

NEW COMBINATIONS AND NOVELTIES IN *ERIOGONUM*
(POLYGONACEAE: ERIOGONOIDEAE)

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ABSTRACT

Several new species, varieties and combinations are proposed in the genus *Eriogonum*. Three combinations are proposed: *E. thompsonae* var. *matthewsae* and *E. lonchophyllum* var. *intermontanum* for narrowly restricted Utah endemics, and *E. lonchophyllum* var. *fendlerianum* for a plant of southern Colorado, northern New Mexico and extreme northern Texas. *Eriogonum verrucosum*, *E. meledonum*, *E. capistratum* (including the newly proposed var. *muhlickii* and var. *welshii*) are new species of caespitose yellow flowered perennials related to *E. chrysops* Rydb. in the subg. *Eucycla*. All are narrowly distributed in Idaho and western Montana. New varieties are described in *E. ochrocephalum* (the var. *sceptrum*), *E. shockleyi* (the var. *packardae*) and *E. ovalifolium* (the var. *pansum*); all are members of the subg. *Eucycla* and are found only in Idaho, save the latter which is in adjacent southwestern Montana as well. In California, and in some cases in adjacent Oregon as well, are new varieties of *E.* (subg. *Eucycla*) *nudum* (the coastal var. *paralinum*) and three new varieties of *E.* (subg. *Oligogonum*) *umbellatum* all of serpentine places in the northern Coast Ranges (var. *goodmanii*, var. *humistratum* and var. *argus*). Additional varieties of annual species (subg. *Ganysma* and *Oregonium*), all from California, are proposed in *E. trichopes* (the var. *hooveri*) of the southern Coast Range, in *E. deflexum* (the var. *rectum* of the Mojave and Sonora deserts previously attributed to the more eastern endemic *E. insigne*), in *E. luteolum* (the var. *salutarium* of granitic sands in the Sierra Nevada), and in *E. gracile* (the glabrous var. *incultum* of Orange, Riverside and San Diego cos.). A new species of the subg. *Pterogonum* from the Chihuahuan Desert of northern México, *E. henricksonii*, is also proposed. The subg. *Pterogonum* sect. *Pterogonum* is formally established in accordance with recent changes in the *International Code of Botanical Nomenclature*.

KEY WORDS: Polygonaceae, *Eriogonum*, taxonomy, California, Idaho, Montana, Oregon, Utah, Colorado, México.

INTRODUCTION

A small number of miscellaneous species and varieties of *Eriogonum* Michx. (Polygonaceae: Eriogonoideae) have gone unpublished for several years awaiting critical material, an opportunity, or sufficient pressure to make them available. The rediscovery of *E. chrysops* Rydb. in eastern Oregon now makes it possible to describe a series of species long felt to be distinct from that species but included within it by various authors (Hitchcock 1964; Reveal 1973). A few new species and varieties in *Eriogonum* still remain to be described awaiting adequate type material, but the opportunity to present a review of the eriogonoid genera of California and Arizona for new state floras as well as forthcoming regional treatments for the Chihuahuan Desert, the Intermountain West and for North America north of México makes it mandatory that several names now receive their formal baptism.

TAXONOMY

Eriogonum thompsonae S. Wats. var. *matthewsae* (Rev.) Rev., comb. nov. *E. corymbosum* Benth. in A. DC. var. *matthewsae* Rev., Phytologia 35: 441. 1976.

Welsh (1984) properly pointed out that the var. *matthewsae* was misplaced and my association of it near *Eriogonum corymbosum* var. *aureum* (M.E. Jones) Rev. was an error. The variety is now transferred to its proper species.

Eriogonum lonchophyllum Torr. & A. Gray var. *fendlerianum* (Benth. in A. DC.) Rev., comb. nov. *E. microthecum* Nutt. var. *fendlerianum* Benth. in A. DC., Prodr. 14: 18. 1856. *E. fendlerianum* (Benth. in A. DC.) Small, Bull. Torrey Bot. Club 33: 55. 1906. *E. effusum* Nutt. subsp. *fendlerianum* (Benth. in A. DC.) S. Stokes, Gen. Eriogonum 79. 1936.

Eriogonum lonchophyllum Torr. & A. Gray var. *intermontanum* (Rev.) Rev., comb et stat. nov. *E. intermontanum* Rev., Madroño 19:293. 1969.

As now defined, *Eriogonum lonchophyllum* is an exceedingly variable species ranging from northeastern Utah and adjacent western Colorado south to northern New Mexico eastward to northern Texas. Welsh (1984) reduced *E. saurinum* Rev. to a variety of the species and *E. humivagans* Rev. [*E. corymbosum* Benth. in A. DC. var. *humivagans* (Rev.) Welsh] is now considered to be a synonym of var. *lonchophyllum*. As indicated previously (Reveal 1976), *E. fendlerianum* might well be considered a variant of *E. lonchophyllum* and that view is now proposed.

Eriogonum ochrocephalum S. Wats. var. *sceptrum* Rev., var. nov. — TYPE. UNITED STATES. IDAHO: Owyhee Co.: 11 mi SW of Bruneau along Idaho Highway 51, in clay hills associated with *Atriplex* at about 2800 ft elev, 7 Jul 1974, Reveal 3687 (holotype: US; isotypes: BRY, NY, RSA, UC, UTC and elsewhere).

A var. *ochrocephalum* scapis 2-3.5 dm longis (nec 0.5-2 dm) et involucris 3.5-4.5 (5) mm longis (nec 3-4 mm) differt.

Plants erect clumped herbaceous perennials 2.5-4 dm tall; leaves narrowly elliptic to oblong, the leaf-blade 1.5-2.5 cm long; scapes 2-3.5 dm long, glabrous or thinly floccose when immature in some; involucre narrowly turbinate to turbinate, 3.5-4.5 (5) mm long, 1.5-2.5 mm wide, tomentose or sparsely floccose initially but soon glabrous; flowers yellow, 1-1.5 (2) mm long; achenes 1.5-2 mm long.

Representative Specimens: — UNITED STATES. IDAHO: Elmore Co.: near Glenn Ferry, 5 mi W of King Hill, 13 Jul 1975, Reveal 3898 (BRY, CAS, DUKE, F, MICH, MO, NY, OKL, RSA, TEX, UTC); above Rosevear Gulch, S of Glenn Ferry, 13 May 1980, Grimes et al. 1544 (CAS). Lemhi Co.: 3 mi S of Baker, 23 Jun 1947, Ripley & Barneby 8852 (CAS). Owyhee Co.: 10 mi S of Bruneau, 29 May 1946, Maguire & Holmgren 26236 (BRY, CAS, DS, UC, UTC); above Pickett Creek, 4 mi W of Oreana, 5 Jul 1980, Grimes et al. 1759 (CAS). Payette Co.: SE of Payette, 3 Jun 1945, Ripley & Barneby 6546 (CAS). Twin Falls Co.: 10 mi N of Twin Falls, 30 May 1946, Maguire & Holmgren 26239 (BRY, CAS, DS, MO, TEX, UC, UTC).

The var. *sceptrum* (Latin *sceptrum*, wand, as to the long naked scape) is the common form of the species in southwestern Idaho and is most closely related to the var. *calcareum* (S. Stokes) M.E. Peck of Malheur and Baker cos., Oregon. The leaves and the scapes of var.

calcareum are shorter while the flowers and achenes are decidedly longer (2-3 mm long) than those of the var. *sceptum*. The plants doubtfully placed in the new variety from eastern Idaho (Ripley & Barneby 8852) differ in having sparsely floccose rather than glabrous scapes and tomentose rather than thinly floccose to glabrous involucre. Efforts to relocate plants in Lemhi Co. were unsuccessful.

***Eriogonum verrucosum* Rev., spec. nov.** – TYPE. UNITED STATES. IDAHO: Custer Co.: On a low ridge and slopes west of the road up the East Fork of the Salmon River, 1.3 mi S of U.S. Highway 93, 6 mi E of Clayton and 20 mi SW of Challis, on steep clay slopes associated with *Artemisia*, *Atriplex* and *Phlox* at about 5700 ft elev, 6 Jul 1974, Reveal 3678 (holotype: US!; isotypes: BRY, NY, RSA, UC, UTC and elsewhere).

A Eriogonum chrysops floribus verrucosis differt.

Plants low herbaceous perennials forming mats 1-3 dm across; *leaves* basal, the leaf-blades oblanceolate to spatulate, 10-15 mm long, 3-6 mm wide, densely white-tomentose below, less so and greenish-white above, the tomentose petiole 8-15 mm long; *flowering stems* scapose, $\pm$ erect, 3-7 cm long, glabrous or thinly pubescent with scattered hairs; *inflorescences* capitate, 0.7-1.2 cm across; *bracts* scalelike, ternate, triangular, 1-1.5 mm long, 0.8-1 mm wide, tomentose; *involucre*s congested, (4) 6-8 per head, turbinate, rigid, (2) 2.5-3 mm long, 1.7-2 mm wide, floccose without especially on the upper half of the tube, the 5 triangular teeth 0.5 mm long, not membranous-margined, the bractlets linear, 1-1.5 mm long, minutely fringed with gland-tipped cells, the pedicels 3-4 mm long, glabrous; *flowers* yellow with greenish-yellow to reddish-brown bases and reddish midribs, 1.5-2 mm long in anthesis and up to 2.5 mm long in fruit, glabrous except for minute glands along the midribs within, the outer surface distinctly pustulose especially along the midribs without forming a pronounced keel, the tepals monomorphic, oblong to oblanceolate, those of the outer whorl 0.8-1.1 mm wide, those of the inner whorl 0.5-0.7 mm wide, united about a third of their length; *stamens* slightly exserted, the filaments sparsely pilose basally, the anthers yellow, 0.5-0.6 mm long, narrowly oblong; *achenes* light brown, 1.5-2 mm long, glabrous, the subglobose base tapering to a long, 3-angled beak.

Representative Specimens. – UNITED STATES. IDAHO: Custer Co.: 5 mi above Challis along Garden Creek, 17 Jun 1969, Barneby 15079 (US); Lost River Range, Pahsimeroi Mountains, Lime Creek Canyon, 10 mi SE of Challis, 21 Jun 1982, Cholewa 1016 (ID); near top of divide on Spar Canyon Road, 4 Jul 1948, Christ & Christ 17707 (ID); Morgan Creek, 9 mi N of Challis, 2 Jun 1951, Christ 51-239 and 51-241 (ID); Spar Canyon, Bear Wallow Road, 7 mi from the East Fork of the Salmon River Road, 2 Jul 1981, Grimes & Yakana 2195 (CAS, MARY); near mouth of Pats Creek along Challis Creek Road, 13 Jun 1978, Henderson 4416 (MARY); E of summit of Spar Canyon, 14 Jun 1978, Henderson 4459 (MARY); Lake Creek, 1.5 mi W of Herd Lake, 21 Jun 1980, Henderson 5629 (ID); 0.2 mi from U.S. Highway 93 along W side of Morgan Creek, 13 Jun 1978, Henderson & Brunsfeld 4421 (ID); E side of Salmon River, 0.2 mi below Deadman Hole and adjacent to Tunnel Rock at milepost 234 along U.S. Highway 93 between Challis and Clayton, 17 Jun 1980, Henderson & Henderson 5604 (ID); 20 mi S of Challis, 15 Jun 1944, Hitchcock & Muhlick 8988 (CAS, DS, RM, UC, UTC, WTU); 8 mi S of Challis, 28 Jun 1946, Hitchcock & Muhlick 14118 (WTU); Challis Creek, 19 Jul 1916, Macbride & Payson 3328 (CAS, DS, MO, POM, RM, UC, US); 10 mi SE of Challis, 22 Jun 1947, Ripley & Barneby 8822 (CAS). Lemhi Co.: 4.5 mi SW of Salmon, 7 Jun 1941, Christ 12226 (ID); Salmon, 3 Jul 1920, Payson & Payson 1879 (CAS, RM).

Eriogonum verrucosum (Latin *verrucosus*, warty, alluding to the pustulose tepals) is restricted to clay shale banks in the Challis area of central Idaho. The species is readily distinguished by its densely pustulose tepals on flowers arranged in a rigid involucre. The narrow leaves and glabrous to (and especially when young) sparsely pubescent stems are similar to those seen in *E. capistratum* var. *welshii* which has membranaceous involucre.

The inclusion of low elevation plants from near Salmon within *Eriogonum verrucosum* must be considered tentative. The specimens cited above from Lehmi Co. have been rather poorly preserved and the features need to be confirmed. Attempts to recollect similar plants in the area have been unsuccessful to date.

The new species has long been included within the broad definition of *Eriogonum chrysops*.

***Eriogonum meledonum* Rev., spec. nov.**—TYPE. UNITED STATES. IDAHO: Custer Co.: Along U.S. Highway 93, 9 mi SSE of Stanley and 2 mi N of Obsidian, on steep sandy clay slopes associated with *Artemisia* at about 6950 ft elev, 5 Jul 1974, *Reveal 3674* (holotype: US!; isotypes: BRY, NY, RSA, UC, UTC and elsewhere).

A *Eriogonum chrysops* scapis 4-10 cm longis et rare tomentosis cum foliis (0.8) 1-1.5 cm longis, floribus glabris differt.

Plants low herbaceous perennials forming mats (0.5) 1-2 dm across; *leaves* basal, the leaf-blades spatulate to narrowly elliptic, (8) 10-15 mm long, 4-8 mm wide, densely grayish-tomentose on both surfaces, sometimes less so above, the tomentose petiole (5) 10-15 (18) mm long; *flowering stems* scapose, erect, 4-10 cm long, thinly tomentose; *inflorescences* capitate, 1-1.5 cm across; *bracts* scalelike, ternate, linear-lanceolate, 2-3 mm long, 1-1.3 mm wide, tomentose; *involucres* congested, (4) 6-8 per head, campanulate, membranaceous, 2.5-3 mm long, 3-3.5 mm wide, tomentose, the 5-6 lanceolate teeth 1-1.5 mm long, the pedicels 3-4 mm long, glabrous; *flowers* yellow, becoming rosy-yellow in fruit, 2.5-3 mm long, glabrous, the tepals monomorphic, oblanceolate, united about a third of their length; *stamens* long exserted, the filaments glabrous, the anthers yellow, 0.3-0.4 mm long, oval; *achenes* light brown, 2.5 mm long, glabrous, the subglobose base tapering to a long, 3-angled beak.

Representative Specimens.—UNITED STATES. IDAHO: Custer Co.: 9 mi S of Stanley, 25 Jun 1941, *Cronquist 2694* (DS, MO, UTC); Sawtooth Valley, bluffs along Valley Creek, 2 mi NW of Stanley, 3 Jul 1988, *Moseley 1353* (MARY).

Eriogonum meledonum (Greek *meledonos*, guardian or caretaker, a fanciful name to honor Mabel Allread Cronquist, 1916–, who collected with a famous botanist the summer of 1941 and has watched over him ever since) is a narrowly endemic species known only from a few scattered locations in the Stanley area. It differs from *E. capistratum* in having thinly tomentose rather than glabrous, glandular or densely tomentose scapes and glabrous rather than generally glandular flowers. The leaves of the new species are broader than those of *E. chrysops* and the scape is not densely tomentose as that seen in the Oregon endemic.

***Eriogonum capistratum* Rev., spec. nov.**—TYPE: UNITED STATES. IDAHO: Custer Co.: Antelope Pass, upper end of Copper Basin on a ridge SW of the pass, on rocky volcanic slopes associated with scattered *Artemisia* and grasses at about 9000 ft elev, 11 Jul 1975, *Reveal & Ertter 3876* (holotype, US!; isotypes: BRY, CAS, DUKE, F, MARY, MEXU, MICH, MO, NY, OKL, RSA, TEX, UTC and elsewhere).

A *Eriogonum chrysops* scapis 1-10 cm longis et glabris vel glandulosis, raro rare floccosis cum involucris tomentosis vel glandulosis, floribus glabris vel glandulosis differt.

Plants low often compact herbaceous perennials forming mats (0.5) 1-2.5 (3) dm across; *leaves* basal, the leaf-blades spatulate to narrowly elliptic or elliptic, 5-10 (15) mm long, 2-7 (11) mm wide, densely white-tomentose on both surfaces, sometimes slightly less so and greenish above, with some glandular hairs in var. *muhlickii*, the tomentose petiole 2-6 (10)

mm long; *flowering stems* scapose, $\pm$ erect to erect, 1-10 cm long, glabrous to glandular or sparsely tomentose to floccose; *inflorescences* capitate, 0.7-1.2 cm across; *bracts* scalelike, ternate, triangular to oblanceolate, 1.5-3 mm long, 0.6-2 mm wide, sparsely to densely tomentose or glandular without; *involucre*s congested, 3-6 per head, turbinate-campanulate to campanulate, membranaceous, 2-4 mm long, 2-3.5 mm wide, sparsely to densely tomentose or glandular and sparsely floccose, the 5-7 triangular teeth 0.3-1.2 mm long, the bractlets linear-oblanceolate, 1-2.5 mm long, minutely fringed with gland-tipped cells, the pedicels 2.5-4.5 mm long, glabrous except for a few glands near the tip in some; *flowers* yellow with greenish-brown to reddish-brown midribs and bases, becoming rosy-yellow in fruit, 2-3.5 (4) mm long, glabrous or sparsely glandular, the tepals monomorphic, oblanceolate to oblong, those of the outer whorl slightly wider than those of the inner whorl, united about a quarter of their length; *stamens* mostly exerted, the filaments sparsely pilose basally, the anthers yellow, 0.3-0.4 mm long, oblong; *achenes* brown, 2-3 mm long, glabrous, the subglobose base tapering to a long, 3-angled beak.

Widespread in the valley and adjacent mountain ranges of central Idaho eastward to extreme western Montana mostly above 6000 ft elev.

This species has long been known in the botanical literature as *Eriogonum chrysops* Rydb. In its typical expression, the var. *capistratum*, the stems are glabrous or sometime glandular with long, narrow leaves. This variety is found in the higher elevations of central Idaho usually above 8000 feet elevation. On the eastern edge of its range this taxon gives way to the more densely compact and decidedly glandular var. *muhlickii* in Montana while to the south it is replaced to some degree by the generally lower elevation var. *welshii* which has a tomentose to floccose scape. An unusual and probably undescribed relative to these taxa is represented by an expression with cream colored glandular flowers on erect glabrous stems with long narrowly elliptic leaves having blades 1-1.5 cm long and 1.5-5 mm wide on petioles 0.5-2 cm long. At present the only specimen seen is a collection from the White Knob Mountains along Alder Creek Road (Caicco & Civile 107, ID).

All of the expressions in the *Eriogonum chrysops* complex are morphologically similar differing mainly in having a distinctly rigid, firm involucre tube or a membranaceous, lax tube, with or without glandular hairs, leaves, scapes and floral parts of various sizes, and slight modifications on the tepals in terms of length, width, surface structures and pubescence. Each of these entities is geographically isolated and locally consistent.

Eriogonum capistratum Rev. var. *capistratum*.

Low caespitose mats up to 3 dm across; *leaves* tomentose, the leaf-blades (5) 10-15 mm long on a petiole 4-10 mm long, the tomentum not glandular; *scapes* 3-10 cm long, glabrous or glandular; *involucre*s tomentose or glandular; *flowers* (2.5) 3-3.5 (4) mm long.

Representative Specimens. - UNITED STATES. IDAHO: Blaine Co.: above North Fork, Little Cottonwood Creek, Craters of the Moon National Monument, 29 Jun 1956, *W.H. Baker* 14224 (ID); W of Cobb Peak and SW of Hyndman Peak, Pioneer Mountains, 6 Aug 1977, *Ertter & Lockwood* 2166 (MARY, NY); S end of Soldier Mountain, 26 Jun 1916, *Macbride & Payson* 2896 (CAS, DS, MO, POM, RM, UC, US); base of Devils Bedstead, 28 Jul 1936, *Thompson* 133546 (CAS, MO, US, WTU); Iron Bog, Pioneer Mountains, 24 Jun 1978, *Wellner* 1339 (ID). Custer Co.: Cabin Creek Peak, 15 Aug 1980, *Brunsfeld & Brunsfeld* 1696 (ID); Antelope Pass, 29 Jul 1946, *Christ* 15986 (UC); head of Copper Basin, 7 Jul 1939, *Davis* 1188 (IDS); Mt. Hyndman, 11 Aug 1939, *Davis* 1712 (IDS, UC); head of Slate Creek near Ocalkens Lake in the White Clouds, 24 Aug 1980, *Ertter & Ertter* 4023 and 4036 (MARY, NY); Mount Parks, 15 Aug 1895, *Evermann* 375 (US); head of Pettit Lake, 29 Jul 1895, *Henderson* 3591 (US); 0.2 mi NW of Snowslide Peak, 10 mi SW of Obsidian, 11 Aug 1939, *Hitchcock & Martin* 5786 (DS, OKL, UC, UTC,

WTU); Stanley Lake, 16 Jul 1936, *Mann & Mann 36-131* (KSC); 3 mi SE of Stanley Lake, 16 Jul 1936, *Mann & Worley 70* (ID, US); Railroad Ridge, 5 Aug 1971, *Schlatterer 200* (OGDF); near Stanley Lake, 28 Jul 1937, *Thompson 14010* (CAS, WTU). Valley Co.: Monument Peak, 12 Aug 1924, *Helm 234* (OGDF).

Eriogonum capistratum (from the Latin *capistratus*, tie with a halter or hitch, here fancifully applied to honor Dr. Charles Leo "Hitchy" Hitchcock, 1902-1986, monographer of numerous genera, author with others of the *Vascular plants of the Pacific Northwest*, long-time professor of botany at the University of Washington, and a student's best friend; see Denton 1986) was long confused with *E. chrysops* and was so treated by Hitchcock (1964) where the following variety was illustrated.

The var. *capistratum* is restricted to the higher elevations mainly in the Sawtooth Mountains of central Idaho where it is commonly found from 8000 to 10000 feet elevation on granitic slopes.

***Eriogonum capistratum* Rev. var. *muhlickii* Rev., var. nov. – TYPE: UNITED STATES.**

MONANA: Ravalli Co.: summit of St. Mary's Peak, 7 air mi W of Stevensville, Bitterroot Range, associated with *Phlox*, *Dryas* and *Astragalus* at about 9300 ft elev, 22 Aug 1974, *Reveal 3814* (holotype, US!; isotypes: BRY, MARY, MO, NY, OKL, RSA, UC, UTC and elsewhere).

A var. *capistratum* foliis brevioribus (5-8 mm longis) cum scapis et involucris glandularis differt.

Low compact cespitose mats up to 1.5 dm across; leaves tomentose, the leaf-blades 5-8 mm long on a petiole 2-5 mm long, the tomentum interspersed with glandular hairs; scapes 1-3 cm long, glandular; involucres glandular; flowers 2-2.5 (3) mm long.

Representative Specimens. – UNITED STATES. MONTANA: Deer Lodge Co.: Mt. Tiny, Pintlar Range, 24 Aug 1972, *Lackschewitz 3976* (MONTU); Green Mountain, Pintlar Range, 20 Jul 1974, *Lackschewitz 5302* (MONTU); summit of Pagoda Mountain, 0.5 mi E of Pintlar Pass, Pintlar Range, 28 Jul 1974, *Lackschewitz 5141* (MONTU). Granite Co.: above Warren Lake, 21 Aug 1974, *Lackschewitz 5603* (MONTU). Ravalli Co.: top of St. Mary's Peak, 10 Aug 1946, *Hitchcock & Muhlick 15320* (MO, RSA, UC, WTU); top of St. Mary's Peak, 5 Aug 1947, *Hitchcock & Muhlick 17100* (CAN, DS, RSA, UC, WTU); Ward Mountain, Bitterroot Range, 17 Jul 1966, *Lackschewitz & Fageraas 52* (MONTU); Castle Crag, Bitterroot Range, 18 Aug 1970, *Lackschewitz & Stuart 2376* (MONTU).

For nearly the whole of their professional life times the names of C. Leo Hitchcock and Clarence Muhlick were linked on numerous herbarium labels and in an entertaining array of adventures that were frequently told from two rather divergent points of view. To a young graduate student the interplay between these two men was wonderous. Now that both are gone it is only appropriate that their association continue in at least one of their interests.

The var. *muhlickii* is the eastern component of the species being isolated on the Bitterroot Range of Montana and on other high mountain ranges just to the east. The plant is decidedly glandular, as compared to var. *capistratum*, as well as much more compact. So far as known, the two do not share overlapping geographic ranges.

***Eriogonum capistratum* Rev. var. *welshii* Rev., var. nov. – TYPE: UNITED STATES. IDAHO:**

Custer Co.: along the road from Ellis to Howe, 38 mi S of May and 46 mi N of Howe, 6 mi S of Summit Reservoir and 8.9 mi N of the Butte Co. line, on low windswept barren gravelly clay upper slopes and ridgetops associated with *Artemisia* and *Atriplex* at about 6400 ft elev, 16 Jul 1976, *Reveal & Welsh 4501* (holotype, US!; isotypes: BRY, CAS, DUKE, MEXU, MICH, MO, NY, OKL, RSA, TEX, UTC and elsewhere).

A var. *capistratum* scapis tomentosis vel floccosis differt.

Low compact caespitose mats up to 1.5 dm across; *leaves* tomentose, the leaf-blades 5-12 mm long on a petiole 4-9 mm long, the tomentum not interspersed with glandular hairs; *scapes* 2-8 (10) cm long, tomentose to densely floccose; *involucre*s sparsely to densely tomentose; *flowers* 2-3 mm long.

Representative Specimens. – UNITED STATES. IDAHO: Custer Co.: Lost River Range, Lime Creek, 10 mi SE of Challis, 19 Jun 1979, *Brunsfeld & Brunsfeld* 1017 (ID); White Knob Mountains, W side of Burma Road N of Corral Creek Pass, 8 Jul 1981, *Caicco & Civile* 165 (ID); White Knob Mountains, 0.5 mi E of Corral Creek Summit on the Burma Road, 24 Jun 1979, *Henderson* 5161 (ID, MARY); 42 mi SE of May, 4 Jun 1964, *Holmgren & Reveal* 863 (CAS, NY, RSA, UC, UTC, US); 38 mi S of May, 31 Jul 1976, *Reveal & Reveal* 4606 (BRY, MO, US).

The var. *welshii* (for Dr. Stanley Larsen Welsh, 1929– , professor and curator of the herbarium at Brigham Young University, and author of an Alaskan and a Utah flora) is a narrowly restricted species known only from a few scattered sites in Custer Co., Idaho. This expression is perhaps the most similar to the Oregon endemic, *E. chrysops*. The leaves of the new variety are shorter and mostly broader than those of *E. chrysops*, the tomentose scapes are shorter, and the flowers are glabrous. In *E. chrysops*, the flowers are weakly glandular-puberulent with broader tepals. Another undescribed entity is known from the top of War Eagle Peak in Owyhee Co. This plant has short narrow leaves (the blades 5-8 mm long and 1-3 mm wide with a petiole 2-6 mm long), sparsely floccose scapes 4-6 cm long and membranaceous 5-6-toothed campanulate involucre 3.5-4 mm long that are minutely glandular without except for a few scattered hairs on the teeth. The bright yellow glandular flowers are 2-3 mm long.

Eriogonum shockleyi S. Wats. var. *packardae* Rev., var. nov. – TYPE: UNITED STATES.

IDAHO: Owyhee Co.: above the upper sand dune of upper Halverson Lake, on "blow" areas on the lava rim rock on the northern bank of the Snake River in the Bird of Prey Sanctuary SE of Melba, associated with *Artemisia* and *Atriplex* at about 2500 ft elev, 7 Jul 1974, *Reveal et al.* 3686 (holotype, US!; isotypes: BRY, NY, RSA, UC, UTC and elsewhere).

A var. *shockleyi* scapis $\pm$ nullis differt.

Plants low caespitose herbaceous perennials forming mats 0.5-4 dm across; *leaves* in dense compact rosettes, the leaf-blades elliptic, 1-3 (3.5) mm long, 1-1.5 mm wide, densely tomentose on both surfaces, the petioles 0.5-1 mm long; *flowering stems* lacking, or if present then scapose and less than 5 mm long, tomentose; *inflorescences* capitate and terminal; *bracts* scalelike, ternate, lanceolate, 0.5-1 mm long, tomentose; *involucre*s congested, 2-4 per head, broadly campanulate, $\pm$ membranaceous, 2.5-3 mm long, tomentose, the 4-5 (6) lanceolate teeth 0.8-1 mm long, the pedicels 0.3-0.5 mm long, glabrous; *flowers* 2-5 per involucre, pale yellow, 2.5-3 mm long, densely tomentose, the tepals monomorphic, united about a third of their length; *stamens* exerted, the filaments 3-4 mm long, glabrous, the anthers yellow, 0.3 mm long, oval; *achenes* light brown, 2.5-3 mm long, densely tomentose, the subglobose base tapering to a short, 3-angled beak.

Representative Specimens. – UNITED STATES. IDAHO: Owyhee Co.: 10 mi S of Bruneau near Devil's Bathtub, 9 Jun 1975, *Bright s.n.* (MIN); 1.5 mi ENE of Bruneau along Idaho Highway 51, 9 Jul 1975, *Reveal* 3852 (BRY, MICH, NY, US).

The highly compact cespitose nature of the var. *packardae* and its essentially sessile cluster of involucre covering the whole of the mat quickly differentiates this taxon from the more open, less tightly matted, scapose var. *shockleyi* found to the south. The most densely cespitose forms of var. *packardae* seen are those from the type area where the plant take on the aspect – as the local common name implies – of dried “cow pies.” To the south near Bruneau, the plants are less densely matted and here short scapes may be found.

The new variety is named for Dr. Patricia L. Packard, professor of biology and curator of the Harold M. Tucker Herbarium at the College of Idaho in Caldwell, Idaho. Her enthusiasm for systematic botany has been infectious to numerous undergraduate students, and many such as James Henrickson, Barbara Ertter and James Grimes have gone on in the field.

Eriogonum nudum Douglas ex Benth. var. *paralinum* Rev., var. nov. – TYPE: UNITED STATES. OREGON: Curry Co.: along U.S. Highway 101, 1.4 mi S of the Pistol River – Carpenterville turnoff, in sandy to gravelly soil on a low mesa above the Pacific Ocean associated with scattered *Pinus* at about 150 ft elev, 16 Aug 1976, *Reveal & Reveal 3961* (holotype, US!; isotypes: BRY, CAS, MEXU, MO, NY, OKL, TEX, UTC and elsewhere).

A var. *nudum* involucre 5-10 in quoque fasciculo differt.

Plants spreading herbaceous perennials 1-5 dm high; *leaves* essentially basal, the leaf-blades 1-2 cm long, tomentose below, glabrous and green above, the margins entire, on tomentose petioles 4-10 cm long; *flowering stems* erect, slender, 0.8-3.5 dm long, glabrous, not fistulose; *inflorescences* cymose, 1-2 dm long, branched 1-3 times, the branches glabrous; *involucre* congested, 5-10 per head, 3-5 mm long, 2-2.5 (3) mm wide, glabrous, the 5-6 erect teeth 0.5-0.8 mm long; *flowers* white, 2-4 mm long, glabrous, the tepals $\pm$ monomorphic, oblong, those of the outer whorl slightly wider and shorter than those of the inner whorl; *stamens* exerted, the filaments slightly pilose basally, the anthers dark red to maroon or purple, 0.3-0.4 mm long, oval; *achenes* light brown, 2.5-3 mm long, glabrous.

Representative Specimens. – UNITED STATES. CALIFORNIA: Del Norte Co.: 5 mi S of Crescent City, 17 Jun 1931, *J.T. Howell 6729* (CAS); mouth of the Klamath River, 6 Aug 1947, *Baker 11876* (CAS). OREGON: Curry Co.: Ocean View Camp, Humbug State Park, 21 Jul 1940, *Demaree 21445* (ISC, MIN, MO); 5 mi S of Port Orford, 19 Jul 1939, *Maguire 17201* (RM, UTC); The Heads, Port Orford, 21 Jun 1919, *M.E. Peck 8462* (MO, WILLU); mouth of Wincheck River, 15 Jul 1919, *M.E. Peck 8852* (MIN, WILLU); 0.8 mi S of Brush Creek, 2.7 mi S of Humbug State Park, 16 Aug 1975, *Reveal & Reveal 3963* (BRY, CAS, MO, NY, OKL, US); Harris Beach State Park, NW of Brookings, 8 Jun 1955, *Rosback 171* (DAO, UC); N of Brookings, 7 Aug 1935, *Thompson 12544* (CAS, IND, MIN, OKL, UC, WILLU, WTU); mouth of Pistol River, 21 Jun 1936, *Thompson 12826* (CAS, MO, RSA, WILLU, WTU).

The var. *paralinum* (Greek *paralios*, by or near the sea, alluding to its coastal habitat) is the coastal expression of *Eriogonum nudum*, it being found on the mesas and bluffs above the Pacific Ocean as well as on the immediate coast just above the high water mark. It differs from the more inland var. *nudum* in its having more involucre in a cluster, shorter stems and inflorescences, and in general its more crowded caudex. In many respects the var. *paralinum* is similar to *E. latifolium* Smith in Rees, a densely tomentose coastal plant that occurs from Del Norte Co., California, southward. There are glabrous forms of this species mainly in the San Francisco area (these have been called *E. oblongifolium* Douglas ex Benth.), but these plants still have the compact aspect of *E. latifolium* rather than the more open and erect aspect of *E. nudum*.

***Eriogonum ovalifolium* Nutt. var. *pansum* Rev., var. nov.** – TYPE: UNITED STATES. IDAHO: Boise Co.: along Idaho Highway 21, about 12.5 mi S of Lowman near the West Fork Creek at milepost 59.5, on sandy-loam soil on slopes associated *Pinus*, *Purshia*, *Artemisia*, *Kelloggia* and *Lupinus* at about 6000 ft elev, 12 Jul 1975, *Reveal* 3883 (holotype, US!; isotypes: BRY, CAS, DUKE, F, MEXU, MICH, MO, NEB, NY, OKL, RSA, TEX, UTC and elsewhere).

A var. *ovalifolium* inflorescentibus umbellatis differt.

Plants loosely matted herbaceous perennials 1-3 dm high and 2-5 dm across; *leaves* essentially basal, the leaf-blades elliptic or nearly so, mostly 1-2 cm long, densely tomentose on both surfaces or with the upper surface slightly less so; *flowering stems* erect or nearly so, 0.7-2 dm long, thinly tomentose; *inflorescences* umbellate but usually not obviously so until after fruit set, up to 7 cm long, the branches pedunculate and without bracts subtending the involucre; *flowers* white.

Representative Specimens. – UNITED STATES. IDAHO: Boise Co.: 1 mi E of Lowman, 1 Jun 1944, *Hitchcock & Muhlick* 8593 (OKL, RM, UC, WTU); E of Elk Lake above Sacajawea Hot Spring, 11-12 Jul 1944, *Hitchcock & Muhlick* 9818 (RM, WTU). Custer Co.: Bonanza, 28 Jul 1916, *Macbride & Payson* 3506 (CAS, MIN, POM, RM, UC); Cape Horn, 6 Aug 1916, *Macbride & Payson* 3628 (MIN, RM); 1 mi W of Sunbeam at Sunbeam Hot Springs, 6 Jul 1974, *Reveal* 3679 (BRY, MO, NY, OKL, RM, RSA, UC, US, UTC). Elmore Co.: 26 mi NE of Mountain Home, 1 Jun 1966, *Collotzi & Davidse* 670 (UC, UTC); 3 mi NW of Pine, S of Dog Mountain, 5 Jun 1944, *Hitchcock & Muhlick* 8728 (CAN, DS, IDS, OKL, RM, UC, WTU); Snowslide Creek, near Atlanta, 26 Jun 1942, *MacFadden* 25460 (CAS). MONTANA: Missoula Co.: above Upper Jocco Lake, E of Arlee, 10 Jul 1948, *Hitchcock* 18167 (RM, RSA, UC, WTU). Powell Co.: 6 mi W of Ovando, Blackfoot Valley, 25 Jun 1945, *Hitchcock & Muhlick* 11524 (CAS, WTU). Silver Bow Co.: Durant, 6 Jun 1906, *M.E. Jones s.n.* (POM).

The var. *pansum* (from the Latin *pansus*, spreading out, extended, alluding to the umbellate rather than capitate inflorescences) is not always readily distinguishable as the expanding peduncles are often not obvious until fruit formation. Nonetheless, being aware of the variant, one can quickly recognize by carefully examining the immature inflorescences.

***Eriogonum umbellatum* Torr. var. *goodmanii* Rev., var. nov.** – TYPE: UNITED STATES. OREGON: Josephine Co.: along the O'Brien-Happy Camp Road, 2.7 mi E of U.S. Highway 199 near Waldo, on an open serpentine flat associated with scattered *Pinus* and *Arctostaphylos* at about 1550 ft elev, 9 Aug 1978, *Reveal & Reveal* 4815 (holotype, US!; isotypes: BRY, CAS, OKL, TEX!).

A var. *polyanthum* (Benth. in A. DC.) M.E. Jones plantis tegetes formantes 2-4 dm alatis et 4-7 dm latis, foliis tomentosis, involucri brevioribus (2-3 mm longis nec (3) 4-6 mm longis) cum floribus longioribus (6-8 (9) mm longis nec (4) 6-7 mm longis) differt.

Plants low spreading or prostrate matted herbaceous perennials 2-4 dm high and 4-7 dm across; *leaves* in loose rosettes, the leaf-blade elliptic to ovate, 0.5-2 (3.5) cm long, 0.5-1 (1.5) cm wide, densely white lanate below, only slightly less densely tomentose above, rarely merely densely floccose, the slender tomentose petiole 0.3-1.5 cm long; *flowering stems* stoutish, erect, 1-2.5 (3) dm long, floccose; *inflorescences* umbellate, 3-5 (8) cm long, the branches floccose; *involucre* campanulate, the tube 2-3 mm long, the 6-8 (10) reflexed lobes 2.5-4 mm long, floccose; *flowers* yellow, often becoming reddish with age, 6-8 (9) mm long including the stipe.

Representative Specimens. – UNITED STATES. CALIFORNIA: Del Norte Co.: Poker Flat-Twin Valley Trail, 31 Jul 1938, *Van Deventer* 204 (MSC, UTC). Humboldt Co.: Grouse Mountain, 25 Jul 1933, *Tracy* 12881 (UTC);

Horse Mountain, 6 Jul 1971, *Anderson & Smith J-1281* (HSC). Siskiyou Co.: between Kings Castle and Black Mountain, 9 Jul 1939, *Hitchcock & Martin 5312* (OKL, WTU); 1.4 mi E of the summit of the O'Brien-Happy Camp Road, 18 Aug 1974, *Reveal & Reveal 3799* (BRY, MO, OKL, RM, UC, US, UTC); Marble Mountains, 27 Jun 1976, *Stillman 147* (HSC). Trinity Co.: Senteney Rock, 28 Jul 1976, *Nelson & Nelson 3051* (HSC). OREGON: Josephine Co.: 5 mi N of the California line along the Redwood Highway, 28 Aug 1930, *Goodman & Hitchcock 1820* (BKL, DS, MO, OKL, UC); 3 mi E of O'Brien, 8 Jun 1966, *Holmgren & Reveal 2666* (BRY, CAS, DS, IDS, MSC, NY, RSA, TEX, US, UTC); 10 mi W of U.S. Highway 99 along the Galice-Alameda Road, 22 Jun 1950, *Kruckeberg 1900* (CAN, COLO, RM, RSA, UC); 7 mi E of O'Brien, 18 Aug 1974, *Reveal & Reveal 3803* (BRY, MSC, UC, UTC); 9 mi E of U.S. Highway 199 on the Happy Camp Road, 9 Aug 1978, *Reveal & Reveal 4814* (BRY, CAS, MO, RSA, US); Rough and Ready Creek, 7 Jun 1972, *Rose 72022* (CAS); 1 mi E of O'Brien, 11 Jul 1965, *White 7116559* (HSC).

The var. *goodmanii* is named for George Jones Goodman (1904–), professor of botany at the University of Oklahoma and long-time student of eriogonoid genera best known for his work on *Chorizanthe*. He and C. Leo Hitchcock collected this plant while on their famed 1930 western botanical excursion. The new variety belongs to the var. *polyanthum* complex. It occurs on serpentine soil where it forms large mats of densely tomentose leaves with long erect flowering stems bearing rather short and compact umbellate inflorescences of bright yellow flowers.

Eriogonum umbellatum Torr. var. **humistratum** Rev., var. nov. – TYPE: UNITED STATES.

CALIFORNIA: Trinity Co.: along the south and southwestern ridge of Scott Mountain, associated with scattered *Pinus* and numerous shrubs at 6700-6800 ft elev, 17 Aug 1974, *Reveal & Reveal 3794* (holotype, US!; isotypes: BRY, MARY, NY, RSA, UC, UTC and elsewhere).

A var. *polyanthum* (Benth. in A. DC.) M.E. Jones plantis tegetes formantes 1-1.5 dm alatis et 1-3 dm latis, foliis tomentosis, involucris brevioribus (1.5-2 mm longis nec (3) 4-6 mm longis) differt.

Plants low prostrate matted herbaceous perennials 1-1.5 dm high and 1-3 dm across; *leaves* in ± compact rosettes, the leaf-blade broadly elliptic, 0.5-1.5 cm long, 0.5-1 cm wide, densely white tomentose on both surfaces or slightly less so and grayish-white tomentose above, the tomentose petiole 0.3-1 cm long; *flowering stems* slender, erect, 0.5-1 dm long, floccose; *inflorescences* umbellate, 2-5 cm long, the branches floccose; *involucre*s campanulate, the tube 1.5-2 mm long, the 5-8 reflexed lobes 1.5-3 mm long, floccose; *flowers* bright yellow, 3-6 mm long including the stipe.

Representative Specimens. – UNITED STATES. CALIFORNIA: Siskiyou Co.: trail from Scott Mountain to Carmen Lake, 8 Jul 1949, *Balls 13914* (RM, RSA); N side of Mt. Shasta, 15-30 Jun 1897, *Brown 433* (MIN, UC); Mt. Eddy, 16 Jul 1918, *Heller 13027* (CAS, DS, F, MO, PENN, WIS, UC); summit of Salmon Mountain, 16 Aug 1948, *Parker 182* (DS, RSA, UC); ridge SE of Mt. Eddy, 20 Aug 1976, *Whipple 1713* (HSC). Trinity Co.: near Deadfall Lake, Mt. Eddy, 4 Aug 1976, *Whipple 1646* (HSC).

The name, var. *humistratum* (Latin *humus*, ground, and *stratum*, prostrate, as to the densely matted habit), has appeared in various state and national listings of species, including some rare species lists, even though the name had not been published. The plant is a low, densely matted expression with tomentose leaves and a short stature. A member of the var. *polyanthum* complex, it occurs at the higher elevation mainly on serpentine outcrops in the northern Coast Ranges. The Brown specimen from Mt. Shasta cited above should probably be assigned here, but the Mt. Shasta material differs slightly in several features.

Eriogonum umbellatum Torr. var. *argus* Rev., var. nov. – TYPE: UNITED STATES. CALIFORNIA: Siskiyou Co.: along the Dry Lake Lookout Road, 0.5 mi W of Dry Lake Lookout near the Buckthorn Trail, Klamath National Forest, on sandy-gravelly soil associated with *Abies* and *Lupinus* at 6700 ft elev, 15 Aug 1975, *Reveal & Reveal* 3955 (holotype, US!; isotypes: BRY, CAS, F, MARY, MEXU, MICH, MO, NY, OKL, RSA, TEX, UC, UTC!).

A var. *furcosum* Rev. foliis subtiliter crenatis cum caulibus parce floccosis ad glabris differt.

Plants low spreading matted herbaceous perennials 2-4 dm high and 5-15 dm across; *leaves* in loose rosettes, the leaf-blade oblanceolate to elliptic, (0.7) 1-2 (2.5) cm long, 0.4-1 cm wide, thinly to moderately tomentose below, sparsely floccose to glabrous and green above, the thinly tomentose petiole 0.3-1.5 cm long; *flowering stems* slender, erect, (0.8) 1-2 dm long, sparsely floccose to glabrous, often with a single foliaceous leaflike bract near the middle; *inflorescences* compound umbellate, 2-5 (9) cm long, the branches sparsely floccose to glabrous; *involucre*s campanulate, the tube 2-3 mm long, the 5-8 reflexed lobes 2-3.5 mm long, floccose; *flowers* bright yellow, 3-8 mm long including the stipe.

Representative Specimens. – UNITED STATES. CALIFORNIA: Del Norte Co.: summit of the O'Brien-Happy Camp Road, 19 Aug 1974, *Reveal & Reveal* 3798 (BRY, MO, MSC, NY, OKL, RM, RSA, UC, US, UTC); Little Greyback, 14 Aug 1934, *Lee* 1103 (UC). Glenn Co.: summit of Black Butte, 10 Jul 1982, *Wheeler* 3174 (CAS). Humboldt Co.: Trinity Summit, 25 Jul 1902, *Jepson* 2119 (JEPS); North Trinity Mountain, 31 Jul 1973, *Klipfel* 224 (HSC); head of Devil's Hole, 28 Jul 1935, *Tracy* 14329 (UC, UTC). Siskiyou Co.: Log Lake, Shackelford Creek, 3 Aug 1908, *Butler* 209 (MO, UC, UTC); E side of Mt. Eddy, 28 Aug 1914, *Heller* 11742 (CAS, DS, F, ILL, MIN, NEB, PAC, PENN); Scott Mountain Campground, 8-9 Aug 1953, *Kellogg* 114 (DUKE, IDS, MSC, OKL, UC, UTC); ridge S of English Peak, Marble Mountain, 13 Aug 1969, *Oettinger* 1353 (HSC, RSA, UC); 1.4 mi E of the summit of the O'Brien-Happy Camp Road on the road to Bolan Mountain Lookout, 18 Aug 1974, *Reveal & Reveal* 3801 (BRY, MO, US, UTC); Jaynes Canyon, 1 Sep 1934, *Wheeler* 3234 (CAS, DS, POM); 3.6 mi from Dry Lake Lookout on road to Horse Creek, 5 Jul 1934, *Wolf* 5966 (CAS, RM, RSA, TEX, UC). Trinity Co.: Canyon Creek, Trinity Mountains, 6 Aug 1948, *Alexander & Kellogg* 5431 (UC); summit of Scott Mountain, 19 Aug 1948, *Parker* 223 (DS, RM, RSA, UC); Devil's Canyon Mountains, above White's Creek Lake, 8 Aug 1935, *Tracy* 14711 (CAN, UC); 1 mi W of Mud Springs, 5 Jul 1947, *Tracy* 17781 (OKL, UC, UTC). OREGON: Jackson Co.: near Pilot Rock, Siskiyou Mountains, 18 Jun 1928, *Applegate* 5530 (DS); Mt. Ashland, 11 Jul 1935, *Jackson s.n.* (CAS, DS). Josephine Co.: top of Lake Mountains, Oregon Cave National Monument, 6 Aug 1936, *Applegate* 10770 (DS); 15 mi SE of Cave Junction on Happy Camp Road, 18 Aug 1965, *White* 8186597 (HSC).

The var. *argus* (from the Latin *argus*, eye, alluding to the small clusters of bright yellow flowers against the bright green branches of the inflorescences) is the expression of the var. *stellatum* (Benth. in A. DC.) M.E. Jones complex found mainly on serpentine soils in the northern Coast Ranges of northwestern California and southwestern Oregon. The var. *stellatum* is a more northern taxon mainly of the Cascade Ranges of Oregon and Washington eastward to Idaho. The Sierra Nevada expression is the var. *furcosum* Rev. while the var. *munzii* Rev. is found in the Transverse Ranges of southern California. All of these variants differ slightly morphologically but are consistent within their geographic ranges.

Eriogonum henricksonii Rev., spec. nov. – TYPE: MÉXICO. COAHUILA: 1.5 mi SW of Las Delicias, ca 68 airmiles SW of Cuatro Ciénegas, E side of the Sierra de las Delicias, in a limestone arroyo above the main spring, 26°14'N, 102°49'W, 4000 ft elev, 15 Aug 1973, *Henrickson* 12464a (holotype, US!; isotype: TEX!).

A *Eriogonum fimbriatum* Hess & Rev. floribus flavus differt.

Plants erect herbaceous perennials 4-5 dm high arising from a small compact slightly woody caudex; *leaves* basal, the leaf-blades elliptic, 1.5-2.5 cm long, 0.8-1.5 cm wide, glabrous and green on both surfaces except for the slender straight ciliate hairs 1-2 mm long along the margin and midrib, the base tapering abruptly to a ciliate winged petiole 1-1.5 cm long; *flowering stems* erect, slender, 2-3 dm high, glabrous throughout; *inflorescences* open, cymose, divided 3-6 times, glabrous except for a few scattered small, nearly sessile, white, capitate glands just above the node; *bracts* scalelike, ternate, 1-2 mm long, 0.5-1 mm wide, glabrous; *peduncles* slender, erect, straight, the first 3-5.5 cm long, the succeeding ones (0.5) 1-2 cm long, glabrous except for a few scattered glands at the very base; *involucres* broadly campanulate, 2-2.5 mm long, 3-4 mm wide, glabrous within and without except for a few erect hairs within at the top of the throat, the 5 rounded teeth 0.5-0.7 mm long, the bractlets linear, 1.5-2 mm long, densely villous with long hyaline non-glandular marginal cells up to 0.4 mm long, the pedicels 1.5-2 mm long, glabrous; *flowers* yellow with reddish-brown midribs and bases, 1.5-2.5 mm long in anthesis, 3-4 mm long in fruit, glabrous except for the minute glands along the midrib and base, the tepals slightly dimorphic, those of the outer whorl obovate and shorter than the longer and narrower oblanceolate inner ones, united about a quarter of their length; *stamens* included, 1.5-2 mm long, the filaments glabrous, the anthers yellowish, 1-1.2 mm long, oblong; *achenes* light brown, 2.5-3.5 (4) mm long, ovate, glabrous, the broadly globose base tapering abruptly to a slightly 3-angled beak.

Specimens Examined. - MÉXICO. COAHUILA: 1.5 mi SW of Las Delicias, 12 Aug 1973, *Henrickson & Wendt* 12300 (US).

Eriogonum henricksonii (James Henrickson, 1940- , noted collector and authority on the flora of the Chihuahuan Desert) has been known since just after a revision of the subg. *Pterogonum* (H. Gross) Rev. was published by Hess and Reveal (1977). It was hoped that additional material might be collected prior to the need to describe the species for the Chihuahuan flora, but no one has been back to the area. The new species belongs to the subsect. *Adenogonum* Hess & Rev. of the *Eriogonum* subg. *Pterogonum* sect. *Pterogonum* (H. Gross) Rev., comb. nov., based on *Pterogonum* H. Gross, Bot. Jahrb. Syst. 49: 239. 1913; this combination is now required by the ICBN. The species is most closely related to *E. fimbriatum* of Nuevo León but differs from the remainder of the species in the subsection in having distinctly yellow flowers. The new species occurs on gypsum outcrops in association with *Agave*, *Mortonia*, *Acacia* and *Fouquieria shrevei*.

Eriogonum trichopes Torr. in Emory var. *hooveri* Rev., var. nov. - TYPE: UNITED STATES. CALIFORNIA: San Benito Co.: Griswold Hills, along the New Idria Road near Griswold Creek, 6.4 mi SW of Panoche Road and 3.7 mi N of the summit of the canyon at the Syncline Ranch, on clay hills and road cuts associated with grassland species at about 1550 ft elev, 23 Jun 1978, *Reveal* 4748 (holotype: US!; isotypes: BM, BRY, CAS, GH, MARY, MO, NY, RSA, UTC and elsewhere).

A var. *trichopes* plantis altioribus cum glandulosis basi, pedunculatis et involucris longioribus differt.

Plants erect herbaceous annuals 4-15 (18) dm high; *leaves* basal, the leaf-blades reniform, (0.7) 1-2 (3) cm long and wide, hirsute and green on both surfaces, the petiole 1-3 cm long; *flowering stems* erect, 0.5-2 (5) dm long, glabrous except for the glandular base above the leaves, slightly fistulose in most near the apex; *inflorescences* cymose, rather strict and upright, 3-10 (12) dm long, glabrous except for a few scattered glandular hairs above the first node,

rarely so at the second or third, the branches of the first node often slightly fistulose, rarely so above in larger plants; *peduncles* capillary, $\pm$ erect, 1-4 cm long, glabrous; *involucres* turbinate, 1-1.5 (1.8) mm long, glabrous, the 4 (5) triangular teeth 0.5-0.7 mm long; *flowers* yellow, 1.5-2 mm long at anthesis, 2-2.5 mm long and often reddish at maturity, densely and conspicuously short-hirsute with coarse white curved hairs, the tepals monomorphic, narrowly ovate; *stamens* included, 1-1.5 mm long, the filaments subglabrous basally, the anthers yellow, 0.3-0.5 mm long, oval; *achenes* brown, 2-2.5 mm long, glabrous, the subglobose base tapering to a short, 3-angled beak; $n = 16$.

Representative Specimens. - UNITED STATES. CALIFORNIA: Fresno Co.: 9 mi N of Coalinga, 26 Apr 1934, Keck 2790 (CI, DS). Kern Co.: Cuyama Valley, 28 Apr 1937, Eastwood & Howell 4065 (CAS, PENN, UC); Microwave Fork, Cedar Canyon, Temblor Range, 8 Jul 1969, Twisselmann 15632 (CAS). Monterey Co.: N of Parkfield, 13 Jun 1938, Eastwood & Howell 5887 (BKL, CAS, RSA); 11 mi S of Parkfield Junction, 28 May 1941, Ferris & Bacigalupi 10371 (CAS, DS, LA, MICH, RM, RSA, UC, UTC); Parkfield Grade, N of Parkfield at milepost 7.4, 19 Jun 1987, Reveal & Broome 6489 (BRY, CAS, MARY, MO, NY, RM, RSA, US); Parkfield Grade, 8.2 mi above Parkfield, 16 Jun 1967, Twisselmann 13371 (CAS, MARY, MSU, NY, RSA, UC, US, UTC). San Benito Co.: New Idria, 10 Jul 1861, Brewer 763 (CAS, DS, MO, POM, UC); 5.6 mi S of Panoche Pass above Griswold Creek, 14 Jul 1956, Ferris et al. 13033 (CAS, DS, JEPS); 18 mi from New Idria on road to Panoche, 11 May 1957, Raven 10850 (BRY, ILL, KANS, LL, OKL, OKLA, RM, UC, UTC); 3.1 mi below New Idria along the Panoche Road, 4 Oct 1966, Twisselmann 12881 (CAS, MARY, RSA, UTC). San Luis Obispo Co.: Palo Prieta Canyon, 14 Sep 1946, Hoover 6389 (CAS, OBI, UC); Chalk Mountain, Cuyama Valley, 27 Mar 1967, Hoover 10281 (CAS, OBI); Pinole Canyon near Shandon, 20 May 1952, McMillan 127 (CAS, OBI); Palo Prieta Canyon summit, 25 Apr 1965, Twisselmann 10549 (CAS, RSA). Santa Barbara Co.: Cuyama Valley, 55 mi E of Santa Maria, 17 May 1929, Munz 11422 (POM). Ventura Co.: Lockwood Valley, 19 Jun 1896, Dudley & Lamb 4614 (DS, POM, US); 22 Jun 1949, Pollard s.n. (CAS); Ballinger Canyon, San Emigdio Range, 25 May 1962, Twisselmann 7183 (CAS).

The var. *hooveri* has long been included within the concept of *Eriogonum inflatum* Torr. & Frém. which, in California at least, can flower its first year on the Mojave and Sonora deserts. The new variety is strictly an annual and while some individuals will have 5-toothed involucres similar to *E. inflatum*, the majority are 4-toothed and thus more like the condition in *E. trichopes*. The new variety differs from var. *trichopes* in being a taller, rather strict plant with longer peduncles and involucres. The two variants overlap only slightly in portions of Kern and Ventura cos., California. The new variety is named for Dr. Robert Francis Hoover (1913-1970), one of Willis Jepson's last students and long-time professor of botany at California State Polytechnic University in San Luis Obispo.

***Eriogonum deflexum* Torr. in Ives var. *rectum* Rev., var. nov.** - TYPE: UNITED STATES. CALIFORNIA: San Bernardino Co.: Bristol Mountains, along the west bound lane of Interstate 40, 16.8 mi E of Ludlow and about 66.8 mi E of Interstate 15 at Barstow, on gravelly slopes and road shoulder associated with *Larrea*, 5 Jun 1988, Reveal & Broome 6385 (holotype: US!; isotypes: BM, BRY, CAS, GH, MARY, MO, NY, RSA, UTC and elsewhere).

A var. *baratum* (Elmer) Rev. involucris erectis et turbinatis ad pedunculatis nullis differt. Plants erect herbaceous annuals (3) 5-10 (20) dm high; *leaves* basal, the leaf-blades cordate, 1-3 cm long and wide, densely white-tomentose below, thinly floccose to subglabrate and green above, the tomentose petiole 2-5 cm long; *flowering stems* erect, mostly solitary, 1-2 (4) dm long, slender, glabrous and glaucous; *inflorescences* strict and narrow, (2) 3-9 (18) dm long, slender, glabrous; *bracts* scalelike, ternate, triangular, 1-2 mm long, glabrous; *peduncles* lacking; *involucres* erect, turbinate, 1.5-2 mm long, 1-2 mm wide, glabrous, the 5 rounded teeth 0.2-0.4 mm long; *flowers* white to pinkish, 1-2 mm long, the tepals dimorphic,

those of the outer whorl oblong with truncate bases, those of the inner whorl lanceolate; *stamens* included, 1-1.5 mm long, the filaments subglabrous basally, the anthers red to maroon, 0.3-0.5 mm long, oblong; *achenes* brown, 1.5-2 mm long, glabrous, the subglobose base tapering a short, 3-angled beak; $n = 20$.

Representative Specimens. – UNITED STATES. CALIFORNIA: Imperial Co.: Fish Creek, Split Mountain Canyon, 31 Mar 1939, *Jaeger s.n.* (DS); Split Mountain Canyon, 1 Apr 1939, *Jaeger s.n.* (DS). San Bernardino Co.: Rodman Mountains and Lava Bed Mountains, 0.3 mi S of powerline road to Ford's Knob microwave relay station, 25 Mar 1980, *Emmel 697* (MARY); 10 mi E of Baker, 1 Aug 1939, *Jaeger s.n.* (POM); 18 mi E of Ludlow, Old Dad Mountains, 15 Jul 1975, *Norris 2703* (RSA). San Diego Co.: Fish Creek, Nov 1936, *Gentry 2962* (AHFH); 5 mi NW of Carrizo Station, 27 Jan 1940, *Munz 16835* (POM); Colorado Desert, Nov 1890, *Orcutt 1466* (B, GH, US).

In California this taxon has, in the past (Reveal 1968), been known as *Eriogonum insigne* and is reported as such in Munz (1968, 1974). That error is mine and due largely to my having failed to fully appreciate the differences I was observing and trying to take into account. The var. *rectum* (Latin *rectus*, erect, alluding to the erect sessile involucre) differs from *E. insigne* in having truncate rather than deeply cordate outer tepals and sessile rather than shortly peduncled involucre. Plants from Inyo Co. previously placed in *E. insigne* seem better in *E. deflexum* var. *deflexum*. The new variety is most closely related to the var. *baratum*.

***Eriogonum luteolum* E. Greene var. *saltuarium* Rev., var. nov.** – TYPE: UNITED STATES.

CALIFORNIA: Tuolumne Co.: along California Highway 108, 0.8 mi E of Dardanelle, in deep granitic sandy soil near the highway above the Middle Fork of the Stanislaus River, associated with *Artemisia* and various grasses under *Pinus* at about 6200 ft elev, 22 Jul 1975, *Reveal 3967* (holotype: US; isotypes: BRY, CAS, MARY, MO, NY, OKL, UTC!).

A var. *pedunculatum* (S. Stokes) Rev. involucre brevioribus et floribus et fructibus longioribus differt.

Plants erect herbaceous annuals 1-4.5 dm high; *leaves* strictly basal, the leaf-blades ovate to reniform, 0.5-1.5 cm long, (0.7) 1-1.5 (1.8) cm wide, densely white-tomentose below, floccose and green above, the tomentose petiole 0.5-1.5 cm long; *flowering stems* erect, 0.2-1.5 dm long, slender, glabrous; *inflorescences* strict and narrow, 1.5-4 dm long, the branches slender, glabrous; *bracts* scalelike, ternate, triangular, 1-2 mm long, glabrous; *peduncles* lacking; *involucre* sessile along the branches and closely appressed, cylindric, 2-3 mm long, 0.8-1 (1.2) mm wide, glabrous, the 5 acute teeth 0.2-0.5 mm long; *flowers* white to red, often with a yellowish hue, 2-3 mm long, the tepals monomorphic, obovate; *stamens* included, 1.5-1.8 mm long, the filaments glabrous, the anthers red, 0.2-0.3 mm long, oval; *achenes* brown, 2-2.5 mm long, glabrous, the subglobose base tapering a short, 3-angled beak.

Representative Specimens. – UNITED STATES. CALIFORNIA: Alpine Co.: along California Highway 89, 1.5 mi SE of Luther Pass, 23 Aug 1975, *Reveal 3968* (BRY, CAS, MARY, MO, MICH, OKL, RSA, TEX, US, UTC). Tuolumne Co.: Eureka Valley, 22 Jul 1957, *Hesse 2369* (CAS); Brightman Flat, 15 Jul 1938, *Hoover 3652* (DS, MICH, UC, UTC); near Dardanelle, 21 Jul 1939, *Eastwood & Howell 7611* (CAS, ISC); 0.5 mi W of Dardanelle, 28 Jul 1972, *Reveal & Reveal 2814* (BM, BRY, CAS, GH, MARY, MO, NY, RSA, US, UTC); 0.8 mi east of Dardanelle, 22 Sep 1933, *Wolf & Stark 5473* (BKL, CAS, DS, F, IDS, ISC, MARY, MICH, MIN, MO, POM, RM, UC, UTC).

The var. *saltuarium* (Latin *saltuarius*, ranger or forester, in honor of my father, Jack L. Reveal (1912-1988), district ranger for the United States Forest Service on the Summit District of the Stanislaus National from 1948 until 1960 where the type was collected) is unique within *Eriogonum luteolum* as it is not found on serpentine soils. It is most closely related to the

lower elevation var. *pedunculatum* found along the foothills of the Sierra Nevada from Butte Co. to Tulare Co. The involucre of var. *saltuarium* are 2-3 mm long while those of var. *pedunculatum* are 3-3.5 mm long. The flowers of the new variety are longer (2-3 mm long compared to 1-1.8 mm long) as are the achenes (2-3 mm versus 1-1.4 mm). In general the leaves of var. *saltuarium* are smaller and broader than var. *pedunculatum*.

***Eriogonum gracile* Benth. var. *incultum* Rev., var. nov.**—TYPE: UNITED STATES. CALIFORNIA: San Diego Co.: Palomar Mountains, along East Grade Road (County Road S-7), 1.6 mi SE of Palomar Mountain (townsite) near the junction of County Road S-6, in sandy soil associated with *Quercus* and chaparral at about 5100 ft elev, 28 Jun 1987, Reveal & Broome 6620 (holotype: US!; isotypes: BM, BRY, CAS, GH, MARY, MO, NY, RSA, UTC and elsewhere).

A var. *gracile* plantis glabris differt.

Plants erect herbaceous annuals 2-5 dm high; *leaves* basal and cauline, the leaf-blades oblanceolate to oblong, 1-3 (4) cm long, 0.5-1 (1.5) cm wide, densely white-tomentose below, less so to floccose and green above, often with wavy or crisped margins, the tomentose petiole 1-2 cm long; *flowering stems* erect, 0.5-2 dm long, mostly slender, glabrous; *inflorescences* open but strict and generally narrow, 1.5-4.5 dm long, the branches slender, smooth glabrous; *bracts* scalelike, ternate, triangular, 1-2 mm long, glabrous; *peduncles* lacking; *involucre*s sessile along the branches and closely appressed, cylindric, 1.8-2 mm long, 0.6-1 mm wide, glabrous, the 5 acute teeth 0.1-0.2 mm long; *flowers* white to pale yellow and often reddish, 1-1.5 mm long, the tepals monomorphic, oblong; *stamens* included, 0.8-1.2 mm long, the filaments pilose basally, the anthers yellowish, 0.2-0.3 mm long, oval; *achenes* light brown, 1-1.5 mm long, glabrous, the subglobose base tapering a narrow, 3-angled beak.

The var. *incultum* (Latin *incultus*, untilled, here fancifully referring to the lack of hairs) is found in Orange, Riverside and San Diego cos., California, where it can occur with the var. *gracile* but typically not in mixed populations. At present, my herbarium records do not fully differentiate between the two varieties and thus no representative specimens are cited.

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