



## A new species of *Fimbristylis* (Cyperaceae): *F. drizae* J. Kim & M. Kim

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### 하늘지기속(사초과)의 신종: 물하늘지기 (*Fimbristylis drizae* J. Kim & M. Kim)

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**ABSTRACT:** A new species, *Fimbristylis drizae* J. Kim & M. Kim, is named and described from Sucheong Lake, Jeongeup-si, Jeollabuk-do, Korea. *Fimbristylis drizae* shares several characters (five-angled culm, 1–2 bladeless sheath, and compound anthela inflorescence) with the related species *F. diphylloides* Makino. It is, however, distinct from *F. diphylloides*, which has two to three stigmas, ovate spikelets, two stamens, a blackish brown scale, and a roadside habitat. In contrast, the new species has two stigmas, oval spikelets, one (or rarely two) stamens, a yellowish brown scale, and a lakeside habitat.

**Keywords:** *Fimbristylis drizae*, *Fimbristylis*, Cyperaceae

**적 요:** 사초과의 하늘지기속 신종인 물하늘지기(*Fimbristylis drizae* J. Kim & M. Kim)를 전라북도 정읍시 수청저수지에서 발견하여 기재하였다. 물하늘지기는 줄기는 5각형이고 1–2개의 기부 경생엽이 엽신이 없는 엽초만 있으며 화서는 소수화서를 가진 점에서 검정하늘지기(*F. diphylloides* Makino)와 유사하다. 그러나 물하늘지기는 주두가 2개이고, 소수가 타원형이며, 수술이 1개(드물게 2개)이고, 인편이 황갈색이며 저수지 가장자리에서 자라는 특징을 가지고 있다. 반면에 검정하늘지기는 주두가 2개 또는 3개이고, 소수가 난형이며, 수술이 2개이고, 인편이 흑갈색이며 임도변의 습한 곳에서 자라는 점에서 구별된다.

**주요어:** 물하늘지기, 하늘지기속, 사초과

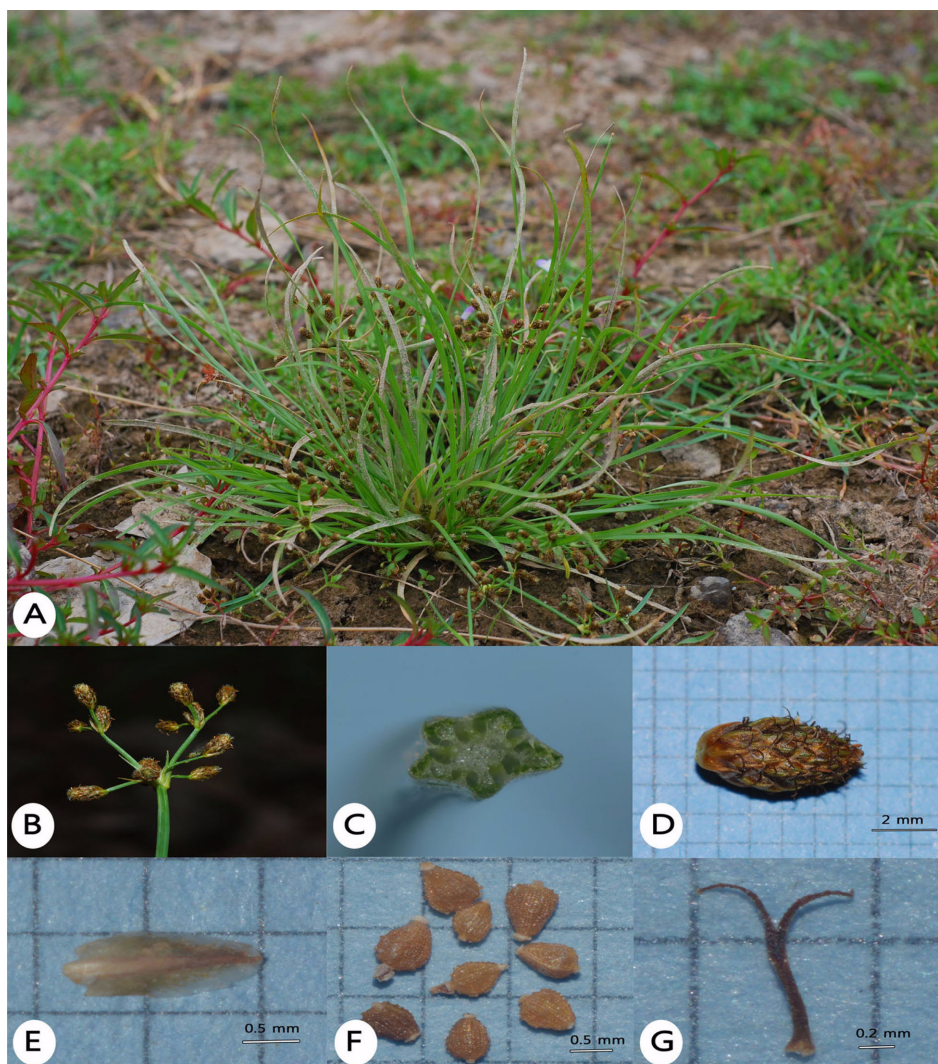
The genus *Fimbristylis* Vahl (Cyperaceae) consists of approximately 200–300 species and is distributed primarily in tropic, subtropic, and temperate zones of the Northern Hemisphere (Vahl, 1805; Makino and Nemoto, 1925; Kral, 1971).

*Fimbristylis* is characterized by the usual presence of leaf blades, leaf sheath without long silk hairs at the apex, and achene with deciduous style base (Zhang et al., 2010; Kim and Kim, 2013). Twenty taxa of *Fimbristylis* are distributed in Korea (Lee, 1980; Lee, 1996; Im, 2000; Lee, 2006; Oh, 2007).

Of these, *F. dichotoma* (L.) Vahl and *F. autumnalis* (L.) Roemer & Schultes occur widely, while *Fimbristylis hookeriana* Boeckeler and *F. diphylloides* Makino are rather rare, with sporadic distribution (Oh, 1991; Oh and Park, 1997; Kim and Kim, 2013).

A new species of *Fimbristylis* was discovered for the first time at Sucheong Lake, Jeongeup-si, Jeollabuk-do Province, Korea. The new species shares several characters with the related species, *F. diphylloides* Makino, but it can be distinguished based on the stigma number (2), spikelet shape (oval), stamen number (1, or rarely 2), scale color (yellowish brown), and habitat (lakeside). Thus, we named this new taxon as *Fimbristylis drizae* J. Kim & M. Kim.

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**Fig. 1.** Photographs of *Fimbristylis drizae* J. Kim & M. Kim. A. Habit; B. Inflorescence; C. Culm cross section; D. Spikelet; E. Scale; F. Achene; G. Style and stigma.

## Taxonomic Treatment

*Fimbristylis drizae* J. Kim & M. Kim, sp. nov. (Figs. 1–3)

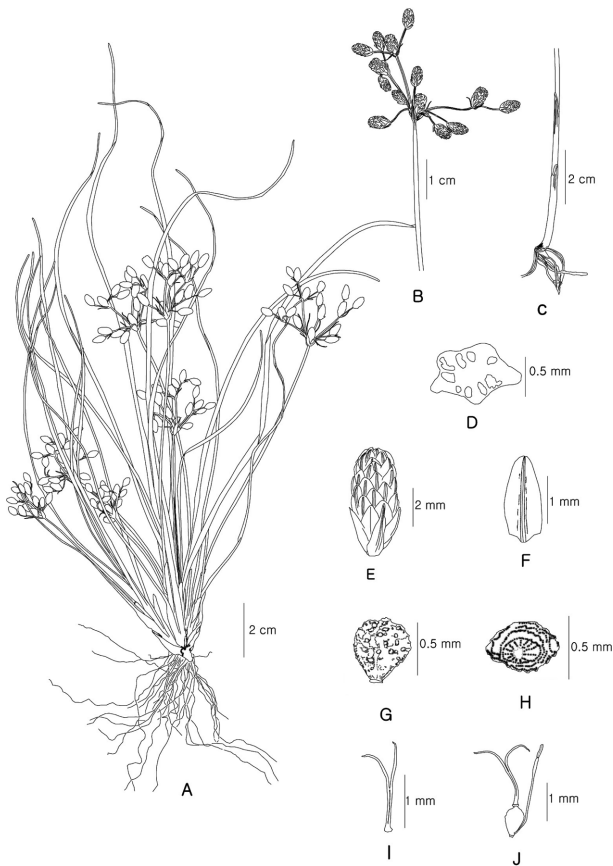
**TYPE:** Korea. Jeollabuk-do Province, Jeongeup-si, Sucheong Lake. 28 Sep 2013. *J. H. Kim 13158* (Holotype, JNU; Isotypes, JNU, KH)

**Korean name:** Mul-ha-neul-ji-gi 물하늘지기

Perennials. Rhizome absent. Culms aslant, 3–31 cm tall, 0.7–1.1 mm in diam., obtusely 5-angled, glabrous. Basal bladeless sheaths 1 or 2, 1–5 cm long. Leaves longer or sometimes shorter than culm; vegetative shoot usually shortly bladed; blade 7–44 cm long, 1–4 mm wide, flat, upper margin finely

toothed, apex acute. Ligule absent. Involucral bracts setaceous, much shorter than inflorescence, base dilated, margin finely serrulate. Inflorescence a subcompound anthela, 1–6 cm long, 1–6 cm wide; rays 3–8, 0.4–4 cm, slight striate. Spikelets solitary, oval, 3–6 mm long, 1.7–2.9 mm wide, whirl over 30-flowered, apex obtuse to rounded. Scales broadly ovate, yellowish brown, 1.7–2.2 mm long, 0.9–1.2 mm wide, margin hyaline, 3-veined keel, veins green, apex mucronate. Stamens 1 (or rarely 2), anthers yellow, 0.5–0.7 mm long. Style not ciliate, 3-angled, 0.7–1.2 mm long; stigmas 2. Achene yellowish brown, obovoid biconvex, 0.6–0.9 mm long, 0.5–0.6 mm wide, with sparsely verruculose.

**Additional specimens examined:** Gyeongsangnam-do: Hadong-gun. 15 Oct. 2008. *Y. H. Cho et al WR-081015-311*



**Fig. 2.** Illustrations of *Fimbristylis drizae* J. Kim & M. Kim. A. Habit; B. Inflorescence; C. Culm base part; D. Culm cross section; E. Spikelet; F. Scale; G. Achene; G. Bottom view of achene; I. Style and stigma; J. Flower.

(KH); Hapcheon-gun. 2 Oct. 2007. *S. C. Ko and J. H. Kim* 358061-0174 (KB); **Daegu:** Dalseong-gun. 7 Oct. 2010. *S. J. Keum and J. S. Yu* 480 (KB); **Jeollanam-do:** Gangjin-gun. 19 Aug. 2012. *J. H. Kim* 12043 4 sheets (JNU); 11 Oct. 2006. *Y. H. Cho et al.* WR-061011-024 (KH); 11 Oct. 2006. *Y. H. Cho et al.* WR-20120818-021 (KH); 9 Oct. 2011. *Y. H. Cho and J. H. Kim* WR-20111009-007 (KH); 17 Oct. 2008. *Y. H. Cho* WR-081017-023 2 sheets (KH); 18 Oct. 2008. *S. H. Park and H. S. Choi* 8279, 82799 (KH); Muan-gun. 11 Oct. 2009. *J. H. Kim* 472 (KB); Imchun Lake, Gangjin-gun. 19 Aug. 2012. *J. H. Kim* 12043 (JNU); Jangseong-gun. 24 Aug. 2012. *J. H. Kim* 12057 4 sheets (JNU); 13 Oct. 2012. *J. H. Kim* 12128, *J. H. Kim* 12129 (JNU); 14 Oct. 2012. *Y. H. Cho and J. H. Kim* WR-20121014-028 (KH); 25 Sep. 2011. *Y. H. Cho and J. H. Kim* WR-20110925-048 (KH); 26 Sep. 2011. *J. C. Yang and J. G. Byeon* L111497 (KH); Jindo-gun. 31 Aug. 2013. *J. H. Kim* 13097 2 sheets (JNU); **Jeollabuk-do:** Gochang-gun. 11 Jul. 2014. *J. H. Kim* 140742 3 sheets (JNU); Jeongeup-si. 28 Sep. 2013. *J. H. Kim* 13138, 13141, 13142 (JNU); 28 Sep.



**Fig. 3.** Holotype of *Fimbristylis drizae* J. Kim & M. Kim.

2013. *J. H. Kim* 13158 2 sheets (JNU); **Chungcheongnam-do:** Buyeo-gun. 3 Sep. 2000. *S. M. Seo* 382 (KB); 24 Sep. 2009. *J. D. Jung and C. K. Kim* 0909181-1 (KB)

**Distribution:** Southern Korea (Gyeongnam, Daegu, Jeonnam, Jeonbuk, Chungnam).

**Etymology:** The specific epithet was derived from Journadette H. Driz, who helped find the new species.

**Habitats:** This new species grows at lakeside in Southern Korea.

**Flowering:** August to October

**Notes:** The authors found that the new species, *F. drizae* J. Kim & M. Kim, has been misidentified as *F. globulosa* var. *austrojaponica* Ohwi until now. It was also known that *F. globulosa* var. *austrojaponica* is a synonym of *F. umbellaris* (Lam.) Vahl based on the original description and type specimen (Kern, 1974; Zhang et al., 2010). This new species closely resembles *F. diphyloides* Makino, but differs by the presence of two stigmas, oval spikelets, one (or rarely two) stamen, yellowish brown scale color, and the lakeside (Table 1; Figs. 1–3). By applying the IUCN Red List Categories and Criteria (IUCN, 2012), *F. drizae* will be evaluated as a category of vulnerable (VU) species because of its small populations at lakeside.

**Table 1.** Comparison of morphological characters of *Fimbristylis drizae* and *F. diphylloides*.

Character	<i>F. drizae</i>	<i>F. diphylloides</i>
Plant length	3–31 cm	9–53 cm
Bladeless sheath	1–2	1–3
Culm cross section	5-angled	5-angled
Inflorescences	compound anthela	compound anthela
Spikelet shape	oval	ovate
Spikelet length	3.0–6.0 mm	4.2–6.2 mm
Spikelet width	1.7–2.9 mm	1.8–2.5 mm
Scale color	yellowish brown	blackish brown
Scale apex	mucronate	obtuse
Scale length	1.7–2.2 mm	1.4–1.8 mm
Stamen numbers	1 (or rarely 2)	2
Style length	0.7–1.2 mm	0.6–0.8 mm
Stigma	2	2–3
Achene shape	biconvex	biconvex or 3-sided
Habitats	lakeside	roadsides

**Key to *Fimbristylis drizae* and its related taxa.**

1. Spikelets very narrowly ovoid to linear  
..... *F. hookeriana*. 바위하늘지기
1. Spikelets ovoid, oblong, narrowly oblong and ovoid-ellipsoid.
2. Inflorescences comprising 1 spikelet  
..... *F. subbispicata* 풀하늘지기
2. Inflorescences comprising 2 or more spikelets.
3. Achene terete ..... *F. stauntonii* 밭하늘지기
3. Achene obovoid biconvex or 3-sided.
4. Style compressed, ciliate; stigmas 2.
5. Style base with long hairs  
..... *F. squarrosa* 민하늘지기
5. Style base glabrous
6. Scale less than 1.5 mm  
..... *F. aestivalis* 좁민하늘지기
6. Scale longer than 2mm
7. Leaf blade folded, achene subsmooth  
..... *F. sieboldii* 갯하늘지기
7. Leaf blade flat, achene with reticulation.
8. Spikelet narrowly oblong, achene with hexagonal reticulation ..... *F. longispica* 큰하늘지기
8. Spikelet ovoid, ellipsoid, achene with transversely oblong reticulation ..... *F. dichotoma* 하늘지기
4. Style 3-sided, not ciliate; stigmas 2 or 3.
9. Annuals, leaf blade compressed  
..... *F. littoralis* 바람하늘지기

9. Perennials, leaf blade flat.
10. Spikelet less than 20 flowers, stem without bladeless sheath  
..... *F. complanata* var. *exaltata* 어른지기
10. Spikelet more than 30 flowers, stem with bladeless sheath.
11. Stamen 2, scale blackish brown, spikelet ovate  
..... *F. diphylloides* 검정하늘지기
11. Stamen 1 (or rarely 2), scale yellowish brown, spikelet oval ..... *F. drizae* 물하늘지기

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