Ptilotrichum*. Therefore, these alleged generic boundaries are artificial, and the two genera should be united. All except one of the species originally described in *Ptilotrichum* have names in *Alyssum*. The following new combination is needed.

Alyssum dahuricum (Peschkova) Al-Shehbaz, comb. nov. Basionym: *Ptilotrichum dahuricum* Peschkova, *Novosti Sist. Vyssh. Rast.* 15: 230. 1979. TYPE: Russia. Chita: Onon River system, mountain at Bukukun River, near Bukukunskij, 18 July 1913, V. Smirnov 1986 (holotype, LE).

Alyssum dahuricum is easily distinguished at anthesis from the closely related *A. tenuifolium* Stephan ex Willdenow by having stramineous stems and by lacking the basal and lowermost cauline leaves. By contrast, *A. tenuifolium* has purplish or greenish stems and persistent basal rosette and cauline leaves.

DRABA VERSUS COELONEMA

The monotypic *Coelonema* was recognized in various Chinese floras (e.g., Zhou et al., 2001) as endemic and was said to differ from *Draba* solely by including stoloniferous perennials with flattened

bases of staminal filaments. *Draba* was said to consist of annuals, biennials, or perennials with slender or slightly flattened staminal filaments. A critical examination at LE of the type of *C. draboides* Maximowicz, as well as numerous other species of Asian *Draba*, reveals that these alleged differences are insignificant because several species of *Draba* (e.g., *D. sibirica* (Pallas) Thellung) are typically stoloniferous, and the filament bases vary in this complex genus of ca. 350 species from slender to distinctly flattened. Therefore, the conclusion reached by Appel and Al-Shehbaz (2003) in uniting *Coelonema* with *Draba* is justified, and the following new combination is needed to accommodate *C. draboides* in *Draba*.

Draba draboides (Maximowicz) Al-Shehbaz, comb. nov. Basionym: *Coelonema draboides* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 424. 1880. TYPE: China. [Gansu]: "Terra Tangutorum. Jugum S a fl. Tetung ad declivitates denudates mintium rarius, 30 April–12 May 1873," *N. M. Prezewalski 14* (holotype, LE).

DRABA

During a visit to LE in 2002, I examined the four syntypes of *Draba eriopoda* Turczaninow, a species widely distributed in Bhutan, China, India, Mongolia, Nepal, and Russia. It became immediately evident that the treatment of *D. eriopoda* in Zhou et al. (2001) represented two distinct species, of which one is described below as new.

Draba bartholomewii Al-Shehbaz, sp. nov. TYPE: China. Qinghai: Dari (Darlag) Xian, just N of Manzhang, along Manzhang He, betw. Dari & Banma (Baima), at base of valley sides in loose soil, 4000 m, 33°17'51"N, 100°25'55"E, 12 Aug. 1993, *Ho Tingnung, Bruce Bartholomew & Michael G. Gilbert 1185* (holotype, MO; isotypes, BM, CAS, E, GH, HNWP, PE). Figure 1.

Herba annua. Caules decumbentes, ad basim ramosi, pilis stellatis praediti. Folia basalia nulla; folia caulina 2–6(–10), sessilia, nonauriculata, ovata vel elliptica, 1–3.5 × 0.4–1.5 cm, subtus pilis subsessilibus stellatis 4-radiatis praedita, supra pilis subsetosis simplicibus et stipitato-furcatis praedita. Racemi 8–20-flori, rhachidibus rectis. Pedicelli fructiferi horizontales, 5–15 mm longi. Petala flava, spatulata, 1.2–1.6 × 0.5–0.6 mm. Ovarium 14–20-ovulatum. Fructus oblongi, 8–10(–12) × (2.5–)3–3.5 mm, compressi, pilis simplicibus et subsessilibus furcatis praediti. Semina 1–1.3 × 0.7–0.9 mm.

Herbs annual, 5–25 cm tall; stems decumbent,

branched primarily at or near base, pubescent with subsessile stellate trichomes rarely mixed with simple ones, rarely glabrous distally. Basal leaves withered by anthesis; cauline leaves 2 to 6(to 10), sessile, not auriculate; leaf blade ovate to elliptic, 1–3.5 × 0.4–1.5 cm, abaxially pubescent with subsessile or short-stalked, 4-rayed, stellate trichomes with simple rays, adaxially with subsetose simple or long-stalked forked trichomes sometimes mixed with fewer, smaller, 4-rayed stellate ones, base cuneate, margin 3- to 5-toothed on each side, apex acute. Racemes 8- to 20-flowered, ebracteate, elongated in fruit; rachis straight; fruiting pedicels 5–15 mm long, horizontal, straight, pubescent all around, or rarely glabrescent. Sepals oblong, 1–1.3 × 0.6–0.8 mm, erect, abaxially pilose with stellate trichomes, base of lateral pair not saccate, margin membranous; petals yellow, spatulate, 1.2–1.6 × 0.5–0.6 mm, apex retuse, obscurely clawed at base; filaments 0.8–1 mm; anthers ovate, 0.1–0.2 mm; ovules 14 to 20 per ovary. Fruit oblong, 8–10(–12) × (2.5–)3–3.5 mm, often horizontal, latiseptate, not twisted; valves sparsely puberulent with simple and subsessile forked trichomes, rarely glabrescent, obscurely veined, base and apex acute; style obsolete, rarely to 0.1 mm; seeds brown, ovate, 1–1.3 × 0.7–0.9 mm. Flowering and fruiting in August.

The new species is named after Bruce Bartholomew, one of the collectors of the type collection.

Draba bartholomewii is easily distinguished from *D. eriopoda* by having decumbent stems, horizontal fruiting pedicels pubescent all around or rarely glabrous, pilose sepals with stellate trichomes, small petals 1.2–1.6 × 0.5–0.6 mm, oblong, often horizontal fruits (2.5–)3–3.5 mm wide, and fruit valves puberulent with simple and subsessile forked trichomes. By contrast, *D. eriopoda* has erect stems, divaricate-ascending fruiting pedicels often glabrous adaxially and pubescent abaxially, pilose sepals with simple trichomes, larger petals 2–3(–3.5) × (0.5–)0.8–1 mm, erect or ascending, ovate or ovate-elliptic fruits 1.5–2.5 mm wide, and glabrous fruit valves.

Draba bartholomewii is also related to *D. alticola* Komarov (Afghanistan, China, Kyrgyzstan, Tajikistan), which it resembles in flower size and fruit shape. However, the latter has rosulate basal leaves, leafless stems, a flexuous rachis in fruiting racemes, pilose sepals with simple and forked trichomes, glabrous fruits 1–2 mm wide, and seeds 0.4–0.5 mm long. *Draba bartholomewii* lacks the basal leaf rosette and has 2 to 6(to 10) cauline leaves, a straight rachis in fruiting racemes, pilose

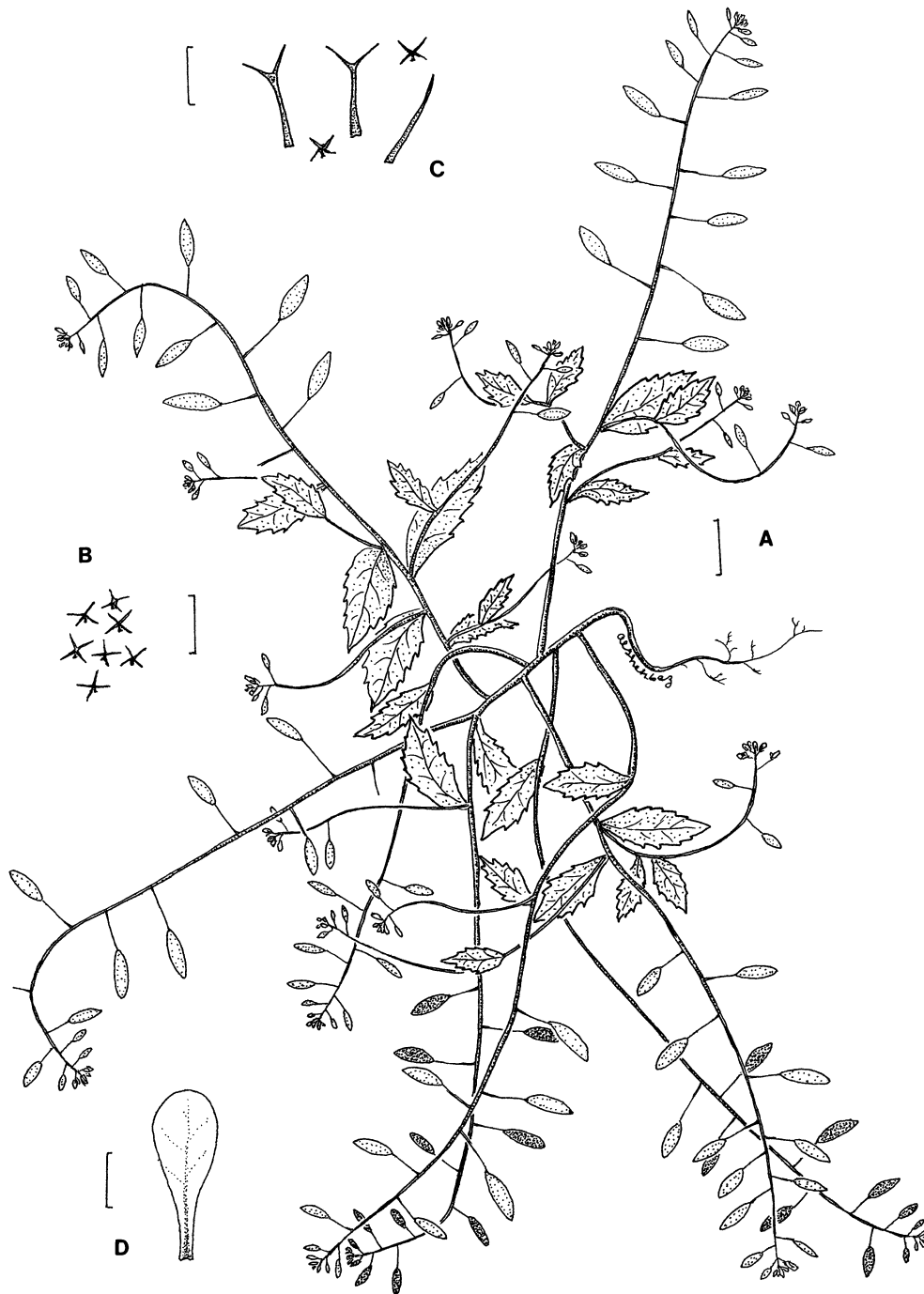


Figure 1. *Draba bartholomewii* Al-Shehbaz. —A. Plant. —B. Trichomes of abaxial leaf surface. —C. Trichomes of adaxial leaf surface. —D. Petal. Scales: A = 1 cm; B, C = 0.2 mm; D = 0.5 mm. Drawn by Al-Shehbaz from the holotype, *Ho, Bartholomew & Gilbert 1185* (MO).

sepals with stellate trichomes, puberulent fruits (2.5–)3–3.5 mm wide, and seeds 0.7–0.9 mm long.

Paratypes. CHINA. **Qinghai:** Nangqen Xian, Xiaolong Gou, W of Nangqen on road to Domba, 32°17'N, 96°16'E, T. N. Ho, B. Bartholomew, M. Watson & M. G. Gilbert 2822 (CAS, HNWP, MO); Tungjen Xian, T. P. Wang 6186 (PE). **Sichuan:** Haitzeshan, H. Smith 11598 (MO, TI, UPS).

HEMICRAMBE VERSUS NESOCRAMBE

Hemicrambe consists of two species, of which one, *H. fruticulosa* Webb, is endemic to Morocco and the other, *H. fruticulosa* (C. C. Townsend) Gómez-Campo, is endemic to the island Soqotra (Yemen). The two species are subshrubs disjunctly separated by some 6900 km (Gómez-Campo, 1977, 1978; Townsend, 1971). The genus is characterized by having yellow or white flowers, petiolate and dentate or lyrate-pinnatifid leaves, patent median nectaries, reflexed fruiting pedicels, and segmented, flattened fruits with a 2- to 4-seeded, indehiscent distal segment and a seedless or 1-seeded, dehiscent proximal segment (Appel & Al-Shehbaz, 2003).

The recently described *Nesocrambe* (Miller et al., 2002) is indistinguishable from *Hemicrambe* in almost every morphological aspect. It is said to be a perennial herb with a woody base instead of a subshrub, but this is an unreliable distinction. Both genera have well-developed, patent, median nectar glands, a feature unique in the entire tribe Brassicaceae (Townsend, 1971; Gómez-Campo, 1977; Miller et al., 2002). Miller et al. (2002) did not include *Nesocrambe socotrana* A. G. Miller in *Hemicrambe* because when they compared it with the Soqotran *H. fruticulosa* they found that *H. fruticulosa* has white instead of yellow flowers, dentate instead of lyrate-pinnatifid leaves, and cylindrical instead of flattened fruits. The Moroccan *H. fruticulosa* has both yellow flowers and lyrate-pinnatifid leaves. The only other difference between the two genera is that in *Hemicrambe* the distal fruit segment is compressed and the proximal segment is sometimes seedless, whereas in *Nesocrambe* the distal fruit segment is cylindrical and the proximal segment is 1-seeded. However, such highly artificial separation is good only at the species rather than the generic level. Miller et al. (2002: 62) have indicated that *Nesocrambe* “is clearly related to *Hemicrambe*.” In my opinion, the remarkable similarities in nectar gland and almost every aspect of the plant (see table 1 in Miller et al., 2002: 63) strongly argue for the maintenance of one genus. Furthermore, there is no need to create a new monotypic genus when its nearest relatives, species of *Hemicrambe*, are

known. Several other genera of the tribe Brassicaceae (e.g., *Conicya* Porta & Rigor ex Roy, *Vella* L.) show fruit diversity far greater than in *Hemicrambe* including *Nesocrambe* (Leadley & Heywood, 1990; Warwick & Al-Shehbaz, 1998).

Miller et al. (2002: 66) stated that “the perennial habit is relatively uncommon in the Brassicaceae.” However, Al-Shehbaz (1984: 349) indicated that “more than 62 percent [of the family] are perennials” and only about 5% are typically woody.

KEY TO THE SPECIES OF *HEMICRAMBE*

- 1a. Leaves crenate-dentate; flowers white; Soqotra *H. fruticulosa*
- 1b. Leaves lyrate-pinnatifid or lyrate-pinnatifid; flowers yellow.
 - 2a. Perennial herbs woody only at base; fruits cylindrical; Soqotra *H. socotrana*
 - 2b. Subshrubs; fruits flattened; Morocco *H. fruticulosa*

Hemicrambe socotrana (A. G. Miller) Al-Shehbaz, comb. nov. Basionym: *Nesocrambe socotrana* A. G. Miller, in Miller et al., Willdenowia 32: 63. 2002. TYPE: Republic of Yemen. Western Soqotra, Sharahin, 12°31'N, 53°20'E, 450 m, 6 Feb. 2001, A. G. Miller, R. Atkinson, A. W. Kulaidi & N. Taleeb M-20021 (holotype, E; isotypes, B not seen, UPS not seen).

LEPIDIUM

Based on extensive molecular studies (Brügge-mann, 2000) and critical evaluation of morphology (Appel & Al-Shehbaz, 2003; Al-Shehbaz et al., 2002), *Coronopus* Zinn was reduced to the synonymy of *Lepidium*. All except one species of *Coronopus* have correct names in *Lepidium*. The exception is *C. squamatus* (Forsskål) Ascherson, a species originally described in *Lepidium* by Forsskål (1775). However, the earliest validly published name for the species is *Cochlearia coronopus* L. (Linnaeus, 1753), and this specific epithet should be used in *Lepidium* when this genus is united with *Coronopus*. Therefore, the following new combination is needed.

Lepidium coronopus (L.) Al-Shehbaz, comb. nov. Basionym: *Cochlearia coronopus* L., Sp. Pl. 2: 648. 1753. TYPE: (lectotype, designated by Jonsell & Jarvis, 2002: 68) Herb. Linn. 826.5 (LINN).

PEGAEOPHYTON VERSUS DILOPHIA

Rawat et al. (1996) described the new species *Dilophia purii* from Garhwal in Northwest India.

The excellent illustration immediately suggested a possible affinity to *Pegaeophyton*. However, the description and illustration indicated the presence of glandular trichomes, a feature not known in any species of *Pegaeophyton* and *Dilophia* Thomson. When I examined the MO isotype of *D. purii*, I found none of the trichomes were glandular, and the generic affinity of this plant to *Pegaeophyton* became abundantly clear. *Pegaeophyton* differs from *Dilophia* by having accumbent instead of incumbent cotyledons, nonfleshy instead of fleshy fusiform roots, obtuse instead of strongly apiculate anthers, and smooth instead of apically cristate fruits.

Pegaeophyton purii (D. S. Rawat, L. R. Dangwal & R. D. Gaur) Al-Shehbaz, comb. nov. Basionym: *Dilophia purii* D. S. Rawat, L. R. Dangwal & R. D. Gaur, J. Bombay Nat. Hist. Soc. 93: 262. 1996. TYPE: India. Northwest Himalaya, Roopkund, 4850 m, 11 Aug. 1993, D. S. Rawat s.n. (holotype, GUH 22,498 not seen; isotype, MO).

Except for having flattened instead of terete and 8- instead of 2- to 4-seeded fruits, *Pegaeophyton purii* is quite similar in all aspects of leaves and flowers to *P. nepalense* Al-Shehbaz, Arai & H. Ohba, a species originally thought to be endemic to Nepal (Al-Shehbaz et al., 1998) but later reported from Bhutan, China, and India (Al-Shehbaz, 2000). The collection of mature fruiting material of *P. purii* should help in the determination of whether or not the two species are conspecific.

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