

TAXONOMY OF *PYRROCOMA UNIFLORA* (ASTERACEAE, ASTEREAE) AND SIMILAR SPECIES

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania

guynesom@sbcglobal.net

ABSTRACT

The *Pyrrocoma uniflora* group as recognized here includes *P. uniflora* (Hook.) Greene, *P. sericea* Greene (Idaho), *P. howellii* (A. Gray) Greene (= *P. linearis*; Oregon, Idaho, Nevada), and ***Pyrrocoma catenaria*** Nesom, **sp. nov.** from the Chain Lakes region in northeastern Sweetwater Co., Wyoming. Variation in *P. uniflora* (in the USA) is complex and geographic variants are pointed out. From Canada, only the types of *Donia uniflora* and *Haplopappus lanceolatus* var. *sublanatus* are included in the study. *Pyrrocoma elliptica* Nesom perhaps is more closely related to the *P. uniflora* group than previously assessed. Monocephalous plants from high elevations in the Wind River Range and Absaroka Mountains of Wyoming are identified (tentatively) as northward-disjunct population systems of *P. clementis* Greene. Many aspects of this overview need further study.

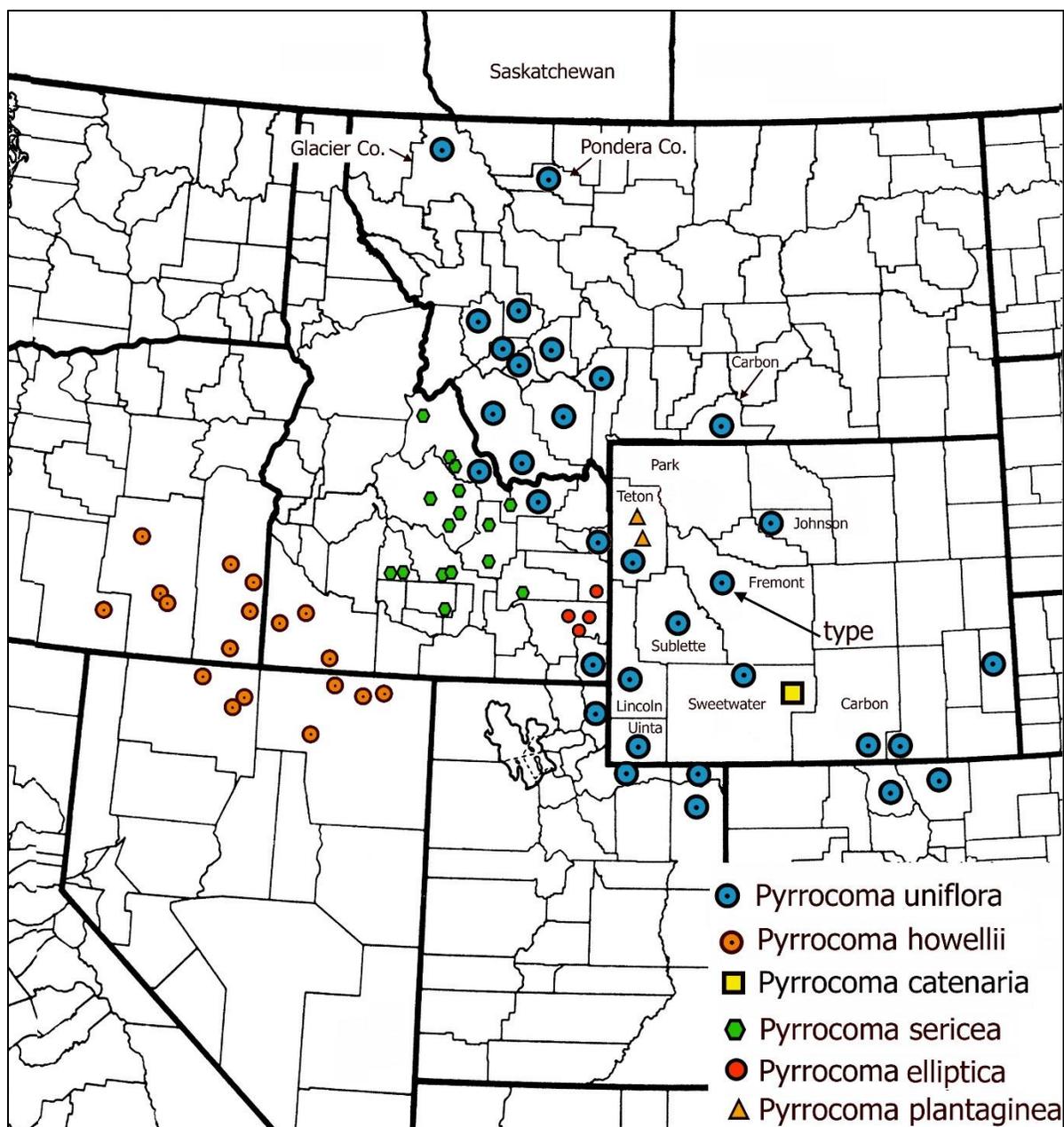
Reduction of the inflorescence to a single head is a common occurrence in *Pyrrocoma* and plants of several evolutionary lines have been typologically identified as "P. uniflora." Here, the concept of *P. uniflora* is tentatively narrowed to a population system from Saskatchewan to north-central Colorado — distinctive regional variants exist in Wyoming and Montana. Most plants from Idaho previously identified as *P. uniflora* are treated here as *P. sericea* Greene. Linear-leaved plants from Oregon, Nevada, and Idaho ("var. *linearis*") are distinct and recognized as *P. howellii* (A. Gray) Greene.

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; isotypes: GH, NY). Figures 1, 2.

Pyrrocoma inuloides (Nutt.) Greene, Erythea 2: 60. 1894. *Homopappus inuloides* Nutt., Trans. Amer. Philos. Soc. 2, 7: 333. 1840. *Haplopappus inuloides* (Nutt.) Torr. & Gray, Fl. N. Amer. 2(2): 241. 1842. **TYPE: Wyoming.** [probably Fremont Co.]: **Protologue:** "Plains of the Rocky Mountains towards the source of the Platte," mid June 1834, *T. Nuttall s.n.* (probable holotype: PH; isotypes: GH, K, UC-fide Mayes 1976). The PH label, handwritten by Nuttall, has his asterisk with the name "Actinaphoria inuloides" — the other labels also are handwritten by Nuttall with the name "Homopappus inuloides." Figures 4-6.

The Wyeth expedition (with Nuttall and ornithologist J.K. Townsend) was in the vicinity of South Pass/Oregon Buttes, Fremont County, around 14 June 1834 (Townsend 1839), where recent collections of *P. uniflora* have been made.

Haplopappus lanceolatus var. *sublanatus* Cody, Canad. Field-Naturalist 70: 126. 1956. **TYPE: CANADA. Northwest Territories,** Mackenzie District. Salt Plain W of Ft. Smith, 60° 03' N, 112° 25' W, rare in sod, 20 Jul 1950, *J. Cody & C.C. Loan 4576* (ALTA-VP; isotypes: CAS, NY, US). Figure 4.



Map 1. Distribution of *Pyrrcoma uniflora*, *P. sericea*, *P. elliptica*, *P. howellii*, and *P. catenaria*. *Pyrrcoma elliptica* perhaps is more closely related to *P. lanceolata*. *Pyrrcoma plantaginea* has been identified as both *P. uniflora* and *P. lanceolata*. *Pyrrcoma gossypina*, far-removed in southern California, has often been identified as a variant within *P. uniflora*.

I have not been able to study general collections from Canada, but the types of *Donia uniflora* and of *Haplopappus lanceolatus* var. *sublanatus* are reasonably placed within the species as it is known from the USA, as recognized here in its broad sense. Images from iNaturalist observations in Canada indicate that 2 species (*P. uniflora* and *P. lanceolata*), occur in Saskatchewan, or maybe even 3 (the third more similar to *P. lanceolata*).

Nearby collection: Mackenzie District. Salt Plain W of Ft. Smith, 60° 03' N, 112° 25' W, very rare in sod, 4 Jul 1950, *Cody & Loan 4168* (S, US). Stems unbranched.

Stems erect to ascending-erect or decumbent-ascending, 8–25 cm, sparsely tomentose to glabrate, eglandular. **Leaves:** basal narrowly lanceolate to oblanceolate, 5–17 cm long, narrowed to a petiole ca. 1/4–1/2 the leaf length, blades 6–15 mm wide, margins usually serrate with 5–9 pairs of shallow teeth or apiculae, less commonly entire to subentire, usually glabrous adaxially and tomentose abaxially but sometimes glabrous or tomentose on both sides, cauline 4–7, mostly linear to linear-lanceolate, becoming bracteate distally, not subclasping or slightly broadened proximally (lanceolate) and subclasping, proximal sometimes opposite to subopposite. **Heads** 1 or rarely 2, ebracteate. **Involucres** 15–19 mm wide (pressed); phyllaries in 2–3 series of equal to subequal length, inner 7–8 mm long, linear to narrowly oblong. **Achenes** ca. 2.5 mm long, sericeous-strigose. Description based on plants of Montana and Wyoming. **Chromosome number**, $2n=12$ (diploid) — Fremont Co.: *Mayes 147, 148, 149*; Sublette Co.: *Mayes 151, 152*. Figures 8–15.

Flowering (May) June–August. Sagebrush areas, meadows, often with sagebrush or willows, wet and alkaline meadows, subalpine meadows, wet roadside areas, around springs, sand and gravel bars, floodplains; (5200, 6400–) 6800–9100 (–9550) feet.

Considerable variation exists within *Pyrocoma uniflora* as recognized here. High-elevation variants of small stature and reduced involucre size occur in the Wind River Range (west slope, cited below, e.g., Fig. 16) and in the Pioneer Range of Beaverhead Co., Montana (cited below, e.g., Fig. 12) — these perhaps are distinct evolutionary entities. Wyoming plants tentatively identified here as *P. clementis* need to be studied in relation to their distinction from *P. uniflora*.

The type collection of *Pyrocoma uniflora* (Saskatchewan) has a second head on a long peduncle, as do others from scattered USA localities and as noted in the protologue for var. *sublanatus* (NWT), the peduncle often markedly thinner than the main stem — e.g., Montana (Carbon Co., *Shelly 1170-MONT*), Beaverhead Co., *Hitchcock 12589-WTU*, Glacier Co., *Vanderhorst s.n.-MONT*), Granite Co., *Lackschewitz 10435-MONTU*); Wyoming (Johnson Co., *Tweedy 3043-RM*, Sublette Co., *Heidel 2231-RM*). It is not implausible that these show influence of *P. lanceolata*, but the latter does not occur in all of the *P. uniflora* localities noted above.

The occurrence of branching stems, with heads on long peduncles, is the main feature distinguishing *Pyrocoma sericea* from *P. uniflora*, but the morphological consistency and relatively wide geographical range of *P. sericea* are emphasized here in its formal recognition.

Distinctly lanceolate cauline leaves with an expanded and subclasping base (as in *Pyrocoma lanceolata*) are characteristic of *P. uniflora* in some regions and contrast with plants with sublinear, non-clasping cauline leaves. Whether a geographic pattern exists remains to be investigated. Similarly, linear phyllaries with a linear, uniformly green midregion are characteristic of some, but others have the green region more restricted to the distal half of the phyllaries.

Additional collections — *Pyrocoma uniflora*

MONTANA

Beaverhead, Carbon, Gallatin, Glacier, Granite, Jefferson, Madison, Missoula, Pondera, Powell, and Silver Bow counties.

Disjunct population system in the Pryor Mountains of Carbon County

These plants are disjunct eastward from the main range of the species (Map 1) but a close match to the characteristic morphology and habitat.

[Custer Natl Forest]: 18 air mi SE of Bridger, Bent Spring and vicinity on the W slope of Big Pryor Mtn, ca. 45° 10' 34.32" N, 108° 35' 47.04" W, moist to dry meadow with patches of sagebrush, 7520–7880 ft, 17 Jul 2008, *Nelson 75330* (MONTU, RM); ca. 30 air mi ESE of Bridger, SE end of East Pryor Mtn on ridge between head of Lost Water and Layout creeks, 45.1638° N, 108.3357° W, limestone outcrops and

rocky low forb-covered ridge, 8640-8750 ft, 21 Jul 2008, *Nelson 75543* (BRY, RM); ca. 31 air mi ESE of Bridger, above and E of Lost Water Canyon near Little Ice Cave, 45.1364° N, 108.3384° W, rocky limber pine/forb savanna, 8160-8240 ft, 21 Jul 2008, *Nelson 75586* (RM); ca. 26 air mi SE of Bridger, Red Pryor Mtn, SE shoulder, steep slope below the rim to the E, 45.1162° N, 108.4489° W, moist meadow with patches of sagebrush on SW-facing slope, 8265-8465 ft, 24 Jul 2008, *Nelson 75679* (ID, RM-USFS); near the enclosure at the junction of Crooked Creek and Dryhead Overlook road, montane meadow, 7600 ft, 9 Jul 1977, *Robertson 1352* (RM); ridge ca. 1.8 air mi NW of Red Pryor Mtn, 0.75 air mi W of Natl Forest Rd 3091, 45.1386° N, 108.4857° W, limestone ridge, open areas among *Pseudotsuga menziesii*, 7900 ft, with *Astragalus miser*, *Bupleurum americanum*, scattered, 25 Jun 1986, *Shelly 1170* (MONTU); Pryor Mtn overlook, subalpine meadow along rock road, 8800 ft, 19 Jul 1973, *Taylor 1675* (RM).

Variants in northern Montana (Map 1)

A collection from Pondera County has short, monocephalous stems but has involucre morphology more like *Pyrocoma lanceolata* than *P. uniflora*:

- Ca. 5 mi S of Butte, Blackfeet Indian Reservation, Heart Butte, 48.2112° N, 112.8357° W, heavy soil of a moist alkaline meadow around a pond in the grasslands, 4800 ft, with *Grindelia squarrosa* and *Juncus balticus*, common, 19 Jul 1988, *Lesica 4656* (MONTU).

A collection from Glacier County has tall stems, one of them branched and with a head:

- 49th parallel at Police Lake (Alberta), 25 Jun 1998, *Vanderhorst s.n.* (MONT). Figure 3.

High elevation variant in Beaverhead Co., Montana

Collections by Peter Lesica from consistently high elevations (9300-9700 ft) in the Pioneer Range (e.g., Fig. 12) and the Beaverhead Mountains have distinctly smaller heads (involucre 10–13 mm wide, inner phyllaries 6–7 mm long) than plants otherwise characteristic of the species in Beaverhead Co. (Map 5) and elsewhere. These may warrant formal recognition but further study is needed.

Beaverhead Co.: Beaverhead Mtns, head of Tex Creek, 44.5441° N, 113.0292° W, moist soil on a gentle NW-facing slope, 9700 ft, with *Astragalus alpinus* and *Lloydia serotina*, common, 30 Jul 1989, *Lesica 4993* (MONTU); Pioneer Range, Keokirk Mtn, N-facing bench below the mtn, 45.6034° N, 112.9458° W, alpine turf, 9500 ft, with *Carex elymoides* and *Lloydia serotina*, common, 25 Jul 1991, *Lesica 5527* (MONTU); Pioneer Range, saddle on the S side of Lion Mtn, 45.6034° N, 112.9252° W, alpine turf, 9300 ft, with *Oxytropis sericea* and *Poa alpina*, common, 2 Aug 2005, *Lesica 9489* (MONTU); Pioneer Range, lower S-facing slope of Lion Mtn, 45.603549° N, 112.94807° W, stony, limestone-derived soil, 9500 ft, with *Senecio canus* and *Oxytropis sericea*, common, 30 Jul 2019, *Lesica 11807* (MONTU).

WYOMING

Lincoln Co.: Fork Creek, 1 mi E of Hwy 89, heavily grazed wet meadow with *Spartina gracilis*, *Glaux maritima*, 5 Jul 1975, *Albee 2683* (UT); ca. 8 km SW of Kemmerer, 41.717° N, 110.617° W, sagebrush steppe, 6898 ft, 3 Jun 1991, *Anderson 16* (UTC); below Commissary Ridge, 1.5 mi S at Smith Fork and Alpine jct, N side of Lake, 42.4987° N, 110.6738° W, 8600 ft, with *Deschampsia*, *Potentilla*, and *Aster*, 17 Aug 1978, *Smith 1180* (COLO); along Wheat Creek above Wheat Creek Meadows, W of County Rd 306, 41° 59' 46.694" N, 110° 32' 20.481" W, Frontier Formation of Oyster Ridge, fossilized marine oyster shells in sandstone, sandy loam and humus on wetland, 7379 ft, with *Carex aquatilis*, *C. macloviana*, *C. praegracilis*, *Phleum pratense*, *Dodecatheon pulchellum*, *Sisyrinchium montanum*, *Pedicularis groenlandica*, *Plantago eriopoda*, 23 Jun 2012, *Wilson et al. WY090-105* (RM). Sublette Co.: 2 mi near 4th July Spring, 42.9903° N, 110.1643° W, 7900 ft, weed-grass with lupine, brome, and valerian, 17 Aug 1927, *Cazier C-84* (RM); ca. 4.5 air mi NW of Elkhorn Junction, N of Elk Mtn, 42.4675° N, 109.33° W, sagebrush flats, wet draw bottom, 7150 ft, 7 Jun 1994, *Cramer 79* (RM); ca. 13 air mi NW of Marbleton, N side of lower Meadow Canyon by Bench Corral Springs, 42.7014° N, 110.2878° W, sagebrush hillside, grassy draw, and spring, 7500-7700 ft, 9 Jun

1994, *Cramer 292* (RM); ca. 17 air mi W of South Pass City, S end on the E side of the Prospect Mtns, 42.4547° N, 109.1344° W, sagebrush slopes and hills, open rocky ridges, aspen groves, and pine stands, 7850-8600 ft, 16 Jun 1994, *Cramer 733* (RM); ca. 12 air mi N of Cora, 43.1036° N, 110.0069° W, pothole lakes and nearby meadows, aspen hillsides, Douglas fir stands, and sagebrush hillsides, 7800-8000 ft, 22 Jul 1994, *Cramer 2211* (RM); ca. 9 air mi N of Daniel Junction, Warren Bridge, 43.0186° N, 110.1233° W, riverside meadows, 7500 ft, with willows and sagebrush, 10 Aug 1994, *Cramer 3324* (CM, RM); ca. 4.5 air mi SE of Merna, Horse Creek, 42.9164° N, 110.2819° W, creekside meadows and willows, 7480 ft, 12 Aug 1994, *Cramer 3665* (RM); Webb Draw, ca. 5.5 air mi ENE of Merna, 42.9744784° N, 110.2441880° W, small reservoir, meadowed draw, hillside spring, aspen grove, and ridgetop sagebrush, 7450-7800 ft, 12 Aug 1994, *Cramer 3692* (COLO); ca. 5.5 air mi N of Pinedale, 42.9468° N, 109.8695° W, marshy grassy meadows, 7500 ft, 26 Jun 1995, *Cramer 7036* (LSU, RM); ca. 13 air mi N of Daniel Jct, Green River, 43.0775° N, 110.0857° W, wet draw meadow with sagebrush sides, 7575 ft, 15 Jul 1995, *Cramer 8294* (RM); ca. 5.5 air mi ENE of Big Sandy, Irish Canyon at Bridger-Teton Natl Forest border, 42.6733° N, 109.3922° W, creekside meadows and willows, 7800 ft, 25 Jul 1995, *Cramer 9422* (RM); W slope Wind River Range, Lamreaux Meadows, ca. 4 air mi NW of Dutch Joe Guard Station, ca. 32 air mi ESE of Pinedale, 42.6564° N, 109.2953° W, dry, sandy weed-dominated dirt road, 9000 ft, 19 Aug 1991, *Fertig 11900* (RM, WS); ca. 30 air mi NNW of Pinedale, Kendall Warm Springs, on E side of Green River, 43.2852° N, 110.0189° W, wet meadow along cold water stream due N of warm spring, 7800 ft, edged by *Salix wolfii* grove, 11 Jul 1994, *Fertig 15029* (RM); W slope Wind River Range, ca. 3 air mi W of Independence Mtn, Sedgewick Meadows and vicinity, 42.6564° N, 109.2369° W, rocky hills with lodgepole pine and adjacent wet meadows and streamsides, 8950-9210 ft, 19 Aug 1991, *Hartman 31126* (RM); Leckie, 42.5707° N, 109.28° W, dry soil, 7850 ft, 25 Jun 1901, *Merrill 5* (RM); Kendall Ranger Station pasture, 43.25444° N, 110.01306° W, rich, dry, open sage flats, 7700 ft, with *Poa*, *Danthonia*, *Sieversia*, *Antennaria*, 14 Jul 1926, *McDonald McD&H-12* (RM); along the road from Hwy 352 to Cora, 26 Jul 1974, *Mayes 151* (TEX); on Hwy 352, 0.5 mi S of the turnoff to New Fork Lake, 26 Jul 1974, *Mayes 152* (TEX); Green River, 43.01861° N, 110.12333° W, 7500 ft, 26 Aug 1894, *Nelson 1035* (RM, WS); ca. 4 air mi W of Pinedale, Duck Creek, 42.87399° N, 109.93414° W, moist creek banks and flood plains, 7081 ft, 6 Jul 2006, *Newton 5845* (RM); near Cora, 7600 ft, 10 Jul 1925, *Payson 4329* (RM, WS); near the lower end of New Fork Lakes, 43.0823° N, 109.9642° W, dry meadow near the lower end of the lakes, 7700 ft, 21 Jul 1925, *Payson 4420* (RM, WS); Kendall [Green River opposite the mouth of Little Twin Creek and just E of Black Butte, 43.1359° N, 110.0612° W], grassy slope, 7600 ft, 5 Aug 1922, *Payson 2921* (RM); Merna, dry alkaline flat, 23 Jul 1922, *Payson 2792* (NY, RM); Big Piney, 42.5422° N, 110.115° W, wet meadow, 6800 ft, 15 Jul 1966, *Tresler 341* (RM). Sublette Co. (Salt River Range): Ca. 19 air mi SW of Big Piney, Lake Ridge, 42.4411° N, 110.3342° W, meadow and adjacent subalpine fir forest with some scattered whitebark pine, 9300-9400 ft, 24 Jul 1993, *Hartman 41899* (RM); Salt River Range, NW slope of Riley Ridge, 42.4853° N, 110.5192° W, rocky, grassy slopes with benches, often with aspen groves, some standing water and springs, 9100-9400 ft, 16 Aug 1993, *Hartman 44192* (RM); Pine Grove, 1.5 mi W of Cretaceous Mtn, 42.4278° N, 110.3755665° W, alkaline meadow, with *Muhlenbergia richardsonis*, *Achnatherum nelsonii*, *Poa secunda*, *Potentilla fruticosa*, *Carex jonesii*, 7960 ft, 14 Jul 2002, *Heidel 2231* (RM); Dry Piney drainage, 42.3263° N, 110.354° W, open, S-facing slope, 7920 ft, 3 Jul 1995, *Jewell 795141* (ID); ca. 16 air mi W of Big Piney, above Emigrant Trail-Lander Cutoff and South Piney Creek, 42.5283° N, 110.4414° W, wet grassy slope near spring, 7640-8160 ft, 21 Jun 1993, *Nelson 25976* (RM); 20 mi W of Big Piney, grassy slopes, Jul 1922, *Payson 2639* (NY, OSC, RM). Sweetwater Co.: Great Divide Basin Area, Oregon Buttes Wilderness Study Area, ca. 1 air mi ENE of Oregon Butte summit, ca. 14.5 air mi S of South Pass City, 42.2591° N, 108.8359° W, small alkaline meadow beside grove at spring on hillside bench, moist silt, partial shade, 7620 ft, with *Elymus trachycaulus*, *Juncus balticus*, *Carex praegracilis*, 25 Jun 2018, *Heidel 4631* (RM); Great Divide Basin, Bush Rim, ca. 4 air mi SW of Oregon Buttes, 6.5 air mi NE of Rock Cabin Spring, 42.2003° N, 108.8714° W, side of spring, 7360-7700 ft, with dense graminoids, wet organic soil, 13 Jul 1995, *Welp 6368* (RM). Teton Co.: W of Driggs, 43.72° N, 111.17° W, swamps, 21 Jun 1938,

Davis 254-38 (ID, IDS, WS-2 sheets); Teton Park, 1.5 mi E of Elk Ranch Reservoir, 43.8066° N, 110.4363° W, 7200 ft, greasewood associated with *Artemisia tridentata* and *Sedum*, moderately abundant, 22 Jun 1971, *Dorn* 1280 (RM); ca. 35 air mi NE of Jackson, bank of Beauty Park Creek adjacent to North Fork Fish Creek Road bridge (FS Rd 30750), 43.6605° N, 110.1019° W, sagebrush bluff with sandy soil, 8200-8227 ft, 21 Jun 1990, *Fertig* 2130 (RM); badlands ridge E of Red Creek, ca. 32 air mi NE of Jackson, 43.6456° N, 110.1417° W, badlands slope, 8000-8400 ft, 21 Jun 1990, *Fertig* 2162 (RM); ca. 32 air mi NE of Jackson, North Fork Fish Creek, 43.6311° N, 110.1408° W, sagebrush meadow, 8000-8530 ft, 11 Jul 1990, *Fertig* 3483 (RM); Jackson Hole, E bank of Flat Creek and flats on SW side of Millers Butte N of oxbow ponds of Flat Creek, ca. 0.7 mi E of Hwy 26, 89, 187 and ca. 2 mi N of Jackson. 43.5044° N, 110.7358° W, hummocky terrain at edge of dried marl flats, 6230 ft, with *Juncus balticus*, *Deschampsia cespitosa*, *Carex praegracilis*, and scattered clumps of *Salix brachycarpa*, *S. bebbiana*, and *S. geyeriana*, 2 Aug 1997, *Fertig* 17861 (RM); Fish Creek/Moccasin Basin Area, Squaw Creek Road from North Fork Fish Creek to Open Fork Creek, 43.6311° N, 110.1208° W, sagebrush grassland. 8000-8300 ft, 12 Jul 1990, *Hartman* 27031 (RM); Mount Leidy Highland Area, 0.7 road mi SW of Hatchet Campground, FS Rd 30160, 43.8224° N, 110.3672° W, sandy soil with patches of lodgepole pine, aspen, and occasional pond, 7300-7400 ft, 23 Jun 1995, *Hartman* 51096 (RM); Jackson, 16 Jun 1931, *Murie* 106 (RM); Bacon Creek, 43.49 N, 110.1382° W, ca. 7500-8200 ft, 15 Aug 1894, *Nelson* 911 (RM); ca. 33 air mi ENE of Jackson, Fish Creek/Moccasin Basin area, along Red Creek, ca. 8 air mi SW of Togwotee Pass, 43.66° N, 110.1617° W, sagebrush-grassland slopes, 8000-8600 ft, 12 Jul 1990, *Nelson* 19459 (RM); ca. 33.5-34 air mi ENE of Jackson, Fish Creek/Moccasin Basin area, above Purdy Creek between Purdy Basin and Buckskin Point, ca. 2 air mi NE of South Fork Fish Creek, 43.5878° N, 110.1008° W, red clay slopes and flats, 8300-8800 ft, 25 Aug 1990, *Nelson* 20276 (RM); Gros Ventre Mtns, drier mounds around an alkali lake, 7100 ft, 28 Aug 1949, *Reed* 2705 (ID, RM). Uinta Co.: Ca. 15 mi S of Evanston, 41.046433° N, 110.977323° W, meadow with *Poa*, *Taraxacum*, 7300 ft, 27 Jun 1999, *Dorn* 2990 (NY); Hwy 410, 0.85 mi E of Robertson, 41° 11' 6" N, 110° 23' 47" W, moist and wet meadow, 7290 ft, 25 Jul 2014, *Goodrich* 28762Q (RM); 7.4 mi WSW of Robertson on Co. Rd 271, 41.16° N, 110.45° W, locally common in clay meadow, 7800 ft, 29 June 1981, *Holmgren* 9962 (CS, WTU); ca. 14 air mi ENE of Evanston, Hinshaw Creek, 1.6 mi N of I-80, then 1 mi E on access road, sagebrush bottoms with wetlands, junegrass, 6820-6980 ft, 27 Jun 1995, *Refsdal* 4475 (BRY). Washakie[?] Co.: Spring Creek, meadows, 24 Jul 1901, *Goodding* 355 (NEB, NY, RM).

***Pyrrocoma uniflora* in Johnson Co., Wyoming** (including collections cited as *P. villosa* in Nesom 2025c): E slope Bighorn Range, ca. 0.75 mi N of Poison Creek and 1 mi W of Billy Creek Rd, ca 2 air mi SE of jct of Hazelton Road and Hwy 16, 44.1272° N, 106.9179° W, meadow on loamy, deep soils with sparse gravel on surface adjacent to 2-track road at edge of *Pinus contorta* woods, meadow dominated by *Festuca idahoensis* and *Poa secunda*, 7840-7880 ft, 20 Jul 1997, *Fertig* 17712 (NY, RM); North Fork Crazy Woman Creek, canyon at SE end of Crazy Woman Mountain in vicinity of bridge crossing Crazy Woman Creek, ca. 2.75 mi E of Hwy 16, 44.1876° N, 106.8514° W, edge of sand-gravel roadside dominated by *Bromus inermis* and *Melilotus officinalis* bordering S-facing granitic talus or streamside conifer woods, 6400 ft, 21 Jul 1997, *Fertig* 17728 (RM); N side of Pole Creek, from Hwy 16 and W for 1 mi, 44.2015135° N, 106.9519579° W, dry fescue meadow on gentle, S-facing toe slopes of silt loam, above broad bottomland and below forest, 8160-8240 ft, with *Festuca idahoensis*, *Antennaria microphylla*, *Eremogone congesta*, *Astragalus alpinus*, *Cerastium arvense*, *Erigeron ochroleucus*, 5 Jul 2017, *Heidel* 4373 (RM); ca. 17 air mi SW of Buffalo, Dry Fork Creek, 2 mi SE of Hwy 16, 44.1292111° N, 106.8984443° W, gravelly creek crossing, saturated at edge of flowing water, 7720 ft, with *Deschampsia cespitosa*, *Hordeum brachyantherum*, *Allium geyeri*, *Juncus balticus*, 6 Jul 2017, *Heidel* 4377 (RM); ca. 2 mi S of Hazelton, E side of Doyle Creek, ca. 2 mi SE of Hazelton Peak, 44.0716937° N, 107.0007405° W, dry to moist fescue meadow, on silt loam, lower gentle slopes in broad valley, W aspect, 8200-8240 ft, with *Festuca idahoensis*, *Antennaria microphylla*, *Eremogone congesta*, *Astragalus alpinus*, *Cerastium arvense*, *Potentilla gracilis*, *Lupinus*

argenteus, 7 Jul 2017, *Heidel 4380* (RM); Pole Creek pasture, 44.2029° N, 106.9339° W, dry parks, 8100 ft, abundant, 25 Jul 1932, *Miller 322* (RM-USFS); Big Horn Mtns, along Doyle Creek on the Hazelton Road, ca. 1.7 air mi SE of Hazelton Pyramid, ca. 24.3 air mi SW of Buffalo, 44.071688° N, 107.00073° W, moist meadows, 8200 ft, 20 Jul 1980, *Nelson 6760* (NY, RM, WS); between Sheridan and Buffalo, rolling plains, 3500-5000 ft, 15 Jun-15 Jul 1900, *Tweedy 3043* (NY, RM).

The only collection of *Pyrrocoma villosa* from Johnson County is this: Headwaters of Clear Creek and Crazy Woman River, 7000-9000 ft, 20 Jul-15 Aug 1900, *Tweedy 3042* (NY, RM). The locality is unclear — the reference probably was to North Fork Crazy Woman Creek, which is the closest the headwaters of Clear Creek (South Fork), but the headwaters of these two are separate by about 20-25 miles. Tweedy made several hundred collections labeled exactly the same way and without further information.

High elevation variants in Wyoming

Two collections identified here as *Pyrrocoma uniflora* from the Salt River Range in Sublette Co. are from unusually high elevation (9100-9400 ft) — *Hartman 41899* and *Hartman 44192* (Maps 3, 4). Others from nearby are from more characteristic elevation — *Heidel 2231*, *Jewell 795141*, *Nelson 25976*, *Payson 2639*, and (from closely adjacent Lincoln Co.) *Smith 1180*. Seemingly characteristic plants of *P. uniflora* also have been collected at higher elevation in Fremont Co — *Kinter 555* and *Massatti 7746*.

A collection from northern Sublette County is of very small plants with linear leaves and small heads with ca. 22 ray florets. It is outside the morphological as well as ecological range of typical *Pyrrocoma uniflora*, which occurs at lower elevations in the area. Wind River Mtns W of Clark Lake, Bridger Wilderness Area at the head of the Green River, over 12,000 ft, 1980, *E. Rose s.n.* (UT). Not mapped.

Two collections identified here as *Pyrrocoma* aff. *uniflora* from the west slope of the Wind River Range (Map 2) are from around 9000 feet — *Fertig 11900* (Fig. 16) and *Hartman 31126*. These are short plants with small heads, possibly evolutionarily distinct from *P. uniflora*.

IDAHO

Bear Lake Co.: N end of Bear Lake, wet alkaline soil, 6000 ft, 2 Jun 1939, *Davis 977* (IDS). Clark Co.: Nicholia Canyon, Jul 1939, *Mays s.n.* (IDS); Targhee Natl Forest, western Centennial Mountains, ca. 34 air mi NW of Dubois, S side of Continental Divide ca 1 air mi E of Bannack Pass, 44.482° N, 112.7742° W, grass-forb slope and ridgetop, 7900-8100 ft, 1 Jun 1992, *Nelson 22199* (ID). Lemhi Co.: BLM-managed lands in the Reservoir pasture of the Yearian Creek allotment, 44.893816° N, 113.55070° W, S-facing slope near the saddle into Cow Creek, 6530 ft, among *Danthonia unispicata*, *Koeleria macrantha*, *Artemisia tripartita*, and *Calochortus eurycarpus*, 9 Jul 2019, *Alverson s.n.* (SBLM); 5 mi N of Gilmore, 3 Jul 1941, *Blake 3783* (ID); Gilmore, 44.458805° N, 113.26974° W, 7000 ft, 2 Jul 1938, *Davis 429* (IDS, WS); 5 mi N of Gilmore, meadow, 3 Jul 1941, *Davis 3783* (IDS, WS); 10 mi E of Gilmore, boggy meadowland, 25 Jun 1947, *Hitchcock 15772* (ID, IDS-2 sheets, WS, WTU-2 sheets); Birch Creek, vicinity of Kaufman Campground, N of Blue Dome, 44.236833° N, 112.97049° W, slightly hummocked, subirrigated, alluvial substrate, meadow vegetation, with *Dasiphora floribunda*, *Potentilla gracilis*, *Poa secunda juncifolia*, common, 8 Jul 2009, *Mancuso 3439* (ID); Upper Birch creek near Kaufman Guard Station, ca. 3 mi N of Lone Pine, 44.2398° N, 112.9635° W, 6400 ft, 28 May 1992, *Moseley 2474* (ID); Idaho Fish & Game Birch Creek Sportsmans access area, USFS Kaufman Guard Station, 44.3141786 N, 112.9645563 W, alkali meadow, 5200 ft, 26 Jun 1987, *Rosentreter 4345* (CIC); BLM-managed lands in the Upper Reese pasture of the Yearian Creek allotment, 44.836411° N, 113.52797° W, depression on top of rocky ridgeline, krummholzed sagebrush, 7400 ft, among *Artemisia tridentata* subsp. *wyomingensis*,

Artemisia tripartita, *Pseudoroegneria spicata*, and *Senecio integerrimus*, 19 Jun 2019, Van Sickle s.n. (SBLM).

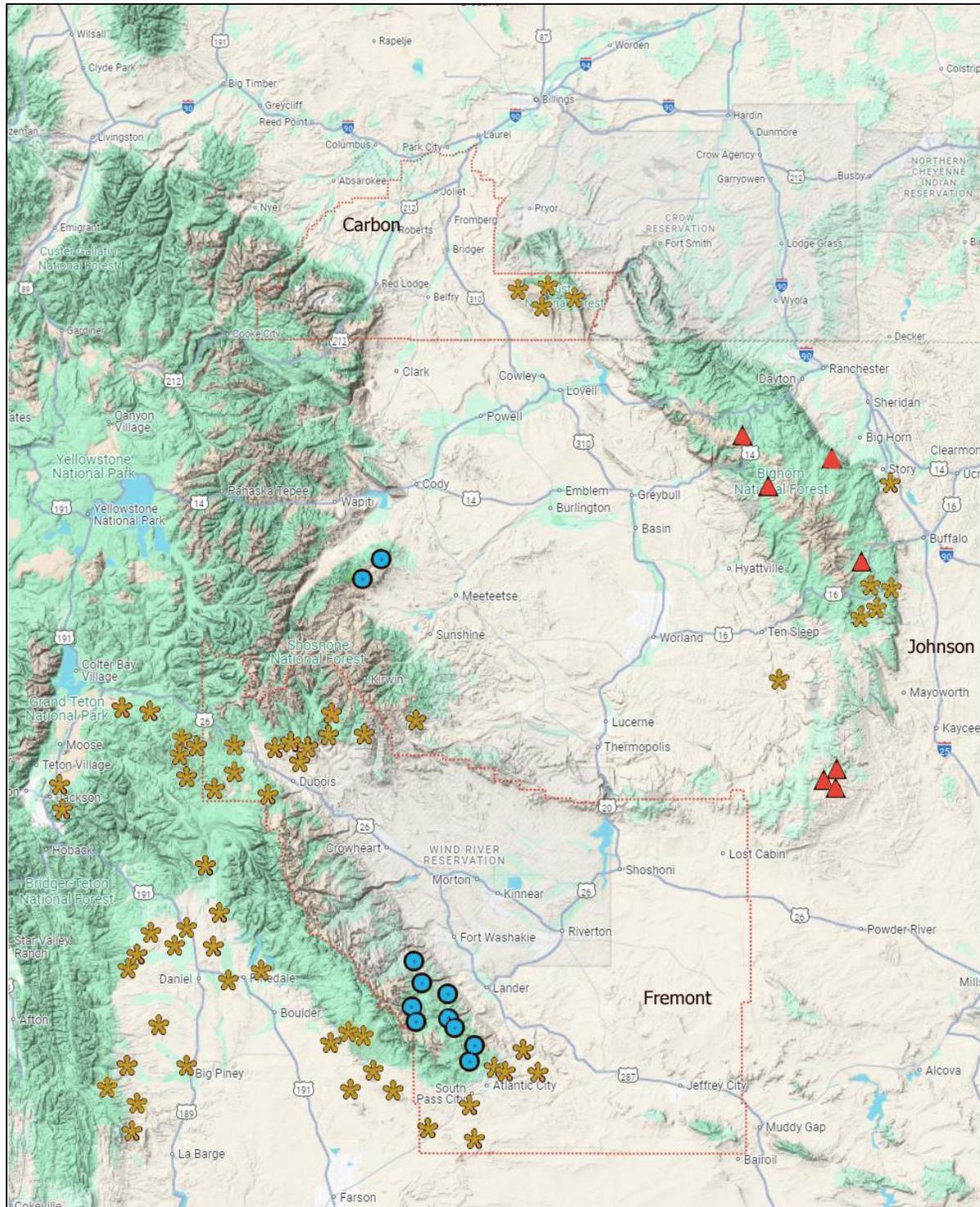
Additional collection of *Pyrocoma elliptica* (not cited in Nesom 2025b). **Idaho.** Caribou Co.: 1.2 km NW of Henry, 42° 55' 2" N, 111° 32' 25" W, calcareous soil in *Potentilla fruticosa*-*Agrostis stolonifera* community, 1875 m, with *Cirsium scariosum*, *Spiranthes romanzoffiana*, *Aster occidentalis*, *Carex flava*, *Helenium* sp., 27 Jul 2004, *Hordijk ID075-059* (ID, IDS). These plants lack the multi-headed inflorescence of *P. elliptica* but they have thickened, completely glabrous leaves with entire to minutely apiculate margins — the locality is near Soda Springs where typical *P. elliptica* occurs but the plants are more like those cited as *P. elliptica* from northwest of Henry and from the Grays Lake area.

UTAH

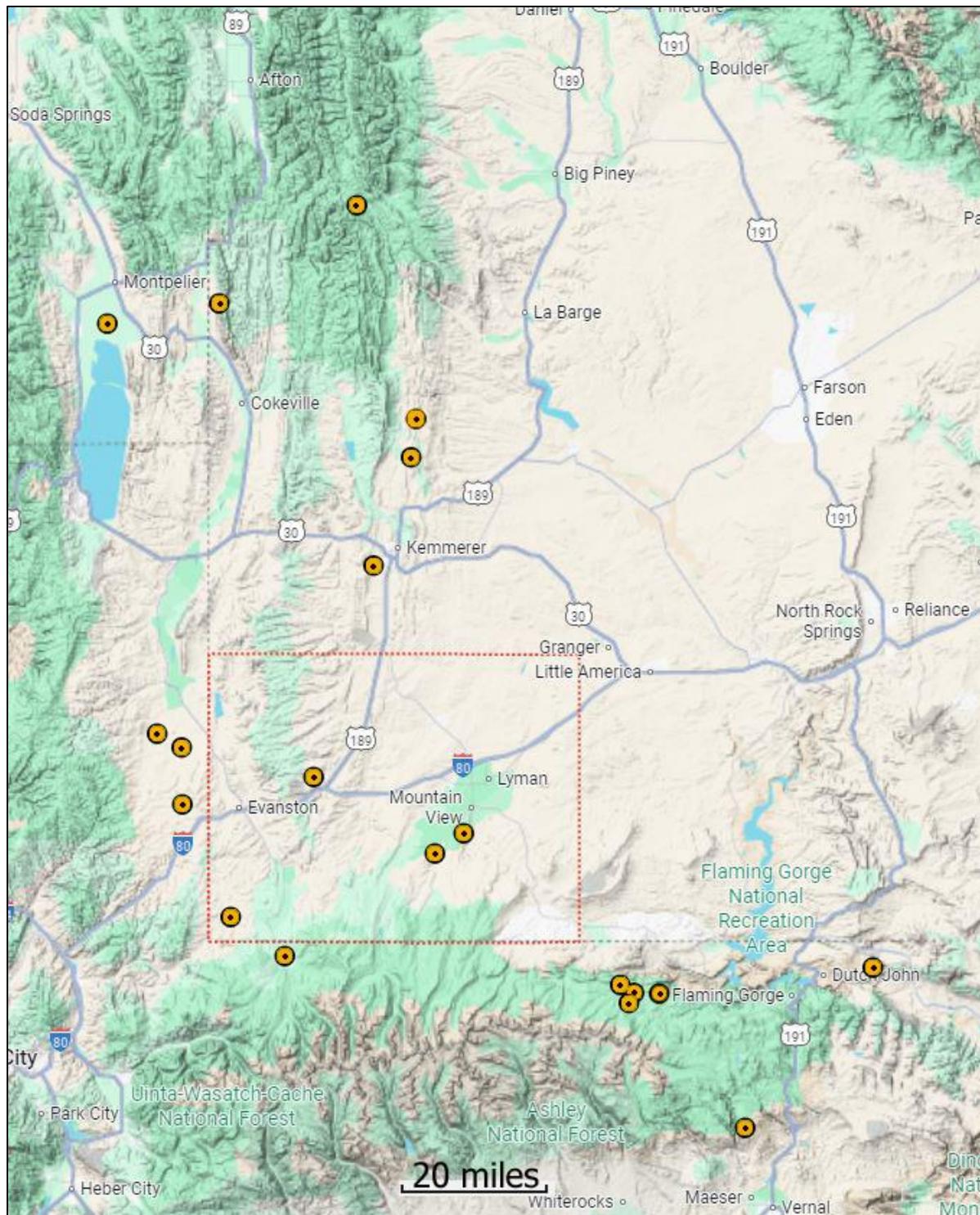
Daggett Co.: North Fork Sheep Creek, Hickerson Park, 13 mi SW (240°) from Manila, dry meadow at the edge of a lodgepole pine forest, 9000 ft, 31 Jul 1981, *Goodrich 15994* (BRY, SSLP, UT); Sheep Creek Park, 18 km SW (224°) of Manila, 40.8798° N, 109.8637° W, 8620 ft, 10 Aug 1983, *Goodrich 19541* (NY); Elk Park, 40.836° N, 109.71027° W, mesic meadow, 8030 ft, 16 Jul 2013, *Goodrich 28644* (BRY USU, UT); Goslin Mountain, 40° 57' 07.7" N 109° 17' 22.2" W, ephemerally moist meadows adjacent to mountain big sagebrush, Nebraska sedge/ wiregrass community, 7635 ft, 22 Jun 2017, *Huber 5547* (BRY, NY, UT, UTC); 9 air mi SW of Manila at Half Moon Park, 40.8798° N, 109.8064° W, 8333 ft, 10 Aug 1983, *Neese 14757* (NY, WTS); ca. 8.5 air mi SW of Manila, Sheep Creek Park, 1.4 mi W of jct of Forest Rds 221/096, 40.8798° N, 109.8637° W, dry meadow, 8660-8700 ft, 21 Aug 1995, *Refsdal 7517* (BRY, RM, USU); Sheep Creek Park, 1.5 mi W of jct of Forest Rd 221 and Forest Rd 096, 40.880354° N, 109.868923° W, wet meadow, 8638 ft, 17 Jul 2018, *Robins 18091* (UTC). Rich Co.: Ca. 10.5 air mi N of Sage Creek Jct, W side of South Lake, 41.92316° N, 111.07566° W, riparian area, 6542 ft, 22 Jun 2005, *Moon 643* (BRY-2 sheets); Deseret Land & Livestock, NNE side of Neponset Reservoir, 41.38116° N, 111.11116° W, riparian community, 6448 ft, 30 Jun 2005, *Moon 756* (BRY, UCR); 1 mi S of Home Canyon, 41.4139° N, 111.2181° W, 6500 ft, 27 Jul 1984, *Franklin 1024* (NY); Deseret Land and Livestock Co, Crane Reservoir, wet meadow, 6800 ft, 18 Jul 1983, *Thorne 2653* (BRY, NY); E side of Crane Reservoir, 41.2694° N, 111.104° W, 6900 ft, 27 Jul 1984, *Thorne 3289* (BRY, NY). Summit Co.: Uintah Mtns, Goodman Ranch near Bear River, 7900 ft, 12 Jul 1926, *Payson 4962* (CHRB, NY, WS). Uintah Co.: Taylor Mtn, 40.621° N, 109.615° W, 8432 ft, 3 Aug 2009, *Goodrich 27637* (BRY, NY).

COLORADO

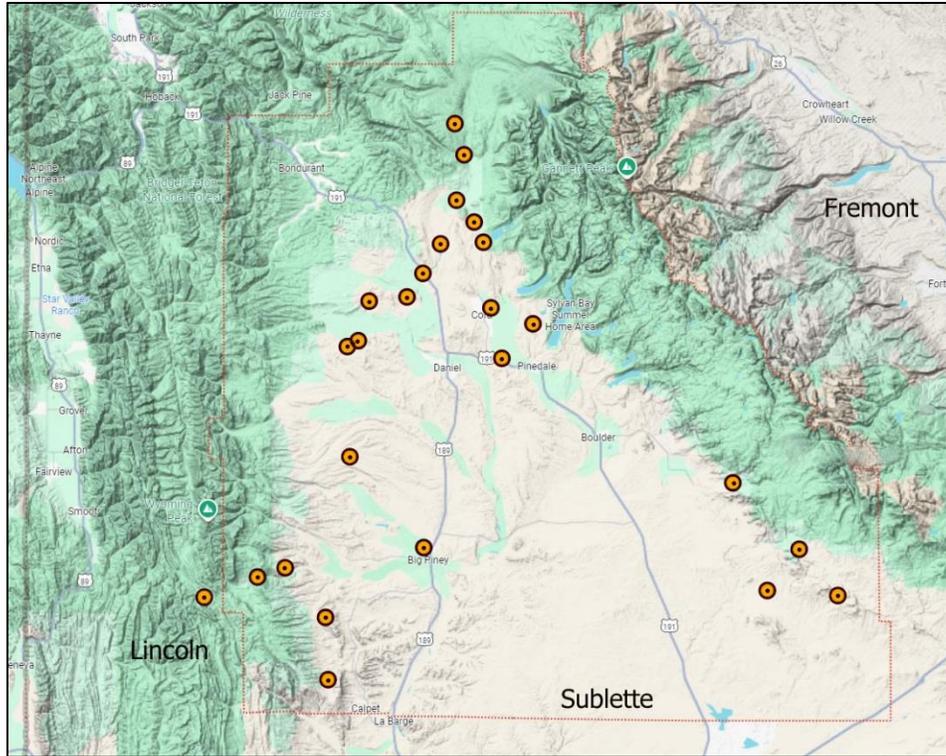
Jackson Co.: Arapaho Natl Wildlife Refuge, North Park, ca. 11 air mi SE of Walden, 40.55915° N, 106.22518° W, willow riparian area and grassland meadow, 8350 ft, 4 Jun 2007, *Lewis 204* (COLO); North Park in edge of Wyoming, Jul 1896, *Osterhout s.n.* (NY); Forest Rd 600 near its jct with Co. Rd 6, 5-10 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).



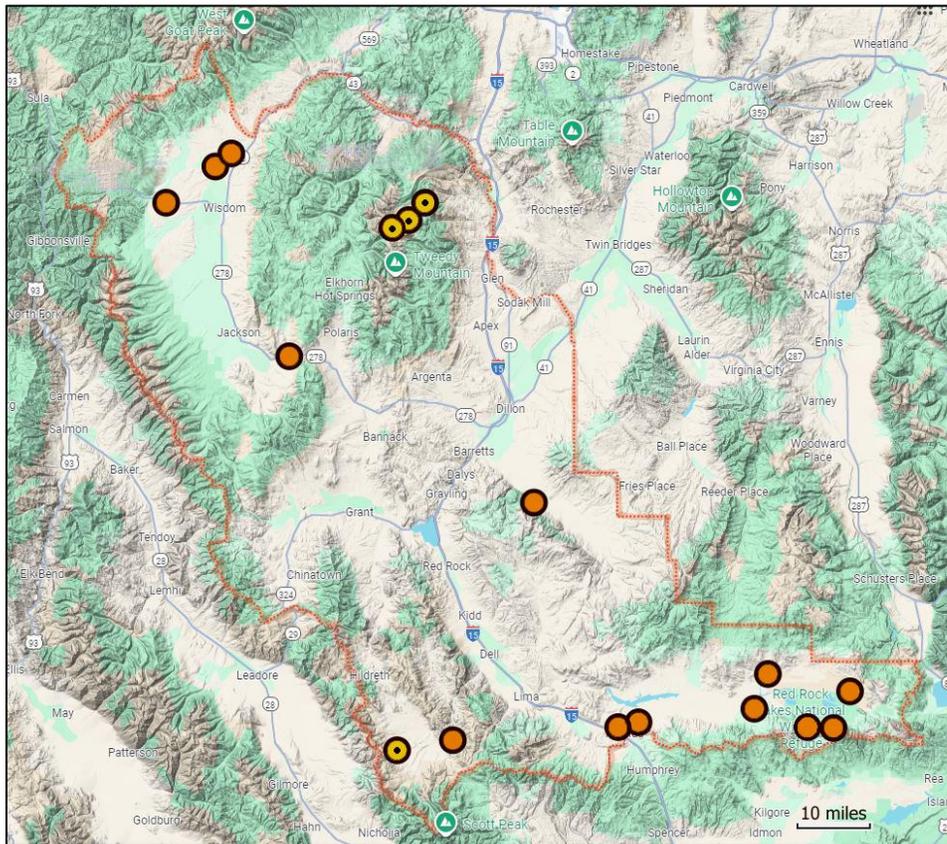
Map 2. Distribution in northwestern Wyoming and adjacent Montana of *Pyrocoma uniflora* (stars), *P. clementis* (blue), and *P. villosa* (triangles, see "Additional collections" for Johnson Co., under *P. uniflora*). The boundaries of Fremont Co. (Wyoming) and Carbon Co. (Montana) are outlined in red. Detail for Sublette County in Map 4. .



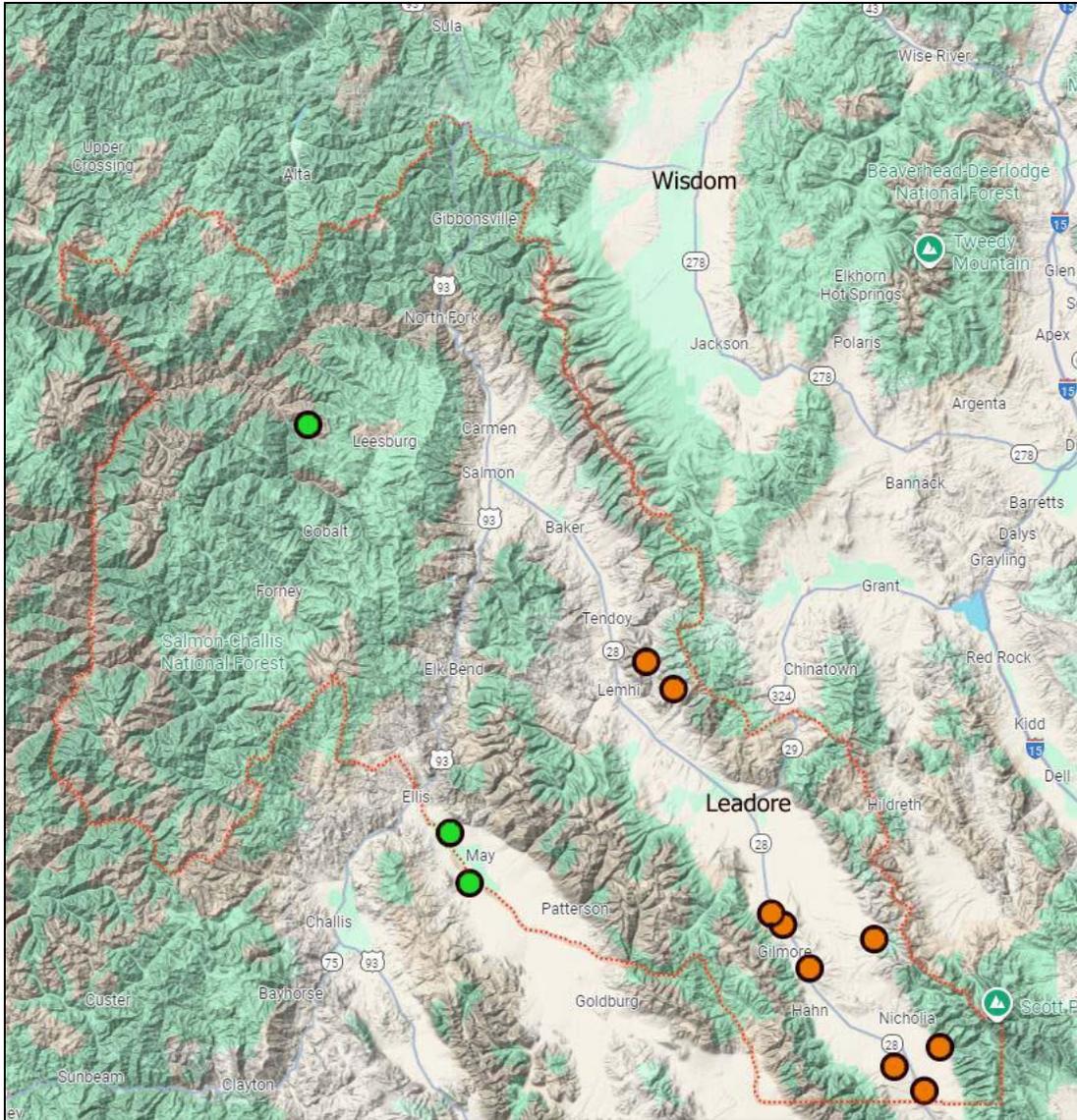
Map 3. Distribution of *Pyrrocoma uniflora* at the corner of Idaho, Wyoming, and Utah. Records cited in the text. Uinta Co., Wyoming, is outlined in red.



Map 4. Distribution of *Pyrocoma uniflora* in Sublette Co. (in part) and adjacent Lincoln Co., Wyoming.



Map 5. Distribution of *Pyrocoma uniflora* in Beaverhead Co., Montana. Dotted-gold symbols are high elevation populations with small heads, cited in the text.



Map 6. Distribution of *Pyrocoma uniflora* and *P. sericea* (green) in Lemhi Co., Idaho.

2. PYROCOMA SERICEA Greene, Leaf. Bot. Observ. Crit. 2: 19. 1909. **TYPE:** Idaho. Butte Co.: Arco, Snake River Plains, 18 Jun 1893, *E. Palmer 197* (holotype: US). Figure 14.

Similar to *Pyrocoma uniflora* in its heads on long peduncles and narrow phyllaries but heads usually 2–4, rarely 1 (populational variation) and restricted to Idaho.

Stems ascending-erect, to decumbent-ascending, 8–25(–32) cm, sparsely villous, eglandular. **Leaves:** basal narrowly lanceolate to narrowly oblanceolate, 5–13 cm long, narrowed to a petiolar region 1/3–1/2 the leaf length, blades 3–10 mm wide, glabrous to flocculent-tomentose on both sides, margins usually shallowly serrate to sharply serrate, cauline mostly 4–6, narrowly lanceolate, subclasping, the proximal often opposite to subopposite. **Heads** 1 or often 2–4 in a loose corymb. **Involucres** 15–18 mm wide (pressed); phyllaries in 2–3(–4) series of subequal to unequal length, inner 5–8 mm long, elliptic-oblong to oblong-oblanceolate with a triangular-acute apex, margins and faces crinkly-villous, eglandular, green area mostly in the distal half, proximal portion indurate with a distinct midvein. **Ray florets** 14–26, fertile, corollas 8–10 mm long, 1.5–2 mm wide, coiling. **Disc corollas** 4–4.5 mm long. **Achenes** 2–2.5 mm long, sericeous-strigose. Figures 14–26.

Flowering (May) June-July (August). Wet alkaline meadows and meadow edges, alkaline flats and creek bottoms, marshy areas, sagebrush; (4400-) 5000-7300 (-8000) feet. Steve Popovich made collections (cited below) from a population in Camas County that show the progression of flowering (June) to flowering/fruitleting (July) to fruitleting (August).

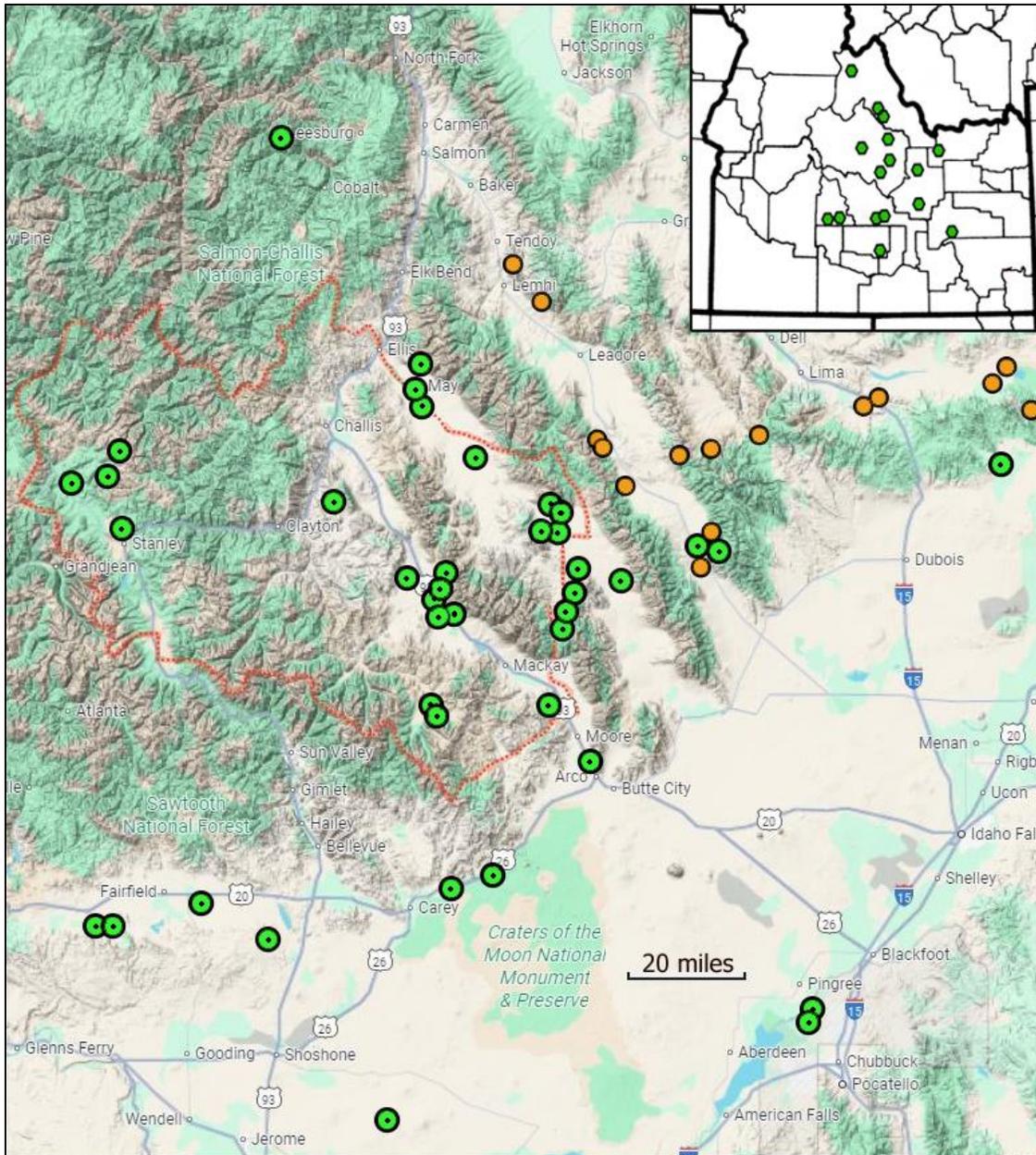
Pyrocoma sericea has branching stems with heads on long peduncles but populational variants sometimes have only a single head. The distinction from *P. uniflora*, based primarily on this feature, is tenuous but geography suggests that two entities exist. In coining the epithet of *P. sericea*, Greene didn't know the extent of infra-specific variation in vestiture, but in any case, the name has existed for more than a century and is useful at least in providing a pointer to the geographic pattern to be further tested.

Additional collections. IDAHO. Bingham Co.: Fort Hall meadows, 43.01593° N, 112.55778° W, meadows, 4400 ft, 21 May 1932, *Davis 106-32* (IDS); Fort Hall Indian Reservation, west side of Clear Creek, 43.030894° N, 112.56068° W, 27 May 1987, *Glennon 1290* (IDS). Blaine Co.: Huff Creek meadows, S of Hwy 20/26/93, N of Carey, 50 yds from CMNM, 43° 21' N, 113° 47' W, dry part of NE edge of meadow, common on lava flow, 4942 ft, with *Juncus*, *Potentilla*, *Penstemon*, *Poa*, "nearest to *P. uniflora*, but with imbricate phyllaries and green phyllary tips as in *P. lanceolata* ... Our Big Camas Prairie and Carey, Idaho area plants do not fit cleanly into either taxon," 29 Jun 2002, *Atwood 28689* (CRMO); Vat Creek study area in Sawtooth NRA, 43.9640596° N, 114.8636830° W, shade under conifers at edge of meadow, 25 Jul 1974, *Ertter ST-211* (CIC); Clyde, moist saline meadow, 5600 ft, 11 Jul 1916, *Macbride & Payson 3179* (US); 14 mi W of Craters of the Moon Natl Monument, 43.3642238° N, 113.8071257° W, sedge-grass meadow, 5250 ft, 14 Jul 1975, *Steele 1044* (BOIS, ID). Butte Co.: Lost River Range, Challis Natl Forest, Coal Creek just off Pass Creek road, 44.046527° N, 113.45291° W, 7300 ft, in cement-like soil with *Artemisia tridentata*, *Agropyron spicatum*, and *Chrysothamnus viscidiflorus*, 12 Jun 1979, *Brunsfeld 949* (ID, OSC); Wet Creek, 44.081° N, 113.406° W, grazed site, 6800 ft, 25 Jun 1991, *Kinney JK91-145* (BOIS, CIC, SRP); Wet Creek, 44.110° N, 113.387° W, enclosure, riparian habitat and adjacent uplands, 6500 ft, 23 Jul 1991, *Smithman LS-2393* (BOIS); Hawley Mountain, NNW ridge, follow ridge from turnout from Pass Creek Road where it crosses Wet Creek and follow ridge to high knoll just below treeline, Site 8, valley floor near creek, 44.142317° N, 113.3658° W, seasonally-flooded wetland with well-developed soil, 6400 ft, 17 Jun 2016, *Williams 1810* (IDS, SRP). Camas Co.: 3.1 mi S of Hill City at jog in Monument Gulch Rd to Bliss, S edge of Camas Prairie, 43.263° N, 115.038° W, rich soil off roadside, 5090 ft, with *Artemisia cana* and mixed grasses, 11 Jun 1981, *Ertter 4178* (CIC); Macon Flat, from Timmerman Jct. (Hwy 20/Hwy 75) drive W for 16 mi, SE on Macon Flat Rd for 3.6 mi, S on 2-track road for 4.1 mi, 43.26485° N, 114.54845° W, dry lake bed, 5145 ft, 2 Jun 2024, *Pollock 934* (SRP — photos at <<https://www.inaturalist.org/observations/220612542>>); Centennial Marsh, Camas Prairie, ca. 10 air km SSW of Corral, 10 meters due E of section road jct with Centennial Marsh old pumphouse dead-end road leading into section 11, and continuing N, E, and S to edges of croplands, 43.262958° N, 114.99820° W, seasonally moist to saturated muddy open alkaline flats, 5065 ft, with *Sphaeromeria potentilloides*, *Rumex*, *Distichlis*, *Beckmannia*, *Chenopodium*, other grasses and weeds, and *Pyrocoma insecticuriis* on immediate W side of section road near canal and in other nearby areas, several hundred plants, 28 Jun 1995 (flowers), *Popovich 7776 A-P* (CIC, IDS, SRP), 17 Jul 1998 (flowers and fruits), *Popovich 6216* (CIC, IDS), 23 Aug 1995 (fruits), *Popovich 7747* (CIC, SRP); Macon Flat Road, 43.32908° N, 114.58041° W, open grazed flat, 5015 ft, clay soils, with *Artemisia papposa*, 2 Jun 2018, *Smith 15112* (CIC, SRP); and *Smith 15133* (CIC, SRP). Clark Co.: Worthing Bridge, 12 Jun 1929, *Mays s.n.* (IDS); Kilgore, open sage flats, 16 Aug 1916, *Rust 890* (ID, US); 7 mi N of Blue Dome along Hwy 28, moist alkaline-clay soil, 6500 ft, 26 Jun 1979, *Taylor 6656* (WWB). Custer Co.: Sawtooth Mtns, Stanley Basin, edge of Little Redfish Lake, 44.4425° N, 114.92722° W, moist grassy meadow, 21 Jul 1953, *Baker 100559* (ID, WTU-2 sheets); 15 mi S of Challis, Drake Ranch, 44.287407° N, 114.23173° W, in valley, 26 Jun 1940, *Christ 11446* (ID-2 sheets, WS); Dry Creek, 13 mi N of Stanley, 44.357406° N, 115.11981° W, in gravelly bed, 15 Jul 1946, *Christ 15787* (ID); 2 mi S of Dickey, moist alkaline bottoms along roadside, 6300 ft. 14 Jul 1941, *Cronquist 3089* (IDS); Pahsimeroi River Valley, Pines Springs, 5480 ft, 2 Aug 1917, *Eggleston 1400* (US); head of Little Lost River Valley, Summit Creek flood channel extending 0.2 mi W of Sawmill Canyon Rd crossing, 44.239° N, 113.373° W, dry open areas, 6235

ft, locally common, 17 Jun 2016, *Ertter 22584* (CIC, IDS, SRP); Thousand Springs BLM ACEC, head of 1000 Springs Creek, 2.5 mi W of Hwy 93 NW of Mackay, 44.1535° N, 113.96134° W, heavy bottom land, wetland vegetation with sedge, 6300 ft, 26 Jun 2019, *Frey 16* (IDS); "lone 40," Upper Little Lost River Valley, 44°16'30.0"N, 113°23'23.9"W, meadow, 10 Aug 2016, *Guenther s.n.* (IFBLM); Challis Natl Forest, S edge of Copper Basin along South Loop Road, ca. 2 mi W of airstrip and Guard Station, 43.806852° N, 113.87948° W, 8000 ft, with *Castilleja pallescens*, *Erigeron pumilus*, *Poa cusickii*, *Festuca ovina*, occasional, 24 Jun 1979, *Henderson 5154* (ID); Upper Little Lost River Valley, upper Summit Creek area at BLM campground, stream ca 500 meters SW of bridge, 44.394009° N, 114.97868° W, moist alkaline meadow along S side, 6440 ft, with *Muhlenbergia richardsonis*, *Juncus ensifolium*, *Juncus balticus*, *Sisyrinchium idahoense*, 26 Jul 1982, *Henderson 6345* (ID); Upper Summit Creek drainage, Little Lost River Valley, BLM land at Iron Spring, ca. 2 mi SE of Summit Reservoir and ca. 2 mi NW of Barney Hot Springs, 44.289284° N, 113.47806° W, hummocky, alkaline meadow adjacent to spring, 6480 ft, with *Agrostis stolonifera*, *Puccinellia pauciflora*, *Sisyrinchium idahoense*, *Erigeron gracilis*, *Juncus balticus*, *Poa pratensis*, *Triglochin maritimum*, *T. palustre*, common, 17 Jul 1986, *Henderson 7157* (ID); Challis Natl Forest, 18 mi SW of Mackay, moist, sandy edge of mountain meadow, 22 Jul 1965, *Hermann 20105* (US); 2 mi E of Dickey, moist alkaline soil, 21 Jun 1947, *Hitchcock 15631* (ID, IDS, WCW, WS, WTU); Little Lost River Valley, 15.9 air mi SSW of Gilmore, 44.25827° N, 113.42912° W, xeric wetland vegetation, 6358 ft, 26-75 individuals, 3 Jul 2010, *Irwin 1974* (ID); Summit Creek Riparian Site, 44.2695542 N, 113.4667982 W, 6419 ft, 8 Jun 1989, *Kinney s.n.* (BOIS); BLM Salmon Dist, Forest/Exptl area, Summit Creek, 44.2695542 N, 113.4667982 W, 6419 ft, 8 Jun 1989, *Kinney s.n.* (BOIS); Goldberg Creek, ca. 2 mi SE of its confluence with the Pahsimeroi River, 44.413362° N, 113.71936° W, 5840 ft, common, 20 Jul 1995, *Mancuso 1415* (ID); Thousand Springs Valley, ca. 0.5 mi S of Whiskey Springs, ca. 16 mi NW of Mackay, 44.0798° N, 113.8406° W, calcareous, whitish-colored, silty-clay alluvial, soil, hummocky microtopography, 6270 ft, with *Phlox kelseyi*, *Plantago eriopoda*, and *Poa* sp., common, 10 Jul 1997, *Mancuso 1615* (ID); BLM land in Thousand Springs Valley, ca. 17 mi NW of Mackey, meadows around Whiskey Springs, adjacent to Hwy 93, 44.090042° N, 113.85039° W, moist loamy alluvium, hummocky, 6300 ft, *Juncus balticus-Phlox kelseyi* community with *Ranunculus cymbalaria*, *Erigeron lonchophyllus*, *Hordeum branchyantherum*, common, 18 Jul 1991, *Moseley 2228* (ID); Copper Basin, ca. 10 mi E From Star Hope Campground, 43.79633° N, 113.86281° W, sagebrush steppe, 7941 ft, 17 Jul 2022, *Pollock 433* (SRP); Salmon River, 8 mi S of Stanley Basin, 31 Jul 1895, *Henderson 3515* (US); Stanley Creek Study Site, 44.2537691 N, 114.9660505 W, dry meadow, 6400 ft, 28 Jun 1990, *Saab VS90-11* (BOIS); head of Little Lost River Valley, upstream from Summit Creek Campground/Picnic area, Site A, 44° 16.517' N, 113° 27.447' W, alkaline soil near stream, 6450 ft, with *Phlox kelseyi*, *Equisetum laevigatum*, *Agrostis stolonifera*, *Astragalus diversifolia*, and *Poa pratensis*, 17 Jun 2016, *West 160* (IDS, SRP). Lemhi Co.: Pahsimeroi Valley, 1 mi N of May, 44.654276° N, 113.91199° W, hummocky lands, black alkali, 2 Jun 1951, *Christ 51-261* (ID, WTU); "Lemhi forest," meadow, 7800 ft, 28 Jul 1927, *Johnson s.n.* (ID); Pahsimeroi Valley, Patterson Creek bottoms, ca. 1.5 mi SW of May, 44.529189° N, 113.69605° W, graminoid-dominated wet meadow complex, alkaline, hummocked, 4950 ft, with *Carex nebrascensis*, *Carex simulata*, *Agrostis stolonifera*, *Juncus balticus*, *Poa pratensis*, *Trifolium repens*, *Rosa woodsii*, uncommon, 14 Jul 2008, *Mancuso 3345* (ID); Birch Creek Valley, at head of Birch Creek, ca. 6 mi N of Lone Pine, 44.5875486° N, 113.9213233° W, extensive wetland communities dominated by *Juncus balticus* and *Carex simulata*, 6550 ft, with *Potentilla fruticosa*, *Salix planifolia*, *Salix candida*, common on drier sites, 5 Aug 1992, *Moseley 2563* (ID, SRP). Lincoln Co.: 4 mi W of Kimama, 42.83806° N, 113.79472° W, playa with *Artemisia cana*, 4 Jun 1951, *Christ 51-330A* (ID, WTU).

Most plants in the area of Wisdom in Beaverhead Co., have unbranched stems (*Hitchcock 9177-ID*, IDS, MONT, WTU, US —14 plants; *Pierce 761-MONTU* — 2 plants); the plant of one collection has several stems with 2-3 heads on long peduncles (*Hitchcock 12589-WTU*). This is close to the Idaho border and perhaps reflects influence of *Pyrrocoma sericea* at the edge of its distribution.

The closest approach of *Pyrrocoma sericea* to *P. uniflora* appears to be at the juncture of Beaverhead and Clark counties, in the area of the Hwy 28 crossing, where they are essentially contiguous (Map 7).



Map 7. Distribution of *Pyrocoma sericea*, all within Idaho. Custer County is outlined in red. The closest approach of *Pyrocoma uniflora* (gold) is shown, where the Lemhi Valley meets the Snake River Valley.

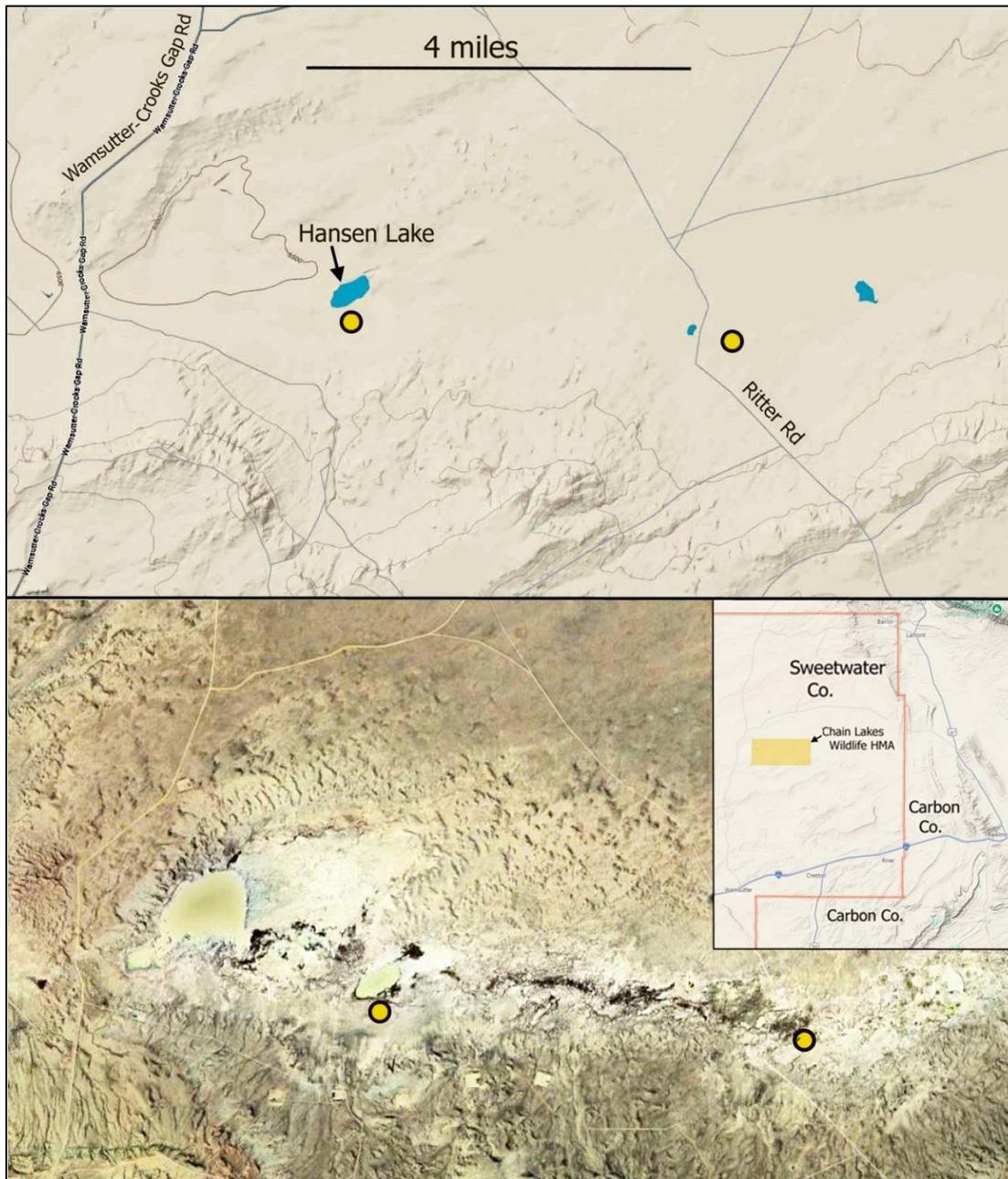
3. PYRROCOMA CATENARIA Nesom, **sp. nov.** **TYPE: Wyoming.** Sweetwater Co.: [Chain Lakes Wildlife Habitat Management Area], S shore of Hansen Lake, 41.9658° N, 107.9241° W, mesic alkaline meadow, 6500 ft, 25 Jun 1978, *W.H. Romme 78-7* (holotype: RM). Figures 27, 29-30.

Similar to *Pyrocoma uniflora* in its solitary heads on mostly bracteate stems and its involucre morphology; distinct in its long, linear, glabrous basal leaves. The epithet ("of a chain") alludes to the Chain Lakes area.

Stems erect to ascending-erect, 11–20 cm, glabrous, often purple. **Leaves:** basal linear, 6–10 cm long, sparsely cottony at the bases, fibrous remnants of petiole bases persistent, blades 1–2.5 mm wide, glabrous, thickened, only the midrib visible, margins entire, cauline linear-lanceolate, proximal and medial subclasping, few and bracteate nearing the inflorescence. **Heads** 1, without immediately

subtending bracts. **Involucres** 11–15 mm wide (pressed); phyllaries narrowly oblong-lanceolate with a sharply triangular apex, in 2–3 series of equal to subequal length, inner 6–7 mm long, outer completely herbaceous, inner green in the distal 1/4, eglandular, glabrous to sparsely villous-pubescent, margins glabrous. **Ray florets** 25–32, corollas 8–10 mm long, 1.5–2 mm wide, coiling. **Disc corollas** 5 mm long. **Achenes** sericeous-strigose.

Additional collection. Sweetwater Co.: Chain Lakes area, ca. 33 air mi NW of Rawlins along BLM Rd 3202 (Ritter Road), 41.965 N, 107.844 W, wet meadow areas with high vegetation cover in playa, 6525 ft, with *Juncus balticus*, *Carex praegracilis*, *Pedicularis crenulata*, *Dodecatheon pulchellum*, *Thelypodium sagittatum*, 20 Jun 2007, *Heidel* 2923 (RM).



Map 8. Distribution of *Pyrocoma catenaria*. Northeastern Sweetwater Co., Wyoming. Chain Lakes Wildlife Habitat Management Area. Upper: Google Maps. Lower: Google Earth.

Both collection sites are in the 62,386-acre Chain Lakes Wildlife Habitat Management Area. CLWHMA "provides winter habitat for antelope, and protects movement routes for pronghorn traveling between summer and winter ranges. The Wyoming Game and Fish Department cooperatively manages this "checkerboard" WHMA with the U.S. Bureau of Land Management. This part of the Red Desert averages six inches of precipitation annually, and its topography is a flat-to-gently rolling steppe. The elevation ranges from 6,500 feet at the lakes to 6,750 feet on Chain Lakes rim -- the dominant topographical feature of this area. Sagebrush grassland communities dominate most of the area, while greasewood grows along the basins around the 'Chain of Lakes.' The area is treeless and the lakes are natural drainage depressions without outlets. Some artesian flows drain into the surrounding wetlands" (WG&FD 2025).

It seems likely that the morphology of *Pyrrocoma catenaria* evolved in an isolated population of *P. uniflora* (although *P. lanceolata* also occurs in the region). Narrow leaves occur in other places in the range of *P. uniflora* but appear to be populational variants. The only other collections of *P. uniflora* from Sweetwater County are from the Oregon Buttes area south of the Wind River Range. Otherwise the closest known occurrences to Chain Lakes are in the Medicine Bow area of southern Carbon County, about 70 miles distant. *Pyrrocoma lanceolata* is more common in Sweetwater County and also occur in the Chain Lakes region (e.g., *Newton 3335-RM*, *Welp 6702-RM*). The similarity of these plants to *P. howellii* in narrowly linear leaves probably is convergent or parallel.

4. PYRROCOMA HOWELLII (A. Gray) Greene, *Erythea* 2: 70. 1894. *Haplopappus howellii* A. Gray, *Synopt. Fl. N. Amer.* ed. 2, 1(2): 446. 1886. *Haplopappus uniflorus* subsp. *howellii* (A. Gray) H.M. Hall, *Publ. Carnegie Inst. Wash.* 389: 150. 1928. *Haplopappus uniflorus* var. *howellii* (A. Gray) Peck, *Man. Higher Pl. Oregon*, 713. 1941. *Haplopappus inuloides* var. *howellii* (A. Gray) Boivin, *Phytologia* 23: 23. 1972. **LECTOTYPE** (Hall 1928): **Oregon**. Harney Co.: Stein's [Steens] Mountain, dry ridges, 6 Jun 1885, *T.J. Howell s.n.* (GH; isolectotypes: K, NY-3 sheets, OSC, PH-2 sheets).

Haplopappus uniflorus subsp. *linearis* Keck, *Aliso* 4: 103. 1958. *Haplopappus inuloides* var. *linearis* (Keck) Boivin, *Phytologia* 23: 23. 1972. *Pyrrocoma linearis* (Keck) Kartesz & Gandhi, *Phytologia* 71: 60. 1991. **TYPE: Idaho**. Owyhee Co.: Mud Flats, 44 mi SW of Grandview, mountain meadows, 17 Jun 1943, *J.H. Christ 14081* (holotype: NY).

Keck saw the type of *Haplopappus howellii* as conspecific with typical [*Pyrrocoma*] *uniflora* and thus described his subsp. *linearis*, noting that it occurs from Owyhee County to Harney County. Cronquist (1994), however, observed that typical *P. uniflora* is not known from the Steens Mountain area (the type locality of *H. howellii*) and reckoned that Gray's name was appropriately applied. The geography of typical *P. uniflora* now is more clearly defined, and other collections of the linear-leaved plants are known from the Steens Mountain area (e.g., *Mansfield 92-152-OSC*, *Wright 1189-OSC*) as well as from further northwest in Harney County (*Peck 13904-OSC*).

Pyrrocoma howellii is distinct from *P. uniflora* in its linear to linear-lanceolate leaves with entire margins, quickly glabrescent to glabrous-glabrate vestiture, and apparently its non-alkaline habitats at higher altitudes.

Flowering May–June (–July). Meadows, rocky slopes, draws, and drainages, swales, intermittent stream banks, dry washes, often with sagebrush or rabbitbrush; (4800–) 5150–7000 (–8100) feet. Map 1.

Collections of *Pyrrocoma howellii* in Nevada. Elko Co.: Sunflower Flat, near the Gold Creek Administrative Site, 41.750368° N, 115.682585° W, rocky swales and gentle hillsides above Martin Creek [W Natl Forest Rd 037], ca 7000 ft, 26 Jun 1981, *Grimes 2148* (KU); Jarbridge Mtns, 0.9 road mi W of the main road to Pole Creek Ranger Station on the road to Canyon Creek Pockets, meadow area at the edge of an aspen grove, 8100 ft, 27 Jun 1986, *Tiehm 10676* (BRY, COLO, ID, IDS, NCSC, NY, TAES, UNLV, VDB); Jarbridge Mtns, Pete Basin on the S end of the range, NW of the Marys River Ranch, with *Artemisia* along a moist draw, 6550 ft, 5 Jun 1988, *Tiehm 11734* (BRY, COLO, ID, MO, NY, RENO, UNLV); Duck Valley Indian Reservation, 5.0 road mi W of Bob Johnson Road to Hat Peak from the Sheep Creek Reservoir

Road, with *Artemisia arbuscula* along rocky drainages, 5440 ft, locally common, 9 Jun 1999, *Tiehm 12855* (ID, NY, RENO, UNLV); Independence Mountains, 3.4 road mi S of Hwy 226 in Taylor Canyon on road down Maggie Creek, 41° 12.861' N, 116° 4.23' W, with *Artemisia arbuscula* along a dry wash, 6300 ft, 20 May 2012, *Tiehm 16413* (CIC, ID, WS). Humboldt Co.: Owyhee Desert, 1.0 road mi W on McDermitt road from jct with Three Corners road, 41°57'31.3" N 117°21'28.5" W, along a small rocky drainage with *Juncus*, 6100 ft, 10 Jun 2008, *Tiehm 15626* (NY, RENO); Santa Rosa Range, 2.1 road mi WNW of main Secret Spring Summit-Greeley Flat road on road on N side of Zymns Butte, along a moist gravelly draw with *Artemisia tridentata* var. *wyomingensis*, 5900 ft, 8 Jun 2019, *Tiehm 18411* (ASC, RENO, RSA, UCR, UNLV); Santa Rosa Range, road on S side of the North Fork of the Little Humboldt River, 1.7 road mi W of road junction near Forks Ranch, small moist draw, surrounded by *Artemisia tridentata*, 5570 ft, 9 Jun 2019, *Tiehm 18414* (RENO, RSA, UCR, UNLV, UTC).

The only collection from Lake Co., Oregon: Hart Mountain Natl Antelope Refuge, Plush, 1 mi W of Desert Lake, 28 Jun 1955, *V. Hall 56* (OSC).

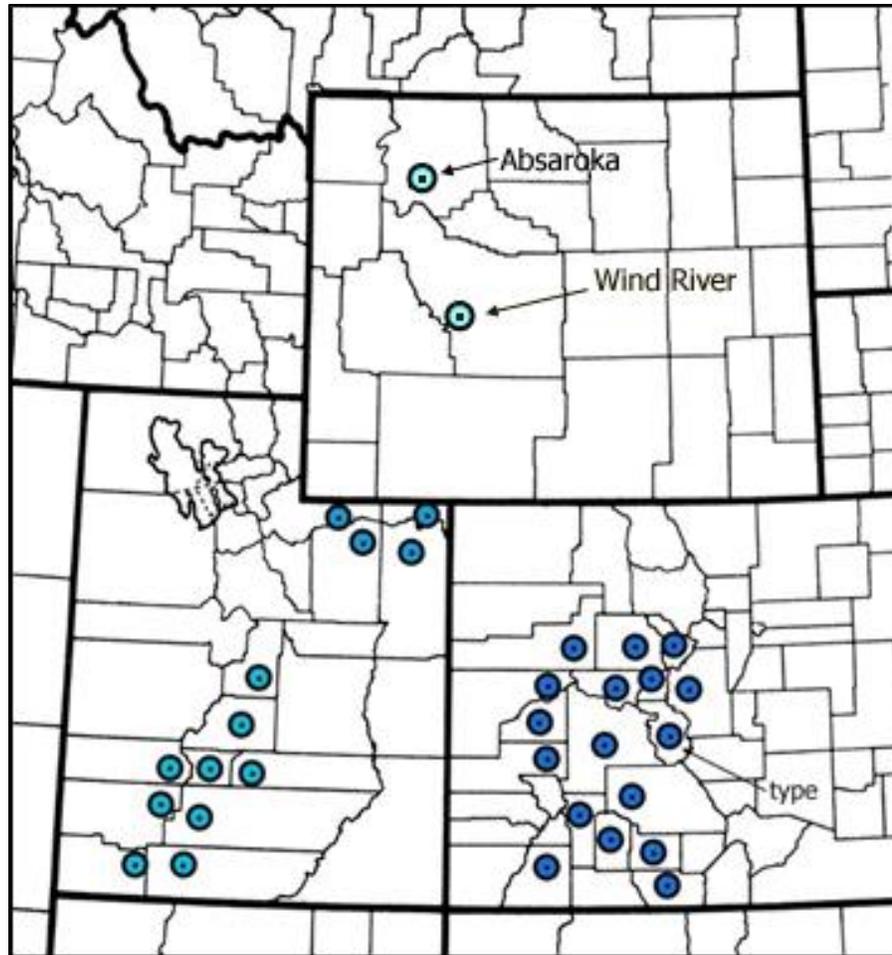
5. *PYRROCOMA CLEMENTIS* IN THE WIND RIVER RANGE AND ABSAROKA MOUNTAINS

Heidel (2011, p. 8) noted that typical *Pyrrocoma clementis* Greene from Colorado and Utah "appears to be consistent with all material examined from the Wind River Range," and in a survey of sensitive plants of the Dickinson Park area (WR Range), she (Heidel 2013) observed that plants there were "an outlying or peripheral population segment" of *P. clementis*. Ladyman (2006) cited and mapped the Wind River plants as var. *villosa*. These plants (e.g., Figs. 31-37) should have been included in my earlier assessments of *P. clementis* (Nesom 2025a, 2025c) because, as observed by Heidel, the similarity to *P. clementis* seem clear. The Absaroka Mountains plants (e.g., Figs. 38-42) are similar and also are morphologically and geographically isolated from other species in Wyoming, and the alpine habits further set them apart. Compared to the Wind River plants, the proximal leaves have more clearly defined petioles, distinctly serrate margins, and more pubescent surfaces — the identification here is tentative and it is plausible that the Absaroka plants may prove to be more closely related to *P. uniflora*.

The plants of both areas (Wind River and Absaroka) are distinct in their oblanceolate to elliptic-oblanceolate, thickened leaves, solitary heads with 28–42 rays, and loose, completely herbaceous phyllaries in 2–3 series of mostly subequal length and with white-fimbriate to tomentose margins. Involucres of Colorado-Utah plants are larger (20–34 mm wide), indicating the need for a detailed assessment of the species, as interpreted here in its distribution of disjunct systems.

Description based on Wyoming plants: **Stems** erect to ascending-erect, (4–)8–20 cm, sparsely villous to tomentose, eglandular, often purplish. **Leaves:** basal oblanceolate to oblanceolate-elliptic, 3.5–8 cm long, attenuate to a weak petiolar region, fibrous remnants of petiole bases weakly persistent, blades thickened, 4–12 mm wide, margins entire or shallowly serrate, glabrous or sometimes sparsely villous abaxially or on both surfaces, eglandular, cauline 4–7, mostly oblong to oblong-lanceolate, proximal and medial wider at the base and subclasping, diminishing in size distally and becoming bracteate. **Heads** 1, ebracteate. **Involucres** 15–20 mm wide (pressed); phyllaries narrowly oblong, in 2–3 series of equal to subequal length, less commonly unequal, loose (not closely appressed), inner 7–11 mm long, inner and outer completely herbaceous or sometimes the inner slightly scarious-indurate on the margins or proximally, margins sparsely but distinctly white-fringed, faces sparsely villous, eglandular. **Ray florets** (22–)24–42, fertile, corollas 10–13 mm long, 2–3 mm wide, coiling. **Disc corollas** 4–5.5 mm long. **Achenes** ca. 5 mm long, sparsely sericeous-strigose.

Flowering mid June–August. Wind River: Rocky or gravelly dry meadows with scattered sagebrush, sagebrush shrubland, forest openings, boggy seeps, river banks and gravel beds; (8000–) 8500–10,000 feet. Habitats at most localities are underlain by igneous rocks, but some appear to be over the Cenozoic-Permian-Triassic limestone and dolomite toward the northeastern edge of the range (Geologic Map of Wyoming, Love & Christiansen 1985). Absaroka: Alpine meadows, transition meadows toward alpine; ca. 9400–11,000 feet.



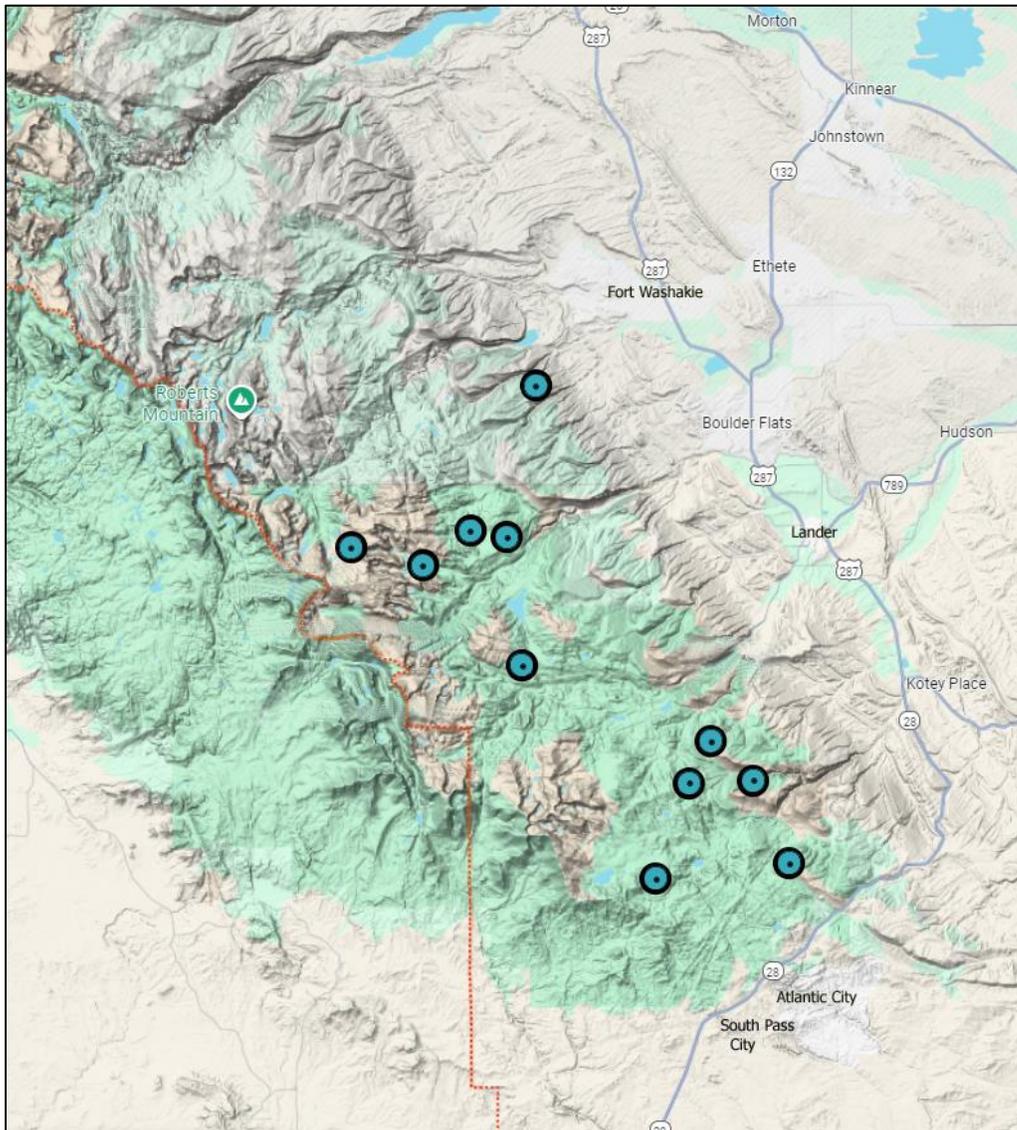
Map 9. Distribution of *Pyrocoma clementis*. Unequivocal evidence that all these are of a single clade is not at hand, but they are morphologically consistent.

Collections examined. **WYOMING. Wind River Range. Fremont Co.:** W of Lander, Popo Agie Primitive Area, between the North Popo Agie River and Dickenson Meadows, [ca. 42.82° N, 109.20° W], 9000-9500 ft, *Pinus contorta* forest, 12 Aug 1975, *Albee 2820* (UT-2 sheets); ca. 10 mi S of Lander, Brown[s] Canyon area, Indian Ridge, [ca. 42.69° N, 108.84° W], N slopes, 3-tip sagebrush grassland, 8900 ft, 24 Jul 1961, *Fisser 638* (RM-USFS); ca. 25 mi W of Lander, on the Moccasin Lake road, mountain meadow with scattered big sagebrush, 9900 ft, 29 Jul 1961, *Fisser 702* (RM-USFS); ca. 17 mi W of Lander, between Dickinson Creek and Dickinson Park, W of campground, 42.8313840° N, 109.0678370° W, upland steppe and forest openings, rocky or gravelly dry meadows, 9320 ft, with *Artemisia tridentata* subsp. *vaseyana*, common, 28 Jul 2012, *Heidel 3724* (RM); ca. 19 air mi W of Lander, Black Mtn to Smith Lake, 42.8107° N, 109.1169° W to 42.8241° N, 109.1189° W, boggy seep, 9800-11,490 ft, 12 Jul 2005, *Massatti 2113* (RM); ca. 12 air mi S of Lander, Weed Draw to Canyon Creek, 42.6606° N, 108.7904° W to 42.6614° N, 108.7968° W to 42.671° N, 108.7917° W, river banks and gravel beds in river, 7660-8750 ft, 25 Jul 2005, *Massatti 3073* (RM); ca. 15 air mi W of Lander, less than 1 mi SE and SW of Black Mtn, 42.8316° N, 109.0284° W to 42.8297° N, 109.0537° W, moss hummock. 9190-9350 ft, 10 Aug 2005, *Massatti 3923* (RM); ca. 10 air mi SSW of Lander, Burnt Gulch to Freak Mtns, 42.6717° N, 108.8666° W to 42.6476° N, 108.8371° W, to 42.648 N, 108.8139° W to 42.6569° N, 108.8253° W, sagebrush shrubland, 8550-9390 ft, 22 Jun 2006, *Massatti 5911* (RM-USFS); Shoshone Lake, Shoshone Basin, and Cyclone Basin, 42.7424° N, 109.028° W to 42.7978° N, 109.0125° W to 42.7424° N, 109.0009° W, dry rocky meadow with gravelly soil, 9360-9750 ft, 25 Jun 2006, *Massatti 6107* (RM-USFS); ca. 17 air mi S of Lander, Limestone Mtn summit, 42.5927° N, 108.75° W to 42.5826° N, 108.728° W, dry rocky limestone meadow, 8280-8950 ft,

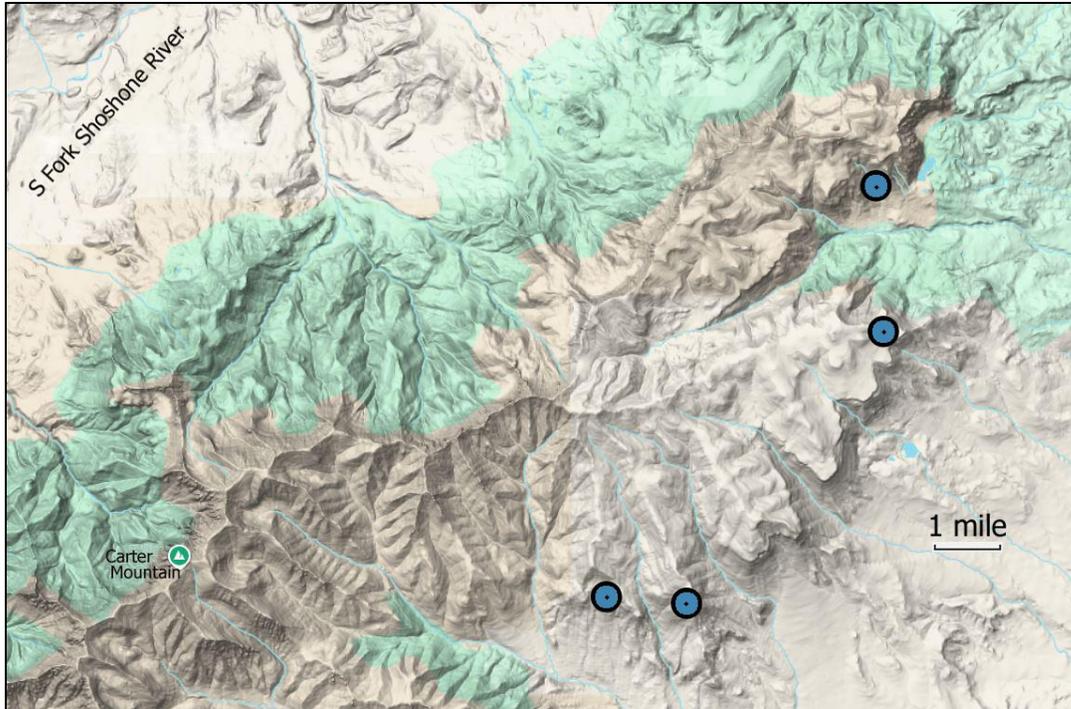
11 Jul 2006, *Massatti 7313* (RM); ca. 19 air mi SSW of Lander, Louis Lake Guard Station to Deer Creek Park, 42.5927° N, 108.8747° W to 42.5882° N, 108.8923° W, dry rocky meadow. 9320-9510 ft, 13 Jul 2006, *Massatti 7357* (RM-USFS); ca 15 air mi W of Lander, less than 1 mi SE and SW of Black Mtn, 42.83065° N, 109.04105° W, 9190-9350 ft, 10 Aug 2005, *Nelson 3923* (NY).

iNaturalist observation. **Wind River Range. Fremont Co.:** Wind River Range, Shoshone Natl Forest, [along Limestone Mtn Road], 42.58091 N, 108.73244 W, *Ryan Donnelly*, 3 Aug 2020.

Absaroka Mountains. Park Co.: W of Meeteetse, Carter Mtn, along Carter Mtn Road, near the head of Rose Creek, 44.1896° N, 109.2648° W, 10,300 ft, 14 Aug 1982, *Evert 4769* (RM) and *Evert 4772* (RM); NE end of Carter Mtn, ca. 1 mi W of Foster Reservoir, Foster Draw, 44.2769° N, 109.20611° W, irrigation ditch along base, open grassy slopes, spruce forest, and transition meadows towards alpine, 9400-9600 feet, 20 Aug 1983, *Hartman 16997* (RM); ca. 19 mi SSW of Cody, ca. 1 mi S of Meeteetse Creek, ca. 2 mi S of Foster Reservoir, 44.2475° N, 109.2042° W, steep-sloped alpine meadows, 9400-10,800 ft, 20 Aug 1983, *Kirkpatrick 2483* (RM, TEX); ca. 21 air mi W of Meeteetse, along ridge between the North Fork Pickett Creek and Little Rose Creek, up to Peak 11448, 44.1896° N, 109.2849° W, alpine meadows, 10,000-11,400 ft, 29 Jul 1984, *Kirkpatrick 5209* (RM).



Map 10. Distribution of *Pyrocoma clementis* in the Wind River Range, Fremont Co., Wyoming.



Map 11. Distribution of *Pyrocoma clementis* in the Absaroka Mountains, Park Co., Wyoming.

ACKNOWLEDGEMENTS

Many thanks to Ernie Nelson and Ben Legler at RM for observations on specimens.

LITERATURE CITED

- Cronquist, A. 1994. Intermountain Flora. Vascular Plants of the Intermountain West, U.S.A. Volume 5. Asterales. The New York Botanical Garden Press, Bronx.
- Heidel, B. 2011. Status of *Pyrocoma clementis* var. *villosa* (hairy tranquil goldenweed), Bighorn Mountains, north-central Wyoming. Unpublished report prepared for the Bighorn National Forest, USDA Forest Service. Wyoming Natural Diversity Database, Laramie.
- Heidel, B. 2013. Sensitive plant survey in the Dickinson Park area, Shoshone National Forest. Prepared for Shoshone National Forest. Wyoming Natural Diversity Database. Laramie
- Ladyman, J.A.R. 2006. *Pyrocoma clementis* var. *villosa* (Rydb.) Mayes ex G.K. Brown & D.J. Keil (tranquil goldenweed): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project.
- Love, J.D. and A.C. Christiansen. 1985. Geologic Map of Wyoming (1:500,000). U.S. Geological Survey. <https://ngmdb.usgs.gov/Prodesc/prodesc_16366.htm>
- Mayes, R.A. 1976. A cytotaxonomic and chemosystematic study of the genus *Pyrocoma* (Asteraceae: Astereae). Ph.D. dissertation, Univ. of Texas, Austin.
- Nesom, G.L. 2025a. *Pyrocoma* (Asteraceae: Astereae) in Colorado and New Mexico. Phytoneuron 2024-11: 1–59.
- Nesom, G.L. 2025b. Three new species of *Pyrocoma* (Asteraceae: Astereae) from Idaho. Phytoneuron 2025-19: 1–46.
- Nesom, G.L. 2025c. *Pyrocoma villosa* (Asteraceae: Astereae), Big Horn Mountains endemic. Phytoneuron 2024-45: 1–11.
- Townsend, J.K. 1839. Narrative of a Journey Across the Rocky Mountains to the Columbia River ... With a Scientific Appendix. Henry Perkins, Philadelphia. <use the article title for digital access>
- WG&FD. 2025. Chain Lakes Wildlife Habitat Management Area. Wyoming Game & Fish Department, Cheyenne. <<https://wgfd.wyo.gov/Public-Access/WHMA/WHMA/chain-lakes>>



Figure 1. *Donia uniflora* Hook. Thomas Drummond in Saskatchewan (K). Holotype.



Figure 2. *Donia uniflora* Hook. Thomas Drummond in Saskatchewan (NY). Isotype.



Figure 3. *Pyrocoma uniflora*. Glacier Co., Montana, at the Canadian border. Vanderhorst s.n. (MONT).

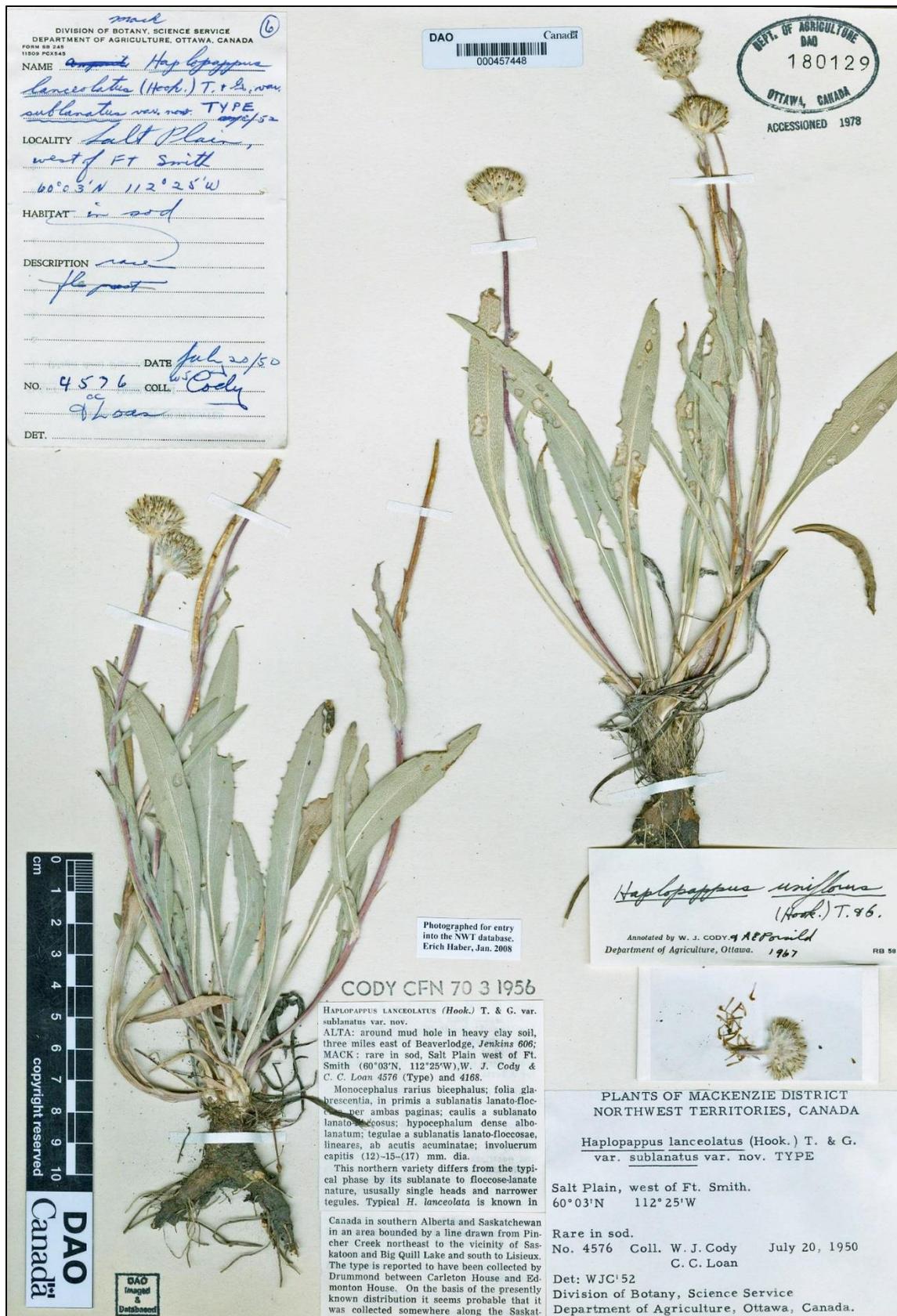


Figure 4. *Haplopappus lanceolatus* var. *sublanatus*. Cody & Loan 4576 (DAO). Holotype.



Figure 5. *Homopappus inuloides* Nutt. Thomas Nuttall in [Fremont Co.] Wyoming (PH). Holotype.



Figure 6. *Homopappus inuloides*. Thomas Nuttall in [Fremont Co.] Wyoming (K). Isotype.



Figure 7. *Homopappus inuloides*. Thomas Nuttall in [Fremont Co.] Wyoming (GH). Isotype.



Figure 8. *Pyrocoma uniflora*. Powell Co., Montana, Lackschewitz 10850 (SRP).



Figure 9. *Pyrocoma uniflora*. Jefferson Co., Montana. Hjalmarsson 4007 (MONT).



Figure 10. *Pyrocoma uniflora*. Carbon Co., Montana. Nelson 75330 (RM-USFS).



Figure 11. *Pyrocoma uniflora*. Beaverhead Co., Montana. Legler 13101 (WTU).

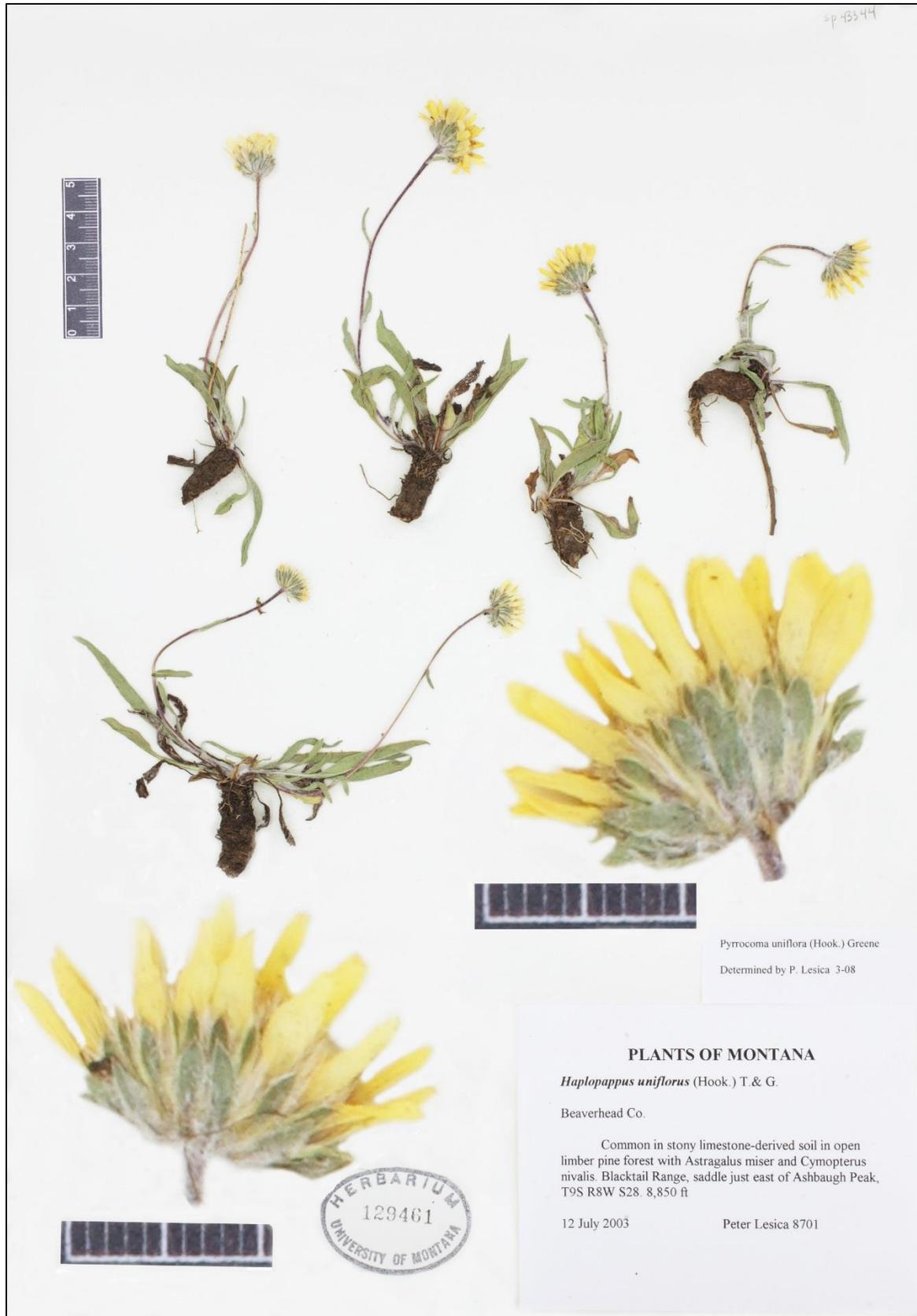


Figure 12. *Pyrocoma uniflora*. Beaverhead Co., Montana. Lesica 8701 (MONTU).



Figure 13. *Pyrocoma uniflora*. Sublette Co., Wyoming. Heidel 2231 (RM).



Figure 14. *Pyrocoma uniflora*. Sublette Co., Wyoming. Cramer 79 (RM).

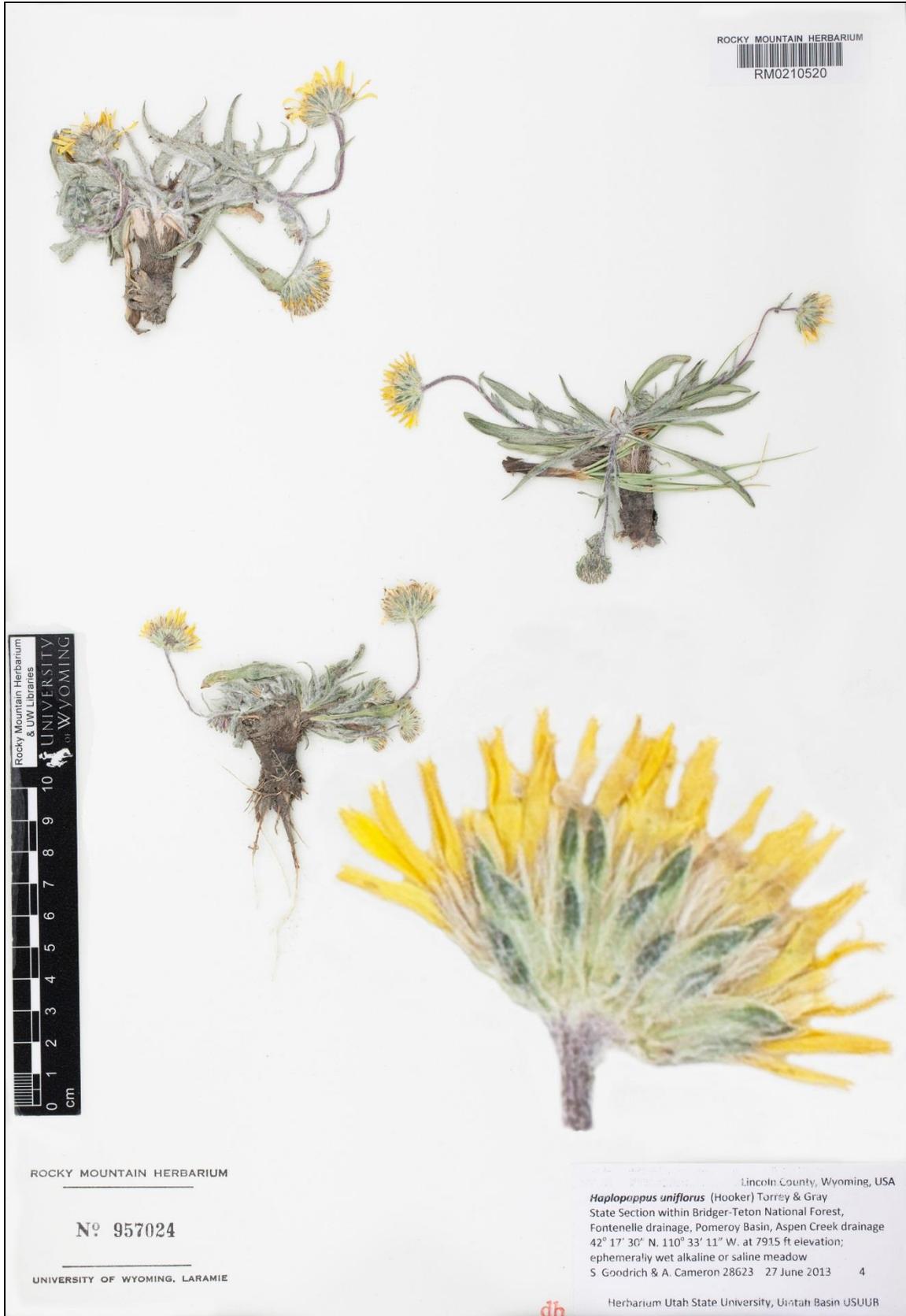


Figure 15. *Pyrocoma uniflora*. Lincoln Co., Wyoming. Goodrich 28623 (RM).



Figure 16. *Pyrocoma* aff. *uniflora*. Wind River Range, Sublette Co., Wyoming. *Fertig 11900* (WS).



Figure 17. *Pyrocoma sericea*. Butte Co., Idaho. Palmer 197 (US). Holotype. Arrow points to node.



Figure 18. *Pyrocoma sericea*. Custer Co., Idaho. Frey 16 (IDS). Arrows point to nodes.



Figure 19. *Pyrocoma sericea*. Blaine Co., Idaho. Macbride & Payson 3179 (US).

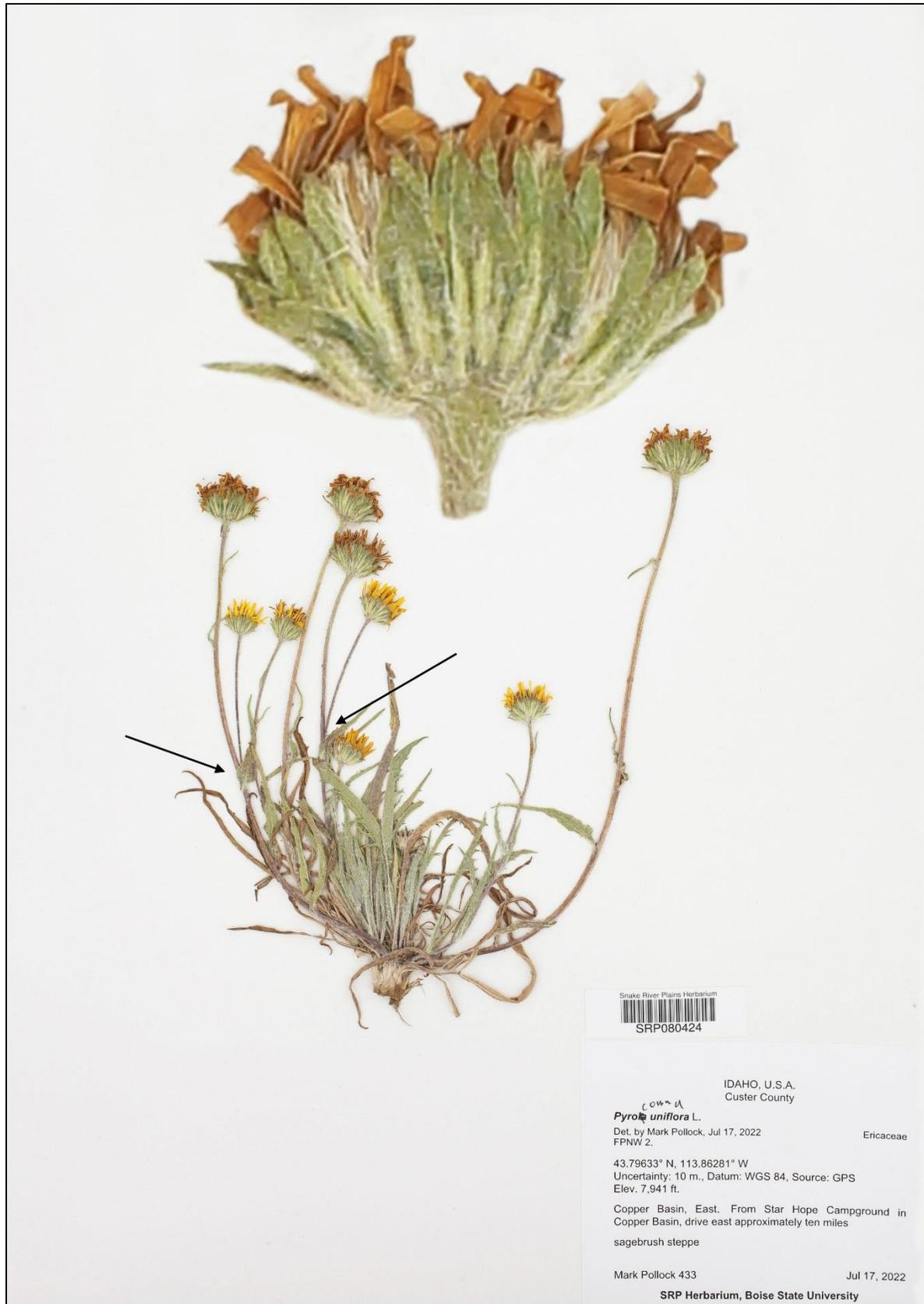


Figure 20. *Pyrocoma sericea*. Custer Co., Idaho. Pollock 433 (SRP).



Figure 21. *Pyrocoma sericea*. Custer Co., Idaho. Ertter 22584 (SRP).



Figure 22. *Pyrocoma sericea*. Custer Co., Idaho. Ertter 22584 (IDS).



Figure 23. *Pyrocoma sericea*. Camas Co., Idaho. Popovich 7776N (CIC).



Figure 24. *Pyrocoma sericea*. Butte Co., Idaho. Kinney JK91-145 (SRP).



Figure 25. *Pyrocoma sericea*. Camas Co., Idaho. *Smith 15133* (CIC). Stems unbranched.



Figure 26. *Pyrocoma sericea*. Lincoln Co., Idaho. *Christ 51-330A* (ID). Stems unbranched.



Figure 27. *Pyrocoma catenaria*. Romme 78-7 (RM). Holotype.



Figure 28. *Pyrocoma catenaria*. Heidel 2923 (RM). Isotype.



Figure 29. *Pyrocoma catenaria* leaves, from the holotype.



Figure 30. *Pyrocoma catenaria* heads, from the holotype.



Figure 31. *Pyrocoma clementis*, Wind River Range. Albee 2820 (UT).



Figure 32. *Pyrocoma clementis*, Wind River Range. Massatti 3073 (RM-USFS).



Figure 33. *Pyrocoma clementis*, Wind River Range. Massatti 3406 (RM-USFS).



Figure 34. *Pyrocoma clementis*, Wind River Range. Massatti 3923 (RM-USFS).



Figure 35. *Pyrocoma clementis*, Wind River Range. Massatti 7357 (RM-USFS).



Figure 36. *Pyrocoma clementis*, Wind River Range. *Massatti 7313* (RM-USFS).



Figure 37. *Pyrocoma clementis*, Wind River Range. Heidel 3724 (RM).



Figure 38. *Pyrocoma clementis*, Absaroka Mountains. Kirkpatrick 2483 (RM).



Figure 39. *Pyrocoma clementis*, Absaroka Mountains. Kirkpatrick 5209 (RM).

Figure 40. *Pyrocoma clementis*, Absaroka Mountains. Evert 4769 (RM).



Figure 41. *Pyrocoma clementis*, Absaroka Mountains. Evert 4772 (RM).

Figure 42. *Pyrocoma clementis*, Absaroka Mountains. Hartman 16997 (RM).