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Philippine Zoological Expedition, 1946-1947
Millipeds of the Genus *Polydesmorhachis* Pocock (Polydesmida: Platyrhacidae)

RICHARD L. HOFFMAN
RADFORD COLLEGE, RADFORD, VIRGINIA

Until recently, only three species of Diplopoda were known from the large and biogeographically important island of Palawan. Two of them were described by R. I. Pocock over 75 years ago: one, a sphaeropoeid, *Castanotherium hirsutellum* (1895), the other a platyrhacid, *Polydesmorhachis atratus* (1897). Much later, in 1961, J.-M. Demange recorded the harpagophorid *Thyropygus segmentatus* from "Paragua," the old name for the island.[1]

To the best of my knowledge no deliberate collections of diplopods were made on Palawan until 1947, when a party under the leadership of Floyd G. Werner spent 11 weeks there and obtained a fair representation of at least the larger species.[2] An interesting new cryptodesmoid from this material was named by me in 1973, and a new species of *Salpidobolus* (1974a) and two new species of *Spissustreptus* (1975) in the following year.

Regrettably, the Field Museum collections do not appear to contain either of the early Pocock species, but do include three

[1]The recent examination of the "Paragua" specimens in the U. S. National Museum revealed that they are in fact referable to the recently-described *Spissustreptus wallacei* Hoffman. *S. segmentatus* is without much doubt confined to Mindanao and some immediately adjacent islands.

[2]A detailed account of the 1946-1947 collections is given by H. Hoogstraal, 1951, Philippine Zoological Expedition 1946-1947, Narrative and Itinerary, in: *Fieldiana: Zoology*, vol. 33, no. 1, pp. 5-86, pls. 1-7. Details on the collection site at Mount Balabag, type locality of the new species named in the present paper, appear on page 78. The Philippine material, along with much other, was placed in my hands for identification by my colleague, Dr. John Kethley of the Field Museum, to whom I here express my thanks.

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undescribed platyrhacids unquestionably congeneric with *P. atratus*. I take this occasion to validate names for these taxa to augment the known Palawan fauna, as well as to establish the systematic position of *Polydesmorhachis* within its family (hitherto impossible without knowledge of the male genitalia). The genus is an interestingly disjunct taxon endemic to Palawan, having no close affinities with platyrhacids on either Luzon or Borneo.

Polydesmorhachis Pocock

Polydesmorhachis Pocock, 1897, Ann. Mag. Nat. Hist., ser. 6, 8, p. 445.

Type species.—*Polydesmorhachis atratus* Pocock, 1897, by monotypy.

Diagnosis.—A genus of small to moderate-sized platyrhacids of variable form and coloration; antennae short, moniliform, articles 2 and 3 larger than usual in the family; collum ellipsoidal, widest across its midlength, the lateral ends often tuberculiform; anterior segments not appreciably wider than those following, body profile in general parallel-sided; ornamentation suppressed, metaterga nearly or entirely smooth or coriaceous; epiproct basally quadrate, apically semi-circular. Sterna smooth, elevated, moderately setose, without trace of subcoxal spines. Dorsal coxal condyles large, projecting. Anterior stigmata large, overlapping onto condyle, their dorsal apex projecting laterad.

Gonopod aperture small, rounded-oval, sometimes with high marginal rim; gonopods relatively small, slender, projecting forward onto sternum of 6th segment; no true sclerotized sternum between coxae, latter of normal shape, with a small field of unmodified macrosetae on dorsal side; telopodite ending apically in two branches (A and C) of which the smaller, median branch is the solenomerite; prostatic groove running up median face of telopodite, but distally curving over to the ventral side (an unusual feature in the family) to attain entry onto the solenomerite.

Distribution.—So far as known, endemic to Palawan.

Species.—Four are known, three of them apparently syntopic at one locality (!), probably as many as 10 to 20 species actually exist.

Relationships.—In the present state of our knowledge, I am unable to ally this genus with any so far known. The course of the prostatic groove appears not to be duplicated elsewhere in the family.

Remarks.—Pocock based this genus upon a single female from Palawan Island, without precise locality. His generic diagnosis was not comparative, and the only thing mentioned that does not apply to most platyrhacids is the formation of the collum (". . . broadest across the middle, where on each side it is furnished with a conspicuous tuberculiform keel"). Still the species could not be referred, due to its overall appearance, to any of the groups then

known to Pocock, and he was no doubt justified in suspecting that the male sex would present supplementary characters in the gonopods.

The four species known at present are relatively small platyrhacids, and quite slender for the family (W/L ratio about 14-18 per cent). It is moreover interesting that specific characters are manifest not only in gonopod structure, but also in peripheral features as size, color, shape of collum and of paranota, relative positioning of the paranota, location of ozopores, form of gonopod socket, and details of surface decor such as supra-coxal tubercules and the presence or absence of facial setation. It is easy to distinguish species by the unaided eye, from either males or females, so that the following key relies entirely on external characters.

There is appreciable plasticity in the structure of the collum. In one species (*P. macropogon*) the end is "normal" in shape; in *P. werneri* there is an indication of apical modification beginning, in *P. atratus* a definite tuberculiform projection occurs, finally in *P. pococki* the lateral end appears as a distinctly set-off lobe itself studded with small tubercules and like nothing else known in the Platyrhacidae.

In most species the antennae are abruptly broadened beyond the first article, the second and third antennomeres in particular seeming disproportionately massive and fully as wide as the fifth or sixth. The degree to which the anterior stigmata are carried up onto the anterior coxal condyle and thence project laterad from its surface also seems to reach an extreme among members of this genus.

Finally, it may be noted that the roster of apparent evolutionary specializations of this group includes pronounced sexual dimorphism, the females being appreciably longer and more massive than males of the same species; again to a greater extent than I have observed elsewhere in this family.

KEY TO THE KNOWN SPECIES OF POLYDESMORHACHIS

1. Collum of normal platyrhacid form, its lateral ends rounded, not set off; body form broad, the W/L ratio ± 18 per cent; paranota depressed in both sexes, continuing slope of middorsum; genae tuberculate, with long pale silky hairs. *macropogon.*

Collum modified, its lateral ends more or less constricted and set off as a tuberculate lobe or process (fig. 1); body form slender, the W/L ratio ± 14 per cent; paranota horizontal or slightly elevated on at least some segments in both sexes; genae without trace of setae 2

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Sternal areas elevated, about as wide as combined length of coxa and prefemur, without trace of subcoxal spines but with two prominent transverse rows of large setae. Legs robust, without peculiarities, the relative lengths of podomeres: $3 > 6 > 2 > 5 = 4 = 1$, the femur by far the longest segment. Ventral sides of segments invested with fairly long setae, dorsal sides with much shorter and usually curved setae. Tarsal claw short, nearly straight, unmodified.

Sternum of segment 6 excavated medially to receive tips of gonopods, this excavation resulting in large, densely setose, rounded subcoxal sternal lobes at base of each leg. Gonopod aperture of normal form, ovoid in shape, with elevated posterior margin and with a low projecting knob on each side in front of the stigmal opening. Gonopod coxae flattened as usual, with a small field of unmodified macrosetae on the dorsal side. Telopodite relatively short, only slightly curved dorsad, terminating in a moderately small, elongate-triangular tibiotarsus (C), from the base of which on the median side projects the slender arcuate solenomerite (A) as represented in Figure 3.

Topoparatype.—Adult female, 55 mm. in length, 7.8 mm. in width at midbody; W/L ratio 14.6 per cent. Generally similar to male in appearance except tuberculation more prominent (12 tubercules in anterior series on collum, 5 major tubercules in each paramedian convexity), middorsal stripe somewhat wider than in male, and lateral edges of paranota nearly straight, not emarginate adjacent to the ozopores.

Etymology.-The species is named in honor of Reginald Innes Pocock, an outstanding early student of Diplopoda and other arthropods, Keeper in the British Museum and later Director of the London Zoological Garden in Regent's Park.

Polydesmorhachis macropogon, new species. Figures 4-7.

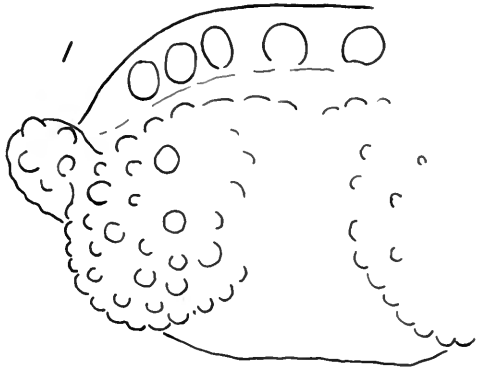
Type material.—Male holotype, eight male and six female paratypes (Field Museum) from south slope of Mount Balabag, 4200 ft., Mantalingajan Range, Palawan Island, P. I.; May 10-14, 1947 (Floyd G. Werner).

Diagnosis.—A moderately large and unusually broad member of the genus (W/L ratio 18-19 per cent), characterized in particular by the setose genae; normal outline of the collum; smooth and depressed paranota; and presence of an elongate projecting tubercule (or cluster of smaller ones) above the posterior coxal condyle. Dorsum uniformly black with outer half of the paranota yellow. Process C of gonopod short, uncinate, recurved mesad; process A curved mesad and dorsad, more slender than in the other two species in which males are known.

Holotype.—Adult male, length ca. 47 mm., maximum width 8.8 mm. at midbody; W/L ratio 18.7 per cent. Body widest at segment 7, thence tapering very gradually posteriad; 2nd segment actually the widest but its paranota strongly depressed ventrad. Segments relatively compact, the paranota nearly in contact.

Opposite.

FIGS. 1-3. *Polydesmorhachis pococki*, new species. **1.** Left side of collum, dorsal aspect. **2.** Left paranotum of 10th segment, dorsal aspect. **3.** Left gonopod, mesal aspect. *a*, solenomerite; *c*, tibiotarsal process.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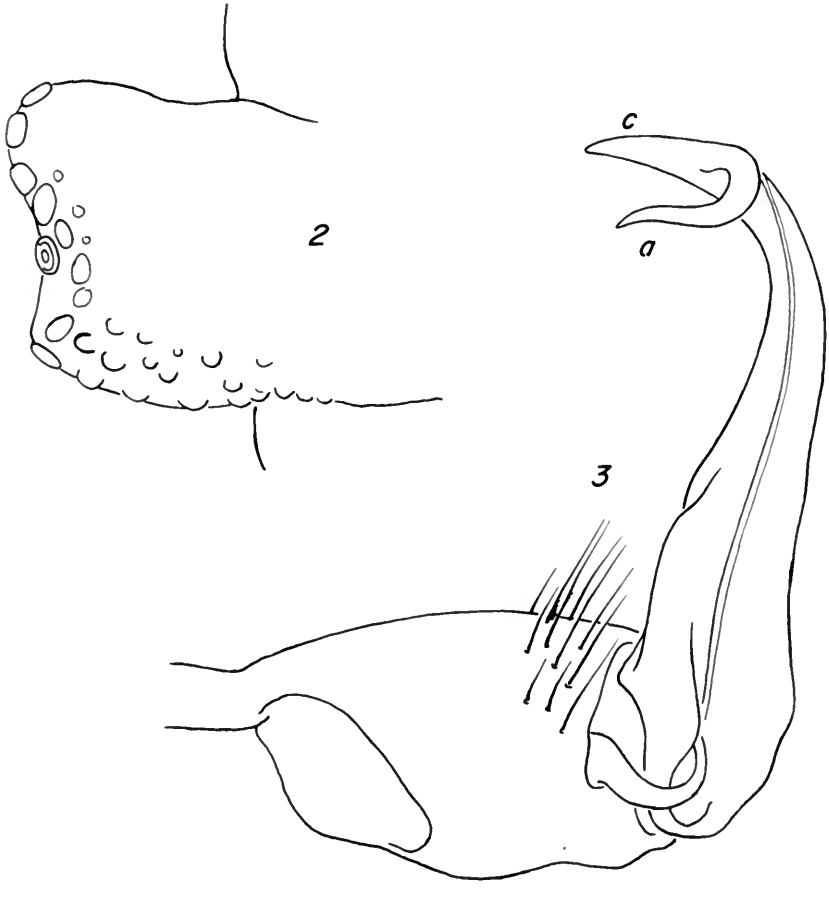
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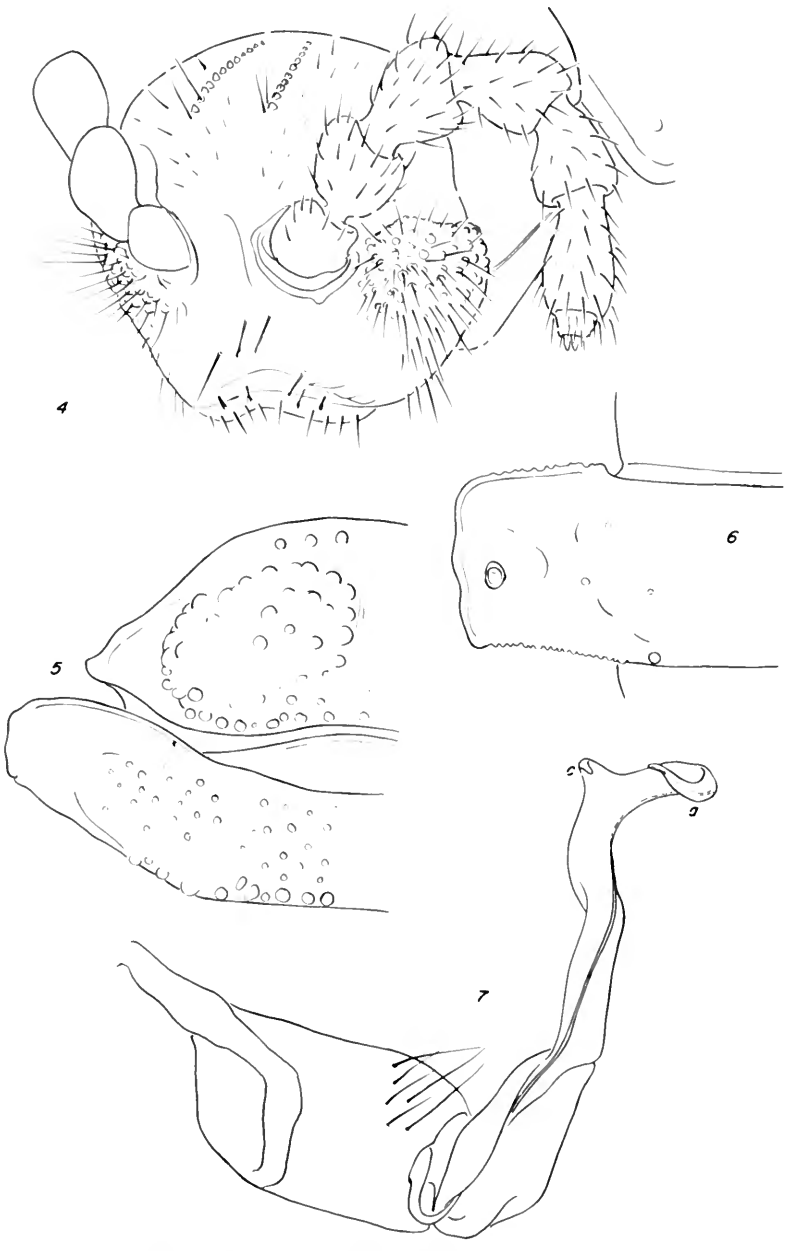
Coloration altered by preservation, but giving impression of originally uniform black dorsally with outer half of paranota yellow, this color extending inward along anterior margin nearly to base; legs also apparently yellow in life.

Head (fig. 4) flattened in front, labrum, clypeus, and frons smooth and polished, epicranium and genae tuberculate and dirt-incrusted, the former sparsely set with large stiff macrosetae, the latter with numerous long pale silky hairs. Epicranium with median depression, each side of which occurs a paramedian, anteriorly divergent low ridge composed of a series of small blackened tubercules. Interantennal space about equal to length of 1st antennomere, deeply depressed, the adjacent margins of antennal sockets with prominent elevated smooth rims. Antennae short, massive, the articles almost as wide as long, all sparsely setose, none with sensory areas.

Collum (fig. 5) transversely oval, slightly wider than head across genae (6.0 mm.), the lateral ends depressed, subacuminate, apically rounded, no trace of modification as in the other species, dorsal surface coriaceous, front and rear edges with traces of low rounded tubercules; a very shallow submarginal groove across middle behind front edge. Paranota of second segment long, slender, directed forward and downward, subtending ends of collum; those of third and fourth segments similar but not so wide and less depressed, margins of all set off by a narrow rim; posterior edge of metaterga with a single row of small round tubercules, largest near posterior edge of paranota but not continuing thereonto. Segments 5-16 subsimilar in appearance, the paranota almost directly transverse (fig. 6), nearly quadrate in dorsal aspect, those of 5th segment nearly twice as long as those of 4th, making a sharp transition in anterior end of body; anterior and posterior finely denticulate-serrate, lateral edge smooth, very slightly sinuous. Ozopores located slightly posterior to midlength, about the diameter of a peritreme from lateral edge, latter entire, smooth and with a distinct margin. Dorsum of metaterga appearing smooth to the eye, but finely microcoriaceous-granulate with a few scattered tubercules; stricture shallow, poorly defined. Podosterna prominent, not impressed, without trace of subcoxal spines, surface moderately beset with long pale stiff setae. Stigmata elongate vertical slits, the anterior larger, curving up and onto the coxal condyle and projecting laterad free from the surface; posterior smaller, less modified, located just behind anterior condyle and widely separated from posterior condyle. Sides of body with a few scattered, tiny tubercules and, just above posterior coxal condyle, either a single, large, elongate, digitiform tubercule or a cluster of three to six smaller tubercules in the same position.

Paranota of posteriormost segments directed caudad and bluntly acute at their corners; dorsum of the metaterga with three more or less regular transverse series of 8 to 10 widely spaced low, polished, tubercules. Epiproct nearly flat with the sides subparallel near the base, distal margin evenly hemispherical in outline.

Gonopod aperture small, rounded-oval, its edges strongly produced into prominent elevated marginal flange giving the effect of a partial sleeve surrounding bases of gonopods. Latter proportionately larger than in the other two species, lying parallel to each other but bowed outward near their midlength, the apices again in contact and broadly interlocked. Telopodite (fig. 7) bisinuate as seen in median aspect, the setose prefemur less than half telopodite length; process C small, subtriangular, its apex slightly recurved mesad, process A curved dominantly mesad except its termination which is curved dorsad in the direction of process C.



FIGS. 4-7. *Polydesmorhachis macropogon*, new species. 4. Head, oblique anterior-lateral aspect, setation omitted from right antenna. 5. Left side of collum and left paranotum of 2nd segment, dorsal aspect. 6. Left paranotum of 10th segment, dorsal aspect. 7. Left gonopod, mesal aspect.

Topoparatype.—Adult female, 57 mm. in length, 10.2 mm. in greatest width, W/L ratio 17.9 per cent. Aside from greater size agreeing closely with the male except that dorsal tuberculation is slightly more conspicuous and sterna relatively a little wider.

Etymology.—From the two Greek words, *macros* (long) + *pogon* (beard), in allusion to the genal setation. Masculine gender.

Polydesmorhachis werneri, new species. Figures 8-11.

Type material.—Male holotype, five male and two female paratypes, Field Museum, from south slope of Mount Balabag, 4200 ft., Mantalingajan Range, Palawan Island, P. I.; May 10-14, 1947 (Floyd G. Werner).

Diagnosis.—Easily recognized by the combination of middorsal light stripe; partly modified collum; high-set, nearly horizontal paranota which are widest across anterior corners; distally broadened epiproct; absence of strongly elevated rim around gonopod socket; absence of genal setae and of tubercules on the sides. Processes A and C of gonopod similar in shape, C slightly larger, both apically attenuated and curved anteriodorsad.

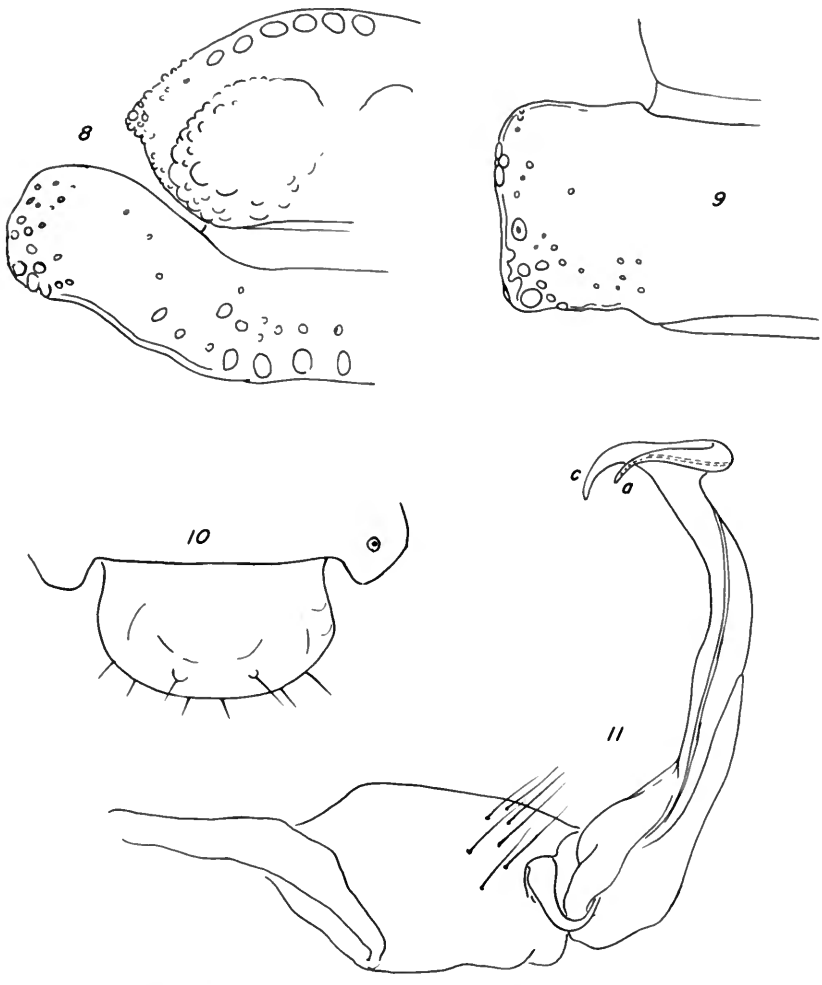
Holotype.—Adult male, length of body ca. 47 mm., 6.8 mm. in width at midbody, W/L ratio 14.5 per cent. Body slender, parallel-sided for most of its length, segments fairly compact and paranota almost in contact. Paranota of segment 2 not notably depressed, giving a width of 7.0 mm., somewhat wider than segments 3 and 4, but segment 5 and several following are equal in width to segment 2.

Dorsum at present light brown, partly obscured by earth incrustation, upper side of paranota lighter, the tubercules testaceous; prozona distinctly darker brown; a narrow (± 1.2 mm.) light middorsal stripe from segment 2 to the penultimate, its edges straight and parallel on prozona, more diffuse and wider on metazona; sterna and legs yellowish-brown, ventrum of prozona nearly white.

Front of head, except labrum and clypeus, roughened and granular, epicranium and especially genae set with prominent rounded tubercules; interantennal space concave, about 1.5 times length of 1st antennomere; socket with prominent polished rim on inner and dorsal sides. Paramedian epicranial ridges obsolete.

Collum (fig. 8) relatively small (4.2 mm. wide), distal surface nearly flattened, with lateral ends projecting at a much lower plane, giving impression of elevated posterior hemisphere sloping down toward front edge; latter with tubercules but without evident submarginal transverse groove.

Paranota of second segment moderately deflexed (fig. 8), tuberculate near the lateral ends but not thickened, distinctly broader than collum and the third segment but being deflexed preserves the approximately parallel-sided profile of the body. Segments 3-19 generally similar, the metazona coriaceously wrinkled middorsally, tuberculation nearly obsolete, but dorsal surface of paranota moderately granulate-tuberculate. Paranota set high on segments, virtually horizontal, the dorsum thus appearing nearly plane; widest across anterior corners and of the form shown in Figure 9; peritreme small, removed from lateral edge by a space equal to its diameter. Sides of segments vertically wrinkled, with scattered microtubercules. Posterior stigmal lobe as large as anterior, extending further dorsad and turned outward



FIGS. 8-11. *Polydesmorhachis werneri*, new species. **8.** Left side of collum and left paranotum of 2nd segment, dorsal aspect. **9.** Left paranotum of 10th segment, dorsal aspect. **10.** Epiproct, dorsal aspect. **11.** Left gonopod, mesal aspect.

apically. Epiproct (fig. 10) constricted at base, broadened distally. Other segmental details about as described for the other species.

Gonopod socket with low, indistinctly elevated posterior rim. Gonopods (fig. 11) elongated, the apical branches interlocked when at rest. Distal processes A and C long, slender, subparallel to each other, curved dorsomesad.

Female topoparatype:—Length ca. 50 mm., greatest width, 8.3 mm., W/L ratio 16.6 per cent. Generally similar to male except paramedian ridges of epicranium distinct; paranota appreciably narrower and depressed so that the dorsum is evenly convex;

dorsal tuberculation more profuse and prominent; sterna broader; middorsal stripe about 50 per cent broader relative to total width of segments.

Etymology:—The species is named for its collector, specialist in Coleoptera and the first person to assemble zoological collections in the interior of southern Palawan.

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