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TWO NEW VARIETIES OF *ERIOGONUM OVALIFOLIUM* (POLYGONACEAE) FROM THE INTERMOUNTAIN WEST, USA

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ABSTRACT

Two long-known varieties of *Eriogonum ovalifolium*, **E. ovalifolium** var. **focarium** Reveal & Mansfield, **var. nov.**, and **E. ovalifolium** var. **rubidium** (Gand.) Reveal & Mansfield, **comb. nov.**, are proposed. The first is confined to the volcanic cinders flats and slopes of Craters of the Moon National Monument, Butte County, Idaho, and related to the more widespread, northern, higher elevation var. *depressum*. The second variety is restricted to Steens Mountain of Harney County, Oregon; it is allied to var. *nivale* of the Sierra Nevada/Cascade cordillera. A key to the varieties is provided.

In our respective floristic work we have long known about two curious expressions of *Eriogonum ovalifolium* Nutt. (Polygonaceae Juss; *Eriogoneae* Dumort.), one at the Craters of the Moon National Monument in Butte County, Idaho, and a second from the higher elevations of Steens Mountain in Harney County, Oregon. Reveal (2012) acknowledged that the former was easy to distinguish from var. *depressum* Blank. because of its bright white tomentum and lower elevation habitat, but the second was much more difficult, and in frustration he assigned the Steens Mountain plant to var. *depressum* after long determining specimens of this entity as var. *nivale* (Canby ex Coville) M.E. Jones. Mansfield (2000), in his *Flora of the Steens Mountains*, properly assigned the later to var. *nivale* as then understood, and indeed that is a far more exact association than that suggested by Reveal in *Intermountain Flora*.

In 2012, as part of the annual meeting of The Eriogonum Society, we were both on Steens Mountain and were able to carefully examine the plant and determined that it was readily distinguished from var. *nivale* of the Sierra Nevada/Cascade cordillera by its prostrate to decumbent scapes. Deciding that it was time to describe this expression, plans were made to study the plant at Crater of the Moon in 2013. This was done in July by Mansfield with permission of the Park Service.

Eriogonum ovalifolium Nutt. var. **focarium** Reveal & Mansfield, **var. nov.** **TYPE. USA. Idaho.** Butte Co.: Craters of the Moon National Monument, 15 Jul 1941, *A. Cronquist 2395* (holotype: UTC; isotypes: IDS, MO). Figures 1 and 2.

Distinguished from var. *depressum* by the bright white lanate pubescence of the leaves.

Plants 0.5–3 dm across; **leaf blades** usually round, 0.2–0.8 cm long, brilliantly white lanate, the margins not brownish; **scapes** mostly erect, 0.3–5(–8) cm long, mostly lanate; **inflorescences** capitate, 1–2.5 cm wide; **involucres** 4–8 per cluster, (2.5–)3–4 mm long; **flowers** 4–5 mm long, the perianth cream to pale yellow, becoming yellowish-red to rose in fruit.

Flowering May-Aug. Black volcanic gravel on gentle slopes and flats in sagebrush communities, conifer woodlands; 1600–1900 m; endemic to Craters of the Moon National Monument, Butte Co., Idaho.

Representative specimens. **USA. IDAHO.** Butte Co.: Craters of the Moon: 20 Jun 1930, *Applegate 6337* (DS); 13 May 1940, *Barkley 5073* (MONTU); 25 Jul 1932, *Christ 1930* (NY); 14 Aug 1937, *Eggler & Eggler 198* (MIN); 2 Jul 2013, *Mansfield et al. 13-223* (CMNP); 22 Jun 1962, *McElroy & Hambly s.n.* (UT); 22 Jun 1938, *Weaver 38-105* (WIS).

Craters-of-the-Moon wild buckwheat, *Eriogonum ovalifolium* var. *focarium* (Latin *focarius*, of the oven, as to the habitat), is restricted to black volcanic cinders flats and slopes that dominate the Craters of the Moon National Monument, a formation that has evolved via a series of eight eruptions over the past 15,000 years, the most recent about 2000 years ago. Given that these events occurred at the end of the last ice age, it is likely that populations of *E. ovalifolium*, and most likely the var. *depressum* phase, occupied the newly created site. With the onset of the hypsithermal, and the pronounced warming of the climate, those individuals able to adapted to the volcanic soil and high temperatures, likely evolve so that today the var. *focarium* is found some 2000 feet below populations of var. *depressum* found on the nearby mountains just to the north. Likewise, the intense sunlight and ground heat of the black gravel probably promoted the survival of plants with dense, brilliantly white lanate to tomentose pubescence that evolved as a mechanism to reflect both light and heat.

Figure 1. Habit of *Eriogonum ovalifolium* var. *focarium.*

Figure 2. Mature flowers (above) and leaves of *Eriogonum ovalifolium* var. *focarium.*

Figure 3. Habit of *Eriogonum ovalifolium* var. *rubidium.*

Figure 4. Prostrate scapes (above) and flowers with achenes of *Eriogonum ovalifolium* var. *rubidium.*

Eriogonum ovalifolium Nutt. var. **rubidum** (Gand.) Reveal & Mansfield, **comb. nov.** *Eriogonum rubidum* Gand., Bull. Soc. Roy. Bot. Belgique 42: 194. 1906. **TYPE. USA. Oregon.** Harney Co.: Head of Wild Horse Creek, Steens Mountain, 15 Jul 1898, *W.C. Cusick 2039* (holotype: LY; isotypes: E, F, G, GH, K, MIN, MO, MSC, NDG(3), P, POM, ORE, UC, US). Figures 3 and 4.

Plants 0.5–5(–7) dm wide; **leaf blades** broadly ovate to round, 0.5–1.2 cm long, densely greenish white-tomentose, the margins occasionally brownish; **scapes** decumbent to prostrate, 0.3–5 cm long, mostly tomentose; **inflorescences** capitate, 1–2.5 cm wide, the branches absent; ***involucres*** 4–8 per cluster, 3–4.5 mm long; **flowers** 4–5 mm long, the perianth white to rose or red.

Flowering Jun-Sep. Sandy to gravelly often worn volcanic slopes and ridges in mixed grassland and sagebrush communities; 2700–3000 m; endemic to Steens Mountain, Harney Co., Oregon.

Representative specimens. **USA. OREGON.** Harney Co.: Steens Mountain: Head of Little Blitzen Gorge, 19 Aug 1971, *Chambers 3342* (NY, OSC, UTC); Alvord Creek, 30 Jun 1959, *Cronquist 8581* (NY, TEX, UTC; N of Wildhorse Lake, 17 Jul 1979, *Ertter & Strachan 3119* (MARY, NY, UTC); rim above Mosquito Creek, 28 Jul 1976, *Grimes 1009* (CIC); rim above Mosquito Creek, 3 Oct 1976, *Kotter 76-208* (CIC); head of Little Blitzen River, 15 Jul 1966, *Holmgren & Reveal* 2880 (BRY, CAS, DS, IDS, KSC, MARY, MIN, MO, MSC, NY, OKL, OKLA, RM, RSA, TEX, UT, UTC); head of Blitzen Canyon, 1 Aug 1946, *Maguire & Holmgren 26809* (CAS, DS, NY, TEX, UC, UTC); above Blitzen Gorge, 16 Jul 1935, *Thompson 12110* (DKL, CAS, DS, MO, MONTU, NY, POM, WTU).

The distinctiveness of the Steens Mountain wild buckwheat, var. *rubidium* (Steens Mountain, Harney County, Oregon, the type location; named for Major Enoch Steen, a U.S. Army officer, in 1860), is not immediately obvious when examining herbarium specimens, but is so when seen in the field because instead of the upright, albeit short, scapes of var. *nivale*, those of var. *rubidium* are typically prostrate. Likewise, the color of the leaf tomentum, being greenish white is different from the typically bright white of the leaves of var. *nivale*. It is suggested that the Steens Mountain expression is the result of isolation and local selection to avoid the brisk and often persistent winds whipping across the summit of the mountain. As the variety also occurs in low sagebrush environments and in an area of heavy winter snows, another factor might be its reduction in stature by only a few centimeters to decrease the impact not only of the wind but also to reduce herbivory. The leaf tomentum is not as white var. *nivale* and thus approaching that of var. *depressum*, but the color pattern of the flowers point to a closer evolutionary history with var. *nivale* than var. *depressum* as does the tendency of most individuals to have a brown tinge to the margin of the leaf blade so typical of the western variant.

Key to the varieties of *Eriogonum ovalifolium*

1. Leaf blades 0.2–1.2 (–2) cm long; scapes usually 0.3–5 (–9) cm long, rarely longer; involucres usually 2–4.5 (rarely 5–8) mm long.

    2. Perianth yellow; c Nevada and ec California ..... 1. var. **caelestinum**
    2. Perianth white, sometimes rose, purple, or red; widespread.

        3. Leaf margins brownish.

            4. Leaf blades densely lanate, the margins consistently brownish ..... 2. var. **eximium**
            4. Leaf blades tomentose, usually without a brownish margin ..... 3. var. **williamsiae**

3. Leaf margins not brownish or, if so, plants of high elevation, c Sierra Nevada and se Oregon.

5. Involucres 5–8 mm long.

6. Leaf blades white-lanate; San Bernardino Mountains, s California ..... 4. var. **vineum**
6. Leaf blades tomentose to floccose; s Sierra Nevada, California ... 5. var. **monarchense**

5. Involucres 3–4.5 mm long.

7. Leaf blades greenish and thinly tomentose at least adaxially, usually elliptic, infrequently oblong to spatulate; scapes often suberect to decumbent, usually thinly floccose; Rocky Mountains of Alberta, Idaho, Montana, and Wyoming, and ne Oregon .... 6. var. **depressum**
7. Leaves densely lanate to white-tomentose on both surfaces or only slightly less so adaxially, not at all greenish, usually round; scapes prostrate to erect, lanate or tomentose; Sierra-Cascade cordillera, desert ranges of Great Basin, and Craters of the Moon National Park, Idaho.

8. Scapes prostrate; flowers bright white at anthesis, pink to purplish-red or deep red in fruit; Steens Mountain, Oregon ..... 7. var. **rubidium**
8. Scapes decumbent to erect; flowers bright white at anthesis to pinkish in fruit, or yellowish white to pale pinkish in fruit; Sierra-Cascade cordillera, disjunct at Craters of the Moon National Park, Idaho.

9. Scapes mostly decumbent; flowers bright white at anthesis to pinkish in fruit; Sierra-Cascade cordillera ..... 8. var. **nivale**
9. Scapes erect or nearly so; flowers yellowish white at anthesis, pale pinkish in fruit; Craters of the Moon National Park, Idaho ..... 9. var. **focarium**

1. Leaf blades usually 1–6 cm long, occasionally shorter; scapes (1–) 5–30 (–40) cm long; involucres (3.5–) 4–6.5 (–8) mm long.

10. Scapes usually 1–5 (–7.5) cm long; leaf margins brownish; rare, wc Nevada, ec California.

11. Leaf blades densely lanate, the margins brownish ..... 2. var. **eximium**
11. Leaf blades white-tomentose, the margins nearly always not brownish . 3. var. **williamsiae**

10. Scapes usually (4–) 7–30 (–40) cm long, rarely shorter; leaf margins only rarely brownish; widespread.

12. Inflorescences umbellate, branches 1–3 cm long; c Idaho and Montana .... 10. var. **pansum**
12. Inflorescences capitate, branches absent; widespread.

13. Flowers 5–7 mm long; involucres 5–7 mm long; s California ..... 4. var. **vineum**
13. Flowers 4–5 mm long; involucres 4–6.5 mm long; widespread.

14. Perianth yellow ..... 11. var. **ovalifolium**
14. Perianth white to rose or purple.

15. Leaf blades spatulate, oblong, or obovate to oval; scapes (4–) 5–20 cm long; widespread ..... 12. var. **purpureum**
15. Leaf blades oblanceolate to narrowly elliptic; scapes (15–) 20–30 (40) cm long; Montana and Wyoming ..... 13. var. **ochroleucum**

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