

2013

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### Recommended Citation

Brummitt, Richard K. and Namoff, Sandra M. (2013) "A New Subspecies of *Calystegia collina* (Greene) Brummitt (Convolvulaceae) in the Coast Ranges of California and Notes on the Distribution of the Species," *Aliso: A Journal of Systematic and Floristic Botany*. Vol. 31: Iss. 2, Article 4.  
Available at: <https://scholarship.claremont.edu/aliso/vol31/iss2/4>

## A NEW SUBSPECIES OF *CALYSTEGIA COLLINA* (GREENE) BRUMMITT (CONVOLVULACEAE) IN THE COAST RANGES OF CALIFORNIA AND NOTES ON THE DISTRIBUTION OF THE SPECIES

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### ABSTRACT

*Calystegia collina* occurs in the Coast Ranges of California from Lake County to Santa Barbara County and is considered closely related to, but specifically separable from, *C. malacophylla*. The northernmost taxon in the *C. collina* complex, subsp. *tridactylosa*, differs from other taxa in significant morphological characters and is geographically disjunct. Further investigation may suggest that subspecies *tridactylosa* should be elevated to the rank of species. The contiguous distributions of subspecies *collina* and *oxyphylla* are detailed, and subspecific rank is justified based on morphological considerations despite range overlap and the existence of some intermediates. Subspecies **apicum**, formerly included in subspecies *venusta* based on sepal similarity, is segregated based on differences in leaf margin morphology, leaf size, and overall differences in pubescence. The revised concept of subspecies *venusta* only includes plants with strongly sinuate leaf margins.

Key words: California Coast Ranges, *Calystegia collina*, circumscription, Convolvulaceae, key, morphology, serpentine.

### INTRODUCTION

*Calystegia collina* (Greene) Brummitt occurs in disjunct populations in the Coast Ranges of California from Lake County in the north to Santa Barbara County in the south. The species is a rhizomatous perennial with a generally low-growing or sprawling growth form. Pollination experiments show that the species is predominately outcrossing, at least in the northern part of the range (Wolf and Harrison 2000). *Calystegia collina* is endemic to the Coast Ranges of California and has been described as a serpentine endemic (Wolf et al. 2000). However, some collections of *C. collina* reported by the Consortium of California Herbaria (2013) explicitly document the species on non-serpentine substrates. Of the 75 collections of *C. collina* that have substrate composition information, 69 (92%) occur on serpentine-influenced soils and nine (8%) on other soil types. The most recent treatment of the species complex in *The Jepson Manual* (Brummitt 2012) recognizes four subspecies based on bracteole, sepal, and indumentum characteristics. In this paper, we review the putative relationships of *C. collina* to other species of *Calystegia*, describe a new morpho-subspecies based on leaf characteristics, and provide a taxonomic key to the species complex.

Similarity in low-growing habit, dense tomentum, and bracteole morphology have persuaded some authors to include *C. collina* as a subspecies or variety in *C. malacophylla* (Greene) Munz, but differences leaf shape and outermost sepal morphology strongly differentiate the two species as described here. North Coast taxa, subsp. *collina* and *oxyphylla*, are differentiated from *C. malacophylla* based on outermost sepal pubescence and leaf shape. Subspecies *collina* and *oxyphylla* are easily differentiated from each other based on leaf

morphology. Subspecies *collina* has entire, deltate to reniform leaf morphology, whereas subsp. *oxyphylla* has triangular-lobed leaf lamina. For the most part, the distribution of subsp. *oxyphylla* is centered west of subsp. *collina*, but admixed populations, i.e., those with plants showing intermediate leaf types, do occur. Although not yet characterized, we hypothesize that subtle ecological factors in conjunction with partial geographic separation are driving reproductive isolation between the subspecies.

*Calystegia collina* subsp. *tridactylosa* is geographically and morphologically distinct from other subspecies of *C. collina* and *C. malacophylla*. The taxon is distinguished morphologically by narrower bracteoles (less than 1.5 mm) relative to all other taxa. Additionally, populations with narrow bracteoles are at the north of the range greater than 30 km disjunct from all other populations of *C. collina* (Fig. 1). General leaf shape and habit of subsp. *tridactylosa* is most similar to that of subsp. *oxyphylla*, with the exception that subsp. *tridactylosa* tends to have leaf margins that are smooth. Subspecies *tridactylosa* is the most distinctive taxon in the *C. collina* complex. It is possible that data relevant to reproductive isolation would support elevating this taxon to the species level.

South of San Francisco Bay, the two taxa recognized here, subsp. **apicum**, subsp. nov., and subsp. *venusta*, broadly overlap with *C. malacophylla* subsp. *pedicellata* (Jeps.) Munz in their distributions, but sympatric populations are not known. Relative to *C. malacophylla* these southern subspecies differ rather markedly in leaf and indumentum characteristics. They also tend to have much smaller leaves than *C. malacophylla*. Although the differences are slight, separate specific rank is preferable. Munz (1968: 85) came to the same conclusion. Subspecies *venusta* is most readily identified by sinuate leaf margins, whereas subsp. **apicum** has distinctly smooth margins. Mirroring the case in the North Coast, the

<sup>4</sup>Deceased 18 Sep 2013

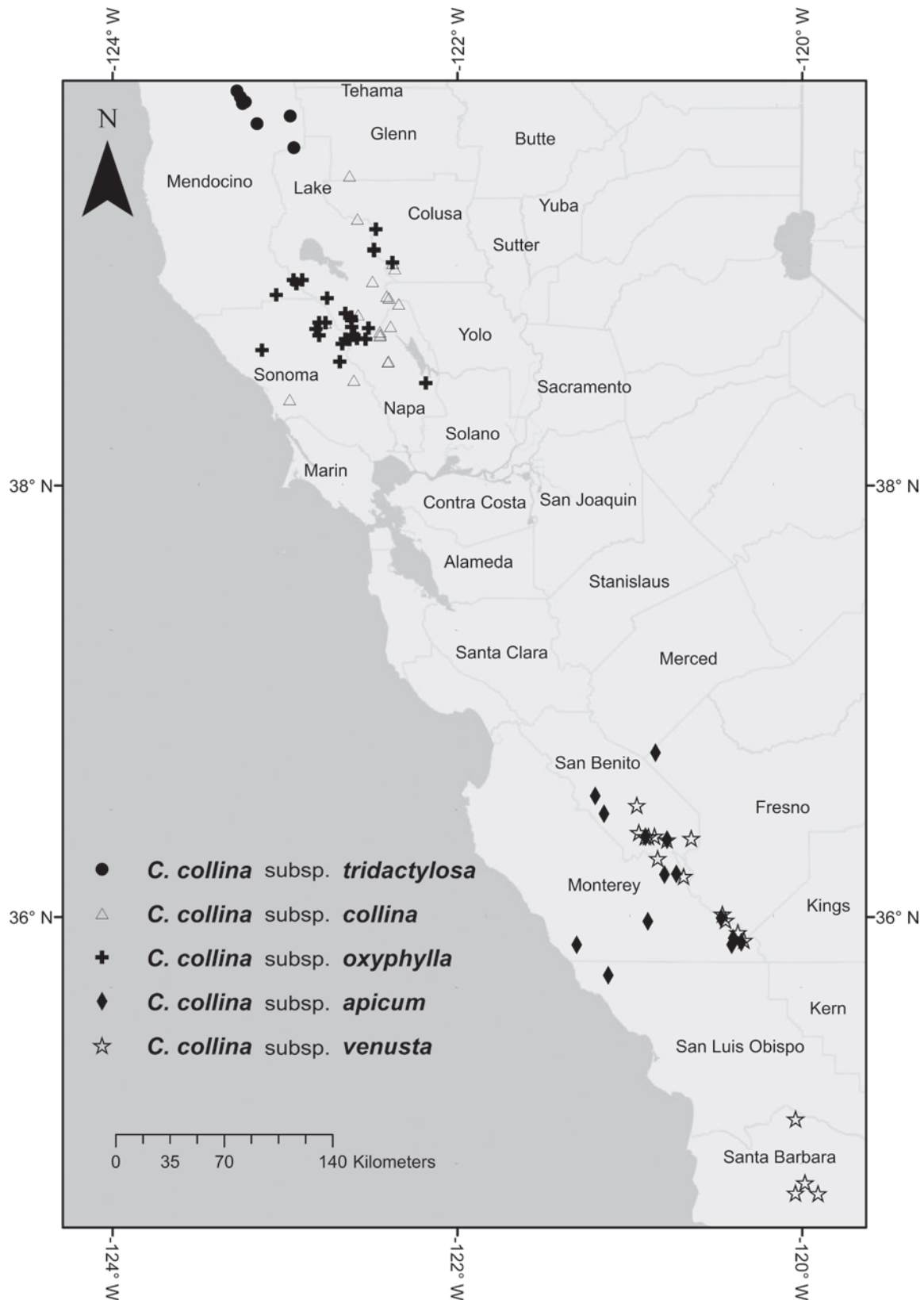


Fig. 1. Distribution of the *Calystegia collina* species complex. Populations of subsp. *tridactylosa* are more than 30 km north of all other populations. The distributions of subsp. *collina* and subsp. *oxyphylla* overlap, but subsp. *oxyphylla* is generally concentrated west of the distribution of subsp. *collina*. Subspecies *venusta* and subsp. *apicum* occur in the South Coast Ranges and have non-discrete distributions. Points represent populations of subspecies based on georeferenced herbarium records. All waypoints were field collected or based on Consortium of California Herbaria (2013) records. The map was created in ArcGIS 10.2, ESRI (Environmental Systems Research Institute), Redlands, CA.

two subspecies have interdigitated ranges, but populations with both or intermediate leaf types have not been observed. Again, subtle ecological factors could contribute to reduce gene flow among populations of these subspecies, which are reflected in differences in leaf morphology. We, therefore, segregate subsp. **apicum** from subsp. *venusta* in the South Coast Ranges.

Evidence from morphometric, ecological, and genetic studies could, undoubtedly, influence how *C. collina* is conceptualized. The descriptions and key present a hypothesis regarding subspecific circumscription within the *C. collina* complex based on morphological features and geographic considerations. Subspecies **apicum** is here segregated from subsp. *venusta* based on differences in leaf margin morphology, leaf size, and overall differences in pubescence. Additionally, type information and descriptions of all the previously recognized subspecific taxa within *C. collina* are provided.

*CALYSTEGIA COLLINA* (Greene) Brummitt, *Ann. Missouri Bot. Gard.* **52**: 215 (1965).—TYPE: USA. California, Napa County: Conn Valley, 38.504316, -122.3945 estimated, 1 May 1894, *W.L. Jepson s.n.* (ND, Herbarium Greeneanum [Greene-Nieuwland Herbarium] 39696, lectotype chosen here, photo K; isolectotype UC). *Convolvulus collinus* Greene, *Pittonia* **3**: 326 (1898); *C. malacophyllus* Greene subsp. *collinus* (Greene) Abrams, Ill. Fl. Pacific States: 386 (1951); *C. malacophyllus* var. *collinus* (Greene) J.H. Thomas, Fl. Santa Cruz Mts.: 275 (1961), without basionym citation. Type as for *C. collina*. *Convolvulus subacaulis* sensu Jeps., Fl. W. Mid. Calif.: 387 (1901) and ed. 2: 326 (1911), pro parte. *Convolvulus villosus* sensu Jeps., Man. Fl. Pl. Calif.: 777 (1925), pro parte. *Convolvulus malacophyllus* sensu Jeps., Fl. Calif. **3**: 120 (1939) pro parte as to “low tufted inner Coast Range form”.

Plants rhizomatous, rhizomes sometimes woody or arising from a somewhat woody rootstock, aerial stems herbaceous, branching near the base only, either subacaulous and tufted with ascending stems up to 8 cm long equaled by the long-petioled lower leaves, or with more elongate procumbent to ascending stems up to 50 cm. Indumentum of stems, leaves, and peduncles tomentellous to tomentose. Leaf blades reniform with indistinct lobes to digitately 3-lobed with oblong lobes, midrib rarely more than 3 cm across, base weakly to strongly cuneate, margins smooth to strongly sinuate-undulate, apex rounded to acute. Peduncles 1-flowered, length up to 6 cm, slightly longer or slightly shorter than subtending leaf. Bracteoles 7–17 × 1.5–14 mm, inserted immediately below sepals, largely exposing to largely concealing the sepals, narrowly oblong and flat to broadly ovate. Sepals 8–13 mm, glabrous to densely appressed-pubescent; corolla (25–) 27–50 (–55) mm, white; stamens 19–28 mm.

Flowering May through June in the California Coast Ranges from Mendocino County to Santa Barbara County, often on serpentine substrate, elevation 130–2100 m. Populations of subspecies represented by point locations in Fig. 1 are based on georeferenced herbarium records listed in the Consortium of California Herbaria (2013) or field collections.

KEY TO SUBSPECIES

- 1. Bracteoles up to 3.5 mm broad, outer sepal pubescent; stems decumbent-ascending, to 50 cm; leaf blades with 3 distinct oblong lobes, margins not undulate, North Coast Ranges . . . . . a. subsp. *tridactylosa*
- 1. Bracteoles more than 4 mm broad; outer sepals pubescent or glabrous; plants subacaulous or stems decumbent-ascending, to 30 cm; leaf blades triangular to reniform, margins undulate to smooth
  - 2. Outer sepals glabrous or strigose down center only
    - 3. Leaf blades broadly triangular, deltate to reniform, lateral margins curve abaxially, basal lobes not abruptly spreading, apex rounded to subacute, North Coast Ranges . . . . . b. subsp. *collina*
    - 3. Leaf blades broadly triangular, lateral margins curve adaxially, basal lobes more or less abruptly defined, apex acute, North Coast Ranges . . . . . c. subsp. *oxyphylla*
  - 2. Outer sepals densely appressed-pubescent
    - 4. Leaf margins smooth, leaves pubescent, mostly 4 × 4 cm, basal lobes more or less abruptly spreading, lateral margins curve adaxially, South Coast Ranges . . . . . d. subsp. **apicum**
    - 4. Leaf margins markedly sinuate-undulate, leaves tomentellous to subsericeous, mostly 1–2 × 1–2 cm, basal lobes not abruptly spreading, lateral margins more or less curve abaxially, South Coast Ranges . . . . . e. subsp. *venusta*

a. *CALYSTEGIA COLLINA* subsp. *TRIDACTYLOSA* (Eastw.) Brummitt, *Ann. Missouri Bot. Gard.* **52**: 215 (1965).—TYPE: USA. California, Mendocino County: hills near Covelo, 39.7827, -123.2791 estimated, 5 Jun 1928, *A. Eastwood 15202* (holotype CAS). *Convolvulus tridactylosus* Eastw., *Proc. Calif. Acad. Sci.*, ser. 4, **20**: 151 (1931). Illustration: Jepson, Fl. Calif. **3**: t. 363 *r* and *s* (leaves only), as *Convolvulus malacophyllus*.

Plants decumbent-ascending to 50 cm, indumentum of stems, leaves, peduncles, and bracteoles densely tomentose with longish almost villous hairs, usually appearing brownish in herbarium specimens. Leaf blades distinctly 3-lobed; median lobe broadly to narrowly triangular, apex acute; lateral lobes forwardly directed and sometimes curving laterally or slightly backwards, or spreading at right angles to median lobe; margins undulate to smooth. Bracteoles 5–10 × 1.5–3.5 mm, linear-elliptic to lanceolate, not completely encircling sepals, apex acute. Outer sepals densely appressed-pubescent; corolla 27–33 mm; stamens ca. 21 mm.

Flowering May through June, restricted to Mendocino County and possibly Lake County, cismontane woodland, chaparral, associated with serpentine-influenced soils, elevation 600–750 m.

*Other specimens seen.*—USA. California, Mendocino County: see type above; Eden Valley and Eel River divide, 8 Jun 1893, *anon.* (UC; photo K); Round Valley, foothills at S side of valley, 610 m, 2 Jun 1938, *J.P. Tracy 15802* (UC; photo K); Plaskett Ridge, near blue banks, 39.6703, -122.97033, forest openings, Jeffrey pine, serpentine, 9 Jul 1980, *J. Jokerst 949* (CHSC); just N of Windy Gap along USFS M1 (aka forest route 1N02), 39.52904, -122.9489 estimated, 1964 m, 4 Aug

1983, *G.L. Smith 8242* (CAS); 20 km NE of Willets, Eden Valley Ranch, by Toney Creek 300 m up from road, under pines on serpentine, 39.6362, -123.1626, 753 m, 1 Jul 2004, *R.K. Brummitt, B. Ertter, T.W. Nelson & J. Wheeler 21016* (K, UC); [by road 300 m from preceding], *ibid.* 21020 (K, UC); foothills SW side of Round Meadow, along road cut on the SE side of California Highway 162 [CA-162], S of Covelo, chaparral, serpentine-influenced soils, WNW facing slope/road cut, 39.74217, -123.25278, 461 m, 17 Jun 2013, *S.M. Namoff 83* (RSA); foothills SW side of Round Meadow near Covelo, 0.8 road miles SW of the intersection of CA-162 and Poonkinney Road, chaparral, oak woodland, serpentine-influenced soils, road cut steep and W facing, approx. 50 individuals, fruit set low, 39.7553, -123.2593, 499 m, 17 Jun 2013, *S.M. Namoff 84* (RSA); foothills S of Round Meadow near Covelo, 250 m E of CA-162, along N side of dirt road, ecotone between chaparral and non-native grass land, from hundreds to a thousand individuals, 39.72799, -123.250494, elevation 620 m, 18 Jun 2013, *S.M. Namoff 85* (RSA).

Subspecies *tridactylosa* differs markedly from the other subspecies in its narrow bracteoles, suggesting that it might even be given specific rank. The subspecies also differs in lacking strongly sinuate-undulate leaf margins of the other northern subspecies, and it is possible that it represents the result of past introgression between *C. collina* and *C. occidentalis* subsp. *occidentalis*. If it should prove to be a recent hybrid, it would be better treated at specific rank, although convincing morphological characters are difficult to find. It also comes close morphologically to plants from northern California named by R.K.B. as *C. occidentalis* "var. *tomentella*", the only essential differences being its more villous indumentum, narrower lobing of the leaves, and the sometimes rather broader bracteoles.

#### b. CALYSTEGIA COLLINA (Greene) Brummitt subsp. COLLINA

Plants subcaulicous, tufted, stems ascending to 8 (-15) cm, indumentum densely tomentose with brown to gray, longish, more or less villous hairs. Leaf blades broadly triangular, deltate to reniform, lateral margins curving abaxially, lamina usually entire to minutely lobed, margins sinuate-undulate, apex rounded to acuminate or sometimes subacute. Bracteoles closely enfolding sepals, broadly ovate, 8-15 × (6-) 9-14 mm, apex acute to obtuse. Outer sepals glabrous or with line of hairs down middle from apex; corolla (30) 34-48 (55) mm; stamens 19-24 mm.

Flowering April to June, southern part of the North Coast Range and San Francisco Bay area, from S and E of Clear Lake to Santa Clara Co., in chaparral and cismontane woodlands, elevation 150-1000 m.

*Other specimens seen.*—USA. California, Colusa County: 2 miles SW of junction of CA-16 and CA-20, 18 Jun 1948, *G.R. Campbell 653* (RSA). Lake County: [without further locality] 1874 or 1875, *Bolander in Rattan*, s.n. (DS); 4-5 miles E of Hough Springs, 7 May 1928, *Abrams 12566* (DS); 14.5 miles from Lower Lake on Monticella Road, 23 May 1937, *J. Ewan 10354* (UC); Mirabel mine, 15 May 1938, *A. Eastwood & J.T. Howell 5526* (CAS); Butts Canyon 7 miles NE of Aetna Springs, 30 Apr 1939, *E. Crum 2085* (BM, CAS, DS, POM, RSA, UC, UTC); 8 miles SE of Middletown, alt. 1100 m, 21 Jun 1945, *Ripley & Barneby 6924* (CAS). Napa

County: see lectotype of *C. collina* above; Howell Mountain, on hills at head of Moore's Creek 3-4 miles E of Angwin's, alt. 1200 ft, 17 May 1902, *Tracy 1520* (UC); Knoxville, rocky ridges, 8 May 1903, *C.F. Baker 2968* (K); Butts Canyon, 10 miles N of Howell Mountain, 2 Jun 1933, *R. Bacigalupi, R.S. Ferris & I. Wiggins 6682* (DS); Howell Mountain, 24 May 1938, *W.L. Jepson 18841* (JEPS); N side of canyon of Sage Creek, ca. 3 miles E of Chiles Valley, alt. 1000 ft, 22 Apr 1950, *Kamb & Chisaki 1776* (UC).

The following seem to be more or less exactly intermediate between subsp. *collina* and subsp. *oxyphylla*: Colusa County: [cult. Kew from seed] CA-20, milepost 1.5, alt. 493 m, serpentine chaparral, 1 Sep 2006, *R. O'Dell CA190*: 97 (K). Sonoma County: 17 km NNE of Healdsburg on Pine Flat Road near Red Hill, *R.K. Brummitt, A. Wolf & R.W. Howe 19860* (CAS, K).

c. CALYSTEGIA COLLINA (Greene) Brummitt subsp. OXYPHYLLA Brummitt, *Kew Bull.* 35: 328 (1980).—TYPE: Lake County, near Glenbrook, 38.8693, -122.7701 estimated, 767 m, 18 Jun 1945, *J.T. Howell 20985* (holotype CAS; photo K). The holotype includes eight plants on one sheet, one of which is more elongate than the others; the lower right-hand plant immediately above the label is designated as the lectotype. Illustration: W.L. Jepson, *Man. Fl. Pl. Calif.*: 776, t. 763, as *Convolvulus villosus*.

Plants subcaulicous, tufted, or with stems decumbent-ascending to 8 (-20) cm, indumentum densely tomentose with brown, ± villous hairs. Leaf blades with triangular median lobe and abruptly spreading basal lobes, lateral margins of leaf curve adaxially, margins usually sinuate-undulate, apex acute. Bracteoles closely enfolding sepals, lanceolate to broadly ovate, 8-17 × 5-11 mm, apex acute to obtuse. Sepals glabrous or with line of hairs down middle from apex of outer sepals; corolla 27-53 mm; stamens 19-28 mm.

Flowering April to June. SE part of North Coast Range from Mount St. Helena to hills west of Clear Lake in Lake, Sonoma and Napa Counties, chaparral and cismontane woodlands, elevation 130-850 m.

*Other specimens seen.*—USA. California, Lake County: see holotype above; summit of ridge W of Leesville, alt. 2000 ft, 10 May 1919, *Heller 13130* (CAS, DS); mountains E of Stanton, 23 May 1920, *W.L. Jepson 8980* (JEPS); between Clear Lake and Lower Lake, 30 May 1926, *Kildale 2063* (DS); Lower Lake, Lakeport Road, top of ridge, 30 May 1926, *Kildale 2063* (DS); 6 miles E of Hough's Mineral Springs, 7 May 1928, *Kildale 4997* (DS); 6 miles E of Hough's Mineral Springs on road to Williams, 7 May 1928, *Wolf 2105* (RSA); Cobb Valley, Kelsey Creek head water, alt. 2300 ft, 15 Jun 1932, *Benson 3688* (DS); between Cobb Mountain and Adams Springs on the Brinkley Ranch, 27 Jun 1933, *Jussel 253* (CAS); N side of Cobb Valley near Glenbrook, alt. 2700 ft, 4 Jul 1935, *Tracy 14031* (UC); 2.9 miles N of Middletown, 11 May 1943, *J.T. Howell 18060* (CAS); 2.9 miles E of Middletown, 11 May 1943, *M.S. Baker 10422* (CAS); Brim Road (Bartlett Springs Road) 0.2 miles W of road to Barrel Spring, 2050 ft alt., serpentine soil, 12 May 1986, *V. Oswald 2019* (CHSC); Bottle Rock Road a few miles NW of Pine Grove, 1.3 miles SE of Sulphur City between Kelseyville and Middleton, alt. 2400 ft, 4 Jun 1988, *B. Ertter 7504* (K, UC); 8.5 km ESE of Middletown on Butts Canyon Road just E of Detert Reservoir,

38.7197, –122.5211, alt. 400 m, serpentine in *P. sabiniana*, 15 May 1998, *R.K. Brummitt, A. Wolf & R.W. Howe 19852* (CAS, K, RSA, UC); 2.5 km N of Middletown on Big Canyon Road 150 m S of Harbin Springs turn-off, 38.7667, –122.6167, alt. 500 m, *R.K. Brummitt, A. Wolf & R.W. Howe 19853* (CAS, K, UC). Napa County: Mount St. Helena, 1892, *E.L. Greene s.n.* (NY, UC); E of Mount St. Helena, 23 May 1934, *Rose 34274* (CAS); 18 km ENE of Healdsburg on Ida Canyon Road 4 km above CA-128, rocky outcrop, 38.6699, –122.6684, alt. 650 m, 15 May 1998, *R.K. Brummitt, A. Wolf & R.W. Howe 19859* (CAS, K). Sonoma County: Knights Valley, April 1877, *H. Edwards s.n.* (NY); Little Sulphur Creek, 11 Jun 1898, *M.S. Baker 648* (POM); 5 miles S of the Geysers, 15 May 1938, *Cantelow 2406* (CAS); summit of grade between Mark West Valley and Franz Valley, 9 Jun 1948, *R. Ferris & L. Lorraine 11660* (CAS, DS, RSA, UC, UTC).

There is some variation in leaf shape within populations, suggesting some intergradation between subsp. *oxyphylla* with subsp. *collina*. The distributions of these taxa are contiguous, and plants more or less exactly intermediate occur (see above). The markedly more western distribution of subsp. *oxyphylla* justifies subspecific separation (Fig. 1).

d. CALYSTEGIA COLLINA subsp. **apicum** Brummitt & Namoff, subsp. nov.—TYPE: USA. California, San Benito County: Bear Valley 0.5 km outside gate of The Pinnacles National Monument, 36.4849, –121.1549, alt. 350 m, 10 May 1998, *R.K. Brummitt 19819* (holotype RSA; isotypes CAS, K, MO, NY, SD, UC, US). The epithet chosen is the genitive plural of the third declension noun *apex*, and signifies proximity to The Pinnacles National Monument.

Plants decumbent-ascending to 30 cm, pubescent with grey hairs. Leaves mostly ca. 4 × 4 cm, margins smooth, basal lobes hastate, ± abruptly spreading, lateral margins curve adaxially, apex more or less acute. Bracteoles loosely to closely enfolding sepals, broadly ovate to lanceolate, 8–16 × 4–10 mm. Sepals densely appressed-pubescent; corolla (25) 30–44 mm, white; stamens 21–24 mm.

Flowering from April through June. South Coast Range, San Benito, Monterey, San Luis Obispo Counties in mesic areas, chaparral, and cismontane woodlands, elevation 350–750 m.

*Other specimens seen.*—USA. California, Monterey County: about 10 miles N of Bradley, W bank of Salinas Road, 35.9797, –120.896 estimated, 130 m, 4 May 1920, *Mallory s.n.* (DS); Mustang Grade, approximate, 12 Jun 1938, *A. Eastwood & J.T. Howell 5817* (CAS); just S of summit of Parkfield-Coalinga road, alt. 3450 ft, 28 May 1941, *R.S. Ferris & R. Bacigalupi 10366* (CAS, DS, RSA, UC); Bill Thompson Ranch 2 miles from Parkfield, alt. 1400 ft, 19 May 1963, *B.F. Howitt 1527* (CAS); hills NW of Turkey Flat, common on a metamorphic rocky-gravelly hillock, Douglas oak, digger pine association, 35.8817, –120.3536, 1500 ft, 30 Apr 1970, *E.C. Twisselmann 16431* (CAS); 35 air km E of King City, lower end Priest Valley, N side of CA-198 just E of mile marker 21, top bank beside highway, on terrace above S side Lewis Creek/North Fork confluence, open or part shade *Quercus-Pinus* woodland, loamy well developed soil derived from serpentine, 36.202, –120.730, 2240 ft, 24 Jun 1991, *R.E. Buck 1817* (JEPS); 1.5 miles E Parkfield, W-facing serpentine slopes with annual herb cover and *Ceanothus cuneatus* chaparral upslope,

35.9003, –120.4000 estimated, 1750 ft, 28 Apr 1995, *D.W. Taylor 14852* (JEPS); Fort Hunter Liggett Training area 17, near Burro Road, ca. 2.0 km N of Three Peaks, ca. 3.25 km W of Burro Mountain, serpentine gravel, cobbles, and boulders in loam, moderate to steep slopes, 35.8695, –121.3086, 700 m, 15 Jun 1995, *E. Painter & E. Neese, HL-1891* (CAS). San Benito County: see type above; near Hernandez Valley, 35.8695, –121.3086 estimated, 3 Jun 1899, *W.R. Dudley s.n.* (DS); southern San Benito Co., Mitchell Valley, 1 Jun 1927, *W.L. Jepson 12212* (JEPS); flats 0.3 miles N of mouth of Lorenzo Vasques Creek at its confluence with San Benito River, grassy flats with open *Pinus sabiniana* woodland, 36.376, –120.91 estimated, 1950 ft, 30 Jun 1991, *D.W. Taylor 11963* (JEPS); inner South Coast Ranges, Hernandez Valley at mouth of Clear Creek 0.4 miles E of Coalinga Road on Clear Creek Road, just E of Hernandez Ranch airstrip mouth of Clear Creek, sandstone-derived soils in open *Quercus lobata* woodland, 36.3624, –120.7842, 2500 ft, 29 Apr 1992, *D.W. Taylor 12478* (JEPS); Bickmore Canyon, in small side canyon N of the Gloria Road, N of Pinnacles National Monument, sandy granitic soils, on flat alluvium bordered by chaparral with *Adenostoma fasciculatum*, *Salvia mellifera* dominant and oak woodland with *Quercus agrifolia*, 36.5667, –121.2014, 1950 ft, 12 Jun 1995, *D.W. Taylor 15089* (JEPS); mouth of Johnson Canyon 0.3 miles N of Red Corral Spring, ca. 5 miles N of Hernandez Reservoir, W-facing, gently sloping margin of chaparral of *Adenostoma fasciculatum* on serpentine, 36.7678, –120.8511 estimated, 2500 ft, 5 May 1995, *D.W. Taylor 14885* (JEPS). San Luis Obispo County: Santa Lucia Mountains, Hearst Ranch, San Simeon Creek Road, 17 road miles from CA-1, between Rocky Butte and Burnett Peak, W-facing serpentine chaparral, barren grassland and spring, scattered *Pinus sabiniana*, 35.726, –121.126, 732 m, 27 May 1998, *D. Keil, w/R. Riggins, D.R. Miller 27506* (RSA).

The subspecies recognized above had been included in subsp. *venusta* when the latter was described (see below), but field observations of both taxa by the present authors in 2012, and further consideration of herbarium specimens, make it desirable to make the present split. Perhaps surprisingly, the simple size of the leaves, much smaller in subsp. *venusta*, as well as the leaf shape, seems to provide an immediate means of identification.

e. CALYSTEGIA COLLINA subsp. **VENUSTA** Brummitt, *Kew Bull.* **35**: 328 (1980).—TYPE: USA. California, Santa Barbara County: where the Figueroa Mountain Road crosses the Los Padres Forest boundary, 34.7431N, –120.0271 estimated, alt. 760 m, 3 May 1961, *E.R. Blakley 4289* (holotype CAS, photo K; isotype JEPS).

Plants subcaulicous to decumbent-ascending to 30 cm, indumentum brownish or greyish to silvery, tomentellous, sometimes subsericeous. Leaf blades triangular to ± reniform, lobes poorly to rather clearly defined, distinctly 1–3-angled, margins sinuate-undulate, apex rounded to acute. Bracteoles loosely to closely enfolding sepals, broadly ovate to lanceolate, 8–16 × 4–10 mm. Sepals densely appressed-pubescent; corolla (25) 30–44 mm, white; stamens 21–24 mm.

Flowering May through June. South Coast Range, Santa Barbara County, chaparral and cismontane woodland, elevation 350–1600 m.

*Other specimens seen.*—USA. California, Santa Barbara County: see type citation above; Zaca Lake Forest Reserve, trail to Manzana, 22 Jun 1906, *A. Eastwood s.n.* (CAS); N of Los Olivos on Figueroa Mountain Road, 1.7 miles S of Los Padres National Forest boundary, roadside serpentine outcrop in pine-oak woodland, 37.7424, –120.0524, alt. 606 m, 9 Jun 2012, *R.K. Brummitt & S.M. Namoff 22041* (K, RSA); N of Los Olivos on Figueroa Mountain Road, 1.1 miles S of Los Padres National Forest boundary, flat serpentine outcrop surrounded by pine-oak woodland, 34.7425, –120.0440, alt. 680 m, *R.K. Brummitt & S.M. Namoff 22042* (K, RSA, UC); N of Los Olivos on Figueroa Mountain Road at boundary of Los Padres National Forest, serpentine in pine-oak woodland, 34.7431, –120.0271, alt. 760 m, 9 Jun 2102, *R.K. Brummitt & S.M. Namoff 22041* (K, RSA).

#### ACKNOWLEDGMENTS

We are grateful to Amy Wolf and Robert W. Howe for facilitating fieldwork for this project, and especially for a guided tour of populations in Napa, Lake, and Sonoma Counties in 1998. Thank you to Kim Kersh at the University and Jepson Herbaria and Rebecca Peters and Debra Trock at the California Academy of Sciences for providing access to necessary

herbarium material. Financial support was provided by The Roy and Janet Taylor Herbarium Research Fund and Rancho Santa Ana Botanic Garden Graduate Student Endowment.

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