

A New Ornamental Species of Snakehead Fish (Teleostei: Channidae) from River Torsa of West Bengal, India

Arpita Dey^{1*}, Ruksa Nur¹, Basudhara Raychowdhury⁴, Debapriya Sarkar²,
Laishram Kosygin Singh³ and Sudip Barat¹

¹Aquaculture and Limnology Research Unit, Department of Zoology, University of North Bengal, Darjeeling, Siliguri - 734 013, West Bengal, India

²Fishery Unit, Uttar Banga Krishi Viswavidyalaya, Pundibari-736165, Cooch Behar, West Bengal, India

³Zoological Survey of India, Indian Museum Complex, 27 J.L. Nehru Road, Kolkata -West Bengal, India

⁴Paribesh Unnayan Parishad, Sagar Island, South 24 Parganas, West Bengal, India

*Corresponding Author E-mail: arpitadeycob@gmail.com

Received: 3.10.2018 | Revised: 7.11.2018 | Accepted: 16.11.2018

ABSTRACT

A new *Channa* species described from River Torsa of Brahmaputra river basin, West Bengal, India. *Channa torsaensis* sp. nov. a new species of *Channa*, is distinguished from congeners by a combination of the following characters namely a dorsal, anal and caudal fins being bluish with a broad dark blue border having a tinge of orange border covering the dark blue border; dorsal fin with numerous back spots; caudal fin with 9-10 black bands; 5-6 oblique greyish-blue bands present on the body; lateral line pored scales 46 in number; dorsal fin rays 36-38; anal fin rays 22 - 25; total vertebrae 44- 45 (16+28).

Key words: Taxonomy, Endemic, Brahmaputra basin, new species of *Channa*.

INTRODUCTION

Species of the genus *Channa* are air breathing freshwater Perciformes fish being distributed in tropical Africa, parts of the Middle East and Asia¹. Family Channidae is commonly known as “Snakehead fish” because of the shape of the head being snake-like and possessing large scales on the head. They are also characterized by having single long dorsal and anal fins, rounded caudal fin and curved lateral line. The head and body are also characterized by cycloid and ctenoid scales². Snakeheads are one of the most common staple food fish in Thailand, Cambodia, Vietnam and other South

East Asian countries where they are extensively cultured^{3,4}. Snakeheads are also consumed as a therapeutic for wound healing as well as reducing post-operative pain and discomfort⁵ and collected for the international aquarium pet trade⁶.

A total of 15 *Channa* species namely *C. amphibeus*, *C. andrao*, *C. aurantimaculata*, *C. barca*, *C. bipuli*, *C. bleheri*, *C. gachua*, *C. marulius*, *C. melanostigma*, *C. pardalis*, *C. pomanensis*, *C. punctata*, *C. quinquefasciata*, *C. stewartii* and *C. striata* were reported from North-East India in the Brahmaputra drainage.

Cite this article: Dey, A., Nur, R., Raychowdhury, B., Sarkar, D., Singh, L.K. and Barat, S., A New Ornamental Species of Snakehead Fish (Teleostei: Channidae) from River Torsa of West Bengal, India, *Int. J. Pure App. Biosci.* 6(6): 497-503 (2018). doi: <http://dx.doi.org/10.18782/2320-7051.7131>

While conducting ichthyofauna surveys in the Dooars region of West Bengal of Brahmaputra basin, an undescribed species of *Channa* was obtained, which is herein described as *Channa torsaensis* sp. nov.

MATERIAL AND METHODS

A new ornamental *Channa* fish species considered for study were collected from different sampling sites of the River Torsa (Dakshin Barajhar forest, Alipurduar district, West Bengal, India) as shown in Fig.1. The collected specimens were measured point to point with slide callipers and measurements recorded in millimetres. Counts and measurements were made on the left side of

specimens. Measurements of body parts and subunits of head were presented as proportion of standard length (SL) and head length (HL), respectively Vishwanath and Geetakumari² and Britz⁷. Dorsal, pectoral, pelvic, anal and caudal fin rays were counted and the colour of the fins also studied. The lateral line scales were counted too. The collected specimens were then fixed in 10% formalin and preserved in 70% alcohol⁸. Radiographs were taken using Fujifilm (C.R-IR-392) in x-ray machine and used for counting the total vertebrae in examined specimens⁹. The examined specimens were deposited in Zoological Survey of India (ZSI), Kolkata, India.

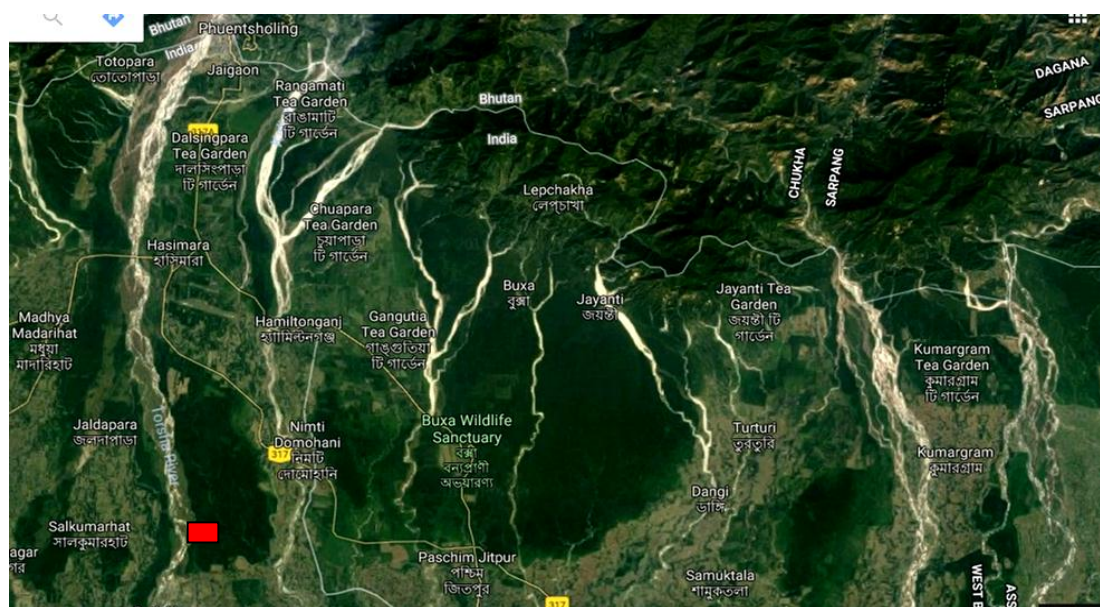


Fig. 1: Distribution of *Channa torsaensis* sp.nov. (red square) in the River Torsa from West Bengal, India (Source: Google map)

RESULTS AND DISCUSSION

Channa torsaensis sp. nov. (Fig.2)

New English name: Cobalt Blue *Channa*

Local name (Bengali): Neel Chang

Holotype. ZSIFF7913, 211 mm SL; India: West Bengal, Alipurduar district, Dakshin Barajhar forest, 2 meters depth; 26° 53' 34" N (Latitude) , 89°32' 52 " E (Longitude); 11th February 2018. Dey et al.

Paratypes. ZSIFF7914, 200.8 mm SL; ZSIFF7914, 244.7mm SL; ZSIFF7914, 179 mm SL; NBU. ZOO.107, 200 mm SL; India: West Bengal, Alipurduar district, Dakshin Barajhar forest, 2 meters depth; 26° 53' 34" N

Copyright © Nov.-Dec., 2018; IJPAB

(Latitude) , 89°32' 52 " E (Longitude); 11th February 2018. Dey et al.

Diagnosis. *Channa torsaensis* sp. nov. is distinguished from all other species of *Channa* except *C. pomanensis* and *C. quinquefasciata* by an unique broad dark blue border on the dorsal, anal and caudal fin and having a tinge of orange border covering; 5-6 oblique greyish-blue bands present on the body. *Channa torsaensis* differs from *C. pomanensis* by the presence of oblique bands (5-6 vs. 7) on the body and fewer lateral line scales (46 vs. 47 – 51), lesser pectoral fin base lengths (5.88-6.9 vs. 17.-20.5 % SL), fewer post orbital

length (31.57 -36.06 vs. 63.2-67.1 % HL), dorsal fin with numerous back spots (vs. absence) and caudal fin with 9-10 black bands. *Channa torsaensis* differs from *C. quinquefasciata* by more dorsal fin rays (36-38 vs.33-35), anal fin rays (22-25 vs.22-23) and lateral line pored scales (46 vs. 42- 45). It is distinguished from *C. bleheri* and *C. andrao* by presence of pelvic fins. It also differs from *C. barca*, *C. stewartii*, *C. aurantimaculata*, *C. melanostigma*, *C. pardalis* and *C. bipuli* by absence of black spots on body (vs. presence of black spots on body). It is further distinguished from *C. amphibeus*, *C. marulius* and *C. striata* by fewer dorsal fin rays (36-38 vs. 42-55). *Channa torsaensis* is distinguished from *C. punctata* and *C. gachua* by presence of broad dark blue border on the dorsal, anal and caudal fin.

Description. Morphometric and meristic data of holotype and four paratypes are given in Table 1. Body elongated and fairly rounded in cross section. Anterior portion of body cylindrical and caudal peduncle region laterally compressed. Body deepest at the dorsal fin region with 5-6 bands in Holotype. Head large with plate-like scales and dorso-ventrally depressed. Anterior dorsal portion of head gently curved and ventral portion slightly downwards at the caudal region. Eyes small, and located at anterior portion of head and situated laterally; partially visible in ventral view. Mouth fairly large and opening moderate to wide and oblique. Lips thick, upper lip more deeply furrowed than lower. Mouth gap extending to middle of eye Caudal fin ending sky blue with a dark broad deep blue border.



Fig. 2: Different views of *Channa torsaensis* sp. nov. Holotype, ZSIF7913, 211 mm SL, Dakshin Barajhar forest, Alipurduar district, West Bengal, India

Table 1: Selected Morphometric and Meristic data for *Channa toraensis* sp.nov. Holotype (ZSIFF7913, 211 mm SL) and 4 Paratypes (ZSIFF7914, 200.8 mm SL; ZSIFF7914, 244.7mm SL; ZSIFF7914, 179 mm SL and NBU ZOO.107, 200mm SL)

	Holotype (ZSIFF7913, 211 mm SL)	Range (N=5)	Mean ± SD
Total length (mm)	258	216-300	253±30.47
Standard length (mm)	211	179-260	210 ±30.19
% of standard length			
Body depth	13.27	13.27- 19	15.58 ± 2.64
Head length	28.90	28.84 - 31.84	31.37 ± 1.31
Pre-dorsal length	32.22	32.22 -33.51	32.96 ± 0.92
Pre-pectoral length	29.38	29.32 -32.5	30.57 ± 1.34
Pre-pelvic length	33.17	32.69 - 37.43	34.78 ± 1.96
Pre-anal length	48.34	48.34 -56.98	50.09 ± 4.08
Caudal peduncle depth	10.90	7 -11.53	10.12 ± 1.83
Dorsal fin base length	60.66	56.36-60.92	58.36± 2.47
Pectoral fin base length	6.2	5.88 -6.9	6.29 ±0.43
Pelvic fin base length	3.8	2.52-3.8	3.2±0.55
Anal fin base length	38.32	38.32-41.19	39.37±1.3
Dorsal fin length	7.58	7.58 -14.5	11.33 ±2.94
Pectoral fin length	7.10	7.10 -18	15.34 ± 4.63
Pelvic fin length	8.53	7.2 -8.53	7.54 ± 0.98
Anal fin length	17.06	6.9-17.06	10.99 ± 3.93
Upper Jaw length	10.90	10.90 -15.5	12.59 ± 1.90
Lower Jaw length	10.42	10.42 -16	12.53 ± 2.09
% of head length			
Head width	62.29	59.01 -66.66	62.53 ± 2.80
Head depth	42.62	37.33 -47.36	42.65 ± 3.83
Snout length	16.39	16 -24.59	19.60 ± 3.55
Eye diameters	13.11	13.11 -14.75	13.71 ± 0.67
Post-orbital length	36.06	31.57 -36.06	34 ± 1.67

Jaws sub-equal and lower jaw protruding beyond upper. Both jaws with sharp, pointed teeth and gap present among teeth. Nostril is small and close to anterior-dorsal margin of eye. Lateral line complete with 46 pored scales, extending straight from shoulder girdle almost in a straight line and dropping down one scale row and then continuing medially to caudal-fin base. Transverse lateral line scales (Ltr.) 5½*(2), 4½ (3) scales above lateral line and 6½ (1), 7½* (3), 8½ (1) scales below lateral line at anal-fin origin. Dorsal fin rays 36 (2), 37(1)*, 38 (2); pectoral fin rays 13, 14

(4)* ; pelvic fin rays 5(5)*; anal fin rays 22(1), 24(1), 25 (3)* and caudal fin rays 10(1)*, 12(4).

Total vertebrae counted from side view (Fig. 3a) and ventral view (Fig. 3b) of radiographic plate of *Channa toraensis* sp. nov. Total vertebrae counted 44, abdominal vertebrae 16 and caudal vertebrae 28. Both jaws with two rows of teeth, outer row with small size villiform teeth and inner row with conical teeth. Middle portion of upper jaw with large sized canine teeth in inner row and branchial teeth with five rows.

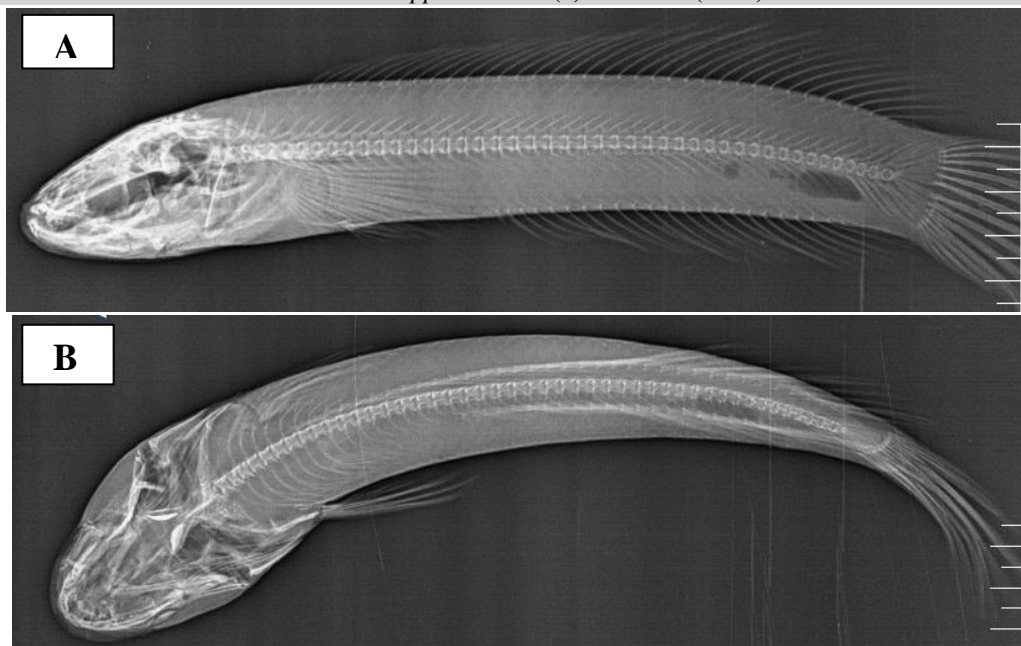


Fig. 3: (A) Radiographic side view and (B) Radiographic ventral view of *Channa torsaensis* sp.nov. used for total vertebral count



Fig. 4: A view of River Torsa, Dakshin Barajhar forest, Alipurduar district, West Bengal, India and type locality of *Channa torsaensis* Holotype

Colouration

Live specimens (Fig. 2) body uniformly greenish grey or brown in colour with 5-6 dark blue bands. Dorsal, anal and caudal fins sky blue in colour with dark broad blue border and borders of narrow orange colour. Dorsal fin with numerous black spots and caudal fin with 9-10 black bands. Eyes pupil black with greyish yellow ring Pelvic fins faint yellowish pink in colour and pectoral fins greyish orange with 5-6 brown and white semi-circular bands. Ventral side bluish white in colour

In alcohol, dorsal side more greyish black than ventral region Dorsal, anal and caudal fins dark grey with a broad white and

black margin. Dorsal, anal and caudal fin ending whitish in colour Dorsal fin with numerous light black spots and caudal fin with 9-10 faint black bands. Pectoral fin cream with six dark grey semi-circular bands Pelvic fin grey with a white margin

Distribution and Habitat

At present, known to be distributed from tributary of River Torsa, Dakshin Barajhar forest, Alipurduar district, West Bengal, India (Fig.4). The running river water was transparent, cool, low depth and having various substrata like gravel, pebbles, sand, soil and medium to large boulders.

Etymology. The new species is named after the River Torsa, from where the fish was collected.

Channa torsaensis sp. nov. can be distinguished from all known congeners except *C. pomanensis* and *C. quinquefasciata* by a broad dark blue border on the dorsal, anal and caudal fin *Channa torsaensis* differs from *C. pomanensis* by the presence of oblique bands (5-6 vs. 7) on the body and fewer lateral line scales (46 vs. 47 – 51), lesser pectoral fin base lengths (5.88-6.9 vs. 17.-20.5 % SL), fewer post orbital length (31.57 -36.06 vs. 63.2-67.1 % HL), dorsal fin with numerous back spots (vs. absence) and caudal fin with 9-10 black bands. *Channa torsaensis* differs from *C. quinquefasciata* by more dorsal fin rays (36-38 vs.33-35), anal fin rays (22-25 vs.22-23) and lateral line pored scales (46 vs. 42- 45).*C. torsaensis* is distinguished from *C. andrao*, *C. asiatica*, *C. bleheri*, *C. burmanica*, *C. hoaluensis*, *C. ninhbinhensis*, *C. nox* and *C. orientalis* by the presence of pelvic fins (vs. absence of pelvic fins).

Channa torsaensis is easily distinguished from *C. diplogramma* and *C. micropeltes* by fewer lateral line scales (46 vs. 86-103) and fewer vertebrae (44-45 vs. 53-57). *C. torsaensis* differs from *C. amphibeus* by the less number of dorsal fin rays (36-38 vs. 50) and lateral line scales (46 vs. 81). The new species differs from *C. paradalis*, *C.barca*, *C. stewartii*, *C. stiktos*, *C. pulchra*, *C. ornatippinis*, *C.bipuli* by the absence of black spots on the body. Further *C. torsaensis* differs from *C. aurantimaculata* by absence of yellow colour body, lesser lateral line scales (46 vs. 51-54), dorsal fin rays (36-38 vs. 45-47) and anal fin rays (21-25 vs 28-30). *C. torsaensis* differs from *C. aurantipectoralis* by the absence of orange pectoral fins (vs. presence), absence of dark V-shaped blotch on the dorsal surface of the head (vs. presence) and fewer lateral line scales (46 vs. 51-64). *C. torsaensis* differs from *C. gachua* by more vertebrae number (44 vs. 43) and *C. melanostigma* by fewer vertebrae number (44-45 vs. 50-51) respectively. It differs from *C. punctatus* by the presence of black bands on pectoral fin (vs.

absence); *C. marulius* by the absence of ocellus on the body (vs. absence); *C. striata* by the fewer dorsal fin rays (36-38 vs 42-45); *C. pseudomarulius* by fewer dorsal fin rays (36-38 vs. 43-50); *C. harcourtbutleri* by fewer caudal rays (10-12 vs. 15); *C. panaw* by fewer pectoral fin rays (13-14 vs. 17-20) and *C. ornatippinis* by the absence of black spots on the cheek (vs. presence). *Channa torsaensis* differs from the remaining congeners *C. argus*, *C. bankanensis*, *C. cyanospilos*, *C. baramensis*, *C. lucius*, *C. maculata*, *C. maruloides*, *C. melanoptera*, *C. melasoma* and *C. pleurophthalma* by the presence of two large scales on each side of the lower jaw undersurface (vs. absence).

CONCLUSION

Based on the diagnosis, *Channa* species have been classified into 15 groups from North-East India in the Brahmaputra drainage, India. *Channa torsaensis* sp. nov. brings the number of *Channa* species to 16 from in Brahmaputra drainage, North East India. *Channa torsaensis* is male mouth-brooder and more aggressive in nature than other native *Channa* species.

Comparative Material

Channa amphibeus: ZSIF11435/1 (Neotype), 183.7 mm SL; India: West Bengal, North Bengal. *Channa aurantimaculata*: ZSIF4053 (Paratype), 130 mm SL; India: Assam, Dibrugarh, Medela reserve forest. *Channa aurantipectoralis*: ZSIF5634 (Holotype), 165.1 mm SL; India: Mizoram, Keisalam River, Dampa Tiger Reserve. *Channa bipuli* : ZSI FF 7650(Holotype),127.0 mm SL, India: Assam, small stream outskirts Garbhanga forest. *Channa burmanica*: ZSIF9755/1 (Holotype), 106 mm SL; N.E. Burma: Putao Plains, Sen-Bin-Ti. *Channa stiktos*: ZSIF7727 (Holotype), 188.3 SL; India: Mizoram, Champhai district, Tiau river. *Channa gachua*: ZSIF7877, 81.1 mm SL; India: Bhubaneswar. *Channa marulius*: ZSI1382, 220 mm SL; Indian: Assam, Guwahati. *Channa barca*: ZSICat378, 219 SL mm; India: Assam, Cuchar. *Channa quinquefasciata*: ZSI FF 7905(Holotype), 101.2 mm SL; India: North Bengal, Torsa

River, Howlong bridge, near Bhutan foothills. *Channa striata*: ZSIF10994/1, 157 mm SL; U Barma. *Channa punctata*: ZSIF2206/2, 101 mm SL; India: Assam, Balipara frontier Tract, Soni Gaon Bhil (Lake). *Channa melanostigma*: Data from Geetakumari & Vishwanath¹⁰. *Channa andrao*: Data from Britz¹¹. *Channa pomanensis*: Data from Gurumayum & Tamang¹².

REFERENCES

1. Berra, T. M., *Freshwater fish distribution*. Academic Press, San Diego, California, 604 (2001).
2. Vishwanath, W. and Geetakumari, K., Diagnosis and interrelationships of fishes of the genus *Channa scopoli* (Teleostei: Channidae) of northeastern India. *Journal of Threatened Taxa*, **1(2)**: 97–105 (2009).
3. Wee, K. L., Snakeheads: Their biology and culture. In: Muir R, ed. Recent Advances in Aquaculture, Westview, Boulder, CO. 181–213 (1982).
4. Sinh, L. X. and Pomeroy, R. S., Farming of snakehead fish (*Channa micropeltes* and *Channa striatus*) in the Mekong Delta of Vietnam. World Aquaculture 2010, San Diego, California (2010).
5. Gam, L. H., Leow, C. Y. and Baie, S., Proteomic analysis of snakehead fish (*Channa striata*) muscle tissue. *Malaysian Journal of Biochemistry and Molecular Biology*, **14(1)**: 25–32 (2006).
6. Raghavan, R., Ornamental fisheries and trade in Kerala. In: Fish Conservation in Kerala (Eds: Leonard Sonnenschein and Allen Benziger). St. Louis, USA: World Aquariums and Oceans Federation. 169–197 (2010).
7. Britz, R., *Channa ornatipinnis* and *pulchra*, C., two new species of dwarf snakeheads from Myanmar (Teleostei: Channidae). *Ichthyological Exploration of Freshwaters*, **18 (4)**: 335–344 (2008).
8. Knight, J. D. M., *Channa pardalis*, a new species of snakehead (Teleostei: Channidae) from Meghalaya, northeastern India. *Journal of Threatened Taxa*, **8(3)**: 8583–8589 (2016).
9. Aguirre, W. E., Walker, K. and Gideon, S., Tinkering with the axial skeleton: vertebral number variation in ecologically divergent three spine Stickleback populations. *Biological Journal of the Linnean Society* **113**: 204–219 (2014).
10. Geetakumari, K. and Vishwanath, W., *Channa melanostigma*, a new species of freshwater snakehead from north-east India (Teleostei: Channidae). *Journal of the Bombay Natural History Society*, **107(3)**: 231–235 (2011).
11. Britz, R., *Channa andrao*, a new species of dwarf snakehead from West Bengal, India (Teleostei: Channidae). *Zootaxa*, **3731(2)**: 287–294 (2013).
12. Gurumayum, S. D. and Tamang, L., *Channa pomanensis*, a new species of snakehead (Teleostei: Channidae) from Arunachal Pradesh, northeastern India. *Species*, **17(57)**: 175-186 (2016).