

Element Codes: ? (*Calystegia felix*) and PDCON040E6 (*Calystegia felix* subsp. *binghamiae*)

Added *Calystegia felix* to 3.1 and changed *C. sepium* subsp. *binghamiae* to 1A in the CNPS Inventory on July 16, 2014

Rare Plant Status Review: *Calystegia felix* and *Calystegia sepium* subsp. *binghamiae*

**Proposed Addition of *C. felix* to CRPR 3.1 1B.1, G1QC G4G2Q / S1S2
Proposed Change of *C. sepium* subsp. *binghamiae* from CRPR 1B.1, G5T1 / S1 to
CRPR 1A, G5TXQ / SX**

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Changes made to the original document appear in blue text.

Background

Calystegia sepium subsp. *binghamiae* is a perennial viniferous herb in the Convolvulaceae. It was added to the CNPS Inventory, Fifth Edition (Skinner and Pavlik 1994) and is currently included as a California Rare Plant Rank (CRPR) 1B.1 taxon. It had previously been treated at the species level, as *Convolvulus binghamiae* (Greene 1887), but was changed to *Convolvulus sepium* var. *binghamiae* by Jepson (1939), then to *Calystegia sepium* var. *binghamiae* by Brummitt (1965). Although first known only from the type locality in Santa Barbara, some later treatments applied the name more broadly to occurrences in Los Angeles and San Bernardino Counties (e.g., Davidson 1909, Davidson and Moxley 1923). Additionally, Abrams (1951) may have based his illustration of *C. binghamiae* on *Johnston 1274* (POM), a specimen from San Bernardino County that is now attributable to a different taxon (see discussion of *C. felix* below) (Sanders and Provance 2013). Prior to its purported rediscovery in the city of Chino in 2011, *C. sepium* subsp. *binghamiae* was only known from the type locality in Santa Barbara and was thought to occur in several historical locations in Los Angeles and San Bernardino Counties. It was thought to be extinct and was subsequently included in the CNPS Inventory as a CRPR 1A taxon. The late R. Brummitt had previously felt that *C. sepium* subsp. *binghamiae* should be re-elevated to species status, but was unsure of this decision, due to a paucity of high-quality specimens. Following the purported rediscovery of this plant in Chino in 2011, Brummitt et al. (2012) had sufficient material to examine and confidently determine it did not belong in *C. sepium*, so they made the new combination *Calystegia binghamiae*. Brummitt et al. (2012) separated *C. binghamiae* from *C. sepium* based on several morphological characters, but they also noted distinct differences between *C. binghamiae* from the southeastern part of its range (Los Angeles and San Bernardino Counties) and *C. binghamiae* from the northwestern part of its range (the type locality in Santa Barbara). In particular, the southeastern *C. binghamiae* specimens have more linear to narrowly elliptic bracteoles, and the bracteoles are at least sometimes inserted remotely from the sepals (versus inserted almost adjacent to the sepals in the Santa Barbara specimens). Brummitt et al. (2012) also noted that the northwestern plants have much more well-developed basal lobes on the leaves in comparison to the southeastern specimens.

While Brummitt et al. (2012) focused particularly on the relationship of *C. binghamiae* to *C. sepium*, Provance and Sanders (2013) focused more on the differences between the southeastern and the northwestern collections of *C. binghamiae*. In addition to citing the morphological differences between the northwestern and southeastern specimens described by Brummitt et al. (2012), Provance and Sanders (2013) examined specimens and high-resolution images of *C. binghamiae*. They observed that the large bracteoles subtending and clasping the calyx (a character always present in members of the *C. sepium* complex) are present in the *C. binghamiae* material from Santa Barbara County, and absent in the specimens collected farther to the south and east. Based on these observations, they concluded that the southeastern material represented a new taxon, and described it as *Calystegia felix* from the type locality in Chino (Sanders 40174). *Calystegia felix* encompasses the material that had previously been attributed to *C. binghamiae* by Brummitt et al. (2012), except for the material from the type locality in Santa Barbara County. Because of its recent original description, *C. felix* was not included in *The Jepson Manual* (1993) or *The Jepson Manual, Second Edition* (Brummitt 2012); the *Flora of North America* treatment for Convolvulaceae is not yet available. Provance and Sanders (2013) also compared the morphology of *C. felix* to that of four similar-looking congeners: *C. occidentalis* subsp. *occidentalis* and subsp. *fulcrata*, *C. peirsonii*, and *C. subacaulis*. A table of these morphological observations is available on page 4 of Provance and Sanders (2013). Although the evolutionary relationship of *C. felix* to other members of the genus remains unclear, *C. felix* is differentiated from each of these four taxa by a combination of floral, vegetative, and growth habit characters (Provance and Sanders 2013). Additionally, *C. felix* is vegetatively very similar to *Convolvulus arvensis*, a common weed in Chino, but the two can easily be separated based on their flower morphology. *Calystegia felix* flowers from March until September (Provance and Sanders 2013).

The recognition of *C. felix* as a unique taxon brings back into question the name of the plants collected in Santa Barbara County. Although Brummitt et al. (2012) felt that they had sufficient data to separate *C. binghamiae* from *C. sepium*, most of their observations were based on specimens that are now attributable to *C. felix*. The Santa Barbara County specimens of *C. binghamiae* have the morphological feature of two bracteoles closely subtending the sepals, so its continued inclusion in the *C. sepium* complex is still warranted (Sanders and Provance 2013). Although Sanders and Provance (pers. comm. 2014) tentatively recommend continuing to recognize the plants from Santa Barbara as *C. sepium* subsp. *binghamiae*, it is also possible that this taxon is synonymous with *C. sepium* subsp. *limnophila*, or that both taxa should be treated as *Calystegia repens*; further investigation is ongoing. To complicate matters further, the native status of *C. sepium* / *C. repens* in California is considered questionable (M. Provance pers. comm. 2014). Several specimens that had previously been identified to subsp. *binghamiae* have since been annotated to subsp. *limnophila*, highlighting the similarities between these two taxa. If the two subspecies are synonymized, the name subsp. *binghamiae* would apply, given that it was described earlier. For the remainder of this document, we will refer to our two taxa of focus sensu Provance and Sanders (2013): *Calystegia felix* from San Bernardino and Los Angeles Counties, and *Calystegia sepium* subsp. *binghamiae* from Santa Barbara.

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Since the initial re-discovery of *C. felix*, five additional occurrences have been located in the city of Chino. All of the extant occurrences are found in irrigated landscaping areas. Provance and Sanders (2013) presumed that the plants have emerged from latent long-lived seed banks where the soil has returned to moister conditions. *Calystegia sepium* seeds have been known to survive for 39 years when buried in soil, so *C. felix* seeds could conceivably have long-term viability as well (Provance and Sanders 2013). It is also possible that the plants have gone unnoticed for decades, especially when considering their similarity to *Convolvulus arvensis* and their unusual habitat. Historical records indicate that the Chino Basin formerly had the vegetation typical of wet meadows and alkali meadows, and the high moisture levels were maintained by a series of springs, or *ciénegas* (Provance and Sanders 2013). *Calystegia felix* presents us with a case similar to that of *Limnanthes douglasii* subsp. *ornduffii* (recently added to CRPR 1B.1), as both of these taxa are no longer found in their natural habitats, but have been able to persist only in human-altered environments. *Calystegia felix* occurs between 30 and 215 meters in elevation.

There are currently ten known occurrences of *Calystegia felix*. Six of those have been recently observed in irrigated planter beds in the city of Chino. At one of those sites, 200 ramets were observed, and about 50 ramets total were observed between all the other sites. However, many of those ramets likely represent clones (Provance and Sanders 2013). Of the four historically-documented occurrences, none has been seen more recently than 1917. The three occurrences from Los Angeles County are listed as possibly extirpated in the CNDDDB (2014) (under the name *C. sepium* subsp. *binghamiae*). However, surveys focused on relocating the Los Angeles County occurrences have never focused on human-altered habitats that are similar to those where *C. felix* has been found in Chino (M. Provance pers. comm. 2014). Surveys near the sites of historical occurrences in Los Angeles County are being planned for spring 2014 (M. Provance pers. comm. 2014).

Calystegia felix should be considered highly threatened, as most of its natural habitat has already been destroyed or highly altered. The six extant occurrences are likely dependent on water from irrigation, and should be considered vulnerable to extirpation from stochastic events in their urban environment, as well as potential changes in land use and/or land management. Additional propagules could potentially exist in undeveloped lands near the known extant occurrences, but the drier conditions caused by hydrological alterations in the Chino Basin may prevent their emergence (inferred from statements made by Provance and Sanders 2013). To address the immediate conservation concerns surrounding this plant, plants from the type locality are being grown ex-situ at Rancho Santa Ana Botanic Garden. Several other plants are also being propagated in private and institutional gardens (Provance and Sanders 2013).

Based on the available information, CNPS and CNDDDB recommend adding *Calystegia felix* to CRPR 3.1 4B-4, and strongly encourage surveys in areas of potential habitat near the historical occurrences in Los Angeles County. If more information on this plant

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becomes available in the future, CNPS and CNDDDB will re-evaluate its status at that time.

CNPS and CNDDDB recommend re-ranking *Calystegia sepium* subsp. *binghamiae* from CRPR 1B.1 to CRPR 1A as the only known locality of this plant has been extirpated. Although taxonomic questions surround this plant, potentially suggesting a CRPR of 3, CNPS and CNDDDB feel that its extinct status should take precedence, at least until further work is done on the group. We recommend continuing to use the name *C. sepium* subsp. *binghamiae*, rather than *C. binghamiae*, because the combination *C. binghamiae* was based on plants now attributable to a different taxon. If this plant is re-discovered or further taxonomic work on the group is conducted, CNPS and CNDDDB will re-evaluate its status at that time.

Recommended Actions

CNPS: Add *Calystegia felix* to CRPR ~~3.1 4B.4~~; Re-rank *Calystegia sepium* subsp. *binghamiae* from CRPR 1B.1 to CRPR 1A

CNDDDB: Add *Calystegia felix* to ~~G1G2Q / S1S2~~; Re-rank *Calystegia sepium* subsp. *binghamiae* from G5T1 / S1 to G5TXQ / SX

New CNPS Inventory Record

Calystegia felix Provance & A.C. Sanders

lucky morning glory

Convolvulaceae

CRPR ~~3.1 4B.4~~

Los Angeles*, Riverside*, San Bernardino

Prado Dam (087B) 3311786, Whittier (089A)* 3311881, Hollywood (111D)* 3411813

Meadows and seeps (sometimes alkaline), riparian scrub (alluvial); elevation 30 – 215 meters.

Annual herb / vine (rhizomatous and stoloniferous). Blooms March to September.

Change to CRPR 1B? All known occurrences are in irrigated landscapes. Discovered in Chino in 2011; originally identified as *C. sepium* ssp. *binghamiae*. Historical occurrences in LAS Co. should be searched for; needs field surveys. Threatened by transmission line development, housing development, and urbanization. Potentially threatened by hydrological alterations, weeding, and herbicide application. Not in *TJM* (1993) or *TJM 2*. See *Madroño* 59(1):25-27 (2012) for information on discovery (as *C. sepium* ssp. *binghamiae*), and *Phytokeys* 32:1-26 (2013) for original description.

Current CNPS Inventory Record

Calystegia sepium (L.) R. Br. ssp. *binghamiae* (Greene) Brummitt

Santa Barbara morning glory

Convolvulaceae

CRPR 1B.1

Los Angeles*, Orange, San Bernardino, Santa Barbara*

Prado Dam (087B) 33117H6, Whittier (089A) 33118H1, Hollywood (111D)*

34118A3, Santa Barbara (142B)* 34119D6

Sent to: CW, SW on 05/21/2014

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Marshes and swamps (coastal); Riparian scrub (alluvial); Historically associated with wetland and marshy places, but possibly in drier situations as well. Possibly silty loam and alkaline; elevation 0 – 220 meters.

Annual herb. Blooms April to May.

Single population rediscovered in Chino in 2011. Previously considered extinct since 1999. Threatened by transmission line development, housing development, and urbanization. Potentially threatened by hydrological alterations, weeding, and herbicide application. Historical occurrences presumed extirpated by wetland modification and urbanization. Does not key out correctly from ssp. *limnophila* in *TJM* (1993) and *TJM* 2. See *Bulletin of the California Academy of Sciences* 2:417 (1887) for original description, and *Madroño* 59(1):25-27 (2012) for information on rediscovery.

Available online at <http://www.rareplants.cnps.org/detail/1603.html>

Revised CNPS Inventory Record

Calystegia sepium (L.) R. Br. ssp. *binghamiae* (Greene) Brummitt

Santa Barbara morning glory

Convolvulaceae

CRPR 1A

Santa Barbara*

Marshes and swamps (coastal); elevation 5 meters.

Annual herb. Blooms August.

Known only from the type locality in Santa Barbara from 1886; presumed extirpated from wetland modification and urbanization. Changed to CRPR 1B in 2011, when thought to have been rediscovered in Chino, but rediscovered plant was described as a new taxon, *C. felix* in 2013. Possibly a synonym of *C. sepium* ssp. *limnophila*. Native status in California uncertain. See *Bulletin of the California Academy of Sciences* 2:417 (1887) for original description, *Annals of the Missouri Botanical Garden* 52(2): 219 (1965) for taxonomic treatment, and *Phytokeys* 32:1-26 (2013) for revised circumscription.

Literature Cited

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