

TWO NEW SPECIES OF *DRABA* AND *EUTREMA* (BRASSICACEAE) FROM SICHUAN, CHINA

IHSAN A. AL-SHEHBAZ¹

Abstract. *Eutrema bouffordii* and *Draba yueii* are described as new from Sichuan Province, China. The relationships and distinguishing characters from their nearest relatives, *E. fontana* and *D. winterbottomii* are discussed.

Keywords: Brassicaceae, *Draba*, *Eutrema*, Brassicaceae, China, Sichuan Province.

Following the publication of the family Brassicaceae for the Flora of China (Zhou et al., 2001), many new species have since been described, and many nomenclatural adjustments have been made (e.g., Al-Shehbaz, 2002a, 2002b; Al-Shehbaz and Warwick, 2005, 2006). Most of the novelties were described from the Xizang-Qinghai Plateau, especially the Hengduan Mountains, one of the floristically richest areas in Asia (Wang et al., 1993; Axelrod et al., 1998). With further explorations to some of the more remote areas of that Plateau, it is highly likely that many more species will be discovered. A case in point, an expedition conducted in 2005 by Dr. David E. Boufford and colleagues to a small part of that Plateau yielded six new species of Brassicaceae, of which two are described below in the genera *Draba* L. and *Eutrema* R. Br., and the remaining four, all in the genus *Solms-laubachia* Muschl., will be dealt with in a separate publication.

Eutrema bouffordii Al-Shehbaz, *sp. nov.*
TYPE: CHINA. Sichuan Province, Serxu Xian: NW of the city of Shiqu (Serxu), vicinity of Anbala Shan at Ya Kou (Ya Pass), border of Sichuan and Qinghai provinces, 33°8'24"N, 97°29'53"E, 4560–4875 m, gravelly disturbed area near pass, 26 July 2005, *D. E. Boufford, J.*

I am profoundly grateful to Peter H. Raven, Director of the Missouri Botanical Garden, and Robert Cook, Director of the Arnold Arboretum and Harvard University Herbaria, for their support of my recent visit to the Harvard. I thank David E. Boufford for allowing me to study his recent collections from Sichuan. The specimens were collected during field investigations in the Hengduan Mountain region of China with support from the U.S. National Science Foundation (grant no. DEB-0321846, to David E. Boufford) and the Chinese National Natural Science Foundation (grants no. 40332021 and 30420120049, to Hang Sun). I am much indebted to Gustavo Romero for his editorial advice.

¹Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A. E-mail: hsan.al-shehbaz@mobot.org

H. Chen, K. Fujikawa, S. L. Kelley, R. H. Ree, H. Sun, J. P. Yue & Y. H. Zhang 33524 (Holotype: A; Isotypes: KUN, MO).

Herba sparse pubescentes. Caules 5–11(–20) cm longi, prostrati vel decumbenti, pubescenti, pili retrorsi. Folia petiolata, nonrosulata, ovata vel oblonga, 0.7–2.0 cm × 3–7 mm. Racemi densiflori, bracteati; pedicelli fructiferi 2.5–7 mm longi, adscendentes, adaxialiter pubescenti. Sepala 1.3–1.7(–2.0) × 0.7–1.0 mm, persistens; petala alba vel lavandula, obovata vel spathulata, 2–3 × 0.5–1.0(–1.4) mm; ovula 4–8. Fructus obcordati, (2–)3–5 × (4–)5–7 mm, puberuli, tuberculati; septum nullum; stylo 1–3 mm longo. Semina oblonga, 1.2–1.6 × 0.8–1.1 mm.

Sparsely to moderately pubescent herbs, with narrowly fusiform roots. Stems 5–11(–20) cm tall, solitary or many branched just above base, prostrate to decumbent, rarely erect, sparsely to densely pubescent with retrorse or spreading trichomes 0.3–0.6 mm long, often glabrous on the side of leaf attachment. Leaves not rosulate; petioles of lowermost leaves (0.5–)1.0–3.6 cm long, gradually becoming shorter upwards; leaf blade ovate to oblong, 0.7–2.0 cm × 3–7 mm, base obtuse or cuneate, margin entire to repand or sparsely dentate. Racemes densely flowered, slightly elongated in fruit, bracteate throughout; bracts leafy, smaller than cauline leaves; fruit-

ing pedicels 2.5–7.0 mm long, ascending, straight, pubescent adaxially. Sepals oblong, 1.3–1.7(–2.0) × 0.7–1.0 mm, persistent, membranous at margin, sparsely pubescent below apex; petals white or lavender, obovate or spatulate, 2–3 × 0.5–1.0(–1.4) mm, attenuate to a claw-like base 1–2 mm long, apex slightly emarginate; filaments 1.5–2.0 mm long, dilated at base; anthers ovate, 0.15–0.20 mm long; ovules 4–8 per ovary. Fruit broadly to narrowly obcordate, slightly angustiseptate, (2–)3–5 × (4–)5–7 mm, emarginate at apex; valves membranous, densely or rarely sparsely puberulent with trichomes to 0.5 mm long, papillate-tuberculate; replum widely and evenly expanded throughout; septum absent; style slender, 1–3 mm long. Seeds dark brown, oblong, foveolate, plump, 1.2–1.6 × 0.8–1.1 mm; cotyledons accumbent.

Eponymy: named in honor of Dr. David E. Boufford, and outstanding student of East Asian botany.

Eutrema bouffordii is most closely related to *E. fontana* (Maxim.) Al-Shehbaz & S. I. Warwick, from which it is easily distinguished by having smaller sepals (1.3–1.7(–2.0) mm vs. 2.5–3.2 mm), smaller petals (2–3 × 0.5–1.0(–1.4) mm vs. 4.5–7.0 × 2.5–3.5(–4.5) mm), densely or rarely sparsely puberulent and papillate-tuberculate (vs. glabrous or sparsely puberulent and not tuberculate) fruit valves, and plump seeds 1.2–1.6 × 0.8–1.1 mm (vs. flattened seeds (1.5–)1.8–2.2 × (1.1–)1.2–1.5 mm). Both species often grow together in many parts of western Sichuan and neighboring Qinghai and Xizang (Tibet), but no intermediates have been found.

Although, *Eutrema fontana* was previously recognized as a species of *Taphrospermum* C. A. Meyer (Al-Shehbaz and Yang, 2000), but recent molecular data (Warwick et al., 2006) strongly support its placement into an expanded *Eutrema* (Al-Shehbaz and Warwick, 2005). The new species was formerly recognized as a subspecies of *E. fontana* (subsp. *microsperma* (Al-Shehbaz & G. Yang) Al-Shehbaz & S. I. Warwick), but the availability of recent collections with excellent flowers and fruits clearly support the recognition of two distinct species.

Draba yuei Al-Shehbaz, *sp. nov.* TYPE: CHINA. Sichuan Province, Jiulong Xian: Tanggu Xiang, NW of the city of Jiulong, Wuxu Hai (Wuxu Lake), 29°9'11"N,

101°24'25"E, 4175 m, on rocks in moss, 22 July 2005, D. E. Boufford, J. H. Chen, K. Fujikawa, S. L. Kelley, R. H. Ree, H. Sun, J. P. Yue, D. C. Zhang & Y. H. Zhang 33414 (Holotype: A; Isotypes: KUN, MO).

Herba perennis, caespitosa, scaposa. Caules 0.7–2.8 cm longi, sparse pubescentes, pilis malpighiaceis et 3- vel 4-radiatis praeditis. Folia basalia rosulata, persistentia, spatulata vel oblanceolata, 2–6 × 0.7–1.5 mm, subglabra vel sparse pubescentia, pilis 2–3(–4)-radiatis praeditis. Racemi 2–5-flori, ebracteati, rhachidibus recti; pedicelli fructiferi divaricati, 3–6 mm longi, abaxialiter sparse pubescenti. Sepala 1.3–1.6 × 0.7–0.9 mm; petala alba, spatulata vel obovata, 3.7–4.0 × 1.1–1.5 mm; ovula (10–)12–20. Fructus ovati, 3.7–4.0 × 1.1–1.5 mm, glabri, stipitati, noncontorti; stylo 0.2–0.8 mm longo. Semina ignota.

Perennial, caespitose, scapose herbs; caudex slender, branched, ultimate branches terminated in rosettes, covered with stramineous petiolar remains of previous years. Stems 0.7–2.8 cm tall, erect, simple, sparsely pubescent with sessile, malpighiaceus and 3- or 4-rayed trichomes. Basal leaves rosulate, persistent; petiole 2.5–6.0 mm long, becoming stramineous and thickened, sparsely ciliate or not; leaf blade spatulate to oblanceolate, 2–6 × 0.7–1.5 mm, subglabrous or sparsely pubescent with sessile or subsessile 2–3(–4)-rayed trichomes with unbranched rays, base attenuate to cuneate, margin entire, not ciliate; cauline leaves absent. Racemes 2–5-flowered, ebracteate, lax, elongated in fruit; rachis straight, slender; fruiting pedicels 3–6 mm long, divaricate, straight, abaxially sparsely pubescent with subsessile, stellate trichomes. Sepals oblong, 1.3–1.6 × 0.7–0.9 mm, erect, abaxially sparsely pubescent, base of lateral pair not saccate; petals white, spatulate to obovate, 3.7–4.0 × 1.1–1.5 mm, apex rounded, claw 0.9–1.4 mm long; filaments 1.1–1.4 mm long; anthers ovate, 0.2–0.3 mm long; nectar glands confluent, subtending bases of all filaments; ovules (10–)12–20 per ovary. Fruit (immature) ovate, 3.7–4.0 × 1.1–1.5 mm, not inflated, latiseptate, not twisted; valves glabrous, not veined, base and apex obtuse; gynophore 0.2–0.8 mm long; style 0.2–0.8 mm long. Mature seeds not seen.

Eponymy: named in honor of Dr. Jipei Yue, one of the collectors of the type material and a student of the Brassicaceae.

Draba yueii is most closely related to *D. winterbottomii* (Hook.f. & Thomson) Pohle. It is easily distinguished from the latter by having sparsely pubescent stems with malpighiaceous and 3- or 4-rayed trichomes, sparsely pubescent leaves with 2–3(–4)-rayed trichomes with unbranched rays, straight rachis of fruiting racemes, abaxially pubescent fruiting pedicels, smaller sepals 1.3–1.6 × 0.7–0.9 mm, and untwisted stipitate fruits with gynophore 0.2–0.8 mm long. By contrast, *D. winterbottomii* has tomentose stems with stellate tri-

chomes, densely tomentose leaves with 4-rayed stellate trichomes the rays of which with 1 or 2 lateral branches on each side, often flexuous rachis of fruiting racemes, fruiting pedicels tomentose all around, larger sepals 2–3 × 1.0–1.5 mm, and sessile, often twisted fruits.

The treatment of *Draba* for the Flora of China (Zhou et al., 2001) included 48 species. During the past four years, six species have been added (Al-Shehbaz, 2002a, 2004a, 2004b), and with the description herein of *D. yueii*, the total in China becomes 55 species.

LITERATURE CITED

- AL-SHEHBAZ, I. A. 2002a. Six new species of *Draba* (Brassicaceae) from the Himalayas. *Novon* 12: 314–318.
- . 2002b. New combinations in Brassicaceae (Cruciferae): *Draba serpens* is a *Hemilophia* and *D. williamsii* is a *Lepidostemon* (Brassicaceae). *Edinb. J. Bot.* 59: 443–450.
- . 2004a. Novelties and notes on miscellaneous Asian Brassicaceae. *Novon* 14: 153–157.
- . 2004b. Two new species of *Draba* (Brassicaceae): *D. mieheorum* from Tibet and *D. sagasteguii* from Peru. *Novon* 14: 249–252.
- AL-SHEHBAZ, I. A. AND G. YANG. 2000. A revision of the Himalayan and Central Asian genus *Taphrospermum* (Brassicaceae). *Harvard Pap. Bot.* 5: 99–108.
- AND S. I. WARWICK. 2005. A synopsis of *Eutrema* (Brassicaceae). *Harvard Pap. Bot.* 10: 129–135.
- AND ———. 2006. A synopsis of *Smelowskia* (Brassicaceae). *Harvard Pap. Bot.* 11(1): 91–99.
- AXELROD, D. I., I. A. AL-SHEHBAZ, AND P. H. RAVEN. 1998. History of the modern flora of China. Pp. 43–55 in A. L. ZHANG AND S. G. WU, EDS., *Proceedings of the International Floristic Characteristics and Diversity of East Asian Plants*. China Higher Education Press, Beijing, and Springer-Verlag, Berlin and other cities.
- WANG, W. T., S. G. WU, K. Y. LANG, P. Q. LI, F. T. PU, AND S. K. CHEN, EDS. 1993. *Vascular plants of the Hengduan Mountains*. Vol. 1. Science Press, Beijing.
- WARWICK, S. I., I. A. AL-SHEHBAZ, AND C. A. SAUDER. 2006. Phylogenetic position of *Arabis arenicola* and generic limits of *Eutrema* and *Aphragmus* (Brassicaceae) based on sequences of nuclear ribosomal DNA. *Can. J. Bot.* 84: 269–281.
- ZHOU, T. Y., L. L. LU, G. YANG, AND I. A. AL-SHEHBAZ. 2001. Brassicaceae (Cruciferae). In Z. Y. WU AND P. H. RAVEN, EDS., *Flora of China*. 8: 1–193. Science Press, Beijing, and Missouri Botanical Garden Press (St. Louis).