

# Two new species of the genus *Rhorus* Förster, 1869 from Thailand (Hymenoptera, Ichneumonidae)

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## Abstract

Two new species the genus *Rhorus* Förster are described from Thailand, *R. inthanonensis* Reshchikov & Xu, **sp. n.** and *R. lannae* Reshchikov & Xu, **sp. n.** from Chiang Mai Province. These are the first records of the genus from Thailand. The type specimen of *R. orientalis* (Cameron, 1909) is re-described and illustrated. An identification key for the Oriental species of *Rhorus* is provided.

## Keywords

*Rhorus*, Pionini, Ctenopelmatinae, new species, Thailand, Oriental Region

## Introduction

*Rhorus* Förster, 1869 is a large genus, belonging to the tribe Pionini and the subfamily Ctenopelmatinae (Hymenoptera, Ichneumonidae). It currently comprises 104 described species (Kasparyan 2012, 2014, 2015, 2016; Yu et al. 2012; Sheng and Sun 2014; Kasparyan et al. 2016), including 16 species from the Nearctic Region (Barron 1986), one species from the Neotropical Region (Gauld et al. 1997), 86 species from the Palaearctic Region (Kasparyan 2012, 2014, 2015, 2016; Sheng and Sun 2014;



Kasparyan et al. 2016), and one species from the Oriental Region (Cameron 1909). The Holarctic fauna was recently reviewed (Barron 1986; Kasparyan 2012, 2014, 2015, 2016; Kasparyan et al. 2016), but the tropical fauna remains mostly unstudied. Only two species are known from the Northern tropics (Cameron 1909; Gauld et al. 1997): *Rhorus orientalis* (Cameron, 1909) from India (Cameron 1909), and *Rhorus gamboai* Gauld, 1997 from Costa Rica (Gauld et al. 1997). It has been suggested that Ctenopelmatinae are poorly represented in tropical areas (Gauld et al. 1997). A global revision of *Rhorus* would require targeted collecting in various countries, and the sorting and determination of specimens in existing collections. The new Thai species described here are the only *Rhorus* found in Thailand so far, confirming the presence of the genus in this country.

## Materials and methods

The two new species from Northern Thailand were collected by Malaise traps during the TIGER project (<http://sharkeylab.org/tiger/>). One new species from a mixed deciduous Dipterocarp forest in Doi Inthanon National Park, Chiang Mai Province, another new species from a pine forest (*Pinus merkusii* and *P. kesiya*) with banana and bamboo near a stream side in Huai Nam Dang National Park, Chiang Mai Province (Fig. 1). The types of the two new species are deposited in the collection of The Queen Sirikit Botanic Garden (QSBG) and Canadian National Collection (CNC). The holotype specimen of *R. orientalis* (Cameron 1909) deposited in the collection of The Natural History Museum, London, UK (BMNH) is redescribed and illustrated. Images were acquired digitally at South China Agricultural University (SCAU) using a CoolSNAP digital camera attached to a Zeiss stereomicroscope Stemi 2000-CS and combined using Image-Pro Plus software, and at BMNH using a Canon EOS 450D digital camera and Helicon Remote (ver. 3.6.6w), with images stacked using Helicon Focus 6. All images were further processed using various minor adjustment levels in Adobe Photoshop such as image cropping and rotation, adjustment of contrast and brightness levels, colour saturation, and background enhancement. Stacked images are available in colour and high resolution at <http://www.morphbank.net>. The morphological terminology mostly follows Gauld (1991).

## Taxonomy

### *Rhorus* Förster, 1869

*Rhorus* Förster, 1869: 195. Type species: *Tryphon mesoxanthus* Gravenhorst, 1829. Included by Woldstedt (1877: 455). Monobasic.

*Dolichoblastus* Strobl, 1903: 52. Type species: *Monoblastus (Dolichoblastus) flavopictus* Strobl. Monobasic. Synonymized by Townes (1945: 485).





**Figure 1.** Landscape and type habitat of *Rhorus lannae* Reshchikov & Xu, sp. n., Huai Nam Dang National Park, Chiang Mai Province, Thailand, photographer Buddhaphong Wongsanont.

*Cyphanza* Cameron, 1909: 723. Type species: *Cyphanzia nigra* Cameron (*nigra* preoccupied in *Rhorus* by Ashmead, 1902 = *cameroni* Townes, 1970). Monobasic. Synonymized by Townes (1945: 485).

**Notes.** The genus *Rhorus* can be distinguished from other genera of Ctenopelmatinae by the following characteristic combination: no suture between face and clypeus; mandible with subbasal convexity; fore wing with an areolet; nervulus usually post-furcal; nervellus inclivous, broken below middle; base of propodeum with U-shaped emargination; ovipositor sheaths semi-cylindrical (their rounded apices bear a hairy membranous depression dorsally); ovipositor slender, lacking a notch.

### Key to the Oriental species of *Rhorus*

- 1 Lower mandible tooth distinctly longer than upper one (Fig. 12); lobe of oral carina distinctly defined and strongly elevated behind mandible (Fig. 19); costula present (Fig. 13); T1 rather elongate,  $3.5 \times$  as long as apical width; face in male entirely yellowish. Only male is known ..... ***R. lannae* Reshchikov & Xu, sp. n.**
- Lower mandible tooth as long as or slightly longer than upper one; lobe of oral carina weakly defined and weakly elevated behind mandible (Fig. 4); costula absent; T1 less elongate,  $1.5\text{--}1.9 \times$  as long as apical width; face black with yellow marks medially (Fig. 3) ..... **2**



- 2 Face with strong central bulge (Fig. 4); T1 1.5 × as long as apical width; ovipositor slightly downcurved (Fig. 2); metasoma reddish-brown except anterior part of T1 (Fig. 7); face in female with a pentagonal yellow mark (Fig. 3). Only female is known.....***R. inthanonensis* Reshchikov & Xu, sp. n.**
- Face without central bulge (Fig. 22); T1 1.9 × as long as apical width; ovipositor slightly upcurved (Fig. 28); metasoma reddish-brown except for T1 and most of T2 black (Fig. 20); upper part of face in female with two yellow spots (Fig. 22). Only female is known.....***R. orientalis* (Cameron)**

***Rhorus inthanonensis* Reshchikov & Xu, sp. n.**

<http://zoobank.org/204C3E2D-4FBA-4DCB-B346-B8BD619028BE>

Figs 2–10

**Material examined.** *Holotype*, female, THAILAND, Chiang Mai, Doi Inthanon National Park, camp ground pond, 1200 m, 18°32.657'N 98°31.482'E, Malaise trap, 21–27.ix.2006, T342, leg. Y. Areeluck (QSBG).

**Diagnosis.** This species differs from other Oriental species by a combination of the following characteristics: lower mandible tooth slightly longer than upper; lobe of oral carina weakly elevated behind mandibles (Fig. 4); face with strong central bulge (Fig. 4); areolet petiolate; costula absent; T1 1.5 × as long as apical width; face in female with a pentagonal yellow mark (Fig. 3); metasoma reddish-brown except for anterior part of T1 (Figs 2, 7).

**Description.** Female (holotype). Body length 6.0 mm. Fore wing length 5.5 mm. Flagellum with 35 flagellomeres, about as long as fore wing; two basal flagellomeres almost as long as maximum diameter of eye; first flagellomere 3.6 × as long as apical width. Head narrowed posteriorly (Fig. 5); temple length in middle 0.5 × transverse diameter of eye; cheek convex below eye; temples smooth. Face with setae, ventrally widened with distinct bulge (Fig. 4); coarsely and densely punctate; average distance between punctures about 0.9 × their diameter. Frons with finer and sparser punctures than those on face. Clypeus finely and sparsely punctate, very weakly separated from face by a weak depression (Fig. 3); its lower margin truncate. Malar space 0.8 × as long as basal width of mandible. Upper tooth slightly shorter than lower tooth; mandible finely punctate, not swollen before base, with a defined transverse depression at its base. Lobe of oral carina weakly elevated behind mandibles (Fig. 4).

Pronotum coarsely and densely punctate, with distinct epomia (Fig. 4). Mesoscutum coarsely and densely punctate (Fig. 8). Mesopleuron (except for speculum) densely punctate (Fig. 6); speculum large, covering about 0.6 × length of mesopleuron, with polished part below mesopleural pit extending to hind corner of mesopleuron. Mesoscutellum rather finely punctate (Fig. 8). Metapleuron finely punctate. Propodeum shining, finely punctate, with long, dense white setae; basal area as long as broad; costulae absent; areola subquadrate, apical area as long as basal area and areola com-





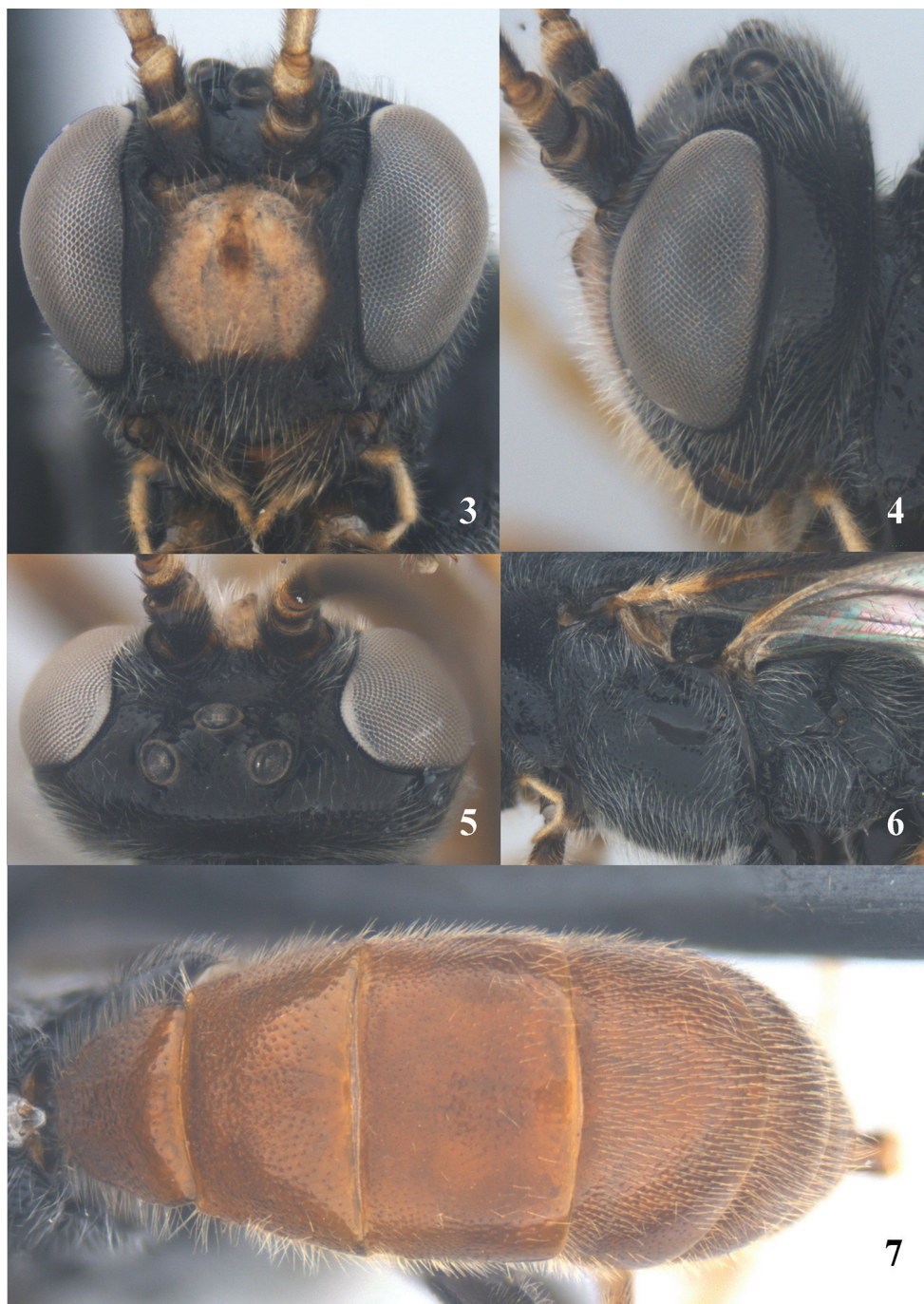
**Figure 2.** *Rhorus inthanonensis* Reshchikov & Xu, sp. n., female holotype, habitus in lateral view.

bined, with distinct longitudinal carina. Pterostigma  $2.3 \times$  as long as broad. Areolet petiolate. Fore wing with cu-a postfurcal. Hind wing with Cu1 intercepted below middle. Fore claw with 7 teeth (Fig. 9). Hind femur  $5.0 \times$  as long as broad; length proportion of hind tarsomeres 1–5 = 38:17:14:8:15; hind claw with 6 teeth.

T1  $1.5 \times$  as long as apical width; its longitudinal carinae extending to  $0.6 \times$  its length; space between carinae smooth, with fine punctures; dorso-lateral carinae complete. T1 (beyond spiracles) and T2 completely smooth, more or less evenly covered with fine punctures (Fig. 7). Last sternite not elongate. Ovipositor slightly downcurved (Fig. 10).

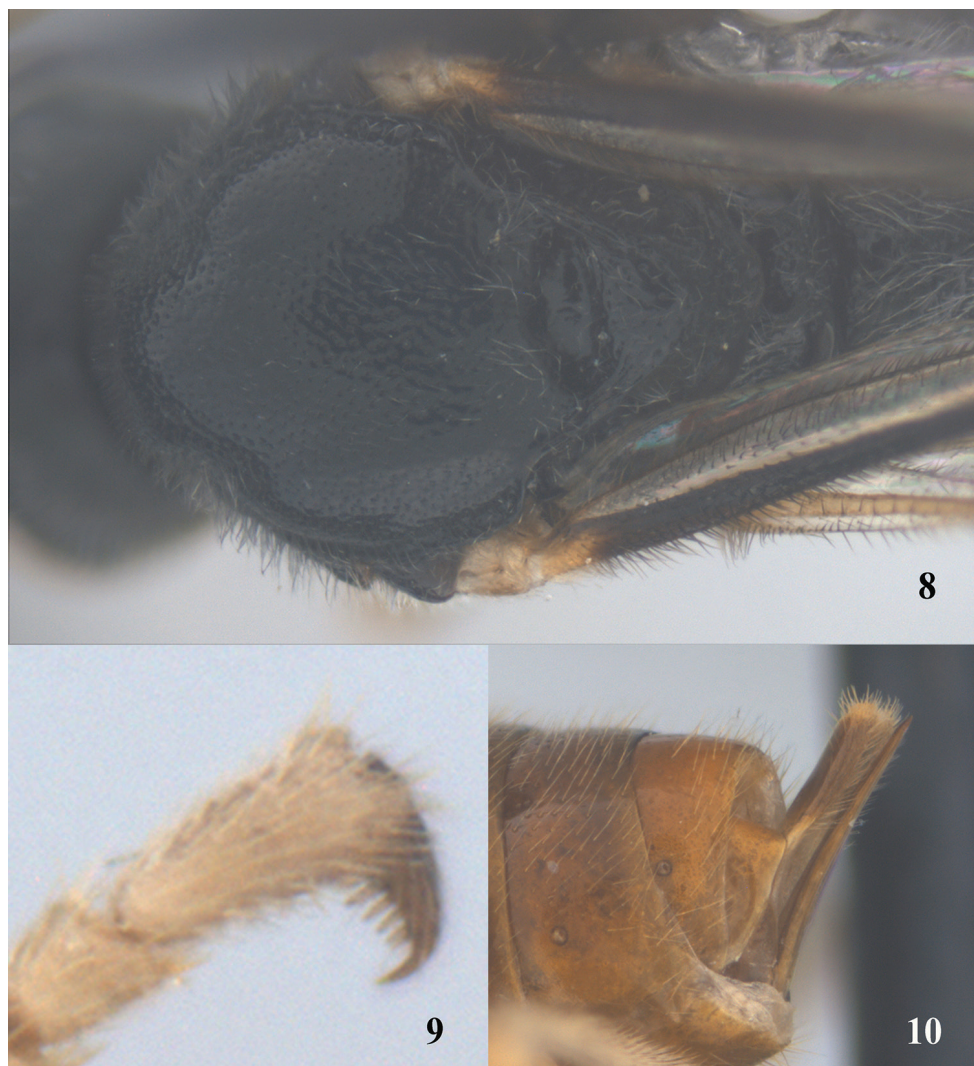
Color. Antenna (except for basal flagellomeres ventrally), head, mesosoma, coxae, trochanters, most of fore and mid femora, apical part of hind tibia, hind tarsus, and pterostigma black (Figs 2–8). Apical part of scape and pedicel, basal flagellomeres ventrally, palpi, pentagonal mark of face, tegula, basal plates of fore wing, apical part of trochanter and fore and mid femora, fore and mid tibiae and tarsi yellowish (Figs





**Figures 3–7.** *Rhorus inthanonensis* Reshchikov & Xu, sp. n. female holotype. **3** Head in frontal view **4** Head in lateral view **5** Head in dorsal view **6** Mesopleuron and metapleuron **7** Metasoma in dorsal view.





**Figures 8–10.** *Rhorus inthanonensis* Reshchikov & Xu, sp. n. female holotype. **8** Mesosoma in dorsal view **9** Claw **10** Apex of metasoma in lateral view.

2–10). Mandible blackish-brown (Fig. 3). Hind femur and basal part of hind tibia, metasoma reddish-brown except anterior part of T1 (Figs 2, 7).

**Male.** Unknown.

**Distribution.** Thailand.

**Etymology.** The species name “*inthanonensis*” refers to the type locality, Mount Doi Inthanon, the highest point in Thailand.



***Rhorus lannae* Reshchikov & Xu, sp. n.**

<http://zoobank.org/4747B442-6861-41B1-94CC-96D9915F2F73>

Figs 1, 11–19

**Material examined.** Holotype, male, THAILAND: Chiang Mai, Huai Nam Dang National Park, guest house, 19°18.803'N 98°36.395'E, Malaise trap, 21–28.ix.2007, T5507, leg. Anuchart & Thawachai (QSBG); Paratypes: 1 male, THAILAND, Chiang Mai, Huai Nam Dang National Park, guest house, 19°18.803'N 98°36.395'E, Malaise trap, 21–28.ix.2007, T5507, leg. Anuchart & Thawachai, (QSBG); 1 male, THAILAND: Chiang Mai, Huai Nam Dang National Park, guest house, 19°18.803'N 98°36.395'E, Malaise trap, 7–14.ix.2007, T5512, leg. Anuchart & Thawachai (CNC).

**Diagnosis.** This species differs from other Oriental species by combination of the following characteristics: lobe of oral carina strongly elevated behind mandibles (Fig. 19); areolet petiolate; costula present (Fig. 19). This new species is similar to the trans-Palaearctic *R. longicornis* Holmgren, but can be separated from the latter by: mesoscutum coarsely punctate (very finely in *R. longicornis*), lobe of oral carina strongly elevated (moderately in *R. longicornis*), mandible yellow and mesoscutellum with yellowish marking in male (always blackish in *R. longicornis*).

**Description.** Male (holotype) (Fig. 11). Body length 10.0 mm. Fore wing length 7.0 mm. Flagellum with 41 flagellomeres, about as long as fore wing; two basal flagellomeres  $0.8 \times$  as long as maximum diameter of eye; first flagellomere  $3.5 \times$  as long as apical width. Head not narrowed posteriorly (Fig. 15); temple length in middle  $0.9 \times$  transverse diameter of eye; cheek convex below eye; temples smooth. Face slightly widened ventrally, without central bulge (Fig. 12); face rather rugose and coarsely and densely punctate; average distance between punctures about  $0.9 \times$  their diameter. Frons with weakly defined longitudinal carina, with weak striae in anterior part and distinct fine punctures in posterior part. Clypeus rather rugose, not separated from face (Fig. 12); its lower margin distinctly truncate. Malar space  $0.6 \times$  as long as basal width of mandible. Upper tooth distinctly shorter than lower tooth (Fig. 12); mandible not swollen before base, slightly rugose, impunctate, with a defined transverse depression at base. Lobe of oral carina strongly elevated behind mandibles (Fig. 19).

Pronotum coarsely and densely punctate, with distinct epomia (Fig. 19). Mesoscutum coarsely and densely punctate (Fig. 14). Mesopleuron (except for speculum) densely punctate (Fig. 19); speculum large, covering about  $0.6 \times$  length of mesopleuron, with polished part below mesopleural pit extending to hind corner of mesopleuron. Mesoscutellum rather finely punctate (Fig. 14). Metapleuron finely punctate. Propodeum shining, finely punctate, with long, dense white setae; basal area fused with area superomedia, U-shaped; costulae present; apical area as long as basal area and area superomedia combined, with distinct longitudinal carina (Fig. 13). Pterostigma  $6.0 \times$  as long as broad (Fig. 18). Areolet petiolate (Fig. 19). Fore wing with cu-a postfurcal. Hind wing with Cu1 intercepted below middle. Fore claw with 9 teeth. Hind femur  $3.5 \times$  as long as broad; length proportion of hind tarsomeres 1–5 = 4:2:1.7:1:2:1.3; hind claw with 5 teeth.



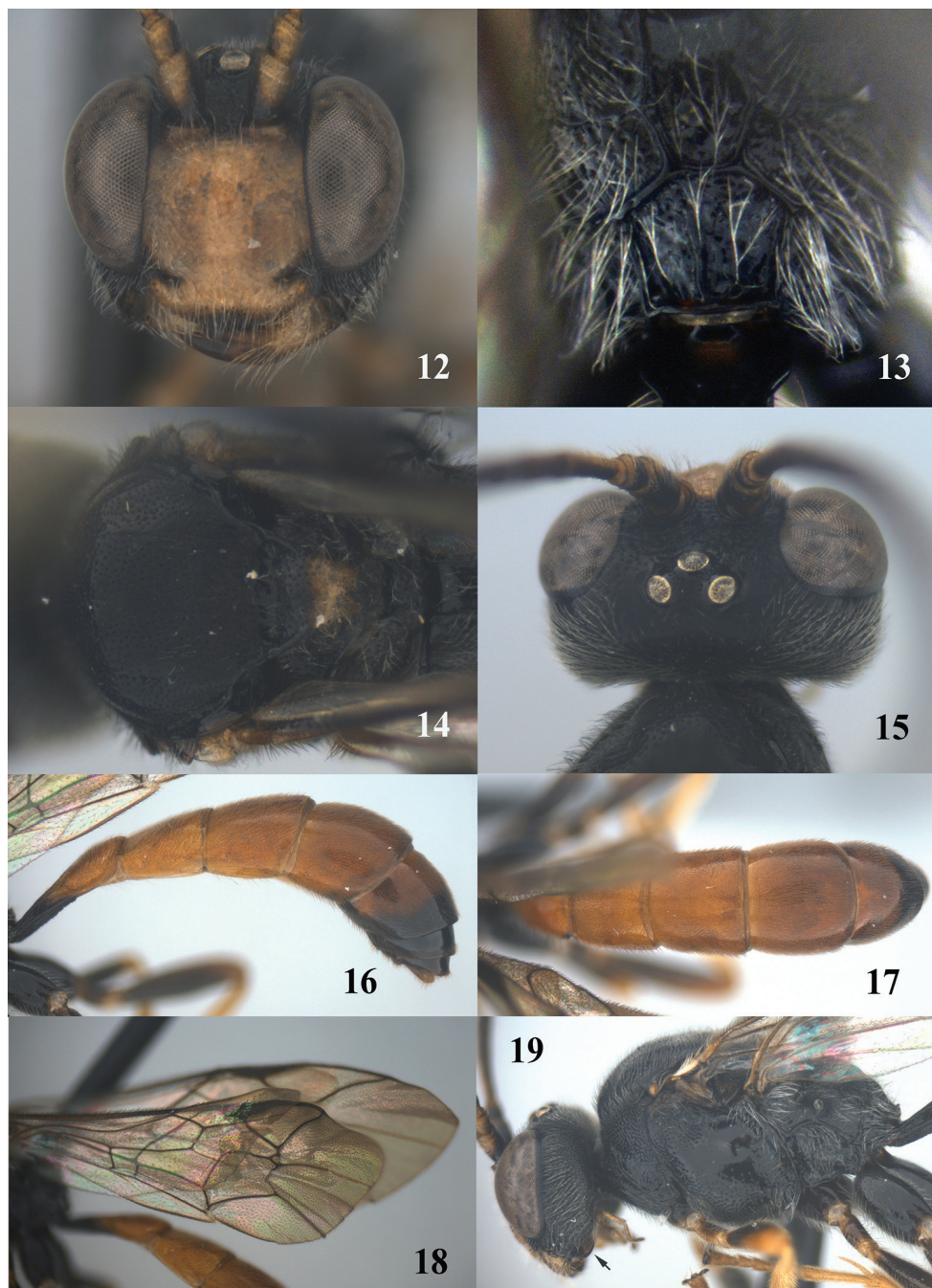


**Figure 11.** *Rhorus lannae* Reshchikov & Xu, sp. n., male paratype, habitus in lateral view.

T1  $3.5 \times$  as long as apical width; its longitudinal carinae extending to  $0.6 \times$  its length; space between carinae smooth, without punctures; dorso-lateral carinae obliterated beyond spiracles. T1 (behind spiracles) and T2 completely smooth and more or less evenly and finely punctate; average distance between punctures  $1.0\text{--}1.5 \times$  their diameter (Fig. 17). Last sternite elongate. Parameres broad basally.

**Color.** Head, mesosoma, coxae, trochanters, most of fore and mid femora dorsally, hind femur, apical part of hind tibia, hind tarsus, basal part of T1, apical part of T5 and following tergites black (Figs 16, 17). Antenna with flagellum dark brown, scape and basal flagellomeres ventrally yellowish (Fig. 12). Mandible yellow, with teeth blackish-brown (Fig. 12). Face entirely yellow (Fig. 12). Apical margin of clypeus and





**Figures 12–19.** *Rhorus lannae* Reshchikov & Xu, sp. n., male paratype. **12** Head in frontal view **13** Propodeum in dorsal view **14** Mesosoma in dorsal view **15** Head in dorsal view **16** Metasoma in lateral view **17** Metasoma in dorsal view **18** Wings **19** Head and mesosoma in lateral view.



area around tentorial pits black (Fig. 12). Mesosoma black (Figs 14, 19), with posterior half of mesoscutellum yellowish-brown (Fig. 14). Tegula and subtegular ridge of mesopleuron black (Fig. 19). Pterostigma black (Fig. 18). Ventral part of fore and mid femora, apical part of hind femur, fore and mid tibiae and tarsi, hind tibia (except apical part), apical part of T1, T2–T4, and apical part of T5 reddish-brown (Figs 16, 17).

**Female.** Unknown.

**Distribution.** Thailand.

**Etymology.** The species name “*lannae*” is derived from a combination of “*lanna*”, the Latin word for “lobe”, reflecting the strongly defined short and high lobe of the oral carina, elevated behind the mandibles, and the Thai word “อาณาจักรล้านนา”, the Lan Na, “Kingdom of a Million Rice Fields”, a medieval state in Northern Thailand.

### ***Rhorus orientalis* (Cameron, 1909)**

Figs 20–28

*Monoblastus orientalis* Cameron, 1909: 727. By original designation.

*Rhorus cameroni* Townes, 1970: 1–307 (replacement name for *Rhorus nigra* (Cameron)).

Synonymized by Gupta (1987).

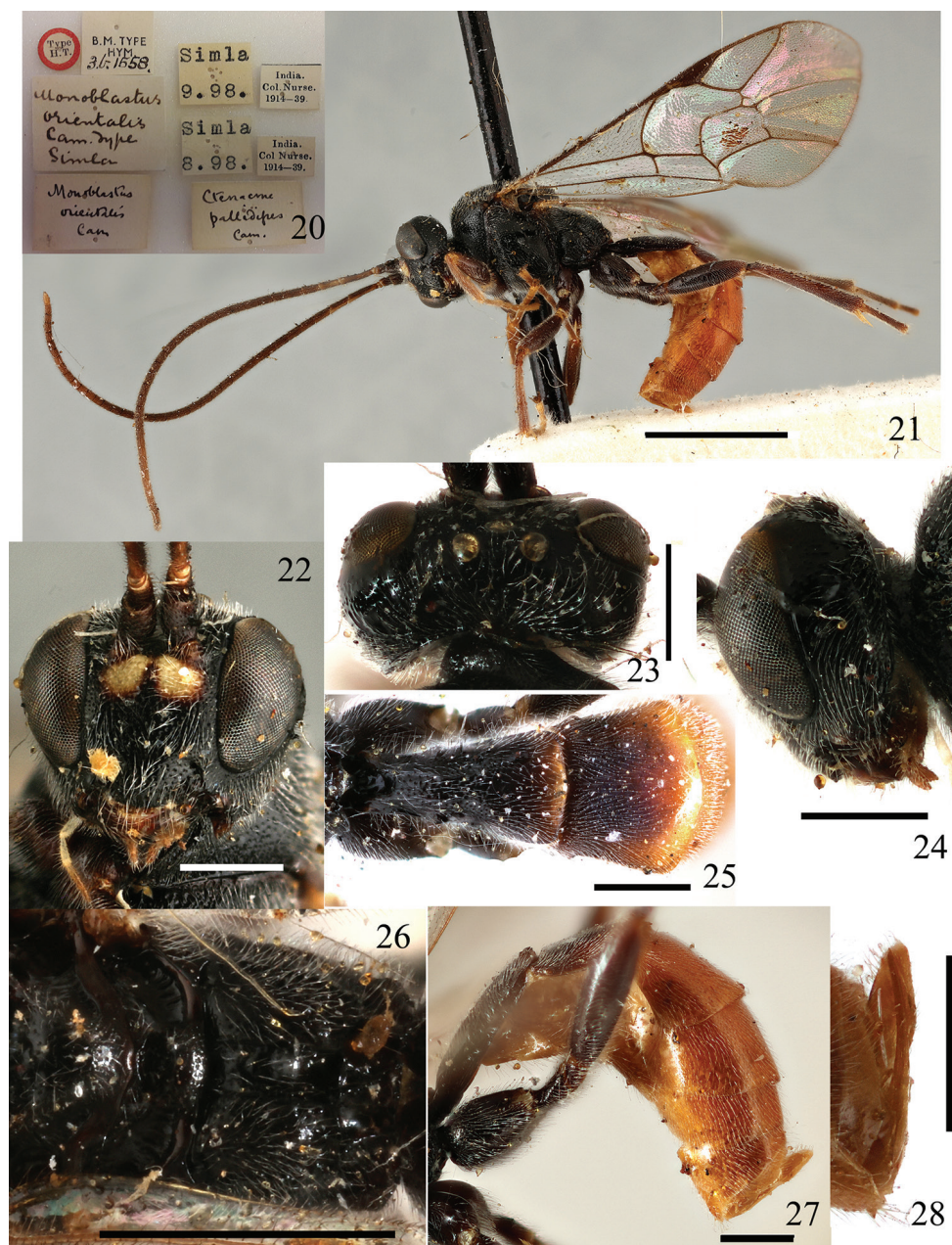
**Material examined.** Holotype, female, INDIA: Himachal Pradesh, Simla, ix.1898, leg. C.G. Nurse (BMNH).

**Diagnosis.** This species differs from other Oriental species by combination of the following characteristics: upper area of face with two yellow spots (Fig. 21); lobe of oral carina behind mandibles weakly defined and slightly elevated behind mandibles (Fig. 20); areolet petiolate; costula absent; T1  $1.9 \times$  as long as apical width; metasoma reddish-brown except for T1 and most of T2 black (Fig. 20).

**Redescription.** Female (holotype) (Fig. 21). Body length 6.5 mm. Fore wing length 5.6 mm. Flagellum with 36 flagellomeres, longer than fore wing; two basal flagellomeres  $0.9 \times$  as long as maximum diameter of eye; first flagellomere  $4.2 \times$  as long as apical width. Head not narrowed posteriorly; temple length in middle  $0.75 \times$  transverse diameter of eye; cheek convex below eye; temples granulate, with setae. Face widened ventrally, without central bulge; face coarsely and densely punctate; average distance between punctures  $0.5 \times$  their diameter (Fig. 22). Frons with finer and sparser punctures than those on face. Clypeus distinctly separated from face by depression, coarsely and densely punctate; its lower margin truncate, with a comb of setae. Malar space  $0.5 \times$  as long as basal width of mandible. Upper tooth of mandible as long as lower one; mandible smooth, not swollen before base, with a defined transverse depression at its base. Oral carina weakly defined and slightly elevated behind mandibles.

Pronotum coarsely and densely punctate, with distinct epomia. Mesoscutum moderately punctate, with shallow notauli. Mesopleuron (except for speculum) finely and densely punctate; speculum large, covering about  $0.75 \times$  length of mesopleuron, polished part below mesopleural pit extending to hind corner of mesopleuron. Mes-





**Figures 20–28.** *Rhorus orientalis* (Cameron, 1909), female holotype. **20** Labels **21** Habitus in lateral view **22** Head in anterior view **23** Head in dorsal view **24** Head in lateral view **25** T1 and T2 in dorsal view **26** Metanotum and propodeum in dorsal view **27** Metasoma in lateral view **28** Apex of metasoma in lateral view. Scale bars: **21**: 2 mm; **22–25, 27, 28**: 0.5 mm; **26**: 1 mm.



oscutellum convex in lateral view and finely punctate. Metapleuron finely and densely punctate. Propodeum smooth, shining, with long, dense white setae; costula absent; areola absent; basal area and areola combined. Pterostigma  $4.1 \times$  as long as broad. Fore wing with cu-a postfurcal. Hind wing with vestigial Cu1 intercepted below middle. Fore claw with 7 teeth. Hind femur  $3.9 \times$  as long as broad. Hind claws missing.

T1  $1.9 \times$  as long as apical width; its longitudinal carinae extending to  $0.6 \times$  its length; space between carinae smooth with shallow punctures; dorso-lateral carinae defined, up to apical  $0.6$ . T2 evenly, finely punctate (Fig. 25); average distance between punctures  $0.5\text{--}2.0 \times$  their diameter. Ovipositor slightly upcurved (Figs 27, 28).

Color. Head black. Upper part of face with two yellow spots (Fig. 22). Antenna with scape and flagellum brown. Mandible brown, with teeth reddish-brown. Mesosoma black. Tegula and subtegular ridge of mesopleuron dark reddish-brown. Legs brown to dark brown, with fore and mid coxae and femora dark reddish-brown. Metasoma yellowish-brown, with T1 and T2 predominantly black but slightly reddish-brown posteriorly (Fig. 25). Ovipositor sheath yellowish-brown (Fig. 28).

**Male.** Unknown.

**Distribution.** India.

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