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Revision of *Horaeomorphus* SCHAUFUSS of East Malaysia, Singapore, and Sunda Islands (Coleoptera: Scydmaenidae)

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ABSTRACT. Species of *Horaeomorphus* SCHAUFUSS (Coleoptera: Scydmaenidae: Scydmaeninae) occurring in E Malaysia, Singapore and Sunda Islands are revised. *Horaeomorphus eumicroides* SCHAUFUSS (Singapore, Kalimantan), *H. sarawakensis* FRANZ (Kedah, Perak, Pahang including Tioman Is., Penang Is., Sarawak, Brunei), *H. valdepunctatus* FRANZ (Pahang), *H. punctatissimus* FRANZ (Sabah, Sumatra, Siberut Is.), *H. heissi* FRANZ (Sumatra, Pahang), *H. loeblianus* FRANZ (Sabah), and *H. sabahensis* FRANZ (Sabah) are redescribed based on type material. Ten new species are described: *H. ishiiianus* n. sp. (Kalimantan), *H. tibialis* n. sp. (Sabah), *H. deformatus* n. sp. (Kuala Terengganu), *H. antennatus* n. sp. (Pahang), *H. caverniventris* n. sp. (Pahang), *H. pseudosabahensis* n. sp. (Sabah, Sarawak), *H. punctifrons* n. sp. (Pahang), *H. tiomanensis* sp. n. (Tioman Is.), *H. jeraianus* n. sp. (Kedah), and *H. jaechi* n. sp. (Sarawak). Important morphological structures are illustrated (including aedeagi and spermathecae), and a key to the species is given.

Key words: entomology, taxonomy, Coleoptera, Scydmaenidae, Cyrtoscydmini, *Horaeomorphus*, revision, new species, Orient.

INTRODUCTION

The ant-like stone beetle genus *Horaeomorphus* (Scydmaeninae, Cyrtoscydmini) was established by SCHAUFUSS (1889) for a single species from Singapore. Since then, over fifty species have been described, distributed in Malaysia, Thailand, mainland China, Taiwan, Japan, Nepal, Australia, New Caledonia, Tasmania, Madagascar, Mauritius, and the Comoro Islands (LEA 1910; LHOSTE 1956; FRANZ 1970, 1971, 1972, 1973, 1975, 1981, 1984, 1985a, 1985b, 1985c, 1986, 1992a, 1992b; JALOSZYŃSKI 2002, 2003). Very recently, *Horaeomorphus*

was discovered in the Philippines (JAŁOSZYŃSKI 2004) and in Vietnam (JAŁOSZYŃSKI & NOMURA 2004). However, at least part of species from Australia and Lemuria are not conspecific with the type species of the genus, and they belong to the enormously large and unclear *Euconnus* or *Sciacharis* complexes (JAŁOSZYŃSKI, unpublished observations). Seven species have been described from East Malaysia, Singapore and Sunda Islands: *H. eumicroides* SCHAUFUSS, *H. loeblianus* FRANZ, *H. punctatissimus* FRANZ, *H. sabahensis* FRANZ, *H. sarawakensis* FRANZ, *H. valdepunctatus* FRANZ, and *H. heissi* FRANZ (SCHAUFUSS 1889; FRANZ 1984, 1985b, 1985c, 1992a, 1992b). It is noteworthy that the latter species, known from Sumatra, for an unclear reason was described in the paper entitled “Neue und ungenugend bekannte Scydmaeniden (Coleoptera) aus Taiwan, Fukien und Thailand” (sic!) (FRANZ 1985b). Original descriptions are inaccurate and lack details important for species identification; especially illustrations of the aedeagi are misleading, in most cases they do not show details of endophallus, essential for determination. A number of new species were found during the present study, and new records for hitherto known species are reported (including the first record of *Horaeomorphus* from Brunei Darussalam); altogether sixteen species are treated herein, including ten new taxa.

The depositories of the studied material and their abbreviations are as follows: Deutsche Entomologische Institut, Eberswalde, Germany (DEI), Muséum d'Histoire Naturelle, Geneva, Switzerland (MHNG), Naturhistorisches Museum Wien, Austria (NMW), National Science Museum, Tokyo, Japan (NSMT), Slovak National Museum, Bratislava, Slovakia (SNMB), private collection of Peter HLAVÁČ, Košice, Slovakia (PCPH), private collection of Paweł JAŁOSZYŃSKI, Poznań, Poland (PCPJ). The measurements are as follows: the length of the head is from the narrowest place of the occipital constriction to the anterior margin of clypeus; the width maximum including eyes; the length of pronotum was measured along midline; the length of elytra along the suture; the width of elytra combined, maximum; elytral index (EI): length/width; total body length is the sum of individual measurements of the head, pronotum and elytra.

TAXONOMY

Genus *Horaeomorphus* SCHAUFUSS

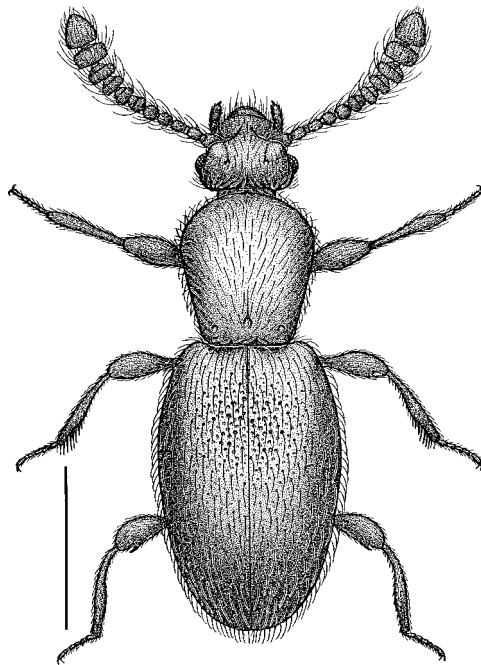
Horaeomorphus SCHAUFUSS, 1889: 21. Type species: *Horaeomorphus eumicroides* SCHAUFUSS, by original designation.

The genus was redefined and characterized in recent papers (JAŁOSZYŃSKI 2002, 2003). Species occurring in the area under study can be identified using the following key:

KEY TO SPECIES OF *HORAEOMORPHUS* FROM EAST MALAYSIA, SINGAPORE, AND SUNDA ISLANDS

1. Elytra broadest posterior to middle *H. eumicroides* SCHAUFUSS
- Elytra broadest in middle or anterior to middle 2.
2. Basal pits on pronotum not connected by groove 3.
- Basal pits on pronotum connected by distinct groove 5.
3. Pronotum in posterior half or less with narrow median longitudinal groove posteriorly connected with median ante-basal pit *H. heissi* FRANZ
- Pronotum without median groove in posterior part 4.
4. Pronotum very long and flat, in posterior third with slightly raised, impunctate line, area between median line and lateral margins slightly impressed *H. deformatus* n. sp.
- Pronotum very broad, oval, without raised median line *H. valdepunctatus* FRANZ
5. Protibiae strongly thickened, much thicker than meso- and metatibiae *H. tibialis* n. sp. (males)
- Protibiae not thicker than meso- and metatibiae or only slightly thicker 6.
6. Internal margin of mesotibiae with very dense and thick setae much longer than half length of tibia *H. ishiianus* n. sp. (males)
- Mesotibiae with setal row along internal margin composed of setae shorter than half length of tibia 7.
7. Median basal pit on pronotum connected anteriorly to distinct longitudinal groove *H. sarawakensis* FRANZ
- Pronotum without median groove 8.
8. Pronotum with distinct, dense punctation at least in central part of disc 9.
- Pronotum with very fine and sparse punctation 14.
9. Central part of pronotal disc with large punctures contrasting with fine punctation of surrounded areas 10.
- Disc equally covered with similar punctures, or punctures gradually and slightly decreasing toward margins 11.
10. Body length >2.7 mm; each large puncture on pronotum with microscopic granule in middle; males with deeply impressed metasternum *H. caverniventris* n. sp.
- Body length about 2.5 mm; punctures on pronotum without granules; metasternum not impressed *H. jaechi* n. sp. (males)
11. Metatibiae in both sexes strongly bent; pronotal disc broadly oval *H. punctatissimus* FRANZ
- Metatibiae nearly straight or only slightly curved; pronotal disc elongate, subtrapezoidal 12.
12. Punctation of frons and vertex distinct, composed of punctures with raised margins; metatrochanter without denticle or expansion on ventral margin *H. punctifrons* FRANZ (males)

- . Punctuation on frons and vertex very fine, barely noticeable; metatrochanters with small denticle or expansion on ventral margin 13.
- 13. Antennomere VI about as long as wide; expansion on ventral margin of metatrochanter larger, very distinct *H. jeraianus* n. sp. (males)
- . Antennomere VI distinctly longer than wide; expansion on ventral margin of metatrochanter smaller, indistinct *H. tiomanensis* n. sp. (males)
- 14. Body length >3 mm; males with modified antennomere IX
..... *H. antennatus* n. sp.
- . Body length <2.7 mm; antennomere IX not modified 15.
- 15. Pronotal disc broadly oval, nearly circular; metatrochanters in males modified *H. valdepunctatus* FRANZ
(individuals with marked transverse groove on pronotum)
- . Pronotal disc distinctly elongate, subtrapezoidal; metatrochanters not modified 16.
- 16. Apical parts of mesotibiae strongly bent *H. loebianus* FRANZ (males)
- . Apical parts of mesotibiae slightly curved 17.
- 17. Antennomere VII about as long as wide; endophallus symmetrical *H. sabahensis* FRANZ (males)
- . Antennomere VII broader than long; endophallus strongly asymmetrical *H. pseudosabahensis* n. sp. (males)



1. *Horaemorphus heissi* FRANZ; habitus of male (scale bar: 0.5 mm)

***Horaeomorphus eumicroides* SCHAUFUSS**

(Figs. 2, 16, 36-38, 45, 75, 119)

Horaeomorphus eumicroides SCHAUFUSS, 1889: 21; FRANZ 1970: 544, fig. 10.

DIAGNOSIS

This species has characteristic very convex, broadly oval elytra widest posterior to middle, and short tibiae, not curved in distal part, similar in both sexes.

REDESCRIPTION

Male. Body (Fig. 2) very convex, slender, reddish-brown, palpi and legs slightly lighter, setation yellowish; body length 1.89-2.03 mm (mean 1.93 mm). Head widest at eyes, length 0.26-0.29 mm (mean 0.27 mm), width 0.40-0.42 mm (mean 0.41 mm); tempora as long as length of eye in dorsal view, regularly rounded; vertex convex, with pair of small, very shallow pits; frons convex; supraantennal tubercles relatively small but well marked, distinctly delimited from frons and vertex. Head with very fine and sparse punctation; setation moderately long, sparse, suberect to erect. Antenna as in Fig. 16, length 0.69-0.77 mm (mean 0.72 mm).

Pronotum elongate, oval, widest near anterior 1/5-1/4, length 0.59-0.64 mm (mean 0.60 mm), maximum width 0.50-0.54 mm (mean 0.52 mm), width at base 0.37-0.39 mm (mean 0.38 mm). Posterior collar very indistinctly constricted from disc, ante-basal row of three very small, indistinct pits located in shallow transverse groove; basal margin of pronotum very slightly emarginate. Punctation very sparse and fine; setation moderately dense and long, suberect.

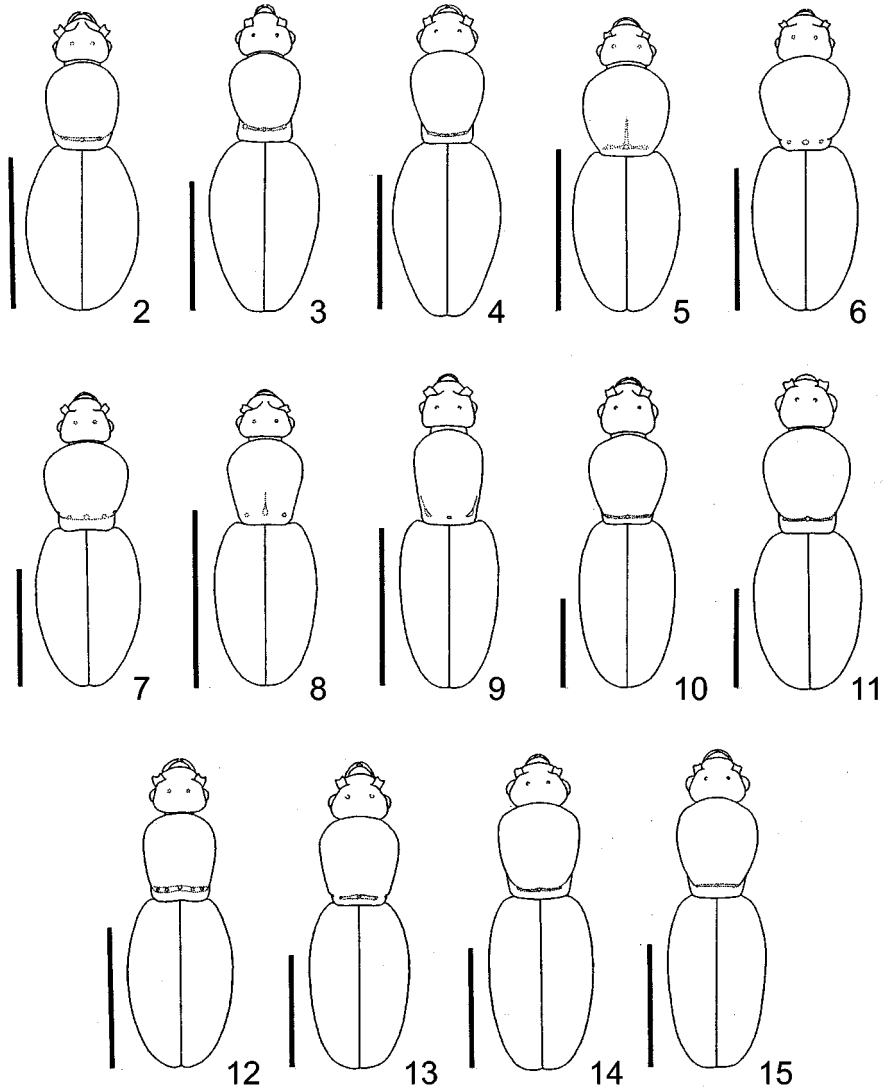
Elytra very convex, not flattened, oval, widest distinctly posterior to middle, length 1.04-1.10 mm (mean 1.06 mm), width 0.74-0.79 mm (mean 0.76 mm), EI 1.39-1.40. Base of elytra very narrow, barely wider than basal margin of pronotum; humeral callus on each elytron distinct and delimited from disc by elongate internal humeral impression. Punctation moderately dense, composed of very small and shallow, but sharply delimited punctures; setation moderately dense, relatively short, suberect; hind wings well developed.

Legs short and robust; hind trochanters (Fig. 45) without modifications, all tibiae (Fig. 75) short, pro- and mesotibiae very slightly recurved, metatibiae minimally curved.

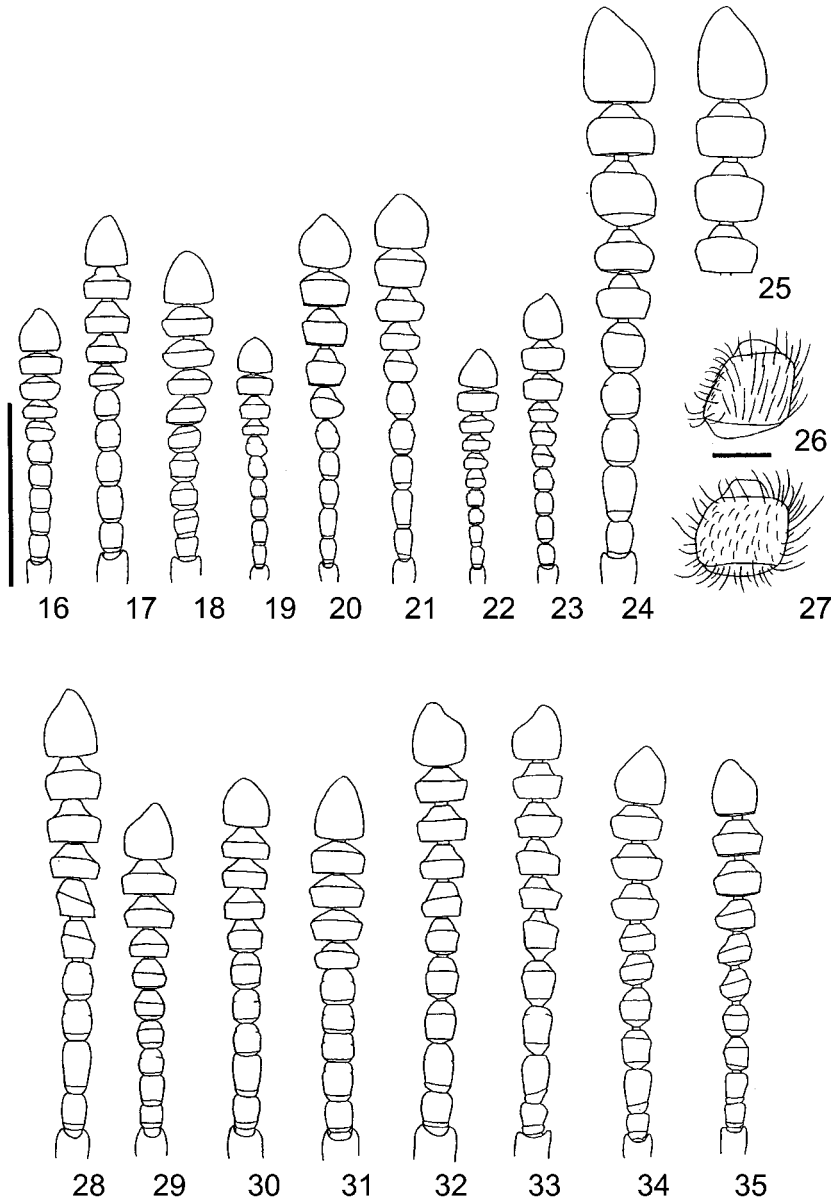
Aedeagus (Figs. 36-38) 0.50 mm in length, broadest near base, with rounded apex; parameres slender, each with three very short apical setae; internal armature of median lobe complicated, with strongly developed central U-shaped part and relatively weakly developed lateral structures.

Female. Externally indistinguishable from male, except for slightly smaller body and lower elytral index. Body length 1.87 mm, length of head 0.30 mm, width of head 0.42 mm, length of antenna 0.74 mm, length of pronotum 0.57 mm, maximum width of pronotum 0.54 mm, width of pronotum at base 0.37 mm, length of elytra 1.00 mm, width of elytra 0.74 mm, EI 1.35.

Spermatheca (Fig. 119) small, 0.09 mm in length, slightly oval, relatively thick-walled, with large accessory gland and very entangled, long ductus spermathecae strongly expanded near distal end.



2-15. Simplified body outline of males in dorsal view. 2 – *Horaeomorphus eumicroides* SCHAUFUSS; 3 – *H. ishianus* n. sp.; 4 – *H. tibialis* n. sp.; 5 – *H. sarawakensis* FRANZ; 6 – *H. valdepunctatus* FRANZ; 7 – *H. punctatissimus* FRANZ; 8 – *H. heissi* FRANZ; 9 – *H. deformatus* n. sp.; 10 – *H. antennatus* n. sp.; 11 – *H. caverniventris* n. sp.; 12 – *H. loeblianus* FRANZ; 13 – *H. punctifrons* n. sp.; 14 – *H. tiomanensis* n. sp.; 15 – *H. jaechi* n. sp. (scale bars: 1 mm)



16-35. Left antenna of males (16-24, 28-35) and female (25) in dorsal view; right antennomere IX of male in dorsal (26) and lateral (27) views. 16 – *Horaeomorphus eumicroides* SCHAUFUSS; 17 – *H. ishiiianus* n. sp.; 18 – *H. tibialis* n. sp.; 19 – *H. sarawakensis* FRANZ; 20 – *H. valdepunctatus* FRANZ; 21 – *H. punctatissimus* FRANZ; 22 – *H. heissi* FRANZ; 23 – *H. deformatus* n. sp.; 24-27 – *H. antennatus* n. sp.; 28 – *H. caverniventris* n. sp.; 29 – *H. loeblianus* FRANZ; 30 – *H. sabahensis* FRANZ; 31 – *H. pseudosabahensis* n. sp.; 32 – *H. punctifrons* n. sp.; 33 – *H. tiomanensis* n. sp.; 34 – *H. jeraianus* n. sp.; 35 – *H. jaechi* n. sp. (scale bars: 16-25, 28-35 – 0.5 mm; 26, 27 – 0.1 mm)

TYPE MATERIAL

Lectotype (female): white printed label „Singap.”, white handwritten square with „17”, white printed label „C. Schaufuss 1930”, red printed label „Syntypus”, white printed label „coll. DEI Eberswalde” (DEI) (des. by FRANZ 1970).

ADDITIONAL MATERIAL STUDIED

1♂, Singapore, Bukit Timah Nat. Res., 3 XI 1966, leg. MURPHY (identified by FRANZ, NMW); 2♂♂, Borneo, E Kalimantan, Lempake, 4 VIII 1993, leg. N. ISHII (NSMT, PCPJ).

DISTRIBUTION

Singapore, E Malaysia (Borneo: Kalimantan).

***Horaeomorphus ishiianus* n. sp.**

(Figs. 3, 17, 39-41, 46, 76)

NAME DERIVATION

This species is dedicated to Mr. Norio ISHII, a Japanese amateur interested in soil invertebrates, who collected the type material of this interesting *Horaeomorphus*.

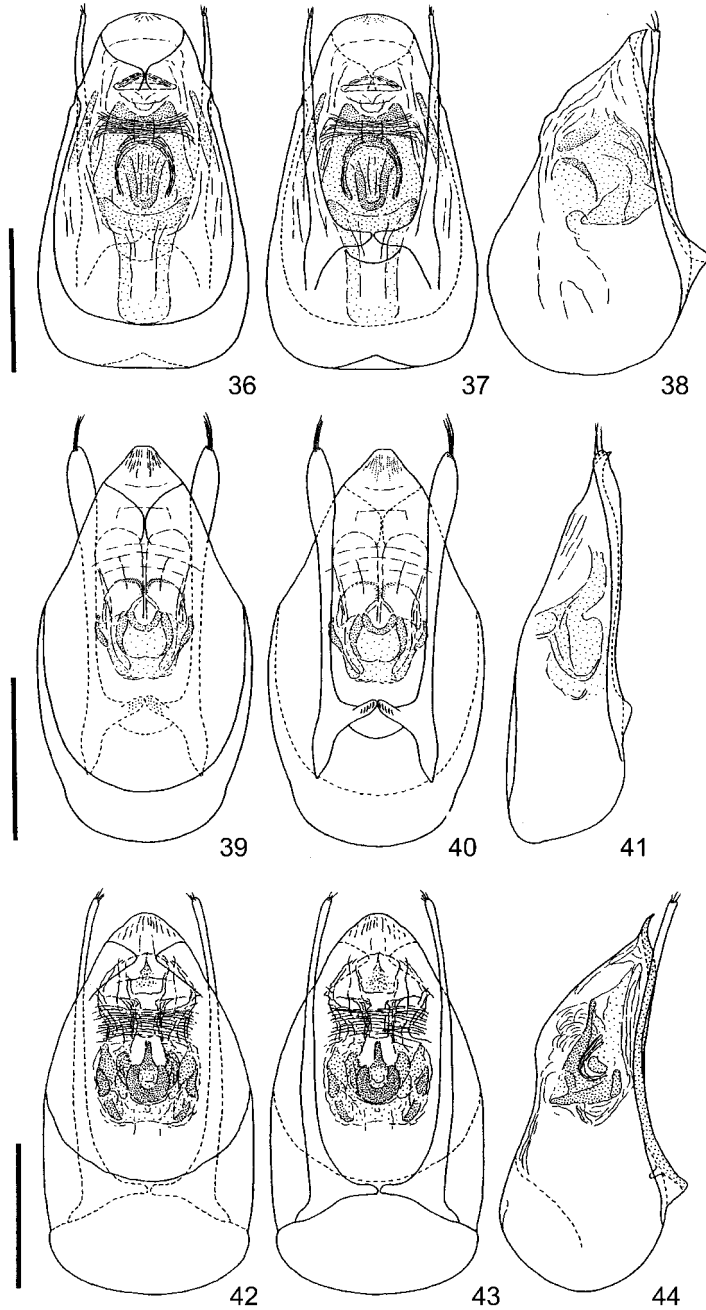
DIAGNOSIS

Males of *H. ishiianus* differ from congeners in small pronotum, distinct and dense punctation of frons, sparse and fine punctation of pronotum and elytra, and, first of all, in mesotibiae, which bear dense brush of setae on internal margin, longer than half length of tibia (female characters unknown).

DESCRIPTION

Male. Body (Fig. 3) moderately large, convex, moderately slender, dark brown, legs and palpi slightly lighter; body length 2.27-2.36 mm (mean 2.31 mm). Head broadest at large eyes, length 0.34-0.36 mm (mean 0.35 mm), width 0.45-0.47 mm (mean 0.46 mm); tempora minimally shorter than length of eye in dorsal view, regularly narrowing toward occipital constriction, not bent and only slightly convex; vertex very short, slightly convex, with pair of small, distinct pits; frons minimally convex; supraantennal tubercles very distinct, well delimited from frons and vertex. Punctation of vertex relatively dense but punctures are shallow, without sharp margins, unevenly distributed, punctures on frons very distinct and dense, supraantennal tubercles impunctate; setation relatively long, especially on sides of vertex, composed of thin, dense, erect setae. Antenna as in Fig. 17, length 0.97-0.99 mm (mean 0.98 mm).

Pronotum elongate, convex, relatively small compared to elytra, broadest between anterior fourth and third, length 0.67-0.69 mm (mean 0.68 mm), maximum width 0.54-0.55 mm (mean 0.545 mm), width at base 0.45 mm; posterior



36-38. *Horaeomorphus eumicroides* SCHAUFUSS; 39-41. *Horaeomorphus ishiiianus* n. sp.; 42-44. *Horaeomorphus tibialis* n. sp. Aedeagus in dorsal (36, 39, 42), ventral (37, 40, 43) and lateral (38, 41, 44) views (scale bar: 0.2 mm)

collar short, well delimited from disc by lateral constriction and by narrow and deep dorsal transverse groove with small, relatively indistinct five pits; basal margin of pronotum nearly straight, minimally concave (barely visible). Punctuation fine and sparse, punctures very shallow and irregular in shape (in holotype slightly more distinct than in paratype); setation relatively long and dense, thicker than that on head, strongly erect.

Elytra elongate, oval, very convex, broadest distinctly anterior to middle, length 1.26-1.31 mm (mean 1.28 mm), width 0.85-0.90 mm (mean 0.87 mm), EI 1.45-1.48. Humeri distinct, sharply delimited by internal humeral impressions; punctuation of elytra fine, moderately sparse; setation long, slightly longer than that on pronotum, dense, strongly erect. Hind wings well developed.

Legs moderately long, rather slender, metatrochanters (Fig. 46) without modifications; protibiae distinctly thickened, mesotibiae curved, with distinct angle in about proximal third of internal margin, from that angle up to slightly more than distal third internal margin bears very long and dense brush of thick setae (Fig. 76, setation not shown).

Aedeagus (Figs. 39-41) 0.49 mm in length, broadest in basal third, with subtrapezoidal apex; parameres broadened toward apices, each with three relatively long apical setae; internal armature relatively simple, with small U-shaped central part surrounded by symmetrical, elongate lateral structures.

Female. Unknown.

TYPE MATERIAL

Holotype (male): white label handwritten in black „E. Kalimantan, Bukit Soehat, 1993 [looking like 1943].viii.6, N. Ishii coll.”, and red printed label „*HORAEOMORPHUS ishiiianus* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (NSMT). Paratype: ♂, same data, but with yellow label with „PARATYPUS” (PCPJ).

DISTRIBUTION

E Malaysia (Borneo: Kalimantan).

REMARKS

The body shape of this species is very similar to that of *H. tibialis* n. sp.; apart from distinctly different aedeagus *H. ishiiianus* has much stronger punctuation of frons, slender protibiae, and longer setae on internal margin of mesotibiae.

***Horaemorphus tibialis* n. sp.**

(Figs. 4, 18, 42-44, 47, 77)

NAME DERIVATION

The name reflects unusually thickened protibiae found in males of the new species.

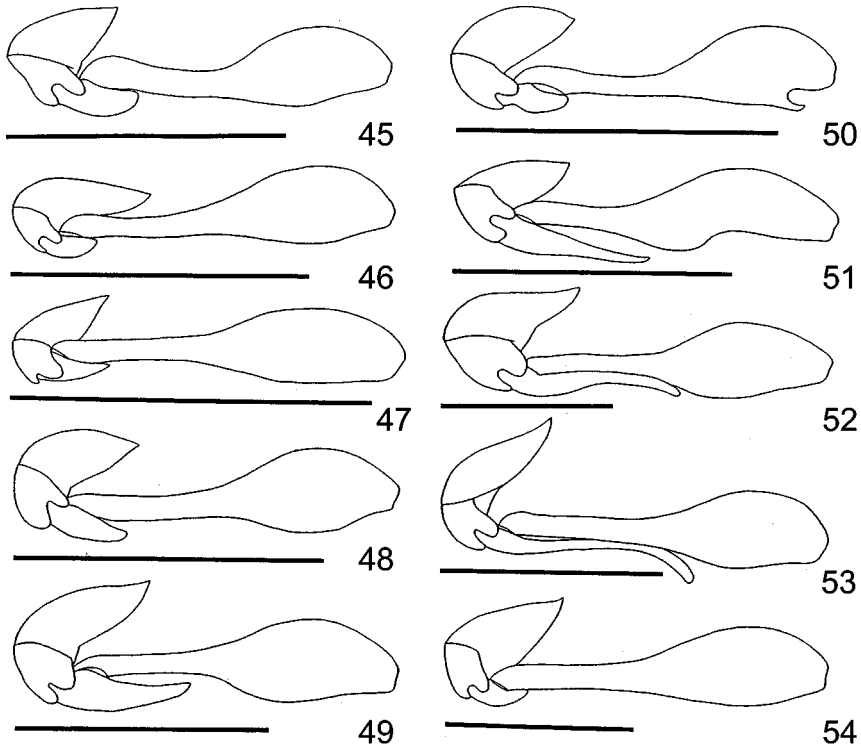
DIAGNOSIS

Horaeomorphus tibialis is externally nearly identical with *H. ishiiianus*, but males have uniquely thickened protibiae, not found in any other species of the genus (female characters unknown).

DESCRIPTION

Male (Fig. 4). This species is extremely similar to *H. ishiiianus* and only differences are described below. Body length 2.27 mm; head with fine and sparse punctuation, length 0.30 mm, width 0.47 mm; antenna as in Fig. 18, length 0.90 mm; pronotum with slightly less distinctly delimited posterior collar, and slightly shorter and less erect setation, length 0.70 mm, maximum width 0.55 mm, width at base 0.42 mm; elytra with widest place slightly closer to middle (but still anterior to middle), covered with slightly shorter and less erect setae, length 1.27 mm, width 0.85 mm, EI 1.50.

Legs moderately long, robust; metatrochanters (Fig. 47) slightly longer than those in *H. ishiiianus*; protibiae very strongly thickened between slender, short



45-54. Right hind coxa, trochanter and femur of male in latero-ventral view. 45 – *Horaeomorphus eumicroides* SCHAUFUSS; 46 – *H. ishiiianus* n. sp.; 47 – *H. tibialis* n. sp.; 48 – *H. sarawakensis* FRANZ; 49 – *H. valdepunctatus* FRANZ; 50 – *H. heissi* FRANZ; 51 – *H. deformatus* n. sp.; 52 – *H. antennatus* n. sp.; 53 – *H. caverniventris* n. sp.; 54 – *H. loeblianus* FRANZ (scale bars: 0.5 mm)

basal and distal parts; mesotibiae recurved with very long, thick and dense setae along distal 2/3 of internal margin, distinctly shorter than those in *H. ishiiianus* (Fig. 77, setation not shown).

Aedeagus (Figs. 42-44) 0.52 mm in length, broadest in basal part, with rounded apex; parameres slender, each with 3-4 very short apical setae; internal armature complicated, with large but short U-shaped central part adjacent distally to dark conical structure and surrounded at each side by well developed, complicated lateral structures.

Female. Unknown.

TYPE MATERIAL

Holotype (male): white printed label „BORNEO: Sabah, 25 km SE Sapulut, Batu Pungul env., FIT, 23. v. 01, Kodada & Čiampor”, and red printed label „*HORAEOMORPHUS tibialis* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (temporarily in PCPH, final depository SNMB).

DISTRIBUTION

E Malaysia (Borneo: Sabah).

Horaeomorphus sarawakensis FRANZ

(Figs. 5, 19, 48, 55-57, 78, 120)

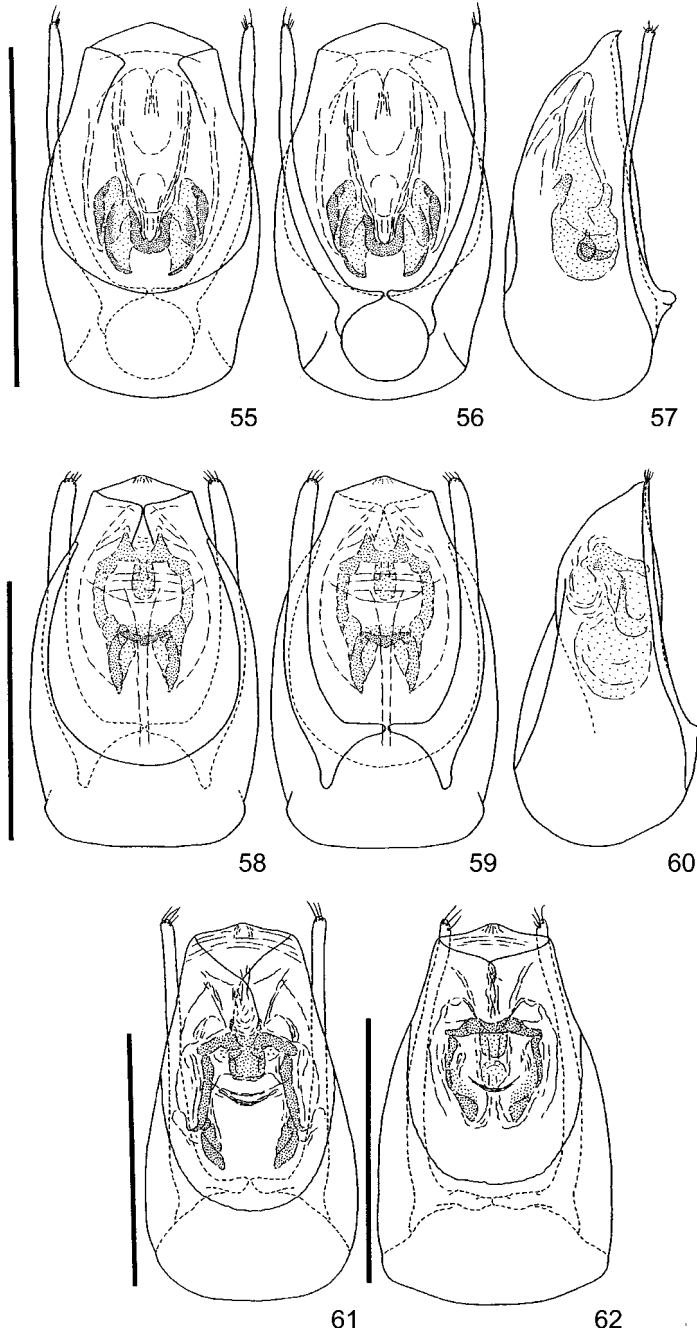
Horaeomorphus sarawakensis FRANZ, 1992a: 73, fig. 6.

DIAGNOSIS

This species can be identified on the basis of relatively small body, median ante-basal pit on pronotum anteriorly connected to shallow longitudinal groove, and strongly bent metatibiae in both sexes.

REDESCRIPTION

Male. Body (Fig. 5) small, slightly flattened, broad, reddish-brown to dark brown, palpi, antennae and legs slightly lighter, setation light brown or yellowish; body length 1.74-1.88 mm (mean 1.82 mm). Head relatively small, widest at eyes, length 0.29 mm, width 0.35-0.37 mm (mean 0.36 mm); tempora slightly shorter than length of eye in dorsal view, weakly rounded up to posterior third, then strongly bent toward occipital constriction; vertex regularly rounded, with pair of small and very shallow pits (in some specimens barely recognizable); frons slightly convex, in posterior half weakly, in anterior half strongly lowering anteriorly; supraantennal tubercles small but well developed, distinctly demarcated from frons and not demarcated or indistinctly demarcated from vertex. Punctuation very fine and sparse; setation relatively sparse, moderately long, suberect to erect. Antenna as in Fig. 19, length 0.57-0.70 mm (mean 0.64 mm).



55-62. *Horaeomorphus sarawakensis* FRANZ; 58-62. *Horaeomorphus valdepunctatus* FRANZ.
 Aedeagus in dorsal (55, 58, 61, 62), ventral (56, 59) and lateral (57, 60) views (scale bar: 0.2 mm)

Pronotum very broad, nearly oval, only slightly longer than wide, widest near anterior third or between middle and anterior third, length 0.54-0.59 mm (mean 0.57 mm), maximum width 0.50-0.57 mm (mean 0.54 mm), width at base 0.29-0.34 mm (mean 0.30 mm). Posterior collar very short, distinctly demarcated from disc by constriction and transverse row of three pits, median pit slightly larger than lateral pair, minimally shifted anteriorly and connected to narrow and very shallow longitudinal groove running up to half of disc (in some specimens less); basal margin of pronotum slightly emarginate or nearly straight. Punctuation variable, always relatively sparse; in holotype composed of fine punctures with raised margins, in most non-type specimens punctures are well delimited but their margins are not raised; setation relatively sparse and moderately long, suberect.

Elytra broad, oval, flattened, widest near anterior third, length 0.91-1.00 mm (mean 0.96 mm), width 0.65-0.72 mm (mean 0.69 mm), EI 1.39-1.40. Humeri projecting anteriorly, so that base of elytra is distinctly arcuate and concave, internal humeral impression very broad, very short and shallow. Punctuation moderately dense, composed of moderately large, sharply marked punctures becoming smaller, shallower and diffused in posterior half of elytra; setation moderately dense and long, suberect to erect. Hind wings well developed.

Legs rather short, especially tibiae; metatrochanters (Fig. 48) only slightly larger than pro- and mesotrochanters; all tibiae (Fig. 78) curved or recurved, metatibiae strongly bent near proximal third.

Aedeagus (Figs. 55-57) very small compared to body length, only 0.22 mm in length, broadest between basal third and middle, with broad, subtriangular apex; parameres relatively slender, each with 3-4 short apical setae; internal armature relatively simple, with large central U-shaped part surrounded at each side by elongate, symmetrical lateral structures.

Female. Externally differs from male in slightly larger body, more slender elytra, more slender femora and minimally less bent metatibiae. Body length 1.79-2.04 mm (mean 1.86 mm), length of head 0.27-0.30 mm (mean 0.29 mm), width of head 0.37-0.42 mm (mean 0.39 mm), length of antenna 0.67-0.80 mm (mean 0.72 mm), length of pronotum 0.55-0.62 mm (mean 0.56 mm), maximum width of pronotum 0.51-0.62 mm (mean 0.54 mm), width of pronotum at base 0.29-0.37 mm (mean 0.33 mm), length of elytra 0.97-1.12 mm (mean 1.01 mm), width of elytra 0.62-0.71 mm (mean 0.69 mm), EI 1.56-1.58.

Spermatheca (Fig. 120) relatively large, 0.07 mm in diameter, nearly spherical, very thin-walled and lightly sclerotized, with small accessory gland and long, not entangled ductus spermathecae.

TYPE MATERIAL

Holotype (male): white printed labels „Damai [or Damsi; hardly legible] Beach, b. Kuching”, „Sarawak, lg. H. Franz”, white handwritten label „Horeomorphus sarawakensis m.” and printed „det. H. Franz”, red handwritten label „Holotypus” (NMW).

ADDITIONAL MATERIAL STUDIED

1f, Brunei Derusalam, Belait, north of Seria, „peat swamp forest”, 11 IV 1993, leg. E. HEISS (NMW, labeled by FRANZ as „*Horaeomorphus* n. sp. (sic!)”); 5 m, 3f f, W Malaysia, Penang Is., Batu Ferringhi, „above Chin Waterfall”, 50 m, 8 XI 1999, leg. CUCCODORO & LÖBL (MHNG); 1 m, Borneo, Sarawak, Lambir NP, leaf litter, ca. 250 m, near Miri, 8 III 2002, leg. S. NOMURA (NSMT); 1 m, Malaysia, Tioman Is. (= Pulau Tioman), road Kampong Tekek – K. Juara, 2°48'N, 104°11'E, 0-100 m, 4-16 III 1998, HAUCK leg. (PCPH); 1m, Malaysia, Penang Is., Aceh Forest Res., 2 km W Telok Bahang, 5-6 VIII 1993, SCHUH leg. (PCPH); 1f, Malaysia, Pahang, Benom Mts., 15 km E Kampong Dong, 3°53'N, 120°0.1'E, 700 m, 1 IV 1998, HAUCK leg. (PCPJ); 1f, Malaysia, Pahang, Tioman Is., Kampung Tekek, 15-26 VII 1992, SCHUH leg. (PCPH); 1 m, 1f, same data but 15-24 VII 1993, (PCPJ); 1 m, 2f f, Malaysia, Perak, Bukit Larut, 5 km S Taiping, 200-500 m, 3 VIII 1993, SCHUH leg. (PCPH, PCPJ); 1 m, 1f, Malaysia, Kedah, Gunung Jerai, 100-500 m, 8 VIII 1993, SCHUH leg. (PCPH).

DISTRIBUTION

W Malaysia (Kedah, Perak, peninsular part of Pahang and Tioman Is.), Penang Is., E Malaysia (Borneo: Sarawak), Brunei Derussalam.

***Horaeomorphus valdepunctatus* FRANZ**

(Figs. 6, 20, 49, 58-62, 79, 121)

Horaeomorphus valdepunctatus FRANZ, 1984: 137; FRANZ 1992a: 73, fig. 5.

DIAGNOSIS

Horaeomorphus valdepunctatus differs from other species with three pits on pronotum in broad and flat body, finely and sparsely punctate head and pronotum, densely punctate elytra, and only slightly curved metatibiae, similar in both sexes.

DESCRIPTION

Male. Body (Fig. 6) moderately large, broad and distinctly flattened, dark brown, legs and palpi slightly lighter, setation yellowish; body length 2.06-2.12 mm (mean 2.09 mm). Head widest at eyes, length 0.31 mm, width 0.45-0.49 mm (mean 0.47 mm); tempora about as long as length of eye in dorsal view or slightly longer, in anterior third nearly parallel, then strongly bent and in posterior third nearly transversal to long axis of head; vertex regularly rounded, with pair of shallow pits; frons slightly convex; supraantennal tubercles well marked, distinctly delimited from frons and only partly delimited from vertex. Punctuation very fine and sparse; setation moderately sparse and long, suberect to erect. Antenna as in Fig. 20, length 0.95-0.97 mm (mean 0.96 mm).

Pronotum very broad and distinctly flattened, broadest near anterior 1/4-1/3, length 0.65-0.67 mm (mean 0.66 mm), maximum width 0.61-0.62 mm (mean

0.615 mm), width at base 0.32-0.37 mm (mean 0.34 mm). Posterior collar very short, well delimited from disc by constriction and row of three shallow pits connected by shallow and sometimes indistinct groove. Punctuation very fine and sparse; setation moderately dense and long, suberect.

Elytra broad, flattened and distinctly impressed in middle at about anterior third; length 1.10-1.14 mm (mean 1.12 mm), width 0.75 mm, EI 1.46-1.52. Humeri distinct, projecting anteriorly so that base of elytra is concave; internal humeral impression on each elytron shallow and broad, relatively short. Punctuation of area between anterior fourth and posterior third of elytra dense and composed of relatively large, slightly diffused punctures, which become smaller, shallower and sparser toward base and apex; setation similar to that on pronotum, moderately long and dense, suberect. Hind wings well developed.

Legs moderately long, rather robust; metatrochanters (Fig. 49) projecting distally, broad and subtriangular; pro- and mesotibiae slightly recurved, widest near middle, metatibiae slightly curved, widest between middle and distal third (Fig. 79).

Aedeagus (Figs. 58-62) slightly variable in shape, including arrangement of internal structures, which can be easily dislocated during preparation; Figs. 61-62 show extreme cases of gradual variability found. Usually median lobe broadest between base and basal third, parameres rather slender, each with 3-4 short apical setae; U-shaped, darkly sclerotized central part is small and surrounded at each side by several elongate lateral structures running toward base of median lobe, usually parts close to base are connected by dark, transverse structure, which sometimes may be located more distally (i.e. closer toward apex of median lobe) as in Fig. 61, or lateral structures are more compact, shorter, with reduced proximal (i.e. closer to base of median lobe) parts, as in Fig. 62.

Female. Externally very similar to male, but with slightly shorter metatrochanters (however, still slightly enlarged compared to pro- and mesotrochanters). Body length 2.01-2.23 mm (mean 2.10 mm), length of head 0.31-0.32 mm (mean 0.32 mm), width of head 0.45-0.50 mm (mean 0.47 mm), length of antenna 0.87-0.95 mm (mean 0.91 mm), length of pronotum 0.60-0.74 mm (mean 0.65 mm), maximum width of pronotum 0.60-0.69 mm (mean 0.63 mm), width of pronotum at base 0.37-0.41 mm (mean 0.39 mm), length of elytra 1.10-1.17 mm (mean 1.13 mm), width of elytra 0.72-0.80 mm (mean 0.76 mm), EI 1.46-1.53.

Spermatheca (Fig. 121) moderately large, 0.07 mm in length, nearly spherical, thin-walled and lightly sclerotized, with relatively large accessory gland and thin, not entangled ductus spermathecae.

TYPE MATERIAL

Holotype (female): white printed label „Malaysia, Cameron Hlds, 25-30. III. 1984, Rougemount”, white handwritten label „*Horaeomorphus valdepunctatus* m.” with printed „det. H. Franz”, red handwritten label „Holotypus” (NMW).

ADDITIONAL MATERIAL STUDIED

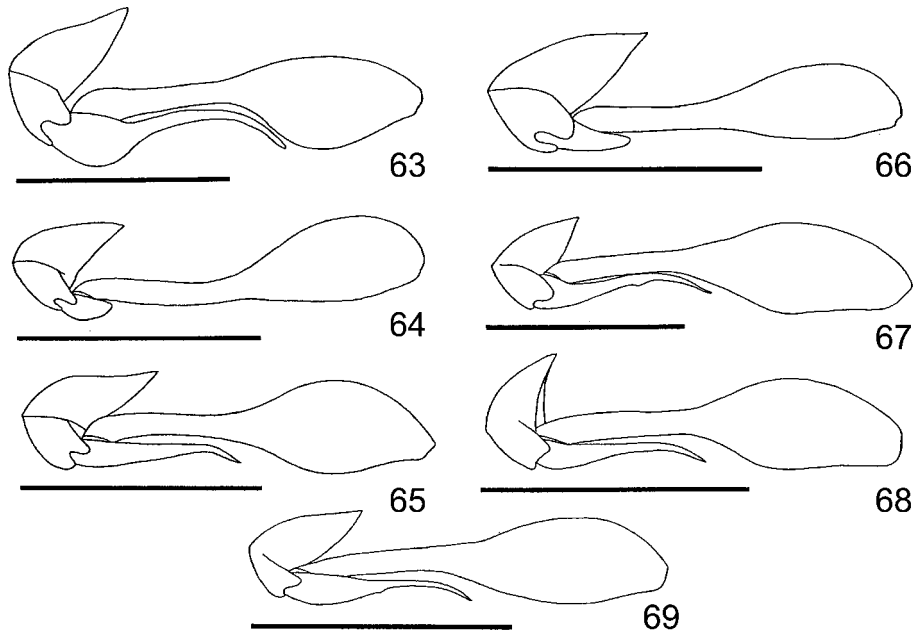
1♂, Malaysia, Pahang, Genting Highlands, 17-19 XI 1987, S. TAITI & L. BARTOLOZZI leg. (NMW); 1♂, probably the same data (rewritten in ink by FRANZ, barely legible) (NMW); 1♂, Pahang, Cameron Highlands, Mt. Jasar, 1 III 2003, S. NAGASHIMA leg. (PCPJ); 1♂, Malaysia, Pahang, Cameron Highlands, Tanah Rata env., 1500 m, 27-31 VII 1993, SCHUH leg. (PCPH); 1♂, Malaysia, Pahang, Cameron Highlands, Gunung Jasar, 1500-1700 m, 30 VII 1993, SCHUH leg. (PCPH); 3mm, 1♀, Malaysia, Pahang, Cameron Highlands, Gunung Beremban, 1600-1800 m, 29 VII 1993, SCHUH leg. (PCPH, PCPJ).

DISTRIBUTION

W Malaysia (Pahang).

REMARKS

The holotype female lacks spermatheca, most likely lost during previous preparations; the description of this structure is based on a non-type specimen.



63-69. Right hind coxa, trochanter and femur of male in latero-ventral view. 63 – *Horaeomorphus punctatissimus* FRANZ; 64 – *H. pseudosabahensis* n. sp.; 65 – *H. punctifrons* n. sp.; 66 – *H. sabahensis* FRANZ; 67 – *H. jeraianus* n. sp.; 68 – *H. jaechi* n. sp.; 69 – *H. tiomanensis* n. sp.; (scale bars: 0.5 mm)

***Horaeomorphus punctatissimus* FRANZ**

(Figs. 7, 21, 63, , 70-74, 80-82, 123)

Horaeomorphus punctatissimus FRANZ, 1992a: 891.

DIAGNOSIS

Horaeomorphus punctatissimus is easily recognizable on the basis of broad pronotum and elytra, slender antennae and strongly modified hind legs in males: metatrochanters are very long, thin and curved, metafemora with ventral margin more convex than dorsal margin, metatibiae very strongly bent in proximal third; in female metatibiae are also strongly bent.

REDESCRIPTION

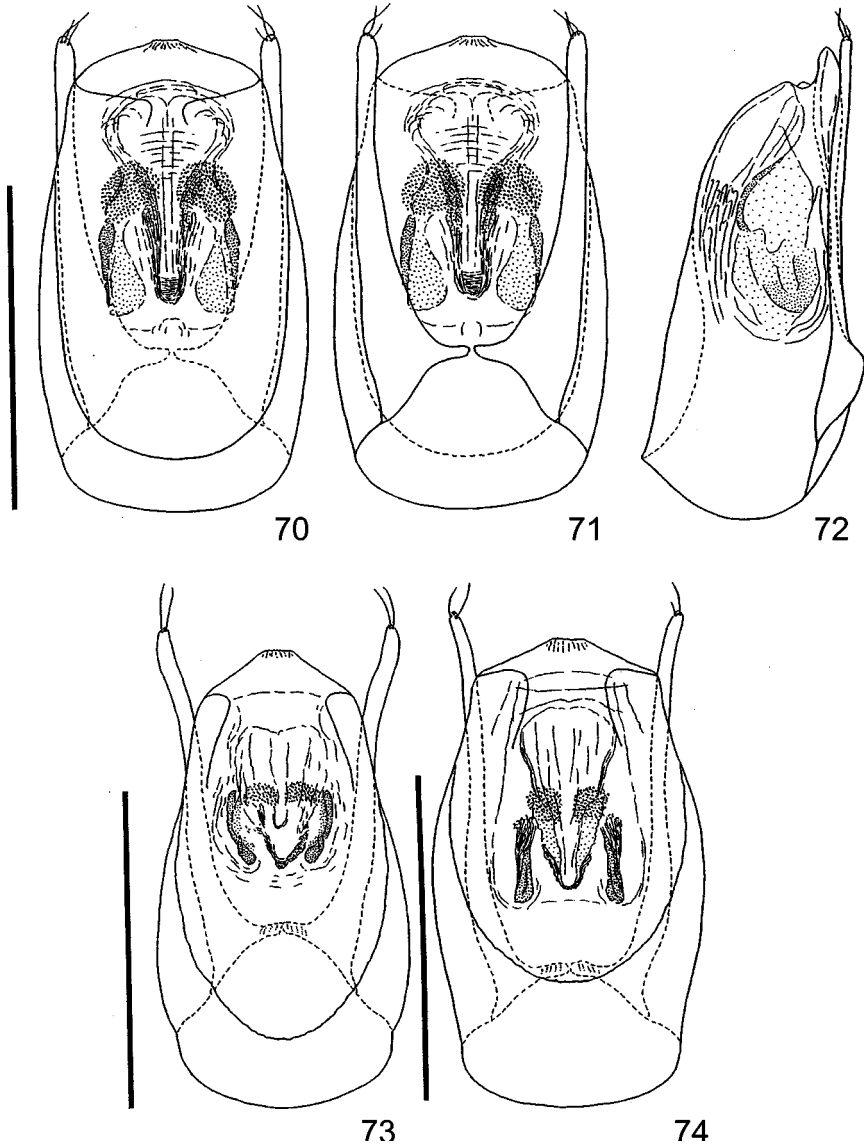
Male. Body (Fig. 7) elongate but very broad and strongly constricted between pronotum and elytra, slightly flattened, moderately dark brown, palpi and legs slightly lighter, setation light brown; body length 2.41-2.61 mm (mean 2.52 mm). Head relatively small, widest at eyes, length 0.37-0.41 mm (mean 0.39 mm), width 0.50-0.51 mm (mean 0.50 mm); tempora about as long as eye in dorsal view, strongly rounded just anterior to middle, so that short part adjacent to occipital constriction is transversal to short part adjacent to eye; vertex weakly convex, with pair of small, shallow pits; posterior part of frons flat, anterior part slightly convex; supraantennal tubercles small, distinct, well delimited from frons, less distinctly from vertex. Punctuation sparse and fine; setation moderately sparse and long, suberect to erect. Antenna as in Fig. 21, length 1.00-1.07 mm (mean 1.03 mm).

Pronotum very broad, widest near anterior fourth, length 0.77-0.79 mm (mean 0.78 mm), maximum width 0.74-0.75 mm (mean 0.74 mm), width at base 0.47-0.50 mm (mean 0.48 mm). Posterior collar very short, sharply delimited from disc by constriction (hardly visible due to dense setation on sides of pronotum); ante-basal row of foveae located in shallow groove, in holotype composed of three distinct, small circular pits and between them with two additional, less distinct and smaller pits, in some paratypes and non-type specimens only three distinct foveae are visible; basal margin of pronotum broadly, distinctly emarginate. Punctuation relatively dense, composed of small, shallow and slightly diffused punctures; setation moderately dense and long, suberect.

Elytra oval, broad, widest distinctly anterior to middle, length 1.27-1.41 mm (mean 1.35 mm), width 0.90-0.99 mm (mean 0.94 mm), EI 1.41-1.42. Humerus on each elytron well marked, prominent, projecting anteriorly so that base of elytra is slightly concave; internal humeral impression very short and broad, moderately deep. Punctuation similar to that on pronotum but composed of slightly smaller punctures; setation moderately dense and long, suberect. Hind wings well developed.

Legs moderately long, rather robust; metatrochanters (Fig. 63) strongly modified, with expanded base and very slender, curved distal projection; metafemora

(Fig. 63) unique in having ventral margin of clavate part more convex than dorsal margin; tibiae (Fig. 80) very characteristic, pro- and mesotibiae only slightly curved, whereas metatibiae strongly bent; in specimens from Borneo as in Fig. 80, in single specimen from Madobak (Indonesia: Siberut Is.) metatibiae bent much



70-74. *Horaeomorphus punctatissimus* FRANZ. Aedeagus of specimens from Borneo (70-72), Siberut Is. (73) and Sumatra (74) in dorsal (70, 73, 74), ventral (71) and lateral (72) views (scale bar: 0.2 mm)

stronger, with slightly curved basal part (Fig. 81), and in another single specimen from Bukit Barisan National Park (Indonesia: N Sumatra) metatibiae are very strongly bent, with distinctly curved basal part (Fig. 82) (see remarks).

Aedeagus (Figs. 70-74) relatively small, 0.29 mm in length, broadest in basal half, with broad, subtrapezoidal apex; parameres relatively broad, each with 2-3 moderately long apical setae; internal armature relatively simple, with very long central U-shaped part surrounded at each side by elongate lateral structures and two lateral groups of small, lightly sclerotized denticles. In males from Indonesia mentioned above (showing different shape of metatibiae than males from Borneo) internal armature is composed of smaller structures, especially the U-shaped part is smaller, slightly asymmetrical, also lateral parts seem to be reduced, and parameres are slightly longer and more slender (Figs. 73, 74) (see remarks).

Female. On average smaller than male, with non-modified hind trochanters, more slender hind femora, but only minimally less bent hind tibiae. Body length 2.37-2.45 mm (mean 2.41 mm), length of head 0.37-0.40 mm (mean 0.39 mm), width of head 0.49-0.50 mm (mean 0.50 mm), length of antenna 0.89-0.92 mm (mean 0.90 mm), length of pronotum 0.75-0.76 mm (mean 0.75 mm), maximum width of pronotum 0.67-0.72 mm (mean 0.70 mm), width of pronotum at base 0.45-0.50 mm (mean 0.47 mm), length of elytra 1.25-1.29 mm (mean 1.27 mm), width of elytra 0.89-0.92 mm (mean 0.90 mm), EI 1.40.

Spermatheca (Fig. 123) large, 0.14 mm in length, oval, very thin-walled and lightly sclerotized, with large projection surrounding insertion of large accessory gland; ductus spermathecae not entangled, only with two loops adjacent to its insertion.

TYPE MATERIAL

Holotype (male): white printed label „BORNEO, SABAH Mt., Kinabalu Nat. Pk., HQ [i.e. headquarters] at Liwangu Rv., 1500 m, 30. IV. 1987, A. Smetana”, small white printed label with male symbol, white handwritten label „*Horaemorphus punctatissimus* m.” and printed „det. H. Franz”, red handwritten label „Holotypus” (MHNG). Paratypes: 1♀, same data as holotype, except for yellow identification label „*Horaemorphus punctatissimus* m., det. H. Franz, PARATYPUS” (MHNG); 1♀, white printed label „SABAH, Crocker Ra. [i.e. Range], 1550-1650 m, 16. V. 1987, Burckhardt-Löbl”, and standard yellow identification label (MHNG); 1♀, white printed labels „BORNEO: Sabah, Mt. Kinabalu NP., Headquarters (sic!), 1558 m, IX / 2-4 / 88” and „large fallen tree *Lithocarpus* sp., D.E. Bright collector”, and yellow identification label (MHNG).

ADDITIONAL MATERIAL STUDIED

1♂, Malaysia, Sabah, Crocker Mts., Gunung Emas, 16-27 IV 1993, leg. I. JENIS (NMW); 1♀, same data except for 50 km E Kota Kinabalu, ŠTRBA & JENIS leg. (NMW); 1♂, Sabah, Crocker Range, Mawar waterfall env., 17 VI 1996, vegetation debris and forest litter around fallen trees, collector unknown (NMW);

5♂♂, 4♀♀, Malaysia, Sabah, Gunung Emas Resort, 52 km road Kota Kinabalu – Tambunan, 23-29 V 1998, P. HLAVÁČ leg. (PCPH, PCPJ); 1♂, Indonesia, Siberut Is. (= Pulau Siberut), Madobak, W Muarasiberut, 19 II 1991, SCHÖDL leg. (NMW); 1♂, Indonesia, Sumatra, Lampung prov., Bukit Barisan Selatan NP, 5 km SW Liwa, 600 m, 7-17 II 2000, HAUCK leg. (PCPJ).

DISTRIBUTION

E Malaysia (Borneo: Sabah), Indonesia (Sumatra and Siberut Is.).

REMARKS

All males from Borneo have similarly bent metatibiae; two individuals from Indonesia (one from N Sumatra, the other one from Siberut Is. at SW coast of Sumatra) were found to have more strongly bent metatibiae. Moreover, they also show some differences in the aedeagi, especially in the internal armature, as described above. Other characters do not differ from those in the specimens coming from Borneo. They may represent subspecies of *H. punctatissimus* or, taking into account an allopatric distribution, even separate species. More abundant material is necessary to clarify the status of populations from Sumatra; herein they are treated as geographic variations of *H. punctatissimus*.

***Horaeomorphus heissi* FRANZ**

(Figs. 1, 8, 22, 50, 83, 86-89, 124)

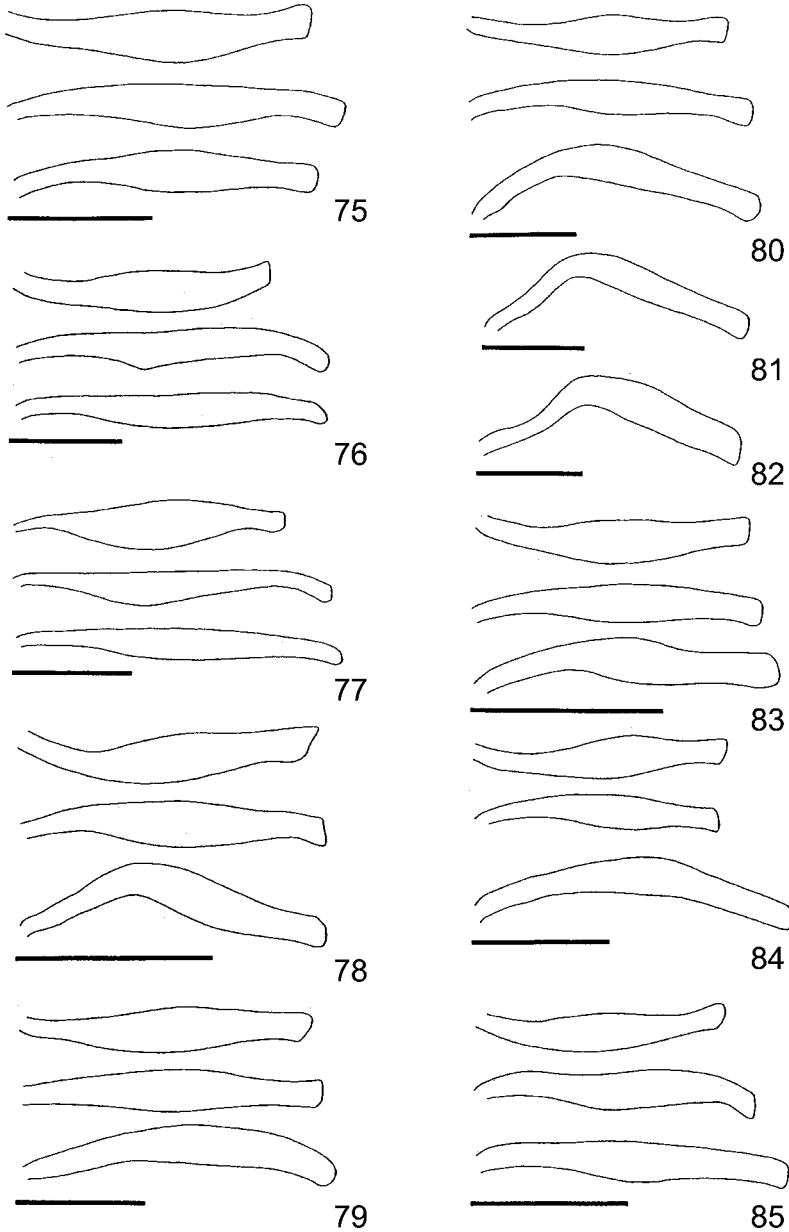
Horaeomorphus heissi FRANZ, 1985b: 124, fig. 36.

DIAGNOSIS

Males of *H. heissi* are unique in having modified metafemora, which bear small, hook-like ventral projection; females can be identified on the basis of very small, flat and slender body, and median ante-basal pit on pronotum anteriorly connected to narrow longitudinal groove.

REDESCRIPTION

Male. Body (Figs. 1, 8) small, flat and slender, light to moderately dark brown, palpi and legs slightly lighter, setation light brown or yellowish; body length 1.59-1.68 (mean 1.62 mm). Head widest at eyes, length 0.25-0.26 mm (mean 0.26 mm), width 0.32-0.34 mm (mean 0.32 mm); tempora minimally shorter than length of eye in dorsal view, rounded and bent at obtuse angle near middle; vertex convex, with pair of small, shallow pits; frons convex; supraantennal tubercles small, well marked but relatively indistinctly delimited from frons and vertex. Head with very sparse and fine punctation and moderately dense and long, suberect to erect setation. Antenna as in Fig. 22, length 0.60-0.65 mm (mean 0.63 mm).



75-80; 83-85. Right protibia (top), mesotibia (middle) and metatibia (bottom) of male in latero-dorsal view. 81-82. Right metatibia of male in latero-dorsal view. 75 - *Horaeomorphus eumicroides* SCHAUFUSS; 76 - *H. ishiiianus* n. sp.; 77 - *H. tibialis* n. sp.; 78 - *H. sarawakensis* FRANZ; 79 - *H. valdepunctatus* FRANZ; 80 - *H. punctatissimus* FRANZ, Borneo; 81 - *H. punctatissimus* FRANZ, Siberut Is.; 82 - *H. punctatissimus* FRANZ, Sumatra; 83 - *H. heissi* FRANZ; 84 - *H. deformatus* n. sp.; 85 - *H. antennatus* n. sp. (scale bars: 0.2 mm)

Pronotum elongate, flat, widest near anterior fourth, length 0.47-0.50 mm (mean 0.48 mm), maximum width 0.41-0.42 mm (mean 0.42 mm), width at base 0.29-0.30 mm (mean 0.29 mm). Posterior collar very short and indistinctly constricted from disc; ante-basal row of pits not impressed, composed of slightly elongate median fovea and pair of lateral, circular foveae located closer to slightly emarginate basal margin of pronotum than median pit, which is anteriorly connected to narrow longitudinal groove. Punctuation fine and sparse; setation moderately dense and long, suberect.

Elytra oval, flat, widest between anterior third and middle, strongly narrowing posteriorly, length 0.87-0.92 mm (mean 0.88 mm), width 0.57-0.62 mm (mean 0.58 mm), EI 1.48-1.52. Each elytron with moderately distinct humerus, indistinctly demarcated by broad but very short and shallow internal humeral impression; elytra slightly impressed around suture in anterior third, apices rounded together. Punctuation very distinct, in anterior half dense, composed of moderately large punctures with diffused margins, distances between punctures are smaller than or equal to puncture diameter, in posterior half of elytra punctures gradually reducing in diameter and becoming shallower, less distinct; setation moderately dense and long, composed of setae slightly thicker than those on pronotum, suberect.

Legs moderately long, rather slender; metafemora (Fig. 50) with small and curved subapical tooth on ventral margin; metatrochanters (Fig. 50) non-modified; tibiae (Fig. 83) only slightly curved or recurved.

Aedeagus (Figs. 86-89) very small, only 0.20 mm in length, broadest usually near basal third, with broadly subtrapezoidal or subtriangular apex; parameres slender, each with three moderately long apical setae; internal armature relatively simple, with large central U-shaped part surrounded at each side by elongate, symmetrical lateral structures. In males from Benom Mts. (W Malaysia: Pahang) median lobe has slightly different shape, parameres are shorter and internal armature shows some differences compared to males from Sumatra (see remarks).

Female. Externally differs from male in on average slightly larger body, and in non-modified metafemora. Body length 1.54-1.84 mm (mean 1.76 mm), length of head 0.25-0.30 mm (mean 0.29 mm), width of head 0.31-0.40 mm (mean 0.37 mm), length of antenna 0.64-0.80 mm (mean 0.74 mm), length of pronotum 0.47-0.52 mm (mean 0.51 mm), maximum width of pronotum 0.41-0.47 mm (mean 0.46 mm), width of pronotum at base 0.29-0.32 mm (mean 0.31 mm), length of elytra 0.82-1.02 mm (mean 0.96 mm), width of elytra 0.54-0.67 mm (mean 0.64 mm), EI 1.52.

Spermatheca (Fig. 124) moderately large, 0.10 mm in length, oval, thick-walled, moderately darkly sclerotized, with small accessory gland and ductus spermathecae with several rather loose loops.

TYPE MATERIAL

Holotype (male): white printed label „N-Sumatra, Brastagi, 20. 7. 80., [illegible symbol similar to Greek letter ζ], Heiss”, white handwritten label „Horiaeo-

morphus heissi m.” and printed „det. H. Franz”, red handwritten label „Holotypus” (NMW). Paratypes: 4♂♂, 1♀, same data as in holotype, except for yellow handwritten labels „Horaemorphus heissi m.” and printed „PARATYPUS”, 2 males misidentified by FRANZ as females (sic!) (NMW).

ADDITIONAL MATERIAL STUDIED

4♂♂, Malaysia, Pahang, Benom Mts., 15 km E Kampong Dong, 3°53'N, 120°01'E, 700 m, 1 IV 1998, HAUCK leg. (PCPH, PCPJ); 3♂♂, 5♀, Indonesia, Sumatra, Bengkulu prov., near Curup, Bukit Kaba Mt., 1000-1500 m, 1-3 II 2001, HAUCK leg. (PCPH, PCPJ).

DISTRIBUTION

Indonesia (Sumatra), W Malaysia (Pahang).

REMARKS

Males from Benom Mts. (W Malaysia, Pahang) differ slightly from those from Sumatra in the shape of the median lobe of the aedeagus, length of parameres and also slightly in structures of the endophallus. However, specimens from those two localities are externally indistinguishable. Little but stable differences may have subspecific status, but specimens from other localities must be studied to verify this thesis. In the present paper these forms are treated as geographic variations. The only female paratype has damaged abdomen, and spermatheca has been lost during previous preparations; description and illustration of this structure was based on non-type material from Sumatra.

Horaemorphus deformatus n. sp.

(Figs. 9, 23, 51, 84, 90-92)

NAME DERIVATION

The name reflects the untypical, strongly asymmetrical aedeagus of the new species.

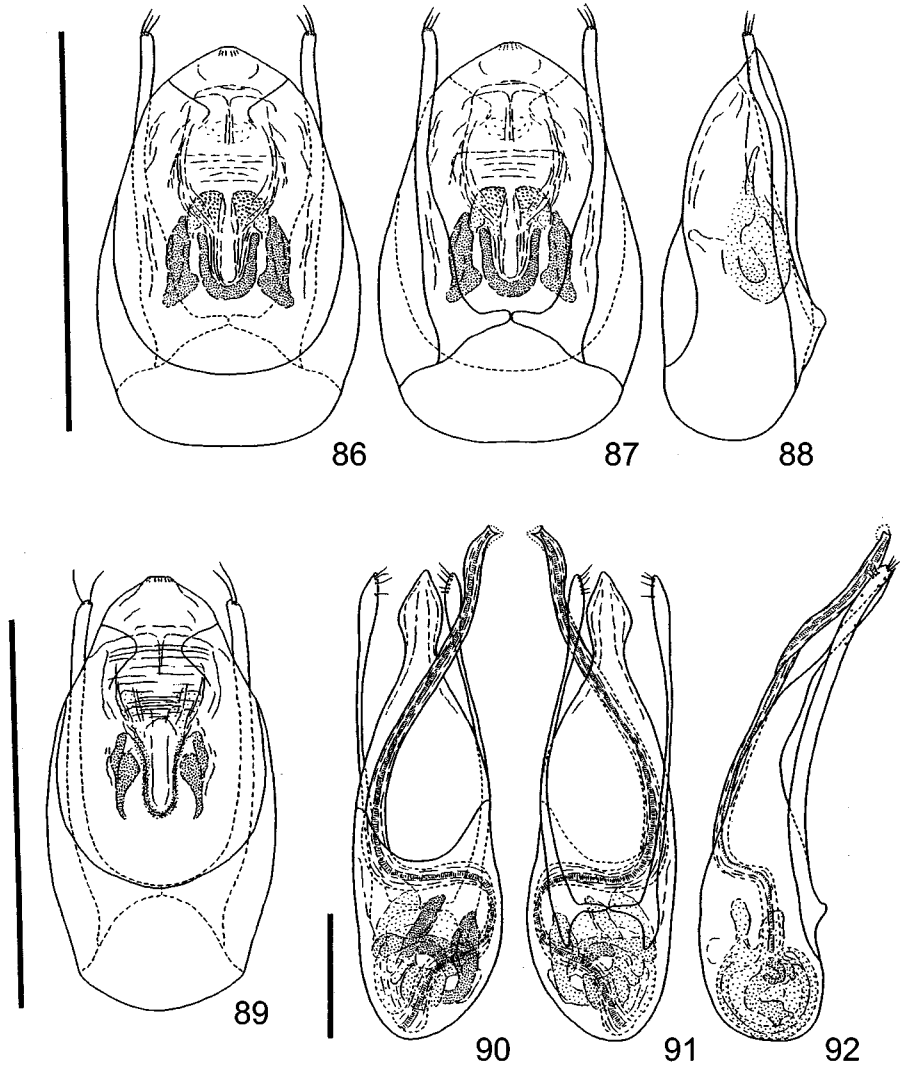
DIAGNOSIS

Horaemorphus deformatus can be easily distinguished from all other congeners on the basis of very flat, small body, and unique shape of metafemora in males, which has clavate part with ventral margin expanded near base and then emarginate.

DESCRIPTION

Male. Body (Fig. 9) small, slender and distinctly flattened, moderately dark brown, with slightly lighter appendices; setation light brown; body length 1.87-2.02 mm (mean 1.94 mm). Head broadest at eyes, length 0.29-0.31 mm (mean

0.30 mm), width 0.36-0.44 mm (mean 0.40 mm); tempora relatively short, about as long as eye in dorsal view, strongly bent near occipital constriction; vertex convex, minimally flattened in middle in posterior third, with pair of small and shallow pits; frons slightly convex; labrum with subtriangular median emargination; supraantennal tubercles small but well visible, distinctly delimited from frons and indistinctly from vertex. Punctuation of head very fine and sparse; setation sparse and short, suberect. Antenna as in Fig. 23, length 0.75-0.77 mm (mean 0.76 mm).



86-89. *Horaeomorphus heissi* FRANZ; specimens from Sumatra (86-88) and Benom Mts. (89). 90-92. *Horaeomorphus deformatus* n. sp. Aedeagus in dorsal (86, 89, 90), ventral (87, 91) and lateral (88, 92) views (scale bar: 0.2 mm)

Pronotum very long and weakly convex, broadest between anterior margin and anterior fourth, length 0.57-0.62 mm (mean 0.59 mm), maximum width 0.42-0.50 mm (mean 0.46 mm), width at base 0.31-0.35 mm (mean 0.33 mm); posterior collar very indistinct; base with three shallow pits, median pit small and oval, lateral pits larger, subtriangular and expanded anteriorly; pronotum in posterior third slightly impressed at each side between median line and lateral margin; basal margin slightly arcuate or nearly straight. Punctuation distinct, composed of small and rather sparse punctures, slightly raised median line in posterior third impunctate; setation short and sparse, suberect.

Elytra elongate, oval, relatively flat, broadest between middle and anterior third, with indistinct adsutural flattening near anterior third; length 1.01-1.09 mm (mean 1.05 mm), width 0.60-0.65 mm (mean 0.62 mm), EI 1.68. Humeri distinctly projecting anteriorly, so that base of elytra concave; internal humeral impressions shallow, short and broad. Punctuation denser than that on pronotum and composed of larger punctures, distances between punctures on average shorter than puncture diameters; setation moderately sparse, relatively short, suberect. Hind wings well developed.

Legs moderately long, slender; metatrochanters (Fig. 51) strongly modified, elongate; metafemora (Fig. 51) with ventral margin of clavate part expanded near base and then emarginate; pro- and mesotibiae only slightly curved, metatibiae relatively strongly curved (Fig. 84).

Aedeagus (Figs. 90-92) very large compared to body length, 0.75 mm in length, with uniquely asymmetrical median lobe broadest in basal half, with separated, rhomboidal apex; parameres nearly symmetrical, very slender with broadened apical parts, each with 4-5 subapical and apical setae; internal armature strongly asymmetrical, very complicated, with very long and broad duct protruding from dorsal opening.

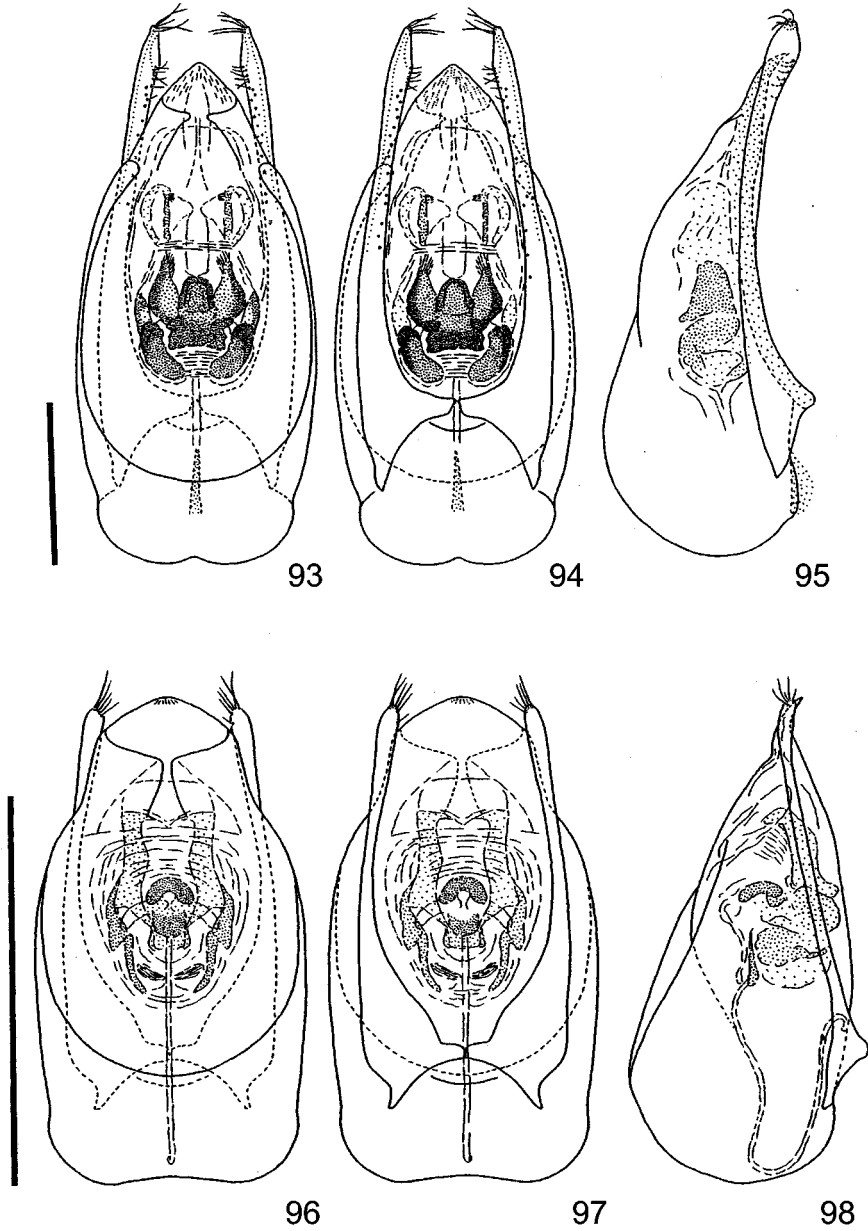
Female. Unknown.

TYPE MATERIAL

Holotype (male): white printed label „Nr. Kenyir Lake, Kuala Terengganu St., W. MALAYSIA, 1-III-2002, Tomoyuki TSURU leg.”, and standard printed red label „*HORAEOMORPHUS deformatus* m., det P. Jałoszyński, 2005, HOLOTYPUS” (NSMT). The holotype lacks left middle leg; left tibia and tarsus as well as right hind leg detached and mounted separately on the same cardboard with the specimen. Paratype: ♂, white printed label „[West Malaysia], Kuala Terengganu State, Near Kenyir Lake (under bark), 1-III-2002, Takashi SHIMADA leg.” (PCPJ).

DISTRIBUTION

W Malaysia (Kuala Terengganu).



93-95. *Horaeomorphus antennatus* n. sp.; 96-98. *Horaeomorphus caverniventris* n. sp. Aedeagus in dorsal (93, 96), ventral (94-97) and lateral (95-98) views (scale bar: 0.2 mm)

REMARKS

Horaemorphus deformatus shows some characters suggesting its separate position within the genus: unusually flat body; emarginate labrum; indistinct posterior collar of the pronotum, and strongly asymmetrical median lobe of the aedeagus along with the endophallus (identical in both two known males). The asymmetrical endophallus was also found in *H. pseudosabahensis*, but that species has symmetrical median lobe and shows no morphological peculiarities, being very similar to other congeners.

***Horaemorphus antennatus* n. sp.**

(Figs. 10, 24-27, 52, 85, 93-95, 125)

NAME DERIVATION

The specific epithet reflects an unusual modification of antennae of the male.

DIAGNOSIS

This is the only species of the genus with sexual dimorphism visible in the shape of antennae: antennomere IX in the male is distinctly asymmetrical and has peculiar setation. Females have non-modified antennae, and can be identified on the basis of large body and relatively fine punctation of pronotal disc.

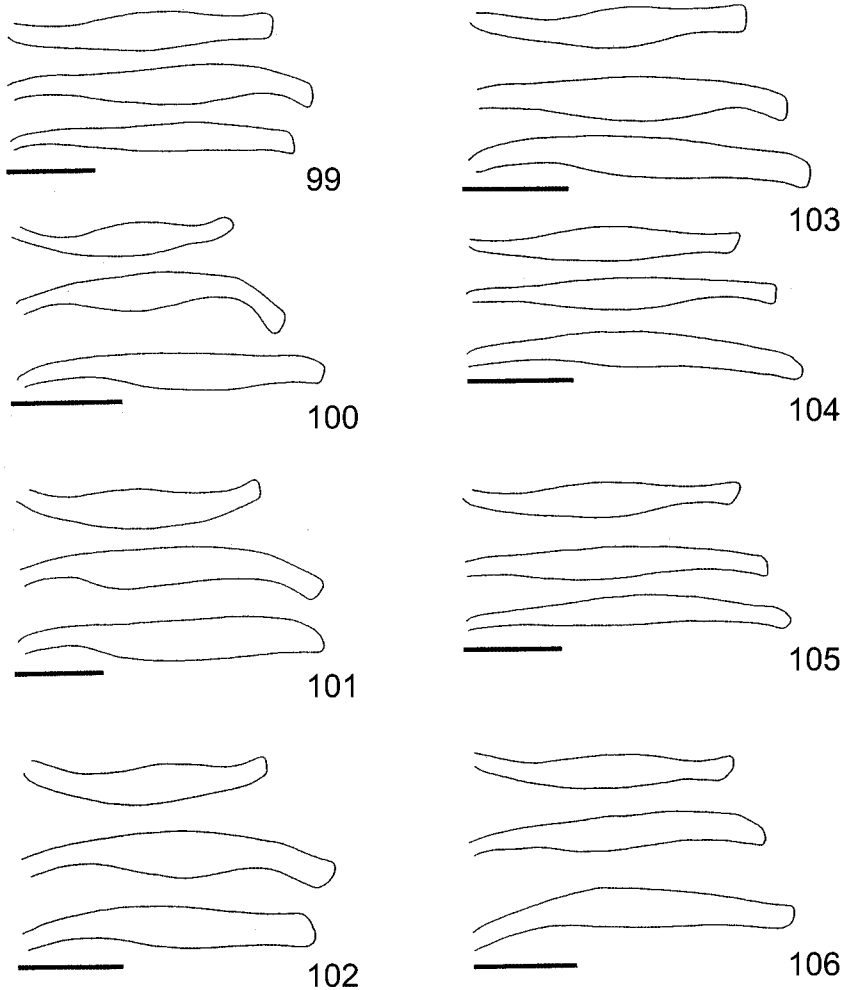
DESCRIPTION

Male. Body (Fig. 10) large, elongate, slender, only slightly flattened, dark brown, in mature specimens pronotum and adsutural flattening on elytra minimally darker, palpi lighter, legs not lighter or clavate parts of femora slightly lighter, setation brownish; body length 3.19-3.41 mm (mean 3.31 mm). Head broadest at large eyes, length 0.50-0.54 mm (mean 0.53 mm), width 0.65-0.69 mm (mean 0.67 mm); tempora as long as length of eye in dorsal view or slightly longer, rounded, not bent; vertex short, with indistinct postero-median subtriangular impression, convex sides and pair of small pits; frons slightly convex; supraantennal tubercles small but very distinct, well delimited from frons and vertex. Punctation on vertex sparse and fine, on frons slightly more distinct, supraantennal tubercles impunctate; setation sparse, very thin, moderately long, erect. Antenna as in Fig. 24, length 1.47-1.54 mm (mean 1.50 mm), antennomere IX (Figs. 26, 27) strongly asymmetrical, with flattened surface covered with short, nearly recumbent setae and surrounded by long, curved setae.

Pronotum elongate, moderately convex, broadest near anterior fourth, length 0.99-1.05 mm (mean 1.00 mm), maximum width 0.76-0.89 mm (mean 0.81 mm), width at base 0.54-0.56 mm (mean 0.55 mm); posterior collar very short, without constriction separating it from disc, with narrow and deep dorsal groove containing three indistinct, small pits, in part of studied specimens traces of two additional pits located between usually indistinct median pit and usually larger

lateral ones are visible; basal margin of pronotum nearly straight or barely noticeably concave. Punctuation variable but always composed of small and shallow punctures with indistinct margins, distances between punctures on average longer than puncture diameter; setation relatively short, moderately dense, suberect to erect.

Elytra elongate, oval, broadest anterior to middle, length 1.70-1.82 mm (mean 1.78 mm), width 1.05-1.10 mm (mean 1.07 mm), EI 1.62-1.65. Humeri only slightly raised and indistinctly delimited by very short, shallow and broad internal



99-106. Right protibia (top), mesotibia (middle) and metatibia (bottom) of male in latero-dorsal view. 99 - *H. caverniventris* n. sp.; 100 - *H. loeblianus* FRANZ; 101 - *H. sabahensis* FRANZ; 102 - *H. pseudosabahensis* n. sp.; 103 - *H. punctifrons* n. sp.; 104 - *H. tiomanensis* n. sp.; 105 - *H. jeranianus* n. sp.; 106 - *H. jaechi* n. sp. (scale bars: 0.2 mm)

humeral impressions; elytra in anterior third with indistinct adsutural flattening; punctation moderately dense, composed of fine punctures distinctly denser on adsutural flattening; setation relatively short, moderately dense, suberect. Hind wings well developed.

Legs long, with robust femora and slender tibiae and tarsi; hind trochanters (Fig. 52) strongly modified, rod-like, very long; protibiae slightly curved, mesotibiae recurved with bent apex and metatibiae very slightly recurved (Fig. 85).

Aedeagus (Figs. 93-95) large, 0.62 mm in length, broadest between basal third and middle, with separated, subtriangular apex; parameres relatively broad, with expanded apices (well visible in lateral view), each with five long apical setae and group of several shorter subapical setae along internal margin; internal armature complicated, darkly sclerotized, with large, bell-shaped central part surrounded at each side by large, elongate lateral structures.

Female. Distinctly smaller than male, with more slender elytra, non-modified antennomere IX (Fig. 25) and simple metatrochanters. Body length 3.09-3.20 mm (mean 3.15 mm), length of head 0.49-0.50 mm (mean 0.50 mm), width of head 0.62-0.64 mm (mean 0.63 mm), length of antenna 1.30-1.35 mm (mean 1.33 mm), length of pronotum 0.91-0.95 mm (mean 0.93 mm), maximum width of pronotum 0.75 mm, width of pronotum at base 0.54-0.55 mm (mean 0.54 mm), length of elytra 1.69-1.75 mm (mean 1.72 mm), width of elytra 1.00-1.04 mm (mean 1.01 mm), EI 1.68-1.69.

Spermatheca (Fig. 125) moderately large, 0.12 mm in length, elongate, oval, relatively thin-walled, with flat and expanded wall near insertion of moderately small accessory gland; ductus spermathecae with several tight loops close to insertion, in further part simple, not entangled.

TYPE MATERIAL

Holotype (male): white printed label „MALAYSIA, PAHANG State, Cameron Highlands, Tanah Rata, 25 XII 2003, leg. P. Jałoszyński” and red printed label „*HORAEOMORPHUS antennatus* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (MHNG). Paratypes: 4♂♂, 3♀♀, same data (PCPJ); 1♂, white printed label „[Malaysia] Pahang St. Cameron Highlands, Mt. Jasar, 1.Mar.2003, Seidai NAGASHIMA” (PCPJ); 1♂, white printed label „MALAYSIA: Pahang, Cameron Highlands, Umg. Tanah Rata, 1500 m, 27.-31.7.1993. lg. Schuh” (PCPH); 1♀, white printed label „Mt. Berembun (1450 m), (Fogging St. 6), Cameron Hl., [Pahang: MALAYSIA], 13.vii.2003., S. Nomura leg.” (NSMT). All paratypes bear standard yellow identification label with „PARATYPUS”.

DISTRIBUTION

W Malaysia (Pahang).

REMARKS

All individuals collected by the author were found under loose bark of a dead, standing deciduous tree, 0.5-1.5 m above ground, with company of ants of the genus *Pheidole*. General body shape of this species is similar to that of *H. caverniventris*, occurring within the same area (see remarks at the latter taxon). *Horaeomorphus antennatus* is the first known *Horaeomorphus* with modified antenna in the male, such modifications are not known in allied genera of the Cyrtoscydmini (i.e. *Syndicus* SCHAUFUSS, *Loeblites* FRANZ or *Anhoraeomorphus* FRANZ).

***Horaeomorphus caverniventris* n. sp.**

(Figs. 11, 28, 53, 99, 96-98, 122)

NAME DERIVATION

The name reflects unique feature of males of the new species, which have deeply impressed metasternum.

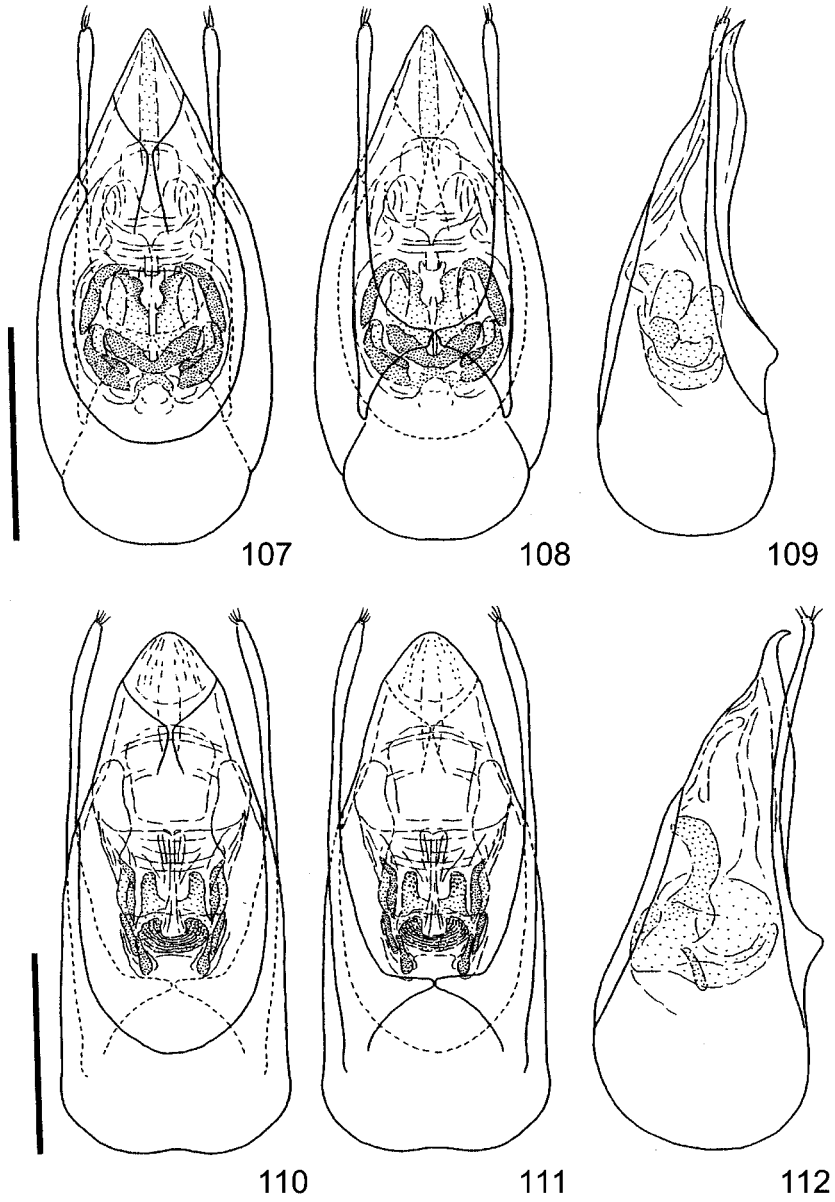
DIAGNOSIS

This species is unique in having large body, central part of pronotum covered with large and dense punctures, each with microscopic granule in the middle, and deep, oval impression of metasternum in males.

DESCRIPTION

Male. Body (Fig. 11) large, relatively convex, moderately light to very dark brown, legs and palpi slightly lighter, setation brownish; body length 2.99-3.34 mm (mean 3.20 mm). Head broadest at large eyes, length 0.47-0.52 mm (mean 0.50 mm), width 0.65-0.67 mm (mean 0.66 mm); tempora as long as eye in dorsal view or slightly longer, rounded but not bent; vertex short, convex, with pair of relatively small pits; frons convex, moderately steeply lowering anteriorly; supraantennal tubercles small but well marked, very distinctly delimited from frons and indistinctly from vertex. Punctuation variable but always rather fine and sparse; setation relatively sparse, composed of thin, moderately long, suberect to erect setae. Antenna as in Fig. 28, length 1.15-1.30 mm (mean 1.22 mm).

Pronotum oval, elongate, moderately convex, broadest between anterior third and middle, length 1.00-1.17 mm (mean 1.09 mm), maximum width 0.82-1.00 mm (mean 0.90 mm), width at base 0.55-0.62 mm (mean 0.58 mm); posterior collar very narrow, indistinctly constricted from disc; three ante-basal pits connected by narrow and deep groove, in some specimens traces of two additional pits are visible between larger median pit and smaller lateral ones; basal margin of pronotum barely noticeably concave. Punctuation in central part of disc composed of large and densely distributed punctures, each puncture has very small median granule, distances between punctures variable, on average shorter than puncture diameter, punctate area is divided by narrow median longitudinal impunctate line,



107-109. *Horaeomorphus loeblianus* FRANZ; 110-112. *Horaeomorphus sabahensis* FRANZ. Aedeagus in dorsal (107, 110), ventral (108, 111) and lateral (109, 112) views (scale bar: 0.2 mm)

remaining parts of disc covered with very fine and sparse punctures; setation moderately dense and rather short, suberect to erect.

Elytra elongate, oval, broadest just anterior to middle, length 1.52-1.65 mm (mean 1.61 mm), width 1.07-1.17 mm (mean 1.12 mm), EI 1.41-1.42. Humeri distinct, delimited by very short, shallow and broad internal humeral impressions; small adsutural area in anterior third very weakly flattened. Punctuation distinct, moderately dense, composed of tiny punctures; setation relatively short, moderately dense, suberect. Hind wings well developed.

Legs long and slender, with strongly modified metatrochanters (Fig. 53) forming long and curved, rod-like processes; tibiae (Fig. 99) nearly straight, only mesotibiae with distinctly curved apices.

Metasternum with very large, oval and deep impression with raised margins in posterior part.

Aedeagus (Figs. 96-98) relatively small, 0.25 mm in length, broadest near middle, with broadly subtriangular apex; parameres moderately slender, with slightly broadened apices, each with 4-6 long apical setae; internal armature complicated, with small bell- or U-shaped central part surrounded at each side by slender, elongate lateral structures, and with very distinct, long median duct connecting central complex with opening at base of parameres (well visible in lateral view).

Female. Externally distinguishable from male by non-modified hind trochanters and metasternum, slightly smaller body and more slender elytra. Body length 2.79-3.12 mm (mean 2.95 mm), length of head 0.42-0.50 mm (mean 0.47 mm), width of head 0.60-0.65 mm (mean 0.63 mm), length of antenna 1.10-1.20 mm (mean 1.13 mm), length of pronotum 0.90-0.97 mm (mean 0.94 mm), maximum width of pronotum 0.75-0.85 mm (mean 0.81 mm), width of pronotum at base 0.52-0.57 mm (mean 0.55 mm), length of elytra 1.47-1.65 mm (mean 1.54 mm), width of elytra 0.97-1.07 mm (mean 1.05 mm), EI 1.51-1.54.

Spermatheca (Fig. 122) large and darkly sclerotized, 0.15 mm in length, elongate, oval, with one side broader, moderately large accessory gland and strongly entangled, long ductus spermathecae distinctly expanded near insertion to spermatheca.

TYPE MATERIAL

Holotype (male): white printed label „Fraser’s Hill (decayed wood: 1.100 m), Pahang, [MALAYSIA], 6. iii. 2003. S. Nomura lg.” and red printed label „*HORAEOMORPHUS caverniventris* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (NSMT). Paratypes: 1♀, same data; 1♂, same data, except for „5. iii. 2003” and „under bark”; 1♂♂, white printed label „FIT: Mt. Mentigi (1.400 m), Cameron Highland, [Pahang: MALAYSIA], 12-16. vii. 2003, S. Nomura”; 1♂, 3♀♀, white printed label „MALAYSIA: Pahang, Cameron Highlands, Gn. [i.e. Gunung] Beremban, 1600-1800 m, 29. VII. 1993, leg. Schuh” (paratypes in NSMT, PCPH, PCPJ). All paratypes with standard yellow printed „PARATYPUS” label.

DISTRIBUTION

W Malaysia (Pahang).

REMARKS

This new species is similar to *H. antennatus*; males can be easily distinguished on the basis of unique (not known in other members of the genus) impression on the metasternum and non-modified antennae; both sexes have distinctly larger and denser pronotal punctation than that in *H. antennatus*. The shape of spermatheca found in this species may have interesting implications for phylogenetic analyses of a complex composed of *Syndicus* MOTSCHULSKY, *Loeblites* FRANZ, *Horaeomorphus* SCHAUFUSS, *Anhoraeomorphus* FRANZ, and probably also *Homoconnus* SHARP. Approximate insertions of ductus spermathecae and accessory gland, flattening of „base” of spermatheca, and central position of accessory gland in the base may represent a primitive intermediary form between typical globular spermatheca known in other species of *Horaeomorphus*, and strongly modified spermatheca typical for *Syndicus* (s. str.) (illustrated in JAŁOSZYŃSKI 2004). In turn, spermatheca in *Syndicus* (*Semisyndicus*) (illustrated in JAŁOSZYŃSKI 2004) and in *Loeblites* (JAŁOSZYŃSKI, in print) may be an intermediary form between *Horaeomorphus caverniventris*-type and *Syndicus* s. str.

***Horaeomorphus loeblianus* FRANZ**

(Figs. 12, 29, 54, 100, 107-109)

Horaeomorphus loeblianus FRANZ, 1992a: 889, fig. 34.

DIAGNOSIS

This species is characteristic in having unmodified metatrochanters and very strongly bent distal parts of mesotibiae in males; female diagnostic characters are unknown.

REDESCRIPTION

Male. Body (Fig. 12) relatively convex and slender, 2.11-2.16 mm in length (mean 2.13 mm), reddish-brown, palpi and antennae slightly lighter, setation light brown. Head widest at eyes, length 0.34-0.35 mm (mean 0.345 mm), width 0.42 mm; tempora minimally shorter than length of eye in dorsal view, regularly rounded; vertex convex, with pair of small and shallow pits; frons slightly convex; supraantennal tubercles prominent, distinctly delimited from vertex and frons. Vertex and frons with moderately dense, small punctures with raised margins, supraantennal tubercles impunctate and glossy; setation moderately dense and long, suberect. Antenna as in Fig. 29, length 0.92-0.95 mm (mean 0.935 mm).

Pronotum oval, elongate, widest near anterior fifth, length 0.62-0.64 mm (mean 0.63 mm), maximum width 0.51 mm, width at base 0.41-0.42 mm (mean 0.415 mm). Posterior collar demarcated from disc by slightly impressed row of

five small, circular pits; basal margin of pronotum distinctly emarginate in middle. Punctuation moderately sparse but very fine, punctures barely noticeable; setation dense, composed of long, suberect to erect setae.

Elytra oval, very convex, widest in middle or minimally anterior to middle, length 1.15-1.17 mm (mean 1.16 mm), width 0.80-0.81 mm (mean 0.805 mm), EI 1.44. Humeral callus on each elytron distinct, sharply delimited from short and shallow internal humeral impression; very narrow adsutural area in anterior third raised. Punctuation fine and sparse, barely visible; setation relatively long and dense, suberect to erect. Hind wings well developed.

Legs moderately long, robust; metatrochanters (Fig. 54) without modifications; protibiae slightly recurved, mesotibiae with very strongly bent distal fifth, metatibiae nearly straight (Fig. 100).

Aedeagus (Figs. 107-109) large, 0.49 mm in length, broadest in basal half, with elongate, triangular apex; parameres slender, with slightly expanded apices, each with three very short apical setae; internal armature darkly sclerotized and complicated, with central U-shaped part very broad and short, surrounded at each side by elongate, complicated lateral structures.

Female. Unidentifiable (see remarks).

TYPE MATERIAL

Holotype (male): white printed label "Sabah Mt., Kinab. N. P. Por. H. S. [i.e. Kinabalu National Park, Poring Hot Springs], area Eastern Ridge, Tr. 790 m, 17.8.88, A. Smetana (B119)", white handwritten label "*Horaeomorphus loeblianus* m." and printed "det. H. Franz", red handwritten label "Holotypus" (MHNG). Paratype: ♂, white printed label "SABAH: Poring Hot Springs, Langanan river, 850 m, 14. V. 1987, Burckhardt-Löbl", yellow handwritten label "*Horaeomorphus loeblianus* m." and printed "PARATYPUS" (NMW).

DISTRIBUTION

E Malaysia (Borneo: Sabah).

REMARKS

Horaeomorphus loeblianus FRANZ, *H. sabahensis* FRANZ and *H. pseudosabahensis* n. sp. are extremely similar and it seems plausible that H. FRANZ, who described two of those species, in fact was not aware of subtle external differences, and had no basis to correctly identify females, which were found to be undistinguishable during the present study. Males of *H. loeblianus* externally differ from *H. sabahensis* FRANZ and *H. pseudosabahensis* in very strongly bent distal part of mesotibia; the only known two males of *H. loeblianus* are also slightly smaller than the two other species. In NMW and MHNG are deposited additional specimens studied (at least in part) by FRANZ, but they do not bear identification labels. These specimens have been attributed to *H. loeblianus* or *H. sabahensis* only by being placed together with corresponding, labeled types. It

is unclear whether this material was used by FRANZ for describing the species, and hence only specimens bearing yellow labels are herein regarded as paratypes. There are three more females belonging to this species complex, which also bear standard yellow „PARATYPUS” labels: one collected in Sabah, Poring Hot Springs, 500 m, 11. V. 1987, BURCKHARDT & LÖBL leg., labeled as paratype of *H. sabahiensis* (sic!), the remaining two labeled as paratypes of *H. loeblianus* (Sabah: Poring Hot Springs, Langanan Fall, 900-950 m, 12. V. 1987, BURCKHARDT & LÖBL leg.; and Sabah Mt., Kinabalu Nat. Park headquarters, Silau-Silau, 1540 m, 14. 8. – 1.9. 88, A. SMETANA leg.). These females, as well as all other females placed in drawers together with holotypes of *H. loeblianus* and *H. sabahensis*, show a high degree of variability in body length and the shape of distal part of mesotibiae (gradual transition from weakly to moderately curved, but never as strongly as in males of *H. loeblianus*). Moreover, among the same group of specimens from MHNG, two males of a separate, good species were found during the present study; two additional males of that new species were discovered in NMW and PCPH. This taxon is described below as *H. pseudosabahensis*. Males of all three species are extremely similar; *H. sabahensis* and *H. pseudosabahensis* differ only in proportions of antennomeres and the shape of aedeagi. All accompanying females were studied in detail during the present work, and proportions of antennomeres were found to be variable and inconclusive for species identifications. Only two types of spermatheca were found (Figs. 126, 127). However, no external characters (including morphometric parameters) correlate with the shape of spermatheca. Moreover, all specimens come from the same area. It was not possible to unambiguously associate females with males of any of the three species, and to verify the status of female paratypes. Therefore, females of *H. loeblianus*, *H. sabahensis* and *H. pseudosabahensis* are treated herein as unidentifiable.

***Horaeomorphus sabahensis* FRANZ**

(Figs. 30, 66, 101, 110-112)

Horaeomorphus sabahensis FRANZ, 1992a: 890.

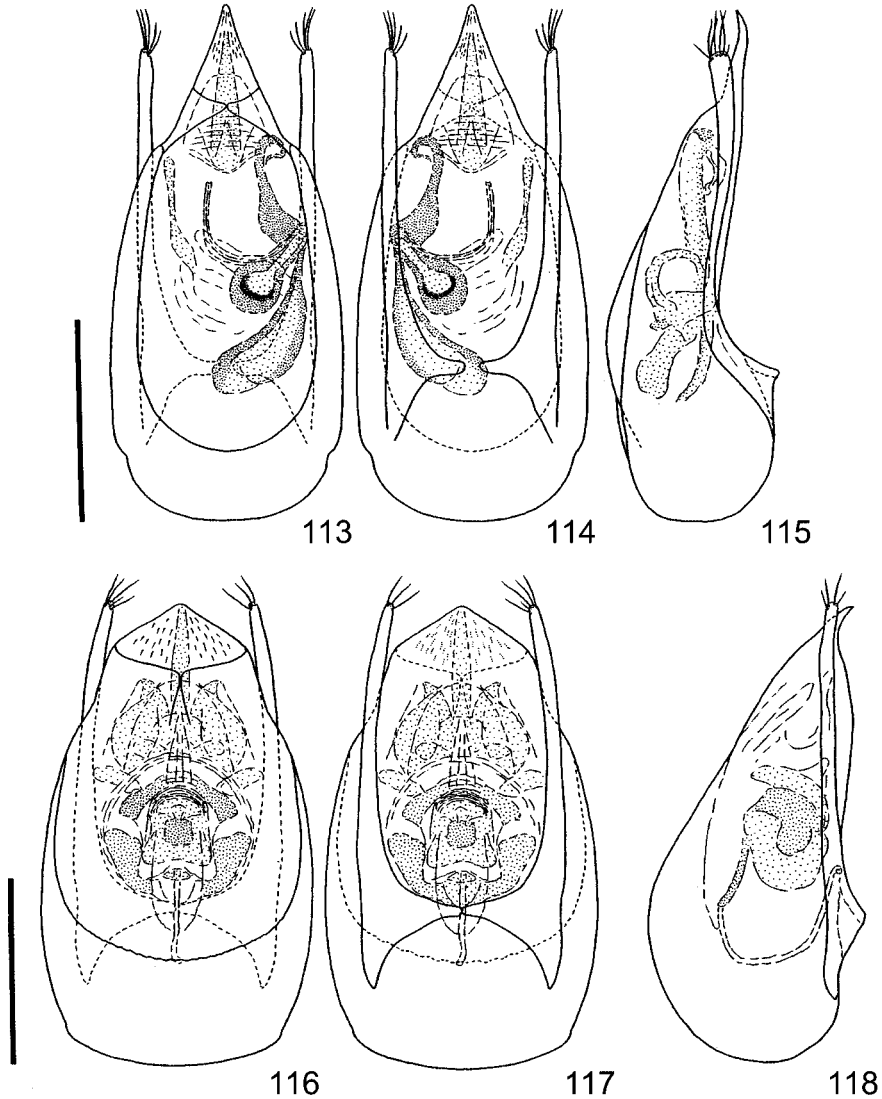
DIAGNOSIS

This species, together with *H. loeblianus* and *H. pseudosabahensis* differs from all remaining species of *Horaeomorphus* in long, convex body with elongate, finely punctate pronotum, finely punctate elytra, and unmodified metatrochanters in males. From *H. loeblianus* it differs in less curved apical part of mesotibiae, and from *H. pseudosabahensis* in about as long as wide antennomere VII and symmetrical endophallus.

REDESCRIPTION

Male. General body shape, pigmentation and setation as in *H. loeblianus*. *Horaeomorphus sabahensis* differs only in more elongate antenna (Fig. 30), less

curved apices of mesotibiae (Fig. 101), measurements, and aedeagus. Body length 2.18-2.67 mm (mean 2.39 mm), length of head 0.31-0.41 mm (mean 0.36 mm), width of head 0.47-0.55 mm (mean 0.51 mm), length of antenna 0.95-1.12 mm (mean 1.01 mm), length of pronotum 0.67-0.77 mm (mean 0.71 mm), maximum width of pronotum 0.51-0.66 mm (mean 0.56 mm), width of pronotum at base



113-115. *Horaemorphus pseudosabahensis* n. sp.; 116-118. *Horaemorphus punctifrons* n. sp. Aedeagus in dorsal (113, 116), ventral (114, 117) and lateral (115, 118) views (scale bar: 0.2 mm)

0.45-0.51 mm (mean 0.47 mm), length of elytra 1.20-1.49 mm (mean 1.32 mm), width of elytra 0.75-1.00 mm (mean 0.86 mm), EI 1.49-1.60.

Aedeagus (Figs. 110-112) large, 0.52 mm in length, broadest near base, with rounded apex; parameres slender, with slightly broadened apices, each with 4-5 very short apical setae; internal armature complicated, with short and very broad central U-shaped part surrounded at each side by slender, relatively small lateral structures.

Female. Unidentifiable (see remarks at *H. loeblianus*).

TYPE MATERIAL

Holotype (male): white printed label "SABAH, Crocker Ra. [i.e. range], 1550-1650 m, 16. V. 1987, Burckhardt-Löbl", white handwritten label "Horaeomorphus sabahensis m." and printed "det. H. Franz", red handwritten label "Holotypus" (MHNG). Paratypes: 1♂, same data (NMW); 1♂, white printed label "SABAH: Poring Hot Springs, 500 m, 11. V. 1987, Burckhardt-Löbl", yellow handwritten label "Horaeomorphus sabahiensis [sic!] m." and printed "PARATYPUS" (MHNG); 1♂, white printed label "SABAH: Poring Hot Springs, 550-600 m, 9.V.1987, #18a, Burckhardt-Löbl", and yellow handwritten identification label as above (NMW).

ADDITIONAL MATERIAL STUDIED

1♂, Sabah, Kibongol Valley, 7 km N Tambunan, 700 m, 20. v. 1987, BURCKHARDT & LÖBL leg. (MHNG); 1♂, Sabah, Kinabalu Nat. Park, above Poring Hot Springs, 550 m, 9. v. 1987, A. SMETANA leg. (MHNG); 1♂, Sabah, Poring Hot Springs, 550-600 m, 9. v. 1987, BURCKHARDT & LÖBL leg. (MHNG).

DISTRIBUTION

E Malaysia (Borneo: Sabah).

REMARKS

See remarks at *H. loeblianus*.

***Horaeomorphus pseudosabahensis* n. sp.**

(Figs. 31, 64, 102, 113-115)

NAME DERIVATION

This species is very similar to *H. sabahensis*, which is reflected by the specific name.

DIAGNOSIS

This species can be distinguished from *H. sabahensis* on the basis of broader than long antennomere VII and the aedeagus; from all other species by the characters given in the diagnosis of *H. sabahensis*.

DESCRIPTION

Male. Morphology as in *H. sabahensis*, including the shape of tibiae (Fig. 102); only hind trochanters (Fig. 64) are slightly shorter, similar to those of *H. loeblianus*, and antennomeres VII-X are more transverse (especially VII, Fig. 31). Body length 2.17-2.33 mm (mean 2.29 mm), length of head 0.30-0.35 mm (mean 0.35 mm), width of head 0.47-0.50 mm (mean 0.48 mm), antenna as in Fig. 31, length 1.00-1.02 mm (mean 1.01 mm), length of pronotum 0.67-0.71 mm (mean 0.70 mm), maximum width of pronotum 0.52-0.55 mm (mean 0.54 mm), width of pronotum at base 0.35-0.41 mm (mean 0.39 mm), length of elytra 1.2-1.27 mm (mean 1.24 mm), width of elytra 0.8-0.87 mm (mean 0.84 mm), EI 1.46-1.50.

Aedeagus (Figs. 113-115) large, 0.51 mm in length, broadest near base, with narrow, subtriangular apex; parameres moderately slender, each with five long apical setae; internal armature strongly asymmetrical, with characteristic darkly sclerotized capsule.

Female. Unknown or unidentifiable (see remarks at *H. loeblianus*).

TYPE MATERIAL

Holotype (male): white printed label "Malaysia, Sabah, Batu Punggul Resort env., 24. VI. – 1. VII. 1996, 11c, vegetation debris and forest floor litter accumulated around large trees near river" (collector unknown), red printed label "*HORAEOMORPHUS pseudosabahensis* m., det. P. Jałoszyński, 2004, HOLOTYPUS" (MHNG). Paratypes: 1♂, white printed label "SABAH: Poring Hot Springs, Langanan Falls, 900-950 m, 12. V. 1987, Burckhardt-Löbl", (MHNG); 1♂, white printed label "Mulu Nat. Park, Sarawak, Borneo", white handwritten label "*Horaeomorphus mului* m." and red handwritten label "Holotypus" (NMW); 1♂, white printed label „BORNEO (Sabah), Batu Punggul Resort, 24-26. 6. 98, Kodada, Čiampur lgt." (PCPH). All paratypes bear standard yellow printed label "*HORAEOMORPHUS pseudosabahensis* m., det. P. Jałoszyński, 2005 PARATYPUS".

DISTRIBUTION

E Malaysia (Borneo: Sabah, Sarawak).

REMARKS

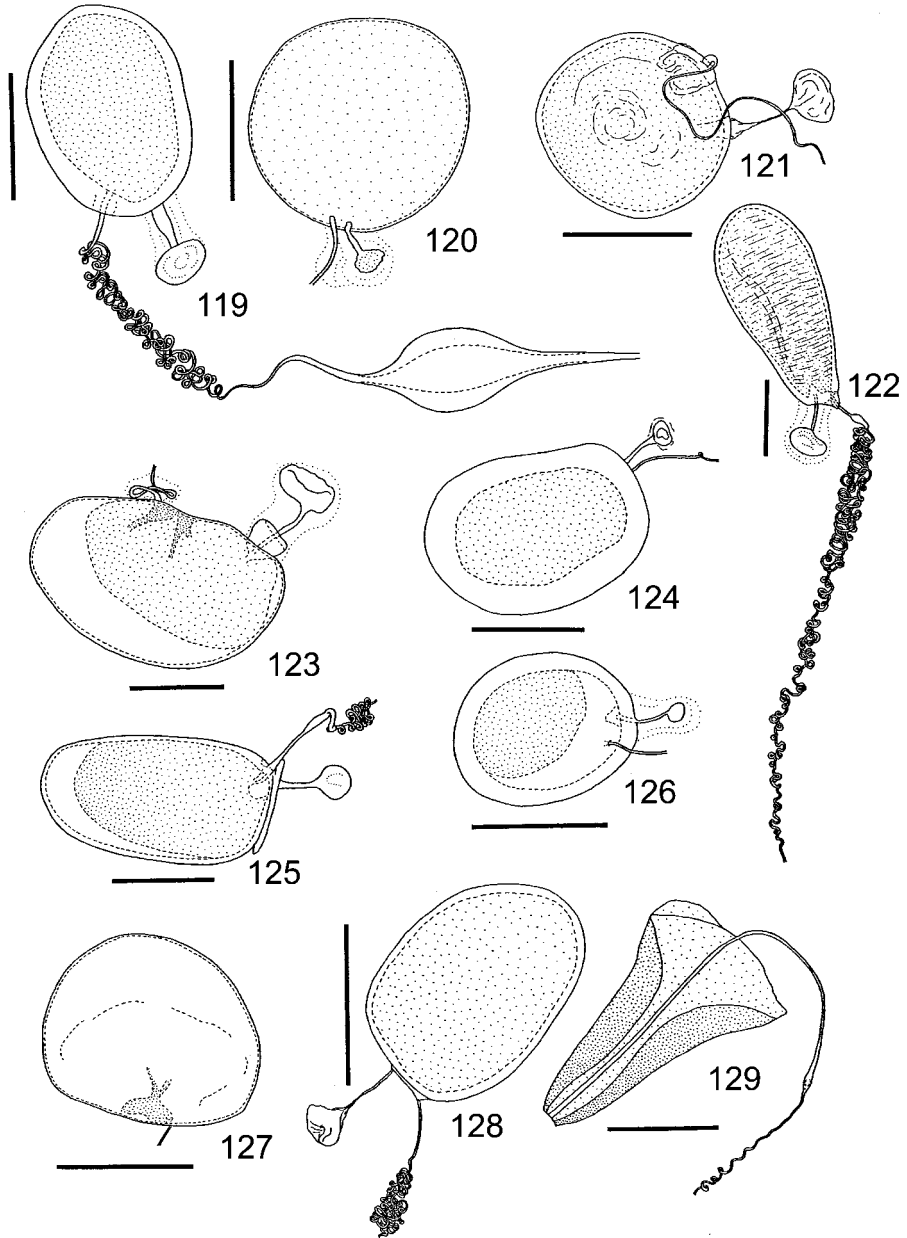
See remarks at *H. loeblianus*. The name "*Horaeomorphus mului*" used by FRANZ in the label of single specimen from Sarawak has never been published and is not valid.

***Horaeomorphus punctifrons* n. sp.**

(Figs. 13, 32, 65, 103, 116-118)

NAME DERIVATION

The specific epithet reflects very distinct punctation of the head.



119-128. Spermatheca; 129. Bursa copulatrix. 119 – *Horaemorphus eumicroides* SCHAUFUSS; 120 – *H. sarawakensis* FRANZ; 121 – *H. valdepunctatus* FRANZ; 122 – *H. caverniventris* n. sp.; 123 – *H. punctatissimus* FRANZ; 124 – *H. heissi* FRANZ; 125 – *H. antennatus* n. sp.; 126-127 – *H. loeblianus* FRANZ, *H. sabahensis* FRANZ or *H. pseudosabahensis* n. sp. (see remarks in the text); 128-129 – *H. tiomanensis* n. sp. (scale bars: 0.05 mm)

DIAGNOSIS

Moderately large species, with very distinct, small punctures on head, very shallow, diffused and moderately large punctures on pronotum, strongly modified metatrochanters and minimally curved, non-modified metatibiae.

DESCRIPTION

Male. Body (Fig. 13) moderately large, elongate, moderately convex, dark brown, palpi and legs slightly lighter, setation light brown; body length 2.55 mm. Head widest at eyes, length 0.40 mm, width 0.55 mm; tempora slightly longer than length of eye in dorsal view, rounded, bent at obtuse angle near middle; vertex convex, with pair of shallow, small pits; frons convex; supraantennal tubercles feebly raised, more distinctly demarcated from frons than from vertex. Punctuation of frons and vertex moderately dense, composed of small but very distinct, sharp punctures with raised margins; supraantennal tubercles impunctate. Setation moderately sparse, composed of thin, long suberect to erect setae. Antenna as in Fig. 32, length 1.15 mm.

Pronotum elongate, relatively broad, widest between anterior fourth and fifth, length 0.76 mm, maximum width 0.74 mm, width at base 0.50 mm. Posterior collar very short, distinctly constricted from disc by three ante-basal pits located in distinct transverse groove; basal margin of pronotum very weakly, broadly emarginate. Disc with moderately dense, small punctures with diffused margins, sides of posterior collar with relatively dense, slightly coarse punctuation; setation moderately dense, relatively short, suberect.

Elytra oval, long, broadest distinctly anterior to middle, length 1.39 mm, width 0.90 mm, EI 1.54. Humerus on each elytron moderately distinct; internal humeral impression very short, broad and very shallow. Punctuation moderately dense, composed of very small, moderately sharply delimited punctures; setation slightly denser than that on pronotum, composed of thicker, moderately long setae. Hind wings well developed.

Legs relatively long, with robust femora and slender tibiae; metatrochanters (Fig. 65) strongly modified; pro- and mesotibiae slightly recurved, metatibiae only slightly curved (Fig. 103).

Aedeagus (Figs. 116-118) large, 0.50 mm in length, broadest near basal third, with broadly subtriangular apex; parameres moderately slender, each with 3-5 long setae; internal armature very complicated, with large bell-shaped central complex surrounded at each side by elongate lateral structures.

Female. Unknown

TYPE MATERIAL

Holotype (male): white printed label „MALAYSIA, Pahang, Taman Negara NP, 12.-14. 7. 1993, leg. H. Forster”, red printed label „*Horaeomorphus punctifrons* m., det. P. Jałoszyński, 2004, HOLOTYPUS” (NMW).

DISTRIBUTION

W Malaysia (Pahang).

***Horaemorphus tiomanensis* n. sp.**

(Figs. 14, 33, 69, 104, 130-132, 128, 129)

NAME DERIVATION

Locotypical, after the Tioman Island (= Pulau Tioman), where the type series has been collected.

DIAGNOSIS

This species has slender body, long and only slightly curved tibiae, and strongly modified metatrochanters; examination of aedeagus is necessary for correct identification; females have unique bursa copulatrix.

DESCRIPTION

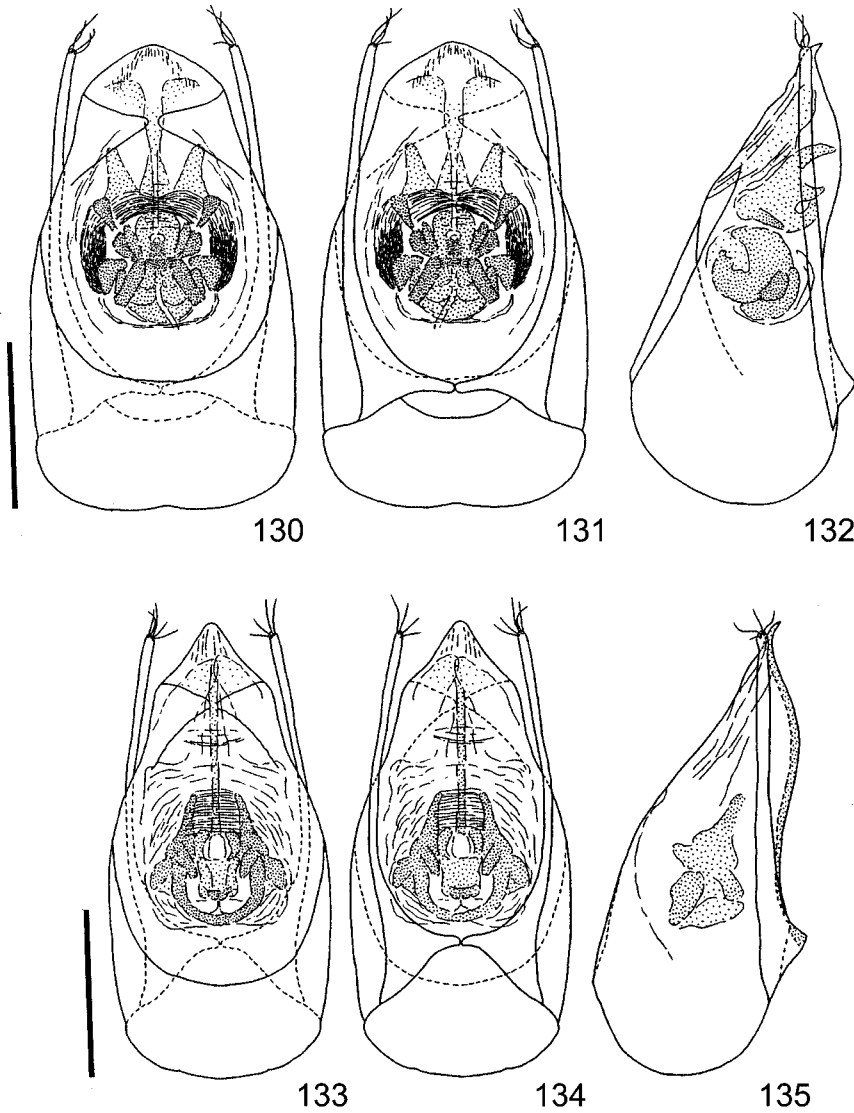
Male. Body (Fig. 14) moderately large, relatively slender, convex, moderately dark brown, legs and palpi slightly lighter, body length 2.47-2.72 mm (mean 2.61 mm). Head broadest at eyes, length 0.37-0.42 mm (mean 0.40 mm), width 0.52-0.60 mm (mean 0.57 mm); tempora about as long as eye in dorsal view or slightly longer, almost regularly rounded, not bent; vertex convex, with indistinct median impression adjacent to occipital constriction, and with pair of small and rather shallow pits; frons distinctly convex; supraantennal tubercles distinct, large, very well delimited from frons and not delimited from vertex. Punctuation very fine, sparse; setation moderately long, sparse, suberect to erect. Antenna as in Fig. 33, length 1.15-1.25 mm (mean 1.20 mm).

Pronotum elongate and weakly convex, broadest between anterior margin and anterior fourth, length 0.75-0.80 mm (mean 0.78 mm), maximum width 0.67-0.75 mm (mean 0.72 mm), width at base 0.45-0.50 mm (mean 0.48 mm); posterior collar short, separated from disc by indistinct lateral constriction and relatively deep and narrow dorsal transverse groove with 3-5 pits (median and lateral pits are always present; smaller additional pits between them are sometimes very indistinct); basal margin slightly arcuate, straight or minimally emarginate. Punctuation relatively dense, composed of large but very shallow punctures with diffused margins, distances between punctures about as long as puncture diameters or slightly shorter; setation moderately long and dense, suberect.

Elytra elongate, oval, moderately convex, broadest slightly anterior to middle, with indistinct adsutural flattening near anterior third, length 1.35-1.50 mm (mean 1.43 mm), width 0.85-0.95 mm (mean 0.91 mm), EI 1.58-1.59. Humeri weakly marked, internal humeral impressions shallow, broad and very short. Punctuation about as dense as that on pronotum but composed of very small punctures; setation moderately long and dense, erect. Hind wings well developed.

Legs relatively long and slender, especially tibiae (Fig. 104), which are only slightly curved; metatrochanters (Fig. 69) strongly modified, with very small denticle or expansion on ventral margin.

Aedeagus (Figs. 130-132) large, 0.57 mm in length, broadest in basal half, with broadly subtriangular apex; parameres slender, each with four long apical



130-132. *Horaemorphus tiomanensis* n. sp.; 133-135. *Horaemorphus jeraianus* n. sp. Aedeagus in dorsal (130, 133), ventral (131, 134) and lateral (132, 135) views (scale bar: 0.2 mm)

setae; internal armature darkly sclerotized and very complicated, in dorso-ventral view resembling a flower, with characteristic elongate triangular projections in distal part.

Female. Externally very similar to male, except for non-modified metatrochanters and smaller body. Body length 2.29-2.42 mm (mean 2.36 mm), length of head 0.35-0.37 mm (mean 0.36 mm), width of head 0.50 mm, length of antenna 1.07-1.10 mm (mean 1.09 mm), length of pronotum 0.67-0.70 mm (mean 0.69 mm), maximum width of pronotum 0.60-0.65 mm (mean 0.62 mm), width of pronotum at base 0.42-0.47 mm (mean 0.45 mm), length of elytra 1.27-1.35 mm (mean 1.31 mm), width of elytra 0.80-0.87 mm (mean 0.84 mm), EI 1.55-1.59.

Spermatheca (Fig. 128) small, 0.07 mm in length, oval, thin-walled, with moderately large accessory gland and long ductus spermathecae, which is strongly entangled near insertion to spermatheca, further part with loose and sparse loops. Spermatheca is connected to conical bursa copulatrix (Fig. 129), length 0.12 mm.

TYPE MATERIAL

Holotype (male): white printed label „MALAYSIA: Pahang, Tioman Island, Kg. Tekek Umgeb., 15.-26. 7. 1992, leg. R. SCHUH”, the collecting date is followed by handwritten „(4)”, and printed red label „*HORAEOMORPHUS tiomanensis* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (temporarily in PCPH, final depository SNMB). Paratypes: 2♂♂, 2♀♀, same data, except for the collecting date which is followed by handwritten „(8)” in two specimens and by „(3)” and „(4)” in remaining two (PCPH, PCPJ).

DISTRIBUTION

W Malaysia (Tioman Is.).

REMARKS

This is the only known Malayan *Horaeomorphus* with large and darkly sclerotized bursa copulatrix, which is very similar to that found in a single species of an allied genus, *Loeblites* FRANZ (JAŁOSZYŃSKI 2005). Large, but very different in shape structure connected to distal part of ductus spermathecae is also present in *Horaeomorphus nepalensis* FRANZ from the Himalaya Mts. (JAŁOSZYŃSKI, unpublished observations).

Horaeomorphus tiomanensis is extremely similar to *H. jeraianus* n. sp.; distinguishing characters are given in the description of the latter species.

***Horaeomorphus jeraianus* n. sp.**

(Figs. 34, 67, 105, 133-135)

NAME DERIVATION

Locotypical, after Mt. Jerai (= Gunung Jerai), the type locality.

DIAGNOSIS

Externally this species is nearly identical to *H. tiomanensis*, it differs in shorter antennomere VI, slightly larger denticle on ventral margin of metatrochanters in males, and in the shape of aedeagus (female characters remain unknown).

DESCRIPTION

Male. Horaeomorphus jeraianus is externally very similar to *H. tiomanensis*; only differences are described below. Body length 2.47-2.67 mm (mean 2.57 mm), length of head 0.37-0.40 mm (mean 0.39 mm), width of head 0.52-0.55 mm (mean 0.54 mm), antenna (Fig. 34) shorter and stouter, with antennomere VI about as long as broad, length of antenna 0.85-0.90 mm (mean 0.87 mm), length of pronotum 0.75-0.80 mm (mean 0.77 mm), maximum width of pronotum 0.62-0.72 mm (mean 0.67 mm), width of pronotum at base 0.45 mm, length of elytra 1.35-1.47 mm (mean 1.41 mm), width of elytra 0.85-0.90 mm (mean 0.87 mm), EI 1.59-1.63.

Legs moderately long, slender; metatrochanters (Fig. 67) more curved and with larger denticle or expansion on ventral margin; tibiae (Fig. 105) very similar to those in *H. tiomanensis*.

Aedeagus (Figs. 133-135) large, 0.55 mm in length, broadest near middle, with subtriangular apex; parameres slender, each with 4-5 long apical setae; internal armature complicated, generally bell-shaped, with large and broad lateral structures.

Female. Unknown.

TYPE MATERIAL

Holotype (male): white printed label „MALAYSIA: Kedah, Gunung Jerai, 100-500 m, 8.8.1993, leg. Schuh”, and printed red label „*HORAEOMORPHUS jeraianus* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (temporarily in PCPH, final depository SNMB). Paratype: ♂, same data, and standard printed yellow label with „PARATYPUS” (PCPJ).

DISTRIBUTION

W Malaysia (Kedah).

***Horaeomorphus jaechi* n. sp.**

(Figs. 15, 35, 68, 106, 136-138)

NAME DERIVATION

The species is dedicated to Dr. Manfred JÄCH from NMW, who collected the type specimen.

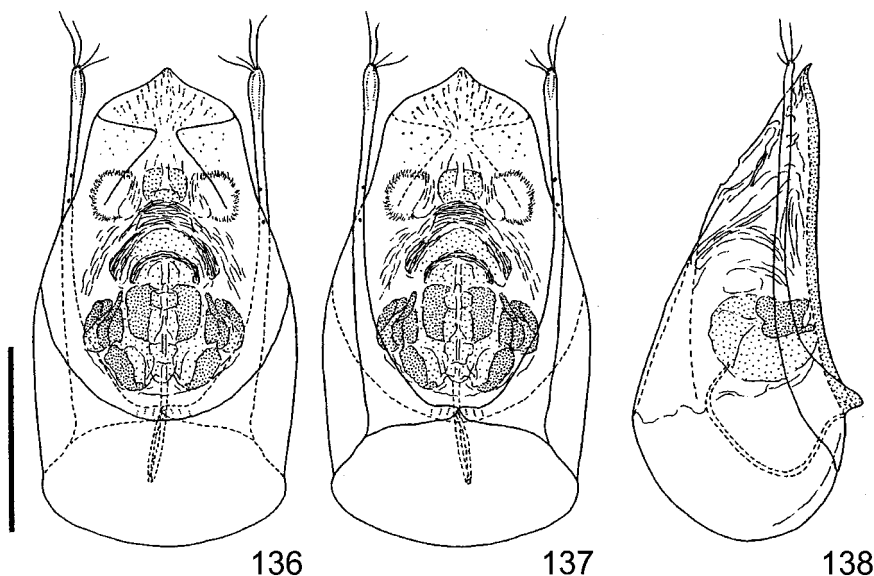
DIAGNOSIS

Moderately large species with strongly punctate central part of pronotum surrounded by finely punctate areas, three basal pits on pronotum connected by groove and strongly modified metatrochanters in males. Examination of aedeagus is necessary to confirm identification (female characters unknown).

DESCRIPTION

Male. Body (Fig. 15) moderately large, slender, weakly convex, moderately dark brown, legs and palpi distinctly lighter, setation light brown, body length 2.52 mm. Head broadest at eyes, length 0.37 mm, width 0.55 mm; tempora about as long as eye in dorsal view, regularly rounded, not bent; vertex convex, with pair of relatively small and shallow pits; frons convex; supraantennal tubercles small, well marked, distinctly delimited from frons and indistinctly from vertex. Punctuation sparse and fine, but punctures have raised margins and are very distinct; setation moderately sparse and long, suberect to erect. Antenna as in Fig. 35, length 1.07 mm.

Pronotum elongate, oval, weakly convex, broadest near anterior fourth, length 0.80 mm, maximum width 0.67 mm, width at base 0.47 mm. Posterior collar short, distinctly separated from disc by lateral constriction and narrow, relatively shallow dorsal transverse groove connecting three basal pits; basal margin nearly straight. Punctuation of central area of disc composed of large, moderately deep punctures with rather sharp margins, distances between punctures variable, on average equal to puncture diameters, some punctures longitudinally elongate;



136-138. *Horaemorphus jaechi* n. sp. Aedeagus in dorsal (136), ventral (137) and lateral (138) views (scale bar: 0.2 mm)

remaining parts of disc covered with very fine and sparse punctures. Setation relatively short, moderately dense, suberect.

Elytra elongate, oval, broadest distinctly anterior to middle, with very indistinct adsutural flattening near anterior third, length 1.35 mm, width 0.85 mm, EI 1.59. Humeri weakly marked; internal humeral impressions broad, short and shallow. Punctuation dense but composed of small punctures; setation moderately long and dense, erect. Hind wings well developed.

Legs long and slender, metatrochanters (Fig. 68) strongly modified, long; tibiae (Fig. 106) only slightly curved.

Aedeagus (Figs. 136-138) large, 0.52 mm in length, broadest near middle, with broadly subtriangular, expanded apex; parameres slender, with slightly broadened apices, each with four long apical setae; internal armature very complicated, with large central bell-shaped part surrounded by complicated lateral structures, and with well visible duct connecting central complex with opening at base of parameres (well visible in lateral view).

Female. Unknown.

TYPE MATERIAL

Holotype (male): white printed label „MAL., Sarawak 1993, 30 km S Miri, Lambir Hills, 24.2., leg. M. Jäch (12)”, and printed red label „*HORAEOMORPHUS jaechi* m., det. P. Jałoszyński, 2005, HOLOTYPUS” (NMW). The holotype has left hind leg detached and mounted separately on the same cardboard with the specimen.

DISTRIBUTION

E Malaysia (Borneo: Sarawak).

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