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MARIPOSATHE *CALOCHORTUS* SOCIETY
NEWSLETTER

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ADVISORS: C. BACCUS
AND B. NESS**I. Announcements.****1. Renewal Notice!...and Please Note our NEW ADDRESS!**

P.O. BOX 2768, BERKELEY, CA 94702-0768. How time flies! It seems like you just paid your dues and here they are due again! But think of all the fine color photos published for the first time this year, e.g. *Calochortus spatulatus*, *C. amoenus* and *C. subalpinus*. Yes it's been a full year since the last dues notice and the treasury is running low. On the bright side, the newsletter will remain at the same low price this year, which some have called the "best bargain" of any horticultural or botanical publication they know of. So please send \$8.00 for domestic addresses and \$10.00 overseas. We will take foreign currency if a small amount is added over the equivalency for \$10.00 in order to exchange it. International money order recommended; please only send cash by registered mail.

2. A botanist has classified all plants in relation to their habitats as falling into three general groups, namely, competitors, pioneers and stress tolerators. Competitors are the most vigorous and compete with other plants for the choicest habitats. Pioneers, such as certain pines, are the first plants on new soils, and thus must have efficient dispersal mechanisms for their seeds. Finally, stress tolerators must learn to tolerate conditions which are adverse for most plants, e.g. excessive heat (deserts), cold (e.g. tundra), dryness (again deserts), soils of low fertility and the like. While discussing these points with Dr. Tom Patterson, who informed me of the classification, I indicated that *Calochortus* spp. had been spoken of as pioneers by certain botanists. Tom disagreed and thinks that they are stress tolerators instead. This is because almost all of the *Calochortus* species put up with adverse conditions for part of the year, namely, drought. Further, many remain on marginal soils, such as serpentine, of low fertility, and cannot compete on lush soils against more aggressive annuals. Many put up with desert conditions as well and others with extreme cold. In a few cases, a species puts up with both intense summer heat and extreme cold, such as *C. macrocarpus* and *C. bruneaunis*, both of which endure sub-zero temperatures in winter with little snow cover and then the very high heat of desert summers, to speak nothing of little rain. Finally, Calochorti do not have the efficient seed dispersal mechanisms of typical pioneers, e.g. winged seeds which can be carried by the wind to new locales. I pointed out that although section *Calochortus* seeds, with their tiny irregular shapes are indeed unlikely to be carried off by the wind, that this is not true for sections *Mariposa* and *Cyclobothra*, both of which have flatter, larger seeds. As anyone who has tried to plant these species on a windy day can testify, the wind will indeed carry these away. This is particularly true for the desert species, all of which tend to have large, lightweight seeds, which the often forceful desert winds could easily disperse for some distance. Further, the volcanism and seismic activity of many of the states in the range of *Calochortus* species creates or exposes new soils, and in some cases Calochorti are found on such newly exposed soils, especially those of low fertility. It may be also that such a general schema for classification can never be more than a rough generalization and that some plants may fall on more than one list. Except for these qualifications, however, Dr. Patterson's classification of the *Calochortaceae* as stress tolerators, rather than pioneers seems on the whole to be correct.

II. Trips: Mexico

As we headed south on Highway 15 from Hermosillo, we were travelling towards the western coast of Mexico. Every so often, there would be a "cuota" (toll) to pay. The total of these tolls between Nogales and Mazatlan came to about \$35.00 in U.S. dollars. There was always an alternative free route we could take, and once or twice we opted for those. But these tended to become very rural,

slowing us down even more, and we had already lost too much time as it was. Towards nighttime, we would have the unpleasant experience of driving alongside a stagnant canal, whose fetid stench followed us for miles.

Along the coast, Highway 15 would go through the various towns and cities. Everywhere, there were small buildings, housing various garages, labor union halls, agricultural supply stores, tile shops, bathroom supply stores, and food shops. It all seemed like a throw-back to commercial districts of the 1950's--only in Spanish.

When it got late, we stopped at the Hotel California (yes, like the Eagles' song!) in Navajoa, spending a little over \$10.00 (U.S.) for a room for the night. The traveling that day had made us all hot and sweaty, and we were glad to be able to take showers. While Hugh took his, I turned the TV in our room on, and caught a news broadcast. Sure enough, an article on Guerrero was the first item. It explained that the rebels were asking for a re-election, since many people had stayed home from the initial one. Things were not expected to be calmed down for quite some time. While Hugh was watching, the station suddenly went off the air. Was this censorship of the news? we wondered.

The next day, we again packed up the car and took off. We were now out of Sonora estado and in Sinaloa, which we would be traveling through for most of the day.

III. Horticulture: 21st Installment of Germination Tests. Shade and Sun

Report on the results of trial growing tests conducted on *Calochortus*

In the wild, most of the Mariposas grow in nearly full sun. Those on west facing slopes or on east facing slopes may receive sun for only part of the day, but receive full sun for that part. Two of the subsections from section *Calochortus*, on the other hand, are shade growers, the Fairy lanterns and Cat's ears. They grow among trees or shrubs in woodlands, where they receive shade for most of the day. Of course very few plants are either in totally full sun or total shade. With the exception of a few plants in sparse desert habitat, almost all plants in sunny habitat are partly shaded, especially at the base, by surrounding plants. Even in the desert, many individual plants are partly shaded by surrounding plants, e.g. sage and juniper. Similarly, few shade growers are totally in shade; many receive sun for a part of the day as the sun changes its angle, and even the shadiest may receive some direct sun at certain times, particularly at or near the daily zenith. Nevertheless, generalizations can be made about the exposure of most species in the wild.

To examine the degree to which such exposures effect germination and growth, the wild exposures of two representative species were reversed. *Calochortus amabilis*, Diogenes Lantern, a fairy lantern which grows mostly in shade, was grown in full sun. *C. luteus*, Gold Nuggets, is almost always found in sunny meadows. The attempt will be made to grow it in nearly full shade. We are deliberately not using a coastal Mariposa, such as *C. catalinae*, as these last receive significant amounts of shade from coastal fog and haze; thus their success in shade would not provide a fair test. They may have adapted to partial shade at some time in their evolution, and thus have a genetic tolerance for it. (Continued next issue)

IV. The Horticultural History of Calochorti

(11th Installment of A. Chickering's "Monograph" from 1938)

"There are some general points about growing Calochorti which might be worthy of particular mention.

"First-- *Weeds*. Practically all Calochorti grow in situations where they are reasonably free from too close association with grass, weeds or close growing flowers. This means that if we are to grow them in our gardens, we must not let their surroundings become too thick or close. It also means that we must use care in introducing other flowers which of themselves may become too thick. I shall never be able, for example, to rid my garden of the serious pest of *Brodiaea grandiflora* [prob. *B. elegans* is meant-ed.]...When it gets wet it mats down on the ground and mildews the Mariposa leaves and

stalks. I have many times sifted the soil where it grows and taken out quantities of bulbs, but I can't eradicate it. Another example is found in two forms of *Zauschneria* which I thought were attractive. They are both spreading everywhere and, in spite of serious effort, I can't get rid of them. These are far worse than the ordinary weeds such as *Erodium*, *Oxalis*, mallows, clovers and the various grasses...When *Calochorti* first come up from seed most of them have the shell of the seed on the tip of the tiny stalk...This shell soon falls off and the young shoot resembles a glossy, dark green spear of grass. It is different in appearance from grass if one looks closely...Of course, weeding of this character requires taking the weeds almost one by one and is slow work. If one could take out all bulbs each year and dig up the soil after the first rains so as to catch most of the weeds and grass and then replant the bulbs, this trouble could be minimized, but I don't find this practicable.

"Second--*Gophers*: Gophers are very destructive in bulb gardens and will almost prevent success entirely unless they are eliminated. I was much troubled with them when I first started my present garden, but I succeeded in trapping them all out so that I have not been bothered with them for some years. One of my grower friends has stopped them by sinking a fine meshed wire 18 inches deep around his plot of Mariposas. He still has to do some trapping to eradicate gophers which come in over the top of his barrier. (Final Installment next issue)

V. Conservation: Report on *Calochortus tiburonensis*, Part I

[Reprinted from the Nature Conservancy Newsletter, Winter 1994-5-ed.]

"Amid one of the most desirable residential spots of the San Francisco Bay Area sits an undisturbed hillside called Ring Mountain. As many as 5000 years ago, native people chipped mysterious markings into rocky prominences near the top of its 6000-foot rise, from which today's hiker can get a stunning 360-degree view of the Bay Area.

"Did the early visitors treasure the rare Tiburon Mariposa...(*Calochortus tiburonensis*) that blooms there late each spring as we do today? We don't know, but the Nature Conservancy has ensured that the [plant], first discovered in 1972 and growing nowhere else, will be forever protected, along with other unusual plants and animals as well as re-developed grasslands boasting nearly twenty species of native grasses.

"During the 1970s and 1980s, plans to build as many as 2100 homes on Ring Mountain prompted community concern for the environmental impact of such development. Eventually only 68 proposed homes were approved by city and county agencies, which also decided that the undeveloped area should be managed to protect the rare species on it.

"Enter the Nature Conservancy. 'Ring Mountain was a remarkable island of pristine natural lands and rare native wildflowers in a sea of suburban development,' said Executive Director Steve McCormick. 'It had to be preserved.'

"By 1984, The Nature Conservancy had purchased 377 ecologically sensitive acres. Since then we have followed a careful design to preserve Ring Mountain's natural resources and abate the problems that had begun to threaten them. We kept close watch on the rare species, removed invasive species, prevented off-road vehicle and other damaging use, completed a comprehensive botanical inventory, and constructed a two-mile interpretive trail.

"Over the years, the community has also become involved. Local volunteers calling themselves 'thistle busters' have spent weekends pulling aggressive and invasive purple thistle, eventually eliminating its threat. Neighbors routinely watch out for the preserve and pick up trash. 'Even without a garbage can on the property, there has never been a litter problem,' remarked the first Ring Mountain preserve manager, Lynn Lozier...

"Today the site is in excellent ecological health and the Tiburon Mariposa...is reproducing even more abundantly than we had hoped. 'Although it was originally thought that there were around 10,000 of the plants on the preserve,' says Area Ecologist Larry Serpa, 'our biological monitoring has shown that about 32,000 of the plants now thrive among the serpentine rocks.'

"The current good health of Ring Mountain is testament to the Nature Conservancy's ability to act at crucial times to protect critical species and habitats. As with many of our projects...we are ready to

turn over the responsibility for stewardship at Ring Mountain to capable managers in its own community. As the result of several months of discussions with conservationists in Marin County, we are hopeful that the Marin County Open Space District will soon assume ownership of Ring Mountain. Locally based, with excellent management expertise, the Open Space District is a respected land steward with the support of an active and involved local conservation community. Ring Mountain will remain open for public visitation and educational use.

"As the Nature Conservancy moves forward on other major conservation projects throughout the state, we will continue to work with the Open Space District to ensure the biological health of Ring Mountain. And it will remain an example of the Nature Conservancy's unique ability to protect threatened habitats, then leave healthy sites in the best possible hands."

VI. Species this Issue: *Calochortus minimus* Ownbey

(For the key to the Nudi (star tulips), see *Mariposa*, Vol. V, #2, 10/93)

Calochortus minimus, the Sierra star tulip, was separated in 1940 by Ownbey in the 1940 Monograph, but was known to botanists much earlier. Due to confusion with *C. nudus*, the same plant had been treated under the latter name by botanists beginning with C. Purdy in 1901. Ownbey established that Watson's original description of *C. nudus* in fact referred to the northern plant, and renamed the southern species *C. minimus*. The Latin epithet means 'very small' or 'minimal.' Ownbey believed that it is the "smallest of the Calochorti."

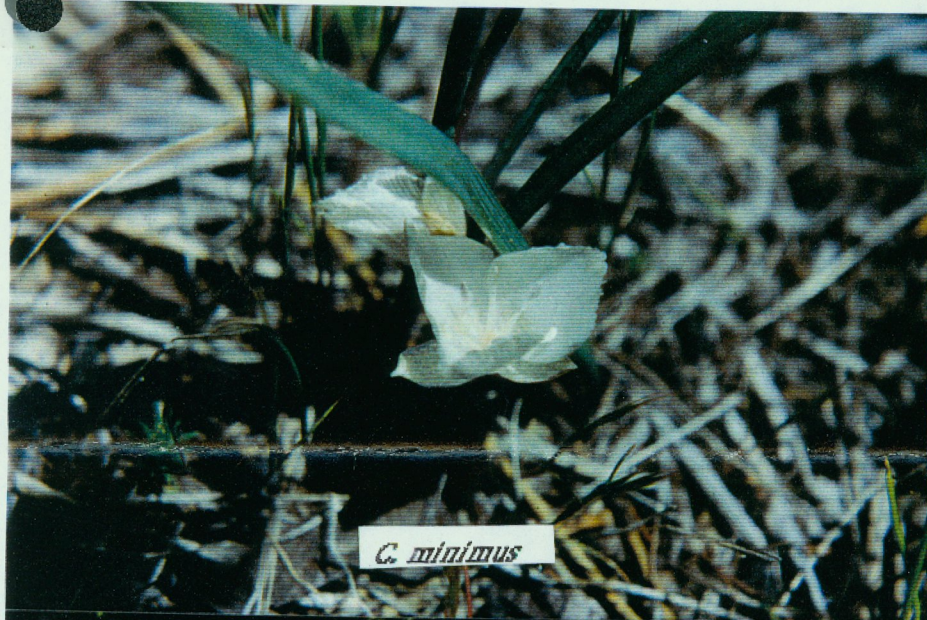
Range and Habitat: *Calochortus minimus* occupies a north-south range in the Sierra Nevada Mountains, from Lake Tahoe (El Dorado Co.) south to about Sequoia National Park (Tulare Co.) entirely in central California. North of Lake Tahoe it overlaps the range of *C. nudus* and forms hybrids in multiple stands. These hybrids will be treated in a future issue of *Mariposa*. Its habitat is definitely alpine, with stands generally occurring above the snow line, from 4000' (about 1200 m) up. As almost all the precipitation ends in late spring, this means that the species must do all of its growing in the short time between snow melt in early spring and the onset of the dry season in May. The precipitation in this range varies from heavy in the north to more moderate amounts in the south, most in the form of snow. I have seen this species both in full sun and in the shade of pines; it may be that the plants must adapt to both habitats as forests go through their own cycles. Fires may occasionally destroy the forests, leaving geophytes like *C. minimus* newly exposed to sun and the plant may have to adapt quickly to survive. Dr. Ness thinks that the species prefers the margins of woods in general. *Calochortus minimus* blooms from May to as late as August at higher altitudes.

Botany: Perhaps due to the hybrid populations in the Northern Sierra, this species was at first confused with *Calochortus nudus*. Since Purdy's botanical separation of the two species, *C. minimus* has been upheld by all botanists of section *Calochortus* except, as per usual, by Jepson. Even he separated what is now known as *C. minimus* from *C. nudus* on a varietal level based on the erect fruits (seed capsules) of the latter species. It is further separated by its size as the flower of *C. minimus* barely gets above the ground, while the stem of *C. nudus* is generally taller. Further, *C. minimus* is consistently white; while all the other Star Tulips vary from white or very pale lilac to purple. *C. minimus* has more pointed and "denticulate" petals at the tips, although this character is not entirely consistent, while the other star tulips have more rounded and smooth apices. The two western Star Tulips, *C. umbellatus* and *C. uniflorus*, also differ in range and habitat from *C. minimus*. They are much taller plants than the Sierra Star tulip and unlike the latter have stem leaves. *Calochortus uniflorus*, unlike *C. minimus* is bulbiferous.

Horticulture: This is not a showy species so I have not grown it in any quantity. Like other alpenes, it wants cold stratification in mild climates in order for the seeds to germinate. Unlike many of the others, it has consistently come up every year for me and bloomed without refrigeration (I took my seed from the lowest altitude stand I could find; this may be why it has not required refrigeration after the first year). In other words, it has been the least fussy of the alpenes which I have come across, growing and blooming every year with little fuss. I use our standard UC Davis mix with bulb fertilizer. Thus for growers who want a fairly easy alpine, which is cute if not showy, this may be the

species to grow. The plant is suitable for temperate areas, however, it does require summer drought during dormancy. Part shade is advised although, as indicated above, there are stands in full sun.

All photos below by H.P. McDonald



C. minimus



C. minimus--plant



C. minimus--habitat



C. umbellatus



C. uniflorus