

**NEW RECORDS OF RARE GENERA OF THE SUBFAMILY  
Rogadinae (Hymenoptera: Braconidae),  
WITH DESCRIPTION OF NINE NEW SPECIES FROM VIETNAM**

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**ABSTRACT**

Six new species of three small genera of the subfamily Rogadinae: *Cystomastacoides* van Achterberg, 1997; *Gyroneuron* Kokujev, 1901 and *Rogasodes* Chen & He, 1997, viz. *Cystomastacoides contrastus* Long, sp. n.; *Cystomastacoides similis* Long, sp. n.; *Gyroneuron asperatum* Long, sp. n.; *Gyroneuron bicoloratum* Long, sp. n.; *Gyroneuron glabrum* Long, sp. n.; and *Rogasodes phongi* Long & Hoa, sp. n.; and three new species of the subgenus *Arcaleiodes* Chen & He, 1997 from Vietnam, namely: *Aleiodes* (*Arcaleiodes*) *hoanglienensis* Long, sp. n., *Aleiodes* (*Arcaleiodes*) *sapa* Long, sp. n. and *Aleiodes* (*Arcaleiodes*) *simulatus* Long, sp. n. are described and illustrated. Additionally, two genera: *Cystomastacoides* van Achterberg and *Rogasodes* Chen & He, and two species: *Aleiodes* (*Arcaleiodes*) *sinamensis* Quicke & Butcher and *Cystomastacoides coxalis* Chen & He are newly recorded for Vietnam's braconid fauna. Keys to species of the genera *Cystomastacoides*, *Gyroneuron* and subgenus *Arcaleiodes* from Vietnam are given. The checklist and distribution of the already known species of the genera are also provided.

**Keywords:** Braconidae, Rogadinae, new record, new species, rare genera, Australasian, Oriental, Vietnam.

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**INTRODUCTION**

Rogadinae is one of the most diverse subfamilies of the Braconidae, however, to date the family Braconidae of Vietnam generally and the subfamily Rogadinae particularly are poorly studied yet. The subfamily Rogadinae comprises representatives known as koinobiont endoparasitoids of mainly macrolepidopteran caterpillars, and pupating within mummified host caterpillar remains is their behavior (Shaw & Huddleston, 1991).

For several years braconid wasps were collected from all over Vietnam to get a first understanding of the fauna of Vietnam and to date we have published some papers on Rogadinae of Vietnam with description of 34 new species (Long, 2014; Long & van Achterberg, 2007, 2008a, 2008b, 2015, 2018).

Recently, the available information on braconid wasps in Vietnam was summarized by Long & Belokobylskij (2003) and Long & van Achterberg (2014). Long & Belokobylskij (2003) reported two species of the genus *Gyroneuron* from Vietnam, namely: *G. mirum* Kokujev and *G. testeator* Watanabe. This paper, a part of the discoveries, deals with the subgenus *Arcaleiodes* and three small genera of the subfamily Rogadinae: *Cystomastacoides*, *Gyroneuron* and *Rogasodes*.

The genus *Arcaleiodes* was described from China (Chen & He, 1997, type species: *Aleiodes unifasciatus* Chen & He, 1991) but has since been synonymised with *Aleiodes* (Belokobylskij, 2000) and treated as a subgenus of *Aleiodes* (Zaldivar-Riverón et al., 2009; Butcher et al., 2012). The subgenus *Arcaleiodes* Chen &

He is a rather rarely collected among the genus *Aleiodes*, and up to now seven species were known from the Oriental region. In this paper we treated *Arcaleiodes* as subgenus of *Aleiodes*, one species is newly recorded and three new species were described from Vietnam's fauna.

*Cystomastacoides* van Achterberg is a rare genus, that was named by van Achterberg in 1997 (Type-species: *Cystomastacoides coxalis* van Achterberg, 1997), and recently Quicke et al. (2013) described three species from Papua New Guinea and Thailand; Ranjith et al. (2018) described two species from India and up to date the genus comprises six species from the Australasian and Oriental regions. Quicke et al. (2013) also provided the first host record for *Cystomastacoides asotaphaga* Quicke, from caterpillars of the erebib moth *Asota plana* Walker (Quicke et al., 2013).

*Gyroneuron* Kokujev is a small genus, that was coined by Kokujev, 1901 (Type-species: *Gyroneuron mirum* Kokujev, 1901; monotype), and this genus comprises two species from the Oriental region (Yu et al., 2005).

The another small genus is *Rogasodes* Chen & He, the genus was erected by Chen & He in 1997 (Type-species: *Rogasodes masaicus* Chen & He, 1997), this genus is originally described from China, and comprises a single species, *R. masaicus* (Chen & He, 1997).

In the paper, nine new species of the above mentioned genera from Vietnam are described and illustrated. Keys to species of the genus *Cystomastacoides*, *Gyroneuron* and subgenus *Arcaleiodes* from Vietnam are also given.

## MATERIALS AND METHODS

The collection of the Rogadinae from Vietnam are used for this paper is kept in the Institute of Ecology and Biological Resources (IEBR) at Ha Noi assembled by the first author and his colleagues during numerous expeditions in Vietnam. The braconid specimens were mainly collected by Malaise traps, partly by sweeping nets and light traps.

The material was stored in 96% ethanol, prepared with the AXA method (van Achterberg, 2009; van Achterberg et al., 2010) and glued on card points. Observations were made

with an Olympus® SZ61 stereomicroscope under fluorescent lamps. Measurements were made with a binocular microscope (Olympus® SZ40), and photographs were made by the first author with a Sony® DSC-WX500 digital camera attached to an Olympus®SZ61 binocular microscope at IEBR and processed with Adobe Photoshop CS5 to adjust the size and background. The scale-lines of the plates indicate mm. For the description, sculpture terms are based on Harris (1979), terminology used in this paper follows the modified Comstock-Needham system (van Achterberg, 1997); for a key to the rogadine genera see Chen & He (1997).

Abbreviations used in this paper are as follows: OD=diameter of posterior ocellus; OOL=ocular-ocellar line; POL=postocellar line; MT: Malaise trap; "Rog.+number": code number indexing for specimens of the subfamily Rogadinae in the collection; C: Central; NE: Northeast; NP: National Park; NW: Northwest; S: South.

The examined specimens (holotypes and paratypes) are kept in the parasitoid collections of Department of Insect Ecology, IEBR and Vietnam National Museum of Nature (VNMN) at Ha Noi, Vietnam. IEBR stands for the Institute of Ecology and Biological Resources, and VAST stands for the Vietnam Academy of Science and Technology.

## RESULTS AND DISCUSSION

### SYSTEMATICS

**Checklist and distribution of *Aleiodes*, *Cystomastacoides*, *Gyroneuron* and *Rogasodes* in alphabetical order** (asterisk indicated new record for the braconid fauna of Vietnam)

*Aleiodes* (*Arcaleiodes*) *aglaurus* Chen & He, 1991. Oriental: China

*Aleiodes* (*Arcaleiodes*) *dresdeni* Quicke & Butcher, 2012. Oriental: Thailand

*Aleiodes* (*Arcaleiodes*) *hubeiensis* (Chen & He, 1997). Oriental: China

*Aleiodes* (*Arcaleiodes*) *hoangliensis* Long, **sp. n.** Oriental: Vietnam

*Aleiodes* (*Arcaleiodes*) *nitidus* Chen & He, 1991. Oriental: China, Vietnam

*Aleiodes* (*Arcaleiodes*) *sapa* Long, **sp. n.** Oriental: Vietnam

(\*) *Aleiodes (Arcaleiodes) siamensis* Quicke & Butcher, 2012 Oriental: Thailand, Vietnam

*Aleiodes (Arcaleiodes) simulatus* Long, sp. n. Oriental: Vietnam

*Aleiodes (Arcaleiodes) unifasciatus* Chen & He, 1991. Oriental: China

*Aleiodes (Arcaleiodes) vanachterbergi* Quicke & Butcher, 2012. Oriental: Thailand

*Cystomastacoides asotaphaga* Quicke, 2013. Oriental: Thailand

*Cystomastacoides contrastus* Long, sp. n. Oriental: Vietnam

(\*) *Cystomastacoides coxalis* Chen & He, 1997. Oriental: China, Vietnam

*Cystomastacoides kiddo* Quicke & Butcher, 2013. Oriental: Thailand

*Cystomastacoides nicolepeeralae* Quicke, 2013. Australasian: Papua New Guinea

*Cystomastacoides sachini* Ranjith, 2018. Oriental: India

*Cystomastacoides similis* Long, sp. n. Oriental: Vietnam

*Cystomastacoides yuvaraji* Ranjith, 2018. Oriental: India

*Gyroneuron mirum* Kokujev, 1901. Oriental: China, India, Vietnam

*Gyroneuron testaceator* Watanabe, 1934. Oriental: China, Vietnam

*Gyroneuron asperatum* Long, sp. n. Oriental: Vietnam

*Gyroneuron bicoloratum* Long, sp. n. Oriental: Vietnam

*Gyroneuron glabrum* Long, sp. n. Oriental: Vietnam

*Rogasodes masaicus* Chen & He, 1997. Oriental: China

*Rogasodes phongi* Long & Hoa, sp. n. Oriental: Vietnam

### Subgenus *Arcaleiodes* Chen & He, 1997

*Arcaleiodes* Chen & He, 1997: 60. Type species *Aleiodes unifasciatus* Chen & He, 1991

### Diagnostic characters

Antenna 50–64 antennomeres, with median cream white segments (Figs 4, 10); maxillary and labial palpi normal, slender (Figs 3, 12); vertex narrow; eyes and ocelli large (Figs 2, 11, 21); length of eyes in dorsal view 3.0–4.0 × temple; occipital carina complete, strong and ventrally angulate (Figs); antescutal depression well developed; prepectal carina complete (Figs 3, 15, 22); precoxal sulcus absent or wide depression (Figs 3, 15, 22); mesoscutum and scutellum densely punctate-rugose or densely granulate (Figs 6, 14, 27); propodeal areola absent, carina only distinctly basally (Figs 1, 13, 28); veins 1-M and m-cu of fore wing diverging posteriorly (Figs 5, 16, 25); vein 1-M of hind wing curved (Figs 7, 17, 25); medio-basal area of second tergite distinct and triangular (Figs 9, 29).

**Biology.** Unknown.

**Distribution.** Oriental region.

This subgenus differs from *Aleiodes* Wesmael in having the vein m-cu of fore wing distinctly diverging from vein 1-M posteriorly (this character can be interpreted as synapomorphy linking *Hemigyryneuron* Baker); the basal cell of hind wing very narrow; the vein 1-M of hind wing strongly curved and the antenna medially with median pale segments.

### Key to species of the *Aleiodes (Arcaleiodes)* from Vietnam

1. Female; propodeum redish or brownish yellow (Fig. 28).....2  
- Male; propodeum black (Figs 1, 13).....3
2. Hind wing vein M+CU 0.9 × 1-M; vein 2-SC+R of hind wing horizontal; propodeum and first metasomal tergite orange; second metasomal tergite cream white or pale yellow on basal 0.6 of tergite.....*A. (Arcaleiodes) siamensis* Quicke & Butcher  
- Hind wing vein M+CU as long as 1-M; vein 2-SC+R of hind wing quadrate (Fig. 25); propodeum orange and first metasomal tergite brownish yellow; second metasomal tergite brownish yellow basally (Fig. 26).....*A. (Arcaleiodes) simulatus* Long, sp. n.
3. Fore wing with vein cu-a unusually thick, subbasal cell glabrous apically (Fig. 16); basal cell of hind wing distinctly wide medially; vein 2-SC+R of hind wing nearly perpendicular (Fig. 17); first metasomal tergite yellow on basal 0.3 and apical 0.3 of tergum, black medially; third metasomal tergite black entirely (Fig. 19).....*A. (Arcaleiodes) sapa* Long, sp. n.

- Fore wing with vein cu-a normal, subbasal cell setose apically (Fig. 5); basal cell of hind wing distinctly narrow medially; vein 2-SC+R of hindwing horizontal (Fig. 7); first metasomal tergite black on basal 0.7 of tergum, yellow apically; third metasomal tergite black with apical transverse ivory strip (Fig. 9).....**A. (*Arcaleiodes*) *hoanglienensis* Long, sp. n.**

**TREATMENT OF SPECIES**

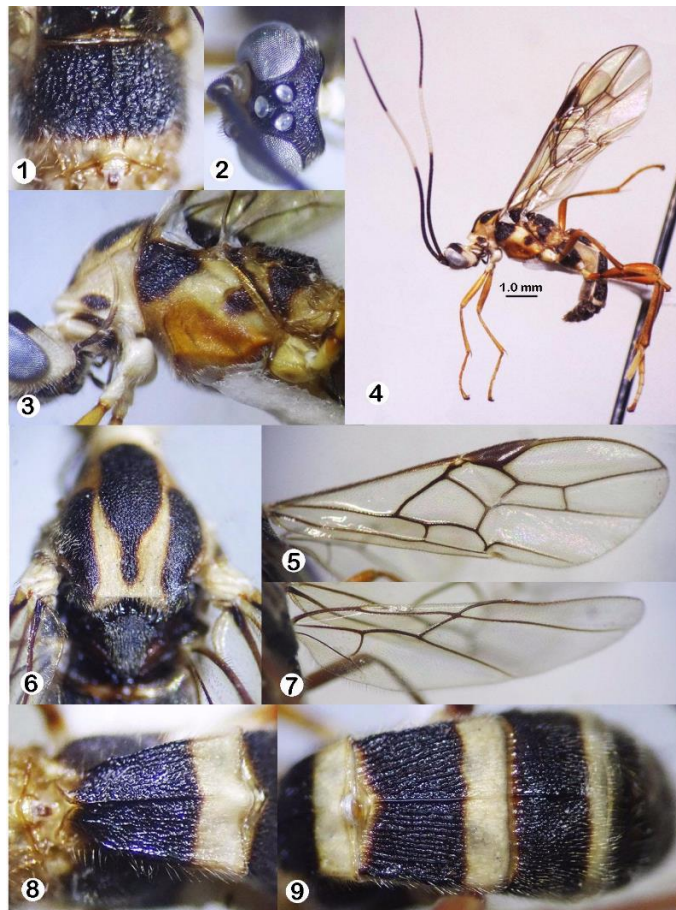
***Aleiodes* (*Arcaleiodes*) *hoanglienensis* Long, sp. n.**

(Figs 1–9)

**Material.** Holotype, ♂, ‘Rog.818’ (IEBR), NW Vietnam: Lao Cai, Hoang Lien NP, 1900m, light trap, 28.ix.2013, PT Nhi.

Body length 7.5 mm, forewing length 6.6 mm and antenna length 8.2 mm (Fig. 4).

**Head.** Antenna with 59 antennomeres; dorsally length of scapus  $1.9 \times$  its width; apical flagellomere acuminate; median flagellomeres  $1.2 \times$  longer than wide (6:5); subapical antennomere  $0.7 \times$  apical antennomere (5:7); ocelli large, POL:OD:OOL = (4:7:3) (Fig. 2); distance between anterior and posterior ocellus as long as distance from posterior ocellus to eye margin; frons, vertex and temple rugo-punctate (Fig. 2).



**Figures 1–9. *Aleiodes* (*Arcaleiodes*) *hoanglienensis* Long, sp. n.;** 1. Propodeum, 2. Head (dorsal view), 3. Mesopleuron, 4. Habitus (male, holotype, lateral view), 5. Mesonotum, 6. Fore wing, 7. Hind wing, 8. First metasomal tergite, 9. Second-third metasomal tergites

**Mesosoma.** Length of mesosoma  $1.8 \times$  longer its height (93:51); mesopleuron rugo- coriaceous; precoxal suture absent (Fig. 3); metapleuron rugose anteriorly, posterior area

with some rugae; lobes of mesoscutum and scutellum densely finely granulate (Fig. 3); propodeum with sinuate midlongitudinal carina, largely rugose laterally (Fig. 1).

**Wings.** Fore wing: length of pterostigma  $3.3 \times$  as long as wide; vein 1-CU1  $0.6 \times$  2-CU1 (20:33); vein 3-SR  $1.25 \times$  vein r (31:15); vein 2-SR+M  $0.6 \times$  vein r (9:15); vein 3-SR  $0.44 \times$  vein SR1 (31:70); basal length of second submarginal cell of fore wing  $2.9 \times$  its maximum width (46:16) (Fig. 5). Hind wing vein m-cu absent; vein M+CU  $1.2 \times$  vein 1-M (39:33); vein 1-M  $1.6 \times$  1r-m (33:21); vein 2-SC+R horizontal (Fig. 7).

**Legs.** Length of hind femur, tibia and basitarsus  $4.3 \times$ ,  $5.8 \times$  and  $6.7 \times$  their maximum width, respectively; hind inner spur  $0.5 \times$  hind basitarsus; fourth tarsus  $0.8 \times$  telotarsus.

**Metasoma.** Length of first metasomal tergite  $1.3 \times$  its apical width (60:45); median length of second tergite  $1.6 \times$  third tergite (49:31); median length of second tergite subequal to its basal width; midlongitudinal carina of 3rd tergite on basal  $0.6$  of tergum; dorsal carinae of first metasomal tergite united, with strong midlongitudinal carina, rugose laterally (Fig. 8); tergite 2 largely striate; tergite 3 longitudinally rugose (Fig. 9).

**Colour.** Scapus and pedicell brownish yellow; flagellum brown basally and apically, with median ivory white band on 24–38 segments; face largely cream white, brown medially; antennal sockets white; frons, stemmaticum and vertex black; temple black dorsally, white ventrally; palpi dark brown but two apical segments whitish yellow. Propleuron pale yellow, with brown patch medio-ventrally (Fig. 3); pronotum whitish yellow; median lobe of mesoscutum anteriorly, lateral lobes laterally black; notauli largely whitish yellow posteriorly (Fig. 6); scutellum and propodeum black. Fore and middle legs yellow, except coxae cream white; hind coxa black; hind trochanter and tarsus pale yellow, except telotarsus darker; hind trochantellus, femur and tibia reddish yellow. First-third metasomal tergites black with apical cream white strips (Fig. 9); tergites 4–6 black.

**Etymology.** The new species named after type locality, Hoang Lien National Park, Northwest Vietnam.

**Female.** Unknown.

**Biology.** Unknown.

*Aleiodes (Arcaleiodes) sapa* Long, sp. n.

(Figs 10–19)

**Material.** Holotype, ♂, 'Rog.318' (IEBR), NW Vietnam: Lao Cai, Sa Pa, 18.x.2004, NT Huong.

Body length 7.8 mm, Fore wing length 7.0 mm and antenna length 9.4 mm (Fig. 10).

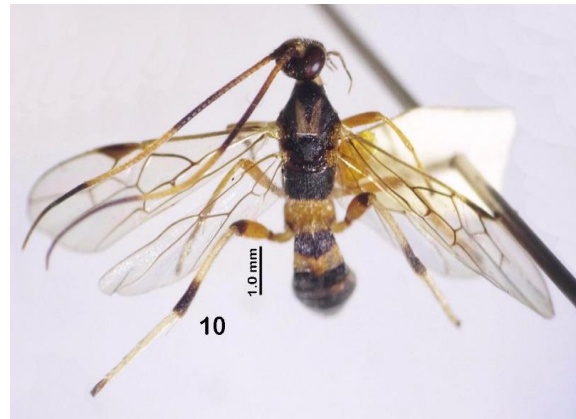


Figure 10. *Aleiodes sapa* Long, sp. n. Habitus (male, holotype, dorsal view)

**Head.** Antenna with 60 antennomeres; dorsally length of scapus  $1.9 \times$  its width; third antennomere  $1.3 \times$  fourth (9:7); subapical antennomere  $0.6 \times$  apical antennomere (5:8); apical antennomere acuminate; median flagellomeres nearly quadrate; ocelli large, in high triangle, POL:OD:OOL=(4:8:3) (Fig. 11); distance between anterior and posterior ocellus  $1.7 \times$  distance from posterior ocellus to eye margin (5:3).

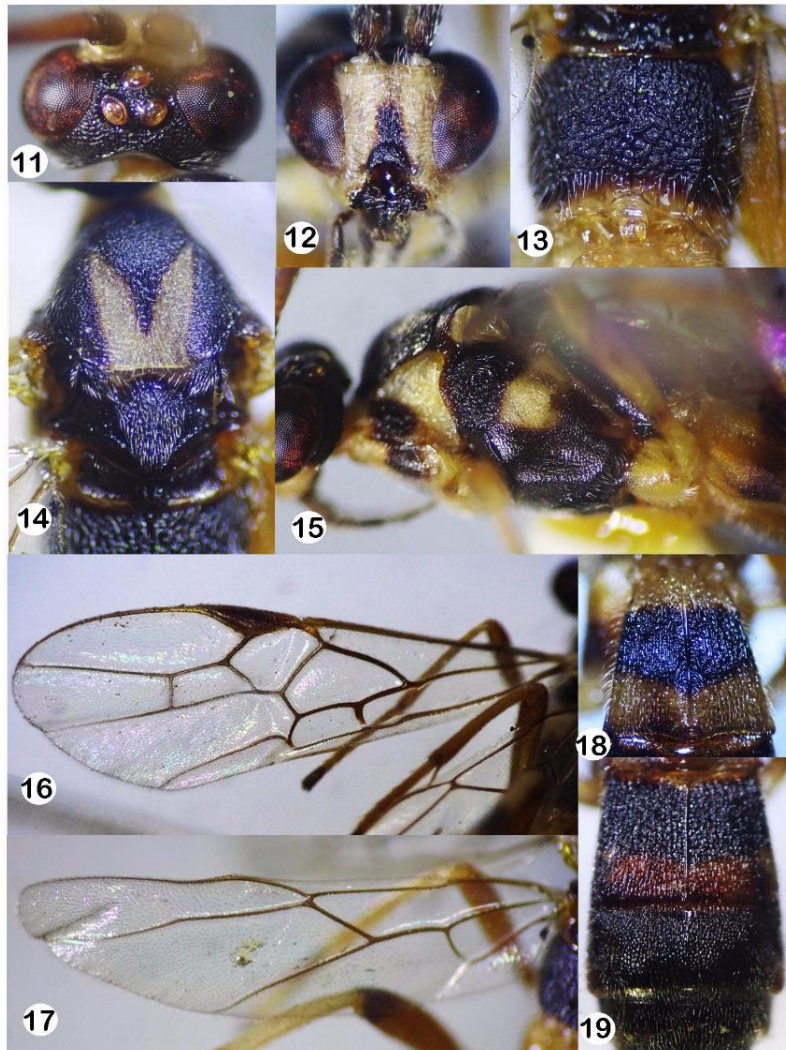
**Mesosoma.** Length of mesosoma  $1.6 \times$  longer its height (62:39); mesopleuron rugopunctate medially, largely rugose anteriorly (Fig. 15); precoxal sulcus absent; metapleuron rugose; lobes of mesoscutum and scutellum granulate (Fig. 14); propodeum with median carina, reticulate-rugose (Fig. 13).

**Wings.** Pterostigma length  $3.25 \times$  its width (52:16); fore wing vein 1-CU1  $2.1 \times$  cu-a (25:12) and  $0.8 \times$  2-CU1 (25:30); vein 3-SR  $1.75 \times$  vein r (28:16),  $1.4 \times$  vein 2-SR (28:20), and  $0.4 \times$  vein SR1 (74:28) (Fig. 16); vein 2-SR+M  $0.75 \times$  vein r (12:16); basal length of second submarginal cell of fore wing  $2.6 \times$  its maximum width (42:16) (Fig. 16). Hind wing

vein m-cu absent; vein M+CU  $1.4 \times$  vein 1-M; M+CU:1-M:1r-m = 40:29:27; vein 2-SC+R perpendicular (Fig. 17).

*Legs.* Length of hind femur, tibia and basitarsus  $3.5 \times$ ,  $7.1 \times$  and  $4.4 \times$  their maximum width, respectively; hind tibial inner spur  $0.55 \times$  hind basitarsus; hind fourth tarsus subequal to telotarsus.

*Metasoma.* Length of first metasomal tergite  $1.15 \times$  its apical width (63:55) (Fig. 18); median length of second tergite  $1.3 \times$  third tergite (47:36); median length of second tergite  $0.9 \times$  its basal width (47:53) (Fig. 19); fine midlongitudinal carina of 3rd tergite on basal 0.4 of tergum; metasomal tergites 1+2 longitudinally rugose; tergite 3 rugose basally, punctate apically (Fig. 19).



Figures 11–19. *Aleiodes (Arcaleiodes) sapa* Long, sp. n.

11. Head (dorsal view), 12. Head (frontal view), 13. Propodeum, 14. Mesonotum, 15. Mesopleuron, 16. Fore wing, 17. Hind wing, 18. First metasomal tergite, 19. Second-third metasomal tergites

*Colour.* Scapus yellowish brown; flagellum yellow basally, with median ivory white band on antennomeres 20–37 (18 segments); face yellow, except area near clypeus black; clypeus black; palpi brown; frons, stemmaticum, vertex and temple black; malar space cream white.

Lobes of mesoscutum black; notauli largely cream white posteriorly (Fig. 14); scutellum and propodeum black (Figs 13, 14); mesopleuron largely black, except pale yellow patch dorsally (Fig. 15); fore and middle legs yellow, except coxae paler; hind coxa and femur yellow,

except apex darker; hind tibia cream white on basal 0.6, brown on apical 0.4; hind tarsus white, except telotarsus brownish yellow. First metasomal tergite dark brown medially, yellow basally and apically (Fig. 18); tergite 2 dark brown on basal 0.7, reddish yellow on apical 0.3; tergites 3–6 black (Fig. 19).

**Etymology.** The new species named after type locality, Sa Pa, a tourism town in highland north mountainous area, Northwest Vietnam.

**Female.** Unknown.

**Biology.** Unknown.

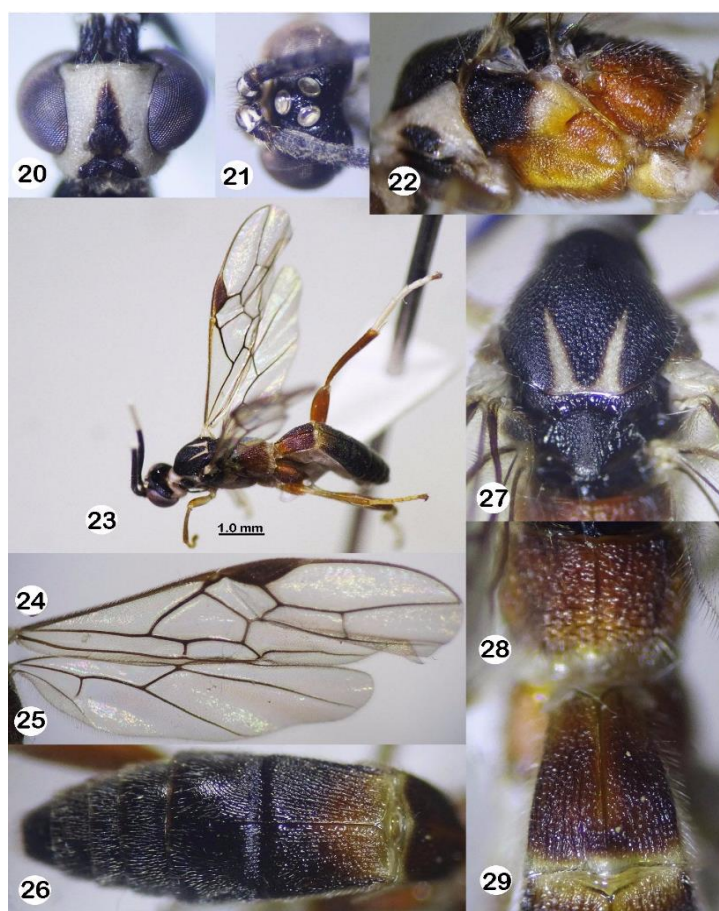
*Aleiodes* (*Arcaleiodes*) *simulatus*  
Long, sp. n.

(Figs 20–29)

**Material.** Holotype, ♀, ‘Rog.1008’ (IEBR), S Vietnam: Lam Dong, Lac Duong, Bi Doup-Nui Ba NP, ix.2017, PT Nhi.

Body length 6.5 mm, Fore wing length 5.6 mm (Fig. 23).

**Head.** Antenna incomplete, with 33 antennomeres remaining; dorsally, length of scapus  $2.2 \times$  maximum width; third antennomere  $1.2 \times$  fourth (7:6); median flagellomeres  $1.25 \times$  longer than wide (5:4); ocelli large, POL:OD:OOL=3:7:2 (Fig. 21); face with short median carina, sparsely rugose (Fig. 20).



Figures 20–29. *Aleiodes* (*Arcaleiodes*) *simulatus* Long, sp. n

20. Head (frontal view), 21. Head (dorsal view), 22. Mesopleuron, 23. Habitus (female, dorso-lateral view), 24. Fore wing, 25. Fore wing, 26. Second-fourth metasomal tergites, 27. Propodeum, 28. Mesonotum, 29. First metasomal tergite

**Mesosoma.** Length of mesosoma  $1.8 \times$  longer its height (102:57); mesopleuron punctate posteriorly, rugo-punctate medially and anteriorly (Fig. 22); precoxal suture absent;

lobes of mesoscutum rugo-punctate; scutellum densely granulate (Fig. 27); propodeum with median carina, foveolate-rugose (Fig. 28).

**Wings.** Fore wing vein 1-CU1  $2.1 \times$  vein cu-a (17:8),  $0.6 \times$  2-CU1 (17:28); vein 3-SR  $1.2 \times$  vein r (13:11),  $0.2 \times$  SR1 (13:56); vein 2-SR+M  $0.9 \times$  vein r (10:11); basal length of second submarginal cell  $2.9 \times$  its maximum width (41:14) (Fig. 24). Hind wing vein m-cu absent; vein M+CU slightly longer or subequal to vein 1-M; M+CU:1-M:1r-m = 32:31:20 (Fig. 25); vein 2+SC+R quadrate.

**Legs.** Length of hind femur, tibia, basitarsus  $3.75 \times$ ,  $7.8 \times$  and  $6.0 \times$  their maximum width, respectively; inner hind tibial spur  $0.44 \times$  hind basitarsus; fourth hind tarsus  $0.6 \times$  hind telotarsus.

**Metasoma.** Length of first metasomal tergite  $1.3 \times$  its apical width (44:33) (Fig. 29); median length of second tergite  $1.3 \times$  third tergite (37:25); median length of second tergite  $1.1 \times$  its basal width (37:34) (Fig. 26); midlongitudinal carina of third tergite on basal  $0.44$  of tergum; first metasomal tergite longitudinally rugose; tergite 2 striate; tergite 3 finely striate at extreme base, most coriaceous (Fig. 26).

**Colour.** Antenna black basally with median ivory white band on antennomeres 23–33 (11 segments); face cream white, dark brown medially as clypeus (Fig. 20); first-second segments of maxillary palp black, third-fifth segments cream white. Propleuron cream white with large black spot ventrally; mesopleuron black anteriorly, yellow posteriorly (Fig. 22); lobes of mesoscutum black, notauli black anteriorly, largely cream white posteriorly (Fig. 27); scutellum black; propodeum and metanotum reddish yellow. Fore and middle legs yellow, except trochanter and trochantellus paler; hind coxa, femur and tibia reddish yellow, except tibia white at base; hind tarsus cream white, except telotarsus brown. First metasomal tergite brownish yellow; second tergite yellow basally, blackish brown apically; third-sixth tergites black (Fig. 26).

**Etymology.** From “simulo” (Latin for imitate, copy), because this new species similar to *A. (Arcaleiodes) siamensis* Quicke & Butcher, from Thailand. Differences of these species are given in the key.

**Female.** Unknown.

**Biology.** Unknown.

*Aleiodes (Arcaleiodes) siamensis* Quicke & Butcher, 2012

**Material.** ♀, ‘Rog.585’ (IEBR), NW Vietnam: Hoa Binh, Da Bac, bushes, sweeping, 6.vi.2008, ND Hiep; ♀, ‘Rog.693’ (IEBR), NW Vietnam: Hoa Binh, Mai Chau, Tan Son, orchard, MT,  $20^{\circ}43'10.3''$ N  $104^{\circ}59'47''$ E, 950m, 20-25.vii.2010, KD Long; ♀, ‘Rog.779’ (IEBR), NW Vietnam: Phu Tho, Tan Son. Xuan Dai, orchard, MT,  $21^{\circ}07'N$   $105^{\circ}00'E$ , 120m, 25.iv.2009, KD Long.

**Notes.** Female of *A. siamensis* collected from Vietnam: Body length 6.5 mm, fore wing length 6.0 mm and antenna length 7.6 mm. Antenna with 55 antennomeres; dorsally length of scapus  $2.0 \times$  its width; third antennomere  $1.3 \times$  fourth (9:7); median flagellomeres  $1.5 \times$  longer than wide; subapical antennomere  $1.3 \times$  apical antennomere (9:7); apical antennomere acuminate; ocelli large, POL:OD:OOL = 3:6:2.

**Mesosoma.** Length of mesosoma  $1.8 \times$  longer its height (102:57); mesopleuron with oblique rugosities medially, largely rugose anteriorly; precoxal suture absent; propodeum largely rugose.

**Wings.** Length of pterostigma  $3.3 \times$  its width; vein r arising from middle of pterostigma; vein 3-SR  $2.0 \times$  vein r (22:11),  $1.5 \times$  vein 2-SR (22:15), and  $0.4 \times$  vein SR1 (22:55); Fore wing vein 1-CU1  $1.4 \times$  vein cu-a (11:8),  $0.7 \times$  vein 2-CU1 (20:28); basal length of second submarginal cell  $2.75 \times$  its maximum width (33:12). Hind wing vein m-cu absent; vein M+CU as long as vein 1-M; M+CU:1-M:1r-m = 30:30:13; vein 2+SC+R horizontal.

**Legs.** Length of hind femur, tibia and basitarsus  $4.1 \times$ ,  $8.5 \times$  and  $5.8 \times$  their maximum width, respectively; hind tibial inner spur  $0.4 \times$  as long as hind basitarsus (16:37).

**Metasoma.** Length of first metasomal tergite  $1.4 \times$  its apical width (46:33); median length of second tergite  $1.5 \times$  third (38:26); median length of second tergite  $1.1 \times$  its basal width (36:34); midlongitudinal carina of 3rd tergite on basal  $0.4$  of tergum; first-second metasomal tergites longitudinally rugose; third tergite finely striate basally, rugo-coriaceous apically.

**Colour.** Antenna black basally, with median ivory white band on antennomeres 20–33 (14 segments); first-third segments of maxillary palp black, fourth-fifth segments white;



mesoscutum and scutellum black; propodeum and first metasomal tergite reddish yellow; fore and middle legs yellow, except telotarsus darker; hind coxa and femur reddish yellow; hind tibia blackish brown, white at base; hind tarsus 1–4 cream white; telotarsus yellowish brown; second tergite yellow on basal 0.7, blackish brown on apical 0.3; fourth-sixth tergites black.

**Genus *Cystomastacoides* van Achterberg, 1997**

*Cystomastacoides* van Achterberg, 1997: Chen & He, 1997: 65. Type-species: *Cystomastacoides coxalis* van Achterberg, 1997.

**Diagnostic characters**

Palpi of female normal but third segment of maxillary palpi and second segment of labial palpi slightly widened apically, except in *Cystomastacoides contrastus* sp. n., palpi with all segments normal; third segment of maxillary palpi and second segment of labial palpi of male

enlarged and swollen (Fig. 45); occipital carina complete, joining hypostomal ventrally (Figs 33, 45); malar suture present (Fig. 44); prepectal carina present; precoxal sulcus impressed medially (Fig. 34); lateral carinae of propodeum protruding posteriorly (Figs 39, 47); pterostigma long; fore wing vein m-cu curved (Figs 37, 49); vein SR1 slightly curved (Figs 37, 49); hind wing vein M+CU longer vein 1-M (but slightly shorter in *Cystomastacoides contrastus* sp. n.); vein 2-SC+R quadrate, perpendicular or horizontal (Figs 38, 50); hind coxa with a tubercle dorsally (Fig. 35); claws with medium lobe; hind tibial spurs largely glabrous and curved (Fig. 36); first metasomal tergite narrowed basally, dorsope large; dorsal carina united basally, connected to a strong median carina (Figs 40, 48); medio-basal area of second tergite small (Figs 41, 51); second-sixth metasomal tergites with sharp lateral crease (Figs 30, 42); hypopygium convex ventrally (Fig. 30); ovipositor sheath widened.

**Key to species of the genus *Cystomastacoides* van Achterberg from Vietnam**

1. Ocelli medium (Fig. 32); hind femur distinctly narrowed basally and swollen apically (Fig. 36); length of first metasomal tergite  $1.6 \times$  as long as apical width; hind wing vein 1-M distinctly curved medially, vein 2-SC+R horizontal (Fig. 38).....***Cystomastacoides contrastus* Long, sp. n.**

- Ocelli large (Fig. 43); hind femur slender (Fig. 42); length of first metasomal tergite  $2.5\text{--}2.8 \times$  as long as apical width; hind wing vein 1-M of hind wing straight, vein 2-SC+R perpendicular, nearly quadrate (Fig. 50).....**2**

2. Occipital carina evenly rounded; vein 1-M of hind wing  $1.8 \times$  vein 1r-m (Fig. 312 in Chen & He, 1997); apical half of fifth and sixth metasomal tergites smooth.....***Cystomastacoides coxalis* Chen and He**

- Occipital carina wavy (Figs 43, 45); vein 1-M of hind wing  $1.7 \times$  vein 1r-m (Fig. 50); fifth metasomal tergite almost longitudinally rugose; sixth metasomal tergite sparsely punctate.....***Cystomastacoides similis* Long, sp. n.**

***Cystomastacoides contrastus* Long, sp. n.**

(Figs 30–41)

**Material.** Holotype, ♀, 'Rog.024' (IEBR), NW Vietnam: Hoa Binh, Yen Thuy, Lac Thinh, forest, MT,  $20^{\circ}33'06''\text{N}$   $105^{\circ}34'11''\text{E}$ , 315m, 5.v.2002 KD Long.

**Description**

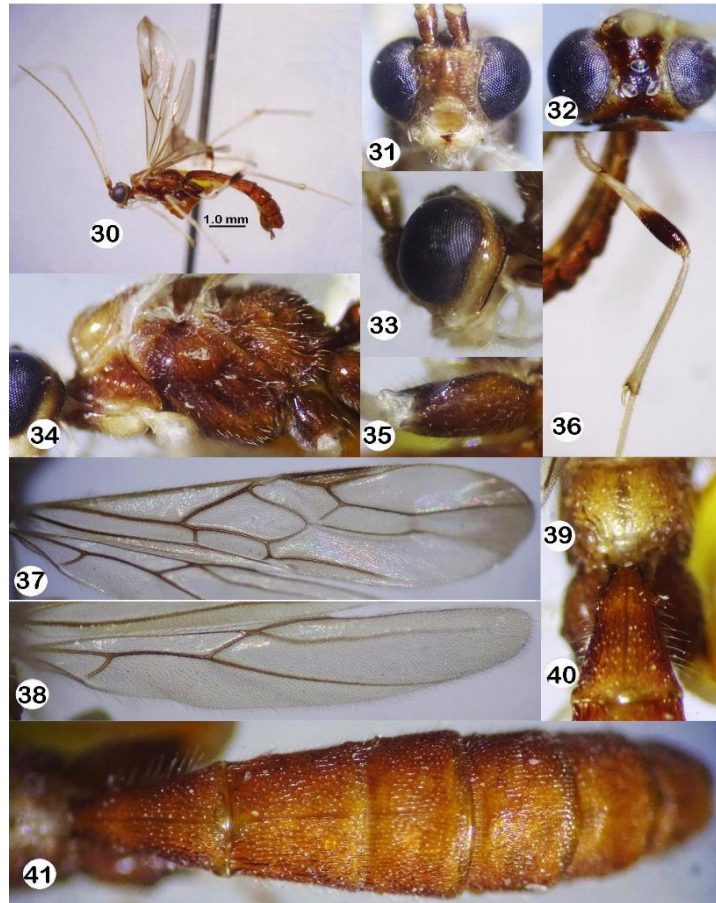
Holotype, female, body length 6.1 mm, Fore wing length 5.1 mm (Fig. 30).

**Head.** Antenna with 49 antennomeres; dorsally, length  $1.8 \times$  longer than its maximum width (11:6); middle antennomere  $2.8 \times$  longer than wide (7:2.5); third antennomere  $1.1 \times$

fourth (10:9) width of face  $0.9 \times$  length of face and clypeus combined (15:17); malar space  $0.5 \times$  as long as mandible width (3.5:7); mandible width  $0.8 \times$  as long as hypoclypeal depression (7:9); malar suture present; distance between tentorial pits  $5.0 \times$  distance between pit and eye margin (10:2) (Fig. 31); in dorsal view, height of eye  $4.75 \times$  as long as temple (19:4), occipital carina evenly concave (Fig. 32); in lateral view, width of eye  $2.7 \times$  as long as temple (16:6); ocelli medium, in high triangle, POL:OD:OOL=2:4:3; distance between front and hind ocelli as long as OOL (Fig. 32); face largely rugose laterally; frons shiny, almost smooth with fine radial striae close to antennal sockets; vertex and temple smooth (Fig. 33).

*Mesosoma.* Length of mesosoma  $1.4 \times$  as long as high (68:47); propleuron sparsely crenulated medially (Fig. 34); mesoscutum more or less protruding above pronotum, with sparse but large punctures; notauli deep, punctate anteriorly; lobes of mesoscutum with rugose deep medial depression posterior between notauli; pres-

cutellar depression  $0.4 \times$  scutellum (5:12); scutellum rugo-punctate; precoxal sulcus shallow; mesopleuron shiny, largely smooth, rugate anteriorly; metapleuron sparsely punctate anteriorly (Fig. 34), posterior area with parallel rugae; propodeum largely rugose with trace of crenulated areola (Fig. 39).



Figures 30–41. *Cystomastacoides contrastus* Long, sp. n.

30. Habitus (female, holotype, lateral view), 31. Head (frontal view), 32. Head (dorsal view), 33. Head (lateral view), 34. Mesopleuron, 35. Hind coxa (lateral view), 36. Hind femur and tibia, 37. Fore wing, 38. Hind wing, 39. Propodeum, 40. First metasomal tergite, 41. Metasoma

*Wings.* Fore wing: pterostigma long and narrow,  $6.25 \times$  its width (50:8); r:2-SR:3-SR:SR1=8:11:29:46; vein r arising before middle of pterostigma; vein 1-SR+M s-shaped; vein cu-a rather long, subequal to vein cu-a (Fig. 37), 1-CU1  $0.8 \times$  vein cu-a (5:6), and  $0.2 \times$  vein 2-CU1 (5:28); basal length of second submarginal  $4.75 \times$  its apical width (38:8) (Fig. 37). Hind wing: vein M+CU  $0.9 \times$  vein 1-M; M+CU:1-M:1r-m=24:26:9; vein 2-SC+R longitudinal (Fig. 38).

*Legs.* Hind femur baseball bat-shaped, distinctly narrow basally, swollen apically (Fig. 36); length of hind femur, tibia and basitarsus  $6.1 \times$ ,  $11.1 \times$  and  $10.25 \times$  their width respectively; inner hind tibial spur  $0.29 \times$  basitarsus (12:41).

*Metasoma.* First tergite  $1.6 \times$  its apical width (44:28) (Fig. 40); median length of second tergite  $1.3 \times$  third tergite (29:23); ovipositor sheath  $1.1 \times$  longer hind inner spur (13:12);

first-third tergites with midlongitudinal carina; tergites 4–6 longitudinally rugose (Fig. 41).

**Colour.** Scapus yellow; flagellum cream white but yellowish apically; palpi white; stemmaticum blackish brown; pronotum, mesopleuron and metapleuron dirty yellow; mesoscutum, propodeum and metasoma brownish yellow; fore and middle legs cream white, except telotarsus and middle coxa yellow; hind leg cream white, except hind coxa, apical half of hind femur brown, and probably hind telotarsus (missed) brownish yellow; wings yellow, veins brown; metasoma yellow (Fig. 41).

**Male.** Unknown.

**Biology.** Unknown.

**Etymology.** From “contra” (Latin for “opposite”), because of the contrasting ivory and brownish of hind femur.

**Notes.** The new species differs from all ready known species by having ocelli medium; hind femur strongly narrow basally, swollen apically and bicolorous; hind wing vein 2-SC+R horizontal; vein 1-M curved medially and lightly longer M+CU.

The new species can also be inserted in the key by Quicke et al. (2013) after 1a as follows:

First metasomal tergite  $1.5 \times$  longer than apical width (43:28) (Fig. 40); propodeum with short basal carina and transverse carina medio-posteriorly (Fig. 39), largely areolate rugose; hind wing vein M+CU shorter than vein 1-M ( $0.9 \times$  as long as vein 1-M).

***Cystomastacoides similis* Long, sp. n.**

(Figs 42–51)

**Material.** Holotype, ♂, ‘Rog.023’ (IEBR), NE Vietnam: Ninh Binh, Cuc Phuong NP, forest, sweeping, 7-9.v.2002, KD Long. Paratype, 1♀ (missing ovipositor sheath and ovipositor), ‘Rog.470’ (IEBR), C Vietnam: Thua Thien-Hue, A Luoi, Tra Lanh, 29.v.2006, HV Tru.

**Description**

Holotype, male, body length 9.8 mm, Fore wing length 8.2 mm (Fig. 42).

**Head.** Antenna incomplete, with 55 segments remaining; dorsally, scapus  $2.0 \times$  as long as its maximum width (16:8); middle flagello-

meres  $1.5 \times$  longer than wide (6:4); third antennomere  $1.2 \times$  fourth (12:10); width of face as long as length of face and clypeus combined (23:21) (Fig. 44); malar space  $0.3 \times$  mandible width (4:13); mandible robust, its width  $0.7 \times$  hypoclypeal depression (13:18); distance between tentorial pits  $5.5 \times$  distance between pit and eye margin (11:2); in dorsal view, height of eye  $3.1 \times$  as long as temple (25:8), occipital carina wavy (Fig. 43); in lateral view, width of eye  $2.2 \times$  as long as temple (22:10); ocelli large, POL:OD:OOL=2:8:2; distance between front and hind ocelli  $1.5 \times$  as long as OOL (3:2) (Fig. 43); face rugose; frons smooth medially, coriaceous laterally; vertex and temple smooth (Fig. 45).

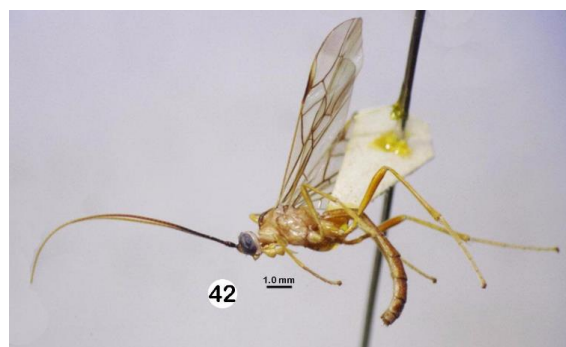


Figure 42. *Cystomastacoides similis* Long, sp.n. Habitus (male, holotype, lateral view)

**Mesosoma.** Length of mesosoma 1.55 times as long as high (65:42); propleuron sparsely crenulate (Fig. 45); mesoscutum sparsely punctate to coriaceous; notauli punctate (Fig. 46); prescutellar depression wide, with one median carina; scutellum smooth; mesopleuron shiny, smooth medially, sparsely punctate ventrally, rugate dorsally; precoxal sulcus shallow, rugopunctate; metapleuron largely rugose; propodeum transversely rugose basally, apical half with sparse longitudinal striae (Fig. 47).

**Wings.** Fore wing: pterostigma long and narrow,  $6.15 \times$  as long as wide (80:13); vein r arising before middle of pterostigma, at distance as long as vein r (Fig. 49); vein r  $1.35 \times$  vein 2-SR (23:17); vein 3-SR  $1.2 \times$  vein r (50:23), and  $0.8 \times$  vein SR1 (50:65); vein 1-CU1 slightly longer vein cu-a (10:9), and  $0.23 \times$  vein 2-CU1 (10:43) (Fig. 49); basal length of second submarginal  $3.5 \times$  as long as its maximum width (193:66). Hind wing: vein 1-M straight; vein M+CU  $1.3 \times$  as long as vein 1-M (57:43); vein

1-M  $1.7 \times$  vein 1r-m (43:25); vein 2-SC+R perpendicular, nearly quadrate (Fig. 50).

*Legs.* Hind femur slender, length of hind femur, tibia and basitarsus  $6.9 \times$ ,  $10.1 \times$  and

$12.0 \times$  their width, respectively; hind basitarsus  $0.7 \times$  tarsus 2-5 (60:85); inner hind tibial spur  $0.2 \times$  as long as basitarsus (11:60); fourth hind tarsus  $1.1 \times$  telotarsus (16:14).

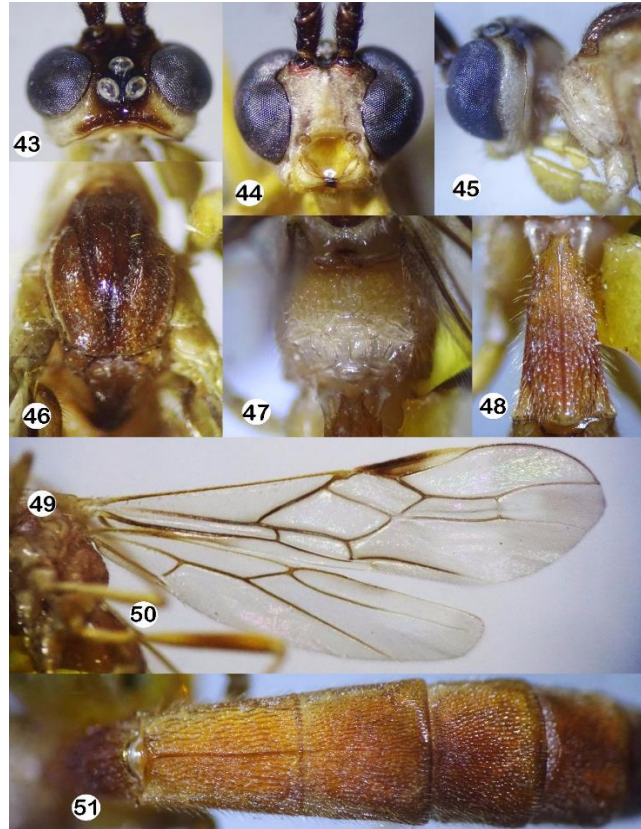


Figure 43–51. *Cystomastacoides similis* Long, sp. n.

43. Head (dorsal view), 44. Head (frontal view), 45. Head (lateral view), 46. Mesonotum, 47. Propodeum, 48. First metasomal tergite, 49. Fore wing, 50. Hind wing, 51. Second-fourth metasomal tergites

*Metasoma.* First tergite  $2.1 \times$  as long as apical width (70:34) (Fig. 48); median length of second tergite  $1.2 \times$  third (55:47); first-third tergites with complete median carina, largely longitudinally rugose; fourth tergite longitudinally rugose (Fig. 51); fifth tergite most longitudinally rugose but punctate at extreme apex; sixth tergite sparsely punctate.

*Colour.* Scapus pale yellow; pedicellus and basal flagellomeres black to blackish brown; palpi yellow; frons and stemmaticum black; mesonotum brownish yellow; propodeum yellow basally, cream white apically (Fig. 47); metasoma yellow, except sixth tergite brownish yellow; all legs yellow, except tarsus paler;

wings yellow, pterostigma brownish yellow basally, pale yellow apically (Fig. 49).

**Biology.** Unknown.

**Etymology.** From “similis” (Latin for like, resembling), because this new species similar to *Cystomastacoides asotaphaga* Quicke, 2013, from Thailand.

**Notes.** The new species differs from all species of the genus by having occipital carina distinctly wavy (as in *C. asotaphaga* Quicke, 2013, from Thailand), and can be inserted in the key by Quicke et al. (2013) after 2a as follows:

Hind wing vein M+CU  $1.3 \times$  vein 1-M (57:43), and  $2.2 \times$  vein 1r-m (57:26) (Fig. 50);

first metasomal tergite  $2.1 \times$  apical width (70:34); median length of second tergite  $1.2 \times$  longer than third tergite (55:47) (Fig. 51).

***Cystomastacoides coxalis* Chen & He**

**Material.** 1 ♂, 'Rog.366' (IEBR), NW Vietnam: Phu Tho, Xuan Son NP, forest, 15-20.x.2004, TX Lam.

**Notes.** Male of *C. coxalis* collected from Vietnam: POL:OD:OOL= 4:9:3; vein 1-CU1 as long as vein cu-a, and  $0.22 \times$  vein 2-CU1 (10:44); vein r  $1.1 \times$  vein 2-SR (23:22); vein 3-SR  $2.3 \times$  vein r (54:23), and  $0.8 \times$  vein SR1 (54:66); vein M+CU  $1.5 \times$  as long as vein 1-M (53:35); vein 1-M  $2.5 \times$  vein 1r-m (35:14).

**Genus *Gyroneuron* Kokujev, 1901**

*Gyroneuron* Kokujev, 1901: 231; Shenefelt, 1975: 1119. Type-species (monotypy): *Gyroneuron mirum* Kokujev, 1901.

**Diagnostic characters**

Antenna 44–50 antennomeres, palpi of female normal and slender, second-third segments of male more or less swollen (Fig. 60); malar suture absent; prepectal carina present, precoxal sulcus wide and shallow; propodeum short, posterior-laterally with a stout tooth; Fore wing with cu-a reclivous and curved; veins M+CU apically, 1-CU1 and cu-a strongly swollen (Figs 55, 66, 75); subbasal cell of Fore wing strongly widened apically, setose or glabrous; hind wing vein 1r-m reclivous (Figs 56, 67); vein M+CU longer vein 1-M; vein m-cu absent; tarsal claw with a large and acute lobe; inner side of hind tibia apex with distinct comb of specialized setae; tibial spur straight and setose; first metasomal tergite with large dorsopes, its dorsal carinae not united (Figs 58, 64, 73); medio-basal area of tergite 2 small and triangular (Figs 58, 61, 76).

**Key to species of the genus *Gyroneuron* Kokujev from Vietnam**

1. Female.....2
- Male.....4
2. Wings hyaline without blackish brown median band (Fig. 328 in Chen & He, 1997); metasoma brownish yellow; frons smooth, with median groove.....*Gyroneuron testaceator* Watanabe
- Wing hyaline with blackish brown median band (Fig. 71; Fig. 328 in Chen & He, 1997); metasoma at least with black spots (Fig. 71).....3
3. Frons with transverse rugae, with median groove; propodeum strongly reticulate-rugose; pterostigma brown; second-fifth metasomal tergites black.....*Gyroneuron mirum* Kokujev
- Frons smooth, with median groove; propodeum sparsely punctate, with deep median groove; pterostigma most blackish brown to black basally, yellow apically (Figs 71); first metasomal tergite blackish brown on apical 0.3 of tergum; second-fourth metasomal tergites black (Fig. 71).....*Gyroneuron bicoloratum* Long, sp. n.
4. Frons with irregular rugosities (Fig. 52); fore vein 1-CU1 distinctly shorter than vein cu-a (Fig. 59); tegula brown (Fig. 55).....*Gyroneuron asperatum* Long, sp. n.
- Frons almost smooth, with median groove (Figs 62, 73); fore vein 1-CU1 longer than vein cu-a (Figs 69, 75); tegula yellow (Figs 65, 74).....5
5. Second-third segments of maxillary palp long and robust (Fig. 63); second submarginal cell of Fore wing slightly narrowed apically; subbasal cell of Fore wing setose apically (Figs 69); hind tibia narrowed basally and distinctly swollen apically, length of hind tibia  $4.6 \times$  its maximum width; second-fourth metasomal tergites largely black medially (Fig. 64).....*Gyroneuron bicoloratum* Long, sp. n.
- Second-third segments of maxillary palp normal; second submarginal cell of Fore wing distinctly narrowed apically; subbasal cell of Fore wing glabrous apically (Fig. 75); hind tibia slender, length  $5.8 \times$  its maximum width; metasoma pale yellow entirely (Fig. 75).....*Gyroneuron glabrum* Long, sp. n.

***Gyroneuron asperatum* Long, sp. n.**

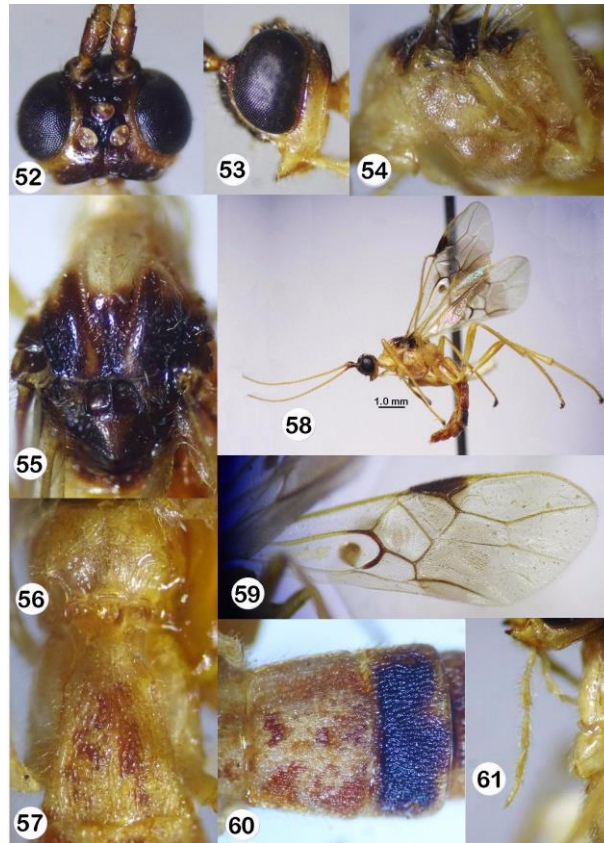
(Figs 52–61)

**Material.** Holotype, ♂, ‘Rog.291’ (IEBR), NC Vietnam: Ha Tinh, Huang Son, Son Kim,

8.v.2004, TX Lam.

**Description**

Holotype, male, body length 6.8 mm, Fore wing length 6.3 mm (Fig. 58).



**Figures 52–61. *Gyroneuron asperatum* Long, sp. n.**

52. Head (dorsal view), 53. Head (lateral view), 54. Mesopleuron, 55. Mesonotum, 56. Habitus (male, holotype, lateral view), 57. Propodeum, 58. First metasomal tergite, 59. Fore wing, 60. Second-third metasomal tergites, 61. Maxillary palp

**Head.** Antenna incomplete, with 28 antennomeres remaining; dorsally, scapus  $1.75 \times$  its maximum width (14:8); third antennomere  $1.6 \times$  fourth (11:7); middle flagellomeres  $3.0 \times$  longer than wide (6:2); width of face  $0.8 \times$  length of face and clypeus combined (19:23); malar space  $0.6 \times$  as long as mandible width (6:10); basal mandible width  $0.8 \times$  as long as hypoclypeal depression (10:12); distance between tentorial pits  $4.3 \times$  distance between pit and eye margin (13:3); maxillary palp normal (Fig. 61); in dorsal view, height of eye  $3.3 \times$  as long as temple (23:7) (Fig. 52); in lateral view, width of eye  $2.5 \times$  as long as temple (20:8) (Fig. 53); ocelli large, in high triangle, POL:OD:OOL=3:7:3;

distance between front and hind ocelli as long as OOL (Fig. 53); face rugo-punctate.

**Mesosoma.** Length of mesosoma  $1.5 \times$  as long as high (48:32); propleuron crenulate (Fig. 54); mesoscutum with sparse but large punctures; notauli deep, crenulate but rugose posteriorly; median lobe of mesoscutum with rugose deep median depression posteriorly (Fig. 55); prescutellar depression wide and rather long,  $0.7 \times$  scutellum (9:13), with one median carina; scutellum with dense punctures; precoxal sulcus shallow, rugose; mesopleuron rugo-punctate anteriorly and ventrally; metapleuron rugo-punctate; propodeum rugo-punctate basolaterally, largely rugo-striate medio-posteriorly (Fig. 56).

**Wings.** Fore wing: pterostigma broad,  $2.7 \times$  its width (41:15); vein r arising behind middle of pterostigma (25:16); vein r  $0.55 \times$  vein 2-SR (10:18); vein 3-SR  $3.0 \times$  vein r (30:10), and  $0.5 \times$  vein SR1 (30:56); vein cu-a rather long, vein 1-CU1  $0.7 \times$  vein cu-a (13:18), and  $0.6 \times$  vein 2-CU1 (13:21); basal length of second submarginal  $2.6 \times$  its maximum width (44:17) (Fig. 59). Hind wing vein M+CU  $1.2 \times$  vein 1-M (42:35); vein 1-M  $2.2 \times$  vein 1r-m (35:16); vein 2-SC+R almost quadrate.

**Legs.** Hind femur slender (Fig. 58); length of hind femur, tibia and basitarsus  $5.1 \times$ ,  $9.0 \times$  and  $8.4 \times$  their width respectively; inner hind tibial spur  $0.3 \times$  basitarsus (11:42).

**Metasoma.** First metasomal tergite  $1.3 \times$  its apical width (60:45) (Fig. 57); median length of second tergite  $1.7 \times$  third tergite (45:27); tergite 1 with sinuate median carina, largely rugo-striate; first-third tergites densely rugo-striate (Figs 52, 60).

**Colour.** Body yellow; scapus brown; flagellum yellow; face, frons and stemmaticum black; vertex brown; median lobe of mesoscutum posteriorly, lateral lobes of mesoscutum, scutellar sulcus, scutellum dark brown; propodeum and all legs yellow; tegula brown; fore wing medially, hind wing apically brownish yellow; apex of subbasal cell of fore wing with brownish spot (Fig. 59); pterostigma, veins r, cu-a, a-CU1, 2-CU1, vein 1A+2A basally and vein 2-M of hind wing brown; tergites 1+2 yellow; tergite 3 black, yellow basally and extremely apically; fourth-sixth tergites yellow.

**Female.** Unknown.

**Biology.** Unknown.

**Etymology.** From “asper” (Latin for rough, uneven), because the new species with frons irregularly rugose.

**Notes.** Two species reported previously in Vietnam (Long & Belokobylskij, 2003): *Gyroneuron mirum* Kokujev and *Gyroneuron testaceator* Watanabe. They are separated from each other by characters given in the key.

***Gyroneuron bicoloratum* Long, sp. n.**

(Figs 62–71)

**Material.** Holotype, ♂, ‘Rog.497’ (VNMN), NE Vietnam: Ha Giang, Vi Xuyen, Cao Bo, forest, 300m, 11.v.2007, KD Long. Paratype,

1♂, ‘Rog.530’ (IEBR), N Vietnam: Ninh Binh, Cuc Phuong NP, Bong, forest, 30.iv.2002, KD Long; paratype, 1♀, ‘Rog.1062’ (IEBR), NE Vietnam: Tuyen Quang, Son Phu, Na Hang NP, forest, MT,  $22^{\circ}17'32.0''\text{N}$   $105^{\circ}28'19.9''\text{E}$ , 573 m, 15.viii.2018, KD Long.

**Description**

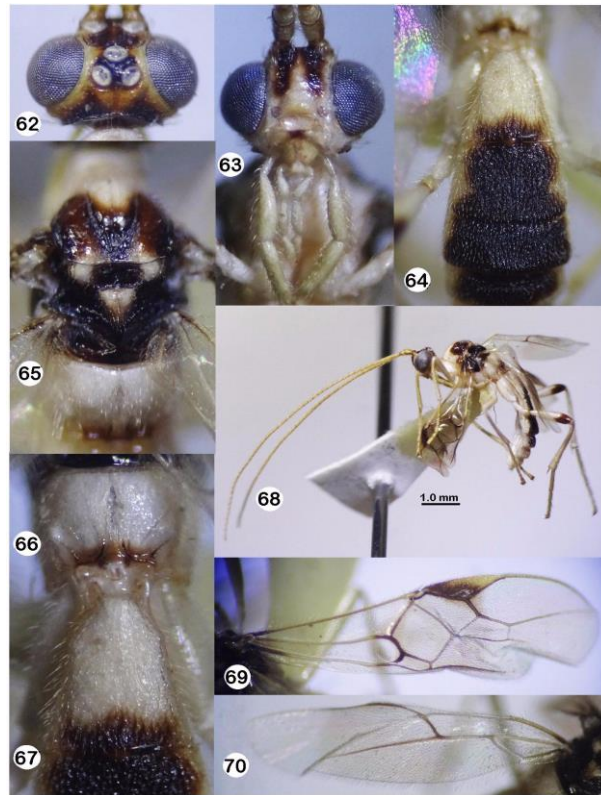
**Holotype,** male, body length 4.4 mm, Fore wing length 4.6 mm, antenna mm (Fig. 68).

**Head.** Antenna with 48 antennomeres; dorsally, scapus  $1.7 \times$  its maximum width (10:6); third antennomere  $1.25 \times$  fourth (10:8); middle antennomere  $2.3 \times$  longer than wide (7:3); second-third segments of maxillary palp long and robust (Fig. 63); width of face  $0.8 \times$  length of face and clypeus combined (15:18) (Fig. 63); malar space  $0.7 \times$  as long as mandible width (4:6); mandible width  $0.75 \times$  as long as hypoclypeal depression (6:8); distance between tentorial pits  $4.5 \times$  distance between pit and eye margin (9:2); in dorsal view, height of eye  $6.3 \times$  as long as temple (19:3); in lateral view, width of eye  $4.25 \times$  as long as temple (17:4); ocelli large, in high triangle, POL:OD:OOL=2.5:6:2.5; distance between front and hind ocelli as long as OOL (Fig. 62); face rugo-coriaceous; frons coriaceous, with sparse striae; vertex and temple almost smooth.

**Mesosoma.** Length of mesosoma  $1.5 \times$  as long as high (67:45); propleuron crenulate; mesoscutum with sparse but large punctures; notauli deep, punctate anteriorly; lobes of mesoscutum with rugose narrow median depression posterior between notauli; prescutellar depression, rather wide, with one median carina,  $0.7 \times$  scutellum (7:10) (Fig. 65); scutellum strongly narrowed posteriorly, almost smooth; precoxal sulcus oblique, deep, sparsely punctate; mesopleuron almost smooth; metapleuron smooth; propodeum with median groove, punctate laterally (Fig. 66).

**Wings.** Fore wing: pterostigma broad, length  $3.15 \times$  its width (41:13); vein r arising from middle of pterostigma; vein r  $0.7 \times$  vein 2-SR (9:13); vein 3-SR  $1.9 \times$  vein r (17:9), and  $0.35 \times$  vein SR1 (17:48); vein 1-CU1  $1.6 \times$  vein cu-a (11:7), and  $0.8 \times$  vein 2-CU1 (11:14); vein 2-CU1 thicker vein 1-CU1; basal length of second submarginal cell  $2.4 \times$  its maximum width

(26:11) (Fig. 69). Hind wing vein M+CU  $1.5 \times 2.1 \times$  vein 1r-m (21:10); vein 2-SC+R longitudinal vein 1-M (32:21); vein 1-M distinctly curved, (Fig. 70).



Figures 62–70. *Gyroneuron bicoloratum* Long, sp. n. (male, holotype)

62. Head (dorsal view), 63. Head (frontal view), 64. First-third metasomal tergites, 65. Mesonotum, 66. Propodeum, 67. First metasomal tergite, 68. Habitus (male, holotype, lateral view), 69. Fore wing, 70. Hind wing

**Legs.** Hind femur distinctly narrow basally, more or less swollen apically (Fig. 68); length of hind femur, tibia and basitarsus  $4.6 \times$ ,  $8.5 \times$  and  $9.0 \times$  their width, respectively; inner hind tibial spur  $0.33 \times$  basitarsus (9:27); hind basitarsus  $1.5 \times$  tarsus 2-5 (27:18); fourth tarsus  $0.8 \times$  telotarsus (8:10).

**Metasoma.** First tergite  $1.25 \times$  its apical width (40:32) (Figs 64, 66); median length of second tergite  $1.6 \times$  third tergite (29:18) (Fig. 64); first-second tergites with midlongitudinal carina (Fig. 64); first-third tergites largely longitudinally rugose; fourth tergite striate with fine granules; fifth-sixth tergites finely striate.

**Colour.** Black and cream white body; antenna pale yellow; frons, stemmaticum and occiput brown to black; palpi whitish yellow; pronotum, median lobe of mesoscutum, scutellum pale yellow; lateral lobes of mesoscutum, scu-

tellar sulcus, metanotum blackish brown; mesopleuron whitish yellow ventrally, blackish brown dorsally; metapleuron, propodeum, fore and middle legs cream white to whitish yellow; hind leg cream white, except brown on apical 0.3 of hind femur; pterostigma basally and ventrally, veins r, 1-CU1, cu-a, M+CU1 apically, vein 1A+2A basally dark brown (Fig. 69); first metasomal tergite cream white to whitish yellow, dark brown at extreme apex (Figs 64, 67); second-fourth tergites largely black, pale yellow laterally (Fig. 64); fifth-sixth tergites whitish yellow.

**Female.** Body length 6.2 mm, Fore wing 6.0 mm, antenna 9.4 mm (Fig. 71). Hind leg cream white, except dark brown on apical 0.3 of hind femur; pterostigma most black, yellow apically, veins r, 1-CU1, cu-a, M+CU1 apically, vein 1A+2A basally blackish brown; first metasomal



tergite cream white to whitish yellow, dark brown in apical 0.3 of tergum.



Figure 71. *Gyroneuron bicoloratum* Long, sp. n. (Paratype, female, dorsal view)

**Biology.** Unknown.

**Etymology.** From bi” (Latin for “two”), and “coloris” (Latin for “hue, tint”) because of the bicoloured body.

***Gyroneuron glabrum* Long, sp. n.**

(Figs 72–81)

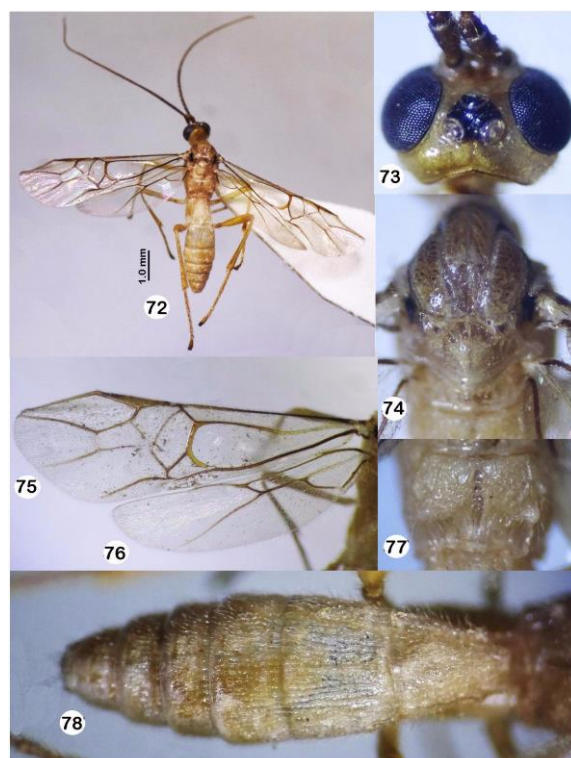
**Material.** Holotype, ♂, ‘Rog.595’ (IEBR), S Vietnam: Lam Dong, Bi Doup-Nui Ba NP, 21.iv.2008, ND Hiep. Paratype, 1 ♀, ‘Rog.1063’ (IEBR), NE Vietnam: Tuyen Quang, Son Phu, Na Hang NP, forest, MT, 22°17’32.0’’N 105°28’19.9’’E, 573m, 5.vi.2018, KD Long.

**Description**

Holotype, male, body length 6.1 mm, Fore wing length 5.9 mm; antenna 6.2 mm (Fig. 72).

**Head.** Antenna with 44 antennomeres; dorsally, scapus 1.6 × as long as maximum width (11:7); third antennomere 1.7 × fourth (10:6); middle antennomere 3.5 × longer than wide (7:2); width of face 0.8 × length of face and clypeus combined (16:20); malar space 0.5 × as long as mandible width (4:8); mandible width 0.7 × as long as hypoclypeal depression (8:12); distance between tentorial pits 5.0 × distance between pit and eye margin (10:2); in dorsal view, height of eye 2.85 × as long as temple (20:7), occipital carina distinctly concave (Fig. 73); in lateral view, width of eye 2.6 × as long as temple (18:7); ocelli large, in high triangle,

POL:OD:OOL=4:6:3; distance between front and hind ocelli as long as OOL (Fig. 73); face rugo-coriaceous; frons, vertex and temple smooth.



Figures 72–78. *Gyroneuron glabrum* Long, sp. n. (male, holotype)

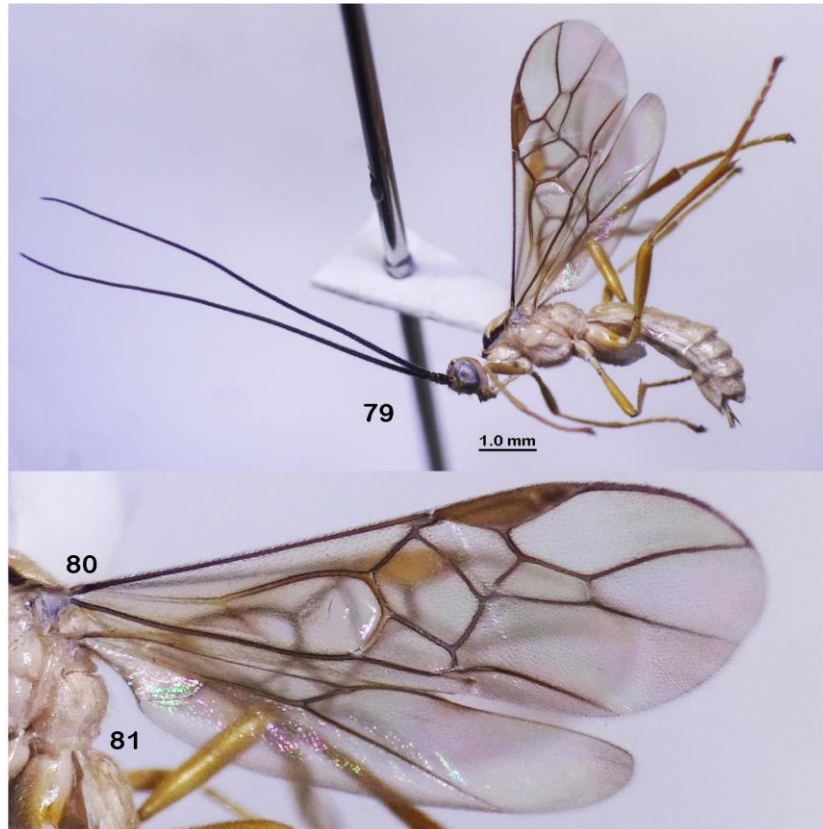
72. Habitus (male, holotype, dorsal view), 73. Head (dorsal view), 74. Mesonotum, 75. Fore wing, 76. Hind wing, 77. Propodeum, 78. Metasoma

**Mesosoma.** Length of mesosoma 1.35 × as long as high (85:63); propleuron crenulate; mesoscutum with sparse but large punctures; notauli shallow, punctate anteriorly; median lobe of mesoscutum with rugose deep medial depression posteriorly (Fig. 74); prescutellar depression with one median carina, 0.7 × scutellum (7:10); scutellum sparsely punctate; precoxal sulcus short, shallow, punctate; mesopleuron shiny, largely smooth, punctate anteriorly and ventrally; metapleuron rugose; propodeum largely rugose laterally, with median deep groove like areola (Fig. 77).

**Wings.** Fore wing: pterostigma rather narrow, 4.3 × its width (47:11); vein r arising behind middle of pterostigma (27:20); vein r 0.6 × vein 2-SR (10:17); vein 3-SR 2.2 × vein

r (22:10), and  $0.4 \times$  vein SR1 (22:51); vein 1-CU1 as long as vein cu-a, and  $1.2 \times$  vein 2-CU1 (20:17) (Fig. 75); basal length of second submarginal  $1.9 \times$  its apical width (29:15); basal

cell of Fore wing glabrous apically (Fig. 75). Hind wing vein M+CU  $1.5 \times$  vein 1-M (45:30); 1-M  $3.0 \times$  vein 1r-m (30:10); vein 2-SC+R longitudinal (Fig. 76).



Figures 79–81. *Gyronneuron glabrum* Long, sp. n. (female, paratype) 79. Habitus (female, paratype, lateral view), 80. Fore wing, 81. Hind wing

**Legs.** Hind femur slender (Fig. 72); length of hind femur, tibia and basitarsus  $5.8 \times$ ,  $9.2 \times$  and  $4.0 \times$  their width respectively; inner hind tibial spur  $0.27 \times$  basitarsus (10:36); hind basitarsus  $0.75 \times$  tarsus 2-5 (36:48); fourth tarsus  $0.7 \times$  telotarsus (8:12).

**Metasoma.** First tergite  $1.3 \times$  its apical width (42:33) (Fig. 78); median length of second tergite  $1.75 \times$  third tergite (35:20); first tergite largely rugo-striate; second-third tergites striate; fourth-sixth tergites almost rugose (Fig. 78).

**Colour.** Pale yellow; scapus brownish yellow; flagellum brown; stemmaticum black; mesoscutum pale yellow, with anterior margin blackish brown; propodeum and metasoma pale yellow; legs yellow; wing veins yellow.

Female. Paratype, female, body length 6.2 mm, Fore wing length 6.1 mm; antenna 8.6 mm (Fig. 79).

Antenna with 56 antennomeres. Fore wing: length of pterostigma  $3.6 \times$  its width (54:15); vein r  $0.7 \times$  vein 2-SR (10:15); vein 3-SR  $2.1 \times$  vein r (21:10), and  $0.4 \times$  vein SR1 (21:54); vein 1-CU1 subequal to vein cu-a, and  $0.6 \times$  vein 2-CU1 (15:24) (Fig. 80); second submarginal of Fore wing distinctly narrowed apically, basal length of second submarginal  $2.4 \times$  its apical width (31:13); basal cell of Fore wing glabrous apically (Fig. 80). Hind wing vein M+CU  $1.3 \times$  vein 1-M (44:35); vein 1-M  $2.9 \times$  vein 1r-m (35:12) (Fig. 81).

**Biology.** Unknown.

**Etymology.** From “glaber” (Latin for hairless), because basal cell of fore wing glabrous apically.

***Rogasodes* Chen & He, 1997**

*Rogasodes* Chen & He, 1997: 88. Type-species: *Rogasodes masaicus* Chen & He, 1997

**Diagnostic characters**

Antenna with 30–50 antennomeres; maxillary and labial palpi normal; malar suture present (Fig. 83); prepectal carina present (Fig. 84); precoxal sulcus oblique, wide and shallow (Fig. 84); notauli deep, sparsely crenulate (Fig. 87); propodeum reticulate-rugose (Fig. 90); Fore wing vein m-cu antefurcal, straight, converging to vein 1-M posteriorly (Fig. 85); fore wing vein 3-SR longer than vein 2-SR; hind wing vein M+CU as long as or slightly longer than vein 1-M; vein 1r-m reclivous; vein SR curved (Fig. 86); vein m-cu absent; tarsal claw with a large and acute lobe ventrally (Fig. 91); hind tibial spurs straight and setose; inner side of hind tibia apex with distinct comb; first metasomal tergite narrowed towards its base, slightly widened extremely basally, its dorsope large, dorsal carinae united (Fig. 88); medio-basal triangular area of second tergite absent (Fig. 85); second-sixth metasomal tergites with sharp lateral crease; hypopygium medium-sized, nearly straight (Fig. 92); ovipositor sheath slender.

***Rogasodes phongi* Long & Hoa, sp. n.**

(Figs 82–92)

**Material.** Holotype, ♀, ‘Rog.1047’ (IEBR), NE Vietnam: Vinh Phuc, Me Linh, Tam Dao forest, MT, 21°23’N 105°42’E, 60m, 8–18.vi.2018, PH Phong. Paratypes, 1♀, ‘Rog.1060’ (VNMN), *ibid.*, but 7–28.vii.2018, PH Phong; 1♀, ‘Rog.389’ (IEBR), NE Vietnam: Vinh Phuc, Me Linh, Tam Dao forest, 11.x.2003, P.T. Nhi.

**Description**

Holotype, female, body length 6.1 mm, Fore wing length 4.3 mm, antenna 7.7 mm (Fig. 89).

**Head.** Antenna with 50 antennomeres; dorsally, scapus 1.7 × its maximum width (10:6); third antennomere 1.1 × fourth (8:7); middle flagellomeres 3.5 × longer than wide (7:2); apical antennomere acuminate; subapical antennomere 0.8 × apical antennomere (5:6); width of face 0.8 × length of face and clypeus com-

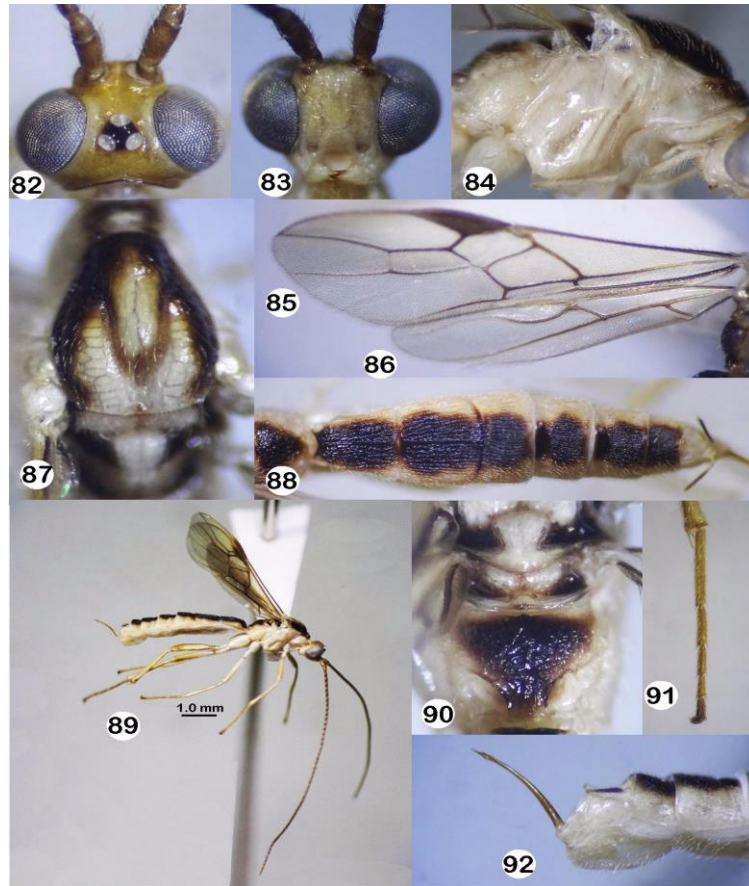
bined (15:19) (Fig. 83); malar space as long as mandible width; mandible width 0.85 × as long as hypoclypeal depression (6:7); distance between tentorial pits 2.3 × distance between pit and eye margin (7:3); in dorsal view, height of eye 3.3 × as long as temple (10:3), occipital carina distinctly concave (Fig. 82); in lateral view, width of eye 1.2 × as long as temple (6:5); ocelli medium, POL:OD:OOL=2:4:3; distance between front and hind ocelli 0.7 × as long as OOL (Fig. 79); face rugose; frons, vertex and temple almost smooth.

**Mesosoma.** Length of mesosoma 1.7 × as long as high (77:46); propleuron smooth (Fig. 84); mesoscutum and scutellum shiny, coriaceous (Fig. 87); notauli sparsely crenulate posteriorly; prescutellar depression 0.55 × scutellum (5:9); mesoscutum and scutellum shiny, coriaceous; precoxal sulcus short, oblique; mesopleuron shiny, largely smooth (Fig. 84); metapleuron sparsely punctuate; propodeum reticulate-rugose laterally, foveolate-rugose medially (Fig. 90).

**Wings.** Fore wing: pterostigma long and narrow, 4.9 × its width (39:8); vein r arising before middle of pterostigma (17:22); vein r 0.7 × vein 2-SR (8:12); vein 3-SR 2.5 × vein r (20:8), and 0.6 × vein SR1 (20:32); vein 1-CU1 0.4 × vein cu-a (2:5); vein 1-CU1 0.14 × vein 2-CU1 (2:14); basal length of second submarginal 2.5 × its maximum width (30:12) (Fig. 85). Hind wing vein M+CU as long as vein 1-M; vein 1-M distinctly curved, and 2.4 × vein 1r-m (22:9); vein 2-SC+R quadrate (Fig. 86).

**Legs.** Length of hind femur, tibia and basitarsus 6.1 ×, 8.6 × and 8.75 × their width respectively; length of hind basitarsus 0.7 × tarsus 2–5 (37:52); inner hind tibial spur 0.3 × basitarsus (11:37); hind fourth tarsus as long as telotarsus.

**Metasoma.** First metasomal tergite 1.1 × its apical width (36:33) (Fig. 88); median length of second tergite 1.65 × third tergite (33:20); first-second tergites with midlongitudinal carina, largely striate; third-fifth tergites striate, granulate between striae; sixth tergite granulate; setose part of ovipositor sheath 0.4 × hind tibia (16:36).



Figures 82–92. *Rogasodes phongi* Long & Hoa, sp. n.

82. Head (dorsal view), 83. Head (frontal view), 84. Mesopleuron, 85. Fore wing, 86. Hind wing, 87. Mesonotum, 88. Metasoma, 89. Habitus, 90. Propodeum, 91. Inner side of hind tibia apex and hind tarsus, 92. Hypopygium and ovipositor (lateral view)

**Colour.** Body pale yellow; antenna yellow; palpi white; stemmaticum black; mesoscutum pale yellow but blackish brown anteriorly and laterally (Fig. 87); propodeum black basomedially, cream white laterally; all legs pale yellow; wing pale yellow with veins brownish yellow; pterostigma whitish yellow apically; first-sixth metasomal tergites black medially, whitish yellow laterally (Fig. 88); hypopygium cream white; ovipositor sheath brown.

**Male.** Unknown.

**Biology.** Unknown.

**Etymology.** Named after Mr. Pham Huy Phong (IEBR), entomologist, who collected the type.

**Notes.** The new species differs from *Rogasodes masaicus* Chen & He, 1997, from China

by the following characters: a) Length of first metasomal tergite  $1.1 \times$  longer than apical width (37:32); b) Median length of second metasomal tergite  $1.65 \times$  longer than third tergite (33:20) and c) Hind wing vein M+CU as long as vein 1-M, and  $2.4 \times$  longer than vein 1r-m (22:9).

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