



MARIPOSA

the newsletter of the *CALOCHORTUS SOCIETY*

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C. venustus "2-spot form"

IN MEMORIAM

On November 28, 1998, the genus *Calochortus* lost a committed friend, a dedicated student and scholar, with the death of Vic Girard. Aged 71, Dr. Girard had spent a good many years "chasing the wild lily" with his partner Stan Farwig. Vic and Stan responded to the request for information on *C. excavatus* which appeared in our last issue by sending a summary of what they had learned from their horticultural efforts to the woman in Bishop, CA, who is working on a restoration project – an effort which led them to volunteer writing the following article for MARIPOSA. Vic's interests extended far beyond the *Calochortus* – to cacti and succulents, to the Geraniaceae, to many South African geophytes. Nevertheless, it is fitting that one of his last activities was working with Stan on the following article.

Species of the issue - *Calochortus excavatus* - by Vic Girard and Stan Farwig

History — *Calochortus excavatus* was first collected at Bishop Creek on 30 May 1886 by W. H. Shockley. It was first published by Edward Lee Greene in 1890. Since Greene's publication, the taxon has had a somewhat tortuous existence. Jepson (1922) reduced it to synonymy with *C. Nuttallii*. Abrams (1923) accepted the classification, although he did state, "*Calochortus excavatus* Greene has a deeply depressed purple gland and purple anthers, and is probably worthy of at least varietal distinction."

Ownbey (1940) removed Greene's plant from synonymy and returned it to specific level; all further major floras (Munz 1959 and Jepson Manual 1993) have followed suit. Ownbey placed *C. excavatus* in his subsection *Nuttalliani*, a heterogeneous collection of taxa of widely different morphology and cytology. Ownbey's *C. Nuttallii* var. *bruneaunis* and var. *panamintensis* have since been raised to specific level because cytological studies have shown that these two have $n=7$, while *C. Nuttallii* has $n=8$ [referring to the number of chromosomes in the nucleus of each cell of the plant — *Eds.*]. As far as we can determine, no similar study has been undertaken for *C. excavatus*. Therefore, *C. excavatus* has the dubious distinction of being the only *Calochortus* in the U.S. for which we completely lack any cytological information. Until such work is completed, we must remain ignorant whether *C. excavatus* is taxonomically closer to *C. Nuttallii* or to *C. bruneaunis*, which it more closely resembles.

Collections and descriptions based on them — Ownbey in his monograph cites only five collections: three at or near Lone Pine (collected 1897 to 1936) and two at or near Bishop (1886, the type, and 1906). Jepson would not allow Ownbey, during the research stage of his Ph.D., to use any material in the Jepson

Herbarium. It is said that Jepson disliked the idea of an "Eastern boy" doing "Western botany." Jepson (1922) listed only two collections: one made by himself in the "White Mts.," and another collection from "Bishop."

With only seven herbarium specimens to work with and, from all evidence, with relatively little field work involved, it should come as no surprise that published descriptions of the species are often at odds. Greene (1890) described the petals as "white shaded with lurid purple above;" Ownbey (1940) described them as "apparently lavender;" Munz (1959) "lavender;" and Fiedler (Jepson Manual, 1993) "lavender, green-striped outside." Only Munz (1959) and the Jepson Manual (1993) give height figures: Munz 1-3 dm., Jepson Manual 10-30 cm. (a total of from 4 to 12 inches).

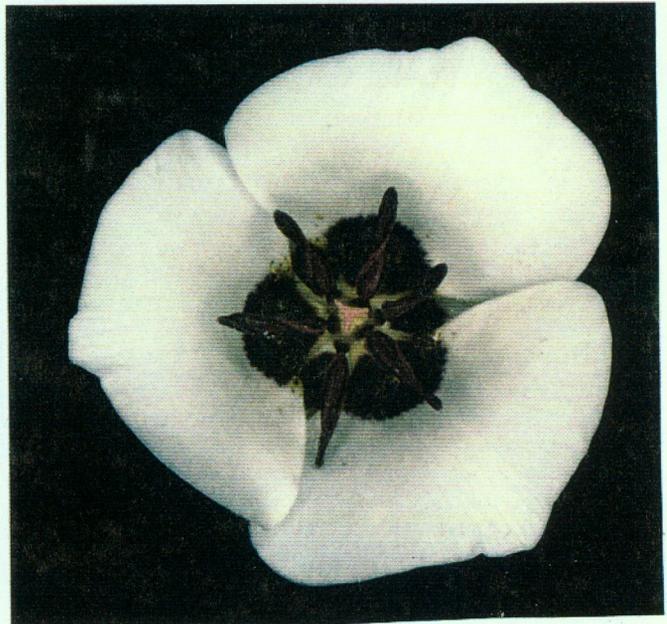
From our field experience, we can say categorically that the ventral side of the petal of *C. excavatus* is pure white, the dorsal side shaded in pale to moderate purple, the color occasional "spilling over" the top of the ventral side, a phenomenon often seen in *C. catalinae* and occasionally in *C. argillosus* [we have also seen it in a few *C. vestae* - see one of the photographs in Vol. X, No. 1 - Eds.]. There is a solid deep purple (to almost black) patch at the base of the petal surrounding a deeply excavated gland (hence its name). Ron Parsons reports that, at a site near Lone Pine (not the Whitney Portals site), a number of *C. excavatus* show multiple fine-line purple striations on the ventral side of the petal, thus giving the petal a "purplish/lavender" cast. Contrary to published descriptions, *C. excavatus*, growing in well watered conditions, is a relatively tall plant, 2 to 2-1/2 feet; plants shorter than that are essentially depauperate. Therefore, *C. excavatus* is two or three times taller than *C. bruneaunis*, which also has a white petal and a dark purple patch, mottled however with yellow and orange, resembling an exotic insect [compare the two species in the photographs on p. 3].

Habitat — Of the 32 sites of *C. excavatus* listed in the NDDDB Inventory [the Natural Diversity DataBase maintained by the California Department of Fish and Game - Eds.], dating from the middle 1980s, all but one are to be found within the confines of Owens Valley. The one site near Benton at 6430 ft. has not been seen by us. The area around Benton and Benton Hot Springs is what we would describe as harsh desert, more appropriate for *C. bruneaunis*. Twenty-five years ago, a sign hung outside a store in Benton advertising itself as "100 Miles From Nowhere and 2 Feet From Hell." Owens Valley technically begins at what used to be Owens Lake, now a vast empty crater but which in the last century contained enough water for a steamship to ply across it from Cartago on the western shore to the Cerro Gordo mines on the eastern. The Valley, from Owens Lake at the south to Bishop at the north, gradually rises in elevation: Cartago 3641 ft., Lone Pine 3727, Independence 3925, Big Pine 4002, Bishop 4147; immediately north of Bishop one has to climb almost 2300 feet up the Sherman grade to 6436 ft. It is only at this 6500-5700 foot altitude, and in the drier areas, that one finds *C. bruneaunis*. *C. excavatus* is not only a geographic endemic, it is also limited to a specific habitat. Mary De Decker, many years ago, told us that the plant used to be relatively common throughout Owens Valley and could be found in just about every swale and bottom meadow. But thanks to the Metropolitan Water District (via the Los Angeles Aqueduct, the largest aqueduct in the Western Hemisphere) which has been siphoning all water from the Owens River since 1913, the water table in the Valley has fallen so low that the vast majority of old wet swales and bottom meadows have, beginning as early as the 1930s, long since disappeared.

We are familiar with only two stands of *C. excavatus* (both of which are on the NDDDB Inventory): one just outside the community of Gerkin, a few miles south of Bishop; and the other a couple of miles west of Lone Pine (on the Whitney Portals Road) just as one approaches the Alabama Hills. Ron Parsons reported to us that, thanks to El Niño of 1997-98, literally thousands of plants were seen throughout the

CALOCHORTUS EXCAVATUS —

Photographs by Ron Parsons



Compare
***C. bruneanus* —**

Photographs by
Stan Farwig



Alabama Hills themselves. Both the Gerkin and the Whitney Portals sites are notable: at Gerkin an underground spring, flowing out of a rocky hillside some couple of hundred yards away, keeps the site moist until well into the middle or end of summer; and the ground along the road to Whitney Portals dips considerably in one area, where it collects water and is occasionally flooded by Lone Pine Creek. Virtually every site listed in the NDDDB Inventory is described as "(moist) alkaline meadow" or near "springs." The associative flora includes: *Juncus balticus* (rush), *Distichlis spicata* (saltgrass), *Sporobolus airoides* (dropseed grass), *Sidalcea covillei* (mallow, endemic to Owens Valley), *Chrysothamnus nauseosus* (yellow-flowered composite), wild rose (probably *Rosa woodsii*), and other plants that demand water: *Iris*, *Sisyrinchium*, and in one site, *Epipactis gigantea* [a native orchid — Eds.].

We lack exact annual precipitation and weather statistics for Owens Valley. We can say, from personal experience, the Valley is brutally cold and dry in the winter, when virtually every night the temperature drops below (and often well below) freezing, and brutally hot and dry in the summer. Vic Girard spent several weeks in Lone Pine in August 1967, and the temperature dropped to a balmy 87°F. at around 3 a.m. one night.

As far as range of altitude for *C. excavatus* is concerned, Munz (1959) gives 4000-6000 ft. (1200-1800 m.); the Jepson Manual (1993) gives 1300-2000 m. (4200-6500 ft.). Both ranges, in our opinion and based on what we actually know, are far too high. No stand of the species, as far as we are aware, is known outside the Owens Valley. The NDDDB Inventory lists elevations for 31 of the 32 sites from 3280 ft. (near Independence) to 5000 ft. (also near Independence), with the vast majority ranging from 3780 ft. to 4640 ft. One must therefore question Jepson's collection in the "White Mts." Many years ago, we were informed that a massive stand of "white mariposas" grew in Onion Valley at 9200 ft. The road from Independence to Onion Valley, completed in 1962, is a narrow, paved two-laner cut out of the side of the mountain. We have never gone to Onion Valley to check for ourselves whether the reported "white mariposas" were *C. excavatus*, *C. leichtlinii*, or perhaps *C. panamintensis*.

Restoration — Since there are no reported (or verified) stands of *C. excavatus* outside Owens Valley, and no current stands exist in any but the most extraordinarily well watered environments, any attempt to restore *C. excavatus* must meet the minimal standards to which the species has evolved.

Cultivation — We have made only one attempt at cultivating *C. excavatus*, and that was with a large batch of seeds. These were sown at the same time as seed of other species with which we had previous experience: shortly before the fall rains were to begin in late October or early November. The seed germinated as readily as other species, in two or three weeks, and the four foot box which held them was thickly crowded with seedlings. In light of future developments this may be surprising, since at the time we knew nothing of how stratification was to be done, and the seed had not been subjected to the procedure.

The seedlings grew exceptionally well and seemed robust. We were elated with a belief that the species was proving to be amenable to cultivation, and in a few years we would be looking at a multitude of these handsome plants. Then the first oddity occurred, when the seedlings began to die back from the tips in late February-early March, well before the other seedlings. As customary when seedlings show they are ending their growth period, water was gradually withheld, and the box went dormant.

The second oddity occurred when, with the onset of the fall rains, not a single seedling reappeared. This was a first for us, and hope was maintained well into January, when it became obvious we had seen the last of *C. excavatus* in our backyard.

Some speculation is offered that will hopefully be helpful. Up to this time all of our experience had been with species we think of as being endemic to "the California temperate basin," that is, west of the Sierra Nevada mountains, roughly north to the Mount Shasta area and south to the Baja peninsula. With a climate in which temperatures rarely or only for short periods fall below freezing, these species begin growth with the fall rains. Owens Valley, as we found out one year in February, will have the ground frozen solid for extended periods of time, and it is doubtful a seedling would long survive an early germination.

We speculate that germination (and probably the first appearance of mature plants) takes place in late winter-early spring for *Calochortus* species from the Owens Valley (and other areas of non-temperate winter), and these species have a somewhat shorter growing period than those from more temperate winters. Although we have not had the opportunity to test the following recommendation, it might be prudent in temperate areas to sow seed of *C. excavatus* in late winter or early spring and allow them to grow on until showing signs of going dormant, which will probably be noticeably later than that of fall germinating species. Similarly, they may require cold, dry dormant conditions in the second and subsequent years throughout the winter.

And we would reiterate a maxim we formulated early in our horticultural pursuits: don't accept the failures of others as your own.

An excellent rule in our experience also. Nevertheless, the experience Vic and Stan describe with C. excavatus very much parallels our own efforts to grow C. kennedyi – another species primarily found in moderately high-altitude desert locations, though it occurs on dry ground rather than in swales and wet bottom-meadows — Eds.

Readers' Forum

✿ (More on *C. excavatus*) – I sent a note off about my limited experience with *C. excavatus*. I was able to grow some to blooming stage in the late 70's. Right now I have a stand of *C. obispoensis* going for a project in San Luis Obispo County. I've been maintaining a bed for about 4 years now with quantities varying up to 200-250 bulbs. Some extra *C. leichtlinii* seeds to use for germination tests would be appreciated — Chuck Baccus, San Jose.

We sent you extra C. leichtlinii seeds since we had a good collection of them. Let us know for the Forum how your tests come out – as well as any growing suggestions you can offer!

✿ I have been growing a few of the Mexican (summer-growing) species from [previous years' seed offerings] and usually end up with a few hundred seeds each of *C. barbatus*, *C. fuscus*, *C. exilis*, *C. purpureus*, and maybe a couple of others. Should I be returning this seed to you for distribution? — Robb Smith, 405 Walker Hook Road, Salt Spring Island, BC - V8K 1N7 - Canada.

We think it's probably more efficient for people who would like to try them to write to you directly, so we've included your full address here. We know from experience that we can't do much with them in Sonoma County, and would rather see them go to other people who might like to try them. We assume you would also offer suggestions for propagation ???

✿ I collected seed of some fine *C. macrocarpus* last summer in sagebrush territory near Dog Creek, BC. Would anyone like to trade for seed of some California or Oregon species? — Paige Woodward, 44305 Old Orchard Road, Sardis, BC - V2R 1A9 - Canada

- * The photos of *C. monophyllus* and hybrids are fantastic! Are the hybrids mules, or do they produce viable seed? Do they exhibit hybrid vigor compared with their neighbors (parents, presumably)? Do you think the albino is of species or hybrid status? (certainly the most desirable catsear I have ever seen!) If they produce viable seed, have you any (or bulbs) for sale? I miss your list – do you plan to go commercial again? — Mr. Ray Drew, Laindon, Essex.

In order – thanks for the kudos, but it's the flowers that are fantastic, more than the photos! We've never produced seed from any of the hybrids we've grown, so think they're probably mules. To be certain, of course, one must check those in the wild – but trying to identify which plant in a group is the hybrid while in seed is daunting. There's little sign of hybrid vigor in nature. We've seen two albinos in nature – one among mostly hybrids and one in a mixed population of mostly standard species – so who knows about parentage? Our best hope for reproduction is vegetative, which tends to be very slow in catsears (but patience is rewarding). As for returning to our commercial efforts, we do intend – barring the unexpected and the unplanned – to put out a retail list this coming August and will send you a copy.

- * Reference Joy Bishop and growing in small pots. I grow single bulbs in small pots but have never had them bloom until put in a larger pot. I have also found the bulb grows to blooming size much quicker in a large pot. Due no doubt to the extra nutrients in the larger pot. As you say, high temperatures can kill bulbs in small pots. Even in this country in greenhouses or frames the temperature can reach 90°F to 100°F quite often. — Norman Young, Newdigate, Dorking, Surrey

- * (Response to your comments last issue) – I do feed my bulbs regularly and repot in fresh compost every year so that cannot be my problem. Perhaps the truth is I need California sunshine! — Joy Bishop, Lightwater, Surrey

- * I don't know if you received any criticism for mentioning the [right name of the Stump Springs location] in print, but I think it's the right thing to do. As you point out, development is happening fast in many places, and I think our best chance of conserving these flowers is building awareness — Michael Mace, San Jose

Thanks, Michael. We had a few "I was surprised to see..." comments, but no direct criticism. If people don't approve, we think it's worth discussing the pro's and con's. Clearly, we agree with you. The trick, we believe, is to be careful about who gets the information. If the Society members can't be trusted, we are all in trouble. But we don't "broadcast" site locations to "people in general." By the way, we're planning to include a few thoughts on responsible seed collection in the April issue, as the species bloom and seed collection time approaches.

- * In order to control heat, sun, and rain exposure and to enjoy blooming on my deck, I am using 12" by 12" by 10" deep plastic pots for mobility. But mobility is limited by back problems. Does anyone have advice on a LIGHT plant mix (no sand) to keep the weight of the pots down? — Bob Werra, Ukiah

Finally, several members expressed appreciation for the extensive seed offering this year – thank Mother Nature, not us! It was a fabulous year for seeds! Altogether, more than a third of the members ordered seeds – and we're happy to report that the requests were varied enough so even the seeds in short supply lasted, and we were able to give everyone what they requested. Several members included a few extra dollars with their requests – greatly appreciated, as foreign members are not always able to get hold of US dollars, and the extra dollars covered their costs for us. Thank you!