
Three New Subspecies of *Monardella* (Lamiaceae) from Southern California, U.S.A.

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ABSTRACT. Continuing work on the flora of California after the publication of *The Jepson Manual: Vascular Plants of California* has led to the discovery of three new *Monardella* Benth. (Lamiaceae) subspecies: *M. australis* Abrams subsp. *gabrielensis* Elvin & A. C. Sanders, *M. australis* subsp. *occidentalis* Elvin, R. A. Burgess & A. C. Sanders, and *M. sinuata* Elvin & A. C. Sanders subsp. *gerryi* Elvin, A. C. Sanders & R. A. Burgess. *Monardella australis* subsp. *gabrielensis* occurs in the central and western San Gabriel Mountains of the Transverse Ranges, and *M. australis* subsp. *occidentalis* occurs on Pine Mountain Ridge in the Western Transverse Ranges and the San Rafael Mountains of the adjacent southern portion of the South Coast Ranges. The two new subspecies of *M. australis* are most similar to the autonymic subspecies, but both differ in their bract and leaf morphology, pubescence on the stems and calyces, stature, and distribution. *Monardella sinuata* subsp. *gerryi* occurs in the Las Posas and Camarillo Hills in the coastal plain of Ventura County in the South Coast Region. The new subspecies is most similar to *M. sinuata* subsp. *sinuata* but differs in its stem, leaf, bract, and glomerule size and in its pubescence, nutlets, and ecological setting. *Monardella neglecta* Greene is transferred to a new rank as a subspecies of *M. purpurea* Howell, as *M. purpurea* subsp. *neglecta* (Greene) Elvin & A. C. Sanders. It is a diminutive, glabrous, serpentine endemic on the Marin and Tiburon peninsulas in northern California. A taxonomic assessment of names within the *M. villosa*

Benth. complex results in the synonymy of *M. franciscana* Elmer to *M. villosa* subsp. *villosa*. *Monardella villosa* subsp. *suberrata* (Greene) Epling is recognized as the upland and interior taxon in this species. A lectotype is designated for *M. purpurea* Howell and recognized for both *M. franciscana* Elmer and *M. neglecta* Greene.

Key words: California, IUCN Red List, Lamiaceae, *Monardella*, San Gabriel Mountains, South Coast Ranges, Transverse Ranges.

Monardella Benth. (Lamiaceae) occurs throughout western North America from northern Mexico to southern Canada with 59 taxa distributed among 35 species. California is the center of diversity for *Monardella* with 52 taxa distributed among 30 species (Sanders et al., 2012). Recent work for *The Jepson Manual: Vascular Plants of California* (Baldwin et al., 2012) has stimulated continuing taxonomic investigation of *Monardella*. Work on a flora of Ventura County, California (Burgess & Munro, in prep.), and other ongoing local projects has led to further discoveries in *Monardella*. Most of the taxa in this genus have very limited distributions, which is also the case for the three new subspecies described herein.

Taxonomically important characters in *Monardella*. The main morphological characters that have been used over time to distinguish between taxa in the genus *Monardella* include plant habit and leaf, bract, and inflorescence morphology (Gray, 1876,

1886; Abrams, 1912a, 1912b, 1951; Epling, 1925, 1939; Jepson, 1925, 1943; Munz, 1935, 1959, 1974; Jokerst, 1993). While these historically used characters can be highly variable (e.g., leaf morphology, stem length) within a single taxon, they can still be helpful for identification, especially when used in tandem. Other characters (e.g., calyx length, bract morphology) can be variable in some taxa but are more consistent in others. More recently, we have found pubescence (i.e., of leaf, stem, calyx) to be among the most stable of characters used to distinguish between species and subspecies in *Monardella* (Elvin & Sanders, 2003, 2009; Sanders et al., 2012; Elvin et al., 2013).

We have noticed that each plant structure (e.g., leaf, stem, calyx, bract) in *Monardella* generally has its own distinct pubescence, and each can have one to several different types of trichomes that are intermixed on these structures. For example, *M. robisonii* Epling has one type of glandular trichome and two types of non-glandular trichomes all intermixed on the stems. Unfortunately, many of the different types of pubescence are minute, with some as small as 0.01–0.03 mm in length. Trichomes of this size cannot be seen reliably with a standard 10× hand lens, but they can be distinguished with the use of a microscope. The trichomes do not lend themselves to easy identification in the field, but they do provide for accurate identification.

As noted below, there are differences between the new subspecies and their sister subspecies in many of the standard, old characters (e.g., leaf morphology, stem length); however, in many instances there is overlap between taxa at the edge of the character ranges (e.g., leaf length). The three new subspecies presented below are unequivocally distinct from their sister subspecies in pubescence characters (e.g., stem, bract, calyx).

1. *Monardella australis* Abrams, Muhlenbergia 8: 34. 1912. *Monardella odoratissima* Benth. subsp. *australis* (Abrams) Epling, Ann. Missouri Bot. Gard. 12: 70–71. 1925. *Monardella odoratissima* Benth. var. *australis* (Abrams) Jeps., Fl. Calif. [Jepson] 3: 437. 1943. TYPE: U.S.A. California: Riverside Co., open forests of Tamarack Valley, July 1901, *H. M. Hall* 2486 (holotype, DS; isotypes, MO, UC not seen).

Monardella australis is a caespitose, mat-forming rhizomatous perennial to subshrub distinguished by having long non-glandular trichomes, 0.3–0.6 mm with minute glandular trichomes, 0.02–0.04 mm beneath. It occurs in montane areas at 1350–3300 m

in elevation in the Peninsular and Transverse ranges of southern California.

1a. *Monardella australis* subsp. *australis*. Figure 1A.

Monardella australis subsp. *australis* occurs in mid-montane to subalpine forest, chaparral, rocky openings, at 1450–3300 m in elevation in the San Jacinto and San Bernardino mountains, in Riverside and San Bernardino counties, respectively, in southern California. It is distinguished from the other *M. australis* subspecies by its long calyces (greater than 8.5 mm) and long, purple bracts (12–18 mm) that exceed the calyces.

1b. *Monardella australis* subsp. *cinerea* (Abrams) A. C. Sanders & Elvin, Novon 19(3): 323. 2009. *Monardella cinerea* Abrams, Muhlenbergia 8: 33. 1912. TYPE: U.S.A. California: Los Angeles Co., Mt. San Antonio [Mt. Baldy], 9000 ft. or more, 24 July 1901, *L. R. Abrams* 1928 (holotype, DS; isotypes, MO photo of holotype sheet, OSC not seen). Figure 1B.

Monardella australis subsp. *cinerea* occurs in mid-montane to subalpine forest and is endemic to the upper elevations (1800–3100 m) in the San Gabriel Mountains in Los Angeles County, California. It is distinguished from the other *M. australis* subspecies by its short stems (3–15 cm), very short internodes (3–8[10] mm), short leaves (5–10 mm), the grayish hue of its herbage, and its short calyces (5–7[8] mm).

1c. *Monardella australis* subsp. *gabriellensis* Elvin & A. C. Sanders, subsp. nov. TYPE: U.S.A. California: Los Angeles Co., San Gabriel Mtns., NE face of Pacifico Mtn., 2051 m., 27 Sep. 2011, *D. E. Bramlet*, *E. Kentner* & *J. Zylstra* 4972 (holotype, UCR; isotypes, JEPS, LA, MO, SBBG, US, VFWO). Figures 1C, 2.

Diagnosis. The new subspecies is similar to *Monardella australis* Abrams subsp. *australis*, but differs in having green to stramineous bracts (vs. purple or rose-tinged in subsp. *australis*) that are shorter ([5]6.5–9 mm vs. 12–18 mm) and narrower (2–4.5 mm vs. 4–8 mm), shorter calyces (7–8 mm vs. 8.5–10 mm), and in lacking non-glandular calyx trichomes.

Caespitose perennials to subshrubs, (6)15–25 cm tall, tufted to matted; rhizomatous; stems visibly woody at base, pubescence dense, with 2 types of stem trichomes, (1) glandular, 0.02–0.04 mm and (2) non-glandular, 0.3–0.6 mm. Leaves (6)10–19(21) × (2.2)3.5–5(6) mm, narrowly to widely elliptic, sessile, pale or grayish green; with 2 types of trichomes on

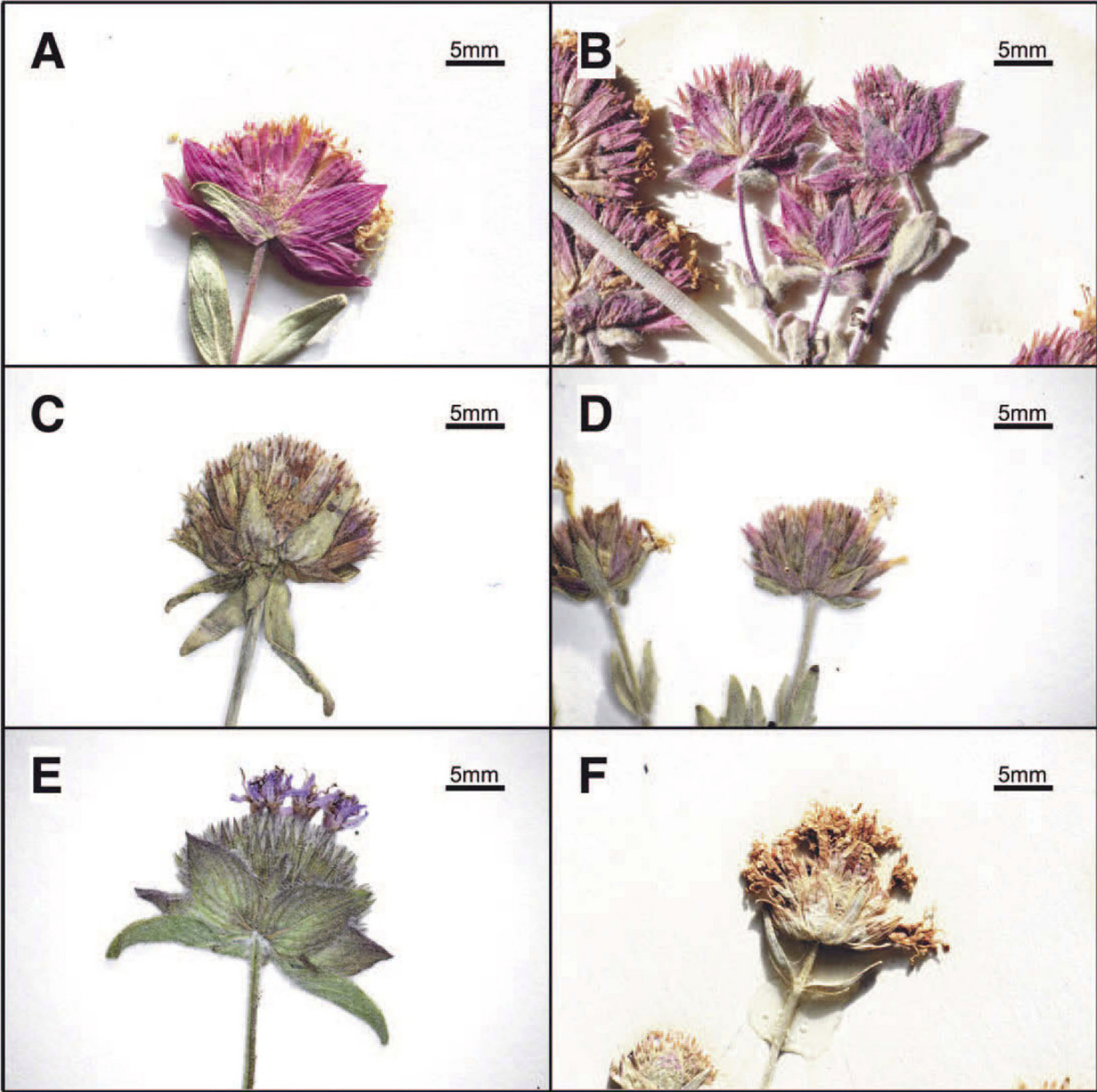


Figure 1. A–F. Glomerules and bracts of *Monardella* Benth. subspecies in southern California. —A. *Monardella australis* Abrams subsp. *australis*. —B. *Monardella australis* subsp. *cinerea* A. C. Sanders & Elvin. —C. *Monardella australis* subsp. *gabrielensis* Elvin & A. C. Sanders. —D. *Monardella australis* subsp. *jokerstii* Elvin & A. C. Sanders. —E. *Monardella australis* subsp. *occidentalis* Elvin, R. A. Burgess & A. C. Sanders. —F. *Monardella linoidea* A. Gray subsp. *erecta* (Abrams) Elvin & A. C. Sanders. A, photographed from *McClintock s.n.* (LA-62613); B, from *L. Abrams 1928* (holotype, DS); C, from *D. E. Bramlet, E. Kentner & J. Zylstra 4972* (holotype, UCR); D, from *M. A. Elvin & K. VinZant 5085* (isotype, IRVC); E, from *R. A. Burgess, M. A. Elvin & L. Simpson 9700* (holotype, UCR); F, from *L. Abrams 2861* (isotype, US). All images taken and prepared by Michael R. Tiffany.

adaxial blade surface, (1) glandular, 0.02–0.04 mm (dense) and (2) non-glandular, 0.4–0.6 mm (sparse to dense); 1 type of trichome on abaxial blade surface, glandular, 0.02–0.04 mm (sparse to dense); leaves subsessile to decurrent, base acute to obtuse, apex acute to obtuse, rounded. Inflorescence a terminal glomerule on primary stems, solitary; glomerules 10–18 mm wide; bracts (5) 6.5–9 × 2–4.5 mm, green to stramineous, occasionally purple-tinged distally, narrowly elliptic to narrowly lanceolate, apices acute,

less than or equaling the calyces. Flowers with the calyx 7–8 mm, green, rarely purple or rose-tinged distally, the calyx with 2 types of trichomes, (1) glandular, 0.1–0.2 mm and (2) glandular, 0.4 mm (sparse), but non-glandular trichomes absent; corolla 12–14 mm, white to cream with fine purple markings that make the corolla appear lavender in general color; stigma 14–17 mm, exserted; stamens 14–16 mm, exserted. Fruit a nutlet, tan to light brown, mottled dark brown, oblong, 2.2–2.3 × 0.8–0.9 mm.



Figure 2. *Monardella australis* Abrams subsp. *gabrielensis* Elvin & A. C. Sanders. Holotype, D. E. Bramlet E. Kentner & J. Zylstra 4972 (UCR).

Distribution and habitat. *Monardella australis* subsp. *gabrielensis* is endemic to the north central San Gabriel Mountains in the Transverse Ranges of southern California. It occurs in openings in montane coniferous forest, montane coniferous woodland, and canyon live oak woodland that sometimes has a montane chaparral understory. The new subspecies most commonly occurs in either colluvium of

decomposed granite/grandiorite soils or granitic outcrops at 1600–2200 m in elevation. Associated dominants in these areas include Cupressaceae such as *Calocedrus decurrens* (Torr.) Florin, Pinaceae such as *Pinus jeffreyi* Balf. and *P. lambertiana* Douglas, and Fabaceae such as *Quercus chrysolepis* Liebm. Other commonly associated species include Poaceae such as *Bromus tectorum* L. and *Poa secunda* J. Presl;

Asteraceae such as *Ericameria nauseosa* (Pall.) G. L. Nesom & G. I. Baird, *Eriophyllum confertiflorum* (DC.) A. Gray, and *Hulsea vestita* A. Gray subsp. *gabrielensis* Wilken; Onagraceae such as *Gayophytum diffusum* Torr. & A. Gray; Orobanchaceae such as *Cordylanthus nevinii* A. Gray; Polygonaceae such as *Eriogonum nudum* Douglas ex Benth. and *E. umbellatum* Torr.; and Rubiaceae such as *Galium jepsonii* Hilend & J. T. Howell.

IUCN Red List category. *Monardella australis* subsp. *gabrielensis* has a restricted distribution in the north-central San Gabriel Mountains. Using historical and current records, the new subspecies has an extent of occurrence (EOO) of approximately 148.6 km² (minimum convex polygon) and an area of occupancy (AOO) of approximately 8 km² (sum of occupied grid squares). All collections have been made within the boundaries of the Angeles National Forest (U.S. Department of Agriculture), which is managed for many uses. This may provide some protection, but it may also result in threats to the species, too, depending on the land use. Given the uncertainty regarding climate change, the extremely limited distribution and fragmentation, and the increase in megafires (fires that burn large areas [e.g., 100,000 acres] and have considerable effects on humans) in southern California, it is assessed here as CR, or Critically Endangered (CR B2ab[i,iii,iv,v]), according to IUCN criteria (2001).

Phenology. Plants of *Monardella australis* subsp. *gabrielensis* have been documented to flower between mid-July and mid-September.

Etymology. The Latin epithet *gabrielensis* refers to the San Gabriel Mountains, in which this subspecies' entire range occurs.

Taxonomic affinities. *Monardella australis* subsp. *gabrielensis* is closely related to the three previously described subspecies of *M. australis* (subspecies *australis*, *cinerea*, and *jokerstii*) and to the new *M. australis* subspecies described below in its habit, vestiture, and general morphology. This new subspecies overlaps in several gross morphological characters with the other subspecies of *M. australis*, such as stem height and leaf size, indicating their close relationship. However, *M. australis* subsp. *gabrielensis* can be distinguished by several morphological characters and occupies a separate geographic range. Prince (2009) conducted a population genetics analysis of several *Monardella* taxa from southern California, and her results indicate that *M. australis* plants in the San

Gabriel Mountains are distinct from those in the San Bernardino Mountains.

Monardella australis subsp. *gabrielensis* is most similar to *M. australis* subsp. *australis* but differs from it in having glomerule bracts that are shorter ([5]6.5–9 mm vs. 12–18 mm in subspecies *australis*), narrower (2–4.5 mm vs. 4–8 mm), and green versus purple or rose-tinged, and in having bracts that are less than or equal to the calyces versus noticeably exceeding them (Fig. 1A, C). The calyces are shorter in *M. australis* subsp. *gabrielensis* (7–8 mm vs. 8.5–10 mm), with shorter (0.1–0.2 mm) glandular trichomes and sparse, longer glandular trichomes to 0.4 mm; these differ from *M. australis* subsp. *australis* and lack its minute (0.04–0.06 mm) glandular trichomes and longer (0.3–0.6 mm) non-glandular trichomes. Occasionally the sparse glandular trichomes 0.4 mm long on the calyces of *M. australis* subsp. *gabrielensis* can lose their glandular tips and appear to be non-glandular. The two subspecies have separate ranges, with the San Gabriel Mountains the range for subspecies *gabrielensis* and the San Bernardino and San Jacinto mountains the range for subspecies *australis*; however, there appears to be a zone of introgression with several specimens that represent putative intermediates between the two subspecies, for example, *R. G. Swinney 9256* (UCR, VFWO) and *R. G. Swinney 11330* (UCR).

Monardella australis subsp. *gabrielensis* is similar to and occurs adjacent to *M. australis* subsp. *cinerea* but can be distinguished from it by its longer corollas (12–14 mm vs. 9–11 mm in subspecies *cinerea*) and absence of minute (0.06 mm) glandular calyx trichomes and long (0.3–0.6 mm) non-glandular calyx trichomes. The two subspecies occur in different ecological settings and at different elevations (1600–2200 m vs. 1800–3100 m). While *M. australis* subsp. *cinerea* is also endemic to the San Gabriel Mountains, it appears not to overlap with subspecies *gabrielensis* in geographic ranges; however, there is at least one specimen (*R. L. Dressler 953* [LA]) that represents a putative intermediate between the two subspecies. More introgressant individuals are expected to be found.

Monardella australis subsp. *gabrielensis* is distinguished from *M. australis* subsp. *jokerstii* by its calyx pubescence (lacking the minute glandular 0.06 mm trichomes and long non-glandular 0.3–0.6 mm trichomes seen in subspecies *jokerstii*), leaf morphology (blades entire vs. serrate), inflorescence branching pattern (solitary glomerules vs. an open compound cyme of glomerules), the number of glomerules per main stem (one vs. one to five), and longer corollas (12–14 mm vs. 10–11 mm). *Monardella*

australis subsp. *gabrielensis* occurs west and north-west of Mount San Antonio (the highest peak in the San Gabriel Mountains at 3069 m), while *M. australis* subsp. *jokerstii* occurs south and east of it.

In the San Bernardino Mountains *Monardella australis* subsp. *australis* (Fig. 1A) and *M. linoides* A. Gray subsp. *erecta* (Abrams) Elvin & A. C. Sanders (Fig. 1F) appear to interbreed extensively, based on numerous putative hybrid specimens. This pattern continues in the San Gabriel Mountains, where there are a number of specimens that exhibit intermediate states in pubescence, leaf and bract size and shape, and general habit between *M. australis* subsp. *gabrielensis* and *M. linoides* subsp. *erecta* specimens (e.g., *O. Mistretta* 1886 [RSA], *R. G. Swinney* 5589 [RSA, UCR], *R. G. Swinney* 5646 [RSA, UCR], *Swinney* 5656 [RSA, UCR]).

Paratypes. U.S.A. **California:** Los Angeles Co., *R. Bacigalupi* 6419 (JEPS not seen, LA), *D. Bramlet* 4959 (GH, OBI), *J. A. Ewan* 8417 (LA), Sep. 1917, *F. Grinnell* s.n. (RSA-401600), 29 Aug. 1917, s.n. (RSA-401603), 29 Aug. 1917, s.n. (POM-8130), 23 Aug. 1893, *H. E. Hasse* s.n. (NY), *O. Mistretta* 1824 (RSA), 1924 (RSA), *F. W. Peirson* 1070 (RSA), *T. S. Ross* 5594 (RSA, UC not seen), 5779 (RSA, UC not seen), *R. G. Swinney* 9071 (RSA, UCR), 9210 (UCR, VFWO), *R. F. Thorne* 38267 (RSA), *L. C. Wheeler* 10058 (RSA), 10308 (RSA), 23 July 1968, s.n. (RSA-638957), 7 Aug. 1968, s.n. (RSA-609405).

1d. *Monardella australis* subsp. *jokerstii* Elvin & A. C. Sanders, Novon 19: 323–324, fig 4. 2009. TYPE: U.S.A. California: San Bernardino Co., S face of Cucamonga Peak, just W of Day Creek, 25 Aug. 2006, *M. A. Elvin* & *K. VinZant* 5085 (holotype, UCSB; isotypes, ARIZ, BRY, CAS, CHSC, F, GH, IRVC, JEPS, K, MO, NY, OBI, RSA, SBBG, SD, UCR, US). Figure 1D.

Monardella australis subsp. *jokerstii* occurs in colluvium on steep scree or talus slopes or stony benches on canyon bottoms in montane forest and chaparral at (160)1350–1750 m in elevation. *Monardella australis* subsp. *jokerstii* is endemic to the San Gabriel Mountains in San Bernardino County, California, where it occurs in the vicinity of Cucamonga Peak (Mount San Antonio) and the western portion of Lytle Creek. It is distinguished from the other *M. australis* subspecies by its serrate leaves and branching inflorescence.

1e. *Monardella australis* subsp. *occidentalis* Elvin, R. A. Burgess & A. C. Sanders, subsp. nov. TYPE: U.S.A. California: Ventura Co., Pine Mountain Ridge, steep slope with clay loam soils derived from a sandstone base in a rocky/scree colluvium matrix, 2130 m, 20 June 2014, *R. A.*

Burgess, *M. A. Elvin* & *L. Simpson* 9700 (holotype, UCR; isotype, CAS, K, LA, MO, OBI, SBBG, VFWO). Figures 1E, 3.

Diagnosis. The new subspecies is similar to *Monardella australis* Abrams subsp. *australis*, but differs in having wider leaves (4–11 mm vs. 2.5–5 mm in subsp. *australis*), shorter bracts (7–12 mm vs. 12–18 mm), shorter calyces (7–8.5 mm vs. 8.5–10 mm), and short nonglandular stem trichomes 0.1–0.2 mm long.

Caespitose perennials to subshrubs, 8–22 cm tall, tufted to matted; rhizomatous; stems visibly woody at base, pubescence dense, with 3 types of stem trichomes, (1) glandular, 0.02–0.04 mm, (2) non-glandular, 0.1–0.2 mm, and (3) non-glandular, 0.3–0.6 mm. Leaves 11–17 mm × 4–11 mm, elliptic to ovate, sessile, pale or grayish green; with 2 types of trichomes on adaxial blades, (1) glandular, 0.02–0.04 mm (dense), and (2) non-glandular, 0.4–0.6 mm; with 3 types of trichomes on abaxial blade surfaces, (1) glandular, 0.02–0.04 mm (dense), (2) non-glandular, 0.1–0.2 mm, and (3) non-glandular, 0.4–0.6 mm; leaves subsessile to decurrent, bases acute to obtuse (truncate) decurrent, apices widely acute to obtuse. Inflorescence a terminal glomerule on primary stems, solitary; glomerules 14–19 mm wide; glomerule bracts 7–12 mm × (3.5)4–5.5 mm, stramineous to purple, widely elliptic, greater than or equaling the calyces. Flowers with the calyx 7–8.5 mm, purple; calyx with 3 types of trichomes, (1) glandular, 0.2 mm, (2) glandular, 0.4 mm (sparse), and (3) non-glandular, 0.3–0.6 mm; corolla 13–16 mm, white to cream, occasionally with purple markings that make it appear pale lavender in general color; stigma 16–19 mm, exserted; stamens 15–18 mm, exserted. Fruit a nutlet, tan to light brown, mottled dark brown, oblong, 2.25–2.35 × 0.8–0.9 mm.

Distribution and habitat. *Monardella australis* subsp. *occidentalis* is an extremely rare plant with only one known extant occurrence, which is in Ventura County. It has been collected in the Western Transverse Ranges and the southeastern edge of the Outer South Coast Ranges in Santa Barbara County. The plants in Ventura County were collected on Pine Mountain Ridge, south of Mount Piños and Frazier Mountain. The plants in Santa Barbara County were collected in the San Rafael Mountains near Big Pine [Mountain]. Specimens have been taken from dry, exposed rocky slopes at elevations between 1890 m and 2433 m. It occurs as an understory species in mixed conifer woodlands and montane chaparral associated with Pinaceae such as *Abies concolor* (Gordon & Glend.) Hildebr., *Pinus jeffreyi*, *P. lambertiana*, *P. ponderosa* P. Lawson & C. Lawson;

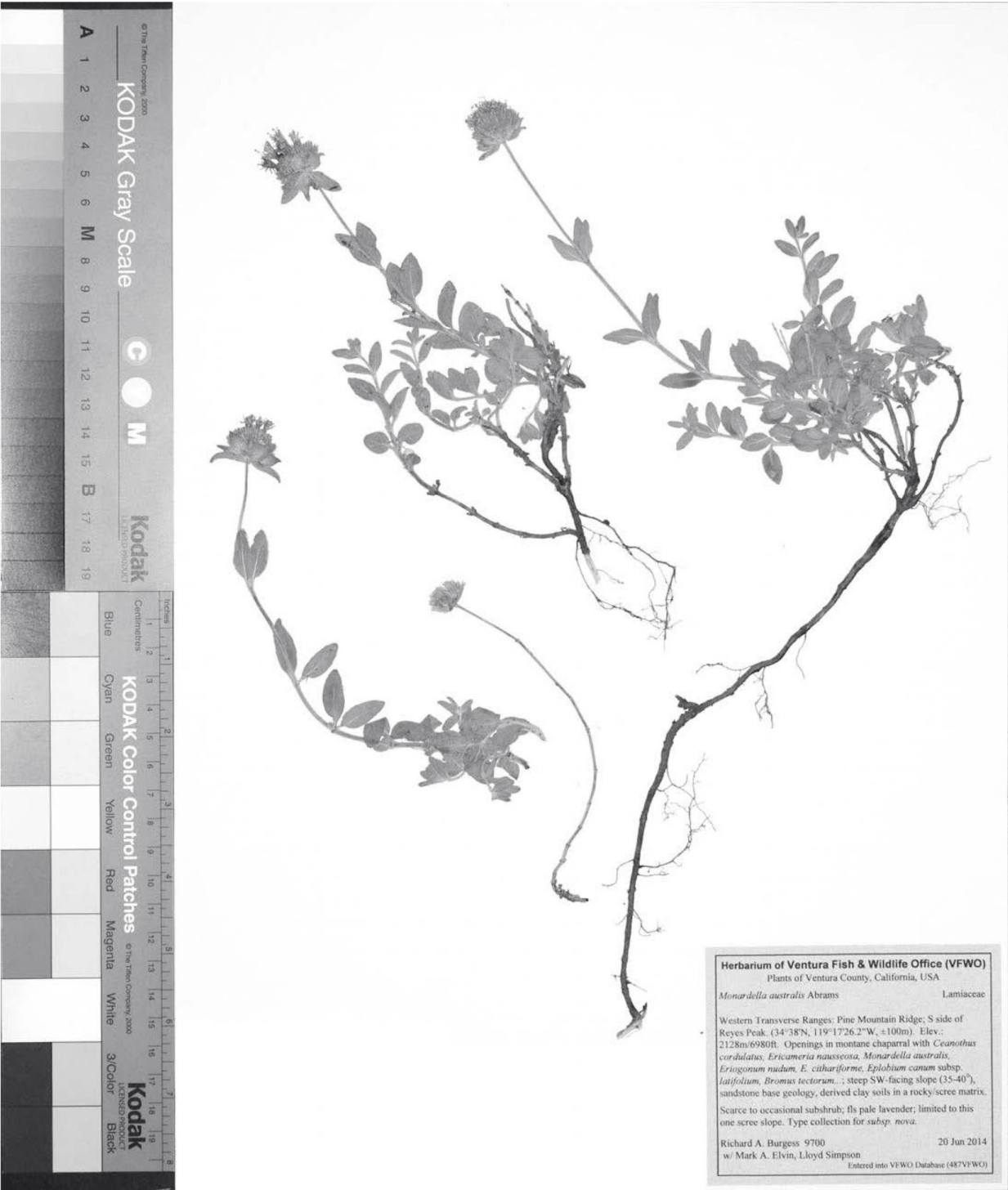


Figure 3. *Monardella australis* Abrams subsp. *occidentalis* Elvin, R. A. Burgess & A. C. Sanders. Holotype, R. A. Burgess, M. A. Elvin & L. Simpson 9700 (UCR).

Asteraceae such as *Ericameria nauseosa* var. *mohavensis* (Greene) G. L. Nesom & G. I. Baird; and Rhamnaceae such as *Ceanothus cordulatus* Kellogg and *Frangula californica* (Eschsch.) A. Gray subsp. *tomentella* (Benth.) Kartesz & Gandhi. Associated herbaceous and suffrutescent perennials of the understory include Asteraceae such as *Chaenactis santolinoides* Greene, Onagraceae such as *Epilobium canum*

(Greene) P. H. Raven subsp. *latifolium* (Hook.) P. H. Raven, and Polemoniaceae such as *Eriastrum densifolium* (Benth.) H. Mason subsp. *austromontanum* (T. T. Craig) H. Mason. *Monardella australis* subsp. *occidentalis* occurs in colluvium on a sandy clay loam soil derived from weathered sandstone, sandy loam, and very gravelly sandy loam. This edaphic condition is unique within *M. australis* because all other *M.*

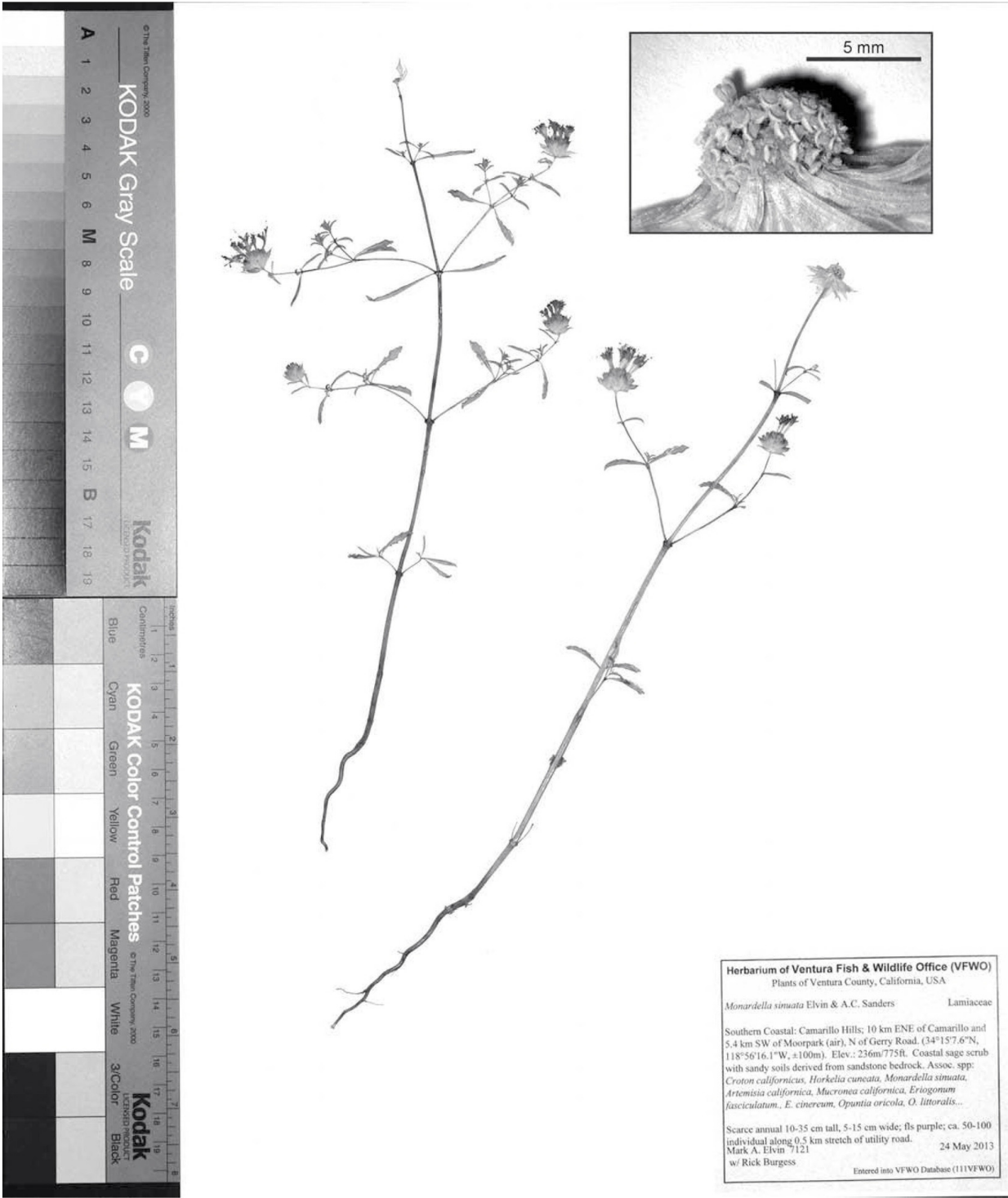


Figure 4. *Monardella sinuata* Elvin & A. C. Sanders subsp. *gerryi* Elvin, A. C. Sanders & R. A. Burgess. Holotype, *M. A. Elvin* & *R. A. Burgess* 7121 (UCR), with pedicel and cuplike structure in inset box at top right.

australis subspecies occur on soils derived from granite.

IUCN Red List category. *Monardella australis* subsp. *occidentalis* appears to be exceedingly rare and has an extremely limited distribution. There have been only five collections, one from Big Pine [Mountain] in the San Rafael Mountains in Santa Barbara County and four from Pine Mountain Ridge

in Ventura County, all from the same site. These two areas are adjacent mountain islands less than 35 km apart. With all known collections from only two sites on adjacent mountains, we estimate the known AOO to be less than 2 km², with 1 km² for each occurrence. Because there have been no other *M. australis* subsp. *occidentalis* collections, the EOO is likely to be small, and we estimate it to be approximately 27 km², using

a minimum convex polygon encompassing the two occurrences, but only 2 km², using the occupied 1 km² grid method. Much of the area between these two occurrences (and on the two mountains) consists of areas below the conifer forests that do not appear to be suitable habitat. Given its extremely limited distribution, the separation of the two occurrences from each other, and uncertainty regarding climate change, *M. australis* subsp. *occidentalis* is assessed here as CR, or Critically Endangered (CR B2ab[i,ii,iii,v]c[iii,iv]), according to IUCN (2001) categories and criteria. Of note is that much of this area does not have easy access, and the region has not been intensely botanized; therefore, more occurrences may be discovered with intensive fieldwork.

Phenology. Plants of *Monardella australis* subsp. *occidentalis* have been documented in flower between early June and early July, but it likely blooms later into the summer and possibly into early fall.

Etymology. The Latin epithet *occidentalis* refers to the distribution of this subspecies in relation to the other *M. australis* subspecies; it is the westernmost, or occidental, of the five subspecies.

Taxonomic affinities. *Monardella australis* subsp. *occidentalis* differs from *M. australis* subsp. *australis* in its wider leaves (4–11 mm vs. 2.5–5 mm in subspecies *australis*), shorter bracts (7–12 mm vs. 12–18 mm), and shorter calyces (7–8.5 mm vs. 8.5–10 mm). It is distinguished by its short (0.1–0.2 mm) non-glandular trichomes on the stems (lacking in subspecies *australis*) and by its short (0.1–0.2 mm) non-glandular trichomes on the abaxial leaf surfaces. *Monardella australis* subsp. *occidentalis* lacks the minute (0.04–0.06 mm) glandular calyx trichomes found in subspecies *australis*. Rather, the new subspecies has short (0.2–0.4 mm) glandular calyx trichomes that are not found in subspecies *australis*, and it has longer corollas (13–16 mm vs. 10–13 mm).

Monardella australis subsp. *occidentalis* differs from *M. australis* subsp. *gabrielensis* in its wider leaf blades (4–11 mm vs. [2.2]3.5–5[6] mm in subspecies *gabrielensis*) and its wider glomerule bracts ([3.5]4–5.5 mm versus 2–4.5 mm), which exceed or equal the calyces versus being less than calyx lengths. It is distinguished by the short (0.1–0.2 mm) non-glandular trichomes on the stems (lacking in subspecies *gabrielensis*) and by the short (0.1–0.2 mm) non-glandular trichomes on abaxial leaf surfaces (lacking in subspecies *gabrielensis*). It lacks short (0.1–0.2 mm) glandular trichomes on the calyces (that are present in subspecies *gabrielensis*) and has longer (0.3–0.6 mm) non-glandular

trichomes on the calyces (lacking in subspecies *gabrielensis*).

Monardella australis subsp. *occidentalis* differs from *M. australis* subsp. *cinerea* in its larger leaves (11–17 × 4–11 mm vs. 5–10 × 2–5 mm in subspecies *cinerea*), its green vestiture (vs. cinerous), and its slightly taller plants (8–22 cm vs. 3–15 cm). It has two types of glandular trichomes, (1) 0.2 mm and (2) 0.4 mm (sparse) on the calyces that are both longer than the short glandular calyx trichomes (0.1–0.2 mm) observed in subspecies *cinerea*. *Monardella australis* subsp. *occidentalis* has corollas that are longer (13–16 mm vs. 9–11 mm for subspecies *cinerea*).

Monardella australis subsp. *occidentalis* is distinguished from *M. australis* subsp. *jokerstii* by its leaf blade margins that are more or less entire (vs. serrate in subspecies *jokerstii*), by its inflorescences as solitary glomerules (vs. one to five glomerules in an open compound cyme), by its longer corollas 13–16 mm (vs. 10–11 mm), and by its smaller habit (8–22 cm vs. 5–35 cm).

Monardella linoides subsp. *oblonga* (Greene) Abrams occurs in the general region of Pine Mountain Ridge (to the north and east). A *Monardella* specimen collected nearby on Sewart Mountain (Burgess 9433 [VFWO]) represents a putative introgressant specimen between *M. australis* subsp. *occidentalis* and *M. linoides* subsp. *oblonga*. Some introgression between these two taxa is expected given the observed introgression between *M. australis* s.l. and *M. linoides* s.l. in the San Bernardino, San Jacinto, and San Gabriel mountains in areas where those species occur in close proximity (Elvin & Sanders, 2009).

Paratypes. U.S.A. **California:** Santa Barbara Co., *R. Hoffmann* 644 (CAS, SBBG); Ventura Co., *R. A. Burgess* 8921 (PH, UCR), 9479 (CIC, GH, JEPS, NDC, NY, RM, US, WTU), *E. R. Chandler* 3124 (SBBG), 8 June 1966, s.n. (SBBG-84125), *M. A. Elvin* 7447 (MSC, OSC, UTC, VFWO).

2. *Monardella sinuata* Elvin & A. C. Sanders, Novon 19: 338–340, fig. 10. 2009. TYPE: U.S.A. California: Santa Barbara Co., Burton Mesa, W of Santa Lucia Canyon, N of Lakes Canyon, 15 May 2006, *M. A. Elvin*, *L. Lum* & *L. Ballard* 4904 (holotype, UCSB; isotypes, IRVC, JEPS, MO, RSA, UCR, US).

Monardella sinuata occurs in sand dunes and openings in coastal scrub and oak woodlands at elevations below 300 m. *Monardella sinuata* occurs from Marin County in northern California to Ventura County in southern California. It is distinguished by its undulating leaf margins and annular habit.

2a. *Monardella sinuata* subsp. *sinuata*.

Monardella sinuata subsp. *sinuata* occurs on sandy soils in relictual dunes and sandy areas in coastal scrub and oak woodland habitats at elevations below 300 m. *Monardella sinuata* subsp. *sinuata* is found in coastal areas from Morro Bay in San Luis Obispo County south to sand dunes in the Purisima Hills in Santa Barbara County, California. It is distinguished from *M. sinuata* subsp. *nigrescens* Elvin & A. C. Sanders by its taller, yet more gracile, habit and by lacking the darkened stems and bract veins and apices of subspecies *nigrescens*.

2b. *Monardella sinuata* subsp. *gerryi* Elvin, A. C. Sanders & R. A. Burgess, subsp. nov. TYPE: U.S.A. California: Ventura Co., Camarillo Hills, sandstone soils, 236 m, 24 May 2013, *M. A. Elvin & R. A. Burgess 7121* (holotype, UCR; isotypes, JEPS, MO, RSA, US, VFWO). Figure 4.

Diagnosis. The new subspecies is similar to *Monardella sinuata* Elvin & A. C. Sanders subsp. *sinuata*, but differs in having the calyx shorter (5.5–6 mm vs. 7–8 mm in subspecies *sinuata*), glandular calyx trichomes 0.02–0.04 mm long (lacking in subspecies *sinuata*), sparse conoideus glands along the stems (lacking in subspecies *sinuata*), and longer nutlets (1.5–1.6 mm vs. ca. 1.1 mm).

Annual, erect, gracile, 7–30(43) cm tall, simple to moderately branched, \pm glabrous to very sparsely pubescent, stem with 1 type of trichome, non-glandular, 0.1–0.2 mm, retrorse, stems stramineous to tan, with conoideus glands sparsely present. Leaves 10–35 \times 2–6 mm, with length-to-width (L:W) ratios of 5–7:1, blades narrowly elliptic, \pm glabrous to very sparsely pubescent, with 1 type of trichome on adaxial surface, non-glandular, 0.1–0.2 mm (rare), with 1 type of trichome on abaxial surface, non-glandular, 0.1–0.2 mm (sparse), leaves subsessile to decurrent (rarely cuneate), margins generally slightly undulate, occasionally strongly undulate, bases acute, apices acute. Inflorescence solitary to an open compound cyme; flowers in terminal glomerules; glomerules 1 to 7 per plant, glomerules on main stem 10–17 mm wide, glomerules on axillary branches, 7–12 mm wide; glomerule bracts 7–9(12) \times 3.5–6 mm; with 1 type of trichome, non-glandular, 0.1–0.2 mm, and with 2 types of cilia, (1) non-glandular, 0.1–0.2 mm and (2) non-glandular, 0.3–0.5 mm (sparse), bracts elliptic to widely lanceolate, veins green, \pm translucent between veins, apices acute to acuminate, purple-tinged or not, less than or equaling calyces. Flowers with pedicels 1–1.5 mm; calyx 5.5–6 mm, rapidly caducous after anthesis, \pm

glabrous to very sparsely pubescent; with 2 types of trichomes, (1) glandular, 0.02–0.04 mm, and (2) non-glandular, 0.3–0.6 mm; calyx teeth with 1 type of trichome, non-glandular, 0.3–0.6 mm; corolla 11–14 mm, upper 2 corolla lobes gland-tipped, purple; stigma 13–17 mm, exserted; stamens 13–17 mm, exserted. Fruit a nutlet, light brown with dark brown spots and streaks, oblong, 1.5–1.6 \times 0.8 mm.

Distribution and habitat. *Monardella sinuata* subsp. *gerryi* is endemic to the Las Posas and Camarillo hills west of the Santa Monica Mountains and southeast of the Santa Clara River in Ventura County, California. It occurs at elevations between 150 m and 243 m in openings in coastal sage scrub. Associated species in the microhabitats include a number of unique and uncommon taxa typically found in coastal maritime scrub or other arid environments: Euphorbiaceae such as *Croton californicus* Müll. Arg., *Euphorbia polycarpa* Benth., and *Stillingia linearifolia* S. Watson; Polygonaceae such as *Mucronea californica* Benth.; Polemoniaceae such as *Eriastrum densifolium* (Benth.) H. Mason subsp. *elongatum* (Benth.) H. Mason; and Rosaceae such as *Horkelia cuneata* Lindl. subsp. *puberula* (Rydb.) D. D. Keck. Other common associates of the dominant plant community of the area, coastal sage scrub, include Asteraceae such as *Artemisia californica* Less., Fabaceae such as *Acmispon glaber* (Vogel) Brouillet, Lamiaceae such as *Salvia mellifera* Greene, and Polygonaceae such as *Eriogonum fasciculatum* Benth. *Monardella sinuata* subsp. *gerryi* occurs in sandy soils in the Las Posas Formation of Pleistocene Age. The soils in this unit are derived from weakly consolidated sandstone, with some gravelly sand units, and are highly susceptible to landsliding (Tan et al., 2004).

IUCN Red List category. *Monardella sinuata* subsp. *gerryi* is exceedingly rare and has only been collected three times since botanists started to document the flora of southern California in the 1800s. Currently, *M. sinuata* subsp. *gerryi* is known only from one small extant occurrence in a remnant patch of fragmented habitat in the Las Posas and Camarillo hills. Of the three *M. sinuata* subsp. *gerryi* collections, two were made over 40 years ago and are considered to be extirpated. We estimate that the Las Posas and Camarillo hills at one time may have supported up to 15.64 km² of suitable habitat before modern human habitation in the area. The Las Posas and Camarillo hills have experienced considerable residential and agricultural development, particularly in the last 10 to 20 years, which has resulted in a considerable loss of habitat and increased fragmen-

tation of the area. We estimate that currently there may be up to 1.84 km² of suitable habitat remaining for this species, all of which is either degraded or extremely fragmented. With only one known extant occurrence, we estimate the known AOO to be less than 1 km² and the EOO to also be less than 1 km². It should be noted that there are still some small pockets of habitat within the Las Posas and Camarillo hills that could harbor additional plants; however, we do not expect this subspecies to occur outside of the Las Posas or Camarillo hills. The Conejo Mountains, located a short distance to the south on the other side of the Simi-Santa Rosa fault zone and the Santa Rosa Valley, were formed from a different geological process and are composed of Conejo Volcanics, which weather to clay soils. The Conejo Mountains support a very different flora with a number of its own rare, narrow endemic plants, for example, Crassulaceae such as *Dudleya parva* Rose & Davidson and *D. verityi* K. M. Nakai and Polygonaceae such as *Eriogonum crocatum* Davidson. Given the uncertainty regarding climate change, its extremely limited extant distribution, and the fragmentation and degradation of the remaining potential habitat, *M. sinuata* subsp. *gerryi* is assessed here as CR, or Critically Endangered (CR B1ab[i,ii,iii,iv,v]-c[I,ii,iii,iv]), according to IUCN (2001) categories and criteria. Because of this subspecies' extremely limited distribution (with only one known extant occurrence), the extreme fragmentation of and disturbance to its habitat, and increasing adverse effects from development, it may become extinct in the near future.

Phenology. Plants of *Monardella sinuata* subsp. *gerryi* have been documented as flowering between April and June.

Etymology. The Latin epithet *gerryi* refers to Will Gerry, who owns the property that contains this plant, allowed us access, and directed us to the place with suitable habitat where the *Monardella* plants grow. Of note is that he is a descendant of Elbridge Gerry, a founding father of the United States and a signer of the Declaration of Independence and Articles of Confederation.

Taxonomic affinities. *Monardella sinuata* subsp. *gerryi* is distinguished from *M. sinuata* subsp. *sinuata* in having narrower leaves (2–6 mm vs. [3]4–10 mm in subspecies *sinuata*), leaves with larger L:W ratios (5–7:1 vs. 3–6:1), and an almost complete lack pubescence on the adaxial leaf blade surfaces. Its primary glomerules are smaller (10–17 mm vs. 10–35 mm), its bracts are narrower (3.5–6 mm vs. 3–12 mm) and do not exceed the calyces (vs.

bracts exceeding the calyces), its pedicels are longer (1–1.5 mm vs. 0.5–1 mm), its calyces are shorter (5.5–6 mm vs. 7–8 mm), it has minute glandular trichomes (0.02–0.04 mm) on the calyces (lacking in subspecies *sinuata*), and its corollas are shorter (11–14 mm vs. 13–16 mm). There are conoideus glands sparsely spread along the stems of *M. sinuata* subsp. *gerryi*, and its nutlets are longer (1.6 mm vs. 1.1 mm).

Monardella sinuata subsp. *gerryi* is distinguished from *M. sinuata* subsp. *nigrescens* in that its leaves are narrower (2–6 mm vs. 4–10 mm in subspecies *nigrescens*), and it has larger leaf L:W ratios (5–7:1 vs. 3–6:1). *Monardella sinuata* subsp. *gerryi* almost completely lacks pubescence on the adaxial blade surface of the leaves, but very rarely it contains 1 type of trichome here, non-glandular, 0.1–0.2 mm (vs. 2 types of trichomes, [1] non-glandular, 0.1–0.2, and [2] non-glandular, 0.3–0.5 mm [very sparse]). Its bracts are shorter (7–9[12] mm vs. 9–16 mm), narrower (3.5–6 mm vs. 6–12 mm), and do not exceed the calyces (vs. the bracts exceeding the calyces). Its primary glomerules are smaller (10–17 mm vs. 10–35 mm wide). Its glomerule bracts bear minute non-glandular trichomes (0.1–0.2 mm; lacking in subspecies *nigrescens*) and lack the long, non-glandular trichomes (0.6–1.2 mm) present in subspecies *nigrescens*. The pedicels of *M. sinuata* subsp. *gerryi* are shorter (1–1.5 mm vs. 2–2.5 mm), its calyces are shorter (5.5–6 mm vs. 7–9 mm) and bear very minute glandular trichomes (0.02–0.04 mm; lacking in subspecies *nigrescens*) and lack the long non-glandular trichomes (0.6–1.1 mm) present in subspecies *nigrescens*. For *M. sinuata* subsp. *gerryi*, its corollas are shorter (11–14 mm vs. 14–16 mm). There are scattered conoideus glands along the stems of *M. sinuata* subsp. *gerryi* (lacking in subspecies *nigrescens*), and its nutlets are longer (1.6 mm vs. 1.1 mm).

The rapid post-anthesal caducous calyces also distinguish *Monardella sinuata* subsp. *gerryi* from subspecies *nigrescens* and subspecies *sinuata*. The calyces on the primary glomerules on *M. sinuata* subsp. *gerryi* begin dropping off while the axillary glomerules are still flowering. This rapid deciduousness has not been observed on any specimens of subspecies *nigrescens*. While the calyces of subspecies *sinuata* are slightly caducous, they do not drop off as readily or to the magnitude observed in subspecies *gerryi*. A cuplike structure remains and is evident on the pedicels of subspecies *gerryi* after the calyces have abscised. These cuplike structures have been observed in subspecies *sinuata* but not in subspecies *nigrescens*.

Monardella sinuata subsp. *gerryi* is geographically separated from the other two subspecies by the Santa Ynez Mountains of the Transverse Ranges. There are no known *M. sinuata* s.l. collections in any areas in the intervening 125+ km between the Las Posas and Camarillo hills and the southeast Purisima Hills. There is little or no suitable habitat in this intervening region. There are no intermediate specimens between *M. sinuata* subsp. *sinuata* and *M. sinuata* subsp. *gerryi*. This geographic isolation would appear to be a significant barrier to gene flow that may warrant recognition of *M. sinuata* subsp. *gerryi* at the specific rank. We considered recognizing *M. sinuata* subsp. *gerryi* at the rank of species because of its significant geographic isolation and other distinct morphological differences from the other *M. sinuata* subspecies; however, erring on the side of caution and recognizing their similarities, we recognize the taxon as a subspecies of *M. sinuata*. We recommend a closer look be taken at this taxon and at any potential gene flow that may or may not be occurring to determine if it warrants recognition as a species.

Paratypes. U.S.A. **California:** Ventura Co., *M. A. Elvin* 7131 (NY, SBBG), *N. French* 311 (UC, USFS [2]), *D. F. Howe* 4924 (SD, SDSU not seen).

2c. *Monardella sinuata* subsp. *nigrescens* Elvin & A. C. Sanders, Novon 19(3): 340–342, fig. 11. 2009. TYPE: U.S.A. California: Marin Co., Point Reyes Peninsula, 12.5 mi. from Inverness, sandy knoll on crest of ridge, 18 May 1938, *A. Carter* 1417 (holotype, GH; isotypes, DS, LA, RM, RSA not seen, UCR, UTC, WTU).

Monardella sinuata subsp. *nigrescens* occurs on sandy soils in coastal strand, dune scrub, sagebrush scrub, coastal chaparral, and oak woodland at elevations below 300 m. *Monardella sinuata* subsp. *nigrescens* occurs in coastal areas from Monterey Bay in Monterey County north to Point Reyes in Marin County, California. It is distinguished from the other two subspecies by its stout habit and its darkened stems and bract veins and apices.

3. *Monardella purpurea* Howell, Fl. N.W. Amer. 1: 550. 1901. *Madronella purpurea* (Howell) A. Nelson, Bot. Gaz. 52: 271. 1911. TYPE: U.S.A. Oregon: Josephine Co., “In dry rocky places, eastern base of the Coast Mountains, southwest Oregon,” near Waldo, 13 June 1884, *J. T. Howell* s.n. (lectotype, designated here, ORE-96231; isoelectotypes, ORE-96230, PH-1113651, PH-742185, US-43116, VT-s.n., WTU-25006).

Discussion. Howell (1901) did not give a specific location for the type, cite any specimens, or mention any herbaria in which specimens might reside in the protologue for *Monardella purpurea* Howell. He simply stated that it was “in dry rocky places, eastern base of the Coast Mountains southwestern Oregon.” For many years, botanists have indicated that an unnumbered Howell collection from 13 June 1884 seems a likely collection from which Howell might have based his description of *M. purpurea* (e.g., Epling, 1925; Jepson, 1943). There are six known duplicates of this unnumbered Howell collection from 13 June 1884 “near Waldo,” and they are consistent with the description in his protologue. Of these six duplicates, two of these reside at ORE, ORE-96230 and ORE-96231. Both are representative of *M. purpurea*, and sheet ORE-96231 has “*purpurea* Howell” and “Type Specimen” handwritten on the label. Stephen Meyers, at OSC, confirmed that the writing is in Howell’s own hand (pers. comm., 2014). We hereby designate specimen ORE-96231 as the lectotype. Considering the remaining sheets to constitute a single gathering, we list the other five duplicates as isoelectotypes accordingly.

Monardella purpurea s.l. occurs in rock outcrops or on rocky slopes, generally in soils associated with or derived from serpentine. It is found in coastal scrub, woodland, or montane forest in coastal areas and coastal mountain ranges from central California (Marin County) north to southwestern Oregon (Douglas County).

3a. *Monardella purpurea* subsp. *purpurea*.

Monardella purpurea subsp. *purpurea* occurs in rock outcrops or on rocky slopes, generally in soils associated with or derived from serpentine. It is found in coastal scrub, woodland, or montane forest in coastal areas and coastal mountain ranges from central California (Sonoma County) north to southwestern Oregon (Douglas County). *Monardella purpurea* subsp. *purpurea* is distinguished by its large leaves (12–30 × 5–10 mm), large bracts (9–14 × 5–7 mm) with a purple tinge or color, purple stems, and is essentially glabrous with a very sparse pubescence occasionally found on stems, bracts, and calyces.

3b. *Monardella purpurea* subsp. *neglecta* (Greene) Elvin & A. C. Sanders, comb. et stat. nov. Basionym: *Monardella neglecta* Greene, Pittonia 5: 82. 1902. *Madronella neglecta* (Greene) Greene, Leaflet Bot. Observ. Crit. 1: 169. 1906. *Monardella odoratissima* Benth. var. *neglecta* (Greene) Jeps., Man. Fl. Pl. Calif. 882. 1925. *Monardella villosa* Benth. subsp. *neglecta*

(Greene) Epling, Ann. Missouri Bot. Gard. 12: 52. 1925. *Monardella villosa* Benth. var. *neglecta* (Greene) Jeps., Fl. Calif. 3: 435. 1943. TYPE: U.S.A. California: Marin Co. [Mt. Tamalpais,] 1875, *Vasey s.n.* (lectotype, designated by Epling [1925: 52–53], US-45760 digital image, isoelectotypes, NDG-44419B, US-45761 digital image).

Discussion. The status of the small, essentially glabrous plants with small, entire to serrulate-toothed leaves from serpentine soils in Marin County, California, has been debated since E. L. Greene first described them as *Monardella neglecta* (Greene, 1902: 82). They have been recognized either as a subordinate taxon of *M. villosa* (Epling, 1925; Jepson, 1943; Abrams, 1951; Munz, 1959) or *M. odoratissima* (Jepson, 1925) or independently at species rank (Greene, 1902; Howell, 1949, 1970) for almost all except the last 21 of the last 111 years. We concur with Greene (1902: 82) that “this neat and elegant” plant is a “most distinct little *Monardella*.” Based on the similar morphological characters and the putative introgression of this taxon with *M. purpurea* in Sonoma County, we treat it here as a subspecies: *M. purpurea* subsp. *neglecta*. It corresponds well morphologically with *M. purpurea* in that they both are very nearly glabrous plants—including the stems, bracts, calyces, and leaves—and both have a predominantly purple vestiture. While there are putative introgressant specimens between *M. purpurea* subsp. *neglecta* and *M. villosa* s.l. (*J. and B. Guggolz 1242* [CHSC, JEPS]; 27 May 1902, *K. Brandegee s.n.* [UC-185721], partial sheet, marked as b.), the taxon does not fit in well with *M. villosa* because it lacks the abundant villous pubescence and robust habit of that species. In contrast, plants of *M. purpurea* subsp. *neglecta* are distinctive in their nearly glabrous surfaces, small stature, and purpletinged herbage. *Monardella purpurea* subsp. *neglecta* differs from *M. purpurea* subsp. *purpurea* in several characters of the leaves, glomerules and their associated bracts, and several pubescence characters. In *M. purpurea* subsp. *neglecta*, the leaf blades are ovate, with serrulate margins, and sized as 9–15 × 3.5–7 mm (vs. blades oblong, entire, 12–30 × 5–10 mm in subspecies *purpurea*), the glomerules are 12–18 mm wide (vs. 15–25 wide mm in subspecies *purpurea*), and the glomerule bracts are somewhat shorter (7–8 mm vs. 9–14 mm). *Monardella purpurea* subsp. *neglecta* contains minute non-glandular trichomes (0.04–0.06 mm) on the stem (vs. minute non-glandular trichomes 0.06–0.1 mm) and non-glandular calyx teeth trichomes (0.2–0.4 mm vs. 0.4–0.6 mm).

In the protologue for *Monardella neglecta*, Greene (1902) did not cite a type specimen. He stated that *M. neglecta* “did not appear to have been collected except by G. R. Vasey in 1875, and Geo. W. Dunn in 1890. The special locality is, of course, unknown” (Greene, 1902: 82). These are presumably the specimens in the Greene Herbarium (NDG) at Notre Dame and in the U.S. National Herbarium (US). It cannot be determined for certain whether Greene saw the specimens at US because he did not annotate them, but we think it is likely. In his monograph of the genus *Monardella* (1925), Epling recognized *M. neglecta* as a subspecies of *M. villosa* and cited *G. R. Vasey s.n.* at US as the “Type” (lectotype). He erroneously listed its collection date as 1876, instead of 1875, in the specimens examined section. While discussing his decision for selecting the Vasey collection as the type, he had this to say about the two syntype collections:

The specimen collected by Vasey on Mt. Tamalpais is cited with the description of *M. neglecta* Greene. In the Greene Herbarium a fragment of this plant is mounted on the same sheet with a specimen collected by G. W. Dunn in Marin Co., July 22, 1890. The latter collection is designated as the type in Greene’s handwriting. Only a photograph of this sheet has been seen by the author (Epling, 1925: 52–53).

Epling listed the *Vasey s.n.* collection at GH as an isotype and the material residing at US as the “type.” There are two duplicates of the Vasey *M. neglecta* collection at US (US-45760 and US-45761). Both specimens have “type” written on them in Epling’s hand, indicating that he saw both specimens. He also annotated sheet US-45760 (1875, *Vasey s.n.*) with the following: “This sheet considered the type sheet by me.” We therefore recognize this sheet as the lectotype. It has the best representative material of all of the syntype sheets, containing three whole plants that include rhizomes, roots, and glomerules with flowers; it has more duplicates; and it is more widely distributed. We recognize sheets US-45761 and NDG-44419B as isoelectotypes.

Monardella purpurea subsp. *neglecta* occurs in rock outcrops and on rocky slopes associated with serpentine soils in coastal scrub. It occurs in Marin and Sonoma counties, California. It is distinguished from subspecies *purpurea* by its smaller leaves (9–15 × 3.5–7 mm vs. 12–30 × 5–10 mm), smaller bracts (7–8 × 4–6 mm vs. 9–14 × 5–7 mm), and serrulate leaves (vs. entire in subspecies *purpurea*).

Additional specimens examined. U.S.A. **California:** Marin Co., 22 July 1890, *Geo. W. Dunn s.n.* (syntype,

NDG-44419A); Tiburon Peninsula, *J. T. Howell 48866* (SBBG), *R. F. Hoover 9483* (OBI); Mt. Tamalpais, *A. Graff M-54* (CHSC), *C. V. Morton 2893* (US); Sonoma Co., Harrison Grade, *R. F. Hoover 9474* (OBI), Monte Rio, *R. F. Hoover 5915* (UC).

- 4. *Monardella villosa*** Benth., Bot. Voy. Sulphur 42, pl. XXI. 1844. *Madronella villosa* (Benth.) Greene, Leaffl. Bot. Observ. Crit. 1: 169. 1906. *Monardella villosa* Benth. subsp. *euvillosa* Epling, Ann. Missouri Bot. Gard. 12: 46, pl. 3, fig. 1. 1925, nom. illeg. TYPE: U.S.A. California: Bodegas, 1841, *R. B. Hinds s.n.* (holotype, K [barcode] 248497).

Discussion. *Monardella villosa* s.l. is a complex and widespread species that occurs from southern California (Santa Barbara County) to central Oregon (Douglas County), a distance of over 1000 km. Recent taxonomic work on *Monardella* revealed a number of issues concerning this species complex that had not been resolved previously. Foremost is that the plants currently treated under that name *M. villosa* subsp. *villosa* do not conform with the type of *M. villosa* subsp. *villosa*, and the name has apparently been misapplied to these plants by American botanists since 1925. This is further discussed below. There also appears to be incipient speciation on the numerous montane island ecosystems and on different local substrates—for example, serpentine and granite—throughout the range of *M. villosa* s.l.

- 4a. *Monardella villosa*** subsp. *villosa* *Monardella franciscana* Elmer, Bot. Gaz. 41: 320. 1906, syn. nov. *Madronella franciscana* (Elmer) Elmer ex A. Heller, Muhlenbergia 2: 244. 1906. *Monardella villosa* Benth. var. *franciscana* (Elmer) Jeps., Man. Fl. Pl. Calif. 881. 1925. *Monardella villosa* Benth. subsp. *franciscana* (Elmer) Jokerst, Phytologia 72: 14. 1992. TYPE: U.S.A. California: San Mateo Co., San Pedro, July 1903, *A. D. E. Elmer 4766* (lectotype, designated by Epling [1925: 48], DS digital image; isoelectotypes, CAS, MO digital image, NY digital image, UC not seen, US digital image).

When Elmer described *Monardella franciscana* in 1906, he did not designate which of the several duplicates of *Elmer 4766* was the holotype (Elmer, 1906) as he had done the previous year with *M. crispa* Elmer (Elmer, 1905). Epling (1925: 48, “type collection of *M. franciscana*, Type in DH”) selected the specimen at DS as type in his monograph having seen specimens of *Elmer 4766* from MO, UC, and US. Because no type was designated in Elmer’s 1905

protologue, all of the *Elmer 4766* specimens represent syntypes. Epling’s later designation of *Elmer 4766* (DS) as the type, therefore, is recognized as the lectotype for this species.

Discussion. *Monardella villosa* subsp. *villosa* occurs in coastal areas of Marin, San Francisco, San Mateo, and Santa Cruz counties in California. It is noted for having an abundance of villous hairs 0.3–1 mm long on the stems, leaves, and calyces with leaves that are ovate to triangular and have an obtuse to truncate base.

The type specimens of *Monardella villosa* subsp. *franciscana* closely correspond to the type of *M. villosa* subsp. *villosa* and are essentially indistinguishable from Bentham’s type for *M. villosa* subsp. *villosa*. Both collections share leaves that have widely obtuse bases that are cuneate to decurrent, are woolly on the abaxial blade surface, and contain an abundance of long, non-glandular trichomes (0.3–1 mm) on the stems, leaves, bracts, and calyces. Plants representing the type collection of *M. villosa* subsp. *franciscana* have bases that are slightly wider than those of the type of *M. villosa* subsp. *villosa*, but the range of variation for this character has almost complete overlap between the two collections. The bases of a few *M. villosa* subsp. *franciscana* leaves on the type sheets attain a wider angle than on *M. villosa* subsp. *villosa* and almost qualify as truncate. *Monardella villosa* subsp. *villosa* (sensu Elvin et al.) plants can best be described as a cline, regarding the leaf base and pubescence characters, that occurs from the south (type location for *M. franciscana*) to the north (type location for *M. villosa*). Plants of interior California and southwestern Oregon previously recognized as *M. villosa* subsp. *villosa* (e.g., Epling, 1925, Jokerst, 1993; Sanders et al., 2012) are not consistent with *M. villosa* subsp. *villosa* because they lack the dense, woolly pubescence on the abaxial leaf surface and the abundant long trichomes (0.3–1 mm) on the stems and, therefore, belong to a different taxon. The types for both *M. villosa* subsp. *villosa* and *M. villosa* subsp. *franciscana* occur in close proximity and the same ecological habitat. Because the type specimen of *M. villosa* was deposited in Europe, at Kew, American workers have had less access to it, which likely increased the misapplication of the name *M. villosa* subsp. *villosa*.

- 4b. *Monardella villosa*** subsp. *obispoensis* (Hoover ex Jeps.) Jokerst, Phytologia 72: 14. 1992. Basionym: *Monardella villosa* Benth. var. *obispoensis* Hoover ex Jeps., Fl. Calif. 3: 435. 1943. *Monardella villosa* Benth. subsp. *obispoensis* (Hoover ex Jeps.) Jokerst, Phytologia 72(1): 14.

1992. TYPE: U.S.A. California: San Luis Obispo Co., near Cuesta Pass, 20 June 1908, *I. J. Condit s.n.* (holotype, JEPS-2652 digital image).

Monardella villosa subsp. *obispoensis* occurs in coastal areas and coastal mountains of California from Santa Barbara County to San Francisco County. It differs from all other *Monardella* taxa by the abundance of distinctive long, branched trichomes on its stems and leaves. With the exception of the zones of introgression between *M. villosa* subsp. *obispoensis* and each *M. villosa* subsp. *villosa* (in the north) and *M. hypoleuca* A. Gray subsp. *hypoleuca* (in the south), these branched trichomes have been found only on a few other specimens throughout the genus, and those specimens contained only a few.

4c. *Monardella villosa* subsp. *suberrata* (Greene)
Epling, Ann. Missouri Bot. Gard. 12: 48. 1925. Basionym: *Monardella suberrata* Greene, Pittonia 5: 81. 1902. *Madronella suberrata* (Greene) Greene, Leaflet. Bot. Observ. Crit. 1: 169. 1906. *Monardella villosa* Benth. subsp. *suberrata* (Greene) Epling, Ann. Missouri Bot. Gard. 12: 48. 1925. *Monardella villosa* Benth. var. *suberrata* (Greene) Jeps., Fl. Calif. 3: 436. 1943. TYPE: U.S.A. California: Sonoma Co., June 1890, *G. W. Dunn s.n.* (holotype, NDG-44448, isotype, GH-s.n. [a photo of holotype sheet]).

Discussion. *Monardella* plants of interior areas and upland habitats throughout California and Oregon with an abundance of villous trichomes 0.3–1 mm have been identified as *M. villosa* subsp. *villosa* from Epling's 1925 monograph through the most recent floristic treatment (Sanders et al., 2012). Yet these plants do not fit within the circumscription of *M. villosa* subsp. *villosa* or conform to the type; therefore, another name must be applied to them. There are seven names available at the rank of subspecies within *M. villosa*: subspecies *villosa*, subspecies *franciscana*, subspecies *globosa* Greene, subspecies *neglecta*, subspecies *obispoensis*, subspecies *sheltonii* (Torr.) Epling, and subspecies *suberrata*. The epithets *villosa*, *franciscana*, *globosa*, *neglecta*, *obispoensis*, and *sheltonii* apply to other currently recognized taxa, most of which are discussed above. The only available name at this rank that applies to the plants in question is *M. villosa* subsp. *suberrata*. The description and type of *M. villosa* subsp. *suberrata* fit within the general characteristics and range of the long-pubescent, wide-leaved plants that occur in the coastal mountain

ranges of central and northern California and into southern Oregon. These plants are hereby recognized as *M. villosa* subsp. *suberrata*.

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