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A NEW VARIETY OF *CENTAURIUM NAMOPHILUM* (GENTIANACEAE)
FROM THE GREAT BASIN¹

C. Rose Broome²

ABSTRACT.— An expression of *Centaurium namophilum* (Gentianaceae), long confused with *C. exaltatum* in the Great Basin of the western United States, is described and designated as var. *nevadense*. It may be separated from the Death Valley region endemic, var. *namophilum*, by its broader leaves, its diffuse corymbose cyme, the ultimate peduncles that are longer than the flowers, its medium to deep rose pink corolla, and its stamens that equal or exceed the style and are only slightly exerted from the corolla-tube. The var. *nevadense* occurs from eastern California to western Utah, and from southeastern Oregon and adjacent Idaho south to the northern Mojave Desert of southeastern California. *Centaurium exaltatum* may be distinguished from the new variety by its broader, more elliptical leaves, dichotomous peduncles, paler pink or bluish and generally four-merous flowers, shorter and more blunt corolla lobes, and a thicker, more included style and stigma.

A phase of the Death Valley region endemic, *Centaurium namophilum* Reveal, Broome & Beatley (Gentianaceae), has been found growing around various desert springs and seeps in the Great Basin of east central California, Nevada, western Utah, southwestern Idaho, and southeastern Oregon. This variety often occurs in close sympatry with *C. exaltatum* (Griseb.) W. F. Wight ex Piper and has been confused with that species.

Centaurium namophilum Reveal, Broome & Beatley var. *nevadense* Broome, var. nov. A var. *namophilo* caulibus gracilioribus, ramificatione corymbosa diffusa ascendentiore, corollis brevioribus roseis, stylis quam staminibus vulgo brevioribus differt. Chromosomatum numerus $n=17$ de typus. Typus: NEVADA: Esmeralda Co.: Gap Springs, 2.8 miles southeast of intersection of Nevada Highway 3A and U.S. Highway 6, T.1N., R.36E., sec. 6, ca 4600 ft elev., 22 Aug 1978, Broome 2388. Holotype, CAS; isotypes, 18 duplicates to be distributed from MARY.

Margins of alkaline springs and seeps or graminoid meadows from Inyo and Mono Counties, California, eastward across central and northern Nevada to western Utah, and northward into southwestern Idaho and southeastern Oregon, mostly from 2200 to 6000 ft elevation. Flowering from late June to September (Figs. 1, 2).

ADDITIONAL COLLECTIONS SEEN.— CALIFORNIA: Inyo Co.: 4 mi N of Lone Pine along U.S. Hwy. 395 at alkali spring on E side of rd at S entrance to Alabama Hills Scenic Route just N of Alabama Gate, 15 Jul 1978, Broome *et al.* 2281 (CAS and 19 duplicates); Owens Valley, N of Lone Pine, just above Alabama Gates, 3700 ft, 22 Jul 1973, DeDecker 3300 (CAS, RSA); E side of Fish Slough, T.6S., R.33E., sec. 6, 4185 ft, 15 Jul 1976, DeDecker 4103 (DEDECKER); alkaline meadow between Mono Co. line and Laws, 19 Jul 1952, Ferris 12552 (CAS, DS, US); Teck (Texas?) Springs, Funeral Mts., Death Valley, 27 Apr 1935, Gilman 1416 (US); shores of Owens Lake, 3600 ft, 5 Jun 1906, Hall & Chandler 7326 (UC); alkali marsh, Fish Slough, 8.5 mi N of Bishop, 2 Sep 1949, Nobs & Smith 1789 (UC); Furnace Creek, 17 May 1915, Parish 10035 (UC); E side of Fish Slough, T.6S., R.33E., sec. 6, ca 4150 ft, 23 Jul 1976, Reveal 4580 (MARY and 4 duplicates). Mono Co.: Fish Slough, T.5N., R.33E., sec. 31, 15 Jul 1978, Broome *et al.* 2282 (MARY and 6 duplicates); Fish Slough, 1.9 mi N of BLM Springs, T.5N., R.33E., sec. 19, 15 Jul 1978, Broome *et al.* 2283 (CAS and 5 duplicates); E side of Fish Slough, T.5S., R.33E., sec. 31, 17 Jul 1978, Broome & Reveal 2284 (CAS and 17 duplicates); Fish Slough, BLM Springs, T.5S., R.33E., sec. 30, 4200 ft, 30 Sep 1974, DeDecker 3697 (CAS); Fish Slough,

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Fig. 1. *Centaurium nanophilum* var. *nevadense*. a,b, habits of two typical mature plants; c, top view of five-merous flower; d, mature capsule with persistent style; e, one valve of fruit showing the degree of placentar intrusion into locule and mature seeds within; f, four-merous flower in side view. (Illustration by Peggy K. Duke of the University of Maryland.)

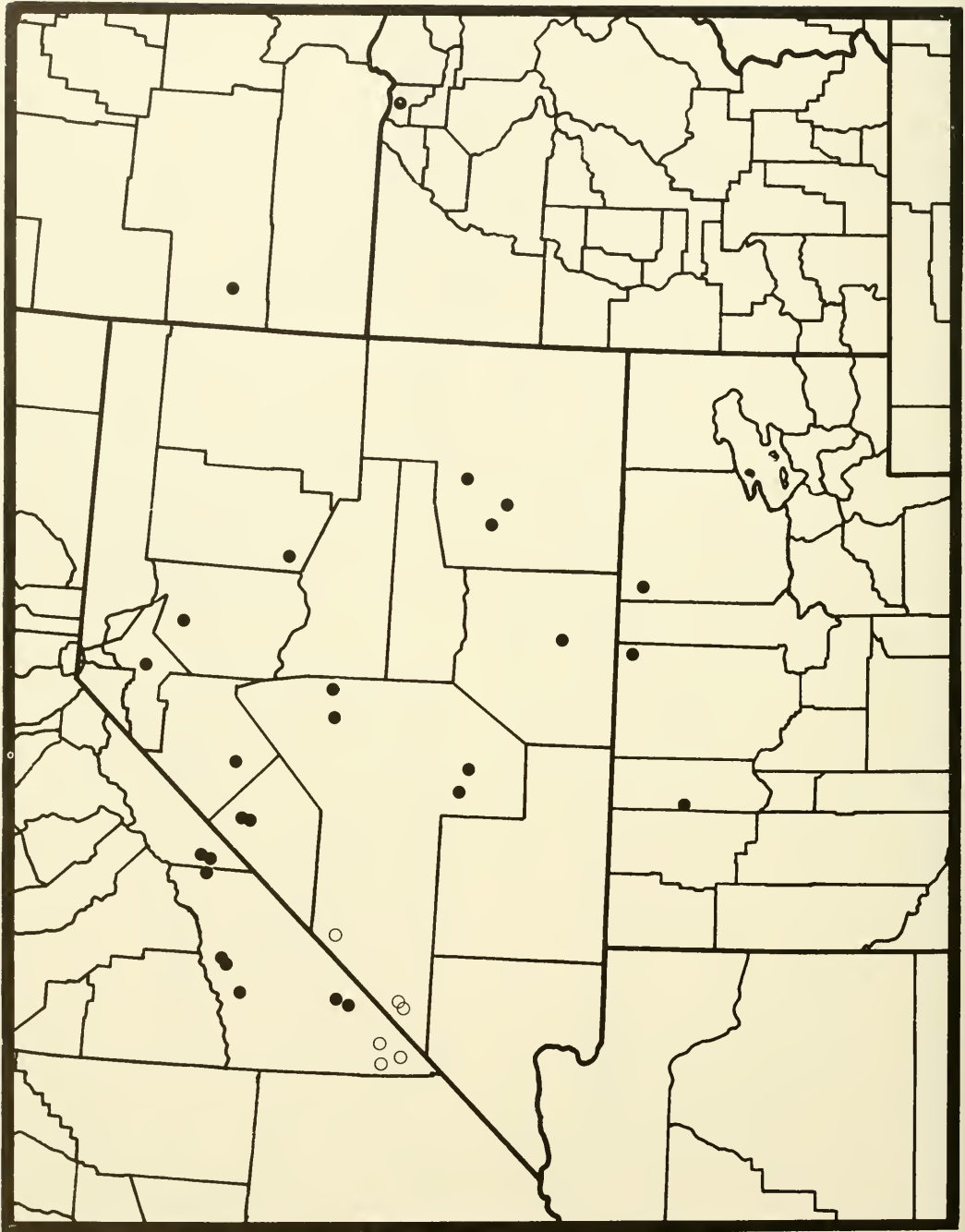


Fig. 2. Distribution of *Centaurium namophilum* var. *namophilum* (open circle) and var. *nevadense* (closed circle) in the western United States.

T.5S., R.33E., sec. 19, ca 4200 ft, 23 Jul 1976, *Reveal 4584* (MARY and 9 duplicates). IDAHO: County Unknown: Lewis' River (=Snake R.), 1834, *Nuttall s.n.* (BM, GH). Payette Co.: New Plymouth, 2200 ft, 1 Jul 1910, *MacBride 321* (UC). NEVADA: Churchill Co.: 6 mi N of Fallon, 6 Jul 1937, *Allen 284* (UC). Elko Co.: 0.2 mi W of Elko Poor Farm along Humboldt R., 9 Jun 1941, *Holmgren 1000* (UC); Ruby Valley, Sulphur Hot Springs, T.31N., R.59E., sec. 11, 6050 ft, 7 Jul 1969, *Holmgren & Kern 3663* (BRY, C, CAS, NY, RENO, WTU); Ruby Valley, 6000 ft, Aug 1865, *Watson 945* (GH); Ruby Valley, 12.9 mi SW of U.S. Hwy. 93 on Nev. Hwy 11, T.32N., R.60E., sec. 20, 31 Jul 1978, *Williams & Tiehm 78-267* (MARY); "Point," at edge of Ruby Lake Nat. Wildlife Ref., T.27N., R.58E., sec. 2, 18 Aug 1978, *Williams & Williams 78-318* (MARY). Esmeralda Co.: NE branch of Fish Lake Valley nr. Gap Springs, 5000 ft, 26 Sep 1938, *Archer 7251* (RENO, UC); nr. Gap Springs, T.1N., R.36E., sec. 5, 13 Aug 1978, *Reveal 4830* (MARY and 21 duplicates); Gap Springs, T.1N., R.36E., sec. 5, 13 Aug 1978, *Reveal 4831* (MARY and 23 duplicates); Gap Springs, T.1N., R.36E., sec. 5, 13 Aug 1978, *Reveal 4833* (MARY and 6 duplicates); Gap (Gap Springs?), 4000 ft, Jul 1886, *Shockley 531* (UC, W); Gap Springs, T.2N., R.36E., sec. 20, 3 Aug 1978, *Williams & Tiehm 78-301* (MARY). Lyon Co.: Wabuska Hot Springs, 0.5 mi N of Wabuska, T.15N., R.25E., sec. 16, 19 Aug 1978, *Broome 2375* (CAS and 23 duplicates); "boiling spring, Bent of Walker R." (=Wabuska Hot Spring), 1859, *H. Engelmann s.n.* (GH). Mineral Co.: Sodaville, 3 mi S of Mina along U.S. Hwy. 95, 22 Aug 1978, *Broome 2385* (CAS and 14 duplicates); Sodaville, 23 Aug 1978, *Broome 2386* (CAS and 4 duplicates); Sodaville, 4650 ft, 12 Aug 1978, *Reveal 4828* (MARY and 21 duplicates); Sodaville, 3 Aug 1978, *Williams & Tiehm 78-302* (MARY). Nye Co.: Smokey Valley, Darroughs Hot

Springs, T.11N., R.43E., sec. 7, 24 Jul 1978, *Goodrich 11909* and *11910* (MARY); Smokey Valley, T.14N., R.43E., sec. 34, 5450 ft, 7 Aug 1978, *Goodrich 12147* (MARY); Railroad Valley, Blue Eagle Spring, T.8N., R.57E., sec. 11, 4760 ft, 23 Jul 1980, *Tiehm & Williams 6193* (MARY); Hot Creek Springs, 8 mi WSW of Sunnyside, T.6N., R.61E., sec. 17, 5220 ft, 29 Aug 1980, *Welsh & Thorne 558* (MARY); Darroughs Hot Springs, T.11N., R.43E., sec. 29, 24 Jul 1978, *Williams & Williams 78-235* (MARY). Pershing Co.: Dixie Valley, Sou Hot Springs, T.26N., R.38E., sec. 29, 19 Jun 1978, *Broome et al. 2172* (CAS and 4 duplicates). White Pine Co.: Steptoe Valley, Monte Neva Hot Springs, T.21N., R.63E., sec. 24, 6050 ft, 28 Jun 1978, *Pinzl & Williams 1927* (MARY); Steptoe Valley, Monte Neva Hot Springs, T.21N., R.64E., sec. 22, 17 Jul 1979, *Thorne & Harrison 660* (BRY, MARY). OREGON: Harney Co.: shores of Borax (=Hot) Lake, T.37S., R.33E., sec. 14, 16 Aug 1978, *Broome 2366* (CAS and 15 duplicates); margin of Borax Lake, 28 Jun 1936, *Peck 19087* (WILLU, WTU). UTAH: Beaver Co.: Escalante Valley, 3 mi S of Thermo Siding, 14.5 mi WSW of Minersville, T.31S., R.12W., sec. 21, 5050 ft, 27 Aug 1980, *Welsh et al. 20136* (MARY); Millard Co.: 6.5 mi E of Gandy, S of Salt Marsh Lake, T.16S., R.18W., sec. 6, 4788 ft, 5 Sep 1976, *Welsh et al. 14512* (BRY). Tooele Co.: Six Mile Spring, 5 mi NW of Callao, T.10S., R.17W., sec. 9, 4800 ft, 20 Jul 1978, *Welsh et al. 17701* (BRY). County unknown: nr. Salt Lake City, 1901, *MeVicker s.n.* (UC).

The new variety differs from var. *namophilum* (Reveal et al., 1974) chiefly in the more ascending, corymbose branching, and the smaller, darker rose pink corollas that are mostly less than 17 mm long, and by having styles shorter than or scarcely exceeding the stamens at anthesis. The following key will serve to differentiate the varieties most of the time.

- A. Principal leaves usually linear and sharply recurved; inflorescence a paniculate cyme with a definite central axis, the main branches diverging at a 45 degree or greater angle; ultimate peduncles generally shorter than the flowers and thus the flowers congested at tips of the branches; corolla pale to medium pink, the corolla-lobes equaling or more than half as long as corolla-tube, the stamens well exerted from the corolla-tube and these exceeded by the style *C. namophilum* var. *namophilum*

- AA. Principal leaves lanceolate or narrowly oblong, ascending or merely outcurved; inflorescence a diffuse corymbose cyme with the main branches ascending at less than a 45 degree angle from the axis; ultimate peduncles usually longer than the flowers and thus the flowers not appearing congested at tips of the branches; corolla medium to deep rose pink, the corolla-lobes less than half as long as corolla-tube, the stamens only slightly exserted from corolla-tube and equaling or exceeding the style
 *C. namophilum* var. *nevadense*

Centaurium namophilum var. *namophilum* is endemic to a narrow desert valley about 45 miles long situated between the Greenwater Mountains on the west and the Resting Spring Range on the east (Fig. 2). The plant occurs from the vicinity of Beatty (Ripley & Barneby 3994, CAS) in southern Nye Co., Nevada, southward along the Amargosa River drainage to near Tecopa, Inyo Co., California. The California collections of this variety (Coville & Funston 275, US, from Resting Springs Valley in 1891; Kerr s.n., CAS, UC, from Shoshone in 1934; and Roos & Roos 4927, RSA, UC, US, from Tecopa in 1950) represent populations that may no longer be extant. The variety could not be located in 1978 despite a careful search of these sites.

About 33 miles west and slightly north of the type locality of var. *namophilum* (in Ash Meadows, Nye Co., Nevada) and across the Funeral-Greenwater mountain system, is the Furnace Creek area in Death Valley, Inyo Co., California. This is now the site of the Death Valley Museum and visitor's center. *Centaurium* apparently exists no longer in this site, but was formerly collected at Furnace Creek in 1915 (S. B. Parish 10035, UC) and at nearby Texas Spring in 1935 (Gilman 1416, US). These collections quite closely resemble the plants from Shoshone and Tecopa referred above to var. *namophilum*. However, they are of the short-styled form with shorter corolla-lobes, and are considered, somewhat arbitrarily, to belong to var. *nevadense*. They more closely resemble the populations of var. *nevadense* that occur some 60 miles west in Owens Valley, at elevations of 3500 ft and above, and other populations scattered through Nevada and adjacent states (Fig. 2), than they do var. *namophilum*.

The var. *nevadense* is the same as *Erythraea nuttallii* sensu Gray (1876) and Coville (1893). Gray accurately distinguished *E. nuttallii* from *E. douglasii* A. Gray (a superfluous name for *Centaurium exaltatum*)

and gave its range as "Nevada, as near as Ruby Valley, and in adjacent parts of Idaho and Utah."

Erythraea nuttallii S. Wats. (1871a) was based on several different elements. Watson referred Nuttall's manuscript names "*E. longiflora*," "*E. elata*," and "*E. tenella*" to this species. However, plate 29 that accompanied the protologue clearly is based on a collection from Carson City, Nevada, gathered by Charles L. Anderson (29), and is the only specimen cited by Watson other than his own 945. Watson did refer to his own Nevada locations (Unionville, Huntington, and Ruby Valley). I have examined the Anderson collection (GH) and the Nuttall specimens upon which the three unpublished names were based (BM, GH, PH). The Anderson specimen is nearly identical to the published figure (t. 29), whereas none of the Nuttall material bears much resemblance to the plate, nor does Watson 945. The Anderson collection, however, is clearly representative of *Centaurium exaltatum*. Because it served as the model for the plate and is not excluded by Watson's description, Anderson 29 (GH!) is hereby designated the lectotype of *E. nuttallii*, and thus that name becomes a taxonomic synonym of *C. exaltatum*.

As for the three Nuttall names mentioned by Watson (1871a), the collections on which they were based represent three discordant elements. Nuttall's "*E. longiflora*" is *Centaurium namophilum* var. *nevadense*; his "*E. elata*" is typical *C. exaltatum*; and his "*E. tenella*" is *C. floribundum* (Benth.) B. L. Robinson. These specimens were gathered by Nuttall on a trip across the Rocky Mountains with Nathaniel J. Wyeth in 1834 (Graustein 1967). "*Erythraea longiflora*" and "*E. elata*" were gathered along the "Lewis' River, R. Mts.," which now refers to the Snake River of southern Idaho and Oregon. His specimen of "*E. tenella*" was gathered from "Port Neff, Columbia River," which is a reference to the

Portneuf River, a tributary of the Snake River in eastern Idaho. Nuttall and Wyeth were there for several weeks in July 1834 while Wyeth was constructing Fort Hall, a trading post along the Snake River near the mouth of the Portneuf (Robertson 1963). Unfortunately, there is no direct information as to where, along the Lewis' River, Nuttall may have gathered his specimens. Wyeth's party was along the Snake River only near Fort Hall and on the Idaho-Oregon border near the mouth of the Boise River where the party crossed into Malheur Co., Oregon, on 24 August. They stayed along the Snake River until reaching the Burnt River 27 August (McKelvey, 1955). Because both *C. exaltatum* and *C. namophilum* var. *nevadense* are known from western Idaho, it is possible Nuttall gathered his material in this area.

Asa Gray (1876) correctly excluded Nuttall's "*Erythraea tenella*" and "*E. elata*" from the concept of *Erythraea nuttallii*, leaving "*E. longiflora*," Anderson 29, a collection by Henry Engelmann (GH), and the Watson collection (Watson 945, GH) from Ruby Valley, Nevada. Unfortunately, only the Ruby Valley collection seems to be extant, and this is var. *nevadense*. It is the only location for the collection number cited by Watson (1871b) himself, and thus it is likely that the plants from Unionville and Huntington, Pershing Co., Nevada, either were not preserved or were incorporated all together into a single collection. As for the Engelmann collection, this too is var. *nevadense*, collected during the 1857-1859 wagon road survey of James Simpson (Jackson 1964) at Wabuska, Lyon Co., Nevada.

George Engelmann, the famed St. Louis botanist and brother of Henry (Reveal 1972), stated in 1878, "This plant [*Erythraea douglasii*] has been confounded by Mr. Watson with his *E. nuttallii*, which, however, is a smaller and more leafy plant, with larger flowers and much larger seeds (0.65 mm long), but much smaller stigmas." Still, Engelmann failed to lectotypify Watson's species, or to circumscribe it correctly.

The incomplete distinctions made in the past between *Centaurium namophilum* var. *nevadense* and *C. exaltatum* are understandable because, in a manner that is typical of sympatric species of *Centaurium*, these

two entities converge greatly when found together. It is sometimes with only the greatest of difficulty that poorly prepared herbarium material can be separated. The main characters by which *C. exaltatum* may be distinguished from var. *nevadense* are its broader, more elliptical leaves, the dichotomous (vs. trichotomous) peduncles, the paler pink or bluish, generally four-merous flowers, the shorter and more blunt corolla lobes, and the generally thicker, more included style and stigma.

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