
Draba simmonsii (Brassicaceae), a New Species of the *D. micropetala* Complex from the Canadian Arctic Archipelago

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ABSTRACT. *Draba simmonsii* Elven & Al-Shehbaz (Brassicaceae), a new species from the Canadian Arctic Archipelago, is described and illustrated. Its taxonomic history, distribution, habitats, and distinguishing characters from the closely related *D. micropetala* Hooker and *D. pauciflora* R. Brown are discussed. The IUCN status of the new species is determined as Least Concern (LC). *Draba simmonsii* is based on *D. alpina* L. var. *gracilescens* Simmons, which is lectotypified.

Key words: Arctic Archipelago, Brassicaceae, Canada, *Draba*, IUCN Red List.

The *Draba micropetala* Hooker complex, recognized by Tolmatchew (1939, 1975) as series *Oblongatae* Tolmatchew, has been considered to include two high arctic species: *D. pauciflora* R. Brown (= *D. adamsii* Ledebour) and *D. micropetala* (or *D. oblongata* auct., non *D. oblongata* R. Brown ex DC.). These species are characterized by very small ($2\text{--}3 \times 0.7\text{--}1.5$ mm), suberect, pale yellow or reddish yellow petals scarcely longer than the 1.8–2.5 mm long sepals and with nearly parallel margins; fruits pubescent primarily with simple trichomes; subsessile stigmas on styles 0.05–0.2(–0.3) mm long; and basal leaves ciliate with stout, simple and/or branched trichomes. *Draba pauciflora* differs from *D. micropetala* by its subacute (vs. obtuse or rounded) leaves with simple and forked (vs. predominantly cruciform) marginal and surface trichomes; non-elongating (vs. elongating) infructescences with straight (vs. somewhat flexuous) rachis; pale reddish yellow (vs. pale yellow) petals; and obovate-oblong (vs. elliptic to elliptic-ovate), olive-brown (vs. grayish green), and subglabrous (vs. moderately to densely) pubescent fruits (see key). The two species differ in ploidy levels: *D. pauciflora* is tetraploid with $2n = 32$ reported from Wrangel Island, Russia (Zhukova et al., 1973; Zhukova & Petrovsky, 1984), Alaska, U.S.A. (Packer & McPherson, 1974; Mulligan, 1974), and Svalbard,

Norway (Brochmann et al., 1993); *D. micropetala* is hexaploid with $2n = 48$ reported from Wrangel Island (Petrovsky & Zhukova, 1981; Zhukova & Petrovsky, 1984) and Svalbard (Brochmann et al., 1993).

Some names have been misapplied in North America and elsewhere in this group. The most consistent misapplication, and the one of concern here, is that of *Draba oblongata*. This name was nearly uniformly applied for *D. micropetala* (or for a collective species concept of *D. micropetala*, *D. pauciflora*, and the new species described below as *D. simmonsii* Elven & Al-Shehbaz). However, Mulligan (1974) showed that the type of the name *D. oblongata* belongs to a white-flowered species with minute stellate hairs, with affinities to *D. cinerea* Adams, and that this name replaces the later-published *D. groenlandica* E. Ekman (Ekman, 1930). Mulligan (1974) also identified the holotype of *D. micropetala* (Canada, Nunavut: Igloolik Island, Parry s.n. [K]). We have inspected this type and confirm Mulligan's conclusion. *Draba pauciflora* was also described from Canada (Nunavut, Bylot Island), but its type, which should be at K, was not found when looked for in the 1990s and again in 2006. The name may need to be re-typified, although its application has not been ambiguous.

Both *Draba micropetala* and *D. pauciflora* are distributed in Canada (Nunavut, Northwest Territories), Greenland, northern Norway, and Russia (Arctic Russia, Siberia, and Far East), and both also occur rarely in northern Alaska; they exhibit some variation throughout their vast distributional range. However, during the revision by one of us (Elven) of *Draba* at CAN and DAO in 2003 for the *Flora of the Canadian Arctic Archipelago* (Aiken et al., 2007), it became clear that only a part of the material of the complex fits well into the two species. The larger part differed from both species in several characters, especially flower size (see below), that justify recognition of a new species: *D. simmonsii*. Plants of the new species

have been recognized previously as different, but have been misunderstood. Simmons (1906: 83, pl. 6, fig. 1–3) described and illustrated the taxon from Ellesmere Island as a new variety, *D. alpina* L. var. *gracilescens* Simmons, and deposited numerous vouchers at O and elsewhere. That variety was maintained by Schulz (1927). Porsild (1955: 127–129, pl. XVII) presented a good description of this entity, with illustration, but under the name *D. oblongata*. As this was the first comprehensive description made under this name, it served for the misapplication of this name in later works.

Draba simmonsii Elven & Al-Shehbaz, nom. et stat. nov. Replaced name: *Draba alpina* L. var. *gracilescens* Simmons, Vasc. Pl. Ellesmereland 83. 1906. TYPE: Canada. Ellesmere Island: Goose Fiord, 76°29'N, 88°40'W, 20 July 1901, Herman G. Simmons 2888 (lectotype, designated here, O; isotype, O). Figure 1.

Herba perennis scaposa, (1.5–)3–11(–13) cm alta. Folia basalia rosulata, oblonga vel oblongo-lanceolata, 5–16 × 2–5 mm, ciliata, pilis, simplicibus ad 1 mm longis et subdendritis minoribus praeditis; folia caulina nulla. Racemi ebracteati, (2)4– ad 10(14)-flori, rhachidibus rectis; pedicelli fructiferi 2.5–10 mm longi. Sepala oblonga, (2.5–)2.8–3.5(–3.8) mm longa; petala pallide flava, anguste obovata, emarginata, (3.5–)3.8–5.5(–5.8) × (2.5–)2.8–4(–4.6) mm. Fructus lanceolati, 5.5–9(–11) × 2.3–3.8 mm, compressi, pilis simplicibus; stylo 0.1–0.3 mm longo; ovula 16 ad 24(28). Semina oblongo-ovata, 1–1.3 × 0.7–0.8 mm.

Perennial herb, scapose; caudex few- to many-branched, with persistent remains of leaf bases and petioles; stems (1.5–)3–11(–13) cm, simple, pubescent throughout with stalked, 2- to 4-rayed and fewer simple trichomes, 0.1–0.3(–0.6) mm, sometimes sparsely pubescent distally. Basal leaves rosulate, not imbricate, oblong to oblong-lanceolate, 5–16 × 2–5 mm, entire, subacute to obtuse; abaxial surfaces pubescent with a mixture of simple and stalked, 2- to 4(to 6)-rayed, stellate to subdendritic trichomes, rarely glabrous; adaxial surfaces glabrous or pubescent; petiole base somewhat thickened, persistent, margin ciliate with simple trichomes 0.5–1 mm; cauline leaves absent. Racemes ebracteate, (2)4- to 10(14)-flowered, slightly elongating in fruit; rachis pubescent as stem, straight; lowermost fruiting pedicels 2.5–10 mm, divaricate, straight, pubescent as stem. Flowers: sepals oblong, (2.5–)2.8–3.5(–3.8) mm, purplish green, with simple and sometimes fewer, short-stalked, 2-rayed trichomes; petals pale yellow, narrowly obovate, emarginate, (3.5–)3.8–5.5(–5.8) × (2.5–)2.8–4(–4.6) mm, with non-parallel sides; stamens 2–3 mm; anthers ovate, ca. 0.5 mm. Fruits lanceolate, 5.5–9(–11) × 2.3–3.8 mm, slightly flat-

tened, not twisted, pubescent with simple and sometimes fewer, 2-rayed trichomes, 0.1–0.3 mm; style 0.1–0.3 mm; stigma as wide as style; ovules and seeds 16 to 24(to 28) per fruit; seeds oblong-ovate, flattened, dark brown, 1–1.3 × 0.7–0.8 mm, wingless.

Distribution and IUCN Red List category. *Draba simmonsii* is widespread in the Canadian Arctic Archipelago, having been recorded from all major islands from Ellesmere, Devon, and Baffin islands, westward to Victoria, Banks, and Prince Patrick islands. In the Canadian arctic islands, this species constitutes more than one third of the total collections of the *D. micropetala* complex, giving *D. simmonsii* an IUCN conservation status of Least Concern (LC) (IUCN, 2001). It is uncertain whether the species occurs outside the Canadian Arctic Archipelago and western Greenland. We have seen no specimens of *D. simmonsii* from Yukon Territory, Alaska, or Eurasia. Its northernmost occurrence on the Canadian mainland is from Cape Bathurst, east of the Mackenzie River. All three species of the *D. micropetala* complex (*D. micropetala*, *D. pauciflora*, *D. simmonsii*) appear to be exclusively arctic; we are not aware of any reports from south of the arctic forest line.

Habitat. *Draba simmonsii* occurs mostly on dry, open ground with sparse or open vegetation or on open patches in fresh to dry closed meadow or heath vegetation. The substrate varies from gravel to silt. It is also found on outwash plains but never in very wet sites. Several sites are known on upper (non-saline) parts of shores. Most sites have circumneutral to basic substrates and, like *D. micropetala*, *D. simmonsii* seems to be largely absent from regions with acidic substrates (e.g., most of Baffin Island). Snow cover is probably scarce to moderate, and it is among the earliest-flowering *Draba* species (Elven, pers. obs.). Nearly all collections are past anthesis, even though several have been collected in early July in the High Arctic (Ellesmere Island). In its ecological preferences, *D. simmonsii* resembles *D. micropetala*; *D. pauciflora* mostly occurs in different sites: moist to wet, mossy, and cold, often with permanent or frequent seepage and well snow-covered. *Draba simmonsii* is slightly more frequent than *D. micropetala* and *D. pauciflora* in regions with acidic substrates. The differences in habitats between the three species are more pronounced in the southern and middle parts of the Arctic; in the climatic Polar Desert they occur together in patches of vascular plant vegetation.

Phenology. Flowering late June through July; fruiting mid-July to August.

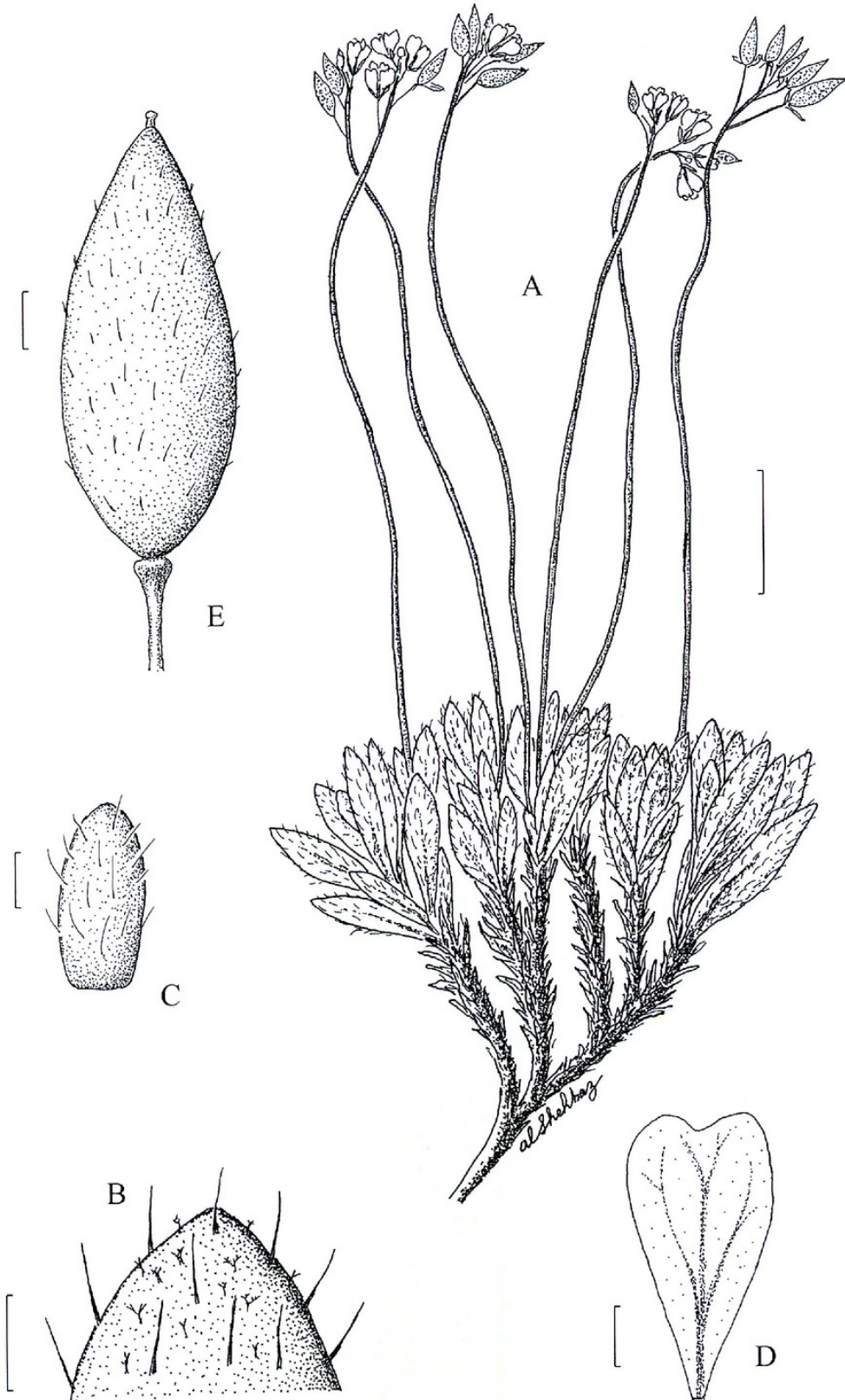


Figure 1. *Draba simmonsii* Elven & Al-Shehbaz. —A. Plant. —B. Abaxial side at leaf apex. —C. Sepal. —D. Petal. —E. Fruit. Drawn by Ihsan A. Al-Shehbaz from the holotype, *Simmons 2888* (O). Scale bars: A = 1 cm; B = 5 mm; C–E = 1 mm.

Discussion. *Draba simmonsii* is named in honor of Herman Georg Simmons (1866–1943), who collected it extensively on Ellesmere Island and recognized it as *D. alpina* var. *gracilescens* (Simmons, 1906). It was

previously confused with *D. micropetala* and *D. pauciflora*, but can be readily distinguished from these by having narrowly obovate (vs. narrowly oblanceolate), distinctly larger ([3.5–]3.8–5.5[–5.8]

$\times [2.5-]2.8-4[-4.6]$ mm vs. $2-3 \times 0.7-1.5$ mm), pale yellow petals with non-parallel (vs. parallel) margins; longer sepals ($[2.5-]2.8-3.5[-3.8]$ mm vs. $1.8-2.5$ mm long); lanceolate (vs. obovate-oblong [*D. pauciflora*] or elliptic to elliptic-ovate [*D. micropetala*]) fruits; and primarily simple and subdendritic (vs. forked or stellate with some simple) trichomes on the subapical abaxial leaf surface. From *D. micropetala*, *D. simmonsii* also differs by having straight (vs. flexuous) rachis of infructescence, purplish green (vs. green) sepals, oblong to oblong-lanceolate (vs. obovate to oblanceolate) leaves, and slightly broader seeds ($0.7-0.8$ mm vs. $0.5-0.6$ mm wide). From *D. pauciflora*, the new species also differs by having an elongating (vs. non-elongating) infructescence, fruits widest at or below (vs. above) middle, and pale yellow (vs. pale reddish yellow) petals (see key).

Simmons (1906: 85) listed 16 collections, all at O, under *Draba alpina* var. *gracilescens*, of which two were cited as the types: "Goose Fjord, below the Falcon Cliff (2888, 4007, type specimens of the description)." The two sheets of *Simmons 2888* have flowers and fruits, whereas the single sheet of *Simmons 4007* is fragmentary. The designation herein of *Simmons 2888* as the lectotype of both *D. simmonsii* and var. *gracilescens* would ensure that the two names remain together.

Paratypes. CANADA. **Nunavut:** Axel Heiberg Island, above Bukken River headwaters, $80^{\circ}31'N$, $92^{\circ}3'W$, L. J. Gillespie, L. R. Consaul & R. Soreng 6605 (O); Port Hendrigan, Beschel 12822 (CAN); Flag Hill, vic. of Upper House, M. Kuc 325 (CAN). Baffin Island, Erik Harbour, $72^{\circ}40'N$, $76^{\circ}30'W$, B. Boivin 1948 (DAO). Bathurst Island, Stuart River Valley, $76^{\circ}14'N$, $99^{\circ}08'W$, W. Blake 47i (DAO); Bracebridge Inlet, $75^{\circ}09'N$, $99^{\circ}44'W$, J. S. Tener & C. R. Harington 47 (CAN). Cornwallis Island, Resolute Bay, $1/4$ mi. W of Weather Station, H. B. Collins 148 (CAN). Devon Island, SE side of Crocker Bay, $74^{\circ}32'N$, $82^{\circ}47'W$, R. Elven 3351/99 (ALA, O), R. Elven 3152/99 (O), R. Elven 3275/99 (O). Victoria Island, Cambridge Bay, J. A. Calder, D. B. O. Savile & I. Kukkonen 24211B (DAO). Ellesmere Island, betw. Muskox Fiord & Baad Fiord, $76^{\circ}30-31'N$, $86^{\circ}46'W$, R. Elven 3073b (ALA, O), R. Elven 3095/99 (O), R. Elven 3115/99 (ALA, O), R. Elven 3131b/99 (O); near Cape Violet, H. G. Simmons 1742 (O); Goose Fiord, Gallow Point, H. G. Simmons 4209 (O); Hayes Sound, Eskimopolis, H. G. Simmons 846 (O); Goose Fiord, near Ptarmigan Gorge, $76^{\circ}48'N$, $88^{\circ}40'W$, H. G. Simmons 4210 (O); Fram Harbor, H. G. Simmons 1205 (O), same area, H. G. Simmons 1096 (O). Bedford Pim Island, $78^{\circ}4'N$, $74^{\circ}50'W$, East Ellesmere Island, H. G. Simmons 4187, 4192 (O); Ekblaw Lake, $81^{\circ}37'N$, $75^{\circ}30'W$, D. F. Murray & B. A. Yurtsev 10295 (ALA). Skräling Island, Alexandra Fiord, E Ellesmere Island, $78^{\circ}53'N$, $75^{\circ}50'W$, H. G. Simmons 4196 (O); Ravine Bay, S. D. MacDonald 37 (CAN); Eureka, $80^{\circ}03'N$, $85^{\circ}31'W$, P. F. Bruggemann 566 (DAO); vic. of Lake Hazen, E side of Gilman Glacier, $81^{\circ}45'-82^{\circ}10'N$, $68^{\circ}30'-72^{\circ}45'W$, J. M. Powell 698 (CAN). Ellef Ringnes Island, W side of Reindeer Peninsula, $78^{\circ}55'N$, $104^{\circ}38'W$, R. Elven 3002/99 (O), R. Elven 3040/99 (ALA, O); Isachsen, $78^{\circ}47'N$, $103^{\circ}33'W$, D. B. O. Savile 4231 (DAO). Anderson River area, Cape

Bathurst, $70^{\circ}29'N$, $127^{\circ}48'W$, R. Elven 2401/99 (ALA, O). King Christian Island, 12 km W of Cape Abernathy, $77^{\circ}45'N$, $101^{\circ}25'W$, E. H. Hamilton T654 (DAO). Melville Island, NE of head of Beverley Inlet, $75^{\circ}06'N$, $107^{\circ}38'W$, R. Elven 2965/99 (ALA, O); Murray Inlet, $75^{\circ}28'N$, $113^{\circ}09'W$, S. A. Edlund 337 (CAN); E Kitson River, $76^{\circ}02'N$, $113^{\circ}05'W$, S. A. Edlund 42 (CAN). Banks Island, NE part of Parker River Valley, $73^{\circ}37'N$, $115^{\circ}51'W$, R. Elven 2722/99 (O), R. Elven 2779/99 (O). Prince Patrick Island, Mould Bay, $76^{\circ}17'N$, $118^{\circ}49'W$, P. F. Bruggemann 485 (DAO).

In the following key, we also include the morphologically distant *Draba oblongata* as its name has been misapplied for *D. simmonsii* and its relatives.

KEY TO THE SPECIES OF THE *DRABA MICROPETALA* COMPLEX

- 1a. Fruits densely pubescent with (2 to) 5- to 12-rayed trichomes; stigma considerably wider than style; petals white; cauline leaves 2, 1, or absent *D. oblongata*
- 1b. Fruits moderately to sparsely pubescent with a mixture of simple and 2-rayed trichomes; stigma about as wide as style; petals pale yellow or pale reddish yellow; cauline leaves absent.
 - 2a. Petals narrowly obovate, $(3.5-)-3.8-5.5(-5.8) \times (2.5-)-2.8-4(-4.6)$ mm, with non-parallel sides; sepals $(2.5-)-2.8-3.5(-3.8)$ mm; fruits lanceolate; subapical abaxial leaf surface with predominantly simple and some dendritic trichomes *D. simmonsii*
 - 2b. Petals narrowly spatulate to oblanceolate, $2-3 \times 0.7-1.5$ mm, with parallel sides; sepals $1.8-2.5$ mm; fruits obovate-oblong, elliptic, or elliptic-ovate; subapical abaxial leaf surface with forked, stellate, and some simple trichomes.
 - 3a. Leaves obtuse or rounded, with predominantly cruciform trichomes; infructescence rachis somewhat flexuous, elongating; petals pale yellow; fruits elliptic to elliptic-ovate *D. micropetala*
 - 3b. Leaves subacute, with simple or forked trichomes; infructescence rachis straight, not elongating; petals pale reddish yellow; fruits obovate-oblong. *D. pauciflora*

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