

# MARIPOSA

— the *CALOCHORTUS* newsletter — ISSN 1543-6934 —  
 c/o Georgie Robinett, P. O. Box 1993, Brookings, OR 97415 USA

*C. venustus* "2-spot form"

## Species of the Issue – *Calochortus simulans*

**Background** – In February 1944, Dr. Robert F. Hoover, professor of botany at the California Polytechnic Institute in San Luis Obispo, published a short article in *Leaflets of Western Botany* entitled "Mariposa, A Neglected Genus" (Vol. IV, No. 1, pp. 1-4). There he proposed the elevation of Marion Ownbey's Section MARIPOSA to full status as a genus separate and distinct from Ownbey's Section CALOCHORTUS, arguing as follows –

Although *Mariposa* has generally been recognized as a section distinct from typical *Calochortus*, its truly distinctive features appear to have been overlooked; at least, no mention of most of these features can be found in any publication. During the twenty-eight years of my residence in California, I have been particularly interested in that group of plants, and my observations have convinced me that two different genera exist where only one has been recognized. ... Although it must be admitted that I have been unable to examine mature seeds of all the species, no species has yet been seen which in any way combines the characters of the two groups.

The differences between the two groups enumerated by Hoover are summarized in the following table.

Element	Proposed genus " <i>Calochortus</i> "	Proposed genus " <i>Mariposa</i> "
Leaves	Never grooved	All with a sharp groove extending the entire length on the upper side
Stigma-branches	Slender, held above the ovary on a short style	Stout, sessile on the ovary [i.e., with no intervening style— <i>Ed.</i> ]
Seeds	Rather coarsely reticulate [network-like]-pitted, not much flattened, dark purple or purple tinged, at least in all California species	Very minutely reticulate, the reticulations not forming evident pits, much flattened, whitish or greenish
Chromosome count	Always in a multiple of ten	Usually in a multiple of seven or eight

The most arguable point in the above table, in my view, regards seed color. While the seeds of all forms of *C. albus*, *C. monophyllus*, and *C. tolmiei*, for example, are indeed "dark purple" (although some authors describe them as "dark red-brown"), a number of California species in Section CALOCHORTUS have seed most often characterized as pale tan or yellowish – for example, *C. coeruleus*, *C. minimus*, *C. nudus*, and

*C. uniflorus*. It is useful to compare the above table with the distinctions drawn among the sections by Ownbey in his "A Monograph of the Genus *Calochortus*" (*Annals of the Missouri Botanical Garden*, Vol. 27, No. 4, September 1940, pp. 371-461).

Element	Section CALOCHORTUS	Section MARIPOSA	Section CYCLOBOTHRHA
Fruit [pods or capsules]	Ovate, three-winged	Linear, three-angled	Linear, three-angled
Bulb coats	Membranaceous	Membranaceous	Thick, fibrous-reticulate
Chromosome count	Ten	(6) 7, 8, or 9	Nine

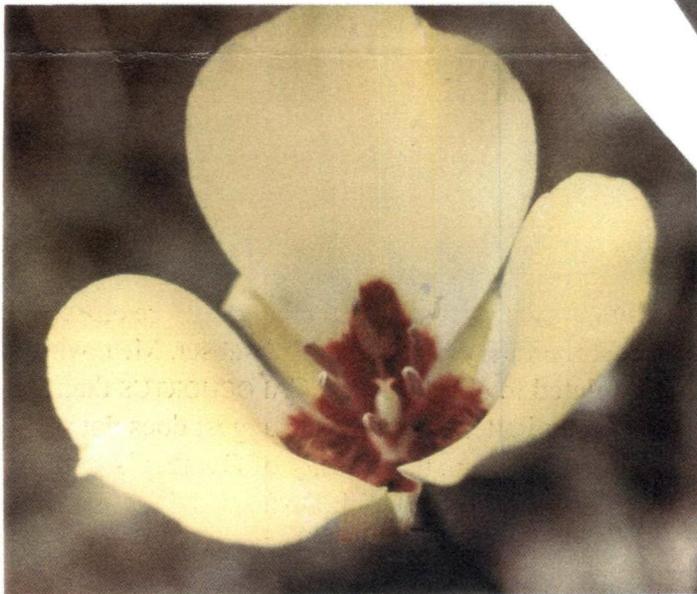
The crux of Hoover's argument for separation is this: "If it is still considered desirable to unite the two groups in one genus, it should be remembered that there are many pairs of genera, at present universally regarded as distinct, which resemble each other more than do *Calochortus* and *Mariposa*. ... If genera are to be based on the actual relationships of plants rather than on mere custom or tradition, a uniform procedure ought to be followed in all such cases."

Hoover goes on to comment that the member species of Ownbey's Section CYCLOBOTHRHA "...probably constitute another distinct genus. However, I have had very little opportunity to study living plants of [this] group and consequently am unwilling to venture a definite statement as to its generic status."

Whatever the merits of Hoover's argument in favor of dividing the genus *Calochortus* (as we know it today) into two (or even three) separate genera, his proposal was not accepted by the "botanical powers that be" of his day, nor has it been since. Perhaps as a result, botanists were also slow to accept another element in his *Leaflets of Western Botany* article – the formal announcement of two previously unrecognized species – *C. argillosus* (which was discussed as the "species of the issue" in *Mariposa*, Vol. XII, Nos. 3+4, January+April 2001) and *C. simulans*. Philip Munz's *A California Flora* – the "botanical standard reference" from the time of its original publication in 1959 until the appearance of the "new *Jepson Manual*" in 1993 – initially made no reference to either species. However, because so many new plants were being discovered in the early 1960's, Munz published a *Supplement* to his work in 1968, and there he did identify *C. simulans* as a legitimate species (though he still did not accept *C. argillosus*). The "new *Jepson Manual*" also recognizes *C. simulans*, as does the California Native Plant Society.

Tom Patterson's DNA analysis gives no help in confirming that *C. simulans* is a valid taxon, because (for reasons not stated) he did not include material from it in his research. However, his results do indicate, at least indirectly, that a separation of the single genus *Calochortus* into two or even three distinct genera may not be a judicious approach. His run of "three rapidly evolving noncoding" segments of chloroplast DNA for 65 species plus 2 vars., 6 geographically separated forms, and 1 hybrid – not completed because the computer used ran out of memory – must be viewed with caution, simply because it was incomplete and therefore might have distorted some relationships. Nevertheless, the clades or groupings suggested by the run include three allied subsets within Section MARIPOSA, with two of the three even more closely related to the Mexican members of Section CYCLOBOTHRHA than they are to the third subset. Meanwhile, the California CYCLOBOTHRHA appear to be more closely related to all of Section CALOCHORTUS than they are to their Mexican "cousins." Thus the classification scheme Patterson's results suggest does not match the kind of split Hoover proposed. On the other hand, it also questions the validity of Ownbey's construct of three distinct sections. Patterson's diagram comparing his seven clades with Ownbey's three sections is reproduced here on page 4. (See the short summary of Patterson's thesis in *Mariposa*, Vol. XIV, No. 4; or the longer summary printed separately as a "Special Paper.")

*Calochortus simulans* –

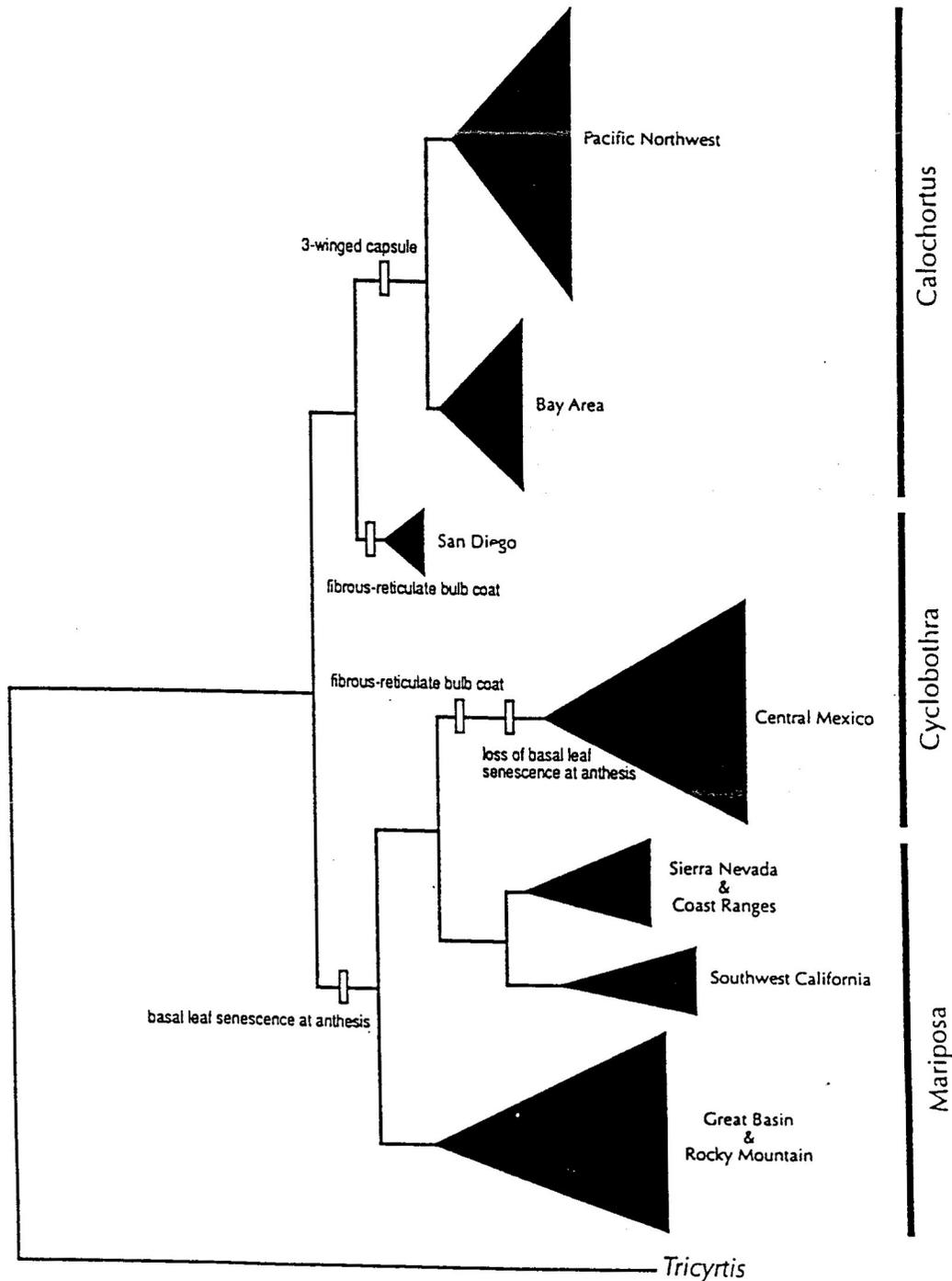


– Photographs by Jim Robinett

**Description** – Here is Hoover’s description (with the spelling modifications necessary to match the genus name *Calochortus* rather than *Mariposa*) –

Plant with appearance of *C. venustus*; petals white, often pink on the outside, the glandular area surrounded by bright red, and often also with a small red spot immediately above. ... *Calochortus simulans* is obviously closely related to *C. venustus*. The seeds of the two species differ in shape, but

**Clades (Groupings) Suggested by Tom Patterson’s DNA Analysis -vs- Ownbey’s Sections**



plants in flower can hardly be distinguished except by the color markings of the petals. In the latter respect, *C. simulans* resembles *C. catalinae*, a species which is quite different in characters of the fruit. This superficial resemblance to *C. catalinae* has suggested the proposed specific name. The distinctness of *C. simulans* from *C. venustus* may be subject to doubt, but it should be noted that, although both species occur in the same region, no intergrading plants or apparent hybrids between them have ever been collected.

He fails to mention that some *C. simulans* populations include plants with flowers that have petals that are more yellowish (though a rather “dusky” or “buffy” yellow) than white, and thus look more peach colored than pink on their exteriors. The majority of populations have only flowers with white petals, however; and I’m not aware of any populations that have no whites but only the yellowish flowers. Munz’s 1968 *Supplement* also failed to mention the existence of some yellow forms, but the “new *Jepson Manual*” does report them. Also of note, there are clearly “intergrade” forms between *C. simulans* and *C. venustus*, now acknowledged in the California Native Plant Society’s *Inventory of Rare and Endangered Plants*. Such forms can be found in at least three places I know of (see below under “Field Notes”). Since Tom Patterson’s DNA analysis did not include a sample of *C. simulans*, we lack any guidance from it as to whether or how *C. simulans* might be related to *C. venustus*, or for that matter, to *C. catalinae*.

The contrast among the seeds of these three species does support the status of *C. simulans* as a separate taxon. While all three are mariposas and have mariposa-type seeds (which range from flat to slightly curved into a “boat” shape, and are generally rounded and pale enough in color so that the darker, internal embryo is usually visible), their seeds are quite different from each other. The seed pods of *C. venustus* are probably the most narrow in Section CALOCHORTUS, and accordingly, its seeds also tend to be very narrow, not truly round, but narrowly oval and rather pointed at their tips. On the other hand, the utterly unique pods of *C. catalinae* (see *Mariposa*, Vol. XIII, No. 4, April 2002) are themselves quite round in cross-section, so its seeds are as well. Only the seeds of species in subsection NUTTALLIANI (such as *C. clavatus* and *C. kennedyi*, which have strikingly large, “fat” pods) match or even exceed them in roundness. In contrast, the seeds of *C. simulans* tend to be slightly pointed at the tips and a little narrower than those of *C. catalinae*, but nowhere near the narrowness of *C. venustus* seeds.

**Field Notes** – *C. simulans* appears to tolerate – or even thrive in – more than one habitat. Jim and I found it most frequently in grassy meadows that were flat or slightly inclined. But we also saw it in chaparral, in that case usually at the edges of banks or on more sharply sloping ground, but still in full sun. It grows in rather hot, arid territory, in the inner South Coast Ranges, at moderate altitudes. It tends to bloom a week or two later than the “South Coast” form of *C. venustus*. Both the “new *Jepson Manual*” and the CNPS *Inventory* limit its occurrence to inland San Luis Obispo and Santa Barbara counties (but see the next paragraph on the locations of intergrade forms).

Hoover was wrong about the lack of intergrade forms between *C. simulans* and *C. venustus*. In 1993 we found large populations of plants that appeared to us to be an intergrade form between the two growing on flat grassy verges at about 1600 to 1800 feet, along the road going north out of Parkfield, which is actually in southeasternmost Monterey county. Why intergrade? Because the primary reddish blotch of the “South Coast” form of *C. venustus* occurs above its more or less square gland (usually with a second blotch higher still on the petal), while in *C. simulans* the squarish gland is situated within a reddish blotch which usually covers the entire petal base. In the case of the intergrades, both these statements were true, with the two blotches sometimes connected, but we never saw an additional blotch higher on the petal (as is found in *C. venustus*). The intergrade form also can be seen near the head of “Davy Brown Trail” on Figueroa Mountain in Santa Barbara county, at about 3600 feet. And we found similar intergrade plants

in smaller numbers well above the Bates Canyon campground in northeastern Santa Barbara county – not to be confused with the many plants growing at about 2400 feet right at the campground, which seem to be pure *C. simulans* and include yellow forms. Finally, in a “good year” (and I have been told that 2003 was a “good year”), *C. simulans* blooms by the thousands at 1600 to 2000 feet, along Highway 58 in southern San Luis Obispo county. Its altitude is listed by both the “new *Jepson Manual*” and the CNPS *Inventory* as “below 1100 meters” (3600 feet), which agrees with our experience.

**Risk** – The “new *Jepson Manual*” classifies *C. simulans* as “UNCOMMON”, a designation which refers to criteria developed some ten years ago for an older CNPS *Inventory*. The most recent *Inventory*, the sixth edition (2001), places *C. simulans* on its “List 1B. Plants Rare, Threatened, or Endangered” and gives it a “R-E-D code” of “**2-1-3**” (**R**arity = distributed in a limited number of occurrences in California; **E**ndangerment = not very endangered in California; **D**istribution = endemic to California). The territory occupied by *C. simulans* is very hot from March to November and too dry to be attractive for either agriculture or (sub)urbanization. Its greatest risk probably comes from deer and rabbits – both of which can be found in that area – or from people who illegally dig up bulbs.

**Cultivation** – Jim and I collected seed of *C. simulans* several times, but he found it difficult to grow. We guessed that our (then) Sonoma county location at about 200 feet, 8 air miles from the ocean, was simply too “moderate” a climate for it to thrive without special care. If you obtain seed, I would recommend sowing it in a sandy, very well-draining mix, watering it sparingly, drying back at the first sign of yellowing of the foliage, and keeping it absolutely dry and protecting it from humid air during (what is hopefully) a long period of summer heat.

## Readers Forum

☼ From Mary Rose, Anacortes, WA – I’ve been growing *C. nitidus* for several years, bulbs I purchased from the Robinett Bulb Farm, grown from Dr. Watson’s seed, I assume. They seem to form a substantial bulblet in the axil of the basal leaf. I know Hitchcock et al. (1969) stated that the absence of such bulblets was supposed to distinguish husky, tetraploid *C. nitidus* from slim, much smaller, diploid *C. longebarbatus*, and Hitchcock has been extensively quoted since in other sources without any change in his description. He doesn’t state how many plants were examined nor mention their stage and variation. Are others finding basal bulblets on their *C. nitidus*?

*Your bulbs were indeed grown from Dr. Watson’s seed. Jim Robinett found that as they matured, some of his C. nitidus plants also formed these bulbils, while others did not, with no obvious explanation. Anyone else have comments?*

☼ From Eric Van Dyke, Aromas, CA – My seed selections from previous years have done splendidly, so I’m trying some more this year, from further south.

*Delighted you are doing well. Those of us who contribute seeds, especially habitat-collected ones, usually make considerable effort to confirm they are of high quality. Remember that you may need to protect more southern species from your higher-rainfall, higher-humidity location.*

☼ From Gwen & Phil Phillips, Cleethorpes, NE Lincs – About changing climate, our spring was very wet with little sun, so growth was not as good, even in the greenhouse, and fewer plants flowered. *Though I’m no longer doing much growing, I notice that our local native plants seem to be “confused” sometimes about when to emerge, when to bloom, etc., the past few years. We’ve had several winters in a row warmer than usual, one of them dryer than average, the others wetter.*