REVISED RECOGNITION OF A HIGH SIERRAN *POTENTILLA* (ROSACEAE) AS *POTENTILLA AMICARUM*

Barbara Ertter

University and Jepson Herbaria, University of California
1001 VLSB #2465, Berkeley, California 94720-2465, U.S.A.
and
Snake River Plains Herbarium, Boise State University
1910 University Drive, Boise, Idaho 83725, U.S.A.
ertter@berkeley.edu

ABSTRACT

Potentilla amicarum Ertter is provided for plants from high elevations (2700–3700 m) in the southern and central Sierra Nevada, and also the White and Sweetwater mountains of California, that have most often been treated as depauperate *P. drummondii* or *P. bruceae,* or else *P. breweri* with subpinnate leaves. The name *P. breweri* var. *viridis* Jepson has sometimes been applied to these plants, but the type of that name is interpreted as the hybrid of *P. wheeleri* and *P. breweri*. A hybrid origin is hypothesized involving *P. breweri, P. drummondii,* and/or *P. glaucophylla*. The size range and elevation of *P. bruceae* in recent floristic treatments is adjusted accordingly, and the distribution of *P drummondii* in California is discussed.

RESUMEN

Potentilla amicarum Ertter es el nombre que se proporciona para plantas de elevaciones altas (2700–3700 m) en el centro y sur de Sierra Nevada, así como las montañas White y Sweetwater de California, que han sido tratadas como *P. drummondii* o *P. bruceae* depauperadas, o también *P. breweri* con hojas subpinnadas. El nombre *P. breweri* var. *viridis* Jepson se ha aplicado a veces a estas plantas, pero el tipo de ese nombre se interpreta como el híbrido de *P. wheeleri* y *P. breweri*. Se hipotetiza un origen híbrido que implica a *P. breweri, P. drummondii,* y/o *P. glaucophylla*. El rango de tamaño y elevación de *P. bruceae* en tratamientos florísticos recientes se ajusta a los nuevos datos, y se discute la distribución de *P drummondii* en California.

INTRODUCTION

Nearly three decades of research by the author on *Potentilla* in California and adjacent parts of western North America have resulted in several publications and revisions (Ertter 1992, 1993, 2012; Ertter et al. 2015; Ertter & Mansfield 2007; Johnston & Ertter 2010), but also in an accumulation of anomalous herbarium specimens representing unresolved taxonomic problems. One of the largest components of this accumulation consists of specimens from high elevations in California that combine features of *P. breweri* S. Watson, *P. bruceae* Rydb. (sensu Ertter et al. 2015), *P. drummondii* Lehm. (sensu Ertter et al. 2015), and perhaps *P. glaucophylla* Lehm. var. *glaucophylla*.

These specimens had initially been interpreted by the author (Ertter 1992, 1993) as recurrent hybrids between *Potentilla breweri* and *P. drummondii*, for which *P. drummondii* ssp. *bruceae* (Rydb.) D.D. Keck was used as the catch-all category. Subsequent field studies and analysis of herbarium material, however, led to a more restricted use of *P. bruceae* for relatively uniform populations in northern California and adjacent Oregon and Nevada (Ertter 2012; Ertter et al. 2015; Ertter & Mansfield 2007). This decision left most collections previously treated as *P. drummondii* ssp. *bruceae* from the central and southern Sierra Nevada, White Mountains, and Sweetwater Mountains of California without a name, pending further research.

Some of these problematic collections undoubtedly do represent recurrent hybrids, especially in the northern Sierra Nevada. Field studies have confirmed the existence of putative hybrid swarms in the general area where such collections originate, and the specimens display the variability that would indicate recurrent hybrids. Collections from the central and southern Sierra Nevada, however, have a sufficiently coherent morphology to warrant recognition as a distinct taxon, which also encompasses the handful of specimens from the White and Sweetwater mountains. To facilitate further research, a name is hereby provided for these plants that join *Potentilla bruceae* and *P. drummondii* in sect. *Graciles* (Rydb.) A. Nels. (Ertter et al. 2015). Terminology

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is as defined and used in Ertter et al. (2015). The terms "subpalmate" and "subpinnate" are used to denote the continuum that exists in the complex between strictly palmate and unequivocally pinnate leaves, quantitatively expressed as leaflet-bearing distal fraction of the leaf axis. Additional label data on both cited and uncited specimens annotated by the author can be obtained from The Consortium of California Herbaria (http://ucjeps.berkeley.edu/consortium/).

Potentilla amicarum Ertter, sp. nov. (**Fig. 1**). Type: U.S.A. California. Inyo Co.: Kearsarge Pass trail, W of Independence, in seep, above 10,500 ft, 7 Aug 1942, *A.M. Alexander & L. Kellogg 3269* (holotype: UC; isotypes seen: DS, MO).

Differs from *Potentilla breweri* in having subpalmate to subpinnate leaves with 2–3(–4) leaflets per side (vs. pinnate with 3–6 leaflets per side), a more erect habit, and less cottony (vs. densely cottony) vestiture; differs from *Potentilla bruceae* and *P. drummondii* in generally smaller stature ([0.4–]1–3[–3.5] vs. 1.5–5[–6] dm) and leaves ([2–]3–7[–10] vs. [4–]7–25[–28] cm) with fewer teeth on lateral leaflets (5–9 vs. 7–17), styles that are not swollen-tapered proximally, and a higher elevation distribution.

Herbs green to more often grayish; caudex most often simple to few-branched. **Stems** ± ascending, less often decumbent, (0.4–)1–3(–3.5) dm, (2–)2.5–4(–6) times as long as basal leaves. **Basal leaves** often 2-ranked, subpalmate to subpinnate (often irregularly so, with lateral pairs sometimes doubled and with distalmost leaflets ± confluent [Fig. 2]), (2–)3–7(–10) × (1–)1.5–3(–4) cm (including petiole); petiole (0.5–)1–3(–6) cm, early-season (outermost) ones usually glabrous, late-season (innermost) often ± cottony and/or soft-hairy, glands absent; leaflets 2–3(–4) per side, on distal (1/10–)1/4–1/2 of leaf axis, overlapping at least distally, lateral leaflets cuneate to obovate or flabellate, 0.5–2(–2.5) × (0.3–)0.5–1.0(–1.3) cm, distal ± 1/2 divided ± 1/2–2/3 (to completely) to midrib, sometimes medially split, teeth 2–4 per side, triangular to linear, (2–)3–6(–10) mm, surfaces similar, green to more often grayish with sparse to dense soft straight to wavy hairs 0.5–1 mm long, sometimes also sparsely cottony, or only hairy on margins (possibly indicating introgression with *P. glaucophylla*), glands absent. **Cauline leaves** (1–)2–3. **Inflorescences** (2–)4–10(–15)-flowered, becoming openly cymose; pedicels (0.5–)1–2.5(–3) cm, straight. **Flowers:** hypanthia (3–)4–6 mm diam., epicalyx bractlets lanceolate-elliptic, 2–4(–5) mm; sepals 4–6 mm, acute to acuminate; petals bright yellow with darker basal patch faint or absent, (4–)5–8 × (4–)5–7 mm; filaments 1.5–2.5(–3) mm; anthers 0.5–0.8 mm; carpels 20–35, styles not swollen-tapered proximally, 2–2.5 mm. **Achenes** ± 1.8 mm, smooth or faintly veined, pale brown. **2*n*** = 70, 87, ca. 92, 129+, univalents and other anomalies often present (discussion below).

Additional Representative Specimens. **U.S.A. CALIFORNIA. Fresno Co.:** Pioneer Basin, *Howell 22659* (CAS, DS); Bubbs Creek Canyon in vicinity of Vidette Meadows, *Howell 24876* (CAS); Bullfrog Lake, *Jepson 846* (JEPS); Goddard Canyon 1/4 mi above N Goddard Creek, *Quibell 6685* (RSA); Hilgard Branch, Bear Creek, *Raven 7205* (CAS); plateau N of Sawmill Pass, *Raven 9861* (CAS); near entrance to Darwin Canyon, *Snow 929* (UC). **Inyo Co.:** W end Gilbert Lake on Onion Valley trail to Kearsarge Pass, *Ertter & Töpel 19224* (UC, SRP, WIS); Fifth Lake, Big Pine Lakes, *Howell 23800* (CAS); between the Grass Bog and Heart Lake, Rock Creek Lake Basin, *Peirson 12186* (JEPS, RSA); SE base of The Hunchback, Coyote Ridge, *Taylor 15424* (JEPS). **Madera Co.:** Shadow Lake to Lake Ediya, *Raven 3345* (CAS). **Mono Co.:** Sweetwater Mountains, Deep Creek, *Alexander & Kellogg 3986* (DS, MO, UC); Slate Creek Valley, *Keck 4924* (DS, UC); Dana Plateau, *Myrick 695* (CAS); White Mountains, Cottonwood Creek drainage between Sheep Mountain and Piute Mountain, *Neubauer 510* (JEPS). **Tulare Co.:** Soldier Pass, *DeDecker 1986* (RSA); between Reflection Lake and Harrison Pass, *Howell 16045* (CAS); between Big Arroyo and Little Five Lakes, *Howell 17758A* (CAS); Lost Canyon, *Howell 17792* (CAS); between Sawtooth Pass and Mineral King, *Howell 17819* (CAS); Farewell Gap, *Purpus 5675* (MO, UC). **Tuolumne Co.:** Gaylor Lakes, *Mason 747* (UC).

Phenology and ecology.—Flowering Jul–Aug. Subalpine meadows, streambanks, alpine fellfields, seeps, moist flats and rocky sites; 2700–3700 m.

Etymology.—The epithet "amicarum" ("of the friends", feminine) primarily honors Louise Kellogg (1879-1967) and Annie Montague Alexander (1867–1950), whose widely distributed collection from the Kearsarge Pass trail is used here as the type, and in recognition of support received by the author from the Louise Kellogg Fund to the University Herbarium. The epithet secondarily acknowledges all the friendship and support the author has received from other women over the years, and is also a nod toward solidarity with my LGBT friends. Annie Alexander is particularly known for her financial support that helped establish the Museum of Vertebrate Zoology and University of Paleontology at the University of California (Stein 2001); it was only in later years that her life partner Louise directed additional largesse to the already existing University Herbarium, with a special interest in providing field support to women (Annetta Carter, pers. comm.).

UNIVERSITY HERBARIUM
University of California
Berkeley
UC 694460

HOLOTYPE
Potentilla amicarum Ertter

POTENTILLEAE FOR FLORA OF NORTH AMERICA
Potentilla amicarum Ertter
det. Barbara Ertter, 2016

694460

University of California at Berkeley
Potentilla drummondii Lehm.
subsp. bruceae (Rydb.) Keck
det. Barbara Ertter 1993

POTENTILLA BREWERI Wats. var.
VIRIDIS Jepson
Barry C. Johnston det. 1980
University of Colorado Museum (Herb. COLO)

HERBARIUM OF THE UNIVERSITY OF CALIFORNIA
SIERRA NEVADA, CALIFORNIA
Potentilla Breweri Wats.
var. viridis Jepson

Flowers bright yellow; in seep, above 10,500 feet,

Kearsarge Pass trail,
west of Independence, Inyo County.

Annie M. Alexander
Louise Kellogg 3269 August 7, 1942

Fig. 1. Holotype of *Potentilla amicarum* Ertter, sp. nov. (*Alexander & Kellogg 3269*, UC)

Fig. 2. Subpalmate basal leaf of *Potentilla amicarum*, with doubled lateral leaflet pairs and confluent distalmost leaflets (*DeDecker 1986*, RSA202294); scale in mm.

Comparison with Related Species.—Potentilla amicarum becomes a fifth species in the *P. drummondii/breweri* complex (= cenospecies *P. drummondii* of Clausen et al. 1940), along with *P. drummondii, P. breweri, P. bruceae,* and *P. versicolor* Rydb. Primary differences among the species as they occur in the Sierra Nevada are summarized in Table 1, preceded by a key that emphasizes the most visibly diagnostic characters. Species and variation in the complex outside of the Sierra Nevada are still under investigation and will be addressed in subsequent papers (e.g., variation in *P. versicolor* by Ertter & DiNicola, in prep.). *Potentilla amicarum* is also distinctive in having a caudex that is most often simple or only few-branched, in contrast to the sturdily branched, long-lived caudices of *P. breweri, P. bruceae,* and *P. drummondii*. Basal leaves are more likely to be arranged in two ranks (as is also the case in *P. glaucophylla*). Petiole vestiture is distinctive in that petioles of the early season/outer leaves are most commonly glabrous while those of the late season/inner leaves are usually more or less cottony, but never shaggy (as in *P. bruceae*) or strigose (as in *P. drummondii*). Distinctive, relatively stiff hairs that are basally contorted (corkscrew-like) are often present.

KEY TO SPECIES OF THE *POTENTILLA DRUMMONDII/BREWERI* COMPLEX THAT OCCUR IN THE SIERRA NEVADA

1. Leaves pinnate; leaflets 3–6 per side on distal 1/2–2/3(–3/4) of leaf axis, grayish green to whitish with sparse to dense cottony hairs, incised 1/2 to completely to midvein, ultimate teeth or segments 3–10; plants prostrate to ascending—California, Nevada, Oregon, and Washington, 1500–3600 m ____ **P. breweri**
1. Leaves subpalmate to subpinnate (rarely pinnate or palmate); leaflets 2–4 per side on distal 1/10–1/2(–3/4) of leaf axis, green to grayish with sparse (or absent) to dense straight or wavy hairs, rarely cottony, incised ±1/2–2/3 (rarely completely) to midvein, teeth 5–15(–17); plants decumbent to nearly erect
    2. Basal leaves (2–)3–7(–10) cm; lateral leaflets 0.5–2(–2.5) cm, with 5–9 teeth; petiole hairs absent (especially outermost) or cottony; style base not swollen-tapered proximally—high Sierra Nevada, Sweetwater and White mountains, California, 2700–3700 m ____ **P. amicarum**
    2. Basal leaves (4–)7–25(–28) cm; lateral leaflets (1–)2–5(–6) cm, with 7–15(–17) teeth; petiole hairs various; style base ± swollen-tapered proximally.
        3. Leaflets usually grayish with abundant hairs; petiole hairs abundant, shaggy, silky, or cottony; northeastern California and adjacent Oregon and Nevada, 1200–2700 m ____ **P. bruceae**
        3. Leaflets green with no or relatively sparse hairs; petiole hairs absent to abundant, strigose; southeastern Alaska to California, east to northwest Montana, 300 (in Alaska) to 2350 m ____ **P. drummondii**

Table 1. Comparison of new species *Potentilla amicarum* with the three other species of the *P. drummondii/breweri* complex that occur in the Sierra Nevada. Terminology is as used in Ertter et al. 2015, and in the description for *P. amicarum* herein.

	amicarum	*drummondii*	*bruceae*	*breweri*
stem orientation	± ascending (decumbent)	decumbent to nearly erect	ascending to nearly erect	prostrate to ascending
stem length in dm	(0.4–)1–3(–3.5)	1.5–4.5(–6)	(1.5–)2–5(–6)	(0.5–)1–3(–4.5)
stem length divided by basal leaf length	(2)2.5–4(–6)	1.5–3	(2–)2.5–3(–5)	2–4(–5)
basal lvs 2-ranked?	often	sometimes	usually not	usually not
basal lf length in cm	(2–)3–7(–10)	(4–)10–25	(4–)7–20(28)	(2–)4–12(–17)
petiole length in cm	(0.5)1–3(–6)	1–10(–15)	(2–)3–15(–20)	1–3(–7)
petiole hairs	0, cottony, and/or soft-hairy	0 or strigose	shaggy, silky, or cottony	cottony
leaf division	subpalmate to subpinnate	subpalmate to subpinnate	subpalmate	pinnate
leaf color	green to grayish	green	usually grayish	grayish green to whitish
leaf hairs	sparse to dense soft hairs	absent to common straight hairs	abundant shaggy hairs	sparse to dense cottony and soft hairs
lflets per side	2–3(–4)	2–4	2–3	3–6
lflet-bearing distal fraction of leaf axis	(1/10–)1/4–1/2	1/10–1/2(–3/4)	1/10–1/4	1/2–2/3(–3/4)
lateral lflet length in cm	0.5–2(–2.5)	(1–)2–5	(1.5–)2–4(–6)	0.5–1.5(–2.5)
teeth per side (lateral lflets)	2–4	3–7	(3–)4–6(–8)	2–5
distal fraction of lflet with teeth	± 1/2	1/2–3/4	2/3–3/4	1/2 to entire
depth of incision	1/2–2/3 (to completely)	± 1/2	± 1/2	1/2 to completely
fls per stem	(2–)4–10(–15)	3–15	5–50	2–15(–25)
sepal length in mm	4–6	5–10	5–10	(3–)4–7
petal length in mm	(4–)5–8	(6–)7–12	5–10	5–9(–10)
style base	not swollen-tapered	swollen-tapered	swollen-tapered	not swollen-tapered
elevation in m	2700–3700	300–2350	1200–2700	1500–3600

DISCUSSION

Distribution and Taxonomic History

The current recognition and circumscription of *Potentilla amicarum* is based largely on morphological evaluation of over 100 herbarium specimens, primarily from the holdings of CAS/DS, UC/JEPS, and RSA/POM, supplemented with several decades of fieldwork intersecting various parts of the species' range. Specimens had been previously identified as *P. drummondii, P. breweri, P. bruceae, P. diversifolia* Lehm. (now *P. glaucophylla*), and even *P. pensylvanica* L. and *P. saxosa* Lemmon ex Greene (now *Ivesia saxosa* (Greene) Ertter). About two-thirds of the selected specimens provided the core circumscription of *P. amicarum,* mostly occurring above 3000 m in Fresno, Inyo, and Tulare counties in the southern Sierra Nevada. "Good" *P. amicarum* extends north along the crest of the Sierra Nevada at least as far as Slate Creek Valley in Mono County and Gaylor Lakes in Tuolumne County, as well as at high elevations in the White Mountains and Sweetwater Mountains in Mono County.

Collections of *Potentilla amicarum* have been referenced under *P. drummondii* in recent floristic treatments: e.g., "Pls in s SNH depauperate, possibly distinct" (Ertter 2012). The species is evidently equivalent to the "alpine races" of both *P. drummondii* ssp. *drummondii* (as ssp. *typica*) and ssp. *bruceae* addressed by Clausen et al. (1940, p. 182), which they noted "appear to constitute a third ecological unit in the species". They refrained from formal taxonomic recognition, however, in part because of the difficulty of maintaining representatives in cultivation.

Potentilla amicarum also largely coincides with Jepson's (1936) circumscription, but not the type, of *P. breweri* var. *viridis* Jepson. The type chosen by Jepson (Golden Trout/Volcano Creek, 3 July 1912, *Jepson 4950* [JEPS]) consists of a single plant, with prostrate stems, a congested small-flowered inflorescence, and salient stalked glands, all of which differ from *P. amicarum* and other members of the *P. drummondii/breweri* complex. Jepson's field notes (added to the type) also indicate the plant grew on sand flats, which is characteristic habitat for co-occurring *P. wheeleri* S. Watson (*Jepson 4949*) but not for members of the *P. drummondii/breweri* complex. Given the glandularity, habit, and habitat, my conclusion is that *Jepson 4950* is the (probably sterile) F1 hybrid between *P. wheeleri* and *P. breweri*. as previously suggested (Ertter 1992).

Johnston's (1980) disposition of the specimens accepted here as comprising *Potentilla amicarum* is more ambiguous. Some collections, including the type (*Alexander & Kellogg 3269*), are specifically cited under *P. breweri* var. *viridis* Jepson; others are scattered among *P. drummondii* and *P. bruceae* (which Johnston treated as a variety of *P. breweri* using an unpublished combination). Johnston's circumscription of var. *viridis* also included many specimens now assigned to *P. versicolor* (Ertter et al. 2015); Johnston relegated the type of *P. versicolor* itself to the synonymy of *P. millefolia* Rydb.

Postulated Hybrid Origin and Infraspecific Variation

I hypothesize that *Potentilla amicarum* is the high-elevation stabilized offshoot of hybridization between *P. breweri* and *P. drummondii,* and/or perhaps *P. glaucophylla* var. *glaucophylla.* As such, *P. amicarum* is not more closely related to one of the parental species than the other, which is part of the reason for selecting species rank. The same parentage is presumed for *P. bruceae,* but that is a significantly larger plant from lower elevations with coarser vestiture and a more swollen-tapered style. The basic leaf shape of *P. amicarum* (Fig. 2, varying to subpinnate) is that of *P. drummondii* and *P. bruceae,* while the size, cottony hairs, and more slender style reflect the presumed *P. breweri* parentage. Subglabrous plants might indicate the contribution of *P. glaucophylla.*

One plausible scenario for such an origin is that relict populations of *Potentilla drummondii* were stranded in the Sierra Nevada after the Pleistocene, and these southern populations then hybridized with *P. breweri* to give rise to *P. amicarum.* Collections from Hockett Meadow are particularly intriguing with this scenario in mind. At 2600 m in Tulare County, Hockett Meadow is farther south than any confirmed population of *P. drummondii,* below the lower elevation limit for *P. amicarum,* and far outside the range of *P. bruceae.* And yet *Hall & Hall 8461* (UC) has the size and leaves of typical *P. drummondii,* though with a grayer coloration and non-strigose vestiture. Other collections from Hockett Meadow (*Hall & Hall 8462,* UC; *Dudley 1874,* DS) fall even further along the intermediacy spectrum between *P. drummondii* and *P. breweri*; both were previously identified as *P. bruceae.*

If the hybrid origin hypothesis is correct, it is likely that *Potentilla amicarum* is a nascent species, still transitional between a nothospecies (i.e., existing only as recurring hybrid events) and a fully stabilized independent taxon, perhaps even involving the coalescence of multiple hybridizations. Localized variation could indicate carry-over from a separate progenitor hybrid event or more recent hybridization with co-occurring species. At least some collections (e.g., *Ertter & Töpel 19224*) represent locally consistent populations with no putative parents in the immediate vicinity; others occur in hybrid swarms in which one can only arbitrarily sort individuals among *P. amicarum, P. bruceae, P. drummondii,* or even putative F1 hybrids. Examples include Middle Rae Lake in Kings Canyon National Park and transition zones such as Tuolumne Meadows in Yosemite National Park.

Although a challenge to classical species concepts, complex reticulate evolution and introgression are common strategies in facultative apomicts (Clausen et al. 1940), which is evidently the situation in cenospecies *Potentilla drummondii* (Clausen et al. 1940). The plants of *P. amicarum* studied by Clausen et al. were high polyploids with irregular meiosis: the "alpine ecotype" from Slate Creek Valley (1172-2) had a mitotic count of $2n$ = ca. 92, with 17 to 30 univalents in first metaphase, while those from Mount Dana (1172-12 and 1172-14) had somatic counts of $2n = 87$ and 70 respectively, with pollen cells and nuclei disintegrating in the latter. A later collection of *P. amicarum* from Fresno County (*Snow 929,* UC) provides a comparable chromosome count on the label, noting $2n$ = "at least 129", many univalents at metaphase, and laggards at anaphase. In *Potentilla,* apomictic reproduction often works by pseudogamy (summary in Eriksen 1996), whereby seeds develop in which the embryo is genetically identical to the parent plant, bypassing meiosis and the complications of unbalanced ploidy.

Although the results of my analysis revealed sufficient coherent morphology over a contiguous ecogeographic range to merit taxonomic recognition, especially in Tulare and Inyo counties, the current circumscription of *Potentilla amicarum* nevertheless includes significant variation in such features as leaf dissection and vestiture. The latter ranges from relatively dense (as in Fig. 2) to subglabrous (possibly resulting from hybridization with *P. glaucophylla),* which led Clausen et al. (1940) to split their postulated "third ecological unit" between alpine races of their *P. drummondii* ssp. *drummondii* and ssp. *bruceae.* While there is some geographic correlation with a portion of this variation (e.g., plants in Tuolumne County are more likely to have predominantly cottony hairs, whereas those from Fresno County are more likely to be subglabrous), the lack of correlation with other characters supports the recognition of a single taxon with significant infraspecific variation, at least provisionally.

Individual collections from well outside the range of *Potentilla amicarum* accepted here have morphologies that could be accommodated within this species, but their lack of a cohesive suite of diagnostic characters suggests that the specimens represent independent recurrent hybridization events whose taxonomic disposition is unresolved. Examples in California include *Ertter 21099* (UC) and *Howell 53163* (CAS) from Alpine County, and multiple collections from Castle Peak ("Mt. Stanford") in Nevada County. Comparable plants are also known from the northern Ruby Mountains in Elko County, Nevada, co-occurring with *P. breweri* (and provisional *P. versicolor*) but well outside the range of *P. drummondii* s.s.; these plants may be more closely related to *P. ovina* J.M. Macoun var. *decurrens* (S. Watson) S.L. Welsh & B.C. Johnst. than to *P. drummondii*. These and other problematic populations are currently under investigation by Alexa DiNicola at the University of Wisconsin.

Adjustments to Recent Accounts of Related Species

As previously noted, above and elsewhere (Ertter & Mansfield 2007), the geographic circumscription of *Potentilla bruceae* had already been reduced to exclude collections now placed in *P. amicarum*. Unfortunately, this reduced circumscription was not fully implemented when an earlier description (i.e., Ertter 1993) was updated for subsequent use (Ertter 2012; Ertter et al. 2015), in part because I had not yet decided on the southern boundary of *P. bruceae.* That question is still not resolved, but with the recognition of *P. amicarum* it is clear that at least the lower size limit of *P. bruceae* stems and leaves needs to be shifted upwards, and the upper elevational limit needs shifting down. The necessary adjustments are as provided in Table 1.

Fewer adjustments are needed for current descriptions of *Potentilla drummondii* in the strict sense (Ertter 2012; Ertter et al. 2015), but a more detailed description of the distribution within California is in order. The species is well represented by collections in the mountains of northwestern California (Del Norte, Humboldt, Siskiyou, and Trinity counties) and also in Yosemite National Park, Tuolumne County, especially in Tuolumne Meadows. Within the North Coast Ranges, a single occurrence is documented from Mendocino County (*Wheeler & Smith 1736*, CAS); glandular, more pinnate-leaved populations on Snow Mountain (Colusa and Lake counties) might qualify as a distinct variety. Only sporadic occurrences are documented elsewhere in California, all from below 2800 m in the Sierra Nevada, mostly on the western slope: e.g., Butte County, (*Oswald & Ahart 3855*, UC), Nevada County (*True 1625*, CAS), Placer County (*Sonne s.n.,* 12 Jul 1885, UC), and Madera County (*Ertter & Clines 21114,* UC). Some collections from the northern Sierra Nevada are intermediates or mixed populations with *P. bruceae*: e.g., *Geis 37c* (UC), *Belshaw 1060* (UC). The apparent rarity of *P. drummondii* in the Sierra Nevada outside of Yosemite National Park may in part indicate how easily this species is confused with the much more common *P. gracilis* Douglas ex Hook.

No adjustments are made to *Potentilla breweri* at this time, other than noting that descriptive elements for this species in Table 1 are based primarily on the range of variation found in the central and southern Sierra Nevada. Specifically excluded are collections of unusually tall plants with ascending stems from relatively low (for *P. breweri*) elevations in Butte, Lassen, and Plumas counties. Also excluded are sparsely cottony collections from the Scott and Trinity mountains of northern California, including the type of *P. millefolia* var. *algida* Jepson. These, and other anomalies in the *P. drummondii/breweri* complex, are currently under investigation as a doctoral study by Alexa DiNicola at the University of Wisconsin; the current paper summarizes my research to date so that the project can be handed over to her for analysis using innovative techniques.

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