

Original Research

Record of *Pillaia indica* Yazdani 1972, an endangered earthworm eel (Teleostei: Chaudhuriidae) from the streams of Brahmaputra drainage in Northeast India

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ABSTRACT:

Pillaia indica Yazdani 1972, a threatened earthworm eel under Synbranchiformes, is recorded from Langkhar (26°46'N and 90°32'E) and Teklai (26°47' N and 90°35'E) streams near Assam-Bhutan border of Chirang District, Assam, India. *Pillaia indica* is distinguished from its congeners in having dorsal soft rays 34–36, anal soft rays 34–36, vertebrae 66 and unpaired fins continuous. The head length 15.1–15.2% SL, dorsal fin base length 43.6–44.8% SL, anal fin base length 44.8–46.3% SL, anus to anal fin distance 2.9–3.1% SL, eye diameter 5.2–5.7% HL and head depth 36.8–37.9% HL.

Keywords:

Chaudhuriid, earthworm eel, new distributional record, Assam-Bhutan streams

Abbreviation:

IUCN-International Union for Conservation of Nature, MSUMNH-Manonmaniam Sundaranar University Museum of Natural History, USNM-US National Museum of Natural History

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INTRODUCTION

The family Chaudhuriidae known as South Asian Mastacembeloid fish includes six genera and ten species viz. *Chaudhuria caudata* Annandale 1918, *C. fusipinnis* Kottelat and Britz 2000 (Kottelat, 2000), *Pillaia indica* Yazdani 1972, *P. kachinica* Kullander, Britz, and Fang 2000, *Garo khajuriae* (Talwar, Yazdani, and Kundu 1977), *Nagaichthys filipes* Kottelat and Lim 1991 in Kottelat 1991, *Chendol keelini* Kottelat and Lim 1994, *C. lubricus* Kottelat and Lim 1994, *Bihunichthys monopteroides* Kottelat and Lim 1994 and *Chaudhuria ritvae* Britz 2010 (calacademy.org/research/ichthyology). The genus *Pillaia* Yazdani and the type species *P. indica* were described from Khasi hills of Meghalaya (Yazdani, 1972). Recently, Arunachalam et al., (2014) reported the range extension of *P. indica* from Khasi hills of Meghalaya to Darjeeling District, West Bengal. Bakalial et al., (2014) reported the species from Lakhimpur District of Assam. During an ichthyological reconnaissance of Langkhar (26°46'N and 90°32'E) and Teklai (26°47'N and 90°35'E) streams near Amteka of Chirang District of Assam, India, we report *Pillaia indica* Yazdani 1972 as a new distributional record of

Brahmaputra drainages. The IUCN Red List of Threatened species enlisted it as an endangered species following the IUCN criteria (Britz and Chaudhry, 2010). The specimens were collected from near the foot-hill streams of Assam-Bhutan border of Chirang District. Mostly, they were found clinging to submerged vegetation based along the edges of the streams or lying at the bottom of streams. They feed on aquatic plant debris, algae, insects, crustaceans and other decaying materials. The juveniles were observed during the period of April-May. The adults are dark reddish brown than the young ones and they occur with other dominant species of the genera like *Amblyceps*, *Badis*, *Barilius*, *Danio*, *Devario*, *Lepidocephalichthys*, *Mastacembelus*, *Microphis*, *Nemacheilus*, *Olyra*, *Puntius*, *Pterocryptis*, *Psilorhynchus*, *Schistura* etc.

MATERIALS AND METHODS

Method of counts and measurements were done following Kottelat and Lim (1994). The collection and preservation of fishes were made following the protocols prescribed by Brooks (2011). Parts of the body are expressed as percentages of standard length (SL) and



Figure 1: A-Lateral view and B-ventral view of *P. indica* (GUZM 1175, 1, 81.9 SL)

Table: 1 Morphometric data of *Pillia indica* Yazdani, 1972 from Teklai

Standard length (SL)	Range (76.2-81.9)	Mean±SD
% SL		
Snout to dorsal fin origin	57.0 - 57.3	57.1 ± 0.15
Snout to anal fin origin	55.8 - 56.1	55.9 ± 0.15
Pre-anus length	53.7 - 54.8	54.1 ± 0.61
Anus to anal fin origin	2.9 - 3.1	3.0 ± 0.09
Dorsal fin base length	43.6 - 44.8	44.1 ± 0.61
Anal fin base length	44.8 - 46.3	45.4 ± 0.78
Caudal fin length	6.2 - 6.5	6.3 ± 0.12
Pectoral fin length	2.4 - 2.6	2.5 ± 0.06
Pre-pectoral length	15.4 - 5.6	15.5 ± 0.11
Body depth at anus	7.2 - 7.3	7.2 ± 0.05
Maximum body width	5.5- 6.7	6.1 ± 0.61
Head length	15.1 - 15.2	15.1 ± 0.03
% HL		
Head depth at eye	25.7 - 26.4	26.0 ± 0.37
Maximum head depth	36.8 - 37.9	37.4 ± 0.55
Maximum head width	36.5 - 37.3	37.0 ± 0.42
Snout length	25.3 - 29.0	27.4 ± 1.95
Pre-nasal length	17.8 - 18.6	18.2 ± 0.40
Eye diameter	5.2 - 5.7	5.4 ± 0.24
Inter orbital distance	12.1 - 12.5	12.4 ± 0.23
Inter nasal distance	13.9 - 15.4	14.8 ± 0.86
Post-orbital head length	69.5 - 70.1	69.8 ± 0.33
Upper jaw length	26.8 - 30.7	28.3 ± 2.09

subunits of head as percentages of head length (HL). The Fin rays were counted under stereo-zoom light microscope (Leica ATC, 2000). The specimens are deposited in the Gauhati University Zoological Museum (GUZM 1175 and 2175, unregistered).

RESULTS AND DISCUSSION

Pillia indica Yazdani 1972 (Figure-1)

Material examined

GUZM 1175, 1, 81.9 mm SL, Langkhar (26°46' N and 90°32'E) near Amteka, 28 November 2013; GUZM 2175 (4), 76.2 - 80.0 mm SL, Teklai (26°47' N and 90°35'E) near Amteka, 25 December 2013, Chirang District of Assam

Diagnosis

Pillia indica Yazdani 1972 differs from its congeners in having dorsal soft rays 34 - 36, anal soft rays 34 - 36, vertebrae 66 and unpaired fins continuous. Snout short with fleshy rostral appendage bearing anterior tubular nostrils, eyes prominent, no fin spines, scales absent.

Description

Biometric data of *Pillia indica* Yazdani 1972 is given in Table-1; body straight, elongated, eel like, slender and laterally compressed. Head anteriorly depressed, snout short, sub-conical, lip folds well developed, median snout narrow, mouth wide, gill opening wide, gill membranes free from isthmus, branchiostegal rays 5 - 6 (5), Dorsal fin continuous with

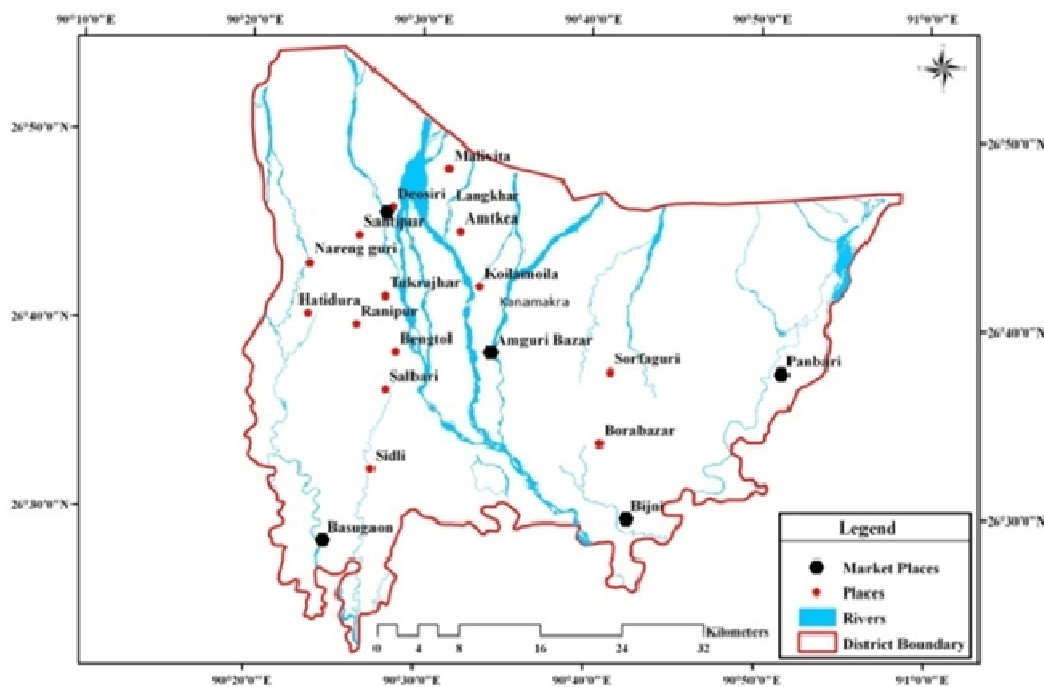


Figure 2: Map of Chirang District showing the habitat locality of *P. indica* Yazdani 1972 (Source: Sewali Pathak *et al.*, 2013)

caudal fin bearing 34 - 36 (5) soft rays, anal fin confluent with caudal fin bearing 34 - 36 (5) soft rays, pectoral fin originates at the end of gill opening with 7 - 9(5) soft rays, pelvic fin absent, caudal fin tapering with 8 - 10(5) soft rays. Body colour of fresh specimen is dark brown and ventral dull white where as it turns light and fade brown in the preserved specimen.

Distribution

Presently known from the Langkhar (26°46'N and 90°32'E) and Teklai (26°47'N and 90°35'E) hill streams near Amtka, about 36 - 40 km north of Biji town in Chirang District, Assam, India (Figure-2). *P. indica* was first described from Sumer stream, about 22 km north of Shillong and Umsing stream, 13 km north of Shillong, Khasi and Jaintia Hills of Meghalaya, India. Recently, it was reported from Anthojora stream in Darjeeling District, West Bengal and also reported by Bakalial *et al.*, 2014 from Lakhimpur District of Assam, Northeast India.

Travers (1984a, 1984b) published the first comprehensive osteological description of Chaudhuriidae and Pillaiidae and reviewed their phylogenetic relationships with Mastacembelidae. Three species of Chaudhuriidae are known from northeastern India (Talwar *et al.*, 1977) and *Pillia indica* from khasi and Jaintia Hills of Meghalaya. *Pillia khajuriai* was described by Talwar *et al.*, (1977) and later the genus was replaced by Yazdani and Talwar (1981) as *Garo khajuriai*, from Rongrengiri, Garo hills, Meghalaya and from Baguri, Kaziranga Wild life Sanctuary, Sivasagar District in Upper Assam (Kullander *et al.*, 2000). Recently, *P. indica* Yazdani 1972 was reported from Anthojora stream in Darjeeling District, West Bengal by Arunachalam *et al.*, (2014), the occurrence of which is unexpected since the two valid species *P. indica* and *G. khajuriai* are distributed in northeastern India. The records of new distribution of *P. indica* contribute the range extension from khasi hills of Meghalaya to the foothills of Assam-Bhutan in northeast India. Biometric

variables in the certain parameters of *P. indica* from Langkhar and Teklai streams in Chirang District of Assam justifies its close with the descriptions predicated by Arunachalam *et al.*, (2014) from West Bengal. Morphologically, the *P. indica* is fairly distinguishable from the other three congeners in pectoral-fin rays (*P. indica* 7 - 9, *P. kachinica* 10 - 11 and *G. khajuriae* 19 - 20) and caudal-fin rays (*P. indica* 8 - 10, *P. kachinica* 10 - 12 and *G. khajuriae* 12) as refer from comparative materials. The dorsal soft rays of *P. indica* are 34 - 36 and anal soft rays 34 - 36 which is differ from other congeners (Britz and Kottelat, 2003).

Comparative materials from published information

Pillaia indica Yazdani, 1972:

USNM 372577, 1, 85.8 mm SL; USNM 372577, 1, 61.0 mm SL; Materials collected from: Sumer stream (22km north of Shillong) of Khasi and Jaintia Hills, Meghalaya, India, elev. 1069 m., (Britz and Kottelat 2003). MSUMNH C17, 8 ex. 37.6 - 70.0 mm SL; CMA (Collections of M. Arunachalam) 26, 2 ex, 42.2 - 47.5 mm SL; West Bengal, Anthojora stream near Gajoldoba Reservoir, Baikunthapur, Darjeeling District (26°51'1.3" N, 86°23'57.7"E), 27th Nov. 2012 (Arunachalam *et al.*, 2014).

Pillaia kachinica Kullander, Britz and Fang 2000:

Native to Myanmar (mainland), known only from two streams in the area of Myitkina, Myanmar (Britz and Kottelat 2003).

Garo khajuriae (Talwar, Yazdani and Kundu 1977):

Holotype, 68.0 mm SL, from a paddy field at Rongrengiri, Garo Hills District, Meghalaya; coll. H. Khajuria, 18 January 1957, Zoological Survey of India regd. No. FF 815, Proceedings of the Indian Academy of Science, 1977, 85B (2): 53 - 56.

CONCLUSION

Pillaia indica is a threatened spineless earthworm eel reported by IUCN and this species is restricted to northeast region. It is known to be endemic

in Khasi Hills of Meghalaya. They dwell in a clear, shallow, moderately flowing hill stream with a sandy bottom. The nature of hiding or buried at the bottom to avoid light is one of the characteristic features of this species. The geographical distribution and some biological aspects of *P. indica* are quite insufficient. Conservation of habitat for the species is highly recommended.

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