



FIG. 1. *Dudleya delgadilloi*. (A) Left to right: inflorescence in flower, rosettes cut from larger plant, and inflorescence in bud. (B) Small, young plant with rosettes viewed from above. Illustrations by Cara Wilcox.

Rose, and *D. greenei* Rose. Yost et al. (2013) did have *D. candida* weakly supported as close to the other three taxa mentioned in that clade.

TAXONOMY

Dudleya delgadilloi S.McCabe, sp. nov. (Figs. 1, 2 A–C). —TYPE: MEXICO, Baja California, Isla Cedros, on ridge on north side of the island, facing west. Associates: *Agave sebastiana* Greene, *Dudleya pachyphytum* Moran & M.Benedict, *Euphorbia misera* Benth., *Ferocactus chrysacanthus* (Orcutt) Britton & Rose, *Dudleya acuminata* Rose, *Cochemia pondii* (Greene) Walton, *Mammillaria goodrichii* Engelm., *Mammillaria brandegeei* (J.M.Coult.) K.Brandege, *Perityle emoryi* Torr., *Rhus lentii* Kellogg, and numerous lichen species. 500 m elevation, 28°21.298', -115°13.577' ± 5m, 31 March 2015, McCabe #1288.28 & Thomas Mulroy, *Sula Vanderplank* (holotype: UC).

Paratypes: Mexico, Baja California, Isla Cedros, same locality as above, originally collected by C. Matt Guilliams, his #2973 on 21 March 2016, plants of the same collection ex hort 23 July 2019, McCabe

#1395, 1396, 1397 (all three at SBBG). Same locality, originally collected by C. Matt Guilliams #2973 on 21 March 2016, ex hort 30 June 2019, McCabe #1387 (SBBG). Mexico, Baja California, Isla Cedros, same locality as above, originally collected by C. Matt Guilliams #2973 on 21 March 2016, ex hort 9 July 2018.

Diagnosis: *Dudleya delgadilloi* has smaller, narrower, more pointed leaves and nodding inflorescences in bud (Fig. 1, 2) than the similar *D. albiflora* (Fig. 2 D, E). The *D. albiflora* usually have more upright nascent inflorescences though the individual inflorescence branches (cincinni) may be recurved (Table 1). With its upright petals, *D. delgadilloi* differs from *D. anomala* (Davidson) Moran, which is larger and has campanulate flowers with ascending petals (Fig. 2 F).

Plants very densely branched, too caespitously branched to see stem between old leaves, low, succulent, to about 30 cm across, rarely epiphytic on *Mammillaria* and other taxa. **Rosettes** as many as 250 per plant, including dead rosettes, mostly 2–3 cm wide [1.2–3.9 cm wide, to 6 or 8 cm wide in cultivation]. **Stem** above ground, 8–10 mm diam., to 15 cm in length, bark where older leaves have

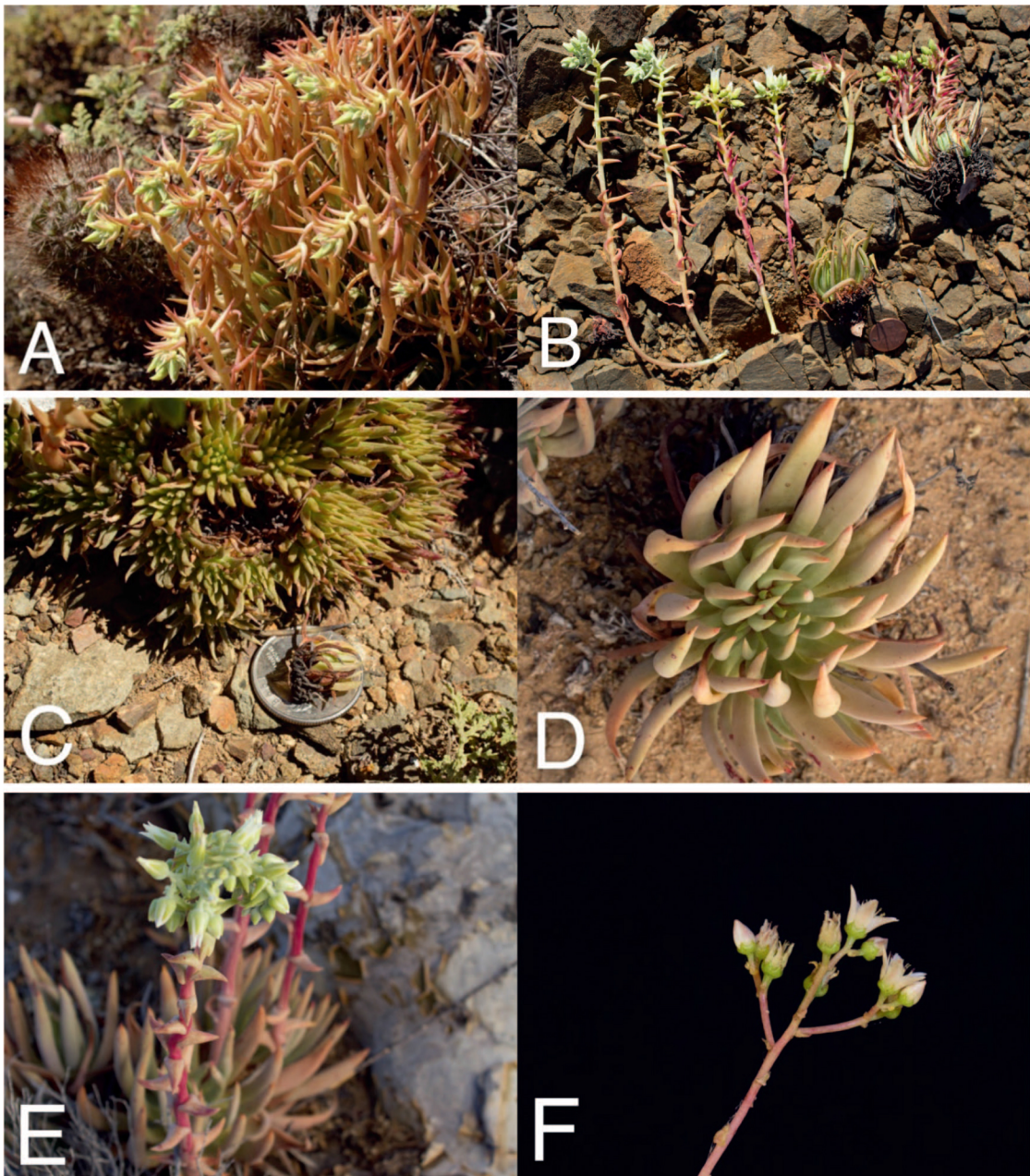


FIG. 2. *Dudleya delgadilloi* (A–C) and other species for comparison. (A) *Dudleya delgadilloi* showing inflorescence morphology in bud. (B) Showing inflorescences in various stages of development, including characteristic nodding apex, slightly upturned at the very apex in the fifth inflorescence from the left. (C) Typical caespitose branching habitat and US quarter for size comparison to a single rosette. (D) *Dudleya albiflora* from the mainland off of Careterra Federal 1 (Federal Highway No. 1) along the road to Misión San Borja. Showing leaves sub-terete and more waxy, less lime-green, than leaves in *D. delgadilloi*. (E) *D. albiflora*. Same location on the mainland, showing nascent inflorescences. (F) Campanulate flower of *D. anomala*. All photos by the author.

fallen off—rusty-brown (reddish-brown), when cut, not wounding or slightly wounding orange, apex not depressed (viewed in longitudinal section). **Leaves** 3 [to rarely 8] mm wide \times 12–17 [–36] mm long, 2–3 mm thick, usually about 30–50 per rosette, evergreen, leaf

bases not buried in soil, succulent, \pm circular in cross-section, linear, erect, straight or curved, rarely waxy, but if waxy, very lightly so, lime-green with some red distally in brighter situations, aging rusty-brown, erect, curving upward, very slightly sticky, apex

TABLE 1. MORPHOLOGICAL COMPARISON OF *D. DELGADILLOI*, *D. ALBIFLORA*, AND *D. ANOMALA*. Some data for *D. albiflora* and *D. anomala* from Moran (1951).

	<i>delgadilloi</i>	<i>albiflora</i>	<i>anomala</i>
Petals (corolla lobes)	upright, white	upright, white	ascending, cream, sometimes with some pink
Petal tips	out-curved	slightly out-curved	slightly out-curved
Peduncle thickness (mm)	2 [-3]	2-4	1-4
# of leaves	30-50	10-25 [-35]	20-30 [15-40]
Leaf width (cm)	0.2-0.4 [-0.8]	0.5-1.5	0.5-1.0
Leaf length (cm)	1.0-1.7 [-3.6]	2-6	1.5-8
Stem diameter (cm)	0.6-1.0	1-2	0.5-1.5 [2]
Waxy	rarely waxy	waxy or not, often waxy	not at all waxy
Stickiness of leaves	not sticky or very slightly so, less sticky than in <i>D. anomala</i>	not sticky	slightly sticky
Leaf orientation	ascending to erect, often nearly erect	ascending to erect	spreading to erect
Amount of branching	extremely caespitose	barely to very caespitose	intermediate level of branching
Floral stem length (cm)	4.5-6.2	5-25	5-45
Inflorescence development	at first ascending to erect, but soon the upper portion of the inflorescence nodding in bud, then the terminal portion of the inflorescence beyond the bend turning up slightly, then entire inflorescence straightening to becoming ascending or erect.	ascending to erect, upper portion of inflorescence <u>not</u> nodding in bud followed by the terminal portion of the inflorescence beyond the bend turning up slightly	ascending to erect, upper portion of inflorescence <u>not</u> nodding in bud followed by the terminal portion of the inflorescence beyond the bend turning up slightly

attenuate, not angled by bud printing, easy to crush, margins rounded, no venation apparent macroscopically on the surface of the leaves, liquid produced by crushing leaves clear, tips not drying first or producing an abscission layer as in *D. edulis* (Nutt.) Moran. **Leaf bases** narrow, tightly attached, translucent, not wounding any color. **Dead leaves** yellowing to brown-rust to grey, short, persistent, curly, easily broken. **Inflorescence development:** At first ascending to erect, but soon the upper portion of the inflorescence nodding in bud, then the terminal portion of the inflorescence beyond the bend turning up slightly, then entire inflorescence straightening to becoming ascending or erect. **Inflorescence** cymose, 4.5-6.2 cm to first branch, 5.0-20.5 cm long, usually one terminal flower and 3-4 branches. **Peduncle** 2-3 mm in diameter, green to red-pink; peduncle and inflorescence often light white waxy; cincinni still coiled when first flower opens, very short and few-flowered, usually 5-18 flowers per inflorescence, bracts light white waxy. **Lower bracts** very crowded, narrow, 3-5 mm wide, 10-15 mm long, usually curving upwards, somewhat red, sometimes waxy, base of upper lower bracts less red, often lighter in color and waxy, bottom lower bracts usually drying by anthesis in the field. **Pedicels** 1-4 mm long. **Flowers:** **Sepals** green and most of them light white waxy; **Corolla** fused 2[-3]mm, corolla lobes twisted in bud—most easily seen from above; **Petals (corolla lobes)** 11 mm long, white, slightly keeled, keel slightly waxy, tips out-curved to 110°; **Stamen** filaments opaque, pale white; **Anthers** pre-dehiscent anthers

red, pollen yellow, i.e. dehiscent anthers yellow; **Gynoeceum** \pm 5 mm long, pistils white at anthesis; **Fruits** \pm erect, follicles, 5-6 mm long.

Distribution and Habitat

Dudleya delgadilloi is endemic to the island and is found on the ridge above La Mina, above Cañon de la Mina. On a west facing ridge, on a roughly 45° slope, below and north of some pines. The plants are within a few hundred meters of *Pinus radiata* var. *cedrosensis* (Howell) Axelrod [*Pinus muricata* var. *cedrosensis*]. The *Dudleya* are growing on rocks, in cracks in rock, and in rocky soil. Rarely, some plants were growing epiphytically upon other succulents. During three days of observations (30, 31, May 2014 and 31 March 2015), the wind and fog were blowing west to east, depositing fog moisture on the *D. delgadilloi* side of the ridge, but not noticeably on the east-facing leeward side of the ridge. However, there was some moisture deposition during the nights well down the east side of the island in Cañon de la Mina. See Oberbauer (1987) for more discussion of the fog and this habitat. Most plants of this taxon grow within 50 m of plants of *D. pachyphytum*. In some cases, the plants of the two taxa are touching. The habitat is succulent scrub with many *D. delgadilloi* plants distributed over two or more acres. There are numerous lichens associated with *D. delgadilloi*. Moran and Benedict (1981) describe the habitat outside of the pines as "open low maritime succulent

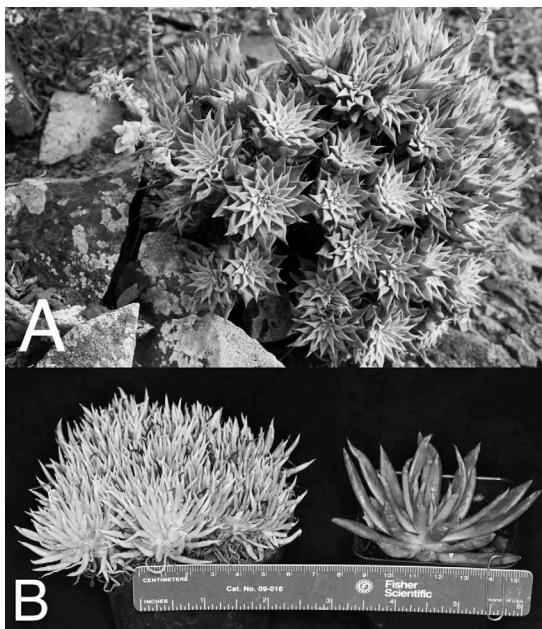


FIG. 3. Possible areas for further research. (A) Putative hybrid of *D. delgadilloi* and *D. acuminata*, which was growing near those two, as well as near *D. pachyphytum*, *D. albiflora*, and to convey a sense of location: *Pinus radiata* var. *cedrosensis*. (B) *Dudleya delgadilloi* seed planted 11 Dec. 2014 on the left and from seed planted 11 Jan. 2020 on the right, photographed 22 Jan. 2021. The older plants tend to have much narrower leaves and smaller rosettes.

desert scrub.” Oberbauer (1987) calls it the “Northern bluff succulent community.”

Possible future research and first year foliage. There are several plants with unusual and variable morphology that are geographically close to *D. delgadilloi*, *D. pachyphytum*, *D. albiflora*, and *D. acuminata* that may be hybrids (Fig. 3 A). The broad leaves of the putative hybrids suggest *D. acuminata* as one possible parent and the numerous short leaves suggest *D. delgadilloi* as another. However, the waxy nature of the leaves and the numerous leaves could be explained by some introgression with *D. albiflora*. These intermediates are exceptionally rare. Further research may help determine the parentage.

Plants of *D. delgadilloi* grown from seed in both Ben Lomond and Santa Cruz, CA had broader leaves the first year (3–8 mm) and narrower leaves (often 2 mm in six-year-old plants) in subsequent years (measured in this example on 17 January 2021 (Fig. 3 B). Apparently, what appears to be juvenile foliage is broader than mature foliage. In contrast, a somewhat similar species, a plant of *D. albiflora* collected by Ted Kipping on Isla Cedros in February 1986 and then grown in Santa Cruz for 30 years showed no tendency to exhibit the same morphological phenomenon. Plants having dramatically nar-

rower leaves after the first year have not been observed in other *Dudleya* taxa.

Etymology

The specific epithet, *delgadilloi* honors Dr. José Delgadillo Hernández, Profesor-Investigador and Director of the Herbarium at the Universidad Autónoma Baja California en Ensenada. Suggested common name: Delgadillo’s Liveforever. Delgadillo’s Siemprevive.

Phenology

Dudleya delgadilloi flowers in the wild in June and in cultivation June–July.