

Four new species of subgenus *Coptophlebia* (Diptera: Empididae: *Empis*) from Xizang, China

Jingyu WANG¹①, Chunmin ZHANG²①, Ding YANG¹

1. Department of Entomology, College of Plant Protection, China Agricultural University, Beijing 100193, China

2. Tongliao Agricultural Technology Extension Center, Tongliao, Inner Mongolia 028000, China

Abstract: Subgenus *Coptophlebia* is one of the largest subgenera in genus *Empis*. It is reported from Xizang for the first time with descriptions of the following four new species: *Empis* (*Coptophlebia*) *breviprojecta* **sp. nov.**, *Empis* (*Coptophlebia*) *brevista* **sp. nov.**, *Empis* (*Coptophlebia*) *linzhiensis* **sp. nov.**, and *Empis* (*Coptophlebia*) *longiprojecta* **sp. nov.** All species belong to the *Empis* (*Coptophlebia*) *hyalipennis* group. A key is presented to separate these species.

Key words: dance flies; taxonomy; key

中国西藏缺脉舞虻亚属 *Coptophlebia* 四新种 (双翅目: 舞虻科: 舞虻属)

王婧瑜¹①, 张春敏²①, 杨定¹

1. 中国农业大学植物保护学院昆虫学系, 北京 100193; 2. 通辽市农业技术推广中心, 内蒙古 通辽 028000

摘要: 缺脉舞虻亚属 *Coptophlebia* 为舞虻属 *Empis* 中最大的亚属之一。本文发现该亚属在我国西藏有分布, 并记述如下 4 新种: 短突缺脉舞虻 *Empis* (*Coptophlebia*) *breviprojecta* **sp. nov.**, 短鬃缺脉舞虻 *Empis* (*Coptophlebia*) *brevista* **sp. nov.**, 林芝缺脉舞虻 *Empis* (*Coptophlebia*) *linzhiensis* **sp. nov.** 和长突缺脉舞虻 *Empis* (*Coptophlebia*) *longiprojecta* **sp. nov.**。所有新种均属于三鬃缺脉舞虻种团 *Empis* (*Coptophlebia*) *hyalipennis* group。文中还编制了该种团西藏种类的检索表。

关键词: 舞虻; 分类; 检索表

Introduction

The subgenus *Coptophlebia* Bezzi, 1909 is one of the largest groups in the genus *Empis*. It contains over 170 known species distributed worldwide, of which 38 species are known to occur in China (Collin 1961; Yang *et al.* 2007, 2018). The *Empis* (*Coptophlebia*) *hyalipennis* species group is characterized by the acrostichal bristles usually absent, abdominal tergite 8 strongly modified and epandrial lamella usually bifurcated (Daugeron *et al.* 2011; Zhou *et al.* 2017). This species group is distributed in the Nearctic, Palearctic and Oriental realms with 24 known species, of which 16 species are known to occur in China (Chvála 1994; Daugeron 1997; Daugeron *et al.* 2011; Zhou *et al.* 2017).

Accepted 21 June 2022. Published online 26 August 2022. Published 25 September 2022.

① Corresponding authors, E-mails: jyu.wang@cau.edu.cn; cauzcm@163.com

In this paper, the subgenus *Coptophlebia* is newly reported from Xizang with descriptions of four new species which belong to the *Empis* (*Coptophlebia*) *hyalipennis* group. A key is presented to separate these species.

Material and methods

Specimens were examined and illustrated using a ZEISS Stemi 2000–c. Genitalic preparations were made by macerating the apical portion of the abdomen in cold 10% NaOH for about 8 hours. The type specimens are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing. The following abbreviations are used: acr — acrostichal bristle(s); ad — anterodorsal bristle(s); av — anteroventral bristle(s); dc — dorsocentral bristle(s); h — humeral bristle(s); ih — inner humeral bristle(s); npl — notopleural bristle(s); oc — ocellar bristle(s); pd — posterodorsal bristle(s); ph — posterior humeral bristle(s); prsc — prescutellar bristle(s); psa — postalar bristle(s); pv — posteroventral bristle(s); sc — scutellar bristle(s).

Taxonomy

Key to species (males) of *Empis* (*Coptophlebia*) *hyalipennis* group from Xizang

1. Hind femur with a bundle of 4 biseriate long thick ventral bristles near base; abdominal tergite 8 distinctly longer than sternite 8 and with very long mid-posterior process 2
- Hind femur without a bundle of ventral bristles near base; abdominal tergite 8 as long as or slightly shorter than sternite 8 and with rather short mid-posterior process 3
2. M1 apically bent, not reaching wing margin; epandrial lamella with long dorsal process bearing 6 very long bristles *E. (C.) linzhiensis* **sp. nov.**
- M1 apically straight, reaching wing margin; epandrial lamella with short dorsal process bearing 4 short bristles *E. (C.) brevista* **sp. nov.**
3. Hairs and bristles on head and thorax very long and thin; irregularly biseriate acr present; abdominal tergite 8 as long as sternite 8, without bundle of very long thick bristles; epandrial lamella with short and bare ventral process distinctly shorter than dorsal process *E. (C.) breviprojecta* **sp. nov.**
- Hairs and bristles on head and thorax short; acr absent; abdominal tergite 8 shorter than sternite 8, with bundle of very long thick bristles near base of postero-lateral process; epandrial lamella with long and haired ventral process nearly as long as dorsal process *E. (C.) longiprojecta* **sp. nov.**

1. *Empis* (*Coptophlebia*) *breviprojecta* **sp. nov.** (Fig. 1)

Description. Male. Body length 4.1 mm, wing length 4.3 mm.

Head black with grey pollinosity. Eyes dark yellow, holoptic with upper ommatidia distinctly enlarged. Hairs and bristles on head very long and thin, not distinguished, blackish. Ocellar tubercle with 2 very long oc. Antenna blackish; scape with some blackish hairs, pedicel with cirlet of blackish subapical hairs; first flagellomere long subconical, basally convex ventrally, 3.35 times longer than wide; apical style as long as first flagellomere. Proboscis very long, 1.7 times as long as head height, dark brown to blackish. Palpus dull blackish, with blackish hairs.

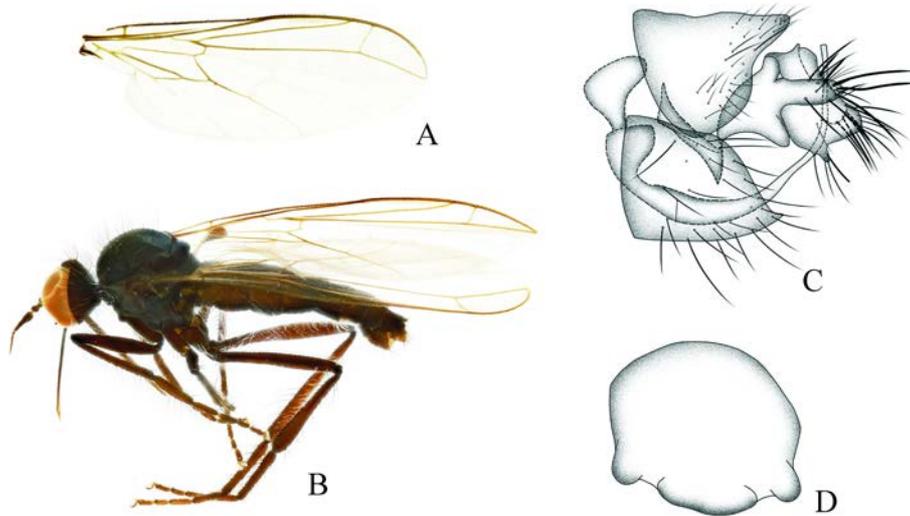


Figure 1. *Empis* (*Coptophlebia*) *breviprojecta* sp. nov. A. Wing; B. Male habitus, lateral view; C. Genitalia, lateral view; D. Tergite 8, dorsal view.

Thorax black with grey pollinosity. Hairs and bristles on thorax very long and thin, not distinctly distinguished, blackish; 1 h, 3 npl, 1 psa; acr irregularly biseriate; dc anteriorly irregularly triseriate, but posteriorly irregularly uniseriate; 4 sc (apicals very long and cruciate, laterals somewhat short). Prosternum laterally with several white hairs. Laterotergite with long and somewhat dense hairs. Legs entirely dark brown except all coxae blackish. Hairs and bristles on legs mostly blackish, partly black. Fore femur with short weak av and pv; mid femur with short weak av and long weak pv; hind femur with short weak av and very long thin pv. Fore tibia and tarsomeres 1–2 with very long and thin dorsal bristles. Mid tibia with somewhat dense av and pv (1 very long av and 1 long av at middle). Hind tibia thickened toward tip with 2 long ad at base and 4 very long av at middle; apically with 1 very long ad and 1 very long pd. Fore tarsomere 1 weakly thickened, nearly as thick as fore tibia. Mid tarsomere 1 basally with 1 very long thin pd, 1 very long anterior bristle and 1 somewhat long pv; apically with 1 very long anterior bristle and 1 somewhat long ad. Hind tarsomere 1 indistinctly thickened with 1 long pd, 1 long av and 2 long pv. Wing hyaline; pterostigma brown, narrow; veins dark brown except M thin, pale; M_1 apically abbreviated. Squama brown, dark yellow fringed. Halter dark brown.

Abdomen nearly straight, apically weakly curved downward, blackish with gray pollinosity; hypopygium nearly as thick as pregenital segments. Hairs and bristles on abdomen dark yellow except those on hypopygium blackish.

Male genitalia. Tergite 8 as long as sternite 8; mid-posterior process weakly convex, lateral process very short and obtuse. Sternite 8 nearly as long as wide, somewhat trapezoid. Epandrial lamella rather small, bifurcated; dorsal process long thick finger-like with short hairs and 6 long thick bristles; ventral process distinctly shorter than dorsal process, subtriangular and bare. Cercus rather large and broad, somewhat quadrate, with very short apico-ventral process.

Holotype. ♂, **China**, Xizang, Yadong, 3400 m, 12-VII-2018, Liang WANG (CAU) leg.

Etymology. This specific epithet refers to the epandrial lamella having a short ventral process.

Diagnosis. Hairs and bristles on head and thorax very long and thin; acr irregularly biseriata. Fore tibia and tarsomeres 1–2 with very long and thin dorsal bristles. Abdominal tergite 8 as long as sternite 8. Epandrial lamella with a short bare ventral process distinctly shorter than dorsal process, bare.

Remarks. The new species is somewhat similar to *Empis (Coptophlebia) quadrata* Zhou, Liu & Yang, 2017 from Sichuan, but may be separated from the latter by the following features: hairs and bristles on head and thorax very long and thin; irregularly biseriata acr present; fore tibia and tarsomeres 1–2 with very long and thin dorsal bristles. In *Empis (Coptophlebia) quadrata*, the hairs and bristles on head and thorax are short; acr are absent; and the fore tibia and tarsomeres 1–2 have short dorsal bristles (Zhou *et al.* 2017).

2. *Empis (Coptophlebia) breviseta* sp. nov. (Fig. 2)

Description. Male. Body length 4.4 mm, wing length 4.7 mm.

Head black with grey pollinosity. Eyes brownish, holoptic with upper ommatidia distinctly enlarged. Hairs and bristles on head blackish except those on lower occiput dark brownish yellow. Ocellar tubercle with 2 long oc. Antenna blackish; scape with several blackish hairs, pedicel with circlet of blackish subapical hairs; first flagellomere long subconical, weakly concave ventrally on about apical half, 3.1 times longer than wide; apical style 0.9 times as long as first flagellomere. Proboscis very long, nearly 2.1 times as long as head height, blackish. Palpus blackish, with blackish hairs.

Thorax black with grey pollinosity. Hairs and bristles on thorax brownish yellow, bristles rather long; 1 h, 1 ih, 1 ph, 3 npl, 2 sa, 1 psa; acr absent, uniseriate dc including 4 prsc; 4 sc (apicals very long and cruciate, laterals rather short). Prosternum laterally with 4 short dark yellow hairs. Laterotergite with long dense hairs. Legs entirely blackish. Hairs and bristles on legs brown to dark brown except those on coxae and trochanters wholly brownish yellow. Fore femur with several short hair-like pv. Mid femur with row of long hair-like pv. Hind femur with row of hair-like av and one bundle of 4 long thick biseriata brownish yellow ventral bristles near base. Fore tibia with long dense dorsal hairs, 3–4 short to long blackish ad, and long and somewhat sparse brown hairs on posterior surface. Mid tibia with row of dense av and sparse pv on apical 2/3; apically with 6 long bristles (including 3 long thick ventral bristles). Hind tibia with 2 very long ad, 4 long to very long pd, 2 very long av and 2 very long pv; apically with 2 short bristles. Fore tarsomere 1 distinctly thickened, nearly as thick as fore tibiae, with long dorsal hairs, 1 very long thick ad and 1 very long thin pd at base and with long and somewhat sparse brown hairs on posterior surface; apically with 4 long thick blackish bristles. Mid tarsomere 1 with 1 very long ad at base, 2 short av and 2 very long pv. Hind tarsomere 1 weakly thickened with 2 ad, 2 pd, 2 long av and 3 pv. Wing hyaline; pterostigma brown, narrow; veins brown to dark brown; M_1 apically weak, reaching wing margin. Squama brown, brownish fringed. Halter brown.

Abdomen nearly straight, apically distinctly curved downward, dark brown with gray pollinosity; hypopygium narrower than pregenital segments. Hairs and bristles on abdomen dark yellow except those on hypopygium brown.

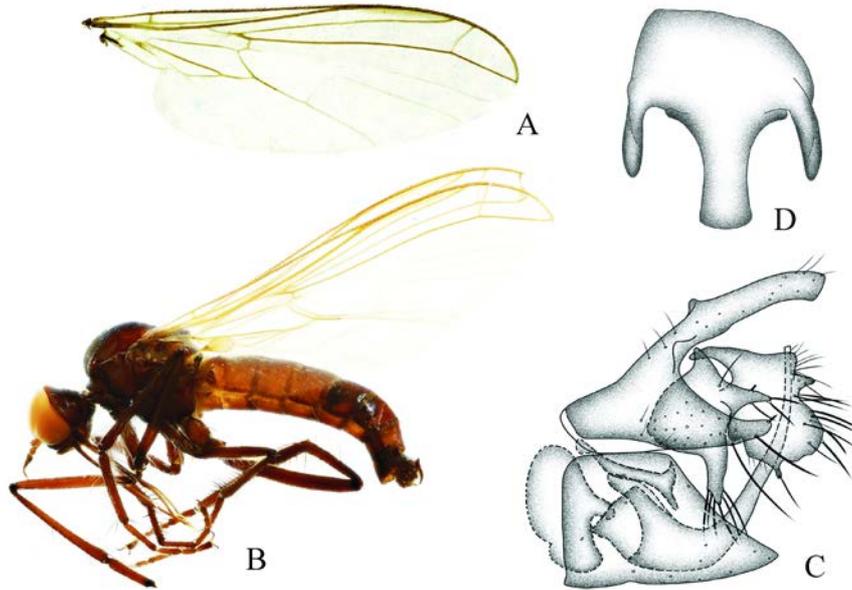


Figure 2. *Empis* (*Coptophlebia*) *breviseta* **sp. nov.** A. Wing; B. Male habitus, lateral view; C. Genitalia, lateral view; D. Tergite 8, dorsal view.

Male genitalia. Tergite 8 distinctly longer than sternite 8, with very long mid-posterior process. Sternite 8 distinctly longer than wide, somewhat trapezoidal. Epandrial lamella with short dorsal process bearing 4 short bristles. Epandrial lamella apically bifurcated; short finger-like dorsal process directed backward with 4 short bristles; long thick perpendicular ventral process with subtriangular tip bearing 6 bristles. Cercus rather large and broad, somewhat trapezoidal.

Holotype. ♂, **China**, Xizang, Linzhi, Namaicun, 3200 m, 17-VII-2012, Wenliang LI (CAU) leg.

Etymology. This specific epithet refers to the short dorsal process of the epandrial lamella having short bristles.

Diagnosis. Fore femur with several short hair-like pv. Fore tibia and tarsomere 1 with long and somewhat sparse brown hairs on posterior surface. M1 apically reaching wing margin. Abdominal tergite 8 distinctly longer than sternite 8, with very long mid-posterior process. Epandrial lamella with short dorsal process bearing 4 short bristles.

Remarks. The two new species, *Empis* (*Coptophlebia*) *breviseta* **sp. nov.** and *Empis* (*Coptophlebia*) *linzhiensis* **sp. nov.**, may be easily separated from other known species of their species group by the abdominal tergite 8 with very long mid-posterior process and hind femur with a bundle of 4 biseriate long thick. In other known species of this species group, the abdominal tergite 8 has a short wide or indistinct mid-posterior process, and the hind femur has no modified ventral bristles near the base (Daugeron *et al.* 2011; Zhou *et al.* 2017). This new species can be easily separated from *Empis* (*Coptophlebia*) *linzhiensis* **sp. nov.** by M1 apically reaching wing margin and the epandrial lamella with the short dorsal process bearing short bristles.

3. *Empis (Coptophlebia) linzhiensis* sp. nov. (Fig. 3)

Description. Male. Body length 4.7 mm, wing length 4.8 mm.

Head black with grey pollinosity. Eyes brownish, holoptic with upper ommatidia distinctly enlarged. Hairs and bristles on head blackish. Ocellar tubercle with 2 long oc. Antenna blackish; scape with several blackish hairs, pedicel with circlet of blackish subapical hairs; first flagellomere long subconical, weakly concave ventrally on apical 2/3, 3.2 times longer than wide; apical style 0.75 times as long as first flagellomere. Proboscis very long, nearly 2.4 times as long as head height, blackish. Palpus blackish with blackish hairs.

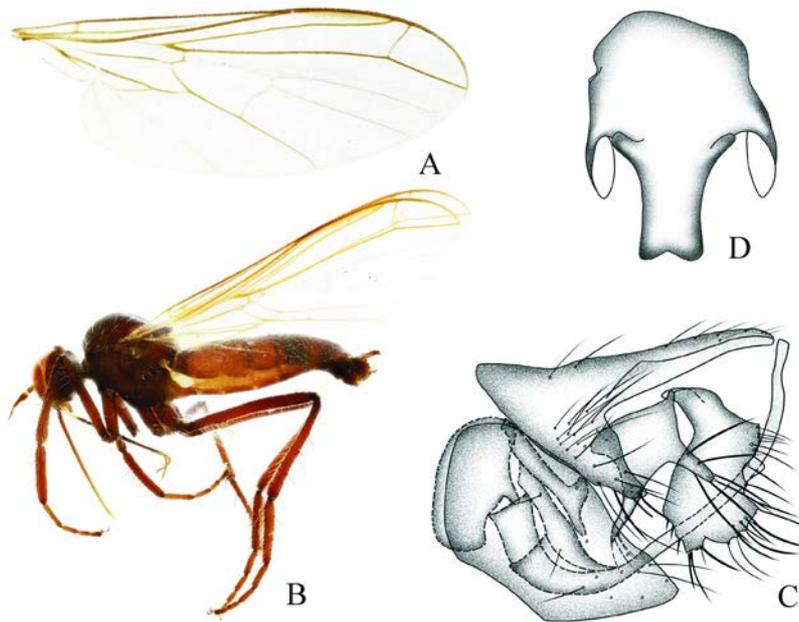


Figure 3. *Empis (Coptophlebia) linzhiensis* sp. nov. A. Wing; B. Male habitus, lateral view; C. Genitalia, lateral view; D. Tergite 8, dorsal view.

Thorax black with grey pollinosity. Hairs and bristles on thorax brownish yellow to brownish, bristles rather long; 1 h, 1 ih, 1 ph, 3 npl, 2 sa, 1 psa; acr absent, irregularly biseriate dc including 4 prsc; 4 sc (apicals very long and cruciate, laterals rather short). Prosternum laterally with 2 very short dark yellow hairs. Laterotergite with long dense hairs. Legs entirely blackish. Hairs and bristles on legs brownish yellow to dark brown except those on coxae and trochanters wholly brownish yellow. Fore femur with several long hair-like pv. Mid femur with row of long to very long hair-like pv. Hind femur with row of hair-like av and one bundle of 4 long thick biseriate brownish yellow ventral bristles near base. Fore tibia with 3–4 rather long blackish ad and with long dense brown posterior hairs; apically with several mostly long thin bristles including 1 very long ad. Mid tibia with row of dense av on apical 2/3; apically with 6 long bristles (including 3 long thick ventral bristles). Hind tibia with 4 very long ad, 4 very long pd and 2 very long av; apically with 5 bristles including 1 very long pd. Fore tarsomere 1 distinctly thickened, nearly as thick as fore tibiae, with several long dorsal bristles including 2 very long ad at base and long dense brown posterior hairs; apically

with 3 long thick blackish bristles. Mid tarsomere 1 with 1 very long ad at base, 1 very long av and 2 very long pv. Hind tarsomere 1 weakly thickened with 1 very long ad, 1 very long pd, 2 av and 2 pv. Wing hyaline; pterostigma brown, narrow; veins brown to dark brown; M_1 apically slightly curved, not reaching wing margin. Squama brownish yellow, pale fringed. Halter brown with dull yellowish knob.

Abdomen nearly straight, apically weakly curved downward, dark brown with gray pollinosity; hypopygium narrower than pregenital segments. Hairs and bristles on abdomen dark yellow except those on hypopygium blackish.

Male genitalia. Tergite 8 distinctly longer than sternite 8, with very long mid-posterior process. Sternite 8 distinctly longer than wide, somewhat trapezoid. Epandrial lamella apically bifurcated; dorsal process long finger-like with 6 very long bristles, ventral process very long finger-like. Cercus rather large and broad, somewhat trapezoid, distinctly narrowed at extreme tip.

Holotype. ♂, **China**, Xizang, Linzhi, Namaicun, 3200 m, 17-VII-2012, Wenliang LI (CAU) leg.

Etymology. This specific epithet refers to the type locality Linzhi.

Diagnosis. Fore femur with several long hair-like pv. Fore tibia and tarsomere 1 with long dense brown hairs on posterior surface. M_1 apically bent, not reaching wing margin. Abdominal tergite 8 distinctly longer than sternite 8, with very long mid-posterior process. Epandrial lamella with long dorsal process bearing 6 very long bristles.

Remarks. This new species is very similar to *Empis* (*Coptophlebia*) *breviseta* **sp. nov.**, but may be separated from the latter by M_1 apically bent and not reaching wing margin and the epandrial lamella with a long dorsal process bearing the very long bristles.

4. *Empis* (*Coptophlebia*) *longiprojecta* **sp. nov.** (Fig. 4)

Description. Male. Body length 4.9 mm, wing length 5.2 mm.

Head black with grey pollinosity. Eyes brownish, holoptic with upper ommatidia distinctly enlarged. Hairs and bristles on head blackish except those on lower occiput dark yellow. Ocellar tubercle with 2 long oc. Antenna blackish; scape with several blackish hairs, pedicel with cirlet of blackish subapical hairs; first flagellomere long subconical, weakly concave ventrally on apical 2/3, 3.2 times longer than wide; apical style 0.9 times as long as first flagellomere. Proboscis very long, nearly 2.4 times as long as head height, dark brown with very short blackish hairs. Palpus blackish with brownish yellow base, hairs blackish.

Thorax black with grey pollinosity. Hairs and bristles on thorax dark yellow, bristles somewhat weak; 1 h, 1 ih, 1 ph, 3 npl, 2 sa, 1 psa; acr absent, irregularly biseriate dc including 4 prsc; 6 sc. Prosternum laterally with 1 short and 2 very long hairs. Laterotergite with very long dense hairs. Legs dark brownish yellow except all coxae dark brown and all femora brown. Hairs and bristles on legs dark brown except those on coxae and trochanters wholly brownish yellow and mid and hind femora basally with dark yellow hairs and bristles on ventral surface. Fore femur somewhat bare ventrally without distinct av and pv. Mid femur basally with long thin av and pv. Hind femur with 3 dark brown anterior bristles and about 20 very long posterior bristles about half as long as hind femur. All tibiae thickened toward tip. Fore tibia apically with 5 very short anterior bristles. Mid tibia with group of ventral bristles on apical 1/3. Hind tibia apically with 4 very short anterior bristles. Fore tarsomere 1

distinctly thickened, nearly as thick as fore tibia; apically with 4 bristles. Mid tarsomere 1 with 4 long irregular bristles at base and 5 long irregular bristles at tip. Hind tarsomere 1 weakly thickened, slightly narrower than hind tibia, with 2 long av; apically with 3 bristles. Wing hyaline; pterostigma brown, narrow; veins dark brown except M somewhat thin, brownish; M_1 apically abbreviated. Squama brown, brownish yellow fringed. Halter dark brownish yellow.

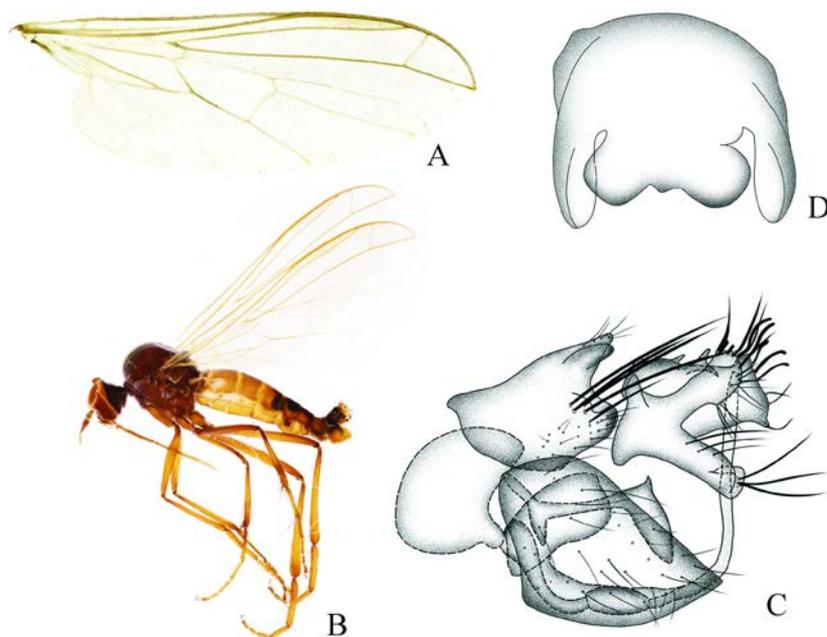


Figure 4. *Empis (Coptophlebia) longiprojecta* sp. nov. A. Wing; B. Male habitus, lateral view; C. Genitalia, lateral view; D. Tergite 8, dorsal view.

Abdomen nearly straight, dark brown with grey pollinosity. Hairs and bristles brown to brownish yellow except those on hypopygium brown to dark brown. Hypopygium distinctly thicker than pregenital segments.

Male genitalia. Tergite 8 shorter than sternite 8; mid-posterior process rather broad with shallow trapezoidal apical incision, lateral process short thick, and a bundle of very long thick bristles near its base. Epandrial lamella bifurcated, ventral process nearly as long as thick dorsal process. Cercus rather large and broad, somewhat trapezoidal.

Holotype. ♂, China, Xizang, Langxian, 3200 m, 23-VIII-2016, Qicheng YANG (light trap) (CAU) leg.

Etymology. This specific epithet refers to the epandrial lamella having a long ventral process.

Diagnosis. Hind femur with about 20 very long yellowish posterior bristles on basal half, about half as long as hind femur. All tibiae thickened toward tip. Abdominal tergite 8 shorter than sternite 8, with bundle of very long thick bristles near base of postero-lateral process; epandrial lamella with long and haired ventral process nearly as long as dorsal process.

Remarks. This new species is similar to *Empis (Coptophlebia) longispina* Zhou, Liu &

Yang, 2017 from Sichuan, but may be separated from the latter by the eyes contiguous on the frons and the epandrial lamella with short thick dorsal and ventral processes. In *Empis* (*Coptophlebia*) *longispina*, the eyes are narrowly separated on the frons, and the epandrial lamella has long narrow dorsal and ventral processes (Zhou *et al.* 2017).

Acknowledgements

We are grateful to Dr. Wenliang LI, Mr. Liang WANG and Mr. Qicheng YANG for collecting specimens. This research was supported by the National Natural Science Foundation of China (31772497).

References

- Bezzi M. 1909. Einige neue paläarktische. *Empis*-Arten. *Deutsche Entomologische Zeitschrift*, 1909: 85–103.
- Chvála M. 1994. The Empidoidea (Diptera) of Fennoscandia and Denmark. III Genus *Empis*. *Fauna Entomologica Scandinavica*, 9: 1–187.
- Collin JE. 1961. *Empididae: British Flies*, Vol. 6. Cambridge University Press, Cambridge, 782 pp.
- Daugeron C. 1997. Notes sur le sous-genre *Coptophlebia* Bezzi et description d'une espèce nouvelle de France (Diptera: Empididae). *Revue Francaise d'Entomologie*, 19: 47–50.
- Daugeron C, Plant A, Shamshev I, Stark A & Grootaert P. 2011. Phylogenetic reappraisal and taxonomic review of the *Empis* (*Coptophlebia*) *hyalipennis*-group (Diptera: Empididae: Empidinae). *Invertebrate Systematics*, 25: 254–271.
- Yang D, Zhang KY, Yao G & Zhang JH. 2007. *World Catalog of Empididae (Insecta: Diptera)*. China Agricultural University Press, Beijing, 599 pp.
- Yang D, Zhang LL & Zhang KY. 2018. *Species Catalog of China. Vol. 2. Animals, Insecta (VI), Diptera (2), Orthorrhaphous Brachycera*. Science Press, Beijing, 387 pp.
- Zhou QX, Liu XY & Yang D. 2017. *Empis* (*Coptophlebia*) *hyalipennis* species group (Diptera: Empididae: Empidinae) from Sichuan. *Transactions of the American Entomological Society*, 143: 557–587.