

First report of the crane fly genus *Elephantomyia* Osten Sacken (Diptera: Limoniidae) from Guangxi, China with description of one new species

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Abstract: The crane fly genus *Elephantomyia* Osten Sacken is reported from Guangxi, China for the first time based on five male and three female adults from Mount Dayaoshan. All are identified as the new species *E. (Elephantomyia) dayaoshana* **sp. nov.** This supplements a gap in the distribution area of this genus in China, with the easternmost record being from Taiwan and the westernmost record from Tibet. This new species is distinguished from its congeners mainly by body coloration and the details of the male genitalia.

Key words: Elephantomyiinae; Elephantomyiini; taxonomy

象大蚊属 *Elephantomyia* 广西新记录并记一新种记述 (双翅目: 沼大蚊科)

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摘要: 基于来自大瑶山的5头雄虫和3头雌虫, 象大蚊属 *Elephantomyia* 在我国广西被首次报道。这些标本被鉴定为同一物种, 即新种大瑶山象大蚊 *E. (Elephantomyia) dayaoshana* **sp. nov.**。象大蚊属在我国最东和最西的分布记录分别来自台湾和西藏, 本发现补充了该属分布区域中的一个空缺。新种主要通过体色和雄性腹部末端特征与其近缘物种区分。

关键词: 象大蚊亚科; 象大蚊族; 分类

Introduction

As a tribe in the subfamily Limoniinae (Diptera: Limoniidae), Elephantomyiini includes four genera: *Elephantomyia* Osten Sacken, 1860, *Helius* Lepeletier & Serville, 1828 (Latreille *et al.* 1828), *Protohelius* Alexander, 1928 (Alexander 1928a) and *Toxorhina* Loew, 1850

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(Alexander 1920; Savchenko *et al.* 1992; Hynes 1997; Podenas & Gelhaus 2007). Although the taxonomic status of Elephantomyiini is controversial, such as Petersen *et al.* (2010) suggesting that it should be treated as a subfamily on the basis of morphological and molecular data, the monophyly of this tribe has been supported by many studies (e.g. Petersen *et al.* 2010; Kang *et al.* 2023).

With the four-genus system, Elephantomyiini has 529 extant species/subspecies widely distributed in all biogeographic regions (Oosterbroek 2023). As a group of insects with flower visiting habits, this tribe has received great attention and been extensively studied abroad (e.g. Welch & Gelhaus 1994; Theischinger 1994, 1996, 2000; Ribeiro & Amorim 2002; Podenas *et al.* 2020). Over the past decade, some taxonomic studies on Elephantomyiini in China have also been carried out, mainly focusing on species belonging to the genera *Elephantomyia* and *Toxorhina* (Zhang *et al.* 2015a, b). In addition, Xu *et al.* (2023) reported the genus *Helius* in Guangxi Zhuang Autonomous Region (Guangxi), China for the first time and published a new species and a newly-recorded subspecies from China. These studies have increased the number of Chinese Elephantomyiini crane fly species/subspecies from 36 to 45, of which 25 belong to *Helius*, 10 to *Elephantomyia*, seven to *Toxorhina* and three to *Protohelius* (Oosterbroek 2023).

To further improve the understanding of the diversity of Elephantomyiini crane flies in Guangxi and the distribution of *Elephantomyia* in China, we examined specimens from Guangxi, resulting in the discovery of *Elephantomyia* in Guangxi for the first time. One new species, *E. (Elephantomyia) dayaoshana* **sp. nov.**, is described and illustrated.

Material and methods

Specimens for this study were collected from Mount Dayaoshan, Guangxi, China (Fig. 1) in 2015 and deposited in the Entomological Museum of China Agricultural University, Beijing, China (CAU). Adults were collected by light trap and stored in 75% ethanol in the field. Genitalia were prepared by boiling the apical portion of the abdomen in lactic acid for 0.5 hours. Prepared specimens were examined using the ZEISS Stemi 2000-C stereomicroscope. Photographs were captured by the Canon EOS 90D digital camera.

The morphological terminology mainly follows Cumming & Wood (2017), and that for venation and genitalia follow de Jong (2017). The following abbreviations are used in figures: aa — aedeagus apodeme; aed — aedeagus; cerc — cercus; goncx — gonocoxite; hyp vlv — hypogynial valve; i gonst — inner gonostylus; interb — interbase; mtg — mediotergite; o gonst — outer gonostylus; presct — prescutum; prn — pronotum; pm — paramere; rst — rostrum; sct — scutum; sctl — scutellum; sla — sclerotized lobe of aedeagus; st — sternite; tg — tergite.

Taxonomy

Class Insecta Linnaeus, 1758

Order Diptera Linnaeus, 1758

Family Limoniidae Speiser, 1909

Subfamily Limoniinae Speiser, 1909

Genus *Elephantomyia* Osten Sacken, 1860

Elephantomyia Osten Sacken, 1860: 220. Type species: *Limnobiaorhynchus canadensis* Westwood, 1836 (original designation).

Small and medium-sized crane flies with body length 4.0–12.0 mm. Body mostly brownish yellow to brownish black. Rostrum elongate, at least half of body length and sometimes even longer than body length. Antennae 14 or 15 segments; flagellomeres usually cylindrical, bearing long verticils. Wings with Sc long, usually ending beyond 2/3 of Rs; sc-r near tip of Sc; R with two branches reaching end of wing; M with three branches reaching end of wing; cell dm usually closed. Male genitalia with simple gonocoxite and two pairs of gonostyli. Aedeagus usually long and spiral.

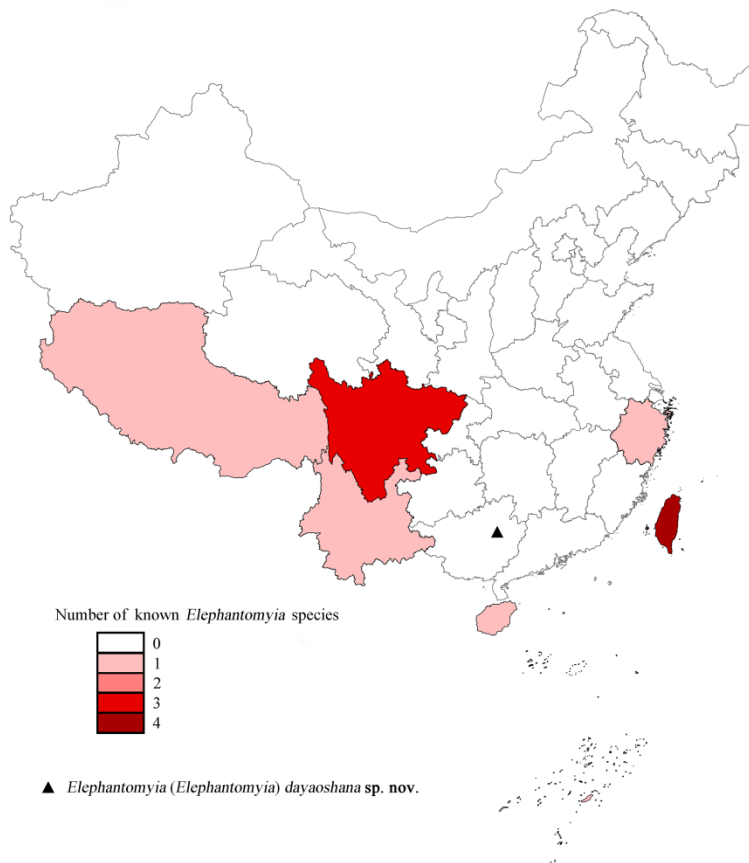


Figure 1. Collecting site of *Elephantomyia* specimens in this study and distribution map of *Elephantomyia* in China.

Remarks. The genus *Elephantomyia* is a cosmopolitan taxon known from the Neotropic (40 taxa), Afrotropic (39), Oriental (23), Palaearctic (17), Australasian (16) and Nearctic (three) Regions (Oosterbroek 2023). Four subgenera are recognized within this genus: *Elephantomyia* Osten Sacken, 1860 (102 taxa), *Elephantomyodes* Alexander, 1923 (Alexander 1923a) (33), *Elephantomyina* Alexander, 1938 (Alexander 1938a) (one) and *Xenoelephantomyia* Alexander, 1965 (one) (Oosterbroek 2023). Ten species/subspecies from two subgenera (i.e. *Elephantomyia* and *Elephantomyodes*) have been known to occur in China,

of which most are distributed in Taiwan and Sichuan (Fig. 1). Herein, this genus is recorded from Guangxi, China for the first time with the following one new species.

Checklist of Chinese *Elephantomyia* crane flies

1. *E. (Elephantomyia) carbo carbo* Alexander, 1938 (Alexander 1938b) — Sichuan
2. *E. (Elephantomyia) dayaoshana* **sp. nov.** — Guangxi
3. *E. (Elephantomyia) insolita* Alexander, 1940 — Sichuan
4. *E. (Elephantomyia) inulta* Alexander, 1938 (Alexander 1938c) — China (Tibet, Yunnan); India
5. *E. (Elephantomyia) laohegouensis* Zhang, Li & Yang, 2015 (Zhang *et al.* 2015a) — Sichuan
6. *E. (Elephantomyia) luculenta* Alexander, 1928 (Alexander 1928b) — Taiwan
7. *E. (Elephantomyia) serotina* Alexander, 1930 — Taiwan
8. *E. (Elephantomyodes) angusticellula* Alexander, 1936 — Hainan
9. *E. (Elephantomyodes) major major* Alexander, 1923 (Alexander 1923a) — Taiwan
10. *E. (Elephantomyodes) major uniformis* Alexander, 1923 (Alexander 1923b) — Taiwan
11. *E. (Elephantomyodes) tianmushana* Zhang, Li & Yang, 2015 (Zhang *et al.* 2015a) — Zhejiang

***Elephantomyia (Elephantomyia) dayaoshana* Lu, Xu & Zhang **sp. nov.** (Figs 2–5)**

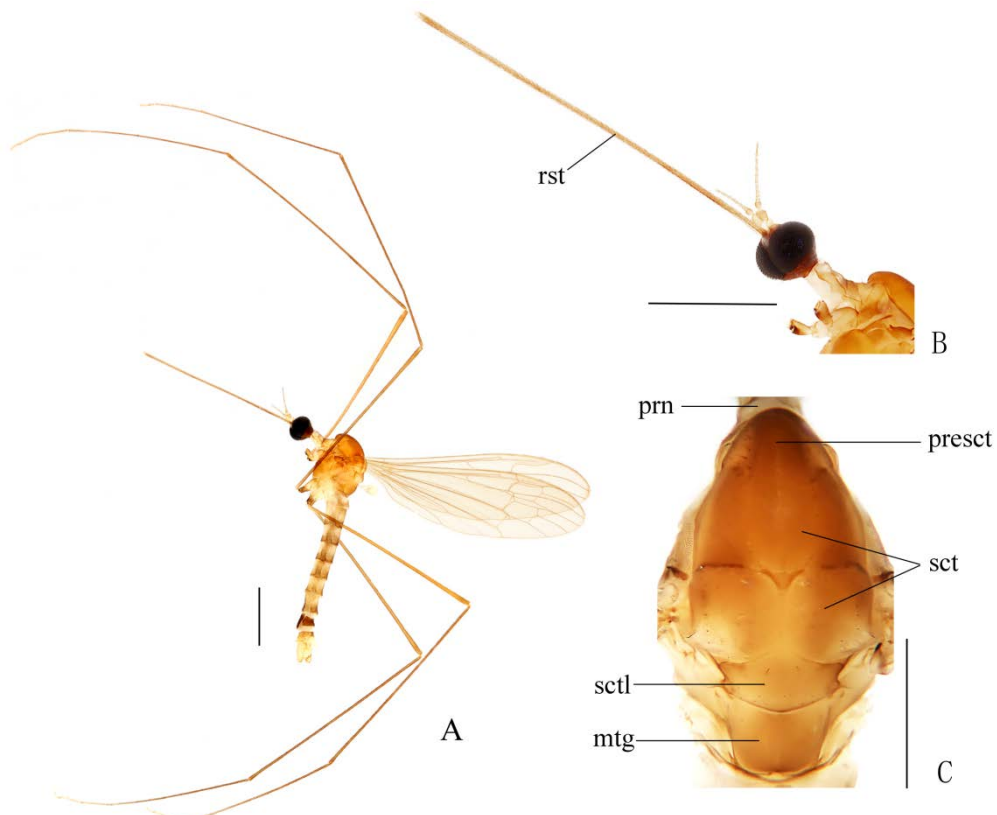


Figure 2. *Elephantomyia (Elephantomyia) dayaoshana* **sp. nov.** A. Habitus of male, lateral view; B. Head, lateral view; C. Thorax, dorsal view. Scale bars = 1.0 mm (A, B); 0.5 mm (C).

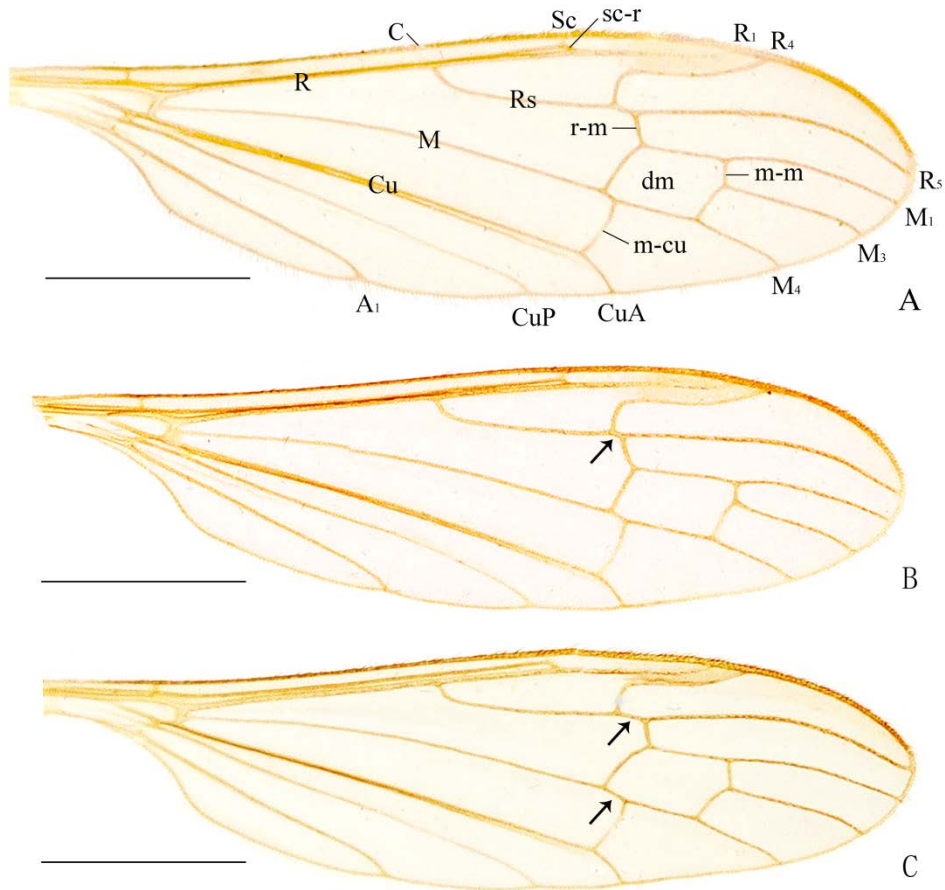


Figure 3. *Elephantomyia (Elephantomyia) dayaoshana* sp. nov. A. Wing; B, C. Variations of wing. Scale bars = 1.0 mm.

Description. Male (Figs 2–4). Body length 4.5–5.3 mm (excluding rostrum), wing length 4.3–5.0 mm, antenna length 0.7–0.8 mm, rostrum length 3.0–3.4 mm, halter length 0.6–0.7 mm.

Head (Fig. 2B). Dark brown. Setae on head pale brown. Antenna pale brown with scape slightly paler. Scape cylindrical, 1.5 times as long as wide. Pedicel oval, tip slightly enlarged. Basal flagellomere oval, tip flat, with short pale brown verticils; outer flagellomeres cylindrical, tapering apically and elongated, with pale brown verticils that exceed length of long corresponding flagellomere. Rostrum about $2/3$ length of remaining body, brown with pale brown setae.

Thorax (Fig. 2C). Pronotum pale brownish yellow with anterior area darker. Prescutum and presutural scutum dark brownish yellow with three nearly confluent broad brown stripes, median stripe longest and darker in front. Postsutural scutum brown with middle area slightly paler, each lobe with a pale spot. Scutellum brownish yellow, with middle and lateral areas darker. Mediotergite brown with bases of both sides paler. Pleuron dark brownish yellow, darker near base of wing (Fig. 2A). Setae on thorax dark brown. Coxae pale brownish yellow, with hind coxa slightly paler; trochanters dark brown, with fore trochanter paler; femora brown, with fore femur paler; tibiae brown; basal tarsi brown with tips paler, remaining tarsi

pale brownish yellow. Setae on legs dark brown. Wing (Fig. 3) pale brownish yellow, stigma darker; veins brown. Venation: Sc ending opposite about 2/3 of Rs; sc-r near its tip; tip of Rs and base of R₅ almost in a straight line; R₄ nearly perpendicular to Rs at base and then strongly bending to almost parallel to base of R₅, tip raised; basal section of R₅ variable in length (Figs 3B, 3C) and usually slightly shorter than r-m (Fig. 3A); m-m about half length of basal section of M₃; m-cu slightly bent, about 1/4–1/3 of its length beyond fork of M, occasionally nearly half of its length (Fig. 3C). Halter pale yellow.

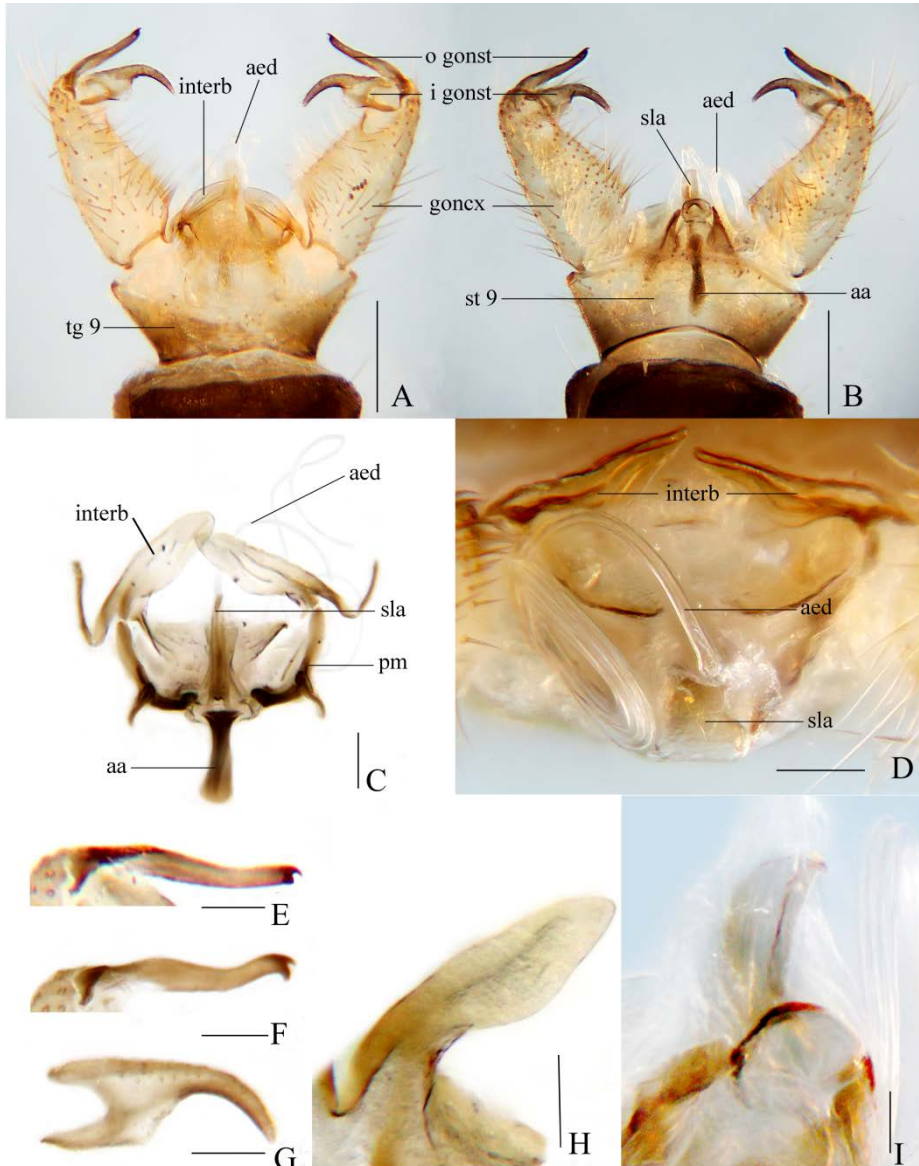


Figure 4. *Elephantomyia (Elephantomyia) dayaoshana* sp. nov. A, B. Male hypopygium, dorsal and ventral views; C, D. Aedeagal complex, dorsal and posterior views; E, F. Outer gonostylus, dorsal and anterior views; G. Inner gonostylus, dorsal view; H. Interbase, dorsal view; I. Sclerotized lobe of aedeagus, lateral view. Scale bars = 0.2 mm (A, B); 0.05 mm (C-H); 0.01 mm (I).

Abdomen (Fig. 2A). Segments 1–7 pale brown with caudal 1/3 brown, segment 8 dark brown.

Hypopygium (Fig. 4). Generally brownish yellow to brown. Posterior margin of tergite 9 with a broad and shallow V-shaped notch (Fig. 4A). Gonocoxite conical, tip round (Figs 4A, 4B). Outer gonostylus sclerotized and slender, slightly curved outwards; tip bifid, outer spine small and bent inward and ventrally with tip acute, inner spine larger and strongly bent ventrally with tip blunt (Figs 4A, 4B, 4E, 4F). Inner gonostylus nearly as long as outer gonostylus, with basal half enlarged, distal half darker and suddenly slender and curved (Figs 4A, 4B, 4G). Interbase schistose and nearly oval, tip round (Figs 4A, 4C, 4H). Paramere club-shaped and slightly curved inward, tip connecting to base of interbase (Fig. 4C). Aedeagus apodeme long and slender, widened at tip (Figs 4B, 4C). Aedeagus nearly transparent, long and spiral dorsally; a sclerotized lobe located inside base, tip acute and bent ventrally (Figs 4A–D, 4I).

Female (Fig. 5). Body length 5.1–6.0 mm (excluding rostrum), wing length 4.1–4.8 mm, rostrum length 2.8–3.3 mm, halter length 0.5–0.7 mm. Generally similar to male by body coloration, except abdomen with segment 8 pale yellow (Figs 5A–C). Ovipositor with tergite 9 pale yellow, tergite 10 pale yellow with caudal 1/3 darker (Figs 5A, 5B). Cercus yellow and darker at subtip, tip raised and acute (Fig. 5B). Hypogynial valve yellow to brown, nearly straight and tapering apically, tip reaching approximately 2/3 of cercus (Fig. 5B).

Holotype. ♂ (CAU), **China**, Guangxi Zhuang Autonomous Region, Jinxiu Yao Autonomous County, Mount Dayaoshan, Yinshan Park, 1170 m, 20-VII-2015, Yan LI (light trap). **Paratypes.** 4♂3♀ (CAU), same data as holotype.

Habits. The species can be attracted by light.

Etymology. The specific epithet *dayaoshana* (adjective, feminine) refers to the type locality Mount Dayaoshan.

Diagnosis. Rostrum about 2/3 length of remaining body. Prescutum and presutural scutum dark brownish yellow with three nearly confluent broad brown stripes, median stripe darker in front. Wing with tip of Rs and base of R₅ almost in a straight line, R₄ nearly perpendicular to Rs at base, m-cu beyond fork of M. Abdomen with segments 1–7 bicolor, segment 8 dark brown in male and pale yellow in female. Outer gonostylus with tip bifid, outer spine small and bent inward and ventrally with tip acute, inner spine larger and strongly bent ventrally with tip blunt. Inner gonostylus with distal half suddenly slender and curved. Interbase nearly oval. Aedeagus nearly transparent, long and spiral dorsally, with a sclerotized lobe.

Remarks. The new species *E. (E.) dayaoshana* **sp. nov.** is similar to *E. (Elephantomyia) inaequistyla* Alexander, 1974 from Nigeria in having similar abdominal coloration and aedeagus of the male hypopygium but can be separated by the prescutum and presutural scutum with three nearly confluent broad stripes (Fig. 2C), the inner gonostylus nearly as long as the outer gonostylus (Figs 4A, 4B) and the nearly oval interbase (Figs 4A, 4C, 4H). In *E. (E.) inaequistyla*, the prescutum and presutural scutum have a central stripe and scarcely evident lateral markings, the inner gonostylus is significantly longer than the outer gonostylus, and the interbase is a small narrow blade (Alexander 1974). The new species is also similar to *E. (Elephantomyia) grahami* Alexander, 1957 from Zimbabwe in having a similar male hypopygium, but it can be easily distinguished from the latter by the prescutum and presutural scutum with three nearly-confluent broad stripes (Fig. 2C), the wing with m-cu beyond fork

of M (Fig. 3) and the mostly bicolor abdomen (Fig. 2A). In *E. (E.) grahami*, the prescutum and presutural scutum have a central stripe, the cross-vein m-cu is before the fork of M, and the abdomen is mostly dark brown (Alexander 1957).

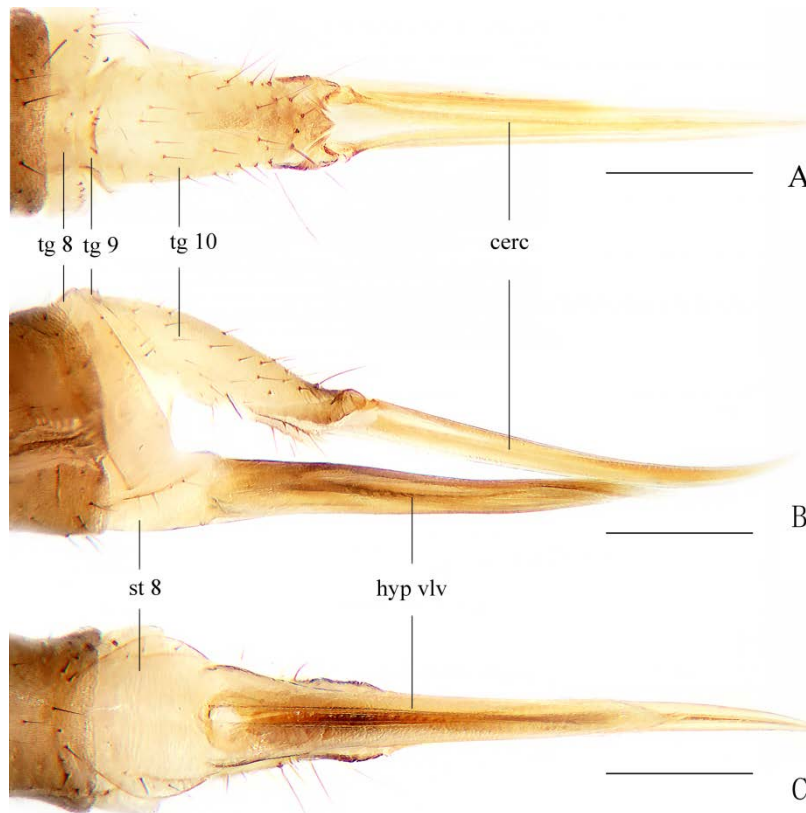


Figure 5. *Elephantomyia (Elephantomyia) dayaoshana* **sp. nov.** A. Female ovipositor, dorsal view; B. Female ovipositor, lateral view; C. Female ovipositor, ventral view. Scale bars = 0.3 mm.

In the wing venation of this new species, the tip of R_s and the base of R_5 are almost in a straight line and R_4 is nearly perpendicular to R_s at the base (Fig. 3), by which it can be distinguished from most species of the subgenus *Elephantomyia*, including the two known species mentioned above. Among the Chinese *Elephantomyia* (s. str.) species, only *E. (E.) inulta* and this new species have this type of wing venation, but *E. (E.) inulta* can be easily distinguished by the body coloration and the details of the male genitalia (Alexander 1938c, Zhang *et al.* 2015a). It is worth noting that this type of wing venation is very common in the subgenus *Elephantomyodes* and can even be considered as a diagnostic characteristic of the subgenus (Alexander 1923a). The remaining two subgenera of the genus *Elephantomyia* are both established based on the characteristics of the wing venation (Alexander 1938a, 1965). This to some extent indicates that the classification system of the genus *Elephantomyia* requires more morphological studies and molecular data for validation in the future.

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