

Identity of *Glomeris bicolor* Wood, 1865, and the Status of the Generic Names *Hyleoglomeris* Verhoeff, 1910 and *Rhopalomeris* Verhoeff, 1906 (Diplopoda, Glomeridae)

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ABSTRACT.— The large, basically Asian genus *Hyleoglomeris* Verhoeff, 1910 is shown to encompass still another species, *H. bicolor* (Wood, 1865) from Hong Kong, comb. n. ex *Glomeris* Latreille, 1802, based on fresh topotypic material which is here redescribed and illustrated in due detail. Verhoeff's (1906) designation of *Glomeris bicolor* as the type species of *Rhopalomeris* Verhoeff, 1906, long acknowledged as based on misidentified material, is here rectified as a misidentified type species, according to the International Code of Zoological Nomenclature (§ 70.3). Following Silvestri (1917), the synonymy of *R. bicolor* sensu Verhoeff (1906) with *R. carnifex* (Pocock, 1889) is reinstated, the latter taxon also reconfirmed as the valid type species of *Rhopalomeris*. The nomenclature of *Hyleoglomeris* and *Rhopalomeris* is thus stabilized, leaving both these genera in their present scopes as defined and used since Silvestri (1917).

KEY WORDS: Diplopoda, *Hyleoglomeris*, *Rhopalomeris*, taxonomy, Hong Kong, Malay Peninsula

INTRODUCTION

The millipede family Glomeridae, order Glomerida, has long been acknowledged to show three major centres of diversification at both generic and specific levels: Mediterranean, Southeast Asian and Nearctic (Mauriès, 2006). Of these, the Southeast Asian centre is the second largest following the Mediterranean one, clearly dominated by species of the large, basically tropical to warm temperate Asian genus *Hyleoglomeris* Verhoeff, 1910. At present this genus encompasses 73 species ranging from Greece and Anatolia in the West, through the Caucasus, Central Asia and the Himalayas, to East and Southeast Asia (Japan, Korea, continental China, Taiwan, Indochina and the Philippines), and Indonesia (from Sumatra to Sulawesi) in the

East and Southeast (Golovatch et al., 2006, 2010).

Hyleoglomeris, however, has long been jeopardized by the slightly older *Rhopalomeris* Verhoeff, 1906. Both these genera share basically the same structure of ♂ legs 17-19, but differ drastically in *Rhopalomeris* showing unusually clavate antennae crowned with numerous, not the usual four, sensory cones (Verhoeff, 1906). Furthermore, Verhoeff was apparently so impressed by this modification of the antennae that he even proposed a new subfamily, *Rhopalomerinae*, to encompass *Rhopalomeris*.

Hyleoglomeris was proposed for two new species from Borneo (Verhoeff, 1910), yet without selection of a type species. It was only Silvestri (1917) who typified and validated *Hyleoglomeris* by selecting *H.*

multilineata Verhoeff, 1910 as type species. *Rhopalomeris*, however, had been properly typified by original designation of *Glomeris bicolor* Wood, 1865 as type species (Verhoeff, 1906).

The problem stems from *G. bicolor* having been described quite poorly from an unknown number of specimens taken from Hong Kong (Wood, 1865). Ever since, topotypic material has been in demand to finally clarify the identity of *G. bicolor*, because its type material is presumably lost (Hoffman, 1980).

Verhoeff's (1906) designation of *G. bicolor* as the type species of *Rhopalomeris* was based on several samples originally housed in the Berlin Museum and previously identified as *G. bicolor* by F. Karsch. Verhoeff uncritically accepted Karsch's determination, even though that material came from as far away from Hong Kong as Salanga Island, off Malacca coast, Malaysia. No wonder that Silvestri (1917), obviously having restudied pertinent material, not only typified *Hyleoglomeris* (and beautifully redescribed and depicted *H. multilineata*), but he also both designated *R. carnifex* (Pocock, 1889), from mainland southern Myanmar, as the type species of *Rhopalomeris* and synonymized *G. bicolor* sensu Verhoeff (1906) with *Rhopalomeris carnifex* var. *pallida* (Pocock, 1889), the latter form previously described from Mergui Archipelago, Myanmar. In other words, Silvestri (1917) was the first to note the type species of *Rhopalomeris* as having been misidentified, and he was also the first to retypify this genus.

Hoffman (1980: 66) detailed this whole story, suggesting that, unless a special ruling from the International Commission be petitioned, *Rhopalomeris* was to become a senior subjective synonym of *Hyleoglomeris*, if *Glomeris bicolor* proves to belong

in *Hyleoglomeris* sensu auctorum. This would result in transfers of the numerous erstwhile *Hyleoglomeris* species to *Rhopalomeris* in order to settle the riddle even at the expense of a seriously deteriorated overall nomenclatural stability of Glomerida. In any event, the true identity of *G. bicolor* has long been understood as crucial to properly assess that of both *Rhopalomeris* and *Hyleoglomeris*.

Luckily, one of us (HWC) has recently collected a nice series of a glomerid from Hong Kong, thus allowing for the riddle to ultimately be solved as based on strict topotypes. Neotype designation has also become possible. Furthermore, now we are able to confirm not only the long-suspected identity of *G. bicolor* as a distinct species of *Hyleoglomeris* sensu auctorum, but also Silvestri's (1917) formal synonymy of *Rhopalomeris carnifex* with *G. bicolor* sensu Karsch and Verhoeff. In addition, in the interests of nomenclatural stability and following not only the later typification of *Rhopalomeris* by Silvestri (1917), but also the International Code of Zoological Nomenclature (§ 70.3), in particular the Misidentified Type Species option, we retain both *Hyleoglomeris* and *Rhopalomeris* in their present scopes.

MATERIALS AND METHODS

Material serving as the basis for the present contribution was preserved in 75% alcohol and is currently shared between the collections of the National Museum of Natural Science, Taichung, Taiwan (NMNS), Department of Biological Sciences, National Sun Yat-Sen University, Kaohsiung, Taiwan (NSYSUB), Virginia Museum of Natural History, Martinsville, USA (VMNH), Zoological Museum, State University of Moscow, Russia (ZMUM), Zoologische

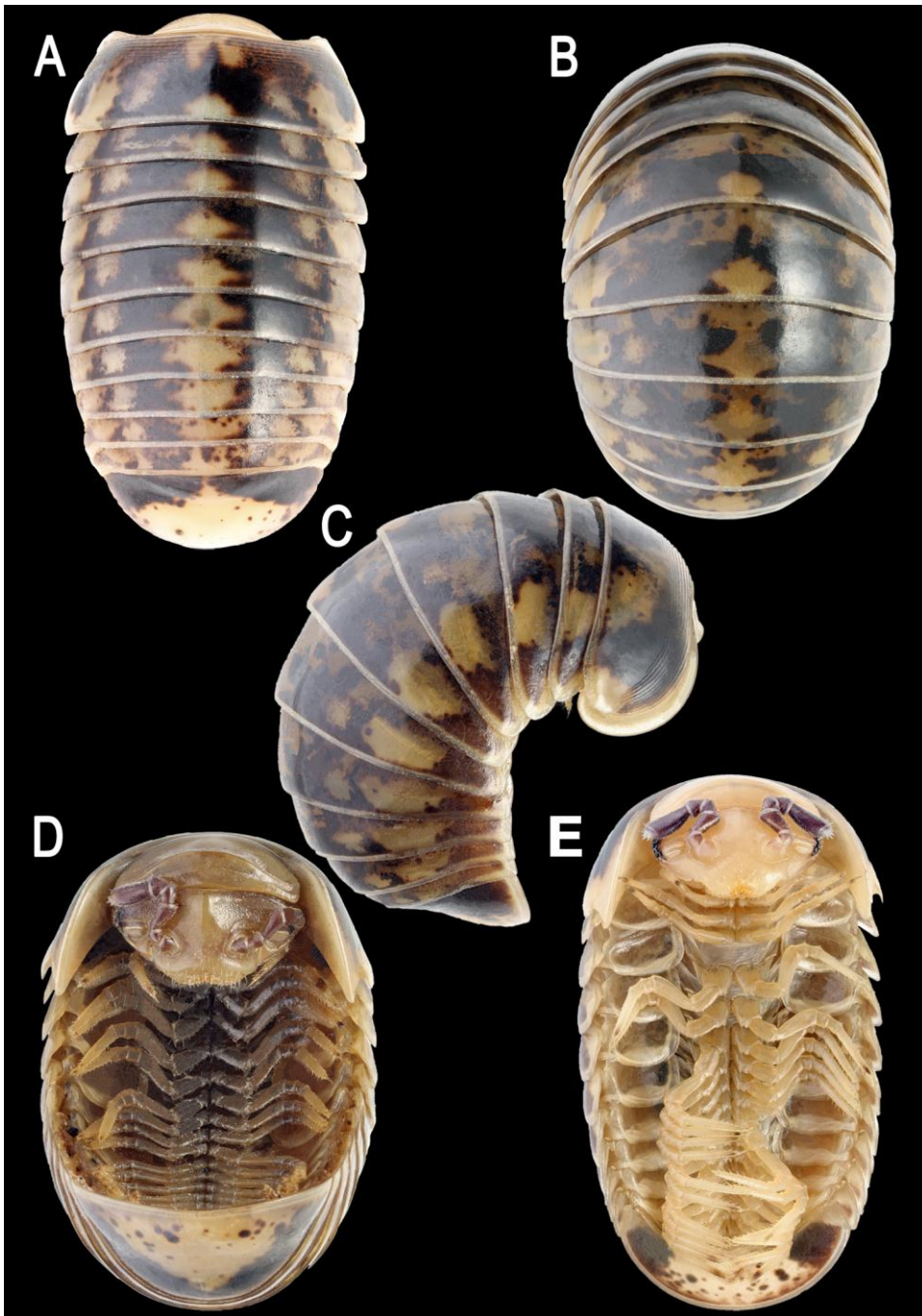


FIGURE 1. *Hyleglomeris bicolor* (Wood, 1865), ♂ (**A** & **E**) & ♀ (**B-D**) from Hong Kong. (**A**) habitus, dorsal; (**B**) dorsal; (**C**) lateral; (**D**) ventral (venter and legs in shade); (**E**) ventral views, respectively. Not photographed to scale. Photos by K. Makarov.

Staatsammlung, Munich, Germany (ZSM), and Museum für Naturkunde, Humboldt Universität, Berlin, Germany (ZMB), as indicated in the following descriptions. Specimens were studied and illustrated using standard stereomicroscopic, photographic and drawing equipment.

In the catalogue sections, D stands for the original description, N for additional descriptive notes, and R for a mere mention or record.

SYSTEMATICS

***Hyleoglomeris bicolor* (Wood, 1865),
comb. n.
(Figures 1 and 2)**

Glomeris bicolor Wood, 1865: 172 (D).

Glomeris bicolor– Preudhomme de Borre, 1884: 21 (R).

Material.– Neotype ♂ (NMNS-6458-001), Hong Kong, Tai Mo Shan, 22°25'41.1" N, 114°16'42.4" E, 23 May 2010, leg. H.W. Chang. – 2 ♂, 1 ♀ (NMNS-006459, NMNS-6458-002), 2 ♂, 1 ♀ (ZMUM), 2 ♂, 1 ♀ (NSYSUB), 2 ♂, 1 ♀ (VMNH), 1 ♂ (ZSM), same locality, together with neotype.

Diagnosis.– Differs from congeners except *H. albicollis* Golovatch, 1983, from Doi Inthanon Mountains, northern Thailand, and *H. aurata* Golovatch, Mikhaljova and Chang, 2010, from Lanyu Island, Taiwan (Golovatch, 1983; Golovatch et al., 2010), mainly in the collum being entirely pallid to yellow. Distinguished from *H. albicollis* through a pallid head and a different colour pattern on terga 2-12 (only 1+1 lateral light marbled spots on terga 2-11, a smaller central spot on the pygidium), from *H. aurata* by the pallid head and the dark brown to blackish, not golden, background

coloration with contrasting 2+2 paramedian pallid spots.

Description.– Length of non-stretched but unrolled specimens of both sexes ca 9.0-10 mm, width 4.8-5.0 mm. General coloration dark brown to blackish with contrasting pallid to olive-yellowish spots, these absent only from entirely pallid to light yellowish head and collum; colour pattern very vivid (Fig. 1A-E). Venter and legs light yellowish. Head entirely light, only antennae contrasting dark purplish brown. Thoracic shield broadly light laterally and, especially, caudolaterally, like terga 3-11 usually with 2+2 paramedian, marbled, light, often mottled spots/bands, as well as a larger, marbled, broadened, axial spot near front margin and a smaller, axial, spot near caudal edge. Pygidium with a large, subtriangular, light, mottled, central spot reaching both caudal and front edges.

Ocellaria mostly blackish, lenses very convex; ocelli 6(7)+1, lateralmost ocellus translucent. Antennae with four large apical cones, segment 6 ca 2.2-2.4 times as long as high.

Collum as usual, with two transverse striae.

Thoracic shield (Fig. 1C) with a small hyposchism field not projecting caudad beyond tergal contour. Striae 8-12, superficial: 3-5 lying above, 1-2 level to, remaining 4-5 below schism; with 7-10 (different) complete, crossing the dorsum. Pygidium evidently impressed centrally, caudal edge regularly rounded (Fig. 1A, C-E).

♂ leg 17 (Fig. 2D) particularly strongly reduced, with a very low, small, rounded coxal lobe and a 4-segmented telopodite. ♂ leg 18 (Fig. 2C) less strongly reduced, with an ogival syncoxital notch and a 4-segmented telopodite.

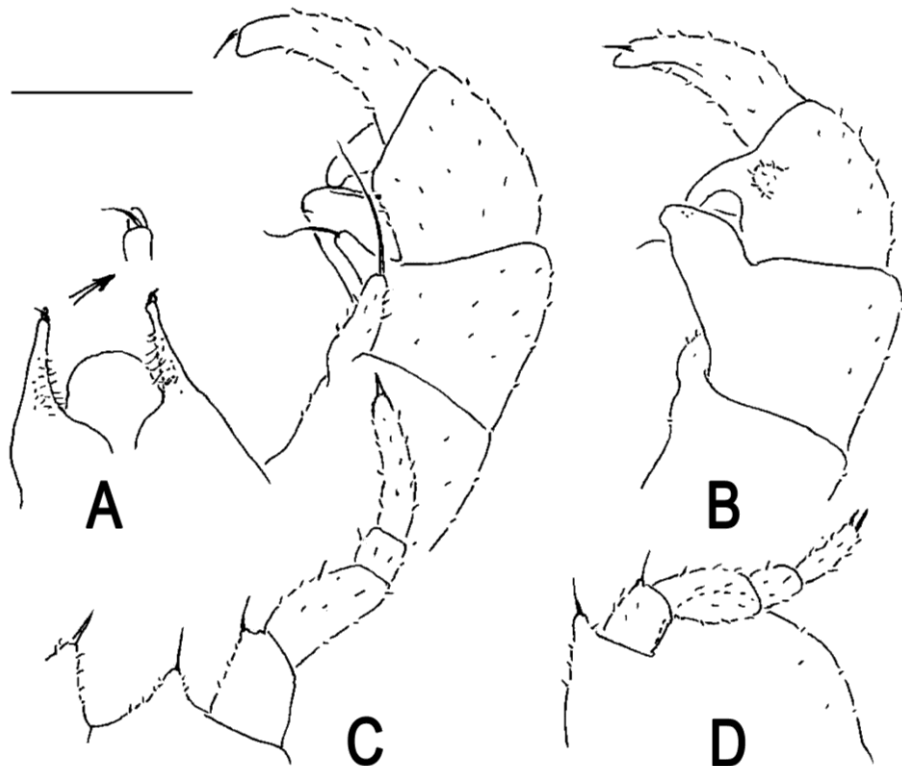


FIGURE 2. *Hyleoglomeris bicolor* (Wood, 1865), ♂ from Hong Kong. (A, B) leg 19 (telopods), front and caudal views, respectively; (C) leg 18; (D) leg 17. Scale: 0.2 mm.

Telopods (Fig. 2A, B) as usual, with a high, rounded syncoxital lobe flanked by high, setose, distally attenuating horns crowned with a lappet and a setoid filament. Tibia on caudal face with a small, papillate, microsetose tubercle at base of caudomedial process. Tarsus rather narrowly rounded at apex, only modestly curved.

Remarks.— The above material is strictly topotypic. Since the type or types are presumably lost (Hoffman, 1980), the above neotype designation is warranted to revalidate this obscure species, which is also to be transferred to *Hyleoglomeris* from *Glomeris* Latreille, 1802, comb. n.

Wood (1865) described the type(s) of *H. bicolor* as showing an olive-and-black

colour pattern, this rather well corresponding to that observed in the above fresh samples. Yet the collum was said to be of a brownish tint, each of the following terga with a transverse, dark olive blotch/spot covering the entire dorsal side, while the pygidium as brownish with an indistinct olive blotch on each side. These minor disagreements are easy to be accounted for by the type(s) having been kept dry, thus grown more infuscate than live or freshly taken material like ours.

Because the thoracic shield in *H. bicolor* is devoid of a light band along the front edge, this species is not a member of the East Asian *stuxbergi*-group (Golovatch et al., 2006), instead to remain ungrouped for the time being.

***Rhopalomeris carnifex* (Pocock, 1889)
(Figure 3)**

- Glomeris carnifex* Pocock, 1889: 290 (D).
Glomeris carnifex var. *pallida* Pocock, 1889: 290 (D).
Glomeris carnifex–Pocock, 1890/91: 385 (R).
 “*Glomeris*” *bicolor*–Verhoeff, 1906: 190 (R).
Rhopalomeris bicolor–Verhoeff, 1906: 189 (N), plus original designation as the type-species of *Rhopalomeris*.
Rhopalomeris bicolor–Verhoeff, 1910: 241 (N).
Rhopalomeris carnifex–Silvestri, 1917: 142 (N) and 149 (R), plus a redesignation as the type-species of *Rhopalomeris*.
Rhopalomeris carnifex–Enghoff, 2005: 88 (R); Decker, 2010: 24 (R).
Rhopalomeris carnifex var. *pallida*–Silvestri, 1917: 143 (N) and 149 (R), plus synonymization with *Rhopalomeris bicolor* in the sense of Verhoeff (1906).

Material.– 1 ♂ (ZSM A20071075), 2 ♂, 1 ♀ (ZMB 923), Salanga Island near Malacca, leg. Weber.

Remarks.– All of this material is definitely the series Verhoeff (1906) said to have been identified as *Glomeris bicolor* by F. Karsch, and originally fully housed in ZMB. The ♂ currently deposited in ZSM is the specimen which served Verhoeff (1906, 1910) for the redescription of *R. bicolor*, and for Silvestri (1917) for a redescription of *R. carnifex* and its synonymization with *R. bicolor*. This fragmented and completely faded ♂ torso is accompanied by two slides (A20031880 and A20031881), whereas the ZMB series is intact, dry and pinned (Fig. 3A).

That the variety *pallida* is indeed nothing else but a colour morph of *R. carnifex*

becomes clear not only because both Pocock (1889) and Silvestri (1917) thought so, but also when one looks at Figure 3, in which the carmine (testaceous) markings on the terga and pygidium so typical of *R. carnifex* are obvious only in two of the ZMB specimens, both ♂♂. The paler, ochry peripheral parts of the terga and pygidium as observed in the var. *pallida* is certainly not a sex-linked character, occurring only in ♀♀, as one might think from the sole ZMB ♀ being paler. On the contrary, both Pocock (1889, 1890/91) and Silvestri (1917), in their descriptions or records, mentioned several ♂♂ and ♀♀ as representing both of these varieties. As a result, *R. carnifex* occurs in the Tanintharyi, or Tenasserim, region of mainland Myanmar, as well as in the Mergui Archipelago (Elphinstone Island), Myanmar and on Salanga Island, off Malacca coast, Malaysia. In addition, this species has recently been recorded from several provinces in southern Thailand (Enghoff, 2005; Decker, 2010).

Silvestri (1917) described and illustrated *R. carnifex* in due detail, thus making its further redescription unnecessary. He also published two further congeners: *R. monacha* Silvestri, 1917 and *R. tonkinensis* Silvestri, 1917, both based only on ♀ material from Perak State, Malaysia and Mauson Mountains, northern Vietnam, respectively. Interestingly, the syntype of *R. tonkinensis*, now in ZSM (A20071075, also accompanied by slide A20031882), had previously been misidentified by Verhoeff as *R. bicolor*, as Verhoeff’s original handwritten labels show. However, since this subsample bears no labels by Silvestri (1917), just like the ZSM ♂ of *Glomeris bicolor* sensu Karsch and Verhoeff, it can be presumed to have been retained by Verhoeff in his private collection, the bulk of which is housed currently in ZSM.

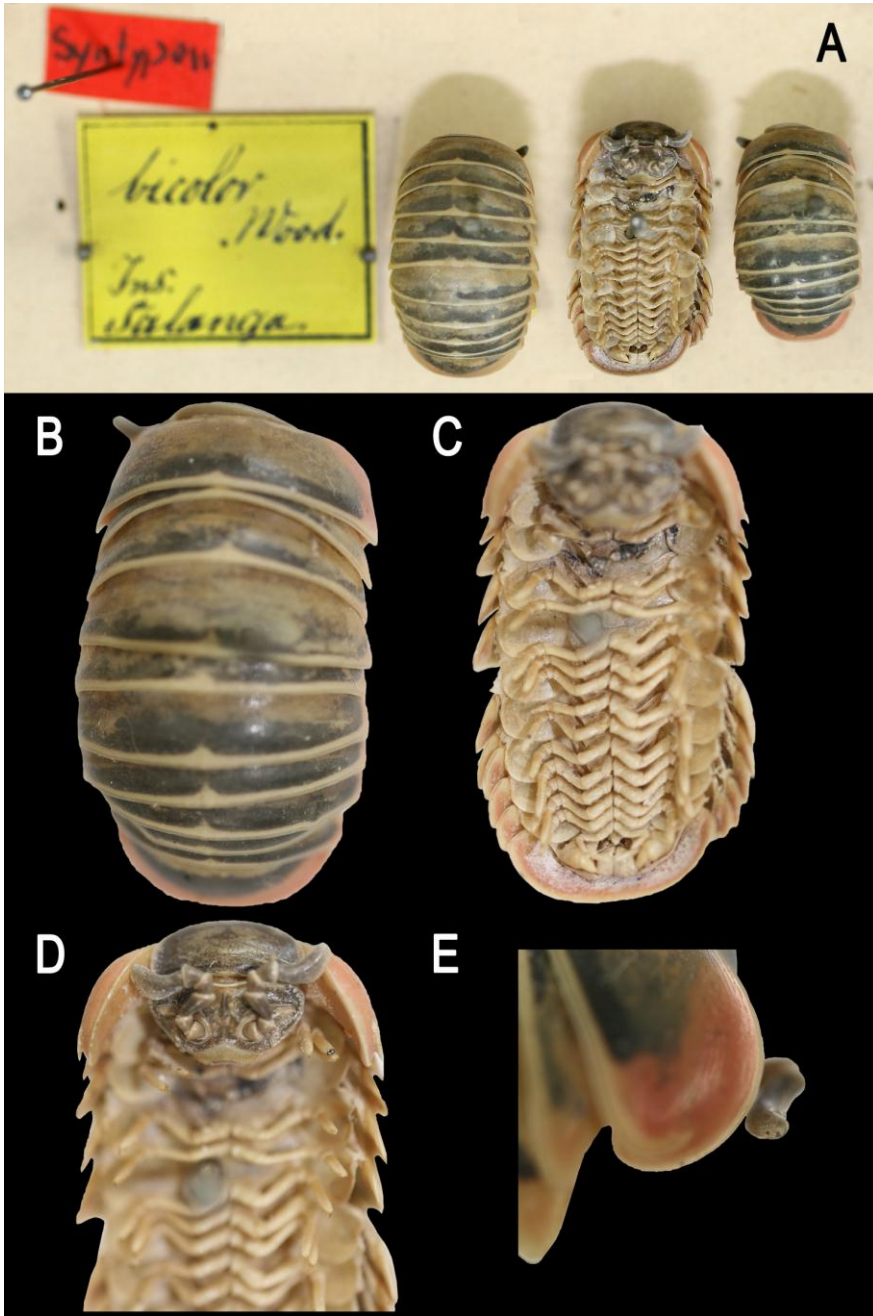


FIGURE 3. *Rhopalomeris carnifex* (Pocock, 1889), ZMB ♂ & ♀ from Salanga Island, Malaysia. (A) Entire ZMB series; (B, C) habitus of ♂, dorsal and ventral views, respectively; (D) anterior body half of ♂, ventral view; (E) thoracic shield and tip of antenna of ♂, enlarged, lateral view. Not photographed to scale. Photos by N. Dalüge.

CONCLUSION

The main outcomes of this note lie in stabilizing the nomenclature of *Hyleoglomeris* and *Rhopalomeris*, leaving both these genera in their present scopes as defined and used since Silvestri (1917). This has only become possible through strict topotypes of *Glomeris bicolor* to have finally become available for study.

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