

**MARIPOSA**

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THE *CALOCHORTUS*  
SOCIETY NEWSLETTER

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ADVISORS:

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**I. Announcements****A. RENEWAL NOTICE**

Yes, time has passed, and its that time of year again, when members must reach into their wallets and send in the annual dues. Fortunately, the little economies we have taken in Berkeley have enabled us to hold down costs, so that there will not be any increase in rates this year! That's right, the newsletter will again be only \$4. for domestic addresses; \$6. for overseas. What a deal! Don't forget to send dues by July, so you won't miss any issues.

This year we will take currency from overseas, equivalent to the overseas subscription rates, so long as an extra \$2. is sent for our costs of conversion. PLEASE SEND REGISTERED MAIL TO INSURE DELIVERY. Overseas members will have to determine for themselves whether this will save over converting to \$US at home or not.

**B. VOTE OF MEMBERS:** Along with your remittance, each member should vote on whether to upgrade the newsletter to color copies. The most cheaply that this could be done is \$1 per issue, which works out to \$4. per year IN ADDITION to the normal subscription price. Thus the color copy rates would be \$8. domestic and \$10 foreign per year. Several members have urged us to include color photos of the "species this issue," and this would be desirable but for the considerable cost of color copies. We have decided to keep the newsletter inexpensive so as to reach as many as possible with a price which is not beyond anyone's means. However, we thought that members may be willing to pay for seeing the flowers in color. Therefore, we are asking for a vote of the society. On a matter of this importance it will take a two-thirds majority for passage of the color copy upgrade with the increased rates that this would entail. Keep in mind that, alternatively, one could borrow the Society's slide show from Dr. Werra or Ron Vinnard in Australia to see the flowers in color. Don't send the extra money with your subscription yet; we will await the outcome of the vote (but please send your regular subscription dues!) "Vote early and often."

**C.** Normally, members should receive four issues per year, in July, October, January and April. Every effort is made to see that each member receives all issues, but we are not, of course, perfect, nor are the mails. If members do not receive all issues in any one year, please write and the missing issue will be replaced.

**D.** Normally we don't mention news or discuss publications not directly concerned with Calochorti, but we are going to make exceptions for what we regard as outstanding items. "In concert with Geostar Travel, the UC Irvine Arboretum has arranged a superb itinerary to explore the rich botanical diversity of South Africa during August 1995." The tour will focus on the botanically rich area of the Southwest Cape Province as well as Naquamaland. Call Mr. Brad Carter of UCI Arboretum at (714) 856-5833 or write c/o UCI Arboretum, Irvine California, 92717. Expensive, but well worth it for friends of Cape Province bulbs.

**II. Trips:**

Due to lack of space will return next month.

### III. Horticultural Tests--19th Installment: Winter and Spring Germination (Further results of germination tests conducted on *Calochortus*).

This test was conducted to determine both the optimum germination time for various species and the preponderance of its growth period. Three species were attempted in both fall and spring, viz., *Calochortus albus*, *C. venustus* and *C. barbatus* representing all three sections. Each is a fairly widespread species, and receives rain from Nov. to April (May to Oct. for *C. barbatus*) in normal years in the wild. Each was planted in pots in both October, in time for the normal rainy season; and also in March, at the beginning of spring, but near the end of the normal rainy season (vice versa for *C. barbatus*). The latter was to test for whether spring germination is possible for winter growing species and vice versa, and if so, beneficial for plant growth. The media and watering schedule was identical for each sp. [Continued next issue]

### IV. The Horticultural History of Calochorti

[Third installment of the article by Allen Chickering from 1938--ed.]

#### "2. The Mariposa Lilies

It is not so easy to segregate the plants falling under this head as it is the Globe Tulips. The varieties and strains are legion. *Calochortus venustus* for example is found in almost all colors of the rainbow and, in addition, has two marked general divisions, one in which the flowers have the eye at the base of the petal and also a spot or blotch of color at the tip [the Coast Range form--ed.], and the other in which this blotch is lacking [the Sierra form--ed.]... *Calochortus macrocarpus* is essentially a desert or dry climate species. It blooms, according to altitude, from late June well into July, is lavender in color with a vertical green stripe or band on each petal, usually has not more than two flowers to a stalk, frequently grows on the level as well as on slopes...I have occasionally succeeded in blooming a small percentage of bulbs...However, I have never been successful in growing seeds and practically all of my plants have ultimately succumbed to mildew. I have sized this species up as not being suitable for our climate at Piedmont. The soil where I have seen it growing has usually been of lava origin. I have tried *C. nuttallii*, also from this region [E. of the Sierra and Cascade Ranges--ed.], without success.

While I am on the subject of desert varieties, I may as well mention the lovely *C. kennedyi*...This plant is inclined to be very short stemmed, in some instances the flower blooming right on the surface of the ground. If, however, it comes up through a shrub, the stem may be as much as a foot or more in length. It has a large bulb. The flower in California is a beautiful orange-red, with a dark eye at the base of each of the three petals. I have usually found this plant growing in a soil composed of decomposed granite of what we might term granite sand...A related species or strain known as *C. aureus* or *C. kennedyi* var. *munzii*, which is yellow in color is found in the Panamint Mountains and east into southern Utah and Arizona [these are generally considered distinct spp.--ed.]. The first bulbs of *C. kennedyi* which I tried...flourished until the flower stalk came up when they mildewed year after year although the bulbs persisted in sending up leaves each year...some bulbs from...Ventura Co...from a dry region itself [but where] the fog from the coast sometimes reaches...I tried...in decomposed granite. I succeeded in getting several blooms for two years and then they died out. I have never had any success with the seeds. I should think, from my experience, that this species might be grown almost anywhere in California away from the fog belt, but they will mildew around the San Francisco Bay region...

### V. Conservation

Rare, threatened and endangered: reflections upon the categories of botanical scarcity. (Part Two)

What is a rare plant? Quantitative factors are complemented by qualitative in the definition of rarity adopted by the CNPS *Inventory*. That is, the "worsening" of the "present environment" of the plant is viewed as the direct cause of the decline in numbers of the plant. Each plant is linked, then, to a specific environment or habitat, to which its survival as a species is tied. If this habitat is altered, destroyed or eliminated, then species dependent upon such an environment are put at risk.

The relation between specific environments and species varies. As Chickering noted in the above



article, *Calochortus weedii* is equally at home in soils with granite or sandstone as the "parent" materials. It is more adaptable, seemingly than plants which are mostly confined to soils with a single parent material. An example of the latter is the commonly noted association of certain plants with "serpentine," i.e. soils with at least one of the parent materials consisting in ultramafic rock. Some plants seem to be confined to "serpentine" soils, while others are more common on it. Another factor in this relation is rainfall, both with respect to quantity and season. Plants which thrive in the low rainfall totals of the desert will not do well in wetlands or areas with huge quantities of rain, and vice versa. Similarly, plants which have adapted to seasonal rainfall, as have most *Calochortus* spp., do not do well in climates with year round rainfall, and vice versa. Still another factor is heat and cold: the difference between temperate and tropical climates and the plants associated with each. The quality of an environment consists in a number of interrelated elements, then, all of which are important in determining whether a plant can be considered rare. As a desert wetland is much rarer than desert drylands, species which are confined to them are intrinsically rarer than desert dry species. This rarity is environmental, and not the result of human intervention in the environment. The habitat suitable for *Calochortus striatus*, which grows in seasonal desert wetlands, would be rarer than that for *C. kennedyi* if the human species had never evolved. The destruction of this habitat is more likely to endanger the plant than the destruction of nearby drylands is to endanger a species adapted to the latter environment, as the greater quantity of desert dryland allows for greater numbers, ceteris paribus. (Cont. next issue)

## VI. Species This Issue: *Calochortus nuttallii*

Genus *Calochortus* Key (modified from Ownbey et al.)

### I. Section *Calochortus*

### II. Section *Mariposa*

#### A. Subsection *Venusti*

#### B. Subsection *Macrocarpi*

C. Subsection *Nuttalliani*. Bulbs ovoid with membrane coat; stems variable in length, often bulbiferous; leaves grooved, often grey-green in color; flowers large, erect, open; sepals not exceeding petals in length; petals often bearing marks in contrasting colors; nectary round or oval, covered with trichomes and surrounded by a membrane

#### 1. Flowers yellow or orange

a. Stems generally short, very bulbiferous; interior petal blotch always in band just above nectary, and petal hairs in same area; medium deserts east of the Sierra Nevada Mts.; genetic tetraploid..... *C. aureus*

#### b. Stems short or long, rarely bulbiferous

ii. petals yellow, orange or vermillion, with dark circular basal blotch surrounding nectary; desert habitat, (n=8)..... *C. kennedyi*

iii. petals always yellow, reddish brown markings not confined to area of nectary; confined to California

α. petal markings variable and petal hairs clavate; chaparral and grassy slopes, (n=8)  
..... *C. clavatus*

β. petal markings uniform and confined to lower half of petal, petal hairs not clavate; montane-chaparral habitat, (n=7)..... *C. concolor*

#### 2. Flowers white, lavender, pink or magenta

a. Petals generally with longitudinal green stripe on exterior

ii. Flowers variable from white to lavender and blue and without petal markings; montane

habitat west of Sierra Nevada and Mojave Desert, (n=7)... *C. invenustus*

iii. Flowers white with petal markings

α. Petals with interior marks confined to nectary area

aa. Petals with dark blotch around nectary, restricted to seasonal wetland habitat, eastern California..... *C. excavatus*

bb. Petals with lighter blotch around nectary, desert mountains, eastern California  
..... *C. bruneaunis* var. *panamintensis*

β. Petals with a greenish blotch around the nectary and a dark band above it, high desert habitat, (n=7)..... *C. bruneaunis*

b. Petals white to magenta, generally without exterior green petal stripe and always with a small, yellowish blotch around the nectary on the interior and a brown band just above it; high desert and montane habitat, (n=8)..... *C. nuttallii*

D. Subsection *Gunnisoniani*

III. Section *Cyclobothra*

*Calochortus nuttallii*, the most well-known Mariposa, was named for Thomas Nuttall, the explorer who was the first European to notice the plant. The Native Americans had known of it for centuries, and used it for a food source. They taught the early pioneers in Utah to dig the bulb, and this helped the settlers to survive their first, lean years in the area. The settlers, prizing the lovely flowers of the plant as well as repaying their debt to its bulb, named the plant the state flower of Utah, where it is common. They called it the "sego lily," after "*segaw*," the Shoshone word for the species.

**Range and Habitat:** This species is probably the most widespread of the genus. It occurs from Nevada northeast to the Dakotas, and southeast to New Mexico, its range roughly forming a large triangle over the Rocky Mountains.

In this immense range, the plant occupies several habitats. These include high deserts, where the plant grows in or near *Artemisia*, desert mountains, where it grows scattered in juniper and pine; mountain meadows and grasslands; montane woodlands; and even prairie in the northeast part of its range in the Dakotas and Nebraska.

In drier areas, the plant prefers flatter ground, but in the mountains, where more rain is captured, *C. nuttallii* is usually found on slopes, especially at the summit of small, local rises. The range generally falls in the temperate climate zone and arid conditions, but it is mild in the southwest part, i.e. SW Utah and Nevada; and wetter in the montane areas of its range.

**Botany:** The membrane-covered bulb, narrow, grooved leaves, large, open flowers, and narrow capsule of this species mark it as a Mariposa. The gray-green leaves, with small sepals, a depressed, oval nectary, with a few hairs confined to the lower petal, and the membrane surrounding the nectary place it within Ownbey's subsection *Nuttalliani*. The subsection was named after this species as it was the first one recognized by botanists.

*Calochortus nuttallii* is distinguished from the other species in this subsection by range, habitat, color, and genetic criteria. From *C. bruneaunis*, *C. concolor*, *C. invenustus* and *C. aureus* it is distinct in having a haploid chromosome number of eight. In color it is distinct from *C. aureus*, *C. clavatus*, *C. concolor*, and *C. kennedyi*. *C. nuttallii* lacks a longitudinal green stripe on its exterior petals, unlike *C. bruneaunis*, *C. excavatus*, *C. invenustus* and its own variety *panamintensis* (Thus the latter may be a variety of *C. bruneaunis*). It differs from *C. concolor*, *C. clavatus*, *C. excavatus*, *C. invenustus* and *C. kennedyi* in habitat, and from all the other species in the section in range. It is more commonly bulbiferous than *C. concolor*, *C. clavatus* and *C. kennedyi*; also, its nectary is generally larger than the latter three species. From the isolated variety *panamintensis* it differs in the presence of a transverse,



• brownish band above the nectary.

• History: *Calochortus nuttallii* (Torrey) was rediscovered by T. Nuttall, who apparently mistook it for a *Fritillaria*, in the early part of the nineteenth century. It was recognized early as a species by Torrey, but other species were constantly being confused with it and then later separated from it. Thus its range, which was once believed to include the Sierra Nevada and San Bernardino Mts. of California, has steadily moved east, and the species is not now known to occur in California. Watson included *C. leichtlinii* and *C. bruneauensis* as well as some of *C. invenustus* in his treatment of *C. nuttallii*. Purdy separated all but *C. bruneauensis* from it, but this still left its range in eastern California. This treatment was accepted by later botanists, including Abrams, Jepson and Ownbey. Ownbey distinguished *C. aureus*, *C. bruneauensis* and var. *panamintensis* as varieties of *C. nuttallii*, but noted the difficulty of distinguishing the different species within this subsection on morphological characters. Finally, recent genetic tests led to the separation of *C. aureus* and *C. bruneauensis* (var. *panamintensis* has not yet been tested, to my knowledge).

**Horticulture:** Reveal noted in *Intermountain Flora* that while all *Calochortus* are difficult to cultivate, *C. nuttallii* is "particularly" so. I do not agree with this evaluation. *C. nuttallii* is far easier to cultivate, in my experience, than many other desert spp. and like other *Calochortus*, will readily germinate and grow if its native conditions are kept in mind. Unlike *C. gunnisoni*, its seeds do not require cold stratification to germinate in mild climates; but it will be hardy in any climate. True, it should be kept on the dry side, but this is only to be expected from a plant which has part of its range in the desert. It tolerates more water than many other desert species, and seeds from high altitude stands may take even more. *C. nuttallii* is obviously adaptable if its range includes habitats from medium deserts to mountain passes and extends over 11 states; with some attention to its needs, it can, I am sure, be grown anywhere.

In the wild, the species usually gets snow in winter, but in small quantities in the desert. Snow melt in early spring germinates the seeds, and the infrequent spring rains keep the plant through the growth cycle. The mature plant generally blooms in late spring, but at high elevations this may be delayed until summer. In most of its range there are summer rains; the species tolerates some water during dormancy, although it also tolerates drought.

I grow this species under the roof of the house on the west side, where the roof extends out from the wall. Here the plant gets sun and some chill. The excess rains are kept off by the extended roofline. The plants are watered every three weeks thoroughly, and kept dry during dormancy. I also have a pot of this species out in the open, and while not all of the seeds in the latter pot survived, many did: surviving on normal Bay Area rainfall. The species does well in our standard, UCD mix with Bulb and

Bloom, a complete bulb fertilizer, added in. Liquid fertilizers are NOT recommended. Full sun after germination, but the seeds germinate more readily if kept in shade in a cold microclimate, like the north side of a structure, and gradually acclimatized to sunlight. (Seeds collected at high altitudes may require cold stratification in mild areas). In the ground, the species has also proven adaptable, growing in a mostly clay mix with a small amount of humus mixed in; clay mixed in a half soil, one-quarter sand and one-quarter peat mix; and a half sand mix with half clay. In the ground, fertilizer does not seem to make much difference; growth rates are equal for identical mixes with and without fertilizer.

