A new species of *Potentilla* (Rosaceae): *P. baekdusanensis* M. Kim

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ABSTRACT: A new species, *Potentilla baekdusanensis* M. Kim, is described here. It is found in Baekdusan Mt., Korea. *Potentilla baekdusanensis* shares several characteristics (pinnately compound leaves, pubescent leaf blades and leaf petioles, different leaflets size, and absent stolons) with the related species *P. fragarioides*. However, this new species has small plants with short and curved hairs, 7 leaflets, small lower leaflets, a glabrous leaflet margin, and yellow petals with a reddish yellow base. In contrast, *P. fragarioides* are large plants with long and straight hairs, 9–15 leaflets, large lower leaflets, a ciliate leaf margin, and yellow petals without a reddish yellow base.

Keywords: *Potentilla baekdusanensis*, *P. fragarioides*, new species, Rosaceae, Baekdusan Mt.

The genus *Potentilla* L. (Rosaceae) consists of approximately 500 species and is distributed primarily in temperate, arctic, and alpine zones of the Northern Hemisphere (Li et al., 2003).

Potentilla are characterized by yellow petals longer than sepals, many stamens, more than 10 carpels, and a dry fruiting receptacle (Lee, 2007). *Potentilla* consists of 6 sections (*Rhopalostylae*, *Nematostylae*, *Closterostylae*, *Leptostylae*, *Potentilla*, *Conostylae*) in China and 4 sections (*Rhopalostylae*, *Nematostylae*, *Potentilla*, *Conostylae*) in Korea (Li et al., 2003). *Potentilla fragarioides* L. belongs to section *Potentilla*. Seventeen taxa of *Potentilla* are distributed in Korea (Lee, 2007). Of them, *P. fragarioides* L. and *P. freyniana* Bornm occur widely in Korea, whereas *P. nivea* L. and *P. gageodoensis* M. Kim are rather rare and sporadically distributed (Lee, 2006; Heo et al., 2013; So et al., 2014; Kim, 2017).

A new species of *Potentilla* was discovered in Baekdusan Mt. in Korea. The new species shares several characters with its related species, *P. fragarioides* L. However, it can be distinguished from *P. fragarioides* based on plant size (i.e., small), leaflet hairs (i.e., short and curved), leaflet margin (i.e., glabrous), and petal base (i.e., reddish yellow). Thus, we named this new species as *Potentilla baekdusanensis* M. Kim.

Taxonomic Treatment

Potentilla baekdusanensis M. Kim, sp. nov. (Figs. 1–3).

TYPE: KOREA. Baekdusan Mt., elev. 800 m, 23 Apr 2017. M. Kim MK176212 (holotype, JNU; isotypes, JNU, KH, KB).

Korean name: Baek-du-san-yang-ji-kkot 백두산양지꽃

Diagnosis: *Potentilla baekdusanensis* M. Kim can be distinguished from its related taxa *P. fragarioides* by having smaller plants with short and curved hairs, 7 leaflets, small lower leaflets, glabrous leaflet margin, and yellow petals with a reddish yellow base (Table 1).

Herbs perennial. Roots numerous. Stolons absent. Flowering stems 5–22, ascending or spreading, 7–11 cm in length. Basal leaves pinnately compound with 7 leaflets, 4–9 cm including petiole; stipules light-brown, abaxially sparsely spreading villous; leaflets at intervals of 0.5–1.0 cm, shortly petiolulate or sessile, pale green on abaxial surface, leaflets elliptic, 1.5–2.0 × 1.0–1.5 cm, adaxial surface pilose or not and abaxial surface pilose on vein, margins serrate and glabrous. Cauline leaves 2, 3-foliolate, leaflets obovate or elliptic, 0.9 × 0.4 cm, abaxial surface pilose, margin serrate and glabrous. Inflorescence terminal, corymbose-cymose. Flowers bisexual, 1.3–1.6 cm in diameter. Pedicel 1.9–2.5 cm, with short and curved hairs. Sepals 5, ovate, 3.5–4.0 × 2.0–

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2.5 mm; epicalyx segments 5, lanceolate, $2.3\text{--}2.8 \times 1.2\text{--}1.5$ mm, with short and curved hairs. Petals 5, yellow with a reddish yellow base, circular, $6\text{--}7 \times 6\text{--}7$ mm, apex emarginate. Style 1, subterminal, clavate, thickened at apex, 1 mm in length. Fruits achene, seeds subreniform, 1.0×0.8 mm.

Flowering: April–May.

Distribution: Korea (Baekdusan Mt.).

Etymology: The specific epithet is derived from Baekdusan Mt., where this new species is found.

Habitats: A population of *Potentilla baekdusanensis* M.

Fig. 1. Photographs of *Potentilla baekdusanensis* M. Kim. **A.** Adult plants with flowers. **B.** Leaf. **C.** Front view of flower. **D.** Petal. **E.** Pistils and stamens. **F.** Sepals and epicalyx segments. **G.** Stipule. **H.** Seed.

Fig. 2. *Potentilla baekdusanensis* M. Kim. **A.** Adult plant with flowers. **B.** Flower. **C.** Sepals and epicalyx segments. **D.** Pistil. **E.** Stamen. **F.** Seed. **G.** Basal leaf.

Kim was found in woodlands on Baekdusan Mt.. This new species occurs under trees in forests dominated by *Abies nephrolepis* (Trautv.) Maxim. and *Larix gmelinii* var. *olgensis* (A. Henry) Ostenf. & Syrach. This species also occurs with other herbaceous species such as *Micranthes*

nelsoniana (D. Don) Small, *Chrysosplenium flaviflorum* Ohwi, *Pyrola dahurica* (Andres) Kom., and *Lobelia sessilifolia* Lamb.

Additional specimens examined (paratypes): KOREA. Baekdusan Mt., 19 May 2014. M. Kim MK140221 (JNU).

Fig. 3. Holotype of *Potentilla baekdusanensis* M. Kim.

Table 1. Comparison of some morphological characters among *Potentilla baekdusanensis* and its related species.

Characters	<i>P. baekdusanensis</i>	<i>P. fragarioides</i>	<i>P. gageodoensis</i>
Plant size	Small	Large	Large
Stolons	Absent	Absent	Absent
Basal leaf length (cm)	4–9	20–30	20–45
Petiole color	Greenish purple	Greenish purple	Green
Number of leaflets	7	9–15	5 (7)
Leaflet shape	Elliptic	Elliptic	Broadly ovate
3 Upper leaflets length (cm)	1.5–2.0	2–6	2.5–8
3 Upper leaflets width (cm)	1.0–1.5	1–3	2–6
Lower leaflet length (cm)	0.3–0.5	3–5	2.5–3.5
Leaflet margin	Glabrous	Ciliate	Densely white ciliate
Number of leaflet teeth	6–7	9–11	13–15
Leaflet abaxial surface hairs	Pilose on vein	Densely pilose	Pilose on vein
Leaflet abaxial surface color	Pale green	Pale green	Pale green
Flowering stem length (cm)	7–11	12–25	19–30
Flowering stem color	Greenish purple	Greenish purple	Green
Number of cauline leaves	2	3 (5)	3
Cauline leaf shape	Ovate	Elliptic	Ovate
Number of flowers per peduncle	6	11–12	3–4
Flower diameter (cm)	1.3–1.6	1.3–2.0	2.5–3.0
Pedicel length (cm)	1.9–2.5	1.5–2	1–3
Sepal shape	Ovate	Ovate	Lanceolate
Sepal size (mm)	3.5–4.0 × 2.0–2.5	4–5 × 1–2	4.5–5.5 × 1.5–2.5
Epicalyx segment shape	Lanceolate	Lanceolate	Oblanceolate
Epicalyx segment size (mm)	2.3–2.8 × 1.2–1.5	4–5 × 1–2	4.8–5.3 × 1.8–2.3
Epicalyx hairs	Short and curved	Long and straight	Long and straight
Petal color	Yellow with a reddish yellow base	Yellow	Yellow
Petal length (mm)	6–7	5–7	10–11
Petal width (mm)	6–7	5–7	10–11
Seed shape	Subreniform	Subreniform	Subreniform

Key to *Potentilla baekdusanensis* and its related taxa

1. Style conic, thickened at base (**Sect. *Conostylae***).
2. Leaves ternately compound *P. nivea* 은양지꽃
2. Leaves pinnately compound.
3. Leaflets lobed *P. chinensis* 딱지꽃
3. Leaflets serrulate.
4. Stolons present *P. stolonifera* 제주양지꽃
4. Stolons absent.

5. Leaflets lower surfaces glabrescent
..... *P. supina* 개소시랑개비
5. Leaflets lower surfaces pilose or glaucous ·
..... *P. dickinsii* 돌양지꽃
1. Style clavate, thickened at apex (**Sect. *Potentilla***).
6. Stolons present; leaves 3-foliolate or palmately 5-foliolate.
7. Leaves 3-foliolate *P. freyniana* 세잎양지꽃
7. Leaves palmately 5-foliolate
..... *P. flagellaris* 덩굴땀말기

6. Stolons absent; leaves pinnately compound.
8. Leaflets thin, elliptic, margin ciliate or glabrous; petals 0.6–0.7 cm long.
9. Basal leaves 4–9 cm; leaflets 7, lower ones small (0.4–0.6 cm), margin glabrous; petal base reddish yellow *P. baekdusanensis* 백두산양지꽃
9. Basal leaves 20–30 cm; leaflets 9–15, lower ones large (1–3 cm), margin ciliate; petal base yellow *P. fragarioides* 양지꽃
8. Leaflets thick, broadly ovate, margin densely white ciliate; petals 0.8–1.1 cm long *P. gageodoensis* 가거양지꽃

By applying the IUCN Red List criteria (IUCN, 2011), *Potentilla baekdusanensis* M. Kim will be evaluated as the category of endangered (EN) species, because of its small population of five hundred individuals found on Baekdusan Mt..

Conflict of Interest

Authors declare that there is no conflict of interest.

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Literature Cited

- Heo, K.-I., S. Lee, M. Yoo, S. Lee, Y. Kwon, S. Y. Lim, S. Kim and S.-C. Kim. 2013. The taxonomical implication of trichome and epicuticular waxes in tribe Potentilleae (Rosaceae) in Korea. *Korean Journal of Plant Taxonomy* 43: 106–117. (in Korean)
- IUCN. 2011. Guidelines for Using the IUCN Red List Categories and Criteria. Version 9.0. Retrieved Jun. 10, 2014, available from <http://www.iucnredlist.org>.
- Kim, M. 2017. Korean Endemic Plants. Haejin Media Co., Seoul. Pp. 197–198. (in Korean)
- Lee, S. 2007. *Potentilla* L. In The Genera of Vascular Plants of Korea. Park, C. W. (ed.), Academy Publishing Co., Seoul. Pp. 549–553.
- Lee, Y.-N. 2006. New Flora of Korea. Vol. I. Kyohak Publishing Co., Ltd., Seoul, Korea. Pp. 535–543. (in Korean)
- Li, C., H. Ikeda and H. Ohba. 2003. *Potentilla* L. In Flora of China. Vol. 9. Pittosporaceae through Connaraceae. Wu, Z. Y., P. H. Raven and D. Y. Hong (eds.), Science Press, Beijing and Missouri Botanical Garden Press, St. Louis, MO. Pp. 291–327.
- So, S., H. Jo and M. Kim. 2014. A new species of *Potentilla* (Rosaceae): *P. gageodoensis* M. Kim. *Korean Journal of Plant Taxonomy* 44: 175–177.

양지꽃속(장미과)의 신종: 백두산양지꽃(*Potentilla baekdusanensis* M. Kim)

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적 요: 백두산에서 양지꽃속의 신종인 백두산양지꽃(*Potentilla baekdusanensis* M. Kim)을 새로이 발견하여 기재하였다. 백두산양지꽃은 잎이 우상복엽이며 엽신과 엽병에 털이 있고 3개의 상부 소엽이 하부 소엽보다 크며 포복경이 없어 양지꽃과 유사하다. 그러나 백두산양지꽃은 식물체가 소형이고 짧은 누운 털이 있으며 근생엽이 7장의 소엽으로 이루어졌고 하부 소엽이 작으며 소엽가장자리에 털이 없고 꽃잎 기부에 황적색의 무늬가 있다. 반면에, 양지꽃은 식물체가 대형이고 긴 곧은 털이 밀생하며 근생엽이 9–15장의 소엽으로 이루어졌고 하부 소엽이 크며 소엽가장자리에 긴털이 밀생하고 꽃잎 기부에 황적색의 무늬가 없는 점에서 두 종이 뚜렷하게 차이가 난다.

주요어: 백두산양지꽃, 양지꽃, 신종, 장미과, 백두산