Two New Subspecies of *Calochortus umpquaensis* (Liliaceae) from Southwestern Oregon: *C. umpquaensis* Fredricks ssp. *confertus* Callahan and *C. umpquaensis* Fredericks ssp. *flavicomus* Callahan

Frank T. Callahan
P.O. Box 5531 Central Point, OR 97502 U.S.A.
callahanseeds@gmail.com

ABSTRACT

Two new subspecies are described for *Calochortus umpquaensis* Fredricks: *C. umpquaensis* Fredricks ssp. *confertus* Callahan and *C. umpquaensis* Fredericks ssp. *flavicomus* Callahan. Both subspecies are isolated from the nominate species and both are endemic to soils derived from ultramafic substrates. Published on-line www.phytologia.org *Phytologia 97(4): 275-281 (Oct 1, 2015)*. ISSN 030319430.

KEY WORDS: *Calochortus,* Liliaceae*,* Umpqua mariposa lily.

Nancy Fredricks (1989) published the name *Calochortus umpquaensis* for an endemic mariposa lily found on serpentine-influenced soils in the Umpqua drainage of southwestern Oregon. She collected the type specimen in Douglas County: "8 km southeast of Rt. 138 on County Rt. 17 (Little River Road), southeast of Glide, T26S R3W Sec. 34, on south facing serpentine slope, elev. 300 m, 3 June 1987, Fredricks 382" (holotype: OSC243401). About 20 years later I examined the as yet unmounted type specimen, which was stored in newspaper. The earliest report of this taxon dates back to the 1950s: Reggie Miller, a botanical collector and founder of the Glide Wildflower Show, discovered it near Peel along Little River Road, in Douglas County, Oregon. She collected specimens of the plant, which she recognized as distinctly different from *Calochortus howellii*, and sent them to an Oregon herbarium, either Oregon State University or the University of Oregon. Unfortunately, they appear to have been lost; she did not receive a response from the herbarium and no trace of her specimens has been found in the herbarium at Oregon State University, which now includes the former University of Oregon herbarium (Ray Godfrey, pers. comm.)

In 1989, I found another population of *Calochortus umpquaensis* while exploring Callahan Meadows, just south of Tiller, Oregon. Callahan Meadows is about 20 miles (32 km) south of the site near Peel where Fredricks collected her type specimen. Ray Godfrey, a Douglas County botanist, took Fredricks to the Callahan Meadows site and she agreed that it was range extension of the species that she was describing. Shortly thereafter, for the benefit of the Tiller Ranger District (Umpqua National Forest), I mapped the entire distribution of the populations that lie south of Tiller. At this time I recognized that these plants were quite different from the plants that Nancy described; they lacked transverse nectary membranes on the adaxial petal surface that were crested with dendritic trichomes, the normal trait for *C. umpquaensis*. In contrast, the plants from Callahan Meadows had a "forest" of long simple trichomes, (hence the specific epithet *confertus*); they also lacked the dense papillose region above the nectary zone that is the norm for typical *C. umpquaensis*. The same year, I began exploring all the other ultramafic sites south of Lane Mountain southwest to Brushy Butte in southern Douglas County. There I discovered yet another distinct *Calochortus* with long yellow trichomes above the nectary, incised nectary membranes that appeared as segmented units and a reduction of papillose trichomes distal from the nectary on the adaxial petal surface. The yellow trichomes are unique to these populations, hence the name *flavicomus*, meaning yellow hairs.

***Calochortus umpquaensis* Fredricks ssp. *umpquaensis*, Umpqua mariposa lily.**
Stems 20-30 cm long, usually not branching. Leaves: basal leaves narrowly lanceolate, to 40 cm long, adaxial surface covered with lineal rows of simple trichomes; cauline leaves 1, not prominent. Inflorescences: 1-5 flowered; bracts 2, subopposite, narrowly lanceolate. Flowers: sepals lanceolate-acuminate, to 2 cm long, petals to 40 mm long, white to cream colored, with dark purple crescent above the nectary, nectary consisting of 3-4 rows of membranes that are not incised nor segmented and crested with dendritic trichomes, adaxial surface strongly papillose, with long simple white trichomes often dendritic at base. Filaments 7 mm long, anthers to 7 mm long. Fruits: nodding, ovate, 3.0-5.5 cm long. Seeds irregular shaped, cream yellow. Chromosome number, 2*n*=20 (Fredricks 1989).

***Calochortus umpquaensis* Fredricks ssp. *confertus* Callahan, ssp. nov. Fig. 1.**
TYPE: USA, Oregon: Douglas County, Tiller, Callahan Meadows, 42° 53' 54.48" N, 122° 57' 53.81" W, ca. 823 m., 3 June 1989 *Callahan 534* (HOLOTYPE: OSC 247669; ISOTYPE: SOC).

The Callahan Meadows mariposa lily differs from the nominate species in the following flower traits: adaxial petal surface not strongly papillose, except zone proximal to the nectary (petal claw), nectary membrane absent, and a dense area of long trichomes are present in the nectary zone; petals: blotch-burgundy, not dark purple (Fig. 2).

Plants growing in soils derived from ultramafic substrates in open, dry meadows. Plants common, but scattered, as this area has been subject to overgrazing by cattle in the past. Unauthorized cattle grazing continues despite a Forest Service closure of this meadow to grazing. Jeanette Sientz, Mary Gerritsen and Ron Parsons accompanied me on this field trip.

***Calochortus umpquaensis* Fredricks ssp. *flavicomus* Callahan, ssp. nov. Fig. 3.**
TYPE: USA, Oregon, Douglas County, ridgeline northeast of Brushy Butte to Buck Peak, confined to ultramafic outcrops and below ridge to Lee Creek Rd. Sec. 15, access on BLM 27-4.5 rd. off South Deer Creek Rd., 43° 09' 44.1" N, 123° 08' 09.5" W, 829 m., 7 July 1990. *Callahan CUF-BB-1-90*, (HOLOTYPE: OSC 243401; ISOTYPE: SOC).

Yellow-banded Umpqua mariposa lily differs from the nominate species in these flower traits: adaxial petal surface slightly papillose, nectary with 3-4 rows of transverse membranes crested with dendritic trichomes that are strongly incised and appear as segmented units; area above nectary zone strongly covered with long yellow hairs; Petals: blotch-purple.

Populations confined to T27S Sec. 35, T28S Sec. 1,2,10,15, Associated speciese: *Ceanothus cuneatus*.

All members of the *C.. umpquaensis* complex appear to be strict endemics of soils derived from ultramafic substrates as they have not, to date, been located on any other soil types. Ultramafic soils are uncommon in Douglas County, so there is a natural scarcity of habitat. Land disturbance activities (road building, quarrying and timber plantations) threaten populations with further loss of habitat. A large population of *C. umpquaensis* north of Lane Mountain has been extirpated due to timber plantation practices. Populations deteriorate under herbicide treatments and in low light conditions under a dense forest canopy. *Calochortus* taxa do best in open meadows, often grassland situations, and some prefer very barren soils that support few other plants. *Calochortus* are also impacted by herbivory. Rabbits, non-native turkeys and deer consume the above ground parts of the plants, quail eat the seeds, and gophers and ground squirrels consume the bulbs. Unauthorized livestock on National Forest lands trample and graze the plants. A common member of the chaparral community, *Ceanothus cuneatus*, that is also adapted to poor soils, often grows with the Umpqua mariposa lily.

Calochortus umpquaensis and its three subspecies are related to a southwestern Oregon complex, noted for the unique architecture of rows of trichomes on the adaxial leaf surface. Members of this group also include *C. coxii* and *C. howellii*, the latter bearing an upright capsule while in all other members the capsule is pendent (Godfrey & Callahan 1988). To date, only *C. elegans* has been rarely found to exhibit trichomes on both the adaxial and abaxial leaf surfaces. Yet another interesting feature of these Oregon endemics is that the nectaries fluoresce in ultraviolet light.

The conservation of the southwestern Oregon complex of *Calochortus* serpentine endemics is difficult because populations occur in a variety of land ownerships, including National Forest, BLM, and private holdings. Livestock grazing is a major problem on all of these land ownerships, and over population of deer and rabbits takes a heavy toll on flowering plants and seed crops. Fire suppression has fostered encroachment of meadows by woody plants, further reducing habitat for *Calochortus*. Road building was noted through several of the plant populations, which also promotes a number of weedy species. Based on my extensive field observations, I believe that if land managers and botanists do not take a proactive conservation role, many of these rare serpentine endemics may be lost in the near future. As one of the landowners remarked to me, "having a rare plant on that site restricts our ability to quarry the site for road building." Perhaps we should consider conservation easements to counter the current consumptive use of these habitat areas.

ACKNOWLEDGEMENTS

I thank Stephen Meyers and Richard Halse for reviewing this article and Cindy Roché for editorial assistance.

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Figure 1. Holotype of *Calochortus umpquaensis* Fredricks ssp. *confertus* Callahan

Figure 2. Flower of *Calochortus umpquaensis* ssp. *confertus*. Note the long dense trichomes in the nectary area and the burgundy blotch.

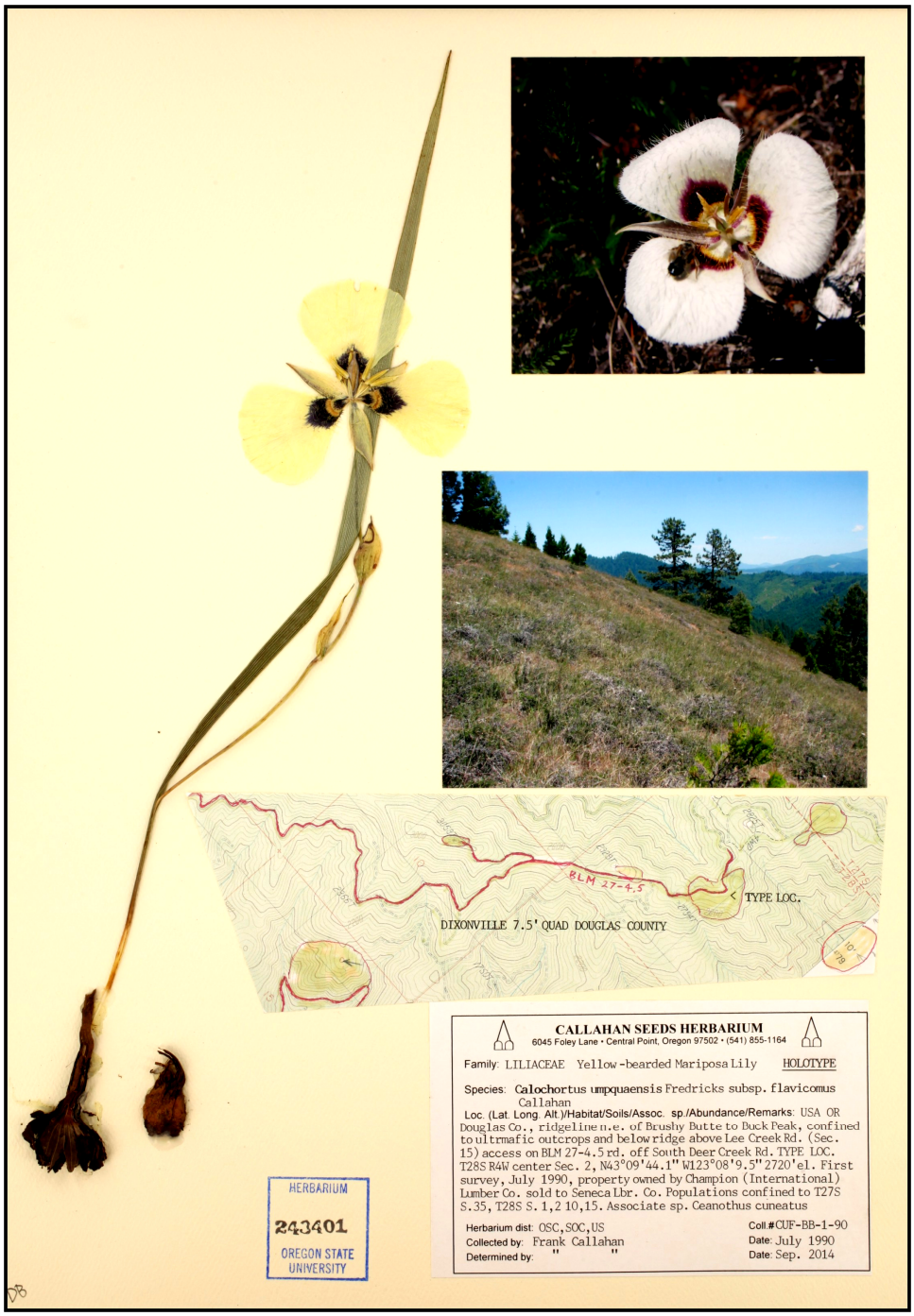

Figure 3. Holotype of *Calochortus umpquaensis* Fredricks ssp. *flavicomus* Callahan

Figure 4. Flower of *Calochortus umpquaensis* ssp. *flavicomus*. Note the long yellow trichomes and the purple blotch.