ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 53 no. 14 10 oktober 1978

STUDIES ON SPIROBOLOID MILLIPEDS. XIII. A THIRD SPECIES OF THE GENUS *TRACHELOMEGALUS* FROM BORNEO (PACHYBOLIDAE)

by

RICHARD L. HOFFMAN

Radford College, Radford, Va. 24142, U.S.A.

With 5 text-figures

Pachybolid millipeds are presently known to occur in a rather narrow paraequatorial belt from West Africa eastward across the continent, with a sparse contingent in South Africa and Madagascar, to south India and southeast Asia and the Greater Sunda Islands. At the easternmost end of this range the group is represented by the anatomically rather disjunct taxon *Trachelomegalus* on the island of Borneo.

For a long time this generic name was used (chiefly by Attems) for species occurring in Sumatra and Indochina as well as Borneo; it was not until 1963 that I could publish a distinction resulting in the revival of *Tonkinbolus* (Verhoeff, 1938) for the mainland forms. Since that time *Trachelomegalus* has remained essentially monotypic (*T. modestior* Chamberlin, 1921, being inadequately documented), and judged from the paucity of museum material, the type species itself has been only rarely collected. So long as only one member of a genus is known, one can never confidently distinguish specific from generic characters, and it was thus a matter of satisfaction for me to recently discover material of a distinctive third member of this genus from Borneo. This species is known from two adult males in the Rijksmuseum van Natuurlijke Historie at Leiden, kindly loaned to me for study by Dr. L. van der Hammen, to whom I here express my appreciation.

Trachelomegalus

(Gk. *trachelos*, neck; *megalos*, enlarged)

Trachelomegalus Silvestri, 1896, Ann. Mus. civ. Stor. nat. Genova, 36: 27. Monobasic. Type species, *Spirobolus hoplurus* Pocock, 1893, by original designation and monotypy. — Hoffman, 1963, Rev. Suisse Zool., 69: 768.

Diagnosis: Medium sized pachybolids with the collum enlarged and extended ventrad below level of labrum, with ventrolateral ends turned caudad; segment 2 larger and extending further ventrad than 3; metazona of most body segments of greater diameter than mesozona; epiproct produced into a long, straight process greatly exceeding paraprocts. Legs very long, their length greater than body diameter; tarsal pads present on most legs, from 1/3d to 2/3ds lengths of tarsus. Sympleura of 7th segment forming thin, median, transverse crest.

Sternum of coleopods narrow, Y-shaped, with enlarged and laminate sternal apodemes, with well-defined posterior extensions; coxae large and prominent, not incurved on posterior side between sternal element and base of telopodite; latter relatively narrow, basally somewhat prolonged proximolaterad; no trace of coxal apodeme. Phallopods of typical pachybolid form, connected by a V-shaped sternum fused with coxa on each side, sternal apodeme displaced to position on proximal side of coxa between two coxal apodemes; each phallopod composed of a single element, no trace of segmentation evident; coxal region with internal gland but no distinct chambers and no apophysis; prostatic groove running out to the enlarged distal end, not ending on a solenomerite or in a subterminal cavity.

Range: Endemic to Borneo.

Species: Three, one described here for the first time.

Remarks: In my 1963 paper I gave a tabular contrast (p. 769) between this genus and *Tonkinbolus*, based on eight structural features. Since that time I have studied additional species of the latter genus as well as two other forms of *Trachelomegalus*, and find it necessary to modify only one distinction, the shape of the coleopod telopodite. As stated "... small, slender, apically drawn out into a slender process ..." this is true only for *T. hoplurus*. The corresponding structure in *T. impectus* is somewhat different in form (fig. 3, T) and this character must be accounted one of specific importance only.

Although the two genera mentioned above remain separable by a number of basically important characters especially of external body form, they do share one point of considerable significance: the coxal region of the coleopods does not extend mesad on the posterior side, so that the base of the telopodite is either broadly in contact with the posterior sternal extension or is separated from it only by an expanse of connective tissue. This structural relationship recurs also in other East Asiatic pachybolids, in the genera *Aulacobolus*, *Eucentrobolus*, and *Litostrophus*, and these five taxa at least may be considered to comprise a discrete group opposed to their African relatives. Tribal or perhaps subfamilial status seems to be justifiable.

The three presently known species of *Trachelomegalus* may be distin-

guished by the following preliminary key. Regrettably the gonopods of *T. modestior* are badly damaged. Aside from a distinctive colour pattern, this species appears to differ from *T. impectus* — at least — by small subjective differences in shape of collum and epiproct. Such characters are not illustrated here as the type specimen of *modestior* appears to be abnormal in the texture of the integument and this may extend into other external variables as well.

1. Collum and epiproct black with reddish borders; each mesozonite with a median dorsal red spot . . . . . *modestior*
— Collum and epiproct overall reddish; segments without median dorsal red spots 2
2. Anterior gonopod: apex of median sternal projection not extending distad as far as ends of coxal endite lobes; telopodite relatively broad distally, never as little as half its basal width, mesal margin with a subterminal notch producing a bilobed effect. Posterior gonopod: subterminal membrane without fine parallel ribbing and marginal pectination, merely granular in appearance (fig. 4, stippled area) . . . . *impectus*
— Anterior gonopod: apex of median sternal projection extending distad as far as ends of coxal endites and relatively acute instead of rounded as in the preceeding species; telopodite abruptly narrowed at midlength, distally about one-third as wide as basal width, and apically recurved caudad. Posterior gonopod: subterminal membranes distinctly pectinate in appearance (fig. 7 in my 1963 paper); apical end of this gonopod with a number of slender filiform appendages . . . . . *hoplurus*

Trachelomegalus hoplurus (Pocock)

Spirobolus hoplurus Pocock, 1893, Ann. Mag. Nat. Hist., (2) 11: 252, fig. 5. Type material: ? Brit. Mus. (Nat. Hist.), from "Northwest Borneo".

Trachelomegalus hoplurus: Silvestri, 1896, Ann. Mus. civ. Stor. nat. Genova, 36: 27. — Carl, 1906, Zool. Jahrb., Abt. Syst., 24: 245. — Hoffman, 1963, Rev. Suisse Zool., 69: 770, figs. 3-7.

?*Trachelomegalus hoplurus*: Attems, 1897, Abh. Senckenb. naturf. Ges., 23: 517, figs. 36-38.

Regrettably, I have been unable to locate the original types of this species in the British Museum collection despite searches on several occasions; the material may be lost. In 1963 I published drawings of the gonopods of a specimen in the Geneva Museum, identified as *T. hoplurus* by J. Carl, and probably correctly so. This specimen came from Sarawak, and may for the present be considered conspecific with Pocock's type.

Not the same statement can be made for the Baram River specimens reported by Attems in 1897. Owing to Attems' technique of macerating gon-

opods in boiling KOH, the drawings in his paper appear to represent grotesquely deformed appendages, and it is to be hoped that at least one undissected male remains in the material (now in the Senckenberg Museum) for an eventual restudy and identification.

In any event, all published references to *Trachelomegalus* in Borneo appear to be based on specimens from Sarawak. The new species to be described here seems to be confined to the southwestern state of Kalimantan Barat and is thus allopatric with *T. hoplurus*.

Trachelomegalus impectus new species (figs. 1-5)

Type material: Male holotype (Mus. Leiden) labeled "Borneo Exp./Dr. Goedhuis/ Sintang/Aug.-Sept. 1894". Male paratype (Mus. Leiden) labeled "Borneo Exp./Max Moret/Gng Kenepai/Pondak I 1894". Sintang is a wellknown settlement on the Kapuas River, but I have been unable to locate so far either Gunung Kenepai or Pondak.

Diagnosis: With the characters of the genus, differing from *T. hoplurus* by the characters cited in the foregoing key.

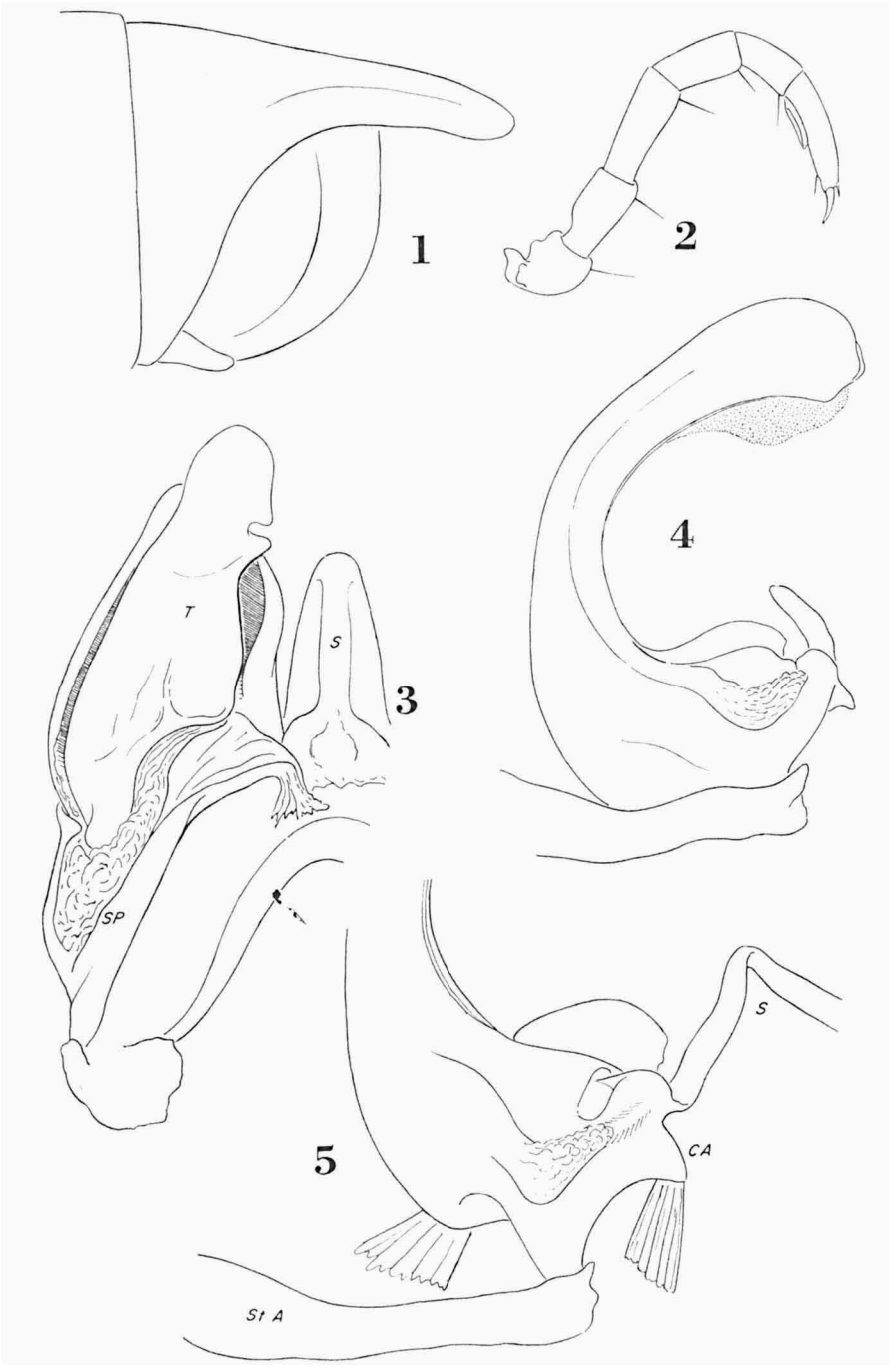
Holotype: Adult male, now fragmented and length not measureable with accuracy. Body with 46 segments, widest at collum, segments 2-5 smaller, 6 and 7 enlarged, segmental diameter thence gradually decreasing posteriad. Width of selected segments as follows:

Segment 1-7.1 mm	Segment 32-5.2 mm
4-5.9	40-5.2
6-6.0	42-5.0
12-5.4	44-4.6
24-5.4	46-3.7

Coloration mostly faded from long preservation, but appearing to have been overall reddish in life, with metazona darker red and with a narrow black submarginal band; legs uniformly pale reddish or orange.

Head moderately convex, smooth and polished, without special modifications. Genae convex, broad, with fine but distinct marginal rim. Ocellaria subtriangular in outline, ocelli in seven rows distributed as folows: 10-10-9-8-7-5-3 = 52 and 11-10-9-8-7-5-3 = 53, greatest dimension of ocellarium, 1.8 mm, equal to interocellarial space. Interantennal distance, 2.1 mm, antennal length, 4.2 mm. Antennae short, robust, largely concealed in space between depressed surface and anterior edge of collum; articles short, the 2nd longest, 6th broadest, a little wider than long; 3rd-5th articles similar in size and shape; 7th very small, flat, elongate oval, with four sensory cones in two oblique diads.

Collum large, surface smooth and polished, anterior edge slightly emarginate across back of head, anterior-lateral edges evenly arcuate to lateral end



Figs. 1-5. *Trachelomegalus impectus* n. sp. 1. Epiproct and paraproct of left side, lateral aspect. 2. Leg from midbody segment. 3. Anterior gonopod, right side, aboral aspect. 4. Right posterior gonopod, lateral aspect. 5. Basal half of right posterior gonopod, oblique caudolateral aspect. All drawings from holotype, and from different magnification. Abbreviations: CA, proximal apodeme of coxa, posterior gonopod; S, sternum; StA, sternal apodeme; SP, posterior extension of sternum of anterior gonopod; T, telopodite of anterior gonopod.

and set off by a broad marginal rim which, however, does not attain posterior edge at lateral end; latter extends ventral to level of labral edge.

Surface of prozona with microscopic isodiametric mesh, surface of mesozona very finely coriaceous with shallow irregular pitting (barely visible at 90 × magnification), surface of metazona finely grooved and striated longitudinally. Metazona separated from mesozona by a narrow shallow depression (suture line not evident), and slightly elevated. Ozopores conspicuous, with elevated rim, set in the mesozona well in front of the transverse suture. Sides of metazona below level of pores with about 30-40 fine longitudinal striae, about half of which are congruent with similar striations on the mesozona. Sterna with about eight transverse striae. Intersegmental membrane with prominent isodiametric mesh texture. Epiproct with long, straight dorsal projection (fig. 1). Paraprocts only slightly convex, with broad flattened marginal area.

Legs long and slender, of the form shown in figure 2. Tarsi with ventral pads on all legs except first two and last six pairs, at midbody pads about half tarsal length, becoming gradually smaller toward rear of body. Anterior coxae without ventral lobes.

Anterior gonopod (fig. 3). Sternum with relatively short median projection, the posterior side of which is produced into a large median septum abruptly expanded proximally and forming a fulcrum between the coxae. Latter broad, the distal ends extending far beyond sternal projection, laterally abbreviated and not subtending telopodite. Sternal branch on posterior side of gonopod abruptly and prominently expanded distomedially. Telopodite broad, spatulate, with deep notch on median edge, as illustrated.

Posterior gonopod (figs. 4, 5). Sternum well sclerotized, V-shaped (figs. 5, S). Coxal region with a membraneous area on lateral side. Proximad coxal apodeme (fig. 5, CA) large and prominent, much more so than distal apodome. Prostatic groove extending out to an enlarged subterminal area (stippled) which lacks the characteristic parallel striation and pectination of *T. hoplurus*. Apical end simple, without slender fimbriae.

Trachelomegalus modestior Chamberlin

Trachelomegatus modestior Chamberlin, 1921, Ann. Mag. Nat. Hist., (9) 7: 78. Male holotype and three female paratypes (Mus. Comp. Zool.) from Ladong, Sarawak, Borneo, H. W. Smith leg.

Through the cooperation of Dr. Herbert W. Levi I was able to study the male holotype of this species. The gonopods are massively deformed, the result apparently of a genetic malfunction, and offer no indication of the

true form. Chamberlin separated *T. modestior* from *T. hoplurus* because of colour differences and a shorter epiproct in the former species.

In direct comparison with the type of *T. impectus, T. modestior* is seen to have distinctly smaller ocellaria (1.5 mm in greatest length as opposed to 1.8 mm) which are also more widely separated (2.1 mm apart against 1.8 in *T. impectus*). The heads of the two specimens otherwise are nearly equal in size, and presumably the observed differences in this character may be accorded specific importance. The interantennal space is likewise greater in *T. modestior*, 2.4 mm versus 2.1 in *T. impectus*. Unfortunately comparable dimensions are not available for *T. hoplurus*.

Literature cited

Attems, C., 1897. Myriopoden. In: Kükenthal, Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo. Zweiter Teil: Wissenschaftlichen Reiseergebnisse. — Abh. Senckenbergischen naturforsch. Gesellsch., 23: 473-536, pls. 21-24.

Carl, J., 1906. Diplopoden aus dem Malayischen Archipel. — Zool. Jahrb., Abt. Syst., 24: 227-246, pl. 17.

Chamberlin, R. V., 1921. New Chilopoda and Diplopoda from the East Indian Region. — Ann. Mag. Nat. Hist., (9) 7: 50-87.

Hoffman, R. L., 1963. Studies on spiroboloid millipeds. VI. Systematic and nomenclatorial notes on the family Pachybolidae. — Rev. Suisse Zool., 69: 759-783, figs. 1-20.

Pocock, R. I., 1893. Upon the identity of some of the types of Diplopoda contained in the collection of the British Museum, together with descriptions of some new species of exotic Iulidae. — Ann. Mag. Nat. Hist., (6) 11: 248-254, pl. 16.

Silvestri, F., 1896. Diplopodi di Borneo. — Ann. Mus. civ. Stor. nat. Genova, 36: 20-28.