

A study of *Chrysotus* (Diptera: Dolichopodidae) from Sichuan, China with one new species

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Abstract: A revision of the genus *Chrysotus* Meigen from Sichuan, China is presented. Sixteen species are recorded. One species is described as new to science: *Chrysotus shuensis* Liu & Yang **sp. nov.**

Key words: Empidoidea; long-legged flies; taxonomy

中国四川省小异长足虻属研究及一新种记述（双翅目：长足虻科）

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摘要：本文对中国四川省的小异长足虻属进行了研究，记述了该属 16 种。描述了 1 新种：蜀小异长足虻 *Chrysotus shuensis* Liu & Yang **sp. nov.**，并提供了整体图和特征图。

关键词：舞虻总科；长足虻科；分类

Introduction

The genus *Chrysotus* Meigen, 1824 is the largest genus in the subfamily Diaphorinae, with 548 species currently known worldwide. Among them, 219 species occur in the Oriental Region, most reported from Guizhou of China (Yang *et al.* 2011; Liu *et al.* 2013, 2016, 2017; Wei *et al.* 2015; Zhou & Wei 2017; Wei 2018). Liu *et al.* reviewed 32 species from Palaearctic China (Liu *et al.* 2019). But the situation in China is more complicated insofar as several species groups were erected only in Guizhou, China (Wei *et al.* 2015; Zhou & Wei 2017; Wei 2018).

Sichuan is located in southwest China. This territory belongs to the Oriental Region. In this study, we present a new species, *Chrysotus shuensis* Liu & Yang **sp. nov.** and list the 16 known species of *Chrysotus* from Sichuan. Four species are reported from Sichuan for the first time.

Material and methods

The specimens in this study were collected from Sichuan mainly using sweep nets. Specimens were stored in 75% ethanol. All species are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing.

Morphological terminology for adult structures mainly follows McAlpine (1981). Terms for the structures of the male genitalia follow Cumming and Wood (2009). Body length was measured from the insertion of the antenna to the apex of the genitalia in males. The following abbreviations are used: acr — acrostichal bristle, ad — anterodorsal bristle, av — anteroventral bristle, d — dorsal bristle, dc — dorsocentral bristle, LI — fore leg, LII — mid leg, LIII — hind leg, npl — notopleural bristle, oc — ocellar bristle, pd — posterodorsal bristle, v — ventral bristle, CuAx ratio — length of m-cu/length of distal portion of CuA.

Taxonomy

The genus *Chrysotus* includes the following 16 species in Sichuan, China.

1. *Chrysotus biprojicienus* Wei & Zhang, 2010 (China: Anhui, Beijing, Chongqing, Fujian, Guangxi, Guizhou, Hainan, Hebei, Hubei, Hunan, Inner Mongolia, Jiangxi, Shaanxi, Shanxi, Sichuan, Taiwan, Tibet, Yunnan, Zhejiang)
2. *Chrysotus emeiensis* Wang & Yang, 2008 (China: Sichuan)
3. *Chrysotus guizhouensis* Wang & Yang, 2008 (China: Guizhou, Sichuan)
4. *Chrysotus magnuscaputus* Liu & Yang, 2015 (China: Hainan, Sichuan)
5. *Chrysotus minutus* Wei & Zhou, 2015 (China: Sichuan)
6. *Chrysotus motuoensis* Liu & Yang, 2013 (China: Sichuan, Tibet)
7. *Chrysotus occultus* Wei & Zhou, 2015 (China: Sichuan)
8. *Chrysotus pengzhouensis* Wei & Zhou, 2015 (China: Sichuan)
9. *Chrysotus petilus* Wei, 2018 (China: Sichuan)
10. *Chrysotus piscicaudatus* Wei, 2018 (China: Sichuan)
11. *Chrysotus shanxiensis* Liu & Yang, 2015 (China: Guangxi, Shaanxi, Shanxi, Shandong, Sichuan, Xinjiang, Yunnan)
12. *Chrysotus shuensis* Liu & Yang sp. nov. (China: Sichuan)
13. *Chrysotus tibetensis* Liu & Yang, 2013 (China: Sichuan, Tibet)
14. *Chrysotus triangulus* Wei & Zhou, 2015 (China: Sichuan)
15. *Chrysotus xinanus* Wei & Zhang, 2012 (China: Guangxi, Guizhou, Sichuan, Yunnan)
16. *Chrysotus zhangii* Wang & Yang, 2008 (China: Fujian, Sichuan)

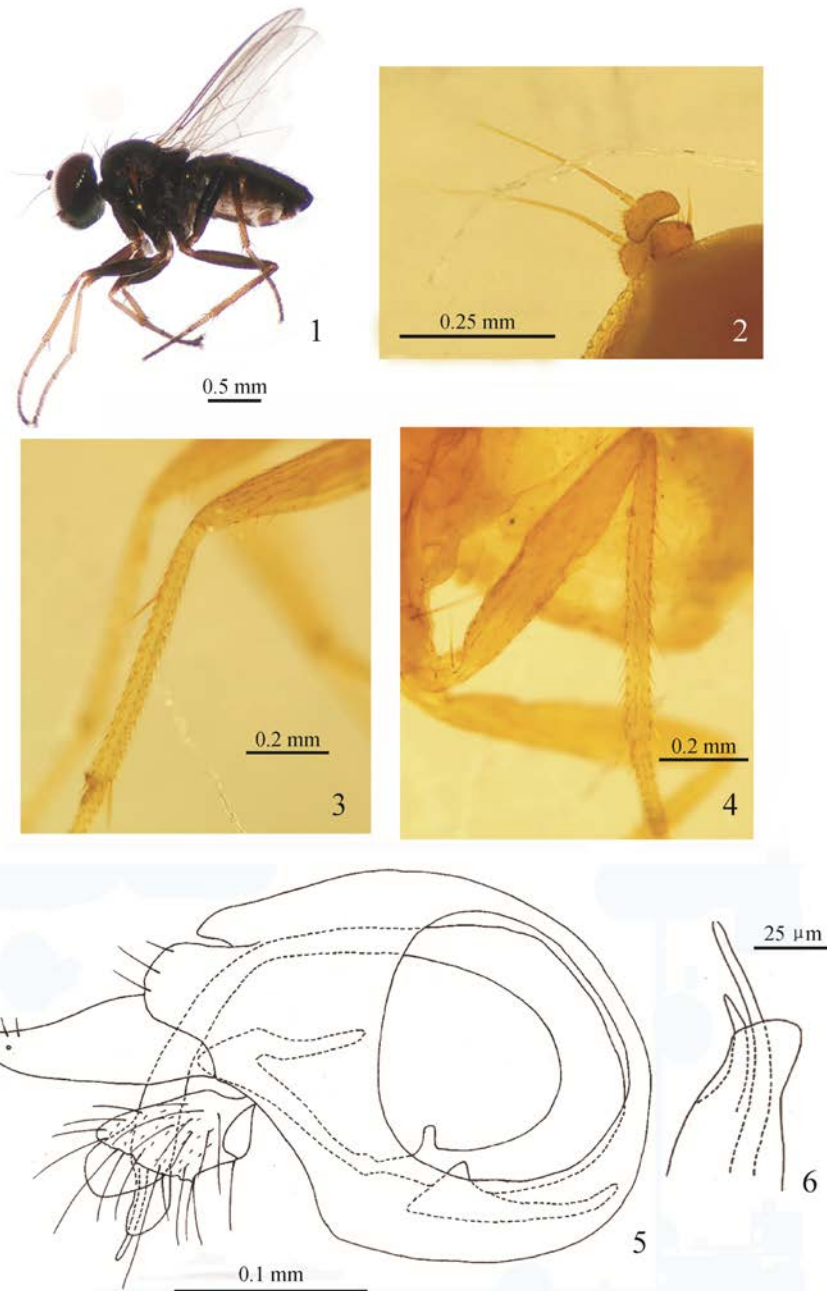
***Chrysotus shuensis* Liu & Yang sp. nov.** (Figs. 1–6)

Male (Fig. 1). Body length 2.5 mm, wing length 2.0 mm.

Head metallic green with pale gray pollinosity; eyes contiguous on face. Hairs and bristles on head black, postocular bristles (including postero-ventral hairs) brown to black. Antenna brown to dark brown, scape and pedicel dark brown, flagellomere brown; first flagellomere nearly subtrapezoidal, 1.8 times wider than long; arista brown, short pubescent (Fig. 2). Proboscis brown with dark yellow hairs; palpus brown with 1 black bristle at apex.

Thorax metallic green with pale gray pollinosity. Hairs and bristles on thorax black; 6 dc

(5 strong and 1 weak), 5–6 irregularly paired acr short and hair-like; scutellar bristles long and strong, lateral scutellar bristles weak; propisternum with 1 long black bristle on lower part and 1 short black bristle on upper part.



Figures 1–6. *Chrysotus shuensis* Liu & Yang **sp. nov.**, ♂, holotype. 1. Habitus, lateral view; 2. First flagellomere, lateral view; 3. Mid tibia, lateral view; 4. Hind tibia, lateral view; 5. Genitalia, lateral view; 6. Apex of phallus, dorsal view.

Legs mainly brown; fore femur brown with somewhat yellow apex; fore tibia yellow, mid and hind tibiae yellow with brown base; all tarsi from tarsomere 1 onward yellow to brown. Hairs and bristles on legs brown to black. Fore coxa with long hairs, hind coxa with 1 outer bristle at base. Hind trochanter with 1 bristle in the middle. Fore femur with 3 pv apically, mid femur with 2–3 av and 2–3 pv apically, hind femur with 2 av and 2 pv apically. Mid tibia with 1 ad at basal 1/4, 3–4 bristles apically (Fig. 3); hind tibia with 2 ad and 1–2 pd, somewhat long ventral hairs, 3–4 short bristles apically (Fig. 4). Relative length of tibia and 5 tarsomeres of legs LI : 4.5 : 2.1 : 1.2 : 1.0 : 0.6 : 0.6 ; LII : 5.5 : 3.8 : 1.4 : 1.0 : 0.6 : 0.6 ; LIII : 6.4 : 2.0 : 1.4 : 1.0 : 0.6 : 0.6.

Wing hyaline, tinged brown; veins blackish, R4+5 and M parallel apically; CuAx ratio 0.37. Squama brown with brown hairs. Halter brown.

Abdomen metallic green with pale gray pollinosity; hairs and bristles on abdomen black. Tergite 6 and sternum 8 with normal hairs. Male genitalia (Fig. 5). Epandrium somewhat rounded, with not obviously angular projection posteriorly. Lateral epandrial lobe protruded, bearing 3 bristles. Surstylus stout, tapered apically. Cercus trapezoidal with moderated bristles. Apex of phallus with two nearly rectangular lobes (Fig. 6).

Female. Unknown.

Holotype. ♂, **China**, Sichuan, Mt. Emei, Jingshui, 29.595°N, 103.379°E, 17-VIII-2012, leg. Zewen CAO.

Distribution: China (Sichuan).

Diagnosis. First flagellomere nearly subtrapezoidal, 1.8 times wider than long. Legs mainly brown; fore femur brown with somewhat yellow apex; fore tibia yellow, mid and hind tibiae yellow with brown base.

Remarks. In the key to the Palearctic species of *Chrysotus* (Negrobov *et al.* 2000), this new species runs to *Chrysotus andrei* Negrobov, but the apex of the phallus of this new species is not bifid. In the key to the Siberian species of *Chrysotus* (Negrobov *et al.* 2014), this new species runs to *Chrysotus tricaudatus* Negrobov Barcalov & Selivanova, and in the key to the Palaearctic Chinese species of *Chrysotus* (Liu *et al.* 2019), this new species runs to *Chrysotus shanxiensis* Liu & Yang. But it differs from these later two species by the shape of the apex of the phallus, and also the coloration of the legs.

This new species also differs from the *Chrysotus leigongshanus* species-group, *Chrysotus papuanus* species-group and *Chrysotus laesus* species-group from southwest China (Wei *et al.* 2015; Zhou & Wei 2017; Wei 2018).

Etymology. The name “shu” refers to the short name for the type location Sichuan.

***Chrysotus magnuscaputus* Liu & Yang, 2016**

Chrysotus magnuscaputus Liu & Yang, 2016: 26. Type location: China (Hainan: Wuzhishan).

Specimens examined. 1♂, **China**, Sichuan, Mt. Emei, Jingshui, 29.595°N, 103.379°E, 17-VIII-2012, leg. Zewen CAO; 1♂, **China**, Sichuan, Mt. Emei, Jingshui, 29.595°N, 103.379°E, 17-VIII-2012, leg. Zhifei LI.

Distribution: China (Hainan, Sichuan).

Diagnosis. First flagellomere dark brown; 1.8 times wider than long. Legs mainly brown; fore and mid tibiae yellow with brown base; all tarsomere 1 yellow, all tarsi from tip of tarsomere 1 onward brown. End of hypandrium thin. Lower side of lateral epandrial lobe

protruded, apex of lateral epandrial lobe with 3 bristles.

***Chrysotus motuoensis* Liu & Yang, 2013**

Chrysotus motuoensis Liu & Yang, 2013: 173. Type location: China (Tibet: Linzhi).

Specimens examined. 1♂1♀, **China**, Sichuan, Liangshan, Shawanxiang, Nawacun, 28.406°N, 100.903°E, 24-VII-2019, leg. Liang WANG; 1♂1♀, **China**, Sichuan, Liangshan, Yanyuan, Guluhu, 27.711°N, 100.856°E, 21-VII-2019, leg. Liang WANG; 6♂1♀, **China**, Sichuan, Liangshan, Yanyuan, Taozixiang, 27.444°N, 101.066°E, 19-VII-2019, leg. Liang WANG; 1♂1♀, **China**, Sichuan, Daocheng, Jiyicun, 29.115°N, 100.217°E, 09-VII-2019, leg. Liang WANG; 3♂5♀, **China**, Sichuan, Liangshan, Yanyuan, Yantangxiang, 27.400°N, 101.140°E, 19-VII-2019, leg. Liang WANG.

Distribution: China (Sichuan, Tibet).

Diagnosis. First flagellomere subtriangular, 1.3 times wider than long. All trochanters yellow; fore femur brown with yellow base and apex, hind femur brown with basal 1/3 yellow. Apex of phallus with 2 sheet-like structure, one short and other relatively long.

***Chrysotus shanxiensis* Liu & Yang, 2015**

Chrysotus shanxiensis Liu & Yang, 2015: 88. Type location: China (Shanxi: Qinshui).

Specimens examined. 1♂1♀, **China**, Sichuan, Yanyuan, Songping, 27.476°N, 101.048°E, 19-VII-2019, leg. Liang WANG; 6♂6♀, **China**, Sichuan, Liangshan, Yanyuan, Yantangxiang, Zhengjiatian, 27.340°N, 101.140°E, 19-VII-2019, leg. Liang WANG.

Distribution: China (Guangxi, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan).

Diagnosis. First flagellomere subtriangular, 1.4 times wider than long. Legs mostly black, fore and mid tibiae yellow with black base and dark yellow to brown apex, hind tibia entirely black. Apex of phallus with 2 fin-like structure.

***Chrysotus tibetensis* Liu & Yang, 2013**

Chrysotus tibetensis Liu & Yang, 2013: 176. Type location: China (Tibet: Linzhi).

Specimens examined. 1♂1♀, **China**, Sichuan, Yajiang, Gexigou, 30.444°N, 100.978°E, 02-VII-2019, leg. Liang WANG; 4♀, **China**, Sichuan, Derongxian, Cirencuo, 28.354°N, 99.373°E, 16-VII-2019, leg. Liang WANG.

Distribution: China (Sichuan, Tibet).

Diagnosis. First flagellomere subtriangular, 1.4 times wider than long. Legs mostly black, fore and mid tibiae yellow with black base and dark yellow to brown apex, hind tibia entirely black. Epandrium with angular projection posteriorly. Apex of phallus with two lateral lobes bluntly round and swollen apically.

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