A New species of *Elsholtzia* (Lamiaceae): *E. byeonsanensis* M. Kim

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향유속(꿀풀과)의 신종: 변산향유(*Elsholtzia byeonsanensis* M. Kim)

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ABSTRACT: A new species, *Elsholtzia byeonsanensis* M. Kim is named and described from Byeonsan, Jeollabukdo Province, Korea. Molecular data confirmed that this new taxon was distinguished from other congeneric species. *Elsholtzia byeonsanensis* shares several characteristics (secund spikes, ovate leaves, long corolla length, etc.) with its related species *E. splendens*, but it is distinct from *E. splendens* which has a large plant, green stem color, chartaceous leaf textures, non-shiny leaf surfaces, pubescent petioles, pubescent leaf blade surfaces, pubescent bract surface, and open woodland habitats by having a small plant, purple stem color, coriaceous leaf textures, shiny leaf surfaces, glabrous petioles, glabrous leaf blade surfaces, glabrous bract surface, and marine habitats.

Keywords: *Elsholtzia byeonsanensis*, *E. splendens*, Lamiaceae

적 요: 전북 변산에서 향유속의 신종인 변산향유(*Elsholtzia byeonsanensis* M. Kim)를 새로이 발견하여 기재하였다. 분자생물학적인 결과는 변산향유가 근연종들과 구별되는 신종임을 지지해 주었다. 변산향유는 꽃이 한쪽 방향으로 밀생하는 수상화서이며 난형인 잎과 화관길이가 길어 꽃향유와 유사하다. 그러나 변산향유는 식물체는 작고 줄기는 자주색이며 잎은 혁질이고 윤기가 나며 엽병과 엽신 표면 및 화서의 포 표면에 털이 없고 바닷가 바위틈에 자라는 반면에, 꽃향유는 식물체는 크고 줄기는 녹색이며 잎은 초질이고 윤기가 없으며 엽병과 엽신 표면 및 화서의 포 표면에 털이 있고 숲 가장자리에서 자라는 점에서 두 종이 뚜렷하게 차이가 난다.

주요어: 변산향유, 꽃향유, 꿀풀과

The genus *Elsholtzia* Willd. (Lamiaceae) consists of approximately 40 species and is distributed primarily in temperate regions of the Northern Hemisphere including China, Russia, Europe, and North America (Li and Hedge, 1994; Jeon and Hong, 2006). The genus *Elsholtzia* are characterized by opposite leaves, compact spikes, ovate bracts, cylindrical calyx, and nutlet fruit (Hong, 2007). Six taxa of *Elsholtzia* are distributed in Korea (Lee, 2000; Lee et al., 2011). Of 6 taxa, *E. splendens* occur widely in Korea, while *E. minima* and *E.*

angustifolia are rather rare and sporadically distributed.

During field work in 2011, a new species from Byeonsan in Jeollabukdo Province, Korea was discovered. In this paper, we named this new taxon as *Elsholtzia byeonsanensis* M. Kim and described several morphological features relative to its related species *E. splendens*. The new species shares several characteristics with its related species, but it can be distinguished based on habit (i.e. small plants), leaf textures (i.e., coriaceous), bract abaxial surface (i.e., glabrous), habitat (i.e., on the steep cliff near sea), etc. Also molecular data confirmed that *Elsholtzia byeonsanensis* is a new species and distinguished from its

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related species (M. Kim et al., unpubl. data).

Elsholtzia byeonsanensis M. Kim, sp. nov. Figs. 1, 2, 3

Korean name: Byeonsan-Hyangyu 변산향유

Herba annulae, erectus, ramosa, 20–35 cm alta. Caulis purpurea. Folia opposita, corium; lamina ovatus, 3.5–4.5 cm longa, 1.5–2.2 cm lata. supra glabra, subtus glandula; petioli glabra, 2.0–3.2 cm longi; margo serratus. Spicae 3.5–4.5 cm longa; bractae ovatus, glabra, 5 × 6–7 mm; pedicelli 1 mm longi. Calyx cylindrus, 2–3 mm longa, 5 lobis. Corolla purpurea, 6–7 mm longi, pilosus et glandula externus. Stamina 4, exserta; filamenta purpurea, glabra; antherae ruber. Ovaria 4 lobis; styli linearis, rubellus, exserta; stigmata 2 lobi. Fructus nuculae; semina brunneolus. Flores Novembris anthesis, purpurea.

Herb annual, erect, branched, 20–35 cm high. Stem purple.

Leaves opposite, coriaceous; leaf blade ovate, 3.5–4.5 × 1.5–2.2 cm, glabrous adaxially, densely impressed glandular abaxially; petiole 2.0–3.2 cm; margin serrate. Spikes secund, 3.5–4.5 cm; bracts broadly ovate, 5 × 6–7 mm. Pedicel 1 mm. Calyx cylindrical, 2–3 mm, villous, 5 lobes. Corolla purple, 6–7 mm, hairy and glandular outside, upper lip emarginate, lower lip 3 lobes. Stamens 4, exserted, 2 anterior ones longer; filaments purplish, glabrous; anther red. Ovary 4 lobed, style reddish, exserted; stigma 2 cleft. Fruit nutlets; seeds brown. Flowering November, purple.

Type Locality: Byeonsan, Jeollabukdo Province, Korea.

Holotype: Byeonsan, Jeollabukdo Province, Korea. Nov. 26, 2011. *M. Kim 110101*. Herbarium of Chonbuk National University (JNU).

Isotype: Byeonsan, Jeollabukdo Province, Korea. Nov. 26, 2011. *M. Kim 110102–110109* (JNU).

Fig. 1. Photographs of *Elsholtzia byeonsanensis* M. Kim at type locality. A. adult plant; B. flower; C. bract; D. habitat; E. inflorescence. Scale bars 1 cm in A and E; 2 mm in B and 1 mm in C.

Fig. 2. *Elsholtzia byeonsanensis* M. Kim. A. habit; B. calyx; C. flower; D. bract; E. pistil.

Flowering: November

Distribution: Byeonsan, Jeollabukdo Province, Korea.

Etymology: The specific epithet is derived from Byeonsan where this new species is located.

Habitats: The natural habitats of *Elsholtzia byeonsanensis* M. Kim were discovered at coastal regions in the Byeonsan, Jeollabukdo Province, Korea. Hundreds of new individuals occur on steep cliffs along the 1–2 km seaside dominated by *Carpinus turczaninowii*, *Elaeagnus macrophylla*, and *Ulmus parvifolia*. The new species also occurs with other herbaceous species dominated by *Dendranthema indicum*, *Aster spathulifolius*, and *Cyrtomium falcatum*.

Key to *Elsholtzia byeonsanensis* M. Kim and its related taxa

1. Spikes cylindrical
 2. Stem quadrilateral, 10–20 cm high *E. saxatilis* 애기향유
 2. Stem rounded, 2–5 cm high *E. minima* 좁향유
1. Spikes secund
 3. Corolla 4–5 mm *E. ciliata* 향유
 3. Corolla more than 5 mm
 4. Petioles absent, leaf blade linear *E. angustifolia* 가는잎향유
 4. Petioles present, leaf blade ovate

Fig. 3. Holotype of *Elsholtzia byeonensis* M. Kim

5. Coriaceous leaf textures, petioles and adaxial surface of leaf blade glabrous; bract surface glabrous; marine habitats *E. byeonensis* 변산향유
5. Chartaceous leaf textures, petioles and adaxial surface of leaf blade pubescent; bract surface pubescent; woodland habitats
6. Plants 40–70 cm *E. splendens* 꽃향유
6. Plants 7–15 cm
..... *E. splendens* var. *hallasanensis* 한라꽃향유

Large populations of the new species, *Elsholtzia byeonensis* M. Kim were first discovered at Byeonsan, Jeollabukdo

Province, Korea. *Elsholtzia byeonensis* shares several characteristics (secund spikes, ovate leaves, long corolla length, etc.) with its related species *E. splendens*, but it is distinct from *E. splendens* which has a large plant, green stem color, chartaceous leaf textures, non-shiny leaf surfaces, pubescent petioles, pubescent leaf blade surface, pubescent bract surface, and open woodland habitats by having a small plant, purple stem color, coriaceous leaf textures, shiny leaf surfaces, glabrous petioles, glabrous leaf blade surface, glabrous bract surface, and marine habitats. Thus, the authors described this taxon as a new species of the genus *Elsholtzia*.

Molecular data provided some insights into the taxonomical

Table 1. Comparison of morphological characters between *Elsholtzia byeonsanensis* M. Kim and its related species *E. splendens*.

Characters	<i>E. byeonsanensis</i>	<i>E. splendens</i>
Plants	small (20–35 cm)	large (40–70 cm)
Stem branching	much	few
Stem shape	quadrilateral	quadrilateral
Stem color	green	purple
Leaf textures	coriaceous	chartaceous
Leaf surfaces	shiny	non-shiny
Petiole	glabrous	pubescent
Petiole length	3.0±0.5	3.7±0.6
Leaf blade shape	ovate	ovate
Leaf blade (adaxial surface)	glabrous	pubescent
Leaf blade length	4.0±0.6*	4.5±0.7
Leaf blade width	1.6±0.4**	2.4±0.5
Spikes length	4.0±0.5	7.0±0.9
Bracts (abaxial surface)	glabrous	pubescent
Flowering	Nov.	Sep.-Oct.
Flower color	purple	purple
Calyx lobes	glabrous	pubescent
Habitats	steep cliffs near the sea	open woodland

*unit is cm

**mean±SD

position of *Elsholtzia byeonsanensis* M. Kim. For example, nrDNA ITS and cpDNA (*rpl16* and *trnH-psbA*) sequences

suggested that *Elsholtzia byeonsanensis* is an independent species and is distinguished from other Korean species (M. Kim et al., unpubl. data).

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