



A new species of *Viola* (Violaceae): *V. breviflora* Jungsim Lee & M. Kim

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제비꽃속(제비꽃과)의 신종 : 방울제비꽃 (*Viola breviflora* Jungsim Lee & M. Kim)

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ABSTRACT: A new species, *Viola breviflora* Jungsim Lee & M. Kim is named and described from Mt. Seogbyeongsan, Gangwondo Province, Korea. The *Viola breviflora* shares several characteristics (acaulescent leaves, white flowers, pubescent leaf blades and petioles, etc.) with its related species *V. keiskei* Miq., but is distinct from *V. keiskei* which has cordate leaf shapes, deep-cordate leaf bases, long pedicels, few flowers, shapeless rhizomes, green fruits, and low altitude habitats by having ovate leaf shapes, shallow-cordate leaf bases, short pedicels, many flowers, L-shape rhizomes, purplish green fruits, and high altitude habitats.

Keywords: *Viola breviflora*, *V. keiskei*, Violaceae

적 요: 강원도 석빙산에서 제비꽃속의 신종인 방울제비꽃(*Viola breviflora* Jungsim Lee & M. Kim)을 새로이 발견하여 기재하였다. 방울제비꽃은 무경종이고 꽃이 흰색이며 엽신과 엽병에 털이 있어 잔털제비꽃과 유사하다. 그러나 방울제비꽃은 잎이 장란형이고 엽저는 얇은 심장저이며 화경이 짧고 꽃이 많이 달리며 지하경은 L형이고 열매는 보라색이며 고산지대에서 자라는 반면에, 잔털제비꽃은 잎이 심장형이고 엽저는 깊은 심장저이며 화경이 길고 꽃이 적게 달리며 지하경은 무경형이고 열매는 녹색이며 주로 저지대에서 자라 두 종이 뚜렷하게 차이가 난다.

주요어: 방울제비꽃, 잔털제비꽃, 제비꽃과

The genus *Viola* L. (Violaceae) consists of approximately 550 species and is distributed primarily in temperate regions of the Northern Hemisphere (Chen et al., 2007).

The genus *Viola* are characterized by a solitary flower, zygomorphic flowers with spur, and capsule fruit (Kim, 1986; Lee, 2006). Thirty eight taxa of *Viola* are distributed in Korea (Lee and Yoo, 2007; Lee et al., 2012). Of 38 taxa, *Viola chaerophylloides* (Regel) W. Becker and *V. seoulensis* Nakai occur widely in Korea, while *V. websteri* Hemsl. and *V. raddeana* Regel are rather rare and sporadically distributed (Yoo, 2013).

A new species of *Viola* from Mt. Seogbyeongsan, Gangwondo Province in Korea was first discovered. Also we found this species at Mt. Hambaegsan, Mt. Daedeogsan, and Mt. Baekdusan. This new species is very similar with the *V. pacifica* Juz. was published invalidly without Latin description in Russia (Juzepchuk, 1949). The new species shares several characters with its related species, *V. keiskei* Miq., but it can be distinguished based on leaf shape (i.e., ovate), leaf bases (i.e., shallow cordate), leaf size (i.e., small), pedicel length (i.e., short), flower numbers (i.e., many), fruit color (i.e., purplish green), etc. Thus, we named this new taxon as the *Viola breviflora* Jungsim Lee & M. Kim.

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Korean name: Bangul-Jebikkot **방울제비꽃**

Herbs perennial. acaulescent, 6-13 cm tall. Rhizomes L-shape. Leaves basal, numerous; stipules adnate to petiole, 10-15 mm; petiole pubescent, 2-7 cm in length; leaf blade ovate, 4-6 cm in length, 2-4 cm in width, adaxial and abaxial surface pubescent; blade margin crenate; blade base shallow cordate. Pedicels purplish green, 4-8 cm, glabrous; bracteoles linear, 7-11 mm. Flowers numerous (5-10). Sepals 5, purplish green, 7-8 mm in length, glabrous; appendage toothed, glabrous, 2-3 mm. Petals 5, white; 2 upper one 11-12 × 6-7 mm; 2 lateral one beard, 10-12 × 5-6 mm; 1 lower one 9-12 × 5-7 mm; spur purplish white, 5-6 mm. Stamens 5. Pistil 1; ovary glabrous; style clavate; stigma projecting capitate, beaked in front. Capsule obovate, 7-9 mm, glabrous, purplish green; seed numerous, brown. Flowering April-May.

Type Locality: Mt. Seogbyeongsan, Gangwondo Province, Korea.

Holotype: Mt. Seogbyeongsan, Gangwondo Province, Korea. April 26, 2014. MKV 20140001. Herbarium of Chonbuk



Fig. 1. A-F. Photographs of *Viola breviflora* Jungsim Lee & M. Kim at type locality. A. Adult plants with flowers; B. Rhizome; C. Front view of flower; D. Side view of flower; E. Pistil; F. Fruit; G. Habitat; H. Adult plants with fruits. Scale bars 2 cm in A; 0.7 cm in C; 1 cm in D; 0.4 cm in E; 1.5 cm in F; 10 cm in H.

National University (JNU).

Isotypes: Mt. Seogbyeongsan, Gangwondo Province, Korea. April 26, 2014. MKV 20140002-20140003 (JNU).

Paratypes: Mt. Hambaegsan. May 1, 2014. MKV 20140004-20140005 (JNU); Mt. Daedeogsan. May 1, 2014. MKV 20140006 (JNU); Mt. Baekdusan. May 20, 2014. MKV 20140007-20140008 (JNU); Mt. Seogbyeongsan, May 27, 2014. MKV 201400012-201400013 (JNU)

Flowering: April-May

Distribution: central and northern Korea (Mt. Seogbyeongsan, Mt. Hambaegsan, Mt. Daedeogsan, Mt. Baekdusan).

Etymology: The specific epithet is derived from the unique characters including short pedicels and many flowers which this new species has.

Habitats: Large populations of *Viola breviflora* Jungsim Lee & M. Kim were found at woodlands in the Mt. Seogbyeongsan area. This new species occurs on rock places under trees in forests dominated by *Quercus mongolica* and *Tilia amurensis*. This species also occurs with other herbaceous species dominated by *Polygonatum odoratum*, *Hepatica asiatica*, *Carex lanceolata*, and *Anemone reflexa*.

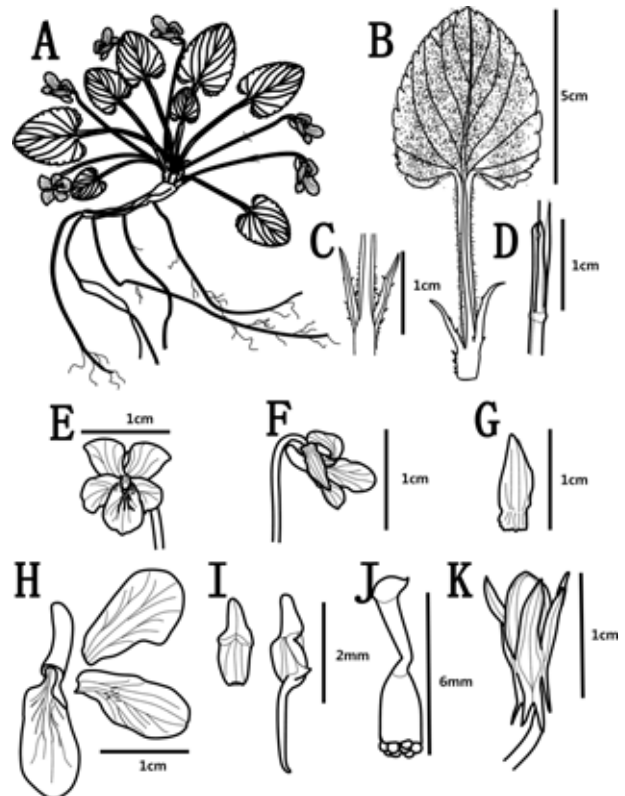


Fig. 2. *Viola breviflora* Jungsim Lee & M. Kim A. Adult plant with flowers; B. Leaf; C. Stipule; D. Bracteoles; E. Front view of flower; F. Side view of flower; G. Sepal; H. Petals; I. Stamens; J. Pistil; K. Fruit.



Fig. 3. Holotype of *Viola breviflora* Jungsim Lee & M. Kim

Key to *Viola breviflora* and its related taxa.

1. Petals yellow *V. orientalis* 노랑제비꽃
1. Petals purple or white
 2. Cauline leaves present *V. acuminata* 줄방제비꽃
 2. Cauline leaves absent
 3. Stigma rounded capitate *V. collina* 둥근털제비꽃
 3. Stigma margined capitate
 4. Stipules free *V. rossii* 고깔제비꽃
 4. Stipules adnate to petioles
 5. Ovary pubescent *V. phalacrocarpa* 털제비꽃
 5. Ovary glabrous
 6. Leaf blade ovate or cordate
 7. Flowers white
 8. Leaf bases shallow cordate, flowers 5-10, pedicels 4-8 cm *V. breviflora* 방울제비꽃
 8. Leaf bases deep cordate, flowers 2-3, pedicels 9-13 cm *V. keiskei* 잔털제비꽃
 7. Flowers purple
 9. Long trichomes absent at petioles *V. ulleungdoensis* 울릉제비꽃

Table 1. Comparison of some morphological characters between *Viola breviflora* and its related species *V. keiskei*.

Characters	<i>V. breviflora</i>	<i>V. keiskei</i>
Plant size	small (6-13 cm)	large (15-30 cm)
Rhizomes	L-shape	shapeless
Cauline leaves	absent	absent
Leaves after flowering	large	more large
Stipules	adnate	adnate
Petiole	pubescent	pubescent
Petiole length	2-7 cm	7-16 cm
Leaf blade shape	small ovate	large cordate
Leaf blade surface	pubescent	pubescent
Leaf blade abaxial surface	purplish green	green
Leaf blade base	shallow cordate	deep cordate
Leaf blade length	4-6 cm	6-10 cm
Leaf blade width	2-4 cm	4-8 cm
Pedicel color	purplish green	purplish green
Pedicel length	short (4-8 cm)	long (9-13 cm)
Bracteoles	linear	linear
Flower color	white	white
Flower numbers	many (5-10)	few (2-3)
Sepal color	purplish green	green
Sepal appendage	glabrous	pubescent
Lateral petals	beard	beard or beardless
Spur color	purplish white	white
Ovary	glabrous	glabrous
Stigma	projecting capitate	flat capitate
Fruit color	purplish green	green
Habitats	high altitude (700-1200 m)	low altitude (100-900 m)

9. Long trichomes present at petioles

..... *V. hirtipes* 흰털제비꽃

6. Leaf blade lanceolate *V. mandshurica* 제비꽃

This new species, *Viola breviflora* Jungsim Lee & M. Kim was first discovered at Mt. Seogbyeongsan, Gangwondo Province in Korea. *Viola breviflora* shares several characteristics (acaulescent leaves, white flowers, pubescent leaf blades and petioles, etc.) with its related species *V. keiskei*. However, it is distinct from *V. keiskei* which has cordate leaf shapes, large leaves, long pedicels, few flowers, and green fruits by having ovate leaf shapes, small leaves, short pedicels, many flowers, and purplish green fruits. Thus, the authors

described this taxon as a new species of the genus *Viola*.

Molecular data provided some insights into the taxonomical position of *Viola breviflora* Jungsim Lee & M. Kim. For example, nrDNA ITS intergenic spacer sequences suggested that *Viola breviflora* is an independent species and distinguished from its related species, *V. keiskei* (M. Kim et al., unpubl. data).

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