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Puntius nigronotus, a new fish species (cypriniformes; cyprinidae) from Kerala, India

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ABSTRACT:

Puntius nigronotus, a new fish species of the family Cyprinidae, is described from Mananthavady River of Kerala, India. It is distinguished from its congeners by the following combination of characters: body deeper, maxillary barbels shorter and never reach nostrils, dorsal fin shorter, 9 branched rays in dorsal fin and 6 branched rays in anal fin, last unbranched dorsal fin ray feebly ossified and flexible, 27 lateral line scales, pre pelvic distance greater, caudal peduncle wide and lateral line straight.

Keywords:

Western Ghats, Mananthavady River, New description, *Puntius viridis*

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INTRODUCTION

Species of genus *Puntius* are the most common cyprinid fishes of India. Jayaram (1991) revised the *Puntius* species of India and classified the genus into ten groups and fourteen complexes. Pethiyagoda *et al.* (2012) created five genera namely *Puntius*, *Dawkinsia*, *Systomus*, *Haludaria* and *Pethia* based on taxonomic analysis of 30 putative species of Indian and Sri Lankan *Puntius* species.

Puntius species are characterized by the absence of rostral barbels, smooth last unbranched dorsal fin ray, presence of free uroneural, simple and accumulate gill

rakers and presence of a post epiphyseal fontanelle. The present fish described from the Mananthavady River of Wayanad, Kerala, India, carries characters of the genus *Puntius* but bears many features to separate it from its relative species. So it is described here as a new species *Puntius nigronotus*.

MATERIALS AND METHODS

Methods used are those of Jayaram (2002); subunits of the head are presented as percentage of Head Length (HL); head length and measurements of body parts are given as percentage of Standard Length (SL).



Figure 1. A fresh specimen of *Puntius nigronotus*, Holotype, ZSI FF 5285, 82.3 mm SL



Figure 2. Head region of *Puntius nigronotus*



Figure 3. Dorsal fin of *P. nigronotus*

Table 1. Meristic Counts of *Puntius nigronotus* sp. nov. and its relative species

SL. No.	Counts	<i>P. nigronotus</i>	<i>P. viridis</i>	<i>P. parrah</i> ZSI FF 4934 (n=4)	<i>P. madhusoodani</i> CRG/SAC 456- 459 (n=4)	<i>P. chola</i> ZSI/ F2203, 4009 (n=2)	<i>P. dorsalis</i> ZSI/F2730, ZSI/ SRC4954 (n=3)	<i>P. sophore</i> ZSI FF 4938 (n= 2)
		ZSI/ WGRC/ Holotype, ZSI FF 5285 (n= 8)	ZSI/ IR/2382, 2383, ZSI FF 4932 (n= 8)	Scale Counts				
1	LLS	27	25- 26	25	25- 26	26	25-26	25
2	PDS	11	9	8	9	9	9	9
3	PRPLS	10	5	6	6	5-6	5-6	5
4	PRAS	18	10- 12	14	14	12-13	11-13	13
5	CPS	10	9-10	10	10	11-12	9-10	10
6	LL/D	5½	5- 5½	5½	4	4½-5	4½-5½	5½
7	LL/V	3½	3½	3½	3	3-3½	2½	3½
8	LL/A	4½	3½	3½	3½	3½	3½	4½
9	L/TR	5½/3½	5-5½/3½	5/4	5/3½	5½/4½	5½/2½	5½/4½
Fin Ray Counts								
10	D	ii, 9	iii, 8	iii, 8	iii, 7	iii, 8	iii, 8	iii, 8
11	P	i, 15	i, 14	i, 14	i, 14	i, 13-16	i, 14-15	i, 13- 14
12	V	i, 8	i, 8	i, 8	ii, 8	i, 8	i, 7	i, 8
13	A	ii, 6	iii, 5	ii, 5	ii, 6	iii, 5	iii, 5	iii, 5
14	C	ii, 17	18- 19	19	19	19	17	18

Abbreviations used:

BDD- Body depth at dorsal fin origin; **IOW-** Inter Orbital Width; **HD-** Head Depth; **LLS-** Lateral Line Scales; **PDS-** Pre Dorsal Scales; **PRPLS-** Pre Pelvic Scales; **PRAS-** Pre Anal Scales; **CPS-** Circum Peduncular Scales; **LCP-** Length of Caudal Peduncle; **DCP-** Depth of

Caudal Peduncle; **LL/D-** scales between lateral line and dorsal fin; **LL/V-** scales between lateral line and ventral fin; **LL/A-** scales between lateral line and anal fin; **L/TR-** Lateral Transverse Scales; **D-** Dorsal fin rays; **P-** Pectoral fin rays; **V-** Ventral fin rays; **A-** Anal fin rays; **C-** Caudal fin rays. **ZSI/ WGRC-** Zoological Survey of India, Western Ghats Regional Centre, Kozhikode; **ZSI-** Zoological Survey of India, Kolkata; **CRG/SAC-** Conservation Research Group, St. Albert's college, Cochin; **ZSI/SRC-** Zoological Survey of India, Southern Regional Centre, Chennai; **UOK/AQB-** department of aquatic biology and fisheries, University of Kerala.

**Figure 4. *Puntius viridis*, Paratype, ZSI FF 4932**

Table 2. Comparison of morphometric characters of *P. nigronotus* and its congeners

SL. No.	Characters	<i>P. nigronotus</i>	<i>P. viridis</i> ZSI/ WGRC/IR/2382, 2383, ZSI FF ZSI FF 5285 4932 (n= 8)	<i>P. parrah</i> ZSI FF 4934 (n=4)	<i>P. madhusoodani</i> CRG/SAC 456-459, (n= 4)
1	Total length (mm)	105.1	91.2-103	86.5-102.0	90.5-118.3
2	Standard Length (mm)	82.3	72-81	65.5-78.0	67.6-91.4
			% SL		
3	Head length	29.5	26.4-31.1	25.6-26.0	27.5-29.5
4	Head depth	22.1	19.7-22.9	21.6-24.0	20.7-23.1
5	Head width	17.0	15.8-17.8	15.4-17.6	15.0-16.7
6	Body depth at dorsal fin	35.8	31.5-33.8	32.1-33.1	34.5-36.2
7	Body depth at anal fin	23.7	21.1-23.9	23.7-24.4	22.1-23.7
8	Body width at dorsal fin	20.0	16.2-19.1	17.3-19.7	17.6-19.1
9	Body width at anal fin	12.2	10.8-13.2	13.4-15.2	11.7-14.5
10	Pre occipital distance	18.5	18.9-23.0	20.5-24.3	18.9-22.9
11	Distance from occiput to dorsal front	33.8	30.4-31.7	24.3-29.8	29.0-32.9
12	Pre-dorsal length	54.7	48.2-54.8	50.0-52.1	49.3-50.6
13	Post-dorsal length	51.0	48.2-54.8	48.7-53.5	50.2-58.6
14	Pre-pectoral length	27.0	25.8-29.7	27.0-28.2	26.2-28.9
15	Pre-pelvic length	52.6	47.9-50.0	47.2-51.3	46.5-50.3
16	Pre-anal length	75.1	72.2-76.6	70.3-74.4	67.6-74.3
17	Length of dorsal fin	21.1	22.4-26.5	22.1-24.4	25.2-28.7
18	Length of pectoral fin	19.4	16.7-19.7	17.6-19.8	17.7-19.1
19	Length of pelvic fin	17.9	17.3-20.3	20.3-21.4	20.7-21.1
20	Length of anal fin	16.2	14.8-18.9	13.3-16.8	19.2-21.5
21	Length of caudal fin	27.7	29.3-30.0	28.4-32.1	24.8-27.0
22	Length of base of dorsal fin	18.2	17.6-19.2	18.0-21.0	19.0-20.0
23	Length of base of anal fin	8.7	9.8-11.1	12.0-15.4	9.0-12.0
24	Length of base of pectoral fin	5.1	4.1-5.3	3.3-4.2	3.7-4.1
25	Length of base of pelvic fin	4.9	5.0-6.9	4.2-5.4	6.0-7.1
26	Length of base of caudal	14.6	13.5-14.2	12.2-14.1	12.4-13.8
27	Length of caudal peduncle	17.6	16.3-17.8	19.1-21.2	12.6-17.5
28	Depth of caudal peduncle	14.0	13.5-14.5	12.9-13.5	12.8-14.6
29	LCP/DCP	79.3	77.0-88.0	63.6-74.3	73.1-84.6
30	Width of caudal peduncle	9.1	5.5-7.4	4.1-5.4	6.2-6.6
31	Distance from pectoral to pelvic fin	25.7	21.0-21.6	20.4-20.9	22.8-25.0
32	Distance from pelvic to anal fin	24.3	23.8-25.0	24.3-26.8	25.0-28.9
33	Distance from anal to caudal fin	26.4	25.9-27.5	27.7-29.6	25.5-27.0
34	Distance from anal to vent	0	2.6-4.1	0	4.8-6.6
35	Distance from ventral to vent	22.5	19.1-22.8	23.0-25.6	22.4-23.4
			% HL		
36	Head depth	74.9	68.2-80.0	84.2-89.5	95.0-100.0
37	Head width	57.6	56.5-63.2	60.0-68.4	55.0-61.9
38	Eye diameter	32.1	26.1-31.6	32.5-36.8	27.5-33.3
39	Inter orbital width	32.1	31.6-40.9	42.1-42.5	37.5-41.9
40	Inter narial width	23.0	23.9-28.9	23.5-30.0	25.0-28.6
41	Snout length	24.7	22.7-31.8	26.3-30.0	28.6-30.0
42	Width of gape of mouth	22.6	23.0-27.3	28.9-30.0	25.0-27.6
43	Length of maxillary barbels	12.3	13.0-21.1	15.0-17.6	14.3-15.0

RESULTS AND DISCUSSION***Puntius nigronotus* sp. nov.**

(Figures 1-3; Table 1 and 2)

Plamoottil, 1 January 2012.

Diagnosis*Puntius nigronotus* can be differentiated from all

Holotype: ZSI FF 5285, 82.3 mm SL, India: Kerala, Mananthavady River, Wayanad, coll. Mathews

its congeners in having blackish dorsal side, shorter maxillary barbels (12.3 % HL), shorter width of mouth

Figure 5. *Puntius parrah*, ZSI FF 4934, coll. Plamoottil

gape (22.6 5 % HL), a higher body (BDD 35.8 % SL), a row of elongated tiny black dots present on dorsal fin, the latter is shorter (21.1 % SL) and with 9 branched rays, last unbranched dorsal fin ray feebly ossified and flexible, 6 branched rays in anal fin, 27 lateral line scales, greater pre pelvic distance (52.6 % SL), wide caudal peduncle (9.1 % SL) and straight lateral line.

Description

General body shape and appearance is shown in Figure 1- 3. Meristic counts are shown in Table 1 and morphometric data in Table 2. Body laterally compressed; dorsal profile convex; region from dorsal front to occiput a little bent, after sinking down very slightly goes straight to snout tip; post dorsal region slightly concave. Ventral profile from the base of pectoral fin to tip of pelvic fin straight, then abruptly concave and then goes straight to caudal base. Eyes situated considerably behind and above the angle of jaws, protruding above the surface of head and distinctly visible from below ventral side; inter orbital region slightly convex; nostrils, in short tube, situated nearer to

Figure 6. *Puntius chola*, ZSI FF 2203, coll. Hora

eyes than to snout tip; jaws equal; barbels one pair maxillaries only, shorter than orbit, feeble and roughly reach the lower margin of orbit but never reach nostrils; mouth terminal, straight and protruding; width of gape of mouth equal to inter narial distance; operculum soft and flexible.

Dorsal fin originates considerably behind the pectoral tip, a little in front of ventral origin and nearer to caudal fin base than snout tip; its upper margin fairly concave; dorsal fin with two undivided and nine branched rays; first ray short and hard; second ray feebly ossified and flexible, tip a little filamentous; its inner margin slightly roughened but not serrated; last branched ray divided to root; pectoral tip never reach ventral origin; ventral fin originates just behind dorsal fin origin and considerably behind pectoral tip; its tip never reach anal fin origin and vent; two axillary scales present on either side of base of ventral, one above the other, of this the upper one soft and delicate and form 2½ in length of ventral fin; lower one short but more fleshy; anal fin roughly rectangular, outer margin fairly concave, its tip

Figure 7. *Puntius dorsalis*, ZSI FF 2730, coll. DayFigure 8. *Puntius madhusoodani*, Paratype, CRG-SAC 459



Figure 9. *Puntius sophore*, ZSI FF 4938, coll. Plamoottil

never reach caudal base; no distance between anal fin origin and vent; no prominent ridge on the base of anal fin and dorsal fin; unbranched and branched rays of anal fin soft; caudal lobes equal. Scales thin and soft; lateral line straight and passes through the middle of body.

Lateral line scales 27.

Colouration

In live condition, back side deep black; upper lateral side blackish brown; lower lateral side silvery white; dorsal fin pale orange red; pectoral, pelvic and anal fins whitish yellow; caudal fin dirty yellow; minute bluish black dots present on operculum; a few tiny elongated black spots present on dorsal fin rays; caudal blotch small, diffuse and concentrated on one scale as an aggregation of bluish black dots. After preservation in formalin back and upper lateral side turned to reddish brown and lower lateral side yellowish white and fins became hyaline.

Etymology: The specific name ‘*nigronotus*’ denotes the color of the new fish. In Greek ‘*nigra*’ means ‘black’ and ‘*notus*’ means ‘back’; refers to the blackish dorsal side of the fish.

Distribution:

Currently known only from the type locality in Kerala.

Comparisons

Puntius nigronotus shows similarity to *Puntius viridis*, *P. parrah* and *P. madhusoodani* of Kerala and *Puntius dorsalis* of Chennai and *Puntius chola* and *P. sophore* of River Ganges (Figure 4- 9). The new fish differs from *Puntius viridis* Plamoottil and Abraham

(2013) in having 27 lateral line scales (vs. 25/26 in *P. viridis*), 11 pre dorsal scales (vs. 9), 9 branched rays in dorsal fin (vs. 8), deeper body (35.8 % SL vs. 31.5-33.8), greater distance (25.7 % SL vs. 21.0- 21.6) from pectoral fin to pelvic fin, no distance from anal fin origin to vent (vs. 2.6- 4.1 % SL) and wider caudal peduncle (9.1 % SL vs. 5.5- 7.4). *P. nigronotus* differs from *P. parrah* Day (1865, 1878, 1889) in having closely located orbits (IOW 32.1 vs. 42.1- 42.5 % HL in *P. parrah*), shorter maxillary barbels (12.3 % HL vs. 15.0- 17.6), lower (HD 74.9 % HL vs. 84.2- 89.5) and longer head (29.5 % SL vs. 25.6- 26.0) and greater number of branched dorsal fin rays (9 vs. 8) and lateral line scales (28 vs. 25).

The new fish differs from *Puntius chola* (Hamilton, 1822) in having 11 pre dorsal scales (vs. 9 in *P. chola*), 10 pre pelvic scales (vs. 5/6), 27 lateral line scales (vs. 26), 9 branched rays in dorsal fin (vs. 8), 6 branched rays in anal fin (vs. 5) and 4½ scales between lateral line and anal fin (vs. 3½). *Puntius nigronotus* differs from *P. dorsalis* Jerdon (1849) in many meristic and morphometric characters. In *P. dorsalis*, a black spot present at the posterior portion of the base of dorsal fin (vs. absent in new species), 2½ scales present between lateral line and ventral fin (vs. 3½), snout longer (31.8-37.1 % HL vs. 24.7), dorsal fin with 8 branched rays (vs. 9) and lateral line with 25/26 scales (vs. 27).

The new species can also be easily distinguished from *Puntius madhusoodani* Kumar et al. (2011) in many taxonomic characters. In *P. madhusoodani* 4 scales present between lateral line and dorsal fin (vs. 5½), pre dorsal scales 9 (vs. 11), dorsal fin longer (25.2- 28.7 % SL vs. 21.1), dorsal fin with 7 branched rays (vs. 9), lateral line scales 27 (vs. 25/26), snout longer (28.6- 30 % HL vs. 24.7), head deeper (head depth 95.0- 100.0 % HL vs. 74.9) and anal fin longer (19.2- 21.5 % SL vs. 16.2). The new species can be distinguished from *Puntius sophore* (Hamilton, 1822) in having one pair of maxillary barbels (vs. absent), smaller eyes (32.1 % HL

vs. 34.7- 36.0), lower head (head depth at occiput 74.9 % HL vs. 80.3- 86.7), lateral line scales 27 (vs. 25), 11 pre dorsal scales (vs. 9) and 9 branched rays in dorsal fin (vs. 8).

CONCLUSION

Puntius nigronotus is a unique fish having greater number of branched dorsal fin rays than all other relative species; its lateral line scales and pre dorsal scales are also greater in number than its congeners; their last unbranched dorsal fin ray feebly ossified and flexible; it was believed that branched rays in dorsal fin of *Puntius* species are only eight (Pethiyagoda *et al.*, 2012); the present fish is an exception to this; *Puntius nigronotus* have nine branched rays in dorsal fin and additionally its last branched ray is divided to root; it is expected that more aspects of its biology will be revealed in near future based on studies on more number of specimens.

Comparative material examined

***Puntius viridis*:** Holotype, 21.08.2011, 81 mm SL, Kallumkal, Manimala River, Kerala, India, 9°20'0"N, 76°30'0"E, coll. Mathews Plamoottil, ZSI/WGRC/IR/2382. Paratypes, 21.08.2011, 5 examples, 72-76 mm SL, Kallumkal, Manimala River, Kerala, India, 9°20'0"N, 76°30'0"E, coll. Mathews Plamoottil, ZSI/WGRC/IR/2383; 10. 10. 2012, 2 examples, 63- 74 mm SL, Manimala River at Kallumkal, Kerala, coll. Mathews Plamoottil, ZSI FF 4932.

***Puntius dorsalis*:** 27.10.95, 1 example, 62 mm SL, Thunakadavu dam, Parambikulam wild life sanctuary, Kerala, ZSI/WGRC/IR 8466, coll. P.M. Sureshan, identified by K.C. Gopi; 23.2.2000, 2 examples, 56- 63 mm SL, Pampa River at Parumala, Kerala, ZSI/WGRC/IR/10379, coll. K. C. Gopi; 11.02.58; 1 example, 53 mm SL, Isteri tank, 7 miles north west of Pondicherry, ZSI/F 2801, coll. A.G.K. Menon; 16.02.1996, 2 examples, 52- 53 mm SL, Sethumadai canal, Indira Gandhi Wild Life sanctuary, Tamil nadu, ZSI/

SRC/F 4954, coll. M.B. Reghunathan; undated, 1 example, Madras, ZSI/F 2730, coll. Francis Day; undated, 1 example, 53 mm SL, Tunga River at Shimoga, ZSI/F 12320/1, coll. H.S. Rao; undated, 5 examples, 55- 62 mm SL, Cauvery River, Coorg, Karnataka, ZSI/F 12319/1, coll. C.R. Narayan Rao;

***Puntius parrah*:** 10.01. 2012, 4 examples, 65.5-78.0 mm SL, Arattupuzha, Karuvannoor River, Irinjalakuda, Kerala, ZSI FF 4934, coll. Mathews Plamoottil; 15.12.1994; 1 example, 60 mm SL, Kuruva Island, Wayanad, ZSI/WGRC/IR/742, coll. C. Radhakrishnan; 24.03.1997, 1 example, 44 mm SL, Parambikulam WLS, ZSI/WGRC/IR/10696, coll. K. C. Gopi; 10.8.2001, 2 examples, 100.0- 103.0 mm SL, Achankoil River, UOK/AQB/F/ 102, coll. Bijukumar; undated, 1 example, Karuvannoor River, Kerala, ZSI/F 2718 Syntype, coll. Francis Day; 08.05. 1977, 6 examples, 71 mm- 94 mm SL, Cauvery River at Chunchanakatte, ZSI/SRC Uncat, coll. K. C. Jayaram.

***Puntius chola*:** 08.11.1939, 1 example, 41.5 mm SL, Soni Gaon Bheel, Lokpa, Batipara, Assam, ZSI/F 2203, coll. S.L. Hora; 1963, 1 example, 54 mm SL, Sukla Talai, Jhalwar, Rajasthan, ZSI/F 4009/2, coll. N. Majumdar & R.N. Bhargava; 18.03.1958, 2 examples, 32.5- 55 mm SL, Raxanal, Bihar, ZSI/F/2804/2, coll. Keval Singh; 3 examples, 50- 62 mm SL, Rajasthan, ZSI/F/4379/2, coll. Birla college, Pilani; 1 example, 71 mm SL, Mahanadi Irrigation Canal, Rudri, Orissa, ZSI/F 13082/1, coll. H.S. Rao.

***Puntius madhusoodani*:** 17.11.2010, Holotype, 91.43mm SL, Manimala River, near Thirumoolapuram, Thiruvalla, Kerala, CRG-SAC 456, coll. K. Krishnakumar; 17. 11. 2010, 3 examples, 67.6 - 80.91 mm SL, Manimala River, near Thirumoolapuram, Thiruvalla, Pathanamthitta District, CRG-SAC 457 – 459 paratypes, coll. K. Krishnakumar and Benno Pereira.

***Puntius sophore*:** 10.05.2012, 2 examples, 58-59 mm SL, Serrampore, River Ganges, Kolkata, ZSI FF

4938, Coll. Mathews Plamoottil; 20.06. 1963, 4 examples, 62.5- 70.0 mm SL, Sukla Talai, Jhalawar, Rajasthan, ZSI/F 4008/2, coll. N. Majumdar & R. N. Bhargava; 24.10.1939, 1 example, 40 mm SL, Suwannee River, east of Hazaribagh Barhi Road, ZSI/F 13827, H.S. Rao; 22.06.1963, 4 examples, 66- 102 mm SL, Gadhuli Talai, Shergarh, Rajasthan, ZSI/F 4023, SE Rajasthan Survey of ZSI; 30.06.1983, 4, examples, 58.0- 67.5 mm SL, Talbi, N. of Bimal Railway station, ZSI/F 4029/2, S. E. Rajasthan Survey of ZSI.

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