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# New record of *Horaia* (Diptera: Blephariceridae) in China with descriptions of two new species

Zehui Kang and Ding Yang\*

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## Abstract

The genus *Horaia* is newly recorded in China. Two new species, *Horaia xizangana* sp. nov. and *H. calla* sp. nov., are described as new to science. A key to the known species of *Horaia* of the world is presented.

Key Words: Diptera; net-winged midge; *Horaia*, new species; Blephariceridae

## Resumen

Se registra el género *Horaia* en China. Se describen dos especies, *Horaia xizangana* sp. nov. y *H. calla* sp. nov., como nuevas para la ciencia. Se presenta una clave para las especies de *Horaia* conocidas en la Región Oriental.

Palabras Clave: Diptera; jején con alas de venación reticulada; *Horaia*; nuevas especies; Blephariceridae

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Blephariceridae, the so called net-winged midges, are a small family in the Nematocera. There are 28 genera and nearly 320 species in the world (Jacobson et al. 2011). They are widely distributed in the world, and the regional endemism is especially rich. *Horaia* is a very small genus in this family distributed only in the Oriental Region (Tonnoir 1930, 1932; Kaul 1976; Courtney 2000; Gibson & Courtney 2007). It includes only 5 known species (one of which has 2 subspecies) as follows: *Horaia montana montana* Tonnoir, 1930, *H. longipes* Tonnoir, 1932 and *H. manaliella* (Kaul, 1976) distributed in India; *H. namtoki* Gibson & Courtney, 2007 and *H. montana piedmonti* Gibson & Courtney, 2007 in Thailand; *H. diminutiva* Gibson & Courtney, 2007 in Nepal (Tonnoir 1930, 1932; Kaul 1976; Gibson & Courtney 2007). It is the first record of the genus *Horaia* in China

Hora (1930) separated the blepharicerid larvae into 2 groups by the presence or absence of well-marked lateral appendages. Tonnoir (1930) described this genus named for Hora and designated *H. montana* as the type species. *Horaia* is an important and distinctive genus. It can be distinguished by the combination of the following characters: antenna short and mostly with 7-9 segments; R with 2 or 3 branches, as  $R_{1+2+3}$  and  $R_{4+5}$ , or  $R_{1+2+3}$ ,  $R_4$  and  $R_5$ ;  $R_5$  usually alone as a detached vein at margin;  $M_2$  absent;  $A_1$  atrophied, not reaching wing margin (Tonnoir 1930; Kaul 1976; Gibson & Courtney 2007).

Gibson & Courtney (2007) analyzed the phylogenetic relationships of Apistomyiini, including 24 characters and 8 taxa. The results suggested that *Horaia* is a monophyletic genus closely related to a clade containing *Apistomyia* and *Parapistomyia*. The results of the phylogenetic analysis are in accord with Zwick's Antarctic origin hypothesis (Zwick 1992).

## Materials and Methods

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Studies were based on whole-animal preparations and dissections. Genitalia were prepared by macerating the apical portion of the abdo-

men in cold 10% NaOH for 12–15 h. specimens were examined and illustrations prepared by using a Zeiss Stemi 2000-C stereomicroscope. Photomicrographs were captured on the same stereomicroscope with Canon Eos-450D. After examination, the abdomen was transferred to fresh glycerine and stored in a microvial pinned below the specimen. Type specimens are deposited in the entomological museum of China Agricultural University, Beijing.

Terms for structures are based primarily on Gibson & Courtney (2007). The following abbreviations in figures are used: c = cercus; ep = epandrium; gl = gonocoxal lobe; gs = gonostylus; gx = gonocoxite; hyd = hypandrium; pa = parameres.

## Results

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### *Horaia xizangana* sp. nov. (Figs. 1–5)

#### Diagnosis

Antenna with 9 segments. Antenna and head with long dense black hairs. Posterior margins of 2nd to 7th segments of abdomen with black elliptical spot. Epandrium with a large black elliptical spot basally. Cercus bilobate, each triangular.

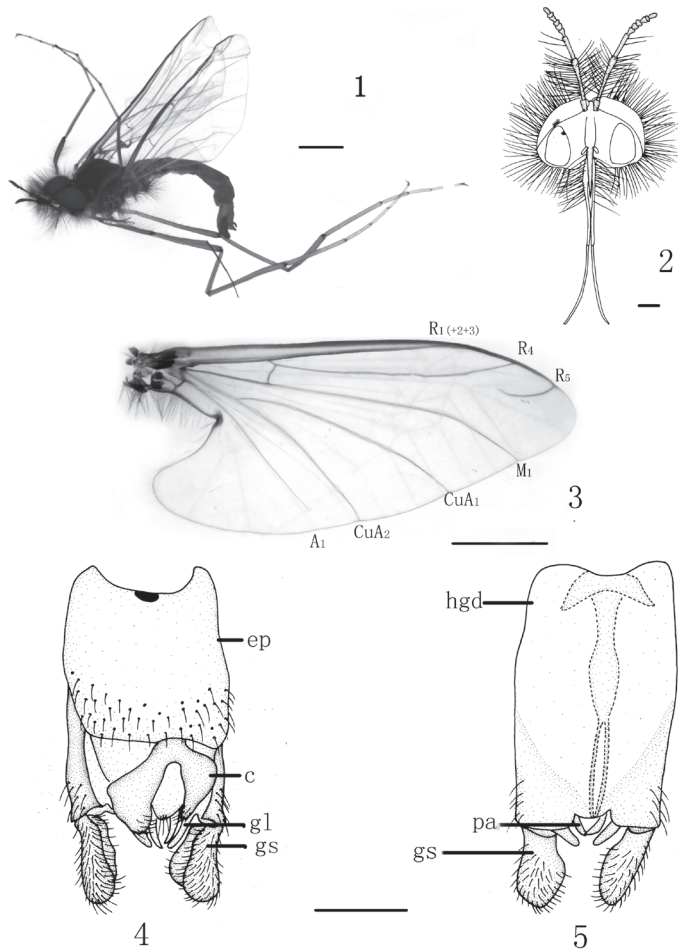
#### Male

Body length 6.5 mm, wing length 5.0 mm. Head (Fig. 2) uniformly black with long dense black hairs. Compound eyes large, upper parts especially large and flat, light brown; lower parts black, with long dense black hairs. Ocelli light yellow, prominent. Antenna with 9 segments, dark brown; scape short, with several long black hairs; pedicel 10 times longer than wide, with long dense hairs; first flagellomere 4 times longer than wide, with several long hairs apically;

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**Figs. 1–5.** *Horaia xizangana* sp. nov. (male). 1. Habitus of male, lateral view; 2. Head; 3. Wing; 4. Male Genitalia, dorsal view; 5. Male Genitalia, ventral view. Abbreviations: c = cercus; ep = epandrium; gl = gonocoxal lobe; gs = gonostylus; gx = gonocoxite; hyd = hypandrium; pa = parameres. Scale bar: 1, 3 = 1 mm; 2, 4–5 = 0.25 mm.

2–6 flagellomeres short, without hair; 7th flagellomere twice longer than wide, without hair. Clypeus long, cylindrical. Proboscis long, free portion twice height of head; labrum elongated, with dense hairs, about one quarter of length of proboscis; palpus small, one segment, dark brown.

Thoracic tergum uniformly black without hairs; laterotergite mostly black, except wing base with gray spots; pleuron mostly without hairs except anepisternum, katepimeron and wing base with 3 bunches of long hairs. Coxae and trochanters uniformly dark brown, with dense black hairs; femora mostly yellow brown, with dark brown spot apically, with a row of long dense hairs; tibiae mostly yellowish brown, with dark brown spot apically; mid and hind tibiae with 2 spines apically; fore tarsomeres slender, dark brown; mid and hind tarsomeres yellowish brown. Wing (Fig. 3) broad, subhyaline; veins brown; base of wing margin with long black hairs;  $R_5$  present at wing margin,  $A_1$  straight. Haltere brown.

Abdomen mostly dark brown, posterior margins of 2nd to 7th segments with black elliptical spot; 1st and 2nd segments each with 2 branches of long dense black hairs laterally; other segments naked.

Male genitalia (Figs. 4–5): Asymmetric. Epandrium irregularly quadrilateral with a large black elliptical spot basally, with short black hairs apically. Cercus bilobate, each triangular, with short

hairs apically. Hypandrium fused with gonocoxite, irregularly quadrilateral, slightly concaved distal margin. Outer gonostylus bilobate, dorsal lobe narrowed, with short dense hairs. Inner gonostylus finger-like, slender, hyaline. Parameres slender, transparent, tapered apically.

#### Female

Unknown.

#### Type Material

HOLOTYPE ♂, CHINA, Xizang, Linzhi, Hanmi, 2011.VIII.6, L. H. Wang (CAU). PARATYPES: CHINA, Xizang, Medog, 62K, 2011.IX.14, G. Yao (CAU).

#### Distribution

China (Xizang).

#### Remarks

This new species is somewhat similar to *Horaia manaliella* (Kaul, 1976), but can be easily separated from the latter by the following features: antenna with 9 segments; antenna and head with long dense black hairs, posterior margins of 2nd to 7th segments with black elliptical spot; epandrium with a large black elliptical spot basally; cercus bilobate, each triangular. In *Horaia manaliella* (Kaul, 1976), the antenna has 8 segments, the epandrium does not have a large black elliptical spot basally, each lobe of the cercus is semicircular (Kaul 1976; Gibson & Courtney 2007).

#### Etymology

The specific name refers to the type locality.

#### *Horaia calla* sp. nov. (Figs. 6–10)

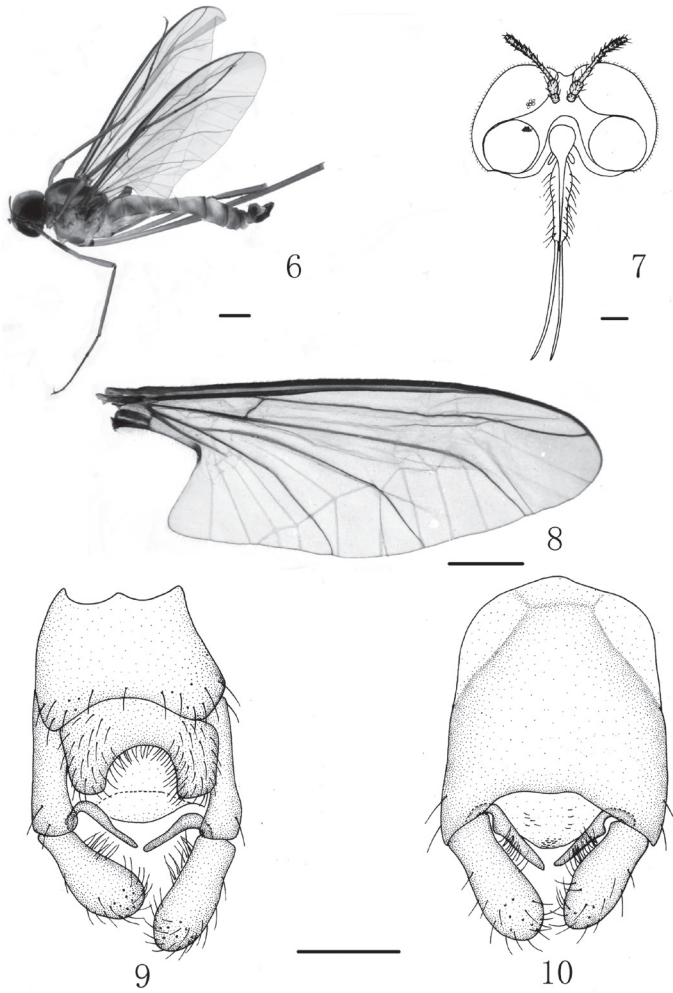
#### Diagnosis

Antenna with 10 segments. Epandrium irregularly trapezoidal, posterior margin slightly concaved medially. Cercus U-shaped. Inner gonostylus slender and straight, slightly enlarged medially.

#### Male

Body length 8.5 mm, wing length 7.5 mm. Head (Fig. 7) brown. Compound eyes large, almost covering all the head; upper parts holoptic, large and flat, brick-red; lower parts black. Ocelli light, prominent. Antenna with 10 segments, uniformly brown; scape short, with several brown short hairs; pedicel short, swollen, with several short hairs; first flagellomere, slender, about 4 times longer than wide; with several short hairs; 2nd flagellomere about 3 times longer than wide; 3–8 flagellomeres short, with short brown hairs. Clypeus round, bulbous; proboscis long, free portion twice height of head; labrum elongate, about half length of proboscis; palpus small, one segment, dark brown.

Thoracic dorsum mostly brown except middle part of mesoscutum yellow posteriorly; scutellum with a transverse black stripe posteriorly; pleuron mostly brown, except an epimeron yellow; thorax without hairs. All coxae and trochanters bicolored, yellow at basal 1/2, dark brown at apical 1/2; all femora uniformly yellow brown, with short brown hairs; tibiae mostly yellow brown, with dark brown spot apically; tarsomeres dark brown, with short black



**Figs. 6–10.** *Horaia calla* sp. nov. (male). 6. Habitus of male, lateral view; 7. Head; 8. Wing; 9. Male Genitalia, dorsal view; 10. Male Genitalia, ventral view. Scale bar: 6, 8 = 1 mm; 7, 9–10 = 0.25 mm.

hairs. Wing (Fig. 8) board, subhyaline; veins brown;  $R_{4+5}$  slightly waved from middle part apically;  $A_1$  not reaching wing margin. Haltere brown.

Abdominal tergites mostly yellow, posterior margins of 4th to 7th segments with black margin; male genitalia dark brown; sternites brown.

Male genitalia (Figs. 9–10): Asymmetric. Epandrium irregularly trapezoidal, posterior margin slightly concaved medially, with short black hairs apically. Cercus U-shaped, with uniformly short hairs. Hypandrium fused with gonocoxite, irregularly quadrilateral, slightly concaved at distal margin. Outer gonostylus board, round apically, with short dense hairs apically, medial part with dense long hairs. Inner gonostylus slender and straight, slightly enlarged medially.

**Female**

Unknown.

**Type Material**

HOLOTYPE ♂, CHINA: Yunnan, Gongshan, Dulongjiang, 2013.VII.1, W. ZHANG (CAU).

**Distribution**

China (Yunnan).

**Remarks**

The adults are similar to those of *H. montana* Tonnoir, but can be separated from the latter by the antenna with 10 segments, the irregularly trapezoidal epandrium with the posterior margin slightly concaved medially, and the U-shaped cercus. In *H. montana*, the antenna has 9 segments, the epandrium is simple, and the cercus is well developed, large and parallel (Gibson & Courtney 2007).

**Etymology**

The specific name refers to its bright color.

**Key to Adults of *Horaia* in the Oriental Region**

[Modified from Gibson & Courtney 2007]

- 1.  $R_3$  vein present as detached vein at wing margin (Fig. 3; Gibson & Courtney 2007, Fig. 10) ..... 2
- $R_3$  vein absent (Fig. 8; Gibson & Courtney 2007, Figs. 11, 12, 13, 14) ..... 3
- 2. Antenna with 9 segments; antenna and head with long dense black hairs; epandrium with a large black elliptical spot basally (Fig. 2); cercus bilobate, each triangular (Figs. 4 and 5) ..... *H. xizangana* sp. nov.
- Antenna with 8 segments; antenna and head bare; epandrium without black elliptical spot basally; cercus bilobate, each semicircular (Gibson & Courtney 2007, Fig. 62) ..... *H. manaliella* (Kaul)
- 3.  $A_1$  vein barely extending beyond anal angle of wing ..... 4
- $A_1$  vein almost reaching margin of wing ..... 6
- 4. Antenna with 9 segments; male pedicel variable, not expanded apically (Gibson & Courtney 2007, Fig. 79) ..... 5
- Antenna with 10 segments; male pedicel short, swollen (Fig. 7) ..... *H. calla* sp. nov.
- 5. Stump of  $R_4$  vein sometimes present on  $R_{4+5}$  vein (Gibson & Courtney 2007, Fig. 12); hind coxa with sparse pale hairs; male antennae glabrous; female body length more than 6.5 mm body length, 7.0 mm wing length ..... *H. montana montana* Tonnoir
- Stump of  $R_4$  vein absent; hind coxa glabrous (Gibson & Courtney 2007, Fig. 14); female smaller, c. 5.0 mm body length, 5.3 mm wing length; male antennae setose ..... *H. montana piedmonti* Gibson & Courtney

6. Maxillary palpi large, spindle-shaped (Gibson & Courtney 2007, Figs. 67, 69) ..... *H. namtoki* Gibson & Courtney  
 —. Maxillary palpi small, globular (Gibson & Courtney 2007, Figs. 72, 74) ..... 7
7. Female eyes divided, upper division present as 2 rows of ommatidia (Gibson & Courtney 2007, Fig. 72, 74) .....  
 ..... *H. diminutiva* Gibson & Courtney  
 —. Female eyes not divided;  $R_{4+5}$  vein straight; front femur with anterodorsal row of setae ..... *H. longipes* Tonnoir

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