

# Identity of the enigmatic *Potentilla radiata*, *P. svanetica*, *P. armeniaca*, and seven further taxa

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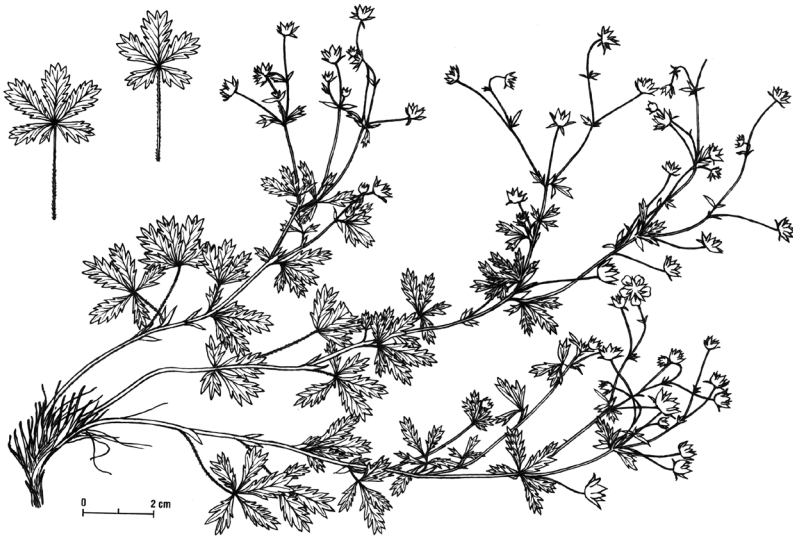
*Potentilla radiata* Lehm., described from northern Iran, also occurs in the Caucasus, Transcaucasia and NE Turkey. It has been reported as *P. svanetica* Siegf. & R. Keller, *P. sommieri* Siegf. & R. Keller or *P. armeniaca* Siegf. ex Th. Wolf by local authors. It was occasionally collected also in the N part of European Russia and in Romania, being described as *P. × burduja* Prodán & Ľopa, *P. × leteae* Prodán, *P. × moeszii* Jáv. ex Prodán, *P. × porciusii* Prodán and *P. gordiagini* Juz. The name *P. radiata* Lehm., not used previously, has priority over all of the mentioned names. *Potentilla radiata* is interpreted as a hybrid between *P. argentea* L. and *P. thuringiaca* Bernh. ex Link.

## Introduction

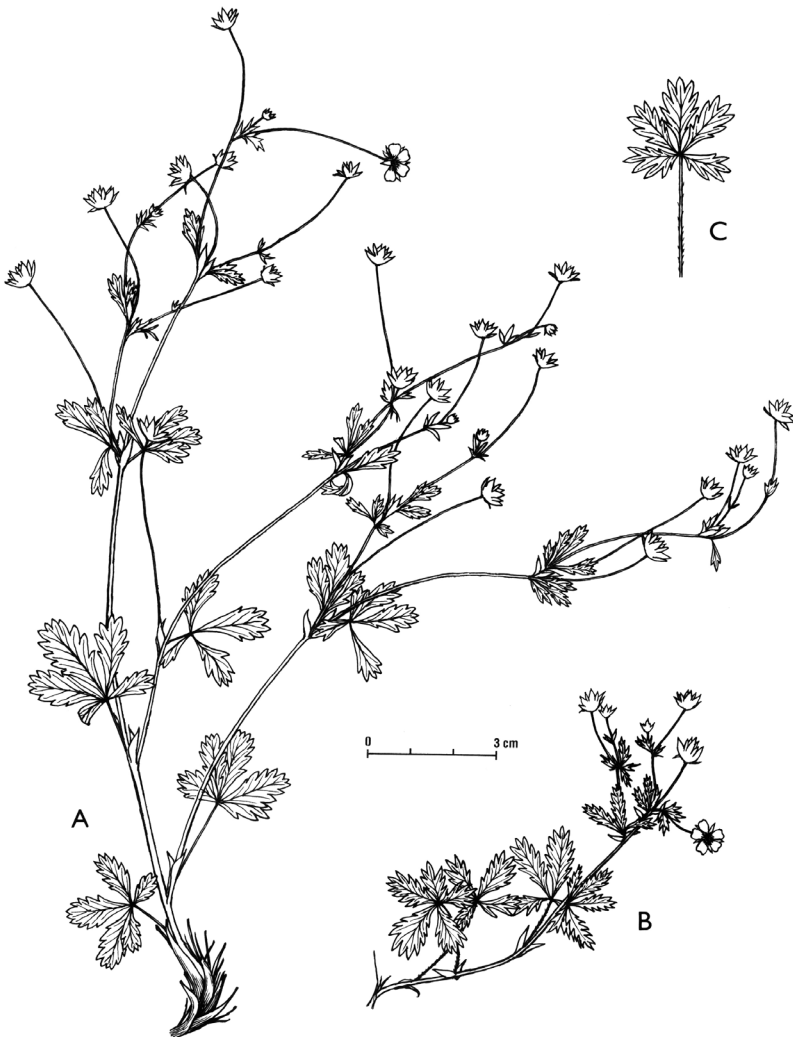
*Potentilla radiata* Lehm. (Figs. 1 and 2) was described from northern Iran in 1849. Up to the present day, it was regarded as an enigmatic species whose one single specimen was collected only once by an unknown collector. Boissier (1872) mentioned that he had not seen it and that he took its description from Lehmann (1856). Parsa (1948) in turn took the description and the record of its occurrence in N Iran from Boissier. Schiman-Czeika (1969) listed it, for the sake of completeness of her treatment, among “*Species incertae et incomplete notae*”, with a description taken from Lehmann and with a note that the only specimen was lost and no new material existed. Khatamsaz (1992) did not mention it at all.

Wolf (1908) mentioned *P. radiata* only marginally, quoting Lehmann’s description. The only botanists to see the type specimen of *P. radiata* in the past 150 years were Emanuel

Purkyně and Ladislav Čelakovský. Purkyně (Professor at the Forest Academy in Bělá pod Bezdězem, N Bohemia), who bought Lehmann’s herbarium of *Potentilla* after Lehmann’s death in 1860 and studied it in detail, left a note “sicher eine *P. collina* ...” on the herbarium label of *P. radiata*. As summarized by Soják (1996), the Museum of the Czech Kingdom (now National Museum in Prague) bought the herbarium in 1865. Čelakovský (1889) did not address the issue of *P. radiata* beyond agreeing with Purkyně’s opinion and drawing attention to the similarity with the Czech species *P. lindackeri* Tausch, a member of the *Collinae* group. Although Wolf (1908) followed Čelakovský in placing *P. radiata* in the *Collinae* group, he questioned whether Čelakovský might have been overly influenced by Purkyně, and that the membership of *P. radiata* in the *Persicae* group could be ruled out. It is worth mentioning that, according to Wolf (1908), the only extant specimen of



**Fig. 1.** *Potentilla radiata* (Abkhasia, from Soják 5158, PR), habit and basal leaves.



**Fig. 2.** *Potentilla radiata*. — **A:** Habit (Iran, from Lindsay 1075, BM). — **B** and **C:** Stem and basal leaf (Abkhasia, from Soják 5672, PR).

*P. radiata* was lost perhaps because Čelakovský had forgotten to return it to the collections. In fact, Wolf overlooked it because its label did not say that it came from Lehmann's herbarium. Had Wolf compared the Prague specimen with the excellent drawing by Lehmann (1856), he could have easily identified the type. Wolf's presumption that *P. radiata* could belong to the *Persicacae* group cannot be sustained because its type specimen has already been found, and it has short styles terminated with a broadened stigma.

## Results

After much trouble, I managed to ascertain that the type of *P. radiata* (preserved at PR) belongs to a species currently named *P. svanetica* Siegr. & R. Keller by Russian and Transcaucasian botanists (see below). The difficulty was caused by the fact that Lehmann's specimen is not a typical form of the species, having, unlike typical forms, only a few leaflet teeth and a rather contracted inflorescence. The two plants are identical in all other characters, especially taxonomically significant ones. They have an identical indumentum on leaflets and petioles, the same appearance of stems and inflorescences, and flower organs of identical size.

*Potentilla svanetica* and the closely related *P. sommieri* Siegr. & R. Keller were described by Keller in 1892 (i.e., 43 years after *P. radiata*) based on collections made by Sommier and Levier in the Caucasus in 1890. Both of Keller's species were adopted by Wolf (1908), Juzepczuk (1941), Grossheim (1949, 1952), Kapeller (1980), Kolakovskiy (1985) and other authors of the former USSR. In my opinion, both of Keller's species represent only unimportant forms of a single species. The differences between *P. svanetica* and *P. sommieri* given by the authors mentioned above (i.e., number of leaflets and their teeth) are insignificant and are not constant even in the original specimens. I previously chose the name *P. svanetica* for the joint species (Soják 2004).

Another closely related species, *P. armeniaca* Siegr. ex Th. Wolf, was described from two locations in northeast Turkey. It was recognized by Peşmen (1972). A careful comparison of syn-

types of *P. armeniaca* with the type material of *P. svanetica* and *P. sommieri* demonstrate that all three plants belong to a single species, for which the name *P. radiata* is to be adopted.

*Potentilla radiata* comprises, according to my opinion, all derivatives arisen through hybridization between *P. argentea* [sect. *Terminaliales*] and *P. thuringiaca* [sect. *Chrysanthae*]. The participation of *P. argentea* in the origin of *P. radiata* is evident in the indumentum of the leaflet underside (fine, thin, slightly or strongly bent, numerous hairs). The participation of *P. thuringiaca* is somewhat difficult to demonstrate because *P. crantzii* (Crantz) Beck ex Fritsch or *P. humifusa* Willd. s. lato might also be among the parents. The participation of the latter two species appears improbable considering the well-developed foliage in the upper part of the stem (particularly in the inflorescence).

Hybrid derivatives from the combination *P. argentea* × *P. thuringiaca* are not confined to the Caucasus, Transcaucasia, Turkey and Iran. They are also found scattered in the northern part of European Russia, from about St. Petersburg to the Urals. They arise polytopically at various locations, sometimes having the nature of recurrent hybrids, elsewhere of stabilized species. They are very variable, vacillating in characters between their parents. They have also been described as *P. gordiagini* Juz. from the southern Urals. A hybrid *P. argentea* × *P. thuringiaca* has also been found in Romania and described as *P. × leteae* Prodán (and at the same time as *P. × burduja* Prodán & Țopa in Prodán, *P. × porciusii* Prodán and *P. × moeszii* Jáv. ex Prodán; cf. Soják 2004).

It is possible that populations of *P. radiata* from northeastern Europe differ from southern populations in having stems branched in the upper half or at the top, and sometimes smaller bracts. But a detailed comparison is practically impossible because of the small number of specimens collected hitherto.

*Potentilla radiata* is rare everywhere, as evidenced by the small number of herbarium sheets deposited in world herbaria. Only eight sheets from the Caucasus are deposited as *P. svanetica* in LE, where *P. sommieri* is missing. This species is missing entirely in the main herbaria of the Transcaucasian republics. Only four speci-

mens from Turkey and two specimens of this species from Iran are housed in BM and K.

For the distribution map of this species, see Grossheim (1952: map 86 as *P. svanetica* and *P. sommieri*). I have observed *P. radiata* only in dry, grassy places near paths in the upper part of forest belt in the western Caucasus, at elevations of (600)1000–1600 m a.s.l. The species grows in similar habitats in other regions, as can be assumed based on the sparse information found on the herbarium labels and in Grossheim (1952: 73).

*Potentilla radiata* could sometimes be mistaken for low forms of *P. inclinata* Vill., which differ in having relatively large petals (5–9 mm). A similar divaricate inflorescence and indumentum of the leaflet underside is found in *P. lazica* Boiss. & Balansa, perhaps endemic to a single locality in NE Turkey, that differs from *P. radiata* in having conspicuously large petals (6–10 mm) and calyces. Small petals (3.5–5 mm) are an important diagnostic character of *P. radiata*.

The *P. lindackeri* complex, derived from *P. argentea* × *P. verna* L. *nom. cons. prop.* (*P. tabernaemontani* Asch.), is found scattered in the central and western part of Europe. It is very similar to *P. radiata* in having small petals and the same type of inflorescence and indumentum of leaflets. If these two species occurred in the same area, it would be difficult to distinguish them. Probably the only reliable difference is in the dissimilar foliage in the inflorescence. The bracts of *P. lindackeri* are small and rather reduced, while they are larger and usually well developed in *P. radiata*.

In eastern Europe, northwestern Kazakhstan, Siberia and the former Soviet Central Asia, *P. argentea* hybridizes with two species that belong, like *P. thuringiaca*, to the section *Chrysanthae*. The resulting hybrids and hybrid species are similar to *P. radiata* by their habit. Derivatives of the combination *P. argentea* × *P. chrysantha* Trevir. (i.e., *P. macropoda* Soják) differ mainly by the absence of 7-foliolate leaves. Plants derived from *P. argentea* × *P. longipes* Ledeb. (i.e. *P. turgaica* Soják, *P. eremica* Th. Wolf *non* Coville) often have a conspicuously shorter and notably sparser indumentum of stems and petioles.

## Synonymy and augmented description

### *Potentilla radiata* Lehm.

Delectus Sem. Hort. Hamburg. Bot. 9. 1849. — TYPE: in Persia boreali, sine collectore et dato (PR, herb. Lehmannianum).

*P. armeniaca* Siegf. ex Th. Wolf, Biblioth. Bot. 16(71): 294. 1908. — SYNTYPES: Armenia turcica, “Sipikor” inter “Szadagh” et “Awschusch”, leg. 1890 Sintenis, planta culta 1892, H. Siegfriedii Exs. Potentill. Cult. no. 648 (DR, Z, LE).

*P. svanetica* Siegf. & R. Keller, Bot. Jahrb. Syst. 14: 507. 1892. — SYNTYPES: Iter Caucasicum, Svanetia ad fl. Hippum (Zchenis-Zchali) inter Zagheri et Lentechi, 1890 *Sommier & Levier* 39 (FI); ibidem prope pagum Tscholur, 1890 *Sommier & Levier* 44 (FI); Svanetia libera ad fl. Nenskra, 1890 *Sommier & Levier* 42 (FI).

*P. sommieri* Siegf. & R. Keller, Bot. Jahrb. Syst. 14: 506. 1892. — TYPE: Iter Caucasicum, Svanetia libera prope pagum Betscho in convalle fl. Ingur, 1890 *Sommier & Levier* 55 (FI).

*P. kandavanensis* Bornm. & Gauba, Repert. Spec. Nov. Regni Veg. 51: 91. 1942, *nom. provis., sine descr. lat.* — TYPE: Persia borealis, Elburs, Kandavan, 1938 *Gauba* 5001 (B).

*P.* × *burduja* Prodán & Ťopa, Analele Acad. Republ. Populare Române 3(17): 650. 1950. — TYPE: Romania. Baia et Miroşlovesti, *Burduja* (I).

*P.* × *leteae* Prodán, Analele Acad. Republ. Populare Române 3(17): 649. 1950. — TYPE: Romania. Dobrogea, distr. Tulcea, *Letea, Nyárády* 1923 (CL).

*P.* × *porciusii* Prodán, Analele Acad. Republ. Populare Române 3(17): 645. 1950. — TYPE: Romania. Năsăud, *Porcius* (CL).

*P.* × *moeszii* Jáv. ex Prodán, Analele Acad. Republ. Populare Române 3(17): 644. 1950. — SYNTYPES: Romania. Ad Ciuc, ad Ciceu, *Nyárády* (CL); Odorhei Zetea (*Zetelaka*), *Nyárády* (CL).

*P. gordiagini* Juz., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 216. 1955. — TYPE: Russia. Ustj-Karabolka, distr. Shadrinsk, *Gordiagin* 1894 (LE).

Rootstock simple, short, ± stout, clothed with remains of brown stipules. Stems (5–)10–30 cm long, ascending or decumbent, rarely almost erect, often from half branched (sometimes branching from base, rarely at apex), ± 5–60-flowered, covered with slightly or strongly flexuous, numerous, ± 0.2–1.3 mm long hairs; cauline leaves (2–)3–5, well developed. Basal leaves (usually missing during the flowering period) ca. 2.5–12 cm long, 5(–7)-foliolate. Lower cauline leaves 5–7-foliolate. Indumentum of petioles very variable; hairs usually 0.4–1(–1.5) mm long, often irregularly flexu-

ous with straight hairs admixed, sometimes all hairs  $\pm$  straight,  $\pm$  numerous,  $\pm$  0.7–1.5 mm long, patent or erect-patent, rarely very short curved hairs prevailing. Leaflets of lower cauline leaves oblong or cuneate-obovate, 1–3 (rarely up to 6)  $\times$  (0.3–)0.5–1(–1.7) cm, with (2–)3–5(–6) pairs of shallow or up to half way towards midrib reaching teeth, the upper leaflet side with straight, appressed hairs or glabrate, underside green or greyish-green, dispersedly or dense hairy, rarely glabrate, between veins with very thin, fine, straight or slightly curved hairs (subcrispate hairs missing). Inflorescence lax, often diffuse, rarely moderately contracted. Flowers (1–)1.1–1.3 cm in diam. Sepals 2.5–4.5  $\times$  1.4–2 mm. Episeals 2.5–4(–5)  $\times$  0.6–1.5(–2) mm, usually shorter, rarely longer than sepals. Petals (3.5–)4–5 mm long, distinctly longer than sepals. Anthers 0.5–0.9 mm long. Styles 1–1.2(–1.3) mm long, moderately thickened and papillose at base. Stigma  $\pm$  dilated. Achenes 1.1–1.2(–1.3) mm long, light brown, sculptured.

DISTRIBUTION: **Georgia.** Regions Abkhazia, Samegrelo-Semo Svaneti, Samtskhe Javakheti. **Armenia.** Mt. Aragats. **Naxçivan** (exclave of **Azerbaijan**). Bichenakh. **Turkey.** Regions Amasya, Erzincan, Rize. **Iran.** Yehlah. **Russia.** Regions St.-Petersburg, Arkhangel'sk, Vologda, Tver', Yaroslavl', Kostroma, Moskva, Nizhniy Novgorod, Kirov, Penza, republic Tatarstan, Ul'yanovsk, Samara, republic Bashkortostan, Perm, Chelyabinsk, Yekaterinburg; Bryansk and Orlov (possibly introduced), Georgian frontier in Karachay-Cherkess A.O. and Severo Ossetian A.S.S.R. **Romania.** Regions Cluj, Tirgu-Mures, Suceava, Constanta.

## References

- Boissier, E. 1872: *Flora Orientalis* 2: 720. — H. Georg, Genevae et Basileae.
- Čelakovský, L. 1889: Über *Potentilla Lindackeri* Tausch und *Potentilla radiata* Lehm. — *Oesterr. Bot. Zeitschr.* 39: 201–205, 247–251.
- Grossheim, A. A. [Гроссгейм, А. А.] 1949: [*Determination key of plants of Caucasus*]. — Izd. Sovetskaya Nauka, Moskva. [In Russian].
- Grossheim, A. A. [Гроссгейм, А. А.] 1952: *Potentilla*. — In: Grossheim, A. A. [Гроссгейм, А. А.] (ed.), [*Flora of Caucasus*, 5]: 61–82. Izd. Akademii Nauk SSSR, Moskva et Leningrad. [In Russian].
- Juzepczuk, S. V. [Юзепчук, С. В.] 1941: *Potentilla*. — In: Shishkin, B. K. & Juzepczuk, S. V. [Шишкин Б. К., Юзепчук, С. В.] (eds.) [*Flora of the USSR*, 10]: 78–223. Izd. Akademii Nauk SSSR, Moskva, Leningrad. [In Russian].
- Kapeller, O. A. [Капеллер, О. А.] 1980: *Potentilla*. — In: Gvinianidze, Z. I. & Lachashvili, I. Ya. [Гвинианидзе, З. И. & Лачашвили, И. Я.] (eds.) [*Flora of Georgia*, 2, 6 ed.]: 144–177. Metsniereba, Tbilisi. [In Georgian].
- Khatamsaz, M. 1992: *Potentilla*. — In: Assadi, M. & Maassoumi, A. A. (eds.), [*Flora of Iran*, 6]: 88–142. Research Institute of Forests and Rangelands, Tehran. [In Farsi].
- Kolakovskiy, A. A. [Колаковский, А. А.] 1985: [*Flora of Abkhazia*, 2, ed. 3]: 203–212. — Metsniereba, Tbilisi. [In Russian].
- Lehmann, J. G. Ch. 1856: *Revisio Potentillarum*. — Apud Eduarum Weberum, Vratislaviae, Bonnae.
- Parsa, A. 1948: *Flore de l'Iran*, 2: 592. — Museum d'histoire Naturelle de Teheran, Teheran.
- Peşmen, H. 1972: *Potentilla*. — In: Davis, P. H. (ed.), *Flora of Turkey* 4: 41–68. University Press, Edinburgh.
- Schiman-Czeika, H. 1969: *Potentilla*. — In: Rechinger, K. H. (ed.), *Flora Iranica* 66: 78–114. Akademische Druck- u. Verlagsanstalt, Graz.
- Soják, J. 1996: Notes on *Potentilla* (Rosaceae). XIV. Type specimens in the Lehmann herbarium. — *Preslia* 68: 97–124.
- Soják, J. 2004: *Potentilla* L. (Rosaceae) and related genera in the former USSR (identification key, checklist and figures). Notes on *Potentilla* XVI. — *Bot. Jahrb. Syst.* 125: 253–340.
- Wolf, Th. 1908: Monographie der Gattung *Potentilla*. — *Biblioth. Bot.* 16(71): 1–715.