



## A new record of *Carex rugata* Ohwi (Cyperaceae) in Korea

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### 한국 미기록 식물: 주름청사초(사초과)

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**ABSTRACT:** An unrecorded species, *Carex rugata* Ohwi, was found in Jeollabuk-do and Jeollanam-do. This species is distinguished from *Carex breviculmis* R. Br., *C. mitrata* Franch., *C. polyschoena* H. Lévl. & Vaniot, *C. genkaiensis* Ohwi, *C. formosensis* H. Lévl. & Vaniot and *C. kamagariensis* K. Okamoto by having achenes with excavated faces. *Carex rugata* Ohwi was named 'Ju-reum-cheong-sa-cho' in Korean based on its specific epithet. In this study, a description, illustrations and photographs of the species are provided.

**Keywords:** *Carex rugata*, sect. *Mitratae*, *Carex*, Cyperaceae, new record

**적 요:** 미기록종인 주름청사초(*Carex rugata* Ohwi)를 전라북도과 전라남도에서 발견하였다. 이 종은 수과 표면이 오목하게 들어가는 특징으로 인해 근연종인 청사초(*C. breviculmis* R. Br.), 겨사초(*C. mitrata* Franch.), 가지청사초(*C. polyschoena* H. Lévl. & Vaniot), 목포사초(*C. genkaiensis* Ohwi), 긴목포사초(*C. formosensis* H. Lévl. & Vaniot) 및 좁목포사초(*C. kamagariensis* K. Okamoto)와 쉽게 구별된다. 국명은 종소명을 고려하여 '주름청사초'로 신칭하였고, 이에 대한 기재, 도해 및 사진을 제시하였다.

**주요어:** 주름청사초, 청사초절, 사초속, 사초과, 미기록

*Carex* L., with about 2,000 species, is the largest genus in family Cyperaceae Juss. and is cosmopolitan in distribution (Reznicek, 1990; Goetghebeur, 1998; Egorova, 1999). It is characterized by all unisexual flowers and completely closed perigynia (Goetghebeur, 1998; Egorova, 1999). The genus is morphologically divided into four subgenera [*Carex* (=Eucarex), *Psyllophora* (=Primocarex), *Vigneae*, *Vigneastrae* (=Indocarex)] following Kükenthal (1909).

Section *Mitratae* Kük. belongs to subgenus *Carex* and is distinguished from other sections of the subgenus by having achenes with annulate, cylindrical or conical base of style at

apex (Kükenthal, 1909; Ohwi, 1936; Dai et al., 2010; Hoshino et al., 2011). This section consists of approximately 60 species and is mainly widespread in Central and East Asia, Europe and Oceania (Egorova, 1999; Dai et al., 2010).

In this study, *Carex rugata* Ohwi is reported as a newly recorded taxon in Korea. In addition, a description, illustrations and photographs of the species are provided.

### Description

*Carex rugata* Ohwi, Acta Phytotax. Geobot. 1: 76 (1932).

Type: Japan, Pref. Kyoto, Mt. Daimonji, 4 May 1931, *J. Ohwi* 29 (holotype: KYO!).

**Plants** perennial, 31.5-45.9 cm long, with long and short rhizomes. **Culms** trigonous, longer than leaves, 21.5-34.1 cm long, smooth; remnants of old leaves fibrous. **Leaves** at base

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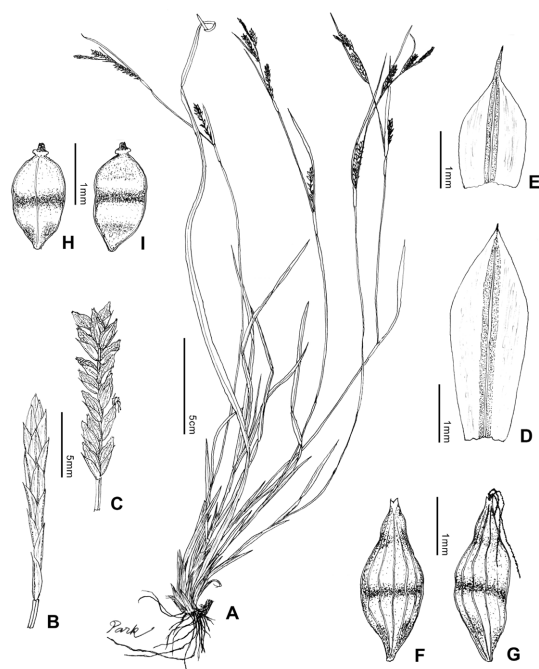
brown, scalelike; distal leaf sheaths glabrous, 5.3-8.8 cm long; distal leaf blades glabrous, 4.3-8.6 cm long, 1.3-3.2 mm wide. **Bracts** 2-5, shorter than inflorescence; proximal bract sheaths 7.4-17.3 mm long; proximal bract blades 4.6-8.1 cm long, 1.6-2.3 mm wide. **Inflorescences** racemose, with 3-6 spikes, 7.4-16.3 cm long. **Terminal spike** staminate, 0.8-1.8 cm long, 1.0-1.9 mm wide, with peduncles 1.9-6.4 mm long; scales green, white at margin, narrowly obovate, 3.1-4.2 mm long, 0.7-1.1 mm wide, awned. **Lateral spikes** 2-5, pistillate, shorter than bracts, lowest ones 1.5-2.1 cm long, 2.6-3.9 mm wide, with peduncles 0.6-5.6 mm long; scales green, white at margin, ovate, 2.3-3.8 mm long, 0.5-0.9 mm wide, awned. **Perigynia** fusiform, 2.5-3.0 mm long, 0.8-1.1 mm wide, glabrous, veined at adaxial and abaxial surfaces, beak 0.4-0.7 mm, mouth slightly bidentate. **Achenes** ellipsoidal, excavated at faces, 1.4-1.8 mm long, 0.7-0.9 mm wide; style base annulate. (Figs. 1, 2).

Korean name: Ju-reum-cheong-sa-cho (주름청사초).

Distribution: China, Japan and Korea.

Korea: Jeollabuk-do and Jeollanam-do.

Voucher specimen: Jeollabuk-do, Buan-gun, Byeonsan-myeon, Junggye-ri, Mt. Neungga, 13 Jun. 2007, *Y. H. Cho, J. G. Lee, S. J. Choi, O. S. Kim and J. H. Lee* WR-070613-036, 037, 038, 039 (KH); Gochang-gun, Buan-myeon, Yongsan-ri, Yeongi Reservoir, 1 Jun. 2010, *Y. H. Cho, D. S. Ryu, S. J. Choi and K. H. Cho* WR-100601-076 (KH); Gochang-gun, Buan-myeon, Yongsan-ri, Yeongi Reservoir, 3 Jun. 2011, *Y. H. Cho and J. H. Kim* WR-20110603-008 (KH); Gochang-gun, Asan-myeon, Samin-ri, Valley of Seonun Temple, 1 Jun. 2010, *Y. H. Cho, D. S. Ryu, S. J. Choi and K. H. Cho* WR-100601-037 (KH); Gochang-gun, Asan-myeon, Samin-ri, Seonun Temple, 3 Jun. 2011, *Y. H. Cho and J. H. Kim* WR-20110603-052 (KH) / Jeollanam-do, Damyang-gun, Yong-myeon, Yongchi-ri, Valley of Yongchubong, 14 May 2006, *Y. H. Cho and K. H. Cho* WR-060514-014, 020 (KH); Damyang-gun, Nam-myeon, Gaam-ri, 8 May 2011, *J. H. Kim* WR-20110508-009 (KH); Haenam-gun, Samsan-myeon, Gurim-ri, Daeheung Temple, 3 Jun 2009, *Y. H. Cho, S. O. Kim, and S. J. Cho* WR-090603-224 (KH); Hwasun-gun, Hancheon-myeon, Bangok-ri, Mt Cheonun, 13 May 2009, *Y. H. Cho, D. S. Ryu, J. G. Lee and O. S. Kim* WR-090513-204 (KH); Hwasun-gun, Nam-myeon, Gosi-ri, Mt. Dubong, 13 May 2009, *Y. H. Cho, D. S. Ryu, J. G. Lee and O. S. Kim* WR-090513-430, 431 (KH); Jangheung-gun, Yuchi-myeon, Bongdeok-ri, Borimcheon, 20 May 2009, *Y. H. Cho, S. O. Kim, and S. J. Cho* WR-090520-134, 135 (KH); Yeonggwang-gun, Bulgap-myeon, Moak-ri, Valley of Bulgap Temple, 15 May 2010, *Y. H. Cho and J. H.*



**Fig. 1.** Illustrations of *Carex rugata* Ohwi. A. Habit; B. Terminal spike (Staminate spike); C. Lateral spike (Pistillate spike); D. Staminate scale; E. Pistillate scale; F. Abaxial view of perigynium; G. Side view of perigynium; H. Abaxial view of achene; I. Side view of achene.



**Fig. 2.** Photographs of *Carex rugata* Ohwi. A. Habit; B. Inflorescence; C. Perigynia; D. Achenes.

*Kim* WR-100515-012 (KH); Yeonggwang-gun, Bulgap-myeon, Moak-ri, Valley of Bulgap Temple, 25 May 2010, *Y. H. Cho, D. S. Ryu and S. J. Choi* WR-100525-049, 052 (KH);

Yeonggwang-gun, Bulgap-myeon, Moak-ri, Valley of Bulgap Temple Reservoir, 13 May 2011, *Y. H. Cho and J. H. Kim* WR-20110513-003, 007, 012, 013, 014, 017 (KH); Yeonggwang-gun, Bulgap-myeon, Moak-ri, Bulgap Temple, 30 Apr. 2004, *H. T. Im* Yeonggwang-04430-226 (KH).

### A key to *Carex rugata* Ohwi and its related taxa in Korea.

1. Achenes neither constricted on angles nor excavated at faces
  2. Perigynia truncate or slightly emarginate at mouth
    3. Staminate scale awned ..... *C. breviculmis* 청사초
    3. Staminate scale awnless ..... *C. mitrata* 겨사초
  2. Perigynia bidentate at mouth
    - ..... *C. polyschoena* 가지청사초
1. Achenes constricted on angles or excavated at faces
  4. Achenes constricted on angles
    5. Terminal spike equal to shorter than lateral spike; pistillate scales shortly awned
      - ..... *C. genkaiensis* 목포사초
    5. Terminal spike longer than lateral spike; pistillate scales with awn 2.0 mm or longer
      6. Achenes lanceolate, apex cylindrical
        - ..... *C. formosensis* 긴목포사초
      6. Achenes ellipsoid to obovate, apex annulated
        - ..... *C. kamagariensis* 좁목포사초
  4. Achenes excavated at faces .... *C. rugata* 주름청사초

*C. rugata* Ohwi is distinguished from *Carex breviculmis* R. Br., *C. mitrata* Franch., *C. polyschoena* H. Lév. & Vaniot, *C. genkaiensis* Ohwi, *C. formosensis* H. Lév. & Vaniot and *C. kamagariensis* K. Okamoto by having achenes with excavated faces. This taxon was named 'Ju-reum-cheong-sa-cho' in Korean based on its specific epithet.

This species has been recorded from Fujian, Anhui and Zhejiang, China and Hokkaido, Honshu, Shikoku and Kyushu, Japan (Jin et al., 2004; Hoshino et al., 2011). In Korea, it grows shady wet margins of forest and share habitats usually with *Carex breviculmis* R. Br., *C. mitrata* Franch., *C. polyschoena* H. Lév. & Vaniot, *C. genkaiensis* Ohwi, *C. kamagariensis* K. Okamoto, *Poa pratensis* L., *P. annua* L., *P. acroleuca* Steud. and *Festuca parvigluma* Steud.

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