



Puntius rohani (Teleostei: Cyprinidae), a new species of barb in the *Puntius filamentosus* group from the southern Western Ghats of India

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Abstract: *Puntius rohani*, a new species of cyprinid fish, is described from the Kanyakumari District, southern India. This species can be distinguished from the other members of the *Puntius filamentosus* Group by the combination of the following characters: the absence of vertical black bands near the tips of the caudal fin; the presence of an elongate black club-shaped blotch 1.5 scales high extending from the 12-13th lateral-line scales to the caudal-fin base; and possessing 2-3+6-9 gill rakers on the first gill arch, 21-23 lateral-line scales, seven predorsal scales, $\frac{1}{2}4+1+3-3\frac{1}{2}$ scales in transverse line from the dorsal-fin origin to the mid-ventral scale row, and 2-2 $\frac{1}{2}$ scales between the lateral line and the pelvic-fin origin.

Keywords: Fish, new species, *Puntius filamentosus* group, Western Ghats.

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INTRODUCTION

The cyprinid fishes of the *Puntius filamentosus* group presently comprise seven species, five of which are endemic to India: *Puntius arulius* (Jerdon), *P. assimilis* (Jerdon), *P. exclamatio* Pethiyagoda & Kottelat, *P. filamentosus* (Valenciennes) and *P. tambraparniei* (Silas), and two to Sri Lanka: *P. singhala* (Duncker) and *P. srilankensis* (Senanayake). These barbs are characterized by adult males developing filamentous extensions to the dorsal-fin branched rays and a juvenile colour pattern consisting of three black bars on the side of the body (Pethiyagoda & Kottelat 2005a). This group of fishes was last reviewed by Pethiyagoda & Kottelat (2005a), who in addition to describing a new species from southern India, revalidated several nominal species until then buried in the synonymy. These authors also drew attention to a fish illustrated as a "colour variety" of *Puntius filamentosus* from Periyakulam reservoir, Kanyakumari District, Tamil Nadu by Indra (1992), and suggested that it could represent an undescribed species. Recent surveys of Kanyakumari Wildlife Sanctuary resulted in fresh collections of this fish, which is described here as *Puntius rohani*, a new species.

MATERIALS AND METHODS

The material for the present study is based mostly on recent collections from the Kanyakumari Wildlife Sanctuary (KWS) during 2008-09 by scientists of the Southern Regional Centre of the Zoological Survey of India, and specimens from earlier surveys in the collections of the Centre. The collection sites are shown in Fig. 1. The specimens are registered in the reserve collections of the Zoological Survey of India, Southern Regional Centre, Chennai (ZSI/SRS) and Zoological Survey of India, Western Ghats Regional Centre, Kozhikode (ZSI / WGRC). Measurements were made with dial calipers to the nearest 0.1mm (except for the largest measurements, viz. total length (TL) and standard length (SL), which were measured with a ruler to the nearest 1mm). Quantification of characters follows Pethiyagoda & Kottelat (2005a) except for length of maxilla, which is measured from the tip of the upper jaw to the



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posterior margin of the maxilla. Subunits of the head are expressed in proportions of both head length (HL) and standard length (SL). Numbers in parenthesis after a count denote the frequency of that count. The 4th lateral row scale from behind opercle, above the 4th lateral-line pored scale and 7th lateral-line pored scale, was removed and compared with the corresponding scales of similar-sized *P. filamentosus* from Chembarampakkam Lake. Photographs of scales were taken with an Olympus SP570 UZ digital camera using super-macro mode.

***Puntius rohani* sp. nov.**
(Images 1, 2, 3A)

Holotype

27.iii.2009, 69.0mm SL, Kodayar River drainage, near Mayilar, KWS, Kanyakumari District, Tamil Nadu, India, 8.5052°N & 77.3015°E, 110m, coll. S. Prabakaran, ZSI/SRS F.8336.

Paratypes

26.iii.2009, 1 ex., 72.0mm SL, same locality as holotype, ZSI/SRS F.8328; 21.iii.2008, 1 ex., 86.0mm SL, Lower Kodayar River drainage, near Kallar, KWS, 8.5282°N & 77.3119°E, 360m, ZSI/SRS F. 8344; 27.iii.2009, 1 ex., 80.0mm SL, Kodayar River drainage, near Vellachithodu, 8.5206°N & 77.3113°E, 330m, ZSI/SRS F.8345; 18.iii.2008, 1 ex., 63.0mm SL, Paralayar River drainage, near Kalikesam, 8.4111°N & 77.3913°E, 110m, all coll. S. Prabakaran, ZSI/SRS F.8362; 16.iv.1992, 1 ex., 84.0mm SL, Pamburivaikal River drainage near Manavalakurichi, 8.1695°N & 77.3141°E, 10m, ZSI/SRS F.8365; 20.ix.1989, 5 ex., 65.0-85.0 mm SL, Palkulam, Paralayar River drainage, coll. J.C. Dhas, ZSI/SRS F. 8366; 18.ii.2003, 4 ex., 63.0-95.0 mm SL, Keeriparai 8.3958°N & 77.4097°E, 140m, / Kalikesam, 8.40873°N & 77.39226°E, 100m, Paralayar drainage, coll. R.J. Ranjit Daniels & J.D. Marcus Knight, ZSI/SRS F.7340.

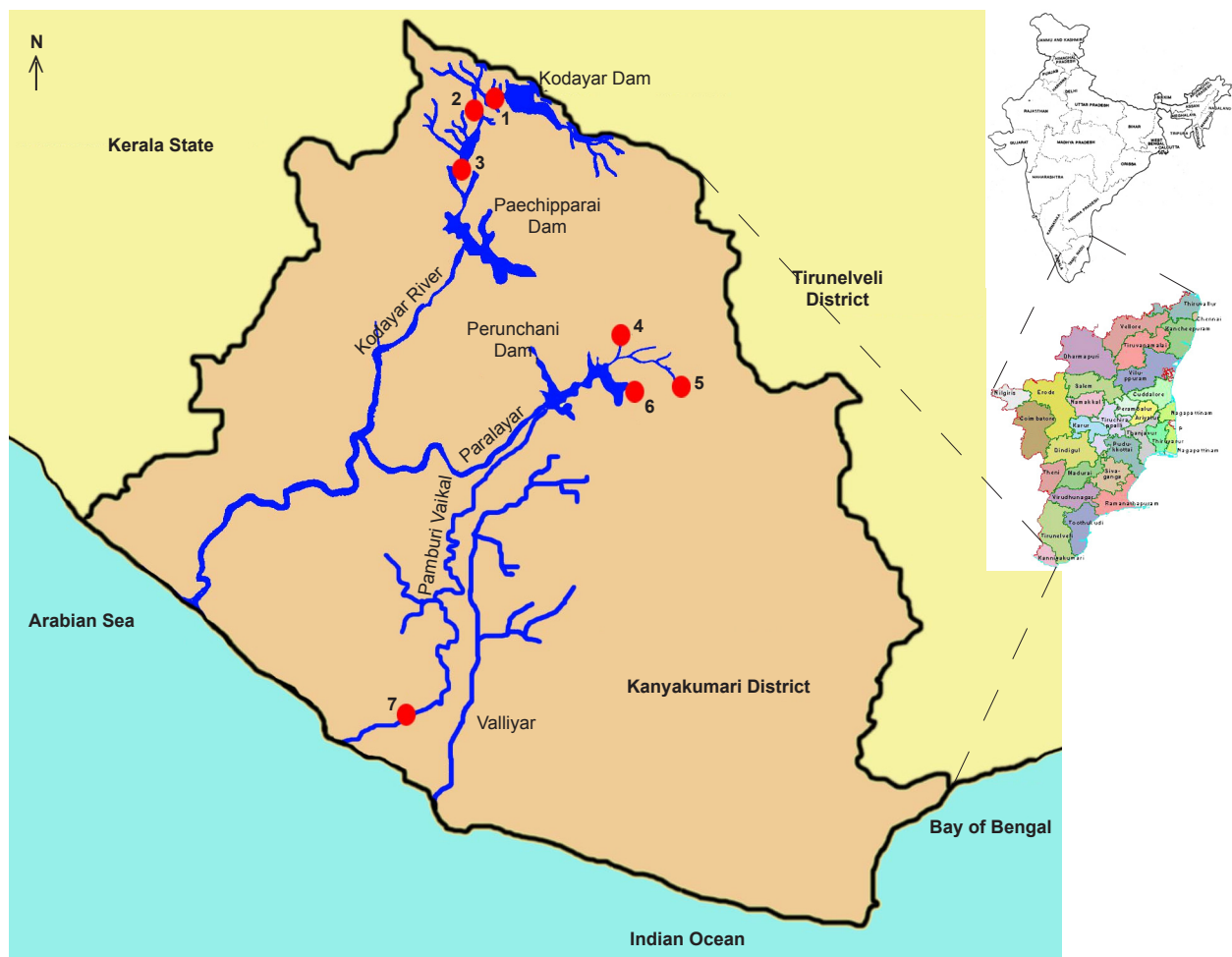


Figure 1. Principal localities in southern India from where *Puntius rohani* sp. nov. has been collected: 1 - Kallar; 2 - Vellachithodu; 3 - Mayilar; 4 - Kalikesam; 5 - Keeriparai; 6 - Palkulam; 7 - Manavalakurichi (map not to scale).



Image 1. *Puntius rohani* sp. nov. holotype, 69mm SL, ZSI/SRS F.8336.

Table 1. Morphometric data of holotype (ZSI/SRS F.8336) and 15 paratypes (ZSI/SRS F.8336, 7340, 8328, 8344-45, 8362, 8365-66) of *Puntius rohani* sp. nov.

Characters	Holotype	Paratypes (N = 15)	Mean \pm SD
Standard length [mm]	69.0	56.0-95.0	
% SL			
Total length	138	133-139	137 \pm 2
Head length	30.8	27.9-31.4	29.7 \pm 1.0
Head depth	23.4	20.3-29.4	23.5 \pm 2.3
Predorsal length	47.3	46.5-53.1	49.4 \pm 1.9
Dorsal to hypural distance	55.0	49.7-56.1	53.0 \pm 1.7
Maximum body depth	35.7	32.2-39.1	36.3 \pm 2.3
Caudal peduncle length	16.2	14.5-17.8	15.8 \pm 1.0
Maximum body width	20.7	12.4-20.7	15.0 \pm 2.5
Caudal peduncle depth	13.0	12.3-18.2	15.2 \pm 1.8
Maxillary barbel length	3.6	2.5-4.6	3.5 \pm 0.5
Snout length	10.1	6.9-10.1	8.6 \pm 0.8
Length of maxilla	8.6	6.8-9.5	8.3 \pm 0.7
Eye diameter	8.6	7.7-9.4	8.7 \pm 0.4
Interorbital width	9.8	9.0-11.1	10.2 \pm 0.5
Internarial width	6.0	5.3-7.4	5.9 \pm 0.5
Postorbital head length	12.3	11.2-15.2	13.1 \pm 1.0
% HL			
Maxillary barbel length	11.7	8.2-16.0	11.8 \pm 2.1
Length of maxilla	28.1	23.6-32.0	28.1 \pm 2.0
Snout length	32.8	23.4-33.9	29.1 \pm 2.7
Eye diameter	28.1	25.7-32.1	29.4 \pm 2.0
Interorbital width	31.9	30.9-37.8	34.3 \pm 1.7
Internarial width	19.7	18.3-23.7	20.1 \pm 1.4
Postorbital head length	39.9	38.9-48.4	44.3 \pm 2.8



Image 2. Snout of *Puntius rohani* sp. nov. holotype, 69mm SL, ZSI/SRS F.8336, showing dense tuberculation.

Additional material

20.ix.1989, 19 ex., 54.0-85.0 mm SL, Palkulam, Paralayar River drainage, coll. J.C. Dhas, ZSI/SRS F. 2831.

Diagnosis

Adults of *Puntius rohani* are distinguished from all members of the *Puntius filamentosus* Group sensu Pethiyagoda & Kottelat (2005a) by their unique colour pattern of a black club-shaped blotch 1.5 scales high extending from the 12-13th lateral-line scales to the caudal-fin base, the absence of any other body colour pattern anterior to it (vs. presence in *P. arulius* (Image 3K), *P. tambraparniei* (Images 3F,G), *P. srilankensis* and *P. exclamatio* (Image 3H)), and the absence of a transverse black band near the tip of each caudal-fin lobe (vs. presence in *P. assimilis* (Image 4J) and *P. filamentosus* (Image 3E)).

Description

Morphometric data of holotype and 14 paratypes



Image 3. A - *P. rohani* sp. nov. (holotype); B - *P. rohani* sp. nov. juvenile; C - *P. rohani* sp. nov. (paratype, ZSI/SRS F.8345, 80mm SL); D - *P. filamentosus* (live specimen, uncatalogued); E - *P. filamentosus* juvenile (live specimen, uncatalogued); F - *P. tambraparniei* (ZSI/SRS F.8369, 57mm SL); G - *P. tambraparniei* juvenile (ZSI/SRS F.8370, 14mm SL); H - *P. exclamatio* (live specimen, uncatalogued); I, J - *P. assimilis* (ZSI/SRS F.8371, 84mm SL); K - *P. arulius* (ZSI/WGRC F.3954, 74mm SL).

are provided in Table 1. General body shape and appearance as in Images 1 and 3A. Body elongate, laterally compressed; dorsal contour ascending, with a low indentation at nape, slightly convex anterior to dorsal-fin insertion; ventral profile equally convex anterior to pelvic-fin origin, curving gently up to anal-fin origin, thence sloping dorsad towards caudal peduncle; caudal peduncle deep, its depth a little less than its length, concave in both dorsal and ventral profiles.

Head length 27.9-31.4 % SL; eyes large, their diameter 25.7-32.1 % HL, positioned nearer to snout than to opercular margin; interorbital wide, a little less than eye diameter; snout length almost equal to eye diameter; males with well-developed tubercles on snout (Image 2). Mouth small, subterminal; lips thick, maxilla extending almost to anterior border of eye. A pair of maxillary barbels present, 8.2-16 % HL. Dorsal fin inserted nearer to tip of snout than to caudal-fin base, with three simple and 8½ branched rays (some branched rays extending as filaments in adults), its distal margin slightly concave. Anal fin with three simple and 5½ branched rays. Pelvic fin with one simple and eight branched rays, its origin slightly posterior to dorsal-fin origin. Pectoral fin with one simple and 13(5) or 14(10) branched rays. Pectoral and pelvic fins short, not reaching pelvic and anal-fin origins, respectively. Caudal fin with 1+9+8+1 principal rays, deeply forked, with pointed lobes. Lateral line complete, with 21(6), 22(8) or 23(1) scales on body including one scale on the caudal-fin base. Transverse scales from dorsal-fin origin to mid-ventral scale row ½4+1+3(13)-3½(2), scales between lateral line and pelvic-fin origin 2(13)-2½(2). An axillary pelvic scale present. Eighteen circumferential scales (counted as the number of scales around the greatest depth of body beginning from the first scale anterior to dorsal-fin origin), 11(14) or 12(1) circumpeduncular scales. 2(9)-3(6)+6(1), 7(8), 8(5) or 9(1) gill rakers on first gill arch.

Colouration: In life, adult specimens greenish above, cream-white underside. Dorsal fin dusky, with traces of red. Pectoral and pelvic fins hyaline. Anal fin bordered with a bright red margin. Caudal fin bright red, lacking markings except for darker colour of principal rays. A dark bluish to black club-shaped marking present on tail, continuing on to principal rays of caudal fin. Formalin-fixed and alcohol-preserved specimens brownish above with a pale yellowish underside. Dorsal fin with branched rays more pigmented than other rays. All other fins creamish. Preserved juveniles express characteristic colouration of *P. filamentosus* group: pale yellow with three black bars on body (Image 3B).

Etymology

The species is named after Rohan Pethiyagoda, in appreciation of his extensive work on the freshwater fishes of India and Sri Lanka. The species name is formed as a

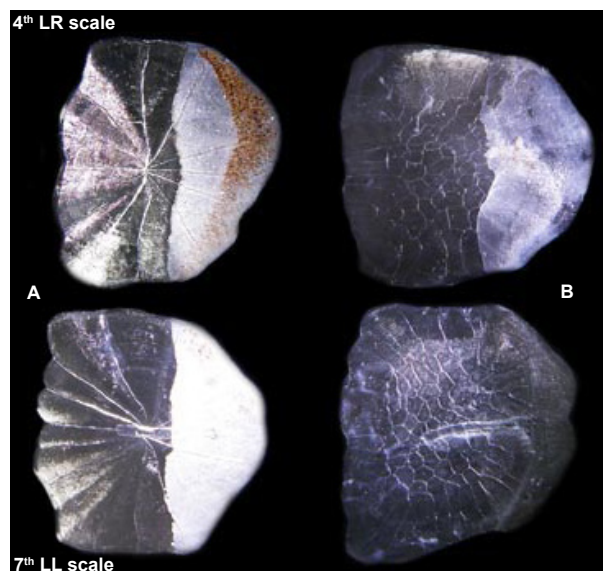


Image 4. 4th Lateral-row scale above 4th lateral-line pored scale (LR) and 7th lateral-line (LL) scales of A - *P. rohani*; B - *P. filamentosus*, from Chembarampakkam Lake, Tamil Nadu, India.

noun in the masculine genitive singular.

Distribution

Puntius rohani sp. nov. is at present known only from the hill streams of Kanyakumari District, Tamil Nadu, India, draining into the Arabian Sea (Fig. 1).

DISCUSSION

Fishes of the genus *Puntius* (Hamilton, 1822), commonly called barbs, are prolific and known to occupy a broad variety of freshwater niches in tropical Asia (Jayaram 1999). Despite a revision of the genus by Jayaram (1991), several taxonomic problems persisted in the *P. filamentosus* Group until the work of Pethiyagoda & Kottelat (2005a,b). One such was the identity of *P. mahecola*, long misidentified or considered a junior synonym of *P. filamentosus*. This resulted in some authors confusing the two species (e.g., Jayaram 1991; Menon 1991; Talwar & Jhingran 1991). Raj (1916) sought to differentiate the two species by the presence or absence of barbels, and a few other authors too, tried unsuccessfully to resolve this confusion (e.g., Selvaraj & Abraham 1987), but none referred to the type specimens of the two species and freshly-collected topotypes until Pethiyagoda & Kottelat (2005b), who showed *P. mahecola* to be distinct from *P. filamentosus*, and indeed not even closely related. Members of the *P. filamentosus* Group have a characteristic juvenile coloration of three black bars on the body, with adult males having filamentous extensions of their branched dorsal-fin rays.

Until now, the *P. filamentosus* Group has included



Image 5. Gravid female *P. filamentosus* (ZSI/SRS F.8368, 113mm SL), showing filamentous extensions of the dorsal fin branched rays.



Image 6. A - Male *P. filamentosus* maintained alive in aquaria with filamentous extensions to the dorsal-fin branched rays (5 December 2009); B - the same specimen with the dorsal-fin filaments absorbed (27 May 2010).



Image 7. Adult male *P. filamentosus* collected from lakes near Sriperambathur, Tamil Nadu, India (116.0mm SL, ZSI/SRS F.8368).

seven species, two of which (*P. singhala* and *P. srilankensis*) are endemic to Sri Lanka. We have not in the present study examined Sri Lankan material but have relied on data provided in Pethiyagoda & Kottelat (2005a). The 4th lateral row scale above the 4th lateral-line scale and 7th lateral-line scale of *P. rohani* sp. nov. was compared with those of *P. filamentosus* collected from Chembarampakkam Lake (Image 4) and found to be very different. The scales of *P. rohani* sp. nov. (3 ex.) have longer and fewer radii meeting at the focus, which is not reticulate, while the scales of *P. filamentosus* (5 ex.) from Chembarampakkam had numerous short radii meeting at a largely reticulated focus.

Indra (1992) published a colour photograph of a barb which she identified as a colour variation of *P. filamentosus* from the Periyakulam Reservoir in Kanyakumari. The same species also featured in the work of Johnson et al. (2007), which compared the genetic variation in different populations of *P. filamentosus* from southern India using restriction fragment length polymorphism (RFLP) analysis. This study showed that the population of *P. filamentosus* in Alancholai, Kanyakumari District, possessed a distinct genetic identity and did not cluster with the other populations studied. The present work shows that the species from Alancholai identified as *P. filamentosus* by Johnson et al. (2007) is in fact a distinct (new) species and not an instance of intraspecific polychromaticism of *P. filamentosus* as it has a shorter interorbital width and a longer maxillary barbel length when compared to *P. filamentosus*. This species is now described as *P. rohani* sp. nov. It has a single pair of well developed maxillary barbels of length 2.5-4.6 % SL (vs. 0.8-2.2 % SL in *P. filamentosus*, 0.0-1.3 % SL in *P. singhala*, and 7.0-10.2 % SL in *P. assimilis*). It is also distinguished by having the mouth subterminal (vs. inferior in *P. srilankensis* and *P. assimilis*) and a greater postorbital head length

of 11.2-15.2 % SL (vs. 8.2-10.4 % SL in *P. assimilis*), a shorter caudal-peduncle length of 14.5-17.8 % SL (vs. 17.9-19.9 % SL in *P. singhala* and 18.5-21.4 % SL in *P. srilankensis* but longer than *P. arulius*, which is 13.1-14.3 % SL). It further differs from *P. srilankensis* by its longer head of 27.9-31.4 % SL (vs. 24.8-26.7 % SL), and greater body depth of 32.2-39.1 % SL (vs. 28-31.9 % SL). *Puntius rohani* sp. nov. also has a narrower interorbital width of 9.0-11.1% SL (vs. 11.2-12.2 % SL in *P. filamentosus*). It further differs in meristic characters such as lateral line scale count of 21-23 + 1 (vs. 18-20 + 1-3 in *P. filamentosus* and 19-20 in *P. assimilis*), and pectoral fin with 1 simple and 13-14 branched rays (vs. 15 in *P. arulius*, *P. tambraparniei* and *P. srilankensis*). It is likely that the locality name 'Periyakulam' mentioned by Indra (1992) is in fact Palkulam (8.371°N & 77.407°E), which is in the same west-flowing drainage, close to the type locality, while Periyakulam (10.050°N & 77.593°E) is on the Vaigai River, which is an east-flowing drainage in Theni District, more than 200km distant from the type locality.

According to Pethiyagoda & Kottelat (2005a), though *P. exclamatio* belongs to the *P. filamentosus* Group, adult males were not known to have filamentous extensions to their dorsal-fin branched rays. Specimens of *P. exclamatio* (see Image 3H) collected from the Kallada River, however, exhibit such filamentous extensions and we speculate that the males examined by Pethiyagoda & Kottelat (2005a) may have had the extensions absorbed during the season in which they were collected (March-April, the end of the dry season in Kerala). Interestingly, during the present study we also encountered a few female specimens of *P. filamentosus* collected from Chembarampakkam Lake (13.000°N & 80.082°E) in the outskirts of Chennai, and Vaigai Dam in Theni District, Tamil Nadu, with filamentous extensions of the dorsal-

fin branched rays (Image 5), which suggests that this character is not always sexually dimorphic. Moreover, we also observed that male *P. filamentosus* maintained in aquaria by the third author shed their dorsal-fin filaments, which grow back after some time (Image 6). We also examined specimens (Image 4I) from the Cauvery River near Bhavani Town, (ZSI/SRS F.79), which resembled *P. assimilis* but had a deeper body, the black band near the caudal fin tips very small and faint, and the shape of the caudal blotch more rounded than elongate (Image 3I). We propose to elucidate the identity of this fish in a subsequent work.

Jerdon (1848) described *P. maderaspatensis*, which has been considered a synonym of *P. filamentosus* (Pethiyagoda & Kottelat 2005a). We collected specimens from the lakes around Sriperambathur (12.970°N & 80.031°E), the type locality of *P. maderaspatensis*. As mentioned by Jerdon (1848), some males from this locality possess bright red caudal fins (Image 7), apart from which they resemble *P. filamentosus*: we too, tentatively treat *P. maderaspatensis* as a synonym of *P. filamentosus* pending further investigation. As stated by Pethiyagoda & Kottelat (2005a) the waters of Tamil Nadu and Kerala have been inadequately explored. Systematic surveys are likely to add more species to this interesting group of fishes.

Comparative material

***Puntius filamentosus*:** 03.ii.2010, 4 ex., 84.0-113.0 mm SL, Vaigai Dam, Vaigai River drainage, ZSI/SRS F.8367; 12.x.2009, 7 ex., 79.0-116.0 mm SL, Chembarampakam Lake, Adyar River drainage, all coll. J.D. Marcus Knight, ZSI/SRS F.8368; November 2003, 4 ex., 60.0-74.0 mm SL, Gundia River drainage, Kodagu District, ZSI/SRS F.7630; 12.ii.1998, 1 ex., 122.0mm SL, Aliyar River drainage, ZSI/SRS F.5611; 24.ii.1998, 53 ex., 59.0-107.0 mm SL, Amaravathi Dam, Amaravathi River drainage, ZSI/SRS F.5664; 25.ii.1998, 34 ex., 63.0-109.0 mm SL, Punganodai, Amaravathi River drainage ZSI/SRS F.5676; 26.ii.1998, 15 ex., 69.0-110.0 mm SL, Kuduthurai, Bhavani River drainage, ZSI/SRS F.5689; 27.ii.1998, 1 ex., 37.0mm SL, Thirumurthi Dam, Palar River drainage, ZSI/SRS F.5710; 28.ii.1998, 8 ex., 30.0-39.0 mm SL, Navalodai, Amaravathi River drainage, all coll. M.S. Ravichandran, ZSI/SRS F.5726; 18.ix.2006, 1 ex., 23.0mm SL, Farangipet, Nethravathi River drainage, coll. S. Prababakaran, ZSI/SRS F.7962; 11.ii.1996, 4 ex., 100.0mm SL, Aliyar canal, Aliyar River drainage, ZSI/SRS F.4908; 11.ii.1996, 14 ex., 85.0-135.0 mm SL, Thirumurthi Dam, Palar River drainage, ZSI/SRS F. 4911; 08.ii.1996, 1 ex., 45.0mm SL, Kallapuram, Amaravathi River drainage, ZSI/SRS F.4931; 13.viii.1997, 1 ex., 38.0 mm SL, Devikulam, Chinnar River drainage, ZSI/SRS F.5320; 15.viii.1997, 1 ex., 36.0mm SL, Valparai, Chalakudi River drainage, ZSI/SRS F.5337; 16.viii.1997, 1 ex., 15.0mm SL, Aliyar, Aliyar River drainage, ZSI/SRS

F.5392; 18.xii.1997, 1 ex., 135.0mm SL, Amaravathi Dam, Amaravathi River drainage, ZSI/SRS F. 5430; 09.viii.1997, 1 ex., 55.0mm SL, Kozhumam, Amaravathi River drainage, ZSI/SRS F.5342; 09.viii.1997, 1 ex., 34.0mm SL, Kallapuram, Amaravathi River drainage, all coll. M.B. Raghunathan, ZSI/SRS F.5351.

***Puntius tambraparniei*:** 11.i.2010, 1 ex., 57.0mm SL, Tamiraparani River drainage, ZSI/SRS F.8369; 11.i.2010, 1 ex., 14.0mm SL, Tamiraparani River drainage, all coll. J.D. Marcus Knight, ZSI/SRS F.8370; 09.i.1995, 3 ex., 39.0-67.0 mm SL, Maradur Anicut, Tamiraparani River drainage, coll. Mary Bai, ZSI/SRS F.8371; 09.iv.1994, 4 ex., 44.0-128.0 mm SL, Sankaran Koil, Tamiraparani River drainage, coll. M.S. Ravichandran, ZSI/SRS F.4232; 19.iv.1994, 1 ex., 35.0mm SL, near Cheramadevi, Tamiraparani River drainage, ZSI/SRS F.4202; 09.iv.1995, 20 ex. 55.0-90.0 mm SL, Papanasam, Tamiraparani River drainage, all coll. M.B. Raghunathan, ZSI/SRS F.4452.

***Puntius cf. assimilis*:** 09.iv.1973 / 15.ii.1979, 9 ex., 40.0-84.0 mm SL, Cauvery River drainage near Bhavani Town, coll. K.C. Jayaram, labelled as *P. filamentosus*, ZSI/SRS F.79.

***Puntius assimilis*:** 02.iv.1992, 6 ex., 60.0-98.0 mm SL, Athirapally Falls, Chalakudi River drainage, coll. K.B. Jegadeesh & R. Kannan, ZSI/SRS F.8372.

***Puntius arulius*:** 07.xii.1985, 1 ex., 74.0mm SL, Bhavani River drainage, Coorg District, Karnataka, ZSI/WGRC F.3954; 10.iii.1990, 3 ex., 65.0-80.0 mm SL, Mavanahalla, Moyar River drainage, Coorg District, Karnataka, all coll. K.N. Nair, ZSI/WGRC F.5077; 2 ex., 74.0-96.0 mm SL, Kabini River, (date: unknown), coll. R.S. Lal Mohan, ZSI/SRS, F.8373.

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Author Contributions: KRD carried out the morphometric study of the new species. TJI was the first to report this species in the year 1992 and has provided specimens for the present study. JDMK also provided specimens for study. He has studied the *Puntius filamentosus* of Tamil Nadu, specially the ones around Chennai for the past two years. All observations regarding *Puntius filamentosus* maintained in aquariums and all photographs except those acknowledged for were provided by him.