

# BENGT-JONSELLIA (BRASSICACEAE), A NEW GENUS FROM MADAGASCAR

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**Abstract.** *Bengt-jonsellia* Al-Shehbaz is described as a new genus endemic to Madagascar, and the new combinations *B. laurentii* (Jonsell) Al-Shehbaz and *B. tsaratananae* (Jonsell) Al-Shehbaz are proposed. The characters distinguishing *Bengt-jonsellia* from *Nasturtium* and *Rorippa* are discussed, and detailed descriptions of the genus and a key to its two species are provided.

**Keywords:** *Bengt-jonsellia*, Brassicaceae, *Ceriosperma*, Cruciferae, *Nasturtium*, *Rorippa*.

*Rorippa* Scop. (Brassicaceae or Cruciferae) includes ca. 80 species represented by native taxa on all continents but Antarctica (Al-Shehbaz, 1988). Although the genus has long been assigned to the tribe Arabideae (Schulz, 1936), extensive molecular phylogenetic studies, summarized by Al-Shehbaz et al. (2006) and Al-Shehbaz (2012), place it in tribe Cardamineae. Previous authors (e.g., Schulz, 1936; Jonsell, 1968, 1974, 1982; Al-Shehbaz, 1988; Al-Shehbaz and Rollins, 1988; Rollins, 1993; Jalas and Suominen, 1994) broadly circumscribed *Rorippa* and united it with *Nasturtium* W. T. Aiton. However, both genera are currently maintained (e.g., Stuckey, 1972; Appel and Al-Shehbaz, 2003; Mabblerley, 2008; Al-Shehbaz, 2010, 2012), and the substantial morphological differences (see Al-Shehbaz and Price, 1998) and family-wide phylogenetic studies (German et al., 2009; Couvreur et al., 2010) support that distinction.

Jonsell (1979) described *Rorippa laurentii* Jonsell as endemic to Madagascar with two subspecies restricted to a few humid cliffs and cleared forests. Except for the herbarium at the Muséum National d'Histoire Naturelle (P), almost all other collections have poor representations of the species. During a visit in 2016 to P, I had the chance to examine substantial collections of this species, as well as fewer specimens in other herbaria, including most of the type material cited below.

*Rorippa laurentii* differs from the remaining species of the genus by having non-auriculate (vs. almost always auriculate) cauline leaves, stems rooting (vs. almost always not rooting) from lower nodes, lowest fruiting pedicels 1–2.3 cm (vs. <1 cm), gynophore 1–3 mm (vs. obsolete), latiseptate (vs. terete) fruit, uniseriate (vs. biseriate) seeds 2.8–4.5 mm (vs. 0.4–1(–2) mm), and 4–10 (vs. 18(–25)–300) ovules per ovary. Although the seed sculpture in *Rorippa* ranges from papillate, reticulate, colliculate, to foveolate (Murley, 1951; Vaughan and Whitehouse, 1971; Jonsell, 1974; Al-Shehbaz, 2010), none of its species has concentrically striate seeds as do the two subspecies of *R. laurentii* that were described by Jonsell (1979) to have ridged seed coat.

Despite its wide distribution and diversity, *Rorippa* was not previously included in a genus-wide molecular

phylogenetic study. However, Nakayama et al. (submitted) have recently studied the chloroplast phylogeny of about 45 species of the genus, and their data show that *R. laurentii* was placed outside of *Rorippa*. As indicated by Jonsell (1979), *R. laurentii* is not related morphologically to any African species, though he associated it with the Australian and Southwest Asian species that Schulz (1933, 1936) placed in the highly heterogeneous *Nasturtium* sect. *Ceriosperma* O.E.Schulz. The section was raised to a monospecific genus by Greuter and Burdet (Greuter and Raus, 1983) to include only the Lebanese-endemic *C. macrocarpum* (Boiss.) Greuter & Burdet. However, as shown by Al-Shehbaz and Jacquemoud (2000) and German (2016), the latter species is perfectly at home in *Barbarea* W. T. Aiton, and it is morphologically, geographically, and molecularly unrelated to *R. laurentii*. Both *Nasturtium* and *R. laurentii* have white flowers, hollow stems rooting from lowermost leaves, ebracteate racemes, smooth or slightly torulose and glabrous fruit, and non-mucilaginous seeds. However, *Nasturtium* differs by having strongly reticulate (vs. striate) seeds, slender (vs. strongly dilated) filament bases, absence (vs. presence) of median nectar glands, 25–50 (vs. 4–10) ovules per ovary, obsolete or to 2 mm (vs. 2.5–6 mm) styles, and obsolete (vs. 1–3 mm) gynophore. Because of the above molecular and morphological differences between *R. laurentii*, the rest of *Rorippa*, and *Nasturtium*, it is clear that the species cannot be maintained in both genera, nor placed in *Ceriosperma* or *Barbarea*. Therefore, the two subspecies of *R. laurentii* are treated as distinct species of a new genus hereafter called *Bengt-jonsellia*.

**Bengt-Jonsellia** Al-Shehbaz, *gen. nov.* TYPE: *B. laurentii* (Jonsell) Al-Shehbaz.

*Herbs* perennial or sometimes annual. *Trichomes* absent. *Multicellular glands* absent. *Stems* erect, rooting from lower nodes, branched above or sometimes also from base, leafy, unarmed. *Basal leaves* not rosulate, soon withered; cauline leaves petiolate, not auriculate at base, simple and pinnatifid to pinnatisect, or pinnately compound, dentate. *Racemes* many-flowered, ebracteate, lax, elongated considerably

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in fruit; rachis straight; fruiting pedicels divaricate to horizontal, straight or curved upwards, persistent. *Sepals* oblong, free, deciduous, ascending to spreading, equal, base of lateral pair not saccate; petals white, erect at base with flaring blade, longer than sepals; blade broadly obovate to suborbicular, apex obtuse to rounded; claw slightly differentiated from blade, much shorter than sepals, glabrous, unappendaged, entire; stamens 6, slightly exerted, erect, slightly tetradynamous; filaments wingless, unappendaged, glabrous, strongly dilated at base, free; anthers oblong, not apiculate; nectar glands confluent, subtending bases of all stamens; median nectaries present; ovules 4–10 per ovary; placentation parietal. *Fruit* dehiscent capsular siliques, linear to ellipsoid, latiseptate, not or slightly inflated, unsegmented; valves papery, with a distinct midvein and obscure or prominent lateral veins, glabrous, not keeled, smooth or slightly torulose, wingless, unappendaged;

gynophore 1–3 mm; replum rounded, visible; septum complete, membranous, veinless; style 2.5–6 mm, attenuate to apex, persistent; stigma capitate, entire, unappendaged. *Seeds* uniseriate, wingless, broadly oblong, plump; seed coat concentrically striate, not mucilaginous when wetted; cotyledons accumbent.

**Eponymy:** The genus is named in honor of Dr. Bengt Jonsell (June 11 1936–), professor emeritus, Swedish Academy member, world authority on *Rorippa*, *Diceratella* Boiss., and *Farsetia* Turra, author of *Flora Nordica*, and expert on the Brassicaceae floras of Eretria, Ethiopia, Madagascar, Somalia, Tropical East Africa, and New Caledonia.

A genus of two species endemic to Madagascar and treated as subspecies of *Rorippa laurentii* by Jonsell (1979). However, the substantial morphological differences (see key) strongly support German (2016) in treating them as distinct species, though he maintained them in *Rorippa*.

KEY TO THE MORPHOLOGICAL DIFFERENCES IN *B. LAURENTII* AND *B. TSARATANANAE*

- 1a. Fruit linear, slightly torulose, not inflated, 2–3 mm wide; cauline leaves pinnatisect to pinnatifid, with sessile, decurrent lobes; fruiting pedicels 1–2 mm; style 2.5–4(–4.5) mm. . . . . *B. laurentii*  
 1b. Fruit ellipsoid, not torulose, slightly inflated, 5–6 mm; cauline leaves pinnately compound; with petiolulate leaflets; fruiting pedicels 1.5–3 mm; style 4–6 mm. . . . . *B. tsaratananae*

**Bengt-jonsellia laurentii** (Jonsell) Al-Shehbaz, *comb. nov.*

Basionym: *Rorippa laurentii* Jonsell, Bot. Notiser 132: 532. 1979. Described from: “Madagascar, prov. Fianarantsoa, massif Andringitra, Antanifotsy, NE slope of Andranotily, c. 1900 m, 29.IV.1978, L. Jonsson 1090.” TYPE: “FLORA MADAGASCARIENSIS. PROV. FIANARANTSOA: Massif Andringitra, Antanifotsy, NE slope of Andranotily, (S22°07', E46°52'I. Alt. c. 1900 m. Large colonies on burnt areas in the Ericaceous-zone (1 year after burning),” 29 Apr 1978, Lars Jonsson 1090 (holotype: UPS [n.v.]; isotypes, BR-0000008887115, ETH-000000006, FT-001106, P-00783438, TAN [n.v.]).

*Stems* 15–120 cm tall, hollow. *Lowermost cauline leaves* petiolate, 3–18.5 × 1.5–10 cm, pinnatifid to pinnatisect, 5- or 7-lobed; lobes sessile, decurrent, dentate, terminal lobe ovate to broadly lanceolate, to 7 × 3 cm, lateral lobes to 5 × 2 cm; upper leaves smaller, 3-lobed; uppermost leaves not lobed, entire or with few teeth. *Racemes* 8–70-flowered; fruiting pedicels 1–2 cm, straight or slightly curved. *Sepals* yellow-green, 3–4 mm, with hyaline margin; petals white with yellow-green veins and claw, suborbicular to broadly obovate, 5–6 × 3–5 mm; claw to 1 mm; filaments 2.5–4 mm; anthers 1.5–2 mm; ovules 6–10 per ovary. *Fruit* linear 2–3.5 cm × 2–2.8(–3) mm, latiseptate, slightly torulose, not inflated; gynophore 1–1.5 mm; style 2.5–4(–4.5) mm. *Seeds* broadly oblong, 2.8–4 × 2–3.8 mm.  $2n = 48$ .

**Bengt-jonsellia tsaratananae** (Jonsell) Al-Shehbaz, *comb. et stat. nov.*

Basionym: *Rorippa laurentii* subsp. *tsaratananae* Jonsell, Bot. Notiser 132: 535. 1979. Described from: “Madagascar, massif of Tsaratanana, Amboabory–Antsianongalata, 2600–2700 m, XI/XII. 1937, Humbert 18471.” TYPE: “Mission H. Humbert—Plantes du MADAGASCAR (5° voyage)—1937-1938 N° 18471 MASSIF DU TSARATANANA (RÉSERVE NATURELLE N° 4) PLATEAUX SUPÉRIEURS ET HAUTS SOMMETS DE L'AMBOABORY A L'ANTSIANONGATALATA: flane S. de l'Antsianongatalata. Ravins humides dans la sylvie à Lichens et brousse éricoïde Altitude: 2600-2700 m. Date de la récolte: Novembre-Décembre 1937. Fl. Blanches LEG. H[ENRI]. HUMBERT” (holotype: P-00047925; isotypes: BR-0000008886439, G-00007018, G-00007020, MO-3400229, MO-3741038, K-000230683, K-000230684, P-00047926, P-00047927, P-00047928).

*Stems* 50–90 cm tall, hollow. *Lowermost cauline leaves* petiolate, 3–7 × 1.7–3 cm, pinnately compound, 5- or 7-foliolate; leaflets with petiolule 1–3 mm, dentate, terminal leaflet ovate to lanceolate, 7–20 × 4–6 mm, dentate or incised, lateral leaflets slightly smaller, usually oblique at base; uppermost leaves smaller, 3-foliolate, entire or dentate. *Racemes* 10–35-flowered; fruiting pedicels 1.5–3 cm, strongly curved upwards. *Sepals* yellow-green, 2.8–3.8 mm, with hyaline margin; petals white, broadly obovate, 4.5–6 × 3–4 mm; claw to 1 mm; filaments 2–3 mm; anthers 1.8–2.2 mm; ovules 4–6 per ovary. *Fruit* ellipsoid 2–3 cm × 5–6 mm, subterete, not torulose, slightly inflated; gynophore 2–3 mm; style 4–6 mm. *Seeds* broadly oblong, 4–4.5 × 3.3–3.8 mm.

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