

Two new species and two new records of *Homidia* (Collembola, Entomobryidae) from China

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Abstract

Homidia, one of the largest genera of the family Entomobryidae, is widely distributed in China. To date, 46 species of this genus are present in China and account for approximately 60 % of all known species of the genus. In the present paper, two new species of *Homidia* are described from China: *H. acutus* sp. nov. and *H. changensis* sp. nov. The former is discriminated by the brown to blue-violet pigment present on whole dorsal body and by pointed tenent hairs. The latter is characterised by having only scattered traces of brown pigment on tergites, and by the special macrochaetal formula of coxae. Additionally, two known species of the genus, *H. linhaiensis* Shi, Pan & Qi, 2009 and *H. socia* Denis, 1929, are reported from Jiangxi Province for the first time, and some of their taxonomic characters are described. A key to the Chinese species of the genus is provided.

Keywords

Chaetotaxy, Entomobryinae, Jiangxi, taxonomy

Introduction

Homidia was established as a subgenus of *Entomobrya* by Börner (1906) based on the presence of inner spines at the base of the dens in adults. Denis (1929) considered the character significant enough to raise *Homidia* to generic level. The genus is also characterised by the presence of “eyebrow” macrochaetae on the anterior part of Abd. IV in adults, the absence of scales, and a bidentate mucro with the subapical tooth much larger than the apical one.

Colour pattern plays a key role in classification of *Homidia* because intraspecific variability is very low. However, some species, such as *H. sauteri*, *H. similis*, *H. sinensis*, and *H. socia*, are widespread and some intraspecific variability of colour pattern from different regions may be sometimes present. Chaetotaxy is also very useful in species identification, especially that of Abd. I, IV, and labium basis.

The first person to study the Chinese *Homidia* was the Frenchman J. R. Denis, who reported *Homidia sauteri* (Börner, 1909) from Yunnan Province in 1928. To date, 46 species have been described or reported from China among a total of 75 species worldwide (Bellinger et al. 1996–2022, Table 1). These species are mainly distributed in the eastern region of China, especially Zhejiang Province (Fig. 1).

Table I. Species checklist of *Homidia* recorded from China.

Species name	Distribution
<i>H. acutus</i> sp. nov.	Jiangxi*
<i>H. anhuiensis</i> Li & Chen, 1997	Anhui
<i>H. apimenta</i> Shi, Pan & Zhang, 2010	Fujian
<i>H. breviseta</i> Pan, 2022	Xizang
<i>H. changensis</i> sp. nov.	Jiangxi*
<i>H. chroma</i> Pan & Yang, 2019	Guangdong
<i>H. dianbaiensis</i> (Lin, 1985)	Guangdong
<i>H. emeiensis</i> Jia, Chen & Christiansen, 2004	Sichuan
<i>H. fascia</i> Wang & Chen, 2001	Jiangsu
<i>H. formosana</i> Uchida, 1943	Taiwan; Zhejiang
<i>H. hangzhouensis</i> Pan & Ma, 2021	Zhejiang
<i>H. hexaseta</i> Pan, Shi & Zhang, 2011	Zhejiang
<i>H. huashanensis</i> Jia, Chen & Christiansen, 2005	Shaanxi
<i>H. jordanai</i> Pan, Shi & Zhang, 2011	Zhejiang
<i>H. laha</i> Christiansen & Bellinger, 1992	Zhejiang
<i>H. latifolia</i> Chen & Li, 1999	Zhejiang
<i>H. leei</i> Chen & Li, 1997	Jiangxi
<i>H. lenisetra</i> Pan & Yang, 2019	Guangdong
<i>H. linhaiensis</i> Shi, Pan & Qi, 2009	Jiangxi*; Zhejiang
<i>H. maijiensis</i> Zhou & Ma, 2022	Gansu
<i>H. mediofascia</i> Shi, Pan & Bai, 2009	Shaanxi
<i>H. nigrifascia</i> Ma & Pan, 2017	Guizhou
<i>H. nigrocephala</i> Uchida, 1943	Taiwan
<i>H. obliquistria</i> Ma & Pan, 2017	Guizhou
<i>H. pentachaeta</i> Li & Christiansen, 1997	Jiangsu
<i>H. phjongjangica</i> Szeptycki, 1973	Jilin; Zhejiang
<i>H. polyseta</i> Chen, 1998	Hunan
<i>H. pseudofascia</i> Pan, Zhang & Li, 2015	Jiangsu
<i>H. pseudosinensis</i> Shi & Pan, 2012	Fujian
<i>H. qimenensis</i> Yi & Chen, 1999	Anhui; Fujian; Guangxi; Jiangxi; Zhejiang
<i>H. quadriseta</i> Pan, 2018	Zhejiang
<i>H. quadrimaculata</i> Pan, 2015	Zhejiang
<i>H. sauteri</i> (Börner, 1909)	Shanxi; Yunnan; Zhejiang
<i>H. sichuanensis</i> Jia, Zhang & Jordana, 2010	Sichuan; Guangdong; Guangxi; Guizhou; Xizang
<i>H. similis</i> Szeptycki, 1973	Zhejiang
<i>H. sinensis</i> Denis, 1929	Beijing; Fujian; Yunnan; Zhejiang; Xizang
<i>H. socia</i> Denis, 1929	Anhui; Fujian; Guangxi; Jiangsu; Jiangxi*; Taiwan; Zhejiang
<i>H. taibaiensis</i> Yuan & Pan, 2013	Shaanxi

Species name	Distribution
<i>H. tiantaiensis</i> Chen & Lin, 1998	Zhejiang
<i>H. tibetensis</i> Chen & Zhong, 1998	Xizang
<i>H. transitoria</i> Denis, 1929	Fujian
<i>H. triangulimacula</i> Pan & Shi, 2015	Zhejiang
<i>H. unichaeta</i> Pan, Shi & Zhang, 2010	Zhejiang
<i>H. wanensis</i> Pan & Ma, 2021	Anhui
<i>H. xianjuensis</i> Wu & Pan, 2016	Zhejiang
<i>H. yandangensis</i> Pan, 2015	Zhejiang
<i>H. zhangi</i> Pan & Shi, 2012	Zhejiang
<i>H. ziguiensis</i> Jia, Chen & Christiansen, 2003	Hubei

Notes: * described or reported in this paper.



Figure 1. Distribution of all Chinese species of *Homidia* (the number in each region represents the number of the species reported from this province). Scale bar: 1000 km.

Materials and methods

Specimens were collected with an aspirator and stored in 99% alcohol. They were mounted on glass slides in Marc André II solution, and were studied with a Leica DM2500 phase contrast microscope. Photographs were taken with a Leica DFC300

FX digital camera mounted on the microscope and a ZEISS Gemini SEM 300. They were enhanced with Photoshop CS2 (Adobe Inc.). The nomenclature of the dorsal macrochaetotaxy of head and interocular chaetae are described following Szeptycki (1973) and Mari Mutt (1986). Labial chaetae are designated following Gisin (1964) and tergal chaetae of the body after Szeptycki (1979).

Abbreviations

Abd	abdominal segment;
Ant	antennal segment;
asl	above sea level;
mac	macrochaeta(e);
ms	specialised microchaeta(e);
NTU	Nantong University;
sens	specialised ordinary chaeta(e);
Th	thoracic segment.

Taxonomic account

Homidia acutus sp. nov.

<https://zoobank.org/C2B263A9-3D3D-4BEE-A1AF-2B04559281E6>

Figs 2–40, Table 2

Type material. *Holotype.* 1♀ on slide, CHINA, Jiangxi Province, Pingxiang City, Luxi County, Gate of Wugong Mountain, 27°29'27"N, 114°07'33"E, 393 m asl, sample number 1229, collected by Y-T Ma, 7-XI-2020, deposited in NTU. *Paratypes.* 3♀ on slides, same data as holotype.

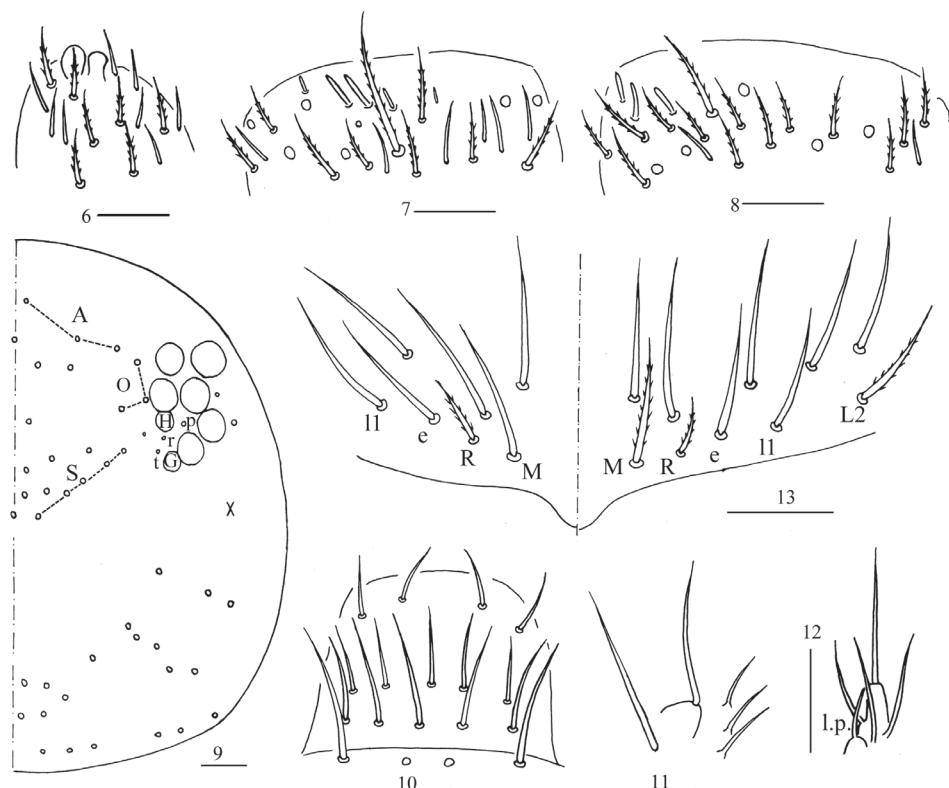
Descriptions. Size. Body length up to 2.05 mm.

Colouration. Ground colour pale white to pale yellow. Eye patches dark blue. Brown to blue-violet pigment present on whole dorsal body, antennae, legs, ventral tube, and manubrium. Some unpigmented irregular stripes or spots present on dorsal side of body (Figs 2–5).

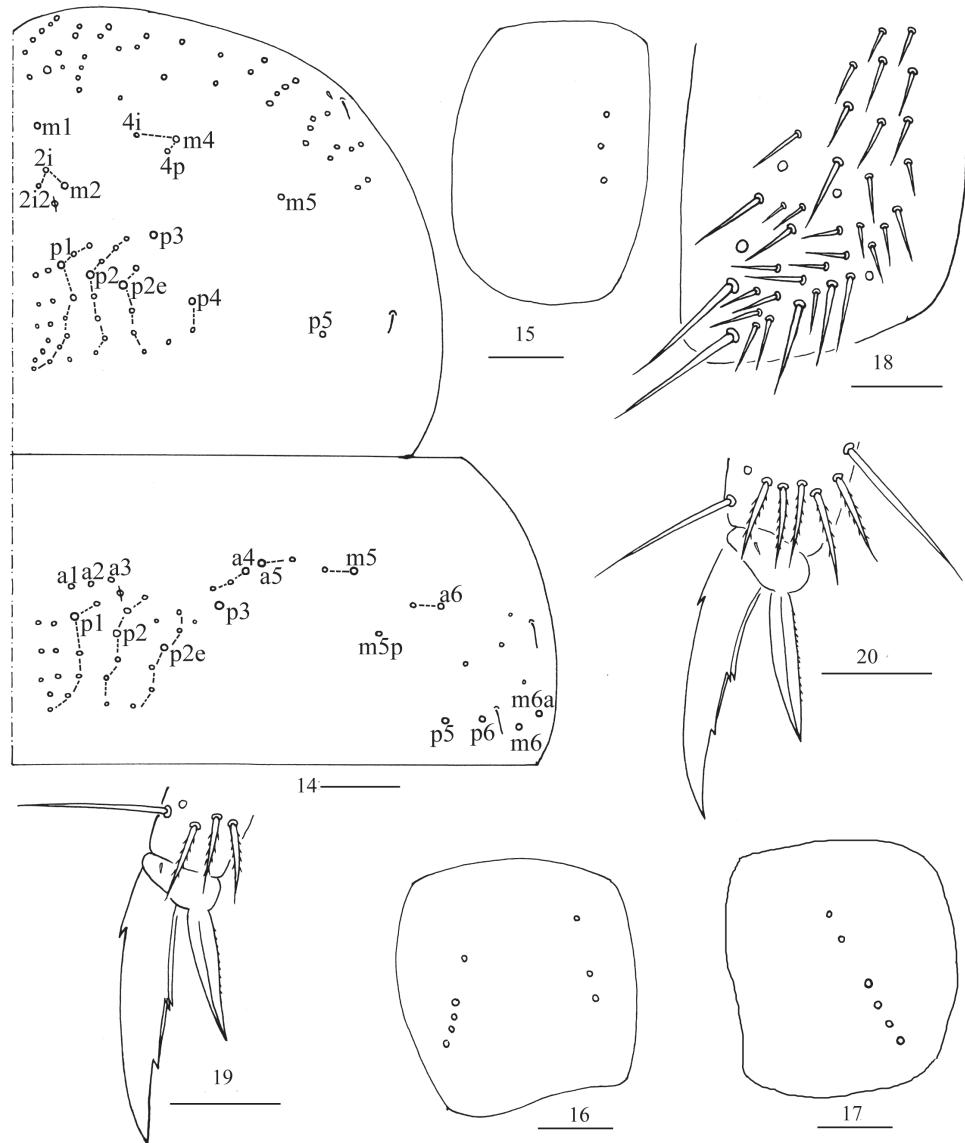
Head. Antenna 0.46–0.58× body length; antennal segment ratio I: II: III: IV = 1: 1.35–1.67: 1.20–1.33: 1.88–1.93. Apical bulb of Ant. IV bilobed (Fig. 6). Ant. III organ with two rod-like chaetae (Fig. 7). Ant. II with three distal rod-like chaetae (Fig. 8). Eyes 8 + 8, G and H smaller than others; interocular chaetae with p, r, and t. Dorsal cephalic chaetotaxy with three antennal (A), three ocellar (O) and five sutural (S) mac (Fig. 9). Labral chaetae as 4/5, 5, 4, all smooth; labral papillae absent (Fig. 10). Basal chaeta of maxillary outer lobe thin, subequal to apical one; sublobal plate with three smooth chaeta-like processes (Fig. 11). Lateral process (l.p.) of labial papilla E differentiated, as thick as normal chaeta, with tip almost reaching apex of papilla E (Fig. 12). Chaetal formula of labial base as MRel₁L₂, chaetae e and l₁ smooth, others ciliate, M of one side smooth in one individual, R/M as 0.45–0.60 (Fig. 13).



Figures 2–5. Habitus of *Homidia acutus* sp. nov. **2** lateral view **3, 4** dorsal view **5** ventral view. Scale bars: 500 µm.

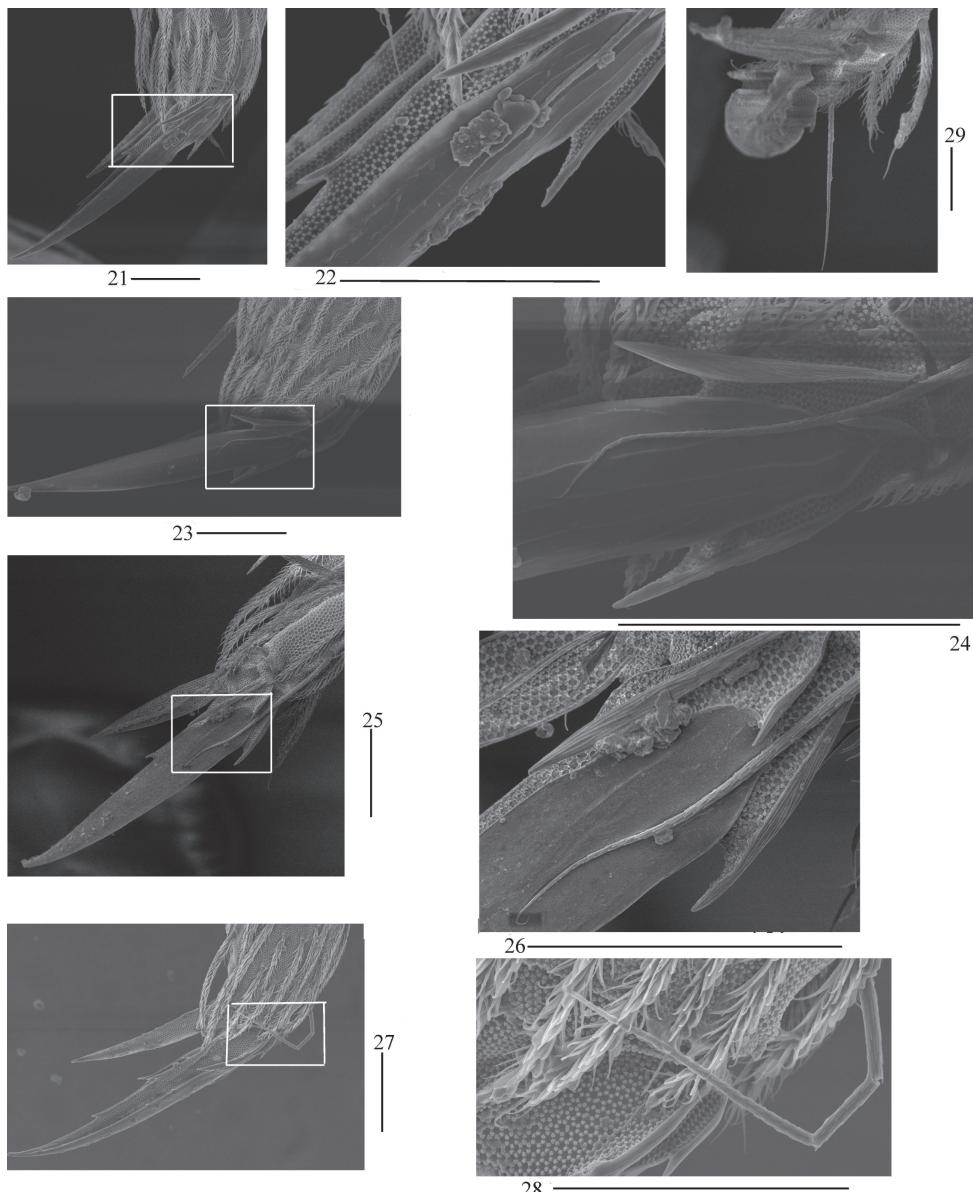


Figures 6–13. *Homidia acutus* sp. nov. **6** apex of Ant. IV **7** Ant. III organ **8** distal Ant. II **9** dorsal chaetotaxy of head **10** labrum **11** maxillary palp and outer lobe **12** labial palp E **13** labial base. Scale bars: 20 µm.



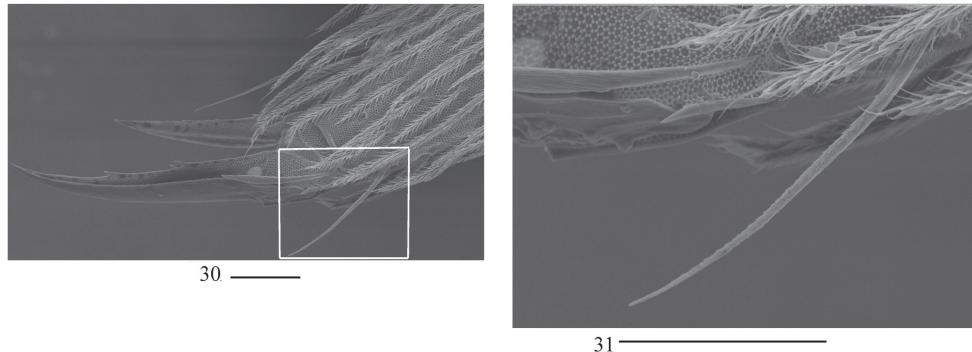
Figures 14–20. *Homidia acutus* sp. nov. **14** cchaerotaxy of Th. II–III **15–17** coxal chaerotaxy of fore, middle and hind leg **18** trochanteral organ **19, 20** fore and hind foot complex. Scale bar: 50 µm (**14**); 20 µm (**15–20**).

Thorax. Th. II with four medio-medial (m₁, m₂, m_{2i}, m_{2i2}), three medio-sublateral (m₄, m_{4i}, m_{4p}), 35–38 posterior mac, one ms and two sens (ms antero-internal to sens). Th. III with 40–49 mac and two sens (Fig. 14). Pseudopores on coxae not clearly seen; coxal macrochaetal formula as 4/4+1, 3/4+2 (Figs 15–17). Trochanteral organ with 40 smooth chaetae (Fig. 18). All tenant hairs pointed and



Figures 21–29. SEM photomicrographs of *Homidia acutus* sp. nov. **21, 23, 25** fore foot complex of three individuals **22, 24, 26** magnifications of white rectangles of **21, 23, 25** respectively **27, 29** middle foot complex of two individuals **28** magnification of white rectangle of **27**. Scale bars: 20 μ m.

shorter than inner edge of unguis. Unguis with three inner teeth, basal pair located at 0.39–0.42 distance from base of inner edge of unguis, distal unpaired tooth at 0.64–0.70 distance from base; unguiculus lanceolate, outer edge slightly serrate (Figs 19–31).



Figures 30, 31. SEM photomicrographs of *Homidia acutus* sp. nov. **30** hind foot complex **31** magnification of white rectangle of **30**. Scale bars: 20 μm .

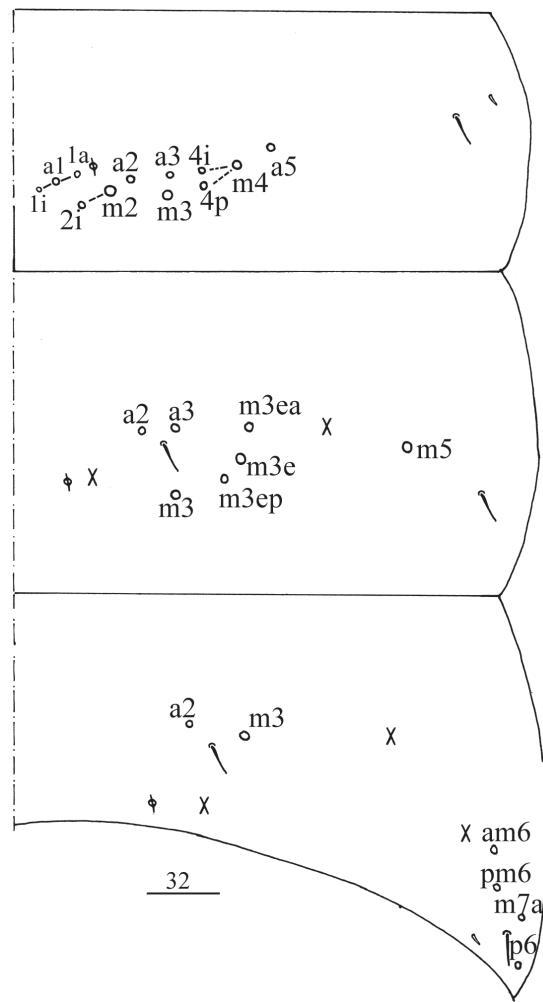


Figure 32. Chaerotaxy of Abd. I-III of *Homidia acutus* sp. nov. Scale bar: 50 μm .

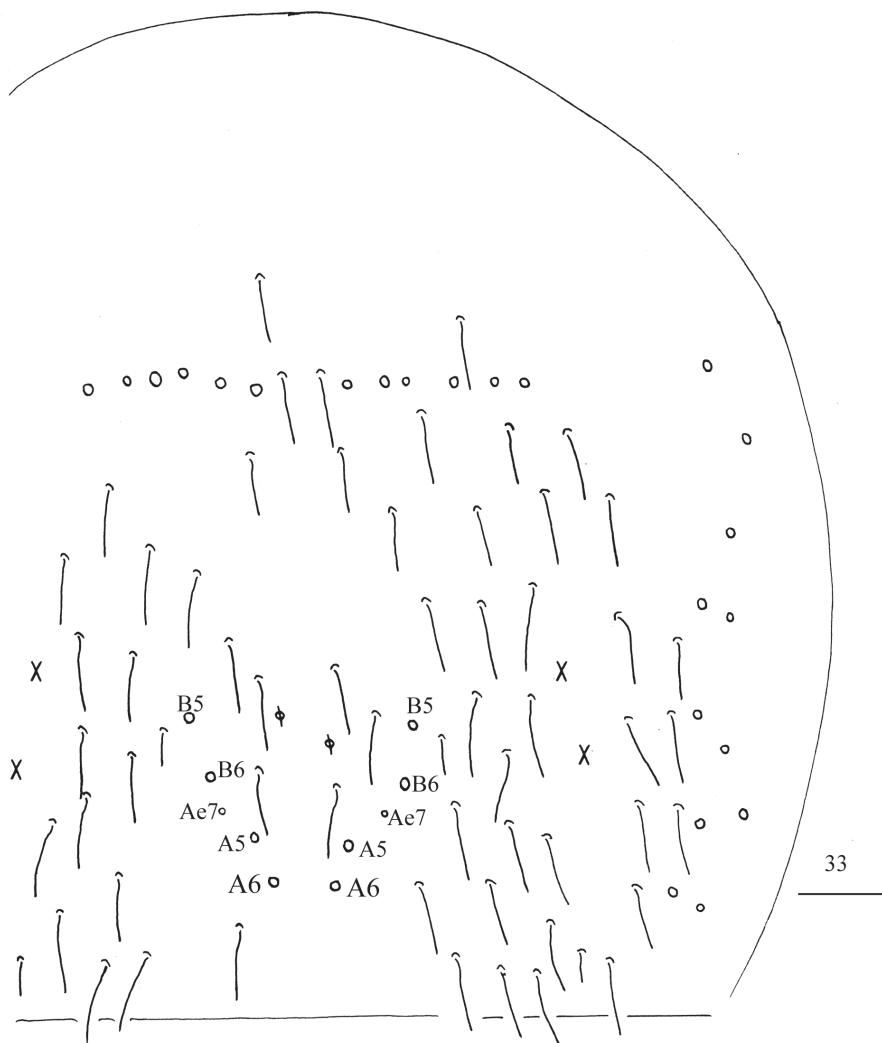
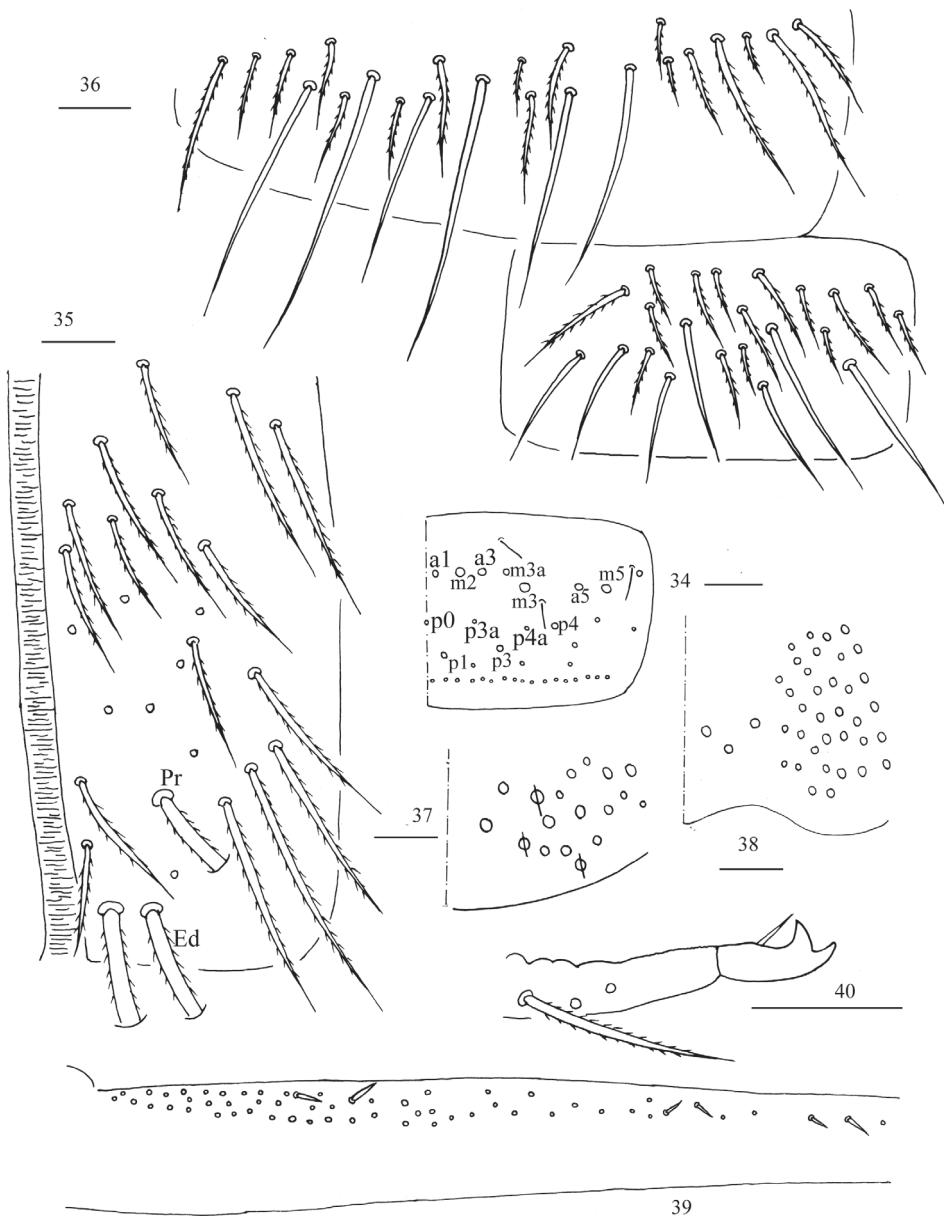


Figure 33. Chaetotaxy of Abd. IV of *Homidia acutus* sp. nov. Scale bar: 50 μm .

Abdomen. Range of Abd. IV length as 5.00–7.50× as dorsal axial length of Abd. III. Abd. I with 11 or 12 (a1a, a1–3, a5, m2–4, m2i, m4i, m4p, a1i sometimes present) mac, ms antero-external to sens. Abd. II with six (a2, a3, m3, m3e, m3ea, m3ep) central, one (m5) lateral mac and two sens. Abd. III with two (a2, m3) central and four (am6, pm6, m7a, p6) lateral mac, one ms and two sens (Fig. 32). Abd. IV with two normal sens and approximately half length of elongate sens; anteriorly with six mac arranged in irregular transverse row, posteriorly with five central mac (A5, A6, B5, B6, Ae7), laterally with 12 or 13 mac (Fig. 33). Abd. V with three sens, middle one posterior to m3 (Fig. 34). Anterior face of ventral tube with 27–32 ciliate chaetae, 3+3 of them as mac, line connecting proximal (Pr) and external-distal (Ed) mac oblique



Figures 34–40. *Homidia acutus* sp. nov. 34 chaetotaxy of Abd. V 35 anterior face of ventral tube 36 posterior face and lateral flap of ventral tube 37 manubrial plaque 38 ventro-apical part of manubrium 39 proximal section of dens (circles also representing spines) 40 mucro. Scale bars: 20 µm.

to median furrow (Fig. 35); posterior face with six distal smooth and numerous ciliate chaetae; lateral flap with seven smooth and 10–15 ciliate chaetae (Fig. 36). Manubrial plate dorsally with 13–15 ciliate chaetae and three pseudopores (Fig. 37); ventrally

Table 2. Comparison between *H. acutus* sp. nov. and *H. zhangi*.

Characters	<i>H. acutus</i> sp. nov.	<i>H. zhangi</i>
Tip of tenent hairs	pointed	clavate
Mac m5 on Th. II	present	absent
Centro-posterior mac on Abd. IV	5 (A5, A6, B5, B6, Ae7) 3(4) (A6, B6, Ae7. B5 sometimes absent)	B5 sometimes absent
Inner teeth on unguis	3	4
Relative position of ms to sens on Abd. I	antero-external	antero-internal
Relative position of middle sens to m3 on Abd. V	postero-external	antero-external

with 32–38 ciliate chaetae on each side (Fig. 38). Dens with 32–59 smooth inner spines (Fig. 39). Mucro bidentate with subapical tooth larger than apical one; tip of basal spine reaching apex of subapical tooth; distal smooth section of dens almost equal to mucro in length (Fig. 40).

Ecology. In the leaves litter of *Phyllostachys edulis*.

Etymology. The name of the species is derived from the Latin *acutus* = pointed, which refers to the tip of tenent hairs.

Remarks. The new species is characterised by pointed tip of tenent hairs and this character can be used to distinguish it from all known species of *Homidia*. It is similar to *H. zhangi* Pan & Shi, 2012 in colour pattern and labium, but there are some differences between them, such as tenent hairs, posterior chaetotaxy of Abd. IV, and other characters. The detailed character comparisons are listed in Table 2.

Homidia changensis sp. nov.

<https://zoobank.org/7A88BCD3-07D5-40B4-8E44-BE1F21AD6FC8>

Figs 41–64, Table 3

Type material. Holotype. 1♀ on slide, CHINA, Jiangxi Province, Nanchang City, Xinjian District, Jiuxi, 28°47'56"N, 115°45'11"E, 168 m asl, sample number 1243, collected by Y-T Ma, 12-XI-2020, deposited in NTU. **Paratypes.** 2♀ on slides, same data as holotype.

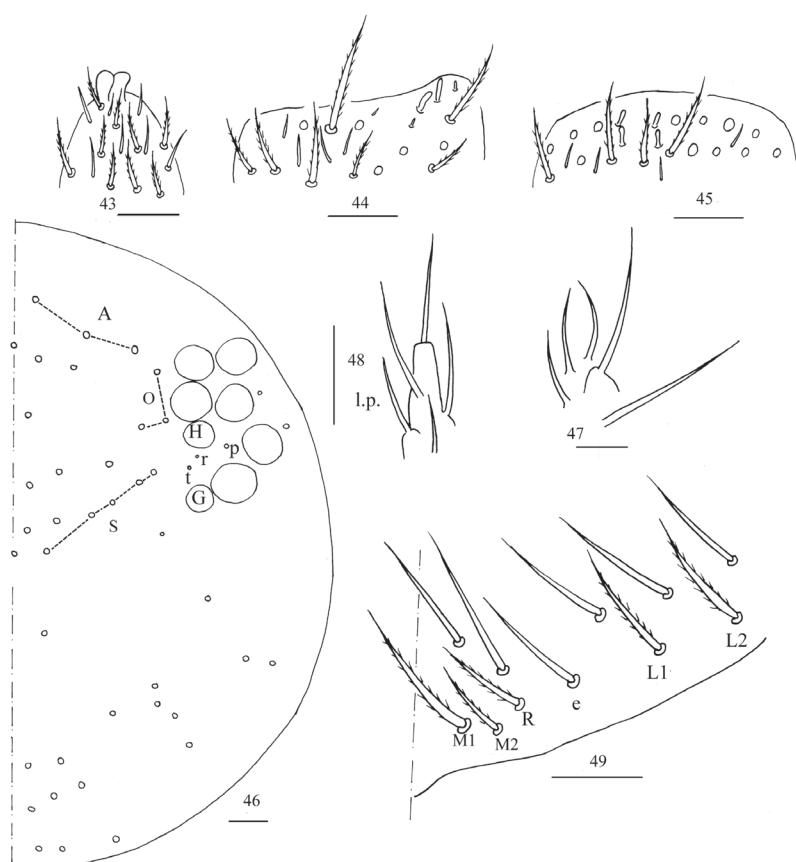
Description. Size. Body length up to 2.33 mm.

Colouration. Ground colour yellow. Ant. II–IV and distal part of Ant. I brown. Eye patches dark blue. Coxae, tibiotarsi, posterior part of Abd. IV and Abd. V with scattered brown pigment (Figs 41, 42).

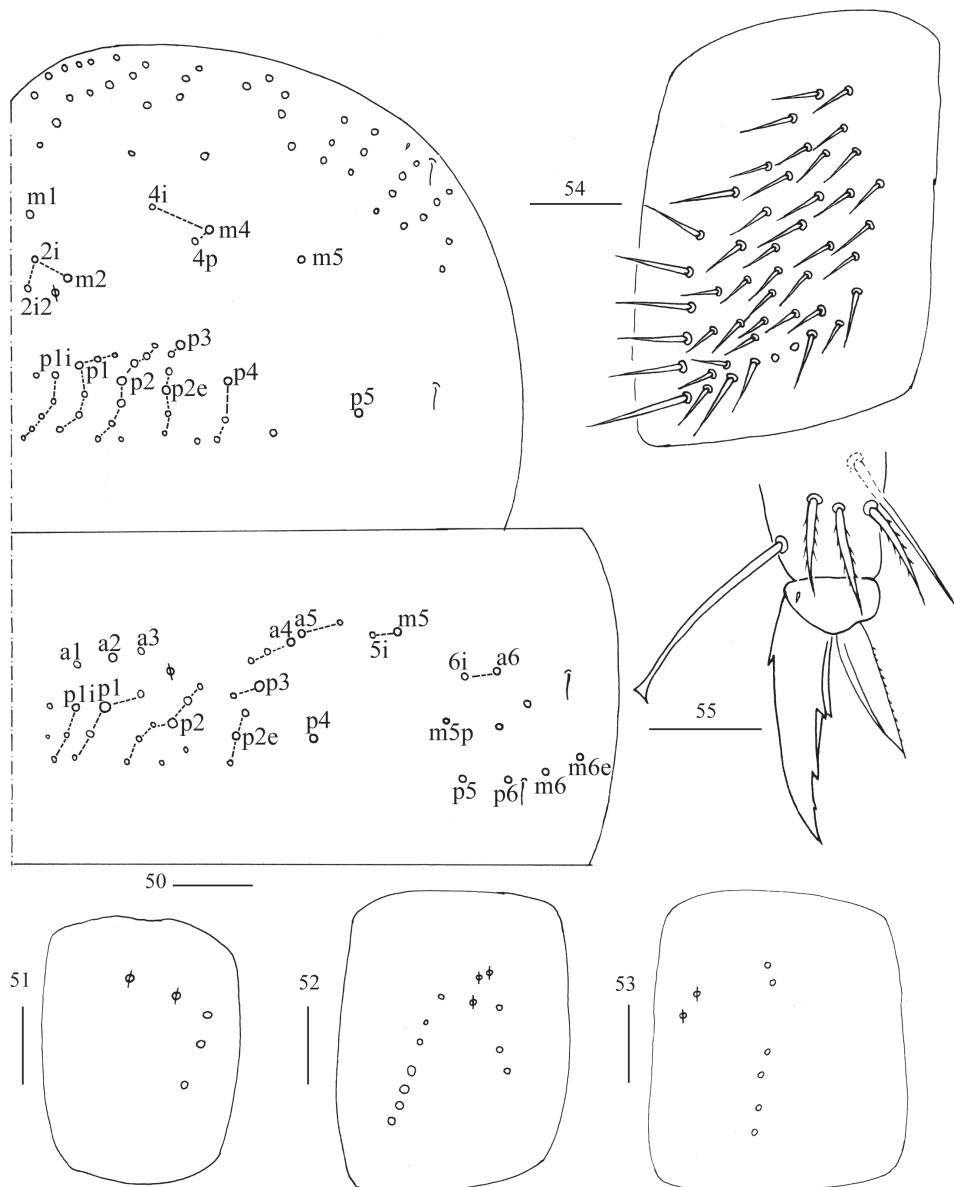
Head. Antenna 0.50–0.57× body length; antennal segment ratio I: II: III: IV = 1: 1.33–1.50: 1.17–1.30: 1.90–2.00. Apical bulb of Ant. IV bilobed (Fig. 43). Ant. III organ with two rod-like chaetae (Fig. 44). Ant. II with four distal rod-like chaetae (Fig. 45). Eyes 8 + 8, G and H smaller than others; interocular chaetae with p, r, and t. Dorsal cephalic chaetotaxy with three antennal (A), three ocellar (O) and five sutural (S) mac (Fig. 46). Basal chaeta of maxillary outer lobe thin, subequal to apical one; sublobal plate with three smooth chaeta-like processes (Fig. 47). Lateral process (l.p.) of labial papilla E differentiated, as thick as normal chaeta, with tip almost reaching



Figures 41, 42. Habitus of *Homidia changensis* sp. nov. Scale bars: 500 µm.



Figures 43–49. *Homidia changensis* sp. nov. **43** apex of Ant. IV **44** Ant. III organ **45** distal Ant. II **46** dorsal chaetotaxy of head **47** maxillary palp and outer lobe **48** labial palp E **49** labial base. Scale bars: 20 µm.



Figures 50–55. *Homidia changensis* sp. nov. **50** chaetotaxy of Th. II–III **51–53** coxal chaetotaxy of fore, middle and hind leg **54** trochanteral organ **55** hind foot complex. Scale bar: 50 µm (**50**); 20 µm (**51–55**).

apex of papilla E (Fig. 48). Chaetal formula of labial base as $M_1 M_2 ReL_1 L_2$, chaeta e smooth, others ciliate, R/M_1 as 0.63–0.70 (Fig. 49).

Thorax. Th. II with four medio-medial (m₁, m₂, m_{2i}, m_{2i2}), three medio-sublateral (m₄, m_{4i}, m_{4p}), 32–38 posterior mac, one ms and two sens (ms antero-internal

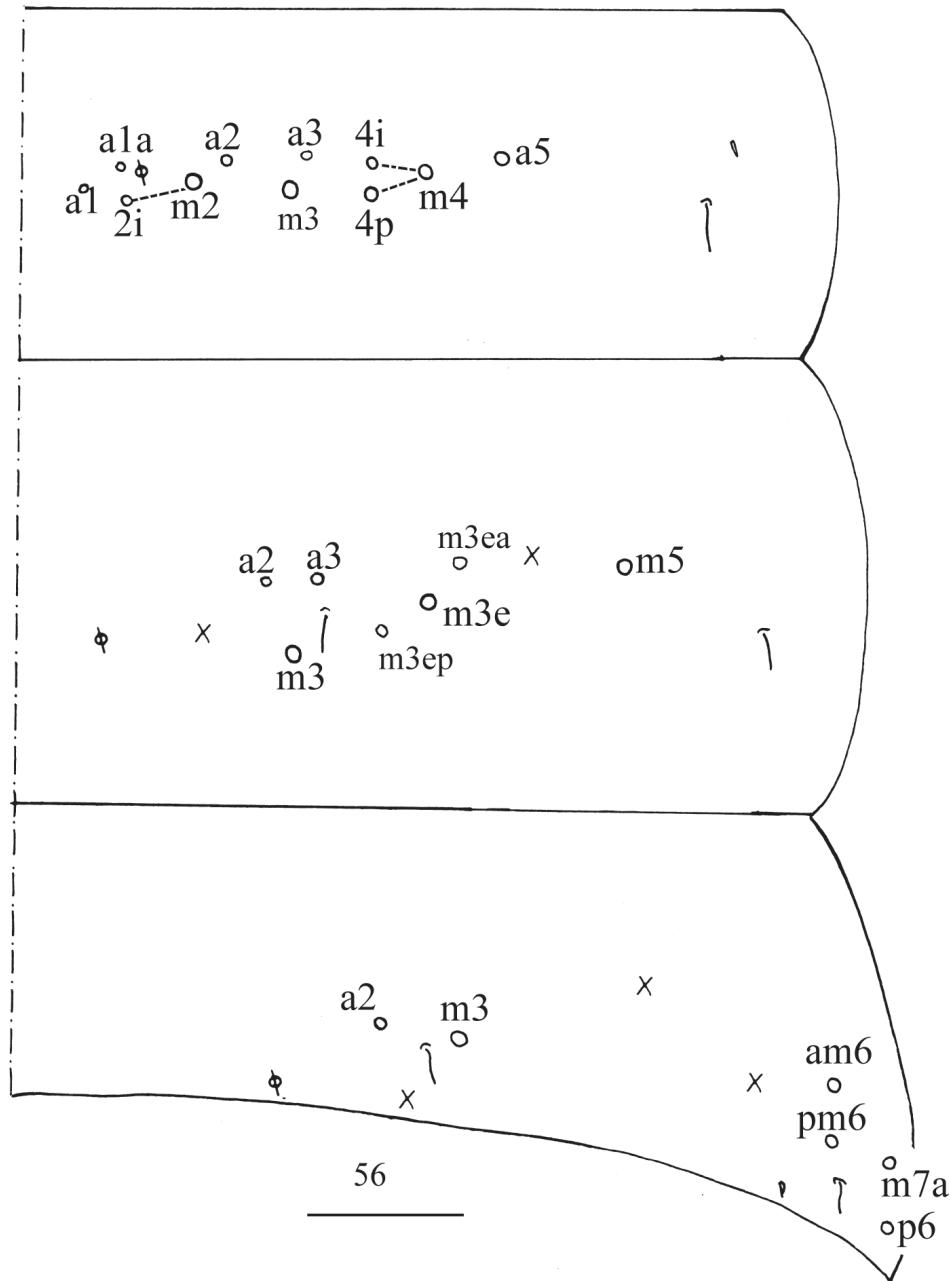


Figure 56. Chaetotaxy of Abd. I–III of *Homidia changensis* sp. nov. Scale bar: 50 μm .

to sens). Th. III with 38–47 mac and two sens (Fig. 50). Pseudopores on coxa I–III as 2, 3, 2, respectively; coxal macrochaetal formula as 3/4+3(4), 3/4+2 (Figs 51–53). Trochanteral organ with 45–48 smooth chaetae (Fig. 54). Tenent hairs clavate and

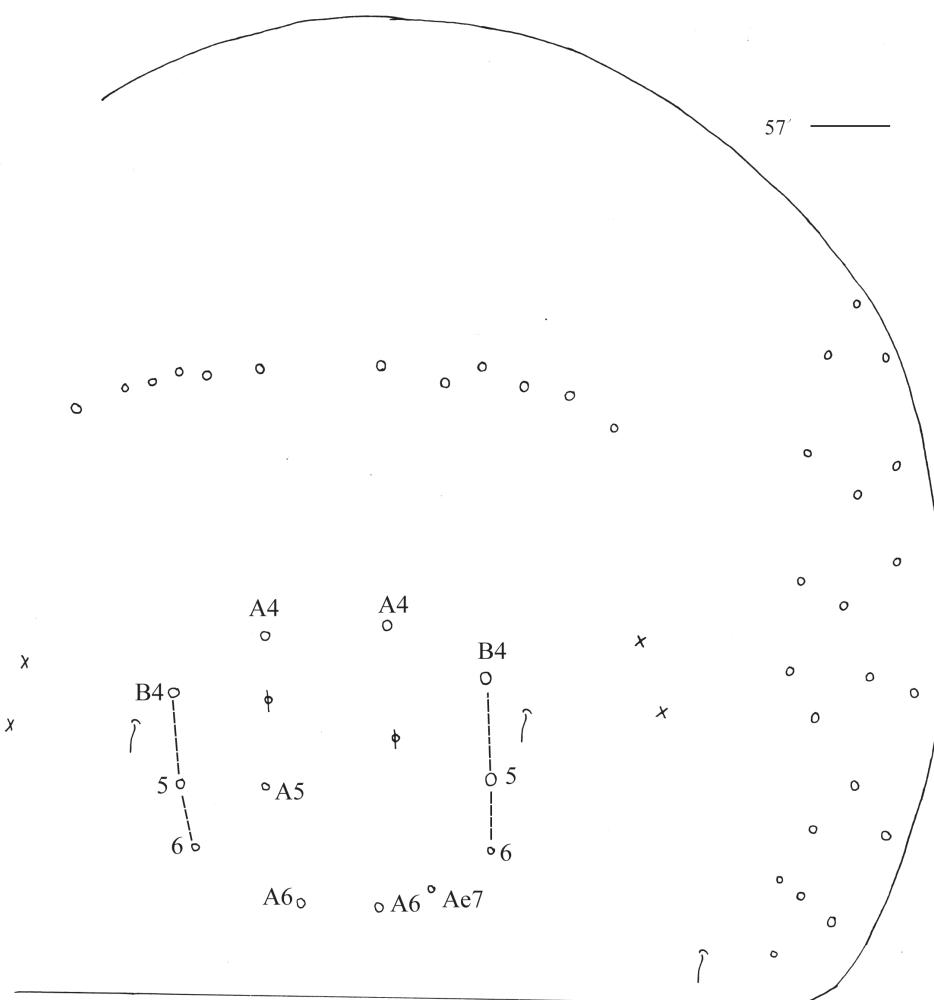
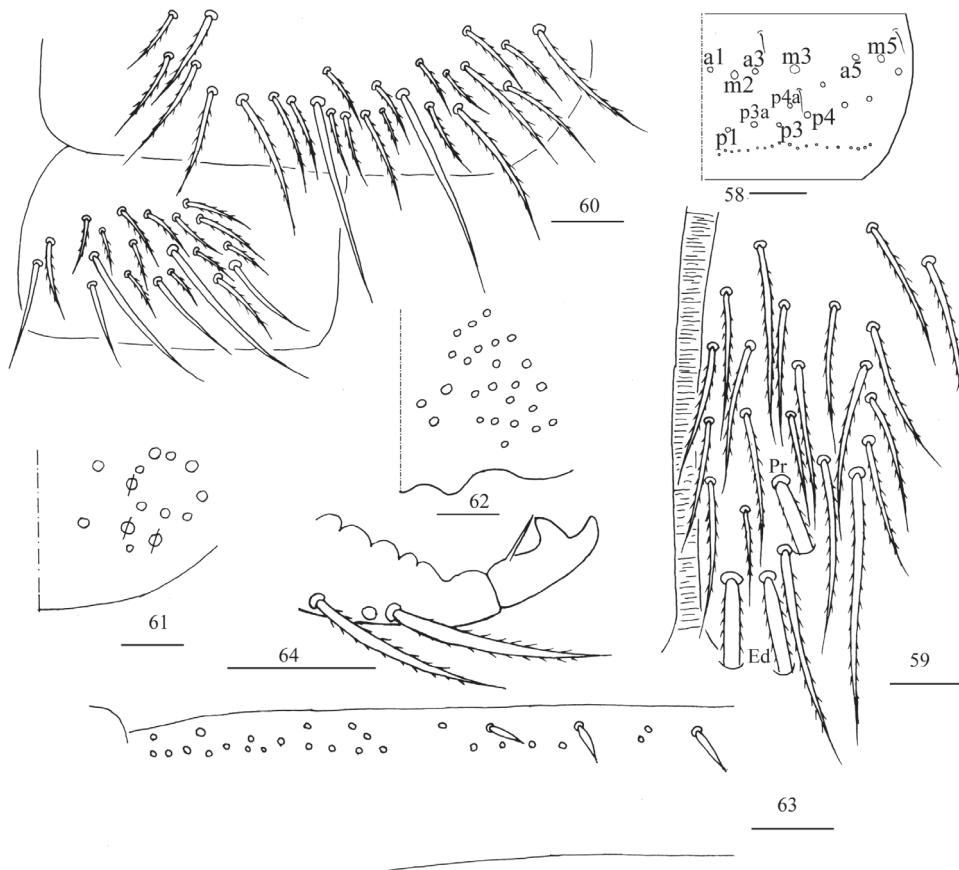


Figure 57. Chaetotaxy of Abd. IV of *Homidia changensis* sp. nov. Scale bar: 50 μm .

almost equal to inner edge of unguis. Unguis with four inner teeth, basal pair located at 0.31–0.41 distance from base of inner edge of unguis, distal unpaired teeth at 0.63–0.71 and 0.83–0.84 distance from base; unguiculus lanceolate, outer edge slightly serrate (Fig. 55).

Abdomen. Range of Abd. IV length as 6.03–10.40× as dorsal axial length of Abd. III. Abd. I with 11 (a_{1a}, a_{1–3}, a₅, m_{2–4}, m_{2i}, m_{4i}, m_{4p}) mac, ms antero-external to sens. Abd. II with six (a₂, a₃, m₃, m_{3e}, m_{3ea}, m_{3ep}) central, one (m₅) lateral mac and two sens. Abd. III with two (a₂, m₃) central and four (am₆, pm₆, m_{7a}, p₆) lateral mac, one ms and two sens (Fig. 56). Abd. IV with two normal sens; anteriorly with six or seven mac arranged in irregular transverse row, posteriorly with 5–7 (A₄, A₆, B_{4–6}, A₅ and Ae₇ sometimes present) central mac, laterally with 20–22 mac (Fig. 57).



Figures 58–64. *Homidia changensis* sp. nov. **58** chaetotaxy of Abd. V **59** anterior face of ventral tube **60** posterior face and lateral flap of ventral tube **61** manubrial plaque (a circle with a slash means a pseudopore) **62** ventro-apical part of manubrium **63** proximal section of dens (circles also representing spines) **64** mucro. Scale bars: 20 μm .

Abd. V with three sens, middle one posterior to m3 (Fig. 58). Anterior face of ventral tube with 24–27 ciliate chaetae, 3+3 of them as mac, line connecting proximal (Pr) and external-distal (Ed) mac oblique to median furrow (Fig. 59); posterior face with two or four distal smooth and numerous ciliate chaetae; lateral flap with six smooth and 14–16 ciliate chaetae (Fig. 60). Manubrial plaque dorsally with 11 or 12 ciliate chaetae and 2–4 pseudopores (Fig. 61); ventrally with 25–28 ciliate chaetae on each side (Fig. 62). Dens with 16–28 smooth inner spines (Fig. 63). Mucro bidentate with subapical tooth larger than apical one; tip of basal spine reaching apex of subapical tooth; distal smooth section of dens shorter than mucro in length (Fig. 64).

Ecology. In the leaves litter of *Phyllostachys edulis*.

Etymology. Named after its locality: Nanchang City, which is abbreviated as Chang.

Table 3. Comparison between *H. changensis* sp. nov. and similar species.

Characters	<i>H. changensis</i> sp. nov.	<i>H. huashanensis</i>	<i>H. jordanai</i>	<i>H. unichaeta</i>	<i>H. koreana</i>
Ground colour	yellow	hazel	pale yellow	pale to yellowish	brown
Length ratio of antenna to body	0.50–0.57	0.67	1.00	0.80–1.00	unknown
Chaetal formula of labial base	M ₁ M ₂ ReL ₁ L ₂	MRE(e)L ₁ L ₂	MReL ₁ L ₂	MRel ₁ L ₂	MReL ₁ L ₂
Chaetae a1, a1a on Abd. I	present	present	absent	a1 rarely present, a1a absent	absent
Central mac on Abd. III	2	2	1	2	2
Centro-posterior mac on Abd. IV	5–7	7–9	2(3)	1	6
Dental spines	16–28	80–114	20–40	19–23	40–50

Remarks. The new species is characterised by its colour pattern and coxal macrochaetotaxy, and can be easily distinguished from all known species of *Homidia*. It is similar to the Chinese species *H. huashanensis* Jia, Chen & Christiansen, 2005, *H. jordanai* Pan, Shi & Zhang, 2011, and *H. unichaeta* Pan, Shi & Zhang, 2010 and the Korean species *H. koreana* Lee & Lee, 1981 in colour pattern, but significant differences exist between these species, such as chaetotaxy on Abd. I and IV and number of dental spines (Table 3).

Homidia linhaiensis Shi, Pan & Qi, 2009

Figs 65–75

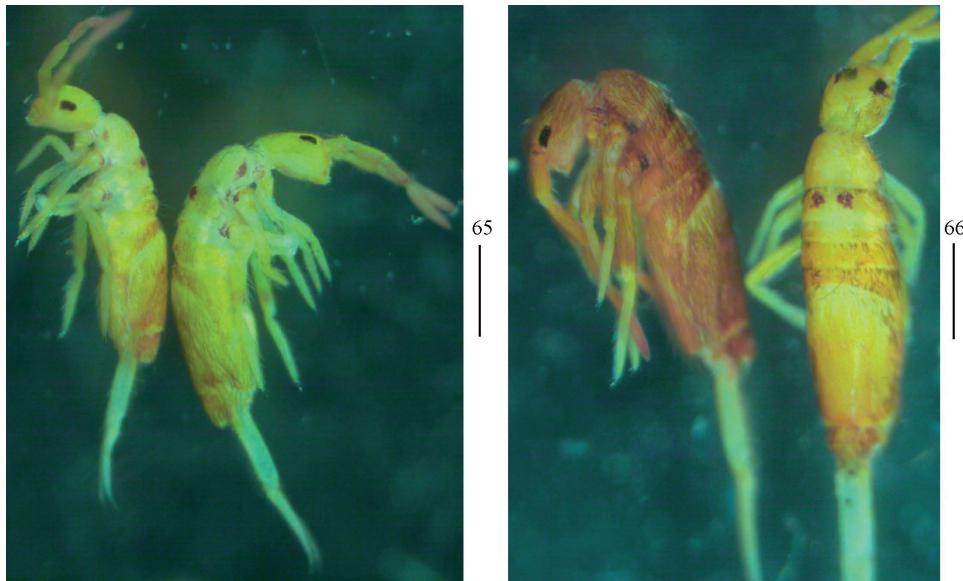
Homidia linhaiensis Shi, Pan & Qi, 2009: 63.

Examined specimens. 2♀ on slides, CHINA, Jiangxi Province, Pingxiang City, Luxi Town, Shankouyan Park, 27°36'55"N, 114°01'39"E, 144 m asl, sample number 1231, collected by Y-T Ma, 7-XI-2020, in the rotten leaves of *Salix babylonica*; 5♀ on slides, CHINA, Jiangxi Province, Nanchang City, Xinjian District, Shizifeng Park, 28°48'48"N, 115°43'15"E, 193 m asl, sample number 1241, collected by Y-T Ma, 12-XI-2020, in the leaves litter of *Phyllostachys edulis*; 2♀ on slides, CHINA, Jiangxi Province, Shangrao City, Yunbifeng Park, 28°27'47"N, 117°58'55"E, 101 m asl, sample number 1246, collected by Y-T Ma, 14-XI-2020, in the leaves litter of *Phyllostachys edulis*.

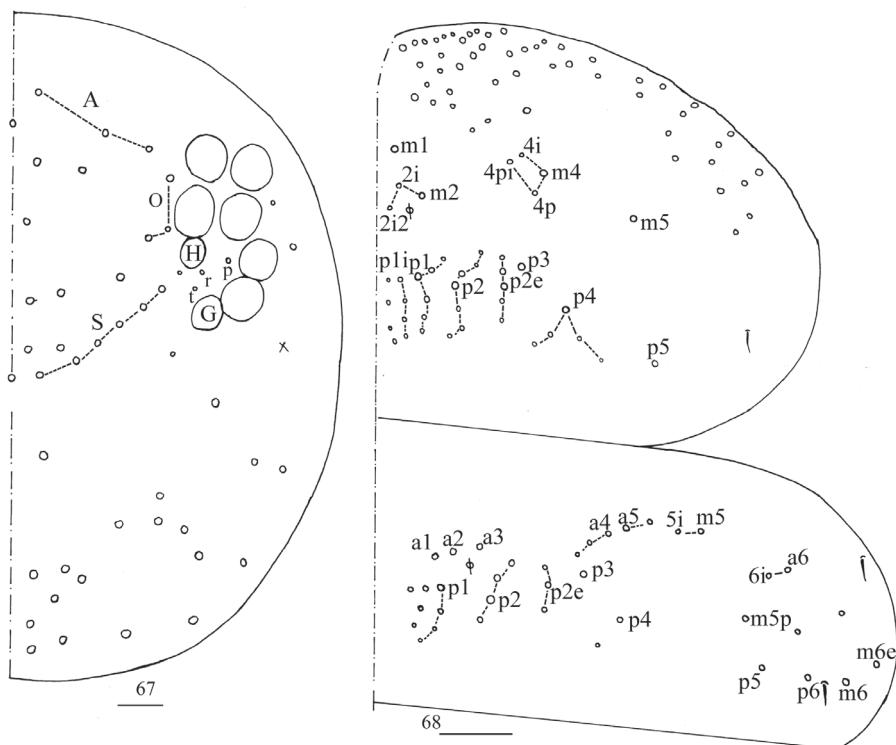
Description. Size. Body length up to 2.00 mm.

Colouration. Ground colour yellow. Ant. III & IV with scattered blue pigment. Eye patches dark blue. Th. III with a pair of dark blue spots and coxae and lateral of Th. II also with blue pigment (Figs 65, 66).

Head. Antenna 0.44–0.59× body length; antennal segment ratio I: II: III: IV = 1: 1.30–1.47: 1.21–1.33: 2.13–2.51. Eyes 8 + 8, interocular chaetae with p, r, and t. Dorsal cephalic chaetotaxy with three antennal (A), three ocellar (O) and six sutural



Figures 65, 66. Habitus of *Homidia linhaiensis*. Scale bars: 500 μm .



Figures 67, 68. *Homidia linhaiensis* **67** dorsal chaetotaxy of head **68** chaetotaxy of Th. II–III. Scale bars: 20 μm (**67**); 50 μm (**68**).

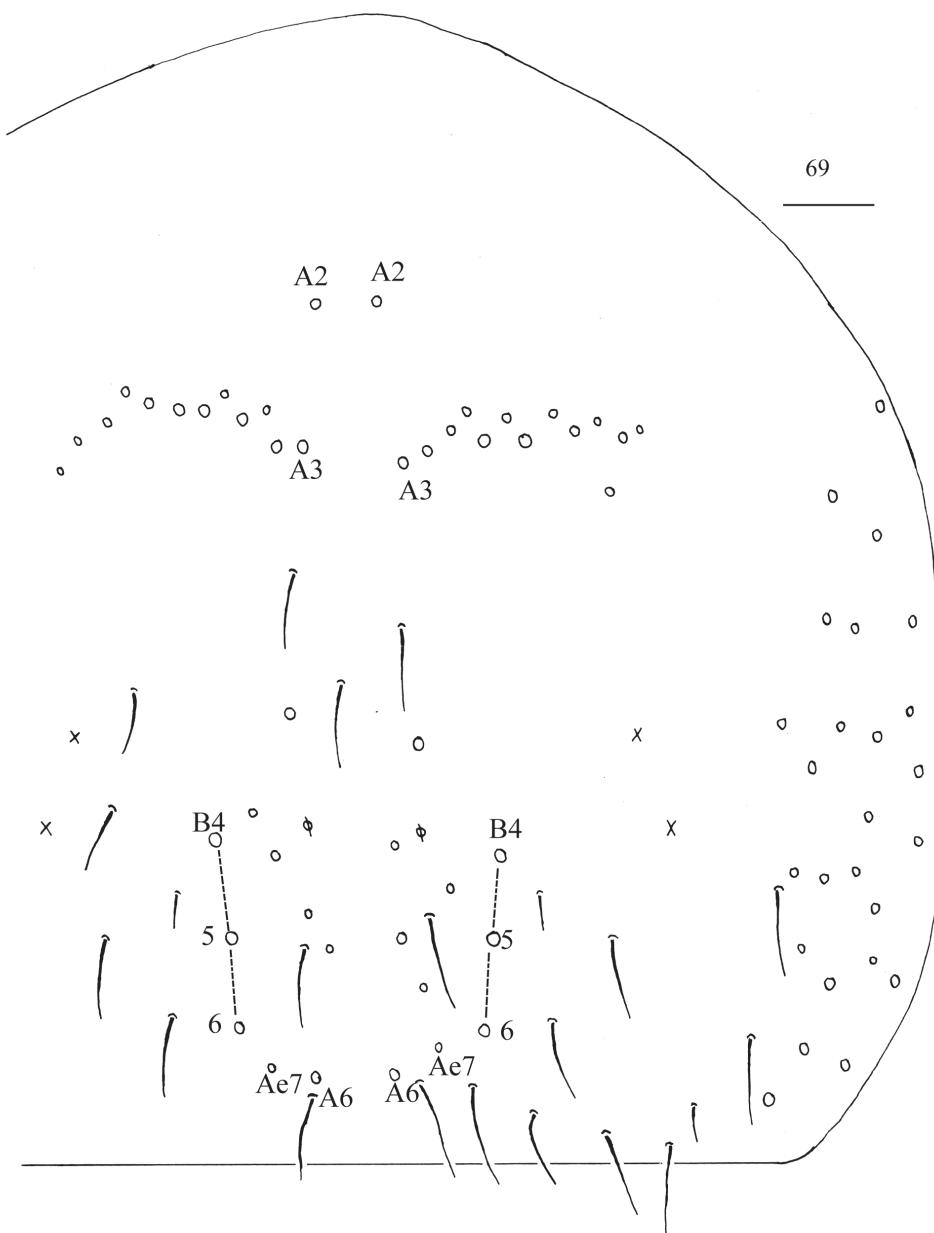
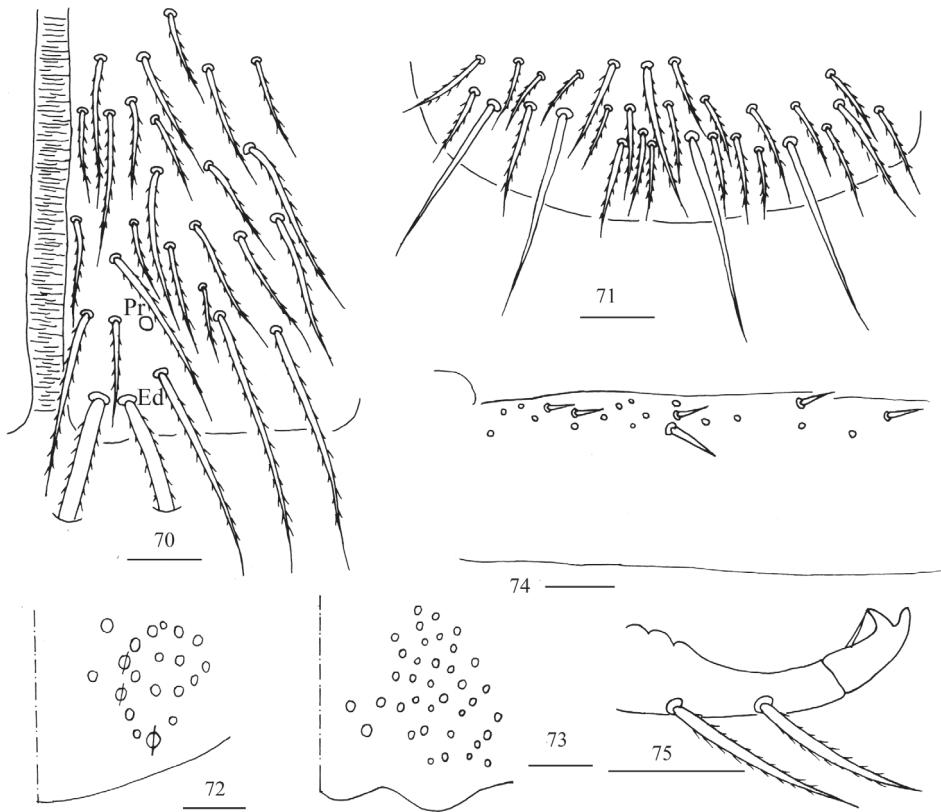


Figure 69. Chaerotaxy of Abd. IV of *Homidia linhaiensis*. Scale bar: 50 μ m.

(S) mac (Fig. 67). Chaetal formula of labial base as MRel₁L₂, chaetae e and l₁ smooth, others ciliate, R/M as 0.56.

Thorax. Th. II with four medio-medial (m1, m2, m2i, m2i2), four medio-sublateral (m4, m4i, m4p, m4pi), 33 posterior mac. Th. III with 36–39 mac and two sens (Fig. 68).



Figures 70–75. *Homidia linhaiensis* **70** anterior face of ventral tube **71** posterior face of ventral tube **72** manubrial plaque **73** ventro-apical part of manubrium **74** proximal section of dens (circles also representing spines) **75** mucro. Scale bars: 20 μm .

Abdomen. Range of Abd. IV length as 6.28–9.32× as dorsal axial length of Abd. III. Abd. I with 10 (a₂, a₃, a₅, m₂–5, m₂i, m₄p) mac, ms antero-internal to sens. Abd. II with six (a₂, a₃, m₃, m₃e, m₃ea, m₃ep) central, one (m₅) lateral mac and two sens. Abd. III with two (a₂, m₃) central and five (am₆, pm₆, m₇a, p₆, p₇) lateral mac, one ms and two sens. Abd. IV anteriorly with 9–13 mac arranged in irregular transverse row, A₂ always present and anterior to transverse row; posteriorly with 10–16 central mac, laterally with 23–27 mac (Fig. 69). Anterior face of ventral tube with 24–28 ciliate chaetae, 3+3 of them as mac, line connecting proximal (Pr) and external-distal (Ed) mac oblique to median furrow (Fig. 70); posterior face with four distal smooth and numerous ciliate chaetae (Fig. 71). Manubrial plaque dorsally with 14–17 ciliate chaetae and three pseudopores (Fig. 72); ventrally with 37 ciliate chaetae on each side (Fig. 73). Dens with 12–21 smooth inner spines (Fig. 74). Mucro bidentate with subapical tooth larger than apical one; tip of basal spine reaching apex of subapical tooth; distal smooth section of dens almost equal to than mucro in length (Fig. 75).

Remarks. This species was first described from Zhejiang Province by Shi et al. (2009) and can be easily distinguished from other known species of the genus by two small blue spots on Th. III, five mac on Abd. III laterally, presence of A2 on Abd. IV. The characters of our specimens agree well with the original description in chaetotaxy of body, labium, colour pattern, and other characters, but there are five smooth chaetae on posterior face of ventral tube from Zhejiang and four smooth chaetae from that from Jiangxi. In fact, the number of smooth chaetae on posterior face of ventral tube may varies intraspecifically from two to five in some species of the genus. Chaetotaxy of manubrial plaque is added here.

Distribution. China (Jiangxi, Zhejiang).

***Homidia socia* Denis, 1929**

Figs 76–86

Homidia socia Denis, 1929: 310.

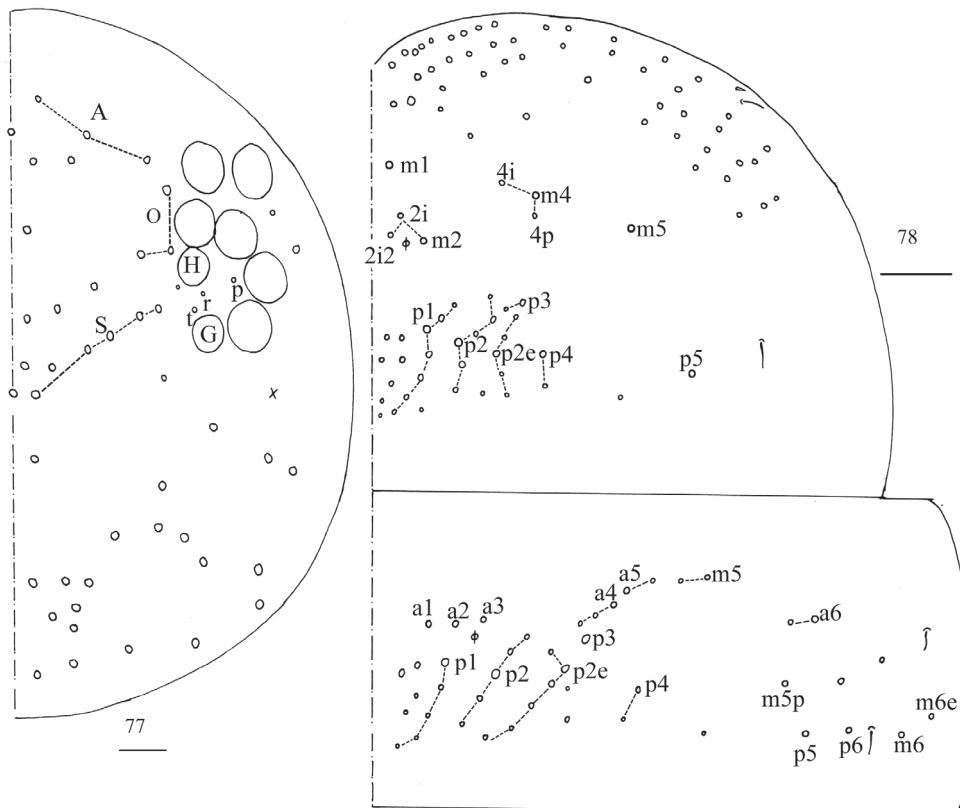
Examined specimens. 3♀ on slides, CHINA, Jiangxi Province, Nanchang City, Xinjian District, Jiuxi, 28°47'56"N, 115°45'11"E, 168 m asl, sample number 1243, collected by Y-T Ma, 12-XI-2020.

Description. Size. Body length up to 2.16 mm.

76



Figure 76. Habitus of *Homidia socia* Scale bar: 500 µm.



Figures 77, 78. *Homidia socia* 77 dorsal chaetotaxy of head 78 chaetotaxy of Th. II–III. Scale bars: 20 µm (77); 50 µm (78).

Colouration. Ground ground colour pale yellow. Ant. I–IV with scattered blue pigment. Eye patches dark blue. A pair of longitudinal blue stripes present along lateral side of head to Abd. III. Medial longitudinal narrow stripe present from Th. II to Abd. III. Abd. V with blue pigment (Fig. 76).

Head. Antenna 0.52–0.66× body length; antennal segment ratio I: II: III: IV = 1: 1.28–1.40: 1.00–1.20: 1.67–2.11. Eyes 8 + 8, G and H smaller than others, interocular chaetae with p, r, and t. Dorsal cephalic chaetotaxy with three antennal (A), three ocellar (O) and five sutural (S) mac (Fig. 77). Chaetal formula of labial base as MREL1L2, all ciliate, R/M as 0.67–0.72.

Thorax. Th. II with four medio-medial (m1, m2, m2i, m2i2), three medio-sub-lateral (m4, m4i, m4p), 30–33 (24) posterior mac. Th. III with 41–45 mac and two sens (Fig. 78). Pseudopores on coxa I–III as 2, 3, 2, respectively; coxal macrochaetal formula as 3/4+3, 3/4+2. Trochanteral organ with 39 smooth chaetae. Tenent hairs clavate and almost equal to inner edge of unguis. Unguis with four inner teeth, basal pair located at 0.38–0.45 distance from base of inner edge of unguis, distal unpaired

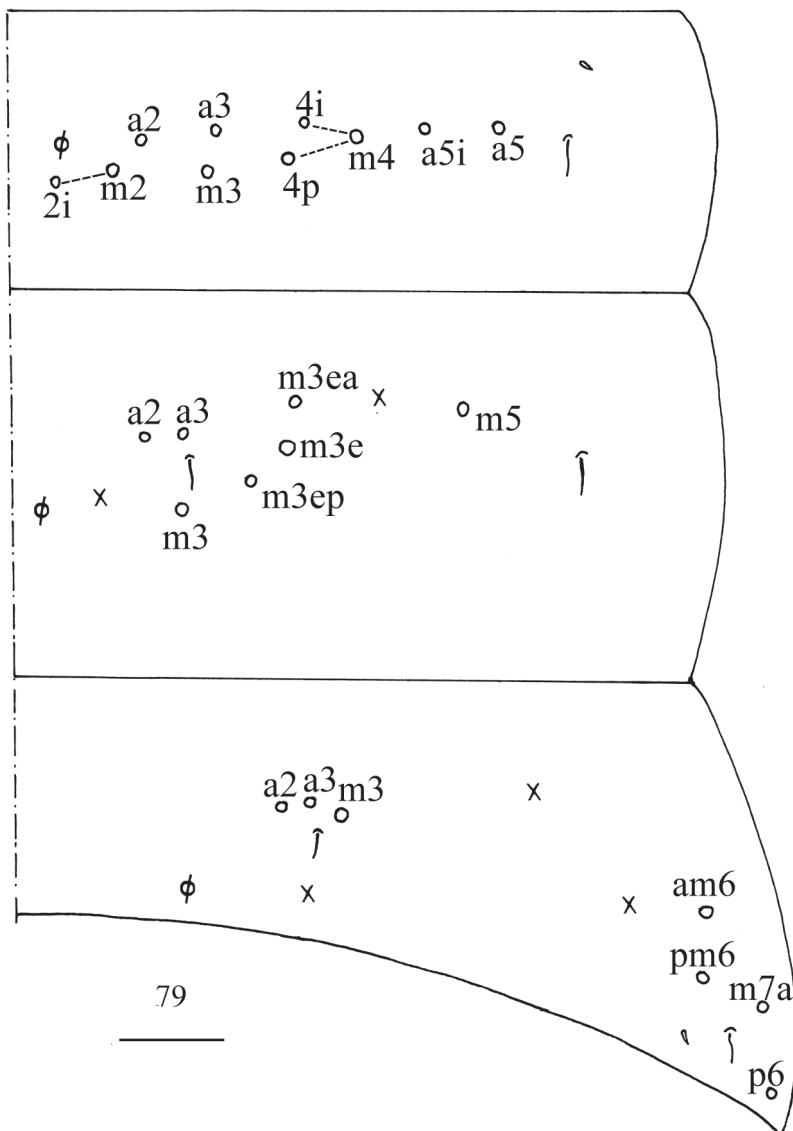


Figure 79. Chaetotaxy of Abd. I-III of *Homidia socia*. Scale bar: 50 μm .

teeth at 0.65–0.67 and 0.80–0.85 distance from base; unguiculus lanceolate, outer edge slightly serrate.

Abdomen. Range of Abd. IV length as 6.25–10.12× as dorsal axial length of Abd. III. Abd. I with 10 (a₂, a₃, a₅, a_{5i}, m_{2–5}, m_{2i}, m_{4i}, m_{4p}) mac, ms antero-external to sens. Abd. II with six (a₂, a₃, m₃, m_{3e}, m_{3ea}, m_{3ep}) central, one (m₅) lateral mac, and two sens. Abd. III with two or three (a₂, m₃, a₃ sometimes absent) central and four (am₆, pm₆, m_{7a}, p₆) lateral mac, one ms, and two sens (Fig. 79). Abd. IV

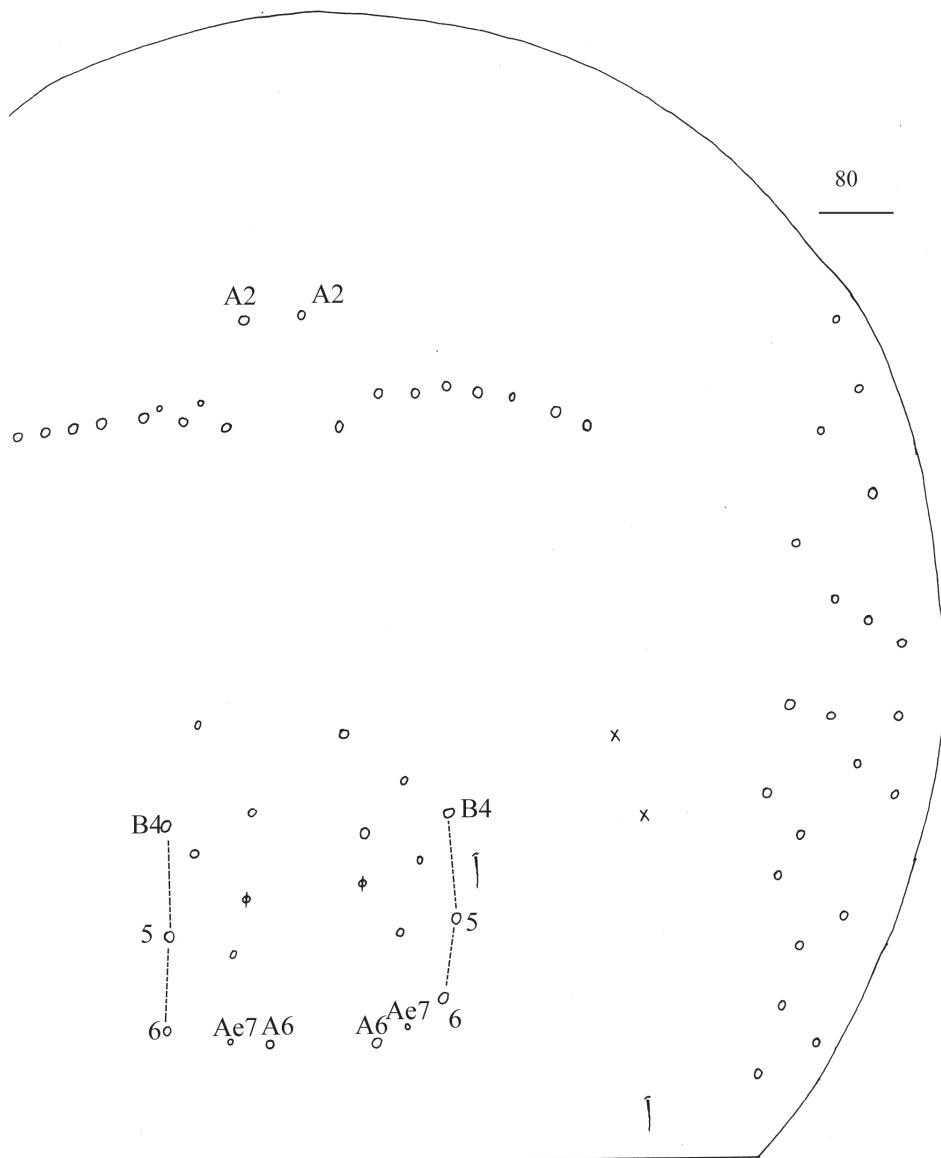
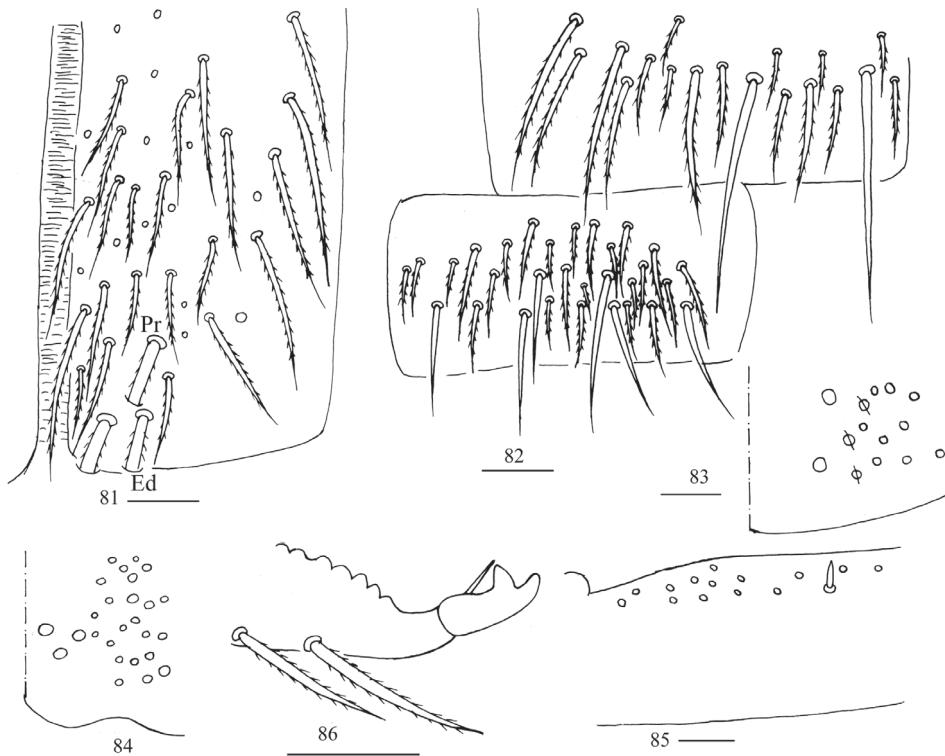


Figure 80. Chaerotaxy of Abd. IV of *Homidia socia*. Scale bar: 50 μm .

anteriorly with eight or nine mac arranged in irregular transverse row, A2 always present and anterior to transverse row; posteriorly with 6–10 central mac; laterally with 18–22 mac (Fig. 80). Anterior face of ventral tube with 39 ciliate chaetae, 3+3 of them as mac, line connecting proximal (Pr) and external-distal (Ed) mac oblique to median furrow (Fig. 81); posterior face with two distal smooth and numerous ciliate chaetae; lateral flap with six smooth and 24 ciliate chaetae (Fig. 82). Manubrial plaque dorsally



Figures 81–86. *Homidia socia* **81** anterior face of ventral tube **82** posterior face and lateral flap of ventral tube **83** manubrial plaque **84** ventro-apical part of manubrium **85** proximal section of dens (circles also representing spines) **86** mucro. Scale bars: 20 µm.

with 11–14 ciliate chaetae and three pseudopores (Fig. 83); ventrally with 26 ciliate chaetae on each side (Fig. 84). Dens with 15 smooth inner spines (Fig. 85). Mucro bidentate with subapical tooth larger than apical one; tip of basal spine reaching apex of subapical tooth; distal smooth section of dens shorter than mucro in length (Fig. 86).

Ecology. In the litter of leaves of *Phyllostachys edulis*.

Remarks. This species was first described from Fujian Province, China by Denis (1929), mainly based on its colour pattern with three longitudinal stripes on dorsal side. Yosii (1942), Stach (1965), Lee and Park (1989), and Chirstiansen and Bellinger (1980, 1992) reported it from Japan, Vietnam, Taiwan (China), and USA, respectively, and their descriptions were relatively simple. Jordana (2012) also reported it based on Vietnamese and Japanese specimens that corresponded in colour pattern to *H. socia* forma *flava* Yosii, 1953 from Japan. In this work, several characters not previously mentioned are added, such as the chaetotaxy of the head, ventral tube, and manubrial plaque. Differences exist between the specimens collected from Jiangxi Province and other authors' previous descriptions that are listed in Table 4. Our specimens, with 15 spines on dens, are similar to those examined by Jordana (2012) which had 14 spines.

Table 4. Comparison of *H. socia* between different descriptions.

Characters	This work	Denis (1929)	Christiansen and Bellinger (1980, 1992)	Stach (1965)	Jordana (2012)
Chaetal formula of labial base	MREL ₁ L ₂	unknown	MREL ₁ L ₂	unknown	unknown
Mac on Abd. I	10	unknown	11 or 15	9	unknown
Central mac on Abd. II	6	unknown	5–6	6	6
Central mac on Abd. III	2–3	unknown	3	3	3
Mac A2 on Abd. IV	present	unknown	present	unknown	present
Mac of transverse row on Abd. IV	8–9	unknown	8	8	7
Centro-posterior mac on Abd. IV	6–10	unknown	5	8	5
Dental spines	15	up to 30	<20	7 or 11	14*

* Jordana (2012) gave 14 spines on dens on the specimens of Vietnam and Japan he examined, and 14–30 spines in the species redescription that included the values given by Denis (1929) in the original description.

Up to 30 spines were given by Denis (1929) for the type specimens of large size from Fujian. These specimens or specimens from the type locality will therefore need to be redescribed to confirm the assignment of our specimens as well as those described by Jordana (2012) to *H. socia*.

Distribution. Japan, USA, Vietnam, and China (Anhui, Fujian, Guangxi, Jiangsu, Jiangxi, Taiwan, Zhejiang).

Discussion

The genus contains 75 known species that are distributed in the U.S.A. and the eastern part of Asia, especially China, Korea, and Japan (Table 5). They usually live in coastal areas from tropical to temperate zones, maybe because humidity is high in these regions. Most species of the genus are endemic (Table 5). However, some of them, such as *H. sauteri* and *H. socia*, are widespread, and were reported from China, Japan, Korea, and the U.S.A. Jia et al. (2005) pointed out that these two species are so widely distributed that they may have been transported by human activity. This hypothesis would, however, need more evidence.

Table 5. Distribution records of *Homidia* species around the world.

Species	China	Japan	Korea	India	Indonesia & Singapore	Vietnam	USA
<i>H. acutus</i> sp. nov.	✓						
<i>H. allospila</i> (Börner, 1909)		✓					
<i>H. amethystinoides</i> Jordana & Baquero, 2010			✓				
<i>H. anhuiensis</i> Li & Chen, 1997	✓						
<i>H. apigmenta</i> Shi, Pan & Zhang, 2010	✓						
<i>H. breviseta</i> Pan, 2022	✓						
<i>H. changensis</i> sp. nov.		✓					

Species	China	Japan	Korea	India	Indonesia & Singapore	Vietnam	USA
<i>H. chosonica</i> Szeptycki, 1973	✓		✓				
<i>H. chroma</i> Pan & Yang, 2019	✓		✓				
<i>H. chrysotrix</i> Yosii, 1942						✓	
<i>H. cingula</i> (Börner, 1906)							✓
<i>H. dianbaiensis</i> (Lin, 1985)	✓						
<i>H. emeiensis</i> Jia, Chen & Christiansen, 2004	✓						
<i>H. fascia</i> Wang & Chen, 2001	✓						
<i>H. flava</i> Yosii, 1953		✓					
<i>H. flavonigra</i> Szeptycki, 1973			✓				
<i>H. formosana</i> Uchida, 1943	✓						
<i>H. fujiyamai</i> Uchida, 1954			✓				
<i>H. glassa</i> Nguyen, 2001						✓	
<i>H. grisea</i> Lee & Lee, 1981			✓				
<i>H. haikae</i> Christiansen & Bellinger, 1992							✓
<i>H. hangzhouensis</i> Pan & Ma, 2021	✓						
<i>H. heuganica</i> Lee & Park, 1984			✓				
<i>H. hexaseta</i> Pan, Shi & Zhang, 2011	✓						
<i>H. hihiu</i> Christiansen & Bellinger, 1992							✓
<i>H. hjesanica</i> Szeptycki, 1973			✓				
<i>H. huashanensis</i> Jia, Chen & Christiansen, 2005	✓						
<i>H. insularis</i> (Carpenter, 1904)							✓
<i>H. jordanai</i> Pan, Shi & Zhang, 2011	✓						
<i>H. kali</i> (Imms, 1912)				✓			
<i>H. koreana</i> Lee & Lee, 1981			✓				
<i>H. laha</i> Christiansen & Bellinger, 1992	✓						✓
<i>H. lakhanpurii</i> Baquero & Jordana, 2015				✓			
<i>H. latifolia</i> Chen & Li, 1999	✓						
<i>H. leei</i> Chen & Li, 1997	✓						
<i>H. leniseta</i> Pan & Yang, 2019	✓						
<i>H. linhaiensis</i> Shi, Pan & Qi, 2009	✓						
<i>H. maijiensis</i> Zhou & Ma, 2022	✓						
<i>H. mediaseta</i> Lee & Lee, 1981			✓				
<i>H. mediosetosa</i> Shi, Pan & Bai, 2009	✓						
<i>H. minutula</i> Kim & Lee, 1995				✓			
<i>H. multidentata</i> Nguyen, 2005							✓
<i>H. munda</i> Yosii, 1956		✓	✓				
<i>H. nigra</i> Lee & Lee, 1981			✓				
<i>H. nigrifascia</i> Ma & Pan, 2017	✓						
<i>H. nigrocephala</i> Uchida, 1943	✓		✓				
<i>H. obliquistria</i> Ma & Pan, 2017	✓						
<i>H. pentachaeta</i> Li & Christiansen, 1997	✓						
<i>H. phjonganica</i> Szeptycki, 1973	✓						
<i>H. polyseta</i> Chen, 1998	✓						
<i>H. pseudofascia</i> Pan, Zhang & Li, 2015	✓						
<i>H. pseudoformosana</i> Kang & Park, 2012							
<i>H. pseudosinensis</i> Shi & Pan, 2012	✓						
<i>H. qimenensis</i> Yi & Chen, 1999	✓						
<i>H. quadrimaculata</i> Pan, 2015	✓						
<i>H. quadriseta</i> Pan, 2018	✓						

Species	China	Japan	Korea	India	Indonesia & Singapore	Vietnam	USA
<i>H. rosannae</i> Jordana & Baquero, 2010		✓					
<i>H. sauteri</i> (Börner, 1909)	✓	✓	✓				✓
<i>H. sichuanensis</i> Jia, Zhang & Jordana, 2010	✓						
<i>H. similis</i> Szeptycki, 1973	✓		✓				
<i>H. sinensis</i> Denis, 1929	✓	✓				✓	
<i>H. socia</i> Denis, 1929	✓	✓				✓	✓
<i>H. sotoi</i> Jordana & Baquero, 2010		✓					
<i>H. speciosa</i> Szeptycki, 1973			✓				
<i>H. subcingula</i> Denis, 1948						✓	
<i>H. taibaiensis</i> Yuan & Pan, 2013	✓						
<i>H. tiantaiensis</i> Chen & Lin, 1998	✓						
<i>H. tibetensis</i> Chen & Zhong, 1998	✓						
<i>H. transitoria</i> Denis, 1929	✓						
<i>H. triangulimacula</i> Pan & Shi, 2015	✓						
<i>H. unichaeta</i> Pan, Shi & Zhang, 2010	✓					✓	
<i>H. wanensis</i> Pan & Ma, 2021	✓						
<i>H. xianjuensis</i> Wu & Pan, 2016	✓						
<i>H. yandangensis</i> Pan, 2015	✓						
<i>H. yosiii</i> Jordana & Baquero, 2010		✓					
<i>H. zhangi</i> Pan & Shi, 2012		✓					
<i>H. ziguiensis</i> Jia, Chen & Christiansen, 2003	✓						

Most species of *Homidia* are heavily pigmented and their colour patterns vary only slightly among specimens of the same species, so colour pattern appears to be a significant character for the morphological taxonomy of the genus. However, colour pattern may exhibit some variability between some species, such as *H. fascia* Wang & Chen, 2001 and *H. pseudofascia* Pan, Zhang & Li, 2015. The new species, *H. acutus* sp. nov. described here shares almost the same colour pattern as *H. zhangi*, but the differences in other characters are significant.

Key to the Chinese species of *Homidia*

- 1 Mental chaetae expanded or leaf-like..... 2
- Mental chaetae normal ciliate 9
- 2 Body without obvious colour pattern except eye patches..... *H. apimenta*
- Body with obvious colour pattern except eye patches 3
- 3 Abd. I–III laterally with oblique stripes..... *H. obliquistria*
- Abd. I–III laterally without oblique stripes 4
- 4 Abd. IV with mac A2..... *H. ziguiensis*
- Abd. IV without mac A2 5
- 5 Central Abd. IV with roughly Y-shaped patch..... *H. qimenensis*
- Abd. IV without Y-shaped patch 6

6	Abd. IV anteriorly with an interrupted dark transverse stripe	7
-	Abd. IV anteriorly without dark transverse stripe.....	8
7	Abd. IV anteriorly with 4–7 mac on each side	<i>H. latifolia</i>
-	Abd. IV anteriorly with 22–24 mac on each side	<i>H. polyseta</i>
8	Labial basal chaetae L ₁ and L ₂ expanded.....	<i>H. triangulumacula</i>
-	Labial basal chaetae L ₁ and L ₂ unexpanded	<i>H. wanensis</i>
9	Body without obvious colour pattern except eye patches.....	10
-	Body with obvious colour pattern except eye patches.....	12
10	Labial basal chaeta L ₁ ciliate, Abd. III without mac a2	<i>H. jordanai</i>
-	Labial basal chaeta L ₁ smooth, Abd. III with mac a2.....	11
11	Abd. IV anteriorly with 3–8 mac and posteriorly 1 mac on each side.....	<i>H. unichaeta</i>
-	<i>H. tibetensis</i>
12	Head entirely dark	13
-	Head not entirely dark.....	15
13	Abd. IV anteriorly with a transverse stripe	<i>H. nigrocephala</i>
-	Abd. IV anteriorly without transverse stripe.....	14
14	Th. II–III entirely dark.....	<i>H. anhuiensis</i>
-	Th. II–III with slightly brown pigment	<i>H. taibaiensis</i>
15	Abd. IV with mac A2.....	16
-	Abd. IV without mac A2	18
16	Labial basal chaetae E & L ₁ ciliate.....	<i>H. socia</i>
-	Labial basal chaetae e & l ₁ smooth	17
17	Abd. III laterally with 5 mac	<i>H. linhaiensis</i>
-	Abd. III laterally with 4 mac	<i>H. tiantaiensis</i>
18	Abd. IV almost entirely dark or with uniform colour	19
-	Abd. IV with some colour patterns	25
19	Abd. IV almost entirely dark.....	<i>H. emeiensis</i>
-	Abd. IV not entirely dark.....	20
20	Abd. III laterally with 5 chaetae	<i>H. pentachaeta</i>
-	Abd. III laterally with 4 chaetae	21
21	Tenent hairs pointed	<i>H. acutus</i> sp. nov.
-	Tenent hairs clavate.....	22
22	Th. II–III medially with a longitudinal stripe.....	<i>H. yandangensis</i>
-	Th. II–III medially without a longitudinal stripe.....	23
23	Th. III without mac p4, labial chaeta L ₁ smooth	<i>H. zhangi</i>
-	Th. III with mac p4, labial chaeta L ₁ ciliate	24
24	Ground colour hazel, dens with 80–114 spines.....	<i>H. huashanensis</i>
-	Ground colour yellow, dens with 16–28 spines	<i>H. changensis</i> sp. nov.
25	Abd. III without obvious colour pattern	26
-	Abd. III with obvious colour pattern.....	34

26	Th. II medially with colour pattern	27
—	Th. II medially without colour pattern	29
27	Th. II medially with a longitudinal stripe	<i>H. mediofascia</i>
—	Th. II medially with a pair of stripes	28
28	Th. III with a pair of patches	<i>H. fascia</i>
—	Th. III without a pair of patches	<i>H. pseudofascia</i>
29	Abd. IV anteriorly with obvious colour pattern	30
—	Abd. IV anteriorly without obvious colour pattern	32
30	Mac a2 on Abd. III absent	<i>H. formosana</i>
—	Mac a2 on Abd. III present	31
31	Head with 8 sutural mac	<i>H. bangzhouensis</i>
—	Head with 9 sutural mac	<i>H. hexaseta</i>
32	Ground colour pale yellow	<i>H. dianbaiensis</i>
—	Ground colour not pale yellow	33
33	Labial basal chaeta E ciliate	<i>H. maijiensis</i>
—	Labial basal chaeta e smooth	<i>H. phjongjangica</i>
34	Abd. IV anteriorly with 2 mac on each side	35
—	Abd. IV anteriorly with more than 2 mac on each side	36
35	Labial chaetae l ₁ and l ₂ smooth	<i>H. leniseta</i>
—	Labial chaetae l ₁ and l ₂ ciliate	<i>H. quadriseta</i>
36	Abd. IV posteriorly with 9–11 mac on each side	<i>H. xianjuensis</i>
—	Abd. IV posteriorly with less than 9 mac on each side	37
37	Th. III dorsally without obvious colour pattern	38
—	Th. III dorsally with obvious colour pattern	40
38	Th. II medially with colour pattern, Abd. II entirely dark	<i>H. nigrifascia</i>
—	Th. II medially without colour pattern, Abd. II not entirely dark	39
39	Unguis with 3 inner teeth	<i>H. chroma</i>
—	Unguis with 4 inner teeth	<i>H. laba</i>
40	Th. II medially without colour pattern	41
—	Th. II medially with colour pattern	45
41	Transverse band of Th. III not reaching lateral edge of body	42
—	Transverse band of Th. III reaching lateral edge of body	43
42	Abd. I with 14 mac	<i>H. breviseta</i>
—	Abd. I with 9 mac	<i>H. similis</i>
43	Dens with 10 spines	<i>H. transitoria</i>
—	Dens with more than 20 spines	44
44	Abd. IV centrally with a transverse band	<i>H. sauteri</i>
—	Abd. IV centrally without a transverse band	<i>H. sinensis</i>
45	Labial basal chaeta E ciliate	<i>H. leei</i>
—	Labial basal chaeta e smooth	46
46	Th. II posteriorly with a M-shaped transverse stripe	<i>H. pseudosinensis</i>
—	Th. II posteriorly without a M-shaped transverse stripe	47
47	Labial basal chaeta l ₁ smooth	<i>H. quadrimaculata</i>
—	Labial basal chaeta L ₁ ciliate	<i>H. sichuanensis</i>

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