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*METOPIDIOTHRIX SHELLEYI*, N. SP., THE FIRST  
CHORDEUMATID MILLIPED FROM THE PHILIPPINES  
(DIPLOPODA, CHORDEUMATIDA, METOPIDIOTRICHIDAE)

by William A. Shear

ABSTRACT

*Metopidothrix shelleyi*, described from Palawan Island, P.I., extends the range of the genus and family northward from Borneo. The species appears most closely related to *M. melanocephala* of Viet Nam. The distribution of metopidiotrichid millipeds is reviewed in the context of east Asiatic palaeogeography.

Chordeumatid millipeds, an important element of the soil and litter fauna in temperate forest communities, are uncommon in the tropics, where they are mostly limited to higher elevations. However, a few genera and families have successfully colonized lowland tropical forests. In Central America, the cleidogonid genera *Solaenogona* Hoffman and *Dybasia* Loomis have been found in Guatemala and Panama, respectively (Shear, 1972). Southeast Asia and the Indo-Pacific region boast two families of chordeumatids that appear to be limited to the tropics: Heterochordeumatidae Attems, from Burma, Sumatra, and Java (Hoffman, 1963), and Metopidiotrichidae Attems, originally described from Java (Attems, 1907). Subsequent work has extended the range of metopidiotrichids to New Guinea (Mauriès, 1978; Shear, 1980), Viet Nam (Golovatch, 1984), Sumbawa (Mauriès, 1988), Borneo (Mauriès, 1989), and Queensland, Australia (a second genus, *Reginaterreuma* Mauriès<sup>1</sup> [Mauriès, 1987]). I report here on a new species of the genus *Metopidothrix* Attems from the Philippine island of Palawan, a significant extension of the generic range. The distribution of the seven known species of *Metopidothrix* provides important evidence about the biogeography of the Indo-Pacific and Australian regions.

I thank my colleague Rowland Shelley, North Carolina State Museum of Natural Sciences, who discovered the specimens of the new species in the collections of the Bernice P. Bishop Museum, Honolulu, Hawaii, and kindly brought them to my attention.

<sup>1</sup>Made the type of a new family, Reginaterreumidae (*recte*: Reginaterreumatidae) by Mauriès (1988). The synonymy of this family and two others with Metopidiotrichidae will be proposed and supported in a forthcoming paper on a new metopidiotrichid genus from Japan (Shear & Tanabe, 1994).

SYSTEMATIC TREATMENT  
Superfamily Heterochordeumatoidea Pocock  
Family Metopidiotrichidae Attems

*Metopidothrix* Attems

*Metopidothrix* Attems, 1907, p. 133; Mauriès, 1988, p. 24 (key to species).  
*Malayothrix* Verhoeff, 1929, p. 1479; Mauriès, 1978, p. 41.

Mauriès synonymized *Malayothrix* with *Metopidothrix* in 1988, arguing that the two genera cannot be maintained as separate on the characters originally proposed by Verhoeff (1929). I concur with this judgment. The secondary sexual modifications of the males in this genus affect the head (unmodified, bearing a small setose knob, or depressed between the antennae), fourth antennal article (with or without a low swelling), and third legpair (normal or enormously enlarged). These modifications occur in at least five distinct combinations in the seven included species, and provide no guidance for grouping them into more than a single genus. The gonopods conform closely to a uniform plan.

With the exception of the new one described below, all known species were keyed by Mauriès (1989).

***Metopidothrix shelleyi*, n. sp.**

Figures 1-6

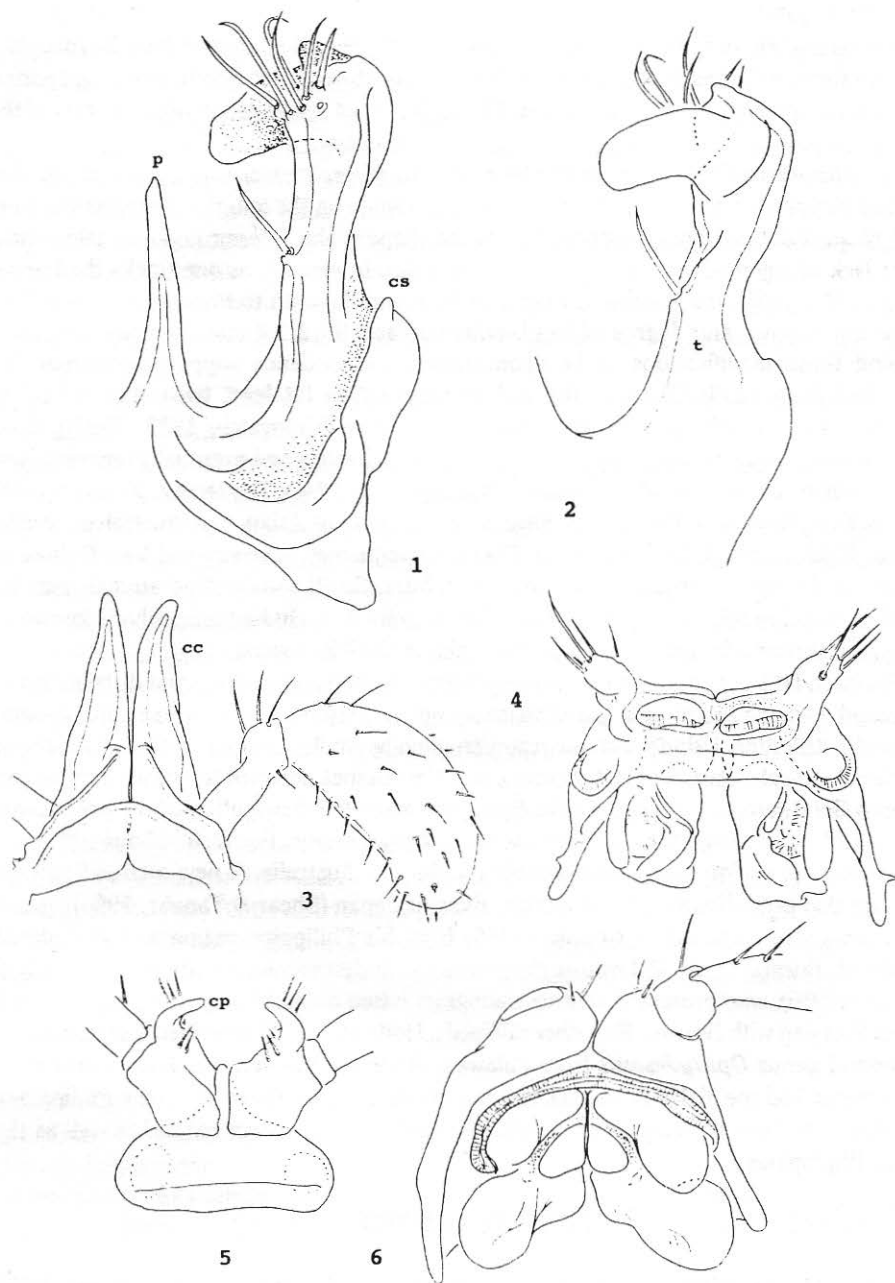
Material: Male holotype, male, female paratypes (Bishop Museum), and male paratype (Virginia Museum of Natural History) from Mantalingajan Range, elevation 620 m, Pinigisan, Palawan, Philippines, 2 April 1962, H. Holtmann leg.

Holotype: Adult male about 5.5 mm long, 0.4 mm wide. Head normal, without modifications usual in the genus, with 13 irregularly shaped, well-separated, black ocelli in an oval patch. Antennae long, reaching fourth trunk segment, not modified. Metaterga with long (ca. 0.15-0.2 mm), acute segmental setae set on low knobs; cuticle smooth and shining. Legpairs anterior to gonopods of normal size, without modifications.

Anterior gonopods (figs. 1, 2) typical of genus. Sternum transverse, solidly fused to coxae; coxal region with a strong, forward-projecting shoulder (*cs*). Median on the sternal region is a long, strong, acute projection (*p*). Telopodite (*t*) erect, with a single seta on the mesal surface at about midlength; apical portion somewhat broadened, curved sharply posteriorly and mesally, with a group of strong setae in the concavity so formed. In the normal position, this apical part of the telopodite curves laterally around the posterior gonopod colpocoxites. Posterior gonopods (fig. 3) also typical; coxae not fused to sternum. Telopodites two-articled, the distal article swollen and ovoid. Colpocoxites (*cc*) very simple, acuminate, appressed mesally. Tenth leg pair (fig. 4) highly modified; coxosternum bearing two large, partly sclerotized glands extending dorsally into the body cavity, telopodites reduced to a single, button-like, setose article. Eleventh leg pair with posteriorly projecting, curved coxal processes (*cp*, fig. 5), otherwise of normal size and shape.

Color uniform creamy tan with slightly darker mottling on the metazonites.

Paratype: Mature female 5.6 mm long, 0.6 mm wide, resembling male in all nonsexual characters. Cyphopods (fig. 6) somewhat resembling those of *M. enghoffi*, the only other species for which they have been described; with heavily sclerotized ridge (*r*) anteriorly; left and right cyphopods appear fused in midline, valves strongly modified, without setae.



Figs. 1-6. *Metopidothrix shelleyi*. Fig. 1. Right anterior gonopod, anterior view, 400x. Fig. 2. Left anterior gonopod, posterior view, 400x. Fig. 3. Posterior gonopods, anterior view, 200x. Fig. 4. Legpair 10, anterior view, 200x. Fig. 5. Coxae of legpair 11, posterior view, 200x. Fig. 6. Cyphopods and bases of legpair 2, posterior view, 200x.

Remarks: Mt. Mantalingajan is about 25 km north of the coastal town of Bonobono, in the southern quarter of Palawan.

The male of *Metopidothrix hauseri* Mauriès (1989), described from Sabah, Borneo, has a concave frons, enlarged legs 3 and 4 (with leg 3 very strongly modified), a unique spotted color pattern, and long processes on coxae 10 which are not found in any other species of the genus.

*Metopidothrix shelleyi* appears to be closest to *M. melanocephala* Golovatch, of Viet Nam. The two species are similar in having a median spine on the anterior gonopod sternum, but *M. shelleyi* differs from *melanocephala* in the shape of the anterior gonopod telopodites and the lack of any modifications of the head in males. In general, as one tracks the known species of *Metopidothrix* southeast from Viet Nam and Palawan to Borneo, Java, and New Guinea, the number and degree of head, antennal, and third leg modifications increases. Assuming these modifications to be apomorphies, the evidence supports an origin for *Metopidothrix* in south China or the Indochinese region (at least two other, probably unrelated, chordeumatid genera are found in Viet Nam [Golovatch, 1983, 1984]), then somehow island-hopping along the volcanic chains of Indonesia and eventually reaching New Guinea, perhaps as the Australian tectonic plate approached Asia. The terrestrial invertebrate fauna of New Guinea is thought to have a predominantly Asian, not Australian, origin (Thorne, 1963; Raven & Axelrod, 1972). These elements may have entered New Guinea as early as the Oligocene Period, or perhaps much later. Small soil-dwelling animals may be easily distributed in soil carried by migrating larger animals, including man, who is known to have spread through Indonesia and into Australia in the Pleistocene.

Simonsen (1992) has pointed out some evidence from the phylogeny and distribution of polydesmid millipeds that suggests vicariance, not migration, might explain this general pattern of distribution. Using a tectonic reconstruction by Audley-Charles (1983), which shows the Malay Peninsula, Java, Sumatra, Borneo, and New Guinea adjacent to one another as part of eastern Gondwana in the late Triassic, Simonsen maps the distribution of the polydesmid family Opisotretidae and shows it to represent a coherent region. For Metopidiotrichidae and its relatives, this region would also include continental Australia. A new metopidiotrichid genus has also been discovered in southern Kyushu, Japan (Shear & Tanabe, 1994).

Palawan was excluded by Gressitt (1956) from his Philippine region and was placed instead with Borneo in the Malayan region; Gressitt's judgment was confirmed by Schuh & Stonedahl (1986), who presented an area cladogram based on mirid bug distributions, which grouped Palawan with Borneo. For other millipeds, Hoffman (1973) described a species of the pterodesmid genus *Ophrydesmus* from Palawan; otherwise the genus is known only from Java, Sumatra, and the Malay Peninsula, and has not been found elsewhere in the Philippines. It remains to be seen if *Metopidothrix* will be found in the *biogeographical* as well as the *political* Philippines.

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