



*C. amabilis*

# MARIPOSA

the newsletter of the *CALOCHORTUS SOCIETY*

c/o Robinett, P.O. Box 1306, Sebastopol, CA 95472 USA

## New subscription rates –

This is the last issue of Volume X (July 1998 through April 1999), and it's time to renew your subscription to *Mariposa*. Balancing income against costs, we lost money this past year. Printing an issue with one color page costs about \$1.80 per copy (including some minor costs associated with photo preparation). Mailing envelopes of adequate quality are 8 cents each; postage is 33 cents per issue domestically, and \$1.00 per issue for overseas. The cost of mailing labels is less than a penny each. All this adds up to about \$2.21 per issue domestically, and \$2.88 overseas. That translates to the following subscription rates for Volume XI (July 1999 through April 2000) –

Domestic	\$ 9.00
Overseas	\$11.50

(A few pennies extra from domestic subscribers serve to offset the few pennies short of costs for overseas subscribers). We're sorry to do this, but we're retired now from our regular jobs, and can't afford to subsidize the newsletter.

As part of our retirement, the Robinetts will be moving to Brookings, Oregon, effective January 1, 2000 – a millennium move, so to speak ! We're looking forward to becoming better acquainted with the more northern *Calochortus* species, and sharing what we learn with our subscribers. And we are already working on developing photo and printing resources in the Brookings area, to assure a smooth transition for the newsletter. In the meantime, please continue to use the Sebastopol address given above on the masthead.

Finally, we want to apologize to several members who wrote us the past few months and waited a long time for a reply. We've been away from home – most of it in preparation for our plans to relocate – and then both were quite sick (Jim had this year's awful flu which developed into pneumonia), and are only just recovered. However, we're both well now, and expect things to go forward more smoothly from here.

## Species of the issue -- the *luteus-superbus* complex, Part I

We're taking a deep breath – because we're proposing to tackle one of the more challenging problems in the genus *Calochortus* – the *luteus-superbus* complex. As noted previously, *C. luteus* was first described by the naturalist Douglas (for whom our *Iris douglasiana* and other plants were named) in 1833. *C. superbus*, on the other hand, was published by John Thomas Howell in 1932. Given the frequent occurrence of both species even today, when much of their preferred habitat has been converted to agricultural use, the gap of ninety-nine years is nothing short of amazing. But it also points to the fact that there is a problem here. Most of the

“problem” has to do with *C. superbus* -- is it a separate species, or merely a var. of something else, and if the latter, a var. of what? By comparison, the issues around *C. luteus* are relatively “easy” to settle.

**Range.** *C. luteus* may be the most common *Calochortus* species in California. Ownbey cites locations in the Coast ranges and inner foothills from Mendocino county on the north to San Luis Obispo county on the south, then on to Santa Cruz Island off the Santa Barbara coast. In the Sacramento valley and Sierra Nevada foothills he lists collection sites from Tehama and Butte counties south to Merced, Fresno, and Tulare counties. The furthest north we have seen *C. luteus* are a number of stands west of Red Bluff, along Highway 36, up to an altitude of about 400 meters (1300 feet). On the east side of the Great Valley, there are vigorous populations on Table Mountain, northeast of Oroville and at similar altitude. In between these two locations the vast majority of lowlands have long been converted to agricultural use – which may account for apparent “gaps” in occurrence. Some years there are huge stands on the lava flows between Oroville and Chico which are not tillable; this is below 80 meters (270 feet).

Stands of *C. luteus* are quite common at lower altitudes in the inland foothills of the Coast Ranges north of San Francisco Bay, and continue south of the Bay. On the north, there are sizeable populations in Sonoma and Lake counties, and in the south along county road J-1 in San Benito county. We’ve seen them in San Mateo county, in the Santa Cruz mountains, in the Carmel Valley (according to Ownbey, the type location is “Carmel Trail” in Monterey county) as well as the Santa Lucia mountains in Monterey county, and along Santa Rosa road west of Paso Robles, San Luis Obispo county. In the lower Sierra Nevada foothills, we have seen occurrences well into Fresno county near the Kings River, though the most vigorous populations may be near Chinese Camp (Tuolumne county) and the town of Coulterville (Mariposa county). We have not seen them in Tulare county.

To summarize, we can confirm current stands in the Coast Ranges from about 35°00 in San Luis Obispo county; to about 40°20 in Tehama county; and in the Sierra Nevada foothills from about 36°45 in Fresno county to about 39°40 in Butte county – in short, on both sides of the Great Valley. They seem to occur only rarely less than 5 air miles from the ocean. The highest altitude we have seen this species is about 600 meters (2000 feet) east of Coulterville, and about 450 meters (1500 feet) west of Red Bluff. The highest collection we know of was by Helen Sharsmith at 960 meters (about 3150 feet) in the Mount Hamilton range southeast of San Francisco. The lowest altitude is speculative: we have seen them below 100 meters in Butte county, and suspect even lower occurrences have been long since extirpated by agricultural activities.

**Habitat.** *C. luteus* is almost always found in grassy meadows and banks, either flat or gently sloped. It may show some “drift” into the margins of very open woodlands, but never very far. It is, in short, a “sun-lover,” even in its hottest summer locations.

**Forms.** All that seems clear enough – so – where’s the problem? First, *C. luteus* is quite variable, in form, in color, and in markings (see the pictures on page 3). It is generally true that it has what Ownbey called a “transversely more or less lunate” gland above the petal base, covered with short, orange-brown to red-brown “hair-like” processes, and that the petal color is yellow. But the shade of yellow may vary from a fairly light yellow (Yokol Valley, Tulare county, per Stan Farwig and Vic Girard), to dark yellow in the Oakland hills (same source). Some stands seem very vigorous, tall with large flowers, while others are small and thin. These may be effects of the particular soil or climate conditions; or they may reflect real genetic differences or races. Beal’s early cytological studies (1939 and 1943) led him to state, “The coastal race seems to be cytologically triploid, while that from the interior is diploid.” But this appears to be based on very few samples, with no assurance that they were representative of the species as a whole.



**Calochortus luteus –**





Further, the petal markings of *C. luteus* are very variable. Some stands may have only a little “penciling” of radiating red-brown lines or a fine, transverse “squiggle mark” above the gland; while others show a distinctive red-brown “blotch,” more or less circular, above the gland as well as lines between the gland and the blotch. As a general rule, the more northern, coastal stands have the blotch, and the southern, more inland stands do not. As for variations in flower shape, see the discussion of **hybrids** below.

**The question of hybrids.** *C. luteus* hybridizes so freely with *C. superbis* that stands of intermediate forms, ranging continuously in color from creamy white to bright yellow, are common on both sides of the Great Valley, both northern and southern. This hybrid was even given a separate entry in Ownbey’s seminal monograph. We believe the commonness of this hybrid was a major contributing factor to the delay in recognizing that *C. superbis* was a separate species.

The flower shape of *C. luteus* seems to vary sometimes – an uncommon phenomenon among mariposas. For example, there are a few stands with flower shape more like that of *C. clavatus* (which has flowers much wider at the base than those of *C. luteus*) along county road J-1 in San Benito county. However, the gland shape and petal markings are definitely those of *C. luteus* rather than *C. clavatus*. And Stan Farwig assures us that these two species are incompatible and cannot hybridize, so hybrids cannot explain this variation.

In San Luis Obispo county there are occasional yellow forms of *C. simulans* – although if this is the result of hybridization (and we don’t think so), the only yellow mariposa we’ve seen in that area is *C. clavatus*. Stan and Vic Girard reported finding a population of yellow *C. vestae* with *C. luteus* growing nearby in Pope Valley, Napa county. (We’ve looked for this population twice in recent years but have not found it.)

Finally, there is the yellow form of *C. venustus* seen occasionally at higher altitudes in the southern Sierra Nevadas. Initially collected by Adele Grant in 1917, it may have been pressed in a manner which obscured the gland shape. In any case, Ownbey classified it as *C. luteus* – even though it was collected at 1500 meters (almost 5000 feet), far above any other occurrence known. We have seen yellow *C. venustus* (a few) along Stump Springs road, and can confirm that they are in our opinion *C. venustus* – distinctly square glands of golden not brownish hairs, a few petal markings in a shade that is decidedly red, not red-brown or brown, and a petal color that is a delicate light yellow, much lighter than the vast majority of *C. luteus*. We are very satisfied, with Vic and Stan, that Ownbey misidentified the plant when he called it *C. luteus*. Stan tells us he and Vic also encountered yellow *C. venustus* near Parkside in Monterey county; near Italian Bar; and even (years ago) in the hills above Antioch in Contra Costa county. Interestingly, in places we have seen *C. luteus* growing nearly “cheek by jowl” with *C. venustus*, particularly in San Benito county, without a single sign of hybridization between them.

We think a major part of “the *luteus-superbis* complex problem” revolves around hybridization and intermediate forms between these two species. Continued next issue, when we will discuss *C. superbis* and the hybrids. In the meantime, if you have comments or current range extensions for *C. luteus*, please write!

**Cultivation.** Jim has found *C. luteus* to be one of the easiest of the mariposas to grow. In Sonoma county he plants the seeds in late winter (January or February) for spring germination. The seeds germinate fairly quickly for him, in 4 to 5 weeks in cool conditions. Generally, at least a few plants will bloom the second year from seed, with most blooming by the third year. After germination, he keeps them well watered until the plants begin to yellow in early summer, then withholds water until cool weather returns in the fall. Regular feeding during the growing season seems very beneficial (see the **Readers’ Forum**); without feeding, they may take 4 to 5 years to reach blooming size. *C. luteus* reproduces vegetatively by stem bulbils near or just below ground level. Bulbils usually require 1 to 2 years to reach blooming size.

## Readers' Forum – Planting Mixes –

✿ *Our correspondence received has been light the past few months (thankfully, since we were unable to respond very quickly) – so we are electing to share in full the information on soil mixes sent to us by Fred Smith of Glendale, Los Angeles county (less than 10 inches of rain a year). Jim has added a few lines about his own favorite mix, and we are reprinting some information on planting mixes from past volumes. Readers should remember that some of the distinctions come from the climatic differences between various locations – especially variations in rainfall.*

When growing bulbs in the ground, you have to start with the soil you have on your property. Raised areas or beds are best for increased drainage. Please remember that, in general, most bulbs love well drained soil and sand, so if you add some sand or other soil additive to heavy soils, your bulbs usually will grow better for it. Be sure to place a small amount of pure sand under each bulb when planting. The following planting mixes can be used for growing bulbs successfully in pots. No rule is absolute – you may want to do some experimenting on your own.

**#1. Lean Soil Mix.** This works well for growing South African and South American bulbs and bulb seeds.

- 3 parts washed sand (builders', industrial, or crushed granite sand)
- 2 parts coarse peat moss (crumbled)
- 2 parts redwood compost
- 1 part perlite or pumice (optional – perlite can contain fluorides which maybe mildly toxic to some plants)

**#2. Lean Soil Mix.** This mix produces good results for growing bulbs and seeds as long as one pays attention to watering and fertilizing. The crushed granite sand is virtually sterile and is said to contain high amounts of potassium (which bulbs love) as well as some trace elements. You may topdress this lean mix with a commercial potting mixture which can consist of forest products, fir bark, redwood particles, Canadian sphagnum peat, and pure sand. Do not use a commercial mix containing manures.

- Crushed granite sand (do not screen out fine particles)
- Topdress with ½-1 inch (12-25 mm) commercial potting mix (optional)

**#3. Rich Soil Mix.** This soil mix is good for growing tulips, hyacinths, narcissus, etc. It is based on planting mixes which contain forest products, sand, and composted manure. Planting mixes should be aged for at least two months – or until the strong odor has dissipated – before mixing into soil mixes used for planting bulbs. (Note: potting mixes are different from planting mixes; potting mixes tend to be less rich; planting mixes tend to be rich and should be aged as indicated above before use in soil mixes for bulbs.)

- 3 parts peat moss (crumbled)
- 2 parts sand (builders', industrial, or crushed granite sand)
- 2 parts commercial planting mix
- 1 part perlite (optional)

**#4. Soilless Mix.** This mix has worked well for amaryllids in containers. See the article on this new planting mix in **HERBERTIA**, Vol. 53 (1998).

- 1 part granite sand including dust particles
- 1 part white silica sand #12 particle size
- 1 part small coarse red volcanic cinders
- 1 part small coarse black volcanic cinders

**Jim's favorite Sonoma county mix** (30-35 inches of rain a year) –

4 parts manureless commercial soil mix (Jim uses Supersoil®)

1 part peat moss

1 part vermiculite

1 part fine sand

1 part perlite

Peat moss and vermiculite are increased for bulbs from woodland and/or wet places, with sand and perlite decreased. This is reversed for bulbs from open meadows and/or dry places. Jim never uses manure. For bulbs that benefit from feeding, Jim uses half-strength Mira-Gro® every 1 to 2 weeks during active growth.

From earlier volumes of Mariposa –

**Chuck Baccus** – Santa Clara county, 15-20 inches of rain a year – Vol. 1, # 2, October 1989

1 part medium fir bark

1 part ground forest humus

1 part "Cal. mix" (50-50 sand and fir bark, ground)

**Stan Farwig and Vic Girard** – Contra Costa county, 15+ inches of rain – Vol. 1, # 3, January 1990

2 parts sand

1 part topsoil

½ part peat moss

handful of ground dolomite

(Stan said their results were always excellent with this mix, so long as supplemental water was provided for more northern species.)

**UC Davis mix** – Vol. 1, # 4, April 1990

half sand and half sphagnum peat moss, by volume

(Hugh McDonald noted that this mix worked well for him in Alameda county, with 20+ inches of rain a year, for section *Mariposa*, but that catsears and globe lilies did not seem to like it as much. In a later issue – Vol. VI, # 1, July 1994 – he reported his results were best overall with this mix: "All species will grow in it if proper amounts of water are applied...However, red lava rock should be substituted for one-quarter of the sand when growing the Mexican species.")

**UC Davis soilless mix** – Vol. V, #4, April 1994

1 part vermiculite

1 part perlite

1 part sphagnum peat moss

(Hugh reported this gave him the best germination results for *C. weedii*.)

We would be happy to publish other mixes used successfully by readers. Be sure to include information on your rainfall, plus other climate details if appropriate.

❁ **NOTE** –

**1999 seed contributions for distribution to MARIPOSA readers will be welcomed !!!**