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MEGADRILOGICA

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ON A NEW SPECIES OF EARTHWORM GENUS *EUTYPHOEUS* (OCTOCHAETIDAE: OLIGOCHAETA) FROM MIZORAM, INDIA.

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ABSTRACT

One new octochaetid species, *Eutyphoeus mizoramensis*, is described from Mizoram in northeast India. Its relationship with closely related species, *E. manipurensis manipurensis* Stephenson and *E. hastatus* Gates is also discussed.

Key words: Oligochaeta, Octochaetidae, *Eutyphoeus mizoramensis* n. sp.

सारांश

भारत के पूर्वोत्तर राज्य मिज़ोराम से एक नई केंचुआ ;वबजवबीमजपकख्र जाति, *मजलचीवमने उग्रवतंउमदेपे*, का वर्णन किया गया है । इसके घनिष्ठ सम्बन्ध की चर्चा *म उदपचनतमदेपे उदपचनतमदेपे* या *म जिंजने* जातियों के साथ भी की गई है ।

बीज-शब्द: Oligochaeta, Octochaetidae, मिज़ोराम, नई जाति ।

RESUMEN

Se describe una nueva especie de octoquetido: *Eutyphoeus mizoramensis* de Mizoram en el nordeste de India. Tambien se discute su relación con las especies estrechamente relacionadas: *E. manipurensis manipurensis* Stephenson y *E. hastatus* de Gates.

Palabras claves: Oligochaeta, Octochaetidae, *Eutyphoeus mizoramensis* n.sp.

RÉSUMÉ

Une nouvelle espèce de l'octochaetid, *Eutyphoeus mizoramensis*, est décrite de Mizoram dans le nord-est de l'Inde. Son rapport avec des espèces étroitement liées, *E. manipurensis manipurensis* Stephenson et les *E. hastatus* Gates Portes sont aussi discutées.

Clé mots: Oligochaeta, Octochaetidae, *Eutyphoeus mizoramensis* n.sp.

INTRODUCTION

The state of Mizoram with an area of 21,087 km² (latitude 21° 58'-24° 35' N, longitude 92° 15' - 93° 29' E), is situated in the northeast corner of India. It is bordered on the northeast by Manipur, on the north by Assam and on the northwest by Tripura, besides its

international boundaries with Myanmar in the east and Bangladesh in the west. The general topography is mountainous with steep hills and deep gorges, and with an average altitude of about 1000 metres above mean sea level. The area experiences heavy rains during the monsoon, with an average annual rainfall of 2540 mm.

The earthworm diversity of Mizoram has not been explored adequately, although earthworms of neighbouring areas of Assam, Myanmar and Bangladesh have been studied extensively (Stephenson, 1923; Gates, 1972; Julka, 1988; Reynolds, 1994; Reynolds *et al.*, 1995; Das and Reynolds, 2003). So far, only one species, *Eutyphoeus gigas* Stephenson, is known from the state (Julka 1988). The present studies on earthworms of Mizoram, however, show the existence of another species, *Eutyphoeus mizoramensis*, which is new to science and is described in this paper. The genus *Eutyphoeus* is believed to have evolved in the mountain wall between India and Myanmar from whence it spread through the Gangetic plain, into the Himalayas and across western and middle portions of Myanmar to the margin of Shan Plateau (Gates 1972). Types of the new species are deposited in High Altitude Zoology Field Station (HAZFS), Zoological Survey of India, Solan.

Eutyphoeus mizoramensis sp. nov.

(Figures 1-3)

Material examined: Holotype (HAZFS An 817), clitellate, 6 paratypes (HAZFS An 818), clitellate, Aizwal (23.36°N, 90°0E) Mizoram, India, altitude 900-1100 m, soil sandy clay loam, soil pH 4.9-6.5, July 2003, coll. S.N. Ramanujam & H. Lalthanbara.

Description:

External: Length 160-169 mm, diameter 6 mm, 143-247 segments. Prostomium tanylobic. First dorsal pore at 11/12. Clitellum annular, $\frac{1}{3}$ xiii- $\frac{1}{3}$ xvii. Setae lumbricine, $aa = 1.7-2.2$ $ab = 0.7-0.8$ $bc = 1.0-1.3$ $cd = 0.12-0.14$ dd on segment 12, $aa = 3.0-3.6$ $ab = 1.2-1.8$ $bc = 1.7-2.3$ $cd = 0.15$ dd on segment 24. Avestibulate; openings of penisetal follicles in deep fissures on conspicuously protuberant, paired oval male porophores, at b lines, on segment 17; male pores paired, minute, each just behind penial setae on posterior lobe of male porophore. Female pores paired, minute, presetal, slightly median to a lines, on segment 14. Spermathecal pores paired, transverse slits, at a lines, in intersegmental furrow 7/8. Genital markings paired; postsetal, at aa or bb with median margins touching or close to each other, usually on segments 7, 16, 18, 19, 20, sometimes on 8, 21, 22, 23, 24; at ab , usually on segments 10-12, sometimes on 8, 9, 12, 16. Nephridiopores not recognized.

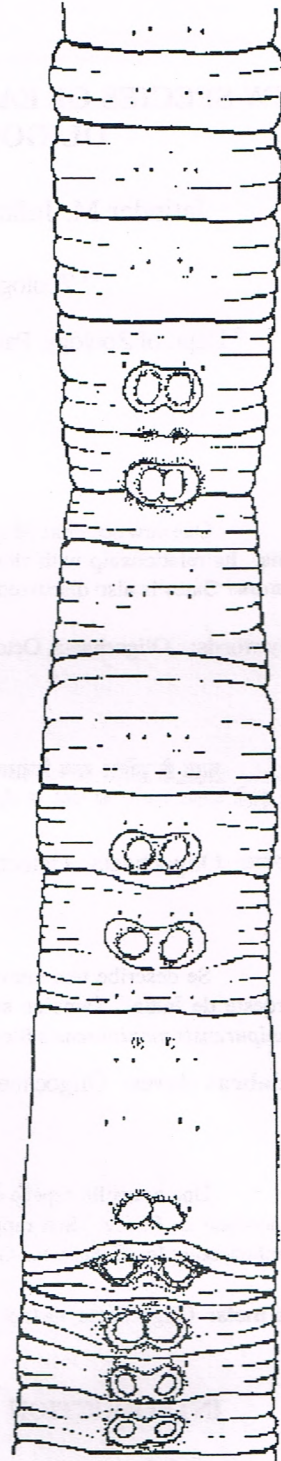


Fig. 1. The genital region of *Eutyphoeus mizoramensis* sp. nov.



Fig. 2. Penial seta of *Eutyphoeus mizoramensis* sp. nov.

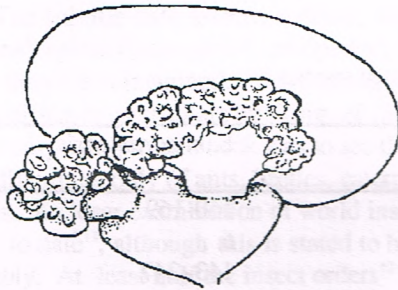


Fig. 3. Spermatheca of *Eutyphoeus mizoramensis* sp. nov.

Internal: Pigment greyish. Septa 4/5/6, 8/9-10/11 muscular, 6/7/8 absent. Oesophagus with a large gizzard in a space between septa 5/6 and 8/9 and a pair of discrete hemi-ellipsoidal intramural calciferous glands in segment 12; intestine begins in segment 15; lateral intestinal caeca paired, broadly tubular, in segment 28; median, unpaired, ventral intestinal caeca 17-23, in segments 33-55; supra-intestinal glands 4-5 pairs, in segments 80-87; dorsal typhlosole simple, lamelliform, in segments $\frac{1}{2}$ 27 to 80-84, lateral typhlosoles in segment 28. Dorsal blood vessel single, complete, extending anterior to gizzard into segment 3; last pair of hearts in segment 13. Holandric, testes and male funnels paired, enclosed in annular sacs, in segments 10 and 11; seminal vesicles paired, in segments 9 and 12, those of 12 extend to segments 14-15. Prostates tubular, paired, in segment 17, extending to segment 18. Penial setae ornamented with numerous, short, widely spaced, transverse rows of fine

spines, tip pointed and slightly curved on one side, 2.29-2.32 mm long, 44 μ m diameter. Spermathecae paired, in segment 8, each with a median and a lateral multiloculate shortly stalked posteriorly directed ental diverticula, each diverticulum opening into duct through a single opening; duct stout, somewhat conical, shorter than ampulla. Genital marking glands sessile, slightly protuberant in to body cavity.

Remarks: *E. mizoramensis* belongs to a group of *Eutyphoeus* species with spermathecal pores at *ab*, male pores discharging directly on to body surface (avestibulate), holandric arrangement of testes, and short seminal vesicles in segment 12 (not extending beyond segment 20), and a complete dorsal blood vessel. It is distinguished from other species of the group *E. manipurensis manipurensis* Stephenson, 1921, and *E. hastatus* Gates, 1929 by the combination of characteristics as given in Table 1.

Biology: The species inhabits orchards, plantations, agriculture fields and river beds with sandy clay loam soil (pH range of 4.9-6.5, moisture 20-26%) at 0-30 cm depth. It forms 2-5 cm high tower-like casts at the soil surface.

Etymology: The name of the species *mizoramensis* is derived from the state Mizoram in which its type locality is located.

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Table 1. Comparison of *Eutyphoeus mizoramensis* sp. nov. with related species.

Character/Species	<i>E. manipurensis</i> <i>manipurensis</i>	<i>E. hastatus</i>	<i>E. mizoramensis</i>
Length (mm)	120	60-180	160-169
Diameter (mm)	5	3-5.5	6
Segments	162	188-211	143-247
Genital papillae	Unpaired and median, at segments 8-9, 16; paired, at segments 8, 16-17; transverse row of 4, at segment 16	Paired, but sometimes united at mV, at segment 16 and/ or one or two post-clitellar segments	Paired, but with median margins touching or close to each other or at <i>ab</i> , on segments 7-12, 16, 18-24
Lateral intestinal caeca	Well-developed, digitiform, in segment 27	Usually absent, when present rudimentary or small, in segment 28	Well-developed, broadly tubular, in segment 28
Ventral intestinal caeca	23-24, in segments 32-56	6-29, in segments 30-61	17-23, in segments 33-55
Supra-intestinal glands	3-5 pairs, in segments 73-78	4-7 pairs, in segments 69, 76-95, 103	4-5 pairs, in segments 80-87
Spermathecae	Unidiverticulate	Bidiverticulate	Bidiverticulate
Seminal vesicles (segment 12)	Extending to segment 14	Extending to as far as segment 20	Extending to segments 14-15