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On the scolopendromorph centipede genus *Mimops* Kraepelin, 1903, with a description of a new family (Chilopoda: Scolopendromorpha)

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Abstract

The type material of the Chinese species *Mimops orientalis* Kraepelin, 1903 and Brazilian *Mimops occidentalis* Chamberlin, 1914 has been examined. *Mimops orientalis* is not a cryptopid. It is here placed in a new family Mimopidae characterized by the possession of a single ocellus on each side of the head plate, forcipular coxosternal plates without teeth, 21 pairs of legs and the ultimate leg-bearing segment and ultimate legs with numerous small spines. The two syntypes of *M. occidentalis* are an early adolescens stadium of a scolopendrid, too immature for the genus to be determined.

Keywords: Chilopoda, China, Mimopidae, *Mimops*, new family, Scolopendromorpha

Introduction

Kraepelin (1903) placed all scolopendromorphs in a single family Scolopendridae with three subfamilies, the Scolopendrinae and Otostigminae, with four ocelli on each side of the head plate, and the Cryptopinae, without ocelli. He placed his new genus *Mimops* with a single Chinese species *M. orientalis* (Kraepelin, 1903) in the Cryptopinae. A second species, *Mimops occidentalis* Chamberlin, 1914, was described from Rio de Janeiro, Brazil. Attems (1930) considered the Scolopendromorpha to consist of two families, the Scolopendridae with subfamilies Scolopendrinae and Otostigminae, and the Cryptopidae with subfamilies Cryptopinae, Theatopsinae (= Plutoniuminae Bollman, 1893), and Scolopocryptopinae. He located *Mimops* in the Cryptopinae. It is obvious, however, from Kraepelin's (1903) description of *M. orientalis* and Chamberlin's (1914) description of *M. occidentalis* that the two *Mimops* species are quite unlike other cryptopines.

The type material of the two species is here redescribed. *Mimops orientalis* is placed in a new family Mimopidae. The two specimens of *Mimops occidentalis* are an early adolescens stadium of a scolopendrid.

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The unidentified Chinese centipedes in the collection of the Natural History Museum, London were examined in the search for further material. There are 28 scolopendromorph specimens, none of which are *Mimops*.

Sources of material

MCZ, Museum of Comparative Zoology, Harvard University, Massachusetts, USA; ZMUH, Zoologisches Institut und Zoologisches Museum der Universität, Hamburg, Germany.

Taxonomy

Family MIMOPIDAE new family

Diagnosis

With a single ocellus on each side of the head plate. Forcipular coxosternal plates without teeth. Twenty-one pairs of legs. Ultimate leg-bearing segment and most podomeres of ultimate legs with numerous small spines.

Type genus *Mimops* Kraepelin, 1903
Mimops orientalis Kraepelin, 1903
 (Figures 1–13)

Mimops orientalis Kraepelin 1903, p 62, Figures 21–24.

Mimops orientalis: Attems 1930, p 248, Figures 325–327.

Holotype: China, Süd Schensi (= Shaanxi Province), August 1903, ZMUH.

Description of holotype

Length 45 mm. Head plate about as long as wide (Figure 1), very finely punctate with posterior margin overlying tergite 1. A single unpigmented ocellus (“weissen Augenfleck”, Kraepelin 1903).

Left antenna damaged, right with 17 antennomeres. Antennomeres at most 1.5 times as long as wide, the basal six glabrous dorsally, the following ones appear to have lost many setae. Kraepelin (1903) stated that the basal seven antennomeres are glabrous, the following only setose laterally, almost glabrous dorsally and ventrally.

Clypeus partially obscured but without the transverse row of setae seen in *Cryptops*. Pretarsus (claw) of second maxilla pointed and without accessory spurs. Not hooked as in *Cryptops*.

Anterior margin of forcipular coxosternum, with a lenticular plate delimited by an oblique suture on each side (Figure 2). The plates lack teeth but each has a prominent seta behind the anterior margin. Forcipular trochanteroprefemur with a low median lobe in the position of the median process or tooth of scolopendrids.

Tergite 1 with anterior transverse (ring) sulcus but no longitudinal sutures (Figure 1). Tergites 2–20 with paramedian sutures. These are poorly developed on tergite 3. (Kraepelin stated that they are incomplete anteriorly on this tergite.) There are longitudinal

Figures 1–7. *Mimops orientalis* holotype. (1) Head and tergite 1 and 2. (2) Left tarsungulum and part of forcipular coxosternum. (3) Tergite 12. (4) Tergite 21. (5) Sternite 7. (6) Terminal segments, ventral view (coxopleural pores not shown). (7) Detail of coxopleural process. cpl, coxosternal plate; oc, ocellus. Scale bars: 1.0 mm.

Figures 8–13. *Mimops orientalis* holotype. (8) Leg from anterior trunk. (9) Part of prefemur and femur of leg 20 to show spinulation. (10) Ultimate leg. (11) Part of prefemur of ultimate leg to show spinulation. (12) Detail of spines on prefemur of ultimate leg. (13) Spiracle of segment 3. Scale bars: 1.0 mm (8–11); 0.5 mm (13).

sulci lateral to the paramedian sutures, more pronounced on the long tergites (Figure 3). Tergite 21 with small spines (Figure 4) and with a narrow posterior median depression. Sternites (Figure 5) with complete paramedian sulci from 3 to 19, almost complete on 2. Sternite 21 attenuated posteriorly, almost triangular with peripheral spines (Figure 6).

Each coxopleuron with an oval pore field of many small pores. Without setae but with small scattered spines. The coxopleural process digitiform and also covered with small spines (Figures 6, 7).

All legs with two-segmented tarsi. Two tibial spurs on legs 1–18, 19 with one, 20 without. Legs 2–20 each with two tarsal spurs. Not observable on leg 1. Anterior legs with very few spines ventrally on the prefemur and femur and a distal transverse row dorsomedially on the prefemur, femur, and tibia (Figure 8). Leg 19 with prefemur, femur, and tibia spined dorsally, medially, and ventrally, and tarsus 1 with spines dorsomedially (Kraepelin gives femur, patella, and tibia, and proximal tarsus of 19 and 20 thickly “dornkörnig”). Leg 20 with prefemur and femur spined on all surfaces (Figure 9), tibia on all but the medial surface and tarsus 1 spined dorsally and medially. Pretarsal accessory spurs (claw spines) present.

Ultimate legs (Figure 10), which are detached, have the prefemur and femur covered in very small spines, except for a median ventral strip (Figures 11, 12). The tibia spined on all but the median ventral and medial surfaces, and tarsus 1 has a few dorsomedial spines. Each spine is associated with a short seta.

The ventral pore-free strip of the prefemur, femur, and tibia of one terminal leg lies in a groove which is continued on to tarsus 1 as a shallow gutter. On the other leg the grooves are very shallow. Pretarsal accessory spurs are absent.

There are nine pairs of small round or oval spiracles (absent on segment 7). The spiracle cup filled with humps (Figure 13), resembling those of the Otostigminae. The spiracles require further investigation.

***Mimops occidentalis* Chamberlin, 1914**
(Figures 14–20)

Mimops occidentalis Chamberlin 1914, p 160, Table 1, Figures 4–7.

Mimops occidentalis: Attems 1930, p 248, Figures 329, 330.

Two syntypes: Brazil, Rio de Janeiro TC-532 (1467), unique number 14474, Nathaniel Thayer Expedition 1864, MCZ.

Description of syntypes

Specimen 1. The specimen is very delicate, pre-moult with the old cuticle lifted. It was examined in 70% ethanol and not cleared.

Length 11 mm. With 17 almost glabrous antennomeres.

Head plate as long as wide with sides converging posteriorly (Figure 14), slightly overlapping tergite 1. Chamberlin stated “longitudinally depressed in caudal region each side of middle” but this is not obvious. Ocelli absent.

Clypeus without setae, labrum with low median tooth.

Telopodite of second maxilla with a rudimentary pretarsus (claw). A single seta on the inner surface of telopodite 3 behind the pretarsus.

Coxosternal tooth plates semicircular, each with three minute teeth (Figures 15, 16). Transverse limiting sulci not apparent, although these were illustrated by Chamberlin (1914, Figure 5). Forcipular trochanteroprefemur with low median process or tooth.

Tergite 1 with indistinct anterior transverse (ring) suture. Chamberlin noted “also with a longitudinal furrow each side of the middle extending cephalad from the caudal region and uniting at an angle with its fellow near the middle of the plate from where they continue as a

Figures 14–20. *Mimops occidentalis* specimen 1. (14) Head and first three tergites. (15) forcipular coxosternum and right tarsungulum. (16) Detail of left coxosternal tooth plate. (17) Terminal segments, ventral view, pores shown on right coxopleuron. (18) Detail of coxopleural process. (19) Prefemur of ultimate leg. (20) Spiracle of segment 3, dorsal view. sp, spines. Scale bars: 0.5 mm.

single median furrow to the transverse sulcus". These are not clear and their nature is doubtful. They may be bands of pigment.

Trunk flattened (probably squashed) with longitudinal folding so it is not clear whether paramedian sulci are present or not. Only tergite 21 marginate. Sternites with complete paramedian sulci. Sternite 21 trapezoidal (Figure 17).

Coxopleuron with short, digitate process bearing two minute spines (Figure 18) and with numerous small pores which may be in the underlying new cuticle.

Legs 1–20 virtually glabrous, with divided tarsi and hooked pretarsus. The femora, tibiae, and tarsi 1 and 2 each with a small internal distal seta.

Ultimate legs: one loose in tube with three nascent spines seen in profile on prefemur (Figure 19).

Spiracles: only that of segment 3 visible. Viewed from the dorsal side this shows an upper and lower triangular flap (Figure 20).

Specimen 2. Length 10 mm. This specimen lacks antennae and terminal legs. The trunk is round rather than dorsoventrally flattened. Small round spiracles are present on segments 3, 5, 8, 10, 12, 16, 18, and 20.

Remarks

The small size, rounded trunk (seen in specimen 2), lack of sclerotization and only a few poorly developed spines and setae suggest that this is an early adolescens stage similar to that described by Lawrence (1947) for *Cormocephalus multispinus* (Kraepelin, 1903). The presence of coxosternal tooth plates, forcipular trochanteroprefemoral process, spined terminal leg prefemur, bisulcate sternites and divided tarsi, suggest that this is a scolopendrid rather than a cryptopid. The structure of the spiracle of segment 3 seen in specimen 1 is the same as that seen in the first free-living adolescens stadium of *Scolopendra gigantea* Linnaeus, 1758 (J. G. E. Lewis, unpublished data).

Presumably the absence of ocelli in these specimens prompted Chamberlin to look for relationships within the Cryptopidae. However, in all probability this early stadium was yet to develop ocelli. Lawrence (1947) noted that the ocelli in the first adolescens stadium of the scolopendrid *Cormocephalus multispinus* are represented merely by four reddish orange pigment spots under the “skin”. No lenses could be distinguished.

It is concluded that the two syntypes of *Mimops occidentalis* are an early adolescens stadium of a scolopendrid, too immature for the genus to be determined with certainty.

Discussion

Table I compares the Scolopendridae, Scolopocryptopidae (reinstated as a family by Shelley 2002), and the cryptopid subfamilies Plutoniuminae and Cryptopinae with *Mimops*. *Mimops* shares most characters with scolopendrids and only one of those tabulated with cryptopines. It differs from the former, however, in having only one ocellus on each side of the head plate and in the presence of small spines on all legs, including the prefemur, tibia, and tarsus 1 of the penultimate and ultimate legs and trunk segment 21. Kraepelin (1903) called these “Dornkörnchen” (literally thorn- or spine-granules). They are not the same as the tergite spinules “Dornpünktchen”, “Dornstrichelung” of some *Otostigmus* and *Alipes* species, or “feinspitzig”. They are smaller than, but homologous with the spines (“Dornen”) of the ultimate leg prefemur and coxopleural process of other scolopendrids, and additionally present distodorsally on the prefemora of some posterior legs of many New World *Scolopendra* species and *Scolopendra valida* Lucas, 1840, from Africa and the Middle East.

Mimops orientalis also differs from all scolopendrids in the untoothed forcipular coxosternal plates. The monotypic scolopendrid genus *Arrhabdotus* lacks coxosternal tooth plates.

As noted above, the spiracles resemble those of otostigmines and require further investigation.

Table I. Comparison of the characters of Scolopendridae with Scolopocryptopidae, Cryptopidae, and *Mimops*.

Character	Scolopendridae	Scolopocryptopidae	Cryptopidae		<i>Mimops</i>
			Plutoniuminae	Cryptopinae	
Pediferous segments	21 (23)	23	21	21	21
Glabrous basal antenno- meres	Present	fd	fd	Absent	Present
Lateral ocelli	Four	Absent	Pale areas	Absent	One
Forcipular coxosternal plates	Present + teeth in most	Present as ridge or absent	Present + teeth	Absent	Present
Sternite paramedian sutures	Present in most	Absent	Absent	Absent	Present
Sternite transverse sulcus	Absent	Present or absent	Absent	Present in most	Absent
Tarsal spurs	Present in most	Present	Present	Absent	Present
Legs with prominent setae	No	fd	fd	In most	No
Tarsi divided on legs 1–19	Yes	Yes or no	No	Mostly not	Yes
Ultimate legs					
Cryptopiform	No	Yes or no	No	Yes	No
Prefemoral spines	Present	Present or absent	Present	Absent	Present
Tibial and tarsal saw teeth	Absent	Present or absent	Absent	Present	Absent

fd, further data required. Characters shared with Scolopendridae are shown in bold type.

Presumably Attems (1930) placed *Mimops* in the subfamily Cryptopinae of the Cryptopidae on the basis of its possessing 21 pairs of legs and supposed single “Augenfleck”. In addition to *Mimops* he included *Cryptops*, *Paracryptops*, and *Anethops* in the subfamily, however, Schileyko and Pavlinov (1997), in a cladistic analysis, showed that although *Cryptops* and *Paracryptops* were closely linked, *Anethops* and *Mimops* occupied various positions in the cladograms and would have preferred to exclude them from the Cryptopinae. However, they made no suggestion as to the possible placement of these genera. Shelley (2002) showed that *Anethops* is a junior synonym of *Scolopocryptops* (*Anethops occidentalis* Chamberlin, 1902 = *Scolopocryptops gracilis* Wood, 1862, family Scolopocryptopidae). This and the removal of *Mimops* to the Scolopendridae, render the Cryptopinae a very homogeneous taxon characterized as lacking ocelli, having 21 pediferous segments and cryptopiform ultimate legs.

Mimops is here placed in a new family Mimopidae defined above.

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