



A newly naturalized species in Korea: *Carex scoparia* Schkuhr ex Willd. var. *scoparia* (Cyperaceae)

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한국 미기록 귀화식물: 한석사초(사초과)

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ABSTRACT: A newly naturalized plant, *Carex scoparia* Schkuhr ex Willd. var. *scoparia*, was found in Mt. Hanseok, Inje-gun, Gangwon-do, Korea. It belongs to sect. *Ovales* Kunth and had been known from North America, and was introduced into Europe and New Zealand. This species distinguished from related taxa in Asia, *Carex maackii* Maxim. and *Carex leporina* L., by pistillate scales lanceolate and having large perigynia. We propose the new Korean name, 'Han-seok-sa-cho', based on its first collecting place. We also provide descriptions for morphological characters, illustrations, photographs and keys to allied taxa.

Keywords: *Carex scoparia* Schkuhr ex Willd. var. *scoparia*, sect. *Ovales*, *Carex*, Cyperaceae, a newly naturalized plant

적 요: 사초과의 미기록 귀화식물인 한석사초(*Carex scoparia* Schkuhr ex Willd. var. *scoparia*)가 강원도 인제군 한석산에서 발견되었다. 타래사초절에 속하는 본 종은 북아메리카 원산으로, 유럽과 뉴질랜드에 도입되어 분포하고 있고, 암꽃의 비늘조각이 피침형이며, 과포가 큰 특징으로 인해 아시아에 분포하는 근연종인 *C. leporina* L. 그리고 타래사초와 뚜렷이 구분된다. 국명은 채집지의 이름을 따서 '한석사초'로 명명하였으며, 형태적 특징에 대한 기재, 도해, 생태사진 및 검색표를 제시하였다.

주요어: 한석사초, 타래사초절, 사초속, 사초과, 미기록 귀화식물

Carex L. is the biggest genus in Cyperaceae, and has about 2,000 species, distributed in wide areas, from cold or high-altitude to warm or tropical places (Reznicek, 1990; Dai et al., 2010). In Korea, 150-160 species of *Carex* are enumerated (Oh, 2006, 2007).

Sect. *Ovales* Kunth is characterized by gynaeandrous spikes, wing-margined perigynia, and a more or less cespitose habit with true vegetative culms present (Rothrock and Reznicek, 1996). This section is the largest in *Carex* subgenus *Vignea* (P.

Beauv. ex T. Lestib.) Peterm. containing 72 North American species, 15 species endemic to South or Central America, and 3 species endemic to Europe and Asia, for a total of 90 species worldwide (Reznicek, 1993). Only one taxa, *Carex maackii* Maxim., of this section is distributed in Korea (Oh, 2006).

In this study, we collected one *Carex* taxa in sect. *Ovales*, *Carex scoparia* Schkuhr ex Willd. var. *scoparia*, at Mt. Hanseok, and reported as a newly naturalized species in Korea. In addition, we provide descriptions for morphological characters, photographs, illustrations and keys to allied taxa such as sect. *Ovales* in Asia, *Carex maackii* and *Carex leporina* L., and *Carex scoparia* var. *tessellata* Fernald & Wiegand that distributed in North America.

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Description

Carex scoparia Schkuhr ex Willd. var. *scoparia*, Sp. Pl. 4(1): 230 (1805). (Figs. 1, 2).

Type: United States, Pennsylvania, February 1805, *G. H. E. Muhlenberg s.n.* (holotype: HAL!).

Korean name: Han-seok-sa-cho (한석사초).

Plants perennial herbs, 20-100 cm long, **Culms** trigonous, few leaves clustered at apex. **Leaves** sheath summits U-shaped; distal ligules 2.3-4.8 mm wide; blades 3-5 per fertile culm 10-32 cm long, 1.4-3.5 mm wide. **Inflorescences** arching or nodding, dense or open, green, yellow, or brown at maturity, 1.5-6 cm long, 5-20 mm wide; proximal internode 2-12 mm; 2nd internode 2-13 mm; proximal bract scalelike, with bristle tip. **Spikes** 3-10, distinct, ellipsoid, 7-16 mm long, 3-13 mm wide, base acute to short-attenuate, apex acute to rounded. **Pistillate scales** hyaline brown, occasionally with green or gold midstripe, lanceolate, 3.4-4 mm, shorter and narrower than perigynia, apex acuminate. **Perigynia** ascending or rarely

widely spreading, golden brown, conspicuously 5-veined on each face or fewer adaxially, winged to base, lanceolate, flat except over achene, 4.2-6.8 mm long, 1.2-2 mm wide, 0.35-0.55 mm thick. **Achenes** ovate or elliptic, 1.3-1.7 mm long, 0.7-0.9 mm wide, 0.3-0.4 mm thick.

Distribution: North America, Europe, New Zealand and Korea (Gangwon-do; Inje-gun).

Specimen examined: Gangwon-do, Inje-gun, Inje-eup, Deokjeok-ri, Mt. Hanseok, 27 Jun. 2013, *K. O. Yoo, J. S. Han, K. S. Cheon, K. A. Kim, Y. H. Park and J. S. Kang 90085-90089* (KWNU); 4 Jun. 2014, *K. O. Yoo, J. S. Han, K. S. Cheon, K. A. Kim, Y. H. Park and J. S. Kang 90090-90093* (KWNU); 1 Aug. 2014, *K. O. Yoo, J. S. Han, K. S. Cheon, K. A. Kim, Y. H. Park and J. S. Kang 90094* (KWNU); 2 Aug. 2014, *K. O. Yoo, J. S. Han, K. S. Cheon, K. A. Kim, Y. H. Park and J. S. Kang 90095-90098* (KWNU).

This newly naturalized species, *Carex scoparia* Schkuhr ex Willd. var. *scoparia*, was corrected in Mt. Hanseok, Inje-gun, Gangwon-do in 2013 and 2014. We propose the new Korean name, 'Han-seok-sa-cho', based on its first collecting place.

This species is distinguished from sect. *Ovales* in Asia, *C.*

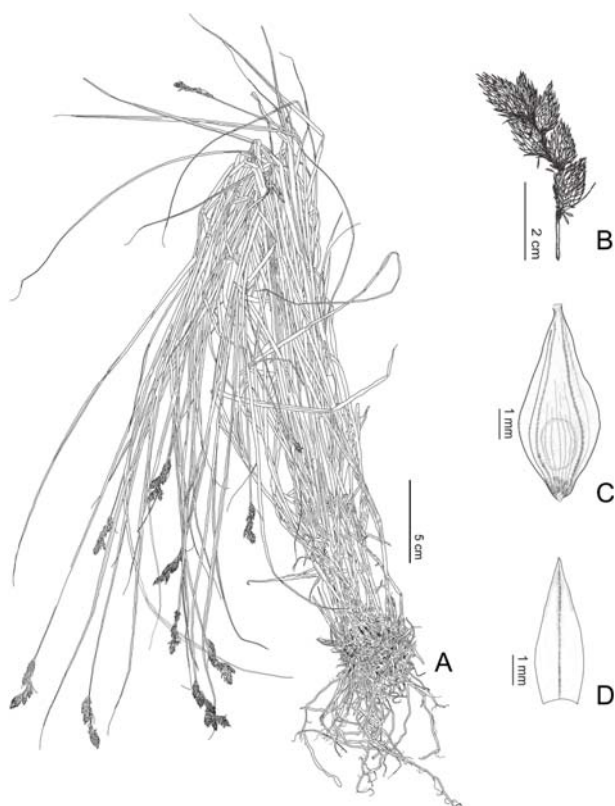


Fig. 1. Illustrations of *Carex scoparia* Schkuhr ex Willd. var. *scoparia*. A. Habit; B. Inflorescence; C. Perigynium; D. Pistillate scale.



Fig. 2. Photographs of *Carex scoparia* Schkuhr ex Willd. var. *scoparia*. A. Habit; B. Inflorescence; C. Achenes; D. Pistillate scale; E. Perigynium.

maackii and *C. leporina*, by pistillate scales lanceolate and having large perigynia. Also, it is distinguished from *C. scoparia* var. *tessellata* by color of pistillate scales and length to width ratio of perigynia.

It is described from Pennsylvania, United States (Willdenow, 1805), and widely distributed in North America and introduced into Europe and New Zealand. In native habitats of North America, it is common in swamps, wet meadows, sandy lake shores, low wet prairies, open marshes, and along roadside (Hermann, 1941; Gilly, 1946).

There are about 70 individuals growing in Mt. Hanseok. Also, it grows wet margins of forest roadside and share habitats usually with *Carex leiorrhyncha* C. A. Mey., *Scirpus wichurae* var. *asiaticus* (Beetle) T. Koyama, *Juncus effusus* var. *decipiens* Buchenau, *J. tenuis* Willd., *Onoclea orientalis* (Hk.) Hk., *Athyrium yokoscense* (Franch. & Sav.) Christ and *Lycopodium lucidius* Turcz.

A key of *Carex scoparia* var. *scoparia* and its related taxa.

1. Pistillate scales ovate; perigynia 3.4-4 mm long, 1-1.6 mm wide
2. Inflorescence contiguous, 2-2.5 cm, spikes 4-7; leaves much shorter than culm, ca. 1.5 mm wide *C. leporina*
2. Inflorescence upper spikes contiguous, lower ones distant, 2-6 cm, spikes 10-20; leaves shorter than or subequaling culm, ca. 2-4 mm wide
..... *C. maackii* 타래사초
1. Pistillate scales lanceolate; perigynia 4.2-6.8 mm long, 1.2-2 mm wide
3. Spikes aggregated; pistillate scales reddish brown, chestnut, or blackish, contrasting with lighter golden brown perigynium body; perigynia 4.2-5 mm long, 2-2.6 times as long as wide
..... *C. scoparia* var. *tessellata*
3. Spikes densely aggregated to distant; pistillate scales golden brown or pale brown, similar in color to perigynium body; perigynia 4.2-6.8 mm long, 2.5-4 times as long as wide
..... *C. scoparia* var. *scoparia* 한석사초

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Literature Cited

- Dai, L. K., S. Y. Liang, S. R. Zhang, Y. C. Tang, T. Koyama, G. C. Tucker, D. A. Simpson, H. J. Noltie, M. T. Strong, J. J. Bruhl, K. L. Wilson and A. M. Muasya. 2010. Cyperaceae. In Flora of China, Vol. 23. Wu, Z. Y., P. H. Raven and D. Y. Hong (eds.). Science Press and Missouri Botanical Garden Press, Beijing and St. Louis. Pp. 164-461.
- Gilly, C. L. 1946. The Cyperaceae of Iowa. Iowa State Journal of Science 21: 55-151.
- Hermann, F. J. 1941. The genus *Carex* in Michigan. American Midland Naturalist 25: 1-72.
- Oh, Y. C. 2006. Korean Caricoideae of Cyperaceae. Sungshin Women's University Press, Seoul. (in Korean)
- Oh, Y. C. 2007. Cyperaceae Juss. In The genera of Vascular Plants of Korea. Park, C. W. (ed.), Academy Publishing Co., Seoul. Pp. 1113-1181.
- Rothrock, P. E. and A. A. Reznicek. 1996. Chromosome numbers in *Carex* section *Ovales* (Cyperaceae) from Eastern North America. Sida 17: 251-258.
- Reznicek, A. A. 1990. Evolution in sedges (*Carex*, Cyperaceae). Canadian Journal of Botany 68: 1409-1432.
- Reznicek, A. A. 1993. A revision of the Mexican members of genus *Carex*, section *Ovales* (Cyperaceae). Contributions of the University of Michigan Herbarium 19: 97-136.
- Willdenow, C. L. 1805. Caroli a Linné Species Plantarum, ed. 4. Berlin. Pp. 230.