



Four new species of *Ioneuromyia* from China (Diptera: Keroplatidae)

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Abstract

Four new species of the genus *Ioneuromyia* Brunetti are described from China: *I. sinica* Xu, Cao et Evenhuis, n. sp.; *I. completa* Xu, Cao et Evenhuis, n. sp.; *I. singulus* Xu, Cao et Evenhuis, n. sp.; *I. wolongensis* Xu, Cao et Evenhuis, n. sp. Another species, *I. semirufa* (Meigen) is newly recorded from Zhejiang province in China. A key to Chinese species of *Ioneuromyia* is given.

Key words: Keroplatidae, *Ioneuromyia*, taxonomy, new species, China

Introduction

Ioneuromyia Brunetti, 1912 is a rather large group in the tribe Orfeliini of the Keroplatinae, represented by over 50 species found in the world (Evenhuis, 2006b). Most of the species are known from the Oriental and Neotropical Regions, only eight including the species dealt with here in the Palaeartic Region.

Until a recent date, only one species of the genus had been known to occur in Taiwan, namely *I. formosana* (Okada, 1938), described originally as a form of the Indian *I. annandalei* Brunetti, 1912. This is the first detailed report of the genus *Ioneuromyia* from China. *Ioneuromyia semirufa* (Meigen, 1818) is newly recorded from Zhejiang province. Four new species were discovered among the specimens collected in July 2006 from Sichuan province (Southwestern China) and are described here. *Ioneuromyia sinica* n. sp. is reported also from Zhejiang province. A key is given to these species to aid in their identification.

The genus is distinguished from other related genera by the following characters (Evenhuis, 2006a): laterotergite, mediotergite, and anepimeron bare; tibiae with setulae in regular rows throughout; costal vein not extending past R5; vein A1 almost reaching wing margin; and bases of forked veins with minute setulae (sometimes only seen under high magnification).

Material and methods

Specimens were collected by sweeping and Malaise traps and preserved in 80% alcohol. Holotypes and paratypes of new species in this study are deposited in the entomological collection of Zhejiang Forestry College, Lin'an, Zhejiang, China (ZJFC). Morphological terminology follows that of Sølvi *et al.* (2000).

Key to the species of *Isoneuromyia* Brunetti known from China

1. Occiput predominantly orange to yellow with darker occipital triangle 2
- Occiput predominantly brownish black to black 3
2. Mesonotum with three distinct dark stripes; antennal flagellomeres brownish black.... *formosana* (Okada)
- Mesonotum with three stripes, median stripe orange and two admedian stripes black (Fig. 1); antennal flagellomeres yellowish orange *sinica* Xu, Cao et Evenhuis, **n. sp.**
3. Veins M₂ and CuA₁ reaching wing margin (Fig. 6); only tergites IV–V orange
..... *completa* Xu, Cao et Evenhuis, **n. sp.**
- Veins M₂ and CuA₁ not reaching wing margin; tergites IV–V not as above..... 4
4. Abdomen predominantly black with some paler markings 5
- Abdomen with more uniform coloration, either black or brownish yellow; gonostyli with two large teeth *semirufa* (Meigen)
5. Gonostyli reduced, apex with only one dark tooth (Fig. 11); paramere strong, in lateral view (Fig. 12) shaped like a broom, with very dense black short hairs apically..... *singula* Xu, Cao et Evenhuis, **n. sp.**
- Gonostyli normal in size, with two dark teeth apically (Fig. 13), two minute dark sclerotized teeth in between large darkly sclerotized ones *wolongensis* Xu, Cao et Evenhuis, **n. sp.**

Descriptions of new species

Isoneuromyia sinica Xu, Cao et Evenhuis, **n. sp.**

(Figs. 1, 5, 9)

Diagnosis. Similar to *I. pallidopsis* Evenhuis, but can be distinguished from it by the median orange stripe (black in *pallidopsis*), the tibial spurs black (yellowish orange in *pallidopsis*), and one minute dark tooth in between the large darkly sclerotized teeth (no minute tooth in *pallidopsis*).

Description. MALE. Lengths: Body: 11.1 mm; wing: 7.3 mm.

Head. Vertex and occiput immediately behind ocelli black; remainder of occiput orange with fairly dense small black recumbent hairs. Ocelli in horizontal line. Frons orange, bare. Antennae: scape and pedicel cup-shaped, orange yellow. Flagellum: segments slightly compressed, orange yellow. Face orange, with small black hairs apicolaterally. Palpi orange. Proboscis yellow.

Thorax. Mesonotum (Fig. 1) yellow with three stripes, median orange stripe extending anteriorly to pronotum, two admedian stripes, black. Scutellum orange. Mesonotum with uniformly small recumbent black hairs dorsally, patch of thick black setae above wing root and on posterior margin of scutellum. Prescutellar area tapering to scutellum. Pronotal lobes orange with dense black setae. Anepisternum and laterotergite yellow, bare; katapisternum anteroventrally brown, remainder of katapisternum yellow; epimeron brownish. Mediotergite bare, brown at sides towards base and yellow at apex. Halter yellow.

Legs. Coxae yellow, fore coxa, apex of mid and hind coxa, with recumbent black hairs. Femora yellow, all with recumbent black hairs. Fore tibia without comb, mid with only posterior comb, hind tibiae with anterior and posterior comb. Tibial spurs black. Fore and mid basitarsus subequal in length to lengths of respective tibiae, hind basitarsus 0.8x length of hind tibia. Claws minute.

Wing (Fig. 5). Subhyaline, yellow, with dark brown infuscation subapically from costa to apex of cell m₂; grey from apex of wing to posterior border; vein R₄ slightly curved upward, ending in C slightly beyond end of R₁; veins M₂ and CuA₁ not reaching wing margin, A₁ reaching wing margin.

Abdomen. Anterior portion of tergites I–IV yellow with a few black hairs, yellowish orange posteriorly with dense recumbent black hairs; tergites V–VII yellowish orange with dense black recumbent hairs; tergite

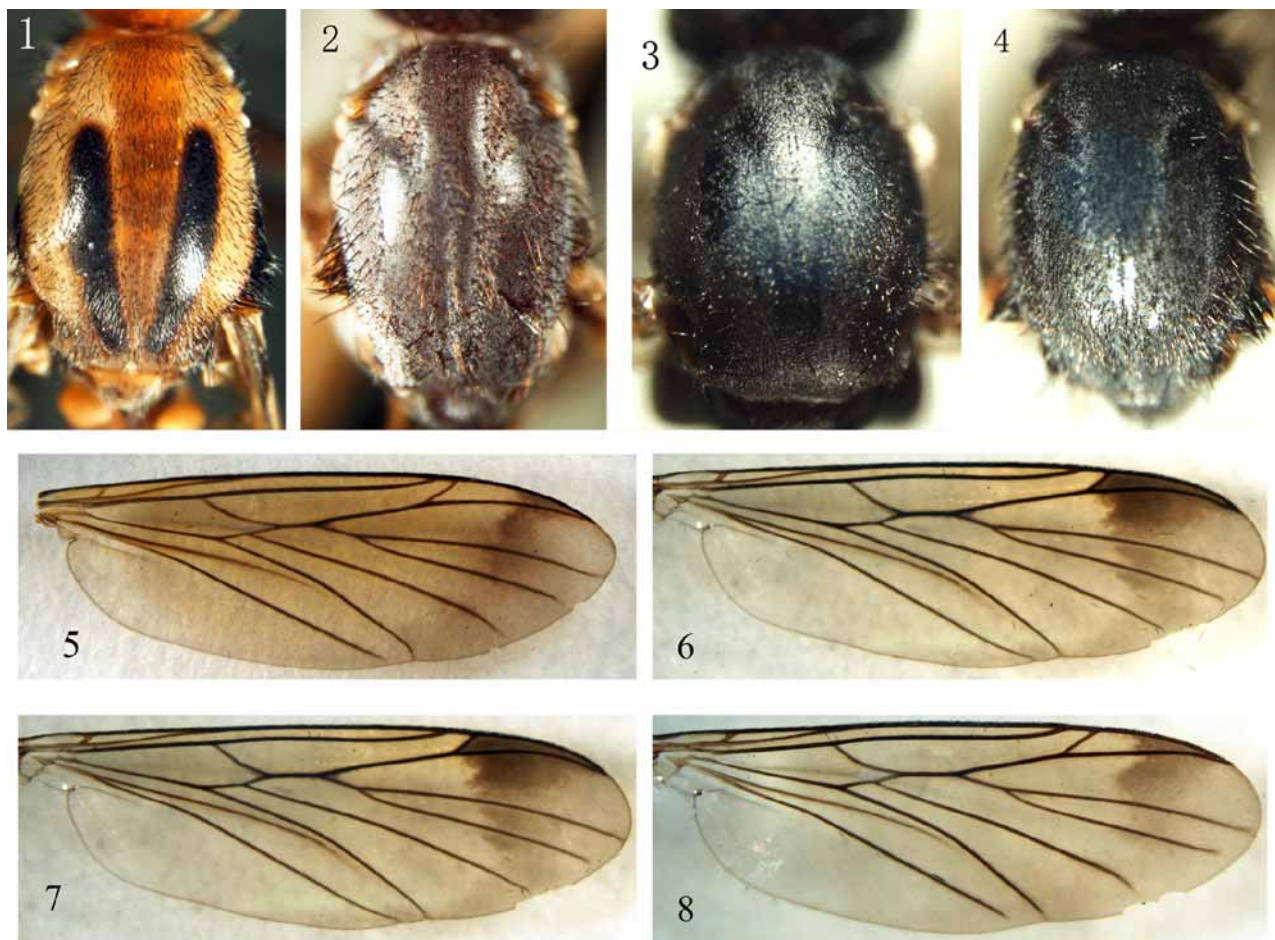
VIII yellow. Sternites patterned as on tergites except VII with yellow color.

Hypopygium (Fig. 9). Not dissected. Gonocoxites yellow, black pilose on apical half. Gonostyli yellow, densely black pilose, apex with two dark black teeth, one minute dark sclerotized tooth in between large darkly sclerotized teeth.

FEMALE. Unknown.

Types. Holotype ♂ (ZJFC 060167) and paratype ♂ from: Sichuan province: Wolong National Natural Reserve, 21 July 2006, Jian Cao. Other paratypes: 2♂, Sichuan province: Laba River Natural Reserve, 15 July 2006, Yiping Wang; 2♂, Zhejiang province: Tianmu mountain, 24 June 1957, Chikun Yang.

Etymology. The species epithet derives from the Latin *sinica* = Chinese, referring to the wide distribution in China.



FIGURES 1–8. 1–4. *Ioneuromyia* thoraces, dorsal view. 1. *I. sinica*, n. sp. 2. *I. completa*, n. sp. 3. *I. singula*, n. sp. 4. *I. wolongensis*, n. sp. 5–8 *Ioneuromyia* wings. 5. *I. sinica*, n. sp. 6. *I. completa*, n. sp. 7. *I. singula*, n. sp. 8. *I. wolongensis*, n. sp.

***Ioneuromyia completa* Xu, Cao et Evenhuis, n. sp.**

(Figs. 2, 6, 10)

Diagnosis. Closest to *I. semirufa* but can be distinguished from it by having only tergites IV–V orange (these tergites not contrasted in colour in *semirufa*), the hind coxa and femur being black (dusky brown in *semirufa*) and the gonocoxites bilobed from the middle (bilobed from one-third basally in *semirufa*). Apex of gonostyli with two dark black teeth and without minute tooth are also good characters to distinguish it from other Chi-

nese species of the genus.

Description. MALE. Lengths: Body: 8.2mm; wing: 5.7 mm.

Head. Vertex and occiput black, with fairly dense small black recumbent hairs. Ocelli in horizontal line. Frons light brown, bare. Antennae: scape and pedicel cup-shaped, brownish black. Flagellum: segments slightly compressed, brownish black. Face brown, with small black hairs apicolaterally. Palpi and Proboscis brown.

Thorax. Mesonotum (Fig. 2) brown or brownish black, with conspicuous bare strips between the double or treble rows of acrostichal and dorsocentral brown bristles. Scutellum brownish black. Patch of thick black setae above wing root and on posterior margin of scutellum. Prescutellar area tapering to scutellum. Pronotal lobes dark brown with dense black setae. Pleura, laterotergite and mediotergite brownish black, bare. Halter yellow, knob yellow with brown dorsally.

Legs. Fore and mid coxae brownish, hind coxa black; fore coxa, and apex of mid and hind coxae, with recumbent black hairs. Fore and mid femora yellow, hind femur black, all with recumbent black hairs. Fore tibia without comb, mid with only posterior comb, hind tibiae with anterior and posterior comb. Tibial spurs black. Fore and mid basitarsus subequal in length to lengths of respective tibiae, hind basitarsus 0.7x length of hind tibia. Claws minute.

Wing (Fig. 6). Hyaline, with brown infuscation subapically from costa to middle of cell m2, fading posteriorly; apex of cell cup and cell a1 with light brown cloud apically; vein R4 slightly sinuous, ending in C slightly beyond end of R1; veins M2, CuA1 and A1 reaching wing margin.

Abdomen. Tergites I–III brownish black, tergites IV–V orange, tergites VI–VIII brownish black, all tergites with dense recumbent black hairs. Sternites patterned as on tergites.

Hypopygium (Fig. 10). Not dissected. Gonocoxites brownish black, black pilose on about apical half. Gonostyli brownish black, densely black pilose, apex with two dark black teeth.

FEMALE. Unknown.

Types. Holotype ♂ (ZJFC 060219) and paratype ♂ from: Sichuan province: Wanglang National Natural Reserve, 2500 m, 25 July 2006, Jian Cao.

Etymology. The species epithet derives from the Latin *completus* = complete, referring to veins M2, CuA1 and A1 reaching wing margin.

***Isoneuromyia singula* Xu, Cao et Evenhuis, n. sp.**

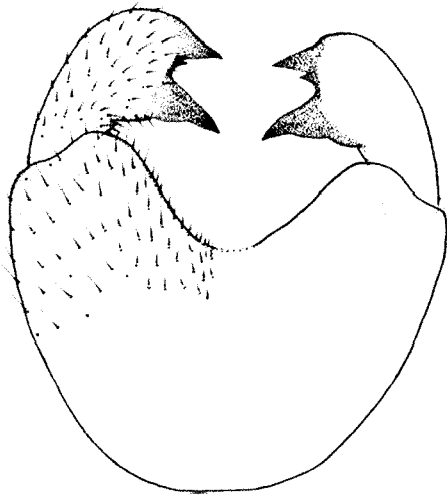
(Figs. 3, 7, 11, 12)

Diagnosis. Similar to *I. yorki* Evenhuis in both having the vertex and occiput black and the tibial spurs black. It can be easily distinguished from *I. yorki* by gonostyli reduced, with only one dark tooth and paramere strong, in lateral view shaped like a broom, with very dense black short hairs apically (paramere relatively weak and gonostyli subtriangular in shape, apex with two black teeth apically in *yorki*).

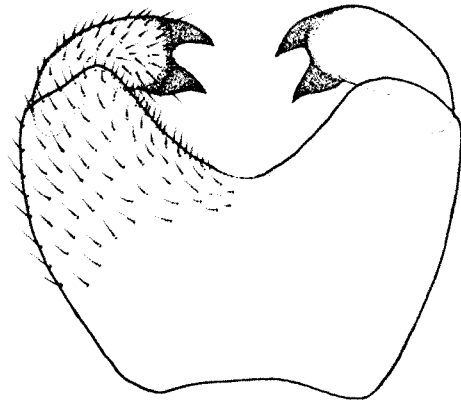
Description. MALE. Lengths: Body: 7.2 mm; wing: 5.6mm.

Head. Vertex and occiput black, with fairly dense small black recumbent hairs. Ocelli in horizontal line. Frons light brown, bare. Antennae: scape and pedicel cup-shaped, brownish black. Flagellum: segments slightly compressed, brownish black. Face brown, with small black hairs apicolaterally. Palpi brown. Proboscis yellowish brown.

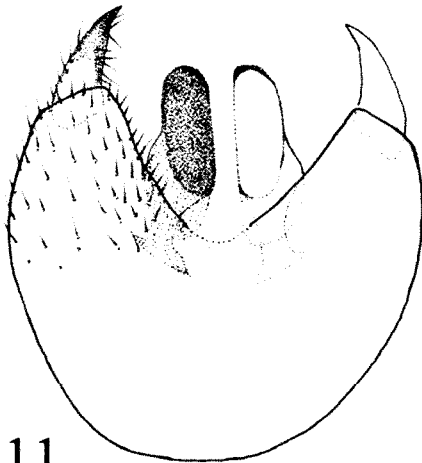
Thorax. Mesonotum (Fig. 3) brownish black, with brown bristles. Scutellum black. Patch of thick black setae above wing root and on posterior margin of scutellum. Prescutellar area tapering to scutellum. Pronotal lobes black with dense black setae. Pleura, laterotergite and mediotergite brownish black, bare. Halter light brown, knob ivory white dorsally.



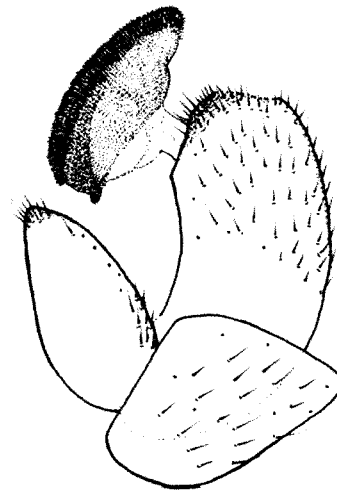
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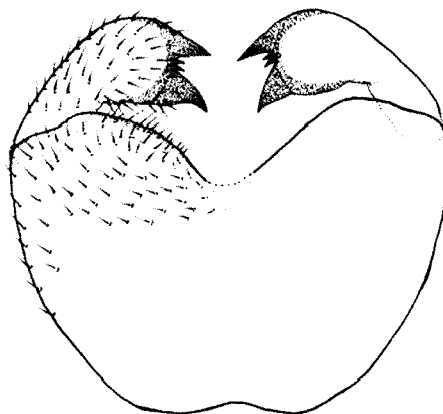
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FIGURES 9–13. *Isoneuromyia* male genitalia. 9. *I. sinica*, **n. sp.** ventral view (cerci and proctiger omitted). 10. *I. completa*, **n. sp.** ventral view (cerci and proctiger omitted). 11. *I. singula*, **n. sp.** ventral view (cerci and proctiger omitted). 12. *I. singula*, **n. sp.** lateral view (gonostyli omitted) 13. *I. wolongensis*, **n. sp.** ventral view (cerci and proctiger omitted). Scale bar = 0.1 mm.

Legs. Coxae yellow with brown basally, fore coxa, and apex of mid and hind coxae, with recumbent black hairs. Fore and mid femora brownish black at base, remainder of them ivory white; hind femur black, all with recumbent black hairs. Fore tibia without comb, mid with only posterior comb, hind tibiae with anterior and posterior comb. Tibial spurs black. Fore basitarsus 1.3x length of fore tibia, mid basitarsus subequal in length to length of mid tibiae, hind basitarsus 0.8x length of hind tibia. Claws minute.

Wing (Fig. 7). Hyaline, with brown infuscation subapically from costa to middle of cell m2, fading posteriorly; vein R4 straight, ending in C slightly beyond end of R1; vein M2, CuA1 not reaching wing margin, A1 quite reaching wing margin.

Abdomen. tergites I–II black; tergite III brownish black with white spots at basal sides; tergites IV sometimes with smaller white spots basolaterally; tergites V–VIII brownish black, all of the tergites with dense recumbent black hairs. Sternites patterned as on tergites.

Hypopygium (Figs. 11, 12). Not dissected. Gonocoxites brownish, with black pilose on about apical half. Gonostyli reduced, brown, with black pilose, apex with only one dark tooth. Paramere strong, in lateral view shaped like a broom, with very dense black short hairs apically.

FEMALE. As in male, but terminal segments of abdomen (III–V) expanded; cerci brown, small, only slightly exerted.

Types. Holotype ♂ (ZJFC 060222) and paratype from: China: Sichuan province: Wanglang National Natural Reserve, 2500 m, 26 July 2006, Jian Cao, Yiping Wang *et al.*

Etymology. The species epithet derives from the Latin *singulus* = single, referring to the gonostylar apex with only one tooth.

***Isoneuromyia wolongensis* Xu, Cao et Evenhuis, n. sp.**

(Figs. 4, 8, 13)

Diagnosis. Closest to *I. singula*, n. sp. but can be distinguished from it by the gonostyli having two dark teeth (only one in *singula*).

Description. MALE. Lengths: Body: 8.5 mm; wing: 5.6mm.

Head. Vertex and occiput black, with fairly dense small black recumbent hairs. Ocelli in horizontal line. Frons light brown, bare. Antennae: scape and pedicel cup-shaped, brownish black. Flagellum: segments slightly compressed, brownish black. Face light brown, with small black hairs apicolaterally. Palpi brown. Proboscis yellowish brown.

Thorax. Mesonotum (Fig. 4) black, pruinose with brown bristles. Scutellum black. Patch of thick black setae above wing root and on posterior margin of scutellum. Prescutellar area tapering to scutellum. Pronotal lobes black with dense black setae. Pleura, laterotergite and mediotergite brownish black, bare. Halter yellow.

Legs. Fore coxa brownish, mid and hind coxae with brown spot at base; fore coxa, and apex of mid and hind coxa, with recumbent black hairs. Fore and mid femora brownish black at base, remainder of them yellow; hind femur brown, all with recumbent black hairs. Fore tibia without comb, mid with only posterior comb, hind tibiae with anterior and posterior comb. Tibial spurs black. Fore and mid basitarsus subequal in length to lengths of respective tibiae, hind basitarsus 0.9x length of hind tibia. Claws minute.

Wing (Fig. 8). Hyaline, with brown infuscation subapically from costa to middle of cell r5, fading posteriorly; vein R4 straight, ending in C slightly beyond end of R1; veins M2, CuA1 and A1 not reaching wing margin.

Abdomen. Tergites I–II black; tergites III–VI brownish black with white spots basolaterally; tergites V–VII brownish black, tergite VIII brown, all tergites with dense recumbent black hairs. Sternites patterned as on tergites.

Hypopygium (Fig. 13). Not dissected. Gonocoxites brownish, black pilose on about apical half. Gonostyli

brown, black pilose, apex with two dark teeth, two minute dark sclerotized tooth in between large darkly sclerotized teeth.

FEMALE. Unknown.

Types. Holotype ♂ (ZJFC 060200) and paratype ♂ from: China: Sichuan province: Wolong National Natural Reserve, 21 July 2006, Jian Cao.

Etymology. The species epithet derives from the place name *Wolong*, referring to the type locality of the species.

***Isoneuromyia semirufa* Meigen, 1818**

Material examined: China: Zhejiang province: Wuyanling National Natural Reserve, 1♂, 4 May 2006, Yiping Wang.

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References

- Evenhuis, N.L. (2006a) New species of *Isoneuromyia* Brunetti (Diptera: Keroplatidae) from the Oriental Region. *Zootaxa*, 1140, 1–29.
- Evenhuis, N.L. (2006b) Catalog of Keroplatidae of the world. *Bishop Museum Bulletin in Entomology*, 13, 1–178.
- Okada, I. (1938) Die von Herrn K. Takeuchi aus Japan gesammelten Nematoceren. *Tenthredo*, 2(1), 33–43.
- Søli, G.E., Vockeroth, J.R. & Matile, L. (2000) 4. Families of Sciaroidea. In: Papp, L. & Darvas, B. (Eds.), *Contributions to a Manual of Palaearctic Diptera (with Special Reference to Flies of Economic Importance)*. Appendix. Science Herald, Budapest, pp. 49–92.