

# Two new species of *Anisotacrus* Schmiedeknecht (Hymenoptera, Ichneumonidae, Ctenopelmatinae) with a key to Eastern Palaearctic species

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## Abstract

Two species of genus *Anisotacrus* Schmiedeknecht, 1913, *A. externus* Sheng & Sun, **sp. nov.** and *A. senticosus* Sheng & Sun, **sp. nov.**, collected from the Natural Reserve, Huairou, Beijing, are described and illustrated. A key to the Eastern Palaearctic species of *Anisotacrus* is provided.

## Keywords

China, Euryproctini, taxonomy

## Introduction

*Anisotacrus* Schmiedeknecht, 1913, a small genus of the tribe Euryproctini in the sub-family Ctenopelmatinae (Hymenoptera: Ichneumonidae), comprises nine species (Yu et al. 2016), of which six are from the Eastern Palaearctic Region (two of them also occur in the Western Palaearctic Region) (Kasparyan and Khalaim 2007; Yu et al. 2016; Kasparyan 2019), two from the Western Palaearctic Region (Meyer 1936; Bauer 1958;

Kazmierczak 2004; Kasparyan and Khalaim 2007; Broad 2016), and three from the Nearctic Region (Carlson 1979; Yu et al. 2016).

Five species from Russia (Kasparyan 2019), and a key to the known species from the Eastern Palaearctic Region, were reported by Kasparyan and Khalaim (2007). *Anisotacrus iyoensis* (Uchida, 1953), described from two male specimens, is very similar to *A. xanthostigma* (Gravenhorst, 1829), and may be conspecific (Kasparyan and Khalaim 2007).

The most reliable-looking host records for *Anisotacrus* are from grass-feeding sawflies of the genus *Dolerus* (Hinz 1961).

In this paper two species of *Anisotacrus* from China with a key to known species from the Eastern Palaearctic region are reported.

## Materials and methods

Specimens were collected by interception traps (IT) (Li et al. 2012) in the Natural Reserve, Huairou, Beijing, China.

Morphological terminology is mostly based on Broad et al. (2018). Images were taken using a Leica M205A stereo microscope with LAS Montage MultiFocus. Type specimens are deposited in General Station of Forest and Grassland Pest Management (GSFGPM), National Forestry and Grassland Administration, China.

## Taxonomy

### *Anisotacrus* Schmiedeknecht, 1913

*Anisotacrus* Schmiedeknecht, 1913: 2710. Type-species: *Mesoleius tenellus* Holmgren, 1857.

**Diagnosis.** (After Townes 1970; Kasparyan and Khalaim 2007). Clypeus wide 3.0–3.3 × as wide as long, apical margin blunt, almost truncate or slightly arcuate. Upper tooth of mandible as long as or slightly shorter than lower tooth. Antenna with at least 32 flagellomeres. Dorsal end of epicnemial carina usually reaching front margin of mesopleuron. Areolet present. Hind wing vein 1-cu longer than cu-a. Hind tarsus with 5<sup>th</sup> segment not unusually long and curved (in contrast to *Hadrodactylus* Förster). Anterior transverse carina of propodeum absent. First tergite 1.7–3.0 × as long as apical width, slender, straight, latero-median carina absent.

**Key to Eastern Palaearctic species of *Anisotacrus* (modified from the key in Kasparyan and Khalaim (2007))**

- 1 First tergite and hind coxa red. Face predominantly yellow .....  
..... *A. kurilensis* Kasparyan, 2007
- First tergite and hind coxa black. Face black or ivory ..... 2

- 2 Face black. Tergites, hind leg except trochantellus, black. First tergite  $1.7 \times$  as long as posterior width.....*A. konishii* Kasparyan, 2007  
 – Face entirely or at least laterally white or yellow. Tergites and hind leg at least partly reddish brown or yellow. First tergite at least  $2.0 \times$  as long as posterior width ..... 3
- 3 Face black, laterally yellow. Mesosoma black. Tergites 2–4 (5) red or with reddish brown spots. Areolet receiving vein 2m-cu basal of its lower posterior corner ..... 4  
 – Face white. Propleuron and spot on upper portion of epicnemium whitish yellow. Second and subsequent tergites reddish brown, if posterior tergites black, then vein 2m-cu slightly distal of areolet (Figs 1, 8) ..... 6
- 4 Frons with wrinkles. Hind wing vein 1-cu approximately as long as cu-a. Tergites 2 and 3 with wrinkles.....*A. bipunctatus* (Gravenhorst, 1829)  
 – Frons shagreened, or with fine punctures. Hind wing vein 1-cu distinctly longer than cu-a. Tergites 2 and 3 shagreened, or with fine punctures..... 5
- 5 First tergite  $2.7 \times$  as long as posterior width. Mesoscutum, fore and mid coxae, trochanters and femur entirely black. Basal half of hind tibia brownish yellow. Hind tarsus black .....*A. senticosus* Sheng & Sun, sp. nov.  
 – First tergite at most  $2.5 \times$  as long as apical width. Anterolateral spot of mesoscutum yellow. Fore and mid coxae and trochanters black, with yellow spots. Hind femur apically and tibia black. Hind tarsus brown .....  
 .....*A. xanthostigma* (Gravenhorst, 1829)
- 6 Malar space  $0.9 \times$  as long as basal width of mandible. Areolet receiving vein 2m-cu basal of its lower posterior corner. Hind coxa, tergite 2 and subsequent tergites reddish brown..... *A. albinotatus* Kasparyan, 2007  
 – Malar space  $0.6 \times$  as long as basal width of mandible. Vein 2m-cu distal of areolet (Figs 1, 8). Hind coxa and posterior tergites black .....  
 .....*A. externus* Sheng & Sun, sp. nov.

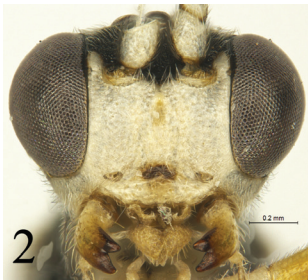
***Anisotacrus externus* Sheng & Sun, sp. nov.**

<http://zoobank.org/D5C3928A-818E-493E-A423-5D6C43BB8582>

Figures 1–12

**Description.** Body length 6.0 mm. Fore wing length 4.6 mm. Ovipositor sheath 0.5 mm long.

**Head.** Inner margins of eyes (Fig. 2) almost parallel, scarcely concave near antennal sockets. Face (Fig. 2) approximately  $1.5 \times$  as wide as long, shagreened, with yellow setae; slightly convex medially; upper lateral between eye and antennal socket with weak longitudinal depression. Clypeus with relatively large punctures;  $3.2 \times$  as wide as long; apical margin almost truncate. Mandible (Figs 2, 3) strong, with dense yellowish brown setae; lower tooth distinctly longer than upper tooth. Malar space with dense yellow setae, about  $0.6 \times$  as long as basal width of mandible. Gena (Figs 3, 4) evenly and



**Figures 1–5.** *Anisotacrus externus* Sheng & Sun, sp. nov. Holotype. Female **1** habitus, lateral view **2** head, anterior view **3** head, lateral view **4** head, dorsal view **5** mesoscutum and scutellum, dorsal view

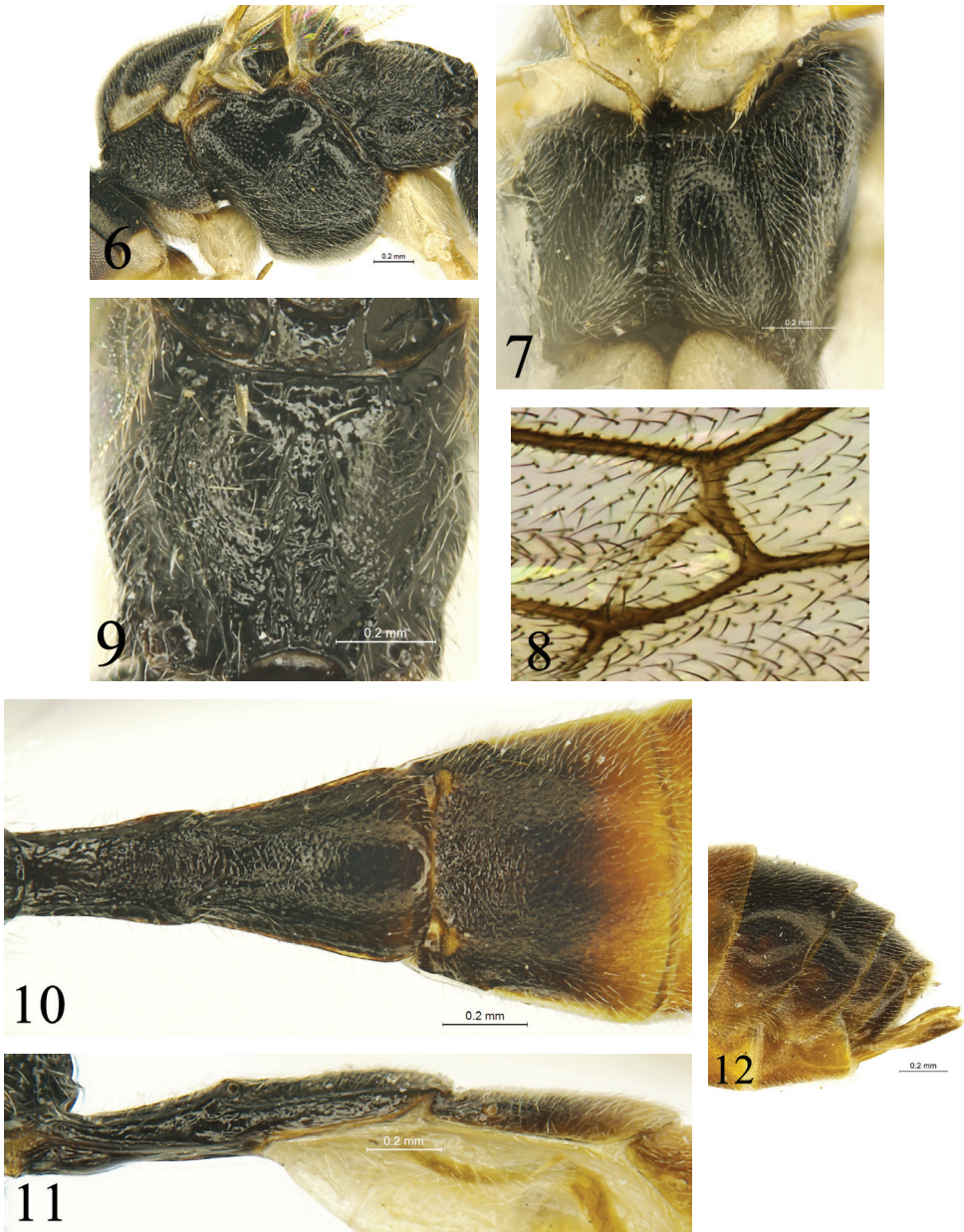
strongly convergent backward, shagreened. Vertex (Fig. 4) shagreened, with dense yellowish brown setae; posteromedian portion distinctly concave. Postocellar line approximately  $0.7 \times$  as long as ocular-ocellar line. Frons almost flat, slightly concave under median ocellus, shagreened. Antenna with 32 flagellomeres; ratio of length from first to fifth flagellomeres: 2.1:1.3:1.2:1.0:1.0. Occipital carina (Figs 3, 4) complete, dorsal portion relatively strong, genal carina joining hypostomal carina above base of mandible.

**Mesosoma.** Anterior margin of pronotum (Fig. 6) with dense short irregular longitudinal wrinkles; lateral concavity with dense transverse wrinkles; dorsoposterior portion with dense fine punctures and yellowish brown setae. Epomia indistinct. Mesoscutum (Fig. 5) almost shiny, anterior and lateral portions with fine punctures, distance between punctures  $0.5\text{--}2.0 \times$  diameter of puncture; posteromedian portion with dense indistinct irregular punctures. Notauli evident on anterior portion of mesoscutum. Scuto-scutellar groove deep, relatively wide, shiny, with thin setae. Scutellum distinctly convex, shiny, with fine irregular punctures. Postscutellum with fine indistinct punctures, anterior portion concave. Upper half of mesopleuron (Fig. 6) shiny, with distinct punctures, distance between punctures  $1.0\text{--}2.5 \times$  diameter of punctures; lower half with dense yellowish white setae and indistinct punctures; beneath speculum and lower posterior portions with indistinct fine wrinkles. Speculum relatively large, smooth, shiny. Upper end of epicnemial carina almost reaching front edge of mesopleuron, about  $0.6$  distance to subtegular ridge. Mesosternum (Fig. 7) with dense punctures, distance between punctures  $1.0\text{--}2.0 \times$  diameter of punctures; median sternal groove relatively deep, with transverse carinae. Metapleuron with surface structure as lower portion of mesopleuron, evenly convex. Juxtacoxal carina absent. Hind leg slender. Hind femur  $5.2 \times$  as long as its maximum width. Ratio of length of hind tarsomeres from first to fifth: 3.8:2.0:1.5:1.0:1.2. Claw simple. Wings slightly yellowish, hyaline. Fore wing with vein 1cu-a interstitial. Areolet small, triangular, distinctly stalked frontally; vein 2m-cu reaching vein M slightly distal of areolet (Fig. 8). Postnerculus intercepted at lower  $0.45$ . Hind wing vein 1-cu  $3.0 \times$  as long as cu-a. Propodeum (Fig. 9) evenly convex, shiny, with irregular indistinct longitudinal wrinkles and brownish setae; lateromedian longitudinal carinae irregular; apicomedian portion with strong longitudinal wrinkles. Propodeal spiracle circular.

**Metasoma.** First tergite (Figs 10, 11)  $2.3 \times$  as long as apical width, evenly widened posteriorly, anterior portion shiny, median portion shagreened; posterior portion smooth, with fine punctures; without glymma; latero-median absent; dorso-lateral carinae weakly present; ventro-lateral carinae complete; spiracle located almost at middle. Second tergite  $0.75 \times$  as long as posterior width, almost shiny, anterior median portion shagreened. Third and subsequent tergites with dense yellowish brown setae. Third tergite  $0.9 \times$  as long as posterior width. Ovipositor (Fig. 12) straight, with a large, deep dorsal notch.

**Coloration** (Fig. 1). Black, except for following: Face, clypeus except a small dark brown spot at the center of clypeal sulcus, mandible except teeth, malar space, maxillary palpi, labial palpi, ventral profiles of scape and pedicel, upper-posterior corner of pronotum, anterolateral portion of mesoscutum, tegula, subtegular ridge, fore and





**Figures 6–12.** *Anisotacrus externus* Sheng & Sun, sp. nov. Holotype. Female **6** mesosoma, lateral view **7** mesosoma, ventral view **8** areolet **9** propodeum **10** first and second tergites, dorsal view **11** first and second tergites, lateral view **12** apical portion of metasoma, lateral view.

middle coxae, trochanters, hind trochantellus yellowish white. Dorsal profiles of scape and pedicel, basal portion of flagellum darkish brown; remainder of flagellum yellowish brown. Fore and mid femora, tibiae and tarsi, basal portion of hind tibia yellow

brown. Hind tarsus brownish black. Posterior portion of second tergite, third and fourth tergites entirely brownish red. Metasomal sternites 2 and 3 whitish yellow, with small lateral longitudinal brown spots; sternites 4–6 almost entirely reddish brown. Ovipositor sheath irregularly blackish brown. Pterostigma and veins brownish black.

**Etymology.** The specific name is derived from the fore wing vein 2m-cu connecting to cubitus distal of lower-posterior corner of areolet.

**Material examined.** *Holotype*: CHINA • ♀; Beijing, Huairou, Labagoumen; 9.VII.2016; IT by Shi-Xiang Zong.

**Distribution.** China.

**Differential diagnosis.** The new species is similar to *A. albinotatus* Kasparyan, 2007, but can be distinguished from the latter by the following combination of characters: malar space about  $0.6 \times$  as long as basal width of mandible; areolet triangular, 2m-cu connecting to cubitus slightly distal of areolet (Fig. 8); hind coxa and posterior tergites of metasoma black. *Anisotacrus albinotatus*: malar space about  $0.9 \times$  as long as basal width of mandible; areolet receiving vein 2m-cu basal of lower posterior corner; hind coxa, second and subsequent tergites reddish brown.

***Anisotacrus senticosus* Sheng & Sun, sp. nov.**

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Figures 13–22

**Description.** Body length 8.7 mm. Fore wing length 6.9 mm. Ovipositor sheath 0.5 mm.

**Head.** Inner margins of eyes (Fig. 14) slightly concave near antennal sockets. Face (Fig. 14)  $1.2 \times$  as wide as long, almost flat, shagreened, with dense fine indistinct punctures and yellowish white setae; upper margin with median narrow smooth longitudinal stripe and a small median tubercle. Clypeus approximately  $3.3 \times$  as wide as long, shagreened, lateral portion with sparse fine punctures, apical median smooth, shiny; apical margin slightly arcuate. Mandible with sparse punctures and dense long yellowish white setae; lower tooth distinctly wider and slightly longer than upper tooth. Malar space about  $0.4 \times$  as long as basal width of mandible. Gena (Figs 15, 16), vertex (Fig. 16) and frons shagreened, with dense yellowish brown setae. Gena strongly convergent backward. Postocellar line approximately  $0.6 \times$  as long as ocular-ocellar line. Antenna with 38 flagellomeres; ratio of length from first to fifth flagellomeres: 2.4:1.3:1.1:1.0:1.0. Occipital carina complete, genal carina joining hypostomal carina above base of mandible.

**Mesosoma.** Pronotum, mesoscutum, mesopleuron and metapleuron shagreened, almost entirely with fine indistinct punctures. Epomia present. Mesoscutum (Fig. 17) evenly convex, anteromedian portion almost shiny; notauli impressed in the frontal  $0.3 \times$  of mesoscutum. Scutoscutellar groove slightly smooth. Scutellum and postscutellum weakly granulate. Postscutellum transversely convex, anterior portion deeply concave. Mesopleuron (Fig. 18) flat. Speculum small, with sparse fine punctures. Upper end of epicnemial carina not reaching to the front margin of mesopleuron and reach-

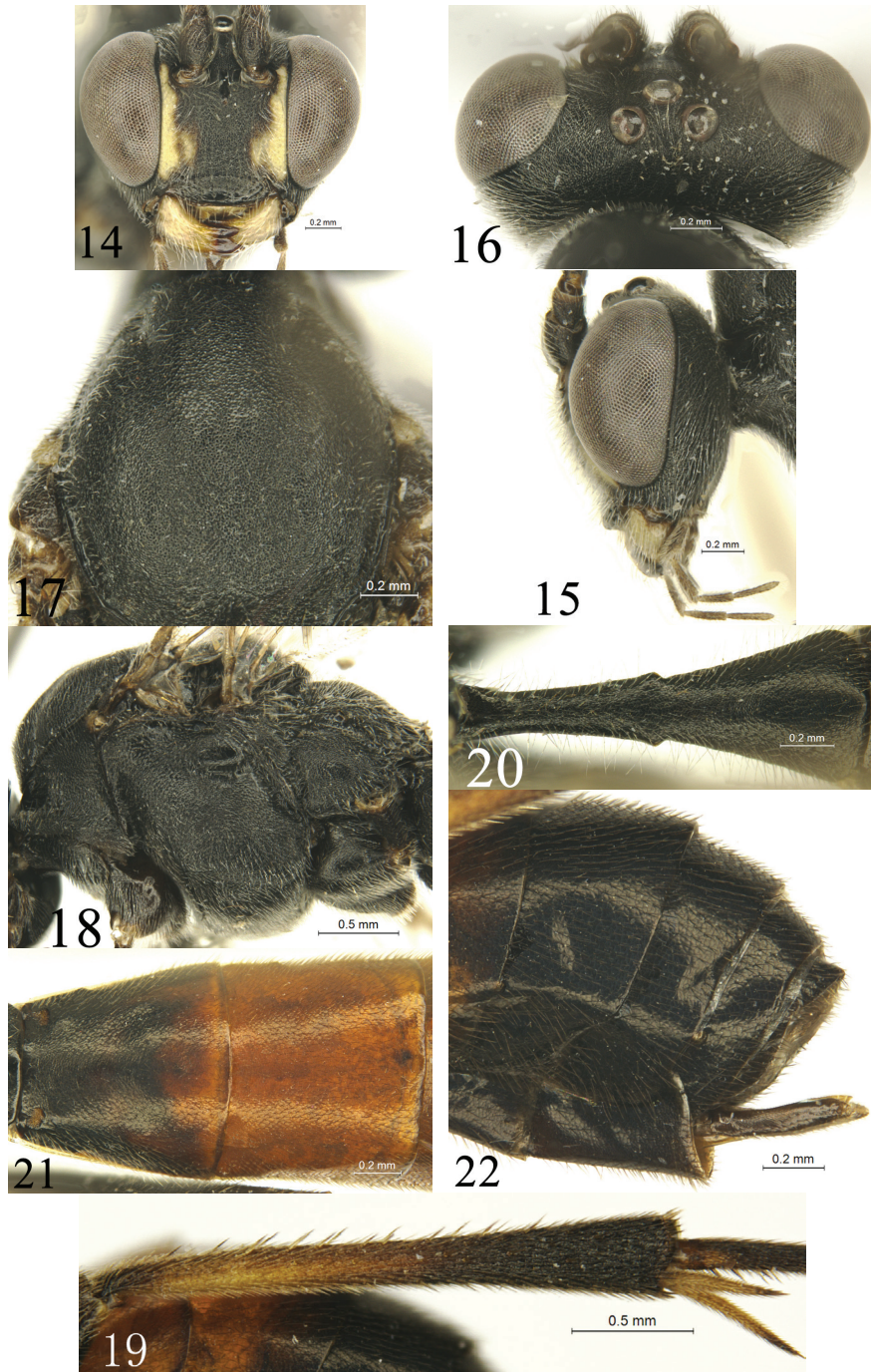


**Figure 13.** *Anisotacrus senticosus* Sheng & Sun, sp. nov. Holotype. Female habitus.

ing 0.5 height of mesopleuron. Metapleuron weakly convex; juxtacoxal carina absent; submetapleural carina complete, strong. Tibiae with sparse long thorns (Fig. 19). Hind femur  $5.6 \times$  as long as its maximum width. Ratio of length of hind tarsomeres from first to fifth: 5.5:2.7:2.0:1.0:1.4. Claw simple. Wings slightly infuscate. Fore wing with vein 1cu-a postfurcal by  $0.2 \times$  length of 1cu-a. Areolet obliquely quadrangular, distinctly stalked frontally, receiving vein 2m-cu approximately in its distal 0.7. Postnerulus intercepted at middle. Hind wing vein 1-cu  $1.5 \times$  as long as cu-a. Propodeum evenly convex, with dense yellowish white setae; anterior portions of lateromedian longitudinal carinae and posterior portions of lateral longitudinal carinae present. Propodeal spiracle circular, convex.

**Metasoma.** First tergite (Fig. 20) approximately  $2.7 \times$  as long as posterior width, straight, shagreened, apical half with sparse fine indistinct punctures; latero-median and dorso-lateral carinae absent; ventro-lateral carinae complete; spiracle small, circular, distinctly convex, located at 0.5 of first tergite. Second and third tergites (Fig. 21) shagreened. Second tergite approximately as long as apical width, anteromedian portion with weak indistinct transverse wrinkles; thyridium transverse, distance to basal margin of second tergite about as its length. Third tergite (Fig. 21) parallel laterally,  $0.85 \times$  as long as wide. Ovipositor sheath (Fig. 22)  $5.5 \times$  as long as maximum width,  $0.2 \times$  as long as hind tibia, upper and lower margins almost parallel.





**Figures 14–22.** *Anisotacrus senticosus* Sheng & Sun, sp. nov. Holotype. Female **14** head, anterior view **15** head, lateral view **16** head, dorsal view **17** mesoscutum, dorsal view **18** mesosoma, lateral view **19** hind tibia, lateral view **20** first tergite, dorsal view **21** second and third tergites, dorsal view **22** apical portion of metasoma, lateral view.

**Coloration** (Fig. 13). Black, except for following: Lateral side of face widely and irregularly, labrum, mandible except teeth and dorso-posterior corners of pronotum yellowish white. Maxillary and labial palpi dark brown. Fore and middle tibiae and tarsomeres 1–4 brownish yellow. Basal half of hind tibia except basal end and tibial spurs reddish brown. Posterior portion of tergite 2, tergite 3 entirely and 4 except posterior margin brownish red. Pterostigma brownish black. Veins blackish brown.

**Etymology.** The specific name is derived from the tibia with thorns.

**Material examined.** *Holotype*: CHINA • ♀; Beijing, Huairou, Labagoumen; 15.VIII.2016; IT by Shi-Xiang Zong.

**Distribution.** China.

**Differential diagnosis.** The new species is similar to *A. xanthostigma* (Gravenhorst, 1829), but can be distinguished from the latter by the following combination of characters: areolet distinctly quadrilateral; first tergite evenly convex, without longitudinal groove; second tergite as long as apical width; third tergite distinctly shorter than its width; mesoscutum, tegulae, all coxae and trochanters black. *Anisotacrus xanthostigma*: areolet triangular; first tergite with longitudinal groove; second tergite longer than apical width; third tergite as long as apical width; anterolateral portion of mesoscutum with yellow spots; tegulae yellow; fore coxae and parts of trochanters yellow.

## Discussion

The male of *Anisotacrus xanthostigma* displays some distinct variation (Kasparyan and Khalaim 2007), including a wide range of coloration. The original description of *A. iyoensis* (Uchida, 1953) was based on two male specimens, and is very similar to *A. xanthostigma* (Gravenhorst, 1829). Both species may be conspecific (Kasparyan and Khalaim 2007). For a decision, the type of *A. iyoensis* and more East Palaearctic material have to be studied in the future.

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