

## New or poorly-known millipedes (Diplopoda) from Papua New Guinea, 1

### Новые и малоизвестные многоножки-диплоподы из Папуа — Новой Гвинеи. 1

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КЛЮЧЕВЫЕ СЛОВА: Diplopoda, таксономия, новые виды, Папуа-Новая Гвинея.

**ABSTRACT.** Three new species of the diplopod family Paradoxosomatidae are described from Papua New Guinea: *Tectoporus fugilil* sp.n., *T. jeekeli* sp.n. and *Eustrongylosoma beroni* sp.n. New records of a few more, mainly pantropical species are given. The species “*Strongylosoma*” *hirtipes* Carl, 1912 and “*S.*” *constrictum* Carl, 1912 from Sulawesi, Indonesia, long suspected to actually belong in *Tectoporus*, are formally transferred therein: *T. hirtipes* (Carl, 1912) and *T. constrictus* (Carl, 1912), both comb.n.

**РЕЗЮМЕ.** Из Папуа-Новой Гвинеи описаны три новых вида диплопод семейства Paradoxosomatidae: *Tectoporus fugilil* sp.n., *T. jeekeli* sp.n. и *Eustrongylosoma beroni* sp.n. Приведены находки там еще нескольких, в основном пантропических видов. Виды “*Strongylosoma*” *hirtipes* Carl, 1912 и “*S.*” *constrictum* Carl, 1912 из Сулавеси (Индонезия), давно подозревавшиеся в принадлежности к роду *Tectoporus*, формально переведены туда: *T. hirtipes* (Carl, 1912) и *T. constrictus* (Carl, 1912), обе comb.n.

#### Introduction

The millipede fauna of New Guinea is largely still a *terra incognita*, the latest checklists [Attems, 1915, 1917] containing only a few dozen species or subspecies. So any significant collection taken from that remote part of Australasia is of special interest.

In this connection, the material taken in Papua New Guinea by Dr. Petar Beron, of the National Museum of Natural History in Sofia, Bulgaria (NMNHS), as one of the participants of the British Speleological Expedition in 1975, is also of utmost importance. It alone comprises several dozen new or poorly known species,

of which only a few have hitherto been described [Hoffman, 1977/78, 2005; Shear, 1980].

This contribution is the first in a planned series of publications dealing with this collection. It focuses on a few known species, as well as three new ones from the family Paradoxosomatidae (Polydesmida) which, in terms of diversity, strongly dominates the Southeast Asian and Australasian faunas of Diplopoda. All material treated here is housed in the NMNHS.

#### Taxonomy

##### Order Spirostreptida

##### Family Cambalopsidae

##### *Hypocambala anguina* (Attems, 1900)

**MATERIAL:** 1 ♂, 2 ♀♀, 4 juv., Papua New Guinea, E. New Britain, village Juvare, cave Luminas II, 19.XI.1975, P. Beron leg.

**REMARKS.** This pantropical species [Jeekel, 2004] is new to the fauna of Papua New Guinea.

##### Order Polydesmida

##### Family Haplodesmidae

##### *Cylindrodesmus hirsutus* (Pocock, 1888)

**MATERIAL:** 1 ♂, 2 ♀♀, Papua New Guinea, New Ireland, Kavieng, 14.XI.1975, leg. P. Beron.

**REMARKS.** This pantropical species [Golovatch et al., 2001] is new to the fauna of Papua New Guinea.

## Family Paradoxosomatidae

*Orthomorpha coarctata* (DeSaussure, 1860)

MATERIAL: 1 ♂, 1 ♀, 1 juv., Papua New Guinea, E. New Britain, village Juvare, cave Luminas II, 19.XI.1975; 4 ♂♂, 1 ♀, Papua New Guinea, Morobe District, Lae, rainforest at sea level, 11.X.1975, all leg. P. Beron.

REMARKS. This pantropical species has already been recorded from several places in New Guinea [Shelley & Lehtinen, 1998; Jeekel, 2009].

*Caloma agametum* Chamberlin, 1945

MATERIAL: 1 ♂, Papua New Guinea, Finim tel Plateau, bottom of 150 m shaft near Girtoil, 8.VIII.1975, leg. British Speleological Expedition (B.S.E.).

REMARKS. This genus has recently been nicely reviewed by Hoffman [2005] and shown to comprise only two species: *C. agametum* and *C. insulare* (Silvestri, 1899), both from New Guinea. The new record actually repeats the one by Hoffman, based on the same collection. Hoffman [2005] considers, though with certain reservations, that *Caloma* belongs to the tribe Sulciferini but, following Golovatch [1996], we believe this genus actually represents a Tectoporini. Based on gonopod structure, *Caloma* seems to be the closest to *Tectoporus*, the main differences between both lying in the presence in the latter genus of a rather slender and simple gonofemurite while the solenomere is largely sheathed by a torsate solenophore. In contrast, the gonopod femurite in *Caloma* is stout and folded, whereas the solenomere is free, not sheathed by a more simple solenophore [Golovatch, 1996].

*Tectoporus fugilil* sp.n.

Figs 1–6.

HOLOTYPE ♂, Papua New Guinea, Western Province, top of Mt Fugilil, 2,980 m a.s.l., 18.VIII.1975, B.S.E. (leg. P. Beron).

DIAGNOSIS. Differs from congeners primarily in the peculiar, highly complex shape of a rather stout solenophore.

NAME. To emphasize the *locus typicus*, a noun in apposition.

DESCRIPTION. Length ca 20 mm, width of midbody pro- and metazona 1.4 and 1.5 mm, respectively. Coloration brown, antennae and legs contrastingly yellow-whitish, only antennomere 5 and, especially, 6 brownish. Collum = 3=4 < 2 < head = 5–16; thereafter body gradually tapering. Antennae long, slender, in situ nearly reaching end of segment 4 dorsally. Paraterga modest, rimmed only dorsally, at most (segments 16–18) only very slightly surpassing rear tergal contour, never pointed, always narrowly rounded, set low (at about half midbody height). Surface shining, smooth all over (even below paraterga), transverse sulcus and structures on metaterga wanting. Constriction between pro- and metazona rather deep, but faintly delimited, with the same microalveolate sculpture at bottom as neighbouring parts of pro- and metazona. Ozopores

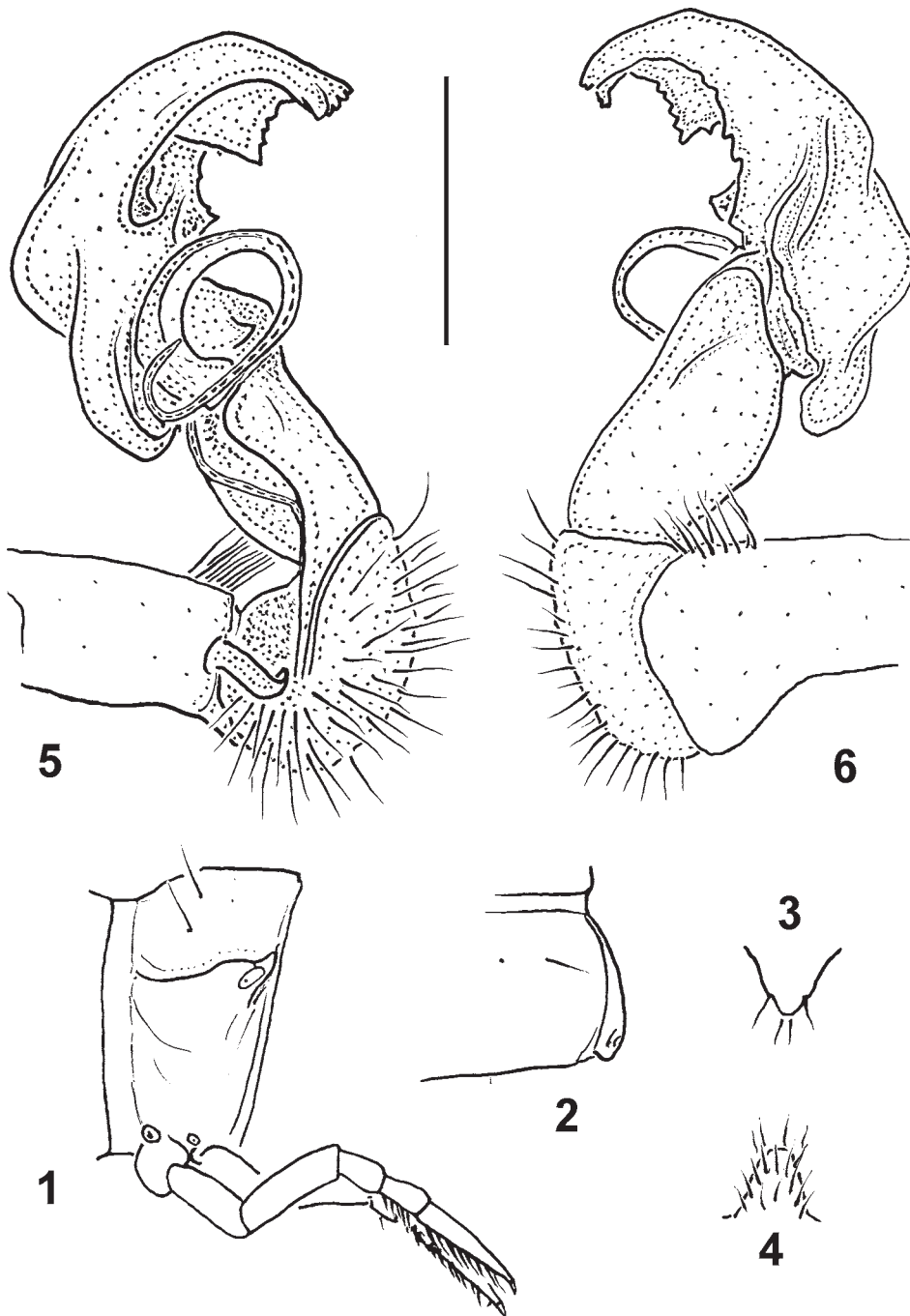
lateral, lying at bottom of a distinct groove near caudal corner of metaterga, poreless paraterga considerably thinner at margin. Axial line missing. Setation pattern traceable only as 2+2 rather long setae in anterior row (Figs 1 & 2); collum with three rows of 4+4, 2+2 and 2+2 setae. Pleurosternal carinae faintly traceable only on segments 2–4, onward totally missing. Epiproct short, rounded, without evident pre-apical setigerous knobs laterally (Fig. 3). Hypoproct broadly trapeziform, with 1+1 long, broadly separated setae at caudal corners.

Sterna modestly setose, with distinct cross-impressions, but without traces of cones; sternal process between coxae 4 long, linguiform, setose (Fig. 4). Legs long, slender, only on segments 2–7 moderately incrassate, thereafter ca 1.5 times longer than midbody height; tarsal and tibial brushes present only until body segment 9, onward gradually thinning out.

Gonopods (Figs 5 & 6) with an elongate, subcylindrical coxite, a rather short prefemoral portion, an uneven and relatively stout femurite, and a complex, enlarged solenophore devoid of evident processes and obviously sheathing most of a flagelliform solenomere.

REMARKS. The new species is the first congener to be found in New Guinea. All the other *Tectoporus* Carl, 1902, a rather large Indonesian genus, have heretofore been reported only between Sumatra in the West and Sulawesi in the East: *T. aberrans* Golovatch, 1996, *T. beroni* Golovatch, 1996, *T. beshkovi* Golovatch, 1996, *T. hirtellus* (Silvestri, 1895), *T. hispidus* Jeekel, 1951, *T. scutigeroides* (Attems, 1930), all from Sumatra, *T. ambiguus* (Carl, 1941), *T. annex* (Chamberlin, 1945), *T. brevopilus* (Attems, 1930), *T. castaneus* Attems, 1930, *T. filarius* (Attems, 1932), *T. gracilipes* Carl, 1902 (the type species), *T. lamellifer* (Chamberlin, 1945), *T. malobarus* (Chamberlin, 1945), *T. pangrangus* (Chamberlin, 1945), all from Java, *T. honestus* Golovatch, 1994, probably from Java as well, *T. pygmaeus* (Pocock, 1894), from Java and Bali, *T. lombokensis* Golovatch, 1995, from Lombok, *T. cornutus* (Attems, 1930), from Sumbawa (and Sabang?), and *T. pictus* (Carl, 1912) and *T. virilis* Jeekel, 1983, both from Sulawesi. Two further Sulawesi species, “*Strongylosoma*” *hirtipes* Carl, 1912 and “*Strongylosoma*” *constrictum* Carl, 1912, have long been suspected to actually belong in *Tectoporus* [Golovatch, 1996] as well, but their transfers are formalized only here: *T. hirtipes* (Carl, 1912) and *T. constrictus* (Carl, 1912), both comb.n.

*T. fugilil* sp.n. falls well within Group 1 of *Tectoporus* distinguished due to the lack of a spine or process on the lateral side of the solenophore [cf. Jeekel, 1951]. To provide a better idea of the status and relationships of *T. fugilil* sp.n., a key will be provided elsewhere to all currently known members of Group 1 of *Tectoporus*; it will also incorporate the next new species described here. A key to all known species of Group 2 is already available [Golovatch, 1996].



Figs 1-6. *Tectoporus fugilil* sp.n., holotype: 1-2 — segment 10, lateral and dorsal views, respectively; 3 — epiproct, dorsal view; 4 — lamina between coxae 4, subcaudal view, 5-6 — left gonopod, mesal and lateral views, respectively. Scale bar 1.5 (1-4) & 0.5 mm (5-6).

Рис. 1-6. *Tectoporus fugilil* sp.n., голотип: 1-2 — сегмент 10, соответственно сбоку и сверху; 3 — эпипрокт, вид сверху; 4 — пластинка между тазиками 4, почти сзади; 5-6 — левый гонопод, соответственно изнутри и сбоку. Масштаб 1,5 (1-4) и 0,5 мм (5-6).

*Tectoporus jeekeli* sp.n.

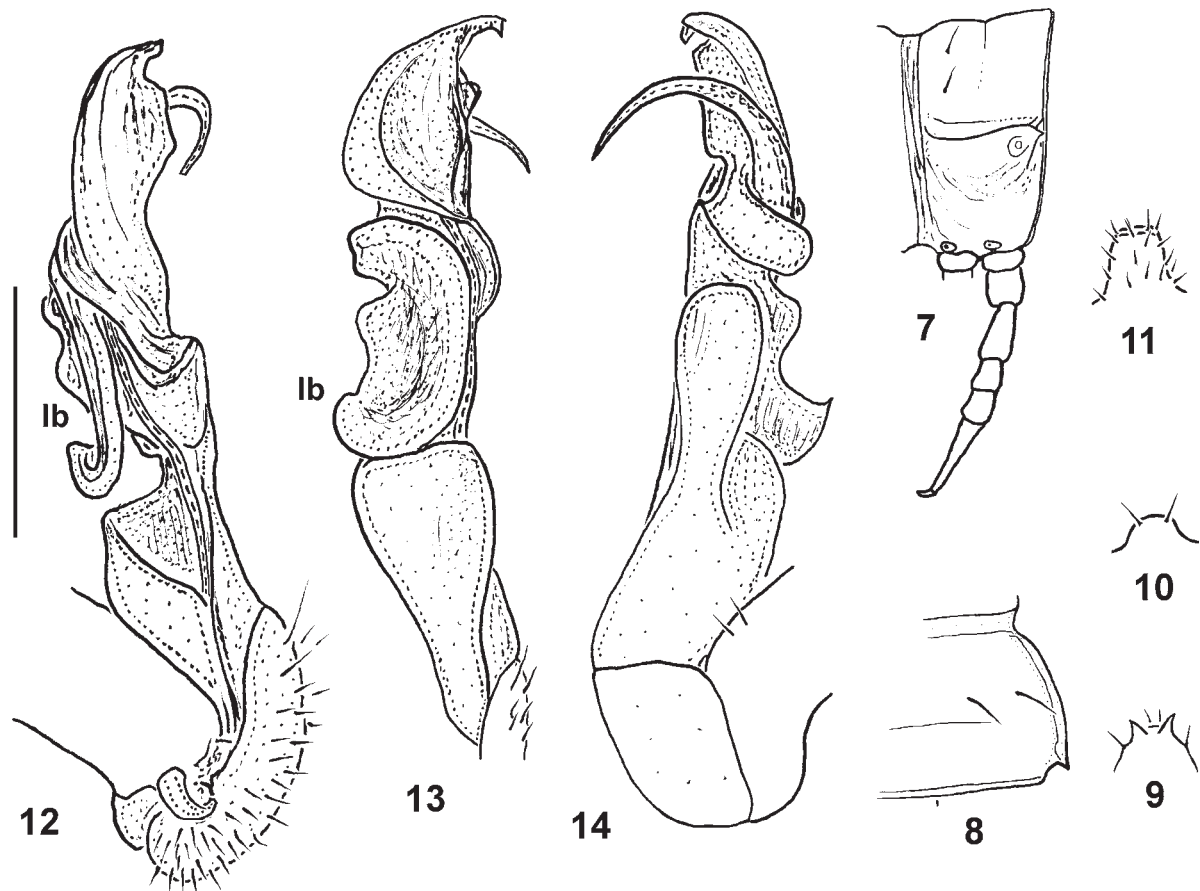
Figs 7-14.

HOLOTYPE ♂, Papua New Guinea: Western Province, top of Mt Fugilil, 2,980 m a.s.l., 29.IX.1975, B.S.E. (leg. P. Beron).

DIAGNOSIS. Differs from congeners in the bifid epiproct, coupled with a peculiar, ear-shaped basal lobe of the solenophore.

NAME. Honours C.A.W. Jeekel, an outstanding specialist in Diplopoda.

DESCRIPTION. Length ca 17 mm, width of mid-body pro- and metazona 1.6 and 1.7 mm, respectively. Coloration rather uniformly light yellow-brownish, metaterga very faintly infuscate laterally compared to remaining parts, thus leaving a large, lighter, subtriangular spot centrally. Head width = 3=4 < collum = 3=4



Figs 7–14. *Tectoporus jeekeli* sp.n., holotype: 7–8 — segment 10, lateral and dorsal views, respectively; 9 — epiproct, dorsal view; 10 — hypoproct, ventral view; 11 — lamina between coxae 4, subcaudal view; 12–14 — left gonopod, mesal, dorsal and lateral views, respectively. Scale bar 1.5 (7–11) and 0.5 mm (12–14).

Рис. 7–14. *Tectoporus jeekeli* sp.n., голотип: 7–8 — сегмент 10, соответственно сбоку и сверху; 9 — эпипрокт, вид сверху; 10 — гипопрокт, вид снизу; 11 — пластинка между тазиками 4, почти сзади; 12–14 — левый гонопод, соответственно изнутри, сверху и сбоку. Масштаб 1,5 (7–11) и 0,5 мм (12–14).

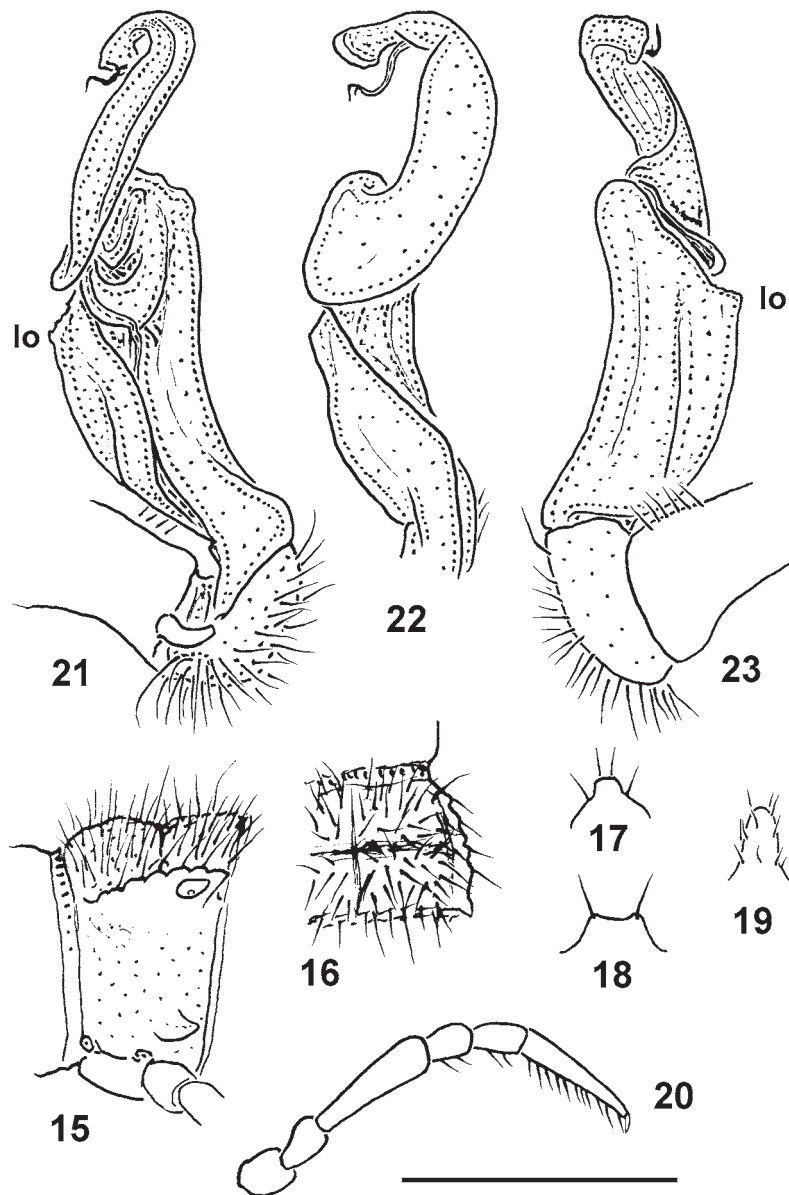
< 2=5–16; thereafter body gradually tapering. Antennae relatively short, clavate, in situ reaching about midway of segment 3 dorsally. Paraterga modest, rimmed only dorsally, at most only reaching rear tergal contour on several segments of posterior body part; pointed starting from segment 4, set low (at about half midbody height). Surface shining, smooth all over (even below paraterga), transverse sulcus on metaterga 6–17 very faint, far from reaching base of paraterga, more like an impression; structures on metaterga wanting. Constriction between pro- and metazona rather deep, but faintly delimited, with the same microalveolate sculpture at bottom as neighbouring parts of pro- and metazona. Ozopores lateral, lying at bottom of a small pit near caudal corner of metaterga, poreless paraterga considerably thinner at margin. Axial line missing. Setation pattern traceable only as 2+2 rather long setae in anterior row (Figs 7 & 8); collum with three rows of 3+3, 2+2 and 2+2 setae. Pleurosternal carinae faintly traceable only on segment 2, onward totally missing. Epiproct short, with two evident teeth

latero-apically, without evident pre-apical setigerous knobs laterally (Fig. 9). Hypoproct roundly trapeziform, with 1+1 long, broadly separated setae at caudal corners (Fig. 10).

Sterna modestly setose, with distinct cross-impressions, but without traces of cones; sternal process between coxae 4 long, linguiform, truncated at apex, setose (Fig. 11). Legs relatively short, in male apparently distinctly incrassate compared to female, midbody ones ca 1.3 times longer than body height; brushes present on femora, tibiae and tarsi 1–6, onward retained only on tibiae and tarsi until body segment 17, last two leg-pairs devoid of brushes.

Gonopods (Figs 12–14) much the same as in *T. fugilil* sp.n., but femorite even stouter while solenophore with a characteristic, ear-shaped lobe (lb) at base.

REMARKS. Both of the new *Tectoporus* occur syntopically and belong to Group 1 in the sense of Jeekel [1951].



Figs 15–23. *Eustrongylosoma beroni* sp.n., holotype: 15–16 — segment 7, lateral and dorsal views, respectively; 17 — epiproct, dorsal view; 18 — hypoproct, ventral view; 19 — lamina between coxae 4, subcaudal view; 20 — midbody leg; 21–23 — left gonopod, mesal, dorsal and lateral views, respectively. Scale bars 1.5 (15–20) and 0.5 mm (21–23).

Рис. 15–23. *Eustrongylosoma beroni* sp.n., голотип: 15–16 — сегмент 7, соответственно сбоку и сверху; 17 — эпипрокт, вид сверху; 18 — гипопрокт, вид снизу; 19 — пластинка между тазиками 4, почти сзади; 20 — среднетуловищная нога; 21–23 — левый гонопод, соответственно изнутри, сверху и сбоку. Масштаб 1,5 (15–20) и 0,5 мм (21–17).

*Eustrongylosoma beroni* sp.n.  
Figs 15–23.

HOLOTYPE ♂ (incomplete, segments 9 and 10 missing), Papua New Guinea, Chimbu Province, village Goglme, cave Ogon I, 1975, leg. P. Beron.

DIAGNOSIS. Differs from congeners in an obviously missing colour pattern, coupled with certain details of somatic and gonopod structure.

NAME. Honours Petar Beron, the collector and our dear friend.

DESCRIPTION. Length ca 18 mm, width of mid-body pro- and metazona 1.7 and 1.8 mm, respectively.

Coloration uniformly yellowish, tegument translucent, rather weakly sclerotized.

Head broadest, >> collum = 2–5 > 3=4 < 6–16; thereafter body gradually tapering. Antennae very long slender, poorly clavate, in situ slightly surpassing segment 4 dorsally, 6<sup>th</sup> antennomere shorter than 2<sup>nd</sup>. Head and collum densely setose. Paraterga modest (Figs 15 & 16), rimmed only dorsally, at most only reaching rear tergal contour, with several setigerous knobs at margin; pointed starting from segment 3, set rather low (at about 1/3 midbody height). Surface shining, smooth nearly all over (even below paraterga) except for

metaterga beset with irregular, minute, setigerous knobs; transverse sulcus present on metaterga 4–19, but fully developed only on metaterga 5–18, mostly very clear, reaching base of paraterga. Axial line thin, present on segments 5–17. Constriction between pro- and metazona rather deep, finely ribbed at bottom both dorsally and dorsolaterally. Ozopores lateral, lying at bottom of a small groove near caudal corner of metaterga, poreless paraterga considerably thinner at margin. Pleurosternal carinae well-developed, present on segments 2–7 (Fig. 15), complete on segments 2–4, retained only as a caudal tooth on segments 5–7. Epiproct short, narrowly subtruncate, without evident pre-apical setigerous knobs laterally (Fig. 17). Hypoproct trapeziform, with 1+1 long, broadly separated setae at caudal corners (Fig. 18).

Sterna densely setose, with distinct cross-impressions, but without traces of cones; sternal process between coxae 4 high, linguiform, rounded at apex, setose (Fig. 19). Legs very long, ca 1.8–1.9 times longer than midbody height; brushes present on tarsi 1–7, onward thinning out; claws very long (Fig. 20).

Gonopods (Figs 21–23) with an elongate, subcylindrical coxite, a short prefemoral part, a distad broadened, rather long, mesally evidently excavated femorite carrying seminal groove at bottom of gutter and supplied with a dorsal, distally slightly uneven lobe (lo), but without any distofemoral process. Solenophore directed laterad, torsate, slender, about as long as femorite, with both a lamina medialis and, especially, a lamina lateralis well-developed, sheathing most of a subflagelliform solenomere.

REMARKS. *Eustrongylosoma* Silvestri, 1896 is another speciose genus comprising several dozen species from Sulawesi, New Guinea, Solomon Islands, the Caroline island Ponape, and Mindanao, Philippines [Hoffman, 1977/78; Golovatch, 1996]. Based on the key to New Guinea species of *Eustrongylosoma* [Hoffman, 1977/78], *E. beroni* sp.n. is distinguished by the lack of a colour pattern, coupled with the presence of irregular, dense, tergal pubescence, of small and laterally serrate paraterga, of a particularly elongate lamina between ♂ coxae 4, of an apically uneven, dorsal lobe

(lo) of the gonofemorite which is devoid of a distolateral process, etc.

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