REVUE SUISSE DE ZOOLOGIE

SWISS JOURNAL OF ZOOLOGY

de la
SOCIÉTÉ SUISSE DE ZOOLOGIE
et du
MUSÉUM D'HISTOIRE NATURELLE
de la Ville de Genève

tome 120
fascicule 4
2013

GENÈVE DÉCEMBRE 2013 ISSN 0035 - 418 X

REVUE SUISSE DE ZOOLOGIE

TOME 120 — FASCICULE 4

Publication subventionnée par:
Académie suisse des Sciences naturelles (SCNAT)
Ville de Genève
Société suisse de Zoologie

Administration

MUSÉUM D'HISTOIRE NATURELLE
1211 GENÈVE 6

Internet: http://www.ville-ge.ch/musinfo/mhng/page/rsz.htm

Prix de l'abonnement:

SUISSE Fr. 225.— UNION POSTALE Fr. 250.—
(en francs suisses)

Les demandes d'abonnement doivent être adressées
à la rédaction de la *Revue suisse de Zoologie*,
Muséum d'histoire naturelle, C.P. 6434, CH-1211 Genève 6, Suisse

REVUE SUISSE DE ZOOLOGIE

SWISS JOURNAL OF ZOOLOGY

ANNALES

de la
SOCIÉTÉ SUISSE DE ZOOLOGIE
et du
MUSÉUM D'HISTOIRE NATURELLE
de la Ville de Genève

tome 120
fascicule 4
2013

GENÈVE DÉCEMBRE 2013 ISSN 0035 - 418 X

REVUE SUISSE DE ZOOLOGIE

TOME 120 — FASCICULE 4

Publication subventionnée par:
Académie suisse des Sciences naturelles (SCNAT)
Ville de Genève
Société suisse de Zoologie

Le comité soumet chaque manuscrit pour évaluation à des experts d'institutions suisses ou étrangères selon le sujet étudié.

La préférence sera donnée aux travaux concernant les domaines suivants: taxonomie, systématique, faunistique, phylogénie, évolution, morphologie et anatomie comparée.

Administration

MUSÉUM D'HISTOIRE NATURELLE
1211 GENÈVE 6

Internet: http://www.ville-ge.ch/musinfo/mhng/page/rsz.htm

Prix de l'abonnement:

SUISSE Fr. 225.— UNION POSTALE Fr. 250.—
(en francs suisses)

Les demandes d'abonnement doivent être adressées
à la rédaction de la *Revue suisse de Zoologie*,
Muséum d'histoire naturelle, C.P. 6434, CH-1211 Genève 6, Suisse

Revue suisse de Zoologie 120 (4): 537-547; décembre 2013

Review of the Afrotropical species of *Deleaster* Erichson, 1839 (Coleoptera, Staphylinidae, Oxytelinae)

Giulio CUCCODORO[1] & György MAKRANCZY[2]
[1] Muséum d'histoire naturelle, Case postale 6434, CH-1211 Genève 6, Switzerland.
E-mail: giulio.cuccodoro@ville-ge.ch
[2] Hungarian Natural History Museum, Baross utca 13, H-1088 Budapest, Hungary.
E-mail: makranczy@zoo.nhmus.hu

Review of the Afrotropical species of *Deleaster* Erichson, 1839 (Coleoptera, Staphylinidae, Oxytelinae). - The Afrotropical species of the genus *Deleaster* are reviewed. A lectotype is designated for the single known species, *Deleaster pectinatus* Fauvel, 1882, and two additional species, *D. gibbosus* sp. n. from Ruwenzori range in Zaire and Uganda and *D. negus* sp. n. from Ethiopia, are described.
These three species are illustrated in colour by habitus photographs, SEM images of relevant morphological characters and the males of the two new species by line drawings of terminalia and genitalia.

Keywords: Taxonomy - lectotype - new species - Afrotropics - Ethiopia - Uganda - Zaire.

INTRODUCTION

The oxyteline genus *Deleaster* Erichson, 1939 is currently placed in Euphaniini Reitter, 1909, previously Deleasterini Reitter, 1909 (see Bouchard *et al.*, 2011). The genus contained eight extant valid species, two of them Nearctic, five Palaearctic, and one Afrotropical (Grebennikov, 2002). The latter comes from above 3300 m a.s.l. in the subalpine zone of Ethiopian highlands, and is presumed to have rather narrow distributional range.

A detailed examination of material from various sources provided evidence that three closely related species occur in the Afrotropical realm. At present, the sole named African species, *Deleaster pectinatus* Fauvel, 1882, is only known from its original type material consisting of two females (one of them in fragments). The remaining specimens represent the two new species described herein. As most of the natural habitats in densely populated parts of Africa are threatened by human activity, the assessment of the biodiversity there appears particulary urgent.

MATERIAL AND METHODS

Habitus photography was made with a Nikon D4 camera with Rodenstock Apo-Rodagon N 50/2.8 lens and layers montaged with ZereneStacker. The SEM images and line drawings were done by the second author, the former with a Hitachi S-2600 N

Manuscript accepted 19.09.2013

scanning electron microscope. Images were taken of uncoated specimens and the equipment was used both in the more usual "3D mode" and the "Compo" mode as the latter was preferred for certain kinds of details. For descriptions and measurements a Leica MZ 12.5 stereoscopic microscope was used. For the line drawings permanent preparations were made in Euparal mounting medium on plastic cards pinned with the specimens. Techniques are described in detail in Makranczy (2006). Drawing was done with a Jenalab (Carl Zeiss, Jena) compound microscope and drawing tube (camera lucida).

Abbreviations for the measurements: HW = head width with eyes; TW = head width at temples; PW = maximum width of pronotum; SW = approximate width of shoulders; AW = maximum width of abdomen; HL = head length (from front margin of clypeus to the beginning of neck in the mid-line); EL = length of eye; TL = length of temple; PL = length of pronotum in the mid-line; SL = length of elytra from shoulder; SC = length of elytra from hind apex of scutellum; FB = forebody length (combined length of head, pronotum and elytra); BL = approximate body length. All measured are taken in dorsal view.

The label data of the types of *D. pectinatus* are reproduced literally in " ", the slash "\" is a separator between each individual label, while ";" indicates line breaks. Text within brackets [ ] is explanatory.

The material studied is deposited in the following collections: ISNB = Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (D. Drugmand); MHNG = Muséum d'histoire naturelle de la ville de Genève, Switzerland; MRAC = Musée Royal de l'Afrique Centrale, Tervuren, Belguim (M. De Meyer); NHMB = Naturhistorisches Museum Basel, Switzerland (E. Sprecher); NHMW = Naturhistorisches Museum Wien, Austria (H. Schillhammer); ZMUN = Natural History Museum, University of Oslo, Oslo, Norway (V. Gusarov).

TAXONOMY

Key to the Afrotropical *Deleaster* species

1a Pubescence on laterobasal portion of abdominal tergites diverging; pectinate middle (comb) of apical edge on tergite VIII without short mesal denticle [North Ethiopia, Mts. Abboï-Miéda/Ābuyē Mēda] . . . . . *D. pectinatus* Fauvel

1b Pubescence on laterobasal portion of abdominal tergites parallel; pectinate middle (comb) of apical edge on tergite VIII with at least one short mesal denticle 2

2a Elytra with posterior portion of disc not swollen; posterior portion of sutural margin in level with disc; posterior margin of elytra arcuate [South Ethiopia, Mts. Gughe] . . . . . *D. negus* n. sp.

2b Elytra with posterior portion of disc swollen; posterior portion of sutural margin below level of disc; posterior margin of elytra subangulate. [Ruwenzori range in Zaire and Uganda] . . . . . *D. gibbosus* n. sp.

Deleaster pectinatus Fauvel, 1882 Figs 1, 4, 8-9, 12-13

Deleaster pectinatus Fauvel, 1882: 129. – Herman, 2001: 1326.

LECTOTYPE (♀, here designated): "S/[ous] les pierres bord; des torrents [Amhara Region,] Mts.; Abboïmiéda [Abboï-Miéda/Ābuyē Mēda, 10.517°N, 39.767°E] (Abyssi;nie) 3800 à 4000 m; 7bre [Septembre 1881, leg. A. Raffray] \ pectinatus; Fvl. \ Deleaster; Er. \ R.I.Sc.N.B. 17.479; Deleaster; Coll. et det. A. Fauvel \ ♀ \ Deleaster; pectinatus Fauvel; det. Makranczy, 2001 \ Lectotype; Deleaster; pectinatus Fauvel; Des. G. Cuccodoro; & Gy. Makranczy 2012" (ISNB).

PARALECTOTYPE (1): same data as lectotype, 1♀ without head (ISNB).

OTHER MATERIAL EXAMINED: none.

REDESCRIPTION

Measurements (n = 1; unit = mm): HW = 1.26; TW = 1.10; PW = 1.22; SW = 1.76; AW = 2.13; HL = 0.91; EL = 0.53; TL = 0.11; PL = 1.03; SL = 2.24; SC = 2.13; FB = 4.38; BL = 7.18.

Habitus as in Fig. 1. Body predominantly reddish brown to dark brown, with head slightly darker and legs, scape, pedicel and borders of abdomen paler. Pubescence dense, with fine, short, depressed hairs, rather inconspicuous; presence of some darker, stronger, erect bristles near pronotal angles.

Head (Fig. 4) rather transverse with clypeus strongly projecting, latter slightly narrower than in the other species. Frontoclypeal (epistomal) suture marked as a strongly impressed transversal groove; surface of clypeus shiny but with very fine coriaceous microsculpture and traces of punctation. Vertex with gently curved, broad grooves (with remnants of ocelli in their middle) extending anterolaterally from middle of neck margin to middle of inner eyes margin, forming together a rather V-shaped impression surrounding disc filled with dense granulose microsculpture similar to that in the groove delineating dorsal part of neck; disc shiny but sparsely punctate with dome-like convexity only feebly delimited from the gentle supraantennal protuberances by shallow longitudinal impressions, latter almost smooth. Antennae (Fig. 12) with third antennomere as long as first, other articles approximately twice as long as broad.

Pronotum (Fig. 4) narrowing posteriorly with lateral margins sinuate; hind angles rather sharp; lateral portions of posterior margin slightly arcuate; presence of two gently protruding knob-like elevations near posterior angles; presence of shallow, curved subbasal impression filled with rough microsculpture; presence of two shallow semi-longitudinal impressions anteriad posterior angles filled with dense punctation and microsculpture making them opaque; medial groove shallow, evanescent in subbasal impression; disc with fine coriaceous/substrigulate microsculpture (except in middle just anteriorly subbasal median spots) in directionality surrounding centre, less distinct than the relatively strong, sparse punctation on centre of disc. Elytra with postscutellar area shortly depressed longitudinally; posterior portion of disc only slightly swollen; posterior portion of sutural margin just slightly below level of disc; posterior margin arcuate (Fig. 8). Legs relatively long and slender, protarsus and in a lesser extent mesotarsus with articles 1 to 4 expanded, outer halves of mesotibia and metatibia with distinct ctenidium consisting of spinules.

Abdomen broadest in middle, narrowing anteriorly and posteriorly; laterosternites very broad. Pubescence on laterobasal parts of tergites (Fig. 13) directed strongly outwards. Pectinate middle (comb) of apical margin of tergite VIII as in Fig. 9.

FIGS 1-3
Habitus of *Deleaster* species. (1) *D. pectinatus* Fauvel, lectotype; (2) *D. negus* sp. n., holotype; (3) *D. gibbosus* sp. n., holotype.

Sexual characters: Female sternite VIII expanded subapically, subtriangular, narrowly rounded apically, with tiny irregular incisions on apical margin. The male of this species is unknown, but externally the males and females in the closely related species do not seem to have any consistent differences, except that the apex of sternite IX is in males often exposed (as on Fig. 16), while its absence suggests the opposite sex, even if the coxites (only present in females) cannot be readily seen. Both sexes in these three species have conspicuous medioapical comb-like structures of tergite VIII, and they are similar in all examined specimens.

DISTRIBUTION: The species is known only from Ethiopia, from its type locality that appears to be the northernmost occurrence for the genus in the Afrotropics.

COMMENTS: *Delaster pectinatus* is easily distingusished from its Afrotropical congeners by the presence on abdominal tergite VIII of a comb lacking minute mesal denticle. The description erroneously mentions two male specimens. Albert Fauvel might have been confused by the "pectinate" apex of the tergite VIII considered as a male secondary sexual character, while it is similar in both sexes.

The types labels miss the informations pertaining to their collector and collecting year. Fauvel (1882) indicates in the orginal description that the collector is Achille Raffray. We pinpoint here that the collection year is 1881 (Raffray 1882).

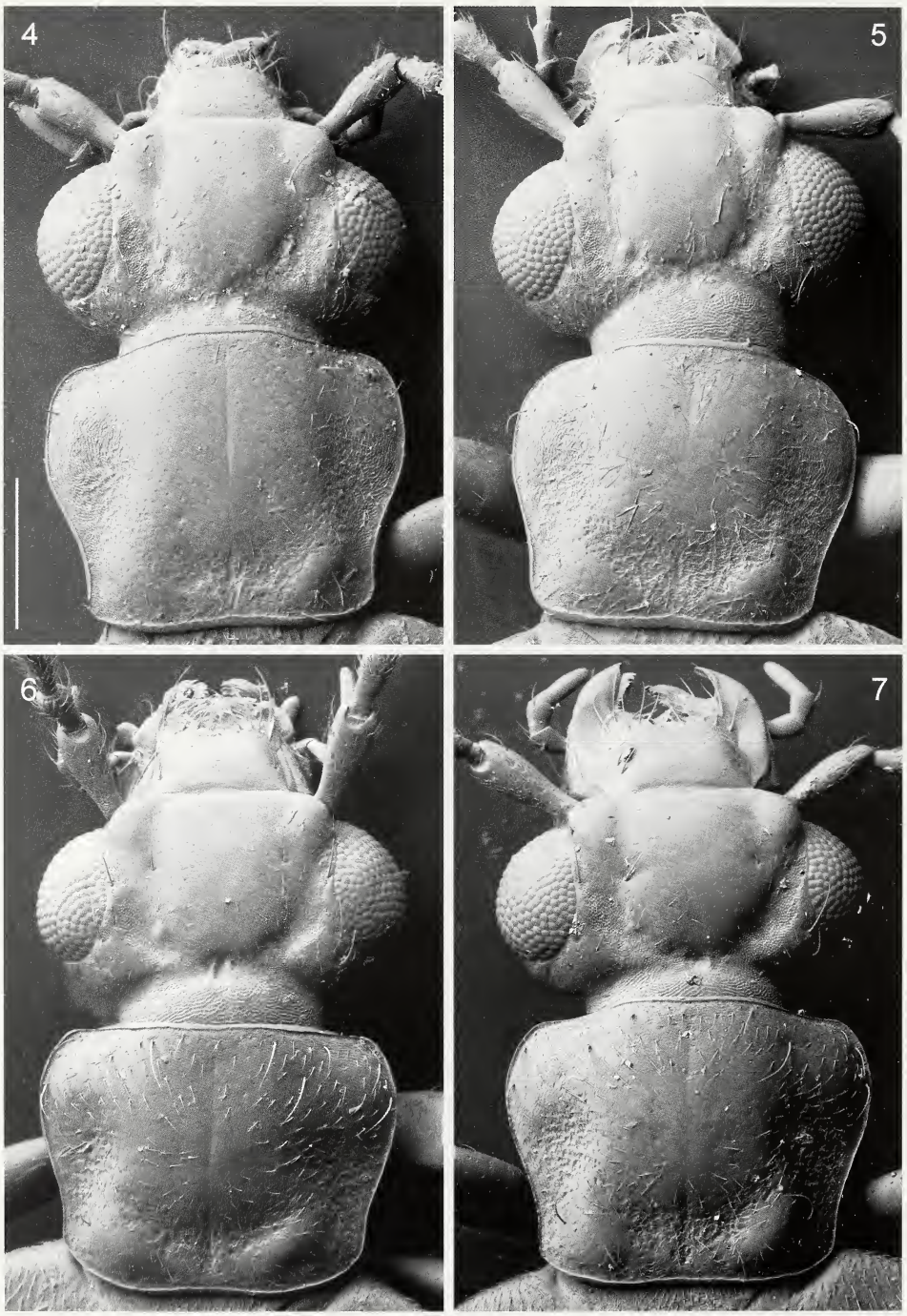
Deleaster gibbosus new species Figs 3, 6-7, 11, 14-20

HOLOTYPE (♂): DEMOCRATIC REPUBLIC OF CONGO (ZAIRE): North Kivu, Northern face of Ruwenzori, camp de Kilindera [0°23'N, 29°55'E], 2750 m, VII-VIII.1974, [leg.] R.P.M. Lejeune, à la lampe U.V. (MRAC).

PARATYPES (7): same data as holotype, 1♂ (MRAC); UGANDA: Western Region, Kasese District, 8km NWW Nyakalengija, Rwenzori Mts. National Park, main trail from John Matte Hut to Nyabitaba Hut, Mubuku River, 0°21.481'N, 29°58.331'E, 2538m, 17.VIII.2008, [leg.] V.I. Gusarov (3551), river banks near bridge 1♂, 3ex. [DNA sample barcodes 10073492, 10073493, 10073495] (ZMUN), 1♀ (MHNG), 1♂ (NHMW).

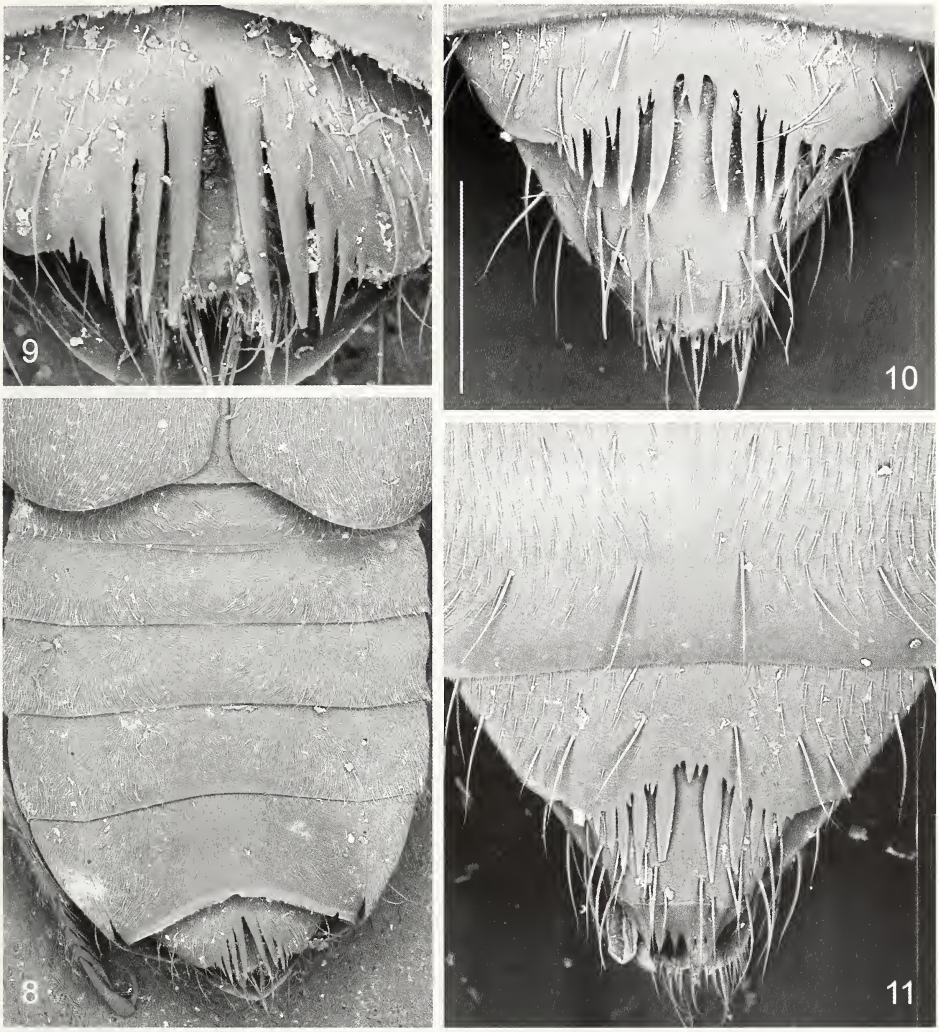
DESCRIPTION: Measurements (n = 5; unit = mm): HW = 1.22 (1.16-1.29); TW = 1.05 (0.99-1.09); PW = 1.17 (1.08-1.22); SW = 1.72 (1.61-1.78); AW = 1.95 (1.80-2.10); HL = 0.82 (0.75-0.87); EL = 0.45 (0.44-0.47); TL = 0.14 (0.12-0.16); PL = 0.96 (0.91-1.00); SL = 2.14 (2.02-2.26); SC = 1.97 (1.83-2.08); FB = 4.21 (3.94-4.40); BL = 6.64 (6.20-7.11).

Similar to *D. pectinatus*, from which it may be distinguished as follows: habitus as in Fig. 3; scape and pedicel almost concolorous with flagellum; head as in Figs 6-7; clypeus slightly trapezoid; frontoclypeal (epistomal) suture marked as a slightly impressed transversal groove; vertex with markedly curved, broad grooves (with the remnants of the ocelli in their middle) extending anterolaterally from middle of neck margin to middle of inner eyes margin, forming together a rather U-shaped impression surrounding disc, filled with dense granulose microsculpture unlike the imbricate microsculpture filling most of the groove delineating dorsal part of neck; pronotum (Figs 6-7) with hind angles rather blunt; lateral portions of posterior pronotal margin broadly arcuate; presence of two rather strongly protruding knob-like elevations near posterior pronotal angles; presence of deep, curved pronotal subbasal impression; medial pronotal groove shallow, distinct on entire length, including in subbasal



FIGS 4-7

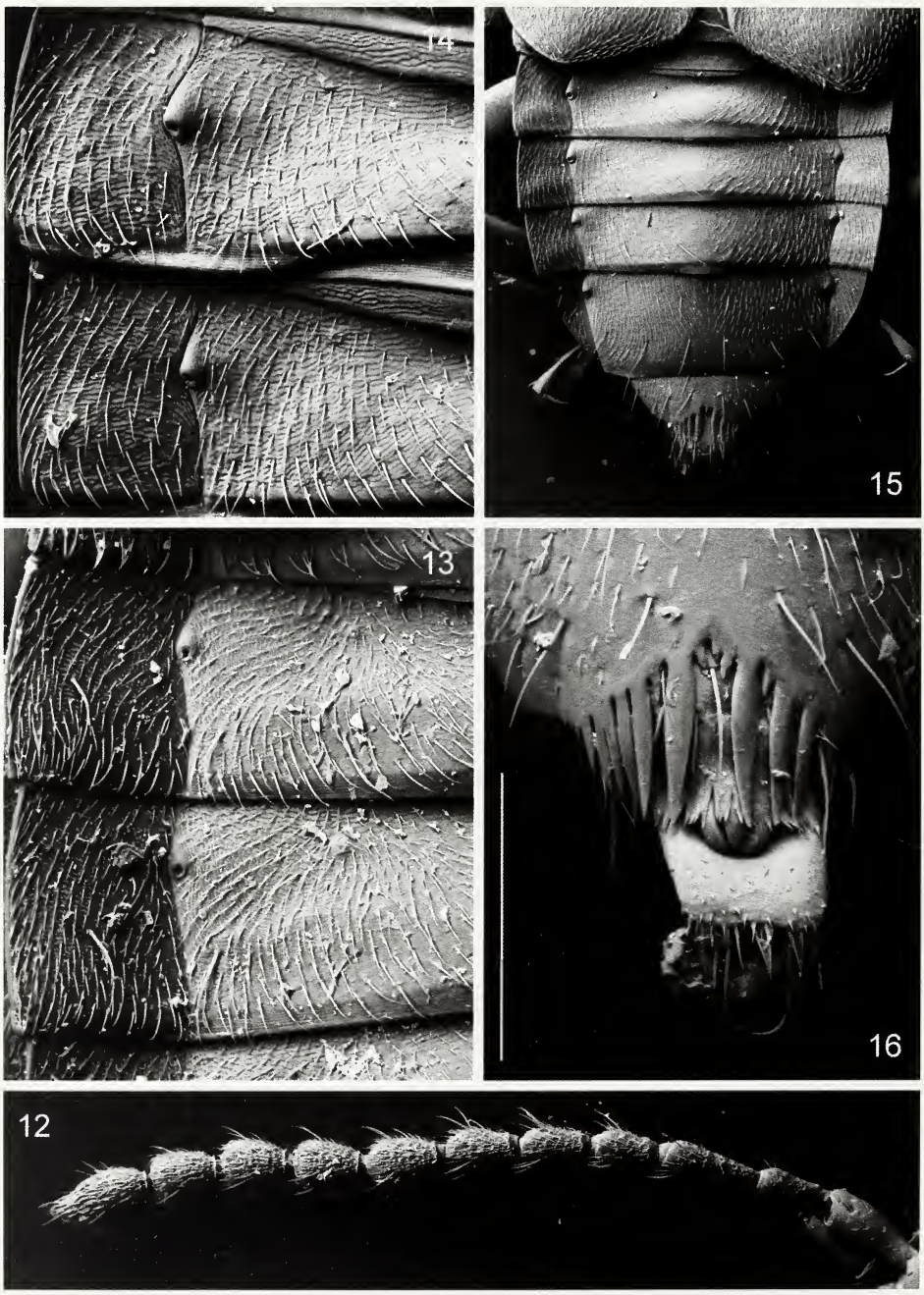
SEM of head and pronotum. (4) *Deleaster pectinatus* Fauvel; (5) *D. negus* sp. n.; (6, 7) *D. gibbosus* sp. n., N Kivu (6) and W Uganda (7). Scale bar = 0.5 mm.



FIGS 8-11

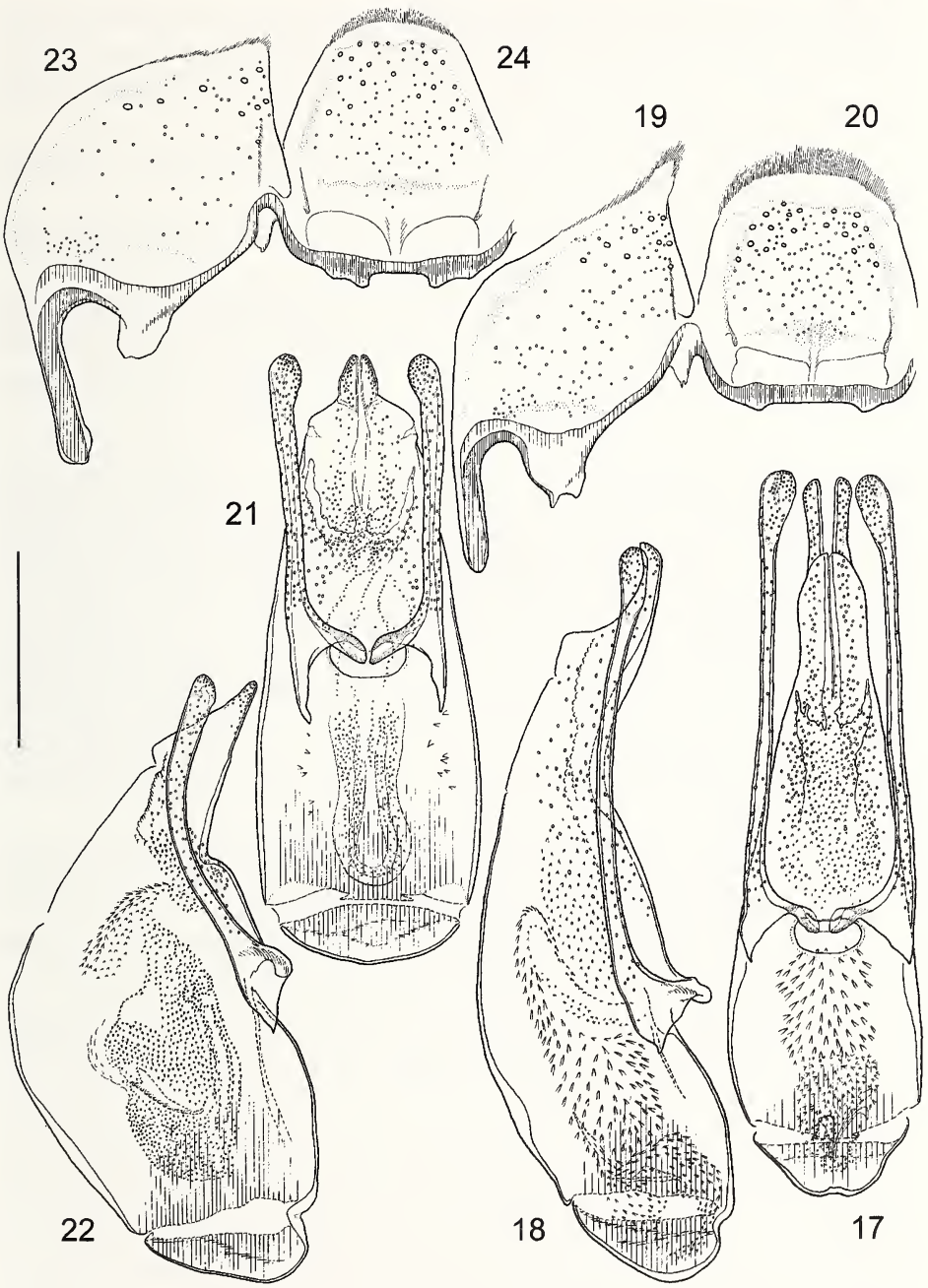
(8-9) *Deleaster pectinatus* Fauvel, elytral apex and abdomen (8), apex of tergite VIII (9). (10) *D. negus* sp. n., abdominal apex. (11) *D. gibbosus* sp. n., abdominal apex. All in dorsal view, SEM in "Compo" mode. Scale bar = 0.25 mm for (9), 0.35 mm for (10), 0.40 mm for (11) and 1.00 mm for (8).

impression; pronotal disc filled with conspicuous medium/fine substrigulate microsculpture, in directionality surrounding centre, latter with scattered, fine and inconspicuous punctation; elytra with posterior portion of disc conspicuously swollen; posterior portion of sutural margin markedly below level of disc; posterior elytral margin subangulate (Fig. 15); abdomen with pubescence on laterobasal parts of tergites (Fig. 14) directed only slightly outwards; pectinate middle (comb) of apical margin of abdominal tergite VIII as in Fig. 11.



FIGS 12-16

(12-13) *Deleaster pectinatus* Fauvel, antenna (12) and lateral part of abdomen (13), dorsal view. (14-16) *D. gibbosus* sp. n. lateral part of abdomen (14), elytral apex with abdomen (15) and abdominal apex (16), dorsal views. All SEM in "3D mode". Scale bar = 0.35 mm for (16), 0.80 mm for (15), 1.00 mm for (12-14).



FIGS 17-24

(17-20) *Deleaster gibbosus* sp. n., male, aedeagus frontal (17) and lateral (18) views, tergites IX (19) and X (20). (21-24) *D. negus* sp. n., male, aedeagus in frontal (21) and lateral (22) views, tergites IX (23) and X (24). Scale bar = 0.34 mm for (17-18), 0.40 mm for (19-24).

Sexual characters: Female abdominal sternite VIII sinuate subapically, broadly rounded and very finely serrate on apical margin. Male abdominal tergite IX as in Fig. 19; tergite X as in Fig. 20; sternite VIII broadly produced on apex, with membranous edge; aedeagus as in Figs 17-18.

ETYMOLOGY: The Latin name of the new species means "humped" and refers to the conspicuously swollen posterior part of the elytra.

DISTRIBUTION: The species is known only from the Ruwenzori range in the Democratic Republic of Congo (Zaire) and Uganda.

COMMENTS: Within Afrotropical *Deleaster*, the presence of conspicuously swollen posterior portion of elytral disc is diagnostic for *D. gibbosus*. The species shares with *D. negus* the presence on abdominal tergite VIII of a comb with a minute mesal denticle, but the two species have very distinctive aedeagi.

Deleaster negus new species Figs 2, 5, 10, 21-24

HOLOTYPE (♂): ETHIOPIA: SNNPR [Southern Nations, Nationalities and Peoples' Region], Gamu Gofa, Gughe Mts., 6km SW Chencha, 6.2031°N, 37.5605°E, 2515m, 05.VIII.2008, leg. J. Beck, automatic light trap (7-11pm), edge of a large pasture next to forest fragment in good condition, apart from dead wood collecting (NHMB).

PARATYPES (9): same data as holotype, 2♂, 3♀ (NHMB), 1♂, 1♀ (MHNG), 1♂ (MRAC), 1♂ (NHMW).

DESCRIPTION: Measurements (n = 10: unit = mm): HW = 1.27 (1.22-1.31); TW = 1.09 (1.04-1.12); PW = 1.19 (1.15-1.23); SW = 1.73 (1.66-1.86); AW = 2.05 (1.95-2.22); HL = 0.85 (0.83-0.87); EL = 0.51 (0.48-0.54); TL = 0.13 (0.10-0.15); PL = 1.02 (0.97-1.06); SL = 2.09 (1.98-2.21); SC = 1.96 (1.81-2.10); FB = 4.32 (4.05-4.56); BL = 7.11 (6.18-7.89).

Similar to *D. pectinatus*, from which it may be distinguished as follows: habitus as in Fig. 2; scape and pedicel almost concolorous with flagellum; head as in Fig. 5; vertex with markedly curved, broad grooves (with the remnants of the ocelli in their middle) extending anterolaterally from middle of neck margin to middle of inner eyes margin, forming together a rather U-shaped impression surrounding the disc, filled with dense granulose microsculpture unlike the imbricate microsculpture filling most of the groove delineating dorsal part of neck; pronotum (Fig. 5) with hind angles evenly rounded; presence of two rather strongly protruding knob-like elevations near posterior pronotal angles; presence of deep, curved pronotal subbasal impression; medial pronotal groove very fine, indistinct posteriorly, an indistinct coriaceous/substrigulate microsculpture in directionality surrounding the centre of pronotal disc, but there missing on larger spots, leaving the surface smooth and shiny; elytra with post-scutellar area gently depressed till middle of suture; posterior portion of elytral disc not swollen; posterior portion of sutural margin on level with disc; abdomen with laterosternites moderately broad; pubescence on laterobasal parts of tergites not directed outwards; pectinate middle (comb) of apical margin of abdominal tergite VIII as in Fig. 10.

Sexual characters: Female abdominal sternite VIII expanded subapically, subtriangular, narrowly rounded apically and with couple of tiny (and occasionally also

1-2 larger) incisions on apical margin. Male abdominal tergite IX as in Fig. 23; tergite X as in Fig. 24; sternite VIII with slightly and narrowly produced apex, with membranous edge; aedeagus as in Figs 21-22.

ETYMOLOGY: The specific epithet 'negus' refers to the title of king in Ethiopia. It is a noun in apposition.

DISTRIBUTION: The species is known only from Ethiopia, from its type locality that lies more south than that of *D. pectinatus* Fauvel.

COMMENTS: *Deleaster negus* is the only Afrotropical member of the genus to possess on the abdominal tergite VIII a comb with a minute mesal denticle in combination with the posterior portion of the elytral disc lacking hump.

ACKNOWLEDGEMENTS

Thanks are due to the curators listed under the material section for loan of types and material under their care. The second author is grateful to the first author who arranged the visit in MHNG and gave an opportunity to the studies that resulted in the present article. The SEM images were taken with financial help of the Hungarian Scientific Research Fund (OTKA No. 69235, principal investigator Zoltán Korsós). The authors warmly thank Harald Schillhammer (NHMW) for the colour habitus photographs and Alfred Newton (Field Museum of Natural History, Chicago), who helped with a copy of the rare publication of Raffray from the Newberry Library (Chicago), unobtainable mostly for its brittle paper.

REFERENCES

BOUCHARD, P., BOUSQUET, Y., DAVIES, A. E., ALONSO-ZARAZAGA, M. A., LAWRENCE, J. F., LYAL, C. H. C., NEWTON, A. F., REID, C. A. M., SCHMITT, M., ŚLIPIŃSKI, A. A., SMITH, A. B. T. 2011. Family-group names in Coleoptera (Insecta). *ZooKeys* 88: 1-972.

FAUVEL, A. 1882. Deux staphylinides de l'Abyssinie subalpine. *Revue d'Entomologie* 1: 129-131.

GREBENNIKOV, K. A. 2002. Western Palaearctic species of the genus *Deleaster* Erichson, 1839 (Coleoptera: Staphylinidae: Oxytelinae). *Zoosystematica Rossica* 10(2): 373-378.

MAKRANCZY, GY. 2006. Systematics and phylogenetic relationships of the genera in the *Carpelimus* group (Coleoptera: Staphylinidae: Oxytelinae). *Annales historico-naturales musei nationalis hungarici* 98: 29-119.

RAFFRAY, A. 1882. Voyage en Abyssinie et au pays de Gallas-Raïas. *Bulletin de la Société de Géographie (de Paris)* (7)3(1): 324-351, altitude table (p. 352), 2 maps.

Revue suisse de Zoologie 120 (4): 549-561; décembre 2013

Four new species of *Homoneura* s. str. from Yunnan, China (Diptera, Lauxaniidae)

Wenliang LI[1, 2] & Ding YANG[1, 3]

[1] Department of Entomology, China Agricultural University, Beijing 100193, China. Email: laughonce@126.com

[2] College of Forestry, Henan University of Science and Technology, Luoyang 471003, China.

[3] Corresponding author. E-mail: dyangcau@yahoo.com.cn

Four new species of *Homoneura* s. str. from Yunnan, China (Diptera, Lauxaniidae). - Four species of *Homoneura* s. str. from Yunnan, China are described as new to science: *H. cangshanensis* sp. n., *H. crispa* sp. n., *H. semiannulata* sp. n. and *H. trisurstylata* sp. n.

Keywords: Diptera - Lauxaniidae - *Homoneura* s. str. - new species - Yunnan.

INTRODUCTION

The genus *Homoneura* van der Wulp in the family Lauxaniidae contains 8 subgenera and more than 600 species in the world. The subgenus *Homoneura* van der Wulp is the largest subgenus, including more than 500 known species in the world and more than 100 known species in China (Shi & Yang 2009; Wang, Gao & Yang 2012; Li & Yang 2012). It can be easily separated from other subgenera of the genus *Homoneura* by the following characters: mesoscutum with anterior supra-alar bristle and intra-alar bristle absent; fore tibia not compressed in male, mid tibia usually with 2-3 posterior ventral bristles, posterior dorsal bristle absent; hind tarsomere 2 not distinctly darkened; wing with costal setulae ending abruptly at tip of R_{4+5}, apical section of M_{1+2} not curved forward (Shi & Yang 2009). In the present paper, 4 new species are added to the fauna of Yunnan.

MATERIAL AND METHODS

Genitalia preparations were made by removing and macerating the apical portion of the abdomen in cold saturated NaOH for 6-10 hours, acidify the preparations with glacial acetic acid in water. After examination, they were transferred to fresh glycerine and stored in a microvial on the pin below the specimen. Specimens examined were deposited in the Entomological Museum of China Agricultural University (CAU), Beijing and in the Natural History Museum of Geneva, Switzerland (MHNG). The general terminology follows McAlpine (1981) and Shewell (1987). The following abbreviations for bristles are used: a = anterior, acr = acrostichal, ad = anterior dorsal, anepst = anepisternal, apv = apical ventral, av = anterior ventral, dc = dorsocentral, kepst = katepisternal, oc = ocellar, or = fronto-orbital, pd = posterior dorsal, prsc = prescutellar, pv = posterior ventral.

Manuscript accepted 19.09.2013

TAXONOMIC PART

***Homoneura cangshanensis* new spec.** Figs 1-10

MATERIAL: Holotype ♂ (CAU), CHINA, Yunnan Province: Dali, Cangshan, Wuweisi (25°43'N, 100°07'E, 2200 m), 30. VII. 2006, Kuiyan Zhang. – Paratypes: CHINA, Yunnan Province: 1 ♀ (CAU), data same as holotype. – 1 ♀ (MNHG), Dali, Cangshan, Wuweisi (25°43'N, 100°07'E, 2200 m), 1. VIII. 2006, Kuiyan Zhang.

ETYMOLOGY: The new species is named after the type locality Cangshan.

DIAGNOSIS: Antennal arista long plumose, with longest hairs as long as height of 1st flagellomere. Wing with 5 brown spots, separately on r-m, dm-cu, and preapices of R_{2+3}, R_{4+5}, M_1, preapcial spot of M_1 obscure. Abdominal tergites 2-5 somewhat irregular brownish yellow at anterior margin; protandrium incompletely circular; surstylus claviform, curved backward and acuate apically; aedeagus with pair of dorsal sclerites incurved and convergent apically.

DESCRIPTION

Male: Body length 4.1 mm, wing length 4.7 mm. *Female*: Body length 4.8-4.9 mm, wing length 5.1-5.2 mm.

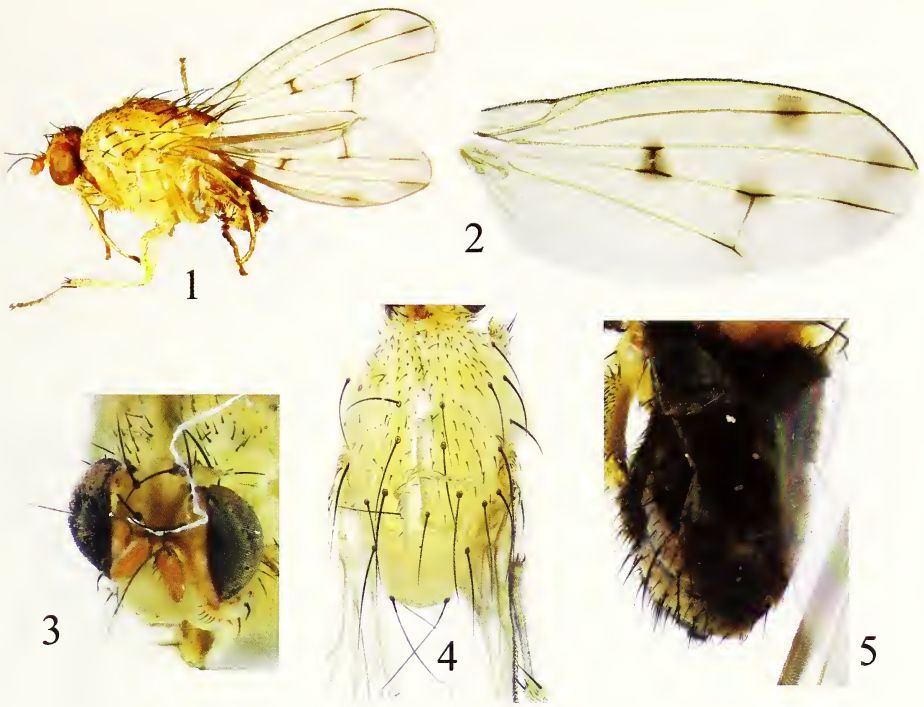
Head (Fig. 3) yellow. Frons slightly wider than long and parallel-sided; ocellar triangle brown; oc strong, about as long as anterior or, anterior or shorter than posterior or. Gena about 1/6 height of eye. Antenna yellow, 1st flagellomere brownish, 1.3 times longer than high; arista long plumose, blackish brown except brown basally, with longest hairs as long as height of 1st flagellomere. Proboscis yellowish brown, with yellowish and blackish hairs; palpus pale yellow with blackish hairs.

Thorax (Fig. 4) yellow with grayish white pruinescence. Mesoscutum with 0+3 dc, anterior dc clearly behind transverse scutal suture, acr in 6 somewhat irregular rows. prsc somewhat shorter than 1st post-sutural dc. Legs pale yellow. Fore femur with 4 strong pv and 5 pd, ctenidium with 11-12 short bristles; fore tibia with 1 long preapical ad and 1 short apv. Mid femur with 4 a and 1 apv; mid tibia with 1 strong preapical ad and 3 strong apv. Hind femur with 1 preapical ad; hind tibia with 1 weak preapical ad and 1 short apv. Wing (Fig. 2) slightly yellow, with 5 brown spots, separately on r-m, dm-cu, and preapices of R_{2+3}, R_{4+5}, M_1, preapcial spot of M_1 obscure; subcostal cell hyaline; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}) and 4th (between R_{4+5} and M_1) sections in proportion of 2.5 : 0.8 : 0.5; r-m beyond middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 1.5 : 1.0; ultimate section of CuA_1 about 1/7 of penultimate. Halter pale yellow.

Abdomen (Fig. 5) yellow; tergites 2-5 somewhat irregular brownish yellow at anterior margin. Male genitalia (Figs. 6-10): protandrium incompletely circular; epandrium nearly trapezoid in lateral view; surstylus claviform , curved backward and acuate apically; hypandrial apodeme long and parallel; gonopod columniform, about as long as aedeagus; aedeagus without apical incision, but with pair of dorsal sclerites incurved and convergent apically; aedeagal apodeme as long as aedeagus.

DISTRIBUTION: China (Yunnan).

REMARKS: The new species resembles *H. longinotata* Shi & Yang from China (Hainan) in the following characters: ocellar triangle brown; oc about as long as anterior or; arista long plumose, with longest hairs as long as height of 1st flagello -



FIGS 1-5

Homoneura cangshanensis sp. n. Male. (1) Body, lateral view. (2) Wing. (3) Head, dorsal view. (4) Mesoscutum, dorsal view. Female. (5) Abdomen, dorsal view.

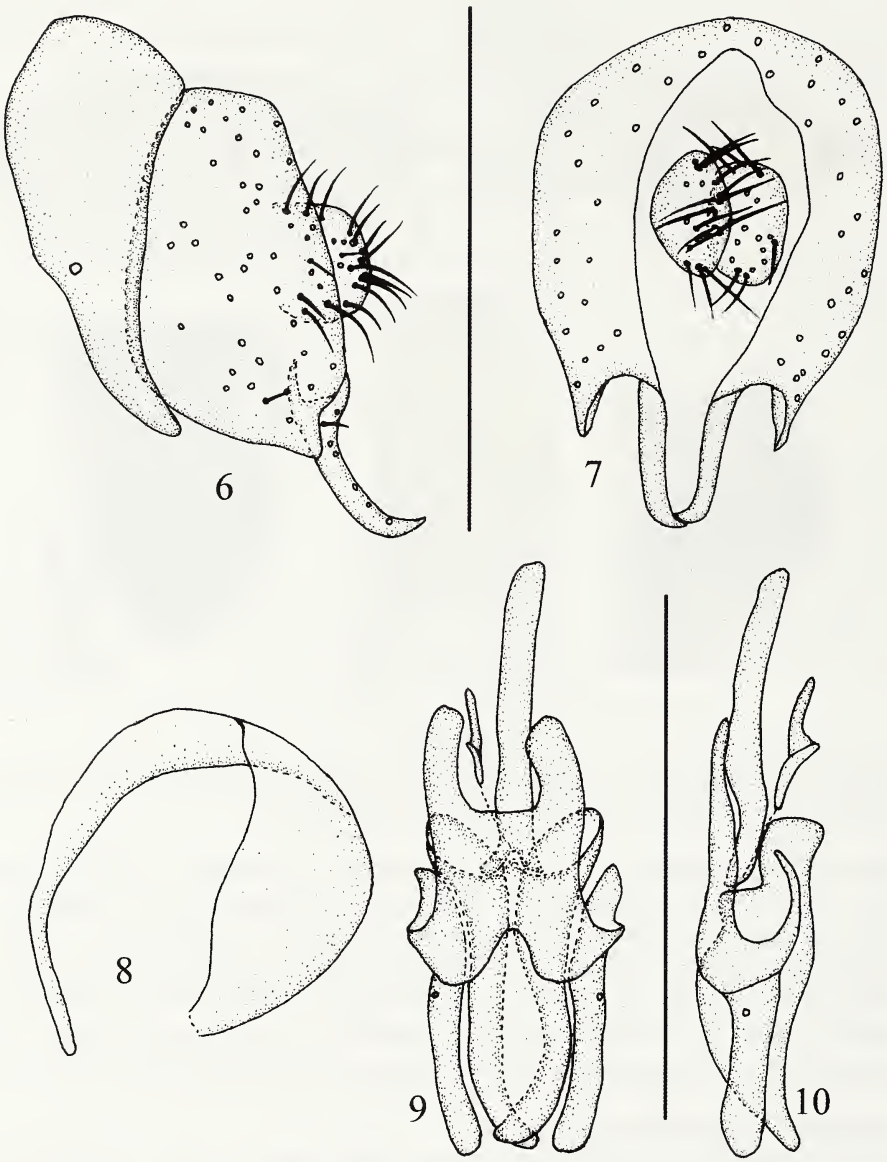
mere; wing with similar pattern; abdomen without dark spots; surstylus claviform, curved backward and acuate apically. But it can be separated from the latter by the following features: frons without dark bands; 1st flagellomere brownish; protandrium incompletely circular; aedeagus without apical incision; aedeagal apodeme as long as aedeagus. In *H. longinotata*, the frons has 2 brownish bands; the 1st flagellomere is black at apical 1/3; the protandrium is a complete circle; the apical incision of the aedeagus is deep; the aedeagal apodeme is shorter than aedeagus (Shi & Yang 2009).

***Homoneura crispa* new. spec.** Figs 11-20

MATERIAL: Holotype ♂ (CAU), CHINA, Yunnan Province: Fugong, Yaping (27°10'N, 98°45'E, 2000 m), 27. V. 2007, Xingyue Liu (CAU). – Paratypes: CHINA, Yunnan Province: 1 ♂ (MNHG), data same as holotype.

ETYMOLOGY: Latin, *crispa*, meaning curled, referring to the aedeagus curled apically.

DIAGNOSIS: Frons with 2 brown lateral bands. Wing with 5 brown spots, dark on dm-cu, r-m, preapices of R_{2+3}, R_{4+5} and M_1; preapical spots of R_{4+5} and M_1 confluent; subcostal cell brownish. Abdominal tergites 2-6 each with a black band at posterior margin, and tergites 3-6 with a narrow black median band; protandrium



FIGS 6-10

Homoneura cangshanensis sp. n. Male. (6) Protandrium and epandrium, lateral view. (7) Epandrial complex, posterior view. (8) Protandrium, anterior view. (9) Aedeagal complex, ventral view. (10) Aedeagal complex, lateral view. Scale 0.5 mm.

circular; surstylus bifurcated; hypandrium Y-shaped; aedeagus curled towards dorsum and acuted apically, with pair of lateral spurs medially.

DESCRIPTION

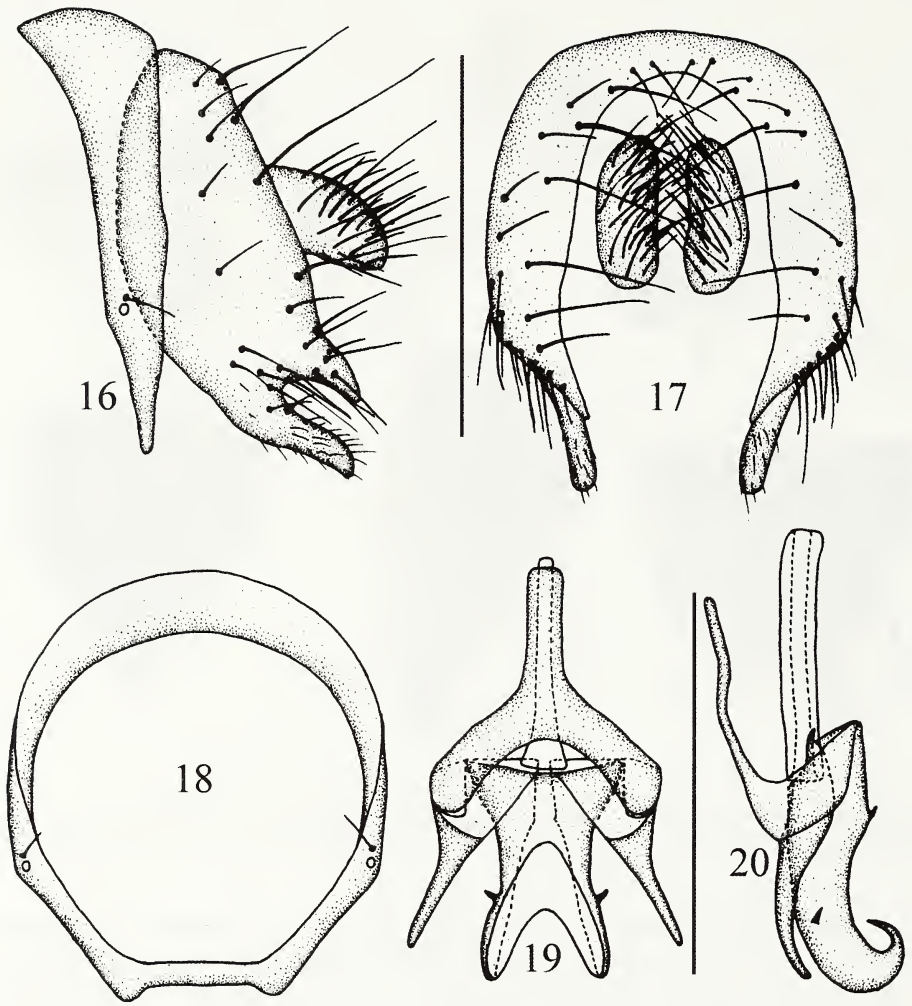
Male: Body length 4.2-4.3 mm; wing length 4.3-4.5 mm.

FIGS 11-15

Homoneura crispa sp. n. Male. (11) Body, lateral view (apical portion of abdomen removed). (12) Wing. (13) Head, dorsal view. (14) Mesoscutum, dorsal view. (15) Abdomen, dorsal view.

Head (Fig. 13) yellow. Frons about as wide as long and parallel-sided, with 2 brown lateral bands; ocellar triangle black brown; oc strong, about as long as anterior or; anterior or shorter than posterior or. Gena about 1/5 height of eye. Antenna yellow; 1st flagellomere yellow except brown one side, 1.6 times longer than high; arista black except brown basally, with longest hairs about 1/4 width of 1st flagellomere. Proboscis brownish, with blackish and yellowish hairs; paplus yellowish, with black hairs.

Thorax (Fig. 14) brownish, with grayish white pruinescence. Mesoscutum with 1 wide blackish brown median band extending to apical margin of scutellum, 0+3 dc, anterior dc close to transverse scutal suture, acr in 6 rows, prsc shorter than anterior dc. Legs yellow. Fore femur with 5 strong pv and 7 pd, ctenidium with 9-10 short bristles; fore tibia with 1 long preapical ad and 1 short apv. Mid femur with 7 a and 1 apv; mid tibia with 1 strong preapical ad and 3 strong apv. Hind femur with 1 preapical ad; hind tibia with 1 weak preapical ad and 1 short apv. Wing (Fig. 12) slightly yellow, with 5 brown spots, dark on dm-cu, r-m, preapices of R_{2+3}, R_{4+5} and M_1; preapical spots of R_{4+5} and M_1 confluent; subcostal cell brownish; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}) and 4th (between R_{4+5} and M_1) sections in proportion of 12 : 2.8 : 2.3; r-m before middle of discal cell; ultimate and penultimate



FIGS 16-20

Homoneura crispa sp. n. Male. (16) Protandrium and epandrium, lateral view. (17) Epandrial complex, posterior view. (18) Protandrium, anterior view. (19) Aedeagal complex, ventral view. (20) Aedeagal complex, lateral view. Scale 0.5 mm.

sections of M_1 in proportion of 1.8 : 1.0; ultimate section of CuA_1 about 1/8 of penultimate. Halter pale yellow.

Abdomen (Fig. 15) brown, with grayish white pruinescence; tergites 2-6 each with a black band at posterior margin, and tergites 3-6 with a narrow black median band. Male genitalia (Figs 16-20): protandrium circular, with setulae above spiracle; surstylus bifurcated, anterior one with hairs, and longer than posterior one; hypandrium Y-shaped, hypandrial apodemes not distinct, gonopod long; aedeagus curled towards dorsum and acuted apically, with pair of lateral spurs medially.

Female: Unknown.

DISTRIBUTION: China (Yunnan).

REMARKS: The new species resembles *H. suturalis* Yang, Zhu & Hu from China (Fujian) in the following characters: wing with similar pattern, preapical spots of R_{4+5} and M_1 confluent; anterior dc close to transverse scutal suture; abdominal tergites with a black median band. But it can be separated from the latter by the following features: face without spots; mesoscutum with 1 wide blackish brown median band extending to apical margin of scutellum; subcostal cell of wing brownish; abdominal tergites 2-6 each with a black band at posterior margin. In *H. suturalis*, the face has a brown spot; the mesoscutum has no darkened bands; the subcostal cell of the wing is hyaline; abdominal tergites 2-6 each has a black band at the posterior margin (Yang, Zhu & Hu 2003).

***Homoneura semiannulata* new spec.** Figs 21-30

MATERIAL: Holotype ♂ (CAU), CHINA, Yunnan Province: Kunming, Xishan, Erdaogou (24°58'N, 102°37'E, 1900 m), 15. IV. 2007, Hui Dong. – Paratypes: CHINA, Yunnan Province: 1 ♀ (CAU), data same as holotype. – 1 ♂ (MNHG), Kunming, Xishan (24°58'N, 102°37'E, 1900 m), 16. V. 1981, Jikun Yang; 1 ♂ (CAU), Kunming, Fengmingshan (25°38'N, 102°51'E, 2600 m), 3. X. 1987, Jinjun Du. – 1 ♂, 4 ♀♀ (CAU & MNHG), Kunming, Xishan (24°58'N, 102°37'E, 1900 m), 28. V. 2005, Xingyue Liu.

ETYMOLOGY: Latin, *semi-*, prefix meaning half + *annulata*, meaning annular, referring to the shape of the hypandrial ventral processes in the lateral view.

DIAGNOSIS: Face brownish except yellow ventral margin medially. Wing (Fig. 23) slightly yellow, with 5 brown spots, separately on r-m, dm-cu, and preapices of R_{2+3}, R_{4+5}, M_1, preapcial spot of M_1 obscure. Abdominal tergites 5-6 each with a brown median spot; protandrium incompletely circular; surstylus consisting of 2 processes; hypandrium semiannular in the lateral view, long ventral processes incurved and almost convergent; aedeagus with deep apical incision.

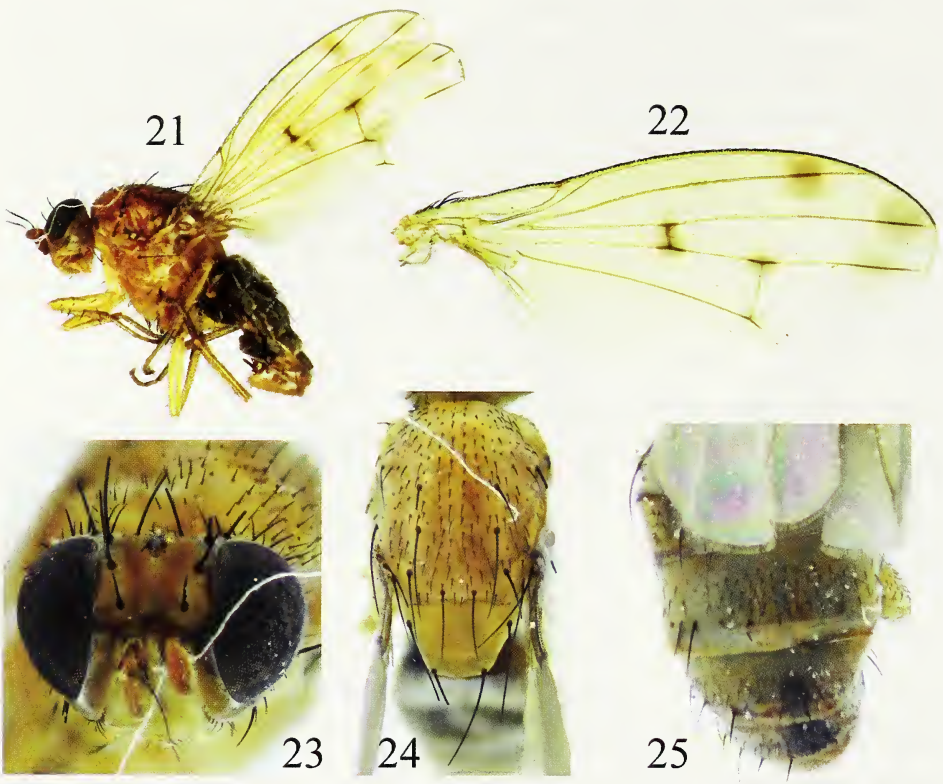
DESCRIPTION

Male: Body length 4.7-5.7 mm, wing length 5.0-5.7 mm.

Female: Body length 5.0-5.3 mm, wing length 5.3-5.5 mm.

Head (Fig. 23) yellow. Face brownish except yellow ventral margin medially. Frons slightly wider than long and parallel-sided; ocellar triangle brown; oc strong, about as long as anterior or, anterior or slightly shorter than posterior or. Gena about 1/6 height of eye. Antennal scape and pedicel yellow, 1st flagellomere brownish except yellow basally; 1st flagellomere 1.3 times longer than high; arista long plumose, blackish brown except brown basally, with longest hairs as long as height of 1st flagellomere. Proboscis yellowish brown, with yellowish and blackish hairs; palpus pale yellow with blackish hairs.

Thorax (Fig. 24) yellow with grayish white pruinescence. Mesoscutum with 0+3 dc, anterior dc clearly behind transverse scutal suture, acr in 6 somewhat irregular rows, prsc somewhat shorter than 1st post-sutural dc. Legs pale yellow. Fore femur with 4 strong pv and 6 pd, ctenidium with 10-12 short bristles; fore tibia with 1 long preapical ad and 1 short apv. Mid femur with 6 a and 1 apv; mid tibia with 1 strong preapical ad and 3 strong apv. Hind femur with 1 preapical ad; hind tibia with 1 weak preapical ad and 1 short apv. Wing (Fig. 22) slightly yellow, with 5 brown spots, sepa-



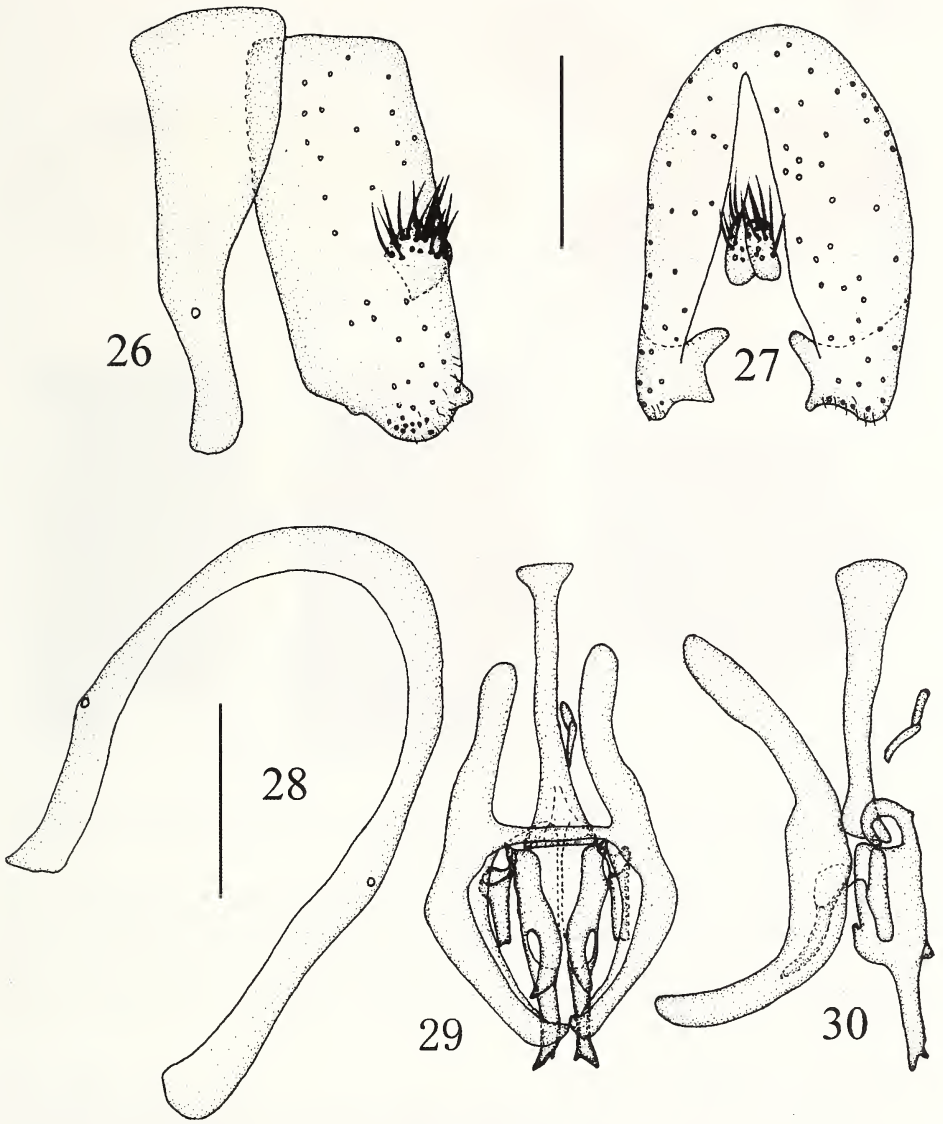
FIGS 21-25

Homoneura semiannulata sp. n. Male. (21) Body, lateral view. (22) Wing. (23) Head, dorsal view. (24) Mesoscutum, dorsal view. (25) Abdomen, dorsal view.

rately on r-m, dm-cu, and preapices of R_{2+3}, R_{4+5}, M_1, preapcial spot of M_1 obscure; subcostal cell hyaline; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}) and 4th (between R_{4+5} and M_1) sections in proportion of 2.6 : 0.8 : 0.5; r-m beyond middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 1.5 : 1.0; ultimate section of CuA_1 about 1/8 of penultimate. Halter pale yellow.

Abdomen (Fig. 25) yellow; tergites 5-6 each with a blackish brown median spot. Male genitalia (Figs 26-30): protandrium incompletely circular; epandrium nearly oblong in lateral view, surstylus consisting of 2 small processes, anterior process at basal 1/3 of epandrium, posterior process at ventral apex of epandrium; hypandrium semiannular in the lateral view, hypandrial apodeme long and parallel, long ventral processes incurved and almost convergent; gonopod columniform, shorter than 1/2 length of aedeagus; aedeagus with deep apical incision, pair of dorsal sclerites bifurcated apically, pair of ventral aclerites curved outward and acute apically; aedeagal apodeme longer than aedeagus.

DISTRIBUTION: China (Yunnan).



FIGS 26-30

Homoneura semiannulata sp. n. Male. (26) Protandrium and epandrium, lateral view. (27) Epandrial complex, posterior view. (28) Protandrium, anterior view. (29) Aedeagal complex, ventral view. (30) Aedeagal complex, lateral view. Scale 0.5 mm.

REMARKS: The new species resembles *H. haejuana* Sasakawa & Kozánek from North Korea in the following characters: frons slightly wider than long; ocellar triangle brown; wing with similar pattern. But it can be separated from the latter by the following features: face brownish except yellow on ventral margin medially; abdominal tergites 5-6 each with a blackish brown median spot; protandrium incompletely

FIGS 31-35

Homoneura trisurstylata sp. n. male. (31) Body, lateral view. (32) Wing. (33) Head, dorsal view. (34) Mesoscutum, dorsal view. (35) Abdomen, dorsal view.

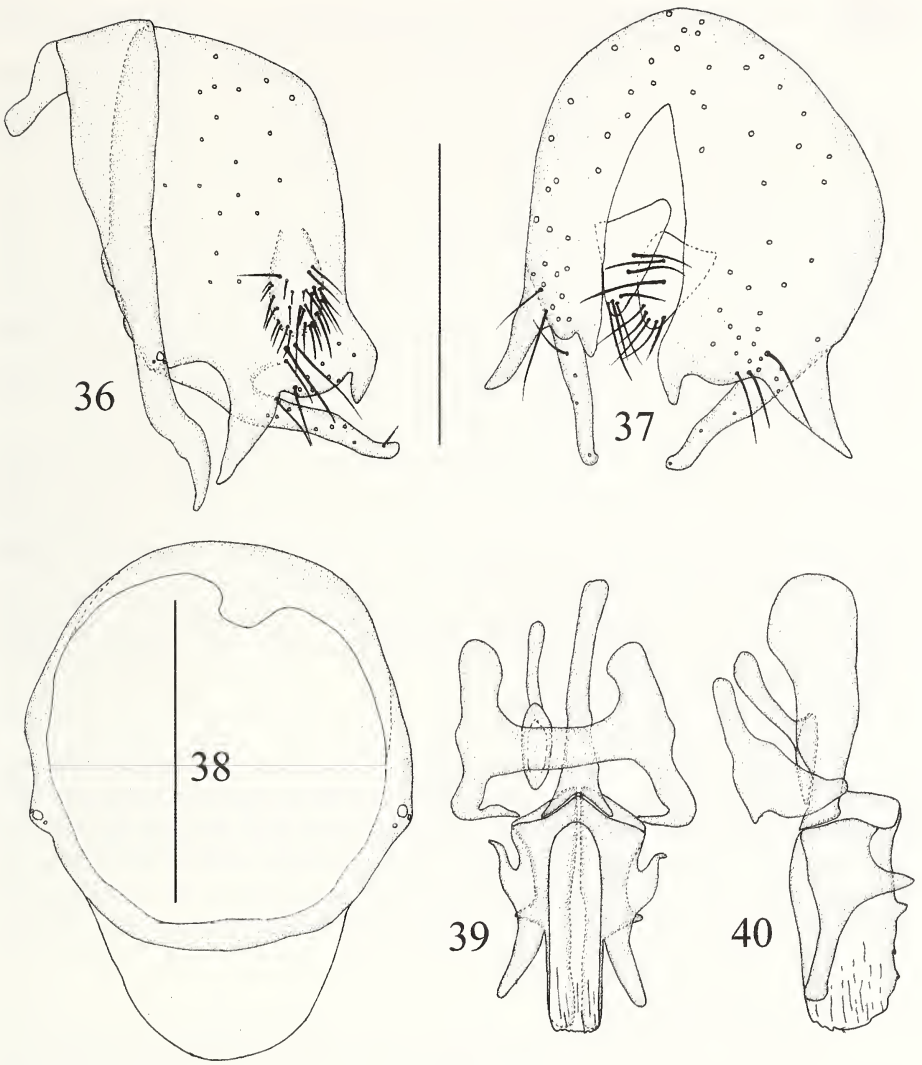
circular; surstylus consisting of 2 small processes; hypandrium semiannular in the lateral view. In *H. haejuana*, the face is entirely yellow; the abdominal tergites 3-6 each has a brown median longitudinal band; the protandrium is a complete circle; the surstylus has a long ungulate process; the hypandrium is not semiannular in the lateral view (Sasakawa & Kozánek 1995).

***Homoneura trisurstylata* new spec.** Figs 31-40

MATERIAL: Holotype ♂ (CAU), CHINA, Yunnan Province: Xishuangbanna, Menglun, Lushilin (21°54'N, 101°16'E, 600 m), 5. V. 2009, Tingting Zhang. – Paratypes: CHINA, Yunnan Province: 1 ♂, 1 ♀ (MNHG), Xishuangbanna, Menglun, Lushilin (21°54'N, 101°16'E, 600 m), 21. IV. 2007, Wenliang Li. – 1 ♀ (CAU), Xishuangbanna, Menglun, Lushilin (21°54'N, 101°16'E, 600 m), 21. IV. 2007, Hui Dong.

ETYMOLOGY: Latin, *tri-*, prefix meaning three + *surstyla*, meaning surstylus, referring to the surstylus consisting of 3 processes.

DIAGNOSIS: Antenna yellow except 1st flagellomere blackish brown at apical 1/3. Wing with 5 brown spots, separately on r-m, dm-cu, preapices of R_{2+3}, M_1, and apex of R_{4+5}, preapcial spot of M_1 obscure. Protandrium circular; surstylus consisting of 3 processes; hypandrium H-shaped.



FIGS 36-40

Homoneura trisurstylata sp. n. male. (36) Protandrium and epandrium, lateral view. (37) Epandrial complex, posterior view. (38) Protandrium, anterior view. (39) Aedeagal complex, ventral view. (40) Aedeagal complex, lateral view. Scale 0.5 mm.

DESCRIPTION

Male: Body length 4.8-5.1 mm, wing length 4.6-4.8 mm.

Female: Body length 4.3-4.6 mm, wing length 4.5-4.6 mm.

Head (Fig. 33) yellow. Frons slightly wider than long and parallel-sided; ocellar triangle brown; oc strong, about as long as anterior or, anterior or slightly shorter than posterior or. Gena about 1/7 height of eye. Antenna yellow except 1st flagellomere blackish brown at apical 1/3; 1st flagellomere 1.4 times longer than high; arista long

plumose, with longest hairs longer than height of 1st flagellomere. Proboscis yellowish brown, with yellowish and blackish hairs; palpus pale yellow with blackish hairs.

Thorax (Fig. 34) yellow with grayish white pruinescence. Mesoscutum with 0+3 dc, anterior dc clearly behind transverse scutal suture, acr in 10 somewhat irregular rows, prsc somewhat shorter than 1st post-sutural dc. Legs pale yellow. Fore femur with 4 strong pv and 5 pd, ctenidium with 12-17 short bristles; fore tibia with 1 long preapical ad and 1 short apv. Mid femur with 6 a and 1 apv; mid tibia with 1 strong preapical ad and 3 strong apv. Hind femur with 1 preapical ad; hind tibia with 1 weak preapical ad and 1 short apv. Wing (Fig. 32) slightly yellow, with 5 brown spots, separately on r-m, dm-cu, preapices of R_{2+3}, M_1, and apex of R_{4+5}, preapcial spot of M_1 obscure; subcostal cell hyaline; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}) and 4th (between R_{4+5} and M_1) sections in proportion of 2.5 : 0.7 : 0.5; r-m at middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 1.5 : 1.0; ultimate section of CuA_1 about 1/8 of penultimate. Halter pale yellow.

Abdomen (Fig. 35) yellow. Male genitalia (Figs 36-40): protandrium circular; epandrium nearly oblong in lateral view, surstylus consisting of 3 processes, in the lateral view, anterior process claviform and recurved, median process triangulum and curved forward, posterior process similar as median process in shape but smaller; hypandrium H-shaped, hypandrial apodeme long and parallel; gonopod columniform, shorter than aedeagus; aedeagus without apical incision, dorsal sclerites with pair of trochiformis processes laterally, and with a small acute process preapically; aedeagal apodeme about as long as aedeagus.

DISTRIBUTION: China (Yunnan).

REMARKS: The new species resembles *H. quiquenotata* (de Meijere) from Java in the following characters: 1st flagellomere blackish brown apically; wing with similar pattern; protandrium circular. But it can be separated from the latter by the following features: surstylus consisting of 3 processes; aedeagus without apical incision; aedeagal apodeme about as long as aedeagus. In H. quiquenotata, the surstylus has 1 process; the aedeagus has a deep apical incision; the aedeagal apodeme is shorter than the aedeagus (Sasakawa, 1992).

ACKNOWLEDGEMENTS

The authors express their sincere thanks to Dr. Kuiyan Zhang, Dr. Xingyue Liu, Dr. Yajun Zhu, Dr. Tingting Zhang, Dr. Jikun Yang, Dr. Jinjun Du and Dr. Hui Dong (Beijing) for their kind help and collecting the specimens. The research was funded by the Ministry of Science and Technology of the Republic of China (2012FY111100) and the National Natural Science Foundation of China (31061160186, 31111140015, 31301903).

REFERENCES

DE MEIJERE, J. C. H. 1910. Studien über südostasiatische Diperen. IV. Die neue Dipteren-fauna van Krakatau. *Tijdschrift voor Entomologie* 53: 120-194.

KERTÉSZ, K. 1900. Beitrãge zur Kenntnis der Indo-Australischen Sapromyza-Arten. *Természetrajzi Füzetek* 23: 254-276.

LI, W. L., LI, Q. & YANG, D. 2008. A new species and a new record species of *Homoneura* from Yunnan, China (Diptera, Lauxaniidae). *Acta Zootaxonomica Sinica* 33(2): 406-409.

LI, W. L. & YANG, D. 2012. Eleven new species of the Homoneura (Homoneura) beckeri group from Yunnan, China (Diptera, Lauxaniidae). *Zootaxa* 3537: 1-28.

MALLOCH, J. R. 1927. H. Sauter's Formosa collection: Sapromyzidae (Diptera). *Entomologische Mitteilungen* 16(3): 159-172.

MALLOCH, J. R. 1929. Notes on some Oriental sapromyzid flies (Diptera), with particular reference to the Philippine species. *Proceedings of the United States National Museum* 74(6): 1-97.

MCALPINE, J. F. 1981. Chapter 2. Morphology and Terminology: Adults. *In*: MCALPINE, J.F., PETERSON, B.V., SHEWELL, G.E. TESKEY, H.J., VOCKEROTH, J.R. & WOOD, D.M. (Coords.), *Manual of Nearctic Diptera*, Vol. 1. *Research Branch, Agriculture Canada, Ottawa, Monograph* 27: 9-63.

SASAKAWA, M. & IKEUCHI, S. 1982. A revision of the Japanese species of *Homoneura* (*Homoneura*) (Diptera, Lauxaniidae). Part 1. *Kontyû* 50 (3): 477-499.

SASAKAWA, M. 1985. A revision of the Japanese species of *Homoneura* (*Homoneura*) (Diptera, Lauxaniidae). Part 3. *Kontyû* 53 (3): 491-502.

SASAKAWA, M. 1992. Lauxaniidae (Diptera) of Malaysia (part 2): a revision of *Homoneura* van der Wulp. *Insecta Matsumurana* 46: 133-210.

SASAKAWA, M. & KOZANEK, M. 1995. Lauxaniidae (Diptera) of North Korea. Part 1. *Japanese Journal of Entomology* 63 (1): 67-75.

SHEWELL, G. E. 1987. Lauxaniidae. *In*: MCALPINE, J.F., PETERSON, B.V., SHEWELL, G.E., TESKEY, H.J., VOCKEROTH, J.R., & WOOD, D.M. (Coords.), *Manual of Nearctic Diptera*, Vol. 2. *Research Branch, Agriculture Canada, Ottawa, Monograph* 28: 951-964.

SHI, L. & YANG, D. 2009. Notes on species groups of subgenus *Homoneura* from China with descriptions of two new species (Diptera, Lauxaniidaae). *Acta Zootaxonomica Sinica* 34 (3): 462-471.

WANG, J. C., GAO, C. X. & YANG, D. 2012. Three new species of the *Homoneura* (*Homoneura*) *henanensis* species group (Diptera, Lauxaniidae), with a key to Chinese species. *Zootaxa* 3262: 35-45.

YANG, D., ZHU, F. & HU, X. Y. 2003. Diptera: Lauxaniidae. *In*: HUANG, B K (Eds). *Fauna of Insects in Fujian Province of China*. Vol. 8: 555-558. Fujian Science and Technology Publishing House, Fuzhou, pp. 706.

Revue suisse de Zoologie 120 (4): 563-573; décembre 2013

Taxonomic notes on the genus *Nomuraius* Hlaváč (Staphylinidae: Pselaphinae)

Zi-Wei YIN & Li-Zhen LI*
Department of Biology, College of Life and Environmental Sciences, Shanghai Normal University, 100 Guilin Road., Xuhui District, Shanghai, 200234, P. R. China.
*Corresponding author. Email: pselaphinae@gmail.com

Taxonomic notes on the genus *Nomuraius* Hlaváč (Staphylinidae: Pselaphinae). - The pselaphine genus *Nomuraius* is characterized and revised with three species being treated: the type species *N. vietnamicus* Hlaváč (north Vietnam), *N. piaoacus* n. spec. (north Vietnam), and *N. sinicus* n. spec. (South China). All species are diagnosed, described, and illustrated. A key for the identification of the species is provided.

Keywords: Coleoptera - taxonomy - new species - Vietnam - China.

INTRODUCTION

The tyrine genus *Nomuraius* Hlaváč is one of the smallest of the *Pselaphodes* complex of genera. It currently contains a single species *N. vietnamicus* Hlaváč from north Vietnam (Hlaváč, 2003; Hlaváč & Chandler, 2005).

According to the original description (Hlaváč, 2003) and the revised key to the genera of the *Pselaphodes* complex (Yin & Hlaváč, 2013), *Nomuraius* is characterized by the following features: 1) head with small, nude vertexal foveae; lacking a frontal fovea; 2) pronotum lacking an antebasal sulcus connecting nude median and lateral antebasal foveae; 3) maxillary palpomeres III-IV each asymmetric, slightly expanded to strongly projecting laterally; and 4) Tarsomeres II greatly lobed, extending beyond midlength of tarsomeres III.

An examination of the types of *N. vietnamicus* housed in the National Science Museum, Tokyo, as well as additional specimens collected from north Vietnam and South China facilitated this study, and resulted in the discovery of two new species. In the present paper, a diagnosis, a description, and illustrations of major diagnostic features are provided for all treated species, An identification key is also presented.

MATERIAL AND METHODS

The material treated in this study is housed in the following public institutions and private collections:

SNUC Insect Collection of Shanghai Normal University, Shanghai, China (Z.-W. Yin)
NSMT National Museum of Nature and Science, Tokyo, Japan (S. Nomura)
pcPH private collection of Peter Hlaváč, Praha, Czech Republic

Manuscript accepted 19.09.2013

The collection data of the referred material are quoted verbatim. A slash (/) is used to separate lines on the same label, and a double slash (//) is used to separate different labels. Authors' notes are included in '[]'. Depository is indicated after the collection data of respective species.

The terminological terms applied here follow Chandler (2001), except we use 'ventrite' instead of 'sternite' when discussing the meso- and metathoracic structures.

The following acronyms are used in the text: AL-length of the abdomen along the midline; AW-maximum width of the abdomen; BL-length of the body (= HL + PL + EL + AL); EL-length of the elytra along the sutural line; EW-maximum width of the elytra; HL-length of the head from the anterior clypeal margin to the occipital constriction; HW-width of the head across eyes; PL-length of the pronotum along the midline; PW-maximum width of the pronotum.

TAXONOMY

Nomuraius Hlaváč, 2003

Nomuraius Hlaváč, 2003: 290; type species: *Nomuraius vietnamicus* Hlaváč, 2002 by monotypy.

DIAGNOSIS: Head with distinct frontal rostrum; with small, nude vertexal foveae; lacking frontal fovea; lacking ocular-mandibular carinae; maxillary palpi asymmetric, palpomeres I short, II distinctly pedunculate at bases, roundly expanded to shortly projecting laterally, palpomeres III-IV shortly pedunculate at bases, distinctly projecting laterally. Pronotum with nude median- and lateral antebasal foveae weakly to distinctly marked, lacking antebasal sulcus. Abdomen with tergite IV longest.

REDESCRIPTION: Length 2.70-3.11 mm. Head with short, narrow frontal rostrum, rostrum slightly prominent, antennal tubercles weak; nude vertexal foveae small and nude, lacking frontal fovea, lateral postantennal pits small; with 11 antennomeres, clubs formed by apical three antennomeres; maxillary palpi asymmetric, palpomere II widest near apices, roundly expanded to slightly projecting laterally, III-IV widest near middle, distinctly projecting laterally. Gular flat, shallow foveae separated.

Pronotum with small punctiform to large round median- and lateral antebasal foveae, median longitudinal sulcus present, lacking antebasal sulcus; lateral procoxal foveae deep. Each elytron with two basal foveae; with one subbasal fovea; discal striae extending from outer basal foveae posteriorly beyond elytral midpoint. Thorax with two median mesoventral foveae widely separated; large lateral mesoventral foveae forked, anterior branch larger than posterior branch; lateral mesocoxal foveae present; lacking median and lateral metaventral foveae; posterior margin of metaventrite deeply notched medially.

Legs with tasomeres I short, II greatly lobed, extending beyond midpoint of tasomeres III.

Abdomen with tergite IV longest, more than twice length of next tergite, VI shortest, V and VII subequal in length; tergite IV with mediobasal foveae moved laterally to form large round pockets at end of basal sulcus, with two small basolateral foveae; tergites V-VII each with one pair of small basolateral foveae. Sternite IV longest, as long as V-VII combined along midlength, lacking mediobasal foveae, with large pockets formed by basolateral foveae; V-VII with basolateral foveae weakly indicated.

Males with posterior half of head, apical portions of pronotum, protibiae and metatibiae variously modified. Aedeagus with asymmetric median lobe; elongate parameres symmetric; diaphragm opening nearly oval.

DISTRIBUTION: Three species are known from South China (*N. sinicus*), and north Vietnam (*N. piaoacus*, *N. vietnamicus*).

COMPARATIVE NOTES: Among the members of the *Pselaphodes* complex of genera, *Nomuraius* shares only with *Taiwanophodes* Hlaváč the greatly lobed tarsomeres II. The two genera can be readily separated by the vertexal foveae being nude, the absence of a frontal fovea, and the pronotum lacking an antebasal sulcus connecting the nude median- and lateral antebasal foveae in *Nomuraius*, while *Taiwanophodes* has setose vertexal and frontal foveae, and the pronotal median- and lateral antebasal foveae are setose and are connected by an antebasal sulcus.

Key to males of *Nomuraius*

1a Head with broad, deep cavity at posterior half (Fig. 1A); antennomeres X much shorter than XI (Fig. 2A); pronotum strongly modified at anterior portion (Fig. 2B); metatibiae simple, not expanded medially (Fig. 2H). (north Vietnam: Cao Bang) . . . . . *Nomuraius piaoacus* Yin & Li, new spec.

1b Head concaved only at posterior margin (Figs 1B, 4A); antennomeres X slightly shorter than XI (Figs 3A, 5A); pronotum only slightly modified at anterior portion (Figs 3B, 5B); metatibiae expanded medially near apices (Figs 3H, 5H) 2

2a Pronotum and elytra relatively more elongate (Fig. 1B); metatibiae less expanded medially near apices (Fig. 3H); tergite VIII about as long as wide (Fig. 3I); apical portion of aedeagal median lobe bent leftward dorsoventrally (Fig. 3L, N). (South China: Guangxi) . . . . . *Nomuraius sinicus* Yin & Li, new spec.

2b Pronotum and elytra relatively shorter (Fig. 4A); metatibiae more expanded medially near apices (Fig. 5H); tergite VIII much wider than long (Fig. 5I); apical portion of aedeagal median lobe bent rightward dorsoventrally (Fig. 5L, N). (north Vietnam: Vinh Phu) . . . . . *Nomuraius vietnamicus* Hlaváč

Nomuraius piaoacus Yin & Li, **new spec.** Figs 1A, 2, 6

HOLOTYPE: ♂, labelled 'Mt. Pia Oac (1,250 m) / Cao Bang Prov. / [N-VIETNAM] / 19.v.2000 / S. Nomura leg. // HOLOTYPE [red] / *Nomuraius piaoacus* / sp. n., Yin & Li / det. 2013, pcPH'.

DIAGNOSIS: Length 2.82 mm. Male: maxillary palpomeres II shortly projecting laterally; posterior half of head and anterior portion of pronotum strongly modified with large cavity and setose tufts, respectively; protibiae with distinct thin apical spur; metatibiae simple, not expanded medially near apices.

DESCRIPTION

Male (Fig. 1A): Length 2.82 mm. Head slightly wider than long, HL 0.52 mm, HW 0.56 mm, posterior half with large, deep cavity; eyes each composed of about

FIG. 1
Male habitus of *Nomuraius* Hlaváč. (A) *N. piaoacus* sp. n. (B) *N. sinicus* sp. n. Scales: 1 mm.

35 facets. Antennal clubs as in Fig. 2A. Pronotum (Fig. 2B) about as long as wide, PL 0.61 mm, PW 0.59 mm, apical portion modified with distinct median projection covered with dense setose tufts apically; distinct median- and lateral antebasal foveae round. Elytra wider than long, EL 0.84 mm, EW 1.02 mm. Long metaventral processes with apices curved anteriorly at apices (Fig. 2C). Trochanters and femora (Figs 2D, F, G) simple; protibiae (Fig. 2E) with thin apical spur; metatibiae simple near apices (Fig. 2H). Abdomen broad at base and narrowed apically, AL 0.85 mm, AW 1.00 mm. Tergite VIII (Fig. 2I) and sternite VIII (Fig. 2J) transverse, sternite IX as in Fig. 2K. Aedeagus length 0.56 mm, with symmetric median lobe apically bent rightwards (Figs 2L-N).

Female: Unknown.

DISTRIBUTION AND NATURAL HISTORY: The new species is currently known only from the type locality (Fig. 6). The single specimen was probably sifted from leaf litter from forest floor like the other congeners.

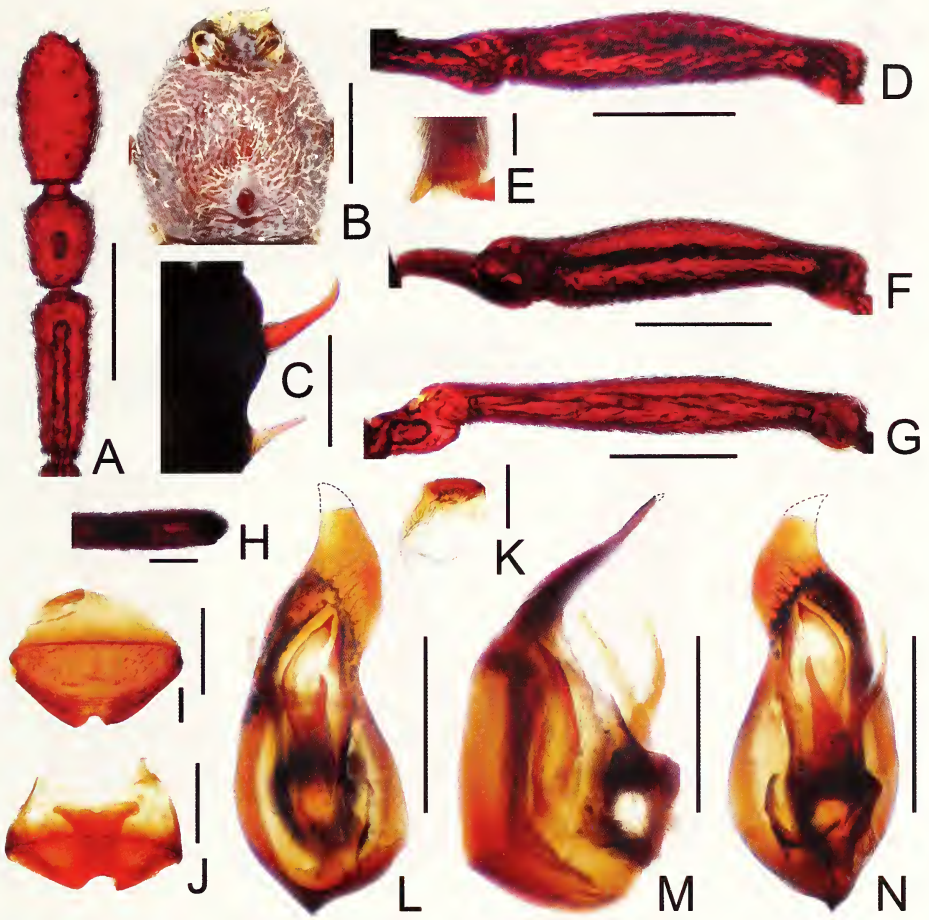


FIG. 2
Male diagnostic features of *Nomuraius piaoacus* sp. n. (A) Antenna. (B) Pronotum. (C) Metaventral process, in lateral view. (D) Protrochanter and profemur. (E) Apical portion of protibia. (F) Mesotrochanter and mesofemur. (G) metatrochanter and metafemur. (H) Apical portion of metatibia. (I) Tergite VIII. (J) Sternite VIII. (K) Sternite IX. (L) Aedeagus, in dorsal view. (M) Same, in lateral view. (N) Same, in ventral view. Scales [mm]: A, B, D, F, G = 0.3; C, I, J, L, M, N = 0.2; H, K = 0.1, E = 0.05.

COMPARATIVE NOTES: *Nomuraius piaoacus* can be easily separated from the other congeners by the strongly modified head and pronotum, and the simple metatibiae in the male. Both *N. sinicus* new spec. (described below) and *N. vietnamicus* have slightly modified head and pronotum, and have the metatibiae with apical portion more or less expanded medially near the apices.

ETYMOLOGY: The specific epithet is derived from the type locality, Pia Oac Mountain.

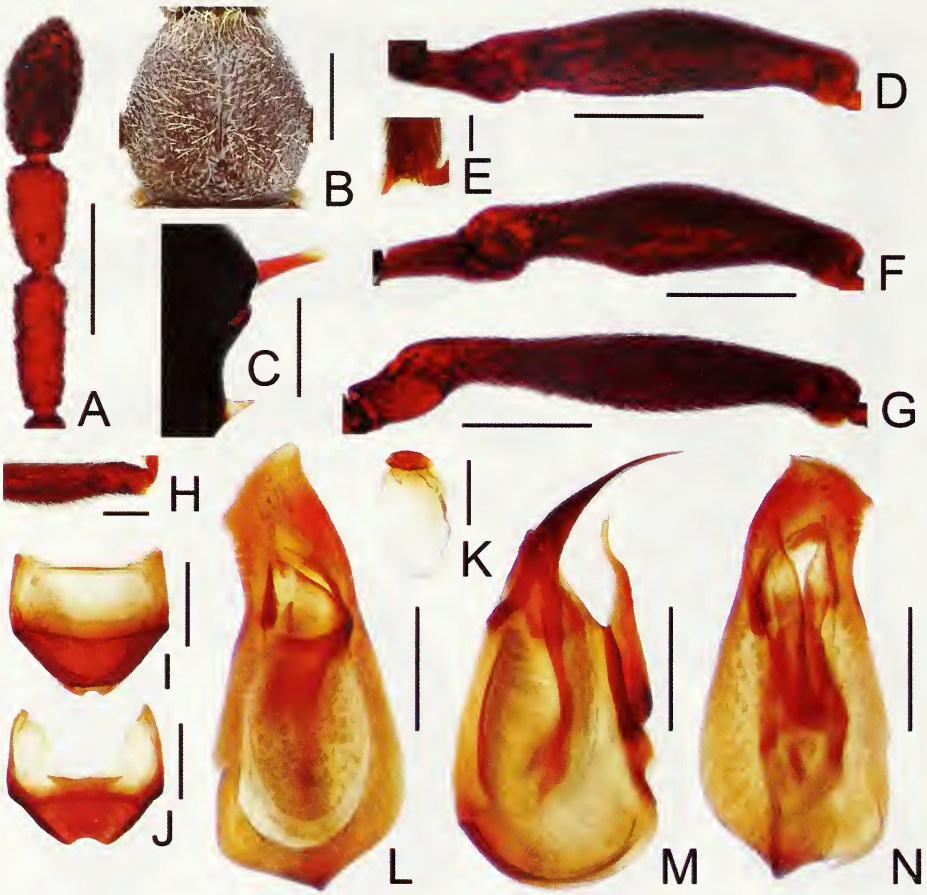


FIG. 3

Male diagnostic features of *Nomuraius sinicus* sp. n. (A) Antenna. (B) Pronotum. (C) Metaventral process, in lateral view. (D) Protrochanter and profemur. (E) Apical portion of protibia. (F) Mesotrochanter and mesofemur. (G) metatrochanter and metafemur. (H) Apical portion of metatibia. (I) Tergite VIII. (J) Sternite VIII. (K) Sternite IX. (L) Aedeagus, in dorsal view. (M) Same, in lateral view. (N) Same, in ventral view. Scales [mm]: A, B, D, F, G = 0.3; C, I, J, L, M, N = 0.2; H, K = 0.1, E = 0.05.

Nomuraius sinicus Yin & Li **new spec.** Figs 1B, 3, 6

HOLOTYPE: ♂, labelled 'CHINA: Guangxi, Shangsi County / Shiwandashan Forest Park, / 21°54′11″N, 107°54′14 E / ca. 325 m, mixed leaf litter, sifted / 25.iv.2011, Peng & Zhu leg. // HOLOTYPE [red] / *Nomuraius sinicus* / sp. n., Yin & Li / det. 2013, SNUC'.

PARATYPE: 1 ♀, same label data as holotype, except 'PARATYPE [yellow] / *Nomuraius sinicus* / sp. n., Yin & Li / det. 2013, SNUC'.

DIAGNOSIS: Length 2.89-3.01 mm. Male: maxillary palpomeres II shortly projecting laterally; head slightly concaved along posterior margin; pronotum with apical portion covered with tufts of setae; protibiae with short apical spur; metatibiae slightly roundly expanded medially near apices.

DESCRIPTION

Male (Fig. 1B). Length 3.01 mm. Head longer than wide, HL 0.65 mm, HW 0.56 mm, posterior margin slightly concaved; eyes each composed of about 30 facets. Antennal clubs as in Fig. 3A. Pronotum (Fig. 3B) slightly longer than wide, PL 0.66 mm, PW 0.62 mm, apical portion covered with sparse setose tufts; punctiform median- and lateral antebasal foveae small. Elytra wider than long, EL 0.85 mm, EW 1.08 mm. Long metaventral processes with bluntly rounded apices (Fig. 3C). Trochanters and femora (Figs 3D, F, G) simple; protibiae (Fig. 3E) with short apical spur; metatibiae slightly roundly expanded medially near apices (Fig. 3H). Abdomen broad at base and narrowed apically, AL 0.85 mm, AW 1.00 mm. Tergite VIII (Fig. 3I) about as long as wide; sternite VIII (Fig. 3J) slightly transverse, sternite IX as in Fig. 3K. Aedeagus length 0.51 mm, with symmetric median lobe apically bent leftwards (Figs 3L-N).

Female: Measurements: BL 2.89 mm, HL 0.65 mm, HW 0.55 mm, PL 0.60 mm, PW 0.59 mm, EL 0.77 mm, EW 1.06 mm, AL 0.87 mm, AW 1.09 mm. Eyes each compose of about 20 facets. Head, pronotum, protibiae and metatibiae simple; maxillary palpomeres II similar to those in male.

DISTRIBUTION AND NATURAL HISTORY: This species is known only from the type locality. The adults were sifted from mixed leaf litter in a broad-leaved forest.

COMPARATIVE NOTES: The new species is most closely allied to *N. vietnamicus* in sharing a similar habitus and male features. Externally, the two species can be separated from several subtle differences. *Nomuraius sinicus* has relatively slightly longer pronotum and elytra, has basal half of the mesofemora covered with long setae at ventral margins, and the metatibiae are relatively less expanded medially near the apices. In contrary, *N. vietnamicus* has relatively shorter pronotum and elytra, has the mesofemora covered with normal setae basoventrally, and the metatibiae are more distinctly expanded medially near the apices. The differences on the genital segments of the two species are more distinct, viz. *N. sinicus* has the tergite VIII nearly as long as wide, and has the aedeagal median lobe bent leftwards at the apex, while *N. vietnamicus* has distinctly transverse tergite VIII, and has the apical portion of the aedeagal median lobe being slenderer and bent rightwards.

ETYMOLOGY: The specific name refers to the county where the species was found.

Nomuraius vietnamicus Hlaváč, 2003 Figs 4-6

Nomuraius vietnamicus Hlaváč, 2003: 290; type locality north Vietnam, Vinh Phu Province, Tam Dao Mountains.

HOLOTYPE: ♂, labelled 'Mt., Tam Dao / (- Tam Dao Hai) / Vinh Phu Prov. // [N-VIETNAM] / 25.ix.1995 / S. Nomura leg. // HOLOTYPE [red] / *NOMURAIUS* / *vietnamicus* sp. nov. / P. Hlaváč det., 2000' (NSMT).

PARATYPE: 1 ♂, same label data as holotype (NSMT).

OTHER MATERIAL EXAMINED (6 ♂♂, 5 ♀♀): 1 ♀, labeled 'Mt., Tam Dao (950 m) / Vinh Phu Prov. / [N-VIETNAM] / 17.vi.1997, S. Nomura leg.' (SNUC); 1 ♂, same label data, except '14.vii.1997' (SNUC). – 1 ♂, same label data, except '21.v.2003' (pcPH). – 1 ♂, 1 ♀, same label data, except '23.v.2003' (SNUC). – 1 ♂, 1 ♀, labeled 'VIETNAM, Tam Dao, / N21°29′27″ E 105°37′49″ / 13.v.2012. 1128 m. / sift 03. V. Grebennikov (pcPH)'. – 1 ♀, same label data, except 'N21°27′54″ E 105°38′56″ / 14.v.2012. 1237 m / sift 04.' (pcPH). – 2 ♂♂, 1 ♀, same label data, except 'N21°27′42″ E 105°38′48″ / 15.v.2012, 1240 m / sift 05.' (pcPH, SNUC).

FIG. 4

Nomuraius vietnamicus Hlaváč, 2003. (A) Male habitus (non-type). (B) Holotype habitus. (C) Type label. Scale: 1 mm.

DIAGNOSIS: Length 2.70-3.11 mm. Male: maxillary palpomeres II roundly expanded laterally; head moderately concaved along posterior margin; pronotum with apical portion covered with tufts of setae; protibiae with short apical spur; metatibiae angularly expanded medially near apices.

SUPPLEMENTARY DESCRIPTION

Male (Fig. 4A, B): Length 2.99-3.10 mm. Head longer than wide, HL 0.71-0.73 mm, HW 0.56-0.57 mm, posterior margin moderately concaved; eyes each composed of about 25 facets. Antennal clubs as in Fig. 5A. Pronotum (Fig. 5B) about as long as wide, PL 0.66-0.68 mm, PW 0.65-0.66 mm, apical portion covered with sparse setose

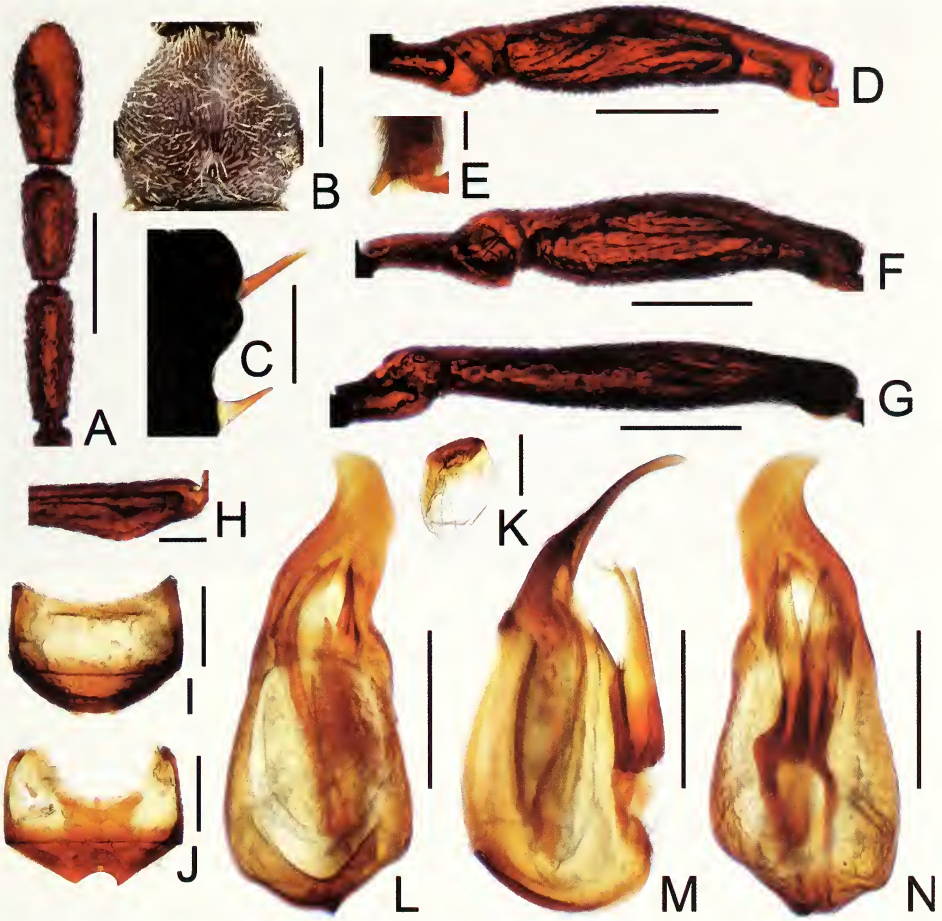


FIG. 5

Male diagnostic features of *Nomuraius vietnamicus* Hlaváč, 2003. (A) Antenna. (B) Pronotum. (C) Metaventral process, in lateral view. (D) Protrochanter and profemur. (E) Apical portion of protibia. (F) Mesotrochanter and mesofemur. (G) metatrochanter and metafemur. (H) Apical portion of metatibia. (I) Tergite VIII. (J) Sternite VIII. (K) Sternite IX. (L) Aedeagus, in dorsal view. (M) Same, in lateral view. (N) Same, in ventral view. Scales [mm]: A, B, D, F, G = 0.3; C, I, J, L, M, N = 0.2; H, K = 0.1, E = 0.05.

tufts; punctiform median- and lateral antebasal foveae small. Elytra wider than long, EL 0.81-0.82 mm, EW 1.11-1.12 mm. Long metaventral processes with pointed apices (Fig. 5C). Trochanters and femora (Figs 5D, F, G) simple; protibiae (Fig. 5E) with short apical spur; metatibiae angularly expanded medially near apices (Fig. 5H). Abdomen broad at base and narrowed apically, AL 0.81-0.87 mm, AW 1.10-1.11 mm. Tergite VIII (Fig. 5I) and sternite VIII (Fig. 5J) transverse, sternite IX as in Fig. 5K. Aedeagus length 0.56 mm, with symmetric median lobe apically bent rightwards (Figs 5L-N).

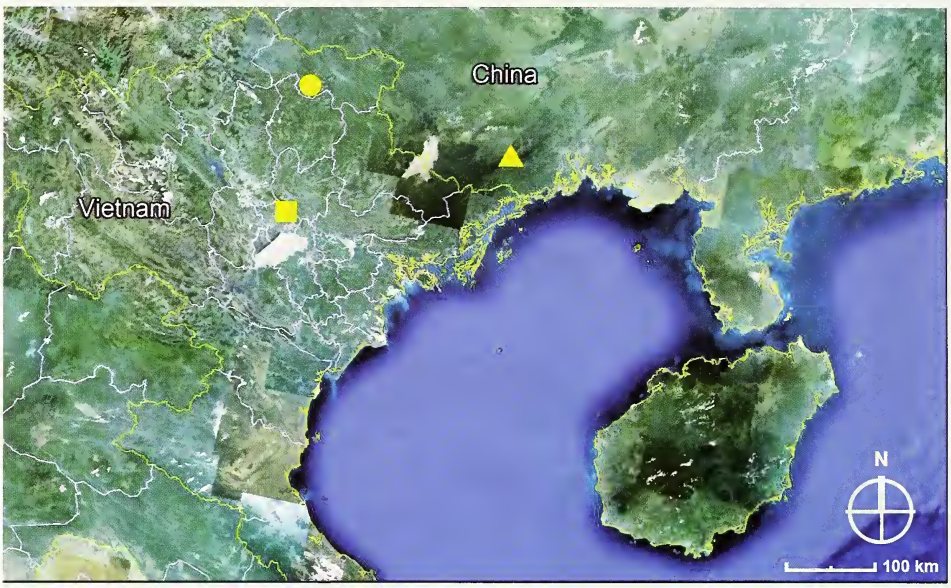


FIG. 6
Distribution of *Nomuraius* Hlaváč. (Circle) *N. piaoacus* sp. n. (Square) *N. vietnamicus* Hlaváč. (Triangle) *N. sinicus* sp. n.

Female: Measurements: BL 2.97-3.11 mm, HL 0.71-0.72 mm, HW 0.55-0.56 mm, PL 0.63-0.64 mm, PW 0.65-0.68 mm, EL 0.75-0.7 mm, EW 1.11-1.12 mm, AL 0.87-0.98 mm, AW 1.16-1.20 mm. Eyes each compose of about 22 facets. Head, pronotum, protibiae and metatibiae simple; maxillary palpomeres II shortly projecting laterally.

DISTRIBUTION AND NATURAL HISTORY: This species is known from several localities at the Tam Dao Mountain, north Vietnam. Individuals were collected from sifted leaf litter of forest floor.

COMPARATIVE NOTES: As discussed above, *N. vietnamicus* is allied to *Nomuraius sinicus*, but can be separated by the relatively shorter pronotum and elytra, the more distinctly medially-expanded apical portion of the metatibiae, the transverse male tergite VIII, and the rightwards-curved apical portion of the aedeagal median lobe.

ACKNOWLEDGEMENTS

We thank Peter Hlaváč (Praha, Czech Republic), Shûhei Nomura (NSMT, Japan) and Zhong Peng (Shanghai Normal University, China) for the collection and/or sending the material used in this paper. Shûhei Nomura is also acknowledged for the hospitality during the first author's visit (Feb. 2012) at NSMT. Comments from Giulio Cuccodoro (MHNG, Geneva) on a previous draft also improved the paper. The present study is supported by the National Natural Science Foundation of China (No. 31172134) and Shanghai Normal University (DZL125, SK. 201242).

REFERENCES

HLAVÁČ, P. 2003. A taxonomic revision of the Tyrini of the Oriental Region. II. - Systematic study on the genus *Pselaphodes* and its allied genera (Coleoptera: Staphylinidae: Pselaphinae). *Annales de la Société Entomologique de France* 38: 283-297.

HLAVÁČ, P. & CHANDLER, D. S. 2005. World catalogue of the species of Tyrini with a key to the genera (Coleoptera: Staphylinidae: Pselaphinae). *Folia Heyrovskyana* 13: 81-143.

YIN, Z. W. & HLAVÁČ, P. 2013. Further studies on the *Pselaphodes* complex of genera from China (Coleoptera, Staphylinidae, Pselaphinae). *ZooKeys* 275: 23-65.

Revue suisse de Zoologie 120 (4): 575-583; décembre 2013

First description of the male of the little-known ant mimicking spider genus *Aetius* O. Pickard-Cambridge (Araneae: Corinnidae)

Pakawin DANKITTIPAKUL[1, 2] & Tippawan SINGTRIPOP[1]*
[1] Endocrinology Research Laboratory, Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.
[2] Manukau Institute of Technology, Private Bag 94006, Manukau 2241, Auckland, New Zealand.
*Corresponding author, e-mail: tippawan.si@cmu.ac.th

First description of the male of the little-known ant mimicking spider genus *Aetius* O. Pickard-Cambridge (Araneae: Corinnidae). - The ant mimicking spider genus *Aetius* O. Pickard-Cambridge, 1896 is known to consist of only two species restricted to the Oriental Region. The present article gives the first description of the male of this genus, based on a male and a female of *A. nocturnus* Deeleman-Reinhold, 2001 collected in an evergreen hill forest of Thailand. The genitalia of both sexes are illustrated.

Keywords: Thailand - Singapore - Borneo - Castianeirinae - ant mimics - conspecific sex - new record - biodiversity.

INTRODUCTION

The male of *Aetius nocturnus* Deeleman-Reinhold, 2001 is described from Thailand for the first time. This discovery considerably extends the range of the species, known until now only from a lowland rainforest of Borneo (Deeleman-Reinhold, 2001). The other species, *A. decollatus* O. Pickard-Cambridge, 1896, is known from India and Sri Lanka. No specimen of *A. nocturnus* has previously been collected on mainland Asia. However, the discovery of this species in a pristine evergreen hill forest of northern Thailand did not come as a surprise. The present case is somewhat comparable to the discoveries of other ant mimicking genera of the sub-family Castianeirinae. These genera consist of a few species, most of which apparently have broad distribution ranges. *Sphecotypus birmanicus* (Thorell, 1897) was originally described from Myanmar and recently reported from the Malay Peninsula and Borneo (Deeleman-Reinhold, 2001). This is also the case for species of *Serendib*. *Serendib suthepica* Deeleman-Reinhold, 2001 was known to occur in northern Thailand and on Bali, whereas *S. volans* Deeleman-Reinhold, 2001 occurs in the southern part of Thailand and on Borneo. *Corinnomma severum* (Thorell, 1877) was originally described from Sulawesi and has subsequently been collected in China, Thailand, Cambodia, the Philippines and Indonesia (Deeleman-Reinhold, 2001).

The study of male genitalia may be of special value in this article. The palpal structures of an *Aetius* male have been studied and presented here for the first time. Although Reimoser (1934) clearly mentioned in his report that he discovered the

Manuscript accepted 24.07.2013

conspecific male of *A. decollatus*, neither description nor illustration was provided. The internal structures of the female genitalia are also described and illustrated here. This is important because the phylogenetic relationships among the various genera of Castianeirinae are not known. The systematic position of many groups cannot be discussed meaningfully without information on the genitalia of both sexes. This is especially true when Southeast Asian genera are involved.

MATERIAL AND METHODS

Material from the following collections has been studied: Muséum d'histoire naturelle de la Ville de Genève, Switzerland (MHNG); Nationaal Natuurhistorisch Museum 'Naturalis', Leiden, the Netherlands (RMNH). New material of the species treated here will be deposited in the collections of the MHNG.

External morphology was examined, measured and illustrated with an Olympus SZX-12 stereomicroscope and an Olympus BX-40 compound microscope equipped with a drawing tube and photographic devices. All measurements are in millimetres (mm), with the measurements of leg segments taken along the dorsal side and given in the following order: total length (femur, patella, tibia, metatarsus, tarsus). The internal female genitalia were temporarily mounted on microscopic slides. The dorsal view of the internal genitalia was drawn in cleared state after maceration in 96% lactic acid for 48-72 hours. The male palps were expanded by placing them in distilled water. In the text 'Fig.' and 'Figs' refer to figures herein, while 'fig.' and 'figs' refer to figures published elsewhere.

Abbreviations used in the text and in the figures are as follows: AER, anterior eye row; ALE, anterior lateral eye; AME, anterior median eye; B, bulbous part of tegulum; CO, copulatory orifice; E, embolus; FD, fertilization duct; PER, posterior eye row; PLE, posterior lateral eyes; PME, posterior median eyes; PR, prolateral ridge on palpal tibia; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; ST, subtegulum.

TAXONOMY

Corinnidae

Aetius O. Pickard-Cambridge, 1896

TYPE SPECIES: *A. decollatus* O. Pickard-Cambridge, 1896, by monotypy.

DIAGNOSIS: *Aetius* can be easily differentiated from other castianeirine genera by a combination of characters: Posterior portion of prosoma protruding, forming a blunt projection hanging over pedicel (Figs 1-2, 8) (other castianeirines and trachelines have a tubular projection connected to the pedicel); prosoma relatively flat in females, in male convex, with a broad central plateau which abruptly slopes towards the margin (Figs 1-5, 8); similar to *Serendib* and *Sphecotypus* in having a strongly recurved PER (Fig. 8), distinguished from *Serendib* by the broad carapace widest at two thirds of its length and by the absence of paired anterior dorsal spines on the opisthosoma (Figs 2-5, 8) (carapace elongate-oval, 1-2 pairs of conspicuous spines present on the opisthosoma in *Serendib*); distinguished from *Sphecotypus* by lacking a deep excavation behind the cephalic region.

The shape of the tegulum in *Aetius* conforms well to the typical palpal morphology of Castianeirinae males and it is characterized as follows: 1) The pyriform tegulum is distinctly narrowed distally (Figs 12-17). 2) The embolus is situated apically (Deeleman-Reinhold, 2001). 3) The subtegulum is generally located retrolaterally (Figs 12, 16) (Haddad, 2004; Reiskind, 1969). However, Bosselaers & Jocqué (2002) described the subtegulum of Castianeirinae as prolaterally and retrolaterally protruding (character 142: 2, found in *Copa* spp.). This is also the case in *Aetius* where a poorly defined prolateral part (Fig. 13) and a small retrolateral protrusion of the subtegulum can be seen (Fig. 12; see also Bosselaers & Jocqué, 2002: 250, fig. 3E). 4) A small retrolateral tibial apophysis is present. Although the absence of the tibial apophysis is considered a synapomorphic character shared among males of the Castianeirinae (Deeleman-Reinhold, 2001; Haddad, 2004; Reiskind, 1969), some species of Asian genera, including *Aetius* (Fig. 15), *Medmassa*, *Serendib*, *Sphecotypus*, do retain a retrolateral tibial apophysis. 5) A deep and wide depression is situated on the ventral surface of the palpal tibia (Figs 13, 16-17). 6) The sperm duct is strongly convoluted (Figs 12, 16). The latter two characters can also be found in males of *Serendib*. 7) A deep basal notch is found in the retrolateral margin of the cymbium (Fig. 15), a character so far only known in *Aetius*.

In all females of *Aetius* the heavily sclerotised epigyne (Figs 9-10) has a pair of rounded copulatory orifices located medially or posteriorly, the insemination ducts are short, and the large, oval spermathecae are simple, without bursae (Figs 11, 18). In most castianeirines the bursae are indistinct and fused with the spermathecae (Deeleman-Reinhold, 2001). These two structures are represented by a convoluted, thick-walled tube with an anterior enlargement in *Pranburia*, *Castoponera*, *Corinnomma*, and *Apochinomma*, whereas in *Aetius* and *Serendib* the posterior portion of this structure is a simple, straight tube.

Aetius nocturnus Deeleman-Reinhold, 2001 Figs 1-4, 6-18

Aetius nocturnus Deeleman-Reinhold, 2001: 336, figs 502-504; description of female.

HOLOTYPE: ♀ (RMNH, examined); Malaysia, Borneo, East Sabah, Danum Valley, primary forest, night collection; 6.-16.V.1991; leg. C.L. Deeleman.

NEW MATERIAL: 1♂, 1♀ (MHNG); Thailand, Chiang Mai Province, Mae Jaem District, Doi Inthanon National Park, Doi Inthanon, 1260 m, evergreen hill forest behind national park headquarters, near pond (18°32.657'N 98°31.482'E); 20.VIII.2006; leg. P. Dankittipakul.

DIAGNOSIS: *A. nocturnus* can be distinguished by the following combination of characters: A short, truncate, posterior tubercle on the carapace in both sexes; opisthosoma with a tuft of white hairs at its rear end; male opisthosoma laterally constricted, female opisthosoma oblong; male palp distinctly elongate distally, with deep basal notch in retrolateral margin of cymbium; elongated, cylindrical embolus longer than bulbous part, with spiniform apex; a triangular RTA present; epigynal region elevated, with copulatory orifices opening posteriorly; spermathecae obtuse, with short, diverging posterior projections and acuminate fertilisation ducts.

NEW MALE: Total length 7.64; prosoma 3.80 long, 2.22 wide; opisthosoma 3.84 long, 1.94 wide.

Prosoma (Figs 4, 6, 8): Prosoma subpentagonal, convex, with broad central plateau abruptly sloping towards margin, highest behind ocular region, widest at two

FIGS 1-2

Aetius nocturnus Deeleman-Reinhold, 2001, newly moulted living female from Singapore. Photos courtesy of Hock Ping Guek and Nicky Bay.

thirds of prosomal length, anteriorly with slightly protruded margin, posteriorly with stalk-like tubercle projecting backwards and overhanging pedicel, its apex truncate. Carapace dark chestnut-brown, integument strongly rugous, covered with numerous hairs, each situated on a minute elevation, forming faint radiating striae; fovea forming a broad and shallow depression. Chelicerae vertical, with a group of distomesal hairs;

FIGS 3-8

Aetius nocturnus Deeleman-Reinhold, 2001, female holotype (3), new male (4, 6-8).
Aetius decollatus O. Pickard-Cambridge, 1896, juvenile male (5).
(3-4) Habitus, dorsal view. (5, 8) Prosoma, dorsal view. (6) Same, ventral view. (7) Opisthosoma, ventral view.

two denticles on each fang groove, promargin with small basal denticles, retromargin with similar-sized denticles situated close to each other. Sternum scutiform, convex, surface marked with numerous punctures, devoid of hairs; lateral margin adorned with short, triangular, sclerotised extensions fitting to coxae; spaces between coxae provided with sclerotised strips extending dorsally into pleural membrane, connecting sternum and carapace; posterior margin of sternum protruding between coxae IV, with a very narrow, digitiform projection.

Eyes (Fig. 8): AER straight, occupying half length of anterior margin of carapace; PER strongly recurved, much wider than AER, with PLE situated near lateral

margin of carapace. Eye sizes and interdistances: AME 0.10, ALE 0.05, PME 0.08, PLE 0.08, AME-AME 0.14, AME-ALE 0.06, ALE-ALE 0.38, PME-PME 0.16, PME-PLE 0.20, PLE-PLE 0.72.

Legs: Measurements: Leg I 8.32 (2.26, 3.00, 1.82, 1.24); II 8.56 (2.48, 2.96, 1.82, 1.30); III 8.20 (2.52, 2.92, 1.80, 0.96); IV 10.92 (3.04, 3.86, 2.60, 1.42). Femora I, III and IV subdistally with one dorsal and one prolateral spine; femur II subdistally with one dorsal spine; anterior tibiae with three pairs of long ventral spines; posterior tibiae with two pairs of long and slender ventral spines; anterior metatarsi with two pairs of long ventral spines; posterior metatarsi with one pair of long and slender ventral spines; tarsi with claw tuft; scopulae indistinct.

Opisthosoma (Figs 4, 6, 7): Opisthosoma elongate-ovoid, laterally constricted, gradually widened posteriorly. Dorsal scutum heavily sclerotised, covering entire dorsal surface; epigastric scutum well-developed, extending anteriorly, forming short, grooved collar ring; ventral scutum rectangular, heavily sclerotised, situated between epigastric furrow and additional sclerotised posterior ring around the spinnerets.

Palp (Figs 12-17): Palpal femur not modified, slightly longer than palpal patella + tibia, with two curved spines at distal end. Palpal patella with one distal spine. Palpal tibia short, with distinct ventral depression; retrolateral tibial apophysis digitiform, weakly sclerotised, represented by transparent lamina; prolaterally with elevated ridge (PR). Cymbium distally elongate, lacking conspicuous spines, baso-retrolaterally strongly excavated, represented by semicircular notch (Fig. 15). Tegulum pyriform; part of subtegulum visible apico-retrolaterally of tegulum (Fig. 12), its prolateral protrusion indistinct (Figs 13, 17); sperm duct strongly convoluted, forming several posterior loops; embolus cylindrical, elongate, forming distal extension of the tegulum, abruptly tapering distally, apex bluntly pointed, almost reaching apex of cymbium.

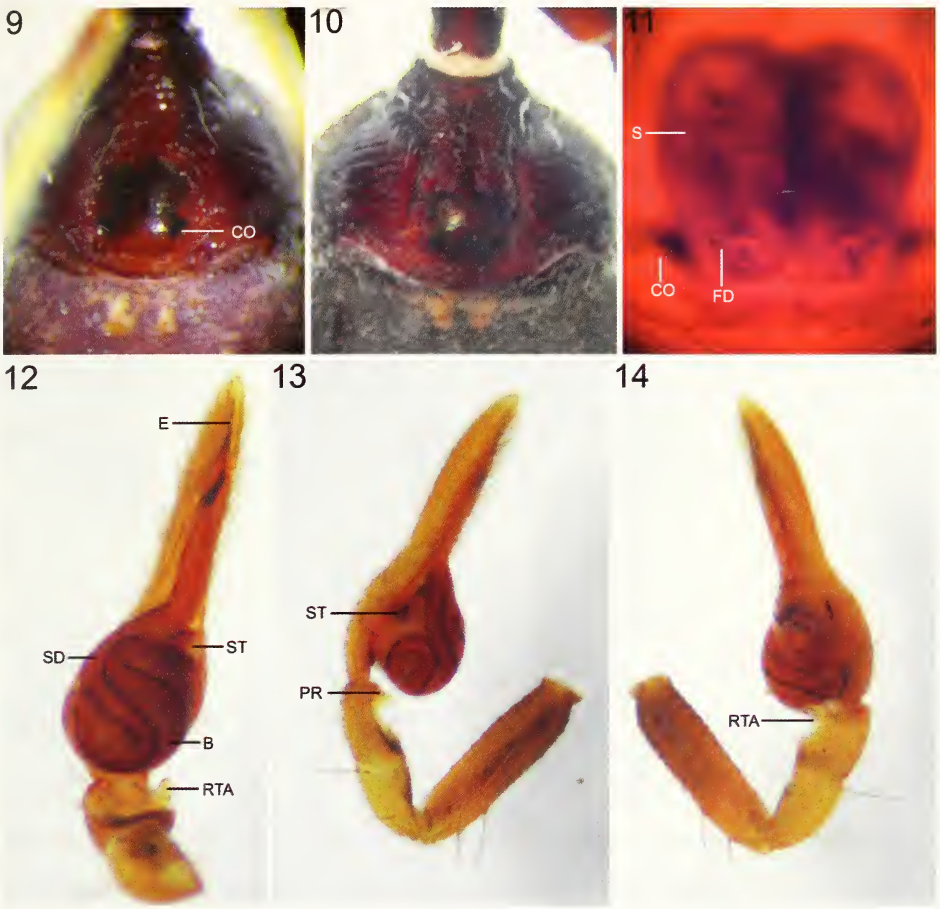
FEMALE HOLOTYPE (Figs 3, 9): For body measurements see Deeleman-Reinhold (2001: 337). Carapace reddish brown, posterior tubercle dark brown. Opisthosoma dark reddish brown, with vague remnant of white pubescence. Dorsal scutum ovoid, almost reaching posterior extremity with a small tuft of white hairs. Ventral scutum rectangular, its anterior margin straight.

Genitalia (Fig. 9): Epigyne being part of epigastric scutum, epigynal region heavily sclerotised, represented by elevated, circular mound with two copulatory orifices situated on posterior lateral margin. Epigyne intact, not dissected, internal structure not examined.

NEW FEMALE (Figs 10-11, 18): General appearance as in male, including leg spination, but distinctly darker; anterior margin of carapace more or less straight, not protruded as in Fig. 8; opisthosoma more robust, posteriorly with tuft of white hairs; remnant of pubescence on dorsal scutum consisting of short hairs situated on wart-like elevations; ventral scutum rectangular, its anterior margin indented medially.

Genitalia (Figs 10-11, 18): Epigynal region distinctly elevated, with two semi-circular copulatory orifices situated posteriorly. Spermathecae ovoid, touching one another, posteriorly with short, diverging tubes and acuminate fertilisation ducts.

VARIATION: Preserved specimens from Thailand apparently lost most of their hairs, except for a tuft of white hairs located at the posterior extremity on the female's



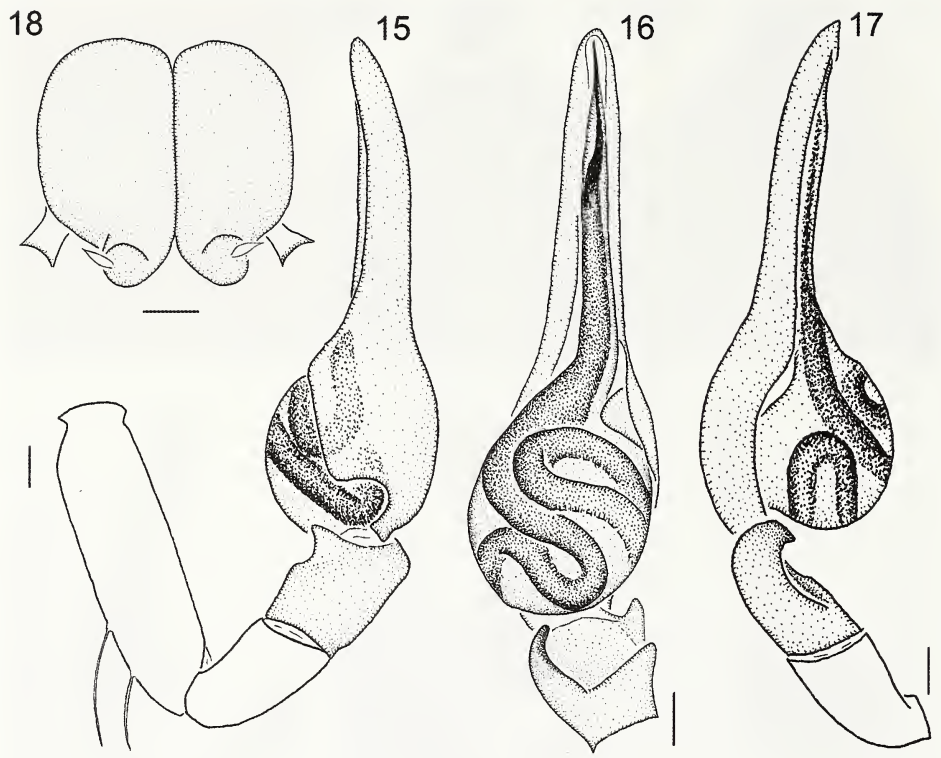
FIGS 9-14

Aetius nocturnus Deeleman-Reinhold, 2001, female holotype (9), new female from Thailand (10-11), new male (12-14).
(9-10) Epigastric plate. (11) Internal genitalia. (12) Male palp, ventral view. (13) Same, prolateral view. (14) Same, retrolateral view. Abbreviations: B, bulbous part of tegulum; CO, copulatory orifice; E, embolus; FD, fertilization duct; PR, prolateral ridge on palpal tibia; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; ST, subtegulum.

opisthosoma. This is also the case in the female holotype (Fig. 3). The coloration and pattern in the original description of *A. nocturnus* by Deeleman-Reinhold (2001) was presumably documented when the holotype was still alive. Photographs of a live spider from Singapore (Figs 1-2) show a similar pattern that conforms well to the original description. These photos were taken of a freshly moulted female.

NATURAL HISTORY: All specimens of *A. nocturnus* were collected in humid forests, suggesting that this species lives in pristine forests of SE Asia.

DISTRIBUTION: Borneo, Thailand (new record) and Singapore (new record).



FIGS 15-18

Aetius nocturnus Deeleman-Reinhold, 2001, new male (15-17) and new female from Thailand (18).

(15) Male palp, retrolateral view. (16) Same, ventral view. (17) Same, prolateral view. (18) Internal genitalia, dorsal view. Scale lines = 0.1 mm.

Aetius decollatus O. Pickard-Cambridge, 1896 Fig. 5

Aetius decollatus O. Pickard-Cambridge, 1896: 1007, pl. 52 fig. 1.

MATERIAL EXAMINED: One penultimate male, India, original label text in square brackets: [Voy. Carl et Escher, Inde méridionale, Mudumalai, 7-9.II], (MHNG, examined). Note: 'Voy. Carl et Escher' was a zoological expedition by J. Carl and K. Escher to southern India in the winter of 1926-1927. Material was collected at Anaimalis, Nilgiris, and Palnis. The hills they visited in these areas are within about 200 miles south and a little west of Bangalore. The Mudumalai National Park and Wildlife Sanctuary lies on the northwestern side of the Nilgiri Hills, in Nilgiri District.

REMARKS: The female holotype was collected from Sri Lanka. The female has a slender opisthosoma with a constriction. The legs are banded. The carapace is dark, with a yellow thoracic region. This pattern conforms well to the juvenile male treated here.

ACKNOWLEDGEMENTS

We are indebted to Dr Jan Bosselaers (Belgium) for providing constructive comments on an earlier version of this manuscript. PD is grateful to the following museum curators for their generous hospitality during his visits: Dr Jeremy Miller and Ms Karen van Dorp (RMNH); Dr Peter J. Schwendinger (MHNG), who also provided the specimen from India. Hock Ping Guek ('Kurt'; Malaysia) and Nicky Bay (Singapore) kindly provided photos of the live spider. Financial support from the Thailand Research Fund through the Royal Golden Jubilee PhD Program (Grant No. PHD/0017/2551) is gratefully acknowledged.

REFERENCES

Bosselaers, J. & Jocqué, R. 2002. Studies in Corinnidae: cladistic analysis of 38 corinnid and liocranid genera, and transfer of Phrurolithinae. *Zoologica Scripta* 31: 241-270.

Deeleman-Reinhold, C. L. 2001. Forest spiders of South East Asia: with a revision of the sac and ground spiders (Araneae: Clubionidae, Corinnidae, Liocranidae, Gnaphosidae, Prodidomidae and Trochanteriidae). *Brill, Leiden*, 591 pp.

Haddad, C. R. 2004. A revision of the African spider genus *Graptartia* (Araneae: Corinnidae). *African Entomology* 12: 71-87.

Pickard-Cambridge, O. 1896. On some new and little-known spiders (Araneidae). *Proceedings of the Zoological Society of London* 1896: 1006-1012.

Reimoser, E. 1934. Araneae aus Süd-Indien. *Revue suisse de Zoologie* 41: 465-511.

Reiskind, J. 1969. The spider subfamily Castianeirinae of North and Central America (Araneae, Clubionidae). *Bulletin of the Museum of Comparative Zoology* 138: 163-325.

Thorell, T. 1877. Studi sui Ragni Malesi e Papuani. I. Ragni di Selebes raccolti nel 1874 dal Dott. O. Beccari. *Annali del Museo Civico di Storia Naturale di Genova* 10: 341-637.

Thorell, T. 1897. Viaggio di Leonardo Fea in Birmania e regioni vicine. LXXIII. Secondo saggio sui Ragni birmani. I. Parallelodontes. Tubitelariae. *Annali del Museo Civico di Storia Naturale di Genova* (2) 17[=37]: 161-267.

Revue suisse de Zoologie 120 (4): 585-663; décembre 2013

A taxonomic revision of the spider genus *Perania* Thorell, 1890 (Araneae: Tetrablemmidae: Pacullinae) with the descriptions of eight new species

Peter J. SCHWENDINGER
Muséum d'histoire naturelle de la Ville de Genève, C.P. 6434, CH-1211 Genève 6, Switzerland. E-mail: peter.schwendinger@ville-ge.ch

A taxonomic revision of the spider genus *Perania* Thorell, 1890 (Araneae: Tetrablemmidae: Pacullinae) with the descriptions of eight new species. - Nineteen *Perania* species are recognized, keyed and attributed to five species-groups. Eight new species are described, *P. tumida*, *P. ferox*, *P. quadrifurcata* and *P. egregia* from northern, northwestern and northeastern Thailand, *P. utara*, *P. harau*, *P. deelemanae* and *P. selatan* from Sumatra. The female copulatory organs of *P. armata* (Thorell, 1890), *P. nigra* (Thorell, 1890), *P. picea* (Thorell, 1890) and *P. birmanica* (Thorell, 1898; known only from the holotype) are illustrated for the first time. *Perania armata*, type species of the monotypic genus *Mirania* Lehtinen, 1981, is shown to be the sister species of *P. nigra*, type species of *Perania*, and thus *Mirania* is kept in the synonymy of *Perania*. *Perania korinchica* Hogg, 1919 is removed from the synonymy of *P. picea* and re-described from a male collected at the type locality. New material of *P. robusta* Schwendinger, 1989, *P. nasuta* Schwendinger, 1989 and *P. siamensis* Schwendinger, 1994 from northern and southern Thailand, of *P. cerastes* Schwendinger, 1994 from peninsular Malaysia, and of *P. nigra*, *P. picea* and *P. armata* from Sumatra is presented. Two morphological forms are recognized for *P. cerastes*. Taxonomic characters and relationships are discussed; general information on the biology of some of these species is given.

Keywords: Southeast Asia - armoured spiders - *Mirania*.

INTRODUCTION

Perania is a genus of armoured spiders that construct irregular sheetwebs in humid forest in Southeast Asia. Although containing the largest representatives of the family Tertablemmidae, *Perania* is rarely collected and still little known. Twelve nominal species have previously been described from eastern Myanmar, Thailand, peninsular Malaysia and Sumatra by Thorell (1890, 1898), Hogg (1919) and Schwendinger (1989, 1994), one of which (*P. robusta*, described from the northernmost tip of Thailand) was later also reported from southern China (Lian, 2009). Here males and females of eight additional species are described from the known range, and a female is reported (but not named) from northern Sumatra, together with juveniles from two Indonesian islands south of Singapore (see Fig. 1). The increasing numbers

Manuscript accepted 04.10.2013

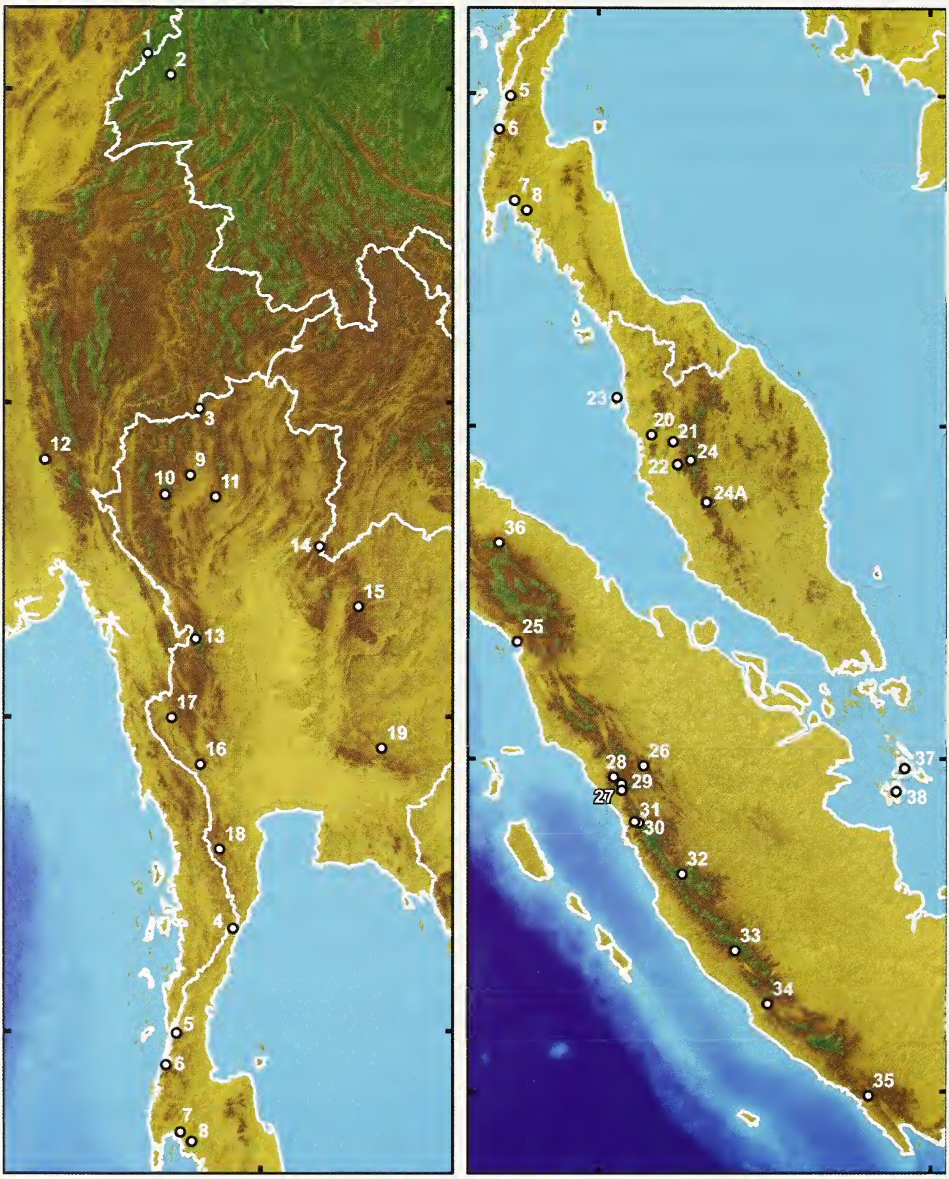


FIG. 1

Localities of *Perania* spp. roughly in order of appearance in the text. Left map: mainland Southeast Asia from southern China to southern Thailand; right map: Thai-Malaysian peninsula, Lingga Archipelago and central part of Sumatra. CHINA: 1 - Zhaobitang (*P. robusta*), 2 - Xiangyangqiao (*P. robusta*); THAILAND: 3 - Doi Angkhang (*P. robusta*), 4 - Huay Yang (*P. siamensis*), 5 - Ranong (*P. siamensis*), 6 - Khlong Nakha (*P. siamensis*), 7 - Thanboke Khoranee (*P. siamensis*), 8 - Khao Phanom Bencha (*P. siamensis*), 9 - Doi Suthep-Pui (*P. nasuta*), 10 - Doi Inthanon (*P. nasuta*), 11 - Doi Khuntan (*P. nasicornis*); MYANMAR: 12 - Bia-po (*P. birmanica*); THAILAND: 13 - Mae Sot - Umphang (*P. ferox* sp. n.), 14 - Phu Soi Dao (*P. tumida* sp. n.), 15 - Nam Nao (*P. egregia* sp. n.), 16 - Sai Yok Noi (*P. quadrifurcata* sp. n.),

of species, localities and specimens that have become known since the last comprehensive taxonomic treatment of the genus [as part of a monograph on the entire family by Lehtinen (1981)] justify a new revision.

MATERIAL AND METHODS

External morphology was studied and drawn using a Zeiss SV11 stereomicroscope, the vulvae (tissue removed with forceps and insect pins) using a Nikon Optiphot compound microscope (both with a drawing tube) and re-checked using a stereomicroscope. Body measurements were taken with a stereomicroscope and are given in millimetres. The total body length and the carapace length include the clypeal process, if present. The sternum length was measured between the midpoint of the anterior margin of the sternum and the posterior edge of the posterior sternal process; the sternum width between coxae II. Lengths of leg articles and palpal articles were measured on the dorsal side, from midpoint of anterior margin to midpoint of posterior margin, and are given in the following order: total (femur + patella + tibia + metatarsus + tarsus). The length of the pulmonary plate was measured from the lateral side. References to figures that are to different scales in the legend of each plate are separated by semicolons.

Terminology of somatic characters follows Lehtinen (1981), that of copulatory organs Schwendinger (1994). The informal appellation "allotype" refers to the paratype on which the description of the female of each new species is based. The term "carapace" is used instead of "dorsal plate of prosoma" or "holopeltidium". The terms "long/short", "wide/narrow" and "deep/shallow" always relate to the longitutinal axis of the spider body, limb or palpal organ.

All setae on the palps and on the carapaces, most cowpat-shaped tubercles and wart-like setal bases (some in anterior portion shown) on the carapaces are omitted in the illustrations.

In the dorsal view of the vulvae the ventral wall of the genital atrium (with or without pigmentation) is illustrated as it can be seen under the microscope through the thin, membranous and transparent dorsal wall of the genital atrium which may easily come off during preparation.

The order in which species within each species group are given is geographical, roughly from north to south. The GPS coordinates of Gua Kanthan and Gua Tempurung were taken from Platnick *et al.* (1997) and checked on Google Earth. None of the specimens examined have registration numbers.

---

17 - Daichongthong (*P. quadrifurcata* sp. n.), 18 - Kaeng Krachan (*P. quadrifurcata* sp. n.), 19 - Sakaerat (*P. quadrifurcata* sp. n.); MALAYSIA (peninsula): 20 - Maxwell's Hill (*P. cerastes*), 21 - Kanthan Cave (*P. cerastes*), 22 - Tempurung Cave (*P. cerastes*), 23 - Penang Hill (*P. cerastes*), 24 - Cameron Highlands (*P. coryne*), 24A - Fraser's Hill (*Perania* sp.); INDONESIA: 25 - Sibolga (*P. utara* sp. n.), 26 - Harau Canyon (*P. harau* sp. n.), 27 - Lembah Anai (*P. armata*), 28 - Lake Maninjau (*P. nigra*), 29 - Mt Singgalang (*P. nigra*, *P. armata*, *P. picea*), 30 - Lubuk Selasih (*P. armata*), 31 - Hutan Raya Bung Hatta (*P. armata*), 32 - Gunung Kerinci (*P. picea*, *P. korinchica*), 33 - Ketenong (*P. deelemanae* sp. n.), 34 - Taba Penanjung (*P. deelemanae* sp. n.), 35 - Liwa (*P. selatan* sp. n.), 36 - Brastagi (*Perania* sp.), 37 - Lingga Island (*Perania* sp.), 38 - Singkep Island (*Perania* sp.).

Abbreviations not explained in the figure legends are: ALE = anterior lateral eyes; MCSNG = Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy; MHNG = Muséum d'histoire naturelle de la Ville de Genève, Switzerland; MZT = Zoological Museum, University of Turku, Finland; NMP = National Museum, Prague, Czech Republic; PME = posterior median eyes; PLE = posterior lateral eyes; SMF = Senckenberg Museum, Frankfurt, Germany.

TAXONOMY

Perania Thorell, 1890

Perania Thorell, 1890: 315; type species by original designation and monotypy, *P. pallida* Thorell, 1890 [formally placed in the synonymy of *Perania nigra* (Thorell, 1890) by Lehtinen, 1981: 15].

Mirania Lehtinen, 1981: 16-17; type species by designation and by monotypy, *Phaedima armata* Thorell, 1890; *Mirania* placed in the synonymy of *Perania* by Schwendinger, 1989: 579.

REMARKS: There is some confusion about which is the valid type species of *Perania*. Bourne (1980: 259) was the first to note that the juvenile holotype of *Perania pallida* (the originally designated type species of *Perania*) is probably conspecific with either *Phaedima picea* Thorell, 1890 or *Phaedima nigra* Thorell, 1890 (both latter species at that time in *Paculla* Simon, 1887, now in *Perania*). On page 250 of the same paper Bourne more specifically suggested that *P. pallida* is conspecific with *P. nigra*, but on page 254 he explicitly gave *P. picea* as the type species "Type species of the genus: *Perania picea* (Thorell, 1890)". Lehtinen (1981: 15) was more decisive about this and placed *P. pallida* in the synonymy of *P. nigra*. The type locality of all three nominal species is Mt Singgalang. As the new specimens of *P. nigra* were found quite close to Mt Singgalang, and new specimens of *P. picea* much further away, it is possible that an incorrect locality was given for the types of *P. picea*. Thus it appears more likely that the type of *P. pallida* is conspecific with the types of *P. nigra*. I therefore follow Lehtinen's decision.

Phaedima Thorell, 1881 (type species *Phaedima granulosa* Thorell, 1881) is a junior homonym of *Phaedima* Robineau-Desvoidy, 1863 in the Diptera. Simon (1887: 194) replaced the name *Phaedima* Thorell, 1881 with *Paculla* Simon, 1887 and later (1894: 573) explicitly transferred all corresponding species. These included *Phaedima granulosa*, *armata*, *P. nigra* and *P. picea*, but not *Perania pallida*. *Paculla granulosa* is still in that combination. *Paculla picea* and *Paculla nigra* were transferred to *Perania* by Bourne (1980: 254, 256) and by Lehtinen (1981: 16, 15); *Paculla armata* was transferred to *Mirania* by Lehtinen (1981: 17) and then to *Perania* by Schwendinger (1989: 579).

When Bourne (1980) synonymised *Perania pallida* with either *Paculla picea* or *Paculla nigra* (unclear; see above), and when Lehtinen (1981) unambiguously synonymised *Perania pallida* with *Paculla nigra*, both authors at the same time also transferred *Paculla picea* and *Paculla nigra* to *Perania*. Therefore *Perania pallida* (the type species of *Perania*) was never in *Paculla* and certainly never in *Phaedima* Thorell. Strictly speaking *Paculla* and *Phaedima* Thorell are thus not synonyms of *Perania*.

DIAGNOSIS: Distinguished from all other Pacullinae by both sexes possessing fragmented lateral opisthosomal plates and a relatively large, posteriorly widened

sternal apophysis; males with a clypeal process (not present in all species), conical setal bases on tibia I and metaratsus I, and a long, narrow cymbial apex (except for one species); females with a reduced dorsal opisthosomal plate, a more or less strongly fragmented anterior opisthosomal plate (except for one species), a more or less strongly fragmented preanal plate, a completely fragmented postgenital plate, and a leathery anterior collar of their vulva.

DESCRIPTION: The following can be added to the observations of Bourne (1980: 252-254) and Lehtinen (1981: 14): Body length 4-13 mm. "Thoracic" portion of carapace in both sexes unmodified (in most species), or with a pair of low humps (only in *P. nigra*; Fig. 21A-D), or with a pair of long, pointed, dorsad-directed horns (only in *P. armata*; Fig. 24A-F). Clypeus of males unmodified, or with a more or less strongly developed process [short, truncate or pointed (Figs 27A-D, 30A-B); or medium-sized to long and digitiform (Figs 15A-B, 19A-F, 31A-D, 34A-B); or long and apically widened (Figs 4A-D, 7A-B, 9A-E, 12A-B, 17A]. Clypeus of females unmodified (in most species), or with a short, rounded hump (in *P. tumida* sp. n., *P. egregia* sp. n. and *P. quadrifurcata* sp. n.; Figs 7C-F, 9F-J and 12G-H, respectively), or with a short, pointed cone (only in some females of *P. deelemanae* sp. n.; Fig. 31F-H). The larger the clypeal process, the lower the "cephalic" portion of the carapace. Chelicerae of most males and females unmodified (Fig. 2H), or with a distolateral boss in males of *P. robusta* and *P. siamensis* (Fig. 2A, E), or with a mediolateral hump in both sexes (more pronounced in female) of *P. coryne* (Fig. 17B-C). Sclerotised parts of legs and palps very dark (as sclerites elsewhere on the body), contrasting with white or cream-coloured membranes. Tibia I and metatarsus I (in *P. utara* sp. n. also metatarsus II) of all males with conical setal bases prolaterally to ventrally (Fig. 36G-H); these mostly absent in females (present, but weaker than in males, on leg I of all *P. egregia* sp. n. and some *P. quadrifurcata* sp. n.). Metatarsus I in males and females of *P. cerastes* and *P. coryne* ventrally with slightly to moderately elevated setal bases carrying proximally thick, strongly sigmoid setae abruptly turning distad and then away from axis of metatarsus (Fig. 36G); in males and females of *P. robusta* equivalent setae also with basal thickening (like an onion plant) but distal portion straight or only slightly sigmoid; these setae in other species unmodified. Postgenital plate of males short and usually more or less completely fused to posterior margin of pulmonary plate (Figs 27F, 36B-C), rarely separate (Fig. 27E); in females always completely fragmented into microplates (Fig. 36E). Preanal plate well-developed in males (Fig. 36A-C); in females more or less modified: reduced to a short, transverse, compass-needle shaped sclerite [in *P. nigra* (Fig. 21F), *P. siamensis* and in some *P. quadrifurcata* sp. n. and some *P. cerastes*], or fragmented into normal or slightly enlarged microplates (in most species; Fig. 36E). Opisthosoma additionally with three pairs of ventrolateral plates with a finely granular surface, lying laterally between unpaired ventral plates (pulmonary, postgenital, preanal and anal plates) with a smooth surface: (1) anterior ventrolateral plates long, narrow, lying parallel to lateral margin of pulmonary plate or being more or less fused with it, (2) median pair [corresponding to Shear's (1978: 8) "perigenital plates"] somewhat triangular, with or without interconnecting bridge or bridge fragments (in males only), situated between postgenital plate and preanal plate,

(3) posterior pair oval to triangular, smaller than the other pairs, always without interconnecting bridge, situated between preanal plate and anal plate (Fig. 36B-C, E). Strap-like lateral plates mostly absent (distinct rudiments only in male of *P. selatan* sp. n.), but instead several bands of microplates present. Posterior side of opisthosoma of males with bands of isolated microplates (in continuation of lateral bands), or with up to seven horizontal strap-like plates (Fig. 37B-C); only female of *P. utara* sp. n. with eight such strap-like plates (shorter than in male), in females of all other species these being fragmented into isolated microplates (Fig. 37D). Microplates near posterior margin of dorsal scutum conically elevated in females of some species (Fig. 36E); not so in males. A few microplates on anterior side of opisthosoma on or above anterior margin of pulmonary plate obliquely elevated and pointed in males and females (less distinct) of *P. harau* sp. n., *P. deelemanae* sp. n. and *P. selatan* sp. n.

Male palp usually with quite long and pointed (in most species; e.g. Fig. 28E, J), rarely short and blunt cymbial apex (only in *P. egregia* sp. n.; Fig. 10C-D); bulbus of palpal organ globular (e.g. Fig. 13A) or pear-shaped (e.g. Fig. 25A, C), with a constricted V-shaped (e.g. Fig. 19H, J) or U-shaped (e.g. Fig. 25A) transition to the embolus (in most species), rarely without a recognisable transition (only in *P. egregia* sp. n.; Fig. 10A-B, E); embolus rarely straight, short, deep/wide at base (only in *P. egregia* sp. n.; Fig. 10A-B, E), usually sigmoid, long, narrow/shallow at base (all other species; e.g. Fig. 7G-H); apex of embolus somewhat triangular (Fig. 2B-C), or fan-shaped (Fig. 2F), or deeply divided into 2-4 tips or lobes (the upper one, if present, called "subterminal lamella", the lower one "embolic part"; e.g. Fig. 2I). No conductor. Palpal tarsus of females without claw. Pocket-like vulva with rigid, partially or completely pigmented ventral wall and with a membranous, transpartent dorsal wall, both continuing into the anterior part of the cuticular uterus in the form of a leathery, strongly pigmented (at least in posterior portion), dorso-ventrally depressed anterior collar (e.g. Fig. 2K, P); a pair of large, more or less distinctly fused, pigmented or unpigmented ventral spermathecae situated between genital atrium and anterior collar (e.g. Fig. 2K); spermathecae with more or less clearly outlined patches of gland pores anteriorly and laterally (extending far onto dorsal sides in some species; e.g. Fig. 23A) in all species (e.g. Fig. 2K), and with external ventral pouches (only in *P. utara* sp. n.; Fig. 18E-G) or internal ventral chambers (e.g. Fig. 33B-E) in some species.

SPECIES INCLUDED: *P. armata* (Thorell, 1890) (Sumatra), *P. birmanica* (Thorell, 1898) (Myanmar), *P. cerastes* Schwendinger, 1994 (peninsular Malaysia), *P. coryne* Schwendinger, 1994 (peninsular Malaysia), *P. egregia* sp. n. (Thailand), *P. ferox* sp. n. (Thailand), *P. harau* sp. n. (Sumatra), *P. deelemanae* sp. n. (Sumatra), *P. korinchica* Hogg, 1919 (Sumatra), *P. nasicornis* Schwendinger, 1994 (Thailand), *P. nasuta* Schwendinger, 1989 (Thailand), *P. nigra* (Thorell, 1890) (Sumatra), *P. picea* (Thorell, 1890) (Sumatra), *P. quadrifurcata* sp. n. (Thailand), *P. robusta* Schwendinger, 1989 (Thailand, China), *P. selatan* sp. n. (Sumatra), *P. siamensis* Schwendinger, 1994 (Thailand), *P. tumida* sp. n. (Thailand), *P. utara* sp. n. (Sumatra). Total: 19 species.

DISTRIBUTION: Southern China, eastern Myanmar (=Burma), Thailand, peninsular Malaysia, Sumatra, islands of the Lingga Archipelago (Fig. 1).

KEY TO THE SPECIES OF *PERANIA*:

1 Males 2
- Females 15
2(1) "Thoracic" portion of carapace with a pair of long, straight, pointed horns (Fig. 24A-C). Western Sumatra . . . . . ***P. armata***
- "Thoracic" portion of carapace without such horns (only a pair of indistinct humps in that position in *P. nigra*, Fig. 21A-C) 3
3(2) Clypeus without process 4
- Clypeus with process 7
4(3) Chelicerae with distolateral boss or hump (Fig. 2A, E; not to be confused with mediolateral bulge on chelicerae of male and female of *P. coryne*, see Fig. 17B-C) 5
- Chelicerae without distolateral boss or hump (Fig. 2H) 6
5(4) Large spiders (5.8-6.6 mm carapace length); chelicerae with pronounced distolateral boss (Fig. 2A); metatarsus I ventrally with a band of proximally swollen, straight setae; apex of embolus shallow (only slightly deeper than median portion of embolus), somewhat triangular, indistinctly bifid (Fig. 2B-C). Northern Thailand, southern China . . . . . ***P. robusta***
- Medium-sized spiders (4.7-5.4 mm carapace length); chelicerae with less pronounced distolateral hump (Fig. 2E); metatarsus I ventrally with normal setae; apex of embolus not split, much deeper than median portion of embolus, fan-shaped (Fig. 2F). Southern Thailand . . . . ***P. siamensis***
6(4) "Thoracic" portion of carapace with a pair of low humps (Fig. 21A-C); embolus much longer than bulbus, together forming a U with near parallel sides (Fig. 22A). No conical setal bases on metatarsus II. Western Sumatra . . . . . ***P. nigra***
- "Thoracic" portion of carapace without posterior humps; embolus about as long as bulbus, at right angles to each other (Fig. 18B-D). Conical setal bases (as in Fig. 36H) on metatarsus II. Northern Sumatra . ***P. utara*** sp. n.
7(3) Clypeal process short, more or less distinctly pointed, occupying less than 10% of carapace length (Figs 27A-D, 30A-B, 34A-B) 8
- Clypeal process medium-sized or long, occupying distinctly more than 10% of carapace length, digitiform, apex not wider than its base in dorsal view (Figs 15A-B, 19A-F, 31A-D) 9
- Clypeal process long, occupying about 20-30% of carapace length, apex distinctly wider than base in dorsal view (Figs 4A-D, 7A-B, 9A-E, 12A-B, 17A) 10
8(7) Clypeal process indistinct, pointed (Fig. 27A-D). Median portion of embolus only slightly bent, about as deep as base of embolus; subterminal lamella short, triangular or rounded, distad-directed; embolic part tapering, abruptly bent ventrad (Fig. 28). No remnants of lateral opisthosomal plates; no or only few microplates on posterior side of opisthosoma interconnected. Western Sumatra . . . . . ***P. picea***
- Clypeal process indistinct, asymmetrically pointed (Fig. 30A-B). Median portion of embolus strongly bent, distinctly deeper than base;

subterminal lamella a broadly and obliquely truncate lobe; embolic part a small pointed tooth with slightly bent tip, directed ventrad (Fig. 30C-H). No remnants of lateral opisthosomal plates; five distinct strap-like horizontal plates on posterior side of opisthosoma. Western Sumatra . . . . . ***P. korinchica***

- Clypeal process distinct, pointed (Fig. 34A-B). Median portion of embolus strongly bent, as deep as or only slightly deeper than base of embolus; subterminal lamella a narrowly rounded, distad-directed lobe; embolic part indistinct, a short, widely rounded lobe (Fig. 34D-G). Remnants of lateral plates in anterior portion of opisthosoma; no or only few microplates in bands on posterior side of opisthosoma interconnected. Southern Sumatra . . . . . ***P. selatan*** sp. n.

9(7) Clypeal process long (occupying more than 20% of carapace length; Fig. 15A-B); ventral side of metatarsus I with proximally swollen, strongly sigmoid setae on low tubercles (Fig. 36G); embolus short, slightly bent, median portion with small prodorsal tooth; no ventrad-directed subapical lamella; apex deep, distinctly bifid, carrying a group of spinuliform microtrichia and a bulge prolaterally (Fig. 15C-T). Peninsular Malaysia . . . . . ***P. cerastes***

- Clypeal process medium-sized (10-15% of carapace length; Fig. 19A-F); metatarsus I ventrally without strongly sigmoid setae; embolus long, strongly sigmoid, median portion straight; a triangular, ventrad-directed subapical lamella below shallow, hook-shaped apex; subterminal lamella very indistinct, distad-directed, embolic part tapering (Fig. 19G-J). Western Sumatra . . . . . ***P. harau*** sp. n.

- Clypeal process medium-sized (10-15% of carapace length; Fig. 31A-D); metatarsus I ventrally without strongly sigmoid setae; embolus long, strongly sigmoid, its apex slightly deeper than median portion, lanceolate, with a short, widely rounded, dorsad-directed subterminal lamella; no ventral subapical lamella (Fig. 32B-F). Southern Sumatra . . . . . ***P. deelemanae*** sp. n.

10(7) Cymbium short, its apex strongly reduced and widely truncate (Fig. 10C, D); palpal organ exceptionally stout, without marked transition between bulbus and embolus (Fig. 10A-B, E). Northeastern Thailand . . ***P. egregia*** sp. n.

- Cymbium long, its apex well-developed, narrow and pointed (Figs 5A-C, 7G-I, 13A-C); palpal organ with marked transition between voluminous bulbus and slender embolus (Figs 5A-B, 7G-H, 13A-B) 11

11(10) Clypeal process hourglass-shaped in dorsal view, its distal margin strongly arched (Fig. 17A); retrolateral margin of chelicera with weak (in female more pronounced) median bulge (Fig. 17B); metatarsus I ventrally with strongly sigmoid, proximally swollen setae on slightly elevated bases (as in Fig. 36G); apex of embolus not much deeper than base, indistinctly divided into small, narrowly rounded or pointed subterminal lamella and larger, more widely rounded, lobate embolic part (Fig. 17D-E). Peninsular Malaysia . . . . . ***P. coryne***

- Clypeal process anvil-shaped in dorsal view, its distal margin slightly arched or straight (Figs 4A, C-D, 7A, 12A); metatarsus I ventrally without strongly sigmoid setae; apex of embolus different 12

12(11) Apex of embolus with four distinct tips (two on each part of deeply split apex), three of them long, shallow and pointed, one of them short, deeper and rounded (Fig. 13A-B, D-G). Western and eastern Thailand . . . . . ***P. quadrifurcata*** sp. n.

- Apex of embolus different, if four tips present, then three of them on embolic part of split apex and not pointed (Figs 2I-J, M-N, 5A-B, D-G, 7G-H) 13

13(12) Deep and lobate subterminal lamella clearly surpassing shallow pointed embolic part without a dorsal lobe (Fig. 5A-B, D-G). Western Thailand . . . . . ***P. ferox*** sp. n.

- Subterminal lamella not or only indistinctly surpassing deep embolic part carrying a dorsal lobe 14

14(13) Subterminal lamella and embolic part not or only slightly overlapping, the former narrowly rounded, the latter broadly truncate (Fig. 2I-J). Northern Thailand . . . . . ***P. nasuta***

- Subterminal lamella and embolic part distinctly overlapping, the former narrowly rounded, the latter tripartite, its median process lobate, widely rounded and most prominent, its lower process small, digitiform and ventrad-directed (Fig. 7G-H). Northern Thailand . . . . . ***P. tumida*** sp. n.

- Subterminal lamella and embolic part distinctly overlapping, the former widely rounded, the latter indistinctly bipartite, its lower process large, deep, with pointed, distad-directed tip (Fig. 2M-N). Northern Thailand . . . . . ***P. nasicornis***

15(1) "Thoracic" portion of carapace with a pair of long, pointed horns (Fig. 24D). Anterior opisthosomal plate entire, separated from pulmonary plate (Fig. 24H-I). Ventral wall of spermathecae with a pair of internal chambers separated from each other (Fig. 26B, E). Western Sumatra . . . . . ***P. armata***

- "Thoracic" portion of carapace with a pair of indistinct humps (Fig. 21D). Anterior opisthosomal plate entire, widely connected to pulmonary plate (Fig. 21E). Ventral wall of spermathecae with a pair of internal chambers connected to each other by a median bridge (Fig. 23B, E). Western Sumatra . . . . . ***P. nigra***

- "Thoracic" portion of carapace without modifications. Anterior opisthosomal plate more or less strongly fragmented, not connected to pulmonary plate (e.g. Fig. 31I) 16

16(15) Eight more or less complete strap-like horizontal plates on posterior side of opisthosoma (Fig. 37C). Ventral wall of spermathecae with a large pair of external pockets (Fig. 18E-G) . . . . . ***P. utara*** sp. n.

- Only bands of microplates on posterior side of opisthosoma (as in Fig. 37D). Ventral wall of spermathecae without external pockets 17

17(16) Ventral wall of spermathecae with a pair of internal chambers (Figs 20B-D, 23B-C, E-F, 26B-C, E-F, 29B-C, 33B-E, 35B-E) 27
- Ventral side of of spermathecae without internal chambers 18
18(17) Tibia I and metatarsus I usually with conical setal bases ventrally (as in Fig. 36H; only absent in one *P. quadrifurcata* sp. n. female examined) 19
- Leg I always without conical setal bases 20
19(18) Clypeal hump always distinct (Fig. 9F-J); spermathecae without posterolateral compartments; anterior collar of vulva surpassing spermathecae for almost their length; median zone of anterior collar distinctly less pigmented than lateral zones (Fig. 11). Northeastern Thailand . ***P. egregia*** sp. n.
- Clypeal hump indistinct (Fig. 12G-H) or absent; each spermatheca with a distinctly separate posterolateral compartment; anterior collar of vulva not or only slightly surpassing spermathecae; median zone of anterior collar slightly less pigmented than lateral zones (Fig. 14A-D). Western to northeastern Thailand . . . . . ***P. quadrifurcata*** sp. n.
20(18) Clypeal hump always present, distinct or indistinct (Fig. 7C-F); vulva as in Fig. 8. NorthernThailand . . . . . ***P. tumida*** sp. n.
- Clypeal hump always absent; vulva different 21
21(20) Spermathecae with indistinctly outlined anterolateral porepatches lying in more or less distinct trenches (Figs 2L, P, 3F); ventral wall of genital atrium and posterior portion of spermathecae only little less pigmented than porepatches (Figs 2K, O, 3E) 25
- Spermathecae with strongly pigmented, distinctly outlined anterior porepatches on bulged surface, no trenches anterolaterally (Figs 2D, G, 16E-F, 17G); posterior portion of spermathecae unpigmented (Figs 16A-C, 17F); ventral wall of genital atrium pigmented or unpigmented 22
22(21) Ventral wall of genital atrium completely or partially pigmented (Figs 16A-D, 17F); metatarsus I ventrally with proximally swollen, strongly sigmoid setae on slightly elevated bases (Fig. 36G) 23
- Ventral wall of genital atrium largely unpigmented (except for a narrow marginal pigmentation); metatarsus I ventrally without strongly sigmoid setae 24
23(22) Porepatches of vulva separated from each other by roughly their width (Fig. 16A-C, E-F). Ventral wall of genital atrium completely pigmented (Fig. 16A-D). Chelicerae unmodified. Peninsular Malaysia . . . . . ***P. cerastes***
- Porepatches of vulva separated from each other by much less than their width (Fig. 17F-G). Ventral wall of genital atrium pigmented in lateral thirds, median third unpigmented (Fig. 17F). Retrolateral surface of chelicerae distinctly bulged in the middle (Fig. 17C). Peninsular Malaysia . . . . . ***P. coryne***
24(22) Spermathecae relatively small, widely separated from each other (Fig. 2D). Large spiders (5.8-6.6 mm carapace length). Northern Thailand and southern China . . . . . ***P. robusta***
- Spermathecae relatively large, almost touching each other in the middle (Fig. 2G). Medium-sized spiders (4.7-5.4 mm carapace length). Southern Thailand . . . . . ***P. siamensis***

25(21) Vulva much wider than long; anterior collar not surpassing widely arched common anterior margin of spermathecae (Fig. 3D-E); anterolateral sides of spermathecae with deep trenches (Fig. 3F). Eastern Myanmar . . . . . ***P. birmanica***

- Vulva longer than wide or only slightly wider than long; anterior collar far surpassing invaginated common anterior margin of spermathecae; anterolateral sides of spermathecae slightly bulged, plane or with shallow trenches (Fig. 2K-L, O-P) 26

26(25) Opisthosoma with conical microplates behind dorsal scutum; spermathecae posteriorly narrower or only slightly wider than anteriorly, lateral margins of spermathecae straight or slightly and evenly convex (Fig. 2K). Northern Thailand . . . . . ***P. nasuta***

- Opisthosoma without elevated microplates; spermathecae posteriorly distinctly wider than anteriorly, their lateral margins distinctly bulged posteriorly (Fig. 2O). Northern Thailand . . . . . ***P. nasicornis***

27(17) Anterior opisthosomal plate fragmented into microplates of similar size. Ventral wall of genital atrium entirely pigmented, relatively long; internal ventral chambers small and with entire walls, or large with broken walls, always without longitudinal ribs; anterior margin of anterior collar of vulva slightly arched (Figs 20A-C, 29A-B) 29

- Anterior opisthosomal plate fragmented into numerous microplates and three larger plates (Fig. 31I). Ventral wall of genital atrium only pigmented in median zone, relatively short; internal chambers of spermathecae large and wide, their walls entire, thick and always enforced with longitudinal ribs; anterior margin of anterior collar of vulva strongly arched (Figs 33A-B, D-E, 35A-B, D-E) 28

28(27) Common anterior margin of spermathecae straight or only slightly invaginated; internal chambers of spermathecae distinctly separated from each other (Fig. 33B, D-E). A short, pointed cone on clypeus of some (but not all) females (Fig. 31F-H). Southern Sumatra . . . . ***P. deelemanae*** sp. n.

- Common anterior margin of spermathecae deeply invaginated; internal chambers of spermathecae close to or in contact with each other (Fig. 35B, D-E). Clypeus always unmodified. Southern Sumatra . . . . . ***P. selatan*** sp. n.

29(27) Internal chambers of spermathecae relatively wide, their walls open on both lateral sides, posteriorly indistinct, anteriorly slivered into 2-3 parallel stripes (Fig. 29B); large spiders (4.8-4.9 mm carapace length). Western Sumatra . . . . . ***P. picea***

- Internal chambers of spermathecae relatively narrow, their walls entire or open laterally on both sides, posteriorly distinct, anteriorly entire (Fig. 20B-C); medium-sized spiders (3.5-4.0 mm carapace length). Western Sumatra . . . . . ***P. harau*** sp. n.

THE *PERANIA ROBUSTA* SPECIES GROUP

DIAGNOSIS: Characterized by a wide vulva with largely unpigmented (pigmentation only in a narrow band along posterior margin) ventral wall of genital atrium; spermathecae with clearly outlined anterior porepatches not or only very slightly extending onto dorsal side, posterior portion of spermathecae unpigmented. Males without clypeal process and with a more or less distinctly developed distal-retrolateral boss on chelicerae; femora of legs and palps granular (with slightly elevated setal bases); anterior ventrolateral plate free or at its posterior end fused to pulmonary plate; bulbus of palpal organ ovoid, apex of embolus not or only indistinctly bifid.

SPECIES INCLUDED: *Perania robusta*, *P. siamensis*.

DISTRIBUTION: Yunnan Province in southern China, northernmost tip of Thailand (and probably the area in between); southern Thailand (Fig. 1, localities 1-8).

Perania robusta Schwendinger, 1989 Figs 2A-D, 36E

Perania robusta Schwendinger, 1989: 577-579 (description of male and female). – Lian, 2009: 31-33, figs 1-3 (description of male and female); Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Chiang Mai Province, Doi Angkhang (19°53'39"N, 99°02'28"E), 1450 m; 22.IV.1987; leg. P. J. Schwendinger.

PARATYPES: 2 ♂ and 1 ♀; 22.IV.1987, 30.X.1987, otherwise same data as for holotype.

NEW MATERIAL EXAMINED: MHNG; 1 ♀ (25.VIII.1990), 2 ♂, 2 ♀, 1 juv. (2.XI.1990); same locality and altitude as for holotype; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1989: 677).

NEW CHARACTERS: Metatarsus I of males more strongly curved than in males of other species; axis of tarsus I not in line with axis of metatarsus I. Males and females with a broad band of proximally swollen, straight setae rising from ventral side of metatarsus I and metatarsus II (on the latter less pronounced) at an unusually acute angle. Anterior pair of ventrolateral plates in males free, not connected with pulmonary plate. Postgenital plate of males relatively large, with angular posterior margin, completely fused to pulmonary plate, both plates linked by a suture. This suture usually sclerotised, in one paratype only lightly sclerotised in a narrow zone behind gonopore; in one non-type male a small unsclerotised slit on the left side of the suture. Anterior opisthosomal plate and preanal plate of all females completely fragmented into isolated microplates. Apex of embolus shallow (only slightly deeper than median portion of embolus) and indistinctly bifid: subterminal lamella broadly truncate and ventrad-directed, separated from short and triangular embolic part by a small indentation (Fig. 2B-C). Vulva with spermathecae separated by a wide unpigmented median zone (Fig. 2D). Spermathecae slightly bulged ventrally, with pores situated mostly in anterior portion, posterior portion (especially anteromedially) with very few or no pores. Ventral wall of genital atrium largely unpigmented apart from a short zone along posterior margin of genital orifice.

DISTRIBUTION: Originally described from northern Thailand, this species was later also recorded from Yunnan Province in southern China (Lian, 2009; Fig. 1, localities 1-3). It most likely also occurs in Burmese territory between these localities.

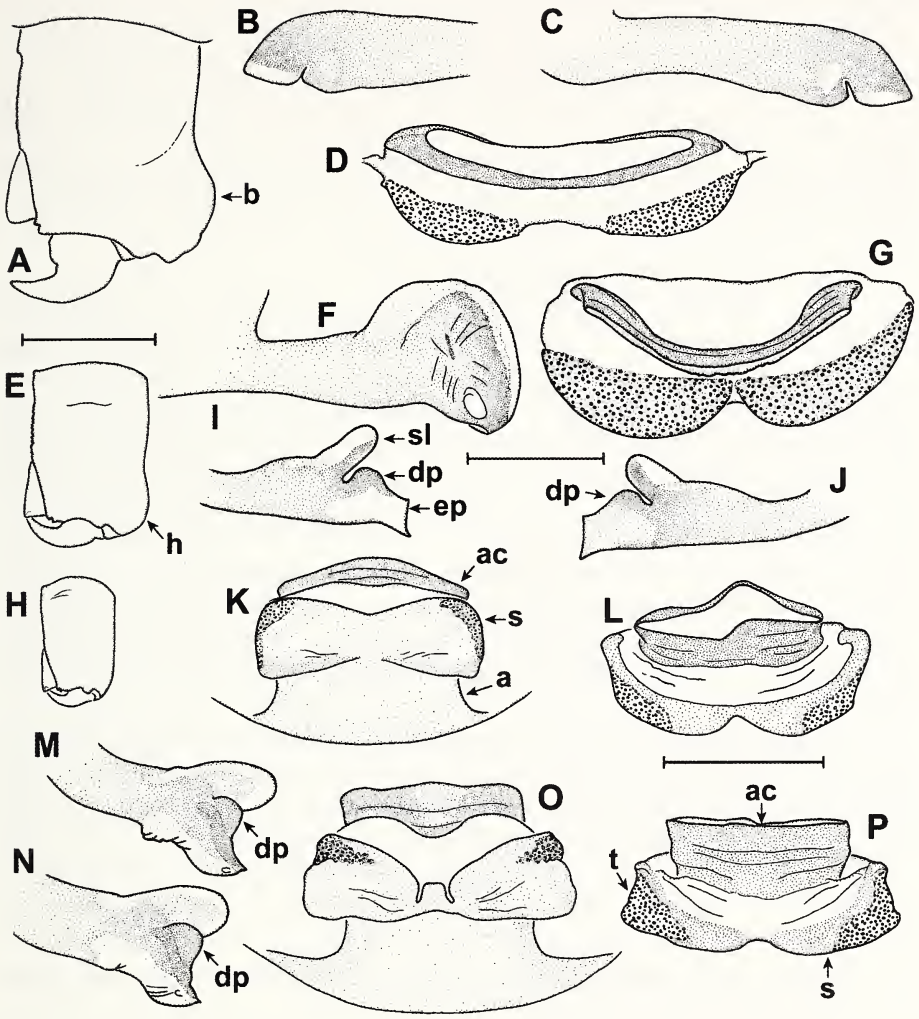


FIG. 2

Perania robusta (A-D), *P. siamensis* (E-G), *P. nasuta* (H-L) and *P. nasicornis* (M-P); new specimens (A-K; H-K from Doi Suthep) and paratypes (L-P). (A, E, H) Left chelicera of male, anterior view. (B, J) Apex of left embolus, retrolateral view. (C, F, I, M-N) Same, prolateral view. (D, G, L, P) Vulva, anterior view. (K, O) Same, ventral view. Abbreviations: a = atrium, ac = anterior collar, b = distolateral boss, dp = dorsal projection on embolic part of apex of palpal organ, ep = embolic part of apex of palpal organ, h = distolateral hump, sl = subterminal lamella, t = trench. Scale lines 1.0 mm (A, E, H), 0.5 mm (B-C, F, I-J, M-N; D, G, K-L, O-P).

Perania siamensis Schwendinger, 1994 Fig. 2E-G

Perania siamensis Schwendinger, 1994: 452-456, figs 15-25 (description of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Ranong Province, about 4 km east of Ranong city, on road to Had Sompaen (9°57'47"N, 98°40'41"E), 50 m; 18.IX.1992; leg. P. J. Schwendinger.

PARATYPES: MHNG; 1 ♂, 3 ♀; same data as for holotype.

OTHER MATERIAL EXAMINED (INCLUDING NEW MATERIAL): MHNG; 1 ♂, 3 ♀; Thailand, Prachuab Khiri Khan Province, Thab Sakae District, Huay Yang National Park (11°37'45"N, 99°34'41"E), 700 m; 29.XI.1991. – MHNG; 3 ♀; Thailand, Ranong Province, Kapoe District, Khlong Nakha Wildlife Sanctuary (9°27'26"N, 98°30'43"E), 30 m; 29.I.1991. – MHNG; 1 ♂, 6 ♀; Thailand, Krabi Province, Khao Phanom District, Khao Phanom Bencha National Park, above Huay To Waterfall (8°14'19"N, 98°55'11"E), 220-260 m; 22.IX.1992, 22.VII.2005. – MHNG; 3 ♂, 1 ♀; Thailand, Krabi Province, Ao Luk District, Thanboke Khoranee National Park, near Sra Boke Khoranee (8°23'12"N, 98°44'16"E), 50 m; 18./19.IX.2006. – MHNG; 1 ♀; Thailand, Phang Nga Province & District, forest above Chao Ngu Cave (8°26'55"N, 98°32'52"E), 250 m, 14.VII.2011. All leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1994: 452).

NEW CHARACTERS: Metatarsi I and II in males and females without modified ventral setae (as present in *P. robusta*). Anterior pair of ventrolateral plates in males mostly free, only their posterior tips fused with pulmonary plate. Postgenital plate in males not (linked by a pigmented but not sclerotised suture) or only partially fused (suture sclerotised in some portions) with posterior margin of pulmonary plate. Preanal plate of females always distinct but very short, anterior opisthosomal plate completely fragmented. Apex of embolus very deep and fan-shaped, without separation into subterminal lamella and embolic part (Fig. 2F). Vulva with both spermathecae strongly bulged, medially close to each other, separated by a deep and narrow gap; anterolateral sides of spermathecae convex, porepatches large (Fig. 2G); posterior portion of spermathecae completely unpigmented. Ventral wall of genital atrium largely unpigmented expect for a narrow triangular, strongly pigmented zone along each lateral margin.

REMARKS: Sra Boke Khoranee and Chao Nu Cave are new localities which lie within the previously known range of this species. At these two sites spiders were collected from webs running into cracks and holes in limestone cliffs and limestone outcrops. The new specimens from Khao Phanom Bencha were found on earthbanks in a semi-evergreen rainforest. The new females are all relatively large, in the size range of the females from Huay Yang and Khao Phanom Bencha mentioned in Schwendinger (1994: 445).

DISTRIBUTION: Southern Thailand, from Prachuab Khiri Khan Province to Krabi Province (Fig. 1, localities 4-8).

THE *PERANIA NASUTA* SPECIES GROUP

DIAGNOSIS: Spermathecae and ventral wall of genital atrium entirely and uniformly pigmented; porepatches on spermathecae indistinctly outlined, only little extending onto dorsal side of vulva; areas with porepatches bulged or forming more or less distinct trenches. Females of some species with clypeal hump and with conical setal bases ventrally on tibia I and metatarsus I. Males (unknown for *P. birmanica*) with long clypeal process with widened, flattened and truncate apex; no distolateral chelicer al boss; anterior pair of ventrolateral plates in males completely or largely free; bulbus of male palpal organ mostly globular (except for *P. egregia* sp. n.), apex of embolus divided into 2-4 tips; subterminal lamella always present and pronounced, lobate or bifid, smaller or larger than embolic part. Femora of legs and palps in males granular (with slightly elevated setal bases).

SPECIES INCLUDED: *Perania birmanica*, *P. egregia* sp. n., *P. ferox* sp. n., *P. nasicornis*, *P. nasuta*, *P. quadrifurcata* sp. n.

DISTRIBUTION: Eastern Myanmar, western, northern and northeastern Thailand (Fig. 1, localities 9-19).

Perania nasuta Schwendinger, 1989 Figs 2H-L, 37D

Perania nasuta Schwendinger, 1989: 574-577, figs 6-11, 24-25 (description of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Chiang Mai Province, Chomthong District, Doi Inthanon (18°31°33"N, 98°29'50"E), 1700 m; 8.X.1987, leg P. J. Schwendinger.

PARATYPES: MHNG; 3 ♂, 3 ♀; 1986-1988, otherwise same data as for holotype; leg. P. J. Schwendinger.

NEW MATERIAL EXAMINED: MHNG; 1 ♂; 15.X.1993, otherwise same data as for holotype; leg. P. J. Schwendinger. – MHNG; 2 ♂, 1 juv.; Chiang Mai Province and District, Doi Suthep-Pui, ravine near Chang Khian Agricultural Station (18°50'09"N, 98°53'47"E), 1420 m; 11.-12.II.1998; leg. P. J. Schwendinger & C. Kropf. – MHNG; 6 ♂ and 4 ♀; same locality; 18.XII.2001; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1989: 574).

NEW CHARACTERS: Anterior opisthosomal plate of females fragmented into microplates (slightly larger than elsewhere on opisthosoma). Anterior pair of ventro-lateral plates of males free, not connected with pulmonary plate. Postgenital plate of males usually completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate of females fragmented into microplates. Apex of embolus deeply split, narrowly rounded subterminal lamella and broadly truncate embolic part not overlapping each other, embolic part with a lobate dorsal projection (Fig. 2I-J). Vulva with posterior dorsal margin of anterior collar more or less straight (unlike in *P. birmanica*); spermathecae with postero-lateral corners not bulged, lateral margins straight or slightly arched (Fig. 2K).

VARIATION: In the holotype and all male paratypes (all from Doi Inthanon) the microplates in the first row of the posterior side of the opisthosoma are interconnected and form a strap-like horizontal plate which is at its lateral ends connected to the posterior margin of the dorsal scutum. In one male from Doi Inthanon and in all males from Doi Suthep-Pui the microplates in the upper row are posteriorly not interconnected (except on one side in one specimen). In three males from Doi Suthep the dorsal scutum is not connected to the upper row of posterior microplates. The postgenital plate of one paratype is partly separated from the pulmonary plate by a short and narrow membranous zone behind the gonopore. All microplates in the preanal region of females from Doi Inthanon are isolated, in females from Doi Suthep-Pui the posterior microplates in that region are laterally more or less distinctly interconnected. All females from Doi Suthep-Pui have less distinctly elevated conical microplates behind the dorsal scutum of the opisthosoma than the females from the type locality.

In two females from Doi Suthep-Pui the vulva has a shorter anterior collar (but still distinctly protruding beyond the anterior margins of the spermathecae, see Fig. 2K) than that of two female paratypes from Doi Inthanon. The anterior collar in the vulva illustrated by Schwendinger (1989: fig. 17) is longer than in the other three

females examined later, possibly expanded due to swelling caused by clearing in KOH. The vulvae of two females from Doi Suthep-Pui have a relatively short genital atrium and spermathecae that are posteriorly slightly wider than anteriorly (Fig. 2K), whereas in the vulvae of two females from the type locality the genital atrium is relatively longer and the spermathecae are anteriorly wider than posteriorly. In contrast to vulvae of *P. nasicornis*, the widening of the *P. nasuta* spermathecae is gradual and the lateral margins are straight or slightly rounded (Fig. 2K cf. Fig. 2O). The distinction between females of *P. nasuta* and *P. nasicornis* are thus less pronounced than previously assumed. See also Remarks under the following species.

REMARKS: All adult specimens (holotype and paratypes) that were available for the description of this species were collected on Doi Inthanon at 1700 m. Two presumably conspecific juveniles were also mentioned. One of them is alledgedly from an altitude of 2530 m on the same mountain, but that is probably a confusion of labels. The other juvenile is from the Doi Suthep-Pui at 1180 m, a mountain about 50 km northeast of the Doi Inthanon. The identification of the latter specimen can now be confirmed. Adult *Perania* subsequently collected at a second, nearby locality on the Doi Suthep-Pui (more precisely collected below Doi Pui; the mountain has two summits, called Doi Suthep and Doi Pui, about 1 km apart) clearly belong to *P. nasuta*.

DISTRIBUTION: Known from two mountains (about 50 km apart) in northern Thailand (Fig. 1, localities 9-10).

BIOLOGY: The new male from Doi Inthanon was adult when collected in mid-October on an earth bank at the side of a road. Three of the juvenile males collected from webs under loose stones in a ravine on Doi Suthep-Pui in late December matured between late September and early October of the following year. One juvenile female collected together with the juvenile males matured in early October of the following year, at the same time as the males. One male was adult when found at the same locality in early February. It appears that although adult spiders of this species can be found at all times of the year, their period of maturation is at the end of the rainy season, in September and October (see also Schwendinger, 1989: 574-577).

Perania nasicornis Schwendinger, 1994 Fig. 2M-P

Perania nasicornis Schwendinger, 1994: 448-452, figs 1-14 (description of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; 1 ♂; Thailand, Lamphun Province, Mae Tha District, Doi Khuntan (18°29'23"N, 99°17'55"E), 1250 m; 16.II.1992; leg P. J. Schwendinger.

PARATYPES: MHNG; 6 ♂, 4 ♀; from the type locality, 1000-1300 m; 6.II.1992, 8.X.1992, leg. P. J. Schwendinger. No additional material available.

DIAGNOSIS: See Schwendinger (1994: 448).

NEW CHARACTERS: Anterior opisthosomal plate of females fragmented into microplates of different sizes. Postgenital plate in all males completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them; all microplates on posterior side of opisthosoma of males close to each other but not fused into horizontal strap-like plates. Anterior pair of ventrolateral plates of males largely free,

only posterior tips fused with pulmonary plate. Preanal plate of females fragmented into microplates, some of the posterior ones slightly wider than the others. Apex of embolus distinctly split, with widely rounded subterminal lamella overlapping pointed embolic part with a quite large, lobate dorsal projection (Fig. 2M-N). Vulva with posterior dorsal margin of anterior collar very widely rounded (unlike in *P. birmanica*); spermathecae with lateral sides distinctly bulged in posterior portion (Fig. 2O).

REMARKS: The porepatches of all spermathecae are much larger than illustrated in the original decription (Fig. 2O-P cf. Schwendinger, 1994: figs 13-14), extending on the lateral sides down to the posterior corners of the spermathecae (but usually not visible in ventral view because hidden behind the bulged posterolateral corners). This and the following two new observations on *P. nasuta* make the distinction between females of *P. nasicornis* and *P. nasuta* more difficult than given in the original description. Not all *P. nasuta* females have a longer anterior collar of the vulva than females of *P. nasicornis* (Fig. 2K cf. Fig. 2O). *Perania nasuta* females from Doi Suthep-Pui have spermathecae that are posteriorly slightly wider than anteriorly (Fig. 2K). Thus females of both species can be more reliably distinguished by the following: *Perania nasuta* with more or less distinctly elevated conical microplates behind dorsal scutum of opisthosoma (microplates not elevated in *P. nasicornis*); spermathecae posteriorly narrower or slightly wider than anteriorly (distinctly wider in *P. nasicornis*), their lateral margins not bulging outwards in posterior portion (distinctly bulged in *P. nasicornis*), pores visible along most of lateral sides in ventral view (pores hidden by bulged posterolateral corner in ventral view in *P. nasicornis*) (Fig. 2K cf. Fig. 2O). Differences were also found in the sizes of the fragments (microplates) of the anterior opisthosomal plates of females: in *P. nasicornis* two lateral, one central and all dorsal fragments (corresponding to the upper margin of the plate) are clearly larger than the remaining microplates; in *P. nasuta* only the two lateral fragments are enlarged. However, the latter differences are not pronounced and cannot be used as a reliable distinction between females of both species. They therefore have not been used in the key to the species.

DISTRIBUTION: Known only from a mountain in northern Thailand (Fig. 1, locality 11).

Perania birmanica (Thorell, 1898) Fig. 3

Paculla birmanica Thorell, 1898: 282-283 (description of ♀).

Perania birmanica (Thorell, 1898). – Bourne, 1980: 256-259, figs 20-23 (re-description and illustration of holotype; transfer); Lehtinen, 1981: 16 (mention; transfer); Schwendinger, 1989: fig. 21 (illustration of outlines of spermathecae); Platnick, 2013 (listing).

HOLOTYPE: MCSN; ♀; "Birmania, Carin Ceba, Biapó" [on original labels], "Carin Chebà" or "Bia-pó" mountains [in original description], approximally 19°05'N, 96°35'E; 1885-1889; leg. Leonardo Fea.

DIAGNOSIS: Female holotype (male unknown) distinguished from females of other congeners by a dorsal opisthosomal scutum with a quite regularly eliptical margin (Fig. 3C; Bourne, 1980: fig. 21), and by largely fused spermathecae with a flat common ventral surface, a widely arched common anterior margin and distinct trenches in anterior and lateral sides.

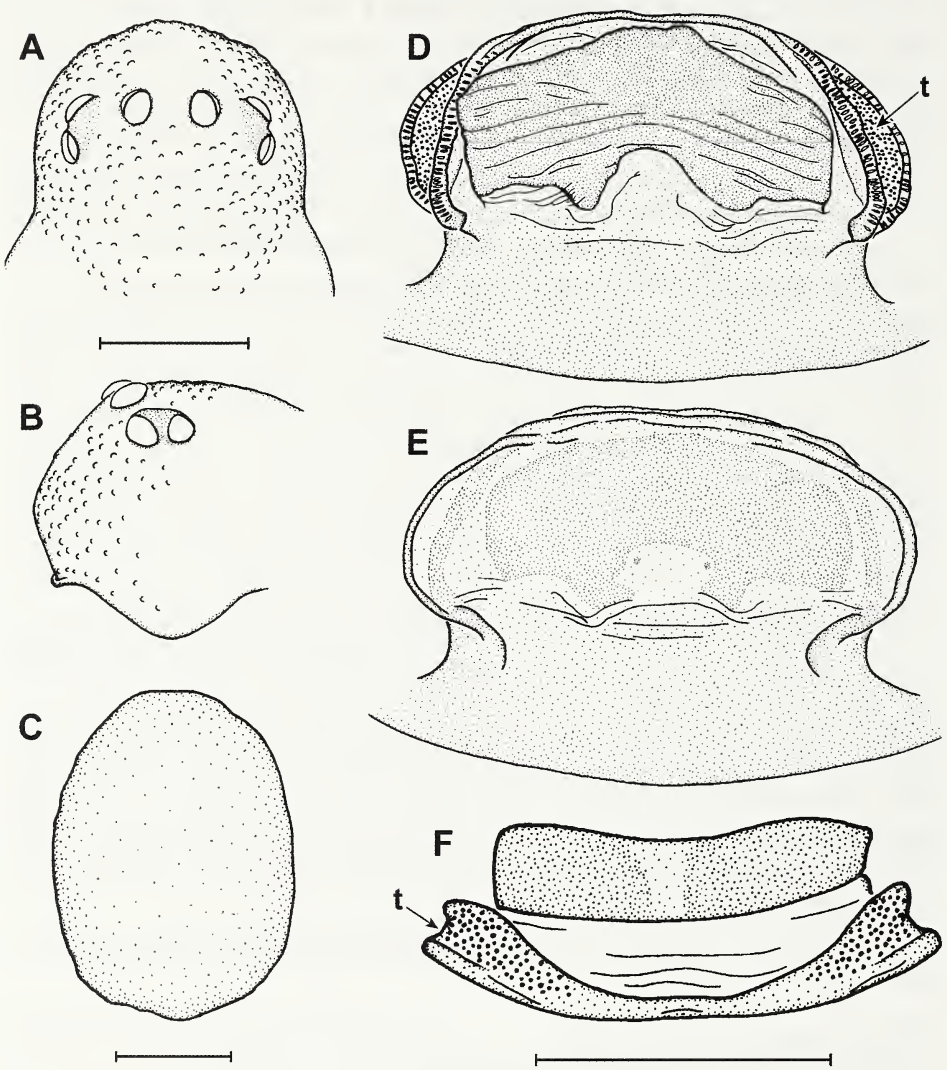


FIG. 3

Perania birmanica Thorell, 1898, female holotype. (A) Anterior portion of carapace, dorsal view. (B) Same, lateral view. (C) Dorsal scutum of opisthosoma, dorsal view. (D) Vulva, dorsal view. (E) Same, ventral view. (F) Same, anterior view. Abbreviation: t = trench. Scale lines 1.0 mm (A-B; C), 0.5 mm (D-F).

NEW CHARACTERS: Vulva with ventral side uniformly pigmented (no unpigmented zone between spermathecae and genital atrium; Fig. 3D-E) and uniformly flat (spermathecae not bulged; Fig. 3F). Vulva similar to that of *P. ferox* sp. n., distinguished by left and right spermathecae without depression or unpigmented zone between them; anterior and lateral sides of spermathecae with narrow porepatches

lying in distinct trenches (Fig. 3F); anterior collar with deep median invagination in posterior margin (Fig. 3D; possibly a condition of the holotype and not a character of the species). Outlines of the holotype's spermathecae shining through the intact genital plate illustrated by Schwendinger (1989: fig. 21). Preanal plate fragmented into microplates, the three posterior ones laterally connected with each other. Anterior opisthosomal plate completely fragmented.

RELATIONSHIPS: Strong similarities in copulatory organs of females and close geographical proximity indicate that *P. birmanica* is closely related to *P. ferox* sp. n. and *P. quadrifurcata* sp. n. Therefore it is quite likely that the unknown male of *P. birmanica* also has a long clypeal process. Lehtinen (1981: 16) speculated that *P. birmanica* could be close to *P. armata* from Sumatra, because Thorell (1898) compared the first with the second species, but there is no evidence for a close relationship between them.

DISTRIBUTION: Known only from the type locality in the mountains of the Karen (= Kayin) State, northeast of Toungoo (Fig. 1, locality 12). This area has been off limits to foreign visitors without a special permit for the last four and a half decades.

Perania ferox sp. n. Figs 4-6

HOLOTYPE: MHNG; ♂; Thailand, Tak Province, km 121 on road from Mae Sot (= Mae Sod) to Umphang (about 16°14'N, 98°59'E), 1270 m; 8.X.1993; leg. P. J. Schwendinger.

PARATYPES: 2 ♂ (one matured in late January 1994) and 4 ♀ (one selected as "allotype") with same data as for holotype.

ETYMOLOGY: Latin adjective "ferox" = fierce; referring to the aggressive defence behaviour of this species.

DIAGNOSIS: Females most similar to the female holotype of *P. birmanica*, distinguished by slightly bulged spermathecae indistinctly separated from each other by oblique bands without pigmentation; anterolateral sides of spermathecae convex, poreplates not lying in trenches; posterior margin of anterior collar fairly straight, without median indentation. Males with long clypeal process; palpal organ similar to that of *P. nasicornis*, but embolic part of apex shallower, without dorsal projection, not overlapping subterminal lamella.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of sclerotised parts mostly dark reddish brown; leg I slightly darker than other legs; membranous parts of opisthosoma light grey-orange. Clypeus with long, distally widened and flattened median process projecting foreward and slightly upward, occupying about 20% of carapace length (Fig. 4A-B). Fovea indistinct and narrow. Total length 10.2. Carapace 5.6 long, 2.7 wide. Eye sizes and interdistances: PME 0. 26 long, separated by 0.19; ALE 0.27 long; ALE-PLE 0.07; PLE 0.27 long, separated by 1.26. Labium 0.7 long, 1.1 wide. Sternum 2.9 long, 2.0 wide. Chelicerae without hump at distolateral corner, with two distinct teeth on anterior margin of fang furrow.

Palp 3.6 long (1.2+0.6+1.1+0.7). Cymbium of typical shape (Fig. 5C). Bulbus globular; embolus large, only slightly bent in its distal portion, apex deeply split: subterminal lamella quite deep, rounded and tongue-shaped, separated by an acute invagination from the much shallower and pointed embolic part (Fig. 5A-B).

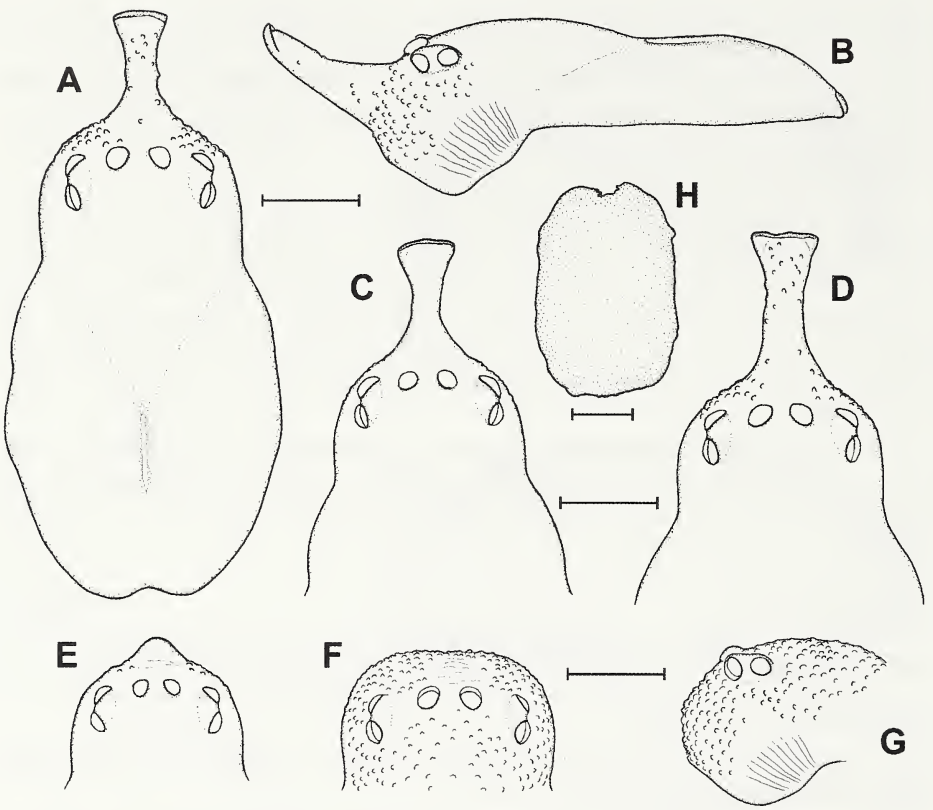


FIG. 4

Perania ferox sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C, D) Anterior portion of carapace of two male paratypes, dorsal view. (E) Same of penultimate male (exuvia). (F) Anterior portion of carapace of female "allotype", dorsal view. (G) Same, lateral view. (H) Dorsal opisthosomal scutum of "allotype", dorsal view. Scale lines 1.0 mm (A-B; C-D; E-G; H).

Legs 3421. About 12 strong dark conical setal bases prolaterally to ventrally on metatarsus I, about 10 smaller ones prolaterally spread over most of tibia I. Paired leg claws with a row of 9-13 teeth (decreasing in numbers from anterior to posterior legs); unpaired leg claws with one denticle. Leg I 15.5 long (4.7+1.8+4.5+3.1+1.4), leg II 12.5 long (3.7+1.4+3.4+2.7+1.3), leg III 9.6 long (2.9+1.1+2.2+2.3+1.1), leg IV 12.3 long (3.6+1.2+3.2+3.1+1.2).

Opisthosoma 4.6 long, 3.0 wide. Dorsal scutum 4.4 long, 2.9 wide, somewhat oval, its surface with only very indistinct elevations. All lateral microscerites flat, those in upper three bands on posterior margin of opisthosoma still fused into strap-like horizontal plates. Pulmonary plate 3.2 long, 2.5 wide; genital region flat. Anterior pair of ventrolateral plates completely free, their posterior tips only touching margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.3 long, 1.0 wide,

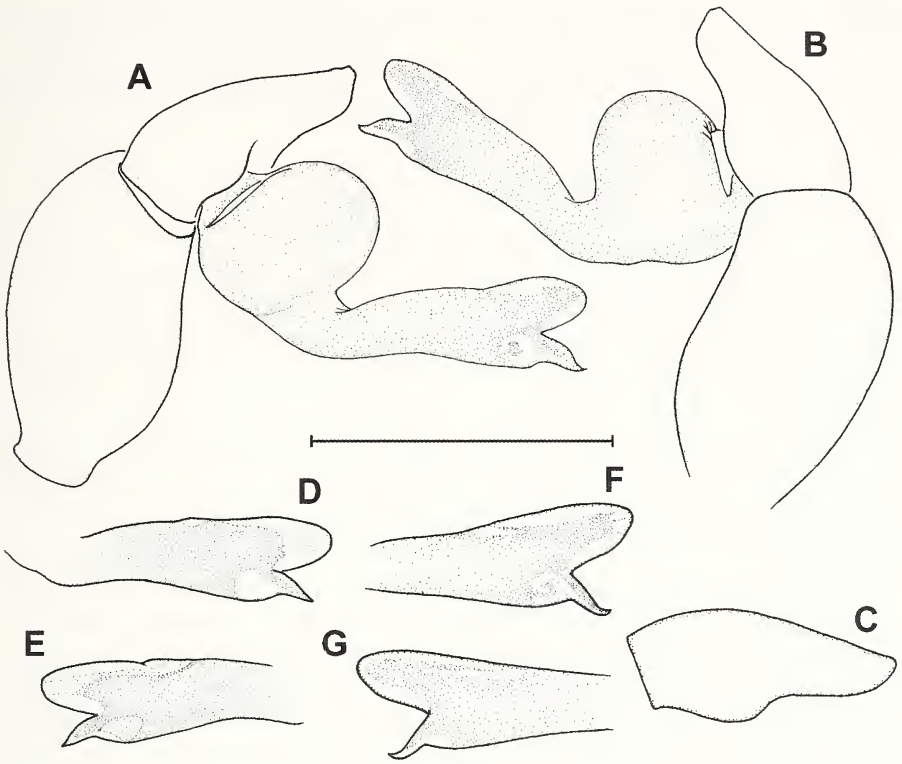


FIG. 5

Perania ferox sp. n. (A) Left palp of holotype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium of holotype, prolateral view. (D, F) Apex of embolus of two male paratypes, prolateral view. (E, G) Same, retrodorsal view. Scale line 1.0 mm.

quadrangular, all margins uneven, the posterior one more distinctly arched than the others. Anal plate 0.9 long, 1.3 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Total length 8.7. Carapace 4.3 long, 2.7 wide; "cephalic" portion domed, anterior margin straight, without clypeal process (Fig. 4F-G). PME 0.25 long, 0.20 apart; ALE 0.22 long; ALE-PLE 0.10; PLE 0.24 long, 1.39 apart. Labium 0.8 long, 1.1 wide. Sternum 2.7 long, 2.0 wide. Right chelicera with two strong teeth on anterior margin of fang forrow, left chelicera with one strong and one weak tooth. Palp 3.6 long (1.1+0.5+0.8+1.2). Legs 3241; tibia I and metatarsus I without conical setal bases. Paired leg claws with a row of 11-12 teeth on anterior legs, 8-10 on posterior legs. Leg I 12.8 long (3.8+1.5+3.5+2.7+1.3), leg II 10.8 long (3.1+1.3+2.8+2.4+1.2), leg III 8.7 long (2.6+1.1+2.0+2.0+1.0), leg IV 11.2 long (3.3+1.2+2.8+2.8+1.1).

Opisthosoma 5.3 long, 3.5 wide; several microplates posterolaterally very distinctly elevated and conical, those on posterior side of opisthosoma flat, very close to each other, but not fused into horizontal strap-like plates. Anterior plate fragmented

into microplates of different sizes. Dorsal scutum 3.5 long, 2.4 wide, subquadrangular (in contrast to ovoid dorsal scutum of *P. birmanica* holotype, Fig. 4H cf. Fig. 3C). Pulmonary plate 2.6 long, 2.5 wide; genital region almost flat, its posterior margin slightly convex. Four laterally extended microplates in front of anal plate, the latter 9.1 long, 1.3 wide.

Vulva (of paratypes) with short anterior collar with moderately arched (or widely angular) anterior margin and straight posterior margin; collar not or only slightly surpassing anterior margin of spermathecae. Ventral side of vulva almost completely pigmented. Spermathecae short, wide and slightly bulged, indistinctly separated from each other by a more or less pronounced, quite shallow median invagination in common anterior margin and by oblique unpigmented bands medially on ventral surface; porepatches narrow and marginal, on convex surface, not lying in trenches (Fig. 6).

REMARK ON JUVENILES: In mature specimens the carapace is firmly connected to the sternum by lateral bridge-sclerites between the leg coxae. In juveniles these connections are not yet in place. The last exuvia of a male paratype has split open along the carapace margin as usual in spiders.

VARIATION: Carapace length in three males (four females) ranges 5.3-6.1 (4.2-4.6), carapace width 2.6-3.0 (2.7-2.9). In the holotype and one male paratype the posterior tips of the anterior pair of ventrolateral plates are only touching the margin of the pulmonary plate, in a second male paratype they are fused with it. One male paratype has all strap-like horizontal plates on the posterior side of the opisthosoma broken. For variation in the shape of the palpal organ of three males (mostly expressed in the angle between the dorsal subterminal lamella and the ventral embolic part) see Fig. 5A-G; for variation in copulatory organs of two females see Fig. 6. The postgenital plate is completely fused to the pulmonary plate in two males (including the holotype) and medially separated by a small membranous stripe behind the gonopore in one male. The females examined have 3-4 laterally extended microplates (fragments of the preanal plate) in front of their anal plate.

RELATIONSHIPS: Judging from strong similarities in copulatory organs of females, *P. ferox* sp. n. is most closely related to *P. birmanica* and *P. quadrifurcata* sp. n. The embolus of *P. ferox* sp. n. is less complex than that of *P. quadrifurcata* sp. n. but of similar overall shape. The geographical proximity of these two species and *P. birmanica* on both sides of the border between Thailand and Myanmar (see Fig. 1, localities 12, 13, 16-19) also suggests a close relationship.

DISTRIBUTION: Known only from the type locality in western central Thailand, close to the border with Myanmar's Kayin (= Karen) State (Fig. 1, locality 13).

BIOLOGY: The spiders examined were collected from steep banks of a small stream in an evergreen hill forest at 1270 m. They lived in loose-meshed sheetwebs running into a retreat as typical for *Perania*. One female used the abandoned burrow of a *Liphistius* female (with an intact exuvia at the bottom) as its retreat. Two *P. ferox* sp. n. females had newly shed exuviae in their webs when collected in early October. One juvenile male matured at the end of January. It continued to feed for about three

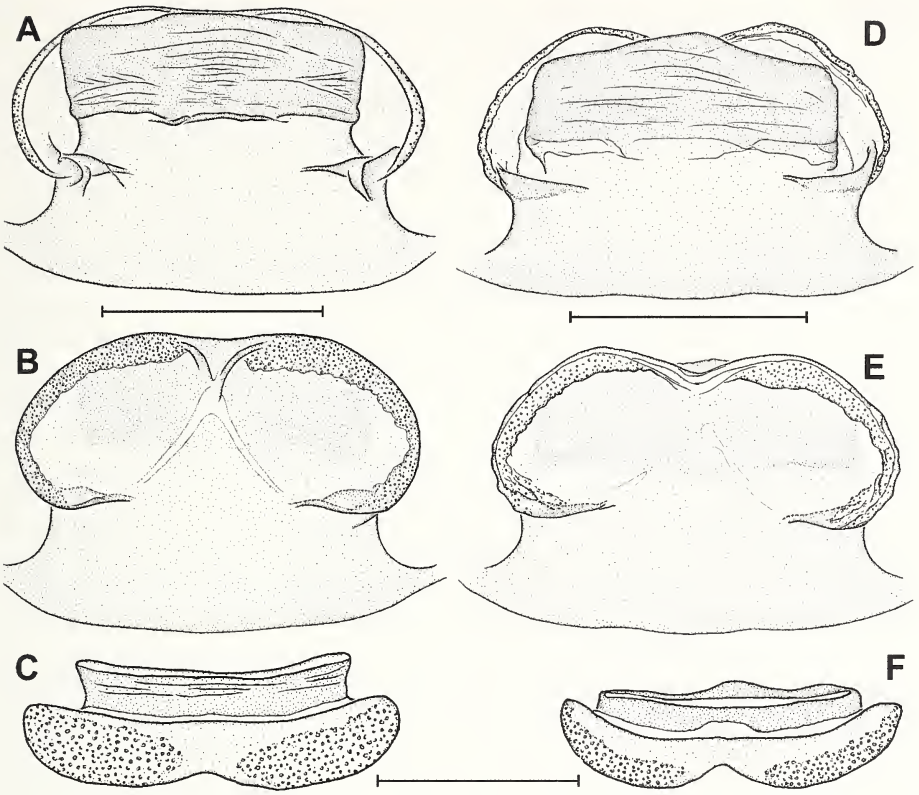


FIG. 6

Perania ferox sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B; D-E; C, F).

months, but then refused prey and died four months into maturity. When collected, the spiders reacted unusually aggressively for *Perania*: threatening by raising their anterior legs (as theraphosid spiders do) and biting the forceps.

Perania tumida sp. n. Figs 7-8

HOLOTYPE: MHNG, sample TH-05/21; ♂ (matured 27.X.2006; exuvia preserved); Thailand, Uttaradit Province, Nam Pat District, Phu Soi Dao (= Phu Soay Dao) National Park, rivulet below Lan Son (17°42'N, 100°57'E), 1600 m; 22.XII.2005; leg. P. J. Schwendinger.

PARATYPES: 3 ♀ (one moulted 10.III.2006 and matured 27.X.2006) with same data as for holotype.

ETYMOLOGY: Latin adjective "tumidus, -a, -um" (= swollen). The species epithet refers to the clypeal hump of females in this species.

DIAGNOSIS: Similar to *P. nasicornis*, distinguished by: Males with apically slightly narrower clypeal process and with strap-like horizontal plates posteriorly on opisthosoma; cymbium with shorter apex; palpal organ with proximally narrower/shal-

lower embolus carrying two lobate and one digitiform projections on deep apex. Females with a small clypeal hump and with conical dorsolateral microplates in posterior half of opisthosoma; vulva with spermathecae more extensively connected to each other in the middle; anterior collar with widely angular distal margin.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of prosoma, chelicerae, palps, proximal articles of leg I and anal plate dark brown, other sclerites reddish brown; membranous parts of opisthosoma light grey-brown. Clypeus with long, distally widened and flattened median process projecting foreward and slightly upward, occupying almost 30% of carapace length (Fig. 7A-B). Fovea indistinct and narrow. Total length 11.8. Carapace 6.7 long, 2.9 wide. Eye sizes and interdistances: PME 0.32 long, separated by 0.13; ALE 0.26 long; ALE-PLE 0.07; PLE 0.31 long, separated by 1.21. Labium 0.9 long, 1.2 wide. Sternum 2.8 long, 2.1 wide. Chelicerae without modifications; with one distinct and one indistinct tooth on anterior margin of fang furrow.

Palp 4.0 long (1.3+0.6+1.2+0.9). Cymbium (Fig. 7I) of typical shape, apex slightly shorter than in species previously described from Thailand. Bulbus globular; embolus large, distal half distinctly deeper than proximal half, apex split: lobate subterminal lamella with straight distal margin, overlapping deep embolic part with a narrowly rounded, lobate dorsal projection, a widely rounded lobate median projection and a small digitiform ventral projection (Fig. 7G-H).

Legs 3421. About 20 dark conical setal bases proventrally and ventrally on metatarsus I, about 10 shorter ones proventrally and ventrally in distal half of tibia I. Paired leg claws with a row of 14-16 teeth on anterior legs, 10-11 on posterior legs; unpaired leg claws with one denticle. Leg I 18.5 long (5.5+1.9+5.5+4.0+1.6), leg II 15.1 long (4.4+1.6+4.3+3.4+1.4), leg III 11.4 long (3.5+1.2+2.7+2.8+1.2), leg IV 14.6 long (4.3+1.3+3.8+3.9+1.3). Right leg I malformed (probably regenerated): with tibia, metatarsus and tarsus shorter and thicker than on left side, without conical setal bases.

Opisthosoma 5.1 long, 3.3 wide. Dorsal scutum 4.8 long, 3.3 wide, somewhat oval, its surface with indistinct elevations. Posterior side of opisthosoma with one strap-like horizontal plate just behind dorsal scutum. Pulmonary plate 3.4 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates in males largely free, only their posterior tips fused with pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.3 long, 0.9 wide, quadrangular, its anterior margin widely arched, its posterior and lateral margins straight. Anal plate 1.0 long, 1.5 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Colour generally darker. Total length 11.3. Carapace 5.5 long, 3.1 wide; "cephalic" portion domed, with a short and basally wide conical hump on clypeus (Fig. 7C-D). PME 0.21 long, 0.24 apart; ALE 0.28 long; ALE-PLE 0.09; PLE 0.30 long, 1.54 apart. Labium 0.9 long, 1.3 wide. Sternum 3.2 long, 2.2 wide. Palp 4.6 long (1.3+0.6+1.1+1.6). Legs 3421; no conical setal bases on tibia I and metatarsus I, but with slightly enlarged setal bases ventrally on metatarsus I. Paired leg claws with a row of 12-15 teeth. Leg I 18.3 long (5.5+1.9+5.3+3.9+1.7), leg II 15.5 long (4.5+1.7+4.3+3.5+1.5), leg III 12.3 long (3.8+1.4+2.9+3.0+1.2), leg IV 15.3 long (4.6+1.5+4.0+3.9+1.3).

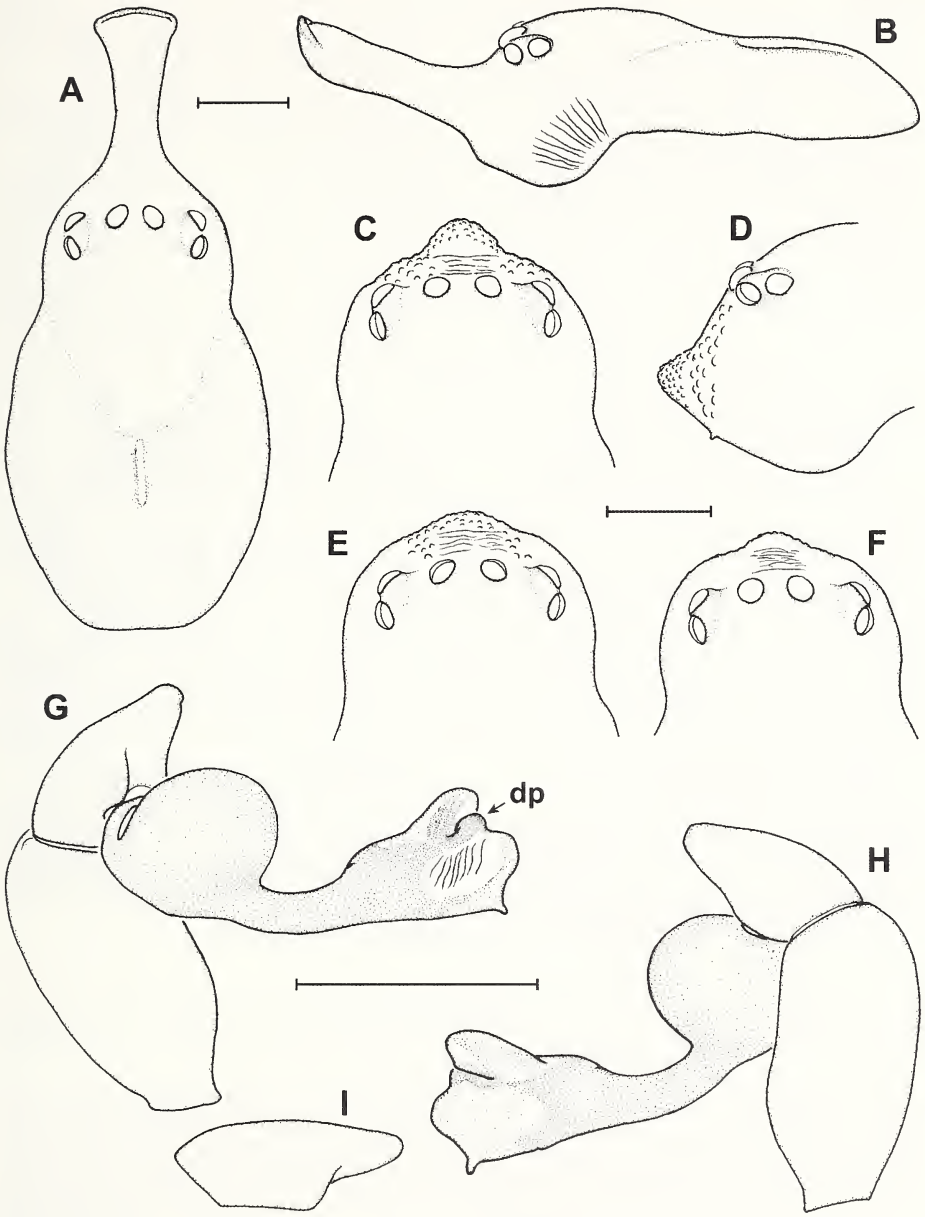


FIG. 7

Perania tumida sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace of female "allotype", dorsal view. (D) Same, lateral view. (E, F) Anterior portion of carapace of two female paratypes, dorsal view. (G) Left palp of holotype, proventral view. (H) Same, retrodorsal view. (I) Left cymbium of holotype, prolateral view. Abbreviation: dp = dorsal projection on embolic part of apex of palpal organ. Scale lines 1.0 mm (A-B; C-F; G-I).

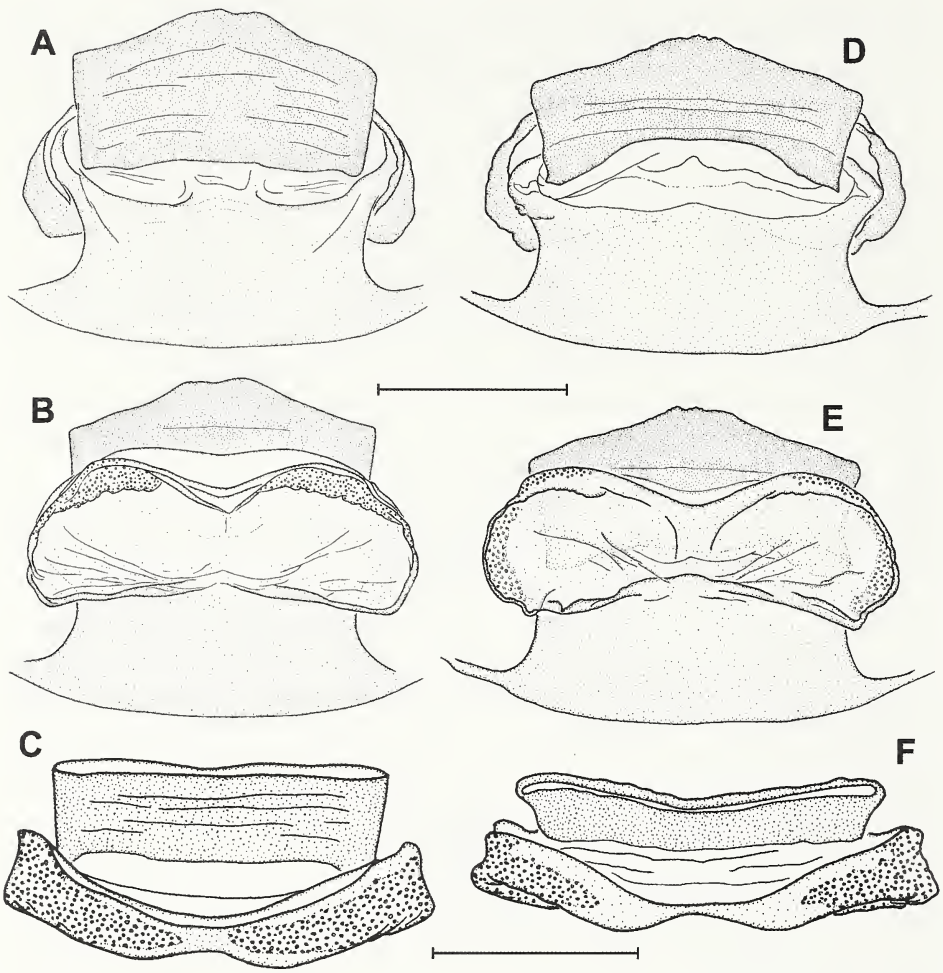


FIG. 8
Perania tumida sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B, D-E; C, F).

Opisthosoma 7.2 long, 4.0 wide; microplates in posterior half (especially dorsally) larger than others, conical and distinctly elevated. Dorsal scutum 5.4 long, 3.0 wide, narrower and with higher surface elevations than in male, especially along midline and in posterior portion. Pulmonary plate 3.1 long, 3.2 wide; genital region slightly more elevated than in male. Three slightly enlarged and laterally fused microplates anterior to anal plate; the latter 1.3 long, 1.5 wide.

Vulva (of paratypes) with fairly long anterior collar with angular anterior margin. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae wide, slightly bulged; common anterior margin with a distinct median invagination; posterior margin more or less straight; lateral margins arched, postero-lateral corners angular; narrow marginal poreplates lying in shallow trenches in

anterior and lateral sides of spermathecae; ventral surface of spermathecae with oblique wrinkles in posterior portion (Fig. 8).

REMARK ON JUVENILES: The last exuvia of the male holotype has a clypeal hump very similar (only slightly wider) to that of the female "allotype".

VARIATION: Carapace length in the three females examined ranges 4.9-5.5, carapace width 2.9-3.1. The clypeal hump of females is more pronounced in larger specimens than in smaller ones (Fig. 7C-F). One of the two vulvae examined has a shorter anterior collar than the other, otherwise both vulvae are very similar (Fig. 8). In the two female paratypes the slightly enlarged microplates that represent remnants of the preanal plate are not laterally fused as in the "allotype".

RELATIONSHIPS: Strong similarities in male and female copulatory organs indicate closest relationship between *P. tumida* sp. n. and *P. nasicornis*.

DISTRIBUTION: Known only from the type locality, a mountain over 2100 m high, at the border between Thailand and Laos (Fig. 1, locality 14). As the types were actually collected only a few hundred metres from a boundary marker, it is safe to assume that this species also occurs on the eastern slopes of the same mountain which lie in Xaignabouri Province, Laos.

BIOLOGY: The types were collected from the banks of a small seasonal stream in an evergreen gallery forest below a savannah with pine trees. The spiders lived in irregular loose sheetwebs running into a retreat in holes. No males were found in late December. The male holotype matured in captivity at the beginning of April, one of the female paratypes in late October of the following year.

Perania egregia sp. n. Figs 9-11

HOLOTYPE: MHNG; ♂; Thailand, Phetchabun Province, Lom Sak District, Nam Nao National Park, rivulet near park headquarters (16°44'33"N, 101°34'13"E), 850 m; 24.XII.1994; leg. P. J. Schwendinger.

PARATYPES: MHNG; 1 ♂, 6 ♀ (one selected as "allotype", not dissected) (collected 21.X.1993) and 2 ♂ (collected 24.XII.1994); all from the type locality; leg. P. J. Schwendinger.

ETYMOLOGY: Latin adjective "egregius, -a, -um" (= outstanding, distinguished). The species epithet refers to the unusual palpal characters of males of this species.

DIAGNOSIS: Males different from those of all congeners by the unique male palp with a short truncate cymbium and a short thick palpal organ. Females similar to those of *P. tumida* sp. n., distinguished by tibia I and metatarsus I ventrally with conical setal bases and by vulva with longer anterior collar and rounded posterolater corners of spermathecae.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally brown, carapace, chelicerae and ventral sclerites dark brown; membranous parts of opisthosoma light grey-brown. Clypeus with long, distally widened and flattened median process projecting foreward and slightly upward, occupying 27% of carapace length (Fig. 9A-B). Fovea indistinct and narrow. Total length 10.2. Carapace 5.6 long, 2.5 wide. Eye sizes and interdistances: PME 0.27 long, separated by 0.12; ALE 0.24 long;

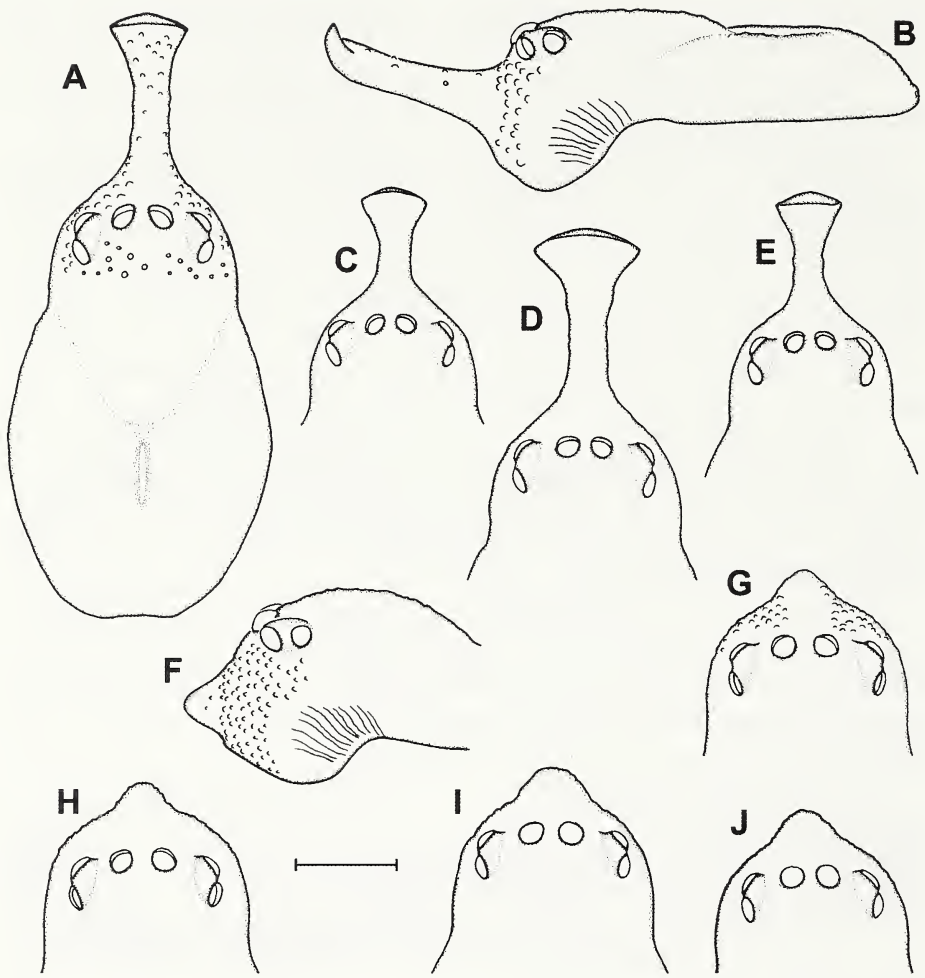


FIG. 9

Perania egregia sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C-E) Anterior portion of carapace of three male paratypes, dorsal view. (F) Anterior portion of carapace of female "allotype", lateral view. (G) Same, dorsal view. (H-J) Anterior portion of carapace of three female paratypes, dorsal view. Scale line 1.0 mm.

ALE-PLE 0.07; PLE 0.25 long, separated by 1.02. Labium 0.7 long, 1.0 wide. Sternum 2.6 long, 1.8 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.4 long (1.3+0.6+1.0+0.5). Cymbium (Fig. 10D, see also Fig. 10C for male paratype) short, with widely truncate, indistinctly bilobate apex (unlike in any other *Perania* species). Palpal organ strongly modified: bulbus and base of embolus of same thickness, without constriction but with only a pallid zone between them; apex of embolus deeply split: lobate, narrowly rounded subterminal dorsal lamella separated

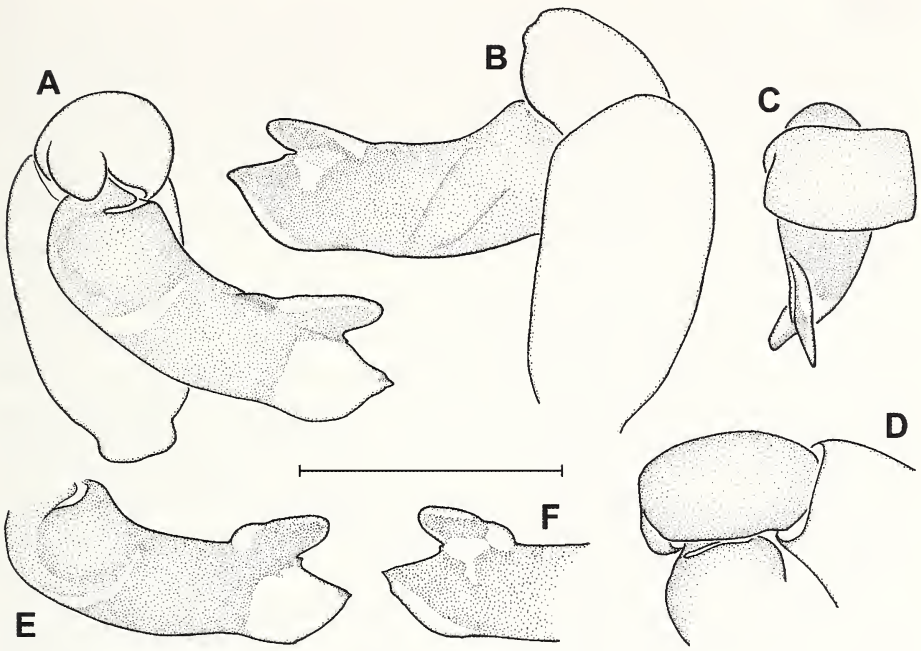


FIG. 10

Perania egregia sp. n. (A) Left palp of male paratype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium and palpal organ of same male, dorsal view. (D) Left cymbium of holotype, retrolateral view. (E) Left palpal organ of holotype, proventral view. (F) Apex of embolus of holotype, retrodorsal view. Scale line 1.0 mm.

by a V-shaped invagination from widely triangular embolic part; a tiny tooth at base of invagination between both apical parts (Fig. 10E-F).

Legs 3421. About 25 dark conical setal bases of various sizes prolaterally to ventrally on metatarsus I, about 15 shorter ones proventrally on tibia I. Paired leg claws with a row of 9-12 teeth; unpaired leg claws with one denticle. Leg I 14.9 long (4.6+1.6+4.3+3.1+1.3), leg II 12.0 long (3.6+1.3+3.3+2.6+1.2), leg III 9.0 long (2.8+1.0+2.2+2.1+0.9), leg IV 11.9 long (3.6+1.1+3.1+3.0+1.1).

Opisthosoma 4.8 long, 3.2 wide. Dorsal scutum 4.1 long, 2.6 wide, somewhat oval, quite smooth, its surface with only few indistinct elevations. All lateral microscerites flat, those in bands on posterior side of opisthosoma closely packed but not fused into horizontal plates. Pulmonary plate 3.2 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates completely free, their posterior tips only touching margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, both linked by a sclerotised suture. Preanal plate 0.4 long, 1.0 wide, somewhat elliptical. Anal plate 0.9 long, 1.2 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Membranous parts of opisthosoma lighter, especially in anterior half. Total length 9.3. Carapace 4.3 long, 2.5 wide; "cephalic" portion domed, with a distinct

conical hump on clypeus occupying about 6% of carapace length (Fig. 9F-G). PME 0.27 long, 0.15 apart; ALE 0.24 long; ALE-PLE 0.09; PLE 0.24 long, 1.26 apart. Labium 0.7 long, 1.0 wide. Sternum 2.4 long, 1.8 wide. Second tooth on anterior margin of cheliceral fang furrow indistinct. Palp 3.3 long (1.0+0.5+0.7+1.1). Legs 3241; tibia I with about 10 conical setal bases prolaterally, metatarsus I with about 20 larger ones prolaterally and proventrally, all of them weaker than in males. Paired leg claws with a row of 10-15 teeth. Leg I 12.6 long (3.9+1.3+3.4+2.7+1.3), leg II 10.6 long (3.2+1.2+2.8+2.3+1.1), leg III 8.3 long (2.6+0.9+2.0+1.9+0.9), leg IV 10.7 long (3.3+1.0+2.8+2.6+1.0).

Opisthosoma 5.4 long, 3.5 wide; microplates in posterior half (especially dorsally) larger than others, slightly elevated and wartlike, those on posterior side of opisthosoma close to each other but not forming strap-like horizontal plates. Dorsal scutum 3.5 long, 1.5 wide, its surface with slight elevations (as in males) plus irregular shallow furrows (mostly along margins) and low ridges. Anterior opisthosomal plate completely fragmented into microplates. Pulmonary plate 2.6 long, 2.4 wide; genital region slightly more elevated than in male, its posterior margin widely rounded. Preanal plate completely fragmented into microplates, three of them slightly wider than the others. Anal plate 1.2 long, 1.5 wide.

Vulva (of paratypes) with very long anterior collar, its median zone distinctly lighter than lateral zones. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae elliptical, with a slight median invagination in common anterior margin; lateral sides with porepatches on flat surface (Fig. 11).

VARIATION: Carapace length in four males (six females) ranges 4.6-6.0 (4.3-4.5), carapace width 2.2-2.6 (2.4-2.6). In the holotype the tiny tooth in the invagination between the subterminal dorsal lamella and the embolic part of the palpal organ is distinct on both palps (Fig. 10E-F), in the male paratypes it is tiny and quite indistinct on one or both palps (Fig. 10A-B). For variation in the vulvae of two females see Fig. 11. For variation in the shape of clypeus modifications of males see Fig. 9A-E, of females see Fig. 9F-J. Two male paratypes have several fused microplates in the uppermost band on the posterior side of the opisthosoma. In all males the postgenital plate is completely fused to the pulmonary plate. In two female paratypes 2-3 microplates in the preanal region are laterally extended; in another female paratype the median microplate is distinctly larger than the nearby ones.

RELATIONSHIPS: The palp of *P. egregia* sp. n. males is strongly autapomorphic, but the distinct clypeal hump and the conical setal bases on tibia I and metatarsus I of females (both latter characters unusual for *Perania* females) and similar vulvae indicate that this species is closely related to *P. tumida* sp. n. and *P. quadrifurcata* sp. n.

DISTRIBUTION: Known only from the type locality in the northeaster region of Thailand (Fig. 1, locality 15).

BIOLOGY: The spiders were found in typical webs built under overhanging edges of earth banks on both sides of a small stream in an evergreen gallery forest with bamboo stands. When collected, the spiders played dead, spread their legs (other spiders then usually retract their legs!) and remained motionless. One of the females

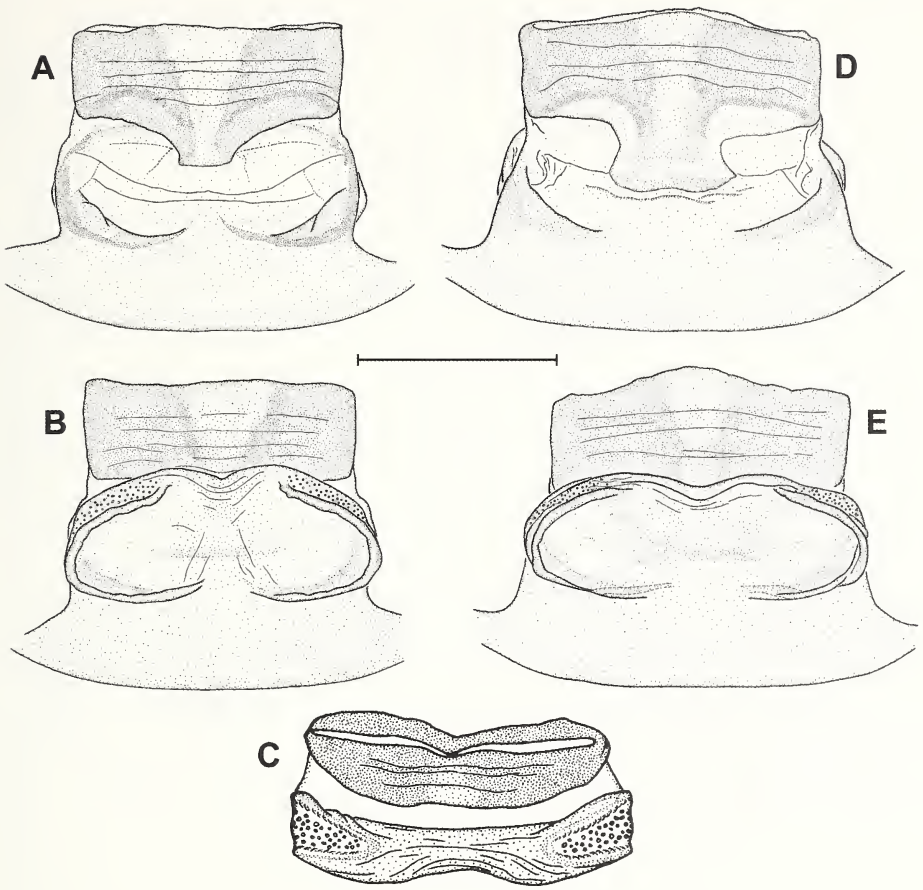


FIG. 11

Perania egregia sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C) Same, anterior view. Scale line 0.5 mm.

collected in late October built three globular egg sacs in captivity between mid-December and early January. These were suspended in the web and contained 19, 14 and 27 grey-brown eggs and spiderlings.

Perania quadrifurcata sp. n. Figs 12-14, 36H, 37B

HOLOTYPE: MHNG, sample TH-02/01; ♂; Thailand, Kanchanaburi Province, Sai Yok District, Sai Yok Noi Waterfall (14°14'16"N, 99°03'28"E), 200 m; 5.-7.VII.2002; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample TH-02/01; 4 ♂, 4 ♀ (one of them the "allotype"), 1 juv. ♂ collected together with the holotype; leg. P. J. Schwendinger. – MHNG, sample TH-00/06; 3 ♂, 2 ♀; Kanchanaburi Province, Sangkhlaburi District, Daichongthong Waterfall (about 14°59'N, 98°36'E), 200 m; 10.XI.2000; leg. P. J. Schwendinger. – NMP; 3 ♂, 1 ♀; Phetchaburi Province,

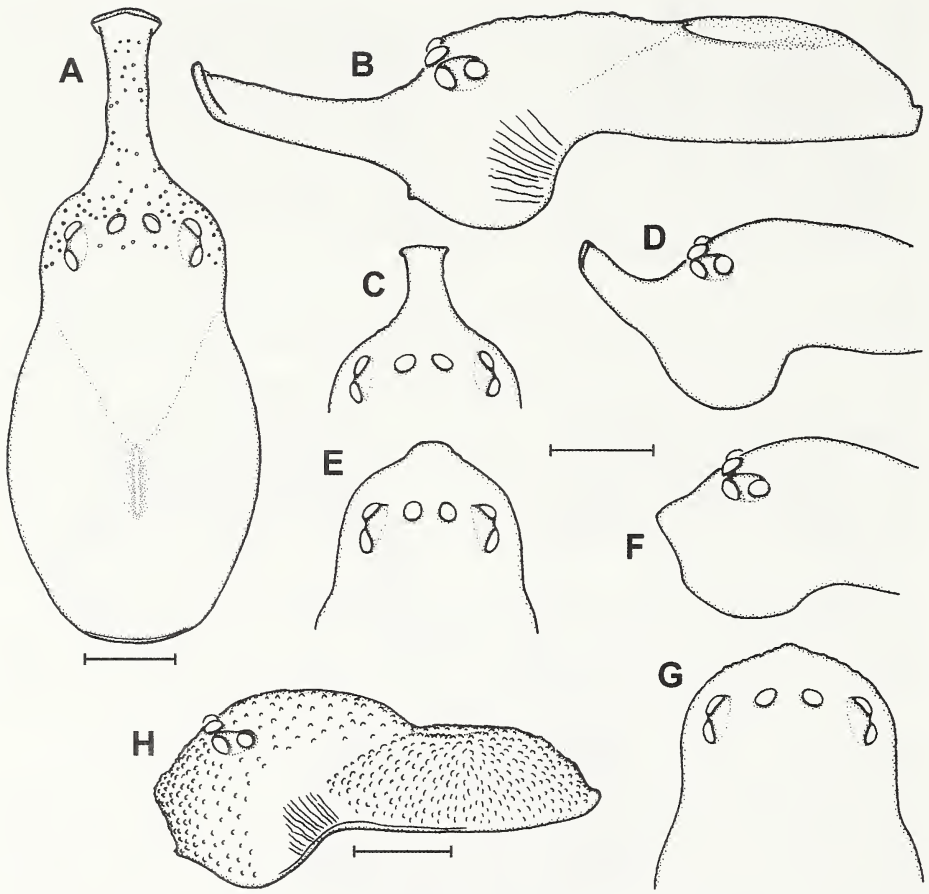


FIG. 12

Perania quadrifurcata sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace of male paratype, dorsal view. (D) Same, lateral view. (E) Anterior portion of carapace of penultimate male, dorsal view. (F) Same, lateral view. (G) Anterior portion of carapace of female "allotype", dorsal view. (H) Entire carapace of "allotype", lateral view. Scale lines 1.0 mm (A-B; C-G; H).

Kaeng Krachan District, Kaeng Krachan National Park, Khao Phanoen Thung, orchid trail (12°53'12"N, 99°21'57"E), 880 m; 4.XII.2011; leg. O. Košulič. – NMP; 1 ♂; Nakhon Ratchasima Province, Wang Nam Khiao District, Sakaerat Biosphere Reserve, Wang Nam Khiao Forestry Training Campus (14°29'44"N, 101°56'17"E), 280 m; 8.XI.2011; leg. O. Košulič.

ETYMOLOGY: Latin adjective "quadrifurcatus, -a, -um" (= 4-forked). The species name refers to the unique shape of the embolus, the apex of which is divided into four tips.

DIAGNOSIS: Similar to *P. ferox* sp. n. Males distinguished by longer clypeal process; five to seven (instead of only three) strap-like horizontal plates on posterior side of opisthosoma; apex of palpal organ with four tips: two long and slender upper

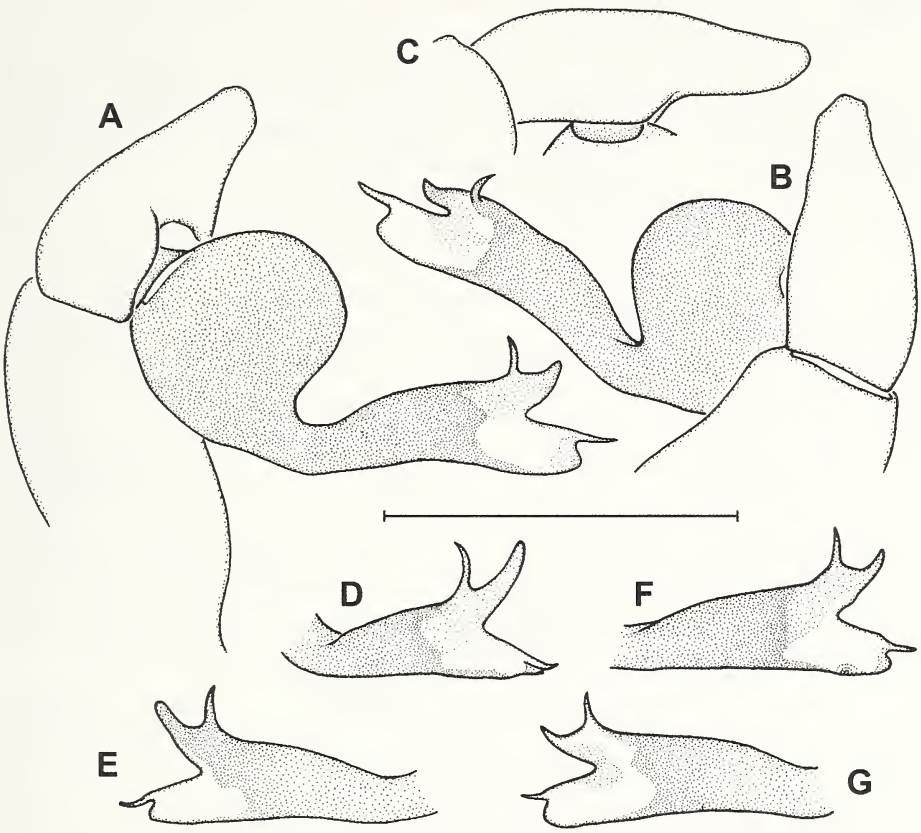


FIG. 13

Perania quadrifurcata sp. n. (A) Left palp of holotype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium of holotype, prolateral view. (D, F) Apex of embolus of two male paratypes from the type locality; proventral view. (E, G) Same, retrodorsal view. Scale line 1.0 mm.

tips (corresponding to subterminal lamella), and a long and slender pointed tip plus a short rounded lobe (corresponding to embolic part). Females distinguished from those of *P. ferox* sp. n. by the presence of conical setal bases ventrally on metatarsus I (in some females also on tibia I); vulva wider, spermathecae with a pair of posterolateral compartments and with shallow trenches on anterior and lateral sides, without oblique unpigmented bands on ventral surface.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of sclerotised parts mostly dark reddish brown, carapace even darker; membranous parts of opisthosoma light grey-orange. Clypeus with long, distally widened and flattened median process projecting foreward and slightly upward, occupying almost 30% of carapace length (Fig. 12A-B). Fovea indistinct and narrow. Total length 12.4. Carapace 6.8 long, 2.7 wide. Eye sizes and interdistances: PME 0.27 long, separated by 0.17; ALE 0.25 long; ALE-PLE 0.09; PLE 0.25 long, separated by 1.21. Labium 0.9 long, 1.1 wide. Sternum

3.0 long, 2.0 wide. Chelicerae without modifications; one distinct and one indistinct tooth on anterior margin of fang furrow.

Palp 3.8 long (1.2+0.6+1.1+0.9). Cymbium of typical shape (Fig. 13C). Bulbus globular; embolus with deeply divided apex carrying four tips: subterminal dorsal lamella split into two shallow, pointed upper tips bent dorsad, one being slightly thinner than the other; embolic part separated from subterminal lamella by a widely V-shaped invagination; embolic part split into a shallow, pointed sigmoid lower tip above a much shorter, deeper, rounded lobe, both of them directed distad (Fig. 13A-B).

Legs 3421. About 30 dark conical setal bases (Fig. 36H) proventrally and ventrally on metatarsus I, about 20 proventrally and ventrally in distal half of tibia I. Paired leg claws with a row of 11-16 teeth (decreasing in numbers from anterior to posterior legs); unpaired leg claws with one denticle. Leg I 19.0 long (5.8+2.0+5.8+3.9+1.5), leg II 14.9 long (4.4+1.6+4.2+3.4+1.3), leg III 11.1 long (3.4+1.3+2.9+2.4+1.1), leg IV 14.8 long (4.6+1.3+4.0+3.7+1.2).

Opisthosoma 5.9 long, 4.0 wide. Dorsal scutum 5.3 long, 3.4 wide, somewhat oval, its surface with low elevations. Posterior side of opisthosoma with five strap-like horizontal plates. Pulmonary plate 3.7 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates completely free, not connected to pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.5 long, 0.9 wide, quadrangular, its anterior margin widely arched, its posterior and lateral margins straight. Anal plate 1.0 long, 1.3 wide.

Description of female ("allotype"; dissected): As in male, except for the following. Total length 7.5. Carapace 4.6 long, 2.7 wide; "cephalic" portion domed, with a short and basally wide, somewhat pointed hump on clypeus (Fig. 12G-H). PME 0.21 long, 0.24 apart; ALE 0.20 long; ALE-PLE 0.09; PLE 0.21 long, 1.41 apart. Labium 0.8 long, 1.1 wide. Sternum 2.7 long, 1.8 wide. Palp 3.1 long (0.7+0.5+0.8+1.1). Legs 32=41; tibia I with about 20 conical setal bases prolaterally and proventrally, metatarsus I with about 30 slightly larger ones in the same position, all of them smaller than in males. Leg I 15.1 long (4.5+1.6+4.3+3.3+1.4), leg II 12.8 long (3.8+1.4+3.5+2.9+1.2), leg III 9.9 long (3.0+1.1+2.4+2.4+1.0), leg IV 12.8 long (3.9+1.2+3.4+3.2+1.1). Paired leg claws with a row of 15 teeth on anterior legs, 7-10 on posterior legs.

Opisthosoma 5.9 long, 4.2 wide; microplates in posterior half of dorsal side distinctly elevated and conical, those on posterior side of opisthosoma less elevated, very close to each other but not forming strap-like horizontal plates. Dorsal scutum 2.7 long, 1.6 wide, with relief slightly higher than in male. Anterior opisthosomal plate completely fragmented into microplates. Pulmonary plate 2.8 long, 2.6 wide; genital region almost flat, its posterior margin more rounded than in male. Preanal plate completely fragmented into microplates. Anal plate 1.1 long, 1.3 wide.

Vulva (Fig. 14C) with short anterior collar not surpassing anterior margin of wide spermathecae. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae largely fused in the middle, their common anterior margin indistinctly invaginated. Each posterolateral corner of spermathecae with a sac-like compartment distinctly separated from anterior portion of spermathecae. Narrow

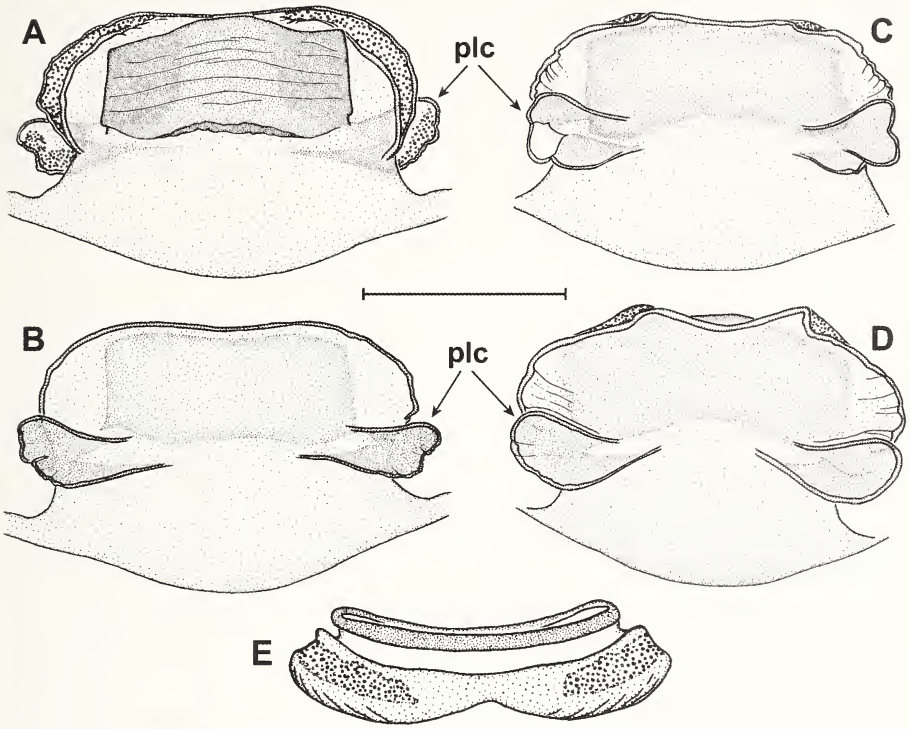


FIG. 14

Perania quadrifurcata sp. n., females; paratype from the type locality (A-B), "allotype" (C), paratype from Daichongthong (D-E). (A) Vulva, dorsal view. (B-D) Same, ventral view. (E) Same, anterior view. Abbreviation: plc = posterolateral compartment of spermatheca. Scale line 0.5 mm.

marginal porepatches on slightly concave surface lying in shallow trenches (see Fig. 14E for paratype).

VARIATION: Carapace length in twelve males (seven females) ranges 4.9-6.8 (4.4-5.0), carapace width 2.5-2.9 (2.6-3.0). The clypeal process in males is usually long (Fig. 12A-B), only in one male from Sai Yok Noi (the type locality) it is short and apparently malformed (Fig. 12C-D). All females, except one from Daitchongthong, have a basally wide, conical, pointed hump on the clypeus (Fig. 12G-H). A very similar but in dorsal view more apically rounded hump is also present in a penultimate male (Fig. 12E-F). Females from Sai Yok have distinct conical setal bases ventrally on tibia I and metatarsus I; the two females from Daichongthong have only very indistinct ones on metatarsus I, none on tibia I; the female from Kaeng Krachan has none on leg I. In all males from Daitchongthong and in the holotype from Sai Yok the postgenital plate is anteriorly completely fused to the pulmonary plate, in three males from Sai Yok it is anteromedially separated by a membranous stripe, and in a fourth male (from Sai Yok) it is anteromedially and anterolaterally separated. The preanal plate is absent in the

"allotype" (from Sai Yok), indistinctly developed in three females from Sai Yok, rudimentary but quite distinct in the two females from Daitchongthong. Two of the four vulvae examined have an indistinctly outlined, very lightly pigmented central area in the ventral wall between the spermathecae and the genital atrium (possibly homologous with the oblique unpigmented bands on the spermathecae of *P. ferox* sp. n.). All males possess five distinct (plus two rather less distinct) strap-like horizontal plates posteriorly on the opisthosoma.

RELATIONSHIPS: The very complex apex of the embolus of *P. quadrifurcata* sp. n. is unique and probably evolved by a subdivision of the two parts (subterminal lamella and embolic part) of a bifid apex. Within the *nasuta*-group only *P. ferox* sp. n. and *P. egregia* sp. n. (males of *P. birmanica* are unknown) also lack a lobate dorsal projection on the embolic part. Strong similarities in the vulvae of *P. quadrifurcata* sp. n., *P. ferox* sp. n. and the holotype of *P. birmanica* indicate a very close relationship between these three species.

DISTRIBUTION: Known from two localities (about 100 km apart) in Kanchanaburi Province and from one locality about 150 km further south in Phetchaburi Province, all in western central Thailand, as well as from one locality on the Khorat Plateau in northeastern Thailand (Fig. 1, localities 16-19). The latter locality (represented by a single male collected by O. Košulič) is about 300 km away from the type locality (which is also the closest of the other three localities) and needs to be confirmed by additional specimens.

BIOLOGY: This species lives in the central and northeastern regions of Thailand, which are seasonally dry. All spiders were collected in the lowlands, in semi-evegreen lowland forest (Kaeng Krachan), evergreen gallery forest near streams and waterfalls (Sai Yok Noi, Daitchongthong), and in mixed evergreen-deciduous forest (Sakaerat). Thus the habitats of this species are relatively humid and shaded. The spiders built irregular loose sheetwebs with a retreat in holes or cracks in earthbanks or limestone rocks covered by moss. In early July (at the type locality) two males were found at night courting in webs of females; one male was then newly moulted and had its last exuvia hanging in the web. Not longer afterwards a female produced an egg cluster in captivity and suspended it in the web as described for *P. siamensis* (Schwendinger, 1994: 455-456).

THE *PERANIA CERASTES* SPECIES GROUP

DIAGNOSIS: Similar to the *robusta*-group. Characterized by the presence of proximally swollen, strongly sigmoid setae on slightly raised bases on the ventral side of metarsus I (Fig. 36G) in both sexes. Fovea anteriorly slightly wider and deeper than posteriorly in both sexes. Females possessing vulvae with an entirely or partly pigmented ventral wall of the genital atrium; spermathecae with distinctly outlined porepatches extending only little onto the dorsal side of the vulva; posterior area of spermathecae unpigmented. Males with long clypeal process, either digitiform (in *P. cerastes*) or hourglass-shaped with a strongly rounded distal margin in dorsal view (in *P. coryne*); chelicerae unmodified (in *P. cerastes*) or with a median-retrolateral cheliceral boss (in *P. coryne*); embolus of male palpal organ with bifid apex, sub -

terminal lamella smaller than embolic part. Anterior pair of ventrolateral plates in males completely or largely free. Femora of legs and palps in males granular.

SPECIES INCLUDED: *Perania cerastes*, *P. coryne*.

DISTRIBUTION: Peninsular Malaysia (Fig. 1, localities 20-24).

Perania cerastes Schwendinger, 1994 Figs 15-16, 36G

Perania cerastes Schwendinger, 1994: 456-458, figs 26-34 (descriptions of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Malaysia (peninsula), Perak, Taiping, Maxwell Hill (= Bukit Larut; about 4°52'N, 100°48'E), 1200 m; 5.II.1991; leg. P. J. Schwendinger.

PARATYPES: MHNG; 2 ♂, 2 ♀; same data as for holotype.

NEW MATERIAL EXAMINED: MHNG; 1 ♀; from the type locality, road between Bukit Larut Guesthouse and summit (4°51.694'N, 100°47.631'E), 900-1380 m; 24.IX.2001; leg. L. Monod. – MHNG; 1 ♂; Malaysia (peninsula), Perak, Gua Kanthan (4°45'41"N, 101°07'19"E), 60 m, in dark part of cave; 15.XII.1997; leg. P. J. Schwendinger. – MHNG; 4 ♂, 1 ♀; Malaysia (peninsula), Perak, Gua Tempurung (4°24'59"N, 101°11'13"E), 40 m, in dark part of cave; 13.XII.1997; leg. P. J. Schwendinger. – MHNG; 2 ♂, 3 ♀; Malaysia (peninsula), Penang Island, Penang Hill (= Bukit Bendera; about 5°25'30"N, 100°16'30"E), 560-650 m; 10.I.1996; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1994: 456).

NEW CHARACTERS: In all specimens anterior portion of fovea developed as a more or less distinct deep pit, in several specimens also posterior portion. Ventral side of metarsus I in males and females carrying strongly sigmoid setae on moderately elevated bases; these setae proximally swollen, turning abruptly distad and then tapering away from axis of metarsus at about 30-40° (Fig. 36G). Males additionally with more strongly elevated, conical setal bases (carrying normal setae) prolaterally on metatarsus I and on anterior portion of tibia I. Tiny spine-like microtrichia (not articulate, without a socket; shown as dots in Fig. 15C-T; erroneously called "pit-like depressions" in original description, Schwendinger, 1994: 457) subapically on prolateral side of embolus, these decreasing in size distally. Anterior pair of ventrolateral plates in males completely free or their posterior tips fused with margin of pulmonary plate. Vulvae with most or all of ventral wall of genital atrium distinctly pigmented (Fig. 16A-D); this pigmentation not extending onto spermathecae as in species of the *nasuta*-group. Spermathecae with clearly outlined anterior porepatches separated from each other for about their width.

VARIATION: There are two distinct morphological forms of males in this species. In specimens collected in caves (lowland/cave form) the two parts of the bifurcate apex of the embolus are distinctly further apart from each other (Fig. 15K-T) than in males from the mountains (highland form; Fig. 15C-J and Schwendinger, 1994: figs 31-32). The postgenital plate in the lowland/cave form is longer and narrower, with a more strongly convex posterior margin, than in the highland form. This dimorphism is not reflected in females: the vulvae of two females from Penang Hill and of the single female from Gua Tempurung are more strongly convex in lateral view and have the anterior collar situated more posteriorly (Fig. 16B-D) than the vulvae of other females from mountain localities (vulva there only slightly convex and collar more

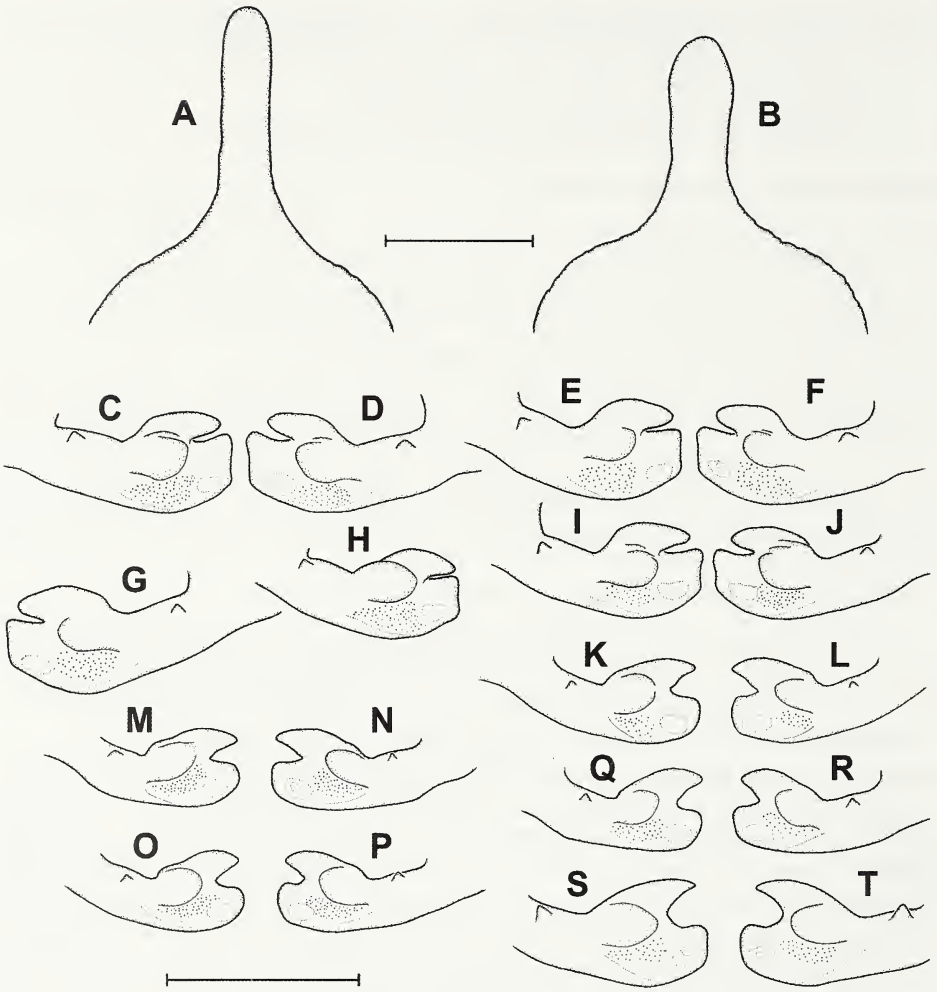


FIG. 15

Perania cerastes, males; highland form (A, C-J), lowland/cave form (B, K-T); holotype from Maxwell Hill (C-D), two paratypes from Maxwell Hill (E-F, G), two specimens from Penang Hill (A, H, I-J), four specimens from Gua Tempurung (B, K-L, M-N, O-P, Q-R), specimen from Gua Kanthan (S-T). (A-B) Clypeal process, dorsal view. (C, E, H, I, K, M, O, Q, S) Left embolus, prolateral view. (D, F, G, J, L, N, P, R, T) Right embolus, same view. Scale line 1.0 mm (A-B; C-T).

anteriorly; Fig. 16A and Schwendinger, 1994: fig. 34). The spermathecal porepatches of the single female collected in a cave are narrower and more angular than in the other females (Fig. 16C cf. Fig. 16A-B), but as only a single female of this form is available, this may only be a case of individual variation. I consider these differences as expressions of geographical variation without species-specific significance.

Carapace lengths in ten males (seven females) range 5.1-7.1 (4.4-4.9), widths 2.7-3.3 (2.9-3.2). No relevant distinctions in somatic morphology could be found

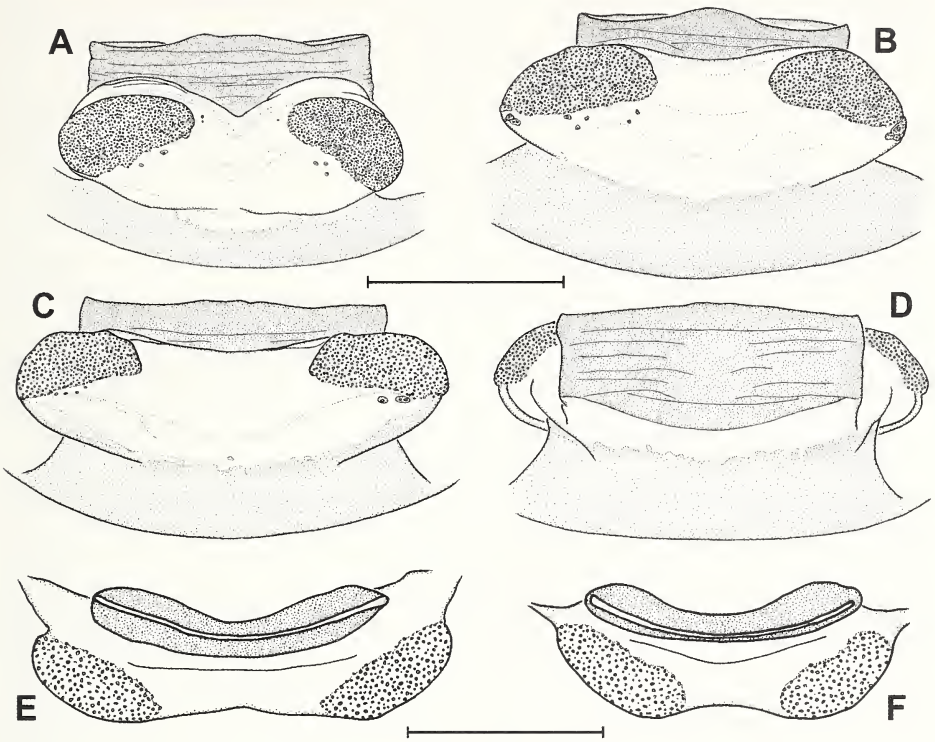


FIG. 16
Perania cerastes, females; from Maxwell Hill (A, F), from Penang Hill (B), from Tempurung Cave (C-E). (A-C) Vulva, ventral view. (D) Same, dorsal view. (E-F) Same, anterior view. Scale lines 0.5 mm (A-D; E-F).

among the specimens from the four localities, except for the males from Tempurung Cave having a relatively shorter clypeal process than males of the highland form (Fig. 15B cf. Fig. 15A); the male from Kanthan Cave has the tip of its clypeal process broken. In the new female from Maxwell's Hill the preanal plate is completely fragmented into microplates; in the two female paratypes (from Maxwell's Hill) it is represented by a small plate; in the three females from Penang Hill and the one from Tempurung Cave the preanal plate is relatively large. In all males the microplates on the posterior side of the opisthosoma are not interconnected and do not form strap-like horizontal plates, but they are closely packed like in a brickwall, except for the uppermost band of one paratype (from Maxwell Hill) in which most posterior microplates are fused. Seven packed horizontal bands are present in one paratype, both males from Penang Hill and two males from Gua Tempurung, five packed bands in two males from Gua Tempurung, one paratype and the holotype, three packed bands in the male from Gua Kanthan.

DISTRIBUTION: This species is currently known from four localities in northwestern peninsular Malaysia: Bukit Larut, a mountain on the mainland, north of Ipoh;

Gua Kanthan and Gua Tempurung, two limestone caves in the lowlands, south of Ipoh; Penang Hill, a mountain on Penang Island (Fig. 1, localities 20-23). The type specimens were collected at 1200 m on Bukit Larut.

BIOLOGY: The lowland spiders were found in completely dark parts of two caves, in webs running into holes and cracks at the foot of cave walls. These spiders show no adaptations to cave life. All other spiders of this species were collected from very humid evergreen forests on two mountains.

Perania coryne Schwendinger, 1994 Fig. 17

Perania coryne Schwendinger, 1994: 458-461, figs 35-42 (descriptions of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Malaysia (peninsula), Pahang State, Cameron Highlands (exact locality unknown; about 4°29'N, 101°23'E); 14.-20.IV.1990; leg. Vincent & Barbara Roth.

PARATYPE: 1 ♀ with same data as for holotype. No new material available.

DIAGNOSIS: See Schwendinger (1994: 458).

NEW CHARACTERS: Fovea anteriorly wider and deeper than posteriorly in female, less distinctly so in male. Retrolateral surface of chelicerae medially bulged in both sexes, in female (Fig. 17C) more distinctly so than in male (Fig. 17B). Male and female with proximally swollen, strongly sigmoid setae on slightly elevated bases ventrally on metarsus I; male additionally with more strongly elevated conical bases carrying normal setae prolaterally on entire length of metatarsus I and prolaterally in anterior portion of tibia I. Apex of embolus indistinctly split: small, narrowly lobate subterminal lamella separated by a small indentation from larger, widely rounded embolic part (Fig. 17D-E). Anterior opisthosomal plate of female fragmented into microplates; one pair of them slightly enlarged. Anterior pair of ventrolateral plates of male largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate of male completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate of females fragmented. Microplates on posterior side of opisthosoma of male not interconnected. Vulva with ventral wall of genital atrium pigmented only laterally, leaving a wide, transparent median zone (mentioned but not illustrated in the original description; Schwendinger, 1994: 461, fig. 41). Spermathecae with clearly outlined anterior porepatches on flat surface, separated from each other for much less than their widths; posterior portion of spermathecae not pigmented (Fig. 17F-G).

DISTRIBUTION: Known only from the type locality in the mountains of central peninsular Malaysia (Fig. 1, locality 24).

THE *PERANIA UTARA* SPECIES GROUP

DIAGNOSIS: Medium-sized species without modifications on clypeus, on "thoracic" portion of carapace or on chelicerae. Female with vulva characterized by large external pouches opening into ventral side of spermathecae; spermathecae and ventral wall of genital atrium entirely and uniformly pigmented; porepatches indistinctly outlined and only slightly extending onto dorsal side of spermathecae; common anterior margin of spermathecae widely arched, not invaginated; strap-like horizontal

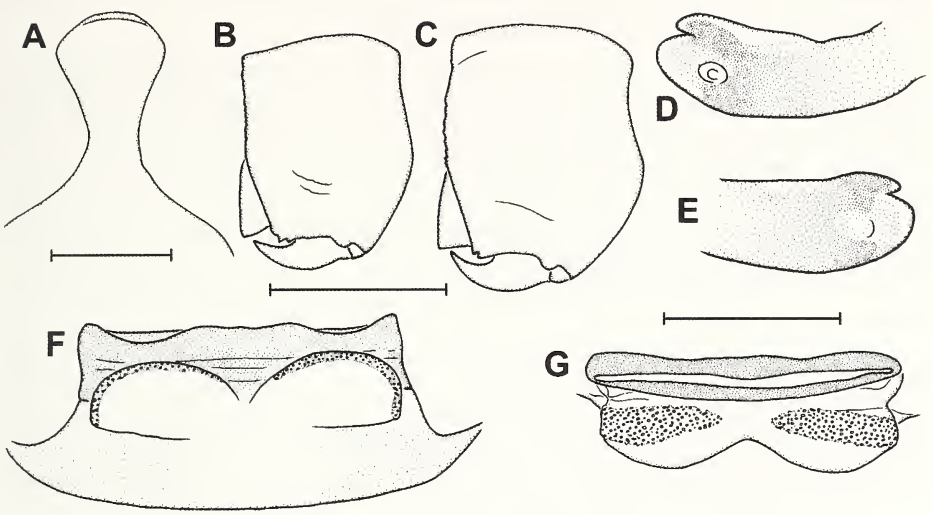


FIG. 17

Perania coryne, male holotype (A-B, D-E) and female "allotype" (C, F-G). (A) Clypeal process, dorsal view. (B-C) Left chelicera, anterior view. (D) Apex of right embolus, prolateral view. (E) Apex of left embolus, same view. (F) Vulva, ventral view. (G) Same, anterior view. Scale lines 1.0 mm (A; B-C), 0.5 mm (D-G).

plates on posterior side of opisthosoma. Male with metatarsus II carrying conical setal bases; femora of legs granular, femur of palp smooth; bulbus of palpal organ ovoid, embolus short and straight.

SPECIES INCLUDED: Only *Perania utara* sp. n.

DISTRIBUTION: Northern Sumatra Province (Fig. 1, locality 25). Further species of this group can be expected to occur in the northern part of Sumatra.

Perania utara sp. n. Figs 18, 36C, 37C

HOLOTYPE: MHNG, sample Sum-06/28; ♂; Indonesia, Sumatra, North Sumatra Province (= Sumatera Utara), hill about 1 km NE of Sibolga (1°45'22"N, 98°46'48"E), 300 m; 26.VI.2006; leg. P. J. Schwendinger.

PARATYPE: 1 ♀ "allotype" with same data as for holotype.

ETYMOLOGY: Indonesian: "utara" = north, northern. Noun in apposition.

DIAGNOSIS: Similar to *P. nigra*, both sexes distinguished by posteriorly narrower carapace without modifications in "thoracic" portion. Females distinguished by spermathecae carrying distinct external pouches (not just chambers inside the spermathecae) on ventral surface, these long and distinctly separated from each other; anterior margin of spermathecae not invaginated; dorsal collar of vulva much wider than in *P. nigra*; anterior opisthosomal plate and preanal plate of female completely fragmented; posterior side of opisthosoma with eight horizontal, strap-like plates of variable width. Male with tibia I and metatarsus I carrying many more conical setal

bases than males of *P. nigra*, a few conical setal bases also on metatarsus II; palpal organ much shorter and stouter, with a deeper apex.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally brown, carapace, chelicerae and ventral sclerites dark brown; membranous parts of opisthosoma light grey-brown. "Thoracic" portion of carapace unusually narrow in dorsal view. Clypeus without median process (Fig. 18A). Fovea deepened and slightly widened in anterior portion. Total length 6.7. Carapace 3.5 long, 2.1 wide. Eye sizes and interdistances: PME 0.21 long, separated by 0.24; ALE 0.22 long; ALE-PLE 0.06; PLE 0.22 long, separated by 1.07. Labium 0.6 long, 0.8 wide. Sternum 2.2 long, 1.5 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 2.6 long (0.8+0.4+0.7+0.7), femur smooth (setal bases not visibly elevated). Cymbium (Fig. 18C) of typical shape, with a pointed apex. Palpal organ quite short and stout; embolus with relatively deep base and indistinctly bifid apex with a pointed dorsad-directed subterminal lamella and a lobate distad-directed embolic part; distal margin of apex slightly invaginated and carrying three teeth (Fig. 18B-D).

Legs 34=21. Femora granular (with slightly elevated setal bases). About 50 quite large conical setal bases prolaterally to ventrally on metatarsus I, about 10 large ones prolaterally and about 50 smaller ones proventrally and ventrally on tibia I; four smaller ones proventrally and prolaterally on metatarsus II, non on tibia II. Paired leg claws with a row of 9-12 teeth; unpaired leg claws with one denticle. Leg I 12.5 long (3.8+1.2+3.9+2.5+1.1), leg II 10.0 long (3.0+1.0+2.8+2.2+1.0), leg III 7.6 long (2.3+0.8+1.8+1.8+0.9), leg IV 10.0 long (2.9+0.9+2.7+2.6+0.9).

Opisthosoma 3.5 long, 2.4 wide. Dorsal scutum 3.2 long, 2.3 wide, somewhat oval, its surface smooth. Most microplates on posterior side of opisthosoma isolated but closely packed, some fused (especially in first, third, fourth, fifth and sixth row from above; Fig. 37C). Pulmonary plate 2.3 long, 2.0 wide. Anterior pair of ventro - lateral plates largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.2 long, 0.7 wide, somewhat elliptical (Fig. 36C). Anal plate 0.7 long, 1.0 wide.

DESCRIPTION OF FEMALE ("allotype"; dissected): As in male, except for the following. Total length 7.2. Carapace 3.6 long, 2.2 wide. PME 0.22 long, 0.35 apart; ALE 0.21 long; ALE-PLE 0.07; PLE 0.21 long, 1.21 apart. Labium 0.6 long, 0.9 wide. Sternum 2.2 long, 1.6 wide. Palp 2.7 long (0.8+0.4+0.6+0.9). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with a row of 11-14 teeth. Leg I 11.2 long (3.3+1.1+3.3+2.4+1.1), leg II 9.5 long (2.8+1.0+2.6+2.1+1.0), leg III 7.6 long (2.2+0.9+1.8+1.8+0.9), leg IV 9.9 long (2.9+0.9+2.6+2.5+1.0).

Opisthosoma 4.4 long, 3.4 wide. Anterior plate fragmented into microplates, two of them slightly larger then the rest. Dorsal scutum 3.0 long, 1.9 wide, its surface with a few scattered low tubercles and low ridges. All microplates flat; median microplates in bands on posterior side of opisthosoma fused, forming eight strap-like horizontal plates, the uppermost one fused to posterior margin of dorsal scutum. Pulmonary plate 2.0 long, 2.1 wide, its posterior margin almost straight. Preanal plate fragmented into a group of slightly enlarged microplates. Anal plate 0.8 long, 1.0 wide.

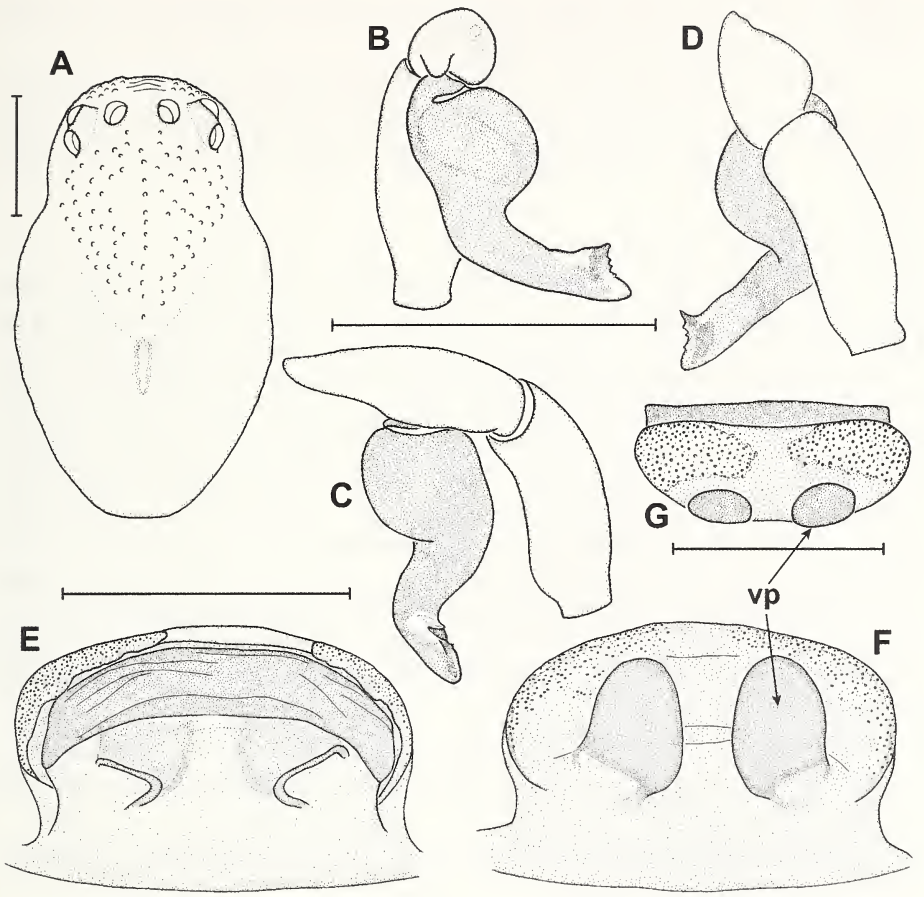


FIG. 18

Perania utara sp. n.; male holotype (A-D) and female "allotype" (E-G). (A) Carapace, dorsal view. (B) Left palp, ventral view. (C) Same, dorsal view. (D) Same, retrolateral view. (E) Vulva, dorsal view. (F) Same, ventral view. (G) Same anterior view. Abbreviation: vp = external ventral pockets. Scale lines 1.0 mm (A; B-D), 0.5 mm (E-F; G).

Vulva with short, very wide anterior collar; ventral wall of genital atrium and spermathecae pigmented throughout; spermathecae completely fused in the middle, elliptical, common anterior margin widely arched, not invaginated and without antero-lateral trenches, with indistinctly outlined porepatches; a pair of paddle-shaped external pouches (filled with sperm and therefore clearly serving as receptacles) attached to posterior portion of ventral side of spermathecae (Fig. 18E-G).

RELATIONSHIPS: The relatively short and stout palpal organ resembles that of *P. egregia* sp. n. but that is probably a homoplasy. The ovoid bulbus of the palpal organ and the paired modifications in the ventral wall of the vulva indicate that *P. utara* sp. n. could be sister to the other *Perania* known from Sumatra. However, these similarities may be plesiomorphies (see Discussion).

DISTRIBUTION: Known only from the type locality, a small hill at the northern outskirts of Sibolga city (Fig. 1, locality 25).

BIOLOGY: The specimens examined were collected by sifting leaf litter in a remnant patch of rain forest near the top of a small hill. No webs were seen, but it is likely that *P. utara* sp. n. constructs irregular sheetwebs as typical for spiders of this genus.

THE *PERANIA NIGRA* SPECIES GROUP

DIAGNOSIS: Small to large species characterized by "thoracic" portion of carapace in both sexes either unmodified, or with a pair of long and spine-like or low and hump-like processes; fovea anteriorly with a more or less distinctly widened pit. Females with spermathecae containing sclerotised internal chambers in the ventral wall; porepatches distinctly outlined and extending far onto dorsal side of spermathecae; ventral side of spermathecae between porepatches and internal chambers unpigmented; ventral wall of genital atrium entirely or only medially pigmented; common anterior margin of spermathecae more or less distinctly invaginated in the middle; anterior opisthosomal plate entire or fragmented into microplates of various sizes; preanal plate rudimentary or completely fragmented into microplates. Males with bulbus of palpal organ ovoid; embolus long and distinctly sigmoid; clypeus unmodified, or with a short tooth-like clypeal process, or with a long digitiform clypeal process (but never with a widened apex); chelicerae unmodified; femora of legs and palps smooth.

SPECIES INCLUDED: *Perania armata*, *P. deelemanae* sp. n., *P. harau* sp. n., *P. korinchica*, *P. nigra*, *P. picea*, *P. selatan* sp. n. and an undescribed species from Brastagi.

DISTRIBUTION: Only known from the Indonesian island of Sumatra (Fig. 1, localities 26-36).

Perania harau sp. n. Figs 19-20

HOLOTYPE: MHNG, sample Sum-06/17; ♂; Indonesia, Sumatra, West Sumatra Province, N of Payakumbuh, entrance of unnamed cave above Harau Canyon (0°06'25"S, 100°40'37"E), 700 m; 9.VI.2006; leg. P. J. Schwendinger.

PARATYPES: MHNG; 3 ♂ and 4 ♀ collected together with the holotype. – MHNG, sample Sum-06/15; 1 ♂ (mature 14.XI.2006); forest above Harau Canyon, near unnamed cave (type locality), 700 m; 9.VI.2006; leg. P. J. Schwendinger.

ETYMOLOGY: The specific epithet refers to the type locality. Name in apposition.

DIAGNOSIS: Similar to *P. picea*, distinguished by smaller size and wider anterior pit in fovea. Males distinguished by distinctly longer clypeal process; transition between bulbus and embolus rather V-shaped, with inner margins (facing each other) not parallel (U-shaped, with parallel inner margins in *P. picea*); distal portion of embolus with a distinct subapical ventral lamella and a very indistinct subterminal lamella. Females with smaller, more thick-walled internal chambers in the ventral side of their spermathecae.

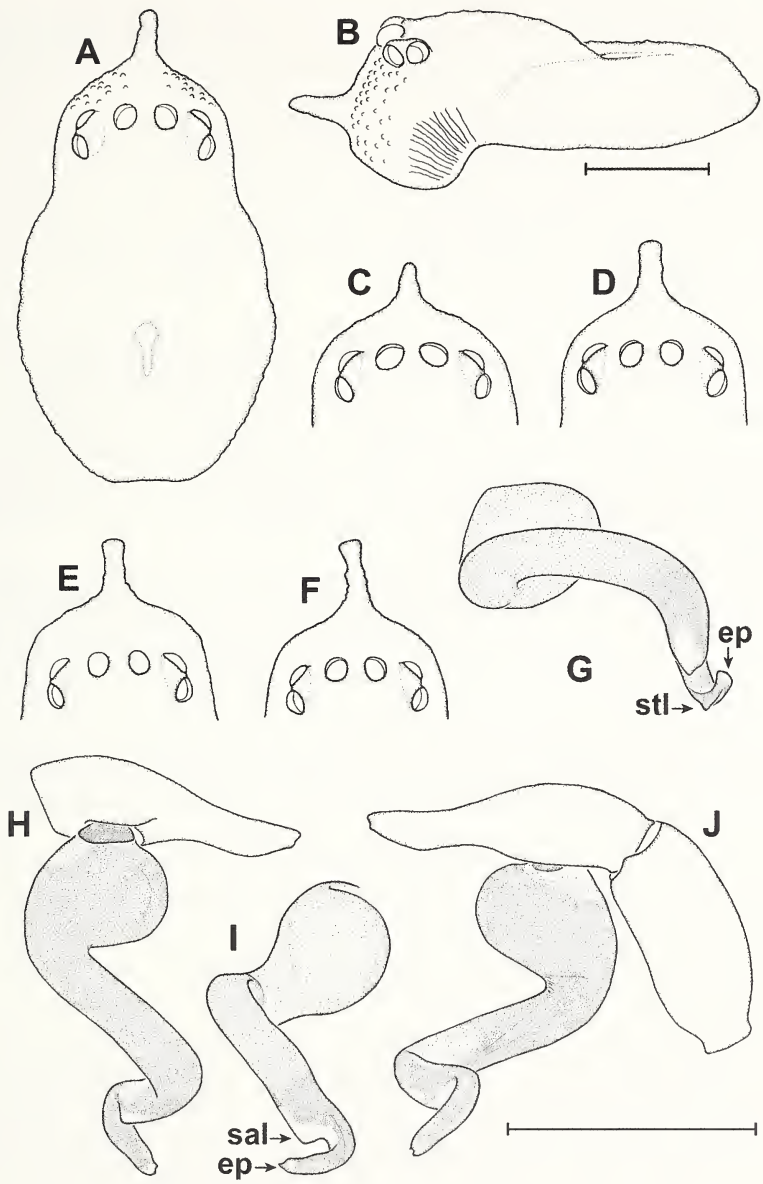


FIG. 19

Perania harau sp. n.; male holotype (A-B, G-J) and four male paratypes (C-F). (A) Carapace, dorsal view. (B) Same, lateral view. (C-F) Anterior portion of carapace, dorsal view. (G) Left palpal organ, ventral view. (H) Left cymbium and palpal organ, prolateral view. (I) Left palpal organ, distal view. (J) Distal portion of left palp, retrolateral view. Abbreviation: ep = embolic part of bifid apex of palpal organ), sal = subapical lamella, stl = subterminal lamella. Scale line 1.0 mm (A-F; G-J).

DESCRIPTION OF MALE (holotype): Colour (in alcohol) dark brown on carapace, chelicerae, palps, anterior legs and ventral sclerites, slightly lighter on posterior legs, opisthosomal sclerites and palpal organ; membranous parts of opisthosoma light grey-brown. Clypeus with moderately long, digitiform median process occupying 13% of carapace length (Fig. 19A-B). Fovea distinct, its anterior portion a relatively wide round pit, its posterior portion a shallow longitudinal furrow. Total length 7.8. Carapace 4.0 long, 2.3 wide. Eye sizes and interdistances: PME 0.25 long, separated by 0.13; ALE 0.24 long; ALE-PLE 0.06; PLE 0.24 long, separated by 0.95. Labium 0.7 long, 0.9 wide. Sternum 2.3 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior fang furrow.

Palp 3.5 long (1.1+0.4+0.9+1.1). Cymbium (Fig. 19H, J) relatively long, with narrow apex. Palpal organ with somewhat V-shaped transition from bulbus to embolus, inner sides of both parts (facing each other) not parallel but at an acute angle (Fig. 19H, J); embolus long, fairly straight in proximal portion, sigmoid in distal portion; a distinct, white, triangular subapical lamella ventrally below shallow, hook-shaped apex; subterminal lamella of apex very indistinct (visible as a small crest in Fig. 19G) and distad-directed; embolic part of apex long, shallow, tapering and ventrad-directed (Fig. 19H-J).

Legs 3241. Eight quite large conical setal bases distributed over almost entire length of metatarsus I proventrally and ventrally, three over distal third of tibia I pro - laterally. Paired leg claws with a row of 10-15 teeth; unpaired leg claws with one denticle. Leg I 15.9 long (4.8+1.5+5.2+3.1+1.3), leg II 12.8 long (3.9+1.2+3.8+2.7+1.2), leg III 10.0 long (3.1+1.0+2.5+2.4+1.0), leg IV 13.0 long (4.0+1.1+3.5+3.3+1.1).

Opisthosoma 3.9 long, 2.6 wide. Dorsal scutum 3.5 long, 2.4 wide, somewhat oval, posteriorly wider than anteriorly, its surface smooth. A few microplates on anterior side of opisthosoma (above anterior margin of pulmonary plate) elevated and obliquely pointed; all other microscerites flat and separated from each other. Pulmonary plate 2.6 long, 2.1 wide; genital region flat. Anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate only laterally fused with pulmonary plate, medially separated by a distinct, angular membranous stripe. Preanal plate 0.2 long, 0.7 wide, with right margin rounded and left margin straight. Anal plate 0.8 long, 1.1 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Colour in alcohol generally lighter (more strongly bleached), difference between anterior and posterior legs less pronounced. Total length 8.0. Carapace 3.8 long, 2.5 wide, "cephalic" portion more strongly elevated than in male, without modification of clypeus. PME 0.25 long, 0.20 apart; ALE 0.25 long; ALE-PLE 0.07; PLE 0.24 long, 1.15 apart. Labium 0.7 long, 1.0 wide. Sternum 2.5 long, 1.8 wide. Palp 3.7 long (1.1+0.5+0.8+1.3). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with a row of 9-15 teeth. Leg I 15.1 long (4.7+1.5+4.6+3.0+1.3), leg II 12.5 long (3.8+1.3+3.5+2.7+1.2), leg III 9.6 long (3.0+1.0+2.4+2.3+0.9), leg IV 12.6 long (3.9+1.1+3.3+3.1+1.2).

Opisthosoma 4.5 long, 3.2 wide. Anterior plate fragmented into microplates, two of them slightly larger then the rest. Elevated and obliquely pointed microplates on anterior side of opisthosoma smaller than in male. Dorsal scutum 3.5 long, 2.7 wide,

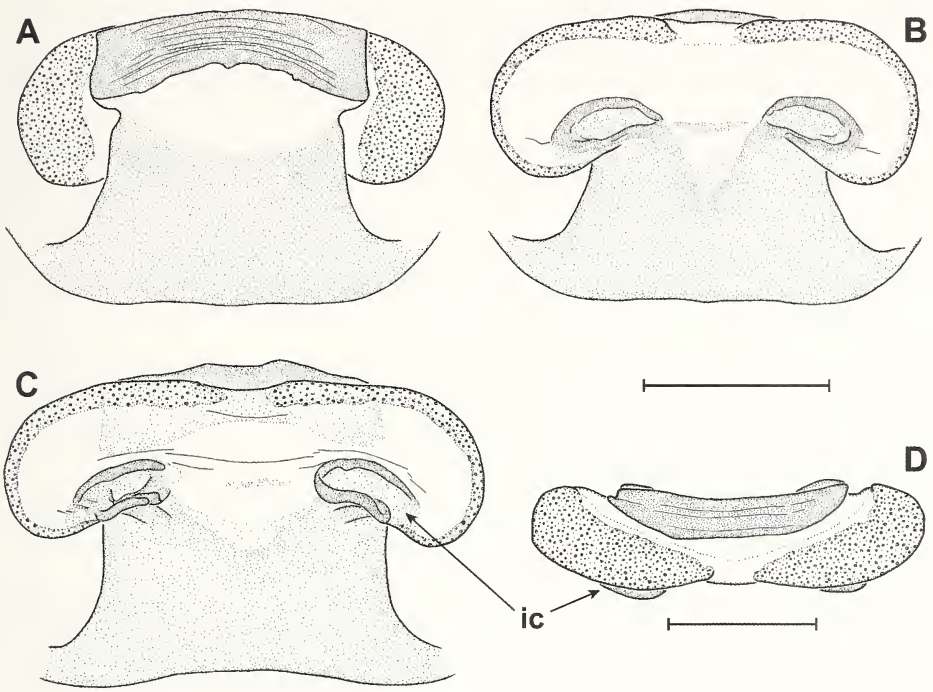


FIG. 20

Perania harau sp. n.; two female paratypes (A-B; C-D). (A) Vulva, dorsal view. (B, C) Same, ventral view. (D) Same, anterior view. Abbreviation: ic = internal chamber of spermatheca. Scale lines 0.5 mm (A-C; D).

its surface with a few indistinct ridges. Pulmonary plate 2.5 long, 2.3 wide; genital region bulged, flanked by several curved wrinkles; posterior margin slightly and very widely invaginated. Preanal plate fragmented into microplates, a few of them slightly larger than others. Anal plate 0.9 long, 1.1 wide.

Vulva (of paratypes, Fig. 20) with quite long, entirely pigmented ventral wall of genital atrium; anterior collar short, its widely rounded anterior margin only little surpassing anterior margin of spermathecae; spermathecae very wide, their common anterior margin almost straight, not or only indistinctly invaginated, their lateral sides bulged, without trenches; porepatches extending far onto dorsal side of spermathecae; a fairly small pair of eliptical internal chambers with thick, closed or laterally open walls in ventral wall of spermathecae.

VARIATION: Carapace length in five males (four females) ranges 4.0-4.2 (3.5-4.0), carapace width 2.3-2.4 (2.3-2.6). See Fig. 19A-F for variation in the shape of the clypeal processes of five males, Fig. 20 for variation in the vulvae of two females. In the holotype and one male paratype the anterior pair of ventrolateral opisthosomal plates lie so close to the lateral margin of the pulmonary plate that they look fused; in other males the separation is more visible. In three male paratypes the postgenital plate is reduced to a small isolated sclerite of variable shape behind the gonopore; in the

fourth paratype and in the holotype it is a short wide sclerite medially separated from the posterior margin of the pulmonary plate and laterally fused to it (as shown in Fig. 27E-F for *P. picea*). In all females examined the peanal plate is completely fragmented into microplates.

RELATIONSHIPS: The new species is most closely related to *P. picea*. Both have a very similar embolus with a small, tringular, distad-directed subterminal lamella and a long, shallow, tapering, sharply ventrad-bent embolic part, and a very long genital atrium. These are probably synapomorphies.

DISTRIBUTION: Known only from the type locality on Sumatra (Fig. 1, locality 26).

BIOLOGY: Most spiders examined were collected from typical webs between rocks and boulders and on the walls at the entrance (in the twilight zone) of an unnamed granite cave surrounded by rain forest. These spiders show no recognizable adaptations to cave-life. One spider was found outside the cave.

Perania nigra (Thorell, 1890) Figs 21-23

Phaedima nigra Thorell, 1890: 310 (description of male and female).
Paculla nigra (Thorell, 1890). – Simon, 1894: 573 (transfer).
Perania nigra (Thorell, 1890). – Bourne, 1980: 256, figs 12-19 (designation of lectotype; redescription of types; transfer). – Lehtinen, 1981: 15-16, figs 6, 8-9 (designation of lectotype; redescription of types; transfer). – Platnick, 2013 (listing).
Perania pallida Thorell, 1890: 316 (description of juvenile), synonymised by Lehtinen, 1981: 15.

TYPES: MCSNG; ♂ lectotype and 1 ♀ paralectotype; Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang; about 0°23'S, 100°21'E) near Bukittinggi; VIII.1878; leg. Odoardo Beccari.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/08; 1 ♂, 2 ♀, 2 juveniles; Indonesia, Sumatra, West Sumatra Province, near Lake Maninjau, waterfall above Gasang Village (about 0°16'30"S, 100°13'50"E), 600-700 m; 12.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Distinguished by a pair of low humps on "thoracic" portion of carapace in both sexes; males with relatively deep, paddle-shaped apex of embolus with a tiny, tooth-like, distad-directed embolic part; females with large anterior opisthosomal plate fused with pulmonary plate, and with internal chambers of spermathecae medially connected by a sclerotised bridge.

RE-DESCRIPTION: Small species; both sexes without clypeal process; a pair of low humps sitting on "thoracic" portion of carapace (Fig. 21A-D); cowpat-shaped tubercles on carapace low, indistinct; conical tubercles along lateral margins of carapace relatively large; anterior portion of fovea pitlike and wider than posterior portion. Males without cheliceral modifications; few conical setal bases prolaterally in distal half of tibia I, many prolaterally to ventrally over entire length of metatarsus I; anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate; postgenital plate more or less completely fused to pulmonary plate; all microplates on posterior side of opisthosoma isolated; cymbium relatively short, with pointed apex (Fig. 22A, D); bulbus ovoid, with U-shaped transition to long and sigmoid embolus (Fig. 22A); apex of embolus deep and somewhat paddle-shaped, with a widely angular or lobate subterminal lamella and with a tiny, tooth-like, distad-

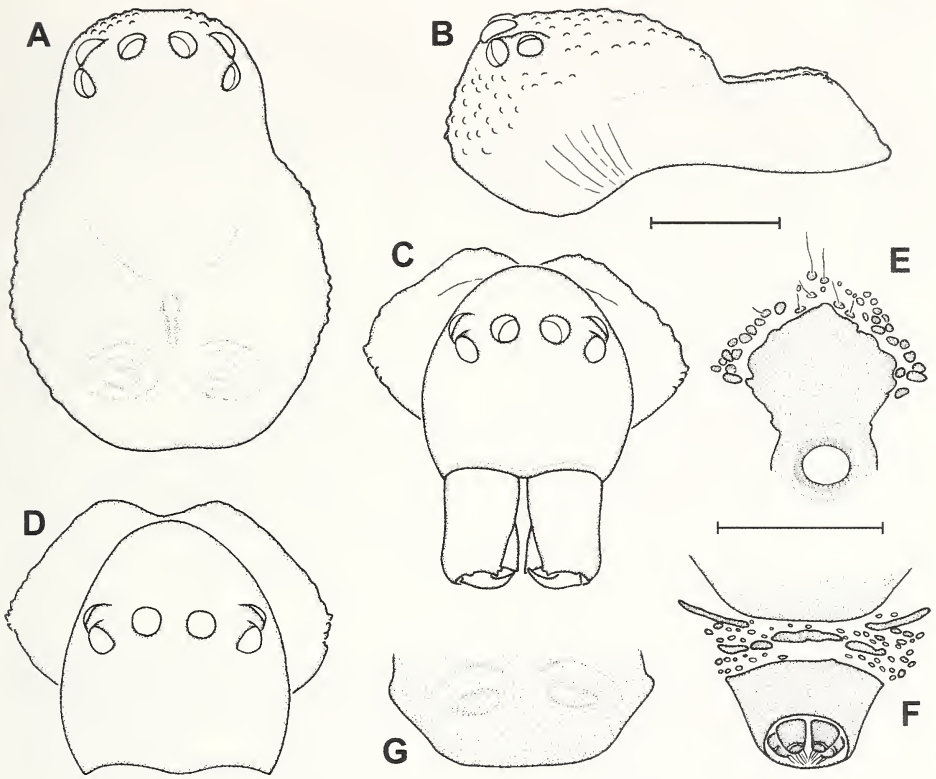


FIG. 21

Perania nigra, male lectotype (A-C), female paralectotype (D-G). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Carapace and chelicerae, anterior view. (D) Carapace, anterior view. (E) Upper anterior side of opisthosoma showing entire anterior plate fused with pulmonary plate. (F) Posterior portion of opisthosoma showing reduced preanal plate, ventral view. (G) Genital region showing oulines of vulva, ventral view. Scale lines 1.0 mm (A-B; C-G).

directed embolic part (Fig. 22B-F). Females with a rudimentary preanal plate (Fig. 21F) and with a large, clearly outlined anterior opisthosomal plate being widely fused with pulmonary plate (Fig. 21E); some opisthosomal microplates near dorsal scutum conical but only slightly elevated; vulva with a short and relatively narrow anterior collar (Fig. 23A, D); fused spermathecae with a deep V-shaped invagination in common anterior margin, ventral wall including a pair of short and wide internal chambers with thin or broken retrolateral walls and thick prolateral walls, both chambers connected to each other by a sclerotised median bridge; ventral wall of spermathecae between porepatches and internal chambers unpigmented (Fig. 23B, E); anterolateral sides of spermathecae with shallow trenches (Fig. 23C, F); porepatches large, extending far onto dorsal side of spermathecae (Fig. 23A, D); ventral wall of genital atrium with wide, slightly pigmented median zone flanked by transparent lateral zones (Fig. 23A-B, D-E).

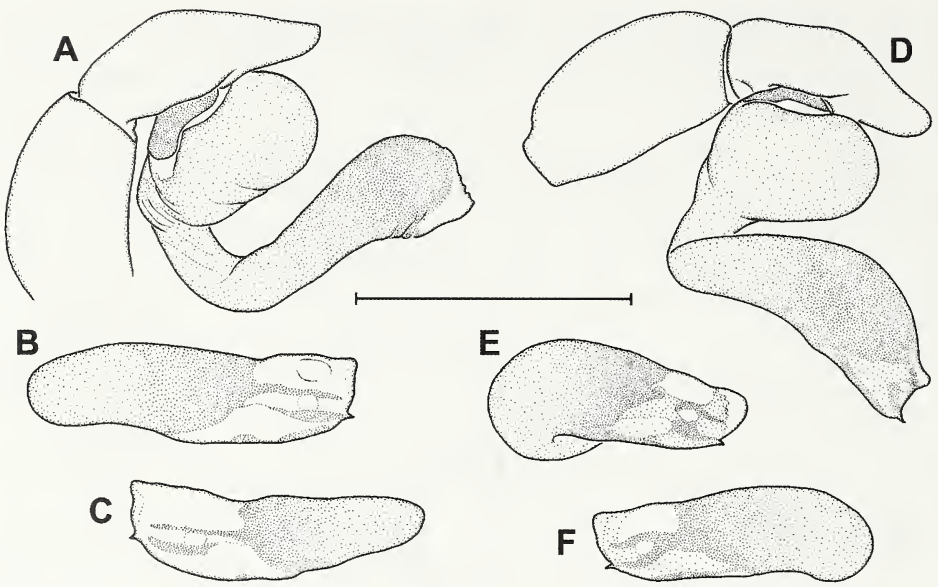


FIG. 22

Perania nigra, male lectotype (A-C), new male (D-F). (A) Distal portion of left palp, prolateral view. (B, E) Apex of left embolus, proventral view. (C, F) Apex of right embolus, same view. (D) Distal part of left palp, proventral view. Scale line 1.0 mm.

VARIATION AND MEASUREMENTS: Carapace lengths in two males (three females) are 3.3 (3.2-3.5), carapace widths 2.3-2.5 (1.9-2.5); the types have the highest values. The male lectotype has a widely invaginated posterior margin of the dorsal opisthosomal scutum, the new male has a straight margin. In the male lectotype the postgenital plate is completely fused to the pulmonary plate, in the new male both plates are medially separated by a very thin membranous stripe. The lectotype has slightly larger tubercles along the lateral margins of the carapace, and more numerous conical setal bases in the distal half of tibia I, whereas the new male has fewer conical tubercles restricted to the distal quarter of tibia I. In the two new females the preanal plate is smaller (but also distinct) than in the female paralectotype.

REMARKS: The female paralectotype was not dissected, but the outlines of the spemathecae and of the ventral chambers are visible from under the cuticle of the pulmonary plate (Fig. 21G) and correspond to those of the vulvae of the newly collected females.

Bourne (1980: 256, fig. 19) called the small unpaired ventral plate of the female paralectotype a "postgenital plate". This confusion probably results from the fact that this specimen has a slightly shrunk opisthosoma in which the median ventrolateral plates (lying between the postgenital and preanal plates) are not clearly visible. A comparison with newly collected females with firm opisthosomata clearly shows a small unpaired ventral plate (with a smooth surface) lying between a triangular pair of median ventrolateral plates and an oval pair of posterior ventrolateral plates (with

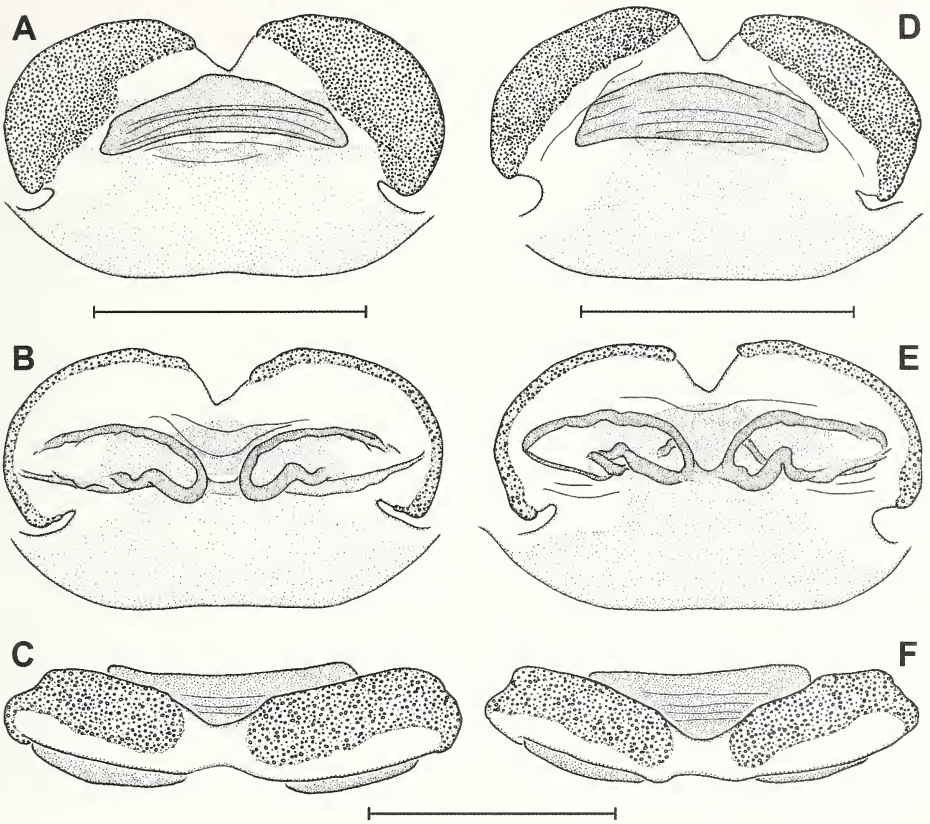


FIG. 23
Perania nigra, two females (A-C; D-F). (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-E; C-F).

granular surfaces). Therefore the median plate illustrated by Bourne is the moderately reduced preanal plate and not the postgenital plate. The postgenital plate is completely fragmented in all *Perania* females. Bourne (1980: 256, fig. 14) claimed that there are "no defined plates between pulmonary and anal plates" in the male lectotype of this species and did not illustrate a preanal plate in the corresponding figure although that is well-developed and clearly visible (as in all *Perania* males).

RELATIONSHIPS: The pair of humps posteriorly on the "thoracic" portion of the carapace and strong similarities in copulatory organs of males and females of *P. armata* show that *P. nigra* and *P. armata* are the closest relatives. Moreover both species share a complete anterior opisthosomal plate, which is more or less fragmented in other congeners. However, the presence of an entire anterior plate is probably plesiomorphic, as may be the presence of paired structures in and on the spermathecae of all *Perania* species from Sumatra.

DISTRIBUTION AND HABITAT: *Perania nigra* is known from two localities (about 15 km apart) in West Sumatra Province (Fig. 1, localities 28-29). The types of *P. nigra*

and the original types of *P. armata* (now lost) were allegedly all collected on Mt Singgalang (Fig. 1, locality 29). Thus both species may occur side by side, although that seems unlikely given their close relationship. The new specimens were collected from a fallen, partially rotten tree and from holes in a stream bank in a remnant patch of primary rain forest.

Perania armata (Thorell, 1890) Figs 24-26

Phaedima armata Thorell, 1890: 313 (description based on two female syntypes, these later lost). – Bourne, 1980: 250, 259 (mention as a "lost species" that belongs in *Perania*).
Paculla armata (Thorell, 1890). – Simon, 1894: 573 (transfer).
Mirania armata (Thorell, 1890). – Lehtinen, 1981: 17, figs 3-5, 12 [description of male; designation of male neotype (in MZT, not examined); transfer].
Perania armata (Thorell, 1890). – Schwendinger, 1989: 579 (transfer by synonymisation of *Mirania* with *Perania*).

TYPES: MCSNG; 2 ♀ syntypes (lost during flooding in 1970); Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang, near Bukittinggi; about 0°23'S, 100°21'E) and Lubu Selassi (= Lubuk Selasih, on road from Padang to Solok, at the foot of Gunung Talang; about 0°57'50"S, 100°36'30"E); 1878; leg. O. Beccari. – Zoological Museum, University of Turku, Finland; ♂ neotype (not examined); West Sumatra Province, 4 km SW of Padangpanjang, Lembah Anai (about 0°28'30"S, 100°21'10"E) at the foot of Gunung Singgalang; 26.IX.1978; leg. P. T. Lehtinen.

NEW MATERIAL EXAMINED: MHNG, sample Sum-06/01; 1 ♂, 2 ♀, 4 juveniles (= 1 penultimate ♂, 1 penultimate ♀, 1 earlier instar, 1 very small juvenile); Indonesia, Sumatra, West Sumatra Province, forest above Taman Hutan Raya Bung Hatta, near road from Padang to Lubuk Selasih (0°56'45"S, 100°32'37"E), 1100 m; 29./30.V.2006; leg. P. J. Schwendinger.

DIAGNOSIS: Juveniles and adults of both sexes easily recognizable by a pair of distinct horns on "thoracic" portion of carapace; adults distinguished by details of their copulatory organs, females additionally by large opisthosomal plate separated from pulmonary plate.

RE-DESCRIPTION: The smallest nominal species in the genus (body 4.3-5.2 long), characterised by a pair of long, straight, dorsad-directed horns on "thoracic" portion of carapace in males, females and at least two juvenile instars (Fig. 24A-F). Cowpat-shaped tubercles in this region very low and indistinct. Clypeus without modification. Anterior margin of cheliceral furrow with two teeth. Few conical setal bases on tibia I and metatarsus I. Large, clearly outlined, somewhat pentagonal anterior opisthosomal plate separated from pulmonary plate in females (Fig. 24H-I). All microplates on posterior side of opisthosoma of new male isolated; all microplates on opisthosoma of females flat. Anterior pair of ventrolateral plates of males fused with pulmonary plate posteriorly and in median portion, leaving a narrow membranous stripe below the spiracles (see Lehtinen, 1981: fig. 4). Postgenital plate of male distinct or indistinct, more or less widely linked to pulmonary plate by a sclerotised suture. Preanal plate completely fragmented in females. Cymbium with moderately long, pointed apex (Fig. 25A, C; Lehtinen, 1981: fig. 5a). Palpal organ with ovoid bulbus and sigmoid embolus, the transition between the two U-shaped (Fig. 25A; Lehtinen, 1981: fig. 5a); embolus becoming gradually deeper in median portion, its apex shallower, indistinctly divided into a short, narrowly lobate subterminal lamella and a rounded embolic part without a tooth (Fig. 25B, D; Lehtinen, 1981: fig. 5b). Vulva wide, its anterior collar short and relatively narrow, not or only slightly surpassing

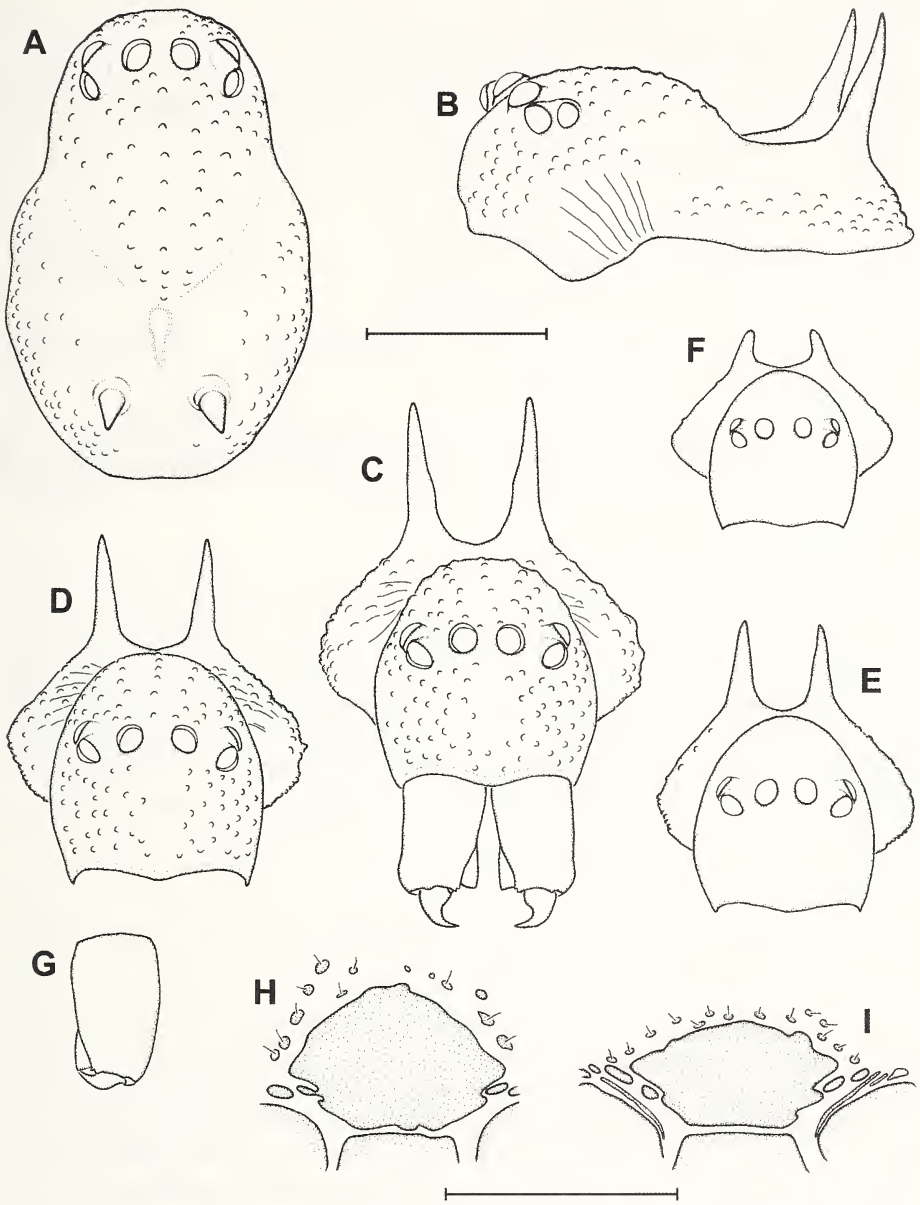


FIG. 24

Perania armata; male (A-C), two females (D, G-I), two juveniles (E-F). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Carapace and chelicerae, anterior view. (D-F) Carapace, anterior view. (G) Left chelicera, anterior view. (H-I) Entire anterior opisthosomal plate separated from pulmonary plate, anterior view. Scale lines 1.0 mm (A-G; H-I).

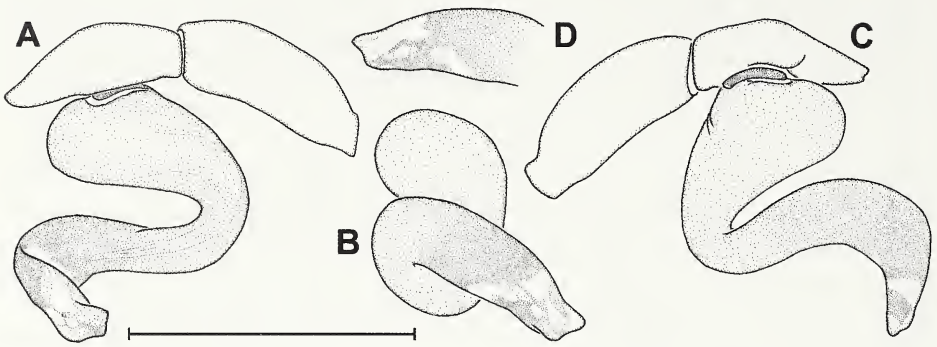


FIG. 25

Perania armata; male palp. (A) Distal portion of left palp, retrodorsal view. (B) Palpal organ, distal view. (C) Distal portion of left palp, proventral view. (D) Apex of right embolus, distal view. Scale line 1.0 mm.

common anterior margin of spermathecae (Fig. 26A, D); spermathecae with a more or less pronounced invagination in common anterior margin, lateral sides plane, without trenches (Fig. 26C, F), porepatches extending quite far onto dorsal side of spermathecae (Fig. 26A, D), ventral wall of spermathecae with a pair of wide, thick-walled internal chambers, these not connected by a median bridge (Fig. 26B, E); genital atrium quite short, with median zone of ventral wall weakly pigmented and less distinctly outlined than in *P. nigra*, lateral zones unpigmented (Fig. 26A-B, D-E).

VARIATION AND MEASUREMENTS: Carapace lengths in two males, including the neotype (and in two females) are 2.25-2.57 (2.49-2.51), carapace width 1.52-1.72 (1.66). The vulvae of two females are shown in Fig. 26. The neotype appears to have the spiracular plate incompletely fused with the pulmonary plate (Lehtinen, 1981: figs 4, 12), which is not the case in the new male or in any other *Perania* male examined. The new male has a somewhat elliptical postgenital plate (about half as wide as the preanal plate) which is anteriorly widely connected to the posterior margin of the pulmonary plate, with a sclerotised suture linking both plates; in the neotype the postgenital plate appears to be more strongly reduced and completely fused with the pulmonary plate, possessing an almost straight posterior margin (Lehtinen, 1981: 17, fig. 12). The preanal plate in the neotype (Lehtinen, 1981: fig. 12) appears to be reduced in size, whereas in the new male it is distinctly larger and quite normal for *Perania* males. The new male carries two conical setal bases prolaterally in the distal quarter of its tibia I, and 5-6 such tubercles prolaterally and proventrally in the distal three-quarters of its metatarsus I; the male neotype has seven conical setal bases on metatarsus I, but none are mentioned for its tibia I (Lehtinen, 1981: 17).

RELATIONSHIPS: Paired modifications in the "thoracic" portion of the carapace in both sexes and strong similarities in male and female copulatory organs strongly indicate that *P. armata* is most closely related to *P. nigra*. Similarities in the palpal organ also show a close relationship of these two species with *P. korinchica*. The

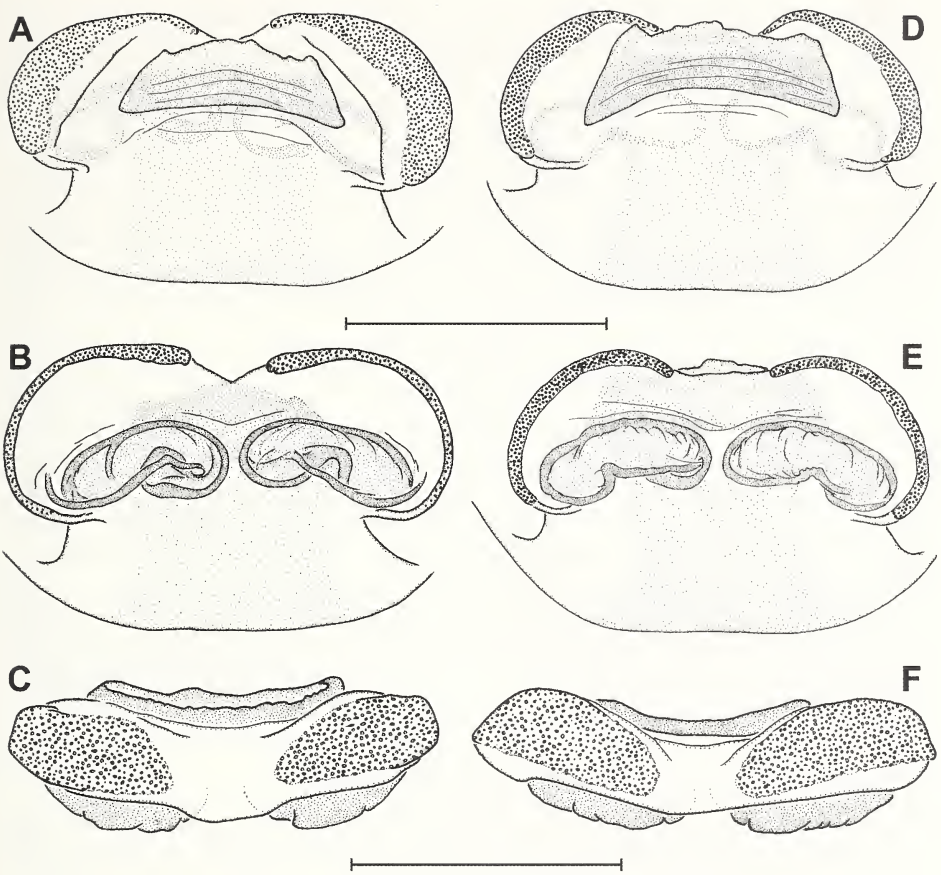


FIG. 26
Perania armata, two females (A-C; D-F). (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B, D-E; C, F).

strongly developed pair of thoracic horns of *P. armata* is unique in the genus, but not without parallels in other genera. Less distinctly developed, paired thoracic protuberances (low mounds) are present in both sexes of *P. nigra*. These modifications in both species are probably homologous and synapomorphic, but are here not considered of generic significance.

DISTRIBUTION AND HABITAT: Known from four localities in the mountains near Padang in western Sumatra (Fig. 1, localities 27, 29-31). The new specimens were collected by sifting leaf litter in a disturbed upland rain forest. No webs were seen, but it is likely that *P. armata* lives in irregular sheetwebs which, according to the size of these spiders, are smaller than in congeners.

REMARKS: The two female syntypes described by Thorell were lost during the 1970 flooding of the MCSNG (Bourne, 1980: 250; Lehtinen, 1981; 17) and still cannot be traced (M. Tavano, personal communication).

I cannot confirm that *P. armata* has "Abdominal plates slightly reduced when compared with *Paculla*, *Lamania* and *Sabahya*, but postgenital and preanal plates easily recognizable" (Lehtinen, 1981: 16) and that its pattern of opisthosomal scuta is "intermediate between the normal pattern in Pacullini, and the strongly reduced pattern in *Perania*" (Lehtinen, 1981: 17). In the *P. armata* specimens examined the opistho - somal pattern of sclerites lies within the variation of the genus, is typical for the species on Sumatra, and (with regards to the anterior opisthosomal plate of females and the postgenital plate of males) is even more derived than that of *P. nigra*. What Lehtinen refers to as the isolated postgenital plate of the male neotype are obviously the median ventrolateral plates which are connected by a narrow bridge (see Lehtinen, 1981: fig. 12).

It is true that the posterior sternal process of *P. armata* is weakly developed (Lehtinen, 1981: 76). It is smaller than in other *Perania* species, but only indistinctly smaller than the one of *P. nigra*. Nevertheless the sternal process of *P. armata* is posteriorly wide (wider than at the base) and truncate (see Lehtinen, 1981: fig. 12), as in all other *Perania* species (see Schwendinger, 1989: figs 7, 13), whereas in *Sabahya*, *Paculla* and *Lamania* it is conical or domed (see Lehtinen, 1981: fig. 24; Schwendinger, 1989: fig. 2). With respect to this character *P. armata* lies at the lower end of the variation within *Perania*, but not outside it.

Lehtinen (1981: 17) regarded the male palp of *P. armata* as "close to that of *P. picea*", but I see much stronger similarities with the palp of *P. nigra* (Fig. 25 cf. Fig. 22).

Perania picea (Thorell, 1890) Figs 27-29

Phaedima picea Thorell, 1890: 305 (description of male and female).
Paculla picea (Thorell, 1890). – Simon, 1894: 573 (transfer).
Perania picea (Thorell, 1890). – Bourne, 1980: 254, figs 6-11 (redescription of types; designation of lectotype; transfer). – Lehtinen, 1981: 16, figs 7, 11 (redescription of types; designation of lectotype; transfer).
Phaedima granulosa Thorell, 1881. – Levi & Levi, 1962: fig. 308 [free-hand drawing of male palp; not a synonym but a misidentification and confusion in labelling (see Lehtinen, 1981: 16)].

TYPES: MCSNG; ♂ lectotype and 1 ♀ paralectotype; Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang; about 0°23'S, 100°21'E) near Bukittinggi; VIII.1878; leg. O. Beccari.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/12; 1 ♂, 1 ♀; Indonesia, Sumatra, Jambi Province, Gunung Kerinci, footpath to summit, W of Kersik Tua (about 1°44'S, 101°15'30"E), 1800-1980 m; 16.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Large species. Males distinguished by indistinct clypeal process in combination with shallow embolus lacking a subapical ventral lamella and ending in an even shallower, pointed, hook-shaped apex carrying a distinct, triangular, distad-directed subterminal lamella; females distinguished by long genital atrium in combination with kidney-shaped spermathecae containing large internal chambers with strongly broken walls.

RE-DESCRIPTION: Both sexes with small marginal teeth posterolaterally on "thoracic" portion of carapace; cowpat-shaped tubercles on carapace low, indistinct; anterior portion of fovea pitlike and slightly wider than posterior portion. Males with

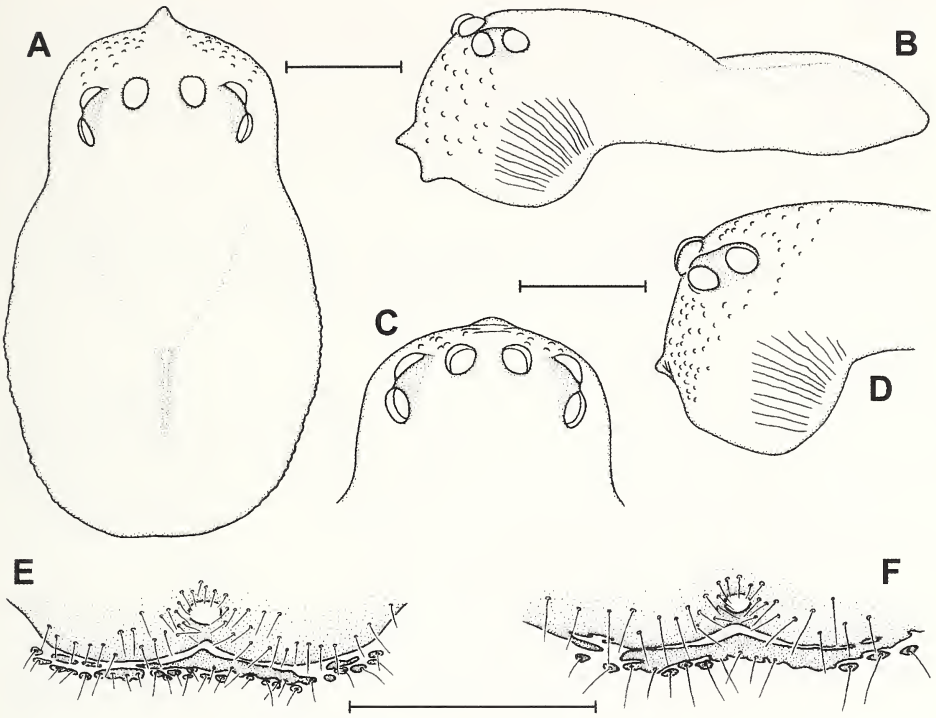


FIG. 27

Perania picea, male lectotype (A-B, E), new male (C-D, F). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace, dorsal view. (D) Same, lateral view. (E-F) Rudiment of postgenital plate at posterior margin of pulmonary plate, ventral view. Scale lines 1.0 mm (A-D; E-F).

a short, conical clypeal process (Fig. 27A-D); no cheliceral modifications; few conical setal bases prolaterally to proventrally in distal portion of tibia I, and several such tubercles prolaterally to proventrally along most of metatarsus I, none on leg II; anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate; postgenital plate at least medially not fused with pulmonary plate (Fig. 27E-F); all microplates on posterior side of opisthosoma isolated; cymbium with relatively long and shallow apex (Fig. 28E, J); bulbus ovoid; with a U-shaped transition to embolus; the latter long and sigmoid, its distal portion sharply tapering to a hook-shaped apex with a short, triangular or widely rounded, distad-directed subterminal lamella at the base, and with a relatively long, pointed, ventrad-directed embolic part (Fig. 28A-D, F-I); no subapical ventral lamella as in *P. harau* sp. n. Females with anterior opisthosomal plate fragmented into microplates, several of these slightly larger than the rest; preanal plate completely fragmented; vulva with an unusually long genital atrium with a strong pigmentation over entire width of its ventral wall (Fig. 29A-B); spermathecae kidney-shaped, with a shallow invagination in common anterior margin and with a pair of widely separated, not inter-

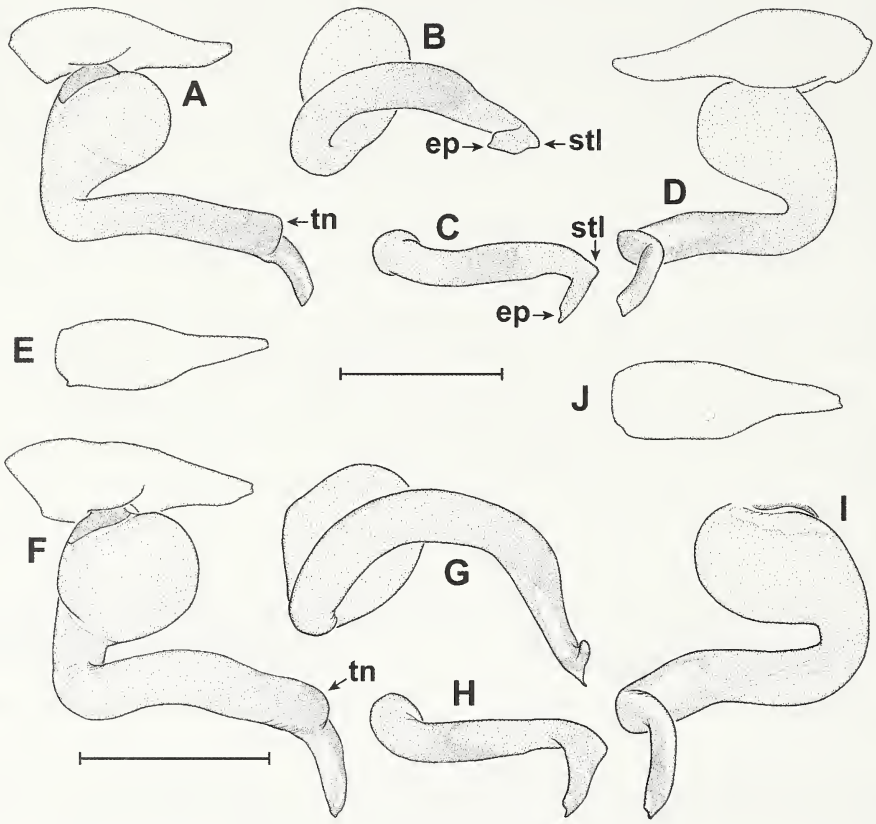


FIG. 28

Perania picea, left palp of male lectotype (A-E) and of new male (F-J). (A, F) Cymbium and palpal organ, proventral view. (B, G) Palpal organ, ventral view. (C, H) Embolus, distal view. (D) Cymbium and palpal organ, retrodorsal view. (E, J) Cymbium, dorsal view. (I) Palpal organ, retrodorsal view. Abbreviations: ep = embolic part of apex of palpal organ), stl = subterminal lamella, tn = sharp transition from deeper median portion of embolus to shallower apex. Scale lines 1.0 mm (A-D, F-I; E, J).

connected internal chambers with broken prolateral and retrolateral walls (Fig. 29B); anterolateral sides of spermathecae without trenches (Fig. 29C); porepatches large, extending far onto dorsal side of spermathecae; anterior collar of vulva short and wide, only little surpassing common anterior margin of spermathecae (Fig. 29A).

VARIATION AND MEASUREMENTS: The types are slightly smaller than the new specimens. Carapace length in two males (two females) is 4.5-4-7 (4.8-4.9), carapace width 2.7-2.8 (3.0-3.3). The male lectotype has a slightly longer clypeal process (Fig. 27A-B cf. Fig. 27C-D) and a shallower cymbial apex (Fig. 28E cf. Fig. 28J) than the new male. In the lectotype the postgenital plate is not connected to the pulmonary plate (Fig. 27E), in the new male it is fused laterally (at least on one side) but still free medially (Fig. 27F). The lectotype has several conical setal bases prolaterally and

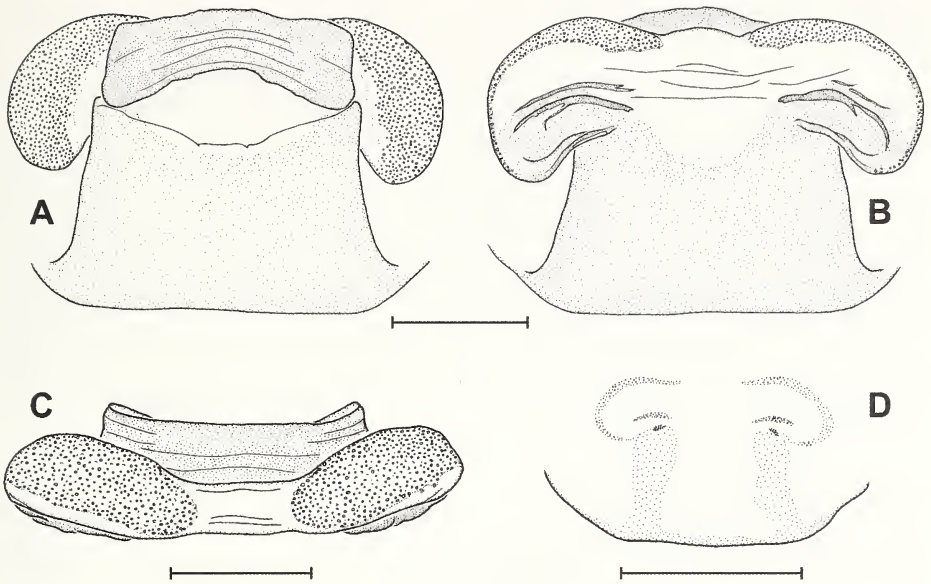


FIG. 29

Perania picea, new female (A-C) and female paralectotype (D). (A) Vulva dorsal view. (B) Same, ventral view. (C) Same, anterior view. (D) Posterior portion of pulmonary plate showing outlines of underlying vulva, ventral view. Scale lines 0.5 mm (A-B; C; D).

proventrally in the distal half of tibia I, whereas the new male has there only one on the right leg and none on the left leg. The new female has a relatively wider dorsal opisthosomal plate than the female paralectotype, being only slightly longer than wide.

RELATIONSHIPS: Judging from the shape of fovea and vulva, *P. picea* belongs in the *nigra*-group, closest to *P. harau* sp. n. These two species share a small clypeal process in males, a long sigmoid embolus with a small to very small distad-directed subterminal lamella and a relatively long and shallow, ventrad-directed embolic part of the apex. They also possess a long and entirely pigmented ventral wall of the genital atrium, somewhat kidney-shaped spermathecae enclosing a pair of internal chambers with thin, entire or broken walls, and a short but wide (almost as wide as the genital atrium) anterior collar.

DISTRIBUTION: *Perania picea* was described from Gunung Singgalang (Fig. 1, locality 29) and later collected on Gunung Kerinci (Fig. 1, locality 32), two volcanoes in the Bukit Barisan range of western Sumatra, about 180 km away from each other. I have some doubts whether the type specimens of. *P. picea* were really collected on or near Gunung Singgalang, which is also the type locality of *P. armata* and *P. nigra*.

BIOLOGY AND REMARKS: I collected several *Perania* at two places in the rain forest along the footpath to the summit of Mt Kerinci. Not recognizing in the field that they belong to different species, I did unfortunately not keep them apart. However, I remember having collected fully pigmented specimens from webs on a stream bank

below the second shelter at 1980 m. These are most likely the specimens that I here attribute to *P. picea*.

The female paralectotype was not dissected, but the outlines of the vulva are visible from under the cuticle of the pulmonary plate (Fig. 29D). These correspond perfectly well to the vulva of the newly collected female (Fig. 29B).

In their revision of theridiid spider genera, Levi & Levi (1962: fig. 308) published a free-hand sketch of the palp of a *Perania* male deposited in the Genoa Museum, which they incorrectly attributed to *Phaedima granulosa* (now in *Paculla*). Lehtinen (1981: 16) assumed that this sketch depicts *Perania nigra*. I rather believe that it shows the palp of the male lectotype of *P. picea*, with the strange subterminal swelling of the embolus corresponding to the sharp transition from the deeper median portion of the embolus to the shallower apex (see Fig. 28A). What looks like a subterminal dorsal boss or bulge in Fig. 28A and Fig. 28F is in fact that transition.

Perania korinchica Hogg, 1919 Fig. 30

Perania korinchica Hogg, 1919: 81-83, pl. 7, fig. 1a-b, d-f [description of female (prosoma only)].

Perania picea (Thorell, 1890). – Shear, 1978: 41 (note on composite specimen). – Lehtinen, 1981: 16 (synonymisation). – Platnick, 2013 (listing as a junior synonym).

TYPE: Natural History Museum London; prosoma of ♀ holotype (not examined); Indonesia, Sumatra, Jambi Province, Korinchi Peak (= Gunung Kerinci), Sungei Kumbang, 4700 ft; early 1914; leg. H. C. Robinson & C. Boden Kloss.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/12; 1 mature ♂, 1 juvenile ♂; Indonesia, Sumatra, Jambi Province, Gunung Kerinci, footpath to summit, W of Kersik Tua (about 1°43'30"S, 101°15'30"E), 1800-1980 m; 16.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Male similar to that of *P. nigra*, distinguished by: larger size, a short process on clypeus, no paired humps on "thoracic" portion of carapace, smaller tubercles on lateral margin of carapace, a more strongly bent embolus, a deeper subterminal lamella with a more rounded upper corner, and a slightly larger, hook-shaped embolic part situated further back and directed ventrad.

DESCRIPTION OF MALE (newly moulted specimen): Colour (in alcohol) mostly light brown, carapace and chelicerae slightly darker; dorsal scutum of opisthosoma grey-brown, membranous parts of opisthosoma cream-coloured. Clypeus with short (occupying only 3% of carapace length), asymmetrically pointed median process (Fig. 30A-B). Fovea distinct, its anterior portion a round pit, its posterior portion a shallow longitudinal furrow. Total length 7.2. Carapace 3.7 long, 2.4 wide. Eye sizes and interdistances: PME 0.29 long, separated by 0.09; ALE 0.27 long; ALE-PLE 0.06; PLE 0.25 long, separated by 0.90. Labium 0.7 long, 0.9 wide. Sternum 2.4 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.4 long (1.0+0.5+0.9+1.0). Cymbium (Fig. 30C, E) of typical shape, with a pointed but not unusually narrow apex. Palpal organ with ovoid bulbus and long sigmoid embolus, its median portion deep and in contact with bulbus on both palps; apex of embolus with a deep, paddle-shaped and obliquely truncate subterminal lamella, and with a small, shallow, hook-shaped and ventrad-directed embolic part distinctly set back from distal margin of embolus (Fig. 30C-H).

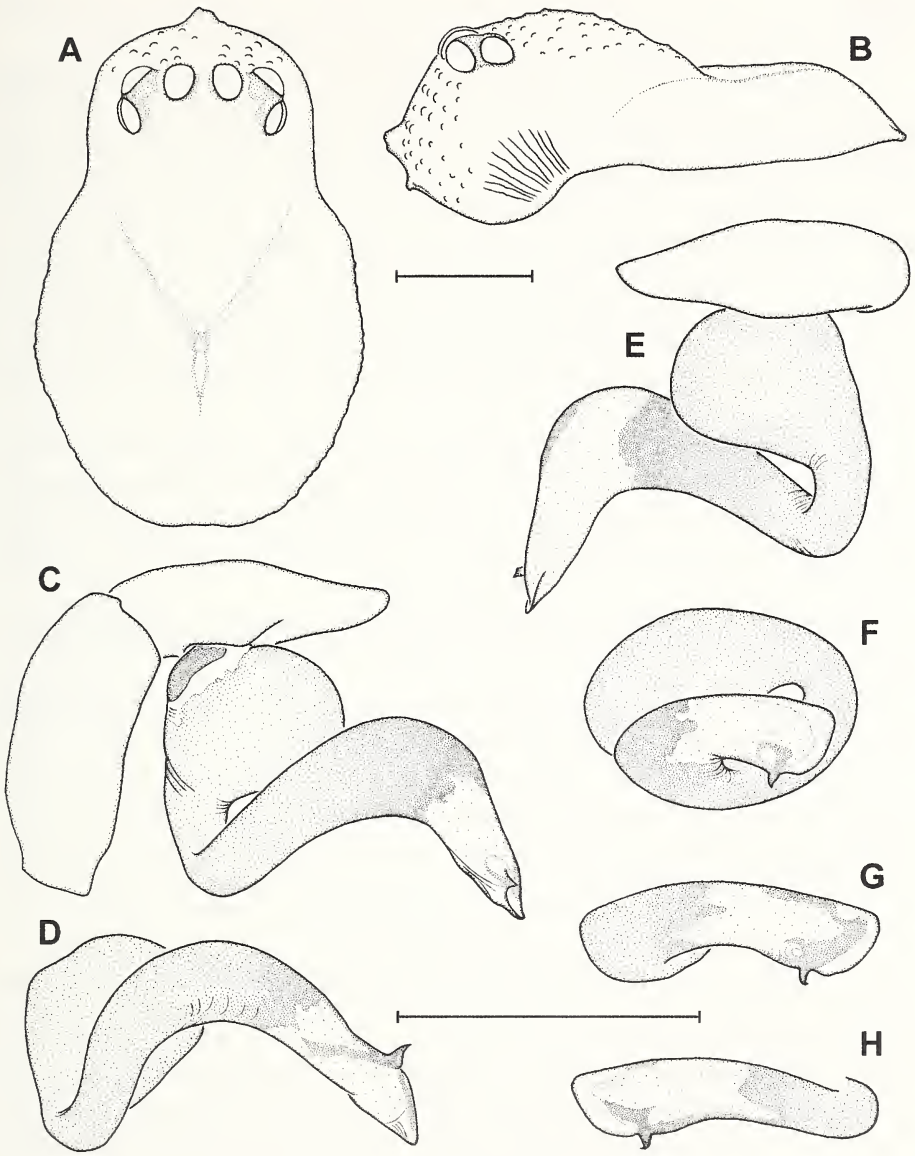


FIG. 30

Perania korinchica, male. (A) Carapace, dorsal view. (B) Same, lateral view. (C) Distal portion of left palp, proventral view. (D) Left palpal organ, ventral view. (E) Left palpal organ and cymbium, retrodorsal view. (F) Left palpal organ, distal view. (G) Left embolus, distal view (slightly more inclined than in F). (H) Right embolus, distal view. Scale lines 1.0 mm (A-B; C-H).

Legs 3241. Seven conical setal bases distributed over almost entire length of metatarsus I prolaterally and proventrally, three/five over distal third of tibia I prola - terally. Paired leg claws with a row of 10-14 teeth; unpaired leg claws with one den -

ticle. Leg I 13.0 long (3.8+1.5+4.1+2.4+1.2), leg II 10.3 long (3.0+1.2+2.9+2.1+1.1), leg III 8.1 long (2.5+1.0+2.0+1.9+0.7), leg IV 10.5 long (3.1+1.1+2.7+2.6+1.0).

Opisthosoma 3.9 long, 2.7 wide. Dorsal scutum 3.5 long, 2.4 wide, somewhat oval, posteriorly wider than anteriorly, its posterior margin straight, smooth. All microplates flat, those in five bands on posterior side of opisthosoma partially fused, forming broken strap-like horizontal plates. A few lateral microplates of lowest band in anterior portion of opisthosoma fused with each other (representing remnants of lateral plates) before running into lateral margin of pulmonary plate. Pulmonary plate 3.0 long, 2.2 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only their anterior tips free. Postgenital plate largely fused to pulmonary plate, with a narrow membranous slit behind gonopore marking border between both plates. Preanal plate 0.2 long, 0.9 wide, irregularly trapezoid. Anal plate 0.7 long, 1.1 wide.

FEMALE: The holotype of this species is the prosoma of a female (Hogg, 1919: 81-83, fig. 1a-b, d-f, not fig. 1c) and it thus provides hardly any distinctive characters. The isolated opisthosoma described and illustrated together with the holotype prosoma actually belongs to a *Leucauge* female in the distantly related spider family Tetragnathidae (see Shear, 1978: 41; Lehtinen, 1981: 16).

RELATIONSHIPS: Morphology of the male palp indicates a close relationship with *P. nigra* and *P. armata*.

DISTRIBUTION: Known only from the type locality, Gunung Kerinci, an active volcano and the highest mountain of Sumatra (Fig. 1, locality 32).

BIOLOGY AND REMARKS: The new specimens of *P. korinchica* and *P. picea* were all collected during my ascent to the summit of Gunung Kerinci and were all put into the same sample (Sum-00/12). According to field notes, the *P. korinchica* specimens were probably collected at 1800 m, from under decaying wood on the floor of a very humid, upland rain forest near the first shelter along the footpath to the summit.

As two *Perania* species are present on Mt Kerinci, one cannot rule out that the female holotype of *P. korinchica* (represented only by a prosoma without relevant specific characters) belongs to *P. picea*, but body size and altitudinal occurrence indicate otherwise. The two species on Mt Kerinci differ in size, and it seems that they occur at different altitudes: the larger one higher up (at 1980 m) than the smaller one (at 1800 m). The holotype of *P. korinchica* was collected at a relatively low altitude (4700 feet = ca 1430 m), and it is clearly smaller than the females of *P. picea* examined (carapace length of *P. korinchica* holotype: 4.5, of *P. picea* females: 4.8-4.9). Thus it is most likely that the new specimens from 1800 m are conspecific with the type of *P. korinchica*.

An embolus, which is so strongly curved upwards that its median portion is in contact with the bulbus of the palpal organ, was not found in any other *Perania* species. It may, however, not be a specific character but a deformation caused by the fact that the spider was preserved shortly after moulting and therefore the palpal organs may not be fully expanded. The asymmetrical clypeal process is presumably due to individual variation and not characteristic for the species.

Perania deelemanae sp. n. Figs 31-33

HOLOTYPE: MHNG, sample Sum-00/18; ♂; Indonesia, Sumatra, Bengkulu Province, Lembah Sungai Ketahun Hulu, about 70 km NW of Curup, road from Muara Aman to Ketenong (about 2°53'S, 102°03'E), 730 m; 24.II.2000; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample Sum-00/18; 1 ♂, 2 ♀ (one of them the "allotype"); same data as for holotype. – MHNG, sample Sum-00/19; 1 ♂, 2 ♀; Indonesia, Sumatra, Bengkulu Province, Taba Penanjung Reserve, road from Taba Penanjung to Kepahiang (about 3°41'S, 102°32'30"E), 630-770 m; 27.II.2000. All leg. P. J. Schwendinger.

ETYMOLOGY: This species is dedicated to Christa Deeleman-Reinhold, a distinguished Indonesian-born expert in Tetrablemmidae and in spiders of Indonesia.

DIAGNOSIS: Similar to *P. nigra*, both sexes distinguished by larger size, lacking humps on "thoracic" portion of carapace, and possessing conical microplates on anterior side of opisthosoma. Males distinguished by a distinct clypeal process, a longer cymbium, and a somewhat lanceolate apex of embolus. Females distinguished from those of *P. nigra* by an indistinct clypeal tubercle (not present in all specimens), a fragmented (but incompletely so) anterior opisthosomal plate, a longer anterior vulval collar, and spermathecae with a less strongly invaginated common anterior margin and with medially not interconnected, more thick-walled internal chambers enforced with ribs.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally dark brown, carapace, chelicerae and ventral sclerites darker than other sclerites; membranous parts of opisthosoma light grey-brown. Clypeus with medium-sized digitiform median process (Fig. 31A-B). Fovea composed of an indistinct anterior pit continuing into a shallow longitudinal furrow. Total length 9.2. Carapace 4.7 long, 2.5 wide; clypeal process 0.7 long, occupying 14% of carapace length. Eye sizes and interdistances: PME 0.26 long, separated by 0.16; ALE 0.26 long; ALE-PLE 0.08; PLE 0.26 long, separated by 1.09. Labium 0.8 long, 1.0 wide. Sternum 2.6 long, 1.8 wide. Chelicerae without modifications; right chelicera with two teeth on anterior margin of fang furrow, left one with one tooth.

Palp 4.0 long (1.1+0.6+1.1+1.2). Cymbium with relatively long, narrowly truncate apex (Fig. 32A). Palpal organ with ovoid bulbus and long, sigmoid embolus, transition between them U-shaped (Fig. 32C); embolus fairly straight in proximal portion, bent in distal portion; apex of embolus deep and somewhat lanceolate, with short, widely rounded subterminal lamella, and obliquely truncate embolic part with its narrowly rounded upper corner projecting far beyond its widely rounded lower corner and far beyond the subterminal lamella (Fig. 32B, D-E).

Legs 3241. Seven (on right side) and eleven (on left side) conical setal bases distributed over almost entire length of metatarsus I prolaterally and proventrally, four (on right side) and five (on left side) over distal half of tibia I prolaterally. Paired leg claws with a row of 13-14 teeth on anterior legs, 10-11 on posteriors; unpaired leg claws with one denticle. Leg I 16.4 long (5.0+1.6+5.2+3.2+1.4), leg II 13.0 long (3.8+1.4+3.7+2.8+1.3), leg III 10.1 long (3.0+1.1+2.4+2.5+1.1), leg IV 13.4 long (4.0+1.3+3.5+3.4+1.2).

Opisthosoma 4.5 long, 3.2 wide. Dorsal scutum 4.1 long, 2.7 wide, somewhat oval, posteriorly wider than anteriorly, its surface with indistinct low tubercles and

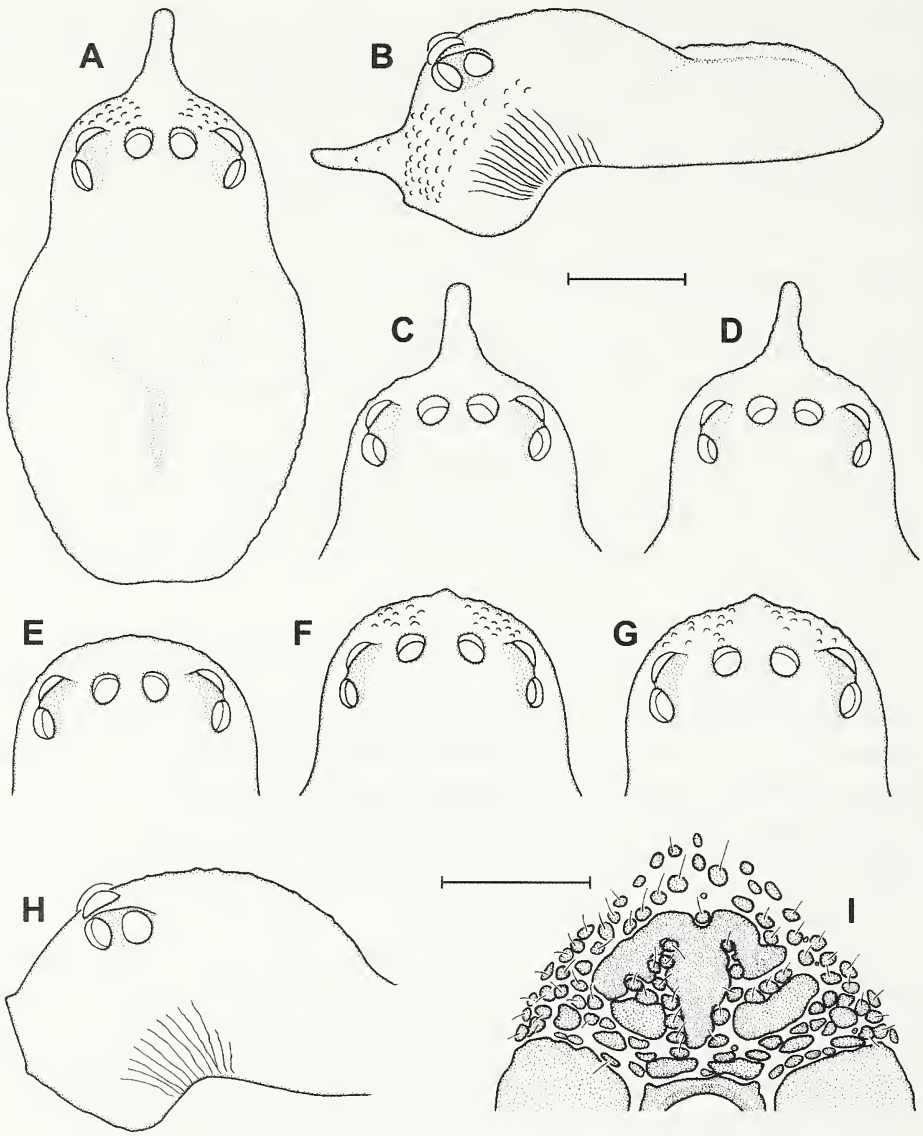


FIG. 31

Perania deelemanae sp. n., male holotype (A-B), male paratype from type locality (C), male paratype from Taba Penanjung (D), two female paratypes (E-F), female "allotype" (G-I). (A) Carapace, dorsal view. (B) Same, lateral view. (C-G) Anterior portion of carapace, dorsal view. (H) Same, lateral view. (I) Upper anterior side of opisthosoma showing fragmented anterior plate. Scale lines 1.0 mm (A-H; I).

ridges. A few microplates fused to anterior margin of pulmonary plate being slightly elevated and conical; all other microplates flat. Lateral microplates in anterior portion of opisthosoma relatively large, quadrangular and closely packed; a few microplates in lowest band anterolaterally on opisthosoma fused with each other. Four broken

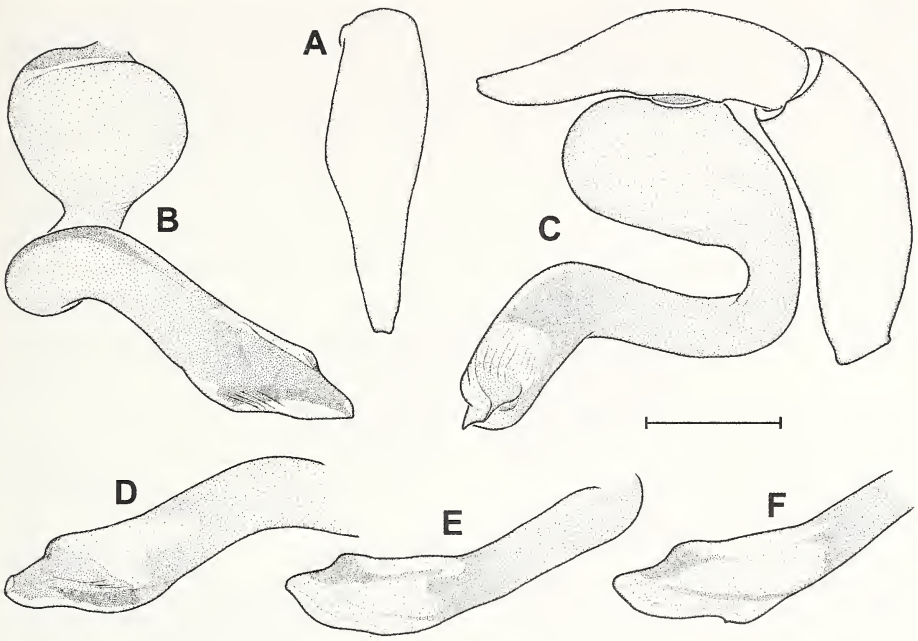


FIG. 32

Perania deelemanae sp. n., male holotype (A-E), male paratype from Taba Penanjung (F). (A) Left cymbium, dorsal view. (B) Left palpal organ, distal view. (C) Distal portion of left palp, retrodorsal view. (D, F) Apex of left embolus, proximal view. (E) Apex of right embolus, distal view. Scale line 0.5 mm.

horizontal strap-like plates on posterior side of opisthosoma. Pulmonary plate 3.1 long, 2.4 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only anterior tips free. Postgenital plate completely fused to pulmonary plate, linked by an indistinct sclerotised suture. Preanal plate 0.2 long, 0.8 wide, somewhat eliptical, with distinctly convex anterior margin and indistinctly concave posterior margin. Anal plate 0.9 long, 1.2 wide.

DESCRIPTION OF FEMALE ("allotype"): As in male, except for the following. Colour slightly darker, especially of legs and dorsal scutum. Total length 9.4. Carapace 4.6 long, 2.8 wide. PME 0.30 long, 0.23 apart; ALE 0.30 long, ALE-PLE 0.10; PLE 0.29 long, 1.38 apart. Clypeal process developed as an indistinct conical tubercle (Fig. 31G-H). Fovea with pronounced anterior pit. Labium 0.8 long, 1.1 wide. Sternum 2.8 long, 2.0 wide. Palp 3.8 long (1.0+0.6+0.8+1.4). Legs 3241; tibia I and metatarsus I without conical setal bases. Paired leg claws with 14-17 teeth on anterior legs, 10-13 on posteriors. Leg I 14.8 long (4.4+1.5+4.4+3.1+1.4), leg II 12.3 long (3.6+1.4+3.4+2.7+1.2), leg III 10.0 long (3.0+1.2+2.3+2.4+1.1), leg IV 13.0 long (3.9+1.3+3.3+3.3+1.2).

Opisthosoma 5.4 long, 3.9 wide. Dorsal scutum 3.9 long, 2.7 wide, its surface with indistinct tubercles. Anterior plate fragmented into several microplates and three small plates, the median one of them being inverted anchor-shaped (Fig. 31I). A few

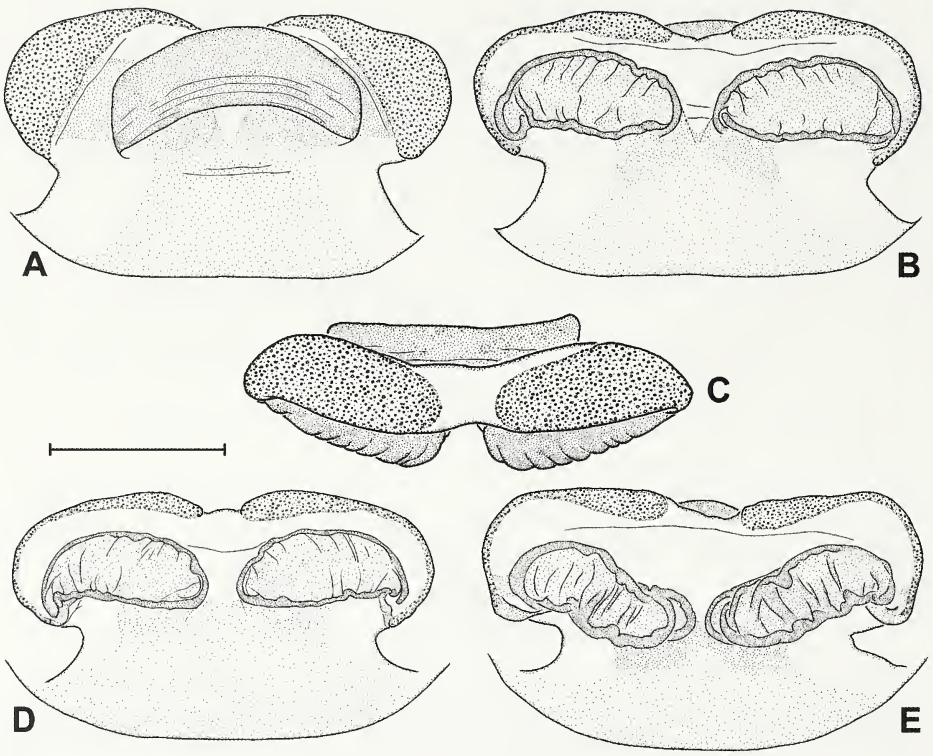


FIG. 33

Perania deelemanae sp. n., females; "allotype" (A-C), paratype from the type locality (D), paratype from Taba Penanjung (E). (A) Vulva dorsal view. (B, D-E) Same, ventral view. (C) Same, anterior view. Scale line 0.5 mm.

isolated microplates above dorsal margin of partially fragmented anterior plate and several microplates near posterior and posterolateral margin of dorsal plate slightly elevated and conical. All microplates on posterior and lateral sides of opisthosoma isolated. Pulmonary plate 2.5 long, 2.7 wide; genital region bulged, with curved wrinkles; posterior margin straight. Preanal plate reduced to a horizontal, compass-needle-shaped sclerite. Anal plate 0.9 long, 1.2 wide.

Vulva relatively short; anterior collar short, its widely rounded anterior margin only slightly surpassing common anterior margin of spermathecae in the middle (Fig. 33A); spermathecae short and wide, with an indistinct median invagination in common anterior margin, ventral side between porepatches and internal chambers unpigmented, anterior and lateral sides bulged, without trenches (Fig. 33C); porepatches extending far onto dorsal side of spermathecae; ventral wall of spermathecae with a pair of large, grain-shaped internal chambers with thick walls and longitudinal enforcement ribs; both chambers prominent (especially near middle of vulva), distinctly separated from each other, without interconnecting bridge (Fig. 33B); ventral wall of genital atrium with pigmented median zone sharply outlined and posteriorly widened, lateral zones unpigmented (Fig. 33A-B).

VARIATION: Carapace length in three males (four females) ranges 4.7-5.1 (4.2-4.6), carapace width 2.5-2.7 (2.7-2.8). Variation in the shape of the clypeal process of males is shown in Fig. 31A-D. Three females have a small, conical, pointed tubercle on the clypeus (Fig. 31F-H), one female lacks such a tubercle (Fig. 31E). The sclerotised suture linking the pulmonary plate and the postgenital plate is distinct in one male, indistinct in the two others. The female "allotype" has the large central fragment of the anterior opisthosomal plate in the shape of an inverted anchor (Fig. 31I), in the other three females examined it is a simple longitudinal bar which is dorsally slightly wider than ventrally. Only the female "allotype" has a quite wide rudimentary preanal plate, in the other conspecific females this is completely fragmented into microplates. Variation in the shape of the embolus of two males is shown in Fig. 32B, D-F, variation in the shape of the vulva of three females in Fig. 33B, D-E.

RELATIONSHIPS: The new species is most similar and probably most closely related to *P. selatan* sp. n.; *Perania nigra*, *P. armata* and *P. kirinchica* appear to be the closest relatives of these two species.

DISTRIBUTION: Known from two localities in the Barisan mountain range to the north and northeast of Bengkulu city (Fig. 1, localities 33-34).

BIOLOGY: The spiders examined were collected from webs on exposed earth-banks on one side of a dirt road running through fields (near a recently cleared patch of rainforest and not far from a stream) in the Lembah Sungai Ketahun Hulu, and from under decaying logs on the floor of a rain forest in the Taba Penanjung Reserve.

Perania selatan sp. n. Figs 34-35

HOLOTYPE: MHNG, sample Sum-00/27; ♂; Indonesia, Sumatra, Lampung Province, Bukit Barisan Selatan National Park, footpath to waterfall, 2 km from road Krui to Liwa, NE of Kubuprahu (5°04'S, 104°03'30"E), 600 m; 5.III.2000; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample Sum-00/27; 7 ♀; same data as for holotype.

ETYMOLOGY: "Selatan" is the Indonesian word for "south". Noun in apposition.

DIAGNOSIS: Similar to *P. deelemanae* sp. n., both sexes distinguished by smaller body size and PME interdistance equal to their diameters (distinctly less so in *P. deelemanae* sp. n.). Male distinguished from those of *P. deelemanae* sp. n. by shorter, more conical clypeal process; lateral microplates in anterior portion of opisthosoma not quadrangular, several of those in lower rows fused into short strap-like lateral plates; conical microplates on anterior side of opisthosoma more distinctly elevated; tip of cymbium narrower; apex of embolus shallower, obliquely truncate, without (or with only very indistinct) subterminal lamella dorsally. Females without clypeal process; common anterior margin of spermatecae with a deeper median invagination; internal chambers of spermathecae with stronger enforcement ribs, usually closer to each other than in *P. deelemanae* sp. n.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally dark brown, carapace, chelicerae, pedipalps, ventral sclerites and dorsal scutum slightly darker, palpal organ and distal articles of posterior legs lighter; membranous parts of opisthosoma grey-brown. Clypeus with short, basally quite narrow conical process

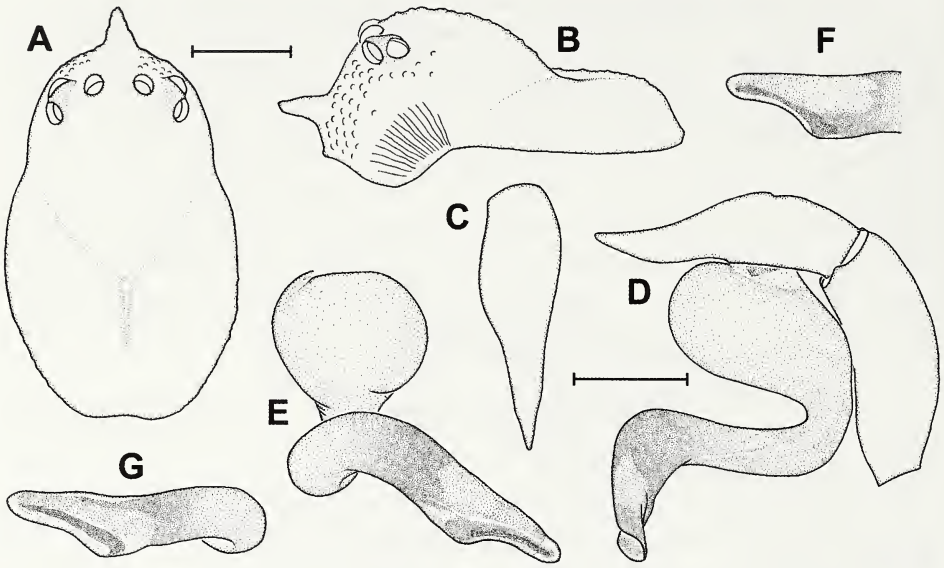


FIG. 34

Perania selatan sp. n., male holotype. (A) Carapace, dorsal view. (B) Same, lateral view. (C) Left cymbium, dorsal view. (D) Distal portion of left palp, retrodorsal view. (E) Left palpal organ, distal view. (F) Apex of left embolus, proximal view. (G) Apex of right embolus, proximal view. Scale lines 1.0 mm (A-B), 0.5 mm (C-G).

(Fig. 34A-B). Fovea relatively deep in anterior half. Total length 7.9. Carapace 4.0 long, 2.3 wide; clypeal process 0.4 long, occupying 9% of carapace length. Eye sizes and interdistances: PME 0.24 long, separated by 0.24; ALE 0.22 long; ALE-PLE 0.11; PLE 0.21 long, separated by 1.08. Labium 0.8 long, 1.0 wide. Sternum 2.3 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.7 long (1.0+0.5+1.0+1.2). Cymbium with long and exceptionally narrow, acutely pointed apex (Fig. 34C). Palpal organ with long embolus bent from bulbus at almost 180°, fairly straight in proximal portion, sigmoid in distal portion; apex of embolus only slightly deeper than median portion of embolus, obliquely truncate, its upper corner narrowly rounded and protruding far beyond widely rounded lower corner; no subterminal lamella discernible dorsally (Fig. 34D-G).

Legs 3241. Nine (on left side) and twelve (on right side) conical setal bases distributed over almost entire length of metatarsus I prolaterally to ventrally, three (on right side) and four (on left side) over distal quarter of tibia I prolaterally. Paired leg claws with a row of 13-14 teeth on anterior legs, 9-12 on posteriors; unpaired leg claws with one denticle. Leg I 14.8 long (4.4+1.4+4.8+3.0+1.2), leg II 11.5 long (3.2+1.2+3.4+2.6+1.1), leg III 9.2 long (2.7+1.0+2.3+2.2+1.0), leg IV 12.1 long (3.6+1.1+3.3+3.0+1.1).

Opisthosoma 4.4 long, 3.1 wide. Dorsal scutum 3.8 long, 2.8 wide, somewhat oval, posteriorly wider than anteriorly, posterior margin straight, its surface carrying

indistinct low tubercles and ridges. Most lateral microplates in anterior portion of opisthosoma medium-sized, elliptical, close to each other and only one row deep in each band; several of those in two lower bands completely fused with each other, forming short lateral strap-like plates (the lowest one longest) and representing remnants of lateral plates; some microplates on and above dorsal margin of pulmonary plate distinctly elevated and pointed; only one broken strap-like horizontal plate on posterior side of opisthosoma. Pulmonary plate 3.2 long, 2.5 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only anterior tips free. Postgenital plate completely fused to pulmonary plate, linked by an indistinct sclerotised suture. Preanal plate 0.2 long, 0.6 wide, with slightly convex anterior margin, straight posterior margin and irregular lateral margins. Anal plate 1.2 long, 1.8 wide.

DESCRIPTION OF FEMALE ("allotype"): As in male, except for the following. Total length 7.0. Carapace 3.4 long, 2.3 wide. PME 0.24 long, 0.26 apart; ALE 0.22 long; ALE-PLE 0.06; PLE 0.24 long, 1.10 apart. No clypeal process. Labium 0.7 long, 1.0 wide. Sternum 2.2 long, 1.6 wide. Palp 3.2 long (0.8+0.4+0.7+1.3). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with 12-14 teeth on anterior legs, 11-12 on posteriors. Leg I 11.4 long (3.4+1.1+3.3+2.4+1.2), leg II 9.6 long (2.9+1.0+2.6+2.1+1.0), leg III 7.9 long (2.3+0.9+1.9+1.9+0.9), leg IV 10.2 long (3.0+1.0+2.7+2.5+1.0).

Opisthosoma 4.4 long, 3.3 wide; several microplates in posterior portion near dorsal scutum slightly elevated and conical, all isolated. Dorsal scutum 3.0 long, 2.0 wide, its posterior margin straight, its surface with distinct tubercles and ridges between them. Anterior plate fragmented into three small plates and several micro - plates, some of the latter situated in the upper portion (corresponding to dorsal margin of fragmented anterior plate) elevated and pointed but slightly smaller than in males. Pulmonary plate 1.9 long, 2.0 wide; genital region bulged; outlines of light spermathecae clearly visible under cuticle; posterior margin widely rounded. Preanal plate completely fragmented. Anal plate 1.4 long, 1.9 wide.

Vulva (of paratype) relatively short; anterior collar short, its widely rounded anterior margin only little surpassing common anterior margin of spermathecae with a distinct median invagination (Fig. 35A); anterior and lateral sides of spermathecae bulged, without trenches (Fig. 35C); porepatches extending far onto dorsal side of spermathecae (Fig. 35A); ventral side of spermathecae with a paramedian pair of somewhat eliptical chambers with thick walls and strong transversal enforcement ribs; both chambers prominent and in contact with each other (Fig. 35B); ventral side of spermathecae between porepatches and internal chambers unpigmented; ventral wall of genital atrium with pigmented median zone clearly outlined, laterally biconcave (Fig. 35A-B).

VARIATION: Carapace length in seven females ranges 3.4-3.8, carapace width 2.3-2.5. The three larger central fragments of the anterior opisthosomal plate of females are variable in size: largest in the "allotype" and in another specimen, smaller in the remaining females. Variation in the shape of the embolus of the left and right palp of the holotype is shown in Fig. 34E-G, variation in the shape of the vulva of three females in Fig. 35B, E-D.

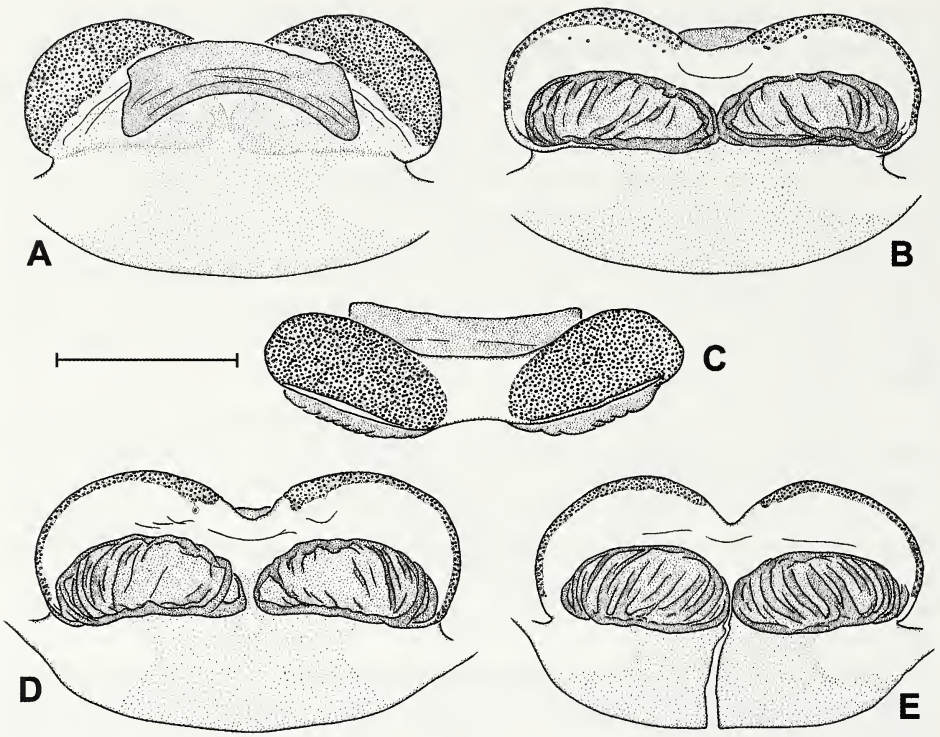


FIG. 35

Perania selatan sp. n., females; first paratype (A-C), second paratype (D), "allotype" (E). (A) Vulva dorsal view. (B, D-E) Same, ventral view (E with damaged atrium). (C) Same, anterior view. Scale line 0.5 mm.

REMARK: The exceptionally narrow cymbium (on both palps; Fig. 34C) of the holotype (the only available male) may not be characteristic of this species. The cymbium shape in *P. selatan* sp. n. could be as variable as in *P. picea* (cf. Fig. 28E, J).

RELATIONSHIPS: The new species is most similar and probably most closely related to *P. deelemanae* sp. n.; both appear closer to *P. nigra*, *P. armata* and *P. korinchica* than to the remaining species in the same group.

DISTRIBUTION: Known only from the type locality in southern Sumatra (Fig. 1, locality 35).

BIOLOGY: The spiders were collected from typical webs under decaying logs on the floor of a lush rain forest.

Perania spp.

MATERIAL EXAMINED: MHNG, sample 29b; 1 ♀; Indonesia, Sumatra, North Sumatra Province, 5 km N of Brastagi, Tongkoh (about 3°14'20"N, 98°30'30"E), 1450 m (mixed pine forest with many epiphytes); 3.XII.1989; leg. D. Burckhardt, I. Löbl & D. Agosti. – MHNG, sample SIM-01/03; 2 juveniles; Indonesia, Lingga Archipelago, Lingga Island, waterfall about 7 km N of Daik (00°08'53"S, 104°36'13"E), 60 m (rain forest along stream); 13.-15.VI.2001;

leg. P. J. Schwendinger. – MHNG, sample SIM-01/04; 1 juvenile; Indonesia, Lingga Archipelago, Singkep Island, Batu Ampar Waterfall, about 10 km NW of Dabo (00°29'31"S, 104°28'31"E), 80 m (rain forest along stream); 17./18.VI.2001; leg. P. J. Schwendinger. – SMF; 1 juvenile; Malaysia (peninsula), Pahang State, Fraser's Hill, Telecom loop (3°43'6.3"N, 101°45'9.86"E), 1300 m (primary forest along road); 16.VI.2013; leg. P. Jäger. All these specimens were collected by sifting.

REMARKS: The single female from near Brastagi (Fig. 1, locality 36) is the smallest known adult *Perania* specimen (total length 4.0 mm). It has a small conical tubercle on the clypeus, its anterior opisthosomal plate is completely (posteriorly and laterally) fused with the pulmonary plate (in other *Perania* spp. this is only the case in males), as are its spiracular plates (not so in other *Perania* females), it has the largest rudiment of a preanal plate among all *Perania* females examined (the latter three characters plesiomorphic), and its spermathecae contain a pair of internal ventral chambers. This specimen thus obviously represents an additional new species in the *nigra*-group, but without a conspecific male I do not want to formally describe and name it.

The three juveniles from two islands in the Lingga Archipelago (Fig. 1, localities 37-38) clearly belong to a *Perania* species (and not to a *Paculla* which co-occurs on the same islands) and thus are the only specimens of this genus from outside mainland SE-Asia and Sumatra.

The juvenile from Fraser's Hill (Fig. 1, locality 24A) could belong to *P. coryne*, to *P. cerastes* or to an undescribed species.

DISCUSSION

MORPHOLOGY AND TAXONOMY: A strong sclerotisation of the opisthosoma, with characteristic anterior, dorsal, lateral, ventrolateral, ventral and posterior plates (Shear, 1978: 8; Lehtinen, 1981: 5), is widespread and plesiomorphic in the Tetrablemmidae. Reductions of these sclerites in *Perania* are therefore apomorphic (Lehtinen, 1981: 77). Such are: dorsal plate relatively small (Fig. 37D) and anterior plate partly (Fig. 31I) or completely fragmented in females; lateral plates almost completely, posterior plates more or less strongly fragmented (Fig. 37B-D) in both sexes; ventral plates fused with each other in males (Fig. 36B-C), reduced or fragmented into microplates in females (Fig. 36E). *Perania* thus represents the most derived genus in the family, which is also indicated by the relatively large size of most of its species.

Perania males generally have a more primitive somatic morphology (closer to the "body plan" of the Tetrablemmidae) than females. (1) They have a distinctly larger dorsal opisthosomal plate than females (Fig. 37B-C cf. Fig. 37D). (2) Their anterior opisthosomal plate is always well-developed and completely integrated into the anterior margin of the pulmonary plate. This condition is found in all *Sabahya*, *Paculla* and *Lamania* females (as well as males), but in *Perania* females only in an undescribed species from Sumatra. In females of all other *Perania* species the anterior plate is reduced to various degrees: still present as an entire sclerite and fused along its ventral margin (but not along its lateral margins as in males) with the pulmonary plate in *P. nigra* (Fig. 21E); entire but completely separated from the pulmonary plate in *P. armata* (Fig. 24H-I); fragmented into three medium-sized plates and many microplates in

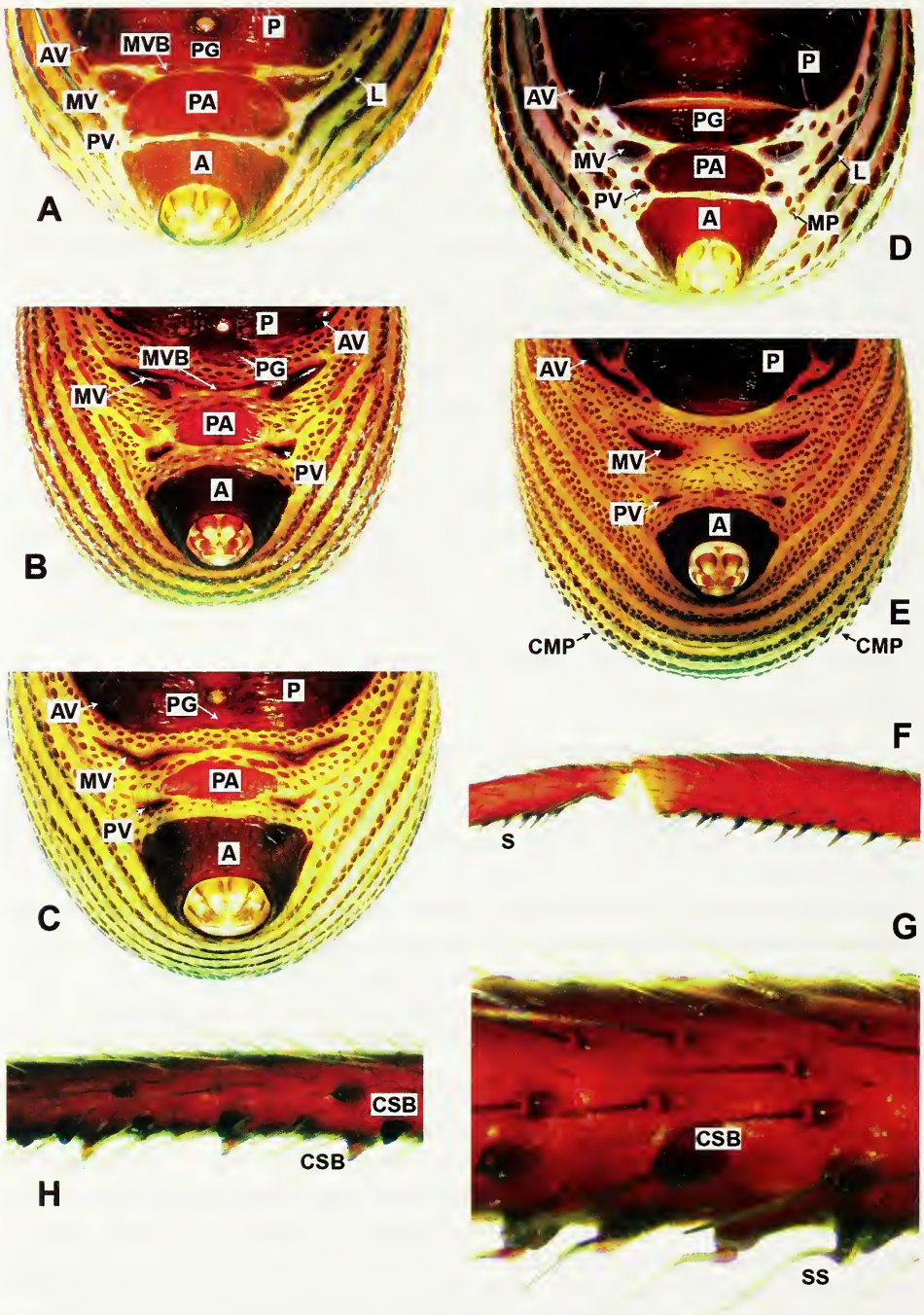


FIG. 36

Posterior portion of opisthosoma, ventral view (A-E) and right leg I, prolateral view (F-H). (A) *Sabahya bispinosa* Deeleman-Reinhold, 1980, male. (B) *Perania cerastes* Schwendinger, 1994,

P. deelemanae sp. n. (Fig. 31I) and *P. selatan* sp n.; completely fragmented into microplates of roughly the same size in females of all remaining species. (3) The male holotype of *P. selatan* sp. n. (and to a lesser extent also males of *P. deelemanae* sp. n.) retains rudiments of lateral plates in the anterior portion of the opisthosoma. (4) The postgenital plate of *Perania* males is short, more or less completely fused to the posterior margin of the pulmonary plate, with a suture (sclerotised or membranous) linking both plates (Figs 27E-F, 36B-C). This condition is also found in males of other Pacullinae genera (Fig. 36A). In all *Perania* females the postgenital plate is completely fragmented into microplates (Fig. 36E), whereas in females of all other tetrablemmid genera the postgenital plate is a well-developed, isolated sclerite behind the epigastric furrow (in which lies the genital orifice) (Fig. 36D). (5) *Perania* males have a fairly well-developed preanal plate (Fig. 36B-C), whereas in *Perania* females the preanal plate is more or less strongly reduced: small but still recognizable as a plate in some *P. cerastes* females, or reduced to slightly enlarged posterior microplates that are laterally fused with each other and form a compassneedle-shaped transversal sclerite (Fig. 21F) (most pronounced in the female of an undescribed species from Brastagi), or completely fragmented into normal microplates (Fig. 36E). The unpaired tracheal spiracle lies on a microplate (recognizable by a short pigmented and sclerotised collar leading inside the opisthosoma) situated just behind the preanal plate (or its rudiments) and more or less strongly overlapped by the latter. If the preanal plate is completely fragmented, then the tracheal spiracle is freely visible as a small, dark median spot between the posterior pair of ventrolateral plates (Fig. 36E). In females of all other tetrablemmid genera the preanal plate is always entire and quite large (Fig. 36D), though slightly smaller than in the corresponding males (Fig. 36A). (7) Males of several species have up to seven strap-like horizontal plates posteriorly on the opisthosoma (Fig. 37B); these are fragmented into isolated microplates (Fig. 37D) in females of all species except *P. utara* sp. n. The strap-like horizontal plates presumably represent fragments of three to four posterior plates found in males and females of other tetrablemmid genera (Fig. 37A).

What I called the "postgenital plate (reduced to a pair of paramedian patches)" in my earlier descriptions of paculline males (Schwendinger, 1989, 1994) is actually the median pair of ventrolateral plates, called "perigenital plates" by Shear (1978: 8). Three pairs of such ventrolateral opisthosomal plates are present in *Perania* (Fig. 36B-C, E), and they can also be recognized in all other Pacullinae (Fig. 36A, D). (1) The posterior pair of ventrolateral plates is the smallest, it is somewhat oval and situated laterally between the anal plate and the preanal plate (if present). In the two known *Sabahya* and in some *Paculla* and *Lamania* species, but not in *Perania*, this pair is

male. (C) *Perania utara* sp. n., male holotype. (D) *Sabahya bispinosa*, female. (E) *Perania robusta* Schwendinger, 1989, female. (F) *Sabahya bispinosa*, male, distal portion of tibia and proximal portion of metatarsus. (G) *Perania cerastes*, male, median portion of metatarsus. (H) *Perania quadrifurcata* sp. n., male holotype, median portion of metatarsus. Abbreviations: A = anal plate; AV = anterior ventrolateral plate; CMP = conical microplate; CSB = conical setal base; L = lateral plate; MP = microplate (normal); MV = median ventrolateral plate; MVB = bridge or bridge fragments of MV (three MVB discernible below PG in Fig. 36D); P = pulmonary plate; PA = preanal plate; PG = postgenital plate; PV = posterior ventrolateral plate; S = spinule; SS = strongly sigmoid seta.

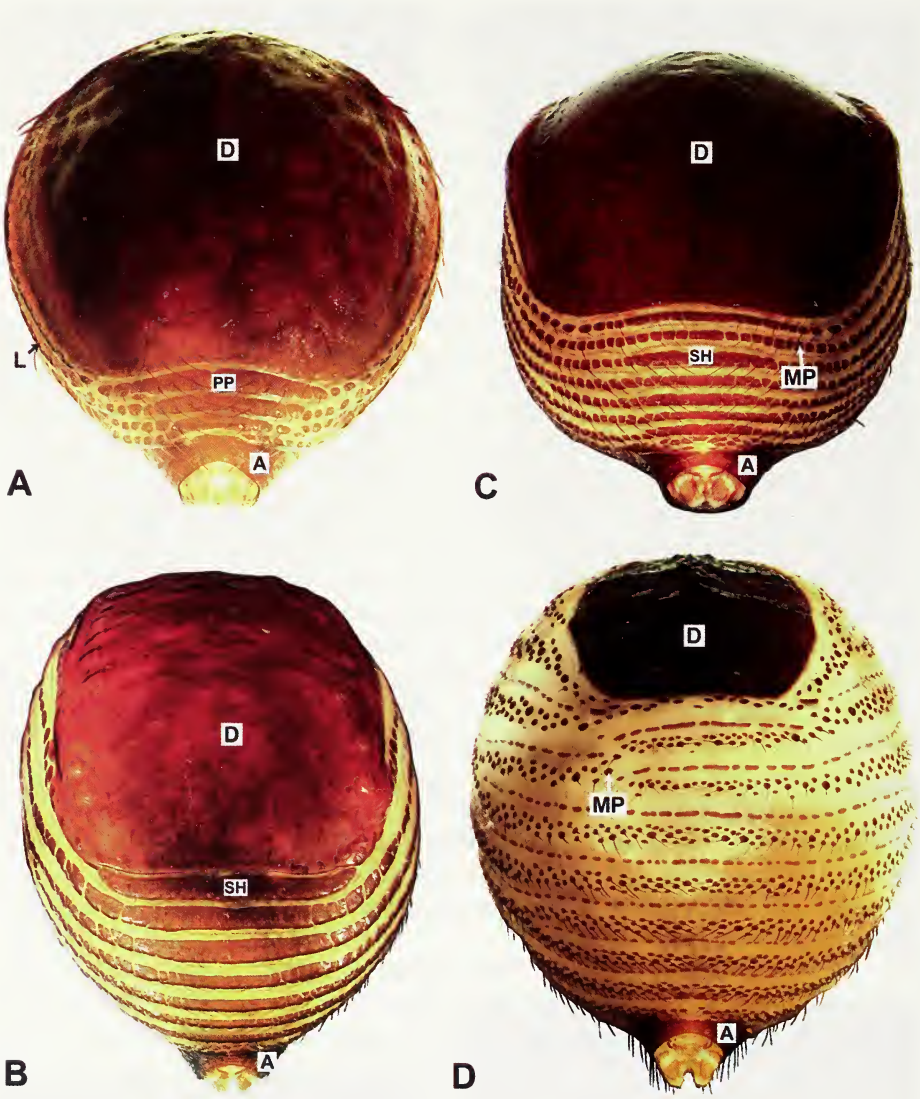


FIG. 37

Posterior side of opisthosoma, posterior view. (A) *Sabahya bispinosa* Deeleman-Reinhold, 1980, male, showing three posterior plates. (B) *Perania quadrifurcata* sp. n., male holotype, showing five entire (upper) strap-like horizontal plates and two broken (lower) ones. (C) *Perania utara* sp. n., male holotype, showing entire and broken strap-like horizontal plates. (D) *Perania nasuta* Schwendinger, 1989, female, showing bands of isolated microplates. Abbreviations: A = anal plate; D = dorsal plate; L = lateral plate; MP = microplate (normal); PP = posterior plate; SH = strap-like horizontal plate.

often (in males more often than in females) fused with the posterolateral margin of the preanal plate (Fig. 36A; free in conspecific female, Fig. 36D). (2) The median pair of ventrolateral plates ("perigenital plates" of Shear, 1978) is larger than the posterior pair, somewhat triangular and situated laterally between the preanal plate and the postgenital plate (if present). Left and right median ventrolateral plates are widely separated or connected to each other by a narrow median bridge (Fig. 36B). In *Perania* species this bridge is usually broken medially by a more or less wide gap (Fig. 36C), in other Pacullinae it is usually fragmented into one to four smaller sclerites (Fig. 36A); in females these sclerites are often partially hidden under the postgenital plate (Fig. 36D). Such small median sclerites anterior to the preanal plate are present in males and females of all *Sabahya* and of some *Paculla* and *Lamania*. They represent fragments of the bridge between the median ventrolateral plates, not fragments of the postgenital plate. (3) The anterior pair of ventrolateral plates is long and narrow, lying close to the lateral margin of the pulmonary plate, in *Perania* females always isolated (as are also the stigmal plates) (Fig. 36E), in males either isolated or more or less extensively fused with the pulmonary plate (Fig. 36B-C). In males and females of all *Sabahya* and some *Lamania* the anterior ventrolateral plates and the pulmonary plate (including the stigmal plates) are completely fused (Fig. 36A, D), in *Paculla* they are fused in all males and separated in females of some species. Apart from being paired and situated more laterally, all ventrolateral plates can be easily distinguished from the unpaired ventral plates by their finely granular surface microstructure (all ventral plates are essentially smooth, but may have wrinkles). The difference in surface microtexture is clearly discernible even when ventral and ventrolateral plates are fused with each other.

A character previously considered restricted to males is the presence of elevated setal bases (in the shape of conical tubercles; Fig. 36G-H, Schwendinger, 1994: fig. 2) prolaterally to ventrally on tibia I and metatarsus I (also on metatarsus II in the male holotype of *P. utara* sp. n.). Such structures are also present (but weaker than in males) in females of *P. egregia* sp. n. and *P. quadrifurcata* sp. n. In addition to these large conical setal bases, smaller blunt tubercles, carrying strongly sigmoid, proximally swollen, abruptly distad-bent setae (Fig. 36G), occur ventrally on the metatarsus I of males and females of *P. cerastes* and *P. coryne* and appear to be an apomorphy for the *cerastes*-group. Males and females of *P. robusta* possess similar, abruptly distad-bent ventral setae on metatarsus I (and less distinct also on metatarsus II), but they are less swollen proximally and straight (instead of sigmoid) above the proximal bend. A different kind of modified setae on leg I is found in males of the two *Sabahya* species: tiny, spine-like ventral setae in the distal half of tibia I and in the proximal third of metatarsus I (Fig. 36F). Males of *Paculla cameronensis* Shear, 1978 possess such ventral spinules on tibia I and proximally on a modified metatarsus I (see Shear, 1978: fig. 122; presumably conspecific males from Maxwell's Hill have no ventral spinules on tarsus I and distally on metarsus I as indicated in that figure); males of *Paculla mului* (Bourne, 1981) have slightly longer spinules ventrally and proventrally on a modified tibia I and shorter ones ventrally in the proximal portion of a normal metatarsus I (see Bourne, 1981: figs 11, 14). All these modifications (verified using specimens deposited in the MHNG) probably provide a better grip on the partner during mating, but, as recognized by Lehtinen (1981: 77), they are not all homologous.

Conical setal bases on leg I are present in all *Perania* males, they are unique to the genus and thus another of its apomorphies.

Clypeal processes in *Perania* are more common than previously though. They are present in males of thirteen species (presumably also in the unknown male of *P. birmanica*) and surprisingly also in females of four species (*P. tumida* sp. n., *P. egregia* sp. n., *P. quadrifurcata* sp. n. and *P. deelemanae* sp. n.). As clypeal processes can be found in the Tetrablemminae (in *Brignoliella* and *Tetrablemma*) but not in any of the other Pacullinae, they are apomorphic for *Perania*.

Species in several paculline genera possess paired modifications in the "thoracic" portion of the carapace: *Sabahya kinabaluana* Deeleman-Reinhold, 1980 (males and females with two small horns); *S. bispinosa* Deeleman-Reinhold, 1980 (males and females with two fairly long horns); *Paculla granulosa* (Thorell, 1881) (males and females with two short horns); *Paculla* sp. from Lingga Island (males and females with two long horns); *Paculla* sp. male from Keningau (Sabah) (two short tubercles with two and three tips each); *Lamania nirmala* Lehtinen, 1981 (male and female with two long horns); *L. bernhardi* (Deeleman-Reinhold, 1980) (idem); *L. lipsae* Dierkens, 2011 (idem); *Lamania* sp. from Crocker Range, Sabah (idem). It is therefore not surprising to find such paired thoracic modifications also in two *Perania* species: *P. armata* with two long pointed horns, *P. nigra* with two low rounded humps. Both structures are here considered homologous. As these two species otherwise correspond well with other *Perania* species in somatic and genital morphology, there is no reason to separate them into a distinct genus - not even into a distinct species-group. Separating *P. armata* alone or together with *P. nigra* (which are both comfortably embedded in the *nigra*-group) from *Perania* would render this genus paraphyletic. *Mirania* is therefore kept in the synonymy of *Perania*. I have transferred *P. armata* to *Perania* and thus placed *Mirania* in its synonymy (Schwendinger, 1989: 579), but later expressed doubt about this decision (Schwendinger, 1994: 463). The discovery of new material of both sexes provides convincing support for maintaining this synonymy.

Another strongly autapomorphic species is *P. egregia* sp. n. (with an untypical cymbium and palpal organ), but clypeus modifications and vulva morphology show that it fits well in the *nasuta*-group. Only one species, *P. utara* sp. n., is sufficiently distinct from all other known species (by palp and vulva morphology) to deserve an isolated position within *Perania* but not outside it. As additional species can be expected to occur in the northern part of Sumatra, the *utara*-group will probably not stay monotypic for very long.

The characteristic paired structures of the spermathecae in the *utara*-group (external pouches) and in the *nigra*-group (internal chambers) appear to be synapomorphic. However, as species from Sumatra exhibit clearly more primitive character states than species from the mainland, it is quite possible that these spermathecal structures are also plesiomorphic in *Perania*. There are two indications for this: (1) the paired posterolateral compartments in the spermathecae of *P. quadrifurcata* sp. n. (belonging to the *nasuta*-group) are possibly homologous with the internal spermathecal chambers in the *nigra*-group, and (2) the laterally open spermathecal chambers with slivered walls of *P. picea*, and to a lesser extent also those of *P. nigra*, *P. armata* and *P. harau* sp. n. (all in the *nigra*-group), could represent different stages of reduction

of formerly thick-walled internal chambers which are still present in the spermathecae of *P. deelemanae* sp. n. and *P. selatan* sp. n. Paired spermathecal structures may thus have been lost (or modified in the case of *P. quadrifurcata* sp. n.) in the species from the mainland.

Unlike other authors who have published on *Perania*, I see little or no taxonomically important information in the paired depressions (sigilla) in the genital region of the pulmonary plate. These structures (called "external epigynal areas" by Lehtinen, 1981: 78) are present in both sexes and their shape is quite uniform among the species examined.

In summary, the status of *Perania* as a monophyletic group within the Pacullinae is well supported by the following eleven apomorphies: (1) conically elevated setal bases prolaterally to ventrally on tibia I and metatarsus I of males (rarely also in females; present also on metarsus II in the male holotype of *P. utara* sp. n.); (2) cymbium with a long and narrow pointed apex (exception: *P. egregia* sp. n.) which corresponds to the short retrodorsal apical lobe on the cymbium in other paculline genera; (3) a small to large clypeal process in males (not in all species) and rarely a small clypeal hump in females; (4) sternal apophysis posteriorly wider than anteriorly, its posterior margin straight, concave or invaginated (see Lehtinen, 1981: fig. 12 and Schwendinger, 1989: figs 7, 13 for *Perania*, and Lehtinen, 1981: fig. 24 and Schwendinger, 1989: fig. 2 for *Sabahya* and *Lamania*, respectively); (5) anterior opisthosomal plate of females more or less strongly fragmented into microplates and more or less distinctly detached from pulmonary plate (exception: undescribed species from Brastagi); (6) dorsal opisthosomal plate of females reduced in size; (7) lateral opisthosomal plates completely fragmented into bands of microplates in both sexes of most species (remnants only found in males of *P. selatan* sp. n. and *P. deelemanae* sp. n.); (8) postgenital plate of females completely fragmented into microplates; (9) preanal plate of females largely or completely fragmented into microplates; (10) vulva with a pair of medially more or less distinctly fused ventral spermathecae carrying pores anteriorly and laterally; (11) vulva with a leathery anterior collar (= anterior part of cuticular uterus externus).

A characteristic feature of all *Perania* species is the presence of cowpat-shaped tubercles (see Schwendinger, 1994: fig. 4) on the "thoracic" portion of the carapace in males and females. These were also found in two species of *Paculla* (including the type species, *P. granulosa*), but not in *Sabahya* and *Lamania*. This points to a possible sister relationship between *Perania* and *Paculla*.

RELATIONSHIPS: Morphological characters (especially of copulatory organs) are good indicators of relationships within the species groups with more than two species, but without a phylogenetic analysis the relationships between the groups cannot be established with any degree of confidence. Within the *nigra*-group, *P. armata* and *P. nigra* differ from the other species by synapomorphic modifications in the "thoracic" portion of the carapace, and judging from similarities in palp morphology *P. korinchica* is very close to them. Genital morphology indicates that *P. deelemanae* sp. n. and *P. selatan* sp. n. are the closest relatives of the previous three species, together forming a subgroup. *Perania harau* sp. n. and *P. picea* form a second subgroup in the *nigra*-group.

Similarities in vulva morphology and geographical proximity indicate also two subgroups in the other relatively species-rich group, the *nasuta*-group: (1) *P. nasuta*, *P. nasicornis*, *P. tumida* sp. n. and *P. egregia* sp. n.; (2) *P. birmanica*, *P. ferox* sp. n. and *P. quadrifurcata* sp. n.

In the species on Sumatra one finds the greatest concentration of plesiomorphic charactes (see discussion on morphology) which indicates that they occupy a phylogenetically basal position within the genus. If so, then the *utara*-group and the *nigra*-group may not be more closely related to each other than each of them to one of the three species groups on the mainland.

BIOGEOGRAPHY AND HABITAT: The known range of *Perania* extends from southern China to southern Sumatra (Fig. 1). Sumatra appears to be the centre of species diversity and the cradle of *Perania*. Eight out of nineteen currently known species (plus an undescribed one) occur on this island; one or two undescribed species (known only from juveniles) are found on two small islands east of Sumatra. Further collecting in that region will almost certainly uncover further new species inside and outside the currently known range of the genus.

Two *Perania* species occur on Gunung Kerinci (the highest mountain of Sumatra) and they seem to be separated by altitude. The occurrence of even three *Perania* species on Gunung Singgalang, however, is doubtful. This would not only be highly unusual with regard to species diversity (only Gunung Kerinci and Gunung Singgalang have more than one recorded *Perania* species), but also because two of these three (*P. nigra* and *P. armata*) are sister species. Until new material from Gunung Singgalang confirms the presence of three *Perania* species there, I assume that the records of 1878 (all specimens collected by O. Beccari) are due to incorrect labelling.

The spiders collected by me come from various habitats: lowland and upland rainforests, evergreen hill forests, evergreen gallery forests, mixed evergreen-deciduous forests, fields near a newly cleared rain forest, the entrance of a cave and the dark zone of two other caves. These spiders were found on earthbanks at the sides of roads and paths, on banks of streams, under rotten wood and bark lying on the forest floor, under stones, and in cracks in limestone (inside and outside caves). The drier localities were all near streams (as were the populations in and outside caves), indicating that *Perania* avoids habitats with permanent or extended dry conditions.

ACKNOWLEDGEMENT

Dr Maria L. Tavano kindly provided a loan of Thorell's types from the collection of the MCSNG. Ondřej Košulič (Mendel University, Brno, Czech Republic) made additional specimens of *P. quadrifurcata* sp. n. available for this study, Lionel Monod (MHNG) an additional specimen of *P. cerastes*, and Peter Jäger (SMF) a juvenile from Malaysia. Liz Price (Kuala Lumpur) took me to Gua Kanthan and Gua Tempurung, Prof. Saowapha Sonthichai took me to Phu Soi Dao, and Dr Hans Bänziger (both Chiang Mai University) went with me to Umphang. Christina Lehmann-Graber produced all ink drawings from my pencil sketches, and Florence Marteau (both in MHNG) digitally arranged them into plates. Lionel Monod helped composing the locality map and the photo plates, and made corrections to some other

figure plates; John Hollier (MHNG) checked the English text. Christa L. Deeleman-Reinhold (Ossendrecht, The Netherlands) kindly reviewed the manuscript and gave valuable suggestions for improvement.

REFERENCES

BOURNE, J. D. 1980. Revision of Thorell's type species of the family Pacullidae (Araneae). *Annali del Museo Civico di Storia Naturale "Giacomo Doria" di Genova* 83: 249-260.

BOURNE, J. D. 1981. Two new armoured spiders of the genus *Paculla* Simon, 1887 from Sarawak (Araneae: Pacullidae). *Bulletin of the British arachnological Society* 5(5): 217-220.

DEELEMAN-REINHOLD, C. L. 1980. Contribution to the knowledge of the Southeast Asian spiders of the families Pacullidae and Tetrablammidae. *Zoologische Mededelingen* 56(5): 65-82.

DIERKENS, M. 2011. Description d'un nouveau Pacullinae de Bornéo: *Lamania lipsae* n. sp. (Araneae, Tetrablemmidae). *Les cahiers du Musée des Confluences - Etudes scientifiques* 2: 93-98.

HOGG, H. R. 1919. Results of an expedition to Korinchi Peak, Sumatra. Invertebrates VI. Spiders. *Journal of the Federal Malay State Museums* 8(3): 81-106, pls 7-12.

LEHTINEN, P. T. 1981. Spiders of the Oriental-Australian region. III. Tetrablemmidae, with a world revision. *Acta Zoological Fennica* 162: 1-151.

LEVI, H. W. & LEVI, L. R. 1962. The genera of the spider family Theridiidae. *Bulletin of the Museum of Comparative Zoology* 127(1): 1-71, figs 1-334.

LIAN, Y. 2009. Description of a large armoured spider newly recorded genus: *Perania* Thorell, 1890 (Araneae: Tetrablemmidae) from Yunnan, China. *Life Science Research* 13(1): 30-33.

PLATNICK, N. I. 2013. The world spider catalog, version 14.0. *American Museum of Natural History,* online at http://research.amnh.org/entomology/spiders/catalog/index.html DOI: 10.5531/db.iz.0001.

PLATNICK, N. I., SCHWENDINGER, P. J. & STEINER, H. 1997. Three new species of the spider genus *Liphistius* (Araneae, Mesothelae) from Malaysia. *American Museum Novitates* 3209: 1-13.

ROBINEAU-DESVOIDY, J. B. 1863. Histoire naturelle des diptères des environs de Paris. Œuvre posthume du Dr Robineau-Desvoidy. Publiée par les soins de sa famille, sous la direction de M. H. Monceaux, vol. 1. *V. Masson et fils, Paris*, xvi + 1143 pp.

SCHWENDINGER, P. J. 1989. On three new armoured spiders (Araneae: Tetrablemmidae, Pacullinae) from Indonesia and Thailand. *Revue suisse de Zoologie* 96(3): 571-582.

SCHWENDINGER, P. J. 1994. Four new *Perania* (Araneae: Tetrablemmidae, Pacullinae) from Thailand and Malaysia. *Revue suisse de Zoologie* 101(2): 447-464.

SHEAR, W. A. 1978. Taxonomic notes on the armored spiders of the families Tetrablemmidae and Pacullidae. *American Museum Novitates* 2650: 1-46.

SIMON, E. 1887. Séance du 23 novembre 1887. *Annales de la Société entomologique de France - Bulletin des séances et bulletin bibliographique de la Société entomologique de France* (série 6) 7: 188-195.

SIMON, E. 1894. Histoire naturelle des araignées, 1st volume, 3rd instalment. *Roret, Paris*, pp. 489-760.

THORELL, 1881. Studi sui ragni malesi e papuani. Parte 3. Ragni dell'Austro-Malesia e del Capo York, conservati nel Museo civico di storia naturale di Genova. *Annali del Museo civico di Storia naturale di Genova* (1) 17: 1-727.

THORELL, 1890. Studi sui ragni malesi e papuani. Parte 4. Ragni dell'Indo-Malesia, racolti da O. Beccari, G. Doria, H. Forbes, J. G. H. Kinberg, ed altri. Volume 1. *Annali del Museo civico di Storia naturale di Genova* (2) 8 [=28]: 1-419.

THORELL, 1898. Viaggio di Leonardo Fea in Birmania e regioni vicine. 80. Secondo saggio sui ragni birmani. 2. Retitelariae et Orbitelariae. *Annali del Museo civico di Storia naturale di Genova* (2) 19 [=39]: 271-378.

Revue suisse de Zoologie 120 (4): 665-734; décembre 2013

A review of the genus *Pseudobironium* Pic (Coleoptera: Staphylinidae: Scaphidiinae)

Ivan LÖBL[1] & Liang TANG[2]

[1] Muséum d'histoire naturelle, Case postale 6434, CH-1211 Genève 6, Switzerland.
E-mail: ivan.lobl@bluewin.ch

[2] Shanghai Normal University, 100 Guilin Road, Shanghai, 200234 R. P. China.
E-mail: monkey_zzz1980@163.com

A review of the genus *Pseudobironium* Pic (Coleoptera: Staphylinidae: Scaphidiinae). - At present, 41 species of *Pseudobironium* Pic are recognized as valid, the following are described as new: *P. antennatum* sp. nov., *P. augur* sp. nov., *P. bilobum* sp. nov., *P. brancuccii* sp. nov., *P. confusum* sp. nov., *P. conspectum* sp. nov., *P. convexum* sp. nov., *P. flagellatum* sp. nov., *P. fujianum* sp. nov., *P. horaki* sp. nov., *P. incisum* sp. nov., *P. javanum* sp. nov., *P. merkli* sp. nov., *P. montanum* sp. nov., *P. parabicolor* sp. nov., *P. pseudobicolor* sp. nov., *P. pubiventer* sp. nov., *P. schuhi* sp. nov., *P. spinipes* sp. nov., and *P. stewarti* sp. nov. *Pseudobironium tonkineum* Pic is synonymized with *P. languei* (Achard), *P. castaneum* Pic is synonymized with *P. carinense* (Achard), and *P. dohertyi* (Achard) is synonymized with *P. vitalisi* (Achard). Lectotypes are designated for *P. achardi* (Pic), *P. carinense* (Achard), *P. dohertyi* (Achard), *P. feai* Pic, *P. subovatum* Pic, *P. tonkineum* Pic, and *P. vitalisi* (Achard). Redescriptions or additional diagnostic characters and illustrations are given for *P. achardi* (Pic), *P. bicolor* Löbl, *P. carinense* (Achard), *P. feai* Pic, *P. grossum* (Achard), *P. languei* (Achard), *P. lewisi* Achard, *P. rufitarse* Löbl, *P. sinicum* Pic, *P. sparsepunctatum* (Pic), *P. subovatum* Pic, *P. ussuricum* Löbl, and *P. vitalisi* (Achard). Four species groups are recognized, based on male genital characters. A key to species is provided. New distributional records are given for most of the previously described species.

Keywords: Coleoptera - Staphylinidae - Scaphidiinae - *Pseudobironium* - taxonomy - Asia

INTRODUCTION

The genus *Pseudobironium* Pic, 1920 comprises comparatively large Scaphisomatini that may be easily distinguished from other members of the tribe (Leschen & Löbl, 2005). Currently, 24 species are considered valid. They are encountered in forested areas and, according to collection data and personal observations, usually found on fungi growing on logs and in moist vegetation debris on forest floor, as most other Scaphidiinae. All examined specimens have fully developed hind wings suggesting flight ability, and actually many were found in flight intercept traps. Their larvae and detailed natural history remain unknown. *Pseudobironium* is one of the Scaphisomatini genera known only from Asia, with range extending from the Indian

Manuscript accepted 02.10.2013

states Kerala in the south-west and Himachal Pradesh in the north-west to the Russian Far East, Japan and Philippines in the east, and to Borneo and Java in south-eastern Asia. The genus appears to be absent from areas south of the Wallace line and, surprisingly, also from Sri Lanka. The gaps in the knowledge of the group are still considerable as suggested by the number of species known from a single locality only.

Geographically restricted overviews of *Pseudobironium*, including redescriptions and descriptions of a few species, were given in some of the papers dealing with the Scaphisomatini of the Palaearctic realm (Löbl, 1969), India (Löbl, 1982), Thailand (Löbl, 1990), Himalaya (Löbl, 1992), China (Löbl, 1999), Taiwan (Löbl, 1980, 2011b), and the Philippines (Löbl, 2011a). Nevertheless, the bulk of material of *Pseudobironium* actually housed in European and Chinese collections remained unidentified. In particular, the identification of the larger and uniformly coloured Chinese and south-east Asian species was problematic, and that of the Japanese *P. lewisi* Achard was likely based on assumption that no other congener occurs in Japan, although two Japanese species are since 130 years represented in collections. New material, mainly housed in the natural history museums of Basel, Geneva, Prague, Stuttgart, Vienna, and in the collection of the Shanghai Normal University, encouraged us to review the group and to provide means enabling species identification. As result, the present paper gives information on 41 species recognized as valid. Twenty of them are described below as new, while three of the former species are placed in synonymy. An additional species represented by a single female is mentioned and included in the key.

MATERIAL AND METHODS

The specimens examined and/or referred to are housed in the following collections:

EUMJ Faculty of Agriculture, Ehime University, Matsuyama, Japan
HNHM Hungarian National Museum of Natural History, Budapest, Hungary
MCSN Museo Civico di Storia Naturalle, Genova, Italy
MHNG Muséum d'histoire naturelle de la Ville de Genève, Switzerland
MNHN Muséum national d'Histoire naturelle, Paris, France
NHMB Naturhistorisches Museum, Basel, Switzerland
NHML Natural History Museum, London, UK
NHRM Naturhistoriska Riksmuseet, Stockholm, Sweden
NHMW Naturhistorisches Museum, Wien, Austria
NMEC Naturkundemuseum, Erfurt, Germany
NMPC National Museum, Praha-Kunratice, Czech Republic
PCAP Private collection of A. Pütz, Eisenhütenstadt, Germany
PCMS Private collection of M. Schülke, Berlin, Germany
SMNS Staatliches Museum für Naturkunde, Stuttgart, Germany
SNUC Shanghai Normal University, Shanghai, P. R. China
TARI Taiwan Agricultural Research Institute, Wufeng, Taiwan
ZIAN Institute of Zoology AN, St. Petersburg, Russia
ZMBC Museum Zoologicum Bogoriense, Bogor, Indonesia
ZMPA Zoological Museum, Academy of Sciences, Warszawa, Poland

Data on different labels under primary type material are separated by a slash.

The body length is measured from the anterior pronotal margin to the inner apical angle of the elytra. The length and width ratios of the antennomeres and of the fourth maxillary palpomere are taken from dry specimens, excepted for *P. spinipes* and *P. fujianum*, and at the same magnification. The microsculpture and punctuation are observed under diffuse lighting. The data on the punctation of the metaventrite and first abdominal sternite do not concern the submesocoxal puncture row of the former and the basal puncture row of the latter. The length of the tarsi and tibiae is compared without the claws length. The abdominal sternites are counted from the first visible sternite (i.e., the third morphological sternite). The length of the aedeagi does not comprise eventually extruded internal sacs. The sides of the aedeagi refer to their morphological sides (with the ostium situated dorsally), rotated to 90° in the group. The width of the parameres is considered without their expanded bases. Members of Pseudobironium have commonly extruded internal sac. The shape and position of structures of the internal sac may appear quite variable pending on the degree of extrusion. The valves of the median lobe are apical and short. They may be more or less opened and affect the shape to the apicodorsal part of the median lobe observed in lateral view. Thus, the shape of the valves is not used as diagnostic character.

Note. The relative length of the apical antennomere is used as a key character. As the respective character state is unknown in *P. grossum*, the species is in two alternative couplets of the key given below.

TAXONOMY

Pseudobironium Pic, 1920

Pseudobironium Pic, 1920a: 15. Type species *Pseudobironium subovatum* Pic, 1920, by monotypy.

Morphoscapha Achard, 1920: 131. Type species *Morphoscapha grossum* Achard, 1920, by original designation.

REMARKS: The description of the genus appeared twice in 1920, the first time in the number 400 of *Echange*, dated "juillet-août", the second time under the synonymous *Morphoscapha* in the Annales of the Belgian entomological society, issued on October 1, 1920. *Pseudobironium* was redescribed by Löbl (1969), and its features and relationships were discussed by Leschen & Löbl (2005). The genus is characterized by the combination of the following characters: Body broad, antennomere III elongate, VIII not or slightly smaller than VII and IX, apical maxillary palpomere normal, pronotum with anterior bead complete, basal pronotal angles not prominent and not reaching metanepisterna, basal lobe of pronotum large, corbiculum present, mesepimera concealed, metanepisterna narrow and with deep suture, elytra with complete basal striae, profemora lacking ctenidium, tibiae robust, abdominal sternite 1 with lateral impressions, submetacoxal lines absent.

Four tentative species groups may be distinguished based on characters of the internal sac of the aedeagus:

The *P. plagiferum* group: the internal sac is membranous except for elongate guide-sclerite surrounding the ejaculatory duct in the middle part of the median lobe. Species included (3): *P. javanum* sp. nov., *P. plagiferum* Löbl, and *P. spinipes* sp. nov.

FIGS 1-2
Pseudobironium spinipes sp. nov. (1), metaventrite (2); scale bars = 1 mm.

FIGS 3-4
Pseudobironium fujianum sp. nov. (3), metaventrite (4); scale bars = 1 mm.

FIGS 5-6
Pseudobironium merkli sp. nov. (5), metaventrite (6); scale bars = 1 mm.

FIGS 7-8
Pseudobironium confusum sp. nov. (7), metaventrite (8); scale bars = 1 mm.

FIGS 9-10
Pseudobironium feai Pic (9), metaventrite (10); scale bars = 1 mm.

FIGS 11-12
Pseudobironium carinense (Achard) (11), metaventrite (12); scale bars = 1 mm.

The *P. merkli* group: with elongate guide-sclerite as in the former group, lacking flagellum, and with paired, fine admesal plates. Species included (4): *P. fujianum* sp. nov., *P. merkli* sp. nov., *P. montanum* sp. nov. and *P. schuhi* sp. nov.

The *P. fasciatum* group: the internal sac has a distinct, very long flagellum not protruding in repos, and additional lateromedian sclerotized pieces. Species included (7): *P. augur* sp. nov., *P. brancuccii* sp. nov., *P. fasciatum* Löbl, *P. flagellatum* sp. nov., *P. impressipenne* Löbl, *P. ineptum* Löbl and *P. rufitarse* Löbl.

The *P. subovatum* group: the flagellum is absent, the internal sac has narrow mesal guide-sclerites surrounding the ejaculatory duct, and additional lateromesal sclerotized pieces. These are paired and subsymmetrical, each usually consisting of one or two cylindrical rods invaginated in a conical sclerite. Additional mesal sclerites may be present. The bulk of the species (25) belongs to this group.

Within the latter group two subgroups may be distinguished, based on the parameres and apical process of the median lobe. The parameres are narrow posteriad base, and the lateral and ventral sides of the median lobe are smooth, or almost smooth, in *P. almoranum* Champion, *P. banonense* (Pic), *P. bicolor* Löbl, *P. bilobum* sp. nov., *P. feai* Pic, *P. horaki* sp. nov., *P. incisum* sp. nov., *P. languei* (Achard), *P. lewisi* Achard, *P. parabicolor* sp. nov., *P. pseudobicolor* sp. nov., *P. pubiventer* sp. nov., *P. sparsepunctatum* (Pic), *P. stewarti* sp. nov., *P. subglabrum* Löbl, and *P. ussuricum* Löbl.

The parameres are strongly widened posteriad base, and the lateral or ventral sides of the apical process of the median lobe are usually tuberculate in *P. antennatum* sp. nov., *P. carinense* (Achard), *P. confusum* sp. nov., *P. conspectum* sp. nov., *P. convexum* sp. nov., *P. grossum* (Achard), *P. hisamatsui* Löbl, *P. subovatum* Pic and *P. vitalisi* (Achard). They have also strongly sclerotized aedeagi with large basal bulb, features however not exclusive to these species.

Two similar species, *P. sparsepunctatum* (Pic) and *P. languei* (Achard), possess short and broad maxillary palpi (see Löbl, 1982b and 2012b), defined as papillate in Leschen & Löbl, 2005. They share comparatively short antennae and their body is weakly convex dorsally. Therefore, they were considered as a possible sister group of the remaining congeners. Their aedeagal characters suggest relationships to *P. subovatum* Pic and its allied. In addition, similar antennae and comparatively weakly convex body are also in some other species, such as *P. achardi* (Pic) and *P. ussuricum* Löbl.

Following species represented in collections by females only are unplaced: *P. achardi* (Pic), *P. sinicum* Pic, and species A.

KEY TO SPECIES OF *PSEUDOBIRONIUM*

1a Ventral mesotibial spur straight in basal half, conspicuously bent in apical half. Body uniformly reddish-brown. Zhejiang ..... *P. spinipes* sp. nov.

1b Ventral mesotibial spur straight or barely bent. Body often black or pronotum and/or elytra with particular colour pattern 2

2a Maxillary palpus short and robust, with apical palpomere about twice as long as broad, not narrowed from base to mid-length. Body black, moderately convex dorsally. Apicolateral parts of abdominal sternite coarsely punctate, sternite 2 wrinkled basolaterally 3

2b Maxillary palpus elongate, with apical palpomere more than twice as long as broad and usually tapering. Body often reddish or with particular colour pattern, and convex dorsally. Apicolateral parts of abdominal sternite 1 usually very finely punctate and sternite 2 usually lacking distinct basolateral wrinkles (present in *P. ussuricum*) 4

3a Aedeagus with tip of median lobe blunt, weakly inflexed; parameres in lateral view about 17 or 18 times as long as in middle wide. Greater Sunda Islands, Palawan . . . . . *P. sparsepunctatum* (Pic)

3b Aedeagus with tip of median lobe abruptly inflexed, almost hook-like; parameres in lateral view about 10 times as long as wide in middle. Malay Peninsula, Thailand, Laos, Vietnam, Taiwan . . . . . *P. languei* (Achard)

4a Pronotum and/or elytra clearly bicolorous, often with conspicuous colour pattern 5

4b Pronotum and elytra reddish-brown to black, lacking particular colour pattern, elytral apices sometimes slightly darkened or lightened 13

5a Lateral parts of metaventrite and of abdominal sternite 1 lacking microsculpture 6

5b Lateral parts of metaventrite and of abdominal sternite 1 distinctly microsculptured 9

6a Center of elytral disc black, surrounded by light, yellowish or reddish area, pronotum distinctly bicolorous. Taiwan . . . . . *P. plagiferum* Löbl

6b Elytral coloration different, pronotum uniformly reddish-brown to black, or becoming slightly lighter laterally 7

7a Antennae short, antennomeres III, IV and VI even in length. Elytra dark, with light apical area. Sumatra . . . . . *P. achardi* (Pic)

7b Antennae long, antennomere III much shorter than IV and VI 8

8a Elytra each with light fascia parallel to lateral margins, lacking subapical reddish spot. South India . . . . . *P. fasciatum* Löbl

8b Elytra each with small subapical reddish spot, not becoming light laterally. South India . . . . . species A

9a Pronotum and elytra distinctly maculate 10

9b Pronotum and elytra lacking distinct spots, pronotum becoming lighter toward lateral margins, elytra light posterior humeral area and in apical third to half. Punctation much coarser on elytra than on pronotum. Vietnam . . . . . *P. stewarti* sp. nov.

10a Aedeagus with parameres curved, not widened apically in lateral view 11

10b Aedeagus with parameres straight, widened apically in lateral view 12

11a Basal bulb of aedeagus shorter than apical process of median lobe. Parameres weakly curved in lateral view. Indonesia: Greater Sunda Islands . . . . . *P. horaki* sp. nov.

11b Basal bulb of aedeagus longer than apical process of median lobe. Parameres in lateral view strongly curved. Himalaya, Meghalaya, Thailand . . . . . *P. bicolor* Löbl

12a Apical part of parameres subtriangular in dorsal view, with apex acute, strongly widened and folded in lateral view. Yunnan . . . *P. parabicolor* sp. nov.

12b Apex of parameres rounded in dorsal view, not folded in lateral view; parameres gradually widened toward level of tip of median lobe in lateral view. Taiwan ..... *P. pseudobicolor* sp. nov.
13a Lateral parts of metaventrite and abdominal sternite 1 with conspicuous coarse punctures. Far East Russia, Korea, Anhui, Yunnan ... *P. ussuricum* Löbl
13b Lateral parts of metaventrite and abdominal sternite 1 very finely punctate . 14
14a Elytra each with shallow, narrow lateral impression starting shortly posterior base and reaching about mid-length, with punctures very dense and conspicuously coarser than those on surrounding elytral surface. Sumatra ..... *P. impressipenne* Löbl
14b Elytra lacking elongate lateral impression 15
15a Antennae short, antennomere XI not more than twice as long as wide. Small species, body length not exceeding 2.3 mm 16
15b Antennae long, antennomere XI usually distinctly more than twice as long as wide. Usually larger species, with body length often exceeding 2.5 mm 17
16a Most of elytra coarsely punctate, with punctures much coarser that those on pronotum. Body black. Antennomere V as long as VI. Himalaya ... . *P. almoranum* Champion
16b Most of elytra finely punctate, with punctures similar to those on pronotum, distinctly coarser only near apices. Body dark reddish-brown. Antennomere V almost 1.5 times as long as VI. Thailand .. *P. subglabrum* Löbl
17a Prohypomera with dense, distinct undulate microsculpture. Vietnam, Yunnan ..... *P. merkli* sp. nov.
17b Prohypomera lacking undulate microsculpture 18
18a Submesocoxal area about as long as shortest interval to metacoxa. Fujian ..... *S. sinicum* Pic
18b Submesocoxal area much shorter than shortest interval to metacoxa 19
19a Apical antennomere conspicuously elongate, about 1.5 times as long as penultimate antennomere and about 4.5 to 5 times as long as wide. Large species, body about 3.3 to 4.0 mm long, black or almost black (see Note above for *P. grossum*) 20
19b Apical antennomere not so long, usually about 1.2 to 1.3 times as long as penultimate antennomere and about 3 to 4 times as long as wide. Species often smaller 22
20a Metaventrite with two elongate admesal tubercles. Hainan, Vietnam ... . *P. confusum* sp. nov.
20b Metaventrite without tubercles 21
21a Metacoxal process not microsculptured, swollen at base. Parameres in lateral view narrowed from base toward inflexed apical section, and with concave upper margin. Malay Peninsula ..... *P. antennatum* sp. nov.
21b Metacoxal process microsculptured, with basomedian tubercle. Parameres in lateral view not narrowed toward inflexed apical section, and with upper margin weakly sinuate. Laos ..... *P. grossum* (Achard)
22a Metaventrite on apicomedian part and/or posterior submesocoxal lines with strigulate microsculpture 23

22b Metaventrite without microsculpture 26
23a Aedeagus with tip of parameres bent mesally and hook-like in dorsal view, almost straight and in basal halves weakly expanded dorsally in lateral view. Philippines . . . . . *P. banonense* (Pic)
23b Aedeagus with tip of parameres not hook-like in dorsal view 24
24a Prohypomera conspicuously pubescent. Metacoxal process swollen in middle. Body reddish-brown, 2.2 mm long. Borneo . . . . *P. pubiventer* sp. nov.
24b Prohypomera smooth, or with extremely short, inconspicuous pubescence . . 25
25a Tip of median lobe knob-like in lateral view. Meghalaya, Myanmar, Laos, Guangxi, Xizang, Hainan . . . . . *P. feai* Pic
25b Tip of median lobe hook-like in lateral view. Yunnan . . . *P. montanum* sp. nov.
26a Abdominal sternite 1 with microsculpture covering entire or almost entire surface and distinct also near its apicolateral margins 31
26b Abdominal sternite 1 lacking microsculpture, or with microsculpture limited onto its median area 27
27a Pronotal and elytral punctation similar, very fine, sometimes indistinct. Small species 2.0 to 2.4 mm long. Body black. Aedeagus with parameres wide and gradually narrowed toward apices in lateral view, apices widened and curved in dorsal view. Membranes of the internal sac with two admesal rows of long spine-like structures. Java . . . . . *P. schuhi* sp. nov.
27b Elytral punctation distinct, coarser than pronotal punctation. Larger species, 2.4 to 3.0 mm long. Body reddish-brown to black 28
28a Antennomere II distinctly longer than III. Median part of abdominal sternite 1 not microsculptured. Parameres of aedeagus sinuate in lateral view. Himalaya, Meghalaya . . . . . *P. brancuccii* sp. nov.
28b Antennomeres II and III even or almost even in length. Median part of abdominal sternite 1 microsculptured 29
29a Parameres narrow, almost straight in lateral view 30
29b Parameres fairly wide, arcuate in dorsal and lateral views. Laos . . . . . *P. flagellatum* sp. nov.
30a Body reddish-brown. Antennomere XI almost 3 times as long as wide. Inflexed tip of median lobe very short. Parameres in dorsal view almost straight. Himalaya . . . . . *P. ineptum* Löbl
30b Body blackish-brown to black. Antennomere XI about 2.5 times as long as wide. Inflexed tip of median lobe fairly long. Parameres distinctly curved in dorsal view. Japan . . . . . *P. augur* sp. nov.
31a Punctation on inferior part of prohypomera clearly more dense and distinct than that on superior part of prohypomera. Japan . . . . *P. lewisi* Achard
31b Prohypomera with even or almost even and very fine punctation, often appearing impunctate 32
32a Male protarsus about as long as or longer than protibia, with tarsomeres 2 and 3 each longer than 1, and tenent setae much longer than respective tarsomeres. Apex of median lobe abruptly curved and acute, parameres strongly narrowed from base toward mid-length. Thailand, Malay Peninsula, Greater Sunda Islands . . . . . *P. subovatum* Pic

32b Male protarsus shorter than protibia, with tarsomeres 2 and 3 not conspicuously elongate, each about as long as tarsomere 1, tenent setae not or moderately longer than respective tarsomeres 33

33a Entire median part of metaventrite densely punctate, centre of metaventrite with foveiform impression. Apical part of parameres gradually widened and bent dorsally in lateral view. Internal sac lacking additional sclerites situated posterior mesal guide-sclerites. Java . . . . . *P. javanum* sp. nov.

33b Narrow mesal stripe of metaventrite smooth, metaventrite without foveiform impression. Apical part of parameres not bent dorsally, usually not widened. Internal sac with sclerites situated posterior mesal guide-sclerites 34

34a Aedeagus with flagellum, parameres conspicuously sinuate in dorsal view. Body black, tarsi reddish, much lighter than body. Himalaya . . . . . *P. rufitarse* Löbl

34b Aedeagus without flagellum, parameres not or weakly sinuate in dorsal view. Body usually dark reddish-brown, tarsi lighter than body, not reddish 35

35a Aedeagus with parameres notched subapically. Vietnam . . . . *P. incisum* sp. nov.

35b Aedeagus with parameres not notched 36

36a Median lobe of aedeagus with a pair of dorsolateral, membranous, elongate lobes. Parameres widened apically in dorsal view, almost evenly arcuate in lateral view. Malay Peninsula . . . . . *P. bilobum* sp. nov.

36b Median lobe of aedeagus without dorsolateral lobes 37

37a Tip of median lobe of aedeagus narrow and acute in lateral view. Body length 2.4-3.2 mm. China: Fujian . . . . . *P. fujianum* sp. nov.

37b Tip of median lobe of aedeagus robust and often truncate in lateral view. Larger species, body length 3.1-4.5 mm 38

38a Parameres with upper margin broadly arcuate in lateral view 39

38b Parameres with upper margin not or only shortly arcuate in lateral view . . . 40

39a Parameres in apical half uneven, distinctly narrowed near apices, with ventral margin sinuate in lateral view. Internal sac with long mesal guide-sclerites and, in addition to other sclerotized pieces, pair of small, mesally bent sclerites. South India, Himalaya, Myanmar, Thailand, Laos, Yunnan . . . . . *P. conspectum* sp. nov.

39b Parameres in apical half evenly curved and wide in lateral view. Internal sac with short mesal guide-sclerites and lacking additional, mesally bent sclerites. Greater Sunda Islands, Sipura, Malay Peninsula, Lankawi, Vietnam, ?Hainan . . . . . *P. convexum* sp. nov.

40a Parameres not conspicuously widened basally, with dorsal and ventral margins parallel in middle third, in lateral view. Median lobe of aedeagus with inconspicuous lateral tubercles. Taiwan . . . . . *P. hisamatsui* Löbl

40b Parameres conspicuously widened basally, with dorsal and ventral margins converging in middle third, in lateral view. Median lobe of aedeagus with distinct lateral tubercles 41

41a Parameres in lateral view distinctly expanded dorsally to form a lobe, with apical section shorter than third of total parameral length. Internal sac with globular vesicles. Myanmar, Thailand, Laos, Vietnam, Yunnan ..... *P. carinense* (Achard)

41b Parameres in lateral view subangulate, not lobed dorsally, with apical section about as long as third of total parameral length. Internal sac without globular vesicles 42

42a Tip of aedeagus narrow and weakly bent in lateral view. Parameres each with mesal lobe visible in dorsal view. Laos ..... *P. gossum* (Achard)

42b Tip of aedeagus thick and not bent in lateral view. Parameres without mesal lobe. Greater Sunda Islands, ?Laos ..... *P. vitalisi* (Achard)

Pseudobironium plagiferum group

Pseudobironium javanum sp. nov. Figs 13, 14

HOLOTYPE ♂: INDONESIA, labelled: Coll. F. C. Drescher Java, Preanger. N. O. I. [printed] Tapos - 700m Mt. Ojedo 22.IX.1905 [handwritten] (ZMBC).

DESCRIPTION: Length 2.45 mm, width 1.75 mm. Head, body, femora and tibiae reddish-brown, antennae and tarsi lighter, almost yellowish. Very narrow basal strip of pronotum, prohypomera and elytra along suture darkened, mesoventrite, metaventrite and abdominal sternite 1 somewhat darker than most of pronotum and elytra. Maxillary palpi with palpomere IV tapering, about 3 times as long as wide. Length ratio of antennomeres as II 9: III 6: IV 12: V 17: VI 13: VII 17: VIII 17: IX 18: X 15: XI 19; antennomere XI about 3 times as long as wide. Punctation on pronotum coarser than that on frons, with puncture intervals mostly about as large as to 3 times as large as puncture diameters. Elytra lacking lateral impressions, without humps, in apical part not impressed, with punctation distinctly coarser than that on pronotum, punctures shallow, not well delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Prohypomera finely punctate. Mesoventrite without mesal ridge. Mesal and apical parts of mesoventrite distinctly, densely punctate, with short pubescence. Metaventrite not microsculptured, flattened in middle, with foveiform impression in centre; entire median part very densely and fairly coarsely punctate, distinctly pubescent, puncture diameters to part larger than puncture intervals. Lateral parts of metaventrite sparsely and very finely punctate. Submesocoxal area about as long as half of shortest interval to metacoxa. Metacoxal process distinctly punctate and pubescent, punctures smaller and less dense than those on median part of metaventrite, mesal stria or tubercle absent, margin truncate. Mesotibiae and metatibiae distinctly curved, mesotibial ventral spur straight. Abdominal sternites with strigulate microsculpture, sternite 1 very finely and sparsely punctate, with lateral transverse impression, following sternites lacking basal wrinkles.

Male: Protarsus somewhat shorter than protibia, with tarsomeres 1 to 3 moderately widened, narrower than apex of protibia, bearing fairly short tenent setae. Aedeagus (Figs 13, 14) 0.81 mm long. Median lobe with basal bulb about as long as apical process, latter hardly inflexed, convex ventrally, with short, bent tip. Parameres almost evenly wide and hardly sinuate between bases and apices in dorsal view, arcuate

and narrowed in middle in lateral view. Internal sac without flagellum and lacking admesal complex of sclerites, with short, straight mesal guide-sclerites, membranes with striate structures visible in lateral view.

DISTRIBUTION: Indonesia: Java.

ETYMOLOGY: The species epithet refers to Java.

COMMENTS: This species may be distinguished from most of its congeners by the middle of the metaventrite densely punctate, lacking smooth mesal area, with distinct pubescence and foveiform impression in middle. It is also well characterized by the shape of the aedeagus and the internal sac lacking complex of sclerites and flagellum. *Pseudobironium plagiferum*, that shares a simple internal sac without a complex of sclerotized structures, differs drastically by the colour pattern of body, longer antennae with the antennomere IV about as long as two thirds of III, and by the shape of the parameres.

Pseudobironium plagiferum Löbl, 1980

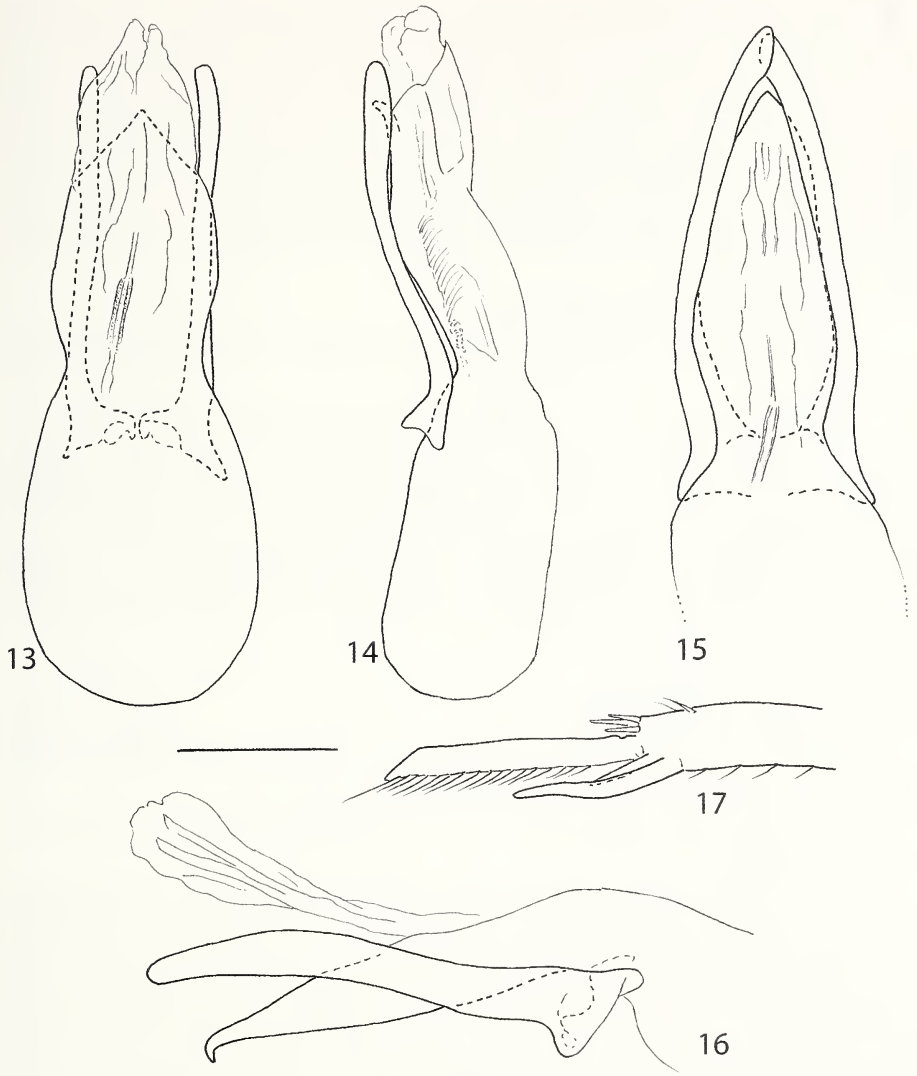
Pseudobironium plagifer Löbl, 1980a: 92. Type material. Holotype ♂: MHNG. Type locality: Taiwan. Distribution: Taiwan.

COMMENTS: The description of this species was based on a single specimen from "Taiwan", lacking detailed locality data. Additional records from Taiwan are in Löbl, 2011b. This species may be easily distinguished from its congeners by the conspicuous colour pattern of the elytra, each having a large, well delimited black spot separated from elytral margins and sutural stria by bright reddish areas.

Pseudobironium spinipes sp. nov. Figs 1, 2, 15-17

HOLOTYPE: ♂, CHINA, Zhejiang, Longquan city, Fengyang shan 1430m, 6.III.2008, leg. Shen-Long Liu (SNUC).

DESCRIPTION: Length 2.65 mm, width 1.75 mm. Body, femora and tibiae uniformly light reddish-brown, antennae, tarsi and apical abdominal segment lighter than body. Maxillary palpi with palpomere IV tapering, about 3 times as long as wide. Length ratio of antennomeres as II 12: III 8: IV 15: V 19: VI 15: VII 17: VIII 16: IX 17: X 16: XI 18; antennomere XI about 2.5 times as wide. Punctation on pronotum very fine, somewhat finer than on frons, with puncture intervals mostly about three or four times as large as puncture diameters. Elytra lacking lateral impressions, with inconspicuous subapical humps, in apical part not impressed, punctation near base and lateral margins about as fine as on pronotum, on most surfaces much coarser and consisting of well delimited punctures. Puncture intervals about twice to three times as large as puncture diameters on centre of elytral disc. Prohypomera smooth, with few very fine punctures. Mesoventrite without mesal ridge, distinctly punctate apically, with few striae, lacking pubescence. Metaventrite without microsculpture, convex mesally, lacking impression, median part densely and fairly coarsely punctate and indistinctly pubescent, except on fairly wide smooth mesal area, puncture diameters mostly smaller than puncture intervals, punctures almost evenly large, irregularly spaced. Lateral parts of metaventrite sparsely, very finely punctate. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process flat,



FIGS 13-17

(13, 14) *Pseudobironium javanum* sp. nov., aedeagus in dorsal (13) and lateral (14) views. (15-17) *Pseudobironium spinipes* sp. nov., aedeagus in dorsal (15) and lateral (16) views, apical part of mesotibia with tarsomere 1 (17); scale bar = 0.2 mm.

impunctate, not microsculptured, with truncate margin. Meso- and metatibiae weakly curved, ventral mesotibial spur conspicuously long and bent in apical half (Fig. 17). Abdominal sternite 1 with few coarse discal punctures, not microsculptured near base, with strigulate, hardly visible microsculpture near apex, lateral impressions large and deep. Following sternites with indistinct strigulate microsculpture, lacking basal wrinkles.

Male: Protarsus distinctly shorter than protibia, with tarsomeres 1 to 3 widened, narrower than apex of protibia, bearing fairly long tenent setae. Aedeagus (Figs 15, 16) with apical process of median lobe 0.47 mm long, widened posterior basal bulb, gradually narrowed from widest point to apex in dorsal view; tip hook like and ventral margin slightly convex in lateral view. Parameres in dorsal view wide near base, gradually narrowed posteriad, evenly wide up to level of tip of median lobe, slightly widened at apices; in lateral view sinuate, almost evenly wide, toward apices somewhat narrowed. Internal sac membranous, with indistinct mesal guide-sclerites, lacking hairy or striate structures.

DISTRIBUTION: China: Zhejiang.

ETYMOLOGY: The species epithet is Latin and refers to the conspicuous mesotibial spur.

COMMENTS: This species may be easily distinguished from its congeners by the shape of its ventral mesotibial spur. It resembles *P. javanum* from which it differs notably by the finer and sparser elytral punctation, the metaventrite lacking impression and impunctate on fairly large mesal area, and the parameres wide in lateral view. The aedeagus of the single available specimen is weakly sclerotized and was damaged while dissection, the basal bulb is almost completely lost, and the dorsally extruded internal sac is likely an artefact.

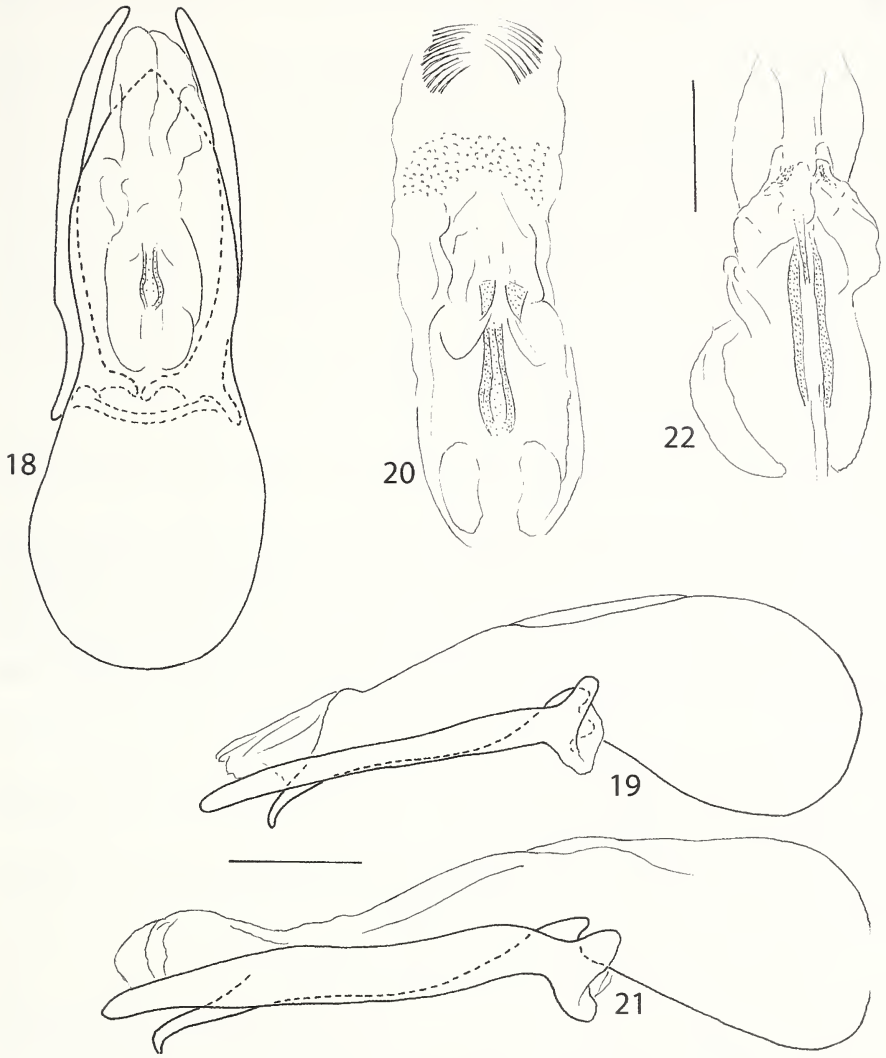
Pseudobironium merkli group

Pseudobironium fujianum sp. nov. Figs 3, 4, 18-20

HOLOTYPE: ♂, CHINA, Fujian Prov., Wuyishan City, Guadun Vill. 27°44'N 117°38'E 1200-1300m, 1.VI.2012, leg. Peng & Dai (SNUC).

PARATYPES: CHINA, with the same data as the holotype but "1300-1500m, 27.V. 2012", 2 ♀ (SNUC, MHNG).

DESCRIPTION: Length 3.20-3.35 mm, width 2.20-2.25 mm. Head very dark, almost black, pronotum black, elytra and most of ventral side of body very dark, almost black, apical abdominal segments lighter, femora and tibiae hardly lighter than elytra, tarsi and antennomeres I to VI light, following antennomeres infuscate. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 13: III 12: IV 20: V 20: VI 18: VII 18: VIII 17: IX 18: X 18: XI 20; antennomere XI about 3 times as long as wide. Punctuation on frons very five, puncture diameters much smaller than puncture intervals. Pronotal punctation coarser than that on frons, with punctures not well delimited, intervals mostly about as to three times as large as puncture diameters. Elytra lacking lateral impressions, without humps, impressed apically, punctation very fine near bases, on most of disc distinctly coarser than that on pronotum, with punctures well delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Prohypomera very finely punctate, with inconspicuous pubescence, lacking microsculpture. Mesoventrite hardly swollen mesally, very finely punctate mesally and basolaterally, lacking striae. Metaventrite not microsculptured, hardly convex in median part, with minute impression posterior centre, densely and coarsely punctate on almost entire median part and indistinctly pubescent, puncture diameters mostly larger than puncture intervals, smooth on short



FIGS 18-22

(18-20) *Pseudobironium fujianum* sp. nov., aedeagus in dorsal (18) and lateral (19) views, internal sac (20) in dorsal view. (21, 22) *Pseudobironium merkli* sp. nov., aedeagus in lateral view (21), internal sac (22) in dorsal view; scale bars for aedeagi = 0.2 mm, internal sac = 0.1 mm.

mesal area between mesocoxae. Lateral parts of metaventrite sparsely, very finely punctate. Submesocoxal area about as long as or slightly longer than half of shortest interval to metacoxa. Area between metacoxae and submesocoxal lines somewhat swollen. Metacoxal process flat, lacking microsculpture, punctate, with truncate margin. Mesotibiae and metatibiae curved, mesotibial ventral spur straight. Abdominal sternites with punctulate microsculpture evanescent on basolateral parts of sternite 1,

latter very finely punctate, with large lateral impression posterior mid-length. Following sternites lacking wrinkles.

Male: Protarsus distinctly shorter than protibia, with tarsomeres 1 to 3 moderately widened, narrower than apices of protibia, bearing fairly short tenent setae. Aedeagus (Figs 18-20) 1.05 mm long. Median lobe with basal bulb slightly shorter than apical process, latter laterally inconspicuously tuberculate, hardly inflexed and weakly convex ventrally, with curved, strongly narrowed tip in lateral view. Parameres gradually bent and weakly narrowed to mid-length in dorsal view, almost straight and weakly narrowed toward apices in lateral view. Internal sac with fairly short, proximally widened median guide-sclerites, pair of small, weakly sclerotized, triangular admesal plates joined to folded membranous lobes, followed by section bearing minute points and in apical part with very fine hair-like structures oriented mesally. Flagellum and complex of admesal sclerites bearing invaginated rods absent.

DISTRIBUTION: China: Fujian.

ETYMOLOGY: The species epithet refers to the Province Fujian where the species was found.

COMMENTS: This species is unique by the almost straight parameres and narrow, bent tip of median lobe (lateral view), in the combination. It is similar to *P. feai*, but may be readily distinguished from the latter by the metaventrite lacking microsculpture and having much shorter smooth mesal surface, and the punctulate abdominal microsculpture. In addition, both species differ drastically by their aedeagal characters.

Pseudobironium merkli sp. nov. Figs 5, 6, 21-23

HOLOTYPE: ♂, VIETNAM, Cuc Phuong, Nihn Binh, 3-10.V.1966, exp. Gy. Topál / Nr. 249 singled material (HNHM).

PARATYPES: VIETNAM, with the same locality data as the holotype, 2 ♀ (HNHM, MHNG). – CHINA, Yunnan Prov., Menlun, Xipian, 985m, 1.VI.2009, 2 ♂, 1 ♀ leg. Wen-Xuan Bi (SNUC, MHNG).

DESCRIPTION: Length 2.65-3.0 mm, width 1.80-2.15 mm. Head and pronotum blackish, elytra becoming somewhat lighter apically. Ventral side of body black to dark brown, apical abdominal segments dark brown, femora and tibiae brown, antennae and tarsi lighter, almost yellowish. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 12: III 10: IV 16: V 18: VI 14: VII 19: VIII 18: IX 19: X 19: XI 19; antennomere XI about 3 times as long as wide. Punctation on frons and pronotum conspicuously dense, punctures on frons about as large as puncture diameters. Pronotal punctures slightly coarser than those on head, with puncture intervals mostly about as to twice as large as puncture diameters. Elytra lacking lateral impressions, without humps, with punctation distinctly coarser than that on pronotum, punctures fairly well delimited, puncture intervals mostly about twice as large as puncture diameters. Prohypomera impunctate, covered by dense microsculpture consistings of waves and striae. Mesoventrite with low mesal ridge, distinctly punctate apically, with short pubescence and few striae. Metaventrite with strigulate microsculpture on apicomedian surface, hardly convex in median part,

lacking impression, almost entire median part very densely and fairly coarsely punctate and indistinctly pubescent, smooth mesal area narrowed posteriad, puncture diameters to part larger than puncture intervals, punctures small near metacoxal proces. Lateral parts of metaventrite sparsely, very finely punctate. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process small, impunctate, with transversely strigulate microsculpture and truncate margin, raised mesally. Mesotibiae and metatibiae curved, mesotibial ventral spur straight. Abdominal sternites with strigulate microsculpture appearing mesh-like on lateral parts of sternite 1 pending on angle of lighting, sternite 1 very finely punctate, with basolateral transverse stria and large transverse lateral impression posterior mid-length. Following sternites lacking wrinkles.

Male: Protarsus distinctly shorter than protibia, with tarsomeres 1 to 3 widened, narrower than apex of protibia, bearing fairly long tenent setae. Aedeagus (Figs 21-23) 1.07-1.08 mm long. Median lobe with basal bulb shorter than apical process, latter hardly inflexed, convex ventrally, with curved, hook-like tip. Parameres gradually narrowed and weakly bent in dorsal view, slightly arcuate and narrowed toward apices in lateral view. Internal sac with long median guide-sclerite, with paired median plates weakly sclerotized except at subapical folds followed by membranous, tubular section and bearing apical, very fine hair-like structures. Flagellum and admesal complex of sclerites with invaginated rods absent.

DISTRIBUTION: China: Yunnan, Vietnam.

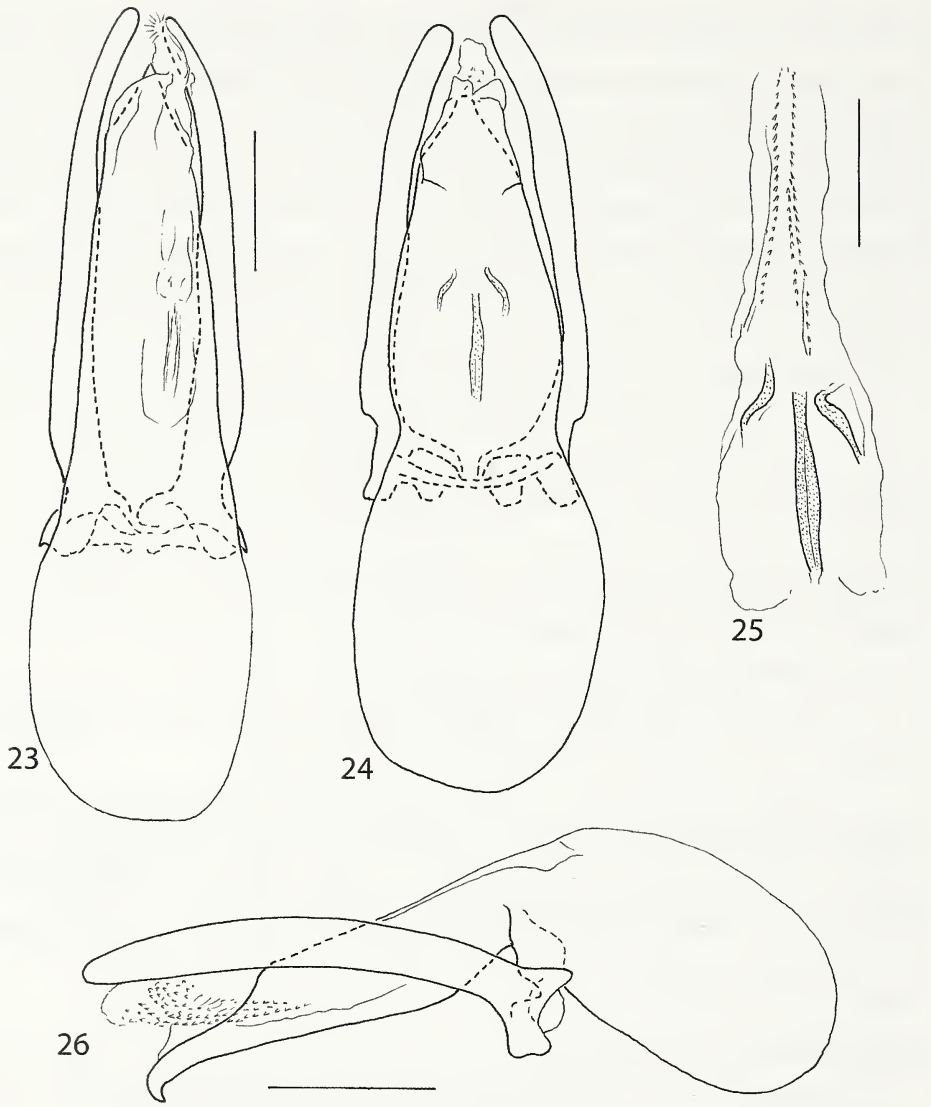
ETYMOLOGY: The species is names in honour of our colleague Otto Merkl, Budapest, Hungary, in acknowledgment of his kind assistances.

COMMENTS: This species is unique in having prohypomera covered by dense, undulate and strigulate microsculpture. It resembles in other external characters to *P. bilobum* and *P. montanum* described below, although it may be also readily distinguished by the very densely and distinctly punctate frons. In addition, it differs notably by dense elytral punctation, darker body, impunctate prohypomera, and punctulate abdominal microsculpture. The aedeagal characters are distinctive, notably by the structures of the internal sac.

Pseudobironium montanum sp. nov. Figs 24-26

HOLOTYPE: ♂, CHINA: Yunnan [CH07-28], Nujiang Lisu Aut. Pref., Gaoligong Shan, side valley, 19 km NW Liuku, 25°59'02"N 98°42'23"E, 2730m, devast. prim. forest, litter sifted, 9.VI.2007, leg. A. Pütz (PCAP).

DESCRIPTION: Length 2.65 mm, width 1.90 mm. Head and most of body black, very narrow basal and apical margins of pronotum reddish, apical abdominal segments, femora and tibiae dark brown, tarsi and antennomeres I to VI light, yellowish-brown, following antennomeres brown. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 13: III 9: IV 15: V 15: VI 12: VII 16: VIII 15: IX 17: X 15: XI 16; antennomere XI about twice as long as wide. Pronotal punctation irregular, consisting of not well delimited punctures as small as those on head and partly distinctly larger, puncture intervals mostly about five times as large as puncture diameters. Elytral punctation fine near base, similar to pronotal punc-



FIGS 23-26

(23) *Pseudobironium merkli* sp. nov., aedeagus in dorsal view. (24-26) *Pseudobironium montanum* sp. nov., aedeagus in dorsal (24) and lateral (26) views, internal sac (25) in dorsal view; scale bars for aedeagi = 0.2 mm, internal sac = 0.1 mm.

tation, dense and coarse on remaining surface, much coarser than on pronotum, with punctures well delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Apical part of elytra impressed. Prohypomera very finely punctate. Middle of mesoventrite distinctly punctate, lacking mesal ridge or line. Metaventrite with microsculpture on small area posterior submesocoxal areas, punc - tation coarse and dense covering most of median part, narrow anteriomesal area

impunctate, apicomedian part flattened, lateral parts very finely punctate. Submesocoxal area about as long as third of interval to metacoxa. Metacoxal process distinctly punctate, with weekly concave margin, lacking tubercle or ridge. Meso- and metatibae fairly curved, mesotibial ventral spur straight. Abdomen with punctulate microsculpture, sternite 1 very finely punctate.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 distinctly widened, much narrower than apex of protibia. Aedeagus (Fig. 24-26) 0.92 mm long. Median lobe with basal bulb shorter than apical process, latter moderately inflexed, with hook-like tip in lateral view. Parameres evenly arcuate, lacking membranous lobes, widest in middle parts in lateral view, almost straight and widest in apical halves in dorsal view. Internal sac without flagellum, with mesal guide-sclerites and pair of narrow, curved lateral sclerites in middle part, membranes with apical denticulate structures.

DISTRIBUTION: China: Yunnan.

ETYMOLOGY: The species epithet is a Latin adjective meaning mountain.

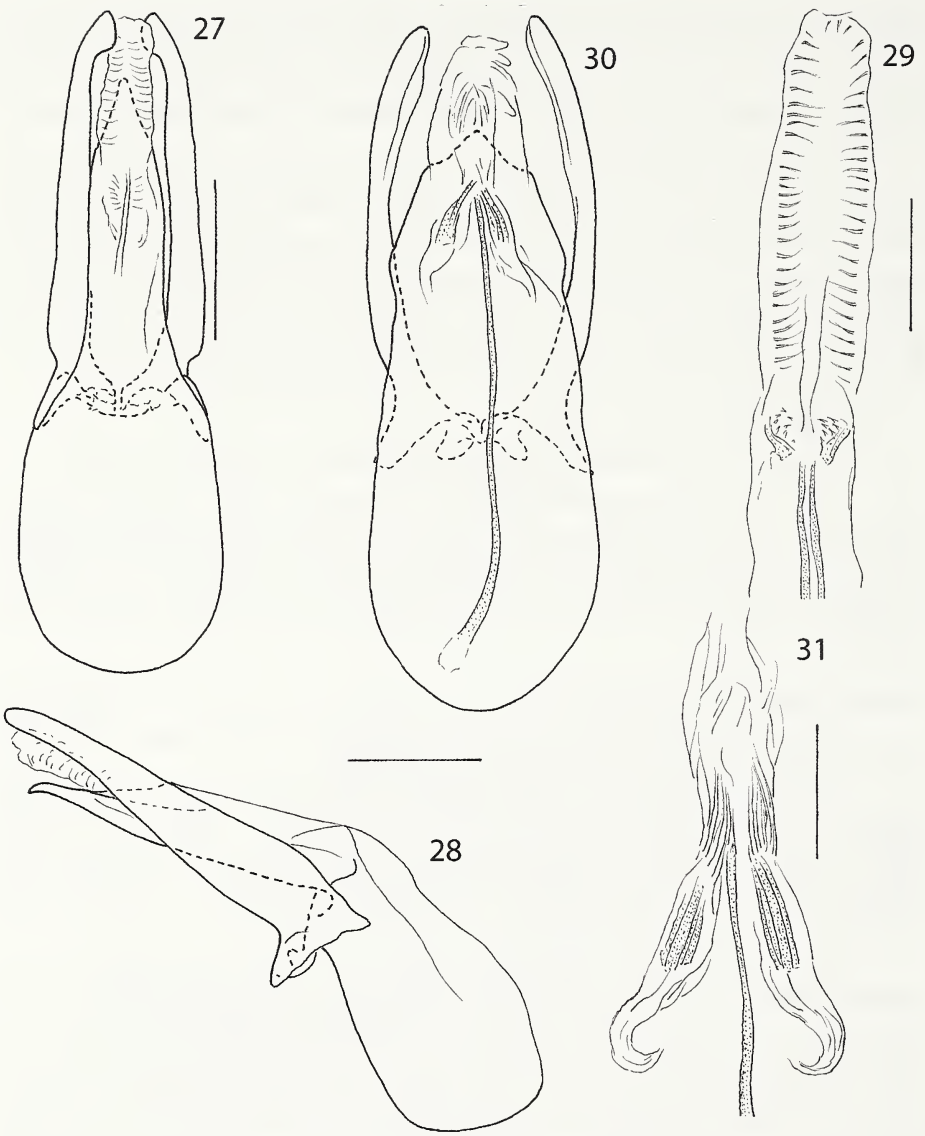
COMMENTS: This species is similar to *P. bilobum* and *P. merkli*. It may be distinguished from them as from other congeners, *P. subovatum* excepted, by the shape of the tip of the median lobe. It differs drastically from *P. subovatum* by the shape of the parameres that are narrow near base in lateral view. See also comments under *P. merkli*.

Pseudobironium schuhi sp. nov. Figs 27-29

HOLOTYPE: ♂, INDONESIA, W. Java, Mt. Gede, 50 km SE Bogor, 1400-1600m, 5-6.XI.1989, leg. I. Löbl, D. Agosti, D. Burckhardt (MHNG).

PARATYPES: INDONESIA, with the same data as the holotype, 5 ♂, 2 ♀. – W. Java, Gede Pangrango Nat. Park way to Cibereum 1500-1620m, 2.-3.VIII.1994, 3 ♂ leg. R. Schuh (NHMW, MHNG). – W. Java, Gede Pangrango, Cibodas Bot. Garden, 1400m, 23.VIII.1994, 1 ♂ leg. R. Schuh (NHMW). – W. Java, Volcan Tangkuban Perahu, 30 km N Bandung, 7.VIII.1984, 1 ♀ leg. J. Robert (MHNG). – W. Java, Preanger [=Parahyangan], Pasir Junghuhn, G. Malabar - 1600m, III.1936, 2 ♀ leg. F. C. Drescher (ZMBC).

DESCRIPTION: Length 2.0-2.4 mm, width 1.46-1.75 mm. Body blackish-brown to black. Femora and tibiae about as dark as body. Apex of abdomen, tarsi, palpi and antennomeres I to VI light, almost yellowish, antennomeres VII to XI slightly darker than preceding. Maxillary palpi with palpomere IV tapering, almost 4 times as long as wide. Length ratio of antennomeres as II 8: III 6: IV 13: V 10: VI 10: VII 12: VIII 11: IX 13: X 12: XI 14; antennomere XI somewhat about 2.5 to almost 3 times as long as wide. Head, pronotum and most of elytra very finely, sparsely punctate, puncture intervals on centre of elytral disc mostly about 5 to 10 times as large as puncture diameters. Some punctures near lateral and apical margins of elytra distinctly larger than remaining elytral punctures. Elytra lacking lateral or subapical impression and hump. Prohypomera, metanepisterna, lateral parts of metaventrite and abdominal sternites with very fine, inconspicuous punctation, similar to that on pronotum. Posterior part of mesoventrite lacking distinct punctures. Metaventrite lacking microsculpture, in middle part almost flat, distinctly punctate on small areas at each side of broad, almost impunctate centre. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process almost impunctate, without microsculpture, lacking



FIGS 27-31

(27-29) *Pseudobironium schuhi* sp. nov., aedeagus in dorsal (27) and lateral (28) views, internal sac (29) in dorsal view. (30, 31) *Pseudobironium augur* sp. nov., aedeagus in dorsal view (30), internal sac in dorsal view (31); scale bars for aedeagus = 0.2 mm, internal sac = 0.1 mm.

median stria or ridge, with margin slightly concave. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 with punctulate microsculpture, in some specimens restricted onto basomedian and apicomedian areas, with very five, sometimes obsolete lateral striae and shallow apicolateral impressions. Following sternites with punctulate microsculpture.

Male: Protarsomeres 1 to 3 moderately widened, narrower than apex of protibia, bearing short ventral setae. Aedeagus (Figs 27-29) 0.81-0.89 mm long, fairly strongly sclerotized. Apical process of median lobe slightly longer than basal bulb, oblique, with ventral side almost straight in lateral view and tip acute. Parameres almost straight and parallel, with apex widened in dorsal view, gradually narrowed and hardly curved in lateral view. Internal sac with mesal guide-sclerites followed by two small, oblique, weakly sclerotized structures joined to membranes bearing very short spines. Apical part of internal sac long, bearing long, spine-like membranous structures.

DISTRIBUTION: Indonesia: Java.

ETYMOLOGY: The species is dedicated to one of its collectors, Rudolf Schuh, Wiener Neustadt, Austria.

COMMENTS: The species resembles *P. subglabrum* and *P. banonense* by its small body size, the dark body, and the finely punctate pronotum and elytra. It differs drastically by its aedeagal characters, in particular by the shape of the parameres which is unique.

Pseudobironium fasciatum group

Pseudobironium augur sp. nov. Figs 30-33

HOLOTYPE: ♂, JAPAN, labelled: Miyanoshita 20.XII-30.XII.80. / Japan G. Lewis 1920 - 320 / Syntype (round) / Pseudobironium lewisi Achard R.J.W.Aldridge det 1975 SYNTYPE (NHML).

PARATYPES: JAPAN, Kyushu, Miyazaki Pref., Mt. Shiraiwa, ca 1680m, 26.-28.VII.1996, 1 ♂ leg. T. Uéno & H. Goto (PCMS). – 3 ♂, 3 ♀ Kumamoto Pref., Mt. Ichifusa, 3.VI.1966, leg. M.T. Chûjô (MHNG). – Oita Pref., Kuju Mt. Kurodake, 29.VI.1995, 1 ♂ leg. T. Uéno (MHNG). – Shikoku, Ishizuchi Mtn. Nat. Park, Tsuchigoya 1400m, 11-18.VIII.1980, log & stump litter with fungi and moss, Fagus - Abies forest, 2 ♂, 1 ♀ leg. S. & J. Peck (MHNG).

DESCRIPTION: Length 2.95-3.10 mm, width 2.0-2.10 mm. Head and body dark reddish-brown to black, apical abdominal segments, femora and tibiae lighter, usually dark brown, tarsi and antennae light reddish-brown, antennomeres VI to XI sometimes infuscate. Maxillary palpi with palpomere IV tapering, about 3 times as long as wide. Length ratio of antennomeres as II 13: III 12: IV 17: V 18: VI 16: VII 17: VIII 17: IX 17: X 16: XI 19; antennomere XI somewhat more than twice as long as wide. Head and pronotum with distinct and dense punctation. Punctation on pronotum notably coarser than on head, with puncture intervals mostly about as to three times as large as puncture diameters. Elytra lacking lateral impressions, without humps, in apical part slightly impressed, with punctation distinctly coarser that pronotal punctation, punctures well delimited, puncture intervals mostly about twice as large as puncture diameters, some intervals about as puncture diameters. Prohypomera with few distinct punctures. Mesoventrite rather finely punctate, without median ridge. Metaventrite in middle weakly convex, irregularly, rather finely punctate except on smooth and wide mesal area, lacking microsculpture. Lateral parts of metaventrite very finely punctate, without microsculpture. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process very finely punctate, lacking mesal stria or tubercle, with margin concave and notched in middle. Mesotibiae and metatibiae distinctly curved, mesotibial ventral spur straight. Abdominal sternites with punctulate micro-

sculpture becoming obsolete on basolateral areas of sternite 1, very finely punctate and with shallow, large lateral impressions. Following sternites lacking wrinkles.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 fairly widened, narrower than apex of protibia, bearing fairly long tenent setae. Aedeagus (Figs 30-33) 1.0-1.06 mm long. Median lobe with basal bulb longer than apical process, latter inflexed, with abruptly bent and comparatively long tip. Parameres almost evenly wide between bases and apices, almost regularly curved in dorsal view, almost straight in lateral view. Internal sac with flagellum, admesal complex of sclerites consisting each of short rods and joined to larger subtriangular plates, covered by striate structures expanded apically.

DISTRIBUTION: Japan: Shikoku, Kyushu.

ETYMOLOGY: The species epithet is a Latin noun, meaning prophecy.

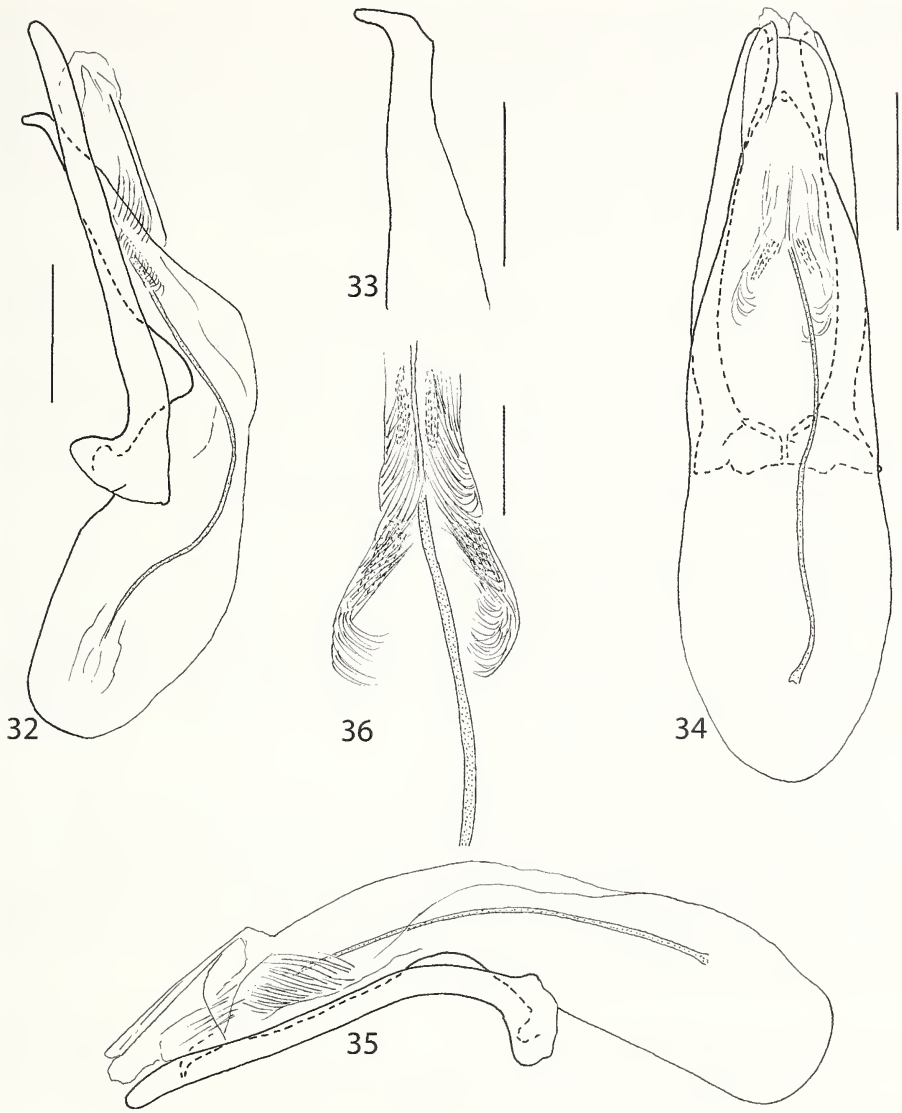
COMMENTS: This species resembles *P. lewisi*. It may be distinguished from the latter by the more reduced prohypomeral punctation, the mesoventrite having distinct punctation restricted onto smaller, posterior area, the wide impunctate mesal area of the metaventrite, the notched margin of metacoxal process, and the abdominal microsculpture evanescent basolaterally. It differs drastically from *P. lewisi* by its aedeagal characters, in particular by the internal sac with a flagellum that is absent from the latter species.

Pseudobironium brancuccii sp. nov. Figs 34-36

HOLOTYPE: ♂, NEPAL, Arun V. Arun R. 800m, Hedangan-Num, 16.VI.1983, leg. M. Brancucci (NHMB).

PARATYPES: INDIA, Meghalaya, Tura Peak, 600-1000m, 25°30'N 90°14'E, 12.-22.VI.2007, 2 ♂, 2 ♀ leg. P. Pacholátko (NHMB, MHNG).

DESCRIPTION: Length 2.80-3.0 mm, width 2.05-2.20 mm. Head, most of abdomen and femora reddish-brown to blackish-brown. Pronotum and elytra dark reddish-brown to almost black. Tibiae slightly lighter than femora. Apical abdominal segments, tarsi and palpi light reddish-brown, antennae yellowish-brown. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 13: III 10: IV 18: V 18: VI 17: VII 17: VIII 17: IX 17: X 16: XI 19; antennomere XI about three times as long as wide. Head and pronotum with similar, fine and dense punctation. Punctures not clearly delimited, intervals between pronotal punctures mostly about twice to three times as large as puncture diameters. Elytra each with very low, inconspicuous and sometimes hardly visible subapical hump and somewhat irregular surface posterior hump, lateral impression absent. Elytral punctation distinctly coarser that pronotal punctation, punctures well delimited, puncture intervals mostly about twice to four times as large as puncture diameters, near apices coarser and denser than on remaining surface. Prohypomera very finely punctate, appearing smooth. Mesoventrite very finely punctate near margin, without median ridge. Metaventrite in middle almost flat, irregularly, rather finely punctate except on smooth anterior area, lacking microsculpture. Lateral parts of metaventrite very finely punctate, without microsculpture. Submesocoxal area slightly longer than third of shortest interval to metacoxa. Metacoxal process smooth, lacking mesal stria or tuber-



FIGS 32-36

(32, 33) *Pseudobironium augur* sp. nov., aedeagus in lateral view (32), tip of median lobe (33); scale bars for aedeagus = 0.2 mm, for tip of median lobe = 0.1 mm. (34-36) *Pseudobironium brancuccii* sp. nov., aedeagus in dorsal (34) and lateral (35) views, internal sac in dorsal view (36); scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

cle, with truncate margin. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 without microsculpture, except on apicomedian area, very finely punctuate. Following sternites with punctulate microsculpture, lacking basal wrinkles and very finely punctate.

Male: Tarsomeres 1 to 3 of prolegs fairly widened, slightly narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 34-36) 1.03-1.06 mm long, fairly sclerotized. Basal bulb narrow. Apical process slightly longer than basal bulb, weakly inflexed, with ventral side hardly sinuate, tip somewhat prominent ventrally and acute in lateral view. Parameres narrow, evenly wide, sinuate in lateral and dorsal views, lacking membranous lobes. Internal sac with sinuate flagellum, inconspicuous pair of admesal, tripartid complexes of sclerites, membranes strigulate.

DISTRIBUTION: Nepal, Northeast India.

ETYMOLOGY: The species is named in honour of one of its collectors, Michel Brancucci, Basel, Switzerland, late friend and colleague of the senior author.

COMMENTS: The aedeagus of this species resembles that of *P. augur*, has however the tip of the median lobe very shortly bent, lacks sclerotized plates joined to admesal sclerotized complex, and differs in the shape of the parameres. It may be distinguished from *P. augur* also by the abdominal microscultpture, narrow impunctate mesal area of metaventrite, and truncate margin of metacoxal process.

Pseudobironium fasciatum Löbl, 1982

Pseudobironium fasciatum Löbl, 1982a: 157.

HOLOTYPE: ♂, EUMJ. Type locality: India, Tamil Nadu, Cinchona, Anaimalai Hills.

ADDITIONAL MATERIAL EXAMINED: INDIA, Kerala, 15 km SW Munnar; 1250m, 1.-9.V.1997, Kallar Valley, 10°02'N 76°58'E, 1 ♂, 1 ♀ leg. L. Dembický & P. Pacholátko (NHMB, MHNG).

DISTRIBUTION: India: Tamil Nadu, Kerala.

COMMENTS: The species was to present known only by its type material. It may be readily distinguished from its congeners by the colour of the elytra, in combination with the metaventrite and the abdominal sternite 1 lacking microsculpture. The aedeagus is characterized by the ejaculatory duct entering a widened orifice of the long, very narrow flagellum that becomes somewhat wider and less sclerotized posterior complex of mesal sclerites, and reaches ostium.

Pseudobironium flagellatum sp. nov. Figs 37, 38

HOLOTYPE: ♂, LAOS, Kham Mouan Prov., Ban Khoun Ngeum, env. 200m, 18°07'N 104°29'E, 19.-31.V.2001, leg. P. Pacholátko (NHMB).

DESCRIPTION: Length 2.70 mm, width 1.95 mm. Head, most of body, femora and tibiae uniformly, fairly light, reddish-brown. Prohypomera, apical abdominal segments, tarsi and antennae slightly lighter. Maxillary palpi with palpomere IV slightly more than twice as long as wide, tapering. Length ratio of antennomeres as II 10: III 10: IV 18: V 17: VI 14: VII 15: VIII 15: IX 15: X 14: XI 17; antennomere XI about 3.5 times as long as wide. Head and pronotum with dense punctation, that on pronotum coarser. Punctures not well delimited, shallow, puncture intervals on pronotum mostly about as large as to three times as large as puncture diameters. Elytra each with very low subapical hump, lateral impression absent. Elytral punctation distinctly coarser that pronotal punctation, punctures mostly well delimited, puncture

intervals mostly slightly larger to three times as large as puncture diameters, near apices denser than on remaining surface. Prohypomera impunctate. Mesoventrite impunctate, lacking median ridge or line. Metaventrite not microsculptured. Median part of metaventrite weakly convex, coarsely and densely punctate except on mesal area, coarse punctures sharply delimited, with diameters to part larger than puncture intervals. Lateral parts of metaventrite very finely punctate, appearing impunctate. Submesocoxal area slightly shorter than half of interval to metacoxa. Metacoxal process smooth, not punctured and without microsculpture, with weakly concave margin, lacking median ridge or tubercle. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely, sparsely punctate, with punctulate microsculpture covering middle third of sternite, becoming almost obsolete apically. Lateral parts of sternite 1 lacking microsculpture, with shallow transverse stria followed by very shallow, inconspicuous impression. Following sternites lacking wrinkles, with hardly visible microsculpture.

Male: Protarsus shorter than protibia, protarsomeres 1 to 3 distinctly widened, narrower than apex of protibia, bearing short tenent setae. Aedeagus (Figs 37, 38) 1.06 mm long. Median lobe with basal bulb elongate, about as long as apical process. Apical process strongly inflexed, with ventral side sinuate, tip abruptly bent and acute. Parameres moderately curved in dorsal and lateral views, almost evenly wide from bases to apices, in lateral view wider than in dorsal view. Internal sac with very long flagellum curved proximally and extruded apically, pair of mesal, conical sclerites not well delimited and surrounded by weakly sclerotized structures; membranes denticulate apically.

DISTRIBUTION: Laos.

ETYMOLOGY: The species epithet refers to the presence of a aedeagal flagellum.

COMMENTS: The species is similar to the Nepalese *P. ineptum*. It may be distinguished by the shape of the parameres that are curved, the more elongate basal bulb of the aedeagus, and the internal sac lacking strigulate structures.

Pseudobironium impressipenne Löbl, 1973

Pseudobironium impressipenne Löbl, 1973: 149.

HOLOTYPE: ♂, MCSN. Type locality: Indonesia: Sumatra, Si-Rambé.

DISTRIBUTION: Indonesia: Sumatra.

COMMENTS: To date, only the holotype of this species is known. The species may be distinguished from its congeners by the elytra each having a shallow lateral impression, bearing punctation notably denser and coarser than that on the remaining discal surface.

Pseudobironium ineptum Löbl, 1992

Pseudobironium ineptum Löbl, 1992: 503.

HOLOTYPE, ♂, MHNG. Type locality: Nepal, Sankhua Sabha District, Arun Valley below Num.

DISTRIBUTION: Nepal.

COMMENTS: The species description was based on a single male, at present in poor state, due to careless manipulation of a technician. Additional specimens were not yet found in examined collections. *Pseudobironium ineptum* is distinguished from other members of the group by its aedeagus with parameres straight, throughout evenly wide.

Pseudobironium rufitarse Löbl, 1992

Pseudobironium rufitarse Löbl, 1992: 502.

HOLOTYPE: ♂, SMNS. Type locality: Nepal, Taplejung District, Yamputhin.

ADDITIONAL MATERIAL EXAMINED: INDIA, East Sikkim, Rongay, 1800m, 23.IV.1985, leg. Ch. J. Rai, 1 ♂ (NHMB).

DISTRIBUTION: India: Sikkim, Nepal.

COMMENTS: The description of the species was based on three Nepalese specimens. The species may be readily distinguished by the peculiar shape of the parameres, as illustrated in Löbl, 1992. It is also characterized by the conspicuously long antennae, with the antennomeres II and III almost even in length. Characters not mentioned in the original description are: mesosternum with low, inconspicuous median ridge, metacoxal process with convave margin, abdominal microsculpture punctulate, sternite 1 with shallow oblique impression situated anterior its mid-length.

Pseudobironium subovatum group

Pseudobironium almoranum subgroup

Pseudobironium almoranum Champion, 1927 Figs 39, 40

Pseudobironium almoranum Champion, 1927: 273.

LECTOTYPE: ♂, NHML. Type locality: India: Uttaranchal Pradesh, Kumaon, W. Almora.

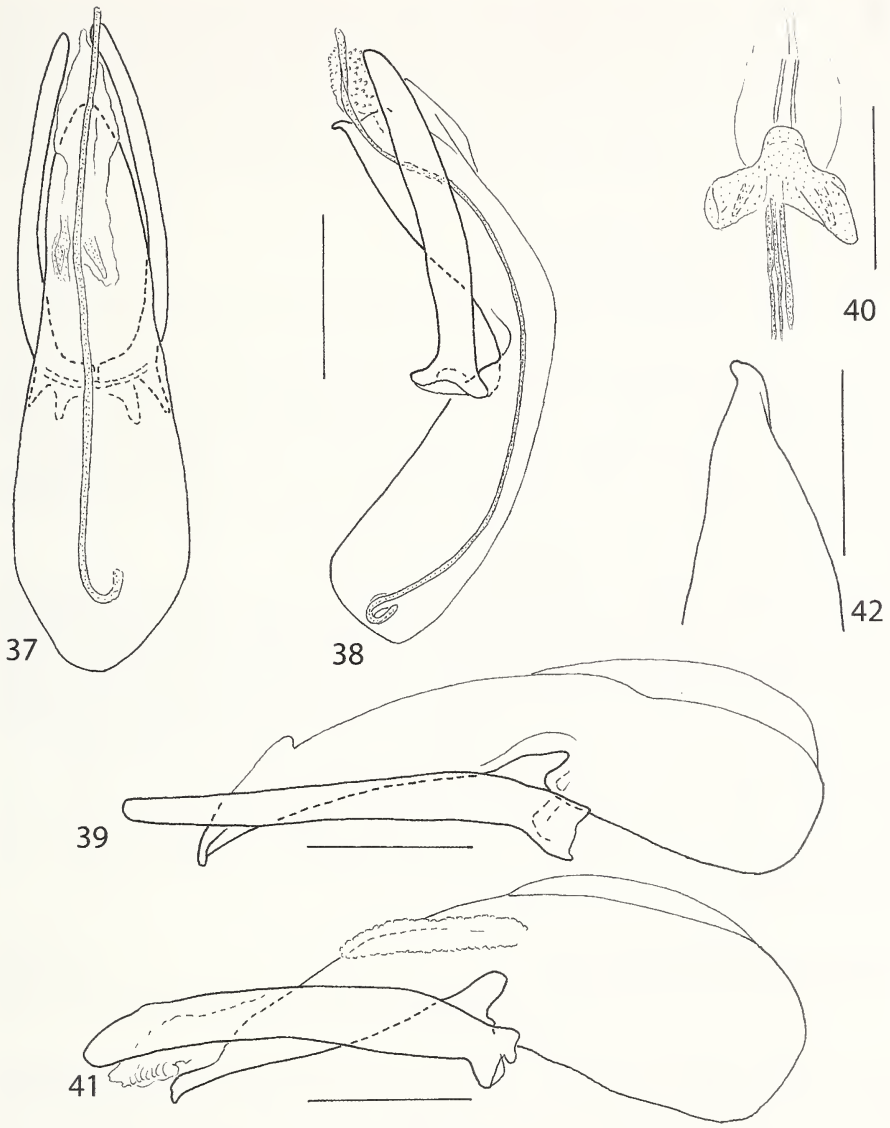
ADDITIONAL MATERIAL EXAMINED. INDIA, Arunachal Pradesh, between Dirang and Bomdla Pass, 27°19'N 92°22'E, 2200m, 15.IV.2004, 1 ♂ leg. L. Dembicky (NHMB). – Arunachal Pradesh, W of Bombila, 2600m, 27°16'N 92°24'E, 2600m, 1 ♀ (MHNG). – NEPAL, Kosi Prov., #9,9a,9b, Chichila 27°28'N 87°14'E, 1900-2000m, 3.-5.VI.2001, Expedit. Mus Basel, 6 ex. (NHMB, MHNG). – Kosi Prov., #11 Num 27°33N 87°17'E 1550m, 8-11.VI.2001, Expedit. Mus Basel, 1 ex. (NHMB).

DISTRIBUTION: India: Arunachal Pradesh, Himachal Pradesh, Uttarakhand (Garhwal, Kumaon); Nepal.

COMMENTS: Löbl (1992: 504, 597) designated the lectotype and gave the diagnostic characters of the species, including illustrations of its aedeagus in dorsal view. The lacking illustration of the aedeagus in lateral view and details of the internal sac are given here (Fig. 39, 40). A female reported from Bhutan (see Löbl, 1984a: 62) and housed in NHMB is similar to *P. almoranum* but cannot be reliably identified. Other distributional data are in Löbl (1969: 324, 1984a: 62, 1986: 343, 1992: 504, and 2005: 180).

Pseudobironium banonense (Pic, 1931)

Scaphosoma banonense Pic, 1931: 3.
Scaphosoma obscuricolle Pic, 1947: 2.



FIGS 37-42

(37, 38) *Pseudobironium flagellatum* sp. nov., aedeagus in dorsal (45) and lateral (47) views; scale bar = 0.3 mm. (39, 40) *Pseudobironium almoranum* Champion, aedeagus in lateral view (39), sclerotized structures of internal sac (40), dorsal view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm. (41, 42) *Pseudobironium bilobum* sp. nov., aedeagus in lateral view (41), tip of median lobe in lateral view (42); scale bars for aedeagus = 0.2 mm, for tip of median lobe = 0.1 mm.

TYPE MATERIAL of *S. banonense*: Lectotype, ♀, MNHN. Type locality: Luzon, Los Banos.

TYPE MATERIAL of *S. obscuricolle*: Lectotype, ♀, MNHN. Type locality: Luzon, Banguio.

DISTRIBUTION: Philippines.

COMMENTS: Both, *S. banonense* and *S. obscuricolle* were transferred to *Pseudobironium* by Löbl, 1970: 126. Each was represented in the MNHN collection by a single specimen that was incorrectly assumed to be the holotype of the respective species (Löbl, 1970: 126). In fact, these specimens are lectotypes (ICZN, Art. 74.6), designated in that latter paper. The names were synonymized, the aedeagus illustrated, and additional distributional records were given in Löbl (2011a: 308).

Pseudobironium bicolor Löbl, 1992

Pseudobironium bicolor Löbl, 1992: 501.

HOLOTYPE ♂: MHNG.Type locality: Nepal, Sankhua Sabha District, Arun Valley below Num.

ADDITIONAL MATERIAL EXAMINED: INDIA, Meghalaya, 3 km E Tura, 1150m, 25°30'N 90°14'E 18.IV.1999, 2 ♂, 1 ♀ leg. L. Dembický & P. Pacholátko (NHMB, MHNG). – LAOS N, Louangphrabang 11-22.V.2002, 19°35'N 101°58'E Thon Khan ca 700m, 1 ♀ leg. V. Kubáň (MHNG). – Laos NE, Xieng Khouang Prov., 19°37-8'N 103°20-21'E, 30km NE Phonsavan: Ban La Nam to Phou Sane Mt., 1300-1700m, 10-30.V.2009, 1 ♀ leg. M. Geiser (NHMB). – THAILAND, Mae Hong Son, Ban Si Lang, 1200m, 23-31.V.1991, 1 ♀ leg. J. Horák (MHNG). – Chiang Mai, Doi Suthep, 24.IV.-13.V.2003, 1 ♀ leg. R. Grimm (SMNS).

DISTRIBUTION: India: Meghalaya; Nepal; Thailand.

COMMENTS: The description of this species was based on a series of specimens, including males from East Nepal, and females from Meghalaya and northern Thailand. These females were previously mentioned but unidentified in Löbl (1982a: 160, 1984b: 62 and 1990: 514). The males from Meghalaya recorded above confirm the identity of the formerly unidentified females. A specimen from Yunnan, possessing similar external characters, was erroneously reported in Löbl, 1999: 721 as *P. bicolor*. It represents a distinct species described below. The aedeagus of *P. bicolor* was illustrated (Löbl, 1992: 597) only in dorsal view. Its shape in lateral view provides additional diagnostic characters: parameres are evenly bent in lateral view, each bearing an apical membranous lobe.

Pseudobironium bilobum sp. nov. Figs 41-44

HOLOTYPE: ♂, MALAYSIA, West Malaysia Pahang C. Highlands Tanah Rata, 20.-25.I. 1995 Gn. Jasar, 14-1500m, leg. S. Bečvář (NHMW).

PARATYPES: with the same data as the holotype, 15 ♂ and 7 ♀ (NHMW, MHNG). – Pahang Cameron Highlands Tanah Rata 1600m, 11.-27.II.2000, 1 ♀ leg. J. Horák (MHNG). – Perak Cameron Highlands Tanah Rata, 13.-16.III.1997, 1 ♂, 2 ♀ leg. I. Jeniš (NHMW, MHNG).

DESCRIPTION: Length 2.35-2.75 mm, width 1.65-2.10 mm. Most of body very dark, blackish-brown to black. Head, apical abdominal segments, femora and tibiae slightly lighter, dark reddish-brown. Tarsi and antennomeres I to VI light reddish-brown, antennomeres VII to XI infuscate. Maxillary palpi with palpomere IV about 3 times as long as wide, tapering. Length ratio of antennomeres as II 11: III 9: IV 15: V 15: VI 13: VII 15: VIII 15: IX 16: X 16: XI 18; antennomere XI about three times as long as wide. Head and pronotum with dense and fine punctation; punctures not well delimited, shallow, puncture intervals on pronotum mostly about twice to three times as large as puncture diameters. Elytra lacking subapical humps and lateral impressions, each with very shallow, small subapical impression. Elytral punctation distinctly

coarser that pronotal punctation, excepted near basal margin, punctures mostly well delimited, puncture intervals mostly twice to three times as large as puncture diameters, few larger punctures in subapical impressions. Prohypomera impunctate. Mesoventrite punctate, lacking median ridge or line. Metaventrite not microsculptured. Median part of metaventrite weakly convex, finely and densely punctate except on smooth mesal area, punctures sharply delimited, with diameters to part about as large as puncture intervals. Lateral parts of metaventrite very finely punctate, appearing impunctate. Submesocoxal area slightly shorter than half of interval to metacoxa. Metacoxal process with weakly concave margin, impunctate, lacking microsculpture, without mesal ridge, stria or tubercle. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely and sparsely punctate, with punctulate microsculpture covering entire surface, and with shallow transverse impression situated posterior mid-length. Following sternites lacking wrinkles, with distinct microsculpture.

Male. Protarsus shorter than protibia, with tarsomeres 1 to 3 moderately widened, narrower than apex of protibia, bearing short tenent setae. Aedeagus (Figs 41-44) 0.87-0.92 mm long. Basal bulb shorter than apical process of median lobe, with dorsal margins expanded apically to form lateral lobes. Apical process weakly inflexed, with apex narrow and rounded in lateral view. Parameres weakly arcuate in dorsal and lateral views, and weakly narrowed in middle part. Internal sac with mesal guide-sclerites, pair of conical sclerites containing each single, narrow invaginated rod, and two additional, flat sclerites. Membranes of internal sac scale-like basally, spinous apically, and with strigulate structures in middle part.

DISTRIBUTION: India: Meghalaya; West Malaysia.

ETYMOLOGY: The species epithet refers to the presence of lobes on the dorsal side of the aedeagal basal bulb.

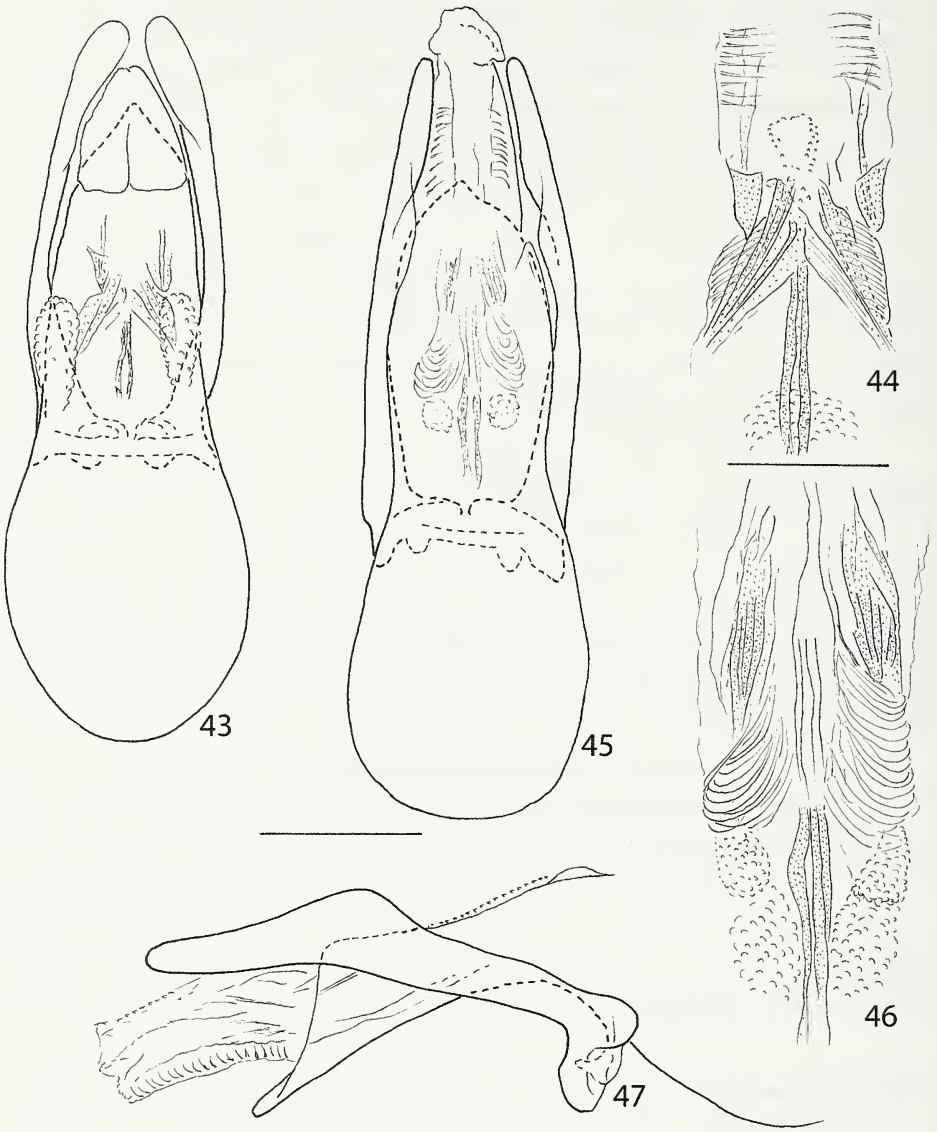
COMMENTS: A unique feature of this species is the presence of lateral lobe of the median lobe. It resembles in external characters *P. sinicum* from which it may be distinguished by the comparatively shorter submesocoxal areas and the slightly impressed elytral apices. It is also similar to *P. merkli* and *P. montanum* in general appearence. See comments under these species.

Pseudobironium confusum sp. nov. Figs 7, 8, 45-47

HOLOTYPE: ♂, CHINA, Hainan, Ledong County, Jianfengling, 1000m, 17-24.V.2011, leg. Wen-Xuan Bi (SNUC).

PARATYPES: CHINA, with the same data as the holotype, 9 ♂, 7 ♀ (SNUC, MHNG). – VIETNAM, N. Vietnam, Tam Dao, 3-11.6.1985, 900-1400m, 1 ♂ leg. J. Jelínek (NMPC).

DESCRIPTION: Length 4.0 mm, width 2.60-2.80 mm. Head reddish-brown. Pronotum and elytra very dark, almost black. Prohypomera, mesoventrite and abdomen dark brown to reddish-brown, apical abdominal segments hardly lighter, metaventrite darker, almost black. Legs reddish-brown, tarsi slightly lighter than tibiae; antennomeres I to VI light reddish-brown, following infuscate. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Length ratio of antennomeres as II 14: III 12: IV 23: V 22: VI 17: VII 23: VIII 22: IX 22: X 21: XI 30; antennomere XI



FIGS 43-47

(43, 44) *Pseudobironium bilobum* sp. nov., aedeagus (43) and internal sac (44) in dorsal views. (45-47) *Pseudobironium confusum* sp. nov., aedeagus in dorsal (45) and lateral (47) views, internal sac (46) in dorsal view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

about four to five times as long as wide. Punctation on head and pronotum dense, pronotal punctation fairly coarse, distinctly coarser than that on head, punctures not well delimited, puncture intervals mostly about as to three times as large as puncture diameters. Elytra lacking humps or impressions, with punctation dense, about as fine as that on pronotum near basal margins, distinctly coarser on prevailing surface,

punctures well delimited, puncture intervals mostly about as to twice as large as puncture diameters. Prohypomera finely, distinctly punctate. Mesoventrite extremely finely punctate, lacking median ridge or line, and lacking striae. Metaventrite not microsculptured, with a pair of admesal elongate tubercles. Median part of metaventrite weakly convex, smooth on mesal area; punctures dense, moderatelly coarse, sharply delimited, with diameters to part about as large as puncture intervals. Lateral parts of metaventrite very finely punctate. Submesocoxal area slightly shorter than half of interval to metacoxa. Metacoxal process impunctate and not microsculptured, with low median ridge and almost truncate margin. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdomen with microsculpture consisting of transverse and oblique striae, becoming punctulate on lateral parts of sternite 1 and evanescent on its basolateral areas; sternite 1 with shallow lateral impression. Sternite 2 with dense row of very short basal striae.

Male. Protarsus shorter than protibia, with tarsomeres 1 to 3 strongly widened, narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 45-47) 1.51-1.52 mm long. Median lobe with basal bulb about as long as apical process, latter inflexed with straight ventral side, tip not bent and blunt in lateral view. Apical process with eventually hardly visible lateral tubercles. Parameres weakly curved, narrowed toward mid-length, with narrow dorsal lobe in dorsal view, hardly curved, almost evenly wide in basal halves, posterior mid-length expanded dorsally, from widest point gradually narrowed apically in lateral view. Internal sac with mesal guide-sclerites, pair of conical sclerites each with invaginated short rod, and pair of membranous basal vesicles. Membranes of internal sac scale-like, overlapping strigulate structures.

DISTRIBUTION: China: Hainan, Vietnam.

ETYMOLOGY: The species epithet is a Latin adjective, referring to confusing external similarity of this species to some of its congeners.

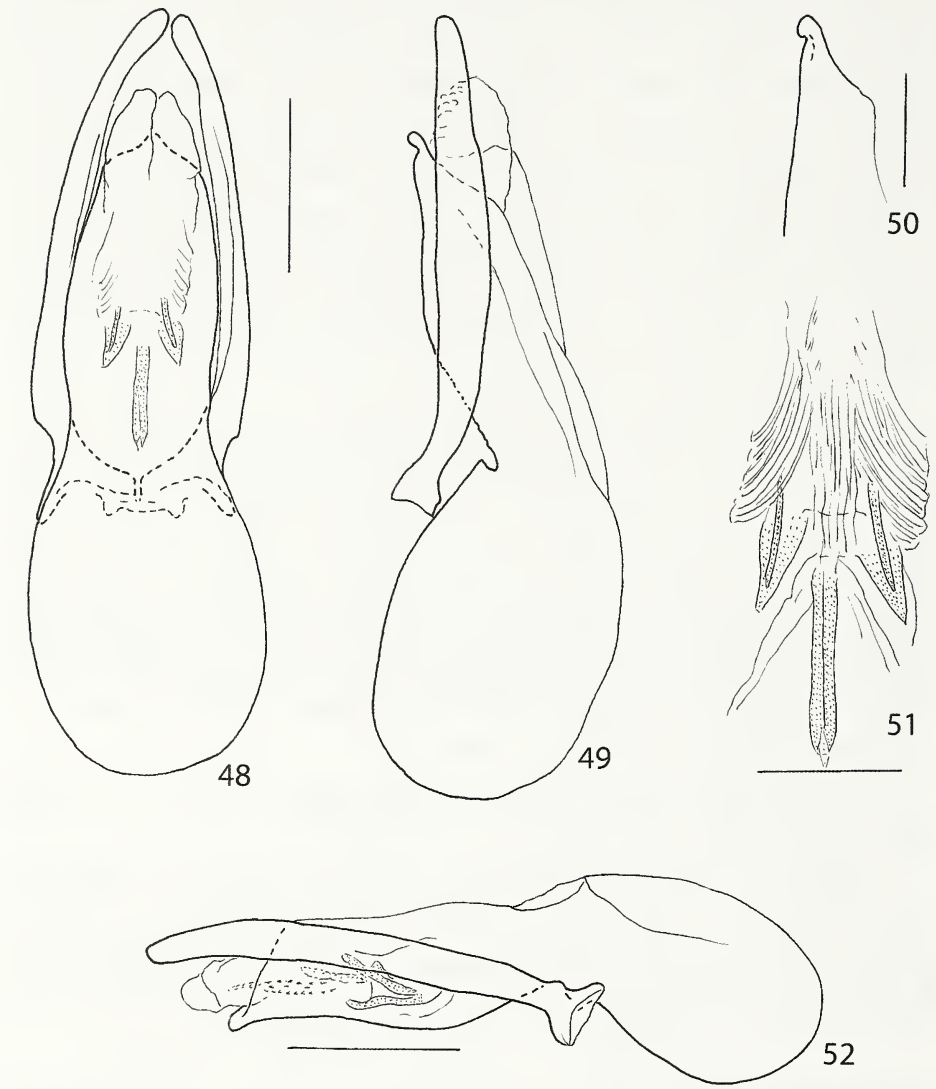
COMMENTS. This species resembles *P. carinense*, *P. grossum*, *P. hisamatsui*, *P. vitalisi* and the below described *P. convenxum* and *P. conspectum* in most of its external characters. It differs from all of them by the metaventrite bearing admesal tubercles, and also from most of its congeneres by the strongly elongate antennomere XI. It may be also distinguished by the large body size, in combination with the aedeagal characters, in particular by the shape of the parameres.

Pseudobironium feai Pic, 1920 Figs 9, 10, 48-51

Pseudobironium feai Pic, 1920b: 24.

LECTOTYPE: ♂, MCSN, by present designation, labelled: Carin Cheba 900-1100 m. L. Fea V XII-88 [printed] / Mus. Civ. Genova [printed] / Pseudobironium Feai n. sp. [hand - written, by Pic] /SYNTYPUS [printed] Pseudobironium feai Pic1920 [handwritten] / Lectotype [red, printed] /Lectotype Pseudobironium feai Pic det. Löbl 1991 [handwritten, "det. Löbl 19" printed].

ADDITIONAL MATERIAL EXAMINED. INDIA, Meghalaya, SW of Cheerrapunjee 25°13'-14'N, 91°40'E, 900m, 23.-25.VI. 2007, 3 ♂, 3 ♀ leg. P. Pacholátko (NHMB, MHNG). With the same data but 25°14'N, 91°40'E, 21.V.2000, 4 ♂ leg. L. Dembický (NHMB, MHNG). – LAOS, Phongsaly Prov., 21°41'-42'N 102°06'-08'E, 28.V.-20.VI.2003, env. 1500m, 2 ♂ leg. V. Kubáň (NHMB, MHNG). – Laos NE, Houa Phan Prov., 20°13'09"N 103°59'54"-104°00'03"E, 1480-1550m, Phou Pane Mts., 9.-16.VI.2009, 1 ♂ leg. D. Hauck (NHMB). – CHINA, Guangxi,



FIGS 48-52

(48-51) *Pseudobironium feai* Pic, aedeagus in dorsal (48) and lateral (49) views, tip of median lobe in lateral view (50), internal sac (51) in dorsal view; scale bars for aedeagus = 0.3 mm, for internal sac = 0.1 mm, for tip of median lobe = 0.05 mm. (52) *Pseudobironium horaki* sp. nov., aedeagus in lateral view; scale bar = 0.2 mm.

Lingui County, Huaping N. R., Anjianping, 1200m, 16.VII.2011, 1 ♂, 5 ♀ leg. Zhong Peng (SNUC). – Xizang, Motuo county, A'niqiao, 1100m, 16-18.VIII.2005, 1 ♂ leg. Liang Tang (SNUC). – Hainan, Ledong County, Jianfengling Nature Reserve, 1000m, 17-24.V.2011, 2 ♂ leg. Wen-Xuan Bi (SNUC, MHNG).

REDESCRIPTION: Length 2.90-3.20 mm, width 2.10-2.50 mm. Head, pronotum, elytra and most of abdomen black. Prohypomera, venter of thorax, apical parts of

ventrites I to V, apical abdominal segments, mouth-parts, femora and tibiae dark reddish-brown; antennomeres I to VI or I to VIII light reddish, apical antennomeres infuscate. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Length ratio of antennomeres as II 13: III 9: IV 16: V 17: VI 14: VII 18: VIII 15: IX 18: X 16: XI 22; antennomere XI three times as long as wide. Head and pronotum with dense and fine punctation; punctures not well delimited, shallow, pronotal punctures slightly larger than those on head, with intervals mostly about twice to four times as large as puncture diameters. Elytra lacking subapical hump and lateral impression, and without subapical impression. Elytral punctation slightly coarser that pronotal punctation, with punctures mostly well delimited, puncture intervals mostly twice to four times as large as puncture diameters. Prohypomera impunctate, not microsculptured. Mesoventrite punctate, lacking median ridge or line. Metaventrite with microsculpture visible on middle part, absent from lateral parts. Median part of metaventrite weakly convex, coarsely and densely punctate except on smooth mesal line, punctures sharply delimited, with diameters to part about as large as puncture intervals. Lateral parts of metaventrite very finely punctate, appearing impunctate. Submesocoxal area about as long as fourth to third of interval to metacoxa. Metacoxal process distinctly microsculptured, lacking median line or ridge, with margin truncate or weakly concave. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely, sparsely punctate, with punctulate and strigulate microsculpture, and with shallow round impression situated posterior mid-length. Following sternites lacking wrinkles, with distinct microsculpture.

Male: Protarsus shorter than protibia, protarsomeres 1 to 3 distinctly widened, somewhat narrower than apex of protibia, with long tenent setae. Aedeagus (Figs 48-51) 1.10-1.31 mm long. Median lobe with basal bulb much shorter than apical process, lacking obvious lateral tubercles, eventually with hardly visible ventral tubercles, weakly inflexed ventrally, with ventral side strongly arcuate, tip blunt, swollen. Parameres weakly curved, almost evenly wide except near base, almost straight in dorsal view. Inner sac with mesal guide-sclerites, pair of subtringular sclerites each with single short rod, membranes strigulate laterad and posterior sclerites, and with very fine spinose structures followed by hardly visible hair-like structures.

DISTRIBUTION: India: Meghalaya, Myanmar, Laos, China: Guangxi, Xizang, Hainan.

COMMENTS: This species may be distinguished by the shape of the tip of the median lobe, as seen in lateral view. A lectotype designation is considered useful because the original description and a somewhat more detailed redescription given by Pic (1921: 163) do not mention the number of examined specimens, and additional syntypes, not necessarily conspecific, may exist in collections.

Pseudobironium horaki sp. nov. Figs 52-54

HOLOTYPE ♂: MALAYSIA, Sarawak, Kapit Distr., Rumah Ugap village, Sut river, 3.-9.III. 1994, J. Horák (MHNG).

PARATYPES: INDONESIA, Java, Idjan Plateau, K. O. Blawan, 900-1500m, 4.XII.1933, 10, I., 5.II.1934, and 20.I.1935, 2 ♂, 4 ♀, 5 ex. sex not examined leg. H. Lucht (MHNG,

ZMBC). – W Java Gn. Halimun Nat. Park 5 km W Cipedey ca 1000m, 22.8.1994, 5 ♀ leg. R. Schuh (NHMW, MHNG). – MALAYSIA: Sarawak, Kuching Distr., Mt. Serapi, 27.-29.III.1994, 1 ♀ leg. J. Horák (MHNG). – NW Borneo, Sarawak, Belaga, 15.III.1990, 1 ♂ A. Riedel (NMEC); Sabah, Poling nr. Ranau, 28.IV.1980, 1 ♀ leg. M. & A. Sakai (EUMJ). – Borneo, Sabah, km 53 road KK-Tambunan Gn. Emas, 1650m, 22.III.- 6.IV.2000, 1 ♂, 1 ♀ leg. Bolm (NHMB, MHNG).

DESCRIPTION: Length 2.35-2.70 mm, width 1.70-2.00 mm. Head brown. Pronotum reddish-brown, with variably large, usually not well delimited dark median spot, often extended from anterior margin to base and narrowed basally. Pronotal base narrowly darkened. Elytra reddish-brown, each with darkened humeral area, dark, not well delimited spot or transverse band situated posterior elytral mid-length, and narrowly darkened apex; area posterior spot or transverse band lighter than area anterior spot. Prohypomera and abdomen reddish-brown as most of pronotum, apical abdominal segments sometimes lighter, mesoventrite and metaventrite darker brown. Femora and tibiae reddish-brown, tarsi and antennomeres I to VI light reddish or almost yellowish, following antennomeres infuscate. Maxillary palpi with palpomere IV about 2.5 times as long as wide, tapering. Antennae long, length ratio of antennomeres as II 10: III 6: IV 9: V 12: VI 10: VII 13: VIII 12: IX 14: X 13: XI 18; antennomere XI about three times as long as wide. Pronotum with punctation dense and distinct on median area, with punctures usually well delimited and some about as large as puncture interval, punctation inconspicuous on lateral areas. Elytral punctation in average slightly finer than that of pronotum, most puncture intervals about twice to three times as large as puncture diameters. Inferior part of prohypomera finely punctate, superior part impunctate. Mesoventrite punctate in middle and along margin, with short median ridge. Metaventrite with transversely strigulate microsculpture sometimes almost evanescent near lateral margins; with median part convex and distinctly punctate, except along smooth mesal line. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as long as one third of interval to metacoxa. Metacoxal process smooth, lacking stria or tubercle, with margin hardly concave. Protibiae and mesotibiae almost straight, metatibiae slightly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely punctate, with strigulate microsculpture, lateral, very shallow, foveiform impressions and slightly impressed oblique lines.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 moderately widened and bearing short tenent setae. Aedeagus (Figs 52-54) 0.73-0.77 mm long. Median lobe with basal bulb much shorter than apical process, latter weakly inflexed, with ventral side sinuate, tip blunt, rounded. Parameres narrow, weakly curved in dorsal and lateral views, with small apical lobe. Internal sac with mesal guide-sclerites, pair of conic sclerites each including one narrow rod and basally joined by membranes to irregular sclerotized piece; membranes posterior sclerites bearing long spicules.

DISTRIBUTION: Malaysia: Sarawak, Sabah; Indonesia: Java.

ETYMOLOGY: The species is named in honour of Jan Horák, Praha, Czech Republic, who is one of its collectors.

COMMENTS: The colour pattern of this species is distinctive. Only *P. bicolor* and *P. parabicolor* have a similar coloration. In addition to its colour pattern, *P. horaki* is characterized by the distinctly punctate inferior part of the prohypomera, strigulate

microsculpture on metaventrite and on abdominal sternite 1, and weekly lobed apices of the parameres, in combination. The examined aedeagi have the membranes of the internal sac bearing long spicules, similar to those in *P. parabicolor*, while the parameres are weekly curved and have a small apical lobe. Apically lobed parameres are also in *P. bicolor*, the aedeagus of latter differs conspicuously by the basal bulb about as long as apical process of median lobe, and by the tip of the median lobe very short and abruptly inflexed ventrally.

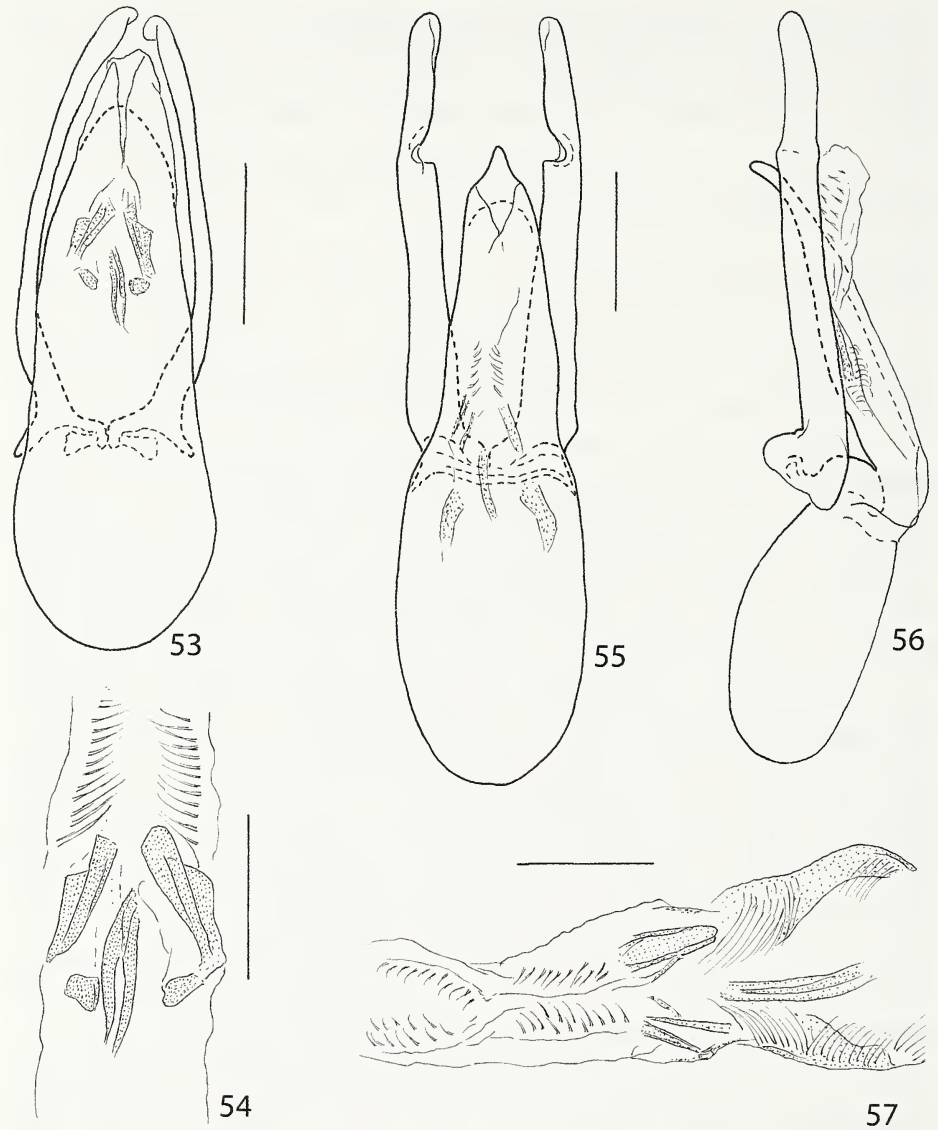
Pseudobironium incisum sp. nov. Figs 55-57

HOLOTYPE: ♂, VIETNAM Tuyen Quang Prov., 360m Na Hang Reserve 20-24.V.97 rainfor. FIT leg. S. Peck #97-13 (MHNG).

PARATYPES: VIETNAM, with the same data as the holotype, 1 ♀; with the same data but 16-20.V. and #97-10, 1 ♀. – With the same data as holotype but 300m, #7-12, 1 ♂, 1 ♀. – Cao Bang Prov., Ba Be Nat. Park 7-11.V.97, 180m for. FIT, 1 ♂ leg. S. Peck, #97-2 (all MHNG).

DESCRIPTION: Length 2.60-2.75 mm, width 1.75-1.90 mm. Head and body reddish-brown, pronotum sometime becoming lighter laterally, mesoventrite and metaventrite slightly darkened. Prohypomera and most of abdomen about as, or lighter than metaventrite, apical abdominal segment light reddish-brown to yellowish. Femora and tibiae as metaventrite, tarsi lighter than tibiae, antennomeres I to VI light reddish-brown, following infuscate. Maxillary palpi with palpomere IV, about 3 times as long as wide. Length ratio of antennomeres as II 12: III 9: IV 17: V 19: VI 15: VII 17: VIII 15: IX 15: X 16: XI 21; antennomere XI about three times as long as wide. Pronotal punctation fine and dense, punctures not clearly delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Elytra lacking impression and hump. Elytral punctation dense, clearly less fine than pronotal, with punctures fairly will delimited, puncture intervals mostly twice to three times as large as puncture diameters. Prohypomera impunctate. Mesoventrite punctate near margin, lacking median ridge. Metaventrite not microsculptured, in median third slightly convex, with coarse punctation covering almost entire surface, impunctate only on narrow mesal area between mesocoxae; punctures coarse, well delimited, becoming very dense and smaller posteriad, puncture intervals mostly about as large as or smaller than puncture diameters. Lateral parts of metavenrite very finely punctate. Submesocoxal area somewhat longer than third of interval to metacoxa. Metacoxal process impunctate, microsculptured, lacking median stria or tubercle, with slightly concave margin. Mesotibiae and metatibiae distinctly curved, mesotibial ventral spur straight. Abdomen with punctulate microsculpture covering almost entire 1. sternite, latter very finely punctate, with very shallow, poorly delimited lateral impression.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 about even in length, distinctly widened, narrower than apex of protibia, bearing tenent setae about as long as respective tarsomere. Aedeagus (Figs 55-57) 0.99-1.12 m long. Median lobe narrow, with basal bulb about as long as apical process, latter strongly inflexed, bent near tip and evenly narrow in lateral view. Parameres almost straight, notched at level of apex of median lobe, slightly narrower posterior than anterior notch. Internal sac with mesal guide-sclerites, pair of flat lateral sclerites posterior latter and joined proximally to weekly sclerotized plates, membranes with dense strigulate structures and in apical part with long spine-like structures.



FIGS 53-57

(53, 54) *Pseudobironium horaki* sp. nov., aedeagus (53) and internal sac (54) in dorsal view. (55-57) *Pseudobironium incisum* sp. nov., aedeagus in dorsal (55) and lateral (56) views, internal sac (57) in dorsal view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

DISTRIBUTION: Vietnam.

ETYMOLOGY: The species epithet is a Latin adjective, referring to the notched parameres.

COMMENTS: This species is unique within the genus in having notched parameres.

Pseudobironium languei (Achard, 1920) Fig. 58

Morphoscapha languei Achard, 1920: 133.
Pseudobironium tonkineum Pic, 1923b: 195, **syn. nov.**
Cyparium monticola Miwa & Mitono, 1943: 536.

TYPE MATERIAL OF *MORPHOSCAPHA LANGUEI*: Syntypes; MNHN. Type locality: Vietnam, Tonkin, Laokai. Examined many year ago by the senior author, at present not available for study.

TYPE MATERIAL OF *P. TONKINEUM*: Lectotype ♀; MNHN, by present designation, labelled: Hoa Binh Tonkin / Type / Morphoscapha grossum probabl /envoye un a Achard / Pseudobironium tonkineum Pic [handwritten] / TYPE (red printed) / Pseudobironium languei (Achard) det. Löbl, 1970 / Lectotype Pseudobironium tonkineum Pic det. I. Löbl, 2013. Paralectotypes, 2 ♀: MNHN, fixed on the same pin and below the lectotype, by present designation (see below).

TYPE MATERIAL OF *CYPARIUM MONTICOLA*: Lectotype ♂: TARI. Type locality: Taiwan, Kuaru. Lectotype designation and synonymy: Löbl, 2011b: 203.

ADDITIONAL MATERIAL EXAMINED: THAILAND, Chumphon Prov., Pha To env. 9°48'N 98°47'E, 1.-21.III.1996, 1 ex. leg. K. Majer (NHMB). – Mae Hong Son, Huai Sua Tao, 11.-17.V.1992, 1 ex. leg. J. Strnad (NHMW). – LAOS, Bolikhamxai Prov., Rd. no. 8, Kharneut (Na Hin) 500m, 30-31.X.2003, 2 ex. leg. S. Kurbatov (MHNG). – Houa Phan Prov., 20°13'09-19"N 103°59'54"-104°00'03"E, 1480-1550m, Phou Pane Mt., 9.-16.VI.2009, 2 ex., leg. D. Hauck (NHMB, MHNG). – Kham Mouan Prov., Ban Khoum Ngeun, env. 200m, 18°07'N 104°29'E, 19.-31.V.2001, 2 ex. leg. P. Pacholátko (NHMB, MHNG). – Same data but 24-29.IV.2001, 1 ex. leg. V. Kubán (NHMB). – Xieng Khouang Prov., 19°37-38'N 103°20'E Phonsavan (30km NE): Phou Sane Mt., env. 1400-1500m, 10.-30.V.2009, 1 ex. leg. Z. Kraus (NHMB). – VIETNAM, Tonkin Hoa Binh, 3 ex. leg. de Cooman (MNHN). – Tonkin Hoa Binh, 27 ex. (MNHN). – Tonkin Hoa Binh, 1 ex. leg. H. Perrot (MHNG); Hoa Binh, 4-7.VI.1986, 1 ex. J. Horák (MHNG). – Cuc Phuong, 24.-25.V.1986, 5 ex. leg. J. Rybníček (NHMB, MHNG). – Same data but VIII.1986, 6 ex. leg. J. Horák (MHNG, NHMB). – Cuc Phuong, 15.VI.1985, 1 ex. leg. A. Olexa (MHNG). – Cuc Phuong, 24.-25.V.1986, 3 ex. leg. A. Olexa (MHNG, NHMB). – Tam Dao, 900m, 13.-24.V.1986, 1 ex. leg. A. Olexa (NHMB). – Ho Long, 29.5.-1.6.1980, 1 ex. leg. J. Jelínek (MHNG).

DISTRIBUTION: West Malaysia, Thailand, Laos, Vietnam, and Taiwan (for records from Taiwan see Löbl, 2012b: 203).

COMMENTS: Pic (1923) described his *P. tonkineum* from "Tonkin: Hoa Binh". In the MNHN that houses the Pic collection is a series of 33 conspecific specimens from Hoa Binh. Among them, 3 females on a single pin, and bearing handwritten Pic's labels, are considered syntypes. The remaining specimens may be members of the original type series. However, in doubt, they are not considered to be syntypes. Löbl (2011b: 203-204) gave new records from Taiwan, mentioned diagnostic characters, and illustrated its antenna, maxillary palpus and aedeagus. The species may be distinguished from the similar *P. sparsepunctatum* (Pic) by its distinctive shape of the apex of the median lobe and the parameres, as seen in lateral view (Fig 58).

Pseudobironium lewisi Achard, 1923 Figs 59-62

Pseudobironium lewisi Achard, 1923: 118.

LECTOTYPE: ♂, NHML, aedeagus mounted on celuloid plate, labelled: Syntype (round) / Nagasaki 13.II.-21.VI.81 / Japan. G. Lewis. 1910 - 320 / Pseudobironium (Morphoscapha) Lewisi n.sp. Type (handwritten by Achard) / Pseudobironium lewisi Achard R.J.W.Aldridge det 1975 SYNTYPE / Lectotype Pseudobironium lewisi Achard det. Löbl, 2013.

PARALECTOTYPES: NHML, 2 ♂, aedeagi examined, bearing round syntype and "Pseudobironium lewisi Achard R.J.W.Aldridge det 1975 SYNTYPE" labels and additional labels "Miyanoshita / Japan G. Lewis 1910 - 320".

PARALECTOTYPES: sex not examined, 3 ex. NMPC, labelled Nagasaki 13.II.-21.IV.81 / Japan. G. Lewis. 1910 - 320 (printed) / Pseudobironium Lewisi Ach. n. sp. (hanswritten).

PARALECTOTYPES; ♀, NHML, probably conspecific with the lectotype, with the round syntype and "Pseudobironium lewisi Achard R.J.W.Aldridge det 1975 SYNTYPE" labels- – 1 ex. with additional "Hakone 17.IV.-19.IV.80 / Japan G. Lewis 1910 - 320"; 2 ex. "Miyanoshita / Japan G. Lewis 1910 - 320".

PARALECTOTYPES: NHML, misidentified *Scaphisoma castaneipenne* Reitter, 1877, all with the round syntype and "Pseudobironium lewisi Achard R.J.W.Aldridge det 1975 SYNTYPE" labels: 1 ♂ and 1 ex. not dissected Nikko / Japan G. Lewis 1910 - 320; 1 ex. Miyanoshita / Japan G. Lewis 1910 - 320; 1 ex., Ashiwo 26.8.81 / Japan G. Lewis 1910 - 320.

PARALECTOTYPE; ♂, NHML, misidentified *Pseudobironium augur* sp. nov., see under latter species.

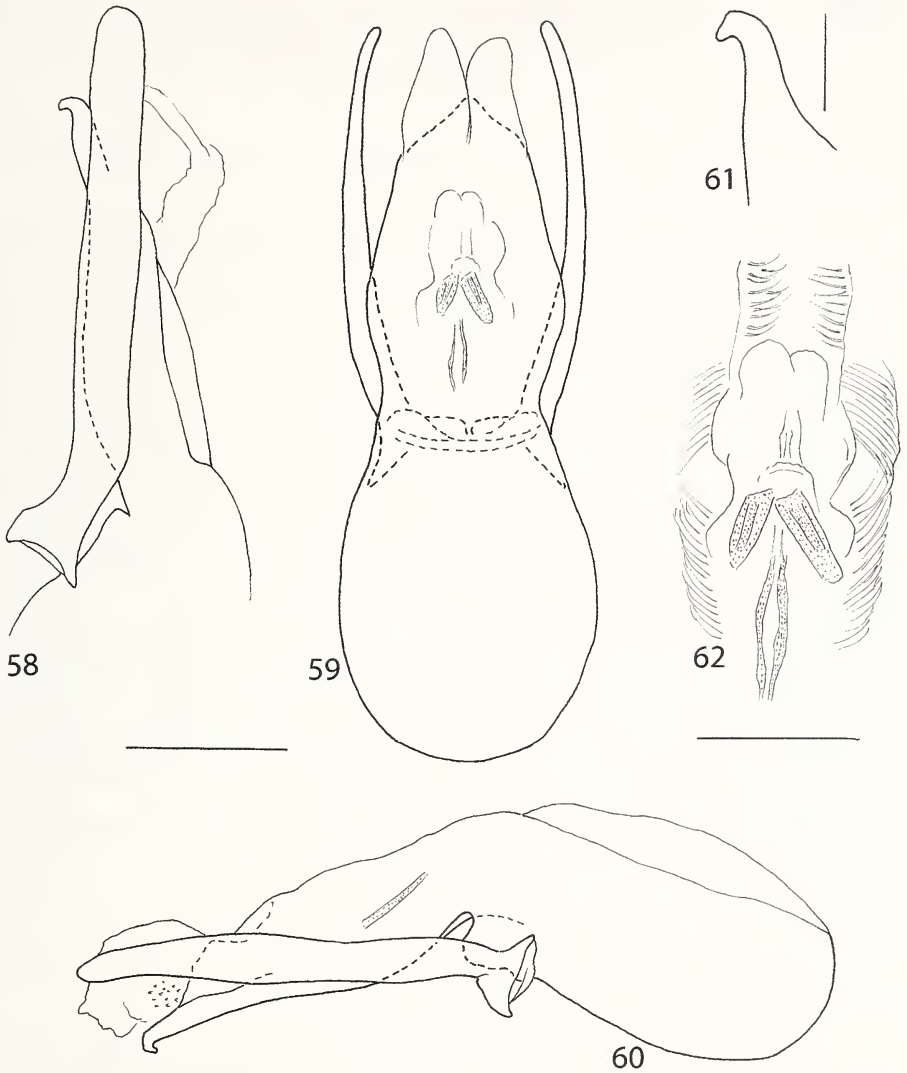
ADDITIONAL MATERIAL EXAMINED (only males). JAPAN, Honshu, Gunma Pref., below Usui Pass, 750m and 900m, 20. and 25.VII.1980, 5 ex. leg. I. Löbl (MHNG). – Gumna Pref., below Usui Bypass, 700m, 20.VII.1980, 2 ex. leg. I. Löbl (MHNG). – Gunma Pref., 3 km N Tsumagoi, 1100m, 18.VII.1980, 1 ex. leg. I. Löbl (MHNG). – Honshu, Tochigi Pref., Nikko Nat. Park, Ryuzu, 1400m, 16.7.1980, 1 ex. leg I. Löbl (MHNG). – Honshu, Tochigi Pref., Chuzenji, 1 ex. leg. G. Lewis (NHML). – Honshu, Gifu Pref., 8km SE Osaka, 750m, 1.VIII.1980, 2 ex. leg. I. Löbl (MHNG). – Honshu, Gifu Pref., 9 km E Gero, 450-500m, 31.7.1980, 3 ex. leg. I. Löbl (MHNG). – Honshu, Nara Pref., Nara Park, 27.-31.VII.1980, 3 ex. leg. C. Besuchet (MHNG). – Honshu, Hiogo Pref., "Higo", 1 ex. leg. G. Lewis (NHML). – Honshu, "Kioto" 1 ex. (NMPC). – Shikoku, Ehime Pref., Mt. Ishizuchi, 1000m, 14.VIII.1980, 1 ex. leg. I. Löbl (MHNG). – Shikoku, Ishizuchi Nat. Park, Omogo valley, 700m, 18-25.VIII.1980, 1 ex. leg. S. & J. Peck (MHNG). – Shikoku, Ishizuchi Nat. Park, Tsuchigoya, 1400m, 11-18.VIII.1980, 1 ex. leg. S. & J. Peck (MHNG). – Shikoku, Tokushima Prof., Mt. Tsurugi, 25-26.VII.1954, 1 ex. leg. M. Chûjô (MHNG). – Kyushu, Kumamoto Pref., Izumi vill., 6.VII.1991, 2 ex. leg. T. Uéno (MHNG). – Kyushu, Kumamoto Pref., Hitoyoshi, 15.-17.V.1881, 1 ex. leg. G. Lewis (NHML).

ADDITIONAL DIAGNOSTIC CHARACTERS: Length 2.40-2.95 mm, width 1.65-2.05 mm. Maxillary palpi with palpomere IV tapering, about 3 times as long as wide. Length ratio of antennomeres as II 12: III 10: IV 16: V 16: VI 14: VII 16: VIII 15: IX 15: X 16: XI 18; antennomere XI about 2.5 times as long as wide (17:7). Pronotum almost as coarsely punctate as elytra. Inferior part of prohypomera with punctation more dense and consisting of punctures distinctly larger than on superior area. Posterior half of mesosternite densely, finely punctate, lacking median ridge. Metaventrite not microsculptured. Submesocoxal area about as long as half of shortest interval to metacoxa. Metacoxal process distinctly punctate, lacking stria or tubercle, with weakly convave margin. Mesotibial ventral spur straight. Abdominal sternite 1 with punctulate microsculpture that may be evanescent on laterobasal area.

Male: Protarsus shorter and protibia, with segments 1 to 3 almost as wide as apex of protibia, bearing moderately long tenent setae. Aedeagus (Figs 59-62) 0.92-1.12 mm long. Internal sac without flagellum, with mesal guide-sclerites, bilobed plate joined to pair of short subcylindrical sclerites. Membranes with inconspicuous strigulate structures, in apical part with long hair-like structures.

DISTRIBUTION: Japan: Honshu, Shikoku, Kyushu.

COMMENTS: The description of the species was based on specimens collected by G. Lewis, coming from Nagasaki, Hakone, Miyanoshita, Ashiwo, and Nikko, the number of specimens examined was not mentioned by Achard (1923). The sole specimen from Nagasaki of the series housed in the NHML was deemed to be holotype (Löbl, 1969). In fact, it is a lectotype, designated in that paper (ICZN, Art. 74.6).



FIGS 58-62

(58) *Pseudobironium languei* (Achard), aedeagus in lateral view. (59-62) *Pseudobironium lewisi* Achard, aedeagus in dorsal (59) and lateral (60) views, tip of median lobe in lateral view (61), internal sac (62) in dorsal view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

Subsequently, R.J.W. Aldridge removed the holotype label and added under all original specimens syntype labels.

The species was several times redescribed and reported from various Japanese localities, e.g. by Miwa & Mitono (1943), Nakane (1955, 1963), Löbl (1969). The records of *P. lewisi* may be based on misidentification, as the presence of a second

species of *Pseudobironium* in Japan was overlooked and some diagnostic characters were not mentioned. The previous illustrations of the aedeagus (Löbl, 1969: 326) lack detail, therefore new illustrations are given here (Figs 59-62).

Pseudobironium parabicolor sp. nov. Figs 63-65

HOLOTYPE: ♂, CHINA: S. Yunnan, Mengyang Nat. Res., ca 500m, 12.XI.1994, rotten wood, leg. S. Kurbatov (MHNG).

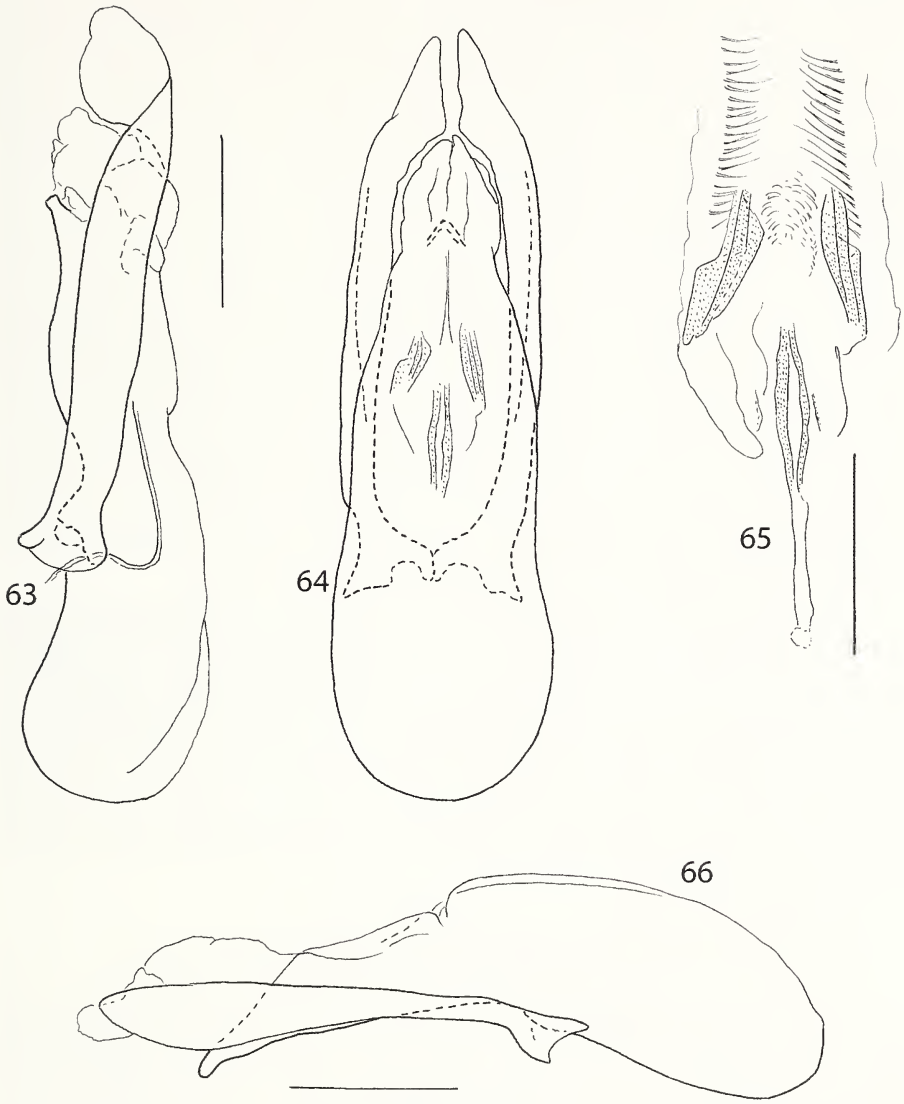
DESCRIPTION: Length 2.40 mm, width 1.80 mm. Body reddish-brown. Head with vertex darker than frons. Pronotum with dark brown to almost blackish, well delimited, subtriangular spot covering most of its centre. Elytra each with dark basal band extending from lateral margin almost to inner third of basal width, dark transverse central band extended from lateral margin about to inner fourth of disc, and distinctly darkened along entire apical and lateral margins. Mesoventrite, mesepisterna and abdominal sternite 1 hardly darker than prohypomera, metaventrite and abdominal sternites 2 to 5 distinctly darker than prohypomera, apical abdominal segments lighter, almost yellowish. Antennomeres I to VI and maxillary palpi yellowish, antennomeres VII-XI darkened. Femora and tibiae about as light as first abdominal sternite, tarsi slightly lighter. Maxillary palpi with palpomere IV tapering, almost 3 times as long as wide. Length ratio of antennomeres as II 9: III 5: IV 9: V 10: VI 10: VII 14: VIII 13: IX 16: X 14: XI 22; antennomere XI 4 times as long as wide. Frons and vertex very finely punctate. Pronotal and elytral punctation similar, fine, fairly sparse and irregular, punctures shallow and not well delimited, puncture intervals usually twice to four times as large as puncture diameters. Prohypomeral punctation indistinct, much finer than that on pronotum. Posterior and mesal parts of mesoventrite punctate. Median part of metaventrite distinctly convex, with longitudinally strigulate microsculpture, distinct punctation limited onto areas laterad smooth, narrow mesal area. Lateral parts of metaventrite appearing impunctate, with strigulate microsculpture on posterior surface. Submesocoxal area about as long as third of shortest interval to metacoxae. Metacoxal process truncate, impunctate, lacking stria or tubercle, weakly swollen transversally. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 with strigulate microsculpture, very finely punctuate. Following sternites with basal wrinkles or coarse basal punctures.

Male: Protarsus shorter than protibia, protarsomeres 1 to 3 weakly widened, much narrower than apex of protibia, bearing short ventral setae. Aedeagus (Figs 63-65) 0.88 mm long, moderately sclerotized. Basal bulb small. Apical process about 1.6 times as long as basal bulb, not inflexed, with ventral side sinuate, tip obliquely truncate in lateral view, parameres wide, almost straight, widened apically, subtriangular apically in dorsal view, forming large, folded lobe in lateral view. Membranous parts of internal sac with long spicules-like structures posterior complex of sclerotized pieces.

DISTRIBUTION: China: Yunnan.

ETYMOLOGY: The species epithet refers to similarity with *P. bicolor*.

COMMENTS: This species resembles *P. bicolor*, in particular by the colour pattern. However, its elytra are not darkened along suture. Both species differ distinctly



FIGS 63-66

(63-65) *Pseudobironium parabicolor* sp. nov., aedeagus in lateral (63) and dorsal (64) views, internal sac (65) in dorsal view. (66) *Pseudobironium pseudobicolor* sp. nov., aedeagus in lateral view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

by their aedeagi. The parameres are in *P. parabicolor* conspicuously widened and subtriangular at apices, while they are only slightly widened and distinctly rounded in *P. bicolor*.

Pseudobironium pseudobicolor sp. nov. Figs 66, 67

HOLOTYPE: ♂, TAIWAN, Pingtung Co., Sandimen Township, Rd 29, env. Saijia 1053m, 13.ii.2012, leg. S. Vít (MHNG).

DESCRIPTION: Length 2.50 mm, width 1.75 mm. Head and body reddish-brown. Pronotum moderately darkened on large central area, limits of darkened area obsolete. Elytra darkened at base and at apex, not along lateral margins. Inferior part of prohypomera, mesoventrite and metaventrite slightly darkened, remaining ventral surface about as most of pronotum and elytra. Femora and tibiae as most of body, tarsi slightly lighter. Maxillary palpi and antennomeres I to VI yellowish, following antennomeres darkened. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 11: III 7: IV 11: V 13: VI 10: VII 14: VIII 13: IX 15: X 14: XI 20; antennomere XI four times as long as wide. Frons and vertex finely and densely punctate. Pronotum and elytra with similar, dense and fairly coarse punctation, puncture intervals mostly slightly larger to three times as large as puncture diameters. Elytral punctures well delimited. Prohypomeral punctation indistinct. Mesoventrite with apical, erect setae. Metaventrite not microsculptured, middle part weakly convex and almost entirely densely punctate, smooth area limited to narrow mesal surface. Lateral parts of metaventrite very finely punctate, appearing impunctate. Submesocoxal area as long as third of shortest interval to metacoxae. Metacoxal process truncate, smooth, with stria or tubercle. Mesotibiae and metatibiae distinctly curved, mesotibial ventral spur straight. Abdominal sternites with strigulate microsculpture, very finely punctate. Following sternites lacking wrinkles.

Male: Protarsus shorter than protibia. Protarsomeres 1 to 3 moderately widened, much narrower than apex of protibia, bearing fairly long ventral setae. Aedeagus (Figs 66, 67) 0.84 mm long, moderately sclerotized. Basal bulb long. Apical process about as long as basal bulb, weakly inflexed, with ventral side almost straight, except near tip, tip slightly bent and rounded in lateral view. Parameres almost straight in lateral view, somewhat curved posterior base and apically in dorsal view, with inner margin membranous posterior mid-length lobe, narrow near base and gradually widened in lateral view. Membranes of internal sac irregularly, densely folded, without obvious denticles or spines.

DISTRIBUTION: Taiwan.

ETYMOLOGY: The species epithet refers to similarity with *P. bicolor*.

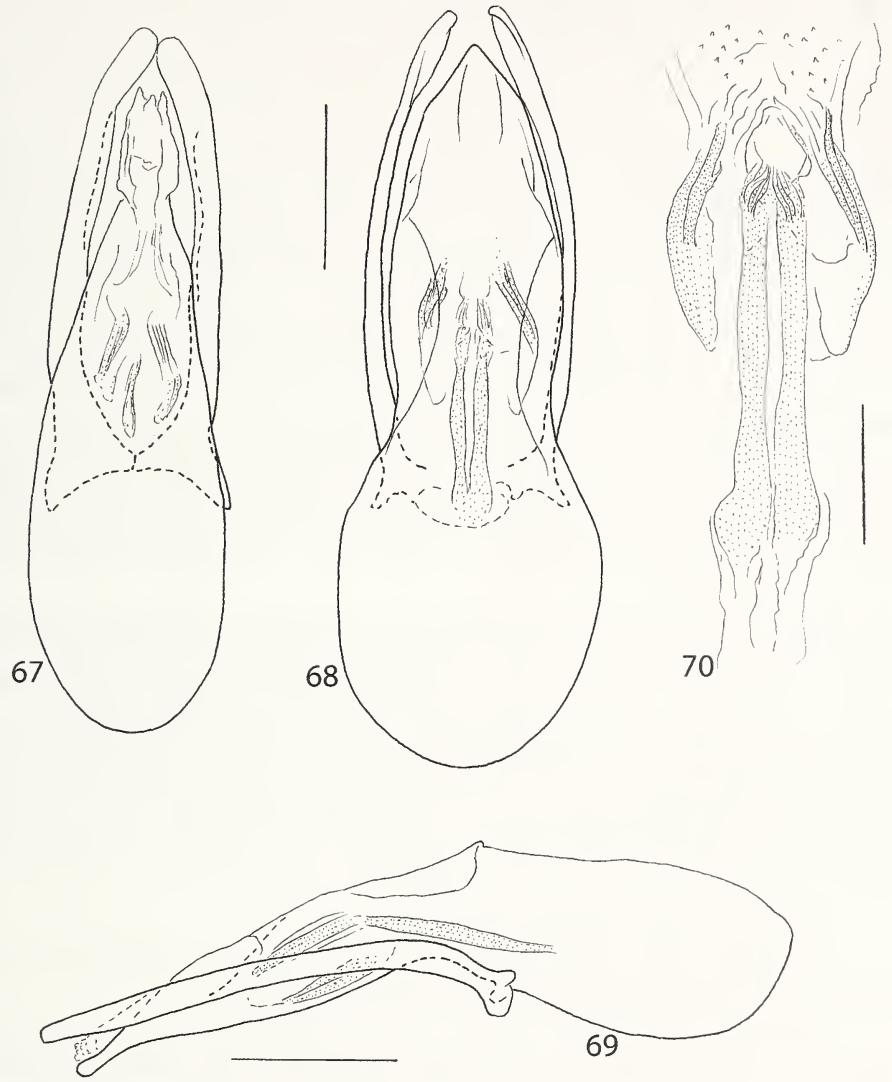
COMMENTS: This species resembles *P. horaki*, *P. bicolor* and *P. parabicolor* by its maculate pronotum. It differs from *P. horaki* by the elytra distinctly darkened along apices, and from *P. bicolor* and *P. parabicolor* by the hardly darkened middle part of elytral disc. The shape of the parameres in *P. pseudobicolor*, as seen in lateral view, is unique and provides a sure diagnostic character separating this species from its congeners.

Pseudobironium pubiventer sp. nov. Figs 68-70

HOLOTYPE: ♂, MALAYSIA, East Malaysia, Sabah, Mt. Kinabalu Nat. Park 1700m, 16-30.VII.2002, leg. S. Kurbatov & Zimina (NHMB).

PARATYPE ♀: with the same data as the holotype (MHNG).

DESCRIPTION: Length 2.20 mm, width 1.52 mm. Head, most of body, femora and tibiae reddish-brown, mesoventrite and metaventrite slightly darkened, brown, elytra near apices, apical abdominal segments, tarsi and antennomeres I to V lighter,



FIGS 67-70

(67) *Pseudobironium pseudobicolor* sp. nov., aedeagus in dorsal view (67); scale bar = 0.2 mm. *Pseudobironium pubiventer* sp. nov., aedeagus in dorsal (68) and lateral (69) views, internal sac in dorsal view (70); scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

antennomeres VI to XI infuscate. Head and pronotum densely, very finely punctate, punctures not clearly delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Elytra with punctation fine near sutural striae, becoming coarse laterally, much coarser than on pronotum, with puncture intervals mostly about twice to three times as large as puncture diameters on outer halves, and denser apically,

punctures partly about as large as intervals near apices. Elytral lacking lateral impressions and humps, near apices somewhat flattened. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Antennae long, length ratio of antennomeres as II 10: III 6: IV 11: V 15: VI 11: VII 14: VIII 13: IX 13: X 14: XI 15; antennomere XI about 2.5 times as long as wide. Prohypomera distinctly, finely punctate and bearing well visible, long pubescence. Mesoventrite im middle swollen, impunctate, obliquely striate. Metaventrite between mesocoxae weakly convex, median part posterior level of mesocoxae flat, with small, shallow impression in middle, distinct pubescence. Metaventrite with strigulate microsculpture on posterior half of median area and between meso- and metacoxae, lacking microsculpture on remaining surface; punc - tation fairly coarse and dense near inner margin of mesocoxae and in median impression, very fine and sparse on middle of swollen area between mesocoxae, fine and very dense on flattened posterior part of mesal area, very fine and sparse on lateral parts. Submesocoxal area about as third of interval to metacoxae. Metacoxal process carinate laterally, with concave apical margin, punctulate microsculpture, impunctate. Mesotibiae and metatibiae moderately curved, mesotibial ventral spur straight. Abdominal sternites with strigulate microsculpure. Sternite 1 very finely punctate, basal puncture row obsolete, with narrow oblique lateral impression followed by fairly wide lateral impression.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 68-70) 0.93 mm long. Median lobe with basal bulb moderately convex ventrally, slightly shorter than apical process. Apical process weakly inflexed, ventrally sinuate, near tip oblique in lateral view, tip almost reaching level of apices of parameres. Parameres arcuate in dorsal view and with narrow ventral lobe, in lateral view almost straight. Internal sac with pair of very long mesal guide-sclerites and admesal sclerites consisting of two rods joined ventrally to weakly sclerotized plates. Membranes of internal sac with sparse, extremely short denticles.

DISTRIBUTION: East Malaysia: Sabah.

ETYMOLOGY: The specific epithet is a noun in apposition and refers to the presence of well visible pubescence on the ventral side of the body.

COMMENTS: This species may be distinguished from other small-sized congeners with reddish-brown body by the combination of following characters: antennomere XI clearly more than twice as long as wide, prohypomera pubescent, metaventrite with strigulate microsculpture and fine punctation on its apicomedian part, metacoxal process microsculptured, mesoventrite swollen in middle, tip of median lobe almost in level with apices of parameres. The species is unique in having distinctly pubescent prohypomera and the mesal guides-sclerites of the internal sac very long, almost as long as third of the median lobe. It shares with *P. javanum* the impressed metaventrite.

Pseudobironium sparsepunctatum (Pic, 1915) Fig. 71

Amalocera sparsepunctata Pic, 1915: 31.
Morphoscapha bangueyi Achard, 1920: 134.

LECTOTYPE *A. SPARSEPUNCTATA*: ♀, MNHN. Type locality: East Malaysia: Banguey [= Banggi Is.]. Lectotype designation and transfer to *Pseudobironium*: Löbl, 1982b.

LECTOTYPE *M. BANGUEYI*: ♂, NMPC. Type locality: East Malaysia: Banguey [= Banggi Is.]. Lectotype designation and synonymy: Löbl, 1982b.

ADDITIONAL MATERIAL EXAMINED: INDONESIA, Java, G. Slamat, Batoerraden, 21.X.1928, 2 ex. leg. F. C. Drescher (ZMBC, MHNG). – Java, Zuid-Preanger, Patimoean, VI. 1925, 2 ex. leg. F. C. Drescher (ZMBC, MHNG). – West Sumatra, south hills above Padangpanjang, 2.-6.IV.1996, 1 ex. leg. S. Bečvář (MHNG). – MALAYSIA, East Malayasia, Sarawak, Kapit Distr., Sebong, Belah riv. 9.-23.III.1994, 1 ex. leg. J. Horák (MHNG). – Sarawak, Kapit Distr., Sebong, Belah riv. 9.-12.III.1994, 4 ex. leg. S. Bilý (NMPC, MHNG). – Sabah, env. Batu Punggul Resort., 24.VI.-1.VII.1996, lower floor forest vegetation, 3 ex. (MHNG).

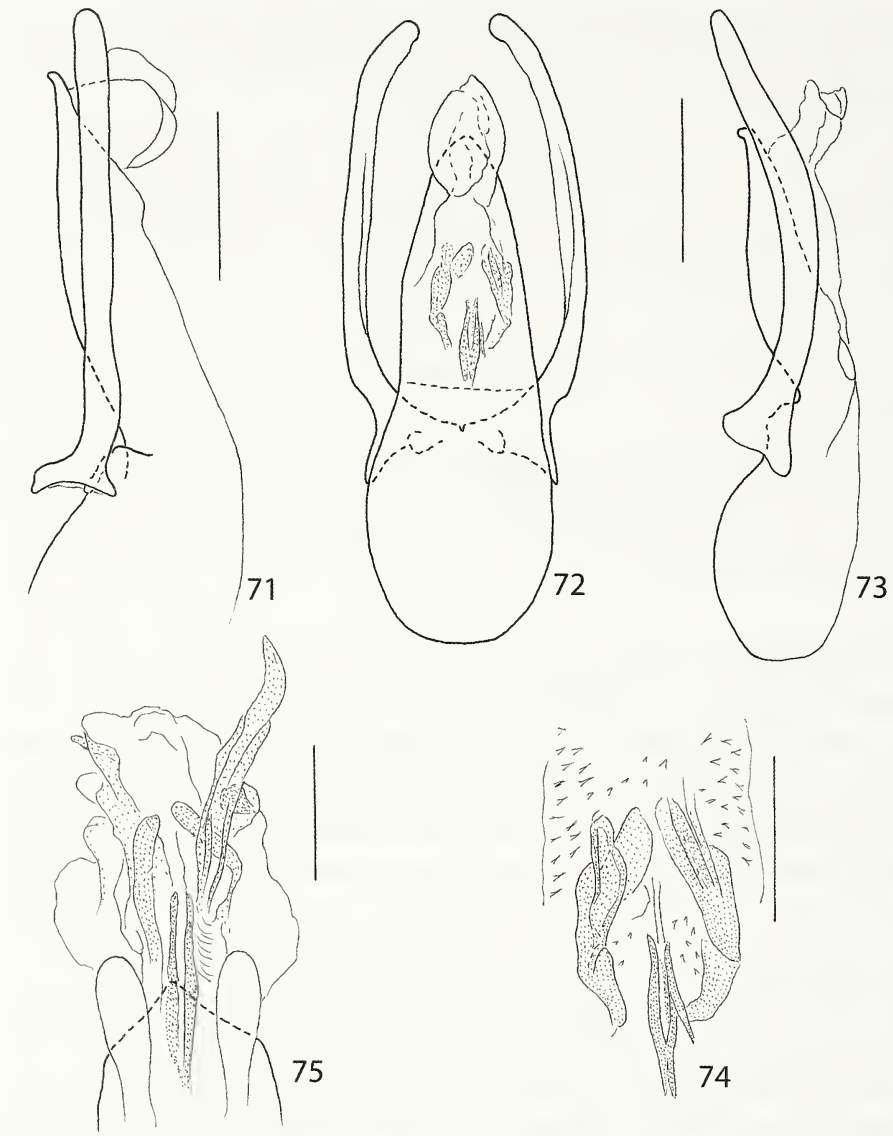
DISTRIBUTION: East Malaysia: Sarawak, Sabah, Banggi; Indonesia: Java; Philippines: Palawan (see also Löbl, 1982b: 790 for records from East Malaysia and Palawan).

COMMENTS: The species was redescribed and its antenna, maxillary palpus and aedeagus were illustrated in Löbl (1982b: 791). It may be distinguished from the very similar *P. languei* (Achard) by the shape of the apex of the median lobe and the parameres seen in lateral view (Fig. 71). The record from Thailand in Löbl, 1990: 514 refers to the latter species.

Pseudobironium stewarti sp. nov. Figs 72-74

HOLOTYPE: ♂, VIETNAM, Tuyen Quang Prov., 300m, Na Hang Reserve, 16-20.V.1997, rainforest FIT 97-8, leg. S. Peck (MHNG).

DESCRIPTION: Length 2.65 mm, width 1.80 mm. Head, most of pronotum, most of anterior halves of elytra, mesoventrite and metaventrite very dark brown. Lateral parts of pronotum, prohypomera, lateral parts of elytra posterior humeral area, and abdomen somewhat lighter. Apical halves of elytra much lighter than elytral centres. Maxillary palpi, antennae and tarsi light brown, femora and tibiae dark brown. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length ratio of antennomeres as II 10: III 7: IV 12: V 15: VI 10: VII 16: VIII 15: IX 16: X 16: XI 20; antennomere XI about 3.3 times as long as wide. Head and pronotum with similar, fine and dense punctation. Punctures fairly well delimited, intervals between them mostly about as to three times as large as puncture diameters. Elytra lacking subapical humps and lateral impressions. Elytral punctation distinctly coarser that pronotal punctation, punctures well delimited, puncture intervals mostly about as large as, to twice large as puncture diameters. Prohypomera very finely punctate, appearing smooth. Mesoventrite with median ridge, coarsely punctate near margin. Metaventrite in middle almost flat, coarsely punctate except on narrow smooth mesal area, with strigulate microsculpture. Lateral parts of metaventrite very finely punctate, with strigulate microsculpture on posterior half, lacking microsculpture on anterior half. Submesocoxal area as long as third of shortest interval to metacoxa. Metacoxal process impunctate, microsculptured, without median stria or ridge, truncate. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely punctate, with long, oblique lateral impressions, and strigulate microsculpture. Following sternites with strigulate microsculpture, lacking basal wrinkles, very finely punctate.



FIGS 71-75

(71) *Pseudobironium sparsepunctatum* (Pic), aedeagus in lateral view; scale bar = 0.2 mm. (72-74) *Pseudobironium stewarti* sp. nov., aedeagus in dorsal (72) and lateral (73) views, internal sac in dorsal view (74). (75) *Pseudobironium ussuricum* Löbl, apex of aedeagus with extruded internal sac; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

Male: Protibia longer than protarsus, latter not particularly elongate, with tarsomeres 1 to 3 weakly widened, much narrower than apex of protibia, bearing short tenent setae. Aedeagus (Figs 72-74) 0.79 mm long, moderately sclerotized. Basal bulb small. Apical process slightly longer than basal bulb, not inflexed, with ventral side sinuate, tip somewhat prominent ventrally and rounded in lateral view. Parameres

narrow, almost evenly wide, arcuate in lateral view, straight with weakly bent apical parts in dorsal view, narrowly membranous along most of apical halves of the inner margins. Membranous parts of internal sac with short spicules posterior and below complex of sclerotized pieces.

DISTRIBUTION: Vietnam.

ETYMOLOGY: The species is named in honour of its collector, Stewart B. Peck, Ottawa, Canada, one of the most efficient field workers the senior author ever met.

COMMENTS: This species resembles *P. bicolor* by its colour pattern, body size and elytral punctation. It differs however in having much finer pronotal punctation, different length ratio of the antennomeres, in particular by the antennomere XI much longer than III, the microsculptured lateroposterior parts of the metaventrite and entire surface of the 1st abdominal sternite. The aedeagal characters of *P. stewarti* suggest close relationships to *P. horaki* and *P. bicolor* from which it differs by the parameres conspicuously arcuate in lateral view and lacking apical lobes.

Pseudobironium subglabrum Löbl, 1990

Pseudobironium subglabrum Löbl, 1990: 514.

HOLOTYPE: ♂, MHNG. Type locality: Thailand, Chiang Mai, Doi Inthanon, 1650m.

DISTRIBUTION: Thailand.

COMMENTS: The species remains known by the single type. It may be distinguished from the presumably related *P. almoranum* by the reddish-brown body with elytra slightly darkened apically, the elytral punctation fine except near apices, the broader apical process of the median lobe, the curved parameres, and the structures of the internal sac.

Pseudobironium ussuricum Löbl, 1969 Figs 75-77

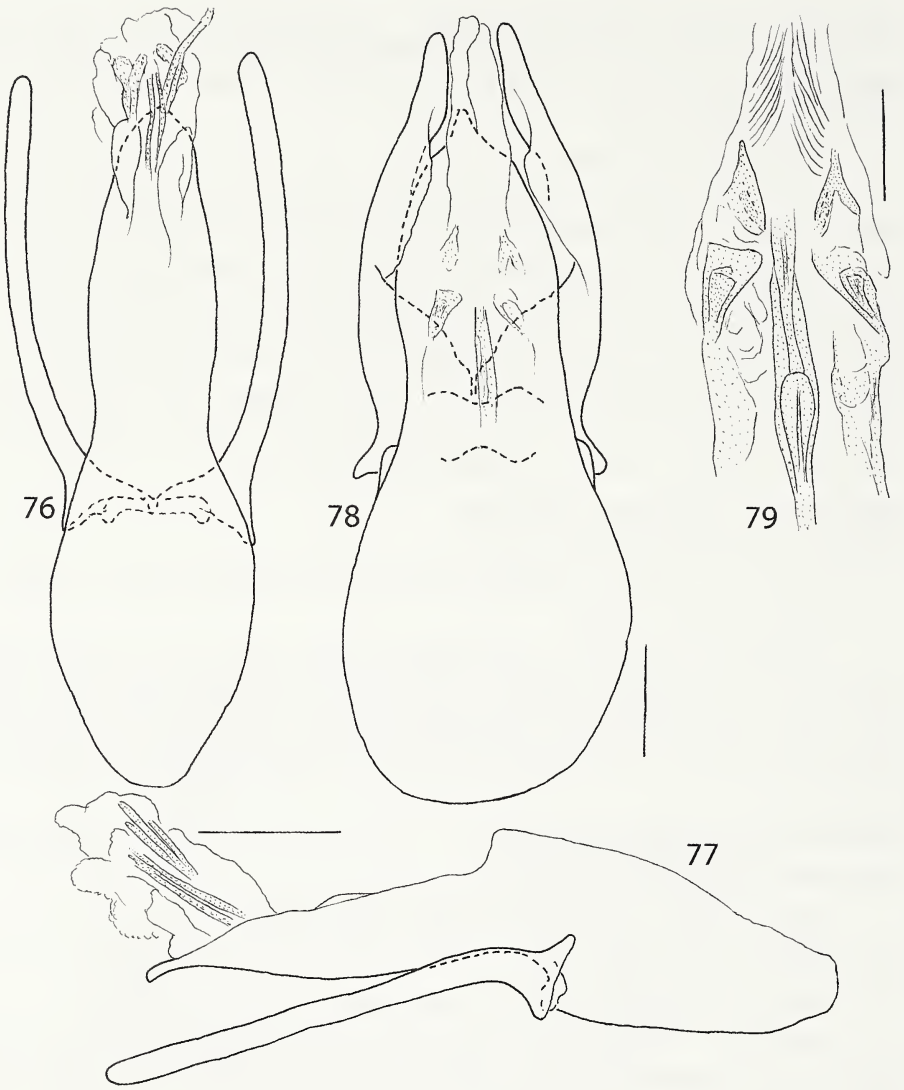
Pseudobironium ussuricum Löbl, 1969: 325.

HOLOTYPE: ZMAN. Type locality: Russia, Ussuri, Vinogradovka.

ADDITIONAL MATERIAL EXAMINED: CHINA, Yunnan, Xishuangbanna, 24.I.1993, 1 ex. leg. G. de Rougemont (MHNG).

DISTRIBUTION: Far East Russia, China: Anhui, Yunnan; South Korea.

COMMENTS: This species is unique in having metaventrite and abdominal sternite 1 coarsely punctate laterally. It has short antennae and the body comparatively weekly convex dorsally, and resembles in these two characters *P. sparsepunctatum*, *P. languei* and *P. achardi*. The ultimate segment of the maxillary palpi is however tapering and about 3 times as long as wide, quite distinctive from that in *P. sparsepunctatum* and *P. languei*, while *P. achardi* is distinctive by its smaller size of body and peculiar coloration of the pronotum and elytra. The length ratio of the antennomeres in P. ussuricum is as follows: II 10: III 6: IV 8: V 10: VI 7: VII 13: VIII 12: IX 13: X 12: XI 17; antennomere XI about three times as long as wide. The aedeagus (Figs 75-77) is characterized by the very narrow and weakly inflexed tip of the medina lobe (in lateral view) and narrow, straight parameres. The description of *P. ussuricum* was based on specimens from Far East Russia. The species was subsequently reported from the Chinese province Anhui (Löbl, 1984b: 993) and from Korea (Hoshina & Ahn, 2005: 522).



FIGS 76-79

(76, 77) *Pseudobironium ussuricum* Löbl, aedeagus in dorsal (76) and lateral (77) views, scale bar = 0.2 mm. (78, 79) *Pseudobironium antennatum* sp. nov., aedeagus in dorsal view (78), internal sac in dorsal view (79); scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

Pseudobironium subovatum subgroup

Pseudobironium antennatum sp. nov. Figs 78-80

HOLOTYPE: ♂, MALAYSIA, West Malaysia, Benom Mts., 15 km E Kampong Dong, 700m, 3°53'N 102°01'E, 1.VI.1998, leg. L. Dembický & P. Pacholátko (NHMB).

PARATYPES: MALAYSIA, with the same data as the holotype, 3 ♂, 1 ♀ (NHMB, MHNG). – Perak, Cameron Highlands, Lata Iskandar [waterfall] env., 04°19.5'N 101°19.5'E, 445m, 6.V.2009, 1 ♂ leg. J. Hájek (NMHC). – Tioman, 400m, Kampong Tekek - K. Juara, 9.III.198, 2°48'N 104°11'E, 1 ♂, 1 ♀ leg. L. Dembický & P. Pacholátko (NHMB, MHNG).

DESCRIPTION: Length 3.30-3.70 mm, width 2.40-2.70 mm. Head and body dark brown to black, venter of body lighter than dorsal side of body, dark brown or dark reddish-brown. Femora and tibiae as ventral side of body, maxillary palpi, antennae and tarsi lighter, reddish-brown to yellowish. Maxillary palpi with palpomere IV tapering posterior mid-length, about 4 times as long as wide. Length ratio of antennomeres as II 15: III 12: IV 23: V 22: VI 19: VII 20: VIII 20: IX 21: X 20: XI 30; antennomere XI about four to five times as long as wide. Head with fine and very dense punctation. Pronotal punctation uneven, most punctures distinctly coarser than on head, dense, not well delimited, puncture intervals usually about as to three times as large as puncture diameters. Elytra lacking subapical humps and lateral impressions, impressed along apices. Elytral punctation distinctly coarser that pronotal punctation, with fairly well delimited puncture and intervals mostly about twice to three times as large as puncture diameters. Prohypomera very finely punctate, appearing smooth. Mesoventrite with median carina, extremely finely punctate near margin, lacking striae. Metaventrite in middle weakly convex, coarsely punctate except on narrow smooth mesal area, without microsculpture. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process smooth, not microsculptured, slightly swollen basomedially, margin truncate. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely punctate, with large lateral impressions and strigulate microsculpture distinct on entire surface. Following sternites very finely punctate, with strigulate microsculpture, without basal wrinkles.

Male: Protibia longer than protarsus, latter not particularly elongate, with tarsomeres 1 to 3 strongly widened, slightly narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 78-80) 1.47-1.50 mm long. Median lobe with basal bulb large, longer than apical process, latter inflexed with sinuate ventral side, tip in lateral view narrow, slightly bent, rounded. Apical process with ventral tubercles. Parameres in dorsal view wide, curved, strongly narrowed toward mid-length, with large mesal lobe, somewhat widened and bent in apical fifth. Parameres in lateral view wide, in middle about as wide as middle of apical process, with ventral margin sinuate, distinctly concave in apical half, dorsal margin weakly concave between base and mid-length, expanded between mid-length and apical fifth, dorsal and ventral margins parallel-sided near tip. Internal sac with long mesal guide-sclerites, conical sclerites each bearing invaginated subtriangular sclerite followed by not clearly defined subtriangular structure. Membranes of internal sac lacking scale-like structures and vesicles, striate posteriad sclerites.

DISTRIBUTION: West Malaysia.

ETYMOLOGY: The species epithet is a Latin adjective, referring to the distinctive antennae in this species.

COMMENTS: This species may be easily distinguished from other members of the subgroup by the elongate antennomere XI, similar to that in *P. confusum*. In addition, it differs in external characters from other members of the subgroup by the smooth metacoxal process and carinate mesoventrite. The lobed parameres and the shape of the tip of median lobe are similar to those in *P. grossum*, while the shape of the sclerotized structures of the internal sac are diagnostic.

Pseudobironium carinense (Achard, 1920) Figs 11, 12, 81-83

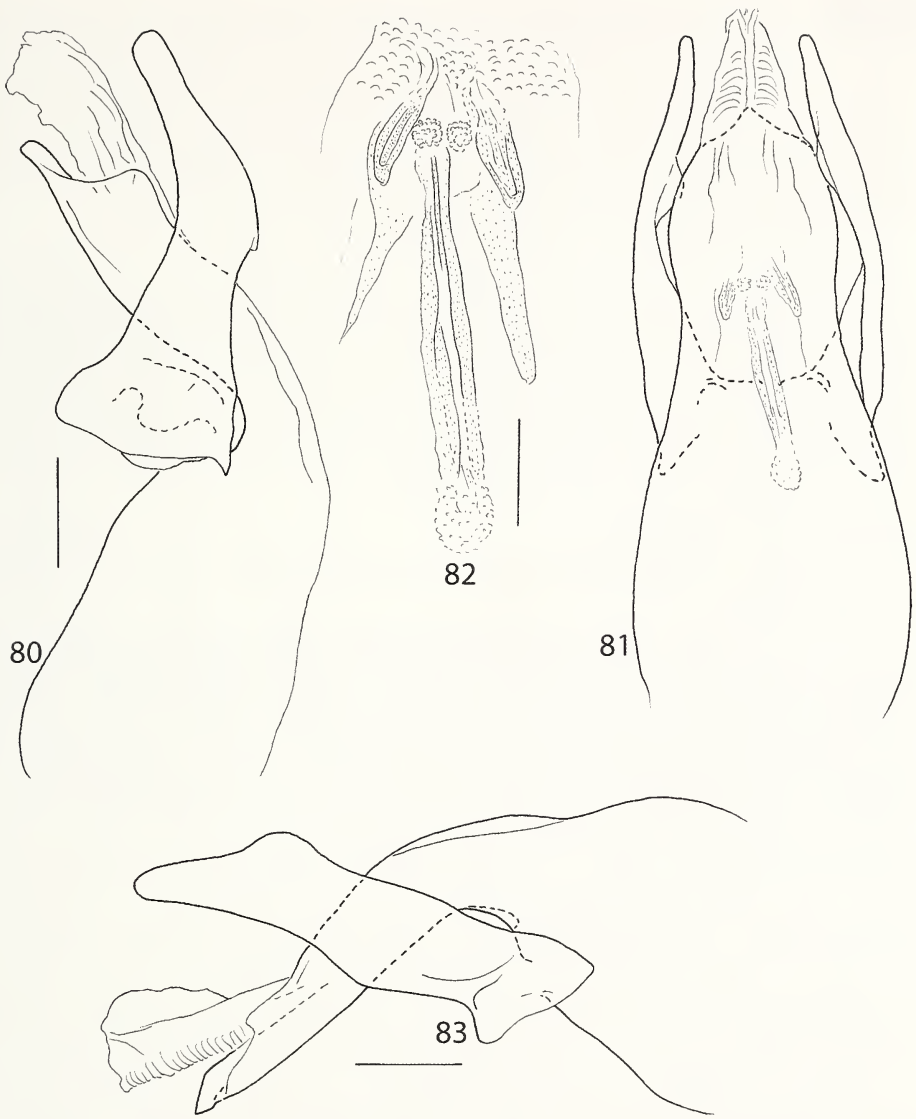
Morphoscapha carinense Achard, 1920: 134.
Psedobironium castaneum Pic, 1923a: 17, **syn. nov.**

LECTOTYPE OF *M. CARINENSE*: ♀, MNHN, by present designation, labelled: Carin Chebà 900-1100. m. L.Fea V XII-88 (printed) / TYPE (printed, red) / Morphoscapha carinense n. sp. J. Achard det TYPE (handwritten by Achard, "J. Achard det." printed) / Lectotype Pseudobironium carinense (Achard) det. I. Löbl, 2013. Paralectotype ♀: NMPC, labelled: Carin Chebà 900-1100. m. L.Fea V XII-88 (printed) / Museum Paris Coll. A. Grouvelle 1915 (printed) / Morphoscapha carinense Achard Cotype (handwritten) / Mus. Nat. Pragae Inv. 18 722 / Paralectotype Pseudobironium carinense (Achard) det. I. Löbl, 2013.

TYPE MATERIAL OF *M. CASTANEUM*: Lectotype, ♂: MNHN, designated by Löbl, 1992: 504. It bears following labels: Lac Tho (handwritten by Pic / Type (handwritten by Pic) / castaneum n. sp. (handwritten by Pic) / TYPE (red, printed / Museum Paris Coll. M. Pic (printed / Lectotype Pseudobironium castaneum Pic det. Löbl, 1991.

ADDITIONAL MATERIAL EXAMINED: MYANMAR, labelled Carin Chebà 900-1100m. L. Fea V XII-88 (printed) [as the lectotype], 1 ♂, 1 ♀ (MHNG). – THAILAND, Mae Hong son, Rau Si Lang, 1-8.V.1992, 1 ♂ leg. J. Horák (MHNG); Chiang Mai, Doi Suthep, 1200m, 3.V.2004, 5 ♂, 1 ♀ leg. R. Grimm (SMNS, MHNG). – Same data but 24.IV.-13.V.2003, 1 ♂, 1 ♀ (SMNS). – Same data but 27-29.IV.2004, 5 ♂, 1 ♀ (SMNS, MHNG). – Chiang Mai, Doi Pui, 1600-1685m, 7-9.V.2004, 1 ♂ leg. R. Grimm (SMNS). – C. Thailand, Khao Yai Nat. Park, 19-21.IV.1996, 2 ♂ leg. S. Bečvář (MHNG). – S. Thailand, Krabi env., Wat Tam Sua, rain forest, 28.III.2008, 1 ♂ leg. A. Pütz (PCAP). – LAOS, Kham Mouan Prov., Ban Khoun Ngeum; env. 200m 18°07'N 104°29'E 19.-31.V.2001, 1 ♂ leg. P. Pacholátko (NHMB). – Viangchan Prov., Phou Khao Khouay Nap. Park, , Nam Leuk, env. Tad Leuk Waterfalls, 1.-8.VI.1996, 200m, FIT (15c), 1 ♂ leg. H. Schillhammer (NHMW). – VIETNAM, Hoa Binh Tonkin, 1 ♂ leg. H. Perrot (MHNG). – Hoa Binh, 6 ♂ (MHNG). – Tonkin, 1 ♂ (NMPC). – Without locality data, 1 ♂ (NMPC). – CHINA, Yunnan, Menla, Wangtianshu, 600m, 6.VI.2009, 5 ♂, 1 ♀ leg. Wen-Xuan Bi (SNUC). – With same data but 5.VI.2008, 5 ♂ 4 ♀ leg. Liang Tang (SNUC, MHNG). – Menlun, Xipian, 985m, 1.VI.2009, 5 ♂, 1 ♀ leg. Wen-Xuan Bi (SNUC).

REDESCRIPTION: Length 3.45-3.60 mm, width 2.30-2.70 mm. Head and body uniformly, or almost uniformly dark reddish-brown, abdomen lighter apically, femora and tibiae about as dark as most of body, tarsi and antennae slightly lighter. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Length ratio of antennomeres as II 15: III 11: IV 22: V 22: VI 16: VII 22: VIII 19: IX 20: X 20: XI 25; antennomere XI about 3.5 times as long as wide. Head with dense and fine, well delimited punctation. Pronotal punctures fairly fine, well delimited, with intervals mostly about as to three times as large as puncture diameters. Elytra lacking subapical hump and lateral impression, and without subapical impression. Elytral punctation coarser that pronotal punctation, excepted near base, with punctures mostly well delimited, puncture intervals mostly twice to four times as large as puncture diameters. Prohypomera distinctly punctate, lacking microsculpture. Mesoventrite very finely punctate on mesal and apical surfaces, lacking median ridge or line. Metaventrite not microsculptured. Median part of metaventrite hardly convex, densely punctate except on mesal area, punctures sharply delimited, with diameters to part about as large as puncture intervals. Lateral parts of metaventrite very finely punctate. Submesocoxal area distinctly shorter than half of interval to metacoxa. Metacoxal process tuberculate and finely punctate in middle, not microsculptured, impunctate laterally, with margin concave. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdomen with strigulate microsculpture evanescent on basolateral parts of sternite 1; sternite 1 with shallow lateral impressions. Base of following sternite indistinctly, very finely wrinkled.



FIGS 80-83

(80) Pseudobironium antennatum sp. nov., aedeagus in lateral view; scale bar = 0.2 mm. (81-83) *Pseudobironium carinense* (Achard), aedeagus in dorsal (81) and lateral (83) views, internal sac (82) in dorsal view; scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 strongly widened, narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 81-83) 1.34-1.53 mm long. Median lobe with basal bulb large, longer than apical process, latter inflexed with weakly sinuate ventral side, tip in lateral view robust, not bent, obliquely truncate. Apical process with lateral tubercles. Parameres in dorsal view moderately

wide, curved, narrowed toward apical fifth, somewhat widened and bent in apical fifth. Parameres in lateral view wide, in middle about as wide as middle of apical process, with ventral margin sinuate, distinctly concave in apical two fifth, dorsal margin weakly sinuate between base and apical third, expanded before apical fourth and appearing lobe-like, gradually narrowed toward apices. Internal sac with long mesal guide-sclerites, conical sclerites bearing single invaginated rod. Membranes of internal sac scale-like, with pair of small vesicles situated posterior guide-sclerites.

DISTRIBUTION: Myanmar, Thailand, Laos, Vietnam, China: Yunnan.

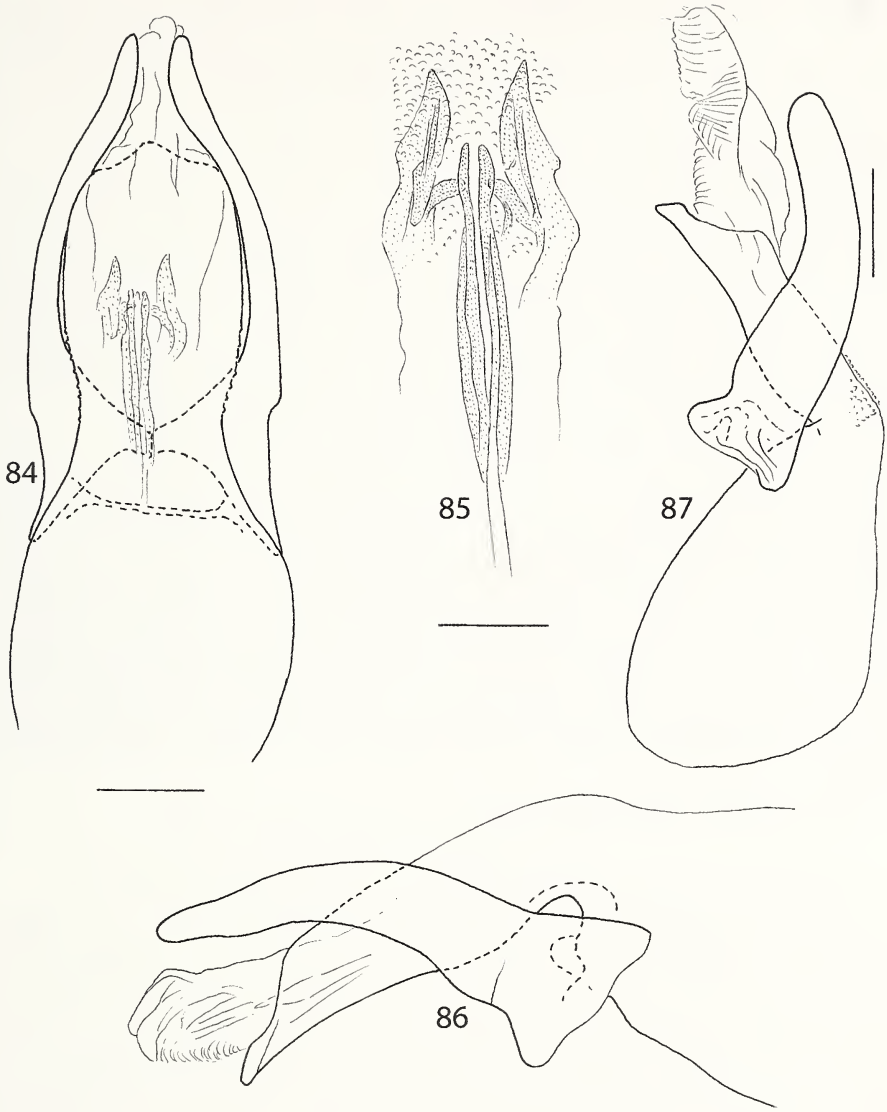
COMMENTS: This species is similar to *P. grossum* and other congeners with laterally tuberculate apical process of median lobe. It may be distinguished only by its male sexual characters, in particular by the shape of the parameres seen in lateral view. The identification of *P. carinense* is based on a male bearing the same locality data as the lectotype and sharing its external diagnostic characters. For records from Thailand see Löbl (1990: 514). The records of the species from Nepal (Löbl, 1992: 504) are based on misidentified *P. conspectum*, see below.

Pseudobironium conspectum sp. nov. Figs 84-86

HOLOTYPE: ♂, NEPAL, Kosi, Arun Valley below Mun, 1050m, 22.IV.84, leg. I. Löbl & A. Smetana (MHNG).

PARATYPES: NEPAL, Kosi, Arun Valley below Mun, 1050m, 22.IV.84, 2 ♂ leg. I. Löbl & A. Smetana (MHNG). – Central Nepal, Narayani SW Sauraha, Royal Chitwan Nat. Park 180m, 27°34'51"N 84°29'30"E 15.VII.2001 KL/HF, 1 ♂ leg. A. Kopetz (NMEC). – INDIA, Tamil Nadu,Anamalai Hills Cinchona 3500 ft. V.1965, 2 ♂ leg. P. S. Nathan (MHNG). – Tamil Nadu, "Nilgiri Hills, H. L. Andrewes ravin 3500 ft.", 1 ♂ (NMPC). – Kerala, Vattiar, Cardamom Hills 1000m, 10 km SW Munnar 5-17.XII.93, 77°01'E 10°02'N ,1 ♀ leg. D. Boukal & Z. Kejval (MHNG). – Kerala, Cardamom Hills, Pamba env., ca 50 km NW of Pathanamthitta, valley of Pambayiar river, 77°05'E 9°25'N ca 300m, 15-18.V.1999, 1 ♂, 3 ♀ leg. Z. Kejval & M. Trýzna (MHNG). – West Bengal, Darjeeling Distr. labelled "British Bootan Maria Basti 1899" 2 ♂, and with the same data but "1900", 1 ♂ (NMPC, MHNG). – MYANMAR, "Tenasserim Coll. Helfer", 1 ♂ (NMPC); Kachim State, Indawgyi Lake, 7 km S Lonton 25°02'42"N 96°16'52"E 20-25.V.1999, ca 250m, flight intercept trap, 5 ♂, 7 ♀ leg. H. Schillhammer & R. Schuh (NHMW, MHNG). – THAILAND, Ranong Prov., Ranong: Hot Springs, 9°56'N 98°40'E, 23-25.II.1996, 1 ♂ leg. K. Majer (NHMB). – LAOS, Central, Prov. Viangchan, Phou Khao Khouay Nat. Park, Nam Leuk, env. Tad Leuk Waterf., 1.-8.VI.1996, 200m, flight intercept trap, 1 ♂ leg. H. Schillhammmer (NHMW). – Kham Mouan Prov., Ban Khoung Ngeum, ca 200m, 18°07'N 104°29'E, 19-31.V.2001, 5 ♂, 7 ♀ leg. P. Pacholátko and 4 ♀, with the same data but 24-29.IV.2001 (NHMB, MHNG). – Phongsaly Prov., 21°41-2'N 102°06-08'E, 28.V.-20.VI.2003, env. Phongsaly, ca 1500m, 2 ♀ leg. V. Kubáň (NHMB). – Phongsaly Prov., 21°41"N 102°06-08'E, env. Phongsaly, ca 1500m, 6-17.V.2004, 4 ♀ leg. V. Kubáň (NHMB, MHNG). – Phongsaly Prov., 21°21'N 102°04'E, 19-26.V. 2004, ca 1150m, 1 ♂ leg. V. Kubáň (NHMB). – Phongsaly Prov., 21°21'N 102°03'E, Ban Sano Mai, 19-26.V. 2004, ca 1150m, 1 ♀ leg. V. Kubáň (NHMB). – Khammouan Prov., 18°07'N 104°29'E, Ban Khoum Ngeun, ca 200m, 24-29.IV.2001, 7 ♀ leg. V. Kubáň (NHMB, MHNG). – N. Laos, Louangphrabang, 11-22.V.2002, 19°35'N 101°58'E, Thong Khan, 1 ♀ leg. V. Kubáň (NHMB). – Champassak Prov., near Paksé, 1 ♂ (MHNG); CHINA, S. Yunnan (Xishuangbanna) 25km NW Jinghong vic. Zjong Zhi Chang, 22°11'06"N 100°39'05"E, 780m, 28.VI.2008 MF, rubb. plant., 1 ♂ leg. A. Weigel (NMEC).

DESCRIPTION: Length 3.00-3.60 mm, width 2.20-2.65 mm. Head and body dark reddish-brown to almost black. Apical abdominal segments, femora and tibiae as dark as body or somewhat lighter. Tarsi, maxillary palpi, and antennae light brown. Maxillary palpi with palpomere IV tapering, about 4 times as long as wide. Length



FIGS 84-87

(84-86) *Pseudobironium conspectum* sp. nov., aedeagus in dorsal (84) and lateral (86) views, internal sac (85) in dorsal view; scale bar for aedeagus = 0.2 mm, for internal sac = 0.1 mm. (87) *Pseudobironium convexum* sp. nov., aedeagus in lateral view; scale bar = 0.2 mm.

ratio of antennomeres as II 13: III 11: IV 20: V 20: VI 15: VII 19: VIII 18: IX 19: X 17: XI 23; antennomere XI about four times as long as wide. Head with fine and dense punctation. Pronotal punctation distinctly coarser than that on head, dense, with punctures not well delimited, puncture intervals usually about twice to three times as large as puncture diameters. Elytra lacking subapical hump and lateral impression.

Elytral punctation near base about as fine pronotal punctation, on most surfaces distinctly coarser, with fairly well delimited punctures and intervals mostly about twice to three times as large as puncture diameters. Prohypomera very finely punctate, appearing smooth. Mesoventrite without median ridge, extremely finely punctate, very finely striate near margin. Metaventrite in middle almost flat, coarsely punctate except on narrow smooth mesal area, without microsculpture, often with two minute spine-like protuberances near middle. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process impunctate or with few punctures in middle, punctulate microsculpture and indistinct basomedian tubercle, margin truncate. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely punctate, with large lateral impressions, strigulate microsculpture evanescent basolaterally, appearing often punctulate on basolateral areas. Following sternites very finely punctate, with strigulate microsculpture and basal wrinkles often obsolete.

Male. Protarsus slightly shorter than protibia, protarsomeres 1 to 3 strongly widened, somewhat narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 84-86) 1.30-1.60 mm long, strongly sclerotized. Median lobe strongly sclerotized, with basal bulb large, about as long as apical process, latter narrowed apically, inflexed, with ventral side convex in basal half, weakly concave in apical half, tip hardly bent and stout in lateral view. Apical process with lateral tubercles. Parameres wide near base, gradually narrowed apically, with upper and lower margins sinuate near apices. Internal sac with long mesal guide-sclerites, pair of small, mesally bent sclerites, pair of conical lateral sclerites, each with fairly long, invaginated rod. Membranes of internal sac with very fine scale-like structures, lacking strigulate structures.

DISTRIBUTION: India, Nepal, Myanmar, Thailand, Laos, Yunnan.

ETYMOLOGY: Latin adjective, referring to distinct diagnostic characters.

COMMENTS: The species was referred to in Löbl, 1982a: 159 as "spec. indet. a" and it was reported from Nepal in Löbl (1992: 504), identified as *P. castaneum* Pic. It is similar to *P. carinense*, *P. convexum* and *P. grossum*. The males may be distinguished from these species by the shape of the parameres. In addition, the internal sac with a pair of mesally curved sclerites and lacking strigulate structures separates the species from *P. grossum*. The presence of minute spine-like metasternal protuberances is a unique feature, not present in all examined specimens. The females are associated when collected together with males, if no other similar species is known from the same locality.

Pseudobironium convexum sp. nov. Figs 87-89

HOLOTYPE: ♂, INDONESIA, Sumatra Aceh, Mt. Leuser N. P., Ketambe 800m, 28.XI.1989, leg. I. Löbl, D. Agosti, D. Burckhardt (MHNG).

PARATYPES: INDONESIA, with the same data as the holotype, 1 ♂, 2 ♀ (MHNG). – Mentawei, Sipora, Sereinu V-VI.1894, 2 ♂ leg. E. Modigliani (NMPC). – MALAYSIA, East Malaysia, Sabah, labelled "Sandakan Borneo Baker", 2 ♂ (NMPC). – West Malaysia, Lankawi, Kampung Buku, 60m, 26.XI.2001, under bark on fungi, 1 ♂, leg. I. Löbl (MHNG). – Cameron Highlands, km 29 "Power station", 21.IV.1990, 1 ♂ leg. A. Riedel (SMNS). – Telantan

Terennggganu Sekayu, 28.II.1997, 2 ♂, 3 ♀ leg. I. Jeniš (NHMW, MHNG). – VIETNAM, S. Vietnam, 14 km SW Bao Loc 16-29.V.1994, 6 ♂, 9 ♀ leg. P. Pacholátko & L. Dembický (NHMW, MHNG).

ADDITIONAL MATERIAL: CHINA, Hainan, Ledong County, Jianfengling 1000m, 17-24.V.2011, 1 ♂ leg. Weng-Xuan Bi (SNUC).

DESCRIPTION: Length 2.90-3.60 mm, width 2.10-2.65 mm. Head and body dark brown to black, abdomen, eventually also venter of body somewhat lighter than dorsal side of body. Femora and tibiae somewhat lighter than dorsal side of body, maxillary palpi, antennae and tarsi light reddish-brown to yellowish. Maxillary palpi with palpomere IV tapering posterior mid-length, almost 3 times as long as wide. Length ratio of antennomeres as II 13: III 10: IV 20: V 20: VI 17: VII 20: VIII 19: IX 20: X 18: XI 21; antennomere XI about 2.5 times as long as wide. Head with fine and dense punctation. Pronotal punctation distinctly coarser than that on head, dense, with punctures not well delimited, puncture intervals usually about as to three times as large as puncture diameters. Elytra lacking subapical hump and lateral impression. Elytral punctation near base about as fine pronotal punctation, on most surfaces distinctly coarser, punctures fairly well delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Prohypomera very finely punctate, appearing smooth. Mesoventrite without median ridge, extremely finely punctate, very finely striate near margin. Metaventrite in middle almost flat, coarsely punctate except on narrow smooth mesal area, without microsculpture. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as long as third of shortest interval to metacoxa. Metacoxal process impunctate, with punctulate microsculpture and distinct median tubercle, margin truncate or slightly concave. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely punctate, with large lateral impressions, strigulate microsculpture evanescent basolaterally and often appearing punctulate apicolaterally. Following sternites very finely punctate, with strigulate microsculpture, basal wrinkles present or obsolete.

Male. Protibia longer than protarsus. Protarsus not particularly elongate, tarsomeres 1 to 3 strongly widened, narrower than apex of protibia, bearing long tenent setae. Aedeagus (Figs 87-89) 1.02-1.36 mm long, strongly sclerotized. Median lobe with basal bulb large, longer than apical process, latter narrowed apically, inflexed, with ventral side convex in basal half, oblique in apical half, tip hardly bent and stout in lateral view. Apical process with lateral tubercles. Parameres wide, narrowed toward mid-length, in apical half evenly curved and wide, with upper margin almost evenly arcuate in lateral view. Internal sac with short mesal guide-sclerites, pair of conical lateral sclerites and two small invaginated rods. Membranes of internal sac with strigulate structures overlapped by scale-like structures.

DISTRIBUTION: Indonesia: Sumatra, Mentawei, Kalimantan; West Malaysia; Vietnam; China: Hainan?

ETYMOLOGY: Latin adjective, referring to the shape of the upper margin of the parameres.

COMMENTS: This species is very similar to *P. confusum*, *P. carinense*, *P. conspectum*, *P. grossum*, and *P. vitalisi* in its external characters. These species share, in addition to the tuberculate lateral sides of the apical process of median lobe, a large

basal bulb of the median lobe. *Pseudobironium convexum* may be readily distinguished by the shape of the parameres of the aedeagus as seen in lateral view. In addition, it possesses short guide-sclerites and striate membranes of the internal sac. The specimen from Hainan possesses somewhat narrower parameres and longer quide-sclerites than those in other examined specimens.

Pseudobironium grossum (Achard, 1920) Figs 90, 91

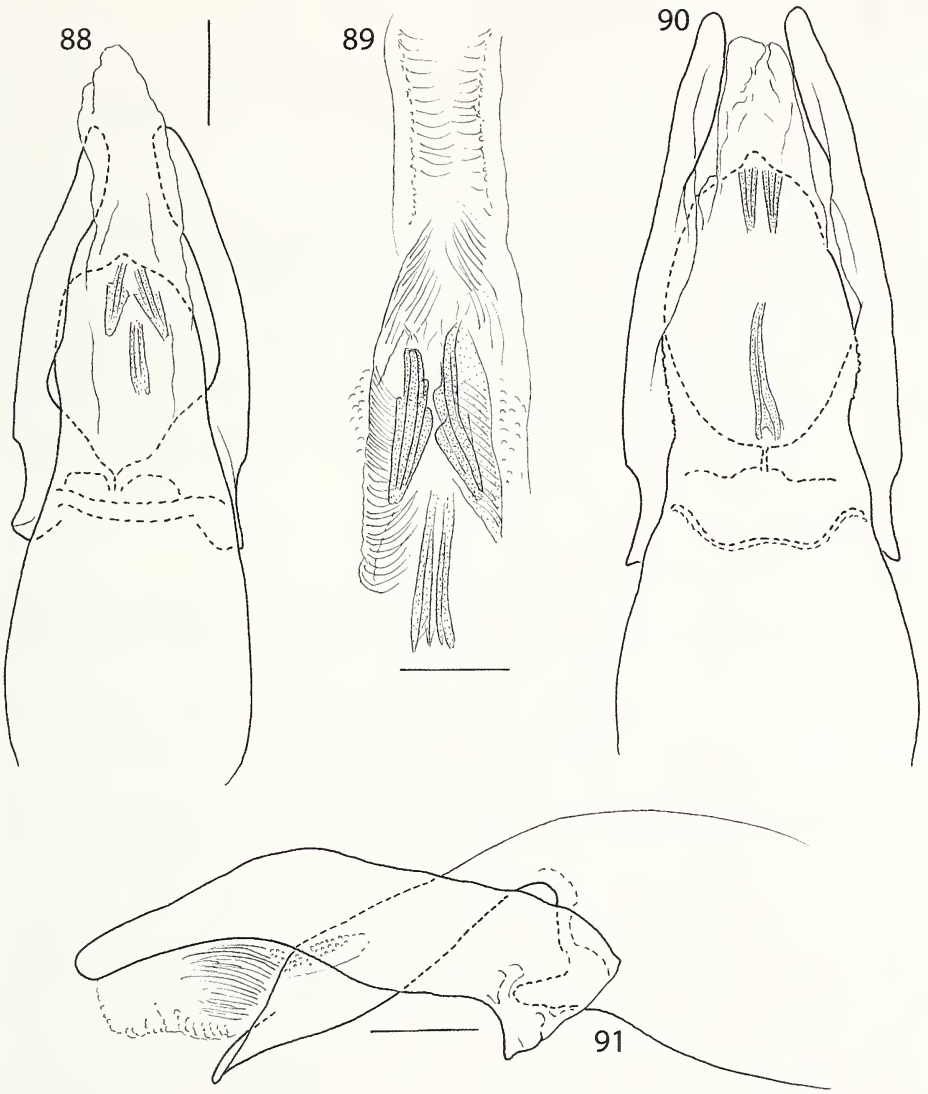
Morphoscapha grossum Achard, 1920: 132.

HOLOTYPE: ♂, NMPC, labelled: Laos (Vitalis) [handwritten] / TYPE [red, printed] Morphoscapha grossum ng.nsp J. Achard det. TYPE [handwritten, by Achard, "J.Achard det." printed] / Mus. Nat. Pragae Inv. 18 716 / Pseudobironium grossum (Achard) det. Löbl 1970.

REDESCRIPTION: Length 3.85 mm, width 2.80 mm. Body black, femora, tibiae and apical abdominal segments dark brown, tarsi and antennae light brown. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Length ratio of antennomeres as II 15: III 14: IV 26: V 26: VI 19: VII 22: VIII 22 (right antenna broken off after antennomere VII, left antenna broken off after V). Pronotal punctation dense, with punctures not well delimited, puncture intervals usually about twice to four times as large as puncture diameters. Elytra lacking subapical hump and lateral impression. Elytral punctation near base about as fine pronotal punctation, on most surfaces distinctly coarser, with well delimited punctures and puncture intervals mostly twice to four times as large as puncture diameters. Prohypomera impunctate, not microsculptured. Mesoventrite impunctate, lacking median ridge or line, finely striate near margin. Metaventrite not microsculptured, fairly flat in middle. Median part of metaventrite coarsely and densely punctate except on smooth mesal line, punctures sharply delimited, with intervals about as to twice as large as puncture diameters. Lateral parts of metaventrite very finely punctate, appearing impunctate. Submesocoxal area about as fourth of interval to metacoxa. Metacoxal process distinctly microsculptured, with basomedian tubercle, concave margin. Mesotibiae and metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely, sparsely punctate, with strigulate microsculpture, smooth basolaterally, and with shallow round impression situated posterior mid-length. Following sternites lacking wrinkles, with distinct microsculpture.

Male: Protarsus shorter than protibia, protarsomeres 1 to 3 strongly widened, about as wide as apex of protibia, with long tenent setae. Aedeagus (Figs 90, 91) 1.64 mm long. Median lobe strongly sclerotized, with basal bulb large, longer than apical process. Apical process with lateral tubercles, inflexed, ventral side oblique to mid-length, rounded in apical half, apex slightly curved, fairly narrow, with blunt tip in lateral view. Parameres with weakly sclerotized inner lobes seen in dorsal or ventral views only. Parameres in lateral view narrowed from basal third toward apical third, in apical third obliqely bent and almost evenly wide. Internal sac with fairly long mesal guide-sclerites, pair of long conical lateral sclerites each with narrow invaginated rods. Membranes of internal sac scale-like, without strigulate structures.

DISTRIBUTION: Laos.



FIGS 88-91

(88-89) *Pseudobironium convexum* sp. nov., aedeagus (88) and internal sac (89) in dorsal view. (90, 91) *Pseudobironium grossum* (Achard), aedeagus in dorsal (90) and lateral views (91), scale bars for aedeagus = 0.2 mm, for internal sac = 0.1 mm.

COMMENTS: The species may be distinguished from other members of the subgroup by the mesally lobed parameres (seen only in dorsal and ventral views), in combination with the narrow apical part of the median lobe, the internal sac lacking vesicles and striate membranose structures and possessing curved guide-sclerites, narrow pair of conical sclerites each bearing a single invaginated rod.

Pseudobironium hisamatsui Löbl, 2011

Pseudobironium hisamatsui Löbl, 2011b: 203.

HOLOTYPE: ♂, MHNG. Type locality: Taiwan, Tienhsiang Hualien Co.

ADDITIONAL MATERIAL EXAMINED: TAIWAN, Tapei County, Beitou Township (Shipai metro station), Mt. Samau (S), 3.I.2009, 2 ♀ leg. S. Vít (MHNG).

DISTRIBUTION: Taiwan.

COMMENTS: The description of the species was based on a single male. The two specimens listed above are females. They are larger and darker than the holotype: the body length is 3.35 mm, and the pronotum and elytra are black or almost black. The species may be distinguished from most of the similar species, such as *P. vitalisi* and *P. confusum*, by the shape of the parameres. See comments under *P. confusum*. Previously unnoticed caracters are the median lobe of the aedeagus laterally tuberclulate, suggesting relationships with *P. grossum*, *P. carinense*, *P. conspectum*, and *P. connexum*, and the metacoxal process weakly bilobed, impunctate, with punctulate microsculpture and a minute mediobasal tubercle.

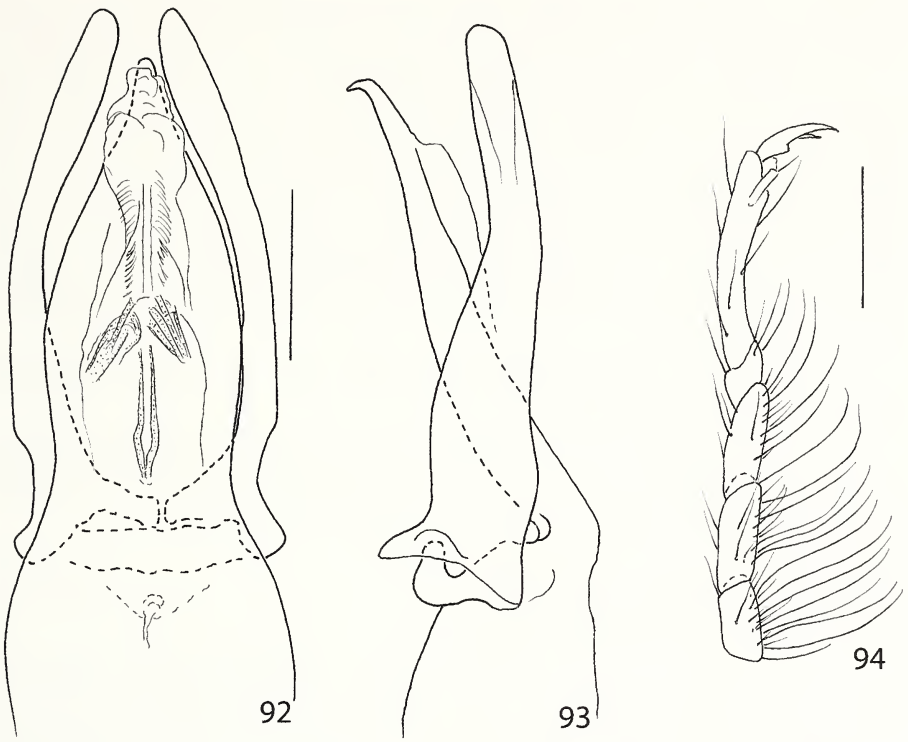
Pseudobironium subovatum Pic, 1920 Figs 92-94

Pseudobironium subovatum Pic, 1920a: 15

TYPE MATERIAL: Lectotype, ♂, MNHN, by present designation, labelled: Palembang Sumatra [printed] / type [handwritten, by Pic] / Omalocera Er. Sp.? [handwritten] / Pseudobironium subovatum ng nsp [handwritten, by Pic] / TYPE [printed red] / Pseudobironium subovatum Pic det Löbl 1970 / Lectotype [printed red].

ADDITIONAL MATERIAL EXAMINED: INDONESIA, West Sumatra Prov., Kerinci Seblat Nat. Park 24 km NE Tapan, Muara Sako east, 2°05'S 101°15'E, 400-550m, 4-18.III.2003, 2 ex., leg. L. Dembický (NMHB). – Sumatra, Liangagas, 1 ex. leg. Dohrn (ZMPA). – Sumatra, Soekaranda, 1 ex. leg. Dohrn (ZMPA). – East Kalimantan, ca 50 km W of Balikpapan, PT Fajar Surya Swadaya [area], 01°13.4'S 116°22.6'E, 66m, 27, 30.XI. 2011, 1 ex. leg. J. Hájek, J. Schneider and P. Votruba (NMPC). – Kalimantan Barat, Gunung Paiung Nat. Park, Caban Panti research site,1°13'S 110°7' E, lowland forest, from bracket fungi, No. 10, 18.-26.VII1993; 4 ex. leg. O. Merkl (HNHM, MHNG). – MALAYSIA: West Malaysia, Pahang, Taman Negara Nat. Park, 12-14.VII.1993, 8 ex. leg. H. Forster (NHMW, MHNG). – Pahang, 30 km E of Ipoh, 1500m, Cameron Highlands, Tanah Rata, 7.-9.I.1999, 1 ex. leg. P. Čechovský (NHMW). – Taman Negara, env. Kuala Tahan, 12-29.VI.1997, 2 ex. leg. S. Kazantcev (NHMB, MHNG). – Benom Mts, 15 km E Kampong Dong; 700m, 3°53'N 102° 01'E 1.IV.1998, 1 ex. L. Dembický & P. Pacholátko (NHMB). – Johor, 50-400m, Endau-Rompin, 19.III.1998, Pulau Jasin, 2°31'N 103°21' E, 1 ex. leg. L. Dembický & P. Pacholátko (NHMB). – East Malaysia, Sabah, Bajnaran Maitland, Batu Pungul 25-27.V.1995, 1 ex. leg. I. Jeniš (MHNG). – Sabah, Crocker Range, Gunung Emas, 1500-1700m, around km 52 road Kota Kinabalu Tambunan, 6-18.VI.1996, 1 ex. (MHNG). – Sarawak, Mt. Matang, XII.1913, 1 ex. leg. G.E. Bryant (NHMP). – Sarawak, Bario, 1200-1400m, 25.IX.-7.X.2001, 1 ex. leg. S. Kurbatov (MHNG). – THAILAND, Phang-nga Prov., Lamnu distr., NE Lam Kaen (white banana waterfall) 08°37.324N, 98°18.362E, 75m, 13.viii.2012, 3 ex. leg. A. Weigel (NMEC, MHNG).

REDESCRIPTION: Length 2.90-3.50 mm, width 2.0-2.23 mm. Head, pronotum, prohypomera, elytra and abdomen uniformly dark reddish-brown, metaventrite usually darker. Femora and tibiae about as most of body, tarsi and antennomeres I to VI lighter, reddish-brown, following antennomeres infuscate. Maxillary palpi with palpomere IV about 3.5 times as long as wide, tapering. Length ratio of antennomeres as II 11: III 9: IV 19: V 23: VI 15: VII 22: VIII 21: IX 21: X 21: XI 22; antennomere XI about 3.5 times as long as wide. Head and pronotum with dense and fine punctation; punctures



FIGS 92-94

(92-94) *Pseudobironium subovatum* Pic, aedeagus in dorsal (92) and lateral views (93), male protarsus in lateral view (94); scale bars = 0.2 mm.

not well delimited, shallow, pronotal punctures slightly larger than those on head, with intervals mostly about twice to three times as large as puncture diameters. Elytra lacking subapical humps, lateral and subapical impressions. Elytral punctation coarser that pronotal punctation, with punctures mostly well delimited, puncture intervals mostly about as, to twice as large as puncture diameters. Prohypomera impunctate. Mesoventrite punctate, lacking median ridge or line. Metaventrite without microsculpture. Median part of metaventrite flattened, coarsely and densely punctate except on mesal line, punctures sharply delimited, with diameters partly about as large as or larger than puncture intervals, finer near apical process. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as half of interval to metacoxa. Metacoxal process with truncate margin or very weakly concave, with fine mesal stria, usually with few punctures and hardly visible microsculpture. Mesotibiae and meta - tibiae distinctly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely, sparsely punctate, with microsculpture consisting of short striae, eventually punctulate on lateral areas, with shallow, irregular oblique impression situated posterior mid-length and usually with very shallow irregularly rounded impression. Following sternites lacking wrinkles, with distinct microsculpture.

Male: Protarsus long, longer than protibia, with tarsomeres 2 and 3 (Fig. 94) conspicuously elongate and strongly widened, somewhat narrower than apex of protibia, with tenent setae conspicuously long, longer than respective tarsomeres. Aedeagus (Figs 92, 93) 1.10-1.22 mm long. Median lobe with basal bulb shorter than apical process, latter gradually narrowed, moderately inflexed, with ventral side convex, tip abruptly bent and acute in lateral view. Parameres curved and narrowed in middle third in dorsal view, conspicuously wide in basal third, gradually narrowed toward apical two fifth and in apical part evenly wide in lateral view. Internal sac with guide-sclerites, pair of conical lateral sclerites each with invaginated smaller conical sclerite and short rod. Membranes of internal sac bearing denticle-like and strigulate structures posterior sclerites.

DISTRIBUTION: South Thailand, Malaysia: West Malaysia and Borneo; Indonesia: Sumatra and Borneo.

COMMENTS: This species may be readily distinguished by the strongly elongate male protarsi bearing very long tenent setae, the tip of the median lobe abruptly bent and acute, and by the shape of the parameres as seen in lateral view.

Pseudobironium vitalisi (Achard, 1920) Figs 95-97

Morphoscapha vitalisi Achard, 1920: 133.
Morphoscapa dohertyi Achard, 1920: 135, **syn. nov.**

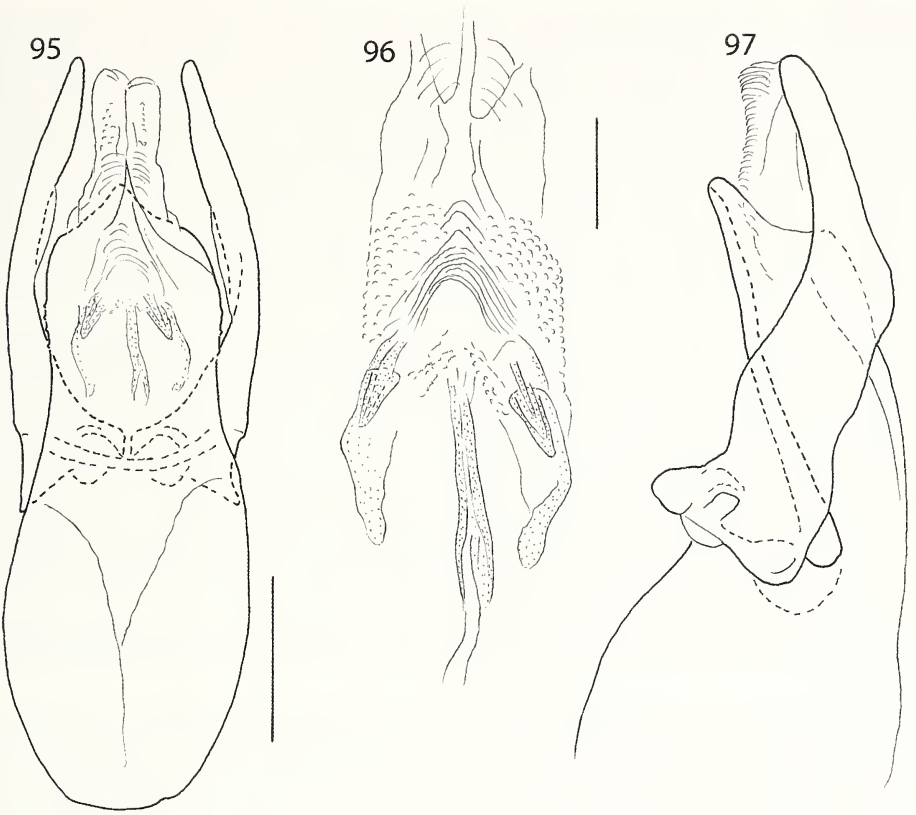
LECTOTYPE of *M. vitalisi*: ♂ MNHN, by present designation, labelled: Sumatra Est 91-92 Coll. Grouvelle [handwritten] / TYPE [red, printed] / MUSEUM PARIS 1917 Coll. GROUVELLE / Morphoscapha Vitalisi n. sp. J. Achard det. 1920 [handwritten by Achard, his name printed] / Lectotype [red, printed] / Lectotype Pseudobironium vitalisi (Achard) det. Löbl 1991 [handwritten].

PARALECTOTYPE OF *M. VITALISI*: ♀, MNPC, by present designation, labelled: Laos Vitalis [handwritten] / TYPE [red, printed] / Morphoscapha Vitalisi n. sp. J. Achard det. 1920 [handwritten by Achard, his name printed] / Pseudobironium vitalisi det. Löbl, 1970.

LECTOTYPE OF *M. DOHERTYI*: ♀, MNPC, by present designation, labelled: Martapura S. E. Borneo Doherty. 1891. [printed] / Museum Paris Coll. Grouvelle [printed] / Morphoscapha dohertyi n. sp. [handwritten] J. Achard [printed] Type [handwritten] /TYPE [printed, red] / Lectotype Pseudobironium dobertyi (Achard), det. I. Löbl, 2013.

PARALECTOTYPE OF *M. DOHERTYI*: ♀, MNPC, labelled: Martapura S. E. Borneo. Doherty 1891. [printed] / Museum Paris Coll. Grouvelle [printed] / Morphoscapha dohertyi Achard CoType [handwritten] / Mus. Nat. Pragae Inv. 18 722 / Pseudobironium dohertyi (Achard) det. Löbl 1970.

ADDITIONAL MATERIAL EXAMINED (only males): INDONESIA, Java [without other data], 1 ex. (MHNG). – Sumatra [without other data], 1 ex. (NMPC). – Kalimantan, Martapura, 1 ex. leg. Doherty (NMPC). – MALAYSIA, Sabah, Batu Punggui Resort env. 24.VI.-1.VII.1996, 11c vegetation debris and forest floor litter accumulated along large trees near river, 2 ex. (NHMW). – Sabah, Sabalangan River env., ca 25 km SE Sapulut, 26.06.1998, 3 ex. leg. J. Kodada & F. Čiampor (NHMW, MHNG). – Sabah, Bajnaran Maitland, Batu Pungul, 25-27.V.1995, 1 ex. leg. I. Jeniš (NHMW). – Sabah, ca 5 km S Sapulut, Saliku riv., in primary forest ca 600m, 16.V.2001, 4 ex. leg. J.F. Kočiam (NHMW, MHNG). – Sabah, Batu Punggul Resort env., 24.VI.-1.VII.1996, 11e, lower floor of vegetation (beating), 4 ex. (NHMW, MHNG). – Sabah, Poling nr. Ranau, 25. and 30.IV.1980, 3 ex. leg. M. & S. Sakai (EUMJ, MHNG). – Sabah, km 55 road KK - Tambunan, Gn. Emas, 1650m, 22.III.-6.IV.2000, 1 ex. leg. Bolm (NHMB). – NE Sarawak, Bario, 1200-1400m, 25.IX.-7.X.2001, 1 ex. leg. S. Kurbatov (MHNG). – Sarawak, Kapit, 1-2.III.1994, 1 ex. leg. J. Horák (MHNG). – Sarawak, Kapit Distr., Sebong Belah riv., 9-23.III.1994, 3 ex. leg. J. Horák (MHNG).



FIGS 95-97
(95-97) *Pseudobironium vitalisi* (Achard), aedeagus in dorsal (95) and lateral (97) views, internal sac (96) in dorsal view; scale bar = 0.3 mm for aedeagus, = 0.1 mm for internal sac.

REDESCRIPTION: Length 3.30-3.50 mm, width 2.50-2.70 mm. Head, body and femora uniformly reddish-brown to very dark brown, apical abdominal segments and tibiae somewhat lighter, tarsi and antennomeres I to VI distinctly lighter than tibiae, yellowish, antennomeres VII to XI infuscate. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Length ratio of antennomeres as II 12: III 10: IV 19: V 20: VI 16: VII 19: VIII 19: IX 19: X 19: XI 26; antennomere XI well four times as long as wide. Head and pronotum with very fine punctation, punctures not well delimited, shallow. Punctures on head fairly dense, pronotal punctures slightly larger than those on head, with intervals mostly about twice to five times as large as puncture diameters, near base more dense and less fine than on remaining surface. Elytra lacking subapical hump and lateral impression, and without subapical impression. Elytral punctation coarser that pronotal punctation, with punctures mostly well delimited, puncture intervals mostly about twice to four times as large as puncture diameters. Prohypomera very finely punctate. Mesoventrite extremely finely punctate, lacking median ridge or line. Metaventrite not microsculptured. Median part of metaventrite

flattened in posterior half, coarsely and densely punctate except on mesal line, punctures sharply delimited, with diameters partly about as large as or larger than puncture intervals, hardly finer near apical process. Lateral parts of metaventrite very finely punctate. Submesocoxal area about as fourth of interval to metacoxa. Metacoxal process impunctate, with strigulate microsculpture, truncate margin, distinct median tubercle. Mesotibiae and metatibiae strongly curved, mesotibial ventral spur straight. Abdominal sternite 1 very finely, sparsely punctate, with microsculpture consisting of striae distinct on mesal area, punctulate microsculpture on lateral areas, and with shallow, lateral impressions. Following sternites lacking wrinkles, with distinct microsculpture.

Male: Protarsus shorter than protibia, with tarsomeres 1 to 3 strongly widened, somewhat narrower than apex of protibia. Aedeagus (Figs 95-97) 1.85-2.35 mm long. Median lobe with basal bulb large, longer than apical process, latter bearing lateral tubercles, with weakly sinuate ventral side and blunt tip in lateral view. Parameres weakly curved and with narrow lobes in dorsal view, very wide between base and apical third, with slightly sinuate upper margin, gradually narrowed toward tip in lateral view. Internal sac with mesal guide-sclerites, pair of conical lateral sclerites each with invaginated conical sclerite and short rod. Membranes of internal sac strigulate and with scale-like structures posterior mesal sclerites.

DISTRIBUTION: Indonesia: Java, Sumatra, Kalimantan; East Malaysia: Sabah, Sarawak.

COMMENTS: Achard (1920) based his description of *M. vitalisi* on specimens from "Indo-Chine: Laos (Vitalis da Salvaza, in coll. Achard)" and "Sumatra oriental (coll. Grouvelle in Museum d'Histoire Naturelle de Paris)". Only a single original specimen of *M. vitalisi* is present in each of these two collections. The unambiguously characterized male is designated as lectotype. The identity of the female, designated as paralectotype, is problematic. The two original specimens of *M. dohertyi* from Sumatra are labelled as "Type" and "Co-type", respectively. They are in fact syntypes, and a lectotype is here designated. Their synonymy is based on absence of species specific characters that would distinguish them from *P. vitalisi*, and is supported by the presence of a male from the type locality.

Unplaced species

Pseudobironium achardi (Pic, 1920)

Amalocera achardi Pic, 1920c: 242.

LECTOTYPE: ♀, NMPC, by present designation, from INDONESIA, labelled: Sumatra Palembang (handwritten) / Amalocera Achardi mihi (handwritten by Pic) / TYPE (red, printed) / Amalocera achardi Pic J. Achard det. Type (handwritten by Achard, "J. Achard. det." printed) / Mus. Nat. Pragae Inv. 18 744 (red) / Pseudobironium achardi (Pic) det. Löbl, 1970 (handwritten, "det. Löbl 19" printed) / Lectotype Pseudobironium achardi (Pic) det. Löbl, 2012.

REDESCRIPTION: Length 2.30 mm, width 1.66 mm. Head with frons very dark, blackish, mouth-parts reddish. Pronotum with large black central spot reaching anterior margin, reddish on sides and behind black spot. Narrow basal strip of pronotum darkened. Elytra black, reddish at apices. Reddish apical area of elytron near lateral margins almost as fourth of elytron, becoming narrower toward suture, at suture about

as seventh of sutural length. Prohypomera, mesoventrite, abdomen and legs light reddish-brown, tarsi slightly lighter than tibiae. Metaventrite darker than mesoventrite and abdomen; antennomeres I to VI yellowish, following infuscate. Maxillary palpi with palpomere IV about 3 times as long as wide, tapering. Antennae conspicuously short, length ratio of antennomeres as II 9: III 5: IV 5: V 8: VI 5: VII 10: VIII 10: IX 10: X 10: XI 14; antennomere XI twice as long as wide (left antenna, only two basal antennomeres of the right antenna are present). Pronotal punctation distinct although very fine on dark spot, almost indistinct laterally. Elytral punctation similar to pronotal on narrow basal area, on remaining surface coarser, consisting of well delimited punctures, puncture intervals usually three to four times as large as puncture diameters, near apices denser, with intervals as to three times as large as puncture diameters. Prohypomera smooth. Mesoventrite lacking median ridge or stria, very finely punctate near margin. Metaventrite with median part not microsculptured, convex anteriad, flattened in apical half, with fairly coarse and dense punctation covering most of surface, mesal area included, only anterior portion impunctate. Lateral parts of metaventrite with punctulate microsculpture and very fine, sparse punctation. Submesocoxal area about as long as third of interval to metacoxa. Metacoxal process weakly sinuate. Mesotibiae hardly curved, metatibiae weakly curved, mesotibial ventral spur straight. Abdominal sternite 1 impunctate basolaterally, finely punctate apicolaterally and on median area; with distinct punctulate microsculpture on median area; with foveiform, fairly deep lateral impressions.

DISTRIBUTION: Indonesia: Sumatra.

COMMENTS: This species was transferred to *Pseudobironium* in Löbl (1975: 269). It is well characterized by its colour pattern and short antennae, with antennomeres III, IV and VI equally long. The body is comparatively weakly convex, similar to that in *P. sparsepunctatum* and *P. languei*. These three species have also similar antennae but differ drastically by the palpi which are tapering in *P. achardi*. The species remains represented by the single original specimen. As the number of specimens examined was not mentioned by Pic, 1920 and not necessarily conspecific syntypes may exist in collections, the designation of a lectotype is considered useful.

Pseudobironium sinicum Pic, 1954

Pseudobironium sinicum Pic, 1954: 88.

LECTOTYPE: ♀, NHRM, from CHINA, labelled: Kuatun, Fukien China 2.10.46 (Tschung Sen.) / Type (printed) Pseudobironium sinicum det. Pic, n. sp. (handwritten) (red) /Lectotype P. sinicum Pic det. Löbl 1998 (handwritten, "det. Löbl 19" printed / 9843 E 91 (printed, blue) / NHRS-JLKB 000020749 (printed). Lectotype designation: Löbl, 1999: 721.

PARALECTOTYPE: ♀, with the same locality data as the lectotype (MHNG).

REDESCRIPTION: Length 3.0 mm, width 2.05 mm. Head and most of body blackish, mouth-parts reddish, abdomen slightly lighter than most of body, with apical segments reddish-brown. Femora and tibiae dark brown, tarsi light brown. Maxillary palpi with palpomere IV about 4 times as long as wide, tapering. Head and pronotum very finely punctate, pronotal punctures not well delimited, much smaller than puncture intervals. Elytra lacking humps or impressions, with punctation coarser than that on pronotum, punctures fairly well delimited, distinctly coarser in middle than

near bases, apices, along sutural striae and along lateral margins, with puncture intervals mostly about twice as large as puncture diameters. Prohypomera very finely punctate, not microsculptured. Mesoventrite lacking median ridge or stria, very finely punctate near margin and with several very fine striae. Metaventrite not microsculptured, with median part convex anteriad, flattened in apical half, surface near metacoxae swollen, punctation fairly coarse and dense, punctures to part larger than puncture intervals, covering most of surface including posterior third of mesal area; anterior two thirds of mesal area impunctate. Lateral parts of metaventrite very finely punctate. Submesocoxal area as long as interval to metacoxa. Metacoxal process flat, lacking tubercle, not microsculptured, with few fine punctures, margin distinctly concave. Mesotibiae and metatibiae moderately curved, mesotibial ventral spur straight. Abdominal sternite 1 extremely finely punctate and with distinct punctulate microsculpture. Lateral impressions large, foveiform, fairly deep. Following sternites lacking basal wrinkles, with punctulate microsculpture.

DISTRIBUTION: China: Fujian.

COMMENTS: The species may be distinguished from its congeners by the comparatively large mesocoxal areas that are as long as the shortest interval between their margins and the metacoxae. The lectotype has the antennae and right protarsus broken off, the paralectotype is missing the head. The additional specimen from the same locality reported in Löbl (1999) is not conspecific.

Pseudobironium sp. A

MATERIAL EXAMINED: INDIA, Tamil Nadu, Nilgiri Hills 900m 15km NE Kotagin, Kunchappanai, 17-22.11.93, 1 ♀ leg. D. Boukal & Z. Kejval (MHNG).

DESCRIPTION: Length 2.6 mm, width 1.9 mm. Head dark brown. Pronotum and most of elytra blackish-brown, elytra along basal margins and on sutural areas slightly lighter than on disc, each elytron with distinct reddish subapical spot; latter oblique, about as wide as interval to apical margin. Ventral side of thorax laterally about as dark as pronotum and most of elytra, mesoventrite, mesal part metaventrite and abdomen hardly lighter. Femora and tibiae dark reddish-brown. Tarsi and antennae light reddish. Maxillary palpi with palpomere IV tapering, about 2.5 times as long as wide. Length ratio of antennomeres as II 11: III 10: IV 15: V 17: VI 15: VII 17: VIII 12: IX 13: X 12: XI 16; antennomere XI somewhat more than twice as long as wide. Head and pronotum with very fine punctation, punctures not clearly delimited, puncture intervals mostly about twice to three times as large as puncture diameters. Elytral punctation very fine along basal margins, fairly coarse on remaining surface, with punctures fairly well delimited, puncture intervals mostly about as large as to three times as large as puncture diameters. Prohypomera, mesoventrite, lateral parts of metaventrite and of 1st abdominal sternite lacking microsculpture and very finely punctate. Mesal part of metaventrite weakly convex, fairly coarsely punctate on posterior two thirds, very finely punctate near anterior margin. Submesocoxal area almost as long as half of interval to mesocoxa. Metacoxal process truncate, with mesal stria. Mesotibiae and metatibiae moderately curved, mesotibial ventral spur straight. Abdominal sternite 1 with apicolateral transverse impression, middle part of sternite 1 and following sternites with microsculpture consisting of inconspicuous, short striae.

COMMENTS: The species may be easily distinguished by the elytra having each a reddish subapical spot. Nevertheless, we prefer to leave it unnamed until male characters will become known.

ACKNOWLEDGEMENTS

We are greatly indebted to following colleagues and friends for the loan or gift of specimens upon which the present work is based: M. Amir, Bogor, Indonesia; Johannes Bergsten, Stockholm, Sweden; Svatopluk Bilý, Praha, Czech Republic; Roger G. Booth, London, UK; Daniel Burckhardt, Basel, Switzerland; late Michio Chûjô, Kagawa, Japan; Tierry Deuve, Paris, France; Jiří Hájek, Praha, Czech Republic; Matthias Hartmann, Erfurt, Germany; Jan Horák, Praha, Czech Republic; Josef Jelínek, Praha, Czech Republik; Zbyněk Kejval, Domažlice, Czech Republic; Jan Kodada, Bratislava, Slovakia; Sergei Kurbatov, Moscow, Russia; Otto Merkl, Budapest, Hungary; late M. Mroczkowski, Warszawa, Poland; Stewart B. Peck, Ottawa, Canada; Roberto Poggi, Genova, Italy; Andreas Pütz, Eisenhütenstadt, Germany; Alexander Riedel, Karlsruhe, Germany; Guillaume de Rougemont, London, UK; Wolfgang Schawaller, Stuttgart, Germany; Harald Schillhammer, Wien, Austria; Eva Sprecher-Uebersax, Basel, Switzerland; Azadeh Taghavian, Paris, France; Maria Tavano, Genova, Italy; Wen-XuanBi, Shanghai, China and Stanislav Vít, Genève, Switzerland. Hans Huijbregts, Leiden, Netherlands, provided actually used names for several old Javanese locality names. Particular thanks are due to the authorities of the Lembaga Ilmu Pengetahuan Indonesia, Jakarta, for a field work permit granted in 1989.

REFERENCES

ACHARD, J. 1920. Notes sur les Scaphidiidae de la faune Indo-Malaise. *Annales de la Société entomologique de Belgique* 60: 123-136.

ACHARD, J. 1923. Revision des Scaphidiidae de la faune japonaise. *Fragments entomologiques*: 94-120.

CHAMPION, G. C. 1927. Some Indian Coleoptera (24). *The Entomologist's Monthly Magazine* 63: 267-279.

HOSHINA, H. & AHN, K.-J. 2005. New record of the genus and species *Pseudobironium ussuricum* Löbl (Coleoptera, Staphylinidae) from Korea. *Elytra* 33: 522.

LESCHEN, R. A. B. & LÖBL, I. 2005. Phylogeny and classification of Scaphisomatini (Staphylinidae: Scaphidiinae) with notes on mycophagy, termitophily and functional morphology. *Coleopterists Society Monographs, Patricia Vaurie series* no. 3: 63 pp.

LÖBL, I. 1969. Revision der paläarktischen Arten der Gattungen *Pseudobironium* Pic, *Scaphischema* Reitter und *Eubaeocera* Cornell der Tribus Scaphisomini (Col. Scaphidiidae). *Mitteilungen der Schweizerischen entomologischen Gesellschaft* 42: 321-343.

LÖBL, I. 1970. Über einige Scaphidiidae (Coleoptera) aus der Sammlung des Muséum National d'Histoire naturelle de Paris. *Mitteilungen der Schweizerischen entomologischen Gesellschaft* 43: 125-132.

LÖBL, I. 1973. Über einige orientalische Scaphidiidae (Coleoptera) aus dem Museo Civico di Storia Naturale di Genova und Muséum National d'Histoire Naturelle de Paris. *Nouvelle Revue d'Entomologie* 3: 149-160.

LÖBL, I. 1975. Beitrag zur Kenntnis der orientalischen Scaphisomini (Coleoptera, Scaphidiidae). *Mitteilungen der Schweizerischen entomologischen Gesellschaft* 48: 269-290.

LÖBL, I. 1980. Beitrag zur Kenntnis der Scaphidiidae (Coleoptera) Taiwans. *Revue suisse de Zoologie* 87: 91-123.

LÖBL, I. 1982a. Contribution à la connaissance des *Pseudobironium* Pic de l'Inde (Coleoptera, Scaphidiidae). *Archives de sciences* 35: 157-160.

LÖBL, I. 1982b. Sur l'identité de trois "Amalocera" de Bornéo (Coleoptera, Scaphidiidae). *Revue suisse de Zoologie* 89: 789-795.

LÖBL, I. 1984a. Les Scaphidiidae (Coleoptera) du nord-est de l'Inde et du Bhoutan I. *Revue suisse de Zoologie* 91: 57-107.

LÖBL, I. 1984b. Scaphidiidae (Coleoptera) de Birmanie et de Chine nouveaux ou peu connus. *Revue suisse de Zoologie* 91: 993-1005.

LÖBL, I. 1986. Contribution à la connaissance des Scaphidiidae (Coleoptera) du nord-ouest de l'Inde et du Pakistan. *Revue suisse de Zoologie* 93: 341-367.

LÖBL, I. 1990. Review of the Scaphidiidae (Coleoptera) of Thailand. *Revue suisse de Zoologie* 97: 505-621.

LÖBL, I. 1992. The Scaphidiidae (Coleoptera) of the Nepal Himalaya. *Revue suisse de Zoologie* 99: 471-627.

LÖBL, I. 1999. A review of the Scaphidiinae (Coleoptera: Staphylinidae) of the People's Republic of China, I. *Revue suisse de Zoologie* 106: 691-744.

LÖBL, I. 2005. On a collection of Scaphidiinae (Coleoptera, Stapyhlinidae [sic]) from Nepal. *Veröffentlichungen Naturkundemuseum Erfurt* 24: 177-181.

LÖBL, I. 2011a. On the Scaphisomatini (Coleoptera: Staphylinidae: Scaphidiinae) of the Philippines. *Studies and Reports Taxonomical Series* 7: 303-316.

LÖBL, I. 2011b. Notes on some Taiwanese Scaphidiinae (Coleoptera: Staphylinidae) described by Miwa and Mitono, with description of a new species and new records. *Japanese Journal of systematic Entomology* 17: 199-207.

MIWA, Y. & MITONO, T. 1943. Scaphidiidae of my country [= Scaphidiidae of Japan and Formosa]. *Transactions of the Natural History Society of Formosa* 33: 512-555 (in Japanese).

NAKANE, T. 1955. Nihon no kôchu (27) [The Coleoptera of Japan]. *Shin-Konchū* 8 (9): 49-53 (in Japanese).

NAKANE, T. 1963. Scaphidiidae. Pp. 78-80, pls. 39, 40. *In*: Nakane T., Ohbayashi K., Nomura S., & Kurosawa Y: *Iconographia Insectorum Japonicorum, Colore naturali edita. Volumen 2 (Coleoptera)*. Tokyo: Hokuryu-kan, 443 pp., 192 pls. (in Japanese).

PIC, M. 1915. Diagnoses de nouveaux genres et nouvelles espèces de Scaphidiides. *L'Echange, Revue linnéenne* 31: 30-32.

PIC, M. 1920a. Diagnoses de coléoptères exotiques. *L'Echange, Revue linnéenne* 36: 15-16.

PIC, M. 1920b. Coléoptères exotiques en partie nouveaux. *L'Echange, Revue linnéenne* 36: 22-24.

PIC, M. 1920c. Nouveaux scaphidiides de Sumatra (Col.). *Bulletin de la Société entomologique de France* 1920: 242-243.

PIC, M. 1921. Scaphidiides recueillis par feu L. Fea. *Annali del Museo Civico di Storia Naturale di Genova* 49: 158-167.

PIC, M. 1923a. Nouveautés diverses. *Mélanges exotico-entomologiques* 38: 1-32.

PIC, M. 1923b. Scaphidiides exotiques nouveaux (Col.). *Bulletin de la Société entomologique de France* 1923: 194-196.

PIC, M. 1931. Nouveautés diverses. *Mélanges exotico-entomologiques* 57: 1-36.

PIC, M. 1947. *Diversité entomologiques* 2: 1-16

PIC, M. 1954. Coléoptères nouveaux de Chine. *Bulletin de la Société entomologique de Mulhouse* 1954: 53-59.

ERRATA CORRIGE

PIEROTTI, H. 2013. Contributi al riordinamento sistematico dei Peritelini w-paleartici (Coleoptera, Curculionidae, Entiminae). VIII. Sintesi delle conoscenze al 31 dicembre 2010. *Revue suisse de Zoologie* 120 (1): 29-81.

Pag. 45.
7. *lavagnei* Pierotti & Bellò, 1992
leggere:
7. *lavagnei* Pierotti & Bellò, 1994

Pag. 45-46.
8a Funicolo antennale molto robusto, il settimo articolo più di due volte più largo che lungo. Elitre con lunghe setole erette. Pene a profilo subarrotondato nella porzione apicale . . . . . *crassicornis*
8b Funicolo antennale poco robusto, il settimo articolo meno di due volte più largo che lungo. Elitre con setole semierette, più brevi. Pene a profilo scutiforme nella porzione apicale . . . . . *perezi*

leggere:
8a Funicolo antennale poco robusto, il settimo articolo meno di due volte più largo che lungo. Elitre con setole semierette, più brevi. Pene a profilo scutiforme nella porzione apicale . . . . . *perezi*
8b Funicolo antennale molto robusto, il settimo articolo più di due volte più largo che lungo 8c
8ca Elitre con lunghe setole erette. Pene a profilo subarrotondato nella porzione apicale . . . . . *crassicornis*
8cb Elitre con setole semierette. Pene a lati subparalleli fin presso l'apice, qui a profilo largamente scutiforme . . . . . *gerundana*

REVUE SUISSE DE ZOOLOGIE

Tome 120 — Fascicule 4

REVUE SUISSE DE ZOOLOGIE

Volume 120 — Number 4

Indexed in CURRENT CONTENTS, SCIENCE CITATION INDEX

PUBLICATIONS DU MUSEUM D'HISTOIRE NATURELLE DE GENÈVE

CATALOGUE DES INVERTEBRES DE LA SUISSE, Nos 1-17 (1908-1926) ..... série Fr. 285.—
(prix des fascicules sur demande)

REVUE DE PALÉOBIOLOGIE ..... Echange ou par fascicule Fr. 35.—

LE RHINOLOPHE (Bulletin du centre d'étude des chauves-souris) ..... par fascicule Fr. 35.—

THE EUROPEAN PROTURA: THEIR TAXONOMY, ECOLOGY AND DISTRIBUTION, WITH KEYS FOR DETERMINATION
J. Nosek, 345 p., 1973 ..... Fr. 30.—

CLASSIFICATION OF THE DIPLOPODA
R. L. Hoffman, 237 p., 1979 ..... Fr. 30.—

LES OISEAUX NICHEURS DU CANTON DE GENÈVE
P. Géroudet, C. Guex & M. Maire
351 p., nombreuses cartes et figures, 1983 ..... Fr. 45.—

CATALOGUE COMMENTÉ DES TYPES D'ECHINODERMES ACTUELS CONSERVÉS DANS LES COLLECTIONS NATIONALES SUISSES, SUIVI D'UNE NOTICE SUR LA CONTRIBUTION DE LOUIS AGASSIZ À LA CONNAISSANCE DES ECHINODERMES ACTUELS
M. Jangoux, 67 p., 1985 ..... Fr. 15.—

RADULAS DE GASTÉROPODES LITTORAUX DE LA MANCHE (COTENTIN-BAIE DE SEINE, FRANCE)
Y. Finet, J. Wüest & K. Mareda, 62 p., 1991 ..... Fr. 10.—

GASTROPODS OF THE CHANNEL AND ATLANTIC OCEAN: SHELLS AND RADULAS
Y. Finet, J. Wüest & K. Mareda, 1992 ..... Fr. 30.—

O. SCHMIDT SPONGE CATALOGUE
R. Desqueyroux-Faundez & S.M. Stone, 190 p., 1992 ..... Fr. 40.—

ATLAS DE RÉPARTITION DES AMPHIBIENS ET REPTILES DU CANTON DE GENÈVE
A. Keller, V. Aellen & V. Mahnert, 48 p., 1993 ..... Fr. 15.—

THE MARINE MOLLUSKS OF THE GALAPAGOS ISLANDS: A DOCUMENTED FAUNAL LIST
Y. Finet, 180 p., 1995 ..... Fr. 30.—

NOTICE SUR LES COLLECTIONS MALACOLOGIQUES DU MUSEUM D'HISTOIRE NATURELLE DE GENEVE
J.-C. Cailliez, 49 p., 1995 ..... Fr. 22.—

PROCEEDINGS OF THE XIIIth INTERNATIONAL CONGRESS OF ARACHNOLOGY, Geneva 1995 (ed. V. Mahnert), 720 p. (2 vol.), 1996 ..... Fr. 160.—

INSTRUMENTA BIODIVERSITATIS

CATALOGUE OF THE SCAPHIDIINAE (COLEOPTERA: STAPHYLINIDAE)
(*Instrumenta Biodiversitatis* I), I. Löbl, xii + 190 p., 1997 ..... Fr. 50.—

CATALOGUE SYNONYMIQUE ET GEOGRAPHIQUE DES SYRPHIDAE (DIPTERA) DE LA REGION AFROTROPICALE
(*Instrumenta Biodiversitatis* II), H. G. Dirickx, x +187 p., 1998 ..... Fr. 50.—

A REVISION OF THE CORYLOPHIDAE (COLEOPTERA) OF THE WEST PALAEARCTIC REGION
(*Instrumenta Biodiversitatis* III), S. Bowestead, 203 p., 1999 ..... Fr. 60.—

THE HERPETOFAUNA OF SOUTHERN YEMEN AND THE SOKOTRA ARCHIPELAGO
(*Instrumenta Biodiversitatis* IV), B. Schätti & A. Desvoignes, 178 p., 1999 ..... Fr. 70.—

PSOCOPTERA (INSECTA): WORLD CATALOGUE AND BIBLIOGRAPHY
(*Instrumenta Biodiversitatis* V), C. Lienhard & C. N. Smithers, xli + 745 p., 2002 ..... Fr. 180.—

REVISION DER PALÄARKTISCHEN ARTEN DER GATTUNG *BRACHYGLUTA* THOMSON, 1859 (COLEOPTERA, STAPHYLINIDAE) (1. Teil)
(*Instrumenta Biodiversitatis* VI), G. Sabella, Ch. Bückle, V. Brachat & C. Besuchet, vi + 283 p., 2004 ..... Fr. 100.—

PHYLOGENY, TAXONOMY, AND BIOLOGY OF TEPHRITOID FLIES (DIPTERA, TEPHRITOIDEA)
Proceedings of the "3rd Tephritoid Taxonomist's Meeting, Geneva, 19.-24. July 2004"
(*Instrumenta Biodiversitatis* VII). B. Merz, vi + 274 p., 2006 ..... Fr. 100.—

LISTE ANNOTÉE DES INSECTES (INSECTA) DU CANTON DE GENÈVE
(*Instrumenta Biodiversitatis* VIII). (ed. B. Merz), 532 p., 2012 ..... Fr. 85.—

Volume 120 - Number 4 - 2013

Revue suisse de Zoologie: Instructions for Authors

The *Revue suisse de Zoologie* publishes original results of zoological systematics and related fields. Priority is given to contribution submitted by members of the Swiss Zoological Society or studies presenting results based on collections of Swiss museums. Contributions from other authors may be accepted as space permits.

Submission of a manuscript implies that it has been approved by all authors, that it reports their unpublished work and that it is not being considered for publication elsewhere. A financial contribution may be asked from the authors for the impression of colour plates. All manuscripts are refereed by experts.

In order to facilitate publication and avoid delays authors should follow the *Instructions to Authors* and refer to a current issue of the RSZ or our web-pages for acceptable style and format. Papers may be written in French, German, Italian and English. Authors and writing in their native language should pay particular attention to the linguistic quality of the text.

Manuscripts must be printed, on one side only and double-spaced, on A4 (210 x 297 mm) or equivalent paper and all pages should be membered. All margins must be at least 25 mm wide. Authors must submit **three paper copies** (print-out), including tables and figures, and are expected to retain another copy. **Original artwork** should only be submitted with the revised version of the accepted manuscript. The accepted final version of the manuscript must be submitted on a CD as a single file in Microsoft Word (.doc) or Rich Text Format (.rtf).

The text should be in roman (standard) type face throughout, except for genus and species names which must be formatted in *italics* (***bold italics*** in taxa headings) and author's names in the list of references (not in other parts of the text!), which should be formatted in SMALL CAPITALS, LARGE CAPITALS may be used for main chapter-headings and SMALL CAPITALS, for subordinate headings. Footnotes and cross-references to specific pages should be avoided. Papers should conform to the following general layout.

Title page. A concise but informative full title plus a running title of not more than 40 letters and spaces, full name(s) and surname(s) of author(s), and full address(es) including e-mail address(es) if possible.

Abstract. The abstract is in English, composed of the title and a short text of up to 200 words. It should summarise the contents and conclusions of the paper and name all newly described taxa. The abstract is followed by up to 10 keywords, separated by hyphens, which are suitable for indexing. Some of the terms used in the title may be omitted from the list of keywords in favour of significant terms not mentioned in the title.

Introduction. A short introduction to the background and the reasons for the work.

Material and methods. Sufficient experimental details must be given to enable other workers to repeat the work. The full binominal name should be given for all organisms. The International Code of Zoological Nomenclature must be strictly followed. Cite the authors of species on their first mention.

Results. These should be concise and should not include methods or discussion. Text and tables should not duplicate the same information. The abbreviations gen. n., sp. n., syn. n. and comb. n. must be used to distinguish all new taxa, synonyms or combinations. Primary types must be deposited in a museums or similar institution. In taxonomic papers the species heading should be followed by synonyms, material examined, description, distribution, and comments. All material examined should be listed in similar, compact and easily intelligible format; the information should be in the same language in the text. Sex symbols should be used rather than "male" and "female" (text file: $ = ♂. £ = ♀).

Discussion. The should not be excessive and should not repeat results nor contain new information, but should emphasize the significance and relevance of the results reported.

References. The autor-date system (name-year system) must be used for the citation of references in the text, e.g. White & Green (1995) or (White & Green, 1995). For references with three and more authors the form Brown *et al.* (1995) or (Brown *et al.*, 1995; White *et al.*, 1996) should be used. In the text authors' names have to be written in standard type face. However, in the list of references they should be formated in SMALL CAPITALS (see below). The list of references must include all publications cited in the text and only these. References must be listed in alphabetical order of authors, in the case of several papers by the same author, the name has to be repeated for each reference. The title of the paper and the name of the journal must be given in full in the following style:

PENARD, E. 1888. Recherches sur le *Ceratium macroceros. Thèse, Genève*, 43 pp.

PENARD, E. 1889. Etudes sur quelques Héliozoaires d'eau douce. *Archives de Biologie* 9: 1-61.

MERTENS, R. & WERMUTH, H. 1960. Die Amphibien und Reptilien Europas. *Kramer, Frankfurt am Main*, XI + 264 pp.

HANDLEY, C. O. JR 1996. Checklist of the mammals of Panama (pp. 753-795). *In*: WENZEL, R. L. & TIPTON, V. J. (eds). Ectoparasites of Panama. *Field Museum of Natural History, Chicago*, XII + 861 pp.

Tables. These should be self-explanatory, with the title at the top, organised to fit 122 x 180 mm.

Figures. These may be line drawings or half tones, not integrated in the text-file, and all should be numbered consecutively. Drawings and lettering should be prepared to withstand reduction to fit the page size of 122 x 170 mm. Magnification should be indicated with scale lines. Refrain from mixing drawings and half tones. Originals of figures (ink drawings, photographs, slides) should be submitted together with the revised version of the accepted manuscript. Original drawings will not be returned automatically. The *Revue suisse de Zoologie* declines responsibility for lost or damaged slides or other documents. It files of scanned figures are submitted, this should be clearly indicated on the print-out. Scanned line drawings must be saved as TIF files in bitmap mode with a resolution of at least 600 dpi. Half tone illustrations and photos must have at least 300 dpi resolution.

Legends to figures. These should be typed in numerical order on a separate sheet.

Proofs. Only page proofs are supplied, and authors may be charged for alterations (other than printer's errors) if they are numerous.

Offprints. All authors will receive a PDF file of their article, but no free offprints. Offprints may be ordered at current prices when the proofs are returned.

Correspondence. All correspondence should be addressed to:

Revue suisse de Zoologie, Muséum d'histoire naturelle, CP 6434, CH-1211 Genève 6, Switzerland.
Phone: +41 22 418 63 33 - Fax: +41 22 418 63 01. E-mail: rsz.mhn@ville-ge.ch
Home page RSZ: http://www.ville-ge.ch/mhng/publication03.php

REVUE SUISSE DE ZOOLOGIE

Volume 120 — Number 4

Indexed in CURRENT CONTENTS, SCIENCE CITATION INDEX