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Carex pingleensis (*Carex* sect. *Mitratae*), a new species of Cyperaceae from Guangxi, China

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ABSTRACT: *Carex pingleensis* Z.C. Lu, Y.F. Lu & X.F. Jin, a new species of *Carex* sect. *Mitratae* Kük. from northeastern Guangxi, China, is described and illustrated. This species is easily distinguished from all the other species of sect. *Mitratae* by its spikes gathering at the top of culms; nutlets neither contracted on angles nor excavated at faces; male glumes apex obtuse, both sides united near base, abaxial surface with pubescence and utricles shorter, only 2.8–3.2 mm long, densely pubescent.

KEY WORDS: *Carex pseudotristachya*, *Carex tristachya*, Cyperaceae, morphology, taxonomy.

INTRODUCTION

The genus *Carex* L., with ca. 2000 species, is the largest genus in the family Cyperaceae, and it is widely distributed in various habitats (Dai *et al*., 2010). There are 500+ species represented in China (Dai *et al*., 2000, 2010; Jin, 2017; Jin and Zhong, 2008; Jin *et al*., 2004, 2012, 2015; Kew, 2019). Although *Carex* was morphologically divided into three subgenera, namely subg. *Vigneastra* (Tuck.) Kük., subg. *Vignea* (P. Beauv. ex T. Lestib.) Peterm. and subg. *Carex* (Dai *et al*., 2010), these subgenera are now known to be paraphyletic or polyphyletic, with the exception of subg. *Vignea* (Waterway and Starr, 2007; Global Carex Group, 2015, 2016).

Section *Mitratae* Kük. (1909), a large section, that belongs to subg. *Carex*, comprises 60+ species, which are mainly distributed in central, eastern and southeastern Asia, with a few species extending to Australia, New Zealand and Europe (Dai *et al*., 2010). During our fieldwork in Pingle County, northeastern Guangxi, China, a new species of *Carex* sect. *Mitratae* was collected, and it is described below.

MATERIAL AND METHODS

In May 2018, during the investigation of medicinal plant resource in Pingle County, Guangxi, China, we collected a distinct *Carex* plant with immature nutlets. In order to supplement and improve the materials, we collected the mature nutlets specimens again in May 2019. When collecting the morphological diversity to be fully considered, including the size, shape and color of culms, leaves, bracts, spikes, glumes, utricles, nutlets and so on. After that, we carefully studied the morphological characters of the specimens, measured all kinds of data, anatomy the utricles, and take pictures of them. Finally, by comparing the morphological characters with other species of *Carex*, we confirmed this species to be a new species to science, and then the specimens were collated and examined to complete the morphological description.

TAXONOMIC TREATMENT

Carex pingleensis Z.C. Lu, Y.F. Lu & X.F. Jin, ***sp. nov.*** **平樂薹草 Figs. 1 & 2**

***Type*:** CHINA. Guangxi: Guilin City, Pingle County, Yao Nationality Township of Dafa, Pingshan Village, in evergreen broad-leaved forests, elevation ca. 440 m, 20 May 2019, *Yu-Lan Su and Jin-Quan Huang LZC199* (holotype: IBK00421264; isotype: IBK00421266 and HTC).

***Diagnosis*:** *Carex pingleensis* is similar to *Carex pseudotristachya* X.F. Jin & C.Z. Zheng and *Carex tristachya* Thunb., but differs from the latter two species in its culms 6–9.5 cm tall (vs. 15–20 cm and vs. 20–45 cm); leaves much surpassing the culms (vs. equaling to exceeding culms and vs. shorter than or nearly equaling culms); male glumes abaxial surface with pubescence (vs. glabrous and vs. glabrous); utricles 2.8–3.2 mm long (vs. 4.5–5 mm and vs. 3–3.2 mm), densely pubescent (vs. puberulent and vs. puberulent).

***Description*:** Perennial herb. **Rhizome** short, woody, hard, with numerous, slender, fibrous roots. **Culms** sparsely tufted, central, trigonous, slender, erect, smooth, 6–9.5 cm tall. **Leaves** much surpassing the culms, densely tufted, margins spreading or slightly revolute; blades 1.2–2 mm wide, apex acuminate, margins and both sides scabrous, abaxial surface densely granular. **Bracts** leaflike or setaceous, the leaflike ones longer than

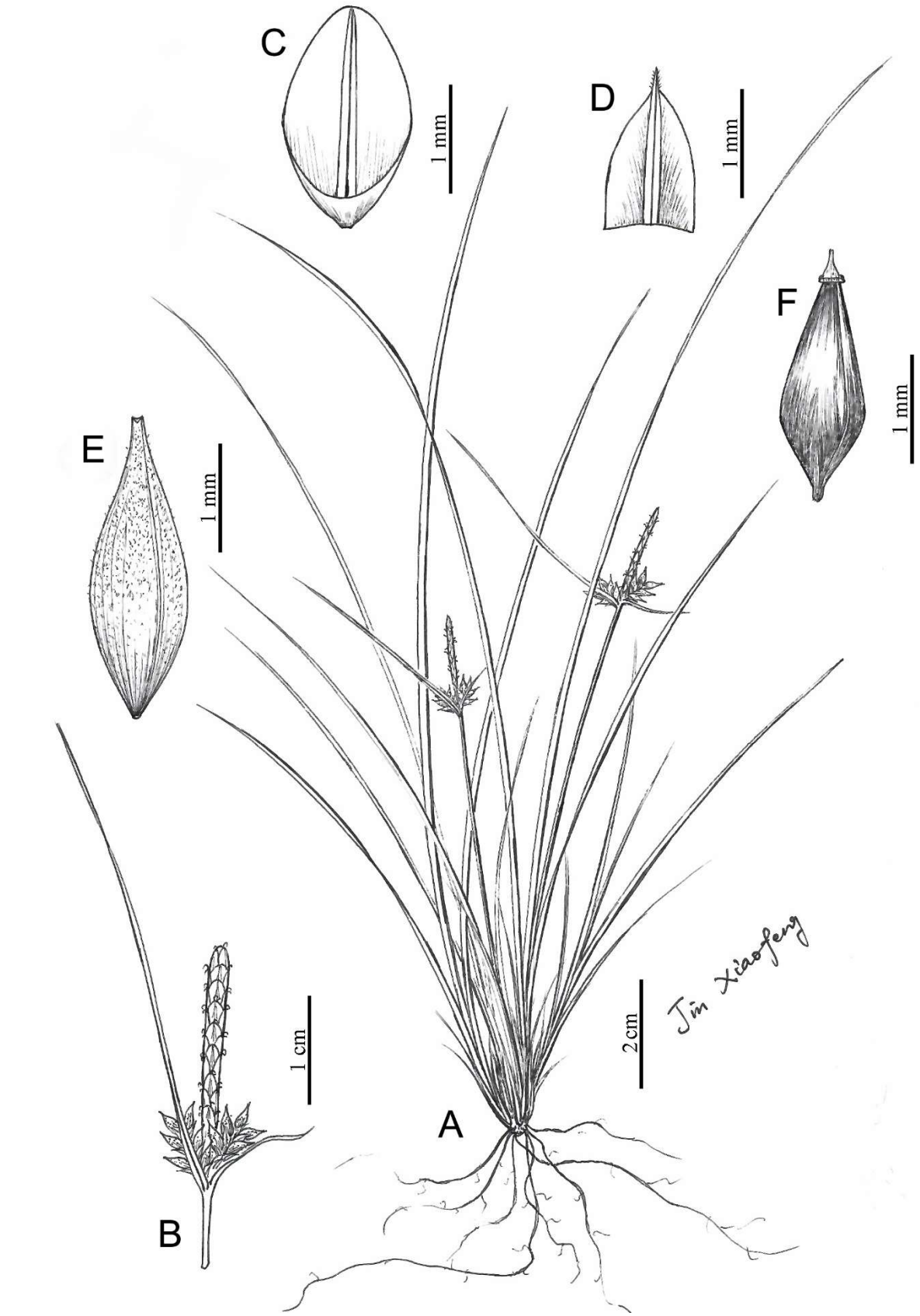

Fig. 1. ***Carex pingleensis*****: A.** Habit, **B.** Inflorescence, **C.** Male glume, **D.** Female glume, **E.** Utricle, **F.** Nutlet.

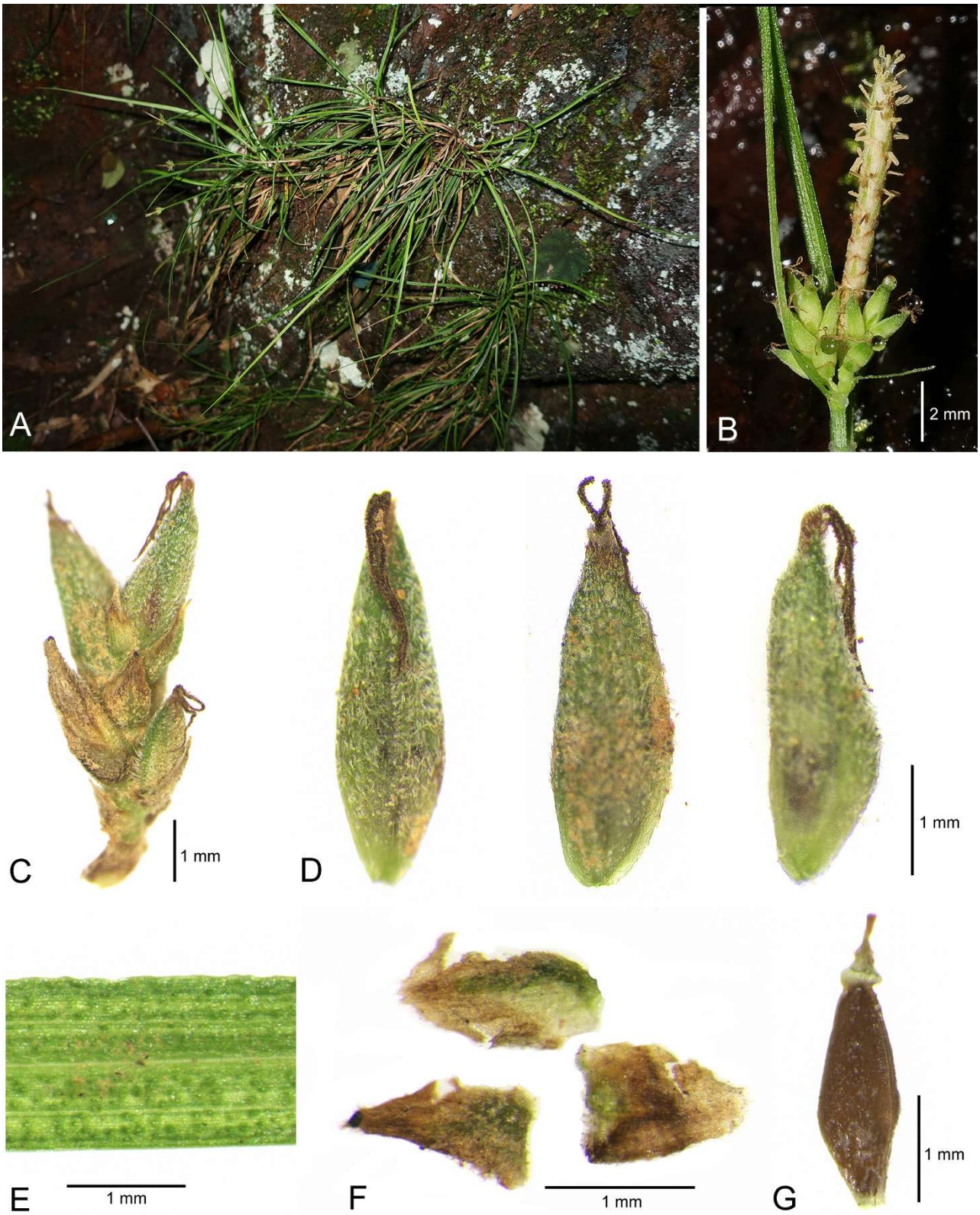

Fig. 2. *Carex pingleensis*: A. Habit, **B.** Inflorescence, **C.** Spike female, **D.** Utricles, **E.** A part of leaf, **F.** Female glumes, **G.** Nutlet.

Table 1. Comparisons among ***Carex pingleensis***, ***C. pseudotristachya*** and ***C. tristachya***

Traits/species	*Carex pingleensis*	*C. pseudotristachya*	*C. tristachya*
Culms	6–9.5 cm tall	15–20 cm tall	20–45 cm tall
Leaves	much surpassing the culms; blades 1.2–2 mm wide	equaling to exceeding culms; blades 3–5 mm wide	shorter than or nearly equaling culms; blades 2–4(–5) mm wide
Bracts	leaflike or setaceous, sheathless	leaflike, sheathed, sheath 5–10 mm long	leaflike, sheathed, sheath 6–12 mm long
Spikes	2 or 3, gathering at the top of culms; terminal spike male, 1–2 cm long, sessile; lateral spikes 4–5 mm long, sessile	2–4, upper ones separated; terminal spike male, 1–2 cm long, subsessile; lateral spikes 10–25 mm long, stipitate	4–6, upper ones contiguous and fastigiate; terminal spike male, 1–4 cm long, subsessile; lateral spikes 10–30 mm long, stipitate
Male glumes	abaxial surface with pubescence	glabrous	glabrous
Female glumes	abaxial surface with pubescence	glabrous	glabrous
Utricles	ovate-lanceolate or ovate-fusiform, 2.8–3.2 mm long, densely pubescent	ovate-fusiform, 4.5–5 mm long, puberulent	ovate-fusiform, 3–3.2 mm long, puberulent
Nutlets	chestnut, rhomb-ovate ellipsoid, ca. 2 mm long	yellowish, ovate, ca. 3 mm long	pale brown, ovate, 2–2.5 mm long

the inflorescence, sheathless. **Spikes** 2 or 3, gathering at the top of culms; terminal spike male, linear-cylindric, 10–20 × 1–1.2 mm, sessile, densely flowered; lateral spikes female, extremely short cylindric or ovate-cylindric, 4–5 × 3–4 mm, female part with 4–9 flowers, sessile. **Male glumes** broadly ovate, pale brownish-yellow, 2–2.2 mm long, apex obtuse, both sides united near the base, abaxial surface with pubescence, with 3 yellow veins. **Female glumes** ovate, yellowish, 1.2–1.5 mm long, apex obtuse, abaxial surface with pubescence, with 3 yellow-green veins, extended toward the top to a 0.2–0.3 mm long coarse awn. **Utricles** pale yellowish-green, longer than the glumes, ovate-lanceolate or ovate-fusiform, trigonous, 2.8–3.2 mm long, densely pubescent, many veined, apex abruptly contracted into a 0.5 mm long beak, orifice minutely 2-toothed. **Nutlets** chestnut, tightly enveloped, rhomb-ovate ellipsoid, ca. 2 mm, base with a straight stalk ca. 0.2 mm long, discoid-annulate at apex; **style** base straight, slightly thickened; **stigmas** 3.

Distribution and habitat**:** *Carex pingleensis* has only been collected from Pingle County, Guangxi, China. This new species grows in a valley of evergreen broad-leaved forests, at an elevation of 400–500 m. Associated species include *Cibotium barometz* (L.) J. Sm., *Diospyros xiangguiensis* S. Lee, *Ficus langkokensis* Drake, *Helicia reticulata* W.T. Wang, *Homalium cochinchinense* (Lour.) Druce, *Nothapodytes pittosporoides* (Oliv.) Sleumer, *Pilea peploides* (Gaudich.) Hook. et Arn., *Pothos chinensis* (Raf.) Merr.

Conservation status**:** During our fieldwork in 2018 and 2019, three populations and about 300 individuals were discovered. We didn't do more surveys in its population, so the number of living populations is unknown. According to the IUCN Red List Categories and Criteria (IUCN, 2019), *Carex pingleensis* well be considered in the Data Deficient (DD) category.

Phenology**:** Flowering and fruiting from April to June.

Etymology**:** The specific epithet '*pingleensis*' refers to the type locality of this new species.

Notes**:** *Carex pingleensis* is similar to *C. pseudotristachya* and *C. tristachya* in the utricles, which are gradually attenuate into a beak at the apex, with their orifices minutely 2-toothed, as well as the nutlets that are neither contracted on angles nor excavated at faces, trigonous; but differs from them in its culms shorter; leaves much surpassing the culms; male glumes abaxial surface with pubescence; utricles shorter, densely pubescent. More detailed morphological comparation between *C. pingleensis* and its related species are presented in Table 1.

Additional specimens examined**:** CHINA. Guangxi: Guilin City, Pingle County, Yao Nationality Township of Dafa, Pingshan Village, in the evergreen broad-leaved forests, elevation ca. 436 m, 15 May 2018, *Pingle Exped. 450330180515041LY* (IBK00421267 and HTC).

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