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ARABIS HIRSHBERGIAE (BRASSICACEAE), A NARROW ENDEMIC FROM THE CUYAMACA MOUNTAINS, SAN DIEGO COUNTY, CALIFORNIA

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ABSTRACT

A narrow endemic from the Cuyamaca Mountains of southern California is described as a new species, *Arabis hirshbergiae*. Closest relationships appear to be with *A. johnstonii* and *A. parishii*, also narrow endemics from the San Jacinto and San Bernardino Mountains respectively. All three species are associated with pebble plain habitats in montane areas characterized by relatively gentle relief compared with surrounding canyons and ridge systems.

Key words: *Arabis*, Brassicaceae, Peninsular Ranges, San Jacinto Mountains, San Bernardino Mountains, Cuyamaca Mountains, southern California, endemic, pebble plain.

The Cuyamaca Mountains, part of the Peninsular Ranges of southern California and northern Baja California, Mexico, are noted for their rich floristic diversity and wealth of endemic and variously rare and disjunct species (Hirshberg and Clemons 1996). In the spring of 1995, Jerilyn Hirshberg, long-time botanical explorer of the Cuyamaca Mountains, brought to my attention an unusual, low-growing *Arabis* with relatively large, showy flowers which she found in open areas east of Cuyamaca Lake. At the time, she suspected the *Arabis* in question might represent a disjunct population of *Arabis johnstonii* Munz, a narrow endemic of the San Jacinto Mountains some 80 km to the north. Upon cursory examination of overall habit, leaf shape, and flower size, as well as habitat, this determination seemed reasonable, and the name was applied to the specimen, although with some reservation. Unfortunately, the original specimen was in early anthesis and possessed but a few, immature fruit, making a more confident identification difficult. Subsequent collections with more mature siliques were made by Hirshberg from the same population later in the spring, and mature fruit and seeds were gathered in the early summer. From evaluation of the material thus available, I further questioned whether the Cuyamaca plants did indeed fit within the current circumscription of *A. johnstonii* (Rollins 1993). Upon re-examining the Cuyamaca plants and comparing them with various *Arabis* species, a suite of vegetative and floral characters was identified that readily separates these plants from other species in the genus, including the undoubtedly closely related *A. johnstonii,* and *A. parishii* S. Watson. Consequently, I propose here the recognition of a new species, *Arabis hirshbergiae.*

Arabis hirshbergiae S. Boyd, sp. nov. (Fig. 1).—Type: USA, California, San Diego County, Cuyamaca Mountains, east of Cuyamaca Reservoir along Sunrise Highway (S-1), 0.5 mi southeast of junction with Hwy 79, about 50 feet north of the road near the Pedro Fages Trail marker, near 33°00′N, 116°30′W, elev. ca. 1,400 meters, 19 Mar 1995, *Hirshberg s.n.* (holotype, RSA; isotype GH).

Arabis hirshbergiae differt a *A. johnstonii* Munz stylo breviore, gynophoro latiore, et petalis longioribus; a *A. parishii* S. Watson stylo breviore et crassiore, gynophoro distinctum, sepalis longioribus, petalis leviter longioribus, et seminibus late alatis; a specibus ambo pubi foliorum basalium et caulinum parce densa.

Perennial herb from a branched, woody caudex, *stems* erect to ascending, mostly unbranched, 5–15 cm tall, with moderately dense, short dendritic trichomes below, becoming sparse above; *basal leaves* gray-green, numerous, ascending, entire, linear-oblanceolate to spatulate, with obtuse apex, 1.5–2.5 mm long (including petiole), 1.5–3 mm wide, uniformly covered with short dendritic trichomes, but not dense and hoary, i.e., the epidermis readily visible below hairs; *cauline leaves* gray-green, entire, grading from linear-oblanceolate to linear to narrowly lanceolate and gradually reduced above, vestiture similar to basal leaves but generally less dense; *inflorescence* racemose, pedicels ascending, 3–5.5 mm long at anthesis, 8–14 mm in fruit, purplish mottled, with sparse dendritic hairs; *sepals* linear-oblong to linear-oblanceolate with rounded apex, rose-purple, 5.2–6.5 mm long, 1.5–2 mm wide, with sparse, white, dendritic trichomes abaxially; *petals* cuneate-oblanceolate with rounded apex, 12.8–14 mm long, blade 3.5–4 mm wide, uniform rose-purple with darker veins; *stamens* 6, didynamous, exerted,

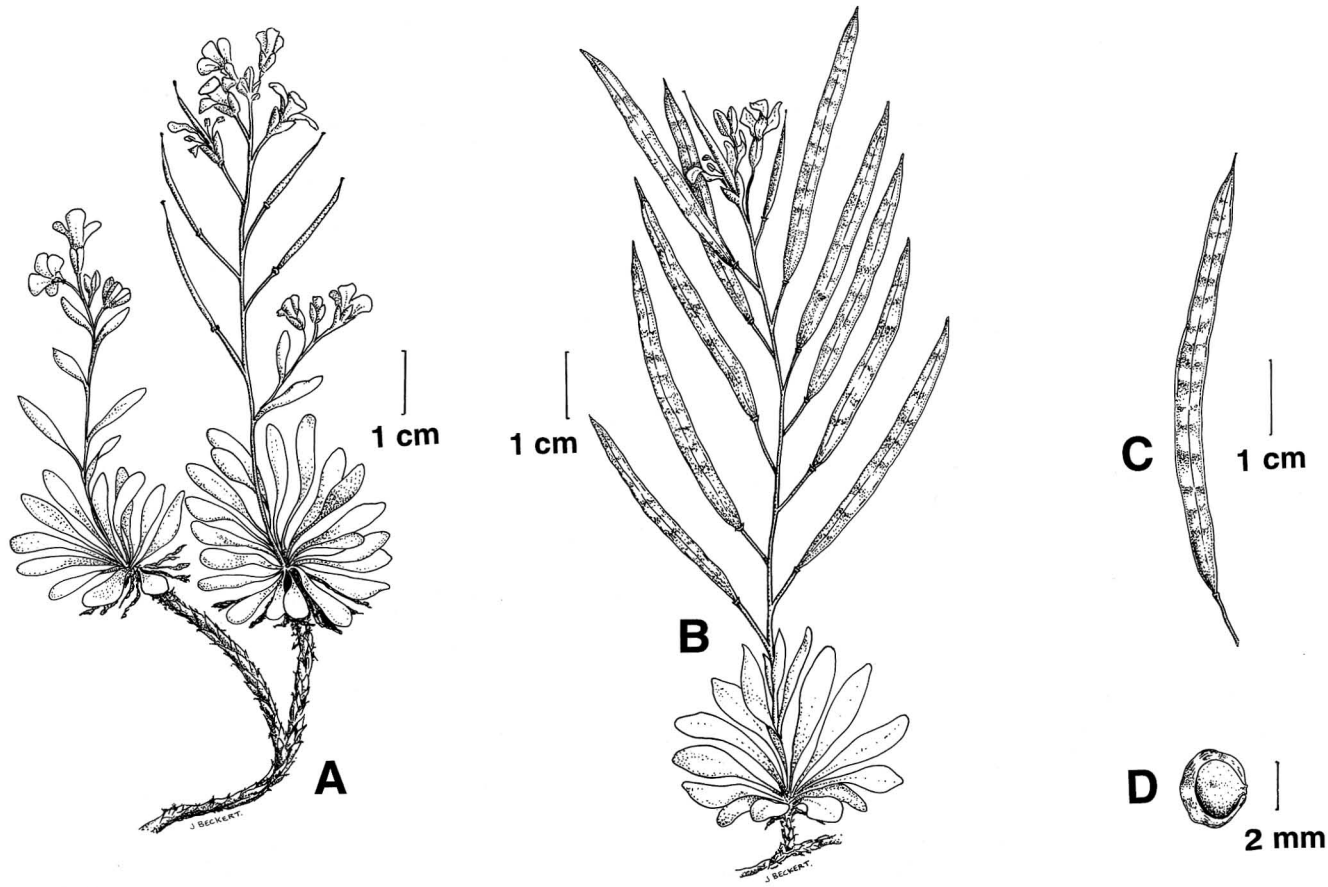

Fig. 1. *Arabis hirshbergiae;* A. habit of plant at anthesis, B. habit in fruit, C. detail of fruit, D. detail of seed.

filaments narrow, pale cream below, purplish above, ± equal, 6.1–6.5 mm long, anthers of paired stamens ca. 1.5 mm long, those of lateral stamens ca. 1.9 mm; *ovary* linear, glabrous, 8–10 mm long at anthesis, style 0.75–1 mm long; *fruit* a narrowly linear capsule, the valves flattened parallel to the hyaline partition, straight or slightly arcuate, ascending, 45–60 mm long, 3–4 mm wide, gynobase 0.5–0.75 mm long; *seeds* uniseriate, flat, round, broadly winged, 1.9–2.7 mm long, the wing ca. 0.4–0.8 mm wide.

Paratype.—[same locality as type], 24 Apr 1995, *Hirshberg s.n.* (RSA).

Arabis hirshbergiae appears most closely related to *A. johnstonii* and *A. parishii.* The general habit, basal leaf shape and size, and fruit morphology of *A. hirshbergiae* are similar to *A. johnstonii,* although differing in having longer and broader petals (12.8–14 mm long vs. 8–10 mm; 3.5–4 mm wide vs. 2–3 mm), a consistently shorter style (± 1 mm vs. 1–2 mm), shorter and broader gynophore, and broader silique valves (3–4 mm vs. 2–3 mm). In its showy flowers, *A. hirshbergiae* is more similar to *A. parishii,* although its petals are slightly longer (12.8–14 mm vs. 8–13 mm), the sepals considerably longer (5.2–6.5 mm vs. 3–4 mm long), the leaves broader, silique longer (45–60 mm vs. 10–20 mm), and broader (3–4 mm vs. 2–3 mm), with seeds broadly winged (vs. wingless or narrowly winged). The most striking difference between these two taxa, however, is the long-filiform style of *A. parishii* (4–8 mm), which is exceptional in the genus.

Arabis parishii and *A. johnstonii* are narrowly endemic plants with edaphically correlated distributions. *Arabis parishii* is restricted to the San Bernardino Mountains, where it is associated with both carbonate rocks and an unusual edaphic situation referred to as pebble plain habitat (Derby and Wilson 1978; Krantz 1990; Skinner and Pavlik 1994). *Arabis johnstonii* is restricted to the San Jacinto Mountains, also in association with pebble plain habitats. Therefore, it is of considerable interest that *A. hirshbergiae* is also associated with a pebble plain formation.

In the San Bernardino Mountains, where best developed, pebble plains are associated with regions of relatively gentle topography surrounded by steep-sided canyons and ridge systems (e.g., Bear Valley, Baldwin Lake, Holcomb Valley, etc.). These edaphic features represent lenses of cobbley or gravelly clay soils containing quartzite and other native rocks which are subjected to frost heave in the winter and intense heat from solar radiation in the summer (Krantz 1990). As a consequence, trees and shrubs are sparse or absent, but a rich assemblage of annuals, geophytes, and al-

pinelike caespitose perennials are present (Derby and Wilson 1978). In the San Jacinto Mountains, pebble plain habitat is also associated with an area of relatively gentle relief centered about Garner Valley (a.k.a. Hemet Valley). In the Cuyamaca Mountains, Hirshberg (pers. comm.) reports pebble plain habitat east of Cuyamaca Lake where cobbles and gravel of gabbro and quartzite have weathered to a vernally saturated clay. The vicinity about Cuyamaca Lake is also a region of relatively gentle relief, comparable physiographically to the Bear Valley region of the San Bernardino Mountains and Garner Valley of the San Jacinto Mountains. All of these pebble plain areas are noted for their concentration of endemic, disjunct, and relictual plants (Derby and Wilson 1978; Krantz 1990).

Arabis hirshbergiae, A. johnstonii, and *A. parishii* likely share a common ancestor, perhaps a more alpine-adapted species, that had a broader distribution during the Pleistocene. Subsequent warming at the end of the last Ice Age, or earlier interglacial times, and the concomitant retreat of alpine flora northward and higher in elevation may have left isolated populations of this progenitor in patches of habitat that, through high ambient solar radiation and physical properties of the soil, favors those plants possessing both the cold and drought tolerance associated with alpine species. Divergence due to geographical isolation could have subsequently resulted in the morphological variation we observe today.

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LITERATURE CITED

Derby J. A, and R. C. Wilson. 1978. Floristics of pavement plains of the San Bernardino Mountains. *Aliso* **9**: 374–378

Hirshberg, J., and D. Clemons. 1996. Vascular plants of the Cuyamaca and Laguna Mountains, California. *Phytologia* **81**: 69–102.

Krantz, T. 1990. A guide to the rare and unusual wildflowers of the Big Bear Valley Preserve. Friends of the Big Bear Valley Preserve, Big Bear, CA. 30 p.

Rollins, R. C. 1993. The Cruciferae of continental North America: systematics of the mustard family from the Arctic to Panama. Stanford University Press, Stanford, CA. 976 p.

Skinner, M. W., and B. M. Pavlik (eds.). 1994. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publ. No. 1, 5th ed. CNPS, Sacramento, CA.