Review of the millipede genus *Hyleoglomeris* Verhoeff, 1910 (Diplopoda, Glomerida, Glomeridae), with descriptions of new species from caves in Southeast Asia

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ABSTRACT
The large, widespread, primarily Asian genus *Hyleoglomeris* Verhoeff, 1910 is reviewed. All of its 64 currently known species are keyed, including six new species: *H. maculata* n. sp., *H. reducta* n. sp. and *H. eusulcata* n. sp., from caves in southern China; *H. speophila* n. sp., from a cave in northern Vietnam; and *H. sulcostriata* n. sp. and *H. differens* n. sp., from caves in Laos. In addition, *H. sinensis* (Brölemann, 1896) is redescribed from type material and a lectotype is designated. *Hyleoglomeris emarginata* Golovatch, 1981 and *H. robusta* Attems, 1938 are redescribed from topotypes and notes are given on their variation.

KEY WORDS
Diplopoda,
Glomerida,
Hyleoglomeris,
subterranean biology,
cave,
Southeast Asia,
China,
Vietnam,
Laos,
new species.

RÉSUMÉ

Révision des diplopodes du genre Hyleoglomeris *Verhoeff, 1910 (Diplopoda, Glomerida, Glomeridae) et description de nouvelles espèces cavernicoles d'Asie du Sud-Est.*

Le genre *Hyleoglomeris* Verhoeff, 1910, principalement asiatique et à très large répartition, est révisé. Une clé de détermination est présentée, incluant les 58 espèces déjà connues auxquelles s'ajoutent six nouvelles espèces : *H. maculata* n. sp., *H. reducta* n. sp. et *H. eusulcata* n. sp. de grottes du sud de la Chine, *H. speophila* n. sp. d'une grotte du nord du Vietnam, *H. sulcostriata* n. sp. et *H. differens* n. sp. de grottes du Laos. En outre, *H. sinensis* (Brölemann, 1896) est redécrit sur le matériel type et un lectotype est désigné. *Hyleoglomeris emarginata* Golovatch, 1981 et *H. robusta* Attems, 1938 sont redécrits sur du matériel topotypique, avec des remarques sur leur variabilité.

MOTS CLÉS
Diplopoda,
Glomerida,
Hyleoglomeris,
biologie souterraine,
grotte,
Asie du Sud-Est,
Chine,
Vietnam,
Laos,
nouvelles espèces.

INTRODUCTION

The millipede genus *Hyleoglomeris* Verhoeff, 1910 is one of the largest and certainly the most widespread in the entire order Glomerida. At the moment, this genus contains nearly 60 nominate species, ranging from Greece in the West to Japan in the East, and the Sunda Archipelago (Sulawesi) in the Southeast (Fig. 1). In Greece and northwestern Anatolia, the range slightly overlaps with that of the primarily European and even more speciose genus *Glomeris* Latreille, 1803.

Both these genera are deemed quite closely related, at least belonging to the same subfamily Glomerinae Leach, 1815 (cf. Hoffman 1980), even though Mauriès (1971, 1984, 2005) places them in different tribes. The main distinction between *Glomeris* and *Hyleoglomeris* lies in the considerably less strongly differentiated caudofemoral outgrowth on male leg-pair 19 (= telopods) in the former genus (cf. Mauriès 1971). In *Hyleoglomeris*, this outgrowth has become enlarged, set at nearly a right angle to the femur and directed more ventrally than mesally, with the tip supporting a membranous sac. *Glomeris* also appears to be more basal in that its species are usually larger in size, with less numerous striae on the thoracic (= chest) shield, in possessing a less strongly reduced male leg-pair 17, and usually in having a caudal knob at the base of the tibial outgrowth of the telopod. Interestingly, the westernmost species group of *Glomeris*, which is definitely monophyletic and restricted to the Canary Islands, contains a transitional series of forms with a more or less expressed "hyleoglomerization syndrome" (Golovatch & Enghoff 2003). In species such as *G. alluaudi* Brölemann, 1901, *G. vicentae* Golovatch & Enghoff, 2003 and *G. hierroensis* Golovatch & Enghoff, 2003, the caudofemoral outgrowth of the telopods tends to be increased in size, positioned ventrad at an angle to the femur, and supplied with a membranous sac on top. Furthermore, some of these taxa are among the smallest in the genus.

In other words, the direct origin of *Hyleoglomeris* from a *Glomeris*-like ancestor seems to be a viable hypothesis. The nearly perfect geographical separation of *Hyleoglomeris* and *Glomeris* also supports this viewpoint (cf. Golovatch 1989).

Regrettably, the nomenclatural history of *Hyleoglomeris* is shrouded in uncertainty. As Hoffman (1980) has already explained in detail, the name *Hyleoglomeris* is retained over the older and possibly synonymous name *Rhopalomeris* Verhoeff, 1906 until the identity of the type species of the latter, *Glomeris bicolor* Wood, 1865, from Hong Kong, has been settled. In their most recent survey of the myriapods of China, Wang & Mauriès (1996) referred to *Glomeris bicolor* as a species *incertae sedis*. In addition, even if *R. bicolor* proves to have

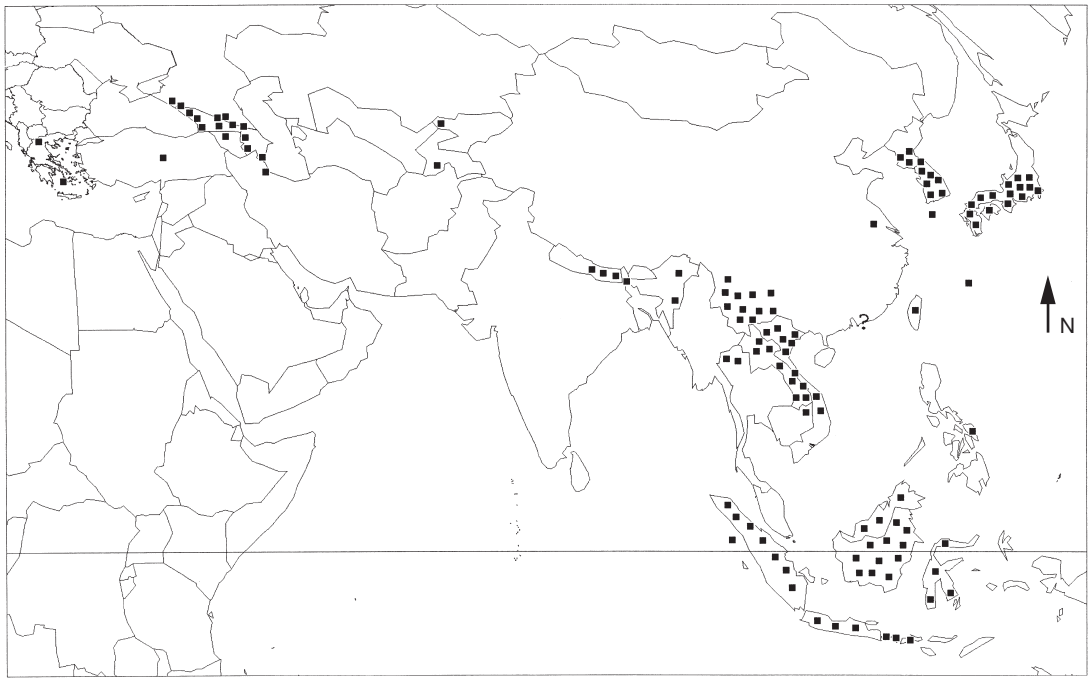

FIG. 1. — World distribution of the genus *Hyleoglomeris* Verhoeff, 1910.

enlarged and modified distal antennomeres, as in *R. carnifex* (Pocock, 1887) and the other species of the genus (Silvestri 1917), the telopod structure of both these nominal genera may well turn out to be basically the same. This alone might justify sinking *Hyleoglomeris* under *Rhopalomeris*. For the time being, however, we prefer to use the generic name *Hyleoglomeris* in its traditional sense.

MATERIAL

The material serving as the basis for the present contribution derives from the mainly subterranean collections made in China or Southeast Asia by Anne Bedos and Louis Deharveng (Muséum national d'Histoire naturelle, Paris – MNHN), Petar Beron (National Museum of Natural History, Sofia – NMNHS) and Peter Trontelj (Biology Department, Biotechnical Faculty, University of Ljubljana – OB BF UL). The bulk of this material has been deposited in MNHN and NMNHS, with a few voucher specimens shared with the collection of the Zoological Museum of the Moscow State University, Russia (ZMUM).

SYSTEMATICS

Order GLOMERIDA Brandt, 1833
Family GLOMERIDAE Leach, 1815

Genus *Hyleoglomeris* Verhoeff, 1910

Hyleoglomeris Verhoeff, 1910: 245, figs 1-4.

Nesoglomeris Carl, 1912: 100. Type species: *Nesoglomeris sarasinorum* Carl, 1912, by subsequent designation (Jeekel 1970: 15); synonymised by Verhoeff (1912: 150).

Sundameris Verhoeff, 1936: 163. Type species: *Apiomeris jacobsoni* Silvestri, 1917, by monotypy; synonymised by Hoffman (1980: 68).

Perkeomeris Verhoeff, 1936: 163 (invalidly proposed, without type species designation).

Okeanomeris Verhoeff, 1942: 214, figs 18, 19. Type species: *Hyleoglomeris nigra* Verhoeff, 1942, by monotypy; synonymised by Hoffman (1980: 68).

Zygethomeris Chamberlin, 1921: 55. Type species: *Zygethomeris lamprus* Chamberlin, 1921, by original designation; synonymised by Hoffman (1980: 68).

NOTE. — Since Mauriès (1971) referred to *Sundameris* and *Okeanomeris* as "synonyms or subgenera" of *Hyleoglomeris*, we emphasize that it was Hoffman (1980) who first listed them as strict synonyms.

TYPE SPECIES. — *Hyleoglomeris multilineata* Verhoeff, 1910, by subsequent designation (Silvestri 1917: 107).

SPECIES INCLUDED

Below is a checklist of the species currently attributed to *Hyleoglomeris*, arranged in alphabetical order.

1. *H. albicollis* Golovatch, 1983, described from Thailand (Ghi NP, Mae Chaem), still known only from the original description (Golovatch 1983).
2. *H. albicornis* (Pocock, 1894), originally described from Sumatra (Singkarah) as *Glomeris albicornis* Pocock, 1894, cited as such also by Silvestri (1895), still known only from the original description (Pocock 1894).
3. *H. albicorporis* Zhang & Zhang, 1995, described rather recently from a cave at Baoshan, Yunnan Province, China (Zhang & Zhang 1995).
4. *H. alticola* (Carl, 1912), first described as *Nesoglomeris alticola* Carl, 1912, from Bowonglangi, S Sulawesi; still known only from the original description (Carl 1912).
5. *H. armeniaca* Golovatch, 1989, described and still known only from N Armenia, Caucasus (Golovatch 1989).
6. *H. atricornis* (Silvestri, 1917), first described as *Apiomeris* (*Hyleoglomeris*) *atricornis* Silvestri, 1917, from Borneo (Mt. Mulu); still known only from the original description (Silvestri 1917).
7. *H. awchasica* (Brandt, 1840), from Colchis, W Caucasus within Georgia and Russia, with both *Glomeris kallipygos* Attems, 1907 and *Glomeris kubana* Verhoeff, 1921 established as its junior synonyms (Golovatch 1989).
8. *H. beccarii* (Silvestri, 1917), first described as *Apiomeris* (*Hyleoglomeris*) *beccarii* Silvestri, 1917, from Sumatra (Mt. Singalan), still known only from the original description (Silvestri 1917).
9. *H. beroni* Mauriès, 1984, described and still known only from Greece (Naxos Island: Zeus Cave) (Mauriès 1984).
10. *H. crassipes* Golovatch, 1987, described and still known only from Nepal (Terhathum District, Tinjura Dara near Chauki) (Golovatch 1987).
11. *H. crebristriata* (Silvestri, 1917), first described as *Apiomeris* (*Hyleoglomeris*) *crebristriata* Silvestri, 1917, from Sarawak, Borneo; still known only from the original description from female material (Silvestri 1917).
12. *H. cremea* Golovatch, 1983, described and still known only from N Thailand (Chiang Dao) (Golovatch 1983).
13. *H. diversicolor* (Silvestri, 1895), first described as *Glomeris diversicolor* Silvestri, 1895, from Sumatra (Si-Rambé) (Silvestri 1895), then redescribed as *Apiomeris* (*Hyleoglomeris*) *diversicolor* (Silvestri, 1895), based on type material (Silvestri 1917).
14. *H. electa* (Silvestri, 1917), first described from female material as *Apiomeris* (*Hyleoglomeris*) *electa* Silvestri, 1917, from India (Darjeeling District: Ghumti) (Silvestri 1917), later redescribed based on male and female samples from near Dalat, Vietnam (Attems 1938), also reported from Xieng Kuang, Boloven Plateau, Laos (Attems 1953). Some additional comments concerning the identity of this species are given below.
15. *H. emarginata* Golovatch, 1981, described from China (Kiangsu Province: Cisian-Shan 25 km S of Nanjing) (Golovatch 1981), it has since been reported from S Korea as well (Mikhaljova & Lim 2000); redescribed below.
16. *H. epirotica* (Mauriès, 1966), first described as *Speleoglomeris* (*sic*) *epirotica* Mauriès, 1966, from Greece (Epirus, Joànnina, Pérama: Pérama Cave) (Mauriès 1966), transferred to *Hyleoglomeris* by Mauriès (1984).
17. *H. eremita* (Carl, 1912), first described as *Nesoglomeris eremita* Carl, 1912, from a single female holotype from Bowonglangi, S Sulawesi; still known only from the original description (Carl 1912).
18. *H. formosa* (Silvestri, 1895), first described as *Glomeris formosa* Silvestri, 1895, from Sumatra (Benkoelen) (Silvestri 1895), later redescribed as *Apiomeris* (*Hyleoglomeris*) *formosa* (Silvestri, 1895), based on type material (Silvestri 1917).
19. *H. gorkhalis* Golovatch, 1987, described and still known only from Nepal (Gorkha District, between Naya Sangu and Gorkha) (Golovatch 1987).
20. *H. insularum* Verhoeff, 1936, first described as *Hyleoglomeris* (*Perkeromeris*) *insularum* Verhoeff, 1936, based on a single female holotype from near Tokyo, Japan (Verhoeff 1936); later again reported from the same locality (Chamberlin & Wang 1953; Shinohara 1981).
21. *H. jacobsoni* (Silvestri, 1917), first described as *Apiomeris* (*Hyleoglomeris*) *jacobsoni* Silvestri, 1917, from Java (Nongkodjadjar) (Silvestri 1917), later reported from several Lesser Sunda islands: Bali (Gitgit), Sumbawa (Batoe Doelang) and Flores (Geli Moetoe) (Attems 1930). Based solely on 3- rather

than 4-segmented male telopodites 17 as illustrated by Attems (1930), Verhoeff (1936) established *Sundameris* to only incorporate *H. jacobsoni*. The conspecificity of Attems' samples with type material is still to be verified (cf. Verhoeff 1936).

22. *H. japonica* Verhoeff, 1936, first described as *Hyleoglomeris* (*Perkeromeris*) *japonica* Verhoeff, 1936, from Enoshima near Tokyo, Japan (Verhoeff 1936).
23. *H. khumbua* Golovatch, 1987, described and still known only from Nepal (Solukhumbu District, Khumbu, Mt. Everest region) (Golovatch 1987).
24. *H. kirgisica* Golovatch, 1976, described and still known only from the W Tian-Shan Mountains within Kirghizia, Central Asia (Golovatch 1976; Read & Golovatch 1994).
25. *H. kirropeza* (Attems, 1897), first described as *Glomeris kirropeza* Attems, 1897, from Sulawesi (Minahassa) from a few females (Attems 1897), later redescribed as *Nesoglomeris kirropeza* (Attems, 1897) from both sexes from Lokon and Soputan, N Sulawesi (Carl 1912).
26. *H. koreana* Golovatch, 1978, first described from S Korea (Golovatch 1978), currently known over most of the Korean Peninsula and on Cheju Island (Golovatch 1981; Lim *et al*. 1992; Mikhaljova & Kim 1993; Kim & Lim 1995a, b; Mikhaljova & Lim 2000; Mikhaljova *et al*. 2000).
27. *H. lamprus* (Chamberlin, 1921), first described as *Zygethomeris lamprus* Chamberlin, 1921, from Borneo (Sarawak, Ladong) (Chamberlin 1921), it has since been recorded in the Philippines (Samar) (Wang 1951, 1961). However, like most of Wang's work, this identification requires verification.
28. *H. lenkorana* Golovatch, 1976, described and still known from Hyrcania within Azerbaijan, Caucasus and N Iran (Golovatch 1976, 1989).
29. *H. lohmanderi* Golovatch, 1975, described and still known only from Azerbaijan, Caucasus (Golovatch 1975, 1989).
30. *H. lucida* Haga, 1956, described and since referred to as *Hyleoglomeris lucidus* Haga, 1956 (recte: *lucida*, to agree in gender with the feminine generic name), from Honshu, Japan (Takashima & Haga 1956; Shinohara 1978).
31. *H. maior* Attems, 1938, described and still known only from two localities in S Vietnam: Phanrang and Hon Ba (Attems 1938). Some additional comments concerning the identity of this species are given below.
32. *H. minuta* Verhoeff, 1910, described from Borneo (Verhoeff 1910), redescribed based on type material from Mt. Radjang, Klawang, Borneo (Silvestri 1917).
33. *H. modesta* (Silvestri, 1917), described as *Apiomeris* (*Hyleoglomeris*) *modesta* Silvestri, 1917, from India (Assam, Kobo); still known only from the original description (Silvestri 1917).
34. *H. modiglianii* (Silvestri, 1895), described as *Glomeris Modiglianii* (*sic*) Silvestri, 1895, from Nias Island (Lelemboli) (Silvestri 1895), redescribed as *Apiomeris* (*Hyleoglomeris*) *modiglianii* (Silvestri, 1917), based on type material (Silvestri 1917).
35. *H. montana* Golovatch, 1983, described and still known only from N Thailand (Chieng Mai, Doi Inthanon) (Golovatch 1983).
36. *H. multilineata* Verhoeff, 1910, described from Borneo (Bengkajong) (Verhoeff 1910, 1915), redescribed from type material (Silvestri 1917).
37. *H. nagarjunga* Golovatch, 1987, described and still known only from Nepal (Kathmandu Valley, Nagarjung, Mt. Jamacok) (Golovatch 1987).
38. *H. nigra* Verhoeff, 1942, described as *Hyleoglomeris* (*Okeanomeris*) *nigra* Verhoeff, 1942, from Japan (Shikoku, near Koti) (Verhoeff 1942).
39. *H. paucilineata* (Silvestri, 1917), described as *Apiomeris* (*Hyleoglomeris*) *paucilineata* Silvestri, 1917, based solely on female material from Borneo (Kari Orang, Kutei); still known only from the original description (Silvestri 1917).
40. *H. piccola* (Attems, 1899), described and securely known only from Hyrcania within Azerbaijan, Caucasus (Attems 1899; Golovatch 1976, 1989).
41. *H. pulchra* Attems, 1953, described based solely on female material, still known only from Laos (Paklay) (Attems 1953).
42. *H. robusta* Attems, 1938, described based solely on female material from Peak Lang Biang, S Vietnam; hitherto known only from the original description (Attems 1938), redescribed and commented upon below.
43. *H. sakamotoensis* Takano, 1981, described and still known only from Kyushu, Japan (Takano 1981).
44. *H. sarasinorum* (Carl, 1912), described as *Nesoglomeris sarasinorum* Carl, 1912, from S Sulawesi (Loka); still known only from the original description (Carl 1912).
45. *H. siamensis* (Silvestri, 1917), described as *Apiomeris* (*Hyleoglomeris*) *siamensis* Silvestri, 1917, from Thailand (Meetaw, Raheng); still known only from the original description (Silvestri 1917).
46. *H. sinensis* (Brölemann, 1896), described as *Glomeris sinensis* Brölemann, 1896, from China (Brölemann 1896); redescribed below.
47. *H. specialis* Golovatch, 1989, described and still known only from the Central and E Caucasus Major within Georgia, Azerbaijan and Russia (Golovatch 1989).
48. *H. stuxbergi* (Attems, 1909), described as *Glomeris Stuxbergi* (*sic*) Attems, 1909, from Mangaesi, foot of Mt. Fuji, Honshu, Japan (Attems 1909), later reported from other localities in Saitama Prefecture, Honshu (Shinohara 1978).

49. *H. sulcata* Verhoeff, 1942, described and still known only from female material taken from near Takashima (Tokushima?), Shikoku, Japan (Verhoeff 1942); omitted from the later keys to the Japanese *Hyleoglomeris* species (Takakuwa 1954; Miyosi 1959).
50. *H. talasensis* (Lohmander, 1939), described as *Glomeris talasensis* Lohmander, 1939, from Central Turkey (Kayseri, Talas) (Lohmander 1939), redescribed from type and additional topotypic material (Golovatch 1989).
51. *H. tinjurana* Golovatch, 1987, described and still known only from Nepal (Terhathum District, Tinjura Dara near Chauki) (Golovatch 1987).
52. *H. triangularis* Haga, 1968, described and still known only from a cave in Fukuoka District, Kyushu, Japan (Haga 1968).
53. *H. triangulifera* Attems, 1938, described and still known only from female material taken from near Nhatrang, S Vietnam (Attems 1938).
54. *H. uenoi* Miyosi, 1955, described and still known only from Yamaguchi Prefecture, S Honshu, Japan (Miyosi 1955).
55. *H. venustula* (Silvestri, 1917), described as *Apiomeris* (*Hyleoglomeris*) *venustula* Silvestri, 1917, from India (NE Assam, Sadiya), still known only from its original description (Silvestri 1917).
56. *H. vittata* Verhoeff, 1929, described from Taiwan (Kankan), still known only from its original description (Verhoeff 1929).
57. *H. yamashinai* Verhoeff, 1937, described as *Hyleoglomeris* (*Perkeomeris*) *yamashinai* Verhoeff, 1937, from Okinawa Island, Riukius, Japan (Verhoeff 1937), redescribed based on topotypic material (Murakami 1975).
58. *H. zonifera* (Silvestri, 1917), described as *Apiomeris* (*Hyleoglomeris*) *zonifera* Silvestri, 1917, based solely on female material from Borneo (Mt. Matang); still known only from the original description (Silvestri 1917).

In addition, at least one unidentified *Hyleoglomeris* species has been recorded in Taiwan (Korsós 2004), and another, apparently new species, occurs in Tajikistan, Central Asia (Golovatch unpubl.). This brings the total number of *Hyleoglomeris* species to nearly 60, undoubtedly with many more awaiting discovery and description. This statement is here illustrated by the descriptions of six new species from China and Indochina.

No attempt has been made yet to key all *Hyleoglomeris* species, though several regional keys are available. These concern the faunas of Sulawesi (Carl 1912), Indochina (Attems 1938; Golovatch 1983), the Himalayas (Golovatch 1987), the Caucaso-Irano-Anatolian region (Golovatch 1989) and, in part, Japan (Verhoeff 1936, 1942; Takakuwa 1954; Miyosi 1959; Murakami 1975). The present paper is therefore concluded by a general key to all 64 species of *Hyleoglomeris* described to date.

Regrettably, the quality of most of the earlier descriptions and illustrations is often quite poor and many species have been based on females alone. All of which severely hampers taxonomic work on *Hyleoglomeris.* Most of the old species require restudy, preferably based on fresh topotypic material, in order to attempt a serious revision of this genus in a step-by-step way. Thus, three old species are redescribed herein, one based on type material, the others on topotypes. So it is by necessity that the key below is mainly based on regional faunas rather than being purely systematic. It still contains several problems, especially as regards couplets 24 and 35, which cannot be resolved using the available literature alone.

Hyleoglomeris emarginata Golovatch, 1981 (Fig. 2)

MATERIAL EXAMINED. — **China.** Kiangsu Province, Nanjing, Zijin (Purple) Mt., 350-450 m, 9.X.1988, leg. P. Beron, 36 ♂♂, 32 ♀♀, 6 juvs (NMNHS); 3 ♂♂, 3 ♀♀ (MNHN CC160); 3 ♂♂, 3 ♀♀ (ZMUM).

DESCRIPTION

Length of adults of both sexes ranging between 6.0 and 9.0 mm, width between 3.0 and 4.0 mm. Background coloration varying from castaneous or gray-brown to blackish, legs from whitish yellow to red-brown, often becoming darker distally; markings on terga ranging from whitish to gray-yellow.

Head above level of antennal sockets marbled reddish-brown to dark brown, antennae dark red-brown, antennomere 6 about 2 times longer than wide; ocelli 4 + 1 + 1 to 7 + 1, black, convex. Collum dark, usually with a transverse, central, marbled yellow-brown spot.

Body with a distinctive, more or less wide, yellow to grayish, more or less complete, axial stripe usually growing thinner and more obscure toward pygidium (Fig. 2A). In particularly dark specimens, the pattern is marbled gray-brown and indistinct. Thoracic shield

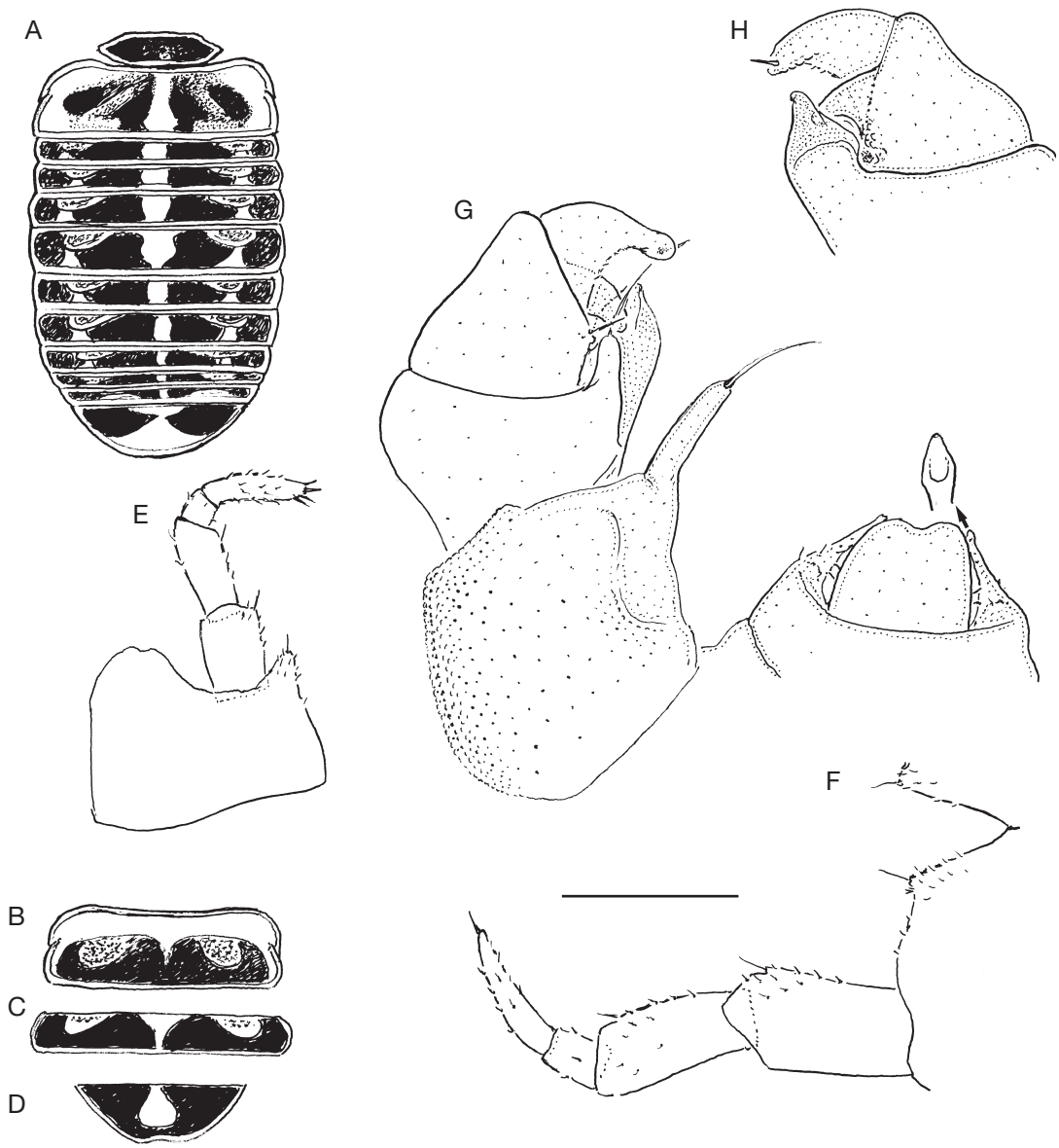

FIG. 2. — *Hyleoglomeris emarginata* Golovatch, 1981, ♂ near-topotypes: **A**, typical colour pattern; **B**, rather usual colour pattern on thoracic shield; **C**, same on a midbody tergite; **D**, same on pygidium; **E**, leg 17; **F**, leg 18; **G**, leg 19 (telopod), front view; **H**, distal part of telopod, caudal view. Scale bar: A-D, drawn not to scale; E-H, 0.4 mm.

dark, with a conspicuous, more or less wide, yellow to (medially) grayish band along lateral and anterior margins (Fig. 2B); sometimes the band even extends caudolaterally (Fig. 2A), often interrupted near axial stripe; latter sometimes incomplete caudally, always flanked by a paramedian pair of large, more or less marbled spots (Fig. 2A, B). Middorsal spots on each of terga 3 to 11 usually rather parallel-sided, but quite often V-shaped, subtriangular; each of these terga also with a pair of large, sublateral, yellow to marbled

yellow-brownish spots which normally do not reach the translucid caudal and lateral edges (Fig. 2A, C). Pygidium with a large, subtriangular to drop-shaped central spot, usually, but not always, set off from a translucid caudal margin (Fig. 2A, D).

Collum with two transverse striae.

Thoracic shield with a relatively narrow hyposchism nearly reaching the caudal tergal contour; 6 or 7 transverse striae, of which 1 or 2 start above schism and, together with subsequent 2 or 3 striae, cross the dorsum.

Male pygidium usually slightly sinuate medially at caudal margin (Fig. 2D).

Male leg 17 (Fig. 2E) with a more or less high, often irregularly rounded, outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 2F) with a more or less ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 2G, H) with a more or less high but invariably distinctly emarginate central syncoxital lobe flanked by two setose horns crowned with a lanceolate structure, with or without a lateral setoid subapically. Prefemur micropapillate laterally. Caudomedial outgrowth of femur relatively narrow at base (Fig. 2H). Caudomedial outgrowth of tibia with a micropapillate tubercle at base (Fig. 2H). Tarsus quite broadly rounded apically (Fig. 2G, H).

REMARKS

This new abundant material, which can be considered as near-topotypic, allows a better understanding of the pronounced morphological variation of this remarkable species. Given the vast distance between Nanjing and South Korea, the recent record of *H. emarginata* in S Korea by Mikhaljova & Lim (2000) requires verification.

Hyleoglomeris montana Golovatch, 1983

MATERIAL EXAMINED. — **Thailand.** Doi Inthanon National Park, 2000-2540 m, 13.XI.1984, leg. P. Beron & S. Andreev, 1 ♂, 1 ♀, 1 juv. (NMNHS); 1 ♀ (MNHN CC162).

REMARKS

This new material, which is strictly topotypical, allows a slight improvement to the original description (Golovatch 1983) in that the background coloration of the adults is not always blackish but gray-brown. The pattern is exactly as described earlier, but the axial stripe and the pale spots on all terga are slightly larger or wider.

Hyleoglomeris nagarjunga Golovatch, 1987

MATERIAL EXAMINED. — **Nepal.** Langlang Valley, Syabrubesi, 1600 m, 15.IX.1984, leg. P. Beron & S. Andreev, 1 ♂ (NMNHS).

REMARKS

This new material, which can be considered as near-topotypic, is in perfect agreement with the original description (Golovatch 1987).

Hyleoglomeris robusta Attems, 1938 (Fig. 3)

MATERIAL EXAMINED. — **Vietnam.** Lam Dong, Dalat, Peak Lang Bian, 1800-2000 m, secondary forest, 21.XII.1998, leg. L. Deharveng & A. Bedos, 1 ♂, 1 ♀ (MNHN CC161).

DESCRIPTION OF NEW MATERIAL

Length 13.5 (♂) and 15 mm (♀), width 7.0 (♂) and 7.2 mm (♀). Background coloration dark gray-brown to blackish, legs yellow to red-brown, telopods pale red-brown, markings on terga from yellow to gray-yellow.

Head above level of antennal sockets marbled reddish-brown to dark brown, antennae dark red-brown to blackish, antennomere 6 about 2.3-2.4 times longer than wide; ocelli 7 + 1 (♂) or 6 + 1 (♀), black, convex. Collum dark, with a transverse, central, marbled yellow-brown spot.

Body with a narrow axial stripe, latter obscure in anterior halves of terga but broadened into a clear subtriangular spot at caudal edge (Fig. 3A). In addition, thoracic shield with 1 + 1 large, paramedian, distinctly marbled spots nearly (♀) or fully (♂) in touch anteromedially, both well removed from sides. Subsequent terga with similar but sublateral spots. Pygidium with a small median spot at caudal margin. Caudal and lateral margins of all terga broadly translucid.

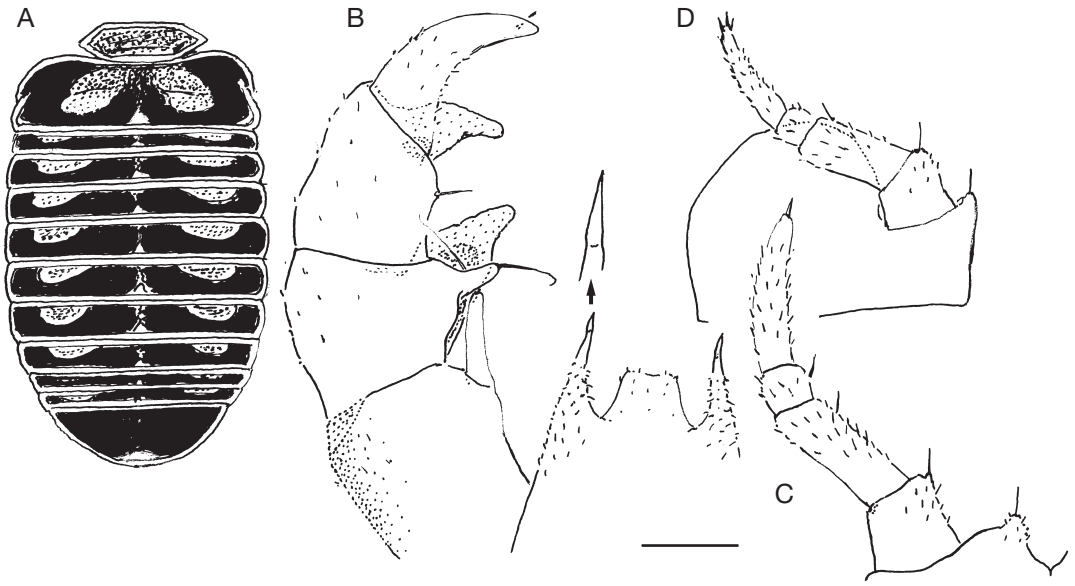

FIG. 3. — *Hyleoglomeris robusta* Attems, 1938, ♂ topotype: **A**, colour pattern; **B**, leg 17; **C**, leg 18; **D**, telopod, front view. Scale bar: A, drawn not to scale; B-D, 0.4 mm.

Collum with two transverse striae.

Thoracic shield with a relatively narrow hyposchism slightly surpassing the caudal tergal contour; 10 (♂) or 9 (♀) transverse striae, of which 4 or 5 start above the schism and 8 or 7 cross the dorsum, respectively; last two striae abbreviated and positioned very far from schism, first stria never crossing the entire shield.

Pygidium regularly rounded in both sexes.

Male leg 17 (Fig. 3B) with a high outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 3C) with an ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 3D) with a rather high and poorly emarginate central syncoxital lobe flanked by two simple setose horns pointed apically. Prefemur micropapillate laterally. Caudomedial outgrowth of tibia with a tubercle at base. Tarsus rather narrowly rounded apically.

REMARKS

This new material, which can be considered as strictly topotypic, is in good but not complete agreement with the original description (Attems 1938). Thus, the size of the holotype female (16 mm long, 8.2 mm wide) appears to be somewhat larger than that of the topotypes. The colour of the legs was stated to be red-brown, whereas in the fresh material at hand the entire venter with legs is yellow to light red-brown. The colour pattern of the pygidium was described in a highly contradictory way, suggesting a mistake. First it was said to show a large, light, subquadrate spot flanked by two marbled fields with adjacent spots. Then, the same pygidium was stated as having a brown-yellow, subquadrate, median spot extending from the caudal margin up to 2/3 length of the pygidium. We can assume that in the first case Attems (1938) actually described the colour pattern of the thoracic shield, whereas in the second he was describing that of the pygidium proper. In the new samples, the patterns agree well with these descriptions, but the pale median spots seem to be smaller and subtriangular on all postcollar terga, including the pygidium. Moreover, the number of striae on the thoracic shield was said to be 11, of which 9 cross the dorsum, whereas in the new material there are 9 or 10 such striae, with only 7 or 8 crossing the entire shield.

The fresh material at hand allows not only the description of the male characters, but also the structure of the hyposchism, which was totally ignored by Attems.

In addition, this material provides further insights into the identity of two other congeners known from S Vietnam. The first of these is *H. electa* in the sense of Attems (1938, 1953). As noted above, Attems (1938) recorded and redescribed this species – originally described from a female from the Himalayas (Silvestri 1917) – from Peak Lang Bian near Dalat, Vietnam, which is the type locality of *H. robusta*, and later (Attems 1953) reported the same species from Laos.

When one compares Attems' description of *H. electa* with the above redescription of *H. robusta*, a good match is also evident. However, *H. electa* from Lang Bian differs in having a smaller body size (less than 10 mm long); a larger median spot on the pygidium; a higher number (12) of striae on the thoracic shield, of which only 3-5 cross it entirely; a lower outer coxal lobe of male leg 17; bifid syncoxital horns of the telopods and some other traits.

The other species to be compared is *H. maior*, known from two localities in S Vietnam (Attems 1938), both lying not too far away from Dalat. Here the match is even more complete: ♂ 15 mm long and 7.0 mm wide, ♀ 17 mm long and 9.0 mm wide; a light, narrow, triangular, caudomedian spot present on most terga, including the pygidium; 8 striae on the thoracic shield, of which 6 cross the dorsum; the outer lobes of male leg 17 are very high; the tips of the syncoxital horns of the telopods are simple and acuminate.

Despite the differences, the above sample from Lang Bian is referred to *H. robusta* not only because of strict syntopy (shared as well with *H. electa* in the sense of Attems), but also in view of the similarities in body size, colour pattern, the total number of striae on the thoracic shield and of those crossing the shield entirely (closer to both *H. robusta* and *H. maior*, though quite comparable with *H. electa* as well), the conformation of male legs 17 and 19 (previously unknown in *H. robusta*, in some respects, such as the high outer coxal lobes and the simple and acuminate syncoxital horns, being more similar to *H. maior*, whereas in some other points, such as the shape of the syncoxital lobe, more like *H. electa*).

In other words, though differing in several minor details, the new sample appears to somewhat bridge the gaps between the existing descriptions of *H. robusta*, *H. maior* and *H. electa* in the sense of Attems. However, only abundant additional material coming from various places in Indochina, combined with a restudy of the relevant types, topotypes or identified samples, can help resolve the riddle, if, at least in S Vietnam, we face a single polymorphic species, as suggested here, or there are indeed several distinct but closely related congeners involved. In any event, the serious doubts expressed by Golovatch (1987) as regards the conspecificity of material of *H. electa* from the Himalayas and Indochina remain.

Hyleoglomeris sinensis (Brölemann, 1896)
(Figs 4; 5)

TYPE MATERIAL. — **China.** Tibet, Tat-Sien-Lou, leg. Oberthur, ded. Dolfuss, lectotype ♂ (here designated), paralectotypes 5 ♂♂, 2 ♀♀ (MNHN CC089). — Sichuan Province, Siao-Lou, leg. Oberthur, ded. Dolfuss, paralectotypes 7 ♂♂, 6 ♀♀ (MNHN CC089).

DIAGNOSIS. — Differs from congeners by the peculiar colour pattern, combined with the particularly strongly enlarged telopods with subtransverse and denticulate syncoxital horns.

DESCRIPTION

Length 8.5-9.5 (♂) or 9.75-10 mm (♀), width 5.5-6.0 (♂) or 5.5-6.5 mm (♀).

Lectotype ♂ 9.0 mm long and 5.5 mm wide. Background coloration of this once dried material, now in alcohol, rather uniformly dark brown to blackish, legs dark brown, antennae dark brown to blackish.

Colour pattern (Fig. 5A) usually traceable as a rather clear, wide, paler band along anterior edge of thoracic shield, often also as 1 + 1 vague, sublateral, strongly marbled spots on terga (2)3-11.

Antennomere 6 *c.* 2.8 times longer than wide; ocelli 6 + 1 to 7 + 1, black, convex.

Collum with two transverse striae.

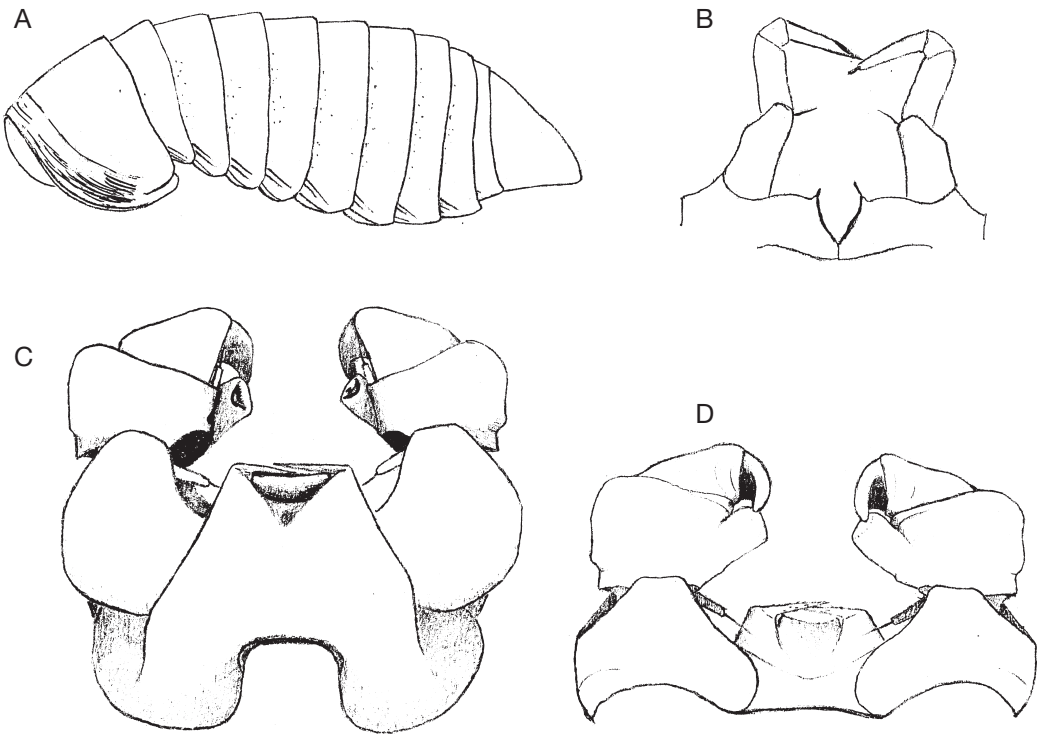

FIG. 4. — *Hyleoglomeris sinensis* (Brölemann, 1896), ♀ paralectotype (**A**) and ♂ lectotype (**B**-**D**) from Tat-Sien-Lou, Tibet: **A**, habitus, lateral view; **B**, leg 18; **C**, **D**, telopods, front and caudal views, respectively. Drawn not to scale (Brölemann's original drawings, Iconographie Brolemann, MNHN).

Thoracic shield with a narrow hyposchism not reaching the caudal tergal contour; 10 or 11 transverse striae, of which 5 or 6 start above the schism and 6 or 7 in differing combinations cross the dorsum (Fig. 4A).

Male pygidium strongly emarginate medially at caudal margin (Fig. 5A).

Male leg 17 (Fig. 5B) with a rather low to medium-sized, often irregularly rounded, outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Figs 4B; 5C) with a more or less broadly ogival syncoxital notch; telopodite 4-segmented.

Telopods (Figs 4C, D; 5D) particularly strongly enlarged, heavily sclerotised, with a high, roundly subquadrate syncoxital lobe flanked by two denticulated horns directed (sub)mesad and each crowned with a harpoon-shaped structure (Fig. 5E). Caudomedial outgrowth of tibia with a tubercle at base. Tarsus rather subacuminate to narrowly rounded apically.

REMARKS

A lectotype is here selected from the syntype series from Tibet (original label reading "Glomeris Oberthuri Brölemann n. sp., Chine, Thibet, Tat-Sien-Lou (Oberthur 1/2 Dolfuss)"), because, as clearly stated on Brölemann's original drawings, only the dissected male served for the execution of the illustrations reproduced here as Figure 4A, C, D (Iconographie Brolemann, MNHN). The label name "Oberthuri" is a *nomen nudum*, since the species was published as *sinensis*.

To document that the other series of paralectotypes represents the same species, Figure 5 has been prepared. The original label reads "Glomeris Oberthuri Brölemann n. sp., Chine, Province de Si-Tchouen, Siao-Lou (Dolfuss)".

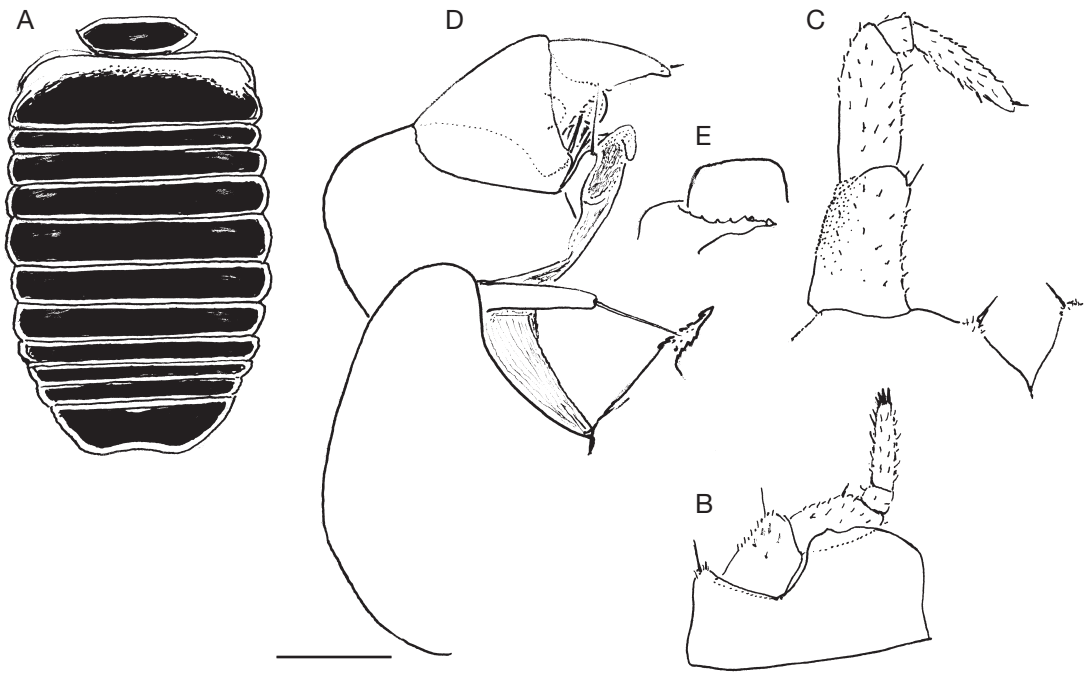

FIG. 5. — *Hyleoglomeris sinensis* (Brölemann, 1896), ♂ paralectotype from Siao-Lou, Sichuan: **A**, colour pattern; **B**, leg 17; **C**, leg 18; **D**, telopod, front view; **E**, left half of telopod syncoxite. Scale bar: A, drawn not to scale; B-E, 0.5 mm.

Hyleoglomeris maculata n. sp.
(Fig. 6)

TYPE MATERIAL. — **China.** Yunnan Province, Menzi County, Lao Shao Dong Cave, 5.I.1989, leg. P. Beron, holotype ♂ (NMNHS), paratypes 4 ♂♂, 6 ♀♀, 4 juvs (NMNHS); 3 ♂♂, 2 ♀♀ (MNHN CC154); 3 ♂♂, 2 ♀♀ (ZMUM). — Same county, Wulichong Sinkhole Cave (No. 3), paratypes 4 ♂♂, 6 ♀♀, 4 juvs (NMNHS).

ETYMOLOGY. — To emphasize the peculiar maculate colour pattern.

DIAGNOSIS. — Differs from congeners by the peculiar colour pattern, combined with a relatively strongly reduced hyposchism and certain details of telopod structure.

DESCRIPTION

Length 6.0-8.0 (♂) or 6.5-10 mm (♀), width 3.0-4.0 (♂) or 3.3-5.0 mm (♀). Holotype 7.0 mm long and 3.5 mm wide.

Background coloration pallid to yellow, spots on terga brown to dark brown.

Head marbled red-brown, antennae dark red-brown, antennomere 6 about 2.3-2.4 times longer than wide; ocelli 6 + 1 to 7 + 1, black, convex; Tömösváry's organ transverse-oval, only slightly wider than long.

Collum, thoracic shield and tergite 11 entirely pale. Body with a distinctive pattern (Fig. 6A) of 1 + 1 large, transverse-oval, evidently separated, paramedian spots on terga 3-10 and on pygidium, as well as of 1 + 1 increasingly small, roundish, sublateral spots on terga 3-(8)9.

Collum with two transverse striae.

Thoracic shield with a narrow hyposchism not reaching the caudal tergal contour; 9 or 10 transverse striae, of which 5 or 6 start above the schism and 4-6 others in differing combinations (never the first and the last though) cross the dorsum.

Male pygidium usually slightly sinuate medially at caudal margin.

Male leg 17 (Fig. 6B) with a medium-sized and regularly rounded outer coxal lobe; telopodite 3-segmented.

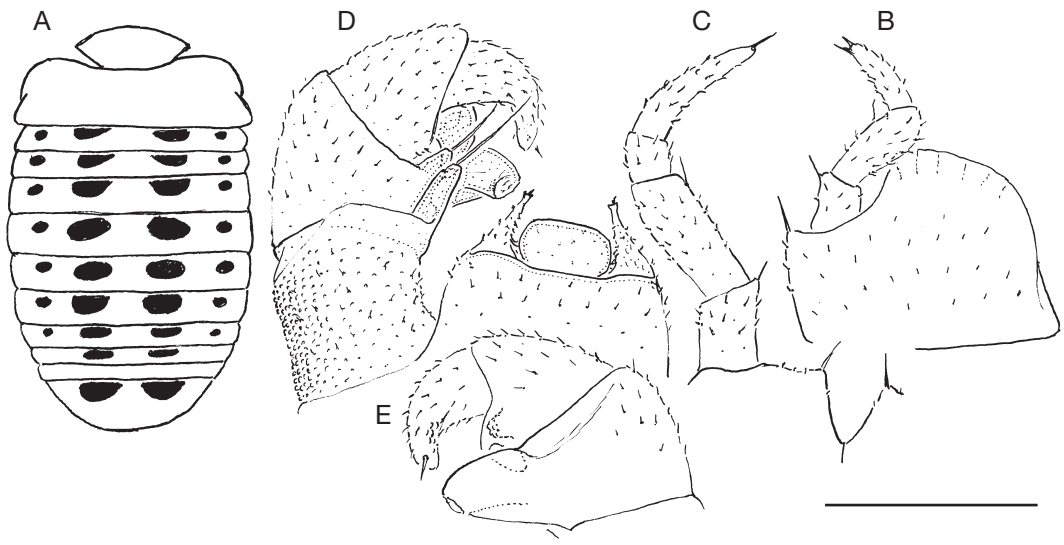

FIG. 6. — *Hyleoglomeris maculata* n. sp., ♂ paratype from Cave Loa Shao Dong: **A**, colour pattern; **B**, leg 17; **C**, leg 18; **D**, telopod, front view; **E**, distal part of telopod, caudal view. Scale bar: A, drawn not to scale; B-E, 0.5 mm.

Male leg 18 (Fig. 6C) with a more or less narrowly ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 6D, E) with a rather high and subovoid central syncoxital lobe flanked by two setose horns crowned with a foveole-shaped structure with an apical setoid. Prefemur micropapillate laterally. Caudomedial outgrowth of femur relatively narrow at base (Fig. 6E). Caudomedial outgrowth of tibia with a micropapillate tubercle at base (Fig. 6E). Tarsus weakly rounded apically (Fig. 6D, E).

REMARKS

Based on the coloured head, ocelli and tergal pattern, this species is probably only troglophilic. Its closest relatives seem to be some of the sympatric troglobitic congeners (see below).

Hyleoglomeris reducta n. sp.
(Fig. 7)

TYPE MATERIAL. — **China.** Yunnan Province, Jianshui County, Yan Dong Cave, 12.I.1989, leg. P. Beron, holotype ♂ (NMNHS), paratypes 20 ♂♂, 12 ♀♀ (NMNHS); 3 ♂♂, 2 ♀♀ (MNHN CC155); 3 ♂♂, 2 ♀♀ (ZMUM).

ETYMOLOGY. — To emphasize the coloration, hyposchism and the number of the striae crossing the thoracic shield, all strongly reduced.

DIAGNOSIS. — Differs from congeners by the strongly reduced coloration and hyposchism, combined with certain details of telopod structure.

DESCRIPTION

Length 5.5-7.5 (♂) or 6.0-8.5 mm (♀), width 2.8-3.6 (♂) or 3.0-4.0 mm (♀). Holotype 7.5 mm long and 3.7 mm wide.

Coloration usually entirely pallid, only in few paratypes (5 ♂♂, 1 ♀) with remnants of pigment expressed as head being light red-brown above antennal sockets, and antennae brown; in one of these males a light red-brownish tergal pattern is also retained as large, transverse, apparently marbled, paramedian spots nearly in touch anteromedially on terga 3-11 and pygidium, and as increasingly small sublateral spotlets on terga 3-8.

Antennomere 6 about 2.5 times longer than wide; ocelli 6 + 1 to 7 + 1, unpigmented, convex, especially evident in pigmented specimens; Tömösváry's organ transverse-oval, only slightly wider than long.

Collum with two transverse striae.

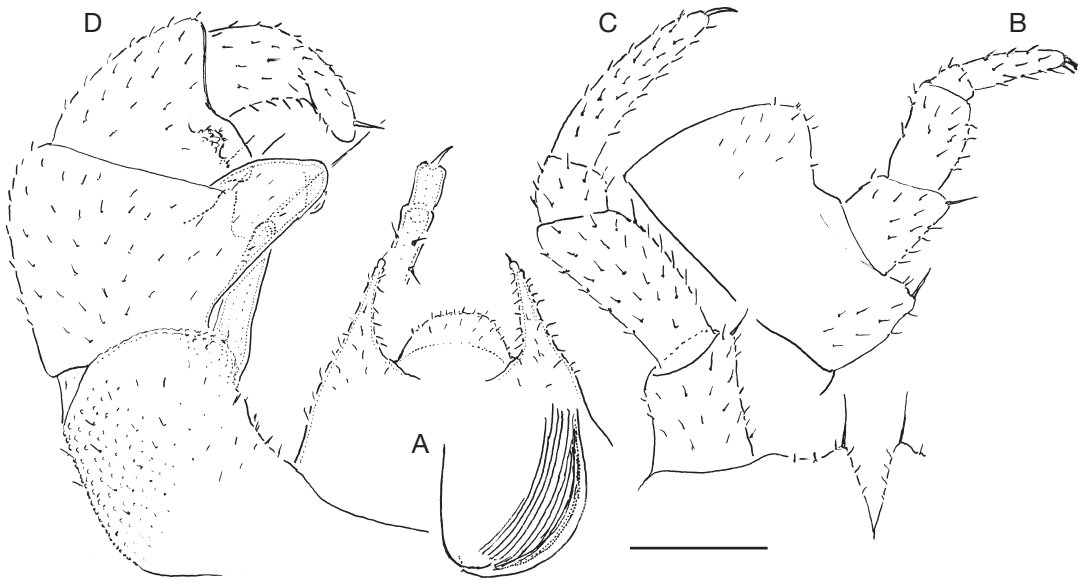

FIG. 7. — *Hyleoglomeris reducta* n. sp., ♂ paratype: **A**, lateral side of thoracic shield; **B**, leg 17; **C**, leg 18; **D**, telopod, caudal view. Scale bar: A, drawn not to scale; B-D, 0.4 mm.

Thoracic shield with a very small and narrow hyposchism not reaching the caudal tergal contour (Fig. 7A); 6 or 7 transverse striae, of which 4 or 5 start above the schism and (1)2-3 ones (never the first and last though) cross the dorsum.

Male pygidium virtually not sinuate medially at caudal margin.

Male leg 17 (Fig. 7B) with a low outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 7C) with a more or less narrowly ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 7D) with a rather high and roundly subtrapeziform syncoxital lobe flanked by two setose horns crowned with an apical setoid. Prefemur micropapillate laterally. Caudomedial outgrowth of tibia with a micropapillate tubercle at base. Tarsus rather modestly rounded apically.

REMARKS

Only one cavernicolous congener has hitherto been described from China in general and from Yunnan in particular: *H. albicorporis* Zhang & Zhang, 1995, from Shihua Cave at Baoshan. Based only on three specimens, which were described quite superficially (Zhang & Zhang 1995), it is hard to decide whether *H. albicorporis* is indeed devoid of pigmentation, and thus whether it differs from some other, especially endogean, congeners encountered in SE China (see also below). It matches *H. reducta* n. sp. quite closely, not only on geographical grounds, but also in terms of at least body size and the conformation of male legs 17-19. The only meaningful differences between these two species that can be drawn from the original description of *H. albicorporis* concern the latter's ordinary (i.e. small) hyposchism, a slenderer male telopodite 17, and the tip of the telopod syncoxital horns supplied with a subapical, rather than apical, setoid.

The fact that only a few (6 of 42, or *c.* 14%) specimens from the type series of *H. reducta* n. sp. still retain pigment, and only one shows some traces of a tergal pattern, is important, apparently reflecting an intermediate stage of evolution toward complete cavernicoly. Whether or not *H. reducta* n. sp. is already a troglobite is impossible to decide based solely on the above morphological and geographical evidence. The colour pattern of the single particularly "atavis-

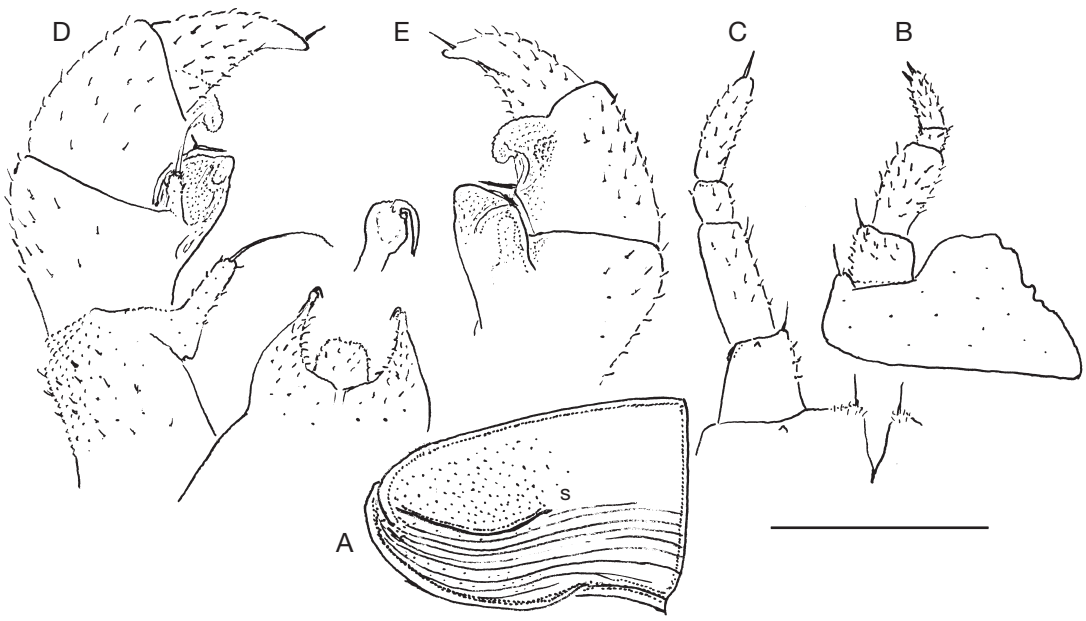

FIG. 8. — *Hyleoglomeris eusulcata* n. sp., ♂ paratype: **A**, lateral side of thoracic shield; **B**, leg 17; **C**, leg 18; **D**, telopod, front view; **E**, distal part of telopod, caudal view. Abbreviation: **s**, sulcus. Scale bar: A, drawn not to scale; B-E, 0.4 mm.

tic" male in the sample strongly resembles that of *H. maculata*, but differs in the paramedian spots being nearly in touch anteromedially. In addition, *H. reducta* n. sp. shows an even more strongly reduced hyposchism and less numerous striae on the thoracic shield.

In general, Yunnan is among China's provinces particularly rich in karst caves that support numerous troglobitic animals (Chen *et al.* 2001). Yan Dong Cave is known to contain several troglobitic arthropods, including the millipede *Bollmania beroni* Stoev & Enghoff, 2005 (cf. Stoev & Enghoff 2005).

Hyleoglomeris eusulcata n. sp.
(Fig. 8)

TYPE MATERIAL. — **China.** Guizhou Province, Libo County, La Tai Dong Cave, 6.III.1995, leg. P. Trontelj, holotype ♂ (MNHN CC156); paratypes 2 ♂♂, 2 ♀♀ (MNHN CC156); 1 ♂, 1 ♀, 3 juvs (OB BF UL); 1 ♂, 1 ♀ (ZMUM).

ETYMOLOGY. — To emphasize the conspicuous lateral sulcus present on the thoracic shield.

DIAGNOSIS. — Differs from congeners by the single stria on the collum, combined with a peculiar sulcus on the thoracic shield.

DESCRIPTION

Length of adults 7.0-8.0 (♂) or 7.0-9.0 mm (♀), width 3.0-3.8 mm (♂, ♀). Holotype 8.0 mm long and 3.1 mm wide.

Coloration entirely pallid, unpigmented.

Antennomere 6 about 2.3-2.4 times longer than wide, antennomere 7 only slightly shorter than 2nd; 2 or 3 barely visible ocelli, unpigmented; Tömösváry's organ transverse-oval, about twice as wide as long.

Body teguments softer than usual. Collum with one transverse stria.

Thoracic shield with a rather small hyposchism not reaching the caudal tergal contour (Fig. 8A); 8 or 9 transverse striae, of which 5 or 7 start above the schism, on an elevation just in front of a conspicuous, slightly curved, midway lateral sulcus (s) delimiting a slight but evident impression in posterolateral portion of the shield; usually 6 striae (never the first and last though) cross the dorsum.

Male pygidium virtually not sinuate medially at caudal margin.

Male leg 17 (Fig. 8B) with a rather low, rounded, outer coxal lobe of irregular shape; telopodite 4-segmented.

Male leg 18 (Fig. 8C) with a more or less narrowly ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 8D, E) with a rather small, roundly subtrapeziform syncoxital lobe flanked by two setose horns crowned with an apical setoid. Prefemur micropapillate laterally. Caudomedial outgrowth of tibia with a micropapillate tubercle at base. Tarsus narrowly rounded apically.

REMARKS

This new species differs markedly from congeners by having only a single stria crossing the collum, as well as in having a conspicuous sulcus above the schism, delimiting a slight but evident lateral impression (shown stippled in Figure 8A). A similar sulcus is only observed in *H. sulcostriata* n. sp., from Laos (see below). Neither of these traits seems troglomorphic, but the softer teguments, and the complete loss of pigmentation and most of the ocelli, are definitely troglomorphic features. Most likely we face a disjunct troglobitic species in this case.

In general, Guizhou is very rich in karst caves that contain numerous troglobitic arthropods and other animals (Chen *et al.* 2001).

Hyleoglomeris speophila n. sp.
(Fig. 9)

TYPE MATERIAL. — **Vietnam.** Hai Phong, Cat Ba Island, Phu Long, Thien Luong Cave, 29.IX.1998, leg. L. Deharveng, holotype ♂ (MNHN CC157).

ETYMOLOGY. — To emphasize cavernicoly.

DIAGNOSIS. — Differs from congeners in some troglomorphic traits, combined with a relatively broad caudofemoral process of the telopod.

DESCRIPTION

Length 8.5 mm, width 4.1 mm.

Coloration entirely pallid, unpigmented.

Antennomere 6 about 2.0 times longer than wide, antennomere 7 very short; 6 poorly visible, unpigmented but convex ocelli on each side of head; Tömösváry's organ transverse-oval, about twice as wide as long.

Collum with two transverse striae.

Thoracic shield with a rather narrow hyposchism slightly surpassing the caudal tergal contour; 9 transverse striae, of which 6 start above the schism and 5 (neither the first nor the last one though) cross the dorsum.

Male pygidium virtually not sinuate medially at caudal margin.

Male leg 17 (Fig. 9A) with a high, rounded outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 9B) with a rounded syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 9C, D) with a rather small, roundly subtrapeziform syncoxital lobe flanked by two setose horns crowned with an apical setoid. Prefemur and femur micropapillate nearly throughout. Caudomedial outgrowth of femur wide at base, that of tibia with a pilose tubercle at base. Tarsus narrowly rounded apically, almost pointed.

REMARKS

Based on morphological evidence, this new species resembles several epigean congeners from China or Indochina, such as *H. maculata* n. sp. (see above), *H. electa* in the sense of Attems (1938) and others, but none of these shows the troglomorphic features of complete depigmentation and elongate Tömösváry's organs. However, the ocelli are still discernible and neither the antennae nor the legs are particularly long. To prove that we face a troglobite, additional observations and material are necessary. In general, Vietnam supports numerous karst caves rich in troglobites (Deharveng *et al.* 2001), while Thien Luong Cave is known to mainly harbour troglobitic arthropods (Deharveng pers. comm.).

Hyleoglomeris sulcostriata n. sp.
(Fig. 10)

TYPE MATERIAL. — **Laos.** Vang Vieng, Tham Non (102.433°E, 18.951°N), cave, 1.I.2000, leg. L. Deharveng & A. Bedos, holotype ♂ (MNHN CC158); paratypes 1 ♀ (MNHN CC158); 1 ♂ (ZMUM). — Khammouan Province, Ban Vieng, Tham Houai Sai (104.937°E,

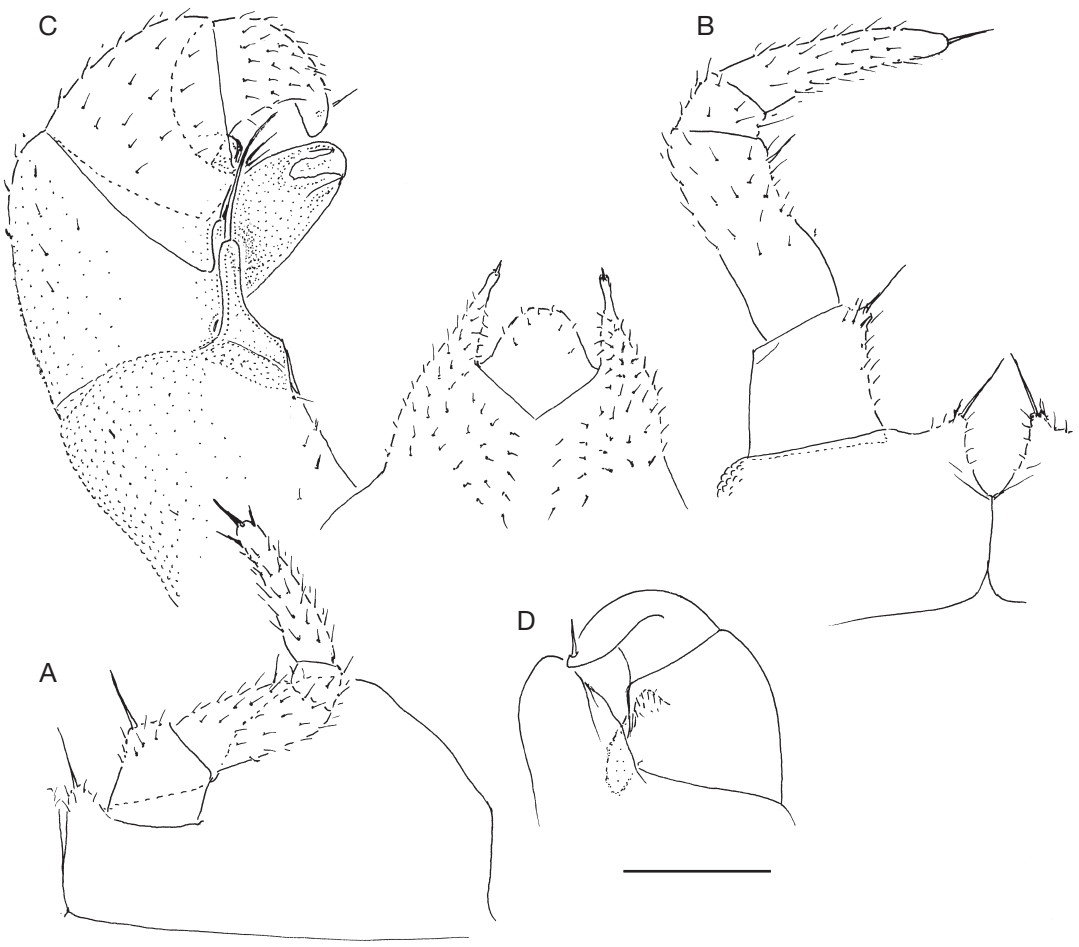

FIG. 9. — *Hyleoglomeris speophila* n. sp., ♂ holotype: **A**, leg 17; **B**, leg 18; **C**, telopod, front view; **D**, distal part of telopod, caudal view. Scale bar: 0.4 mm.

17.552°N), sink cave, 13.II.2001, leg. X. Noguès, paratype ♂ (MNHN CC158). — Same province, Ban Nam Non, Nam Non (104.688°E, 18.027°N), cave, 15.II.1999, leg. J. Lordon, paratypes 1 ♂, 1 ♀ (MNHN CC158).

ETYMOLOGY. — To emphasize a conspicuous lateral sulcus on the thoracic shield turning into a stria middorsally.

DIAGNOSIS. — Differs from congeners in some troglomorphic traits, combined with a conspicuous lateral sulcus on the thoracic shield turning into a stria middorsally.

DESCRIPTION

Length 5.0-6.0 (♂) or 5.5-7.0 mm (♀), width 2.5-3.0 (♂) or 2.8-3.5 mm (♀). Holotype 6.0 mm long and 2.8 mm wide.

Coloration entirely pallid, unpigmented.

Antennomere 6 about 1.6-1.7 times longer than wide, antennomere 7 very short; 5 or 6 poorly visible, unpigmented but convex ocelli on each side of head; Tömösváry's organ transverse-oval, about twice as wide as long.

Collum with two transverse striae.

Thoracic shield with a medium-sized hyposchism slightly surpassing the caudal tergal contour; 10 or 11 transverse striae, of which 8 or 9 start above the schism and 7 or 8 cross the dorsum; most of the striae lying on an elevation just in front of a

conspicuous, rather strongly and regularly curved (like the other striae), midway, lateral sulcus delimiting a slight impression in posterolateral portion of the shield; the sulcus deep basally, starting just at schism end, gradually turning into the last crossing stria in apical third of the shield.

Male pygidium virtually not sinuate medially at caudal margin.

Male leg 17 (Fig. 10A, E, H) with a low to medium-sized, more or less rounded, sometimes micropapillate outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 10B, F, I) with a broadly rounded to ogival syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 10C, D, G, J) somewhat variable, with a roundly subtrapeziform to large and emarginate syncoxital lobe flanked by two setose horns crowned with a subapical setoid. Prefemur micropapillate laterally. Caudomedial outgrowth of femur rather narrow, that of tibia with a distinct to very prominent tubercle at base. Tarsus narrowly rounded apically, subacuminate.

REMARKS

As the material comes from three different caves in Laos, with a distance between both Khammouan caves of about 60 km (although located in the same karst area), which in turn are separated from Tham Non by a distance of about 300 km, variation is certainly something to expect. The specimens from the Khammouan caves appear to be particularly similar. They are slightly larger in size (3.0-3.5 mm wide), there are usually seven striae crossing the thoracic shield while the respective male legs 17-19 are nearly identical, with an unusually high tubercle at base of the telopod tibial outgrowth (Fig. 10E-J). In contrast, the sample from Tham Non is distinct in that the animals are a little smaller (width 2.5-2.8 mm), usually showing eight striae crossing the thoracic shield, while male legs 17-19 are slightly different (Fig. 10A-D).

Nevertheless, there can be no doubt that the samples are conspecific because of the striking midway sulcus present on the thoracic shield. A similar sulcus is only known to occur in *H. eusulcata* n. sp., from Guizhou (see above), attesting to their particularly close relations. However, in *H. sulcostriata* n. sp. this sulcus gradually turns middorsally into the last stria crossing the shield.

This species also shows such troglomorphic features as complete depigmentation and an elongate Tömösváry's organ, but the ocelli are still discernible and neither the antennae nor the legs are particularly elongate. To prove that we face a troglobite, additional observations and material are necessary.

In general, Laos is rich in karst caves that support numerous troglobites, presumably several among diplopods as well (Besson *et al.* 2001).

Hyleoglomeris differens n. sp.
(Fig. 11)

TYPE MATERIAL. — **Laos.** Khammouan Province, Ban Thongkha, Tham Non, cave, hand collection, 15.II.1998, leg. L. Deharveng & A. Bedos, holotype ♂ (MNHN CC159); paratypes 1 ♂, 3 ♀♀ (MNHN CC159).

ETYMOLOGY. — To emphasize the sharp differences from the parapatric *H. sulcostriata* n. sp., as well as the numerous striae on the thoracic shield, among which only few cross the dorsum.

DIAGNOSIS. — Differs from congeners in some troglomorphic traits, combined with a high number of striae on the thoracic shield, among which only few cross the dorsum.

DESCRIPTION

Length 6.5-7.0 (♂) or 6.0-7.8 mm (♀), width 3.4-4.0 (♂) or 3.2-4.2 mm (♀). Holotype 7.0 mm long and 4.0 mm wide.

Coloration nearly entirely pallid, but with marbled red-brown sides of head around Tömösváry's organ and with blackish ocelli.

Antennomere 6 about 2 times longer than wide, antennomere 7 very short; 6 + 1 convex ocelli on each side of head; Tömösváry's organ transverse-oval, about twice as wide as long.

Collum with two transverse striae.

Thoracic shield with a very narrow hyposchism barely surpassing the caudal tergal contour; 10-13 transverse striae, of which most start above the schism but only 3 (usually) or 4 (seldom,

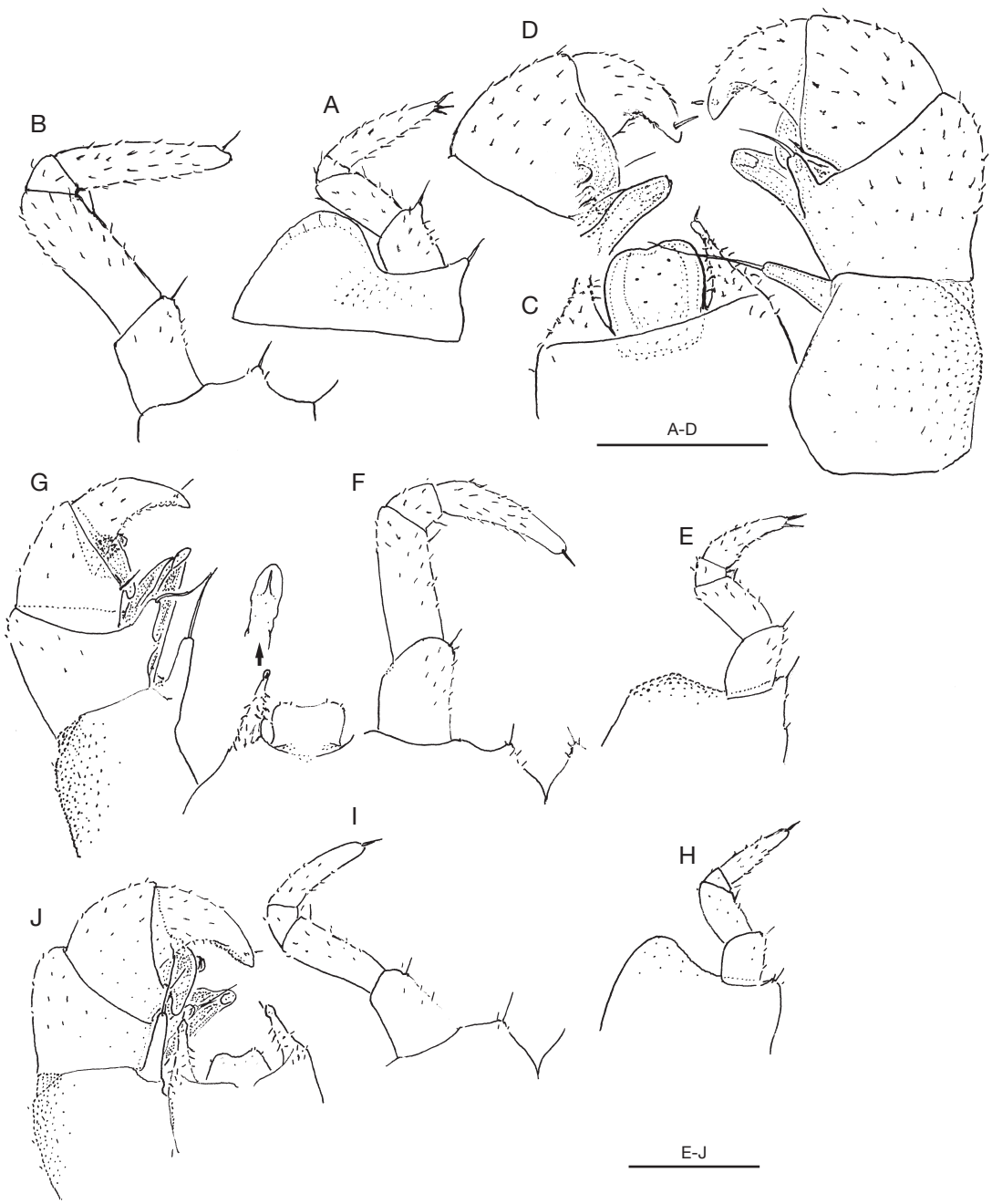

FIG. 10. — *Hyleoglomeris sulcostriata* n. sp., ♂ holotype (**A**-**D**), ♂ paratype from Nam Non (**E**-**G**) and ♂ paratype from Tham Houai Sai (**H**-**J**); **A**, **E**, **H**, leg 17; **B**, **F**, **I**, leg 18; **C**, **G**, **J**, telopods, front view; **D**, distal part of telopod, caudal view. Scale bars: A-D, 0.3 mm; E-J, 0.4 mm.

holotype), neither the first nor the last though, cross the dorsum.

Male pygidium virtually not sinuate medially at caudal margin.

Male leg 17 (Fig. 11A) with a modest, rounded, outer coxal lobe; telopodite 4-segmented.

Male leg 18 (Fig. 11B) with a broadly rounded syncoxital notch; telopodite 4-segmented.

Telopods (Fig. 11C) with a rather small, roundly subtriangular syncoxital lobe flanked by two setose horns crowned with a subapical setoid. Prefemur and, to a lesser degree, femur micropapillate laterally. Caudomedial outgrowth of femur wide at base, pilose on caudal surface; that of tibia with a pilose tubercle at base. Tarsus narrowly rounded apically.

REMARKS

The relations of *H. differens* n. sp. are difficult to determine, as only few congeners, like *H. electa* in the sense of Attems (1938), show a small body size, combined with a high number of striae on the thoracic shield and a contrastingly low number of those that cross the dorsum. However, none of these other species possesses definite traits of troglomorphism, such as a completely unpigmented body and an only partly pigmented head. Based on this latter character alone, this new species can only be considered as a troglophile at most.

CONCLUDING NOTES

Naturally, for a large genus like *Hyleoglomeris*, ranging from SE Europe in the West to Japan in the East, to the Himalayas in the South and to Sulawesi in the Southeast (Fig. 1), one would expect several distinct species groups to occur. However, these are often difficult to outline, chiefly because of the poor quality of most of the earlier descriptions. In addition, there appear to be too few useful characters to recognize species reliably, and even these are often variable. With a wealth of further new *Hyleoglomeris* undoubtedly remaining to be discovered and described, the following attempt at species group discrimination must be understood as highly provisional.

The Greek species are evidently very closely related to each other (Mauriès 1984). Both are highly evolved, peripheral, westernmost troglobites, not only because of their profound troglomorphism but also due to the shared, reduced, 3-segmented male telopodite 17. This pair can be called the *epirotica*-group.

Further to the east, i.e. in Anatolia, the Caucasus, NW Iran and Central Asia, there are no true cavernicoles among *Hyleoglomeris* species. Nearly all are epigean, vividly coloured, rarely (*H. awchasica*) relatively large forms; only *H. lohmanderi*, a presumed geo- and troglophile, is entirely unpigmented (Golovatch 1989). In this ensemble, which can be termed the *awchasica*-group, only *H. armeniaca* and, sometimes, *H. specialis* show reduced, 3-segmented male telopodites 17. All of its species show a (sub)apical setoid on the telopod syncoxital horns.

The species encountered in Korea, Japan and Taiwan seem to form another homogeneous assemblage, which can be called the *stuxbergi*-group. Generally, it corresponds in scope to what Verhoeff (1936) invalidly proposed as the subgenus *Perkeomeris* plus the later-distinguished *Okeanomeris* (cf. Verhoeff 1942). Again, this group mainly includes epigean, nicely coloured forms, with only one a presumed troglobite (*H. triangularis*), and a few others that are troglophiles at most. These species are small to medium-sized (length ≤ 11 mm), usually more or less broadly pale over the anterior half of the thoracic shield. Only two species whose males have been described, *H. koreana* and *H. japonica*, appear to show a subapical setoid on the telopod syncoxital horns.

The same degree of homogeneity can be presumed concerning the Himalayan ensemble (Golovatch 1987), which can be called the *modesta*-group. Two of its species, including *H. modesta* s.s., are only known from female material. Another, *H. venustula*, is unusual in showing bizarre, strongly enlarged syncoxital horns of the telopods (Silvestri 1917), similar to those occurring in species of the North American genus *Onomeris* Cook, 1896. Only some of the species of this group show a (sub)apical setoid on the telopod syncoxital horns.

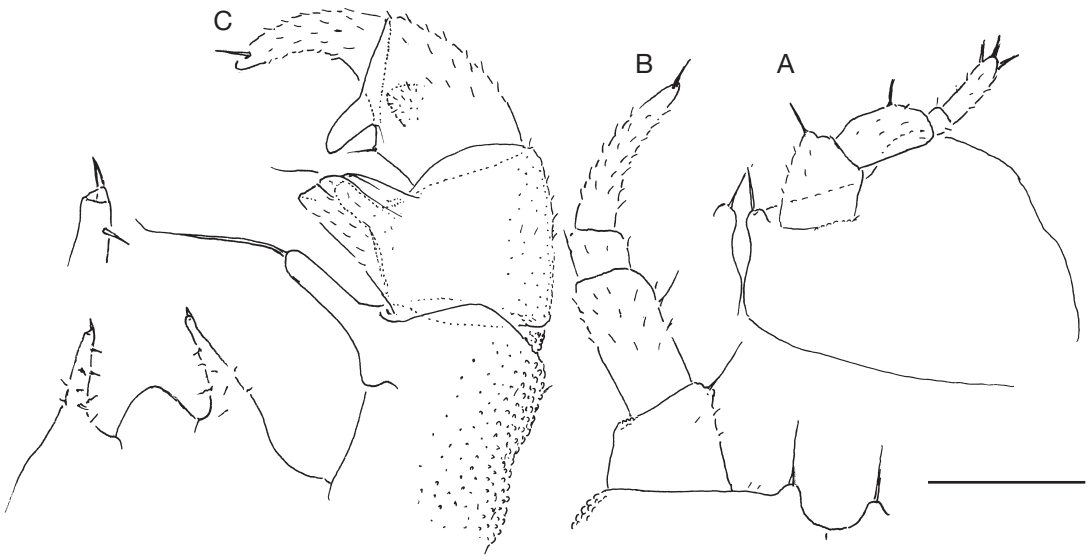

FIG. 11. — *Hyleoglomeris differens* n. sp., ♂ paratype: **A**, leg 17; **B**, leg 18; **C**, telopod, caudal view. Scale bar: 0.4 mm.

The fauna of the Sunda area, ranging from Sumatra to Sulawesi, seems to form a group of its own, the *albicornis*-group. In no way does it correspond to the superfluous genus *Sundameris* proposed by Verhoeff (1936) to incorporate *H. jacobsoni* in the sense of Attems (1930), with a 3- rather than 4-segmented male telopodite 17 (note: in the Caucasian species *H. specialis* this character varies within populations, see Golovatch 1989). Most of the species of this group lack a vivid colour pattern, being more or less monochrome; many are large (> 10 mm long), and all but one (*H. diversicolor*) of those known from the male sex seem to be devoid of a (sub)apical setoid on the telopod syncoxital horns. Interestingly, paler species dominate the fauna of Borneo, while darker ones predominate in Sumatra and Sulawesi.

Finally, the large complex of Chinese and Indochinese forms must be considered. Here we encounter several relatively large species, invariably epigean, such as the aberrant *H. sinensis* (also showing a broadly pale anterior part of the thoracic shield) and the more typical *H. robusta*, *H. siamensis*, *H. cremea* etc. Most of the species, however, are again small to medium-sized.

Due to the similarities in colour pattern, in the shape of the male pygidium and, above all, in the particularly incrassate telopods, the *sinensis*-group can be distinguished, composed of *H. sinensis* and *H. emarginata*. The broadly pale anterior part of their thoracic shield seems to represent a kind of bridge, both geographically and morphologically, to species of the *stuxbergi*-group in Korea, Japan and Taiwan.

As revealed in this study, a certain proportion of the Chinese and Indochinese *Hyleoglomeris* is composed of cavernicolous, often clearly troglobitic species, nearly all of which are small. Unlike the Greek outpost, however, the SE Asian troglobites cannot be treated as peripheral, the more so because troglobitic congeners are unknown from either the Malay Peninsula or the Sunda Archipelago. This does not, however, mean that *Hyleoglomeris* cavernicoles are necessarily absent there – simply that our current knowledge of the fauna is too imperfect. We propose the *eusulcata*-group for *H. eusulcata* s.s. and *H. sulcostriata*, both of which show a peculiar lateral sulcus and a distinct striatiferous elevation near the schism of the thoracic shield, but we refrain from grouping any other of the ungrouped congeners of this complex.

KEY TO THE SPECIES OF *HYLEOGLOMERIS* VERHOEFF, 1910

1. SE Europe ..... *epirotica*-group, 2
— Asia 3

2. Body entirely unpigmented; hyposchism considerably surpassing caudal tergal contour of thoracic shield; Greece (cave in Epirus) ..... *H. epirotica*
— Body with rudimentary pigment at least near Tömösváry's organs; hyposchism barely surpassing caudal tergal contour of thoracic shield; Greece (cave on Naxos Island) ..... *H. beroni*

3. Anatolia, Caucasus, NW Iran and Central Asia ..... *awchasica*-group, 4
— Other parts of Asia 11

4. Animals entirely unpigmented; S Azerbaijan, Caucasus ..... *H. lohmanderi*
— Terga, head and ocelli clearly pigmented, usually a vivid pattern on all terga 5

5. A pale axial line or a row of paler spots on terga (2)3-11 6
— Neither a pale axial line nor a row of paler spots on terga (2)3-11 7

6. A more or less wide, variable axial stripe on terga 2(3)-11; pygidial spot wider along caudal margin; Colchis, W Caucasus ..... *H. awchasica*
— An axial row of paler subtriangular spots on terga 2-11; pygidial spot narrower along caudal margin; Hyrcania (Azerbaijan, NW Iran) ..... *H. lenkorana*

7. Two pale spots on each side of terga 3-11; male pygidium with a more or less clear central spot; Central and E Caucasus Major ..... *H. specialis*
— Only one paler spot on each side of terga 3-11; male and female pygidium either entirely dark or with some pale markings 8

8. Pygidium with a bright central spot in both sexes; SE Azerbaijan, Caucasus .... *H. piccola*
— Pygidium with a poorly-expressed central spot at most (usually in ♂), more often entirely dark 9

9. Male pygidium usually with a poorly-expressed central spot; male telopodite 17 3-segmented; N Armenia, Caucasus ..... *H. armeniaca*
— Pygidium of both sexes entirely dark, devoid of pale markings; male telopodite 17 4-segmented 10

10. Thoracic shield with 8-10 striae, of which 4 or 5 crossing the dorsum; syncoxital lobe of telopod slightly emarginate; W Tian-Shan Mountains, Central Asia ..... *H. kirgisica*
— Thoracic shield with 4 or 5 striae, of which only 2 cross the dorsum; syncoxital lobe of telopod not emarginate; Central Turkey ..... *H. talasensis*

11. Background coloration dark, pattern/markings lighter; Himalayas of India and Nepal ..... *modesta*-group, 12
— Background coloration usually but not always dark; E and SE Asia 19

12. Spots of axial row on terga 3-11 more or less Y-shaped, with a small darker anteromedian patch often concealed by preceding tergum; Nepal 13
— Spots of axial row on terga 3-11 (sub)triangular, more or less drop-shaped or parallel-sided 14

13. Caudolateral parts of terga 2-11 dark, without bright spots; median spot on pygidium oblong-oval ..... *H. khumbua*
— Caudolateral parts of terga 2-11 particularly pale; median spot on pygidium anchor-shaped ..... *H. tinjurana*

14. Light axial spots on terga 2-11 (sub)triangular, V-shaped 15
— Light axial spots on terga 2-11 either differently shaped or, if (sub)triangular, then inverted V-shaped 16

15. Antennomere 6 about 1.5 times as long as wide; light axial spots on terga 3-11 triangular; central spot on pygidium not particularly broadened caudad; caudal process of telopod tibia with a tubercle at base; Nepal ..... *H. gorkhalis*
— Antennomere 6 about 1.8 times as long as wide; light axial spots on terga 3-11 only subtriangular, not pointed caudally; central spot on pygidium well broadened caudad; caudal process of telopod tibia devoid of a tubercle at base; Assam ..... *H. modesta*

16. Light axial spots on terga 2-11 more or less triangular (broadened posteriorly); a large trapeziform or subtrapeziform median spot on pygidium 17
— Light axial spots on terga 2-11 usually more round, not triangular; median spot on pygidium sometimes considerably reduced, never (sub)trapeziform 18

17. Antennomere 6 about 1.8 times as long as wide; median spot on pygidium distinctly trapeziform; Darjeeling District ..... *H. electa*
— Antennomere 6 about 1.9-2.0 times as long as wide; median spot on pygidium only subtrapeziform, sometimes strongly reduced; Nepal ..... *H. nagarjunga*

18. Male telopodites 17 and 18 particularly incrassate; telopod syncoxital lobe wide, regularly convex, much broader than base of each syncoxital horn; Nepal ..... *H. crassipes*
— Male telopodites 17 and 18 normal, not particularly incrassate; telopod syncoxital horns unusually thick, at base nearly as wide as a slightly emarginate and small central lobe; Assam ..... *H. venustula*

19. Continental Southeast Asia (S China, Vietnam, Laos, Thailand) 20
— Malay Archipelago, Korea, Japan, Taiwan 36

20. Body totally unpigmented; cavernicoles 21
— At least some terga with a vivid colour pattern; mostly epigean 26

21. Thoracic shield with a remarkable midway sulcus laterally near or at end of schism, demarcating a shallow impression in posterolateral part of shield ... *eusulcata*-group, 22
— Thoracic shield laterally with fine transverse striae only 23

22. Collum with only a single transverse stria; sulcus on thoracic shield starting behind end of schism, abruptly ending dorsad (Fig. 8A: s); Guizhou, China ..... *H. eusulcata* n. sp.
— Collum with two normal transverse striae; sulcus on thoracic shield starting at end of schism, gradually turning into last stria crossing the dorsum; Laos ..... *H. sulcostriata* n. sp.

23. Head pigmented above level of antennal sockets, ocelli blackish; 10-13 striae on thoracic shield, of which only some 3 or 4 cross the dorsum; Laos ..... *H. differens* n. sp.
— Head usually unpigmented, rarely with both dorsocaudal half and antennae pigmented, but even then ocelli unpigmented; no such strong difference in the total number of thoracic striae and those crossing the dorsum 24

24. Head usually unpigmented, rarely with both dorsocaudal half and antennae pigmented, even more seldom with traces of a colour pattern on terga; antennomere 6 about 2.5 times as long as wide; 6 or 7 striae on thoracic shield, of which (1)2-3 cross the dorsum; Yunnan, China ..... *H. reducta* n. sp.
— Head always totally unpigmented 25

25. Male telopodites 17-19 more incrassate (Fig. 9); antennomere 6 about 2 times as long as wide; thoracic shield with 9 striae, of which 5 cross the dorsum; N Vietnam ... *H. speophila* n. sp.

— Male telopodites 17-19 less incrassate; Yunnan, China ..... *H. albicorporis*

26. Thoracic shield and pygidium entirely or mainly light, whitish to brown; spots or markings, when present, darker than background 27
— Thoracic shield and pygidium mainly dark, brown to black; spots or markings, when present, lighter than background 31

27. Collum, thoracic shield and tergum 9 (sometimes also tergum 8) without spots, pattern as in Figure 6A; caves in Yunnan, China ..... *H. maculata* n. sp.
— Pattern different; usually more southerly species 28

28. Thoracic shield and pygidium with distinct spots or markings 29
— Neither thoracic shield nor pygidium with distinct spots 30

29. Thoracic shield yellowish-brown, pygidium whitish-yellow, both with darker spots strongly contrasting with a black background on terga 3-11, each provided with 3 rows of large yellowish spots; larger: 6.5 mm wide; S Vietnam ..... *H. triangulifera*
— Thoracic shield and pygidium creamy brown, each with a pair of darker spots not contrasting with a similarly creamy brown background on terga 3-11; smaller: 5.0 mm wide; Thailand ..... *H. siamensis*

30. Collum, thoracic shield and pygidium only slightly lighter than, and not contrasting with, light brown or brown terga 3-11, which show a more or less wide, regular, lighter axial stripe; larger: 4.5-7.0 mm wide; N Thailand ..... *H. cremea*
— Collum darker, thoracic shield and pygidium orange-yellowish, distinctly contrasting with black background of terga 3-11, latter each provided with a large, median, yellowish spot; smaller: 3.0 mm wide; S Vietnam ..... *H. pulchra*

31. Collum yellow, strongly contrasting with mainly black following terga; N Thailand .... *H. albicollis*
— Collum at least partly with dark pigment, usually marbled 32

32. Thoracic shield broadly pale along anterior edge; telopods particularly strongly incrassate; China ..... *sinensis*-group, 33
— Pattern different; telopods usual; more southerly species 34

33. Pattern on thoracic shield as in Figure 5A; male pygidium very strongly emarginate medially at caudal margin (Fig. 5A); telopods extremely incrassate (Figs 4C, D; 5D); Tibet and Sichuan, China ..... *H. sinensis*
— Pattern on thoracic shield as in Figure 2B, sometimes slightly infuscate middorsally (Fig. 2A); male pygidium less sinuate medially at caudal margin (Fig. 2D); telopods slightly less incrassate (Fig. 2G); Nanjing, China ..... *H. emarginata*

34. Thoracic shield to tergum 4 entirely dark, without lighter spots or markings; larger: 7.0-9.0 mm wide ..... *H. maior*
— Thoracic shield to tergum 4 also with some lighter spots or markings; usually an axial line or a row of spots present from thoracic shield to pygidium, on all terga but pygidium these flanked by a large, marbled, transverse-oval, more or less sublateral spot; usually smaller in size ... 35

35. A light, fairly regular, whitish axial line running from fore margin of thoracic shield to near end of pygidium, where it broadens into an obscure, subtriangular, median spot near (in ♂) a weakly sinuate caudal margin; N Thailand ..... *H. montana*
— Only an axial row of individual, often quite small and obscure spots near caudal margin of thoracic shield to pygidium (Fig. 3A); pygidium regularly rounded caudally; S Vietnam, ?Laos ..... *H. robusta* (?syn. of *H. electa*, ?syn. of *H. maior*)

36. Malay Archipelago ..... *albicornis*-group, 37
— Korea, Japan, Taiwan ..... *stuxbergi*-group, 53

37. Background coloration of terga dark, brown to blackish, with or without a lighter pattern (excluding the usual fulvous edges of terga) 38
— Background coloration of terga lighter, monochrome, whitish to creamy, reddish or light brown, usually without clear-cut dark markings 45

38. Coloration of terga monochrome, brown to blackish, only some terga sometimes with more or less obscure, marbled sublateral spots or other indistinct markings; venter and legs pale 39
— Coloration variegated 44

39. Smaller: 6.0 mm long and 3.0 mm wide; usually uniformly blackish, but sometimes with two rows of indistinct spots on terga 2-5(6, 7); Java, Bali, Sumbawa and Flores .... *H. jacobsoni*
— Larger: > 8 mm long and 4 mm wide; other islands of the Sunda Archipelago 40

40. Larger: 18-19 mm long and 8.0 mm wide; tergal coloration chocolate brown; 9 or 10 striae on thoracic shield, most crossing dorsum; Sarawak, Borneo and ?the Philippines ... . *H. lamprus*
— Smaller: < 14 mm long and < 7.0 mm wide; background coloration gray-brown to blackish; Sumatra or Sulawesi 41

41. Larger: 13 mm long and 6.5 mm wide (♀); collum entirely pallid, rather contrasting with a gray-brown coloration of following terga, most of which slightly marbled on sides; terga 4-11 slightly sinuous middorsally at caudal edge; Sulawesi ..... *H. eremita*
— Smaller: ≤ 12 mm long and 6.0 mm wide; collum with dark pigment; terga 4-11 as usual regularly rounded middorsally 42

42. Smaller: 9.0 mm long and 4.5 mm wide; coloration uniformly dark brown to blackish, terga sometimes marbled sublaterally; antennae dark; Sulawesi ..... *H. kirropeza*
— Larger: ≥ 10 mm long and ≥ 5.0 mm wide; coloration entirely blackish; antennae whitish to yellowish; Sumatra 43

43. Larger: 12 mm long; lighter markings on terga absent; 9 striae on thoracic shield, of which 5 cross the dorsum ..... *H. beccarii*
— Smaller: ≤ 10.5 mm long; lighter markings on terga sometimes present as an obscure axial line or a row of spotlets near caudal margin; 7-9 striae on thoracic shield, most of which cross the dorsum ..... *H. albicornis*

44. Coloration of terga uniformly blackish, only pygidium with a brown central spot; male pygidium only modestly sinuate medially at caudal margin; Sumatra ..... *H. formosa*
— Coloration of terga gray-blackish, only lateral parts of terga 2-11 and a large triangular spot on pygidium light; male pygidium strongly sinuate medially at caudal margin; Sulawesi ..... *H. sarasinorum*

45. Smaller: 6.5 mm long and 3.5 mm wide; terga whitish-yellow; about 16 striae on thoracic shield, of which only 4 cross the dorsum; Sulawesi ..... *H. alticola*
— Larger: ≥ 8.0 mm long; usually light yellowish-brown; striae on thoracic shield less numerous; other islands of the Sunda Archipelago 46

46. Body reddish, only antennomeres 5 and 6 brown; 13 or 14 striae on thoracic shield, of which 8 cross the dorsum; Sarawak, Borneo ..... *H. crebristriata*
— Coloration different; striae on thoracic shield less numerous 47

47. Larger: 22 mm long and 10 mm wide (♀); antennomere 6 about 2.5 times as long as wide; only 5-7 striae on thoracic shield, of which 4 cross the dorsum; Borneo ... *H. paucilineata*
— Smaller: ≤ 17 mm long and ≤ 8.5 mm wide; antennomere 6 at most 2.2 times as long as wide; striae on thoracic shield usually more numerous 48

48. Larger: ≥ 13-14 mm long and ≥ 6.0 mm wide 49
— Smaller: ≤ 9 mm long and ≤ 5.0 mm wide 51

49. Larger: 17 mm long and 8.5 mm wide; ocelli unpigmented; antennae pale; 10 or 11 striae on thoracic shield, of which 6 cross the dorsum; Borneo ..... *H. multilineata*
— Smaller: ≤ 13-14 mm long and 6.0 mm wide; ocelli black, antennae dark; either 4 or 10 striae cross the thoracic shield 50

50. Antennomere 6 about 2.2 times as long as wide; 8-10 striae on thoracic shield, of which 4 cross the dorsum; central syncoxital lobe of telopods slightly emarginate, as usual, lower than adjacent horns; Borneo ..... *H. atricornis*
— Antennomere 6 about 2 times as long as wide; 11 or 12 striae on thoracic shield, of which 10 cross the dorsum; central syncoxital lobe of telopods rounded, higher than adjacent horns; Sumatra ..... *H. diversicolor*

51. Terga 5-7 and anterior half of tergum 8 darker than the creamy background; antennomere 6 about 2.0 times as long as wide ..... *H. zonifera*
— Terga either uniformly creamy throughout or terga 4 and 5 each with a single, darker, large, median spot against a light brown background; antennomere 6 at most 1.7 times as long as wide 52

52. Terga 4 and 5 each with a single, darker, large, median spot against a light brown background; antennomere 6 only 1.5-1.6 times as long as wide; central syncoxital lobe of telopods as high as adjacent horns; Nias ..... *H. modiglianii*
— Terga uniformly creamy throughout, with a single, darker, large, median spot against a light brown background; antennomere 6 about 1.7 times as long as wide; central syncoxital lobe of telopods, as usual, lower than adjacent horns; Borneo ..... *H. minuta*

53. Body entirely yellowish-white; central lobe of telopod syncoxite narrowly subtriangular; troglobite from Kyushu, Japan ..... *H. triangularis*
— Body at least partly pigmented; central lobe of telopod syncoxite, when known, different 54

54. Terga entirely blackish (except for the usual tranclucid margins); caudofemoral process of telopod very large; Shikoku, Japan ..... *H. nigra*
— Usually at least terga 3-10 with a pair of sublateral marbled spots, seldom with darker bands near caudal margin; caudofemoral process of telopod narrower and usually smaller 55

55. Thoracic shield and pygidium entirely blackish (except for the usual tranclucid margins); 8-10 striae on thoracic shield, of which only 1 or 2 cross the dorsum; Saitama Pref., Honshu, Japan ..... *H. lucida*
— At least thoracic shield with a more or less wide pale band along anterior margin; if striae on thoracic shield similarly numerous, then usually more than 2 cross the dorsum ... 56

56. Male pygidium strongly emarginate medially at caudal margin; Kumamoto Pref., Kyushu, Japan ..... *H. sakamotoensis*
— Male pygidium at most slightly sinuate medially at caudal margin; other localities ... 57

57. Pygidium entirely brown to blackish (except for the usual translucid caudal margin); usually < 8 mm long 58

— Pygidium with a lighter part or spot, or with darker markings; usually > 9 mm long 62

58. Larger: 9-11 mm long and 4.5-5.2 mm wide; central lobe of telopod syncoxite strongly convex and rounded, flanked by two setose horns; Korea ..... *H. koreana*
— Smaller: usually 5.0-7.5 (rarely up to 9.0) mm long and about 3.0 mm wide; central lobe of telopod syncoxite or setose horns different; Japan 59

59. Thoracic shield entirely pale yellowish-brown with a darker median spot stretching from caudal margin anteriad until about midway of shield, rounded or acuminate anteriorly; central lobe of telopod syncoxite strongly emarginate; Saitama Pref., Central Honshu, Japan ... . *H. stuxbergi*
— Thoracic shield darker over most or much of its caudal half; central lobe of telopod syncoxite at most only slightly emarginate 60

60. Thoracic shield with 10-12 striae, of which 4 or 5 cross the dorsum; Okinawa, Japan ... . *H. yamashinai*
— Thoracic shield with 9 striae at most, of which 2 or 3 cross the dorsum; Tokyo, Japan 61

61. Smaller: 5.0 (♂) to 6.5 (♀) mm long; thoracic shield broadly light along anterior margin, with 9 striae, of which 3 cross the dorsum; telopod syncoxital horns bare ... *H. japonica*
— Larger: 7.5 mm long (♀); thoracic shield more narrowly light along anterior margin, with 7-8 striae, of which 2 cross the dorsum ..... *H. insularum*

62. Length 11 mm (♀); pygidium with an irregular, transverse, paler field anteriorly; thoracic shield with 6 striae, of which only 2 cross the dorsum; ?Tokushima Pref., ?Shikoku, Japan ..... *H. sulcata*
— Length 9-10 mm; pygidium with a lighter or darker field anteriorly 63

63. Background coloration gray-yellowish; thoracic shield with a transverse, brown, crescent-shaped band covering the middle third; a similar but wider band on pygidium; terga 3-10 with a similar brown band near the translucid caudal margin; Taiwan ..... *H. vittata*
— Coloration blackish; thoracic shield dark over caudal half; pygidium light over anterior third; antennomere 6 about 2.2 times as long as wide; Yamaguchi Pref., S Honshu, Japan ..... *H. uenoi*

NOTE ADDED TO PROOF

While this paper was in press, Mikhaljova & Lim (2006) have described five new species of *Hyleoglomeris* Verhoeff, 1910 from S Korea alone, all placed in the *stuxbergi*-group: *H. unicolorata* Lim, 2006, *H. buana* Lim, 2006 (formerly misidentified in Korea as *H. emarginata* Golovatch, 1981), *H. obscura* Lim, 2006, *H. confragosa* Mikhaljova & Lim, 2006 and *H. alutacea* Mikhaljova & Lim, 2006. These authors have also compiled a key to all six species of this genus currently known from Korea.

MIKHALJOVA E. V. & LIM K.-Y. 2006. — New species of the genus *Hyleoglomeris* from Korea (Diplopoda: Glomerida: Glomeridae). *Zootaxa* 1224: 45-58.

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