

## ***Parrya nauruaq* (Brassicaceae), a New Species from Alaska**

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*Parrya nauruaq* (Brassicaceae), a New Species from Alaska

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ABSTRACT. *Parrya nauruaq* Al-Shehbaz, J. R. Grant, R. Lipkin, D. F. Murray & C. L. Parker (Brassicaceae) is described from the Seward Peninsula of Alaska. It differs from the other North American species in *Parrya* R. Brown by its smaller flowers and fruits, and by its fewer seeds per fruit. A key to the four North American species of *Parrya* is provided.

*Key words:* Alaska, Brassicaceae, North America, *Parrya*.

*Parrya* R. Brown is a genus of 25 to 36 species, the majority of which are distributed in Central Asia and the Himalayas, with a minor representation in North America (Appel & Al-Shehbaz, 2003). It is a distinctive genus easily distinguished by its scapose habit, frequent presence of multicellular glands with multi-seriate stalks, accumbent cotyledons, winged seeds, ebracteate racemes, flattened replum, and latiseptate fruits (flattened parallel to the septum) not readily detached from the fruiting pedicel. *Parrya* was

reduced to a monotypic genus, with *P. arctica* R. Brown as the type, by Botschantzev (1972), who transferred almost all of the species to *Neuroloma* Andrzejewski ex DC. However, such delimitation is unwarranted based on molecular studies in progress by one of us (Grant).

There are four species of *Parrya* in North America, including the novelty described below. Of these, *P. arctica* is distributed in the Canadian Arctic islands of the Northwest Territories and Nunavut. Its major center of distribution falls between 93°–125°W and 67°–76°N (authors' compilation).

*Parrya nudicaulis* (L.) Regel was divided by Hultén (1971) into six subspecies, and its range was said to extend from the Canadian Arctic and Alaska into the Russian Far East, Siberia, Central Asia, China, and the Himalayas. However, molecular studies and a critical evaluation of morphology (Grant, unpublished data) indicate that the species appears to be restricted to Alaska, Canada (Yukon and Northwest

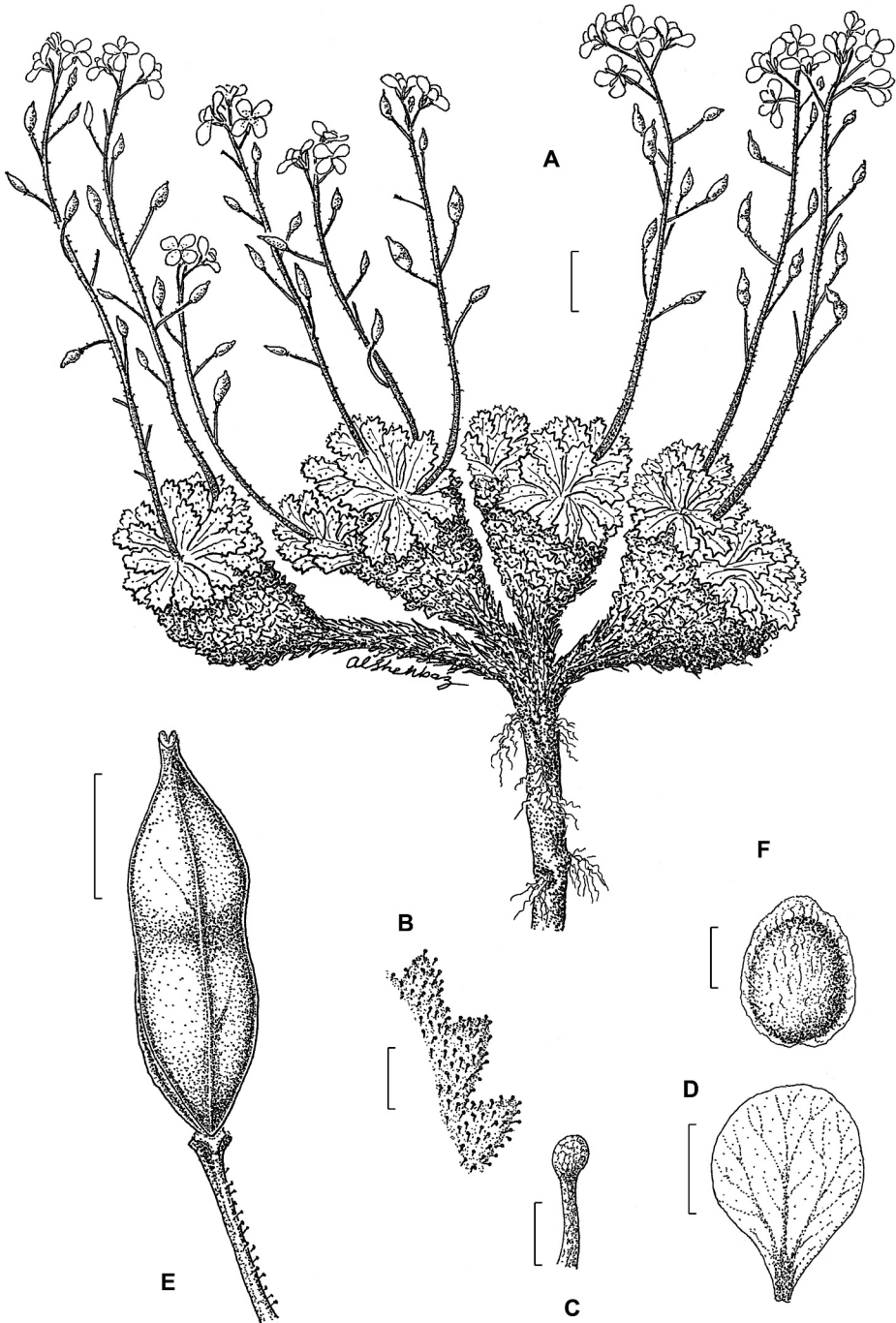


Figure 1. *Parrya nauruaq* Al-Shehbaz, J. R. Grant, R. Lipkin, D. F. Murray & C. L. Parker. —A. Plant. —B. Portion of leaf showing glands. —C. Gland. —D. Petal. —E. Fruit. —F. Seed. Scale bars: A = 1 cm; B = 1 mm; C = 0.1 mm; D = 2 mm; E, F = 5 mm. Drawn by Ihsan A. Al-Shehbaz: A–D from the isotype, *Parker, Lipkin & Meyers 15987* (MO); E, F from the paratype, *Parker & Beattie 15451* (MO).

Territories), and the Russian Far East. Specimens previously attributed to *P. nudicaulis* from the Himalayas (e.g., Tibet and India) and Central Asia represent at least three other species, necessitating a reconsideration of the species limits of *P. nudicaulis* s.l. in Asia.

The third species, *Parrya rydbergii* Botschantzev, is a narrow endemic restricted to the Uinta Mountains and Mount Emmons in Utah (Daggett, Duchesne, Summit, and Uintah Counties) and the Big Sheep and Beartooth Mountains in Wyoming (Park and Sublette Counties), U.S.A. It was reduced by Rollins (1993) to synonymy of *P. nudicaulis* and was treated by Hultén (1971) as a subspecies and by Holmgren (2005) as a variety of that species. However, the two species are geographically disjunct and can easily be distinguished morphologically (see key).

The fourth species, *Parrya nauruaq* Al-Shehbaz, J. R. Grant, R. Lipkin, D. F. Murray & C. L. Parker, which was first collected by Parker in July 1982 and subsequently by others (see below), is described herein as a new species.

Genus-wide molecular systematic studies on *Parrya* are in progress (Grant, in prep.). Preliminary results based on nuclear ribosomal internal transcribed spacer (ITS) and 5S non-transcribed spacer (5S-NTS) sequences of 14 species represented by some 90 samples (including nearly 40 of *P. nudicaulis* s. str.) indicate that the four North American species (*P. arctica*, *P. nauruaq*, *P. nudicaulis*, and *P. rydbergii*) are closely related and form a monophyletic group. Both *P. arctica* and *P. rydbergii* are phylogenetically distinct from *P. nudicaulis*, whereas *P. nauruaq* shows a closer relationship to *P. nudicaulis* (and secondarily to *P. arctica*, supporting the floral and leaf morphological differences between the species as indicated below).

***Parrya nauruaq*** Al-Shehbaz, J. R. Grant, R. Lipkin, D. F. Murray & C. L. Parker, sp. nov. TYPE: U.S.A. Alaska: Nome Quadrangle, Seward Peninsula, 12 km NNE of Cape Rodney, Moon Mtns., 64°44'06"N, 166°20'05"W, 15–100 m, 8 June 2005, C. L. Parker, R. Lipkin & C. R. Meyers 15987 (holotype, ALA; isotype, MO).

Herba perennis caespitosa, scaposa, glandulosa. Folia basalia obovata vel late spatulata, 0.6–1.5(–2) × 0.4–0.8(–1) cm, dentata vel subintegra. Racemi 6- ad 16-flori; pedicelli fructiferi divaricati-ascendentes, 0.5–0.9(–1.2) cm longi. Sepala ovata, 2.5–3.5(–4.1) × 1.2–1.7 mm; petala pallide violacea, atrovenerosa, obovata, 6–8(–9.1) × 3–5 mm, apice rotunda; ovula 6 ad 8. Fructus obovati vel oblongi, 0.8–1.4(–1.7) cm × 5–7 mm. Semina suborbicularia vel late ovata, 4–6 × 3.5–5 mm; ala 0.8–1.5 mm lata.

Plants densely caespitose, scapose perennial, moderately to densely glandular on leaves and scapes,

trichomes absent; caudex branched, densely covered with petiolar remains or leaves of previous years; stems 4–8 cm. Basal leaves rosulate; petiole 0.2–1 cm, 2–4 mm wide at base; leaf blade obovate to broadly spatulate, 0.6–1.5(–2) × 0.4–0.8(–1) cm, base cuneate, coarsely dentate to subentire, apex acute; cauline leaves absent. Racemes 6- to 16-flowered; fruiting pedicels divaricate-ascending, lowermost 0.5–0.9(–1.2) cm. Sepals ovate, 2.5–3.5(–4.1) × 1.2–1.7 mm, eglandular; petals pale violet with distinctly darker veins, broadly obovate, 6–8(–9.1) × 3–5 mm, apex rounded; claw 2–3.5 mm; median filaments 2.5–3 mm; anthers oblong, 0.9–1 mm. Fruits obovate to oblong, 0.8–1.4(–1.7) cm × 5–7 mm; valves with a prominent midvein, eglandular or sparsely glandular; style 0.2–1 mm; ovules and seeds 6 to 8 per fruit (rarely up to 4 seeds produced). Seeds suborbicular to broadly ovate, flattened, 4–6 × 3.5–5 mm, with a broad wing 0.8–1.5 mm wide.

*Etymology.* The specific epithet “*nauruaq*” means “flower,” “plant,” or literally, “something that grows” in Inupiaq, the language of the Inuit. It is a noun used in apposition and, therefore, is to be maintained according to Article 23.1 of the *International Code of Botanical Nomenclature* (McNeill et al., 2006).

*Parrya nauruaq* grows on floodplains and slopes with fine to gravel-sized, weathered carbonate rocks on nearly unvegetated landscape. By contrast, *P. nudicaulis*, which also occupies these general habitats, grows on slightly moister sites often with greater vegetation cover, though very rarely both species grow together in sites with extremely low plant cover. In addition, *P. nauruaq* has pale violet, distinctly smaller flowers (petals 6–8(–9.1) mm long with darker veins) and a musky fragrance, whereas *P. nudicaulis* has purplish, considerably larger flowers (petals 14–22 mm long with fainter veins) and a sweet fragrance. In the very few cases where the two species grew side by side, they were distinct and with no sign of intergrading. The two species can easily be distinguished from a distance by their habit. *Parrya nauruaq* is caespitose and with a thick woody caudex densely clothed in leaves of previous seasons, whereas *P. nudicaulis* is not caespitose and with a slender caudex often not clothed with leaf remains. The new species is readily separated from the other three North American *Parrya* species by the following key.

KEY TO THE NORTH AMERICAN SPECIES OF *PARRYA*

- 1a. Sepals 2.5–3.5(–4.1) mm long; petals 6–8(–9.1) mm long, apex often rounded; ovules and seeds 6 to 8 per fruit; fruit obovate to oblong-ovate, 0.8–1.4(–1.7) cm long . . . . . *P. nauruaq*

- 1b. Sepals (3)–4–8 mm long; petals (8)–10–22 mm long, apex emarginate; ovules and seeds 10 to 20 per fruit; fruit narrowly oblong to linear-lanceolate, (1)–1.5–5 cm long.
- 2a. Leaves linear to linear-oblancoate, 2–5 (–7) mm wide; sepals (3)–4–5 mm long; petals (8)–10–13 × 3–5 mm, claws 3.5–4.5 mm long; plants eglandular; ovules and seeds 14 to 20 per fruit . . . . . *P. arctica*
- 2b. Leaves obovate, spatulate, broadly oblanceolate, lanceolate, or oblong, (6)–10–28 mm wide; sepals 5–9 mm long; petals (14)–16–23 × 7–12 mm, claws 6–12 mm long; plants glandular or eglandular; ovules and seeds 10 to 16 per fruit.
- 3a. Leaves incised to coarsely dentate; lower fruiting pedicels 0.4–1.5(–2) cm long; plants densely glandular, very rarely eglandular, densely caespitose; filaments 4–6 mm long; Utah and Wyoming . . . . . *P. rydbergii*
- 3b. Leaves entire, minutely to coarsely dentate, rarely incised; lower fruiting pedicels (1)–1.5–4(–6) cm long; plants eglandular or glandular, not caespitose; filaments 6–10 mm long; Alaska, Northwest Territories, and Yukon . . . . . *P. nudicaulis*

Chromosome numbers were determined by Grant in Neuchâtel from floral buds fixed in the field in Carnoy's solution. Haploid counts ( $n = 7$ ) were obtained from pollen mother cells, and diploid counts ( $2n = 14$ ) were made from ovary tissues for both *Parrya nudicaulis* (voucher: *Parker 16029* at ALA) and *P. nauruaq* (voucher: *Parker 16001* at ALA). These chromosome counts are in agreement with previously published counts of *Parrya* (see Warwick & Al-Shehbaz, 2006).

*Paratypes.* U.S.A. **Alaska:** Nome Quadrangle (all from the Seward Peninsula): Moon Mtns., badlands habitat, 170 m, 30 June 1997, *D. F. Murray & R. Lipkin 12220* (ALA); 10 km NNE of Cape Rodney, low uplands N of Sinuk, 30 m, 19 Aug. 2003, *C. L. Parker & K. Beattie 15451* (ALA, MO); 12 km NNE of Cape Rodney, 30 m, 18 Aug. 2003, *Parker & Beattie 15404* (ALA, MO); 12 km NNE of Cape Rodney, Moon Mtns., 15–100 m, 7 June 2005, *Parker, Lipkin*

& *C. R. Meyers 15969* (ALA, MO); 9 km NE of Cape Rodney, Moon Mtns., 15–80 m, 9 June 2005, *Parker, Lipkin & Meyers 16001* (ALA, MO); 9 km NE of Cape Rodney, Moon Mtns., 15–80 m, 9 June 2005, *Parker, Lipkin & Meyers 16014* (ALA, MO); 12 km NNE of Cape Rodney, Moon Mtns., NW corner, 30–100 m, 10 June 2005, *Parker, Lipkin & Meyers 16030* (ALA, MO). Solomon Quadrangle: Council Rd., calcareous scree, 2 July 1982, *Parker 230* (ALA); Council Rd., bluffs above Salmon River, 22 June 1983, *S. Kelso 83-25* (ALA).

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