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A New Thyropygine Milliped from Sabah (Spirostreptida: Harpagophoridae)

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Abstract

Spissustreptus strigilectus is described as a new species from a male specimen collected in the Kabili-Sepilok Forest Reserve, northern Sabah. Although showing some affinity with the sympatric *S. hosei* (Pocock, 1892), *strigilectus* differs from all known members of the genus by the presence of an elongated, medially directed, process on the arculus region of the gonopod. The two Phillippine species named *Spirostreptus moseleyi* Pocock, 1893, and *Spirosteptus foveolatus* Karsch, 1881, are tentatively referred to this genus, with historical commentary, new combination for both names.

Key words

Spissustreptus, new species, Sabah, Harpagophoridae, Diplopoda

Introduction

Spissustreptus is a distinctive harpagophorid genus of 10 species endemic to Borneo and the Philippine Islands. Originally proposed by Demange (1961: 46) as a subgenus of *Thyropygus*, it was later elevated to generic status by Hoffman (1975: 138) who added two new species to the eight recognized by Demange while disallowing two of the forms described by that author. A complete catalog of all literature relative to these species was provided by Jeekel (2006). About a decade past, I had the opportunity to identify some harpagophorids collected during a study of the attraction of various local scarab beetles to recently dead millipeds conducted in Sabah by Dr. F.-T. Krell whose interesting findings may be consulted by reference to the published account (Brühl & Krell 2003). One of the specimens examined is an undescribed species of *Spissustreptus* which is given a name at this time to provide a specific identity to the subject of that

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research. I take the occasion to append some remarks about the possible reference to *Spissustreptus* of several regional species so far not placed in any particular genus.

Taxonomy

***Spissustreptus strigilectus*, sp. n.**
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Figures 1–6.

Material: Male holotype (Virginia Museum of Natural History) from Kabili-Sepilok Forest Reserve (5.52W, 117.57E), Sabah; F.-T. Krell, leg. 15-17 October 2000, in primary forest.

Diagnosis: Similar to *S. hosei* in gonopod structure, differing from it (and other members of the genus) by the presence of a prominent medially-directed process on the arculus region of the telopodite (Fig. 5, fp) and by the long, sinuous primary tibial process.

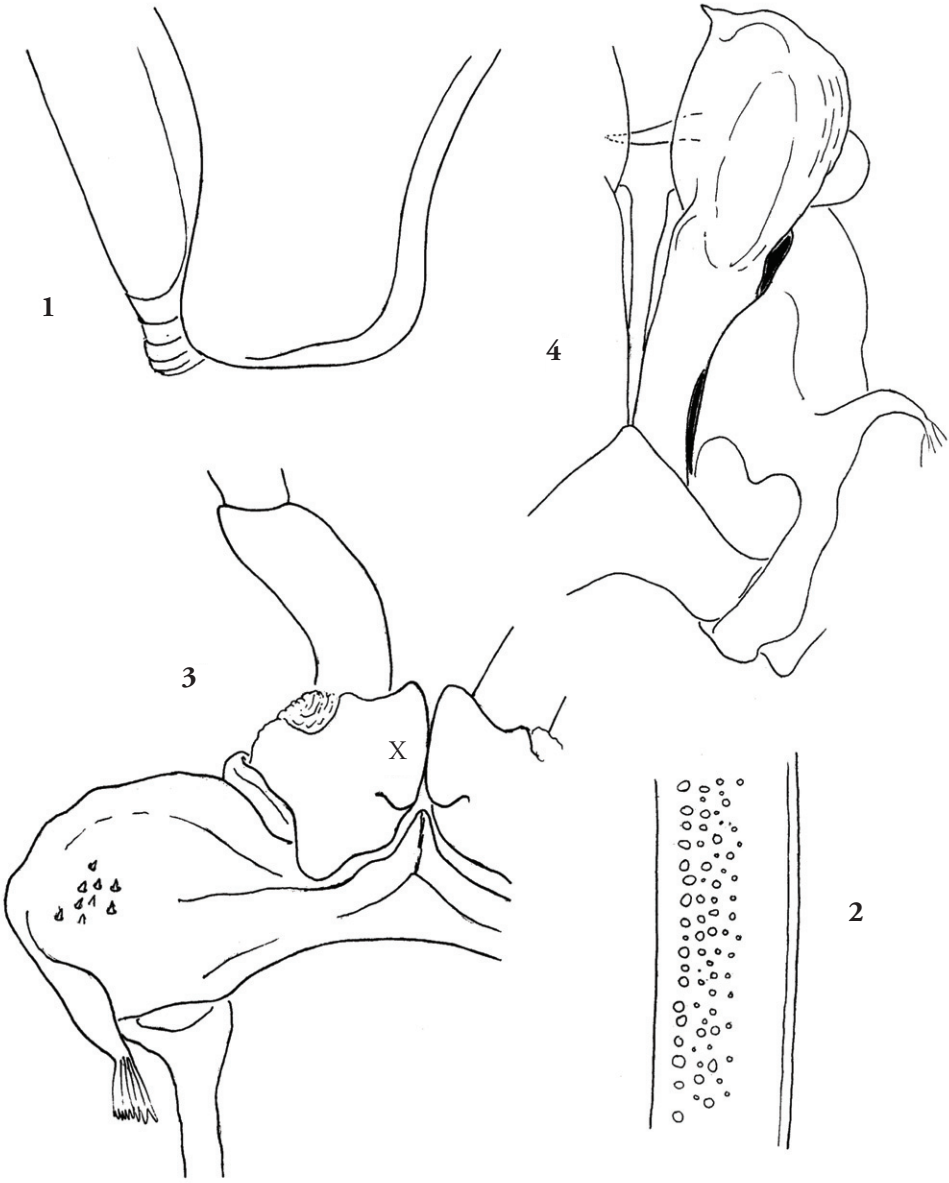
Name: A neologism of two Latin elements (*strigilis*: scraper + *lectus*: gather) with the intended meaning "collected by a scratcher" in reference to the collector of the type material ("*krell*" being an obscure German term for a malevolent imp disposed to scratch its victims).

Holotype: Adult male with 65 segments (63+ collum and preanal ring). Body fragmented, but length ca. 170 mm, diameter 12 mm over most of length, diminishing to 9 mm at base of epiproct. Color pattern cingulated with sharply defined rings, metazona dark reddish brown to piceus, mesozona and prozona light gray with fine indistinct mottling of white dots; antennae and legs bright orange, possibly more reddish in life.

Front of head evenly convex, entire surface smooth, very finely and sparsely punctate; occipital area finely costulate; interantennal and interocellarial spaces both 3.2 mm, a shallow rounded depression each side near antennal socket. Anterior edge of the latter margined. Ocelli in approximately seven rows (those in the ventralmost row small, irregular, and difficult to count) as follows: 13-13-11-8-7-6-3 = 61. Antennae relatively short (7.8 mm), the antennomeres polished, almost glabrous, 2nd by far the largest, 3rd-5th triangular, as broad distally as the length; 6th and 7th with distinct transversely oval sensory pit; four apical sensory cones, separated by inturned edge of 6th into two discrete diads.

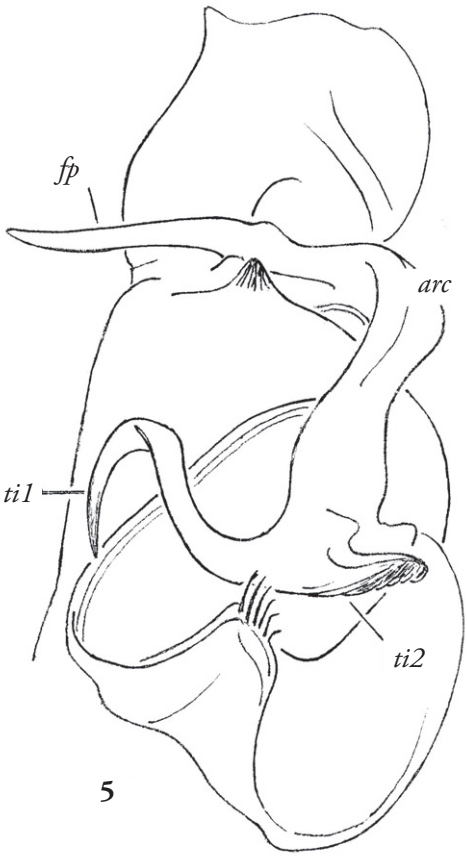
Mandibular basomere prominently produced into an elongate lateral lobe with membranous ventral surface. Gnathochilarium of typical harpagophorid structure; prebasalar sclerite narrow, entire, stipes with a single large subapical seta and a field of several much smaller setae basally; distal third of stipes strongly modified, forming a prominent oval convexity with membranous surface into which the sensory cone and its basal pedicle are deeply embedded (cf. Comment 1).

Lateral ends of collum moderately produced into an anteroventral lobe set off by a single marginal striation (Fig. 1), surface smooth and impunctate; middorsal area with two large, shallow but distinct paramedian depressions.



Figures 1–4. *Spissustreptus strigilectus*, structural details. **1.** Lateral lobe of collum, right side. **2.** Sigilla pattern, inside midbody metazonum, anterior to the left. **3.** Right side of sternum and 1st pair of legs, oral aspect. X, accessory lobe of prefemur. **4.** Right side of gonopods, oral aspect.

Body segments/rings essentially smooth and polished; metazona set off by distinct sulcus and beset with about 20-25 longitudinal striae/ridges ventrad to ozopores, mesozona and prozona distinguished only ventral to level of ozopores, both with transverse microstriations. Ozopores present from segments 5-64, placed in metazona immedi-



Figures 5–6. *Spissustreptus strigilectus*, gonopods. **5.** Left gonopod, aboral aspect. *arc*, arculus region of telopodite; *fp*, "femoral process", *ti1*, primary "tibial process", *ti2,* secondary "tibial process". **6.** Telopodite of left gonopod, lateral aspect showing rugosity of *ti2*.

ately posterior to a slight curve of the sulcus. Prosterna smooth and polished, without trace of striations; stigmatic fossae large, extending laterad as far as end of femora (but only to end of prefemora on posterior segments). Metacoxal cavities open. Sigilla rounded, small to minute (Fig. 2), occupying about 2/3rds length of pigmented endometazonum. Legs moderately long (9 mm at midbody), podomeres nearly glabrous, each with only a few long setae on ventral surface, often only one placed distally; tarsi typically with two pairs of ventral setae, the distal pair larger. Tarsal claw long, nearly straight, slightly compressed, subtended by a single large dorsal tarsal seta. Tibial and tarsal membranous pads large, occupying most of ventral surface of those podomeres, present on all legs from 3rd pair to last.

Preanal ring smooth, legless, epiproct set off by a distinct transverse basal groove, relatively short, only equalling caudal edges of paraprocts, latter moderately convex, labiate (the edges thickened and set off by a shallow depression); hypoproct small, coalesced with preanal ring on one side.

First pair of legs of male as figured (Fig. 3), prefemora with distinct secondary lobe (X) at base of femora (cf. Comment 2). Legs of segments 2-3 slightly smaller than others, podomeres with setation, but otherwise unmodified.

Gonopods (Figs. 4-6) of the form typical for this genus, specifically distinctive in the very large, mesally directed process from the arculus region, long and bisinuous primary "tibial spine" (*ti*1), and coarsely rugulose secondary spine (*ti*2) (Comment 3).

Comment 1: stipital spur on male gnathochilarium

The presence of the stout distal stipital spur on a convexity of variable prominence is apparently a synapomorphy for all species of Spirostreptoidea – there is no trace of a comparable modification in any of the "near-spirostreptoid" families (e.g., Pseudonannolenidae, Choctellidae) known to me. In Spirostreptidae and Odontopygidae the convexity is relatively small and of the same surface texture as the rest of the stipe. The enlarged extent and definitely membranous surface in those harpagophorids in which it has been noted (e.g., by Pimvichai et al. 2009) may prove to be an autapomorphy for that family and future descriptions should take this into account. The possible function of this so-called stipital spur has not been addressed by anyone so far as I know (unless I have missed its explanation in some arcane Verhoeffian essay).

Comment 2: first pair of male legs

Contrary to the situation in the allied family Spirostreptidae, knowledge of the first pair of legs of the male sex in harpagophorids is extremely deficient, most information being embodied in Attems' "Diplopoda of India" (1936) in which he illustrated about a dozen species. Regrettably this momentum did not carry over into his subsequent work on Indonesian species, and the monograph on the fauna of that region by Demange (1961) passed over the first legs without any mention. My small janitorial paper (1980) depicted (Fig. 11, L^2) these legs in *Balustreptus jucundus* (Demange, 1961) showing the presence of a singular distal lobe on the prefemur thought to be unique to that genus. More recently, Pimvichai et al. (2009) illustrated the first male legs in their new species *Thyropygus chelatus* and (2010) in *Heptischius lactuca.* In both instances, a distal prefemoral modification is indicated although less prominent than in *jucundus*. *En fin*, the presence of a similar lobe (X on Fig. 3) in *S. strigilectus* suggests that this potential taxonomic character may occur sporadically in different subfamilies of Harpagophoridae albeit with limited phylogenetic significance. I did not find a corresponding prefemoral lobe in *Junceustreptus retrorsus* Hoffman, 1980, which is in the same subfamily (Rhynchoproctinae) as *Balustreptus* and *Heptischius.*

Comment 3: telopodital processes

The telopodite of thyropygine harpagophorids is typically ornamented with several processes ("spines") of variable size, shape, and position. Traditionally these have been designated in the context of imaginary topographic homology that related various parts of the telopodite to individual podomeres of the walking legs. Thus a spine originating where the telopodite emerged from the coxal folds (*Knie* in German, *grand courbure* in French) has historically been considered an outgrowth of the femoral region, those more distal as being morphologically tibial. Although I believe that such correlations can scarcely be substantiated, I continue their use (e.g., on Fig. 5) until a less subjective terminology can be devised, consistent for all of the taxa of Spirostreptoidea.

Two other possible species of *Spissustreptus*?

The following entries represent largely subjective justification for the inclusion of two enigmatic Philippine harpagophorids in *Spissustreptus*: inferences for possible future investigation. Two others: *Spirostreptus punctilabium* and *S. gracilipes* of Newport (1844), supposedly from the Philippines, require investigation to ensure that the identity of those species is consonant with what is known about the regional fauna.

***Spissustreptus foveatus* (Karsch), new combination**
Figure 7.

Spirostreptus foveatus Karsch 1881: 24. Female holotype (ZMB 825) from "Rosobosa, prope Manillam", E. von Martens leg.
Spirostreptus foveatus: Jeekel 2006: 48.

The original description of this species states little that is not common to most harpagophorids, aside from its association with *S. opinatus* Karsch, 1881, on the basis of elongated stigmatic grooves. My examination of the type specimen in Berlin showed that it is an adult, with 2nd and 3rd segments enlarged, and with a body diameter of 9.3 mm. The epiproct is slender and slightly upturned distally.

Aside from the stated provenance (which could easily be erroneous), the character that most suggests placement in *Spissustreptus* is the sigilla pattern (Fig. 2) which occupies the entire length of the endometazonal pigmented area and is not dissimilar to that of *S. segmentatus* (cf. fig. 12 in Hoffman 1975). The stated number of segments, 53, is lower than for any of the known species, although 56 has been noted for a specimen of *S. wallacei* from Palawan. At the time of my hasty examination of the type specimen, it did not occur to me to verify Karsch's count.

Although current knowledge of Philippine millipeds does not account for a spirostreptidan on Luzon, it may be remembered that this information is geographically

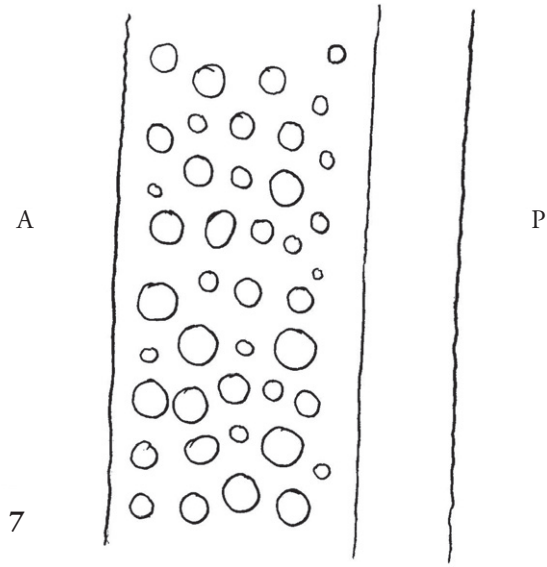


Figure 7. *Spissustreptus? foveolatus* (Karsch), sigilla pattern, from midbody ring of holotype.

biased, most of the species being known from Mount Maquiling at the southern end of Laguna de Bay. I was unable to locate a place "Rosobosa", but there is a likely alternate to consider: Bosobosa in the mountains of Rizal Province, about 15 miles/25 km east of Manila. This settlement near the base of Mount Kanumay (surely still forested at the time of his visit) would have been appealing to a snail collector such as von Martens, and I submit the theory that the initial "B" was altered to "R" during some curatorial/clerical transcription of Martens' original label. With this much to start with, perhaps topotypes of *foveolatus* can be sought, and if unsuccessfully, open the possibility of simple mislabeling at some stage along the process.

***Spissustreptus moseleyi* (Pocock), new combination**

Spirostreptus Moseleyi Pocock 1893: 135, pl. 9, figs. 6, 6a. Female holotype (BMNH, not examined) from Malamaui (Basilan, Mindanao) Philippines (Challenger Expedition).

Spirostreptus moseleyi: Attems 1914: 290 (incertae sedis). – Demange 1961: 265 (as species inquirenda).

Geographically, this species can only be a harpagophorid. On the basis of its occurrence on Malamaui Island, reference to *Spissustreptus* seems entirely reasonable since *S. segmentatus* has already been documented for the adjacent Basilan Island, and since no other genus of this family is known from Mindanao. Of course, the eventual collection of a male topotype conspecific with the female holotype will be necessary for resolution

of the present, circumstantially derived, generic allocation. Now developed as a center for tourism, Malamaui is conveniently accessible (as is its "parent" island of Basilan).

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