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A new species of *Parapsilorhynchus* Hora, 1921 (Teleostei, Cyprinidae) from Mahanadi River basin of Odisha, India

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ABSTRACT

A new cyprinid fish, *Parapsilorhynchus swaini* sp. nov., is described based on specimens collected from a stream near Harisankar, Mahanadi River basin of Odisha, India. It differs from other species of the genus in having following combination of characters: elongated and slender body (depth at dorsal fin origin 16.9-18.7% SL); narrow and slender head (width 60.0-68.7% HL, height at occiput 40.0-50.0% HL); narrow inter orbital space (46.6-50.0% HL); 33-34 lateral line scales; 3 simple pectoral fin rays, poorly developed callous pad behind lower lip which is not delimited posteriorly, pectoral fin longer than head length, presence of tubercles on snout and a black bar on the anal fin. With the description of this new species, distributional range of the genus *Parapsilorhynchus* is extended further north in the Eastern Ghats to the Mahanadi River drainage of Odisha.

Keywords: Cyprinidae, Mahanadi River basin, New species, Odisha, *Parapsilorhynchus swaini*

Introduction

The members of the genus *Parapsilorhynchus* Hora, 1921 (family Cyprinidae) are small-sized rheophilic fishes, which are distributed in hill streams of the Western and Eastern Ghats and the Satpura mountain ranges of India. Currently, the genus consists of five valid species *viz*., *Parapsilorhynchus tentaculatus* (Annandale, 1919), *P. discophorus* Hora, 1921; *P. prateri* Hora & Misra, 1938; *P. elongatus* Singh, 1994 and *P. odishaensis* Baliarsingh, Kosygin & Swain, 2017. They are characterised by having two blunt rostral barbels on the snout, 2 to 3 simple pectoral fin rays, upper lip concealed by a fringed rostral cap, which is covered with numerous papillae, prominent lower lip with a rudimentary disc or callous pad behind it, gill openings extending to the ventral surface and cyprinid type swim bladder. A recent ichthyological survey of the Mahanadi River basin in Odisha yielded five specimens of an undescribed species of *Parapsilorhynchus*. These specimens are herein described as *Parapsilorhynchus swaini* sp. nov.

Materials and methods

Measurements were made on the left side of the specimens with digital calipers to the nearest 0.1 mm following Jayaram (1999). Fin rays and numbers of scales were counted under a stereozoom microscope. Morphometric data are expressed in percentages of standard length (SL) or head length (HL) or caudal peduncle length. Fin rays counts of dorsal, pectoral, pelvic and anal fins include simple and branched rays. The type specimens were deposited in the Zoological Survey of India (ZSI), Kolkata.

Results

Taxonomy

Parapsilorhynchus swaini sp. nov. Baliarsingh & Kosygin

Common name: Mahanadhi minnow

Holotype: ZSI FF5057, 42 mm SL (Fig. 1, Table 1. 2), caught off a stream near Harisankar, Mahanadi River basin in Odisha, India, 20°51′18.08″N; 82°51′37.75″E, Coll. B. K. Baliarsingh, 17 August, 2013.

Paratypes: ZSI FF 5058, 32-42 mm SL, 4 specimens, same data as holotype.

Diagnosis

Parapsilorhynchus swaini sp. nov. can be distinguished from other species of the genus by the following combination of characters: elongated and slender body (depth at dorsal fin origin 16.9-18.7% SL); narrow and slender head (width 60.0-68.7% HL, height at occiput 40.0-50.0% HL); narrow inter orbital space (46.6-50.0% HL); 33-34 lateral line scales; 3 simple pectoral fin rays, poorly developed callous pad behind lower lip which is not delimited posteriorly, pectoral fin

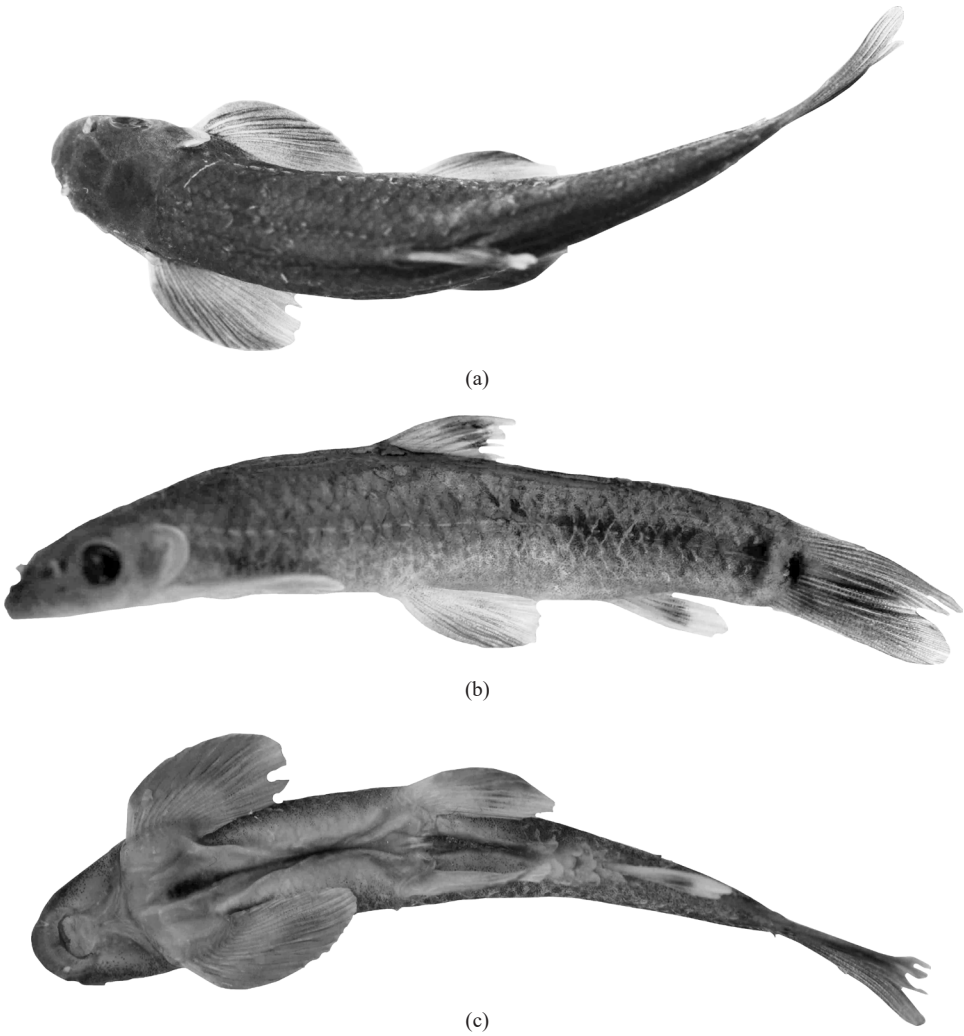

Fig. 1. *Parapsilorhynchus swaini* sp. nov., ZSI FF5057, holotype, 42.0 mm SL; (a) Dorsal, (b) lateral and (c) ventral views

longer than head length, presence of tubercles on snout and a black bar on the anal fin.

Description

Morphometric data of holotype and 4 paratypes are listed in Table 1 and 2. Body elongate, slender (Fig. 1), greatest depth at dorsal fin origin, ventral surface flattened. Head depressed with a prominent snout. Snout slightly rounded with a few poorly developed horny tubercles. Mouth small, inferior, crescent-shaped. Upper lip concealed by a prominent rostral fold, which is fringed and papillated. A groove present around the corners of the mouth, which is continuous anteriorly round the outer margin of the rostral fold. Lower lip bilobed, finely papillated, with a poorly developed callous pad behind it, which is not delimited posteriorly (Fig. 2). Eyes large, visible from ventral surface, its diameter smaller than inter orbital space. One rostral pair of barbels, shorter than eye diameter.

Dorsal fin with ii, 6 (1), ii, 6, i (3), or ii, 7(1) rays, inserted slightly in advance of pelvic fin, its origin almost equidistant between snout tip and caudal fin base. Pectoral fin with iii, 10, i (4) or iii, 11, i (1) rays, longer than head, not reaching pelvic fin origin. Base of the pectoral fin forms adhesive pads ventrally, with a few anterior branched rays and simple rays (Fig. 3). Pelvic fin with i, 5, i (5) ray, shorter than pectoral, not reaching anal opening. Anal fin base short, with i, 5 (5) rays, not reaching base of caudal fin. Lateral line complete with 33 or 34 scales. Scales in lateral transverse row above lateral line 4 or 4½ and below lateral line from pelvic fin origin 3½ or 4. Predorsal scales 18-22, scales arranged irregularly. Chest and belly scaled. Caudal fin forked with i, 17, i (4) or i,18, i (1) principal rays.

Table 1. Morphometric data of *Parapsilorhynchus swaini* sp. nov.

Morphometric parameters	Holotype (ZSI FF 5057)	Paratypes		Mean±SD
		Min.	Max.	
Standard length (mm)	42	32	42	36.7±4.17
% Standard length				
Head length	22.8	22.5	23.5	22.9±0.48
Body depth	18.3	16.9	18.7	17.7±0.76
Caudal peduncle length	14.2	12.5	14.7	13.8±0.82
Caudal peduncle height	11.9	10.2	12.5	11.5±0.65
Predorsal length	50	50	53.5	51.3±1.43
Prepectoral length	14.2	13.7	18.7	16.2±2.17
Prepelvic length	50	50	53.1	51.3±1.34
Preanal length	73.8	73.8	81.2	77.7±3.11
Preanus length	71.4	70	75	71.8±1.97
Dorsal fin height	16.6	16.6	18.7	17.5±0.80
Pectoral fin length	24	24	26.5	25.2±0.89
Pelvic fin length	19	17.5	20.3	18.8±1.03
Anal fin height	19	14	19	16.2±2.05
Caudal fin length	25	22.5	25	23.6±0.89
Distance from anus to caudal fin base	25	21.2	25	23.4±1.64
% Head length				
Head height at occiput	41.6	40	50	43.9±3.80
Head width	67.7	60	68.7	65.1±3.69
Eye diameter	31.2	25	31.2	27.1±2.56
Snout length	38.5	33.3	40	37.4±2.48
Inter orbital space	46.8	46.6	50	48.7±1.80
Mouth width	26.0	26	31.2	28.5±2.50
Rostral barbel length	7.3	7.3	12.5	9.9±1.95
% Caudal peduncle length				
Caudal peduncle height	83.3	76	91	83.7±5.91

Min. = Minimum, Max. = Maximum; SD = Standard deviation

Table 2. Meristic data of *Parapsilorhynchus swaini* sp. nov.

Counts	Holotype (ZSI FF 5057)	Paratypes
Dorsal fin rays	ii,6,i	ii,6 or ii,6,i or ii,7
Pectoral fin rays	iii,10,i	iii,10,i or iii,11,i
Ventral fin rays	i,5,i	i,7,i
Anal fin rays	i,5	i,5
Caudal fin rays	i,17,i	i,17,i or i,18,i
Predorsal scales	19	18-22
Lateral line scales	34	33 or 34
Lateral transverse scales	4/1/4	4 or 4½/1/3½ or 4

Colour

Body dark grey with white ventral surface. A black horizontal bar or vertically elongated spot on the caudal peduncle. Dorsal and anal fins with a distinct black bar at the middle. All the fins dusky. Caudal fin with black longitudinal mark on median rays.

Distribution

Presently known from a stream near Harisankar, Mahanadi River basin in Odisha, India (Fig. 4).

Etymology

Named after Dr. S. K. Swain of ICAR-Central Institute of Freshwater Aquaculture (ICAR-CIFA), Bhubaneshwar for his encouragement and support in the present study.

Discussion

Parapsilorhynchus swaini sp. nov. is similar to *P. elongatus* in having an elongated body and 3 unbranched pectoral fin rays. However, the new species can be distinguished from *P. elongatus* in having lesser lateral line scales (33-34 *vs* 36), shorter predorsal length (50.0-53.5% SL *vs* 56.2), pectoral fin longer (*vs* shorter) than head length, narrower interorbital space (46.6-50.0% HL *vs* 60.2-66.6) and presence (*vs* absence) of black bar

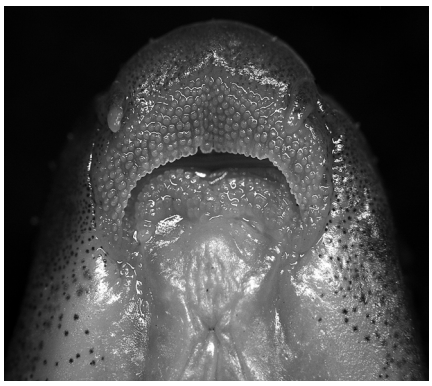

Fig. 2. Mouth of *Parapsilorhynchus swaini* sp. nov., holotype (ZSI FF 5057), 42 mm SL

Fig. 3. Pectoral fin of *Parapsilorhynchus swaini* sp. nov showing adhesive pad

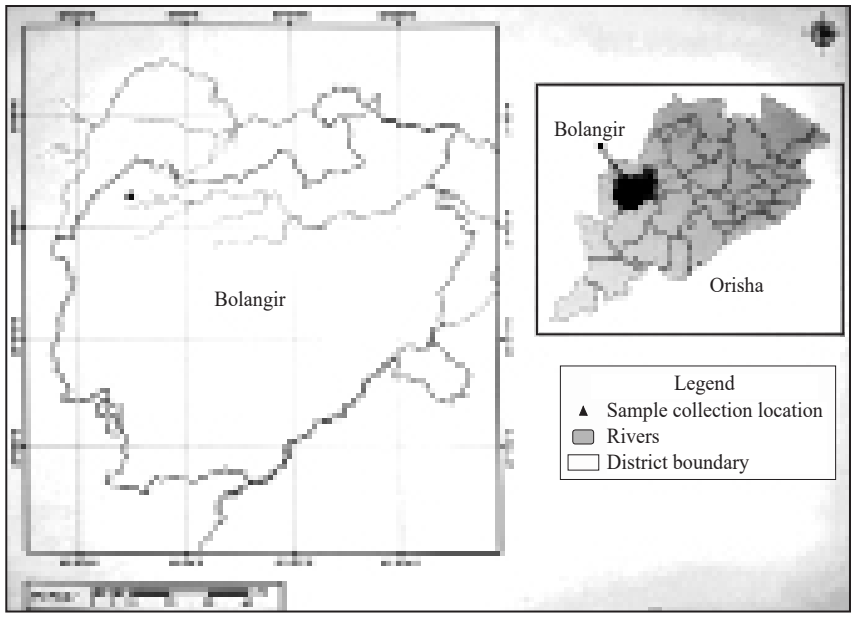

Fig. 4. Map showing type locality of *Parapsilorhynchus swaini* sp. nov

on the anal fin (Table 3). *P. swaini* sp. nov. differs from *P. discophorus* in having a poorly (*vs* prominently) developed callous pad behind the lower lip, which is not delimited posteriorly, a more slender body (depth at dorsal fin origin 16.9-17.6% SL *vs* 18.3-24.2), more simple pectoral fin rays (3 *vs* 2), pectoral fin longer (*vs* shorter) than head and presence (*vs* absence) of a black bar on the anal fin.

P. swaini sp. nov. differs from *P. tentaculatus* in having lesser lateral line scales (33-34 *vs* 36-39), a more depressed head (height at occiput 40-50% HL *vs* 61.1), eyes visible (*vs* not visible) from ventral side of head, presence (*vs* absence) of tubercles on the snout, presence of a vertical black bar (*vs* oval spot) on the caudal fin and presence (*vs* absence) of a black bar on the anal fin. The new species differs from *P. prateri* in having fewer lateral line scales (33-34 *vs* 43-47), a more depressed head (height at occiput 40-50% HL *vs* 57.2-60.0), larger eyes (25.0-31.2% HL *vs* 20.0-22.7) and poorly developed (*vs* well developed) callous pad behind the lower lip.

Recently, Baliarsingh *et al.* (2017) described *Parapsilorhynchus odishaensis* from the Mahendra Tanaya and Rushikulya Rivers in the southern part of Odisha. The new species is similar to *P. odishaensis* in having poorly developed callus pad, tubercles on the snout and 3 simple pectoral fin rays. However, *P. swaini* differs from *P. odishaensis* in having a more slender body (depth at dorsal fin origin 16.9-18.7% SL *vs* 19.6-25.0),

Table 3. Comparison of morphometric characters of different species of the genus *Parapsilorhynchus*

Morphometric characters	*P. discophorus* (ZSI-WRCP/3817; Hora, 1921)	*P. elongatus* (Singh, 1994)	*P. odishaensis* (Baliarsingh *et al.,* 2017)	*P. prateri* (Hora & Misra, 1938)	*P. swaini* sp. nov. (ZSI FF5057 & FF5058)	*P. tentaculatus* (Type ZSI F 9695/1)
% Standard length						
Body depth	18.3-24.2	17.2	19.6-25.0	17.0-18.7	16.9-18.7	22.2
Predorsal length	49.1-54.7	56.2	51.5-57.1	-	50.0-53.5	52.8
% Head length						
Head height at occiput	40.9-49.1	-	57.2-75.0	57.2-60.0	40.0-50	61.1
Head width	59.1-73.0	-	71.4-94.1	72.7-73.0	60.0-68.7	72.2
Eye diameter	23.5-30.8	22.2-30.3	18.7-28.6	22.0-22.7	25.0-31.2	27.9
Inter orbital space	56.2	60.2-66.6	53.3-64.3	47.3-50.0	46.6-50	50.0
Mouth width	32.6-40.0	-	23.5-28.6	-	26.0-31.2	-
Lateral line scale	33-35	36	33-35	43-47	33-34	36 - 39
Pectoral fin rays	2	3	3-4	-	3	3
Horny tubercles on the snout	Absent/poorly developed	Absent	Well developed	Absent	Poorly developed	Absent
Visibility of eye from ventral side of head	Visible	Visible	Visible	Visible	Visible	Not visible
Pectoral fin length	Shorter than head length	Shorter than head length	Equal or longer than head length	Equal to head length	Longer than head length	Damaged
Shape of lower lip	Rounded	Bilobed	Rounded	Rounded	Bilobed	Bilobed
Callous pad	Well developed	Poorly developed	Poorly developed	Well developed	Poorly developed	Poorly developed
Black bar on anal fin	Absent	Absent	Absent	Absent	Present	Absent

slender and narrower head (depth at occiput 40-50% HL *vs* 57.2-75.0; 60.0-68.7% HL *vs* 71.4-94.1), smaller interorbital space 46.6-50.0% HL *vs* 53.3-64.3), poorly (*vs* prominently) developed tubercles on snout, presence (*vs* absence) of adhesive pads at the base and ventral surface of simple rays of pectoral fin, a bilobed (*vs* rounded) lower lip and a distinct black bar on anal fin.

Yazdani and Singh (1991) pointed out that fishes of the genus *Parapsilorhynchus* possess peculiar combination of characters, which they share with other cyprinid subfamilies. However, based on the osteological studies they remarked that *Parapsilorhynchus* has its own distinctive characters not found in the related subfamilies. They also remarked that *Parapsilorhynchus* appears to have common origin with the related genus *Psilorhynchus,* which occurs in the Himalayan region as they have similarities in general morphology and habitats. Fishes of the genus *Parapsilorhynchus* were considered endemic in the Western Ghats and the Satpura mountain ranges of India (Singh, 1994) except *P. tentaculatus* which was also reported from Eastern Ghats in Andhra Pradesh (Rama Devi and Menon, 1995; Rema Devi and Indra, 2003). However, *P. odishaensis,* was described recently from the Eastern Ghats of India (Baliarsingh *et al.,* 2017). With the description of this new species, distribution of the genus is further extended to north in the Eastern Ghats to the Mahanadi River drainage of Odisha.

Comparative materials

Parapsilorhynchus discophorus, 4 ex., 26.4-32.0 mm SL, ZSI-WRCP/3817; India: Vasishti River, Pophli, Ratnagiri District, Maharashtra. Additional data from Hora (1921) and Yazdani and Rao (1977).

Parapsilorhynchus odishaensis, holotype, 35.0 mm SL, ZSI FF 4625; India: Mahendra Tanaya River, Tiniamba Village, Rayagada District, Odisha. Additional data from Baliarsingh *et al.* (2017).

Parapsilorhynchus prateri, type, 36 mm SL, ZSI F 12498/1; India: Deolali, Maharashtra. Additional data from Hora and Misra (1938).

Parapsilorhynchus tentaculatus, type, 1ex., 36 mm SL, ZSI F 9695/1; India: small hill-streamlets at Khandalla, Poona District, Maharashtra. Additional data from Annandale (1919).

Parapsilorhynchus elongatus: Data from Singh (1994).

Key to species of *Parapsilorhynchus*

1. Lateral line scales less than 43 2

   Lateral line scales 43-47 ..... *P. prateri*

2. Callous pad well developed 3

   Callous pad poorly developed 4

3. Pectoral fin with 2 simple rays, its length shorter than HL; Lateral line scales 33-35 ……..... *P. discophorus*

   Pectoral fin with 3 simple rays, its length longer than HL; Lateral line scales 36 .....*P. elongatus*

4 . Lateral line scales 36-39; eyes not visible from ventral side of head …….…….....*P. tentaculatus*

   Lateral line scales 33-35; eyes visible from ventral side of head …….....……... 5

5. Body depth 19.6-25% SL; Anal fin without black bar .... *P. odishaensis*

   Body depth 16.9-18.7% SL; Anal fin with a black bar .... *P. swaini* sp. nov.

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