Nesom, G.L. 2025. *Pyrrocoma* (Asteraceae: Astereae) in Colorado and New Mexico. Phytoneuron 2024-11: 1–59. Published 30 April 2025. ISSN 2153 733X

PYRROCOMA (ASTERACEAE: ASTEREAE) IN COLORADO AND NEW MEXICO

GUY L. NESOM
Research Associate
Academy of Natural Sciences of Drexel University
Philadelphia, Pennsylvania
guynesom@sbcglobal.net

ABSTRACT

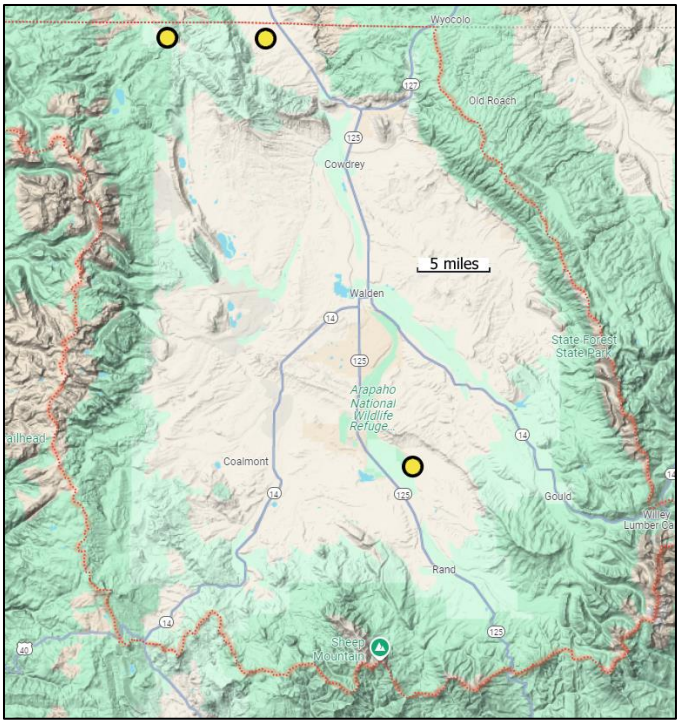
Eight species are recorded for Colorado: *P. clementis*, *P. crocea*, *P. uniflora*, *P. lanceolata*, and four previously unrecognized species — *Pyrrocoma vaseyi* (Parry) Rydb. (previously interpreted in synonymy of *P. lanceolata*), **Pyrrocoma cebollana** Nesom, **sp. nov.**, **Pyrrocoma sanluisia** Nesom, **sp. nov.**, and **Pyrrocoma spiralis** Nesom, **sp. nov.** Two species of *Pyrrocoma* have numerous populations in New Mexico, *P. crocea* and *P. genuflexa*, which probably are evolutionary sisters but are discontinuous in morphology and geography, each regarded here at specific rank. *Pyrrocoma sanluisia* is known by one collection from Rio Arriba Co., New Mexico, barely across the border from Colorado.

Four species of *Pyrrocoma* have been recognized from Colorado (e.g., Weber & Wittmann 2022; Ackerfield 2022; USDA Plants 2025): *P. clementis*, *P. crocea*, *P. lanceolata*, and *P. uniflora*. From New Mexico, only *P. crocea* has been recognized (e.g., Allred 2024; Ackerfield 2025). The dissertation study by Mayes (1976) essentially had the same view. The present study finds 8 species in Colorado and 3 in New Mexico — the increase for Colorado is largely the result of reinterpretation of plants identified as *P. lanceolata*, but one new species is described from a single recent collection from Ouray County.

1. PYRROCOMA UNIFLORA (Hook.) Greene, Erythea 2: 60. 1894. *Donia uniflora* Hook., Fl. Bor. Amer. 2: 25. 1834. *Homopappus uniflorus* (Hook.) Nutt., Trans. Amer. Philos. Soc. 2, 7: 332. 1840. *Haplopappus uniflorus* (Hook.) Torr. & Gray, Fl. N. Amer. 2: 241. 1842. *Aster uniflorus* (Hook.) Kuntze, Rev. Gen. 1: 318. 1891. *Hoorebekia uniflora* (Hook.) M.E. Jones, Bull. Montana State Univ., Biol. Ser. ser. 15: 49. 1910. **TYPE**: **CANADA**. **Saskatchewan**. Plains of Saskatchewan and prairies of the Rocky Mountains, [1825], *T. Drummond s.n.* (holotype: K, fragment-NDG).

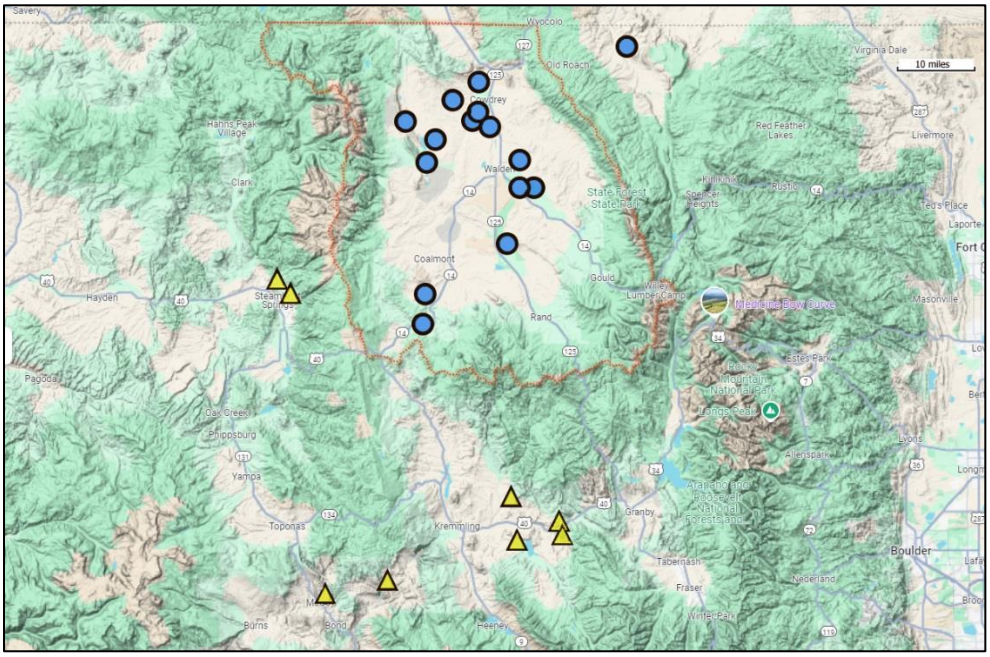
Many collections of *Pyrrocoma clementis* have been identified as *P. uniflora* (heads are mostly solitary in both species), but *P. clementis* differs in morphology and geography (see below). A detailed study of the taxonomy of *P. uniflora* and similar species will be presented separately (Nesom in prep.).

The only Colorado localities of *Pyrrocoma uniflora* known to me are from Jackson County: Arapaho Natl Wildlife Refuge, North Park, ca. 11 air mi SE of Walden, 40.55915 N, 106.22518 W, willow riparian area and grassland meadow, 8350 ft, 4 June 2007, *Lewis 204* (COLO); North Park in edge of Wyoming, Jul 1896, *Osterhout s.n.* (NY, Fig. 1); Forest Rd 600 near its jct with Co Rd 6, 5-10 mi NE of Big Creek Lakes in North Park, 40.982381 N, 106.541224 W, wet roadside near an inundated ditch, 8372 ft, with *Potentilla* sp., locally scattered, 10 Jul 1999, *Smookler 191* (KHD). A collection from Moffat County sometimes identified as *P. uniflora* instead is *Xylorhiza venusta* (*Cox & Dunn 2467* — MO, UT).



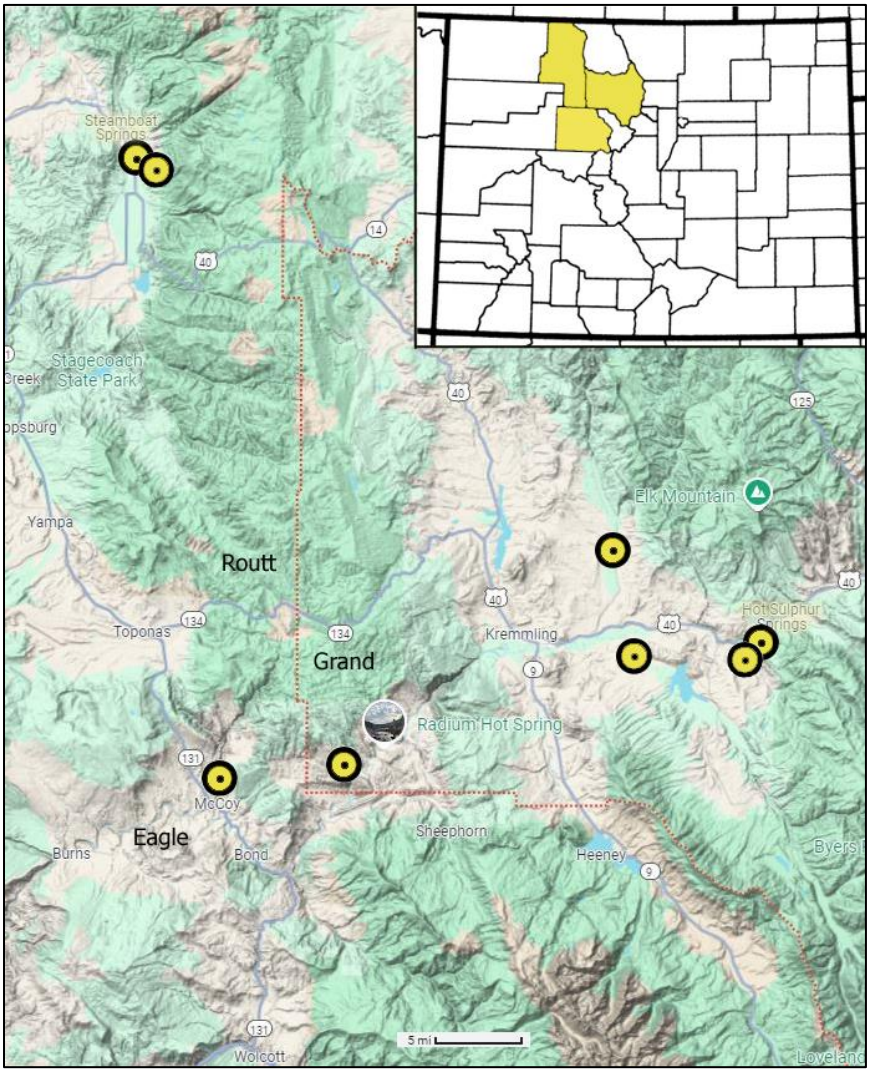
Map 1. Distribution of *Pyrrocoma uniflora* in Colorado. Jackson County, outlined in red.

2. PYRROCOMA LANCEOLATA (Hook.) Greene, Erythea 2: 69. 1894. *Donia lanceolata* Hook., Fl. Bor. Amer. 2: 25. 1834. *Haplopappus lanceolatus* (Hook.) Torr. & Gray, Fl. N. Amer. 2: 241. 1842. *Hoorebekia lanceolata* (Hook.) M.E. Jones, Bull. Univ. Mont. Biol. 15: 49. 1910. **TYPE**: **CANADA**. **Saskatchewan**. Between Carleton House and Edmonton House, *T. Drummond s.n.* (holotype: K; probable isotype: NY). A study of the taxonomy of *Pyrrocoma lanceolata* will be presented separately (Nesom in prep.).



Map 2. Distribution of *Pyrrocoma lanceolata* (blue circles) in Colorado and *Pyrrocoma vaseyi* (yellow triangles). Jackson County is outlined in red. See Figures 2-6.

Two plants with branching stems and the phyllary morphology of *Pyrrocoma lanceolata* — but with tomentose vestiture — perhap reflect introgression with *P. uniflora*: North Park, dry plains, 9 Aug 1899, *Crandall 3232* (US).



Map 3. Distribution of *Pyrrocoma vaseyi*. Grand (outlined in red), Routt, and Eagle cos., Colorado.

3. PYRROCOMA VASEYI (Parry) Rydb., Bull. Torrey Bot. Club 27: 626. 1900. *Haplopappus lanceolatus* var. *vaseyi* Parry in D.C. Eat., Botany [40th Parallel], 160. 1871. *Haplopappus lanceolatus* subsp. *vaseyi* (Parry) Hall, Publ. Carnegie Inst. Wash. 389: 117. 1928. **LECTOTYPE** (Hall 1928, p. 118): **Colorado**. Grand Co.: Rocky Mountains, Middle Park, 1868, *G.R. Vasey 273* (GH; isolectotypes: ILL, MO, NY-2 sheets, PH, YU). A sheet at US — "Bot. King Survey 160 (1871)" is not part of the type collection, but another — "from Dr. Vasey, Herb. Lester F. Ward" — may be, as it is the same species as the type.

George Vasey was with the Powell Expedition in 1868 — their group used Sulphur Hot Springs as a base for exploration of the Middle Park area (Stegner 1954). Vasey's field notes (not seen) are in the Smithsonian (NMNH) Main Library, but the identity of the collection itself gives assurance that it was made at the Hot Springs.

Stems ascending-erect, 10–25 cm, glabrous. **Leaves**: basal, lanceolate, 5–10 cm long, attenuate to a petiolar region ca. 1 cm long, blades 4–7 mm wide, thickened, with raised venation

abaxially, margins entire or with 2–5 pairs of minute teeth, fibrous remnant of petioles persistent, cauline not clasping. **Heads** numerous in a subracemoid to paniculate array. **Involucres** 9–12 mm wide (pressed); phyllaries broadly oblong with deltate apex, in 2–3 series of unequal length, inner 5.5–7 mm long, glabrous, eglandular, green patch on distal 1/3. **Ray florets** ca. 12–14, corollas 9–10 mm long 1.5–2 mm wide, coiling. **Disc corollas** 5 mm long. **Achenes** ca. 3 mm long, sericeous-strigose. Figs. 7-14.

Additional collections. **Colorado**. Eagle Co.: McCoy, hillsides, 4 Aug 1917, *Johnston & Hedgcock* 309/ *1321* (GREE, RM-2 sheets) McCoy, hillsides, 4 Aug 1917, *Johnston & Hedgcock 1376* (GREE); Grand Co.: Sulphur Springs, 3 Sep 1916, *Bethel s.n.* (CS); Sulphur Springs, 5 Aug 1921, *Bethel s.n.* (CS); Hot Sulphur Springs, 5 Aug 1921, *Bethel 6297* (RM, probably a duplicate of the CS specimen); 2 mi W of Radium, at the head of Yarmony Creek [39.941497 N, 106.570546 W], 8500 ft, stony loam, 20 Jul 1980, *Leet s.n.* (ENLC); 4.2 mi N on County Rd 2 from Hwy 40, 1.5 mi E on BLM road, 40.12 N, 106.24 W, silty soil along an alkali spring of gentle S slope, with sagebrush, 7900 ft, uncommon, 6 Aug 1994, *Tear Jr. 1655* (CS, KDH); Sulphur Springs, 22 Jul 1906, *Osterhout s.n.* (NMC); Middle Park, 1868, *Vasey 273* (SJNM); Middle Park, 3.8 mi N of the Colorado River along Troublesome Creek road, above E bank of the creek, on strongly odoriferous selenium clay knolls, 8005 ft, 30 Jul 1986, *Weber 17837* (NY). Routt Co.: Steamboat Springs Jul 1892, *Eastwood s.n.* (NMC); Steamboat Springs, 2 Sep 1900, *Osterhout 2262* (RM); Steamboat Springs, 14 Jul 1902, *Osterhout 2692* (RM); "Routtt Co.," Sep 1891, *Trelease s.n.* (MO).

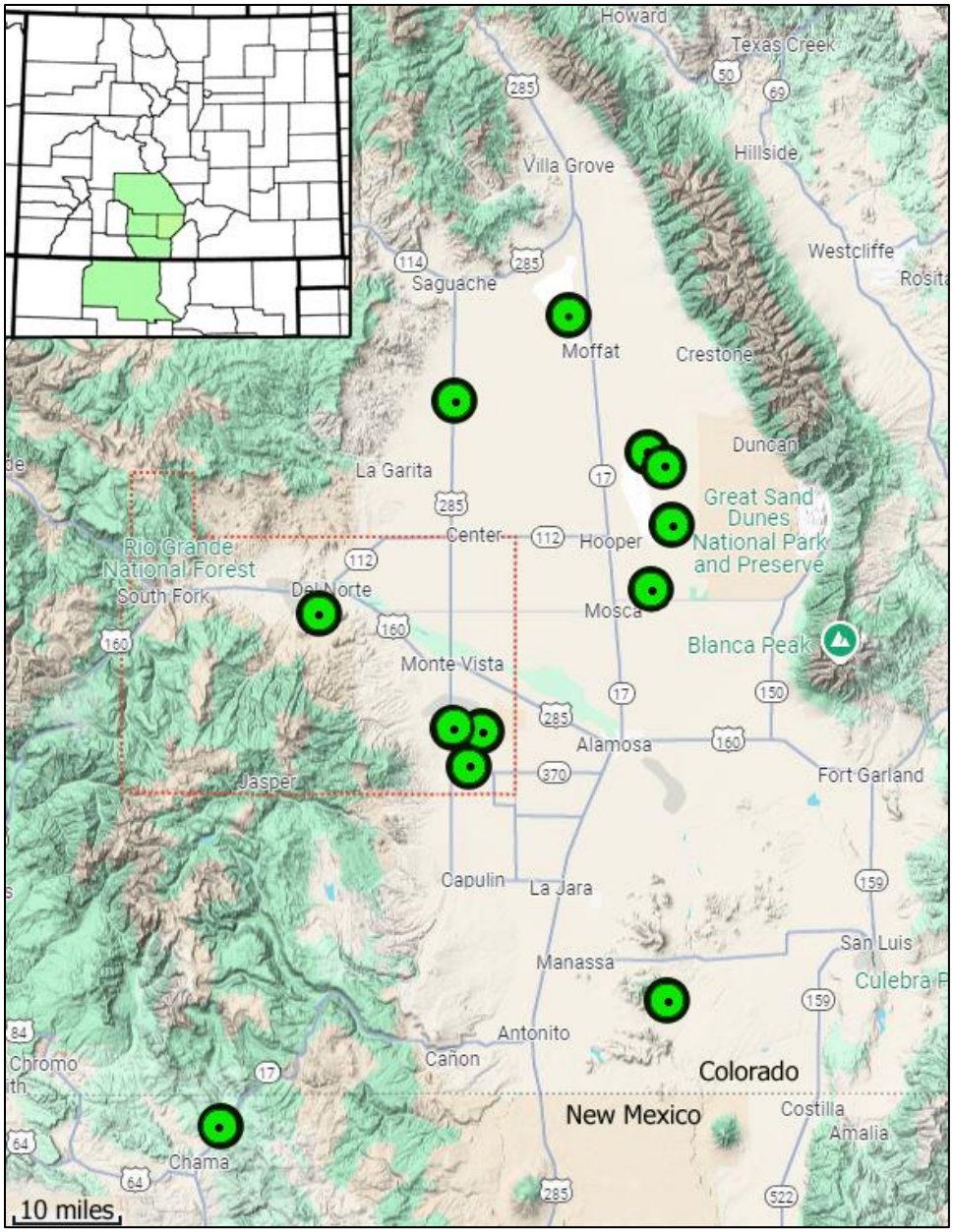
Pyrrocoma vaseyi is similar to *P. sanluisia* but has leaves with raised venation abaxially, more heads in a congested inflorescence (shorter peduncles), heads with broader phyllaries in 2–3 series of unequal length (vs. 3–4 series of linear-oblong phyllaries), and 12–14 ray florets (vs. 20–34).

4. PYRROCOMA SANLUISIA Nesom, **sp. nov. TYPE**: **Colorado**. Saguache Co.: San Luis Valley, Baca Natl Wildlife Refuge, ca. 0.5 mi due E of Great Sand Dunes Natl Park & Preserve, 37.75853 N, 105.7343 W, stock tank supplied by flowing artesian well in *Chrysothamnus-Sarcobatus* shrubland, with *Chrysothamnus nauseosus* subsp. *consimilis*, *Sarcobatus vermiculatus*, *Eleocharis* sp., *Juncus arcticus*, 7575 ft, 21 Aug 2012, *P. Regensberg 941* (KHD). Figure 15.

Similar to eastern *Pyrrocoma lanceolata* in its multiple, relatively small heads but different in its narrower, thickened basal leaves with mostly entire margins, more elongate green patch of the phyllaries, and its tetraploid (vs. hexaploid) chromosome number.

Stems ascending-erect, 8–35 cm, sparsely villous, glabrescent, eglandular. **Leaves**: basal lanceolate to oblanceolate 5–17 cm long, attenuate to a petiolar region, fibrous remnants of petiole bases persistent, blades 4–8 mm wide, margins entire to minutely serrulate with a few teeth, surfaces glabrous or the cauline sparsely villous proximally (near the insertion), eglandular, thickened, cauline oblong-lanceolate, entire or serrulate distally with 3–4 pairs of teeth, subclasping (proximal). **Heads** mostly (3–)4–8 in a loosely corymboid array, peduncles 2–5 cm long. **Involucres** 10–12 mm wide (pressed); phyllaries narrowly to linear-oblong or narrowly oblong-lanceolate with a triangular-lanceolate apex, indurate proximally, green patch elongate on distal 1/2, glabrous except the outermost villous at the base, eglandular, in 3(–4) series of subequal to unequal length, inner 6–7 mm long. **Ray florets** 20–34, fertile, corollas 7–8 mm long, 1–1.5 mm wide, coiling. **Disc corollas** 5 mm long. **Achenes** 3 mm long, sericeous-strigose with fine hairs. Figures 15-18.

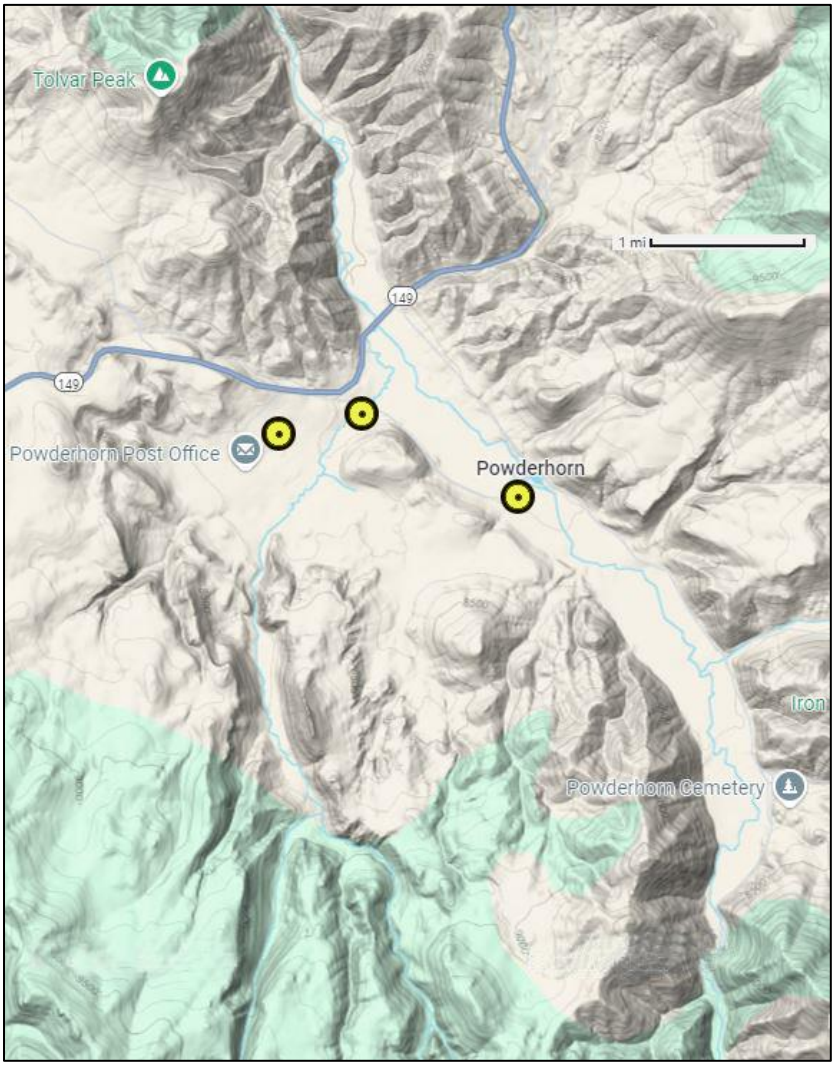
A tetraploid chromosome number (2n=24) was reported for a plant from Saguache County identified as *Pyrrocoma lanceolata* (Anderson et al. 1974). The voucher (*Anderson 2528*, cited as KSC) has not been located, but it almost certainly is a representative of *P. sanluisia*.



Map 4. Distribution of *Pyrrocoma sanluisia*. Saguache, Rio Grande (red outline), Alamosa, and Conejos cos., Colorado, and Rio Grande Co., New Mexico. The collection from New Mexico seems slightly out-of-habitat, perhaps a waif, but its identity is secure.

Additional collections. **Colorado**. Alamosa Co.: Lakes of the San Luis Valley, common there but not elsewhere, *Brandegee 4377*, *1156* [both numbers on the label] (MO); near San Luis Lakes, Sep, *Brandegee 1156* (MO). Conejos Co.: Outcrop of volcanic boulders between north and south Pinon Hills, 37.13 N, 105.81 W, along road in sandy soil, with *Descurania* and *Bouteloua*, 13 Jul 1986, *O'Kane 2522* (CS). Rio Grande Co.: 2 mi W of Del Norte, 37.67 N, 106.37 W, clay loam, 3 Sep 1942, *Ginter s.n.* (CS); Monte Vista Natl Wildlife Refuge, 37.48 N, 106.12 W, drier sites, common, 11 Aug 1966, *Pospanala s.n.* (CS); 9 mi S of Monte Vista, bordering wet, alkaline meadow, 22 Jul 1957, *Penland 4852* (COLO); Monte Vista, among greasewood in moist places, 16 Jul 1934, *Ramaley 14295* (COLO); Monte Vista, 14 Aug 1931, *Ramaley 13036* (COLO); Monte Vista, saline soil, common among greasewood, 14 Sep 1938, *Ramaley 16828* (COLO); Monte Vista Wildlife Refuge, 13 km S of Monte Vista on Hwy 15, 4 km N of jct with Hwy 370, SW corner of Refuge, S end day-use viewing area, W side of hwy, 37.4666 N, 106.14883 W, low area

along highway, saline clay, with *Distichlys*, *Peritoma*, *Almutaster*, 2335 m, 11 Aug 2014, *Spellenberg 14933* (NMC). Saguache Co.: San Luis Valley, 10.5 mi S of Saguache, along Hwy 285 just S of Russell Lakes, frequent in wet alkaline meadows with *Distichlis* and *Juncus*, 7620 ft, 29 Jul 1963, *Barkley 2528* (NY); San Luis Valley, Baca Natl Wildlife Refuge, ca. 11.5 mi SSW of Crestone, heading NW on 2-track from Antelope Springs, 37.836774 N, 105.771194 W, salt crusted meadow, clay soil, with scattered, stunted *Chrysothamnus* and occasional *Sarcobatus*, also *Distichlis stricta* and *Cleome multicaulis*, frequent, 7563 ft, 22 Aug 2012, *Islam 12-415* (KHD), *Islam 12-416* (KHD), and *Islam 12-417* (KHD); N of Moffat, meadow, 9 Aug 1930, *Ramaley 12493* (RM); San Luis Valley, Expedition of 1873, *J. Wolf "474, 485 (1061)*" (NY, US). **New Mexico**. Rio Arriba Co.: Along Hwy 17, 4.1 mi NE of jct with Hwy 64/84 in Chama, 4.2 mi SW of the Colorado state line, aspen forest area, common along gravelly hwy shoulder, 8100 ft, 20 Aug 1984, *Wetter 809* (NY).



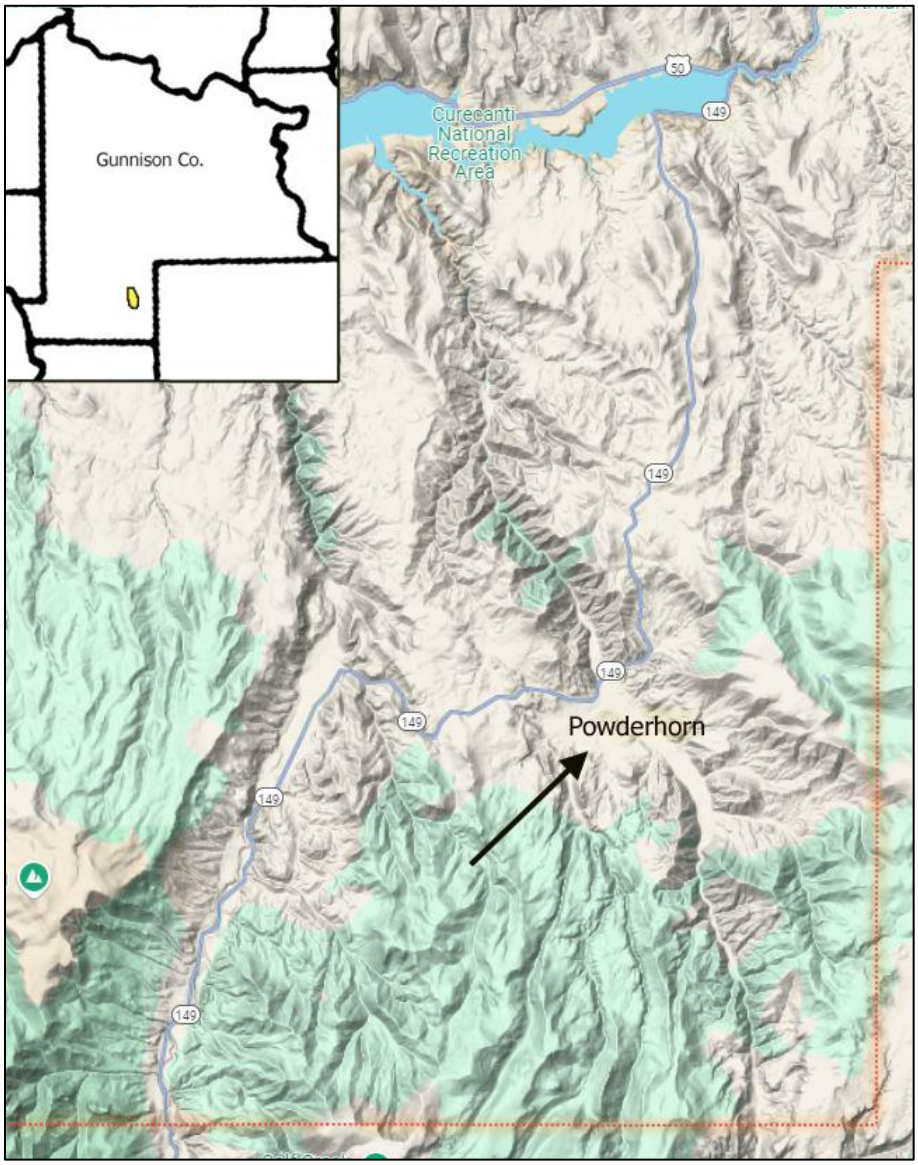
Map 5. *Pyrrocoma cebollana*, collection localities, Gunnison Co., Colorado.

5. PYRROCOMA CEBOLLANA Nesom, **sp. nov. TYPE**: **Colorado**. Gunnison Co.: Powderhorn, saline soil near mineral spa, 29 July 1964, *W.A. Weber 12157* (holotype: COLO). Figure 21.

Identified as *Pyrrocoma lanceolata* but distinct from that species in geography and ploidy level, also in the cottony villous vestiture of stems, leaves, and involucres, sessile cauline leaves (vs. clasping to subclasping), and larger heads (involucres 16–20 mm wide vs. 9–12 in Colorado and W#yoming, rays 22–34 vs. 10–20 in Colorado and Wyoming).

Stems ascending-erect, 15–25 cm, sparsely villous with very fine white hairs mostly parallel to the stem, eglandular. **Leaves**: basal oblanceolate, 5–8 cm long, attenuate to a petiolar region ca. 1/3 the length, fibrous remnants of petiole bases persistent, cottony pubescent at the very base, 6–16 mm wide, margins coarsely serrate, surfaces sparsely but persistently cottony-villous, eglandular, cauline narrowly oblong-lanceolate, barely subclasping or not at all. **Heads** 1 or 2–4 in a loose raceme on peduncles 2–5 cm long. **Involucres** 16–20 mm wide (pressed); phyllaries oblong with a triangular-lanceolate apex, eglandular, in 3 series of subequal length, inner 6.6–8 mm long. **Ray florets** 22–34, fertile, corollas 10–11 mm long, 1.5–2 mm wide, coiling. **Disc corollas** 5 mm long. **Achenes** 3–3.5 mm long, sericeous-strigose. Chromosome number, n = 24 (*Mayes 106*). Figures 19-21.

Additional collections. **Colorado**. Gunnison Co.: Halfway between Cebolla Hot Springs [Powderhorn] and Powderhorn Post Office, mineral spring area, wet, clayey, alkaline soil, near mineral spring, 8000 ft, 27 Jul 1962, *Barrell & Spongberg 443a-62* (RMBL, US); along the road to the Powderhorn Post Office, in a ditch, 15 Aug 1973, *Mayes 106* (MO, RM, TEX).

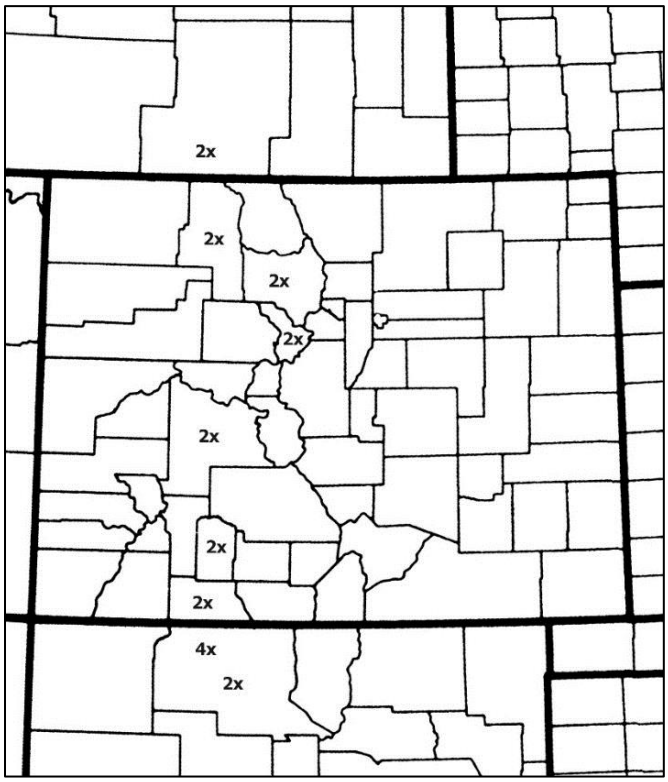


Map 6. Location of the Powderhorn area within Gunnison County. Southeastern Gunnison County (red outline), showing location of Powderhorn.

6. PYRROCOMA CROCEA (A. Gray) Greene, Erythea 2: 69. 1894. *Haplopappus croceus* A. Gray, Proc. Amer. Acad. Nat. Sci. Philadelphia 1863: 65. 1864. *Aster croceus* (A. Gray) Kuntze, Rev. Gen. 1: 317. 1891. **LECTOTYPE** (designated here): **Colorado**. "Colorado Territory, lat. 39°-41°, alpine and subalpine," 1862, *C.C. Parry* "=" (GH). *Hall & Harbour 257* – BRU, GH, MO, NY, US).

The protologue: "A. (PYRROCOMA] CROCEUS, n. sp.* Subalpine, in the Middle Park, &c., west of the Rocky Mountains range" — perhaps an amalgum from the labels of two collections mounted on the same GH sheet. Left: Rocky Mountain Flora, 1862, *E. Hall & J.P. Harbour 257*. Right: Colorado Territory, lat. 39°-41°, alpine and subalpine, 1862, *C.C. Parry* "No. =", annotated by Gray as "Aplopappus (Pyrrocoma croceus, n. sp." — the "=" sign perhaps referring to the "257" on the Hall & Harbour label. The Colorado collections were made conjointly by Parry with Hall and Harbour, as explained by Gray (1863). The right-side collection with the Parry label is interpreted here as the lectotype as Gray's annotation implies that it was the one that had his attention, and in the Synoptical Flora (2[1]: 128. 1884, as *Aplopappus*) he noted that the species was "first coll. by Parry." Many of Parry's collections with numbers near 257 were made in Middle Park in Teller County, but Teller County appears to be out of range for the species, as is Park County (see Map 9) — thus it is probable that the number was from Hall & Harbour and that the collection was made to the north or west of Park County. Gray's epithet apparently alluded to the ray color, as he described "ligulis 50 et ultra longe exsertis supra croceis."

A distinctive species, rarely if ever misidentified — with tall stems erect from the base, large glabrous leaves with entire margins, lack of persistent fibrous remnants of the basal leaf petioles, and a single head (sometimes 2–3, rarely more). Ray color varies from yellow to orange or red-orange. Distinctions betweeen typical *Pyrrocoma crocea* and *P. genuflexa* are outlined below in a key couplet. Neither appears to occur in saline habitats. Variants with the inner phyllaries purple-rimmed (e.g., Figs. 31, 37) are striking but considered here as populational variants.



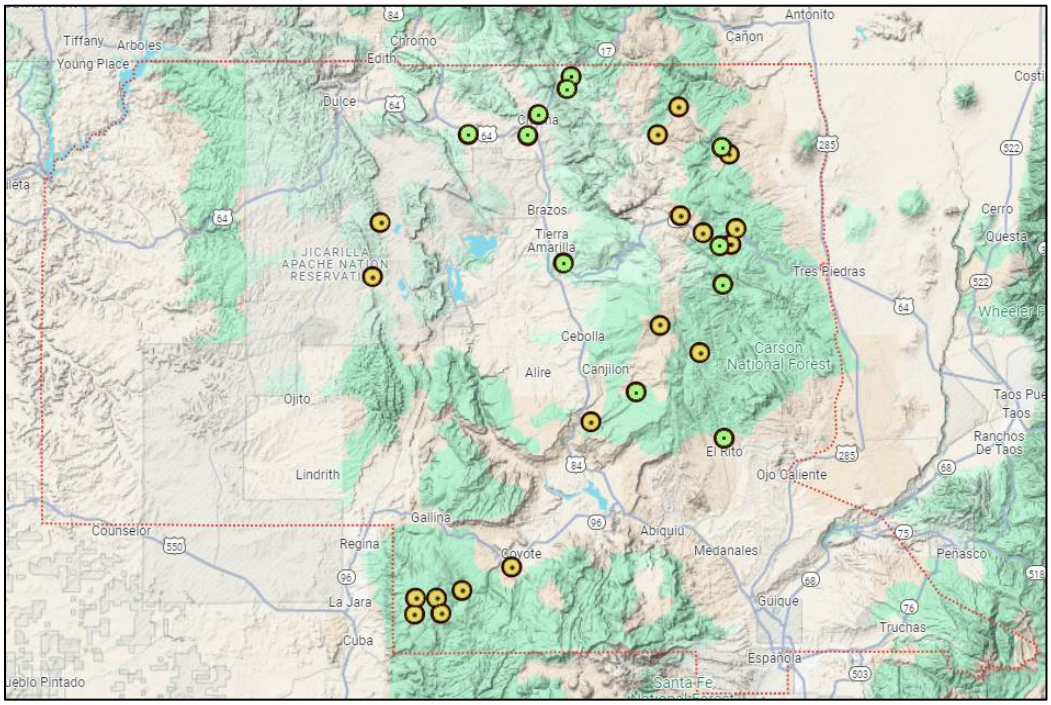
Map 7. Distribution of chromosome counts in *Pyrocoma crocea*, most made by Mayes (1976). See further comments in the text.

Mayes reported chromosome counts of 2n = 12 (diploid) from 18 populations of *Pyrrocoma crocea* in six Colorado counties and from 1 each in Carbon Co., Wyoming, and Rio Arriba Co., New Mexico. A diploid count was made from Routt Co., Colorado, by Anderson et al. (1974), and an apparently unpublished diploid count was made by T.J. Watson from Archuleta County (*Watson 529*, TEX). A tetraploid count (2n = 24) for *P. crocea* was reported by Anderson et al. (1974) from Rio Arriba Co. (voucher *Anderson 2510* - LSU-3 sheets) — these plants do not appear distinct from others in the same region determined to be diploid. The geography of the chromosome counts is summarized in Map 7.

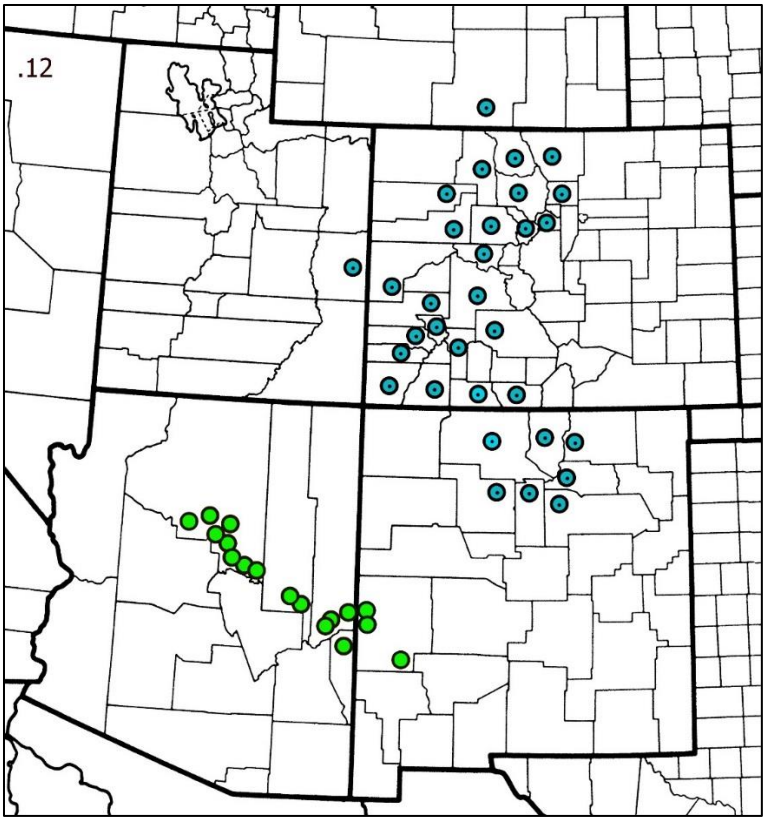
Stems in *Pyrrocoma crocea* mostly are unbranched, but branched stems occur throughout the range (e.g., Figs. 27, 28. The voucher for the tetraploid count in Rio Arriba Co. was made from branched plants, but diploid counts also have been made from branched plants (e.g., *Mayes 110* and *Mayes 129* from Archuleta Co., Colorado, reported by Mayes 1976). Populational variation in branching (unbranched and branched) also occurs in *P. genuflexa* (see below) and other species of *Pyrrocoma*. Morphological similarity and geographical proximity suggest that *P. crocea* is closely related to *P. clementis*.

Local variability in branching is documented by collections from the area of Hopewell Lake in Rio Arriba Co. and slightly to the west along Hwy 64 (e.g., *Hutchins 11080*, *Sivinski 5827* — branched; others unbranched). *Jacobs 5176* from along the south rim of the Valles Caldera in Sandoval Co., is the only collection from that area with branched stems among others unbranched. *Urbatsch 3627* from Colfax Co. and the closely adjacent *St. John s.n.* are the only collections from the western system in New Mexico with branched stems.

A collection of *Pyrrocoma crocea* from east of Bayfield in La Plata Co., Colorado (*Wooton 2599*, US-2 sheets, Fig. 28), is particularly unusual in its racemoid inflorescence — the stems have 4–5 heads (or more from proximal, unopened buds). Stems from other La Plata Co. collections have 1(–2) heads. A collection of *P. genuflexa* from Coconino Co., Arizona (Heiser 857 (MO) has stems with 4 and 6 heads.



Map 8. *Pyrrocoma crocea* in Rio Arriba Co., New Mexico (outlined in red), showing collection localities of branched plants (green) and unbranched plants (yellow).



Map 9. Distribution of *Pyrrocoma crocea* and *P. genuflexa*. Vouchers for the Utah occurrence are these: Grand Co.: La Sal Mts, Lower Beaver Basin, 8380 ft, 27 Jun 1986, *Franklin 4055* (NY); La Sal Mts, Boren Mesa, 9200 ft, 4 Aug 1984, *Franklin 1145* (NY); Weiser, La Sal Mts, 8-9000 ft, May-Oct 1899, *Purpus 7006* (MO, US). Many collections have been made from the Medicine Bow Mountains of Carbon Co., Wyoming. New Mexico collections of *P. genuflexa* are cited below — all are from the San Francisco Mountains of Catron Co., except for the type of *P. amplectens*, from the Mogollon Mountains slightly further southeast.

Hall (1928) transferred *Pyrrocoma genuflexa* to varietal rank within *P. crocea* without comment; Mayes (1976) followed, noting simply that "two varieties are recognized," and others since have not made a reassessment. While the two almost certainly are evolutionary sisters, they are distinct in morphology and widely separated in geography. The differences are mostly quantitative, but the difference in phyllary morphology is consistent and diagnostic. The discontinuity is recognized here by treating each at specific rank, with names already available.

1. Stems 25–65 cm tall; involucres 15–21 mm high; phyllaries elliptic-oblanceolate to oblong-oblanceolate, loosely spreading; disc corollas 8–12 mm long; ligules 15–35 mm long; achenes 7–9 mm long ..... **Pyrrocoma crocea**
1. Stems 10–35 cm tall; involucres 10–15 mm high; phyllaries narrowly oblong to oblong-lanceolate, erect and closely appressed except distally; disc corollas 7–9 mm long; ligules 15–22 mm long; achenes 6 mm long ..... **Pyrrocoma genuflexa**

7. PYRROCOMA GENUFLEXA Greene, Pittonia 3: 348. 1898. *Haplopappus croceus* subsp. *genuflexus* (Greene) Hall, Publ. Carnegie Inst. Wash. 389: 99. 1928. *Haplopappus croceus* var. *genuflexus* (Greene) Blake, J. Wash. Acad. Sci. 30: 467. 1940. *Pyrrocoma crocea* var. *genuflexa* (Greene) Mayes ex Brown & Keil, Phytologia 73: 58. 1992. **TYPE**: **Arizona**. Coconino Co.: Near Flagstaff, 5 Sep 1894, *J.W. Toumey 25* (holotype: NDG; isotype: UC).

Pyrrocoma amplectens Greene Leafl. Bot. Observ. Crit. 2: 10. 1909. **TYPE**: **New Mexico**. Catron Co.: Mogollon Mountains, Middle Fork Gila River, ca. 9000 ft, 17 Aug 1903, *O.B. Metcalfe 540* (holotype: US; isotypes: ARIZ, GH, MIN, MO, NDG, NY, RM).

Pyrrocoma adsurgens Greene, Leafl. Bot. Observ. Crit. 2: 22. 1909. **TYPE**: **Arizona**. Coconino Co.: Flagstaff, Aug 1883, *H.H. Rusby 645* (holotype: US; isotypes: F, NY-2 sheets, PH, RSA, TEX).

Figures 22-25.

***Pyrrocoma genuflexa* in New Mexico**. Catron Co.: Apache Natl Forest, Bishop Peak, T04S, R20W, Sec31, rocky gravelly soil, coniferous and mixed woodland, *Pinus edulis* and *Juniperus* sp., 8000 ft, frequent, 18 Aug 1993, *Boucher 1236* (SNM); San Francisco Mountains, just S of the jct of Forest Service Rds 385 and 220 along road 220, 33.959 N, 109.0263 W, moist montane meadow with *Allium*, *Iris*, and *Erigeron flagellaris*, surrounded by a ponderosa pine forest, 8800ft, 4 Aug 2010, *O'Kane 9481* (SJNM); San Francisco Mountains, ca. 3.1 road mi S of Hwy 180 on Forest Rd 209, 33.715 N, 108.970 W, sandy rhyolitic soil in swale near shallow ephemeral pond, with *Juncus dudleyi*, *Agrostis* sp., 8670 ft, 13 Aug 2008, *Sivinski 6962* (UNM).

8. PYRROCOMA CLEMENTIS Rydb., Bull. Torrey Bot. Club 27: 625. 1900. *Haplopappus clementis* (Rydb.) Blake, Contr. U.S. Natl. Herb. 25: 543. 1925. **TYPE**: **Colorado**. Chaffee Co.: Mt. Harvard, 1896, *F. Clements 44* (holotype: NY; isotypes: NEB, NY).

Pyrrocoma calendulacea Greene, Leafl. Bot. Observ. Crit. 2: 9. 1909. **TYPE**: **Colorado**. "Union Pass," Jul 1873, *J. Wolf & J.T. Rothrock 579, 472* with Wheeler's Expedition (holotype: US; isotype: GH). The label of both sheets has the collection number as "579, 472" — the protologue did not specify a number.

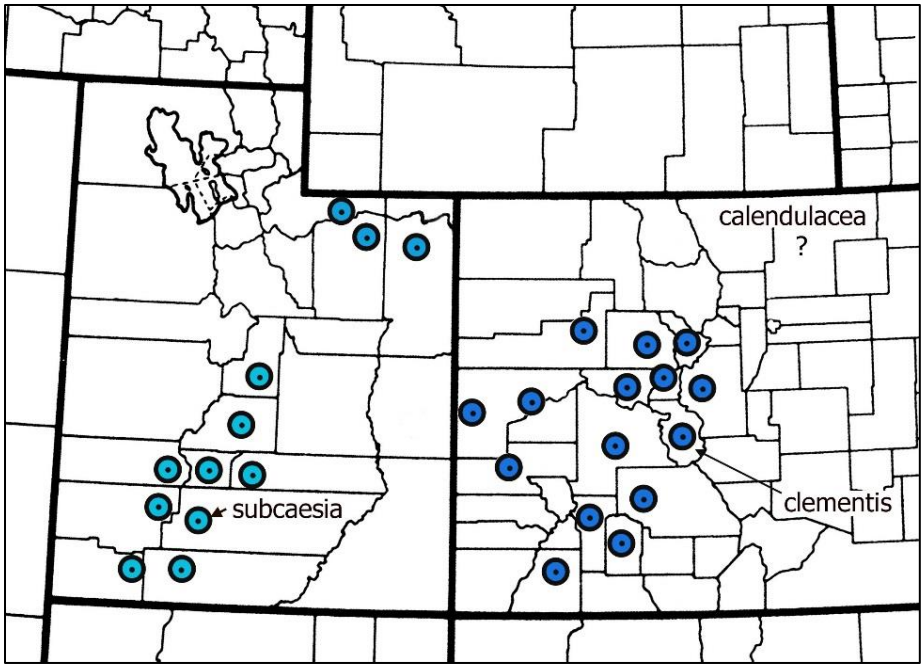
Wolf's collections from 1873 appear to have been numbered in geographical sets rather than in strict sequence by date. "Wolf" and "Wolf & Rothrock" made many collections from Park and Lake counties, particularly from the Twin Lakes area (collection numbers ranging from 406 to 593, plus higher and lower), and it seems plausible that the *P. calendulacea* type came from there. On the other hand, no other collection of *P. clementis* has been made from Park County and there is no "Union Pass" there (or, apparently, anywhere else in Colorado), thus the type locality is considered here as unknown.

Stems decumbent to decumbent-ascending, 6–18(–40) cm. **Leaves** thickened, narrowly lanceolate, 9–16 mm wide, margins entire, fibrous remnants of petiole bases not persistent or only weakly so. **Heads** 1, rarely 2-3(–6). **Involucres** 20–34 mm wide; phyllaries narrowly oblong to oblong-obovate, completely herbaceous, in 3-4 series and characteristically equal to subequal in length, but collections have been made of plants with phyllaries in conspicuously graduate series (e.g., Figs. 42, 43) — such collections apparently are populational variants, without geographical coherence, phyllary margins usually fringed-ciliate with white hairs. **Achenes** sericeous-strigose. 2n = 12. Figures 38-43.

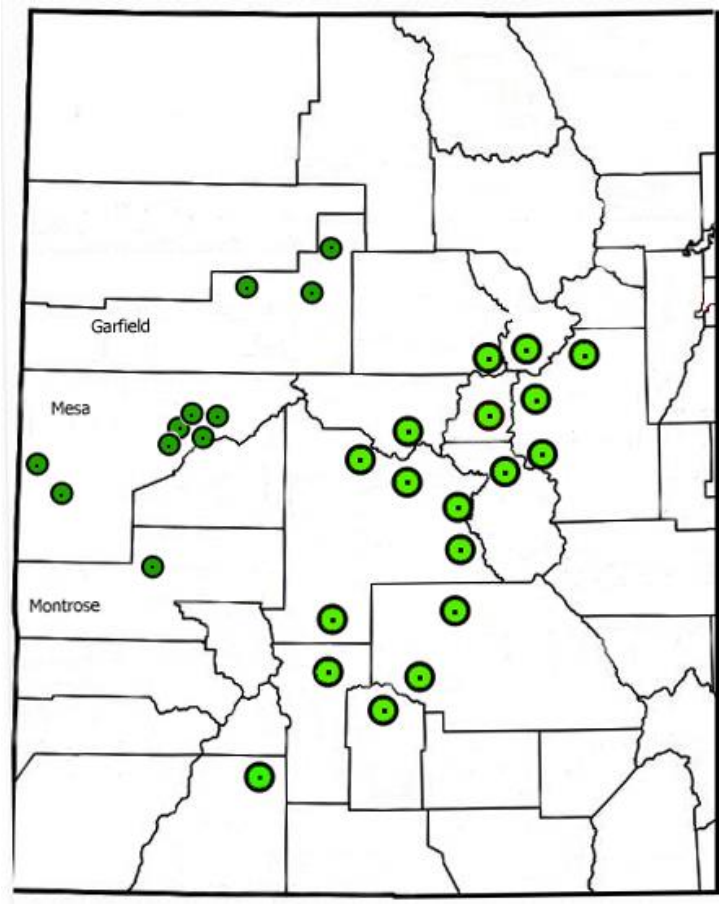
Flowering Jun–Sep. Meadows, open rocky slopes, limestone outcrops in shrub communities, habitats apparently not alkaline; 8200-12,500 feet.

Pyrrocoma clementis occurs in three disjunct population systems — south-central Utah, northeastern Utah, and central Colorado (Map 10). No consistent way to identify these as separate entities is evident.

In Colorado, plants from Garfield, Mesa, and Montrose counties appear to be geographically distinct, and some (particularly on Grand Mesa) sometimes have taller, branched stems. Considering the wider distribution of the species, they are considered here within the range of variation. *Atwood 16019* (MO; Kane Co., Utah) has 1 plant monocephalous and one with 6 heads racemoid.

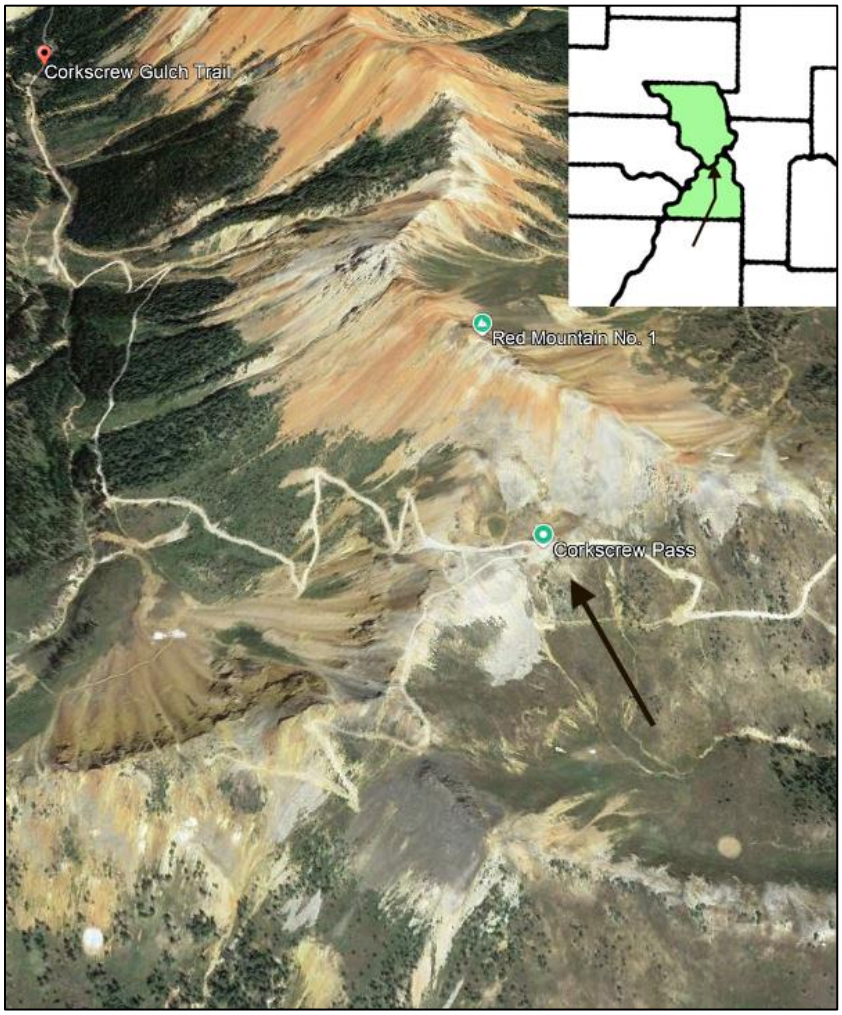


Map 10. Distribution of *Pyrrocoma clementis*, showing disjunct geographical segments of the range (Utah and Colorado) and locality of type collections.



Map 11. Distribution of *Pyrrocoma clementis* in Colorado. Smaller symbols in western counties perhaps are a distinct population system.

***Pyrrocoma clementis* from counties of western Colorado**. Garfield Co.: 5 mi S of jct of Four-mile Rd and Eas Miller Creek, 9246 ft, with *Juncus*, *Poa*, *Deschampsia*, 31 Jul 1981, *O'Kane 383* (CS); 1.4 mi NNE of Trojan Lake, wet meadow, 9249 ft, with *Festuca*, *Deschampsia*, *Agropyron*, *Carex*, 16 Aug 1982, *O'Kane 521* (CS); White River Natl Forest, Twin Lakes, 11,000 ft, 12 Aug 1936, *Penland 1430* (NY); Carbonate, ca 13 mi N of Glenwood Springs, limestone mesa and ridge, 10,800-11,100 ft, with clumps of *Abies* and *Picea*, 23 Jul 1990, *Vanderhorst 1279* (COLO, RM, RMBL). Mesa Co.: Grand Mesa, ca 30 air mi E of Grand Junction, Skyway Ski Trail and Scales Lakes, 39.0418 N, 108.0268 W, open areas in moist spruce/fir forest, 10,600-10,820 ft, 2 Aug 2010, *Brummer 1473* (KHD-2 sheets, RM); Grand Mesa, ca 20 air mi ESE of Grand Junction, Lands End near Bolen Reservoir, 39.0163° N, 108.2124° W, rocky area with shallow soil on mesa top, 9800-9962 ft, 6 Aug 2010, *Brummer 1689* (RM); Grand Mesa, ca 25.5 m ESE of Grand Junction, Mesa Lakes area, Glacier Springs Trail, W along West Bench, to ca 2 mi W of Glacier Springs Campground, 39.043° N, 108.1067° W to 39.0463° N, 108.0925° W, spruce/fir understory, 9860-10050 ft, 27 Aug 2012, *Brummer 11453* (RM); Uncompahgre Plateau, off Uranium Road, ca 2 mi W of Divide Road on Rim Trail, 38.6849 -108.7483, dry meadow 9100 ft, with *Potentilla*, *Cerastium*, *Achillea*, and *Sedum*, grazed area with low diversity, 8 Jul 1994, *Lyon 5668* (RM); North Uncompahgre Plateau, Two-V Ranch, 38.85 N, 108.91 W, disturbed area along roadside, 8900 ft, 25 Jul 1994, *Lyon 6486* (FLD); Grand Mesa, top, 8000 ft, 21 Jul 1936, *Ramaley 15478* (COLO); Grand Mesa Natl Forest, between Anderson's Reservoir #1 and 2, 39.033 N, 108.124 W, meadow, 10,350 ft, 8 Jul 1981, *Siplivinsky 1499* (BRIT, COLO). Montrose Co.: Uncompahgre Natl Forest, near entrance to Columbine Campground, E of Divide Road, dry slope of excavated area for pond, spruce/fir forest, 9136 ft, 16 Jul 2013, *Wingate 9735* (COLO, KHD).



Map 12. Locality of *Pyrrocoma spiralis* — Corkscrew Pass (arrow), at the Ouray/San Juan border.

9. PYRROCOMA SPIRALIS Nesom, **sp. nov. TYPE**: **Colorado**. Ouray Co.: Corkscrew Gulch Road, at pass between Red Mountain No. 1 and No. 2 [Corkscrew Pass, ca. 12,150 ft at the Ouray/San Juan County border], T42N R7W Sec 8 SW, alpine tundra with *Geum rossii*, 30 Jul 1998, *M.J. Lyon 8925* (holotype: FLD). Figures 44, 45.

Similar to *Pyrrocoma clementis* and *P. crocea* in its basal leaves with entire margins and mostly monocephalous stems. Similar to *P. crocea* in its broadly elliptic outer phyllaries and lack of persistent fibrous remnants of the basal leaves. Distinct from both in its small stature (stems, leaves, involucres), glandular stems and leaves, and small heads.

Stems ascending-erect, 6 cm, slightly purple, minutely puberulent with short (0.1 mm), erect, viscid, sometimes gland-tipped hairs. **Leaves**: basal mostly senescent, 3 cm long, blades narrowly elliptic, 4 mm wide, faces minutely and inconspicuously puberulent with erect, viscid hairs, margins entire, eciliate or the cauline irregularly ciliate with short, viscid hairs, petiole bases apparently without persistent fibrous remnants, cauline ca. 8, narrowly oblanceolate, not clasping, continuing to immediately beneath the head. **Heads** solitary, closely subtended by 1–2 leaf-like bracts (distal-most cauline leaves). **Involucres** 1.5 cm wide (pressed); phyllaries in 2–3 series of subequal length, outer broadly elliptic, 8 mm long, all green except for a small indurate zone at the very base, minutely and barely perceptibly puberulent, inner oblanceolate. **Ray flowers** ca. 15, fertile, corollas ca. 8–9 mm long, 1.5–2 mm wide. **Disc corollas** ca. 4 mm long. **Achenes** [mature size not seen], faces sericeous-strigose.

The evolutionary relationship of *Pyrrocoma spiralis* perhaps is closest to *P. crocea* or *P. clementis*, especially in view of the mostly herbaceous phyllaries and Coloradoan geography. The glandular vestiture of *P. spiralis* differs from both.

ACKNOWLEDGEMENTS

I'm grateful for loans from FLD (to TEX), opportunities to study at MO, PH, TEX-LL, and US, and to Mark Mayfield for searching in KSC for chromosome vouchers.

LITERATURE CITED

Ackerfield, J. 2022. Flora of Colorado (ed. 2). BRIT Press, Botanical Research Inst. of Texas, Fort Worth.

Allred, K.W 2024. Flora Neomexicana I : Annotated Checklist, 4th edition. Lulu.com.

Anderson, L.C., D.W. Kyhos, T. Mosquin, A.M. Powell, and P.H. Raven. 1974. Chromosome numbers in Compositae. IX. *Haplopapus* and other Astereae. Amer. J. Bot. 61: 665–671.

Hall, H.M. 1928. The Genus *Haplopappus*. A Phylogenetic Study in the Compositae. Publ. Carnegie Inst. Washington 389: 1–391.

Ackerfield, J. 2025. *Pyrrocoma*. Page 278, in K.D. Heil and S.L. O'Kane. Vascular Plants of New Mexico. Monogr. Syst. Bot. 140, Missouri Botanical Garden Press.

Mayes, R.A. 1976. A cytotaxonomic and chemosystematic study of the genus *Pyrrocoma* (Asteraceae: Astereae). Ph.D. dissertation, Univ. of Texas, Austin.

Stegner, W. 1954. Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West. Houghton Mifflin, Boston. Reprinted several times; Penguin Books in 1992.

USDA Plants. 2025. PLANTS Database. U.S. Dept. of Agriculture, Natural Resources Conservation Service. <https://plants.usda.gov/>

Weber, W.A. and R.C. Wittmann. 2000. Catalog of the Colorado Flora: A Biodiversity Baseline. Univ. of Colorado Museum of Natural History, Boulder.

Figure 1. *Pyrrocoma uniflora*. Jackson Co., Colorado, *Osterhout s.n.* (NY).

Figure 2. *Pyrrocoma lanceolata*. Jackson Co., Colorado, *Harrington 8337* (CS).

Figure 3. *Pyrrocoma lanceolata*. Jackson Co., Colorado. Details from *Islam 12-526* (KHD).

Figure 4. *Pyrrocoma lanceolata*. Jackson Co., Colorado, *Weber 17084* (CS).

Figure 5. *Pyrrocoma lanceolata*. Jackson Co., Colorado, *Lafferty 76* (COLO).

Figure 6. *Pyrrocoma lanceolata*. Jackson Co., Colorado, *Goodding 1927* (COLO).

Figure 7. *Pyrrocoma vasey*. Detail from *Vasey 273* (NY), isotype.

Figure 8. *Pyrrocoma vasey*. Grand Co., Colorado, *Bethel s.n.* (CS).

Figure 9. *Pyrrocoma vasey*. Grand Co., Colorado, *Bethel s.n.* (CS).

Figure 10. *Pyrrocoma vasey*. Grand Co., Colorado, *Tear 1655* (KHD).

Figure 11. *Pyrrocoma vasey*. Routt Co., Colorado, *Eastwood s.n.* (COLO).

Figure 12. *Pyrrocoma vasey*. Grand Co., Colorado, *Weber & Dahnke 17837* (COLO).

Figure 13. *Pyrrocoma vasey*. Grand Co., Colorado, *Weber & Dahnke 17837* (NY).

Figure 14. *Pyrrocoma vasey*. Eagle Co., Colorado, *Johnston & Hedgcock 309* (GREE).

Figure 15. *Pyrrocoma sanluisia*. Saguache Co., Colorado, *Regensberg 941* (KHD), holotype.

Figure 16. *Pyrrocoma sanluisia*. Saguache Co., Colorado, *Anderson 2528* (NY).

Figure 17. *Pyrrocoma sanluisia*. Saguache Co., Colorado, *Islam 12-416* (KHD).

Figure 18. *Pyrrocoma sanluisia*. Saguache Co., Colorado, *Islam 12-415* (KHD).

Figure 19. *Pyrrocoma cebollana*. Gunnison Co., Colorado, *Barrell 443a-62* (RMBL).

Figure 20. *Pyrrocoma cebollana*. Gunnison Co., Colorado, *Barrell 443a-62* (US).

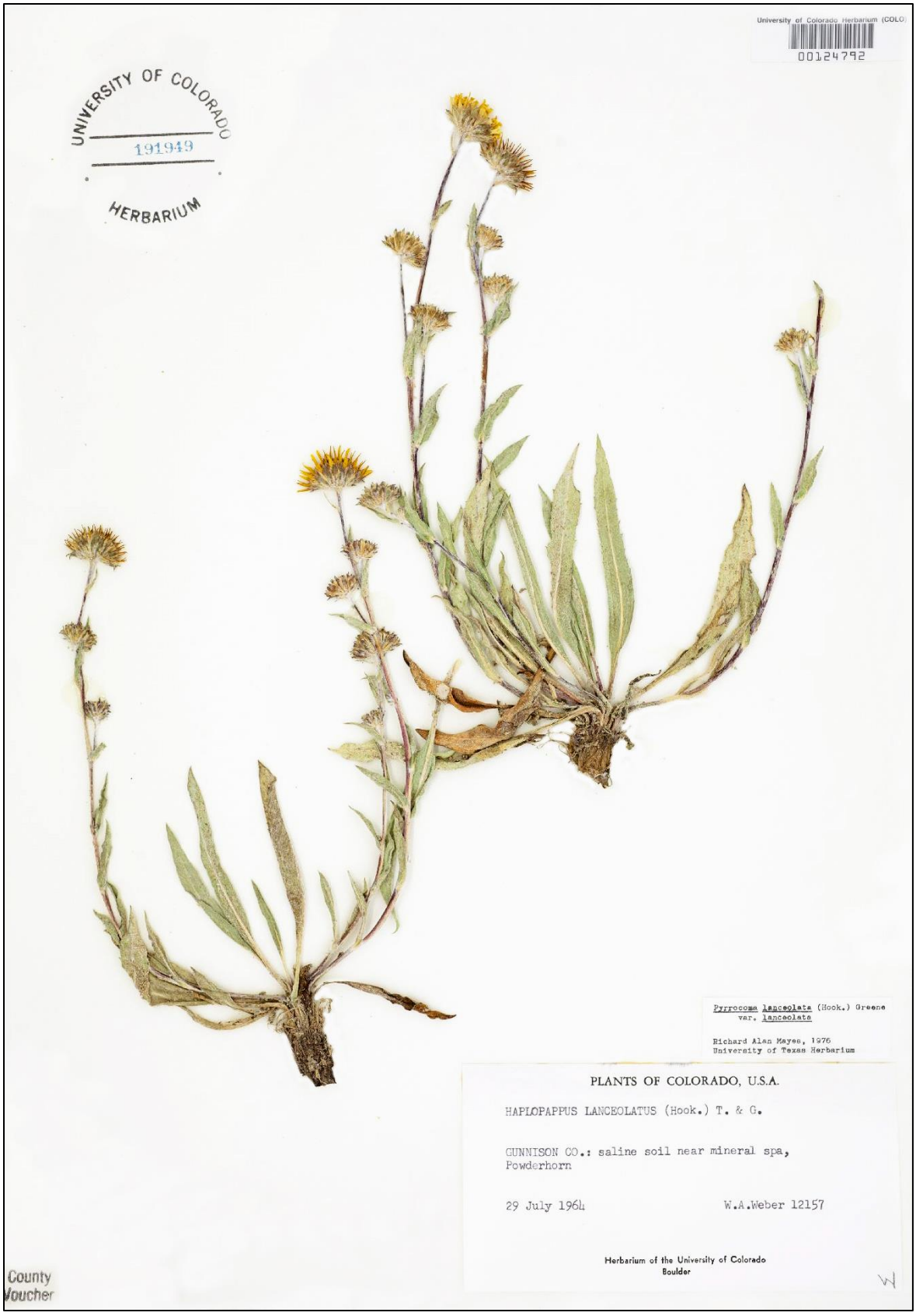


Figure 21. *Pyrrocoma cebollana*. Gunnison Co., Colorado, *Weber 12157* (COLO).

Figure 22. *Pyrrocoma genuflexa*. Coconino Co., Arizona, *Kluwin 228* (ASC).

Figure 23. *Pyrrocoma genuflexa*. Coconino Co., Arizona, *Sanchez s.n.* (ASC).

Figure 24. *Pyrrocoma genuflexa*. Catron Co., New Mexico. *Sivinski & Lowrey 6962* (UNM).

Figure 25. *Pyrrocoma genuflexa*, with erect, narrowly oblong phyllaries. iNaturalist photo, David Greenberger, 7 September 2022, Apache Co., Arizona.

Figure 26. *Pyrrocoma crocea*. Grand Co., Utah, *Franklin 4055* (NY).

Figure 27. *Pyrrocoma crocea*. Gunnison Co., Colorado, *Barrell 275-65* (RMBL).

Figure 28. *Pyrrocoma crocea*. La Plata Co., Colorado, *Wooton 2599* (US).

Figure 29. *Pyrrocoma crocea*. Rio Grande Co., New Mexico, *Keller 355a* (JMH).

Figure 30. *Pyrrocoma crocea*. Rio Arriba Co., New Mexico, *Nelson 66100* (RM).

Figure 31. *Pyrrocoma crocea*. Rio Arriba Co., New Mexico, *Larson 1664* (RM). Unsually short stems.

Figure 32. *Pyrrocoma crocea*. Rio Arriba Co., New Mexico, *Anderson 2510* (LSU), voucher for tetraploid chromosome count (2n = 24).

Figure 33. *Pyrrocoma crocea*, with loosely spreading phyllaries. iNaturalist photo, Greg Pappas, 3 August 2022, Carbon Co., Wyoming

Figure 34. *Pyrrocoma crocea*, with spreading phyllaries. iNaturalist photo, Greg Pappas, 20 Jul 2022, Carbon Co., Wyoming.

Figure 35. *Pyrrocoma crocea*, with spreading obovate phyllaries. iNaturalist photo, 4marcie12h, 8 July 2022, Gunnison Co., Colorado.

Figure 36. *Pyrrocoma crocea*, with patent phyllaries. iNaturalist photo, Anthony Culpepper 8 August 2019, Hinsdale Co., Colorado.

Figure 37. *Pyrrocoma crocea*, variant with loosely spreading phyllaries, the inner purple-rimmed. iNaturalist photo, Alec McKeand, 24 July 2024, Rio Arriba Co., New Mexico.

Figure 38. *Pyrrocoma clementis*. Park Co., Colorado, *Wetter 756* (NY),

Figure 39. *Pyrrocoma clementis*. Lake Co., Colorado, *Osterhout 2649* (NY).

Figure 40. *Pyrrocoma clementis*. Mesa Co., Colorado, *Brummer 1473* (KHD).

Figure 41. *Pyrrocoma clementis*. Conejos Co., Colorado, *Ownbey 1393* (COLO).

Figure 42. *Pyrrocoma clementis*. Mesa Co., Colorado, *Lyon 6486* (FLD). Phyllaries of unequal length.

Figure 43. *Pyrrocoma clementis*. Hinsdale Co., Colorado, *Rollins 1465* (NY). Phyllaries of unequal length.

Figure 44. *Pyrrocoma spiralis*. Ouray Co., Colorado, *Lyon 8925* (FLD), holotype.

Figure 45. *Pyrrocoma spiralis*. Detail of holotype.