



*C. amabilis*

# MARIPOSA

the newsletter of the *CALOCHORTUS SOCIETY*

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## Time for subscription renewals –

This is the last issue of Volume XI (July 1999 through April 2000), and it's time to renew your subscription to *Mariposa*. Although the U.S. Postal Service is threatening to once again raise their rates, they have not yet done so. As a result, we are able to offer Volume XII (July 2000 through April 2001) at the same rates as Volume XI –

Domestic \$ 9.00  
Overseas \$11.50

Your credit with us is –

*The extra money you sent last year helped to pay for the extra color page. We hope you're pleased with the result and will continue your support –*

Please remember to renew your subscription before July. (Some subscribers have already paid for the next volume year. If this applies to you, your credit is handwritten in above.)

*Best wishes*

## Species of the issue -- *Calochortus syntrophus*

On June 12, 1993, Forest Botanist Frank Callahan discovered a new species of *Calochortus* while searching for sites of another newly described plant, *Neviusia cliftonii*, in the Montgomery Creek area of northeastern Shasta county, California. *C. superbus* was well known to exist in quantity in this area – a fact which became all the more apparent following the massive Montgomery Creek fire in 1996 – but the plants Frank found, although clearly mariposas, were equally clearly **not** *C. superbus*. After intensive research, he was able to identify a considerable number of characteristics which the two species do **not** share, as well as differences in the soils on which they grew. The announcement of a new taxon and the results of his research were published in Volume 49 (1993) of the journal of the International Bulb Society, *Herbertia*. (Our thanks to Frank for reviewing a draft of this article, as well as for providing us with John Erwin's beautiful pictures.)

**Comparison with *C. superbus*** – The similarities and differences Frank noted between *C. syntrophus* and *C. superbus* are summarized below, in two tables adapted from his *Herbertia* article. First, the similarities –

Similar Characteristics	<i>C. syntrophus</i>	<i>C. superbus</i>
Capsule size: length x width	6.5 cm x 0.9 cm (maximum)	6.5 cm x 0.9 cm (control) 7 cm x 0.9 cm (maximum)
Petal length and width	5 cm x 5 cm	5 cm x 5 cm

The differences he found between the two species, however, far outweighed the similarities –

Differing Characteristics	<i>C. syntrophus</i>	<i>C. superbus</i>
Capsule keel: color, width	dull yellow-brown, 0.8-0.8 mm	near white-brown, 1.4 mm
Capsule groove: width x depth	1 mm x 0.5 mm	0.5 mm x 1 mm
Capsule: seed angle	55°	40°
Capsule: seeds per locule	24.3	62.3
Capsule: seeds per capsule	73	187
Number of seeds per 0.5 grams	125	257
Seed: dimensions	1 mm x 6 mm x 4 mm	0.5 mm x 4.5 mm x 2 mm
% of capsule utilized for seeds	66 ±	83 ±
Embryo	obscure	visible
Petal coloration	white, proximal half petal yellow with distal edge of reddish brown, blotch ± equidistant from petal tip to petal base, yellow region fluorescent under long-wave ultraviolet light	white, yellow, lavender, pink, rarely red; proximal petal lineolate with smaller brown oculate blotch surrounded by yellow; distal edge of blotch is 2/3 of the distance from petal base to petal tip
Gland	Concave-elliptical, densely beset with orange trichomes ± 1 mm long, surrounded with scant yellow trichomes to 5 mm long; proximal edge of gland 5-8 mm from petal base	Acute 45° (similar to an inverted "V"), trichomes 0.2-1 mm long, brown, surrounded by scant, brown trichomes to 5 mm long; proximal edge of gland 10+ mm from petal base
Bulbs: main bulb division	common	rare
Bulbs: width	1.6 cm	1.0-1.4 cm
Bulbs: depth in soil	20+ cm	10 cm or less
Basal leaves	green-active on 6/12/93	green to withering on 6/12/93

Ownbey used the gland as the primary determinant of species differentiation. In terms of gross appearance, note that the glands of the two species are positioned differently on the petal, with that of *C. syntrophus* being noticeably closer to the petal base; are shaped quite differently (elliptical, as opposed to an inverted "V"); and are different in color (orange and yellow, versus brown). Further, the lower third-to-half of the petals of *C. syntrophus* are golden-yellow, with a superimposed red-to-red-brown blotch separated from the gland by a narrow band of golden-yellow; and the upper half of its petals are creamy white. On the other hand, the petals of *C. superbus* are most often entirely creamy white (sometimes lavender or pink), with a distinct "eye-spot" blotch of dark red-brown surrounded by a narrow band of yellow oculation placed well above the gland; the yellow oculation is usually the only area of yellow on the petal.

With so many differing and distinguishing characteristics, the reader may wonder why it is necessary to delineate the differences so exactly. The answer lies in the geographic proximity of the two species. *C. superbus* is known to be a very common species and occurs in great numbers less than two miles away. Given the small size and light weight of the seeds of *C. superbus*, its seeds are easily transported by both wind and water. And given the location of *C. syntrophus* downhill from large stands of *C. superbus*, it becomes necessary for a professional botanist to **prove** that the plant in question is something absolutely "different" from previously known species.



**Calochortus syntrophus** –



Photographs by John Erwin



**Location and habitat** – Frank researched the single site on which *C. syntrophus* is known to grow, as well as the characteristics of the plant itself. The site is on Cove Road, a side road which runs to the north from Highway 299 toward the Pit River. The plant is endemic to a very narrow habitat – an approximately 5-acre “island” of what are called Kilarc series soils that somehow avoided being overrun by the lava and mudflows from the southern Cascades covering the rest of the Montgomery Creek area. This unique habitat is a moderately sloped, rocky, thinly grassy, open woodland that also supports a small oak species (*Quercus douglasii*) not occurring outside the “island.” Surrounding the site are thick conifer forests, composed predominantly of pine (primarily *Pinus ponderosa*, plus limited *P. sabiniana*) and fir (*Pseudotsuga menziesii*). The site itself offers great floristic diversity, including a number of other bulbous or geophytic species (Frank identified both *Calochortus monophyllus* and *C. tolmiei*, plus 4 *Alliums*, 3 *Brodiaeas*, 2 *Triteleias*, a *Dodecatheon*, an *Erythronium*, a *Fritillaria*, and a *Sisyrinchium*).

We have visited the *C. syntrophus* site six times between 1994 to 1999, viewing it both in flower and in fruit. Seeing the plant *in situ* brings to mind yet another difference we would note between it and *C. superbus* – it appears their preferred habitats are not quite the same. *C. superbus* prefers open, grassy meadows with little or no slope, though it can occasionally be seen at the sunny edges of open woodlands. *C. syntrophus*, on the other hand, while it occurs in a thinly grassy open woodland of moderate slope, seems to be concentrated either at the edges of the gullies which drain off the average 75 inches annual rainfall at the site, or else under or close to the small oak trees there – which would be unusual choices for *C. superbus*.

**Comparison with *C. leichtlinii*** – To those who rely on seeing plants in the field for their information, what also may be of interest is the similarity of *C. syntrophus* to another species entirely, *C. leichtlinii*, at least in terms of “gross morphology” or general appearance of the flowers. The pattern of the petal markings between these two is quite similar, while neither is similar to the petal markings of *C. superbus* (see photographs). But...but... The colors are all wrong – *C. leichtlinii* has a smaller area of yellow on the lowermost part of the petal; and the blotch of color above the gland is a dark, smoky red, blue, or gray in *C. leichtlinii*, but a bright brick-red in *C. syntrophus*. The altitude is all wrong – most manuals give 4000 feet as the lower limit of occurrence for *C. leichtlinii* (though we have seen it as low as 3400 feet in Nevada county), while the *C. syntrophus* site is about 1700 feet. The habitat is all wrong – *C. leichtlinii* is usually found on rocky outcrops and scree, while the *C. syntrophus* site is a thinly grassy, open woodland. Also, the seeds *C. leichtlinii* are white and inflated or “puffy” – a characteristic they share with other mariposas that grow at higher altitudes. The seeds of *C. syntrophus* are described in detail in the table above.

Owney describes the gland of *C. leichtlinii* as “irregular, but more or less triangular-ovate,” rather than the concave-elliptical gland of *C. syntrophus*. When Frank reviewed a draft of this article, he added to the list of dissimilarities between *C. syntrophus* and *C. leichtlinii*. The petal graphics (mapping of the nectary, hairs, and color manifestations in relation to the petal surface) differ. In addition, the nectary of *C. leichtlinii* is longitudinally elliptical with intertwined trichomes or hairs. Further, *C. leichtlinii* has “spur-like stem bulbs and a unique capsule venation and seed angle.” Finally, *C. leichtlinii* has anthers that are unusually shaped, “more or less sagittate” (i.e., shaped like an arrowhead, with downward pointing spurs). It seems clear to us that *C. syntrophus* cannot be dismissed as merely an oddly colored, low-altitude variant of *C. leichtlinii*, despite the similarities in petal markings.

**Issues of taxon recognition and risk of extirpation** – The *C. syntrophus* population has been estimated at about 200 blooming-size plants. The site is on private properties, intersected by Cove Road and several private roads. The area is not heavily settled, but it is settled, and there is evidence of recent grading adjacent



Compare with *C. syntrophus* -

*C. superbus* on the left  
*C. leichtlinii* on the right

(Photographs by Jim Robinett)



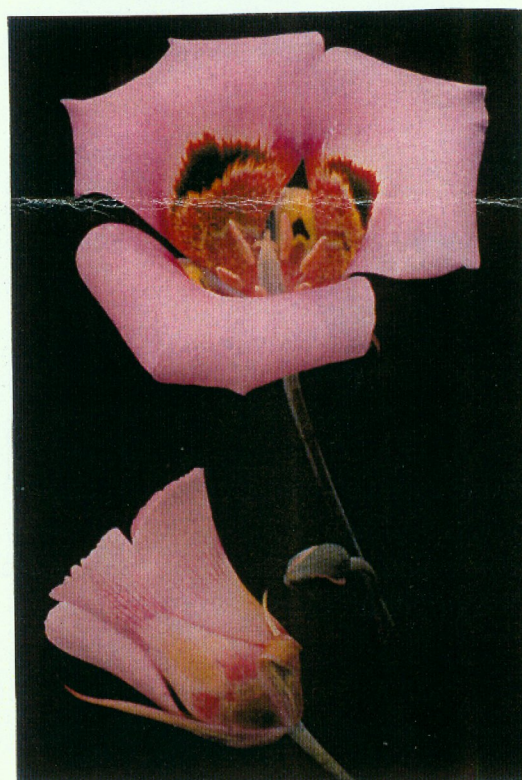
*C. plummerae*



*C. venustus* (Mt. Piños form)



two  
forms of  
*C. vestae*



(Photographs by Lottie Jenvey)



to the site, presumably for one or more new houses. Like many *Calochortus*, *C. syntrophus* does not preserve its previous years' bulb coats very well, which makes assessing the longevity of individual bulbs difficult. The greater bulb size and depth in the soil at which bulbs are found (see table) do suggest it may be longer-lived than *C. superbus*. If so, this would support preservation of the plant.

Some of our visits to the *C. syntrophus* site have included other individuals knowledgeable about *Calochortus* in the field – Vic Girard and Jim and Jennie Archibald of the UK (well known to species plant enthusiasts for their periodic and very comprehensive seed lists). All of us concur with Frank Callahan that this is a new, previously undescribed species of *Calochortus*. However, the California Native Plant Society (CNPS) initially declined to recognize it as a new taxon, instead classifying it as an odd form of *C. superbus*. This raised great concerns about its survival.

Happily, Dave Tibor, Rare Plant Botanist at CNPS, now reports that the new (6th) edition of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (scheduled for publication later this year) will include *C. syntrophus* on its "List 3: Plants About Which We Need More Information – A Review List," until the taxonomic issues are resolved. (Given all the differences noted between *C. syntrophus* and *C. superbus*, and the unusual habitat the former is limited to, it seems to us that the resolution should not be difficult.) *C. syntrophus* will be given a "RED code" of "3-3-3" (**Rarity** = "distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported" / **Endangerment** = "endangered throughout its range" / **Distribution** = "endemic to California") in the new *Inventory* – a designation it fully deserves. Without recognition and protection, this species is at considerable risk of extirpation from its type locality and only known site – which is why we collected seeds of *C. syntrophus* for members this past fall.

**Cultivation** – Jim has been growing *C. syntrophus* since 1996. He has found that it needs a long period of cool weather to germinate, but does not seem to require the extreme cold needed by *C. macrocarpus*. Once germinated, it grows reasonably well. Its needs in the Sonoma County climate seem similar to other non-desert mariposas; it benefits from light feeding and extra water during its growing season – though not as much extra water as *C. vestae* has required. It has not yet bloomed for us, and does not appear to be headed for bloom this year.

### ✂ On a personal note ...

Our correspondence has been sparse over the winter months, as it was last year. So we will close with – first, an apology for the lateness of this issue and previous one. In January we were closing out our Bulb Farm business and focusing on getting our huge library moved to Oregon; this delayed the last issue. Then (as some of you already know) on February 8th Jim suffered a stroke. Fortunately it was a relatively minor one, and he is progressing very well in rehabilitation, walking with a single-point cane and gradually regaining use of his arm and hand. The expectations are for a virtually complete recovery. But with time in hospital, rehabilitation hospital, and now out-patient therapy, our planned schedule received quite a setback!

Second – the generosity of those members who have sent us money above and beyond the subscription cost this past year has helped us to provide our readers with a second page of color photographs, enabling direct comparison among *C. syntrophus*, *C. superbus*, and *C. leichtlinii*. But we especially appreciate being able to share with all of you the beautiful pictures sent to us by member Lottie Jenvey.