

Two new species of the millipede family Glomeridae from Vietnam (Diplopoda: Glomerida)

Два новых вида диплопод семейства Glomeridae из Вьетнама (Diplopoda: Glomerida)

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КЛЮЧЕВЫЕ СЛОВА: Glomerida, *Rhopalomeris*, *Hyleoglomeris*, таксономия, новый вид, Вьетнам.

ABSTRACT. Two new species are described from forest litter in central and southern Vietnam, respectively: *Rhopalomeris variegata* **sp.n.** and *Hyleoglomeris cattienensis* **sp.n.** Both differ from congeners primarily by peculiar colour patterns. A key is given to all four presently known species of the genus *Rhopalomeris* Verhoeff, 1906.

РЕЗЮМЕ. Из лесной подстилки соответственно в Центральном и Южном Вьетнаме описаны два новых вида: *Rhopalomeris variegata* **sp.n.** и *Hyleoglomeris cattienensis* **sp.n.** Они отличаются от остальных видов в своих родах, прежде всего, особенностями окраски. Дан ключ для всех четырех ныне известных видов рода *Rhopalomeris* Verhoeff, 1906.

Introduction

The basically Holarctic millipede family Glomeridae, as well as the order Glomerida where it belongs, both are long known to show two major diversification centres, one in the Mediterranean area and the other in Southeast Asia [Minelli, 2015]. These two regions share only one genus, *Hyleoglomeris* Verhoeff, 1910, the largest and most widespread in the whole order. This genus currently contains over 100 species which range from the Balkans in the west, through Anatolia, the Caucasus and Central Asia, to China, Korea, Japan and Taiwan in the east, and the Philippines and Sulawesi, Indonesia in the southeast, with the bulk of species diversity being confined to southeastern and eastern Asia [Golovatch, 2015]. In contrast, *Rhopalomeris* Verhoeff, 1906, is a small Oriental genus which comprises only three species ranging from Malaysia and Myanmar in the south, through Thailand, to northern Vietnam in the north [Golovatch et al., 2011]. The nomenclature of both these genera has become stabilized only quite recently [Golovatch et al., 2011].

The present note adds one new species each to *Rhopalomeris* and *Hyleoglomeris*, both collected by the second author in forest litter in Vietnam. The types are deposited in the collection of the Zoological Museum, State University of Moscow, Russia (ZMUM + acquisition number).

Rhopalomeris variegata **sp.n.**

Figs 1–7.

MATERIAL. HOLOTYPE ♂ (ZMUM p3485), Vietnam, Gia Lai Prov., Kon Chu Rang Nature Reserve, 14°30'54"N, 108°32'47"E, ca 1000 m a.s.l., mixed tropical forest in flood-plain, leaf litter, 05.2016, leg. I.I. Semenyuk.

PARATYPES: 3 ♀♀ (ZMUM p3486), same data, together with holotype.

NAME. To emphasize the highly characteristic, variegated coloration; adjective.

DIAGNOSIS. This new species differs clearly from all three other species of the genus, *R. carnifex* (Pocock, 1889), the type-species from the Malay Peninsula and adjacent archipelagos within Malaysia, Myanmar and southern Thailand, *R. monacha* Silvestri, 1917, from Perak State, Western Malaysia, and *R. tonkinensis* Silvestri, 1917, from Mount Mau Son, Lang Son Province, northern Vietnam, primarily by the peculiar, variegated colour pattern, from *R. carnifex*, the sole other congener known also from the ♂ sex, additionally by a considerably shorter and less strongly curved antennomere 6, and a smaller and lower central lobe of the telopod syncoxite [Silvestri, 1917; Golovatch et al., 2011]. See also Key below.

DESCRIPTION. Length of holotype ca 15 mm, width (maximum on tergum 2) ca 7.0 mm; length of paratypes ca 16 (♂) or 17–18 mm (♀), width on tergum 2 ca 7.5–8.0 mm (♂, ♀). Body rather uniformly dark, brown and grey-yellowish, only ocelli blackish. Antennae mostly dark marbled brown to brown, only antennomere 8 pallid. Head largely brown, only labrum and mid-dorsal parts lighter, grey-yellowish. Dorsal pattern not too strongly contrasting, but clearly variegated



Figs 1–3. Habitus of *Rhopalomeris variegata* sp.n., ♂ holotype: 1 — dorsal view; 2 — lateral view; 3 — ventral view. Pictures by K. Makarov, taken not to scale.

Рис. 1–3. Общий вид *Rhopalomeris variegata* sp.n., голотип ♂: 1 — сверху; 2 — сбоку; 3 — снизу. Фотографии К. Макарова, снято без масштаба.

(Figs 1–3): collum with a marbled yellow-brownish, oblong, central spot only slightly separated along lighter anterior and posterior margins, as well as from both lighter lateral ends; postcollum terga with an axial series of light, small, subtriangular spots at caudal margin; a paramedian pair of larger, transversely ovoid, dorsolateral, sometimes strongly mottled spots; and another paramedial pair of similarly large, transversely ovoid, sometimes likewise strongly mottled, sublateral spots. Anal shield (= pygidium) with a large, light, central, more or less rounded spot reaching a similarly light caudal margin; sides also light, but mottled. Venter and legs entirely light grey-yellowish.

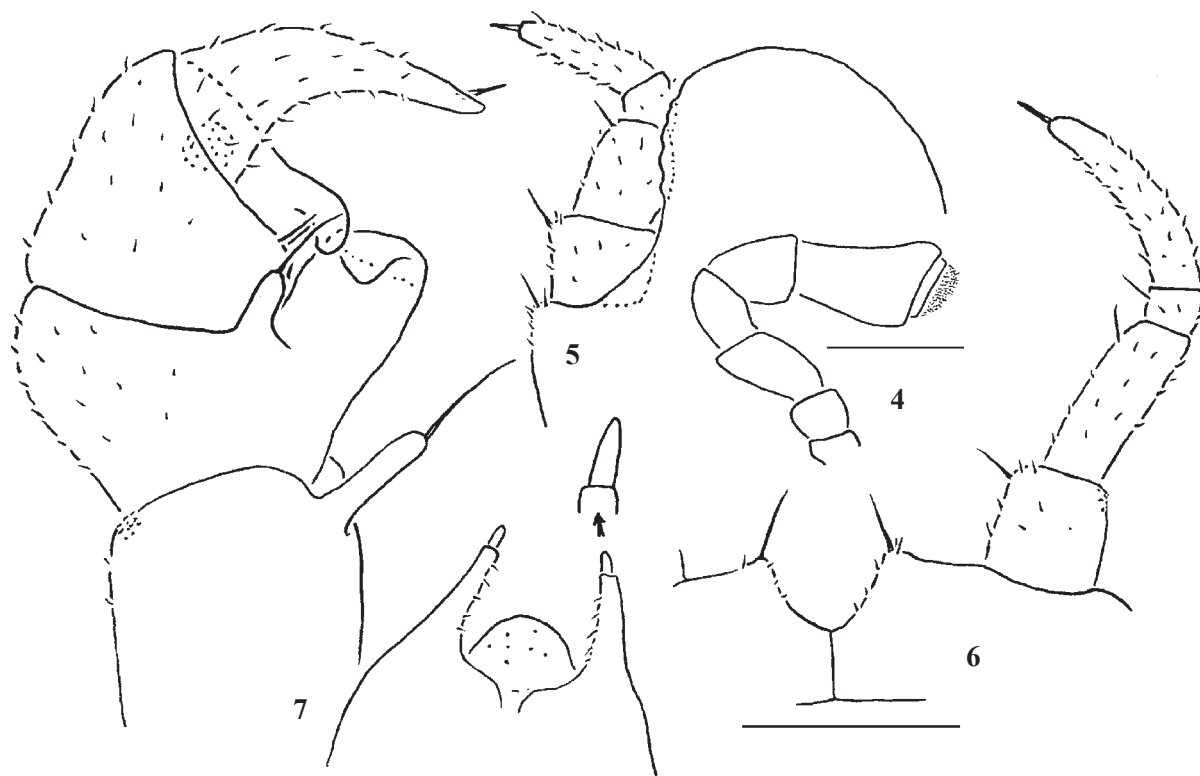
Tergal tegument very finely leathery, moderately shining. Ocelli 8+1, convex, completely translucent. Tömösváry's organ transverse-oval, ca 1.4 times wider than long. Antennomere 6 rather short, ca 2.0 times as long as high, dorsal margin as usual, only slightly curved (Figs 3–4). Disk of antennomere 8 beset with numerous, small, sensory cones (Figs 3–4). Collum with two transverse striae. Tergum 2 with a narrow hyposchism not reaching behind caudal tergal margin; 8–10 superficial transverse striae: three starting below schism, two level with, all others (3–5) above schism, with 6–8 crossing the dorsum. Anal shield regularly rounded at caudal margin.

♂ leg 17 (Fig. 5) strongly reduced, with a high, rather regularly rounded, outer coxal lobe; telopodite 4-segmented, with only one strong apical spine.

♂ leg 18 (Fig. 6) less strongly reduced, with an ogival syncoxital notch; telopodite also 4-segmented, tarsus with one apical spine.

♂ legs 19, or telopods (Fig. 7), very strongly incrassate, with a relatively low, rounded, central, syncoxital lobe flanked by two poorly setose horns, each latter about twice as high as syncoxital lobe and crowned by a very small, finger-shaped, rounded lobule. Prefemur anteriorly with a typically long trichostele distoventrally. Femur distoventrally with a small anterior trichostele and a large posterior outgrowth, the latter set at ca 120° to femur and bearing a membranous apical sac folded anteriorly. Tibia distoventrally with a strong anterior seta and a rather large posterior outgrowth, the latter also bearing a membranous apical sac folded anteriorly, as well as a distinct, round, parabasilar tubercle on caudal face. Tarsus rather strongly curved, subacuminate apically.

REMARKS. The diagnosis of *Rhopalomeris* as formulated in Minelli [2015] is not very exact, as it considers only the characters of the type-species, *R. carnifex*. Antennomere 6 in most congeners is actually typical of Glomeridae, less strongly curved, although the numerous sensory cones on antennomere 8 are indeed striking and clearly apomorphic. In fact, the antennae in *Rhopalomeris* are the same as in the sympatric genus *Pepalomeris* Silvestri, 1917, whereas the conformation of ♂ legs 17–19 is the same as in the largely sympatric genus *Hyleglomeris* (see also below).



Figs 4–7. *Rhopalomeris variegata* sp.n., ♂ holotype: 4 — antenna, lateral view; 5 — right leg 17, anterior view; 6 — right leg 18, anterior view; 7 — left telopod, anterior view. Scale bars: 4 — 1.0 mm; 5–7 — 0.5 mm.

Рис. 4–7. *Rhopalomeris variegata* sp.n., голотип ♂: 4 — антенна, сбоку; 5 — правая нога 17, спереди; 6 — правая нога 18, спереди; 7 — левый телопод, спереди. Масштаб: 4 — 1,0 мм; 5–7 — 0,5 мм.

The following key to *Rhopalomeris* spp. can be proposed to incorporate the new species.

- 1(2) Antennomere 6 usually remarkably long and strongly curved, its dorsal margin very distinctly concave. Dorsum mostly dark, pattern not variegated, lateral margins of terga and/or caudal margin of anal shield sometimes carmine. Central lobe of telopod syncoxite clearly higher than lateral horns, each of the latter with a tiny filament on top. Much of Malay Peninsula *R. carnifex*
- 2(1) Antennomere 6 usually shorter and at most only faintly curved, its dorsal margin at most only slightly concave (Figs 3 & 4). Dorsum generally either dark or light, pattern sometimes variegated, but lateral margins of terga never carmine. Central lobe of telopod syncoxite (when known) clearly lower than lateral horns, each of the latter without filament on top 3
- 3(4) Body relatively small, ca 12 mm long and 6 mm wide. Head, collum and tergum 2 light yellowish, body mostly blackish thereafter, but a light, rather broad, axial stripe continuing even onto anal shield. Antennomere 6 short, only 1.8–1.9 times as long as high, its dorsal margin straight. Perak State, Western Malaysia *R. monacha*
- 4(3) Body larger, at least 15 mm long and 7 mm wide. Entire dorsum mostly dark. Antennomere 6 somewhat longer, its dorsal margin slightly concave. Vietnam.
- 5(6) Body ca 20 mm long and 11 mm wide (♀). Coloration of dorsum mostly blackish, not variegated. Antennomere 6 ca 2.1–2.2 times as long as high. Hyposchism field smaller, far from reaching caudal margin of tergum 2 in lateral view, carrying only two striae. Mount Mau Son, Lang Son Province *R. tonkinensis*
- 6(5) Body ca 15–18 mm long and 7–8 mm wide (♂, ♀). Coloration of dorsum mostly brown, very clearly variegated (Figs 1–3). Antennomere 6 slightly shorter, ca 2.0 time as long as high (Figs 3–4). Hyposchism field larger, reaching caudal margin of tergum 2 in lateral view, carrying three striae (Fig. 2). Kon Chu Rang Nature Reserve, Gia Lai Province *R. variegata* **sp.n.**

Hyleoglomeris cattienensis **sp.n.**

Figs 8–13

Hyleoglomeris sp. — Golovatch et al., 2011: 80; Golovatch et al., 2013: 202.

MATERIAL. HOLOTYPE ♂ (ZMUM p3487), Vietnam, Dong Nai Prov., Cat Tien National Park, tropical, monsoon, lowland forest, near caves, leaf litter, 01.2012, leg. I.I. Semenyuk.

PARATYPES: 6 ♀♀ (ZMUM p3488), same data, together with holotype.

NAME. To emphasize the provenance from the Cat Tien National Park; adjective.

DIAGNOSIS. This new species differs from all other, very numerous species of the genus primarily by its characteristic, highly vivid colour pattern. From apparently the most similar, and geographically perhaps the closest, *H. robusta* Attems, 1938, from Peak Lang Bian, Dalat Province, southern Vietnam, the new species differs in the lateral parts of tergum 2 and most of the anal shield being light, while the transverse striae on tergum 2 are less numerous (6–7, of which 3–4 cross the dorsum, versus 9–10, of which 7–8 cross the dorsum) [Attems, 1938; Golovatch et al., 2006].

DESCRIPTION. Length of holotype ca 16 mm, width (maximum on tergum 2) ca 7.0 mm; length of paratypes ca 17–18 mm (♀), width on tergum 2 ca 7.0–8.0 mm (♂, ♀). Body mostly dark, blackish brown with

contrasting grey-yellowish or yellowish markings, ocelli also blackish. Antennae mostly dark marbled brown to blackish, only antennomere 8 light. Head largely brown, only labrum and mid-dorsal parts lighter, grey-yellowish. Dorsal pattern strongly contrasting (Figs 8–10): collum with a marbled yellow-brownish, oblong, central spot only slightly separated along lighter anterior and posterior margins, as well as from both lighter lateral ends; postcollum terga each with a light, sometimes vague, axial line broadening either into a subtriangular spot only at caudal margin or a horologiform spot broadened both caudally and anteriorly; a paramedian pair of large, light, transversely ovoid, dorsolateral, anterior spots (strongly marbled) and caudal bands (monochrome yellow-brown), on both sides reaching a broad lighter lateral margin. Anterior 2/3 and sides of tergum 2, as well as most of anal shield light (Figs 8–9). Venter and legs entirely light grey-yellow (Fig. 10).

Tergal tegument smooth and shining. Ocelli 7+1, convex, completely translucent. Tömösváry's organ transverse-oval, ca 1.4 times wider than long. Antennomere 6 rather short, ca 2.1–2.2 times as long as high, dorsal margin as usual, only slightly concave (Fig. 10). Antennomere 8 with only four larger sensory cones. Collum with two transverse striae. Tergum 2 with a narrow hyposchism not reaching behind caudal tergal margin; 6–7 superficial transverse striae: three starting below schism, two level with, all others (1–2) above schism, with 3–4 crossing the dorsum. Anal shield regularly rounded at caudal margin.

♂ leg 17 (Fig. 11) strongly reduced, with a high, rather regularly rounded, outer coxal lobe; telopodite 4-segmented, with only one strong apical spine.

♂ leg 18 (Fig. 12) less strongly reduced, with an ogival syncoxital notch; telopodite also 4-segmented, tarsus with one apical spine.

♂ legs 19, or telopods (Fig. 13), very strongly incrassate, with a relatively low, apically slightly concave, central, syncoxital lobe flanked by two densely setose horns, each latter nearly twice as high as syncoxital lobe and crowned by a very small, spiniform, acuminate filament. Prefemur anteriorly with a typically long trichostele distoventrally. Femur distoventrally with a small anterior trichostele and a large posterior outgrowth, the latter set at ca 120° to femur and bearing a membranous apical sac slightly folded anteriorly. Tibia distoventrally with a strong anterior seta/trichoid and a rather large posterior outgrowth, the latter bearing a distinct parbasal tubercle on caudal face. Tarsus rather strongly curved, subacuminate apically.

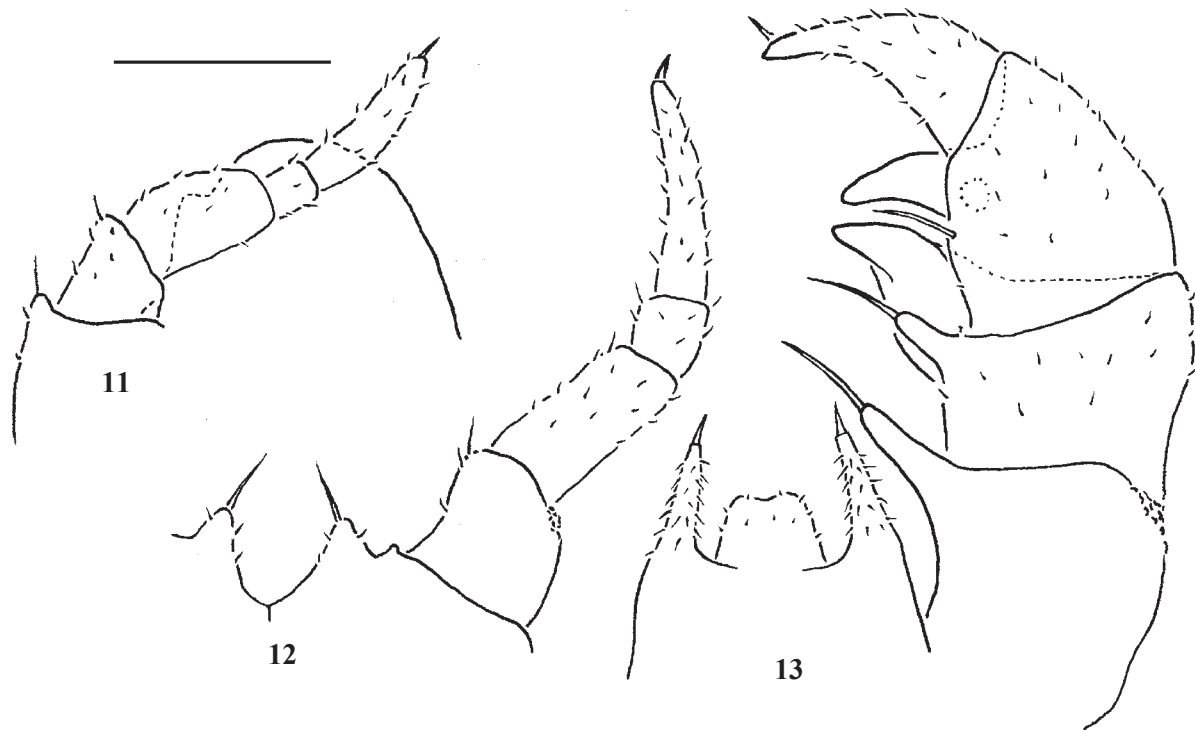
REMARK. This species has been referred to as *Hyleoglomeris* sp. in Golovatch et al. [2011].

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Figs 8–10. Habitus of *Hyleoglomeris cattienensis* sp.n., ♀ paratype: 8 — dorsal view; 9 — lateral view; 10 — ventral view (most of the legs on the left side of the body cut off for chemical analyses). Pictures by K. Makarov, taken not to scale.

Рис. 8–10. Общий вид *Hyleoglomeris cattienensis* sp.n., паратип ♀: 8 — сверху; 9 — сбоку; 10 — снизу (большинство ног на левой стороне тела отрезаны для химических анализов). Фотографии К. Макарова, снято без масштаба.



Figs 11–13. *Hyleoglomeris cattienensis* sp.n., ♂ holotype: 11 — left leg 17, caudal view; 12 — right leg 18, anterior view; 13 — right telopod, anterior view. Scale bar 0.5 mm.

Рис. 11–13. *Hyleoglomeris cattienensis* sp.n., голотип ♂: 11 — левая нога 17, сзади; 12 — правая нога 18, спереди; 13 — правый телопод, спереди. Масштаб 0,5 мм.

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