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Four new species of the *Stegana ornatipes* species group (Diptera: Drosophilidae) from Yunnan, China, with DNA barcoding information

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Abstract

Four new species of *Stegana* (*Steganina*) *ornatipes* species group are found from Yunnan, China: *S. (S.) angustifoliacea* sp. nov., *S. (S.) crinata* sp. nov., *S. (S.) nigripes* sp. nov. and *S. (S.) polysphyra* sp. nov. The DNA sequences of the mitochondrial *COI* gene with BOLD Process ID and GenBank accession numbers are provided for the Chinese species.

Key words: Barcoding, drosophilid fauna, East Asia, *ornatipes* group, taxonomy

Introduction

Up to the present, a total of 153 species of the subgenus *Stegana* (*Steganina*) has been reported from the World (Bächli 2014; Lu *et al.* 2011a; Wang *et al.* 2013; Zhang *et al.* 2014), 76 of them from Chinese part of the Oriental region, which shows that southern China might be an important area in the origin and early radiations of the subgenus *Steganina*. The *Stegana ornatipes* species group is as it were endemic to the Oriental region, and including 11 species described (Cheng *et al.* 2009; Lu *et al.* 2011b), only one species, *Stegana ornatipes* Wheeler & Takada, 1964 is distributed in Micronesia. Recently, based on DNA sequence data of two mitochondrial genes, cytochrome oxidase subunit I (*COI*) and NADH dehydrogenase subunit 2 (*ND2*), phylogenetic relationships among eight species of the *ornatipes* group were analyzed (Lu *et al.* 2011); in addition, Zhang *et al.* (2014) reported 28 DNA barcoding fragments of the mitochondrial *COI* gene for 17 species of the genus *Stegana* from Taiwan, including five samples of two *ornatipes* species: *S. chitouensis* Sidorenko, 1998 and *S. ornatipes* Wheeler & Takada, 1964.

In this paper, four new species of the *ornatipes* group are described from Yunnan, southwestern China. In addition, a total of 12 DNA sequences of the mitochondrial *COI* gene for eight Chinese species of the *ornatipes* group are provided with BOLD Process ID and GenBank accession numbers (Table 1). Up to the present, a total 26 mtDNA *COI* sequences of 14 species of the *ornatipes* group have been reported from China plus in Lu *et al.* (2011) and Zhang *et al.* (2014).

Material and methods

Materials and morphological terminology. All specimens examined were collected by sweeping on tree trunks or tussocks nearby streams in the forest, preserved in 75% ethanol, and then dried and pinned after morphological examination and identification. The specimens are deposited in Department of Entomology, South China Agricultural University, Guangzhou, China (SCAU). We followed Zhang & Toda (1992) and Chen & Toda (2001) for the definitions of measurements, indices and abbreviations.

DNA extraction, sequencing and sequence alignment. A total of 12 representative individuals belonging eight species were employed for DNA sequencing of the mitochondrial *COI* gene (Table 1). For this purpose, total DNA was extracted from each fly using the TIANGEN™ DNA extraction kit following manufacturer's

Specimens examined. Holotype ♂ (SCAU, No. 124148), CHINA: Yixiang, Pu'er, Yunnan, altitude 1400 m, 2.x.2011, on tree trunk, HW Chen. Paratype: CHINA: 1♂ (SCAU, No. 124149), Hesong, Menghai, Yunnan, 21°49' N, 100°06' E, altitude 1800 m, 7.v.2012, on tree trunk, HW Chen.

Etymology. A combination of the Greek words: *poly* + *sphyrā*, referring to the shape paramere.

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