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Dudleya Cymosa Subsp. Costafolia (Crassulaceae), A New Subspecies from the Southern Sierra Nevada, Tulare County, California

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DUDLEYA CYMOSA SUBSP. COSTAFOLIA (CRASSULACEAE),
A NEW SUBSPECIES FROM THE SOUTHERN
SIERRA NEVADA, TULARE COUNTY, CALIFORNIA

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ABSTRACT

Dudleya cymosa subsp. costafolia, a new subspecies from the southern Sierra Nevada, Tulare County, California, is described and illustrated. Along with bright yellow flowers, the cespitose plant produces numerous, small rosettes with rib-shaped linear to linear-oblanceolate leaves, which are unique to the subspecies. The authors have searched numerous other rock outcrops, especially limestone, in the general area for additional plants with no success. Dudleya cymosa subsp. costafolia evidently is restricted to a solitary limestone outcrop north of the South Fork of the Middle Fork of the Tule River.

Key words: Dudleya, Crassulaceae, Sierra Nevada, taxonomy, plant ecology, endangered species.

INTRODUCTION

The second author, while searching in Tulare County in 1983 for range extensions of uncommon calciphiles (e.g., Cheilanthes cooperae D. C. Eat., Mimulus norrisii Heckard & Shevock, and Notholaena jonesii Maxon), discovered a yellow-flowered population of Dudleya cymosa (Lemaire) Britton & Rose with unusually narrow leaves and numerous, small, densely packed rosettes. Although we searched numerous rock outcrops, especially of limestone, in the Tule River area, only D. cymosa subsp. cymosa grew at these sites. As a result, D. cymosa subsp. costafolia appears to be restricted to the type locality, a southwest-facing limestone outcrop north of the South Fork of the Middle Fork of the Tule River and west of Pierpoint Springs Resort. Unfortunately, the type locality has been subdivided for mountain home development, which may threaten D. cymosa subsp. costafolia.

TAXONOMY

Dudleya cymosa (Lemaire) Britton & Rose subsp. costafolia Bartel & Shevock, subsp. nov.

Ab alis D. cymosa (Lem.) B. & R. subspeciebus rosulae foliis penanguste linearibus vel linear-oblanceolatus 2.5-7 mm latis, caudice sarppisse pluriramosa diversa.
Plants to 10 cm wide, consisting of 5–40 densely packed rosettes; caudex short, 1.5–2 cm thick, typically much-branched. Rosettes 1–5(-7) cm diam., of 7–15(-20) erect to ascending leaves; rosette leaves linear to sublinear to linear-oblan­ceolate, acute to acuminate, 1–7(-8) cm long, 2.5–7(-8) mm wide, 1.5–4 mm thick, glaucous to glaucescent in age, the adaxial surface usually plane to convex,
the margins rounded except towards base, which is 4.5–8 mm wide. Inflorescence obpyramidal, of 2–4 mostly ascending branches that rebranch 0–3 times producing cincinni 1–4 cm long with 2–7 flowers; floral stem erect, glaucous to glaucescent, 5–15(–20) cm long, 1.5–3.5 mm thick, naked in lower 1–7 cm; cauline leaves 5–20, ascending to spreading, triangular-lanceolate, acute to acuminate, the lowermost 4–30 mm long, 2–6 mm wide; pedicels erect, 2.5–9(–17) mm long, 1.2–1.5 mm diam. Flowers: calyx subtruncate to tapering below, 4–6 mm long, 4–6 mm wide, the sepals appressed, triangular-ovate, acute, 2–5 mm long, 2–4 mm wide, usually slightly glaucescent; corolla bright yellow, basally connate 1–3 mm, the petals erect, spreading apically, lanceolate to narrowly acute, 5–13(–17) mm long, 2–4 mm wide; filaments yellow, the epipetalous ones 3–5 mm long, adnate 1–3 mm, the antesepalous ones 3–7 mm long, adnate 1.5–4 mm, anthers yellow, 1–2 mm long; nectaries reniform, white to yellowish, 0.5–1 mm long; gynoecium 3–6 mm long, 2–3 mm in diameter, the carpels erect, appressed, tapering into styles 1–2 mm long; ovules 20–50 per carpel; seeds brown, 0.5–0.7 mm long, ≤0.2 mm wide, longitudinally striate. Chromosome number: n = 17.


DISTRIBUTION, ECOLOGY, AND PHENOLOGY

Dudleya cymosa subsp. costafolia evidently is restricted to the type locality, a pre-Cretaceous limestone outcrop surrounded by canyon live oak woodland and mixed evergreen chaparral. The lone population, which occurs on private land within the Sequoia National Forest, is north of the South Fork of the Middle Fork of the Tule River and west of Pierpoint Springs Resort. The subspecies flowers from May to early June. Plants growing with the dudleya on the xeric, southwest-facing outcrop include Arabis sparsiflora Nutt. var. arcuata (Nutt.) Rollins, Cercocarpus montanus Raf., Cheilanthes cooperae D. C. Eat., Fremontodendron californicum (Torr.) Coville, Galium aparine L., Keckiella breviflora (Lindl.) Straw subsp. giabrispala (Keck) Straw, Mentzelia lindleyi Torr. & Gray, Notholaena jonesii Maxon, Selaginella hanseni Hieron., Toxicodendron diversilobum (Torr. & Gray) Greene, and Yucca whipplei Torr. var. intermedia (Haines) J. M. Webber.

Such similarly vegetated limestone outcrops exist near the type locality, but searches of these sites failed to locate additional populations of the new subspecies. Though most occurrences of D. cymosa subsp. cymosa along the Middle Fork of the Tule River produce yellow-orange to red-orange flowers, one population of this dudleya growing on limestone west of the type locality of D. cymosa subsp. costafolia has yellow flowers [west of Moorehouse Creek, 21 May 1987, Bartel 1224 (CAS, RSA)]. However, this population produces the broad, oblong-oblan
celate rosette leaves (12–25 mm wide) typical of the common form of D. cymosa subsp. cymosa, which grows on a variety of substrates in the Tule River canyon. Given the rugged, nearly inaccessible quality of the terrain along the North and
South Forks of the Middle Fork Tule River, other colonies of *D. cymosa* subsp. *costafolia* may be found in the future.

A combination of floral and vegetative characters separate *Dudleya cymosa* subsp. *costafolia* from *D. calcicola* Bartel & Shevock, *D. abramsii* Rose, and other subspecies of *D. cymosa*. *Dudleya calcicola* produces pale yellow flowers versus the bright yellow flowers of *D. cymosa* subsp. *costafolia*. Moreover, the rosette leaves of the former dudleya differ in shape (oblong-lanceolate or tapering from base versus linear to linear-oblancoleolate) and typically are broader (3–13 mm versus 2.5–7 mm) than the new subspecies (Bartel and Shevock 1983). Similar differences exist between *D. abramsii* and *D. cymosa* subsp. *costafolia*. In addition, *D. abramsii* typically has petals with red striations on the keel and few-branched bifurcate inflorescences, unlike the new subspecies. The exceedingly narrow leaves and numerous, small, densely packed rosettes of *D. cymosa* subsp. *costafolia* distinguish it from the other subspecies of *D. cymosa*. Moreover, the floral stem of the new subspecies (≤15 cm) does not approach the maximum length reported for *D. cymosa* subsp. *cymosa* (25 cm, Moran 1960; 45 cm, Nakai 1987), including the populations from the Kaweah and Tule River watersheds. However, the similar glaucous leaf waxes and floral morphologies of the two dudleyas growing in the Tule River canyon suggest a close relationship.

Live plants of *D. cymosa* subsp. *costafolia* collected from the type locality in 1983 and 1986 continued to produce densely packed rosettes of generally linear-oblancoleolate leaves in cultivation. Because the subspecies resembles alpine “cushion” plants and can be easily grown from offsets and seed, *D. cymosa* subsp. *costafolia* may have some horticultural value. However, the only known population cannot tolerate collection to any significant degree. Consequently, we will distribute live material to California botanical gardens for cultivation and eventual public availability.

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**LITERATURE CITED**

