



Research article

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The species of *Campodorus* Förster, 1869 and a related species (Hymenoptera, Ichneumonidae) from China

Shu-Ping SUN¹, Tao LI², Mao-Ling SHENG^{3,*} & Jun LÜ⁴

^{1,2,3} General Station of Forest and Grassland Pest Management, National Forestry and Grassland Administration, 58 Huanghe North Street, Shenyang 110034, P.R. China.

⁴ Forest Pest Control and Quarantine Station of Kuandian Manzu Autonomous County, Kuandian Liaoning 118200, P.R. China.

* Corresponding author: shengmaoling@163.com

¹ Email: sfzssp@163.com

² Email: litao200105@163.com

⁴ Email: kdxlj@163.com

¹ [urn:lsid:zoobank.org:author:974C0354-6118-4EA9-890F-EF5ECE8F257A](https://zoobank.org/author/974C0354-6118-4EA9-890F-EF5ECE8F257A)

² [urn:lsid:zoobank.org:author:AE2C4D7F-6132-4A33-A5EC-04CF541BD80E](https://zoobank.org/author/AE2C4D7F-6132-4A33-A5EC-04CF541BD80E)

³ [urn:lsid:zoobank.org:author:3C0EBDB7-26F7-469B-8DB1-5C7B1C6D9B89](https://zoobank.org/author/3C0EBDB7-26F7-469B-8DB1-5C7B1C6D9B89)

⁴ [urn:lsid:zoobank.org:author:D5E7E123-3B35-4CEC-85C8-D315EC51B689](https://zoobank.org/author/D5E7E123-3B35-4CEC-85C8-D315EC51B689)

Abstract. Ten species of *Campodorus* Förster, 1869 are reported from China and five species are new to science: *C. albilineatus* Sheng, Sun & Li sp. nov. from Guangxi Zhuang Autonomous Region in the Oriental part of China, *C. punctatus* Sheng, Sun & Li sp. nov. and *C. rasilis* Sheng, Sun & Li sp. nov. from Beijing, *C. shandongicus* Sheng, Sun & Li sp. nov. from Shandong Province and *C. truncatus* Sheng, Sun & Li, sp. nov. from Liaoning Province. Three species, *C. ciliatus* (Holmgren, 1857) and *C. dauricus* Kasparyan, 2005 collected from Liaoning Province and *Mesoleius faciator* Kasparyan, 2001 from Beijing, are new records for China. A key to species of *Campodorus* and a related genus known in China is provided.

Keywords. Key, new species, *Campodorus*, Ctenopelmatinae, taxonomy.

Sun S.-P., Li T., Sheng M.-L. & Lü J. 2020. The species of *Campodorus* Förster, 1869 and a related species (Hymenoptera, Ichneumonidae) from China. *European Journal of Taxonomy* 658: 1–26.

<https://doi.org/10.5852/ejt.2020.658>

Introduction

Campodorus Förster, 1869 (Hymenoptera Linnaeus, 1758, Ichneumonidae Latreille, 1802, Ctenopelmatinae Förster, 1869) comprises 138 species (Yu *et al.* 2016), of which 51 are from the Eastern Palaearctic (25 of them also found in the Western Palaearctic) (Kasparyan 2003, 2005, 2006; Uchida 1935), 99 from the Western Palaearctic (Heinrich 1952; Teunissen 1953; Riedel & Hansen 2012; Yu *et al.* 2016) and 14 from the Nearctic Region (Ashmead 1902; Townes & Townes 1973; Carlson 1979; Jussila 1996, 2006); only a single species is known in the Oriental Region (Kasparyan 1998). No

species of *Campodorus* have been recorded in the Australasian or tropical Regions. Prior to the present study, two species have been described from China: *Campodorus micropunctatus* (Uchida, 1942) and *C. variegatus* (Jurine, 1807) (Uchida 1942; Sheng & Sun 2014; Yu *et al.* 2016).

The Palaearctic species of *Campodorus* were successively revised and keyed by Kasparyan (2003, 2005, 2006). The Far East species of Russia were keyed by Kasparyan & Khalaim (2007). *Campodorus orientalis* Kasparyan, 1998 is the only known Oriental species, collected by R. Malaise in Myanmar (Kasparyan 1998).

There are records of *Campodorus* reared from 38 host species (Yu *et al.* 2016). Hosts belong to the sawfly family Tenthredinidae (Thirion *et al.* 1993; Shaw & Kasparyan 2003; Kasparyan & Kopelke 2009), mostly the subfamily Nematinae (Broad *et al.* 2018). Some reported hosts in the Taxapad database (Yu *et al.* 2016), belonging to Lepidoptera, are obviously erroneous.

In this paper, ten species are reported from China, including *Mesoleius faciator* Kasparyan, 2001, a species which is easily confused with *Campodorus* and was only doubtfully included in *Mesoleius* by Kasparyan (2001). Five new species are described and a key to all known Chinese *Campodorus* species is provided.

Material and methods

Institutional abbreviations

- GSFGPM = General Station of Forest and Grassland Pest Management, National Forestry and Grassland Administration, P.R. China
HUM = Hokkaido University Museum, Sapporo, Japan
KPMNH = Kanagawa Prefectural Museum of Natural History, Odawara, Japan
NHMUK = Natural History Museum, London, United Kingdom
ZISP = Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia
ZSMG = Zoologische Staatssammlung München, Munich, Germany

Specimen collection and rearing

Rearing parasitoids. The cocoons of sawflies were collected under naturally heavily infested trees and reared in the laboratory at room temperature. The emerged insects were collected daily.

Direct collection. Parasitoid adults were collected with interception traps (IT) (Li *et al.* 2012) mainly in the natural reserves of China: Beijing, Guangxi, Jilin, Liaoning, Shandong.

Examined material. Some type specimens of *Campodorus*, deposited in HUM, ZISP and ZSMG, were examined. The photos of the types of *Campodorus orientalis* Kasparyan, 1998, *Cuboscoptes epachthoides* Heinrich, 1952, *Otlophorus crassitarsus* Uchida, 1935 and *Trematopygus micropunctatus* Uchida, 1942, taken by K. Watanabe (KPMNH), were checked and compared to the new species by the corresponding author.

Images were taken using a Leica M205A stereo microscope with LAS Montage MultiFocus. Morphological terminology is mostly based on Broad (2018 *et al.*). All examined specimens including holotypes and paratypes are deposited in the Insect Museum, GSFGPM.

Results

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Superfamily Ichneumonoidea Latreille, 1802
Family Ichneumonidae Latreille, 1802
Subfamily Ctenopelmatinae Förster, 1869
Tribe Mesoleiini Thomson, 1883

Genus *Campodorus* Förster, 1869

Campodorus Förster, 1869 (1868): 213, type-species: *Mesoleius melanogaster* Holmgren, 1857.

Diagnosis (Townes 1970; Gauld *et al.* 1997; Kasparyan 2003)

Apical median portion of clypeus swollen; apical margin usually blunt at midline, sharp laterally, usually projecting as thin lobes. Notaulus usually reaching front edge of mesoscutum. Mesopleuron usually mat or sometimes subpolished, its punctures medium-sized to very fine. Median longitudinal and posterior transverse carinae of propodeum usually complete and strong. Fore wing areolet absent; vein 1cu-a distal to M&RS. Hind wing vein 1-cu longer than cu-a. Dorsal median carinae of first tergite at least reaching beyond spiracle. Second tergite matt (finely shagreened to scabrous), punctures small to very small, or almost absent.

Key to species of *Campodorus* known from China

1. Mesosoma mainly red, at least with large yellow to yellowish brown spots. Hind coxa reddish or yellowish brown.....2
– Mesosoma black or almost entirely black; Hind coxa black or red to yellowish brown.....3
2. Mesoscutum almost shiny, with fine indistinct punctures. Mesoscutum red, except blackish anterior medium spot, mesopleuron red, partly brownish yellow. Face black. Flagellum red brown. In holotype (Transbaikalia) hind tibia white with three blackish rings (basal and subbasal rings weaker).....*C. dauricus* Kasparyan, 2005
– Mesoscutum with distinct punctures. Mesoscutum and mesopleuron largely black. Face largely yellow. Flagellum black.....*C. variegatus* (Jurine, 1807)
3. Median longitudinal carinae of propodeum (Fig. 22) weak or almost absent. Metasomal tergites (Figs 17, 23–25), at least tergites 2–4, reddish brown. Hind coxa and hind femur black, all trochanters whitish (Fig. 17).....*C. shandongicus* Sheng, Sun & Li sp. nov.
– Median longitudinal carinae of propodeum complete, strong. Metasomal tergites black, at most posterior margins narrowly white. Hind coxa and hind femur black or reddish brown.....4
4. Propodeum (Fig. 15) with dense long gray-yellow setae, median longitudinal carinae strongly converging medially; anterior to median portion evidently concave. Face (Fig. 12) entirely yellow.....*Mesoleius* (?*Campodorus*) *faciator* Kasparyan, 2001
– Propodeum without dense long gray-yellow setae, median longitudinal carinae parallel or divergent posteriorly. Face black.....5
5. Second and subsequent tergites entirely reddish brown. Basal part of hind coxa black, apical part red brown.....*C. micropunctatus* (Uchida, 1942)
– Second and subsequent tergites black, or only hind margins more or less white. Hind coxa red to reddish brown, or black.....6

6. Apex of ovipositor sheath (Fig. 58) almost truncate. Area petiolaris of propodeum (Fig. 56) with more or less distinct median longitudinal carina. Hind coxa black. Basal half of hind tibia buff, apical half black.....*C. truncatus* Sheng, Sun & Li sp. nov.
– Apex of ovipositor sheath rounded. Area petiolaris of propodeum without median longitudinal carina. Hind coxa red to reddish brown. Base of hind tibia black, and/or subbasal part more or less black.....7
7. Areas superomedia and petiolaris of propodeum (Fig. 49) completely confluent; median longitudinal carinae strongly, evenly divergent posteriorly. Lower lateral portion of face (Fig. 45) with large yellow spots. Metasomal sternites 2–4 buff, sublaterally with longitudinal black spots.....*C. rasilis* Sheng, Sun & Li sp. nov.
– Area superomedia and area petiolaris of propodeum separated by strong transverse carina. Face entirely black. Metasomal sternites brownish black, or anterior portion gray white.....8
8. Area basalis and area superomedia of propodeum (Fig. 41) separated by strong transverse carina. Ovipositor sheath $3.0 \times$ as long as maximum width, with dorsomedian portion distinctly widened (Fig. 51).....*C. punctatus* Sheng, Sun & Li sp. nov.
– Area basalis and area superomedia of propodeum completely confluent. Ovipositor sheath at least $3.6 \times$ as long as maximum width, widened subapically (Fig. 10).....9
9. Median longitudinal carinae of propodeum strongly converging medially. Ovipositor sheath $4.2 \times$ as long as maximum width. Metasomal tergites almost entirely black. At least basal halves of hind basal three tarsomeres white.....*C. ciliatus* (Holmgren, 1857)
– Median longitudinal carinae of propodeum (Fig. 7) almost parallel. Posterior portions of metasomal tergites (Figs 1, 8, 10) with wide white transverse bands. Ovipositor sheath $3.6 \times$ as long as maximum width. Hind tarsomeres entirely black...*C. albilineatus* Sheng, Sun & Li sp. nov.

Campodorus albilineatus Sheng, Sun & Li sp. nov.

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Figs 1–10

Diagnosis

Clypeus (Fig. 2) approximately $2.2 \times$ as wide as long, shiny, with texture different from face. Speculum large, shiny, smooth (Fig. 6). Metapleuron with texture different from mesopleuron, with dense indistinct punctures. Median longitudinal carinae of propodeum complete, almost parallel. Ovipositor sheath (Fig. 10) approximately $3.6 \times$ as long as its width, evenly widened posteriorly. Hind coxa yellowish white dorsally, brownish red ventrally. Metasomal tergites and sternites 5–6 (Figs 1, 8–10) broadly white on posterior margins.

Differential diagnosis

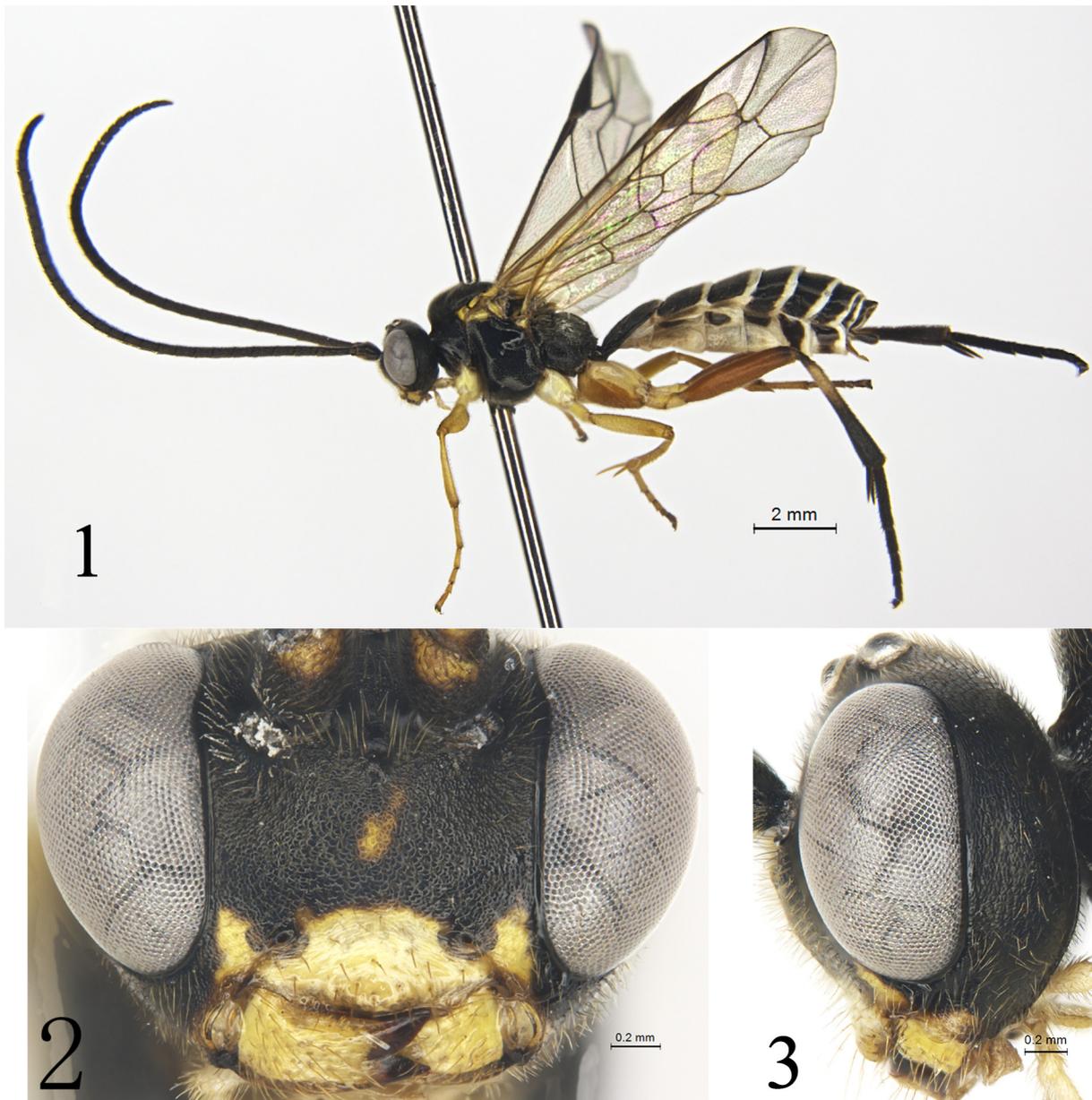
The new species is similar to *C. ciliatus* (Holmgren, 1857), but can be distinguished from the latter by the following combination of characters: median longitudinal carinae of propodeum (Fig. 7) almost parallel; ovipositor sheath (Fig. 10) without particularly long setae; hind coxa yellowish white dorsally, brownish red ventrally; posterior margin of metasomal tergites (Figs 8–10) widely white. Hind tibia pale in basal 0.3, blackish at extreme base and in apical half. *Campodorus ciliatus*: median longitudinal carinae of propodeum strongly narrowed medially; apical portion of ovipositor sheath at apex with a

few particularly long setae; hind coxa entirely red; metasomal tergites almost entirely black. Hind tibia predominantly pale rufous, not darkened at base, and brownish in apical 0.33.

Another Oriental species, *C. orientalis* Kasparyan, 1998, differs from the new species in having the mesothorax and hind coxa completely red, first flagellomere strongly elongate, $1.9 \times$ as long as second, and areas of the propodeum before the level of the spiracle obliterated.

Etymology

The specific name is derived from the white bands on the hind margins of the metasomal tergites.



Figs 1–3. *Campodorus albilineatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **1.** Habitus, lateral view. **2.** Head, anterior view. **3.** Head, lateral view.

Material examined

Holotype

CHINA • ♀; Guangxi Zhuang Autonomous Region, Shangsi, Mt Shiwan; 20 Nov. 2018; interception trap; GSF GPM.

Paratypes

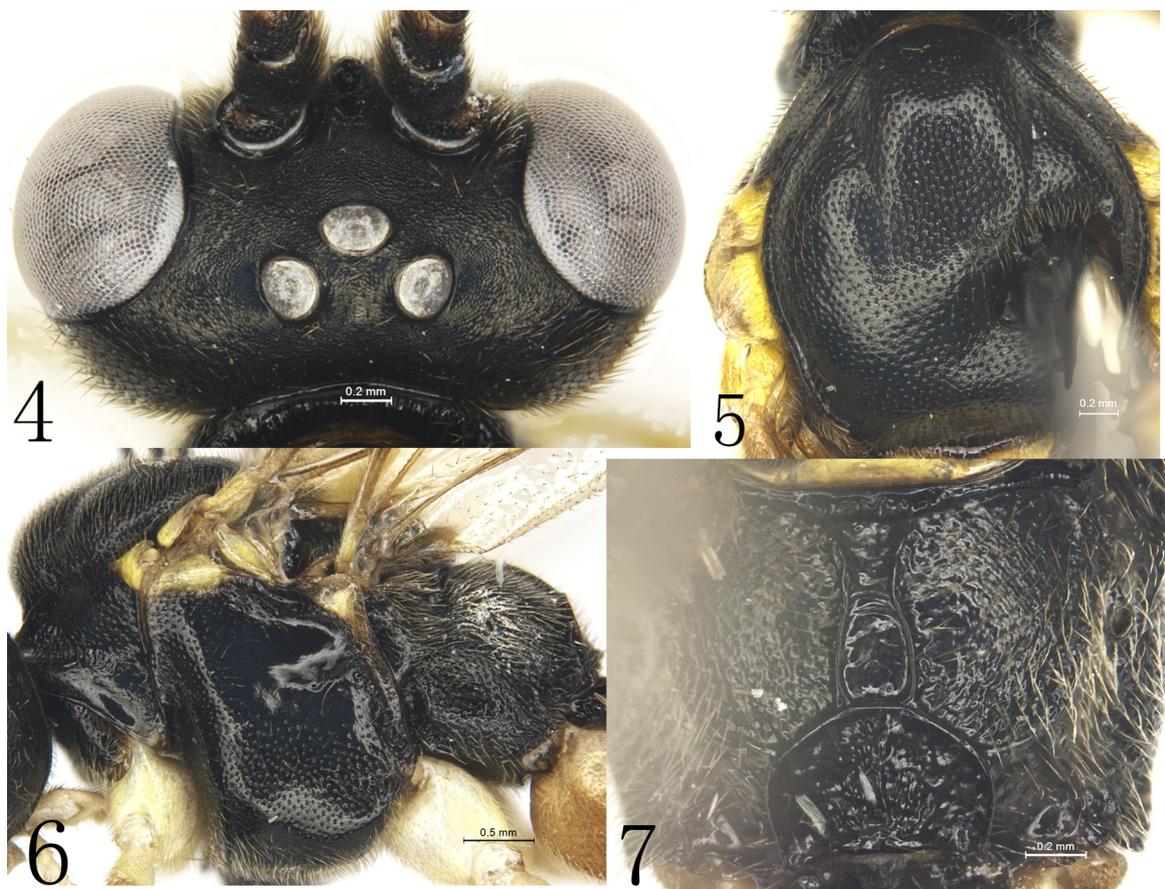
CHINA • 5 ♀♀, 4 ♂♂; Guangxi Zhuang Autonomous Region, Shangsi, Mt Shiwan; 20–27 Nov. 2018; interception trap; GSF GPM.

Description

Female

MEASUREMENTS. Body length 6.9–8.1 mm. Fore wing length 5.5–6.4 mm. Ovipositor sheath length 0.4–0.5 mm.

HEAD. Inner orbits parallel. Face (Fig. 2) approximately $1.7 \times$ as wide as long, shagreened, with shallow indistinct punctures; upper margin with median small tubercle. Clypeus approximately $2.2 \times$ as wide as long, transversely convex, shiny, with sparse yellowish brown setae. Mandible with large shallow sparse punctures and brown setae; upper tooth slightly longer than lower tooth. Malar space slightly shagreened, about $0.4 \times$ as long as basal width of mandible. Gena (Fig. 3) slightly shagreened, hind portion almost shiny, evenly convergent backward. Vertex (Fig. 4) with texture as that of gena, lateral portion with indistinct fine punctures. Postocellar line approximately $0.8 \times$ as long as ocular-ocellar

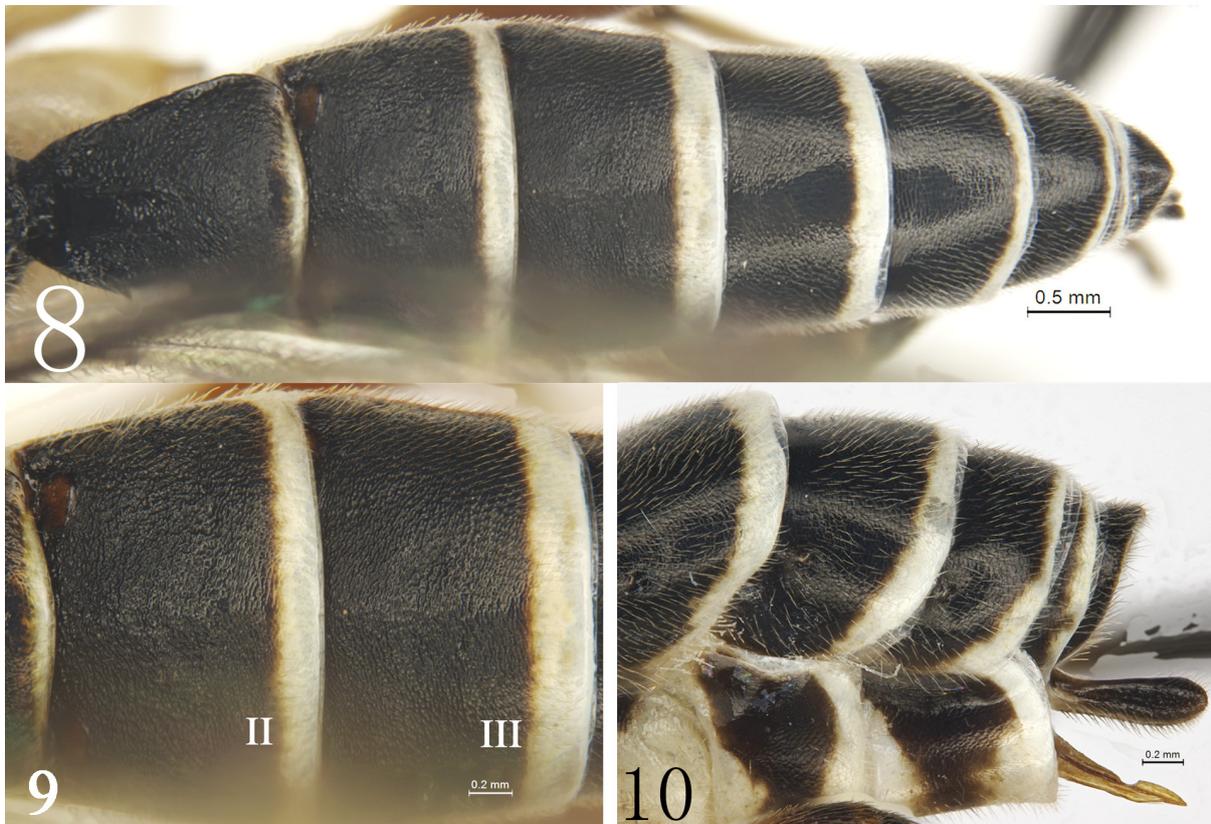


Figs 4–7. *Campodorus albilineatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSF GPM). 4. Head, dorsal view. 5. Mesoscutum. 6. Mesosoma, lateral view. 7. Propodeum.

line. Frons almost flat, shagreened. Antenna with 33–34 flagellomeres; ratio of length from first to fifth flagellomeres approximately: 1.7:1.1:1.0:1.0:1.0.

MESOSOMA. Anterior portion of pronotum (Fig. 6) smooth, shiny; lateral concavity with irregular short transverse wrinkles; upper-posterior portion with distinct, fine punctures. Mesoscutum (Fig. 5) shiny, median portion with relatively dense punctures, distance between punctures $0.5\text{--}2.5 \times$ diameter of puncture; sparser on lateral portion, distance between punctures $1.0\text{--}4.0 \times$ diameter of puncture. Notauli distinct in anterior 0.5 of mesoscutum, slightly convergent posteriorly (Fig. 5). Scutellum with dense fine punctures. Postscutellum almost rectangular, with indistinct shallow punctures. Anterior and lower portion of mesopleuron (Fig. 6) smooth with relatively dense punctures, distance between punctures $0.2\text{--}2.0 \times$ diameter of puncture; speculum and surrounding area shiny, smooth, without punctures. Upper end of epicnemial carina approximately reaching 0.4 distance to subtegular ridge. Metapleuron with dense indistinct punctures and gray-brown setae (Fig. 6). Claw simple. Ratio of length of hind tarsomeres from first to fifth approximately: 5.2:2.3:1.8:1.0:1.4. Wings slightly brownish, hyaline. Fore wing with vein 1cu-a distal to M&RS by approximately $0.5 \times$ length of 1cu-a. Postnervulus intercepted slightly below middle. Hind wing vein 1-cu $1.5\text{--}2.0 \times$ as long as cu-a. Propodeum (Fig. 7) with irregular indistinct rugae; median longitudinal and posterior transverse carinae complete, strong. Median longitudinal carinae very slightly converging medially, area between them shiny. Posterior half of area petiolaris with irregular longitudinal wrinkles. Propodeal spiracle almost circular.

METASOMA. First tergite (Fig. 8) approximately $1.2 \times$ as long as posterior width, strongly and evenly narrowed to base, slightly shagreened; dorsal median carinae reaching to middle; spiracle small, circular, located approximately at anterior 0.4 of first tergite. Second and subsequent tergites (Figs 8–10) distinctly shagreened, with short brownish gray setae. Second tergite (Fig. 9) approximately $0.6 \times$ as long as apical



Figs 8–10. *Campodorus albilineatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **8.** Metasoma, dorsal view. **9.** Tergites 2–3, dorsal view. **10.** Apical portion of metasoma, lateral view.

width. Ovipositor sheath (Fig. 10) approximately $3.6 \times$ as long as its width, evenly widened posteriorly. Ovipositor (Fig. 10) with distinctly wide subapical dorsal notch.

COLORATION (Fig. 1). Black, except for following: apical half of scape ventrally and apical margin of pedicel more or less yellow brown. Clypeus, small median spot and two spots in lower corners of face (Fig. 2), mandible except teeth, maxillary palpi, labial palpi, tegulae, subtegular ridge, scutellum, postscutellum, fore and middle coxae and parts of tarsi, hind coxa dorsally, all trochanters, and subbasal portions of hind tibia whitish yellow. Fore and middle legs except coxae and parts of tarsi brownish yellow. Hind coxa ventrally and hind femur reddish. Posterior portions of metasomal tergites white. Sternites 2–4 broadly whitish in median part, sternites 5 and 6 black with anterior and posterior margins widely white.

Remarks

Campodorus albilineatus sp. nov. is the only species known from the Oriental part of China.

Campodorus ciliatus (Holmgren, 1857)

Material examined

CHINA • 1 ♀; Liaoning Prov., Shenyang; 23 May 1993; Mao-Ling Sheng leg.; GSF GPM.

Remarks

New record for China.

Campodorus dauricus Kasparyan, 2005

Material examined

CHINA • 1 ♀; Liaoning Prov., Shenyang; 4 Jun. 1991; Mao-Ling Sheng leg.; GSF GPM • 1 ♀; Liaoning Prov., Shenyang; 25 Jun. 1991; Mao-Ling Sheng leg.; GSF GPM.

Remarks

New record for China.

Mesoleius (?*Campodorus*) *faciator* Kasparyan, 2001 Figs 11–16

Diagnosis

Head, mesoscutum (Fig. 13), mesopleuron, metasomal tergites 1–3 (Fig. 16) shagreened, almost without punctures. Clypeus approximately $3.3 \times$ as wide as long, smooth, shiny. Lateral portion of propodeum (Fig. 15) with long whitish yellow setae; median longitudinal carinae strongly converge medially. Face and clypeus whitish yellow. Metasomal tergites almost entirely black.

Differential diagnosis

In main peculiarities of coloration and most other diagnostic characters the Chinese specimens correspond to the holotype of *Mesoleius faciator* Kasparyan, 2001 (Russia, Chita Prov.), but differ in dense long pubescence of lateral parts of the propodeum; in having more antennal segments (39 flagellomeres) and smaller body size (fore wing 6.6 mm long); the holotype of *M. faciator* has 36 flagellomeres and fore wing is 8.1 mm long. Although described in the genus *Mesoleius*, Kasparyan (2001) noted that *M. faciator* occupied an intermediate position between *Campodorus* and *Mesoleius*.

Material examined

CHINA • 1 ♀; Beijing, Huairou, Labagoumen; 20 Jun. 2011; Bin Tian leg.; GSF GPM.

Description

Female

MEASUREMENTS. Body length approximately 11.6 mm. Fore wing length approximately 6.8 mm. Ovipositor sheath length approximately 0.4 mm.

HEAD. Face (Fig. 12) approximately $1.8 \times$ as wide as long, shagreened, almost flat, with dense yellowish white setae; upper margin with median small tubercle. Clypeus approximately $3.3 \times$ as wide as long, smooth, shiny, with sparse brown setae; apical margin sharp, subapical portion distinctly convex (Fig. 12). Mandible with sparse indistinct shallow punctures and brown setae; upper tooth slightly wider, longer than lower tooth. Malar area granulated; malar space approximately $0.5 \times$ as long as basal width of mandible. Gena and vertex almost shagreened. Posterior portion of gena distinctly convergent posteriorly. Postocellar line approximately $0.9 \times$ as long as ocular-ocellar line. Antenna with 39 flagellomeres; ratio of length from first to fifth flagellomeres approximately: 1.6:1.3:1.2:1.1:1.0. Occipital carina complete, lower end reaching hypostomal carina distinctly above base of mandible.

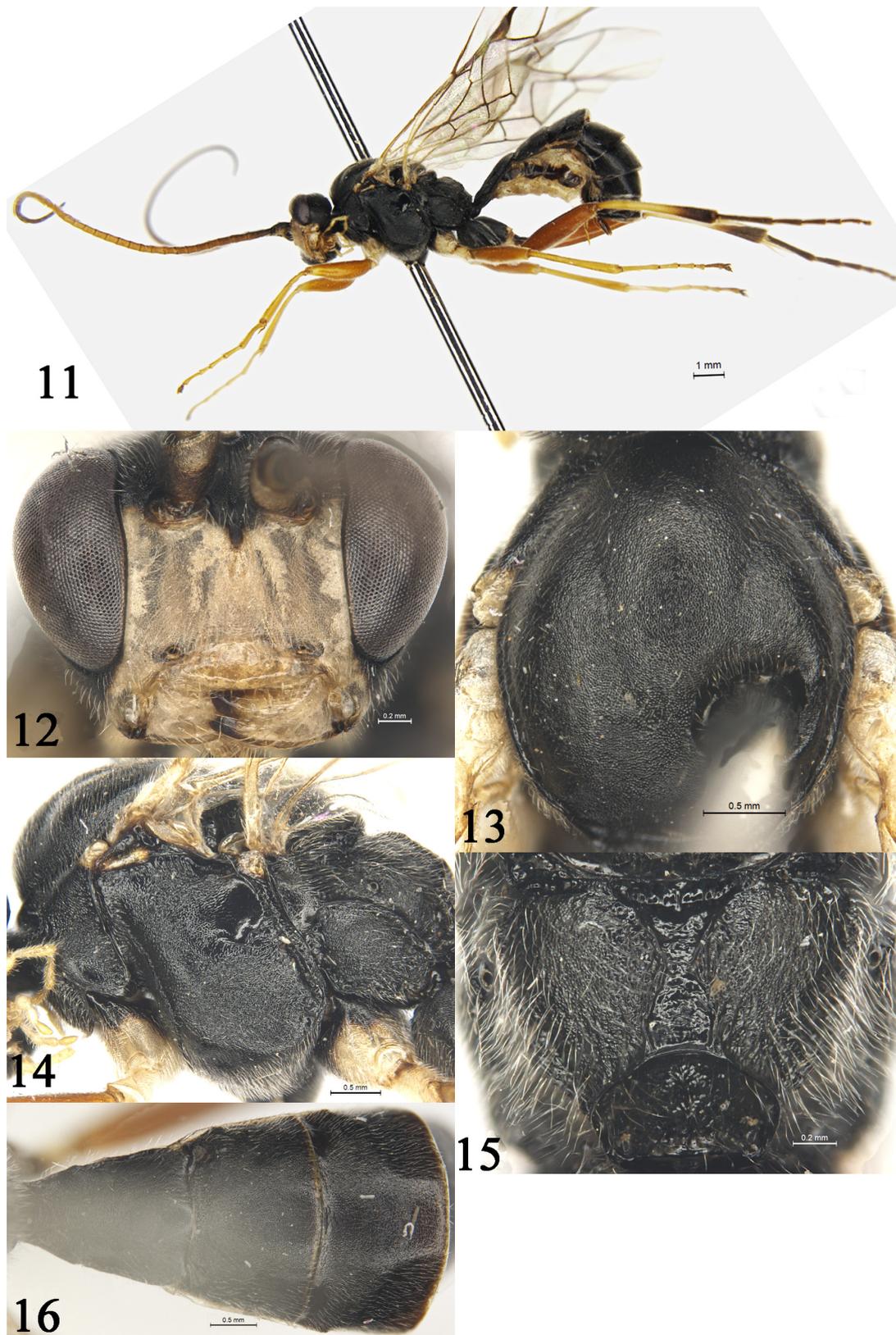
MESOSOMA. Pronotum (Fig. 14) roughly granulated, lateromedian portion of lateral concavity with fine indistinct oblique wrinkles; subdorsal portion with few distinct oblique wrinkles. Mesoscutum (Fig. 13) and scutellum distinctly shagreened, with sparse fine punctures. Notauli reaching middle of mesoscutum. Scutoscutellar groove smooth. Postscutellum transverse, almost shiny, concave at base. Mesopleuron (Fig. 14) roughly indistinctly shagreened; speculum shiny, smooth; area in front of speculum with fine indistinct punctures. Upper end of epicnemial carina reaching to 0.7 distance to subtegular ridge. Metapleuron (Fig. 14) evenly slightly convex, distinctly shagreened; lower posterior portion with irregular oblique wrinkles. Claw simple. Ratio of length of hind tarsomeres from first to fifth: 4.3:2.1:1.7:1.0:1.4. Wings brownish, hyaline. Fore wing with vein 1cu-a distal to M&RS by $0.2 \times$ length of 1cu-a. Postnervulus intercepted below middle. Hind wing vein 1-cu $1.5 \times$ as long as cu-a. Propodeum (Fig. 15) shagreened, lateral portion with long whitish yellow setae; median longitudinal and posterior transverse carinae complete, strong. Median longitudinal carinae strongly narrowed medially, area between them shiny. Area petiolaris shiny, with irregular longitudinal wrinkles. Propodeal spiracle almost circular.

METASOMA. Anterior three metasomal tergites (Fig. 16) shagreened. First tergite $1.4 \times$ as long as posterior width, strongly and evenly tapered to base; posterior margin slightly smooth; dorsal median carina reaching to 0.4 length of first tergite; dorsolateral and ventrolateral carinae complete; spiracle small, circular, slightly convex, located at anterior 0.4 of first tergite. Second tergite (Fig. 16) $0.8 \times$ as long as anterior width, $0.6 \times$ as long as posterior width. Third tergite $0.55 \times$ as long as posterior width, with more or less distinct median transverse depression (Fig. 16). Fourth and subsequent tergites with fine short indistinct transverse rugae. Ovipositor sheath (Fig. 11) about $4.0 \times$ as long as wide, parallel-sided, rounded posteriorly.

COLORATION (Fig. 11). Black, except for following: antennae darkish brown dorsally, brown ventrally. Face, clypeus whitish yellow; mandible except teeth, maxillary palpi, labial palpi, malar area, upper-posterior corners of pronotum, tegulae, subtegular ridge, posterior margins of tergites 3–7 slightly yellowish white. Fore and middle coxae, except for black bases, their trochanters, apex of hind coxa and hind trochanters ventrally yellow. All femora red to brown red. Fore and middle tibiae and tarsi almost evenly yellowish. Basal 0.6 of hind tibia mainly yellow. Pterostigma and veins black brown. Sternites 2–5 whitish yellow, sublateral parts broadly black (Fig. 11).

Remarks

New record for China.



Figs 11–16. *Mesoleius* (?*Campodorus*) *faciator* Kasparyan, 2001, ♀ (GSFGPM). **11.** Habitus, lateral view. **12.** Head, anterior view. **13.** Mesoscutum. **14.** Mesosoma, lateral view. **15.** Propodeum. **16.** Tergites 1–3, dorsal view.

Campodorus shandongicus Sheng, Sun & Li sp. nov.

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Figs 17–25

Diagnosis

The new species may easily be distinguished from most other congeners in coloration (Fig. 17): by the combination of an almost entirely brownish red metasoma, blackish hind femur and hind coxa, and whitish yellow hind trochanter and a broad ring on the hind tibia. Face (Fig. 18) flat, with dense fine punctures, distance between punctures $0.2\text{--}0.5 \times$ diameter of puncture. Upper tooth of mandible slightly shorter than lower tooth. Median longitudinal carinae and median portion of posterior transverse carina of propodeum weak or almost absent. Metasomal tergites shagreened. Ovipositor sheath (Figs 17, 25) approximately $4.2 \times$ as long as its median width, dorsal and ventral margins almost parallel.

Differential diagnosis

The new species is similar to *C. micropunctatus* (Uchida, 1942), but can be distinguished from the latter by the following combinations of characters: median longitudinal carinae of propodeum weak (male) or indistinct (female). Ovipositor sheath $4.5 \times$ as long as maximum width. Flagellum brownish black ventrally, black dorsally. Hind femur black. *Campodorus micropunctatus*: median longitudinal carinae of propodeum distinct and strong. Ovipositor sheath $1.9 \times$ as long as maximum width. Flagellum and hind femur reddish brown.



Fig. 17. *Campodorus shandongicus* Sheng, Sun & Li sp. nov., holotype, ♀, habitus, lateral view (GSFGPM).

Etymology

The specific name is derived from the type locality.

Material examined

Holotype

CHINA • ♀; Shandong Province, Qingdao, Laoshan Forest Farm; 26 Jun. 2017; interception trap; GSFQPM.

Paratypes

CHINA • 2 ♀♀, 3 ♂♂; Shandong Province, Jinan, Yaoxiang Forest Farm; 25–31 May 2017; Mao-Ling Sheng leg.; GSFQPM.

Description

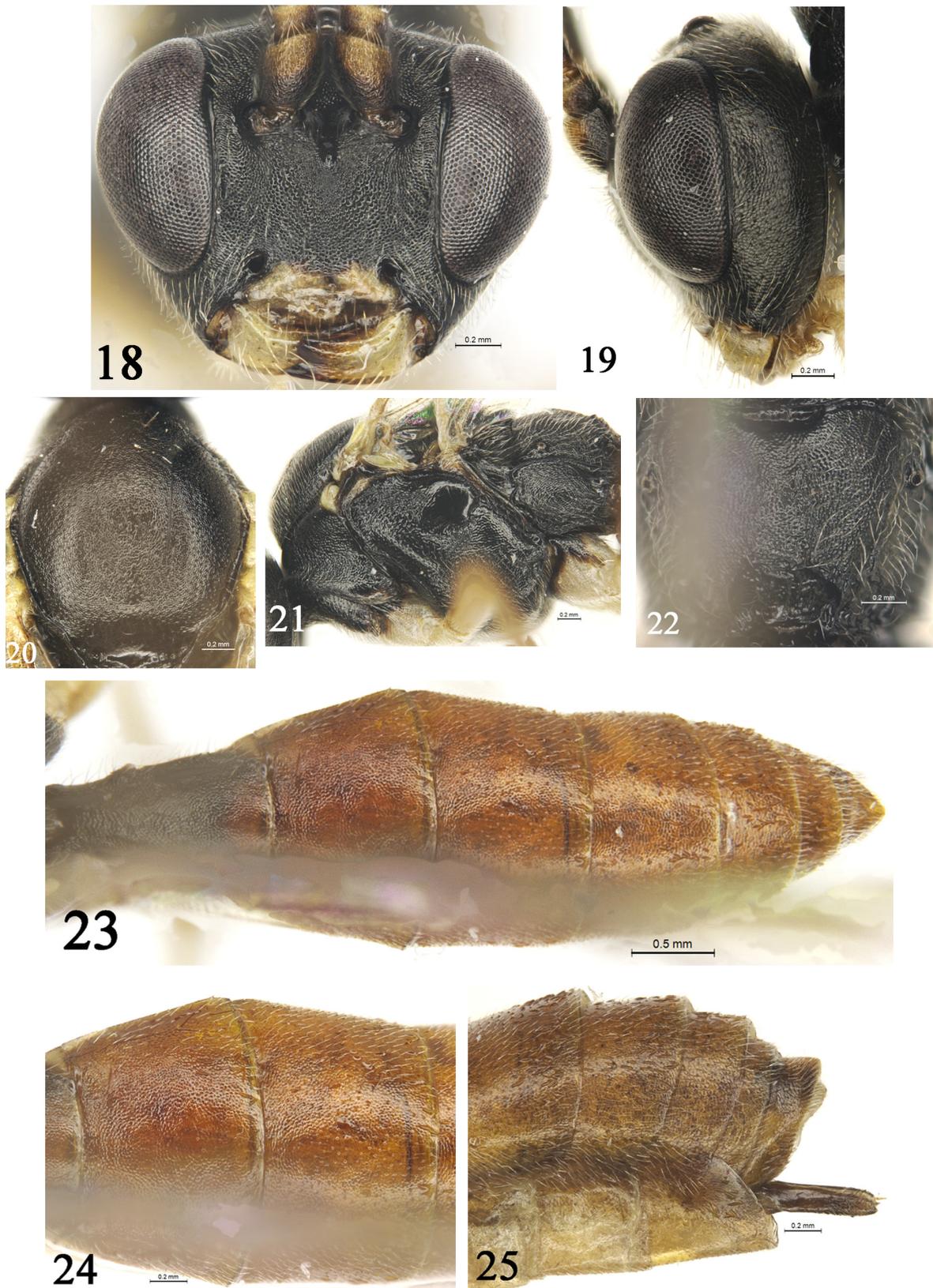
Female

MEASUREMENTS. Body length approximately 5.5 mm. Fore wing length approximately 4.5 mm. Ovipositor sheath length approximately 0.7 mm.

HEAD. Face (Fig. 18) approximately $1.9 \times$ as wide as long, almost flat, with dense fine punctures and fine short setae, distance between punctures $0.2\text{--}0.5 \times$ diameter of puncture; upper margin with median V-shaped emargination and small tubercle. Clypeus approximately $2.7 \times$ as wide as long, smooth, shiny; apical median portion distinctly convex, with indistinct shallow punctures. Mandible with shallow sparse punctures and yellow setae; upper tooth slightly shorter than lower tooth. Malar space shagreened, $0.7 \times$ as long as basal width of mandible. Gena (Fig. 19) finely shagreened, with shallow fine punctures. Vertex and frons with texture as that of gena. Postocellar line approximately $0.8 \times$ as long as ocular-ocellar line. Frons flat. Antenna with 31 flagellomeres; ratio of length from first to fifth flagellomeres approximately: 2.7:1.6:1.5:1.5:1.3. Occipital carina complete, lower end reaching hypostomal carina distinctly above base of mandible.

MESOSOMA. Lower-anterior portion of pronotum (Fig. 21) with fine oblique longitudinal wrinkles; lateral concavity with fine transverse wrinkles; upper-posterior portion shagreened. Mesoscutum (Fig. 20) shagreened, with sparse shallow indistinct punctures, median portion finely irregularly rugose. Anterior 0.3 of notauli present. Scutellum, postscutellum shagreened, with indistinct fine punctures. Mesopleuron (Fig. 21) with dense irregular fine wrinkles; upper-anterior and lower-posterior portions with dense oblique longitudinal wrinkles. Upper end of epicnemial carina approximately reaching to 0.35 height of hind margin of pronotum. Speculum large, shiny, smooth. Metapleuron evenly convex, shagreened, with brownish gray short setae. Basal portion of claw finely pectinate. Ratio of length of hind tarsomeres from first to fifth approximately: 4.7:2.2:1.7:1.0:1.3. Wings slightly brownish, hyaline. Fore wing with vein 1cu-a distal to M&RS approximately by $0.25 \times$ length of 1cu-a. Postnervulus intercepted almost at middle. Hind wing vein 1-cu approximately $4.0 \times$ as long as cu-a; final abscissa of CU almost unpigmented. Propodeum (Fig. 22) with dense fine punctures, distance between punctures $0.2\text{--}1.0 \times$ diameter of puncture; median longitudinal carinae indistinct or absent; median portion of posterior transverse carina absent; area petiolaris with irregular wrinkles. Propodeal spiracle circular.

METASOMA. Metasomal tergites shagreened. First tergite (Figs 23–25) approximately $1.6 \times$ as long as posterior width, evenly narrowed anteriorly; dorsal median carina weak, reaching beyond spiracle; spiracle convex, located at anterior 0.4 of first tergite. Second tergite (Figs 23–24) approximately $0.7 \times$ as long as apical width. Third and fourth tergites with sparse indistinct fine punctures. Third tergite (Figs 23–24) approximately $0.8 \times$ as long as apical width. Ovipositor sheath (Figs 17, 25) rather narrow, in profile parallel-sided, rounded at apex, about $4.2 \times$ as long as its median width. Subapical dorsal notch of ovipositor wide.



Figs 18–25. *Campodorus shandongicus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **18.** Head, anterior view. **19.** Head, lateral view. **20.** Mesoscutum. **21.** Mesosoma, lateral view. **22.** Propodeum. **23.** Metasoma, dorsal view. **24.** Tergites 2–3, dorsal view. **25.** Apical portion of metasoma, lateral view.

COLORATION (Fig. 17). Black, except for following: ventral profiles of antennae darkish brown; clypeus, mandible except teeth, maxillary palpi, labial palpi, upper-posterior corner of pronotum, tegulae, subtegular ridge, fore and middle coxae and trochanters, apices of hind coxa, hind trochanter, basal portion of hind tibia except basal ends whitish yellow; remainder of fore and middle legs, posterior portion of first tergite, second and subsequent tergites red brown; pterostigma brownish black; veins black brown. Sternites brownish yellow.

Male

MEASUREMENTS. Body length approximately 5.8 mm. Fore wing length approximately 4.5 mm.

BODY. Face approximately $1.8 \times$ as wide as long, distance between punctures $0.2\text{--}1.0 \times$ diameter of puncture. Malar space approximately $0.6 \times$ as long as basal width of mandible. Postocellar line approximately $0.9 \times$ as long as ocular-ocellar line. Antenna with 29 flagellomeres; ratio of length from first to fifth flagellomeres: 2.3:1.3:1.2:1.2:1.1. Fore wing with vein 1cu-a distal to M&RS approximately by $0.35 \times$ length of 1cu-a. Hind wing vein 1-cu $5.5 \times$ as long as cu-a. Median longitudinal carinae of propodeum weak, complete, very slightly narrowed anteriorly; basal area distinctly concave; area petiolaris with transverse wrinkles. First tergite $2.0 \times$ as long as posterior width; spiracle located at middle of first tergite. Third tergite approximately as long as posterior width.

COLORATION. Face yellow, dorso-medially with a small black spot; metasomal fifth and subsequent tergites black. Remainder almost entirely the same as female.

Campodorus micropunctatus (Uchida, 1942)

Material examined

Holotype

CHINA • 1 ♀; Liaoning Prov., Tieling; 11 May 1938; I. Okada leg.; HUM.

Campodorus punctatus Sheng, Sun & Li sp. nov.

[urn:lsid:zoobank.org:act:B9653BA7-E1CC-485B-81FF-C10A3ACC5E9E](https://zoobank.org/act:B9653BA7-E1CC-485B-81FF-C10A3ACC5E9E)

Figs 26–34

Diagnosis

Propodeum (Fig. 32) shagreened except shiny areas basalis, superomedia and petiolaris; area basalis separated from area superomedia by strong transverse carina. Area superomedia trapezoidal, almost as long as maximum width. Metasomal tergites (Fig. 33) distinctly shagreened, without punctures. First tergite approximately $1.2 \times$ as long as posterior width. Head except clypeus, mesosoma and metasomal tergites (Figs 33–34) almost entirely black.

Differential diagnosis

The new species is similar to *C. crassitarsus* (Uchida, 1935), but can be distinguished from the latter by the following combination of characters: apical half of clypeus with dense large punctures; median longitudinal carinae of propodeum distinctly narrowed medially (Fig. 32); area superomedia and area basalis separated by strong carina; ovipositor sheath (Fig. 34) $3.0 \times$ as long as maximum width, dorsomedian portion distinctly dilated. *Campodorus crassitarsus*: clypeus almost entirely smooth; median longitudinal carinae of propodeum strongly divergent posteriorly; area superomedia and area basalis confluent (not separated by a carina); ovipositor sheath $2.8 \times$ as long as maximum width, dorsal margin straight, not dilated.

Etymology

The specific name is derived from the clypeus with large punctures.

Material examined

Holotype

CHINA • ♀; Beijing, Mentougou; 22 Aug. 2008; Tao Wang leg.; GSF GPM.

Description

Female

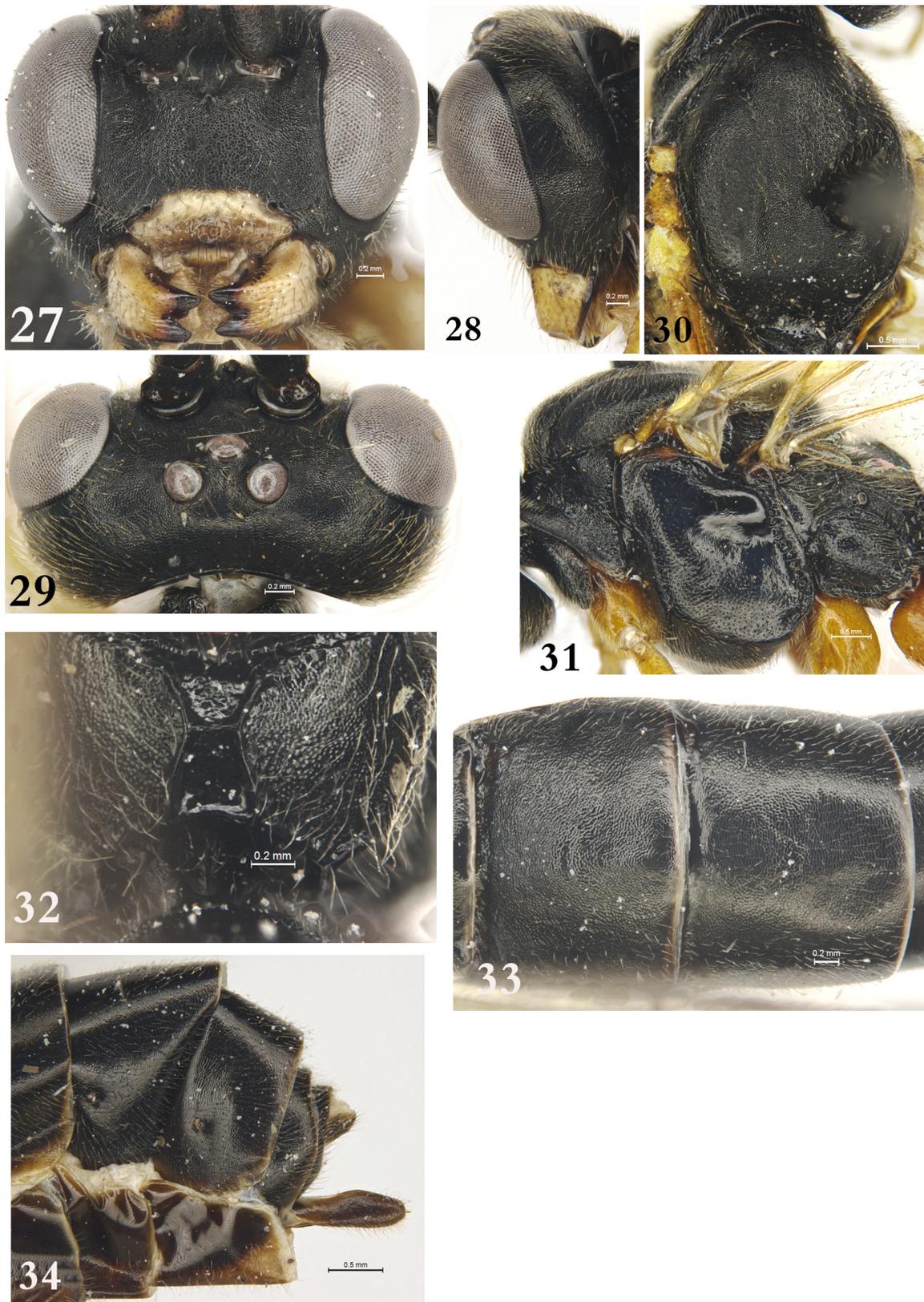
MEASUREMENTS. Body length about 11.3 mm. Fore wing length about 8.7 mm. Ovipositor sheath length 0.7 mm.

HEAD. Inner margins of eyes parallel, distinctly concave near antennal sockets. Face (Fig. 27) approximately $1.9 \times$ as wide as long, shagreened, median portion with fine indistinct punctures; upper lateral portion slightly concave; upper margin with median small tubercle. Clypeus approximately $2.9 \times$ as wide as long, shiny; its median portion apically strongly convex, with large dense punctures (Fig. 27); median section of apical margin evenly distinctly concave. Mandible with sparse fine punctures and brown setae; upper tooth slightly wider and longer than lower tooth. Malar space shagreened, approximately $0.4 \times$ as long as basal width of mandible. Gena (Fig. 28), vertex (Fig. 29) and frons slightly shagreened, with indistinct fine punctures. Gena evenly convergent posteriorly. Postocellar line approximately $0.6 \times$ as long as ocular-ocellar line. Frons almost flat, shagreened. Antenna with 37 flagellomeres; ratio of length from first to fifth flagellomeres approximately: 1.8:1.2:1.1:1.0:1.0.

MESOSOMA. Anterior portion of pronotum (Fig. 31) shagreened; lateral concavity shiny, with short wrinkles; upper-posterior portion shagreened. Mesoscutum (Fig. 30), scutellum and postscutellum shagreened, with shallow sparse indistinct punctures. Scutoscutellar groove almost smooth, shiny. Postscutellum transverse. Mesopleuron (Fig. 31) and metapleuron shagreened, slightly shiny, with fine indistinct punctures. Speculum large, smooth, shiny. Upper end of epicnemial carina approximately reaching to 0.7 distance to subtegular ridge. Metapleuron strongly convex. Ratio of length of hind



Fig. 26. *Campodorus punctatus* Sheng, Sun & Li sp. nov., holotype, ♀, habitus, lateral view (GSF GPM).



Figs 27–34. *Campodorus punctatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **27.** Head, anterior view. **28.** Head, lateral view. **29.** Head, dorsal view. **30.** Mesoscutum. **31.** Mesosoma, lateral view. **32.** Propodeum. **33.** Tergites 2–3, dorsal view. **34.** Apical portion of metasoma, lateral view.

tarsomeres from first to fifth approximately: 5.1:2.5:1.9:1.0:1.4. Wings slightly gray, hyaline. Fore wing with vein 1cu-a distal to M&RS approximately by $0.4 \times$ length of 1cu-a. Postnervulus intercepted slightly below middle. Hind wing vein 1-cu slightly longer than cu-a. Propodeum (Fig. 32) shagreened except shiny areas of basalis, superomedia and petiolaris; area basalis separated from area superomedia by strong transverse carina. Area basalis reversed trapezoidal. Area superomedia trapezoidal, almost as long as maximum width. Propodeal spiracle almost circular, located at anterior 0.25.

METASOMA. First two tergites shagreened. First tergite approximately $1.2 \times$ as long as posterior width; dorsal median carina reaching beyond spiracle; spiracle small, circular, located approximately at anterior 0.4 of first tergite. Second tergite (Fig. 33) approximately $0.8 \times$ as long as anterior width, $0.7 \times$ as long as posterior width. Third and subsequent tergites almost shiny, slightly shagreened, with short brownish gray setae. Ovipositor sheath (Fig. 34) approximately $3.0 \times$ as long as its maximum width, from middle narrowed posteriorly. Ovipositor straight, compressed.

COLORATION (Fig. 26). Black, except for following: basal half of clypeus yellow, apical half yellowish brown (Fig. 27); mandible, except teeth, maxillary palpi, labial palpi, tegulae and subbasal spot of hind tibia yellow; fore and middle legs except yellowish trochanters, hind coxae, trochanters and femur except apex brownish red; antennae, pterostigma and veins brownish black. Sternites 1-3 mainly brownish black medially, black laterally. Sternites 4-6 black.

Campodorus rasilis Sheng, Sun & Li sp. nov.

[urn:lsid:zoobank.org:act:29420300-0110-4CD2-9099-F288E2AB8B4D](https://zoobank.org/act:29420300-0110-4CD2-9099-F288E2AB8B4D)

Figs 35–41

Diagnosis

Upper median area of face (Fig. 36) with dense distinct punctures, lateral portion distinctly shagreened. Clypeus smooth, shiny, $3.2 \times$ as wide as long. Hind wing vein 1-cu approximately $4.0 \times$ as long as cu-a. Anterior and posterior transverse carinae of propodeum (Fig. 39) absent. Median longitudinal carinae evenly narrowed anteriorly, area between them smooth, shiny (Fig. 39). Face black, lower-lateral spots yellowish white (Fig. 36). Flagellum brown. Scutellum and postscutellum reddish brown.



Fig. 35. *Campodorus rasilis* Sheng, Sun & Li sp. nov., holotype, ♀, habitus, lateral view (GSFGPM).

Differential diagnosis

The new species is similar to *C. ciliatus* (Holmgren, 1857), but can be distinguished from the latter by the following combinations of characters: median longitudinal carinae of propodeum (Fig. 39) evenly divergent posteriorly; areas superomedia and petiolaris completely confluent. Ovipositor sheath (Fig. 41) approximately $3.5 \times$ as long as its maximum width, almost parallel. Lower lateral portion of face (Fig. 36) with large yellow spots. Hind tarsus almost entirely black. *Campodorus ciliatus*: median longitudinal carinae of propodeum strongly converging medially; areas superomedia and petiolaris separated by transverse carina. Ovipositor sheath $4.2 \times$ as long as maximum width, slightly expanding posteriorly. Face entirely black. At least basal halves of hind basal three tarsomeres white.

Etymology

The specific name is derived from the median area of the propodeum being smooth.

Material examined

Holotype

CHINA • ♀; Beijing, Yanqing; 13 Jul. 2012; interception trap; GSFQPM.

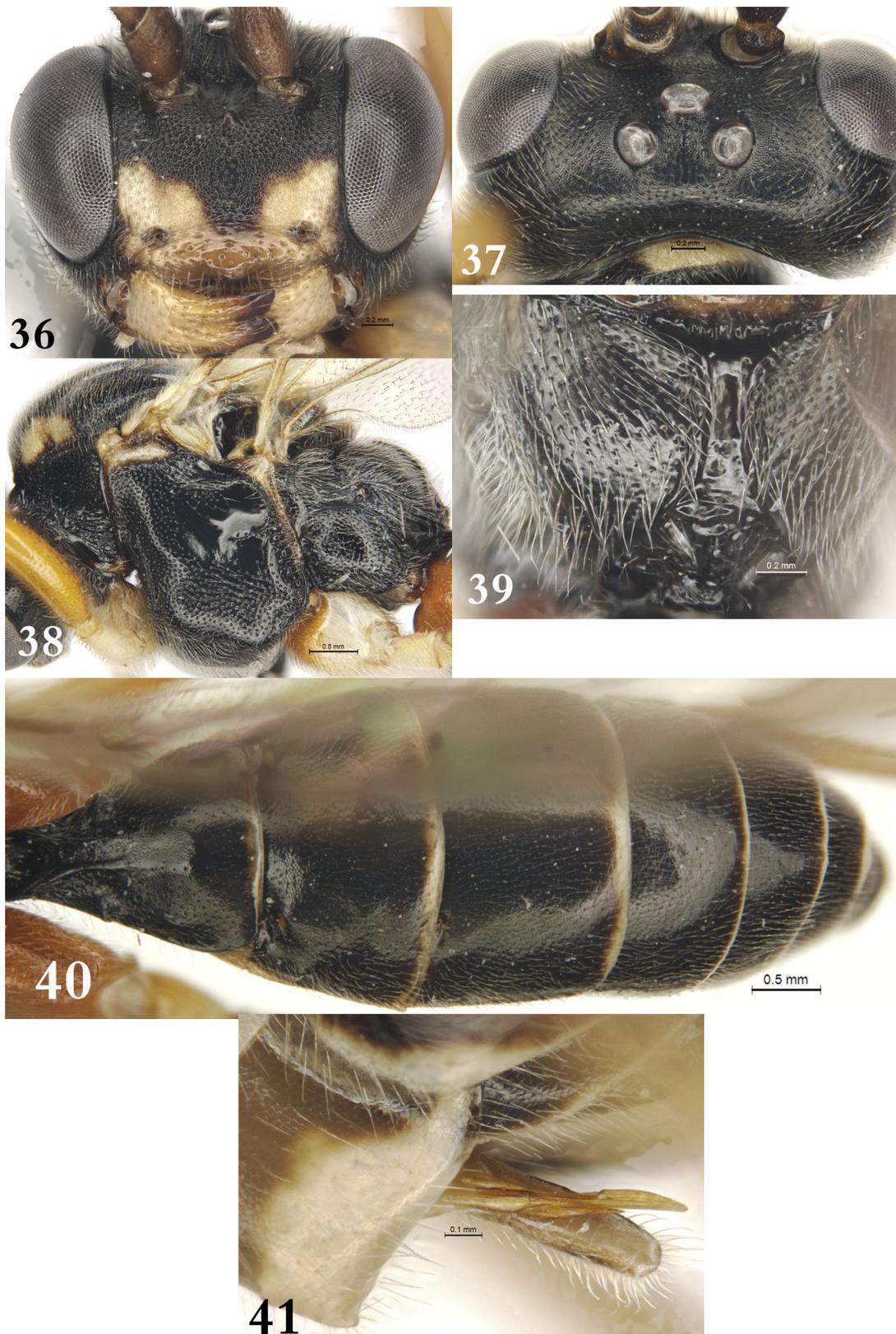
Description

Female

MEASUREMENTS. Body length approximately 8.2 mm. Fore wing length approximately 7.1 mm. Ovipositor sheath length approximately 0.4 mm.

HEAD. Inner margins of eyes slightly convergent ventrally, slightly concave near antennal sockets. Face (Fig. 36) approximately $1.8 \times$ as wide as long, shagreened, upper-median portion with dense distinct punctures; upper margin with median small tubercle. Clypeus approximately $3.2 \times$ as wide as long, apical median portion distinctly convex; apical median margin distinctly concave; shiny, with very sparse punctures and brown setae. Mandible with relatively sparse punctures and yellow brown setae; upper tooth same length and width as lower tooth. Malar area granulate; malar space approximately $0.4 \times$ as long as basal width of mandible. Gena and vertex (Fig. 37) shagreened. Hind portion of gena evenly convergent posteriorly. Lateral and posterior portion of vertex with fine punctures. Postocellar line approximately $0.8 \times$ as long as ocular-ocellar line. Frons shagreened, slightly concave medially. Antenna with 35 flagellomeres; ratio of length from first to fifth flagellomeres approximately: 1.7:1.2:1.0:1.0:1.0. Occipital carina complete, lower end reaching hypostomal carina distinctly above base of mandible.

MESOSOMA. Anterior margin of pronotum (Fig. 38) slightly shagreened, with longitudinal fine wrinkles; upper portion of lateral concavity with distinct transverse wrinkles, lower portion with strong oblique longitudinal wrinkles; upper-posterior portion shiny, with fine punctures. Mesoscutum with dense fine punctures, distance between punctures $0.2\text{--}2.5 \times$ diameter of puncture; sparser on lateral portion, distance between punctures $1.0\text{--}4.0 \times$ diameter of puncture. Anterior half of notauli distinctly present. Scutoscutellar groove almost shiny, lateral portion with short wrinkles. Scutellum and postscutellum with fine punctures. Postscutellum transverse. Mesopleuron (Fig. 38) with dense even punctures, distance between punctures $0.5\text{--}3.0 \times$ diameter of puncture; speculum and adjacent area smooth, shiny, without punctures. Upper end of epicnemial carina approximately reaching to 0.5 distance to subtegular ridge. Metapleuron (Fig. 38) evenly convex, with dense punctures, distance between punctures $0.5\text{--}2.0 \times$ diameter of puncture; with dense short gray-brown setae. Claw simple. Ratio of length of hind tarsomeres from first to fifth approximately: 5.3:2.5:1.8:1.0:1.7. Wings gray, hyaline. Fore wing with vein 1cu-a distal to M&RS approximately by $0.3 \times$ length of 1cu-a. Postnervulus intercepted at lower 0.45. Hind wing vein 1-cu approximately $4.0 \times$ as long as cu-a. Propodeum (Fig. 39) shiny, with dense even punctures and gray white setae except smooth median longitudinal area; without transverse carinae.



Figs 36–41. *Campodorus rasilis* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **36.** Head, anterior view. **37.** Head, dorsal view. **38.** Mesosoma, lateral view. **39.** Propodeum. **40.** Metasoma, dorsal view. **41.** Apical portion of metasoma, lateral view.

Median longitudinal carinae evenly narrowed anteriorly. Area petiolaris with irregular weak wrinkles. Propodeal spiracle circular, located at anterior 0.3 of propodeum.

METASOMA. Tergites (Fig. 40) almost shiny. First tergite approximately $1.3 \times$ as long as posterior width, with sparse fine punctures; dorsal median carina reaching beyond middle; spiracle slightly convex, circular, located slightly anterior to middle of tergite. Second and subsequent tergites (Fig. 40) with fine short gray brown setae. Second tergite approximately $0.7 \times$ as long as anterior width, $0.5 \times$ as long as posterior width. Ovipositor sheath (Fig. 41) approximately $3.5 \times$ as long as its maximum width, almost parallel. Ovipositor (Fig. 41) straight.

COLORATION (Fig. 35). Black, except for following: ventral profiles of scape and pedicel, flagellum brown; lower-lateral portion of face, mandible except teeth, maxillary palpi, labial palpi, fore and middle coxae mostly, all trochanters, basal half of hind tibia except basal end, upper-posterior corners of pronotum, anterolateral spots on mesoscutum, tegulae, subtegular ridge, posterior margins of tergites 1–7 yellowish white; clypeus, fore and middle femora yellowish red, tibia and first three tarsomeres whitish yellow; hind coxa red, femur red with blackish-brown apical 0.25; scutellum and postscutellum reddish brown; pterostigma brownish black; veins black brown. Sternites 1–3 and anterior and posterior portion of 4 yellowish white. Median portion of sternite 4 and sternites 5–6 black.

Campodorus truncatus Sheng, Sun & Li sp. nov.

[urn:lsid:zoobank.org:act:CF57C494-F7D4-4EF4-9843-3FA3B0782BC8](https://zoobank.org/act:CF57C494-F7D4-4EF4-9843-3FA3B0782BC8)

Figs 42–51

Diagnosis

Mesosoma coriaceous, almost without punctures. Median longitudinal carinae of propodeum (Fig. 48) strongly narrowed medially. Area petiolaris with strong median longitudinal carina. Propodeal spiracle located at anterior 0.2 of propodeum. Metasomal tergites (Figs 49–50) shagreened. Apex of ovipositor sheath (Fig. 51) truncate.

Differential diagnosis

The new species is similar to *C. taigator* Kasparyan, 2006, but can be distinguished from the latter by the following combinations of characters: first flagellomere $1.35 \times$ as long as second flagellomere; apex of ovipositor sheath almost truncated. Hind coxa entirely black. Basal half of hind tibia buff. *Campodorus taigator*: first flagellomere $1.1 \times$ as long as second flagellomere. Area superomedia absent. Apex of ovipositor sheath rounded. Hind coxa with yellowish brown spot. Basal portion of hind tibia black brown.

Etymology

The specific name is derived from the truncate apex of the ovipositor sheath.

Material examined

Holotype

CHINA • ♀; Liaoning Province, Xinbin; 29 May 1994; Mao-Ling Sheng leg.; GSF GPM.

Paratype

CHINA • 1 ♀; Liaoning Province, Xinbin; 28 May 1994; Mao-Ling Sheng leg.; GSF GPM.



Figs 42–44. *Campodorus truncatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **42.** Habitus, lateral view. **43.** Head, anterior view. **44.** Head, lateral view.

Description

Female

MEASUREMENTS. Body length 7.0–7.5 mm. Fore wing length 7.0–8.0 mm. Ovipositor sheath length 0.4–0.5 mm.

HEAD. Inner margins of eyes almost parallel. Face (Fig. 43) approximately $1.9 \times$ as wide as long, weakly convex centrally, alutaceous and coriaceous; upper margin with indistinct median small tubercle. Clypeus approximately $3.3 \times$ as wide as long, smooth, shiny, with sparse brown setae; subapical portion distinctly convex transversely; sublateral portion of apical margin triangularly convex in shape. Mandible almost shiny, with relatively dense, yellow brown setae; upper tooth slightly longer than lower tooth. Malar area shagreened; malar space approximately $0.7 \times$ as long as basal width of mandible. Gena (Fig. 44), vertex (Fig. 45) and frons coriaceous. Gena wide, in dorsal view 0.9 times as long as width of eye, posterior portion convergent posteriorly. Postocellar line approximately $0.8 \times$ as long as ocular-ocellar line. Frons almost flat. Antenna with 38 flagellomeres, apical portion gradually thin apically; ratio of length from first to fifth flagellomeres approximately: 2.8:2.0:1.7:1.7:1.6. Occipital carina complete.

MESOSOMA. Pronotum (Fig. 47) coriaceous; upper-anterior portion with distinct transverse wrinkles, lower-median portion irregularly rugate. Mesoscutum (Fig. 46) finely coriaceous, lateral margin with indistinct fine punctures. Scutellum (Fig. 46), postscutellum finely coriaceous. Mesopleuron (Fig. 47) coriaceous, upper and subanterior portions with indistinct fine longitudinal rugae. Upper end of epicnemial carina approximately reaching to half height of hind margin of pronotum. Speculum smooth, shiny, without punctures. Metapleuron coriaceous, evenly convex, lower-posterior portion with indistinct wrinkles. Ratio of length of hind tarsomeres from first to fifth approximately: 5.7:3.0:2.5:1.4:2.0. Wings slightly brownish, hyaline. Fore wing with vein 1cu-a distal to M&RS approximately by $0.3 \times$ length of 1cu-a. Postnervulus intercepted at middle. Hind wing vein 1-cu slightly longer than cu-a. Propodeum (Fig. 48) with dense indistinct punctures, distance between punctures 0.2 – $1.0 \times$ diameter of puncture; median longitudinal and posterior transverse carinae complete, strong. Median longitudinal carinae strongly narrowed medially; area basalis and area superomedia confluent; area petiolaris with strong median longitudinal carina. Propodeal spiracle circular, located at anterior 0.2 of propodeum.

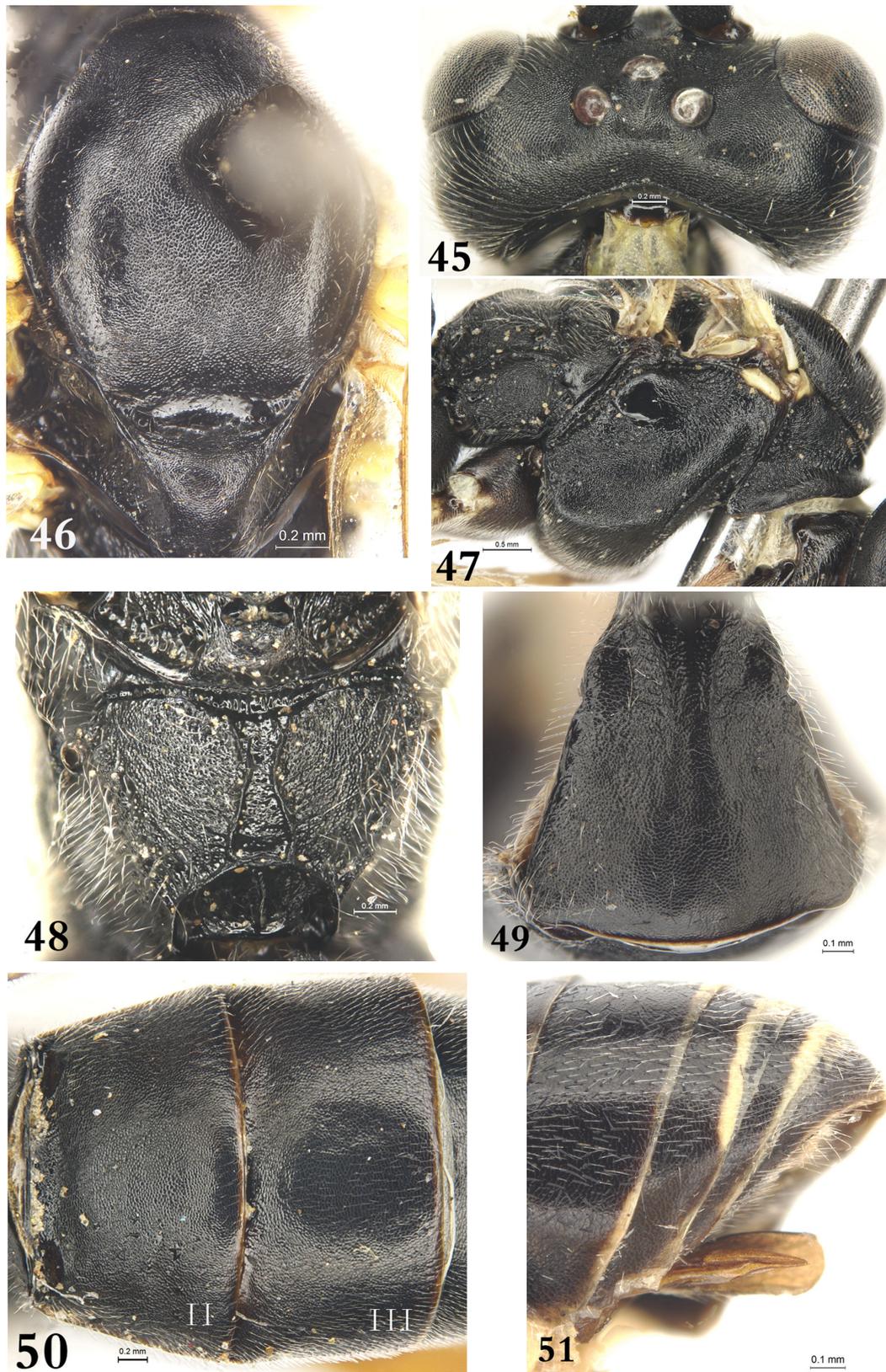
METASOMA. Tergites (Figs 49–50) shagreened. First tergite approximately $1.2 \times$ as long as posterior width, evenly narrowed anteriorly; dorsal median carina nearly reaching to middle; spiracle small, circular, slightly convex, located at anterior 0.4 of first tergite. Second tergite (Fig. 50) approximately $0.6 \times$ as long as apical width, with indistinct median transverse depression. Third tergite (Fig. 50) approximately $0.5 \times$ as long as apical width. Ovipositor sheath (Fig. 51) approximately $1.5 \times$ as long as its width, apex almost truncate.

COLORATION (Fig. 42). Black, except for following: flagellum except basal portion, red brown ventrally, black brown dorsally; clypeus, mandible except teeth, maxillary palpi, labial palpi, tegulae, subtegular ridge, apical portions of fore and middle coxae, basal half of hind tibia except basal end, posterior margins of tergites whitish yellow; fore and middle legs except coxae, trochanters and apical parts of tarsi red brown; pterostigma and veins yellow brown. Sternites 1–3 darkish brown, 4–6 gray brown.

Campodorus variegatus (Jurine, 1807)

Material examined

CHINA • 1 ♀; Liaoning Prov., Xinbin; 26 Aug. 2009; interception trap; GSFQPM.



Figs 45–51. *Campodorus truncatus* Sheng, Sun & Li sp. nov., holotype, ♀ (GSFGPM). **45.** Head, dorsal view. **46.** Mesoscutum and scutellum. **47.** Mesosoma, lateral view. **48.** Propodeum. **49.** Tergite 1, dorsal view. **50.** Tergites 2–3, dorsal view. **51.** Apical portion of metasoma, lateral view.

Discussion

The majority of *Campodorus* have been described from the Palaearctic and Nearctic Regions. Prior to this publication, only one species of *Campodorus* was known from the Oriental Region, from Myanmar (Kasparyan 1998), now a second species, *C. albilineatus* sp. nov., just described above, is known from the northern border of the Oriental part of China. Based on collections from Southern China, Guangdong, Guangxi, Fujian, Jiangxi and Yunnan Provinces, many species of *Campodorus* are still undescribed. The species of the Oriental Region deserve further research.

Acknowledgements

The authors are deeply grateful to Drs Dmitry R. Kasparyan (ZISP) and Gavin Broad (NHMUK) for reviewing this manuscript. The authors are also indebted to Drs Dmitry R. Kasparyan, Andrey I. Khalaim (ZISP), Gavin Broad (NHMUK), Masahiro Ohara (HUM), Stefan Schmidt and Olga Schmidt (ZSMG) for their help while the corresponding author was working in their respective collections and to Kyohei Watanabe (KPMNH) for taking some photos of type *Campodorus* Förster, 1869 from Japan and ZSMG. This research was supported by the National Natural Science Foundation of China (NSFC, No. 31110103062, No. 31501887) and by a key project of Science-technology basic condition platform from The Ministry of Science and Technology of the People's Republic of China (Grant No. 2005DKA21402).

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Manuscript received: 14 November 2019

Manuscript accepted: 26 February 2019

Published on: 3 June 2020

Topic editors: Gavin Broad and Nesrine Akkari

Desk editor: Kristiaan Hoedemakers

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