

# LECTOTYPIFICATIONS AND NEW TAXA IN *POTENTILLA* SECT. *SUBVISCOSAE* (ROSACEAE) IN ARIZONA

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## ABSTRACT

*Potentilla* sect. *Subviscosae* (Rydb.) B.C. Johnston exemplifies evolutionary radiation in the montane Madrean Archipelago of Mexico and the American Southwest, with multiple localized taxa endemic to different mountains ranges. Lectotypification of *Potentilla ramulosa* Rydb. maintains usage as the variety of *P. subviscosa* Greene in the Santa Catalina and Rincon mountains, Arizona. *Potentilla wheeleri* var. *viscidula* Rydb. is lectotypified on the hybrid between *P. ramulosa* and a trifoliolate species in the Huachuca and Santa Rita mountains of Arizona, with the latter species newly described as ***P. rhyolitica*** Ertter. Closely related plants from the Chiricahua Mountains are recognized as ***P. rhyolitica*** var. ***chiricahuensis*** Ertter. An extremely localized *Potentilla* from the Hualapai Mountains, Arizona, is described as ***P. demotica*** Ertter. The range of *P. albiflora* (which has yellow flowers, not white) is extended to the the nearby Mogollon Rim. *Potentilla cottamii* is moved to *P. sect. Subviscosae* from *P. sect. Aureae*. *Potentilla wheeleri* is restricted to southern California, excluding *P. luteosericea* (= *P. pinetorum*) as a separate species in Baja California, Mexico. A key to the non-Mexican species is provided and vernacular names are suggested.

KEY WORDS: *Potentilla* sect. *Subviscosae*, Madrean Archipelago, Huachuca Mountains, Hualapai Mountains, lectotypifications, new species, *Potentilla subviscosa*, *Potentilla ramulosa*, *Potentilla viscidula*, *Potentilla albiflora*, *Potentilla wheeleri*, *Potentilla cottamii*, *Potentilla luteosericea*

## RESUMEN

La sección *Subviscosae* (Rydb.) B.C. Johnston de *Potentilla* ejemplifica una radiación evolutiva en el Archipiélago montañoso Madrense de México y el suroeste de Estados Unidos, representado con múltiples taxa locales y endémicos en los diferentes sistemas montañosos. La lectotipificación de *Potentilla ramulosa* Rydb. mantiene su uso como variedad de *P. subviscosa* Greene de las montañas Santa Catalina y Rincon en Arizona. Se lectotipifica *Potentilla wheeleri* var. *viscidula* Rydb. como un híbrido entre *P. ramulosa* y una especie trifoliolada en las montañas Huachuca y Santa Rita de Arizona, la cual ha sido descrita recientemente como ***P. rhyolitica*** Ertter. Plantas cercanamente relacionadas de las Montañas Chiricahua son reconocidas como ***P. rhyolitica*** var. ***chiricahuensis*** Ertter. Una *Potentilla* de distribución limitada en las Montañas Hualapai, Arizona se describe como ***P. demotica*** Ertter. La distribución de *P. albiflora* (que tiene flores amarillas y no blancas) se extiende al cercano Mogollon Rim. *Potentilla cottamii* se transfiere de la sect. *Subviscosae* a la sect. *Aureae*. *Potentilla wheeleri* circunscribe su distribución al sur de California, excluyendo a *P. luteosericea* (= *P. pinetorum*) como una especie aparte en Baja California, México. Se provee con una clave para identificar las especies que no están en México y se sugieren sus nombres comunes.

## INTRODUCTION

In his 1898 monograph of *Potentilla* L. (Rosaceae), Rydberg divided the genus into multiple “groups,” many of which were adopted and established at formal taxonomic ranks by later workers (e.g., Johnston 1985). Among the more intriguing is *P. sect. Subviscosae* (Rydb.) B.C. Johnst., initially comprised of *Potentilla wheeleri* S. Watson, *P. wheeleri* var. *viscidula* Rydb., *P. subviscosa* Greene, and *P. ramulosa* Rydb. (Rydberg 1896, 1898). These taxa and their subsequently described relatives, all endemic to the southwestern United States and Mexico, share the following characters: 1) stems prostrate to decumbent, or even pendant on vertical rock faces, relatively short and lax; 2) vestiture of entire plant consisting of various proportions of short glandular trichomes, short eglandular hairs ca 0.2 mm long, and long straight eglandular hairs 1–3 mm long; 3) stipules narrowly triangular to linear, ± herbaceous; 4) leaves 3–7-digitate, the leaflets neither tomentose beneath nor notably bicolored, few-toothed; 5) pedicels relatively lax, often becoming recurved; 6) styles (0.7–)1.5–3 mm long, usually somewhat rough-thickened basally; 7) achenes relatively few (4–25) and large (± 1–2 mm long), smooth to lightly ribbed.

What makes *Potentilla* sect. *Subviscosae* intriguing is the extent to which it exemplifies evolutionary radiation in an island setting, with the “islands” in this case consisting of scattered mountain ranges isolated

by arid lowlands. The center of radiation for *P. sect. Subviscosae*, at least in the United States, is the isolated mountains extending north from Mexico's Sierra Madre Occidentale, dubbed the Southwestern Sky Island Ecosystem or the Madrean Archipelago (e.g., McLaughlin 1995). As a result, different unique and highly endemic members of the section occur on the Pinaleno, Santa Catalina/Rincon, Huachuca/Santa Rita, and Chiricahua ranges in southeastern Arizona, including taxa described in the present paper. This radiation presumably also characterizes the more extensive Mexican portion of the "archipelago," but collections and taxonomic analysis of *Potentilla* from this region are too preliminary for a proper evaluation. *Potentilla mexiae* Standl. is unquestionably a member of this section in Chihuahua and Durango, and there is evidence of additional undescribed variation deserving taxonomic recognition.

A full-scale revision of the entire section is strongly called for, with special attention paid to species in Mexico including those currently placed in *Potentilla* sections *Aureae* (Lehm.) Juz. and *Ranunculoides* (Th. Wolf) Juz. However, the current paper focuses on those lectotypifications and new descriptions needed for the pending treatment of *Potentilla* for *Flora of North America North of Mexico*, with some additional notes on several species of interest in the United States.

#### LECTOTYPIFICATIONS

In his initial review of *Potentilla* "group" *Subviscosae* in 1896, Rydberg described *Potentilla wheeleri* var. *viscidula* (p. 429) and *P. ramulosa* (p. 430 and plate 276). The former was based on four syntypes, with two from Arizona ("C.G. Pringle, 1881; J.G. Lemmon, no. 158. 1881") and two from California ("W.G. Wright, 1879; Coville & Funston, no. 1672. 1891"). Two syntypes were given for *P. ramulosa*, both from Arizona: "J.G. Lemmon, no. 399, 1881; H.H. Rusby, 1883." The corresponding herbarium specimens currently known to me are:

#### Syntypes of *Potentilla wheeleri* var. *viscidula*

- C.G. Pringle, s.n., Arizona [Santa Cruz Co. or Pima Co.], Santa Rita Mountains, alt. 8,000 ft, 3 May 1881 (distributed as *Potentilla subviscosa* Greene "near *P. wheeleri*, Watson.")
  - GH 26877, mounted on same sheet as Lemmon 158 syntype (GH 26878), both annotated by Rydberg ("P.A.R.") as "*P. wheeleri* var."
  - 3 sheets at NY, all annotated in Rydberg's hand as *P. viscidula*, plus an unannotated fourth duplicate (NY 39334) mounted with an isotype of *P. subviscosa* Greene (NY 39333)
  - 2 sheets at US, only one annotated by Rydberg
  - 1 sheet at MO, not annotated by Rydberg
- J.G. Lemmon 158, Arizona [Pima Co.], summit of Santa Catalina Mountains, Apr 1888
  - GH 26878, mounted on same sheet with Pringle syntype (GH 26877)
- W.G. Wright, s.n., California [San Bernardino Co.], Mt. San Bernardino, 12,000 ft alt., Jun 1879
  - GH 26880, in packet mounted on same sheet with holotype of *P. wheeleri* (Rothrock 324, California, southern Sierras, 8200 ft, Sept 1875) and 3 non-type collections of *P. wheeleri* s.s. (Parry & Lemmon 100; Parish & Parish 1498)
- E.V. Coville & F. Funston 1672, California [Tulare Co.], Whitney Meadows, Sierra Nevada, 21 Aug 1891
  - GH 26879, not annotated by Rydberg

#### Syntypes of *Potentilla ramulosa*

- J.G. Lemmon 399, Arizona [Cochise Co.], Rucker Valley [in southeastern Chiricahua Mountains], 1881
  - GH 244121, annotated as *P. ramulosa* by Rydberg, originally determined as *P. gracilis* var. *rigida*, on mounted half-sheet
- H.H. Rusby 591 (on 3 of 4 sheets). Arizona, Flagstaff, 1883
  - 3 sheets at NY with a date of Jun 7, one annotated by Rydberg
  - 1 sheet at NY with a date of September

An unnumbered Lemmon collection from the north slopes of the Santa Catalina Mountains, April and May 1881 (MO, UC), is not syntype material, even though Rydberg annotated the MO specimen as *P. wheeleri viscidula* n.v.

In the upcoming treatment of *Potentilla* for *Flora of North America*, both Lemmon 158 (syntype of *P. wheeleri* var. *viscidula*) and Lemmon 399 (syntype of *P. ramulosa*) fall within *P. subviscosa* var. *ramulosa* (Rydb.) Kearney & Peebles. The Pringle syntype is a mixed collection, with *P. subviscosa* var. *ramulosa* being the largest component. Among the multiple exsiccatae, at least one plant (i.e., on the sheet at MO) is the trifoliolate species described below as *P. rhyolitica* Ertter, and some others are probable hybrids between the two



species. The other syntype of *P. ramulosa*, *Rusby 5191*, consists of both early-season (June) and late-season (September) forms of *P. subviscosa* var. *subviscosa*, which exhibits a pronounced seasonal leaf dimorphism. Both of the remaining syntypes of *P. wheeleri* var. *viscidula*, *Coville & Funston 1672* and *Wright s.n.*, fall within *Potentilla wheeleri* s.s., which is restricted to California as currently circumscribed (and as discussed later). *Wright s.n.* represents the high-elevation extreme in the San Bernardino Mountains that Jepson (1925) named *P. wheeleri* var. *paupercula*.

From the preceding, it is clear that application of the names *Potentilla wheeleri* var. *viscidula* and *P. ramulosa* is highly dependent on which syntype is chosen as lectotype for each taxon. As it happens, first-stage lectotypification has already been done by Kearney and Peebles (1942), who cited *Pringle s.n.*, 1881, as the type of *P. viscidula* (Rydb.) Rydb. and *Lemmon 399* as the type of *P. ramulosa*. In that Kearney and Peebles explicitly state that “In order to save indexers the labor of reviewing so large a work, no new names or combinations are published here” (p. 5), it may very well be that they likewise did not intend any new lectotypifications, but this is nevertheless what they effectively accomplished (J. McNeill, pers. comm. 2006).

Fortunately, the selection of *Lemmon 399* as the type of *Potentilla ramulosa* preserves current usage of the epithet for the sole, commonly encountered representative of *P. sect. Subviscosae* in the heavily-visited Santa Catalina Mountains, here treated as *P. subviscosa* var. *ramulosa*. In contrast, if *Rusby 591* had been selected a new name would be needed for plants in the Santa Catalina Mountains, now that the marked seasonal dimorphism of leaf shape in the widespread *P. subviscosa* var. *subviscosa* is better understood, as discussed later.

***Potentilla ramulosa*** Rydb., Bull. Torrey Bot. Club 23:430. 1896. TYPE: U.S.A. ARIZONA. Cochise Co.: Chiricahua Mountains, Rucker Valley, 1881, *Lemmon 399* (LECTOTYPE, designated by Kearney & Peebles, Fl. pl. ferns Ariz. 403. 1942: GH 244121!; the only specimen known) = *P. subviscosa* var. *ramulosa*.

*Potentilla wheeleri* var. *viscidula* presents a more complicated situation. The name was applied broadly at its inception (Rydb. 1896), encompassing a diversity of specimens from southern Arizona and southern California. In his subsequent treatment of the genus for *North American Flora*, Rydb. (1908) added Chihuahua, Mexico, to the distribution of the taxon, possibly based on specimens which would now be identified as *P. mexiae*. He also raised the taxon to species rank as *P. viscidula* (Rydb.) Rydb., a status and circumscription followed by Tidestrom and Kittell (1941). In contrast, Kearney and Peebles (1942) initially treated *P. viscidula* as a synonym of *P. wheeleri*, but in their subsequent flora (1951) they likewise accepted *P. viscidula* as a distinct species (with the caveat, however, that it was “Perhaps too nearly related to *P. wheeleri* Wats.”). Although these Arizona and New Mexico floras continued to include California in the distribution of *P. viscidula*, California floras consistently recognized only *P. wheeleri*, sometimes citing *P. viscidula* in synonymy (e.g., Jepson 1936; Abrams 1944; Munz 1959).

In spite of incompatibility problems with published distributions and descriptions, *Potentilla viscidula* has in practice been increasingly applied to a notably sericeous, trifoliate member of *P. sect. Subviscosae* that occurs on rock outcrops along popular trails near the summit of the Huachuca and Santa Rita mountains of southeastern Arizona, corresponding to the distribution in Arizona as given in Kearney and Peebles (1942, 1951). This species is clearly distinct from the 5-foliate species *P. wheeleri* and *P. subviscosa*, with the latter also having a very different vestiture. My initial understanding, based on herbarium studies and personal fieldwork, was that this trifoliate species was the only member of the section in these two mountain ranges, with a less hairy variant occurring in the Chiricahua Mountains. It was only in the process of lectotypification that I realized that *P. subviscosa* var. *ramulosa* also occurs in the Santa Rita Mountains (as the primary element in the existing lectotype of *P. wheeleri* var. *viscidula*), the Huachuca Mountains (*Goodding 1300*, May 1912, ARIZ, NY, RM), and the Chiricahua Mountains (the lectotype of *P. ramulosa* itself). This odd situation, whereby most historical collections differ from more recent collections from the same mountain ranges, may reflect the fact that early collectors worked from existing bases at lower elevations (e.g., McCleary’s Ranch, now headquarters for the Santa Rita Experimental Range), whereas more recent botanists tend to collect along a newer network of well-constructed trails that lead to the highest peaks. Both *P. viscidula* and *P. subviscosa* are listed in a recent flora of the Huachuca Mountains (Bowers & McLaughlin 1996).



As it happens, the lectotype of *Potentilla wheeleri* var. *viscidula* designated by Kearney and Peebles, or for that matter any of the syntypes, is not compatible with continued use of the name *P. viscidula* for the trifoliate species. Although the *International Code of Botanical Nomenclature* (McNeill et al. 2006) now provides multiple options to conserve established nomenclature in order to avoid “disadvantageous nomenclatural changes” (Art. 14.1), including the conservation of a name using a different type (Art. 14.9), I do not believe that usage of *P. viscidula* for the highly localized trifoliate species is well enough established to justify conservation. The historical conflation with *P. wheeleri* has never ceased, with several recent publications treating *P. viscidula* as synonymous with *P. wheeleri* (e.g., Medina 2003; Kartesz & Meacham 1999; PLANTS database at <http://plants.usda.gov/>). Furthermore, the initial protologue only allows for plants with 5–7 leaflets in sect. *Subviscosae*, and the epithet “*viscidula*” itself is incompatible with the sericeous vestiture of the trifoliate species. For these reasons a fresh slate seems preferable, with the Kearney and Peebles lectotypification retained and the trifoliate plants described below as *P. rhyolitica*.

One further complication is that the dominant element in the Pringle lectotype is the same taxon as the lectotype of *P. ramulosa*, with the epithet *viscidula* having priority at the varietal level. To preserve established usage of *P. subviscosa* var. *ramulosa*, I am therefore selecting one of the minor elements in Pringle’s collection as a second-stage lectotypification, specifically the largest of three plants on GH 26877. From its intermediate vestiture this plant is evidently a hybrid between *P. subviscosa* var. *ramulosa* and the sympatric trifoliate species. The selected plant, on a sheet annotated by Rydberg, is an excellent match for Rydberg’s protologue, and its designation as lectotype removes the epithet *viscidula* from contention with the established epithet *ramulosa* at varietal rank.

***Potentilla wheeleri*** S. Watson var. ***viscidula*** Rydb., Bull. Torrey Bot. Club 23:429. 1896. TYPE: U.S.A. ARIZONA. Santa Cruz Co. or Pima Co.: Santa Rita Mountains, Alt. 8000 ft, 3 May 1881, C.G. Pringle s.n. (LECTOTYPE (first stage designated by Kearney & Peebles, Fl. pl. ferns Ariz. 402. 1942; second stage herein): largest of three plants on GH 26877!) = hybrid between *P. subviscosa* var. *ramulosa* and *P. rhyolitica* var. *rhyolitica*.

#### DESCRIPTION OF *POTENTILLA RHYOLITICA* AND VARIETIES

The drawback with the preceding lectotypification of *Potentilla wheeleri* var. *viscidula* is that the trifoliate species is left without a name, a situation that is here rectified.

***Potentilla rhyolitica*** Ertter, sp. nov. (**Fig. 1**). TYPE: U.S.A. ARIZONA: Cochise Co.: Carr Peak in Huachuca Mts., rhyolite outcrops near junction of Carr Peak and Miller Canyon trails, open forest of ponderosa pine, limber pine, Douglas-fir, oak, & *Holodiscus*, ca. 9000 ft elev., T23S R20E Sec. 22, 3 Jun 1993, B. Ertter 11872 (HOLOTYPE: UC; ISOTYPES: ALA, ASC, ASU, ARIZ, GH, MEXU, MO, NY, PR, US).

*Potentilla albiflora* maxime simile, sed petioli pilis longioribus (1–3 mm vs.  $\pm$  1 mm) et foliolorum dentibus paucioribus.

Plants tufted to rosetted, green to grayish, abundantly glandular. **Stems** prostrate, 0.2–2 dm long, with abundant glandular trichomes and fine spreading hairs  $\pm$  1 mm long. **Leaves** generally ternate, 2–8(–11) cm long; petiole 1–6(–8) cm long with abundant glandular trichomes, short hairs, and spreading longer hairs 1–2(–3) mm long; leaflets 3(–5), obovate, often petiolulate, the central one 1–3 cm long, toothed  $\frac{1}{3}$  to midvein with 2–3(–4) teeth per side, moderately to densely sericeous on both sides. **Inflorescences** 1–10-flowered; pedicels 0.5–1(–2) cm long, becoming recurved in fruit, with abundant short glandular trichomes, short hairs  $\pm$  0.2 mm long, and scattered longer hairs ca. 1 mm long. **Flowers**: hypanthium 3–5 mm diam.; epicalyx bractlets lanceolate-elliptic, 2–4 mm long; sepals 3–5 mm long, acute; petals yellow,  $\pm$  broadly elliptic-obovate to obcordate, 4–7 mm long, the apex rounded to shallowly emarginate; stamens 15–20, the filaments 1.5–3 mm long, the anthers 0.6–1 mm long; styles 5–15, slender, scarcely rough-thickened basally, 2–3 mm long. **Achenes** light brown to reddish brown, 1.5–2.2 mm long, smooth to lightly ribbed.

Although previously associated with *Potentilla wheeleri*, that strictly Californian species has 5–7 leaflets. A closer affinity exists with *P. albiflora* L. O. Williams, another trifoliate member of *P.* sect. *Subviscosae* endemic to southeastern Arizona. Indeed, the differences between *P. rhyolitica* and *P. albiflora* are fairly subtle, consisting primarily of differences in vestiture, number of leaflet teeth, and carpel number. Populations of *P.*

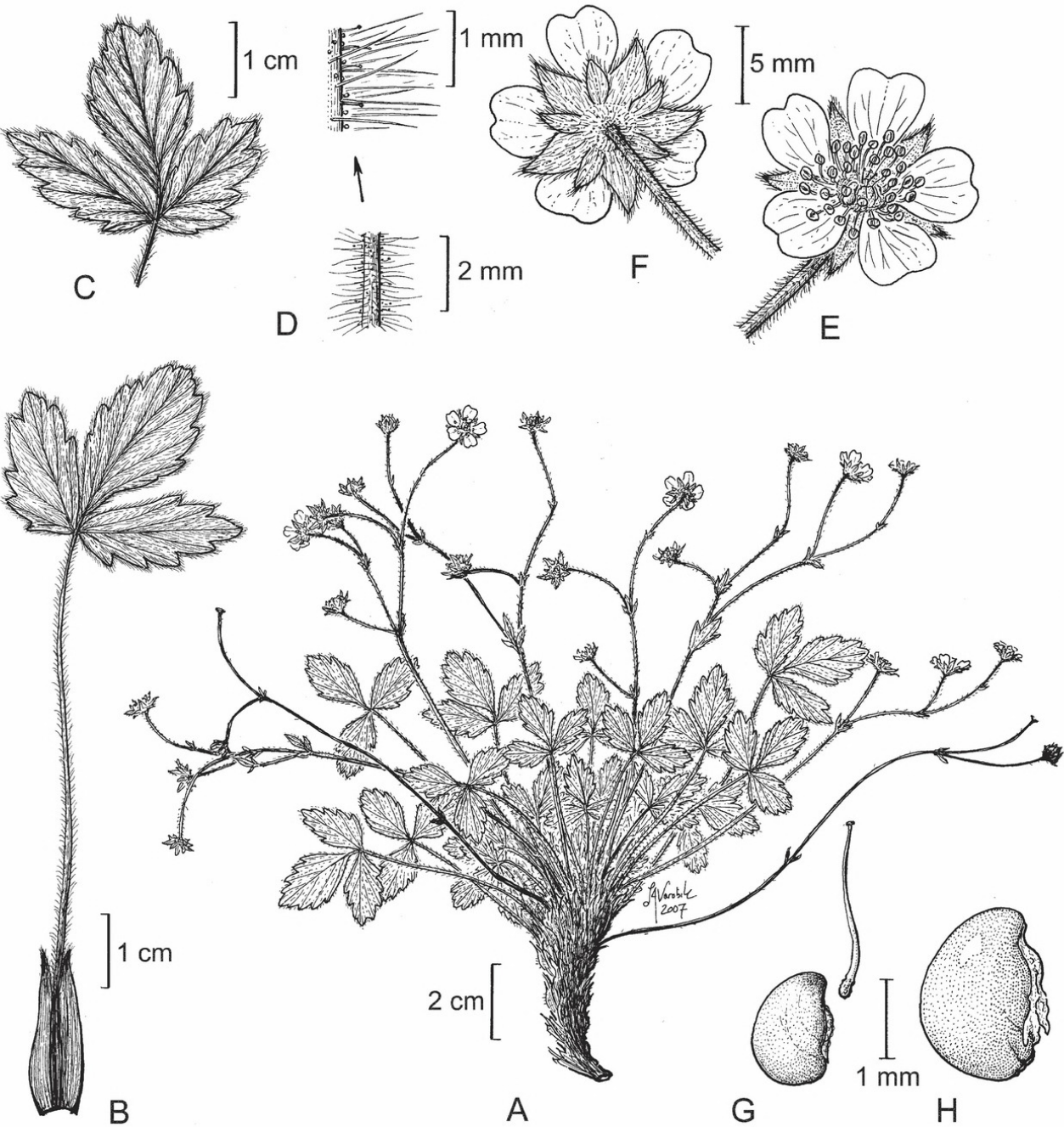


FIG. 1. *Potentilla rhyolitica* Ertter. A–G. *P. rhyolitica* var. *rhyolitica* (drawn from Ertter 11872). A. Habit. B. Basal leaf. C. Underside of leaf. D. Vestiture of petiole. E. Flower, top view. F. Flower, bottom view. G. Achene and style. H. Achene of *P. rhyolitica* var. *chiricahuensis* Ertter (drawn from Blumer 2023).

*rhyolitica* in the Chiricahua Mountains are somewhat intermediate between the two species and sufficiently distinct so as to warrant the recognition of two varieties within *P. rhyolitica*, as presented here.

***Potentilla rhyolitica* var. *rhyolitica***

**Stems** 0.3–2 dm long. **Leaves:** long hairs of petiole  $\pm$  1(–2) mm long; leaflets (moderately to) densely sericeous, gray-green. **Flowers** 2–10; filaments 1.5–2.5 mm long; styles 5–15, 2–2.5 mm long. **Achenes**  $\pm$  1.5 mm long, smooth to lightly ribbed.

*Distribution and phenology.*—Endemic to the summit areas of the Santa Rita and Huachuca mountains in Santa Cruz and Cochise counties, southeastern Arizona, mostly forming dense tufts in crevices of rhyolitic



and quartzitic outcrops in open pine forests, 2600–2900 m elev. Flowering Apr–Jun. An anomalous collection from desert grasslands in the San Rafael Valley southwest of the Huachuca Range (Fritts & Fritts 83-143, COLO, and reported as *P. wheeleri* by McLaughlin [2006]) may also belong here, though in a significantly different ecological setting and with more oblanceolate leaflets.

As already noted, the name *Potentilla viscidula* has frequently been applied to existing collections of this entity, with *P. subviscosa*, *P. dissecta* Pursh, *P. concinna* Richardson, and *P. albiflora* serving as alternate identifications. John J. Thornber, botanist at University of Arizona and the Santa Rita Experimental Range in the early 1900's, was the first to notice the distinctiveness of this taxon. However, although Thornber annotated the ARIZ sheet of *Goodding 110* as “Type!” of a new species, with the epithet “trifoliolata” replaced with “pinetorum,” he did not follow through with formal publication.

The variety is sufficiently localized to warrant conservation attention, especially given its proximity to well-used trails in popular hiking areas. “Huachuca cinquefoil” is recommended as a vernacular name.

ADDITIONAL COLLECTIONS EXAMINED: **U.S.A. Arizona: Cochise Co.:** Huachuca Mts., mountain tops, 8 May 1909, *L.N. Goodding 102* (ARIZ); Miller's Canyon, moist slopes, Huachuca Mts., 8 May 1909, *L.N. Goodding 102a* (RM); Miller's Canyon, Huachuca Mts., dry rocky places, usually clinging to rocks, 8 Jun 1909, *L.N. Goodding 110* (ARIZ, RM); Huachuca Mts., rock crevices on summits, May 1912, *L.N. Goodding 1300* p.p. (BKL, RM p.p. [mixed collection with *P. subviscosa* var. *ramulosa*]); Miller Canyon, top of saddle, Huachuca Mts., 8500 ft, 23 Apr 1955, *H. S. Haskell & C. F. Deaver 5177* (ASC, RSA); Huachuca Mts., Carr Peak Pass along trail to Peak, rhyolite crevices, T23S R20E S22, ca. 8900 ft, 11 May 1984, *Soreng & Muldaven 2386* (COLO). **Santa Cruz Co.:** Mt. Wrightson Peak along Old Baldy Trail, 100 ft below summit, in rock crevices, 18 May 1986, *D. Bertelsen s.n.* (ARIZ); Mt. Baldy, Santa Rita Mts., 9400 ft, 9 May 1937, *R. Darrow s.n.* (ARIZ); Mt. Wrightson (Old Mt. Baldy) in Santa Rita Mts., solid rhyolite outcrops along trail on NE side of peak, 9000 ft, T20S R15E Sec 18, 4 Jun 1993, *B. Ertter 11881* (UC; to be distributed); Santa Rita Mts., 8000 ft, 3 May 1881, *C.G. Pringle 13677* p.p. (MO).

***Potentilla rhyolitica* var. *chiricahuensis*** Ertter, var. nov. (**Fig. 1H**). TYPE: U.S.A. ARIZONA: Cochise Co.: Flys Peak in Chiricahua Mts. ca. 40 air mi SE of Willcox, local on summit and along trail in open forest, rocky openings in forest of limber pine, Douglas-fir, ponderosa pine, and aspen, T18S R30E, 9660 ft, 2 Jun 1993, *B. Ertter 11872* (HOLOTYPE: UC; ISOTYPES: ARIZ, GH, MEXU, MO, NY, US).

A *Potentilla rhyolitica* var. *rhyolitica* foliolis viridioribus et acheniis grandioribus ( $\pm 2$  mm vs.  $\pm 1.5$  mm) differt.

**Stems** 0.2–1(–1.5) dm long. **Leaves:** long hairs of petiole 1–2(–3) mm long; leaflets moderately (to densely) hairy, green. **Flowers** 1–7; filaments 2–3 mm long; styles 5–10, (2–)2.5–3 mm long. **Achenes**  $\pm 2$  mm long, smooth.

**Distribution and phenology.**—Endemic to upper elevations of the Chiricahua Mountains, Cochise Co., Arizona, in rocky openings in mixed conifer forests, 2700–2900 m. Flowering May–Jun.

*Potentilla rhyolitica* var. *chiricahuensis* differs from the typical variety in being greener and less sericeous, with somewhat longer and coarser hairs and larger seeds. It is also less likely to be rooted in outcrops, favoring rocky flats. “Chiricahua cinquefoil” is a suitable vernacular name for this localized taxon, which merits some level of conservation attention.

As with *P. rhyolitica* var. *rhyolitica*, Thornber was evidently the first to recognize that the trifoliate Chiricahua plants represented a distinct taxon. He annotated *Blumer 2023* (US) as the type of a new species, using the epithet “substrigosa,” but this combination was never published.

ADDITIONAL COLLECTIONS EXAMINED: **U.S.A. Arizona: Cochise Co.:** Fly Park, Chiricahua Mts., 8900 ft, 7 Jul 1907, *J. C. Blumer 2023* (US); Rustler's Park, moist slope, 9000 ft, 18–19 Jun 1930, *G. J. Goodman & C. L. Hitchcock 1173* (MO, RM, UC); Chiricahua Wilderness Area, Crest Trail, ¼ mi N of turnoff to Anita Park, 9480 ft, 29 May 1975, *J. & A. Leithliter 7* (ASU); Chiricahua Wilderness Area, intersection of Crest Trail and Tub Spring Trail, ¾ mi S of Long Park, 9070 ft, 10 Jun 1975, *J. & A. Leithliter 52* (ASU); Flys Peak – Cima Cabin Trail junction, Chiricahua Mts., 9200 ft, 29 May 1959, *J. McCormick & Assoc. 82* (ARIZ).

#### DESCRIPTION OF *POTENTILLA* DEMOTICA

In the opposite corner of Arizona, the rarest member of *Potentilla* sect. *Subviscosae* was discovered in 1979 as part of a floristic study in the Hualapai Mountains (Butterwick et al. 1991). It was reported as a western range extension of *P. subviscosa* but differs in rock-dwelling habit, petal color, and epicalyx, among other characters. Although the Hualapai Mountains are not considered part of the Madrean Archipelago, they continue the theme of montane “islands” scattered across the arid Southwest.

***Potentilla demotica*** Ertter, sp. nov. (**Fig. 2**). TYPE: U.S.A. ARIZONA: Mohave Co.: Hualapai Mts. ca. 12 air mi SE of Kingman, pink granite knoll SE of Hualapai Peak, in open ponderosa pine forest, with *Antennaria*, *Heuchera*, *Cheilanthes*, *Poa*, T20N R15W, ca 7500 ft, 30 May 1993, B. Ertter 11864 (HOLOTYPE: UC; ISOTYPES: ARIZ, GH, MO, NY, RSA, US).

*Potentilla rimicola* aemulans, differt foliis brevioribus et epicalyces bracteolis late ellipticis.

**Plants** perennial, rooted in rock crevices, rosetted to tufted, the caudex simple to few-branched on a thickened taproot. **Stems** spreading, 0.2–1.5(–2) dm long, with abundant short septate glandular trichomes, short simple hairs ca. 0.2 mm long (sparse proximally, more abundant distally), and scattered slender spreading hairs 1–2 mm long. **Leaves** primarily basal, palmate, 2–8 cm long; stipules very narrowly triangular; petiole 1–7 cm long, with abundant glandular trichomes and slender spreading hairs 1.5–2.5 mm long; leaflets (3–)5, oblanceolate, the central one 0.5–1.5(–2) cm long, sparsely hairy on both sides, toothed  $\frac{1}{2}$ – $\frac{3}{4}$  to midvein on distal  $\frac{3}{4}$  of blade, the rounded teeth 2–3(–4) per side; cauline leaves 1–2, highly reduced. **Inflorescences** lax, 1–7-flowered; pedicels 0.5–1(–2) cm long, slender, sometimes recurved, with short glandular trichomes, short hairs  $\pm$  0.2 mm long, and longer hairs  $\pm$  1 mm long. **Flowers:** hypanthium shallow, 2–3 mm diam.; epicalyx bractlets ovate-elliptic, 1–2.5 mm long, 1–1.5 mm wide; sepals 2.5–4 mm long, obtuse; petals yellow with darker base,  $\pm$  obcordate with a short claw, shallowly emarginate, 3–7 mm long, exceeding sepals; stamens 20, the filaments 1.3–2 mm long, the anthers 0.5 mm; styles 5–12, slender, scarcely rough-thickened basally, 2–2.5 mm long. **Achenes** light brown with reddish apices, 1.5–1.8 mm, smooth to lightly ribbed.

*Distribution and phenology.*—eastern extension of Hualapai Peak in the Hualapai Mountains of Mohave Co., Arizona, crevices of granite outcrop in ponderosa pine woodland, ca. 2300–2400 m. Flowering May–Jun.

Although initially identified as *Potentilla subviscosa* (Butterwick et al. 1991), *P. demotica* is probably more closely related to *P. rimicola* (Munz & I.M. Johnst.) Ertter, which grows in rock crevices in the mountains of southern California and northern Baja California. The new species is apparently extremely rare and localized, currently known from a single granite knoll in Hualapai Mountain Park, part of the Mohave County park system. The label for *Butterwick & Hillyard* 6757 indicates that about 100 clusters of one to fifteen plants each were present in 1980, which is compatible with my observations in 1993. Conservation attention is obviously called for, though the knoll is a long hike from the nearest trailhead and not directly on any trail.

The epithet *demotica* (from “demotikos,” Greek for “of the people,” suggested by J. Reveal) alludes to the tradition among the Hualapai that they arose from the “Pai” or “the people.” “Hualapai Cinquefoil” is an appropriate vernacular name.

ADDITIONAL COLLECTIONS EXAMINED: U.S.A. Arizona: Mohave Co.: eastern extension of Hualapai Peak, Hualapai Mts., T20N R15W Sec. 32 NW1/4, scattered in rock crevices, Ponderosa Pine Woodland, 8000 ft, 10 Aug 1979, M. Butterwick & B. Parfitt 5407 (ASU, COLO); E portion of Hualapai Peak system, T20N R15W Sec. 32 NW1/4, granitic substrate, Ponderosa Pine Forest, 8000 ft, 6 Jun 1980, M. Butterwick & D. Hillyard 6757 (ASU, COLO).

#### NOTES ON SOME OTHER SPECIES IN *POTENTILLA* SECT. *SUBVISCOSAE*

##### ***Potentilla albiflora*** L.O. Williams

Contrary to the specific epithet, petals of living plants are yellow, not white, though (like many *Potentilla*) they tend to fade in pressed material. “Whiteflowered cinquefoil” is accordingly misleading as a common name, with “Pinaleno cinquefoil” a recommended alternative. Although previously known only from the Pinaleno (Graham) Mountains in Graham Co., Arizona, the following collection (distributed as *P. diversifolia* Lehm.) extends the range to the Mogollon Rim and opens up the possibility of further discoveries in this relatively sparsely botanized corner of Arizona.

ARIZONA: Greenlee Co.: Cienega Camp on Hwy 666, Blue Range, Apache National Forest, 20 mi SW of Alpine, mesic headwaters of the Blue River in mixed coniferous forest, elev. ca. 2600 m, 17 Jul 1964, M. Baad 657 (MICH, WTU).

##### ***Potentilla cottamii*** N. Holmgren

Holmgren (1987) described *Potentilla cottamii* from isolated quartzite outcrops in the Pilot Range and Raft



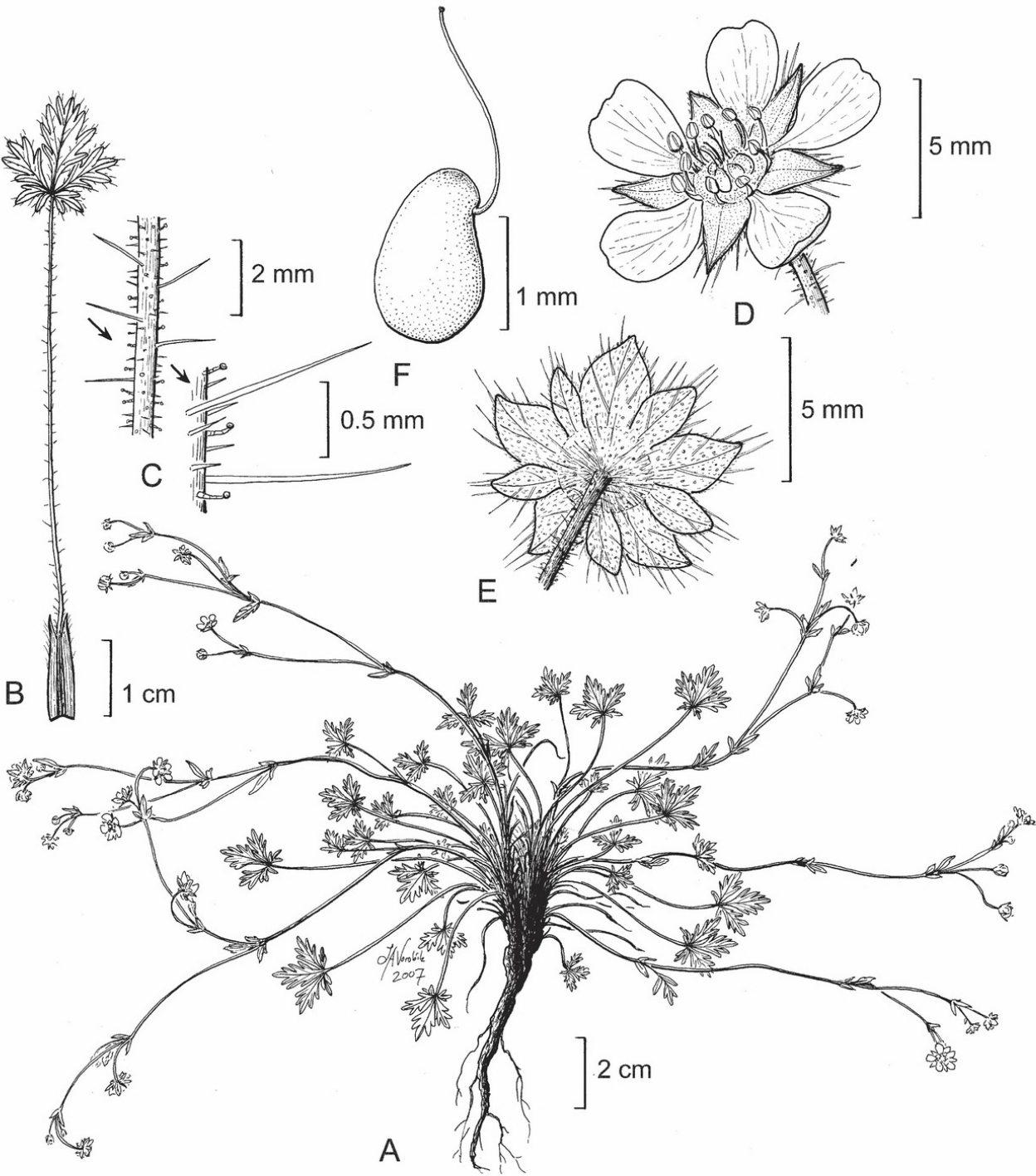


FIG. 2. *Potentilla demotica* Ertter (drawn from Ertter 11864). A. Habit. B. Basal leaf. C. Enlargement of petiole vestiture. D. Flower. E. Hypanthium, epicalyx, calyx. F. Achene and style.

River mountains of northwestern Utah and adjacent Nevada; it has since been found in Utah's Stansbury and Deep Creek mountains. Holmgren speculated that his new species was most comparable to *P. hyparctica* Malte and *P. robbinsiana* Oakes, members of *P. sect. Aureae* occurring in arctic and alpine regions in North America. In contrast, R. Elven (pers. comm. 2006) confirms that any resemblance with these species is superficial, with *P. cottamii* having very different vestiture and stipule types. In my understanding *P. cottamii* fits readily into *P. sect. Subviscosae*, sharing the distinctive combination of simple and glandular vestiture types but with unusually small flowers and accordingly short styles. The trifoliate leaves, stipules, petro-



phytic habit, and biogeographic distribution as a montane “island endemic” are likewise compatible with membership in *P. sect. Subviscosae*.

### ***Potentilla subviscosa* Greene**

The two varieties of *Potentilla subviscosa* have generally been based on extremes of leaflet margins, with var. *subviscosa* having deeply lobed leaflets and var. *ramulosa* having more shallowly and regularly toothed leaflets, which are also significantly larger overall. As so defined, the varieties were largely sympatric and questionably distinct. Multiple examples of collections from the same general area, and even variation on a single plant, indicate that these extremes can occur as striking seasonal differences in leaf shape and petiole vestiture, perhaps as an adaptation to the monsoonal rainfall pattern in the American Southwest. Leaves formed early in the season and coinciding with peak flowering have deeply divided leaflets, and the petiole vestiture often consists almost exclusively of short glandular trichomes. Later-formed leaves have progressively less deeply divided leaflets and an increasing percentage of both short and long non-glandular hairs; the leaves are sometimes significantly larger as well. This dimorphism is best developed in Arizona populations of *P. subviscosa*, including the *Rusby 591* syntype of *P. ramulosa*, which consists of both early-season plants with deeply lobed leaflets and late-season plants with significantly larger, less deeply toothed leaflets. A pencil annotation on one of the latter specimens at NY indicates “status autumnalis” in the handwriting of Jiří Soják, a Czech expert in *Potentilla* based at the National Museum in Prague (PR).

Within this new context of seasonal leaf dimorphism, *P. subviscosa* var. *ramulosa* can still be distinguished by the absence of deeply divided leaflets even on early-formed leaves. As so defined, this variety is the only representative of *P. sect. Subviscosae* that occurs in the Santa Catalina and Rincon ranges in Pima Co., Arizona. Comparable plants have been collected on Aztec Peak in the Sierra Ancha Range of Gila Co., Arizona, where they overlap the range of and possibly intergrade with *P. subviscosa* var. *subviscosa*. The typical variety itself is widespread in the mountains of New Mexico and north of the Mogollon Rim in Arizona, barely entering Colorado in the Sangre de Cristo Range of Las Animas County.

### ***Potentilla wheeleri* S. Watson.**

As here circumscribed, *Potentilla wheeleri* is restricted to the southern Sierra Nevada, San Bernardino Mountains, and San Jacinto Mountains in southern California. Compact plants from the alpine summit of Mount San Gorgonio in the San Bernardino Mountains were described by Jepson (1925) as *P. wheeleri* var. *paupercula*, but I have not found sufficient consistent differences to maintain this as a distinct variety. In contrast, petrophytic plants from Tahquitz Peak (San Jacinto Mountains, Riverside Co., California) and the Sierra San Pedro Mártir (Baja California, Mexico) originally described as *P. wheeleri* var. *rimicola* Munz & I.M. Johnst. are now recognized as a distinct species, *P. rimicola* (Ertter 1991). Other plants of *Potentilla wheeleri* s.l. from the Sierra San Pedro Mártir in Baja California Norte have more open inflorescences, leaves that are sometimes subpalmate, and less hairy leaflets that are only shallowly and apically toothed; these populations can probably also stand as a distinct species, *P. luteosericea* Rydb. (= *P. pinetorum* Wiggins).

#### KEY TO *POTENTILLA* SECT. *SUBVISCOSAE* NORTH OF MEXICO

1. Leaflets mostly 3, rarely 5.
  2. Petals < 2 mm long; styles < 2 mm long; NW Utah and adjacent Nevada \_\_\_\_\_ ***P. cottamii***
  2. Petals 3–8 mm long; styles 2–3 mm long; SE Arizona.
    3. Longest hairs on petiole ± 1 mm long; central leaflet with 3–5(–6) teeth per side; Pinaleno Mountains and nearby Mogollon Rim \_\_\_\_\_ ***P. albiflora***
    3. Longest hairs on petiole 1–2(–3) mm long; central leaflet with 2–3(–4) teeth per side \_\_\_\_\_ ***P. rhyolitica***
    4. Leaves gray-green, ± densely sericeous; styles 2–2.5 mm long; achenes ± 1.5 mm long, smooth to lightly ribbed; Santa Rita and Huachuca mts. \_\_\_\_\_ var. ***rhyolitica***
    4. Leaves green, ± moderately hairy; styles 2.5–3 mm long; achenes ± 2 mm long, smooth; Chiricahua Mts. \_\_\_\_\_ var. ***chiricahuensis***
1. Leaflets mostly 5, rarely 3 or 7.

5. Petals pale yellow adaxially, white abaxially, narrowly obcordate; leaflets with 2–9 teeth or lobes per side \_\_\_\_\_ **P. subviscosa**
6. Leaflets often strongly dimorphic, at least those formed early in season divided  $\frac{1}{2}$ – $\frac{3}{4}$  to midvein into 3–7 lobes per side, late-season leaflets often coarsely toothed less than  $\frac{1}{4}$  to midvein with 6–9 teeth per side; long hairs on petioles 1–1.5(–3) mm long; widespread in n Arizona and New Mexico, barely entering Colorado \_\_\_\_\_ var. **subviscosa**
6. Leaflets scarcely dimorphic, those formed early in season toothed  $\frac{1}{4}$ – $\frac{1}{2}$  to midvein with 2–4 teeth per side, late-season leaflets similarly toothed with up to 6 six teeth per side; long hairs on petioles 2–3(–4) mm long; Santa Catalina and Rincon mts. and Sierra Ancha in SE Arizona \_\_\_\_\_ var. **ramulosa**
5. Petals bright yellow adaxially, somewhat paler abaxially, narrowly to broadly obcordate; leaflets with 2–4(–5) teeth per side.
7. Plants rooted in ground; leaflets densely hairy; styles ca. 20, 1.2–2 mm long; southern Sierra Nevada and San Bernardino Mts. of Calif. \_\_\_\_\_ **P. wheeleri**
7. Plants rooted in rock crevices, often on vertical surfaces; leaflets sparsely to moderately hairy; styles 5–15(–20), 1.5–2.5 mm long.
8. Leaflets 1–3 cm long, oblanceolate to obovate-cuneate, toothed in distal  $\frac{1}{3}$ ; epicalyx bractlets lanceolate-elliptic; San Jacinto Mts., California, & Baja California, Mexico \_\_\_\_\_ **P. rimicola**
8. Leaflets 0.5–1.5(–2) cm long, oblanceolate, toothed in distal  $\frac{3}{4}$ ; epicalyx bractlets ovate-elliptic; Hualapai Mts., Arizona \_\_\_\_\_ **P. demotica**

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