

# Five New Species of the Genus *Atherigona* (*Acritochaeta*) (Diptera, Muscidae) from China

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## ARTICLE INFO

**Received:**  September 25, 2025

**Published:**  October 01, 2025

**Citation:** Zhongyan Zhou and Lianmeng Wei. Five New Species of the Genus *Atherigona* (*Acritochaeta*) (Diptera, Muscidae) from China. Biomed J Sci & Tech Res 63(3)-2025. BJSTR.MS.ID.009893.

## ABSTRACT

This paper is part of ongoing studies on *Atherigona* (*Acritochaeta*) from Guizhou and Sichuan, Southwestern China, which reports five new species: *Atherigona* (*Ac.*) *chongqingensis* sp. nov., *Atherigona* (*Ac.*) *delongensis* sp. nov., *Atherigona* (*Ac.*) *kuankuoshuiensis* sp. nov., *Atherigona* (*Ac.*) *sichuana* sp. nov. and *Atherigona* (*Ac.*) *suiyangensis* sp. nov. The type specimens of the new species are housed in the Wei Lianmeng Model Worker Innovation Studio, Anshun, Guizhou, China (WLMWISAGC).

**Keywords:** Taxonomy; Flies; Southwestern China; Identification Key

**Abbreviations:** ACR: Acrostichal Bristle(s); AC: Subgenus *Acritochaeta*; Ad: Anterodorsal Bristle(s); AT: Subgenus *Atherigona*; Av: Anteroventral Bristle(s); D: Dorsal Bristle(s); P: Posterior Bristle(s); PD: Posterodorsal Bristle(s); PV: Posteroventral Bristle(s)

## Introduction

The muscid shoot fly *Atherigona Rondani* with over 230 species, most of which are found in tropical and subtropical regions (Pont and Magpayo [1]), is an economic pest. The larvae are phytophagous and feed on a variety of wild and cultivated grasses (Poaceae) (*Atherigona* (At.)) or mostly saprophagous (*Acritochaeta* (Ac.)) (Pont and Magpayo, et al. [2]). *Atherigona* (At.) are phytophagous, but *Atherigona* (Ac.) reveal a wide range of feeding strategies as larvae. *Atherigona* (Ac.) *culicivora* Kovac, Pont & Deeming, [3] which was described from Thailand is a facultative predator of culicid larvae (Kovac et Pont [3]) (<https://lknhm.nus.edu.sg/wp-content/uploads/sites/10/2023/10/RBZ-2023-0044.pdf>), and *Atherigona* (Ac.) *orientalis* may be a carrion-feeding forensic indicator (Grzywacz et Pape [4]) (<https://linkinghub.elsevier.com/retrieve/pii/S0001706X14001934>). Generally, *Atherigona* (Ac.) is recognised as facultative predators according to Skidmore (1985) and others. The subgenus *Acritochaeta* was once promoted to the genus *Acritochaeta* by Grimshaw in [5], which was adopted by the Chinese scholar Fan

[6]. In this paper, the genus *Acritochaeta* is still regarded as a subgenus of *Atherigona*, which is the consensus of many scholars. For example Marcos, et al. [1,7-10] etc. Some studies have been published about the Oriental species of *Atherigona* (Pont [11]).

Such as Nepal (Pont, et al. [12,13]), the Philippines (Pont and Magpayo [1]), Vietnam (Shinonaga and Thinh [10]), Borneo Island (Shinonaga [9]), and Thailand (Moophayak, et al. [3,7]). So far, a total of 38 *Atherigona* species have been recorded in China, of which 8 belong to *Atherigona* (Ac.) and 4 of them are endemic to China (He, et al. [6,14-16]). Namely, *Atherigona* (Ac.) *ateripraepeda* He, Huang & Feng, [14], *Atherigona* (Ac.) *atritergita* Fan [17], *Atherigona* (Ac.) *qingchuanica* Qian, Xie & Feng, [15] and *Atherigona* (Ac.) *leigongshana* Wei and Yang, [16]. Five new species of the genus *Atherigona* (Ac.) reported in this article were collected from Southwestern China. The type specimens of the new species are deposited in the Wei Lianmeng Model Worker Innovation Studio, Anshun, Guizhou, China (WLMWIS-AGC) located in the Centre for Disease Prevention and Control of Anshun City, Guizhou (CDPCAG).

## Material and Methods

Specimens examined in this study were obtained from material collected from 2008 to 2010. The collecting was funded by the Projects of the Science Academy of Guizhou Province, the Department of Science and Technology of Guizhou Province, the Guizhou Provincial Governor Fund of Talented Person for Excellent Science, Technology and Education and the Wei Lianmeng Model Worker Innovation Studio, Anshun, Guizhou, China (awarded by Trade Unions of Guizhou, P. R. China). The terminalia were prepared as follows: the last abdominal segment of relaxed specimens was cut off very gently with micro-scissors. The last abdominal segment was then put into 10% aqueous solution of KOH and boiled for 5–10 minutes or kept for 24 hours till all the parts become clear. The male genitalia were drawn with a camera lucida attached to a compound microscope. Morphological terms generally follow Cumming and Wood [18].

## Taxonomy

### Genus *Atherigona* Rondani [19-24]

*Atherigona Rondani* [19], p. 97.

*Acritochaeta* Grimshaw, [5], p. 41.

- **Diagnosis.** See Pont ([12], 1986), Fan [6].
- **Distribution.** Worldwide, mainly in the Oriental, Australian and Afrotropical regions.

### Key to Males of *Atherigona* (*Acritochaeta*) from China (Modified from Xie et al. [15])

1. Scutellum with basal lateral setula almost or 1/2 as long as the sub-basal lateral bristle; cross r-m beyond middle of discal cell; male fore femur with a shallow dorsal preapical excavation; in male, hypopygial prominence and trifoliate process absent (Subgenus *Acritochaeta*).....2

Scutellum with basal lateral setula at most 1/3 as long as the sub-basal lateral seta; cross vein r-m always well in basal half of cell dm; forefemur without a dorsal preapical excavation; male with a trifoliate process and usually a hypopygial prominence.....  
Subgenus *Atherigona*

2. Fore femur without a preapical dorsal excavation.....3

Fore femur with a preapical dorsal excavation.....12

3. Interfrontalia yellow, fore tibia with a pair of pv; wing at tip with a dark narrowly rounded spot.....*Atherigona* (Ac.) apicemaculata Hennig, 1952

Interfrontalia brown or dark brown, fore tibia without pv; wing at tip without a spot.....

.....4

4. Tergite 1+2 with dark hind marginal band or spot.....5

Tergite 1+2 without dark hind marginal band or spot.....11

5. Tergite 1+2 with dark hind marginal band, sometimes with a dark covering spot or spots.....6

Tergite 1+2 with only a dark spot.....8

6. Tergite 1+2 and 3 each with trapezoidal hind marginal band, which is a uniform dark color.....*Atherigona* (Ac.) atrit-ergita Fan, 1988

Tergite 1+2 and 3 each with trapezoidal hind marginal band, which is covered with a deep dark spot.....7

7. Tergite 1+2 and 3 each with hind marginal band bearing pale median strip, the former with a pair of narrow strips and the latter with a pair of large L-shape spots (Figure 1A).....*Atherigona* (Ac.) kuankuoshuiensis sp. nov.

Tergite 1+2 and 3 each with hind marginal band not bearing pale median strip, which is missile shaped (Figure 2A).....*Atherigona* (Ac.) sichuana sp. nov.

8. Cercus with 3 pairs of long bristles posteriorly.....

.....*Atherigona* (Ac.) seticauda (Malloch, [21])

Cercus without 3 pairs of long bristles posteriorly.....9

9. Tergite 3 with a pair of strip-shaped darkish brown hind marginal bands (Figure 3A).....*Atherigona* (Ac.) chongqingensis sp. nov.

Tergite 3 with a brownish dark hind marginal band raised in a trapezoidal shape medially.....10

10. Tergite 1+2 with a trapezoidal black spot (Figure 4A).....

.....*Atherigona* (Ac.) suiyangensis sp. nov.

Tergite 1+2 with a semicircular black median spot (Figure 5A)....

.....*Atherigona* (Ac.) delongensis sp. nov.

11. Tergite 3 entirely black. Cercus with inner lobe bearing an ear-like projection on each side, surstylus with apex not in a clasp shape and straight in lateral view.....*Atherigona* (Ac.) *ateripraepeda* He, et al. [14]

Tergite 3 with hind marginal band shape resembling the character. Cercus with only an ear-like projection in each side, surstylus with apex clasped shape and anteverted in lateral view.....  
*Atherigona* (Ac.) *qingchuanica* Xie, et al. [15]

12. Fore femur with a preapical dorsal excavation with only some hairs and a short but clear apical bristle. Tergite 1+2 with dark hind marginal band and cercus nearly butterfly-shaped viewed posteriorly.....13

Fore femur with a preapical dorsal excavation with longitudinal

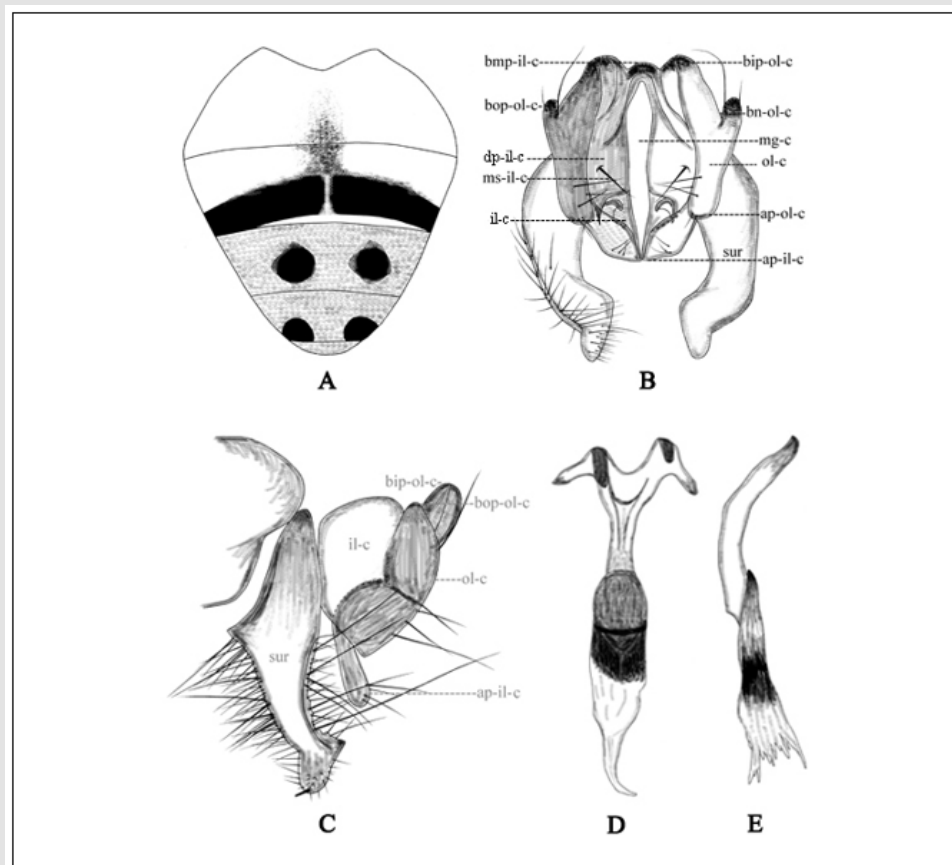
dense black hairs reaching to apex, apical bristle absent. Tergite 1+2 with a pair of broad, separated dusted spots rather than dark and cercus nearly heart-shape viewed posteriorly.....*Atherigona* (Ac.) *orientalis* (Schiner [23])

13. Tergite 1+2 dark basally.....  
.....*Atherigona* (Ac.) *leigongshana* (Wei and Yang [16])

Tergite 1+2 yellow basally.....*Atherigona* (Ac.) *maculigera* (Stein [24])

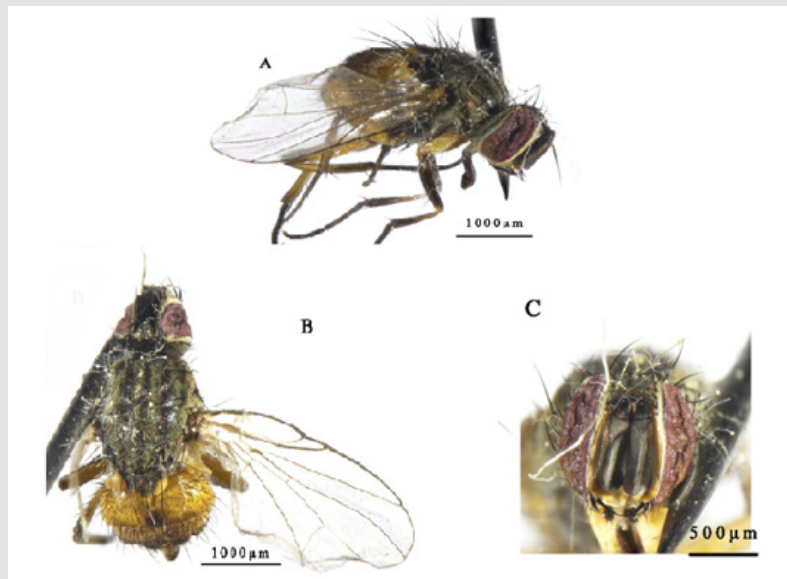
### ***Atherigona* (Ac.) *Chongqingensis* sp. nov.**

Figures 3A-3E, 6A-6C



Note: ap-il-c - apical projection of inner lobe of cercus; ap-ol-c - apical projection of outer lobe of cercus; bip-ol-c - basal inner projection of outer lobe of cercus; bmp-il-c - basal median projection of inner lobe of cercus; bn-ol-c - basal notch of outer lobe of cercus; bop-ol-c - basal outer projection of outer lobe of cercus; dp-il-c - dorsal projection of inner lobe of cercus; il-c - inner lobe of cercus; lp-c - lateral projection of cercus; mg-c - median gap of cercus; mp-c - middle projection of cercus; ms-il-c - median bristle of inner lobe of cercus; ol-c - outer lobe of cercus; sur - surstylus.

**Figure 3:** *Atherigona* (Ac.) *chongqingensis* sp. nov. holotype A abdomen, dorsal view B, C cercus, posterior and lateral views D, E aedeagus, dorsal and lateral views.



**Figure 6:** *Atherigona* (Ac.) *chongqingensis* sp. nov. paratype A habitus, lateral view B habitus, dorsal view C head, anterior view.

### Type Material. Holotype

CHINA, Chongqing, Nanchuan, 29°9'48.10"N, 107°6'19.71"E, 450 m, 12–13. V. 2008, Zaihua Yang leg. Paratypes: 1, same data as holotype; 1, CHINA, Guizhou, Suiyang, Kuankuoshui, 28°13'50.25"N, 107°13'11.703"E, 1500 m, 13–15. VIII. 2010, LM Wei, Q Dai and WP Cao leg. (WLMWISAGC).

- **Diagnosis:** Fore femur without a preapical dorsal excavation; tibia yellow but brown black on apical half, tarsomeres black, somewhat brownish, without fine erect hairs. Hind femur with a distinct ventral keel and hind tibia normal. Tergite 1+2 with a brown strip-like median spot; tergite 3 with a pair of strip-shaped darkish brown hind marginal bands; tergites 4 and 5 each with a pair of rounded black spots. Cercus with an inner lobe in rectangular and an ear-like projection below it in posterior view.

- **Description. Male:** Body length 5.4 mm. Wing length, 4.8 mm.

Head all bristles and hairs black. Mostly black in ground colour; parafacial, gena and mouth area yellow and light grey yellow pruinose. Frontal vitta velvet black. Frons about 0.4 times width of head. Vertex and ocellar tubercle, fronto-orbital blackish grey-brown pruinose; occiput densely grey yellow pruinose. Fronto-orbital plate narrow, with 5 pairs of proclinate or reclinate (lowest one as weak as hair) and 1 pair of reclinate frontal bristles, the frontal bristles in a pair undeveloped. Antenna brownish black; arista brown yellow. Palpus brownish dark. Prementum brown, shining. Thorax ground colour dark, scutellum yellow apically, postpronotal lobes yellowish brown, pleura slightly brownish, grey dusted. Basisternum brownish black shining marginally and its tongue-shaped anterior part shining brown.

Scutum and scutellum densely grey yellow pruinose; scutum with 3 conspicuous shining dark brown longitudinal vittae, all of them start from the back of the neck, middle one narrower than in paramedial ones, all of them reaching scutellum. Presutural acr in 4 rows. 2 strong proepisternal bristles, the top one is obviously much longer and bigger than the bottom and with an additional hair. 2 proepimeral hairs, upper one longer. Basal lateral scutellar hair is 1/3 longer than subbasal lateral bristle; pair of apical bristles strong and long; discal bristles undeveloped; disc of scutellum with some 18 hairs.

### Legs Mainly Yellow. Fore leg

fore coxa yellow, femur black except yellow apically, with 1 preapical pv, without a preapical dorsal excavation; tibia yellow but brown black on apical half, without bristle except at apex; tarsomeres black, somewhat brownish, without fine erect hairs. Mid legs: yellow; coxa brown; femur with 1 apical pd; tibia with 1 short median p. Hind legs: yellow, coxa brown; femur brownish black apically, with 1 preapical d and a row of very short ad. Femur with a distinct ventral keel, tibia with 1 av, 1 ad and 1 pd; tarsomeres black, slightly brownish, tarsomere 5 slightly pale. Wing hyaline, without spot. Cross vein r-m is remarkably in front of discal cell. Calypters yellow, upper one with margin brown. Halter white yellow, yellow basally. Abdomen ground colour reddish yellow, undusted except tergites 4 and 5 thinly grey dusted and the former densely grey dusted laterally; tergite 1+2 with a brown strip-like median spot; tergite 3 with a pair of strip-shaped darkish brown hind marginal bands; tergites 4 and 5 each with a pair of rounded black spots.

### Terminalia (Figures 3B–3E (2 Dissected))

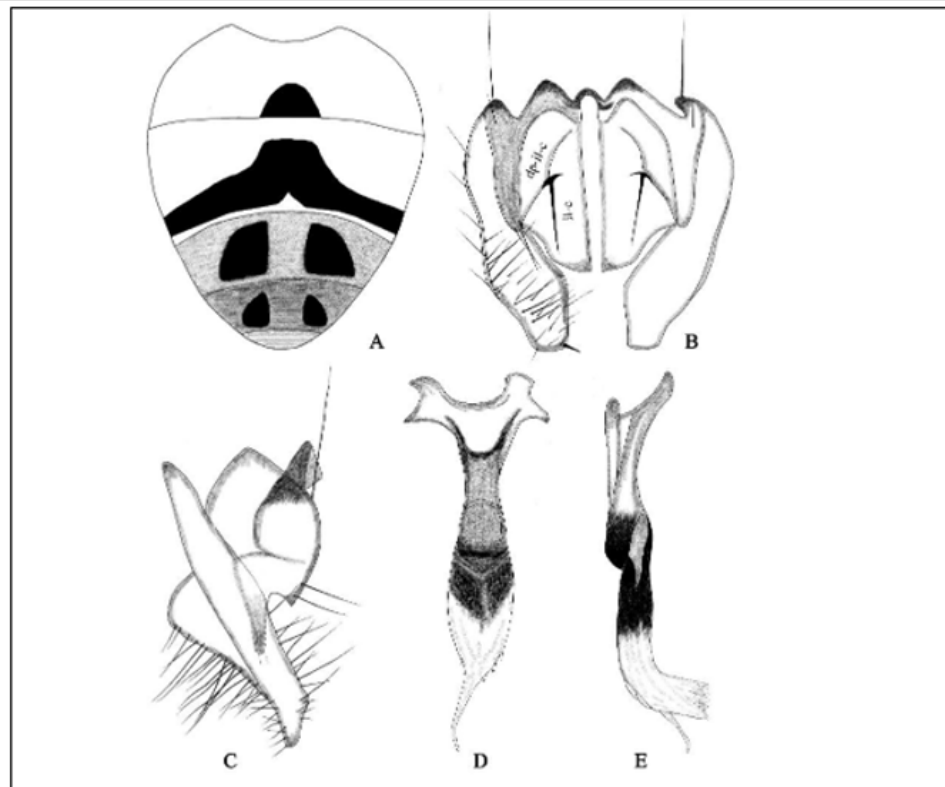
when viewed posteriorly, cercus with the basal median projection of inner lobe arc shaped, obviously lower than in basal inner projection of outer lobe, with a dorsal projection in rectangular and an ear-like projection below it; median gap distinctly separated. In lateral view, apical projection of inner lobe elongated appropriately, ca 4 times as long as wide; surstylus curved with apex blunt (Figure 3C).

- **Female:** Unknown.
- **Distribution:** China (Chongqing).
- **Etymology:** This new species is named after its type locality – Nanchuan, Chongqing, China.
- **Remarks:** The new species is closely related to *Atherigona* (*Ac.*) *seticauda* but the latter has its cercus bearing 3 pairs of long bristles posteriorly, tergite 1+2 with a pair of subtriangular spots, tergite 3 with a median stripe and a long ovate lateral spot, tergite 4 with same the spot pattern as in tergite 3 but with a smaller ovate lateral spot, tergite 5 with a pair of small rounded spots. However, *Atherigona* (*Ac.*) *chongqingensis* sp. nov. has tergite 1+2 bearing a brown strip-like median spot at its base connected to the next segment, tergite 3

with a pair of strip-shaped hind marginal bands, tergite 4 with a pair of rounded black spots, similar to *Atherigona* (*Ac.*) *seticauda*, tergite 5 with a pair of small rounded spots. Additionally, the new species has the inner lobe of cercus with an ear-like projection in lower part. Generally, the cercus without an inner lobe (cercus simple) is a common character (original state) in *Atherigona* (*Acritochaeta*), conversely, cercus with an inner lobe is a derived state. It is reasonable to speculate that the smaller the projection, the more primitive it is; the larger the projection, the more evolved. *Atherigona* (*Ac.*) *suiyangensis* sp. nov. is assumed more primitive because of its cercus being without an inner lobe. Conversely, *Atherigona* (*Ac.*) *chongqingensis* sp. nov. with an inner lobe of cercus in rectangular, is considered more advanced. The other 3 species *Atherigona* (*Ac.*) *delongensis* sp. nov., *Atherigona* (*Ac.*) *kuankuoshuiensis* sp. nov. and *Atherigona* (*Ac.*) *sichuana* sp. nov. each with an inner lobe present on the cercus are in an intermediate state. Therefore, all five species share an ancestral-descendant transformation sequence, and due to their recency of common ancestry, they form a monophyletic group

### *Atherigona* (*Ac.*) *Delongensis* sp. nov.

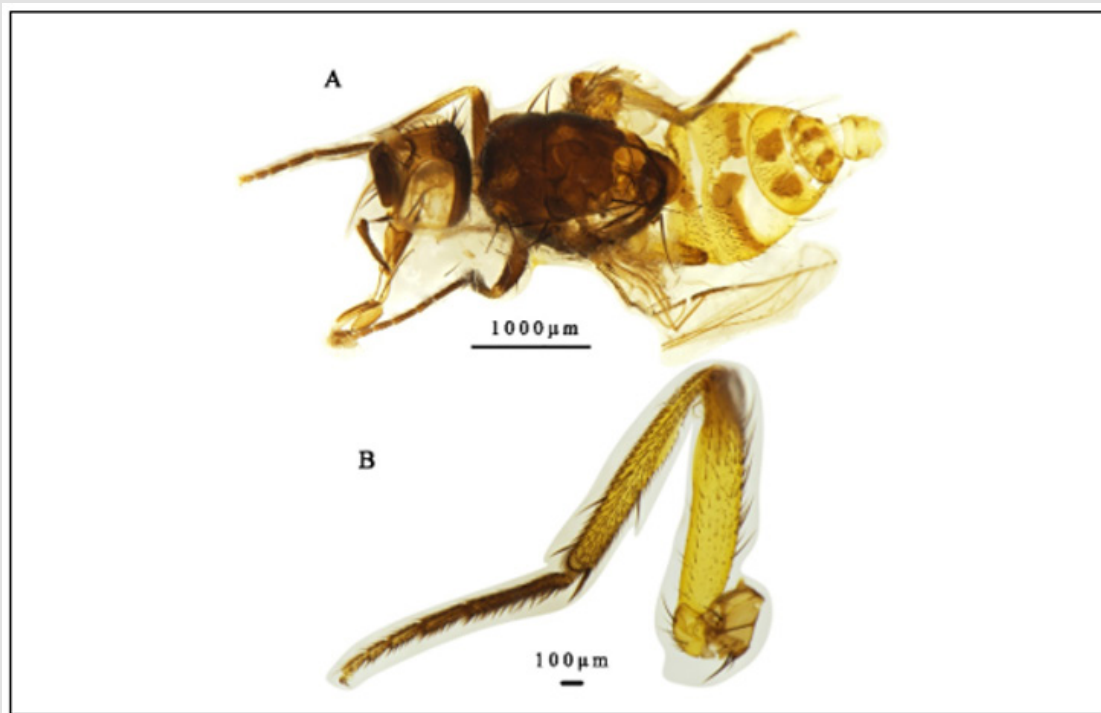
Figures 5A–5E, 7A & 7B.



Note: dp-il-c - dorsal projection of inner lobe of cercus; il-c - inner lobe of cercus.

**Figure 5:** *Atherigona* (*Ac.*) *delongensis* sp. nov. holotype A abdomen, dorsal view B, C cercus, posterior and lateral views D, E aedeagus, dorsal and lateral views.





**Figure 7:** *Atherigona (Ac.) delongensis* sp. nov. paratype A habitus, dorsal view B left hind leg, anterior view.

### Type Material. Holotype

CHINA, Sichuan, Deyang, Delong, 31°8'2.95"N, 104°24'13.00"E, 800 - 900 m, 13 V. 2008, Zaihua Yang leg. Paratypes: 3, CHINA, Guizhou, Suiyang, Kuankuoshui, 28°13'50.25"N, 107°13'11.70"E, 1500 m, 13–15. VIII. 2010, LM Wei, Q Dai and WP Cao leg. (WLMWIS-AGC).

- **Diagnosis:** Fore femur without a preapical dorsal excavation; fore tibia yellow but brown black at apical 3/5; tarsomeres brown black, without fine erect hairs. Mid femur brownish black at dorsal apex. Hind femur and tibia each without ventral keel. Tergite 1+2 with diffused pale brown median spot and same posterior marginal band, tergite 3 with a narrow black brown posterior marginal band; tergites 4 and 5 each with a pair of round blackish brown spots. Cercus with a dorsal projection in low flat triangle, median gap separated distinctly with two sides nearly parallel in posterior view.

- **Description. Male:** Body length, 3.9–5.1 mm. Wing length, 4.2 mm.

Head all bristles and hairs black. Mostly black in ground colour, parafacial, gena and mouth area yellow and light grey yellow pruinose. Frontal vitta velvet black. Frons about 0.4 times width of head. Vertex and ocellar tubercle; fronto-orbital blackish grey-yellow pruinose; occiput densely yellowish grey pruinose. Fronto-orbital plate narrow, with 3 pairs of moderate proclinate or reclinate and 1 pair of reclinate frontal bristles, the frontal bristle in a pair undeveloped. Antenna

brownish black; arista dark yellow. Palpus brownish dark. Premen-tum darkish brown, thinly grey pollinose. Thorax ground colour dark, the apical margin of scutellum yellow, postpronotal lobes somewhat brownish, front of anepisternum darkish brown, pleura more or less brownish, grey dusted. Basisternum brownish black shining marginally and its tongue-shaped anterior part shining brown. Scutum and scutellum densely grey yellow pruinose; scutum shining black medially, with 3 conspicuous dark brown longitudinal vittae, all of them start from the back of the neck, middle one slightly narrower than in paramedial ones and not reaching scutellum but paramedial ones reaching scutellum. Presutural acr in 5 rows. 2 strong proepisternal bristles, the upper one is obviously much longer and bigger than the bottom one, with an additional hair. 2 proepimeral hairs, upper one developed as hair. Basal lateral scutellar hair is 1/3 longer than sub-basal lateral bristle; pair of apical bristles strong and long; discal bristles undeveloped; disc of scutellum with some 14 hairs.

### Legs Mainly Yellow. Fore leg

coxa yellow, femur black except yellow apically, with 1 preapical pv, without a preapical dorsal excavation; tibia yellow but brown black at apical 3/5, without bristle except at apex; tarsomeres brown black, without fine erect hairs. Mid leg: yellow; coxa brown; femur slightly brownish apically, with 1 preapical pd; tibia with 1 short median p. Hind leg: yellow, coxae brown; femur brownish black at dorsal apex, with 1 apical d and a row of very short ad; tibia with 1 av, 1 ad and 1 pd; tarsomeres brown black, tarsomere 5 slightly pale. Hind fe-

mur and tibia each without ventral keel. Wing hyaline. Cross vein r-m is remarkably in front of discal cell. Calypters yellow. Halter orange, knob white yellow. Abdomen ground colour yellow, undusted; tergite 1+2 with diffused pale brown median spot and same posterior marginal band, tergite 3 with a narrow black brown posterior marginal band; tergites 4 and 5 each with a pair of round blackish brown spots.

#### Terminalia (Figures 6B–6E (4 Dissection))

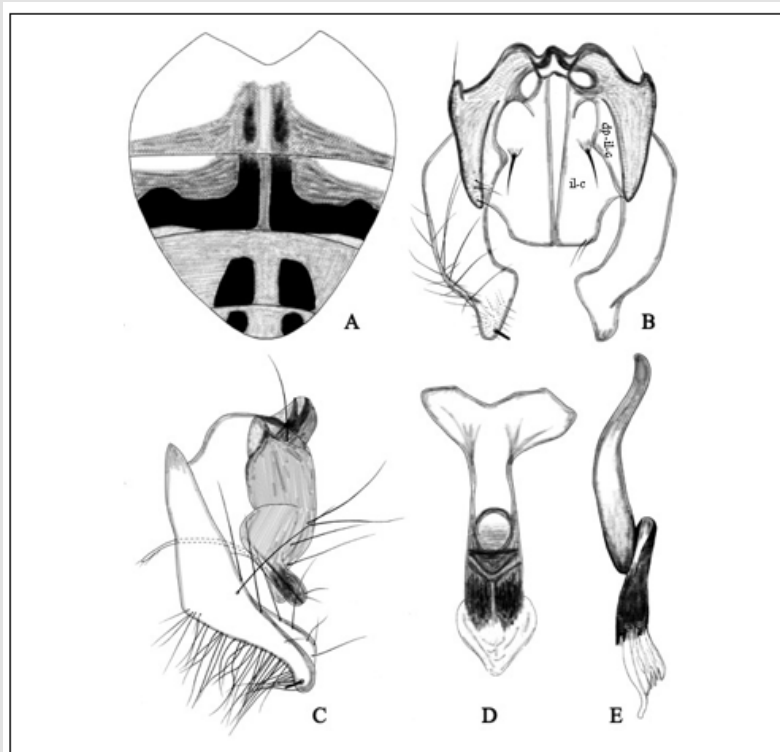
Cercus with the basal median projection of inner lobe arc shaped when viewed posteriorly, obviously lower than in basal inner projection of outer lobe, with a dorsal median projection in low flat triangle, median gap separated distinctly with two sides nearly parallel. In lateral view, basal inner projection of outer lobe with triangular projection posteriorly; apical projection of inner lobe conical, which is about 4 times as long as wide; surstylus straight, with apex conical (Figure 5C).

- **Female:** Unknown.
- **Distribution:** China (Sichuan: Deyang; Guizhou: Suiyang).
- **Etymology:** This new species is named after its type locality – Delong, Sichuan, China.

• **Remarks:** Closely related to *Atherigona* (Ac.) *suiyangensis* sp. nov. but can be separated from the latter by the following features: Mid femur brownish black at dorsal apex, hind femur and tibia each without ventral keel; tergite 1+2 with diffused pale brown median spot and same posterior marginal band, tergite 3 with a narrow black brown posterior marginal band; cercus with basal median projection of inner lobe in low flat triangle, median gap separated distinctly with two sides nearly parallel in posterior view. In contrast, *Atherigona* (Ac.) *suiyangensis* sp. nov. has the mid femur brown black on about apical 1/4, hind femur and hind tibia each with a distinct ventral keel; tergite 1+2 with a pair of darkish brown median strips; tergite 3 with a brownish dark hind marginal band raised in a trapezoidal shape medially; cercus with basal median projection of inner lobes in the shape of paired black globes, basal projection rounded; median gap narrow conical, closing apically. Also, the new species has surstylus straight in lateral view, similar to that of *Atherigona* (Ac.) *sichuana* sp. nov. and *Atherigona* (Ac.) *suiyangensis* sp. nov.

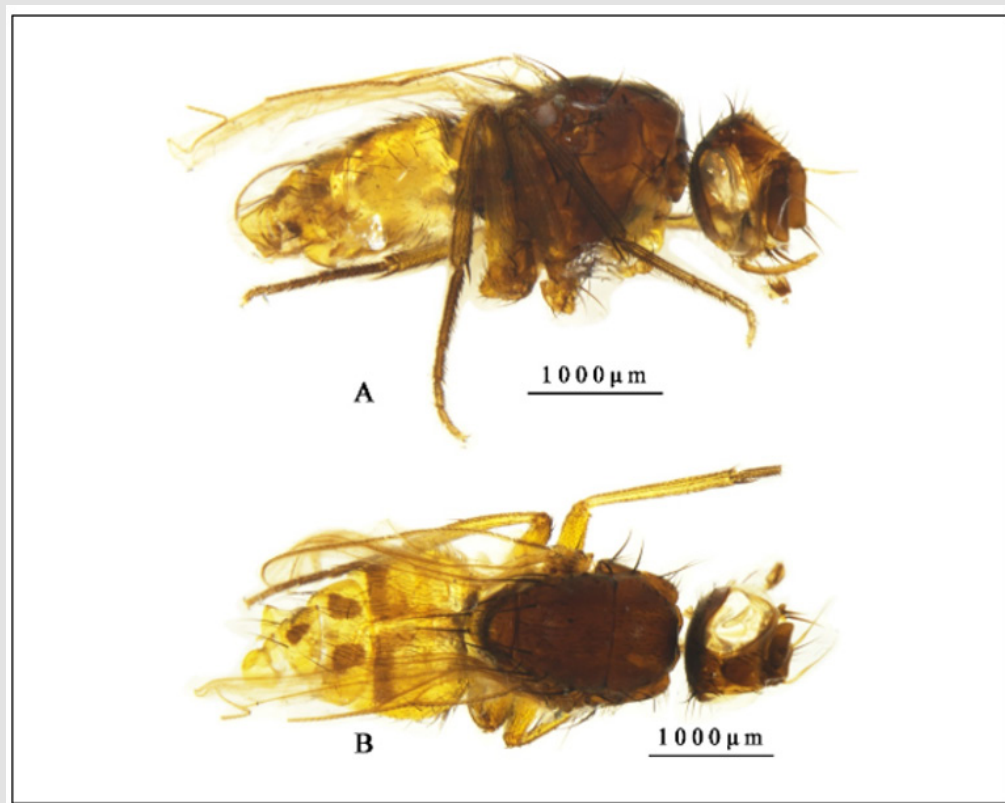
#### *Atherigona* (Ac.) *Kuankuoshuiensis* sp. nov.

Figures 1A–1E, 8A & 8B.



Note: dp-il-c - dorsal projection of inner lobe of cercus; il-c - inner lobe of cercus.

**Figure 1:** *Atherigona* (Ac.) *kuankuoshuiensis* sp. nov. holotype A abdomen, dorsal view B, C cercus, posterior and lateral views D, E aedeagus, dorsal and lateral views.



**Figure 8:** *Atherigona* (Ac.) *kuankuoshuiensis* sp. nov. paratype A habitus, lateral view B habitus, dorsal view.

### Type Material. Holotype

CHINA, Guizhou, Suiyang, Kuankuoshui, 28°13'50.25"N, 107°13'11.70"E, 1500 m, 13–15. VIII. 2010, LM Wei, Q Dai and WP Cao leg. Paratypes: 2, same data as holotype (WLMWISAGC).

- **Diagnosis:** Fore femur without a preapical posterior dorsal excavation; tibia yellow but brown black at apical 2/3; tarsomeres brown black, without fine erect hairs. Hind femur with a distinct ventral keel and hind tibia without ventral keel. Tergite 1+2 with a pair of near "L" shaped pale brown hind marginal bands and a pair of darkish brown median strips; tergite 3 with a pair of near "L" shaped pale brown hind marginal bands and a pair of dark "L" shape spots; tergites 4 and 5 each with a pair of trapezoid-shaped black spots. Cercus with dorsal projection triangular; median gap conical in posterior view. In lateral view, basal inner projection of outer lobe with sclerotized apex branched; apical projection of inner lobe branched, inner one shorter than in outer one.
- **Description. Male:** Body length, 4.4 mm. Wing length, 3.6 mm.

Head all bristles and hairs black. Mostly black in ground colour, parafacial, gena and mouth area yellow and light grey yellow pruinose. Frontal vitta velvet black, reddish dark brown pruinose. Frons about 0.4 times head width. Vertex and ocellar tubercle; fronto-orbital

blackish grey-yellow pruinose; occiput densely grey yellow pruinose. Fronto-orbital plate narrow, with 5 pairs of moderate proclinate or reclinate and 1 pair of reclinate frontal bristles, the frontal bristle in a pair undeveloped. Antenna brownish black; arista dark yellow. Palpus brownish dark. Prementum dark brown, grey dusted. Thorax ground colour dark, the apical margin of scutellum yellow, postpronotal lobes dark and front of anepisternum brown, grey dusted. Basisternum brownish black shining marginally and its tongue-shaped anterior part shining brown. Scutum and scutellum densely grey yellow pruinose; scutum with 3 conspicuous dark brown longitudinal vittae, all of them start from the back of the neck, middle one slightly narrower than in paramedial ones, all of them reaching scutellum. Presutural acr in 5 rows. 2 strong proepisternal bristles, the top one is obviously much longer and bigger than the bottom one. 2 proepimeral hairs, upper one longer. Basal lateral scutellar hair is 1/3 longer than subbasal lateral bristle; a pair of apical bristles strong and long; discal bristle undeveloped; disc of scutellum with some 21 hairs.

### Legs Mainly Yellow. Fore leg

fore coxa yellow, femur black except yellow apically, with 1 preapical pv, without a preapical posterior dorsal excavation; tibia yellow but brown black at apical 2/3, without bristle except at apex; tarsomeres brown black, without fine erect hairs. Mid leg: yellow; coxa



brown; femur with 1 preapical pd; tibia with 1 short median p. Hind leg: yellow, coxa brown; femur reddish brown apically, with 1 apical d and a row of very short ad; tibia with 1 av, 1 ad and 1 pd; tarsomeres brown black, tarsomere 5 pale. Hind femur with a distinct ventral keel and hind tibia without ventral keel. Wing hyaline. Cross vein r-m is remarkably in front of discal cell. Calypters yellow. Halter yellow, knob white yellow. Abdomen ground colour yellow, undusted; tergite 1+2 with a pair of near "L" shaped pale brown hind marginal bands and a pair of darkish brown median strips; tergite 3 with a pair of near "L" shaped pale brown hind marginal bands and a pair of dark "L" shape spots; tergites 4 and 5 each with a pair of trapezoidal black spots.

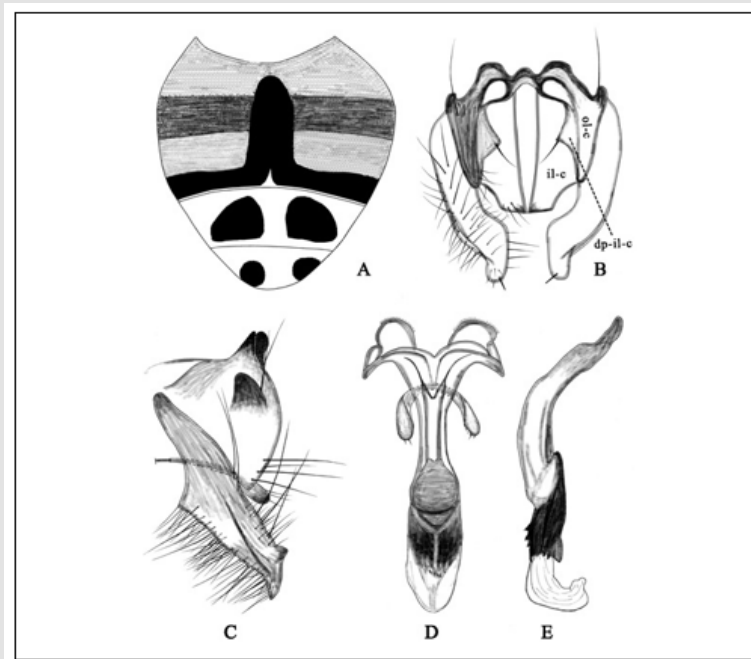
### Terminalia (Figures 5B–5E (3 Dissection))

when viewed posteriorly, cercus with the basal median projection of inner lobe arc shaped, which is almost flush with the apical margin of the basal inner projection of outer lobe; with dorsal projection triangular; median gap conical. In lateral view, basal inner projection of outer lobe with sclerotized apex branched; apical projection of inner lobe branched, inner one shorter than in outer one; surstylus curved, with apex blunt rounded (Figure 1C).

- **Female:** Unknown.
- **Distribution:** China (Guizhou: Suiyang).
- **Etymology:** This new species is named after its type locality – Kuankuoshui, Suiyang, Guizhou, China.
- **Remarks:** Closely related to *Atherigona* (Ac.) atritergita but can be separated from the latter by the following characters: Fore tarsomeres without fine erect hairs, hind femur with a distinct ventral keel; tergite 1+2 with a pair of near "L" shaped pale brown hind marginal bands and a pair of darkish brown median strips, tergite 3 with a pair of near "L" shaped pale brown hind marginal bands and a pair of dark "L" shape spots, tergites 4 and 5 each with a pair of trapezoidal black spots. On the contrary, *Atherigona* (Ac.) atritergita with fore tarsomeres absent of fine erect hairs, hind femur without a distinct ventral keel; tergite 1+2 and 3 each with an irregular trapezoid shaped spot, similarly, tergites 4 and 5 each with a pair of trapezoidal black spots but paler than in the former.

### *Atherigona* (Ac.) *Sichuana* sp. nov.

Figures 2A–2E, 9A & 9B.



**Figure 2:** *Atherigona* (Ac.) *sichuana* sp. nov. holotype A abdomen, dorsal view B, C cercus, posterior and lateral views D, E aedeagus, dorsal and lateral views.

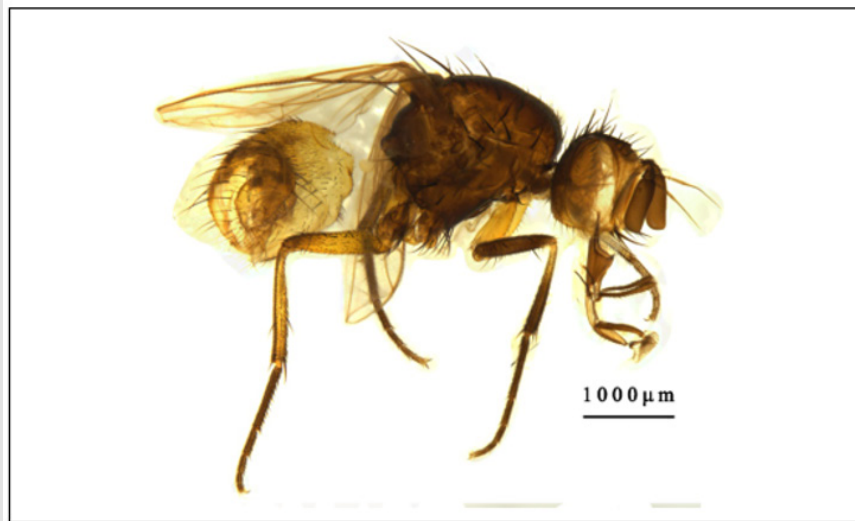


Figure 9: *Atherigona* (Ac.) *sichuana* sp. nov. paratype habitus, lateral view.

### Type Material. Holotype

CHINA, Sichuan, Deyang, Delong, 31°8'2.95"N, 104°24'13.00"E, 800-900m, 13 V. 2008, Zaihua Yang leg. Paratypes: 2, CHINA, Guizhou, Suiyang, Kuankuoshui, 28°13'50.25"N, 107°13'11.70"E, 1500 m, 13-15. VIII. 2010, LM Wei, Q Dai and WP Cao leg. (WLMWISAGC).

- **Diagnosis:** Fore femur without a preapical dorsal excavation; tibia yellow but brown black at apical 3/5, tarsomeres brown black, without fine erect hairs. Hind femur brownish black at apical 1/4 dorsally, tarsomeres 5 not pale; femur with an indistinct ventral keel and hind tibia without ventral keel. Tergite 1+2 with a small triangular brown median spot, tergite 3 with a brownish dark hind marginal band raised into a missile shape medially; tergites 4 and 5 each with a pair of round blackish brown spots. When viewed posteriorly, cercus with dorsal projection in triangle and median gap conical. In lateral view, basal inner projection of outer lobe with sclerotized apex branched, inner one conical and outer one rounded; apical projection of inner lobe with a long and thin rod-shaped projection innerly.

- **Description. Male:** Body length, 4.8 mm. Wing length, 4.4 mm.

Head all bristles and hairs black. Mostly black in ground colour, parafacial, gena and mouth area yellow and light grey yellow pruinose. Frontal vitta velvet black. Frons about 0.4 times width of head. Vertex and ocellar tubercle; fronto-orbital blackish grey-yellow pruinose; occiput densely yellowish grey pruinose. Fronto-orbital plate narrow, with 4 pairs of moderate proclinate or reclinate and 1 pair of reclinate frontal bristles, the frontal bristle in a pair undeveloped. Antenna brownish black; arista dark yellow. Palpus brownish dark. Prementum darkish brown, shining. Thorax ground colour dark, tip

of scutellum yellow, postpronotal lobes somewhat brownish, pleura more or less brownish, grey dusted. Basisternum brownish black shining marginally and its tongue-shaped anterior part shining brown. Scutum and scutellum densely grey yellow pruinose; scutum shining black medially, with 3 conspicuous dark brown longitudinal vittae, all of them start from the back of the neck, middle one slightly narrower than paramedial ones and not reaching scutellum but paramedial ones reaching scutellum. Presutural acr in 4 rows. 2 strong proepisternal bristles, the top one is obviously much longer and bigger than the bottom one, with an additional hair. 2 proepimeral hairs, upper one longer. Basal lateral scutellar hair is 1/3 longer than sub-basal lateral bristle; a pair of apical bristles strong and long; discal bristle undeveloped; disc of scutellum with some 12 hairs.

### Legs Mainly Yellow. Fore leg

fore coxa yellow, fore femur black except yellow apically, with 1 preapical pv, without a preapical dorsal excavation; tibia yellow but brown black at apical 3/5, without bristle except at apex; tarsomeres brown black, without fine erect hairs. Mid leg: yellow; coxa brown; femur slightly brownish apically, with 1 preapical pd; tibia with 1 short median p. Hind leg: yellow, coxa brown; femur brownish black at apical 1/4 dorsally, with 1 apical d and a row of very short ad; tibia with 1 av, 1 ad and 1 pd; tarsomeres brown black, tarsomeres 5 not pale. Hind femur with an indistinct ventral keel and hind tibia without ventral keel. Wing hyaline. Cross vein r-m is remarkably in front of discal cell. Calypters yellow. Halter yellow, knob white yellow. Abdomen ground colour yellow, undusted but tergite 3 at lateral side and tergites 4 and 5 thinly grey dusted; tergite 1+2 with a small triangular brown median spot; tergite 3 with a narrow brownish dark hind marginal band, on which a missile-shaped median spot is raised medially; tergites 4 and 5 each with a pair of round blackish brown spots.

### Terminalia (Figures 7B–7E (3 Dissection))

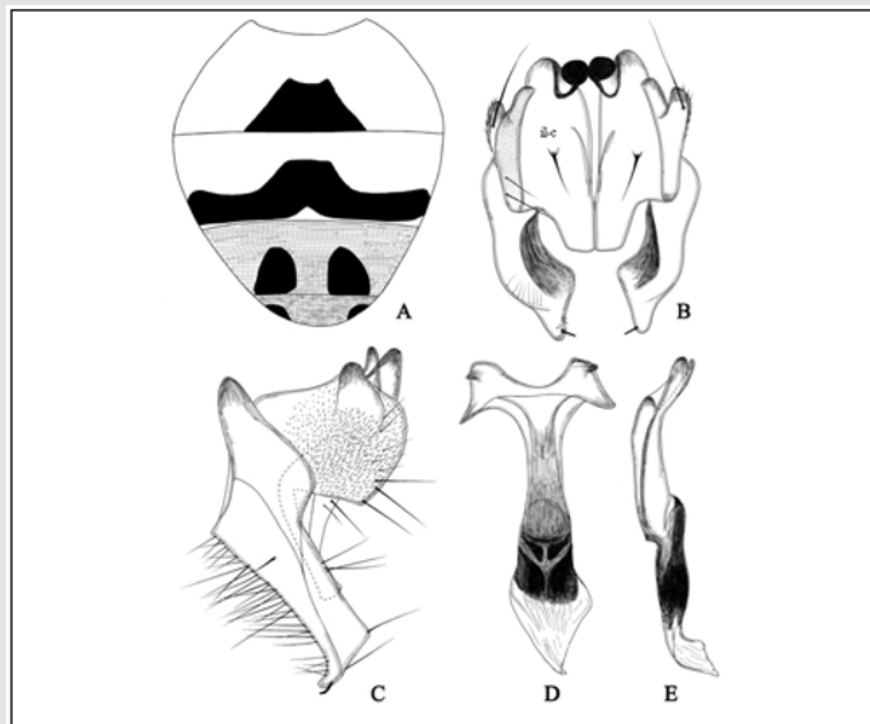
when viewed posteriorly, cercus with the basal median projection of inner lobe arc shaped, which is lower than in basal inner projection of outer lobe; a dorsal projection in triangle and median gap conical. In lateral view, basal inner projection of outer lobe with sclerotized apex branched, inner one conical and outer one rounded; apical projection of inner lobe short about 2 times as long as wide, with a long and thin rod-shaped projection innerly; surstylus straight, with apex conical (Figure 2C).

- **Female:** Unknown.
- **Distribution:** China (Sichuan: Deyang; Guizhou: Suiyang).
- **Etymology:** This new species is named after its type locality – Sichuan, China.

• **Remarks:** Closely related to *Atherigona* (Ac.) atritergita but can be separated from the latter by the following characters: Hind femur brownish black at apical 1/4 dorsally. Tergite 2 entirely covered with brownish dark transverse band, tergite 3 with a narrow brownish dark hind marginal band, on which a missile shaped median spot is raised; tergites 4 and 5 each with a pair of blackish brown spots, the former near trapezoidal and the latter rounded. Conversely, *Atherigona* (Ac.) atritergita with hind femur black in apical half, without a distinct ventral keel; tergite 1+2 and 3 each with an irregular trapezoid shaped spot, similarly, tergites 4 and 5 each with a pair of trapezoidal black spots but paler than in the former.

### *Atherigona* (Ac.) *Suiyangensis* sp. nov.

Figures 4A–4E, 10A & 10B.



Note: il-c - inner lobe of cercus.

**Figure 4:** *Atherigona* (Ac.) *suiyangensis* sp. nov. holotype A abdomen, dorsal view B, C cercus, posterior and lateral views D, E aedeagus, dorsal and lateral views.



**Figure 10:** *Atherigona* (Ac.) *suiyangensis* sp. nov. holotype A habitus, lateral view; B thorax and head, dorsal view.

### Type Material. Holotype

CHINA, Guizhou, Suiyang, Kuankuoshui, 28°13'50.25"N, 107°13'11.70"E, 1500 m, 13–15. VIII. 2010, LM Wei, Q Dai and WP Cao leg. (WLMWISAGC).

- **Diagnosis:** Fore femur without a preapical dorsal excavation; tibia yellow but brown black at apical 3/5, tarsomeres without fine erect hairs. Mid femur brown black on about apical 1/4. Hind femur and hind tibia each with a distinct ventral keel. Tergite 1+2 with a trapezoidal median spot; tergite 3 with a waved brownish dark hind marginal band; tergites 4 and 5 pale darkish brown, each with a pair of round black spots, the former near trapezoidal and the latter rounded. When viewed posteriorly, cercus with basal median projection of inner lobe in the shape of a pair of black globes, basal projection rounded; median gap narrow conical, closing apically. In lateral view, basal inner projection of outer lobe with apex branched, inner one conical and outer one triangular; apical projection of inner lobe very long, about 6 times as long as wide.
- **Description:** Male. Body length, 4.2 mm. Wing length, 3.6 mm.

Head all bristles and hairs black. Mostly black in ground colour, parafacial, gena and mouth area yellow and light grey yellow pruinose. Frontal vitta velvet black. Frons about 0.4 times width of head. Vertex and ocellar tubercle yellowish grey pruinose; fronto-orbital blackish grey pruinose; occiput grey yellow pruinose, tinged with blue-black. Fronto-orbital plate narrow, with 5 pairs of moderate proclinate or reclinate and 1 pair of reclinate frontal bristles, the frontal bristle in a pair undeveloped. Antenna entirely black; arista dark brown. Palpus dark. Prementum dark brown, undusted, shining. Thorax ground colour dark, the apical margin of scutellum yellow, postpronotal lobes dark, postalar callus dark, anepisternum hardly brownish anteriorly, grey dusted. Basisternum brownish black shining marginally and its tongue-shaped anterior part shining brown. Scutum and scutellum densely grey yellow pruinose, tinged with dark blue; scutum with 3 conspicuous dark brown longitudinal vittae, all of them start from the back of the neck, middle one slightly narrower than paramedial ones, all of them reaching scutellum. Presutural acr in 5 rows. 2 strong proepisternal bristles, the top one is obviously much longer and bigger than the bottom one, additional hairs-like weak bristle. 2 proepimeral hairs, upper one longer. Basal lateral scutellar hair about third of subbasal lateral bristle; pair of apical bristles strong and long; discal bristle undeveloped; disc of scutellum with some 13 hairs.

## Legs Mainly Yellow. Fore leg

fore coxa yellow, femur black except yellow apically, with 1 preapical pv, without a preapical dorsal excavation; tibia yellow but brown black at apical 3/5, without bristle except at apex; tarsomeres brown black, without fine erect hairs. Mid leg: yellow; coxa brown; femur brownish apically, with 1 preapical pd; tibia with 1 short median p. Hind leg: yellow, coxa brown; femur brown black about apical 1/4, with 1 preapical pd and a row of very short ad; tibia with 1 av, 1 ad and 1 pd; tarsomeres brown black, tarsomeres 4 and 5 darkish yellow to yellow. Hind femur and hind tibia each with a distinct ventral keel. Wing hyaline. Cross vein r-m is remarkably in front of discal cell. Calypters yellow. Halter yellow, knob white yellow. Abdomen ground colour yellow, undusted; tergite 1+2 with a trapezoidal median spot; tergite 3 with a waved brownish dark hind marginal band; tergites 4 and 5 pale darkish brown, each with a pair of round black spots, the former near trapezoidal and the latter rounded.

## Terminalia (Figures 4B–4E (1 Dissection))

When viewed posteriorly, cercus with basal median projection of inner lobe in the shape of a pair of black globes, which is markedly protruding from basal inner projection of outer lobe; inner lobe with basal projection rounded, somewhat higher than basal median projection of inner lobe; median gap narrow conical, closed apically. In lateral view, basal inner projection of outer lobe with apex branched, inner one conical and outer one triangular; apical projection of inner lobe very long, about 6 times as long as wide; surstylus mainly wide stripe like, with apex conical, curved upwards (Figure 4C).

- **Female:** Unknown.
- **Distribution:** China (Guizhou: Suiyang).

Etymology. This new species is named after its type locality – Kuankuoshui, Suiyang, Guizhou, China.

Remarks. Closely related to *Atherigona* (Ac.) seticauda but can be separated from the latter by the following characters: Tergite 1+2 with a trapezoidal median spot; tergite 3 with a waved brownish dark hind marginal band; tergites 4 and 5 pale darkish brown, each with a pair of round black spots, the former near trapezoidal and the latter rounded. Cercus without 3 pairs of long bristles posteriorly, Conversely, *Atherigona* (Ac.) seticauda with tergite 1+2 with a pair of sub-triangular spots; tergite 3 with median stripe and long ovate lateral spot, tergite 4 with same spot pattern as in tergite 3 but with smaller ovate lateral spot; cercus with 3 pairs of long bristles posteriorly.

## Acknowledgements

We are very grateful to Dr Pont AC, Oxford University Museum of Natural History for correcting the English and providing valuable advice.

## Additional Information

### Conflict of Interest

The authors have declared that no competing interests exist.

### Ethical Statement

No ethical statement was reported.

### Funding

This work was supported by the Project of the Guizhou Provincial Governor Fund of Talented Person for Excellent Science, Technology and Education (awarded to LM. Wei).

### Author Contributions

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### Data Availability

All of the data that support the findings of this study are available in the main text.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2025.63.009893

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