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Aborichthys iphipaniensis, A NEW SPECIES OF LOACH (CYPRINIFORMES: NEMACHEILIDAE) FROM ARUNACHAL PRADESH, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Author LK designed the study, performed the data analysis, confirmed and named the species and finalized the manuscript. Author SDG performed field sampling and preliminary identification of the species. Authors PS and BRC managed the literature searches, data collection and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

A new nemacheiline loach, *Aborichthys iphipaniensis* sp. nov. is described from the Iphipani River in Arunachal Pradesh, Northeastern India. It can be distinguished from congeners in having the following combination of characters: vent closer to snout tip than caudal fin base, long caudal peduncle, shallow body, short pre-dorsal, small eye, lateral line incomplete reaching pelvic fin origin, 33-35 almost uniform bars on lateral side of the body, and obliquely truncate caudal fin. It is considered to be a highly specialised form of the genus *Aborichthys* inhabiting the torrential river, as it has a very elongate body with a far forward position of the vent and long caudal peduncle.

Keywords: *Aborichthys iphipaniensis*; new species; Brahmaputra drainage; India.

1. INTRODUCTION

Fishes of the genus *Aborichthys* Chaudhuri of the family Nemacheilidae are endemic in Eastern Himalaya in northeastern India, Bhutan and Putao, Myanmar [1,2]. They are characterized by having an elongate body; vent situated far forward, close behind pelvic girdle; dorsal fin inserted slightly behind pelvic fins; oblique narrow stripes on body; a black spot at upper extremity of caudal fin base, and rounded or truncate caudal fin marked with concentric rings or irregular black patches [1,3,4]. Currently, seven species of the genus *Aborichthys* are considered valid viz. *A. boutanensis* (McClelland), *A. cataracta* Arunachalam, et al., *A. elongatus* Hora, *A. garoensis* Hora, *A. tikaderi* Barman, *A. verticauda* Arunachalam et al., and *A. waikhomi* Kosygin [5]. Thoni & Hart [5] considered *A. kempi* as a junior synonym of *A. boutanensis*. Kosygin [1] while describing *A. waikhomi* opined that the fishes of the genus

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Aborichthys seems to be in the process of adaptation in the torrential hill streams of upper Brahmaputra drainage and a detail taxonomic study of fishes of the genus would be of great interest. During field survey conducted in the Iphipani River, a tributary of Brahmaputra Basin in Arunachal Pradesh, four specimens of an undescribed *Aborichthys* were collected. It is herein described as *Aborichthys iphipaniensis* sp. nov.

2. MATERIALS AND METHODS

The specimens were fixed in 10% formalin and later transferred to 70% spirit. Measurements were made point to point with digital callipers on the left side of the specimens to the nearest 0.1 mm. Counts and measurements follow Kottelat [6]. Measurements are given as proportions of standard length (SL). Sub-units of the head are presented as proportions of lateral head length (HL). Fin rays were counted under a stereoscopic zoom microscope. The type specimens were deposited in the Zoological Survey of India (ZSI) Kolkata and the ZSI-Arunachal Pradesh Regional Centre (APRC), Itanagar.

3. RESULTS

Aborichthys iphipaniensis sp. nov. (Figs. 1 & 2).

Holotype: ZSI FF 8002, 125.3 mm SL, Brahmaputra River basin: Iphipani River at Roing, Lower Dibang Valley, Arunachal Pradesh, India, 28°10′44″ N; 95°50′08″E, 418 m asl, 4 April 2016, collected by Shantabala Devi and party.

Paratypes: ZSI/V/APRC/P-1659, 3 ex. 107.5-120.8 mm SL, collected with the holotype.

Diagnosis: *Aborichthys iphipaniensis*, new species is distinguished from its congeners by the following combination of characters: vent closer to snout tip than caudal fin base (distance between vent and caudal-fin base 52.0–56.2% SL); long caudal peduncle (21.5–23.3% SL), shallow caudal peduncle (9.2–10.5% SL), shallow body (8.9–9.9% SL), short pre-dorsal (42.4–44.4% SL), small eye (10.9–14.4% HL), pre-pectoral (15.1–17.9% SL, lateral line incomplete reaching pelvic fin origin, 33-35 almost uniform bars on lateral side of the body, and obliquely truncate caudal fin.

Description: Biometric data in Table 1. General appearance as in Fig. 1. Body elongate, dorsal profile elevated from tip of snout to eyes, then evenly straight to posterior of dorsal fin, elevated slightly towards posterior, forming a long dorsal adipose crest, confluent with caudal fin. Head conical, depressed, more or less equal to caudal fin, width greater than height. Snout rounded in lateral view. Eyes small, dorsally located, slightly closer to tip of snout than to posterior rim of opercle, not visible in ventral view. Nostrils close to each other, much closer to eye than to tip of snout. Mouth inferior, slightly concave. Lips thick and fleshy. Lower lip with deep median interruption (Fig. 3). Lower jaw broad, without median notch. Barbels in three pairs; inner rostral barbel reaching base of maxillary, outer rostral barbel reaching vertical through nares, maxillary barbel extending almost to posterior margin of orbit. Body completely covered with minute embedded scales except on chest between pectoral fin. Lateral line incomplete, reaching vertical through pelvic-fin origin.

Dorsal fin small, with one simple and 7½ (n=4) branched rays, distal margin concave, origin nearer to snout tip than to caudal-fin base, inserted posterior to vertical through pelvic-fin origin. Pectoral fin with one simple and 9 (1) or 10 (n=3) branched rays, almost equal head length. Pelvic fin with 1 simple and 7 (n=4) branched rays, surpassing considerably beyond vent; origin closer to pectoral-fin origin than to anal -fin origin. Vent situated nearer to tip of the snout than base of caudal fin. Anal fin short with 2 simple and 5½ (n=4) branched rays, distal posterior margin straight, origin closer to caudal-fin base than pelvic-fin origin. Caudal fin with 15 (n=1)–16 (n=3) branched rays, shorter than head length, obliquely truncate.

Colouration: In preservative, dorsum of head, dark brown, postero-lateral head yellowish with irregular black spots. Ventral surface of body pale white. Body yellowish with 33–35 black oblique bars directed backwards from occiput to caudal fin base almost reaching the ventral surface of the body. Inter-spaces yellowish light, wider than blackish brown bands. Dorsal fin rays with 4 to 5 black bands, inter-radial membrane pale yellow, its base with a black spot, distal margin hyaline. The dorsal adipose crest is yellowish. Pectoral fins are dusky with short black markings. Pelvic and anal fins immaculate. Caudal fin two broad black concentric bands, one broad extending beyond middle of the fin and the other band intensely black situated at posterior of the fin, almost bordering the margin, its distal margin hyaline. A black blotch at the upper extremity of the caudal-fin base.

Etymology: The species is named after Iphipani River, the type locality.

Distribution: *Aborichthys iphipaniensis* is known presently only from the type locality, Iphipani River, Brahmaputra basin of Lower Dibang Valley, in Arunachal Pradesh, India (Figs. 4 and 5).

Fig. 1. *Aborichthys iphipaniensis* ZSI FF 8002, holotype, 127.1 mm SL, Brahmaputra River basin: Iphipani River at Roing, Arunachal Pradesh, India, a, dorsal b, lateral and C, ventral views

Fig. 2. Live individual of *Aborichthys iphipaniensis*, ca 125 mm SL (not included in type series), Brahmaputra River basin: Iphipani River at Roing, Arunachal Pradesh, India

Fig. 3. Lip structure of *Aborichthys iphipaniensis*, ZSI FF 8002, holotype, 127.1 mm SL

Table 1. Morphometric data of holotype and 3 paratypes of *Aborichthys iphipaniensis*

	Holotype	Range	Mean ± SD
Standard length (mm)	127.1	110.8−127.1	
In % of standard length (SL)			
Head Length	15.7	15.7−18.6	17.1 ± 1.5
Body depth	8.9	8.9−9.9	9.2 ± 0.5
Predorsal length	42.6	42.4−44.4	43.1 ± 0.9
Prepectoral length	15.7	15.1−17.9	16.4 ± 1.3
Prepelvic length	39.4	39.4−42.0	41.1 ± 1.2
Preanal length	71.0	71.0−74.5	72.5 ± 1.7
Preanus length	44.7	44.2−48.3	46.1 ± 2.0
Dorsal fin hight	15.6	13.8−15.6	14.7 ± 0.7
Pectoral fin length	12.1	12.7−15.6	13.6 ± 1.7
Pelvic fin length	11.8	10.3−12.7	11.8 ± 1.1
Anal fin length	12.2	11.1−12.2	11.9 ± 0.5
Caudal fin length	17.9	15.8−18.7	17.4 ± 1.2
Caudal peduncle length	22.8	21.5−23.3	22.4 ± 0.8
Caudal peduncle height	10.5	9.2−10.5	9.7 ± 0.6
Vent to Caudal-fin base distance	53.6	52.0−56.2	53.9 ± 1.7
Vent to anal-fin base distance	24.1	24.1−27.5	25.7 ± 1.6
In % of Head Length (HL)			
Head height at occiput	57.5	45.4−57.5	49.9 ± 5.4
Head wide	68.5	63.3−68.5	66.5 ± 2.2
Eye diameter	13.5	10.9−14.4	13.1 ± 1.5
Snout length	46.5	40.5−46.5	43.7 ± 2.9
Inter orbital space	16.5	16.2−21.5	17.9 ± 2.5
Mouth Width	47.0	36.4−47.0	40.7 ± 4.6

Fig. 4. Iphipani River, the type locality of *Aborichthys iphipaniensis*

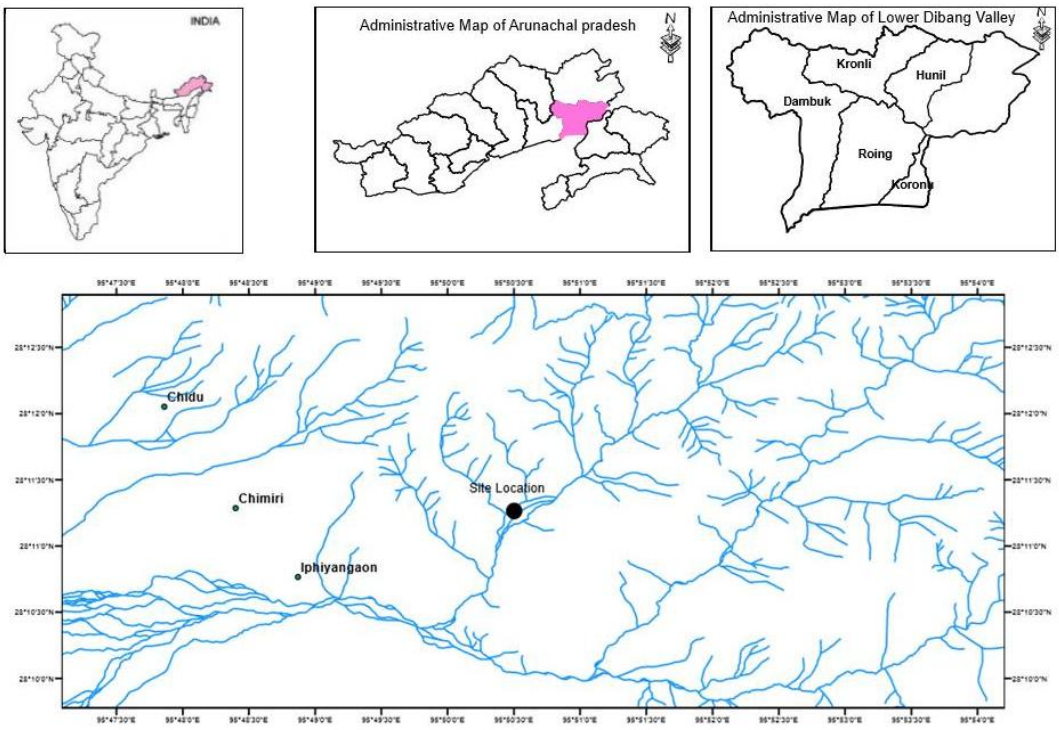

Fig. 5. Map of Arunachal Pradesh, India, showing type locality of *Aborichthys iphipaniensis*

4. DISCUSSION

In *Aborichthys* the position of the vent is considered an important generic character, which distinguishes the genus from most nemacheiline genera in Indochina [7]. Currently, seven species of the genus are considered valid viz. *A. boutanensis*, *A. cataracta*, *A. elongatus*, *A. garoensis*, *A. tikaderi*, *A. verticauda*, and *A. waikhomi* [5]. *Aborichthys iphipaniensis* is similar with *A. garoensis* and *A. tikaderi* in having vent closer to snout tip than to caudal-fin base. However, *A. iphipaniensis* is distinguished from *A. garoensis* in having a longer caudal peduncle (21.5–23.3% SL vs. 18.4–18.8), a more slender caudal peduncle (9.2–10.5% SL vs. 11.4–11.8), more forward position of vent (distance between vent and caudal-fin base 52.0–56.2% SL vs. 47.5–49.2), incomplete lateral line reaching (vs. not reaching) pelvic fin origin, more shorter pre-pectoral length (15.1–17.9% SL vs. 24.4–25.3), laterally uniform (vs. tapering downward) bars on body, and obliquely truncate (vs. rounded) caudal fin; and from *A. tikaderi* by having more black bands on the body (33–35 vs. 15–20), a slender body (8.9–9.9% SL vs. 12.09–12.8), slender caudal peduncle (9.2–10.5% SL vs. 12.2–13.0), smaller eye (10.9–14.4% HL vs. 16.7–17.5) and obliquely truncate (vs. rounded) caudal fin.

Aborichthys iphipaniensis is easily distinguished from *A. boutanensis, A. cataracta, A. elongatus, A. verticauda*, and *A. waikhomi* by having a vent closer to snout tip than to caudal-fin base (vs. closer to the caudal-fin base than to snout). Further, it differs from *A. boutanensis* in having more number of bands on body (33–35 vs. 18−21), a more slender body (depth at dorsal fin origin 8.9–9.9% SL vs. 11.0–14.3), shorter pre-dorsal length (42.4–44.4% SL vs. 45.7–48.2), longer and slender caudal peduncle (length 21.5–23.3% SL vs. 17.7–19.3; depth 9.2–10.5% SL vs. 12.3–15.1); from *A. cataracta* by having a more slender body (depth at dorsal fin origin 8.9–9.9% SL vs. 10.4–13.2), longer caudal peduncle (21.5–23.3% SL vs. 14.0–18.4), shorter pre-dorsal length (42.4–44.4 % SL vs. 45.4–51.2), caudal fin (15.8–18.7% SL vs. 19.4–21.9), pre-pelvic length (39.4–42.0% SL vs. 42.3–49.5), pre-anus length (44.2–48.3% SL vs. 49.7–56.7), smaller inter orbital space (16.2–21.5% HL vs. 27.4-32.0% HL) and black bars on body reaching (vs. not reaching) to ventral surface; from *A. elongatus* by having incomplete (vs. complete) lateral line, longer distance between vent and anal-fin base (24.1–27.5% SL vs. 12.9–15.0), and shorter pre-dorsal (42.4–44.4% SL vs. 48.7–51.0); from *A. verticauda* by having a more slender body (depth at dorsal fin origin 8.9–9.9% SL vs. 11.4–14.7), shorter pre-dorsal (42.4–44.4% SL vs. 48.9–53.7), pre-pectoral (15.1–17.9% SL vs. 20.0–24.2), longer caudal peduncle (21.5–23.3% SL vs. 11.0–16.6) and smaller inter orbital space (16.2–21.5% HL vs. 23.4–29.5) and from *A. waikhomi* by having a more slender body depth (8.9–9.9% SL vs. 12.8–15.8), shorter head (15.7–18.6% SL vs. 21.0–22.0), pre-dorsal (42.4–44.4% SL vs. 49.2–50.8), slender caudal peduncle (9.2–10.5% SL vs. 12.0–13.8) and more black bars on the body (33–35 vs. 12–16).

Vishwanath et al. [8] remarked that fishes of the genus *Aborichthys* are endemic to the Brahmaputra drainage in Eastern Himalaya (encompassing some parts of northeastern India) and opined that it might be the result of Miocene tectonic activity which resulted in the formation of many sister species in the region. Menon [9] remarked that the gradual shifting of vent forward provides fishes with a long tail for life in the swift current. The new species inhabits fast flowing clear water in the Brahmaputra drainage of Eastern Himalaya with a far forward position of the vent and long caudal peduncle.

5. COMPARATIVE MATERIALS

Aborichthys boutanensis: ZSI F 7721/1, 7722/1, 7723/1, (Genotypes of *A. kempi)*, 3, 67.4.2–81.0 mm SL; Egar stream between Renging and Rotung (Brahmaputra drainage), Arunachal Pradesh, India; ZSI F 7769/1, (Cotype of *A. kempi*), 1, 53.0 mm SL; Yambung, Eastern side of Dihang River, Abor hills, Arunachal Pradesh, India. Additional data from Thoni and Hart [6].

A. elongatus: ZSI F10087/1, holotype, 60.1 mm SL; Reang River (Brahmaputra drainage), Darjiling District, India; ZSI F10725/1, paratype, 33.1 mm SL; Balasan River, 14.5 kms from Kurseong, West Bengal.

A. garoensis: ZSI F 10669/1, syntypes, 2, 85.0 mm, 89.5 mm SL; Tura Garo Hills (Brahmaputra drainage), Meghalaya, India.

A. tikaderi: ZSI FF 2135, holotype, 94.4 mm SL; Namdapha Wildlife Sanctuary (Brahmaputra drainage), Arunachal Pradesh, India; ZSI FF 2136, paratypes, 2, 100.0–109.0 mm SL; same data as holotype.

A. waikhomi: ZSI FF 5251, holotype, 65.0 mm SL; Bulbulia stream, a tributary of Nao-Dihing River (Brahmaputra drainage), Arunachal Pradesh, India; ZSI FF 5252, paratypes, 2, 57.1–62.4 mm SL; same data as holotype; V/APRC/ZSI/P-519, paratypes, 3, 61.0-66.5 mm SL; a stream of Noa-Dihing river near Hornbill camp, Namdapha, Arunachal Pradesh, India.

A. cataracta: ZSI SRS F 8575, 73.5 mm SL, paratype; stream joining with Ranga River, Hong Village, Upper Subanshri District, Arunachal Pradesh, India. Additional data from Arunachalam et al. [10].

A. verticaudata: ZSI SRS F 8579, 55.6 mm SL; a tributary of Ranga river, 7 km away from Hola camp, Lower Subansiri District, Arunachal Pradesh, India. Additional data from Arunachalam et al. [10].

6. CONCLUSION

Aborichthys iphipaniensis is described as new to science from the Iphipani River in Arunachal Pradesh, northeastern India. It is considered to be a highly specialised form of the genus inhabiting the torrential river, as it has a very elongate body with a far forward position of the vent and long caudal peduncle.

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COMPETING INTERESTS

Authors have declared that no competing interests exist. The fishes used for this research are commonly available in Arunachal Pradesh and use for research in our country. There is absolutely no conflict of interest between the authors and local communities because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge.

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