



A new species of barb *Puntius nigripinnis* (Teleostei: Cyprinidae) from southern Western Ghats, India

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Author Contribution: JDMK carried out the study of the entire *P. ticto* group. KRD and TJI carried out the morphometric study of the new species. MA provided specimens for study and also helped in the study of the new species.

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Abstract: *Puntius ticto*, a widely distributed barb, was long believed to have many variants. Recent research has shown that what was earlier known as *P. ticto* in different regions of India comprised of many similar looking species such as *P. manipurensis*, *P. muvattupuzhaensis*, *P. pookodensis*, among others. As yet another addition to this complex, we describe *Puntius nigripinnis* sp. nov. from the Nilgiris and Wyanad area of the southern Western Ghats. *Puntius nigripinnis*, sp. nov., is distinguished from all other congeners by lacking barbels and having the last unbranched dorsal ray serrated; 20–21 lateral line scales; lateral line incomplete, piercing 3–5 scales; dorsal, anal, pelvic and pectoral fins black in adult males; body pattern consisting of a humeral mark on the 3rd or 4th lateral-line scale and a second larger, band-like spot on the 18th and 19th scale, forming a ring around the caudal peduncle, and only two scales between the second spot and the root of the caudal fin.

Keywords: *Puntius*, *P. ticto*, new species, Western Ghats.

INTRODUCTION

Hamilton (1822) first described *Puntius ticto* from the “southeastern parts of Bengal”, as a small fish with a spotted dorsal fin and two black spots on the body, one on the lateral line above the pectoral fin and the other near the end of the tail. The other significant characteristics given in the original description include the second unbranched dorsal ray being serrated, the body greenish-silver, the fins pale greenish and in mature individuals slightly stained with red, the absence of barbels and the lateral line being scarcely distinguishable. Subsequently, Day (1878) gave a clearer description of *P. ticto* and distinguished it from *P. stoliczkanus* and *P. punctatus*, which he had described, by the presence of an incomplete lateral line (vs. a complete lateral line in the other two species). Hora (1937) and Hora et al. (1939) treated *P. stoliczkanus* and *P. punctatus* as synonyms of *P. ticto* while Silas (1952) considered *P. stoliczkanus* and *P. punctatus* to be subspecies of *P. ticto*. Jayaram (1991), in his revision of *Puntius*, once again brought *P. stoliczkanus* and *P. punctatus* under the synonymy of *P. ticto*. Talwar & Jhingran (1991) considered *P. stoliczkanus* and *P. punctatus* as synonyms of *P. ticto*. Though other authors recognized *P. stoliczkanus* and *P. punctatus* as valid species (Menon et al. 2000; Beevi & Ramachandran 2005; Mercy & Jacob 2007), it was the redescription of both *P. ticto* and *P. stoliczkanus* by Linthoingambi & Vishwanath (2007) that clearly distinguished the two species. Recent studies of this group of fish led to the descriptions of several new species such as *P. manipurensis* (Menon et al. 2000), *P. muvattupuzhaensis* (Beevi & Ramachandran 2005), *P. pookodensis* (Mercy & Jacob 2007), *P. ater* (Linthoingambi &



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Vishwanath 2007) and *P. khugae* (Linthoingambi & Vishwanath 2007).

During an examination of the specimens deposited in the Southern Regional Centre, Zoological Survey of India and Sri Paramakalyani Centre for Environmental Sciences, Manonmaniam Sundaranar University, the presence of one more valid species similar to *P. ticto*, collected from the Nilgiris and Wyanad area of the Western Ghats was discovered, which in this paper we describe as *P. nigripinnis* sp. nov.

MATERIALS AND METHODS

The material for the present study are based on recent collections from Nilgiris by the scientists of the Southern Regional Centre, Zoological Survey of India and specimens from Kalindhi Stream of river Kabini, Wyanad, in the collections of Sri Paramakalyani Centre for Environmental Sciences. The specimens used in this study are registered in the collections of the Southern Regional Centre, Zoological Survey of India, Chennai (ZSI/SRC) and the private collections of J.D. Marcus Knight (PCJDMK). Measurements were made with dial calipers to the nearest 0.1mm. All quantification of characters is as per Meegaskumbura et al. (2008). Subunits of body are expressed as percentage of Standard Length (SL). Subunits of the head are expressed in proportions of both head length (HL) and standard length (SL).

Puntius nigripinnis sp. nov. (Image 1)

Material examined

Holotype: 21.ix.2002, 45.0mm SL, Kalindhi stream of river Kabini, Wyanad, Kerala, India, (~ 11°47'N & 76°4'E), coll. M. Arunachalam (ZSI/SRC F. 6628).

Paratypes: 21.ix.2002, 3 exs., 33.0–38.0 mm SL, Kalindhi stream of river Kabini, Wyanad, Kerala, India, (~ 11°47'N & 76°4'E), coll. M. Arunachalam (ZSI/SRC F. 6629); 15.ii.1992, 2 exs., 34.0–39.0 mm SL, F. 6578, elevation 1000m, Kakkana halla, Moyar River, Tamil Nadu, India, (~11°34'N & 76°49'E), Coll. G. Thirumalai. (Image 2 A).

Diagnosis

Puntius nigripinnis sp. nov. can be distinguished from its congeners by the absence of barbels and having the last unbranched dorsal ray serrated; 20–21 scales in lateral series; lateral line incomplete, piercing 3–5 scales; dorsal, anal, pelvic and pectoral fins black in adult males; body pattern consisting of a black humeral spot on the 3rd or 4th lateral-line scale and a second larger spot on the 18th and 19th scale, which appears as more of a band, forming a ring around the caudal peduncle; and only two scales between the second spot and the hypural notch.

Description

Morphometric data are presented in Table 1. General body shape and appearance as in Images 1, 2 A and 3. Body moderately deep, laterally compressed; dorsal contour ascending anteriorly, with a low indentation



Image 1. *Puntius nigripinnis* sp. nov., holotype, 45.0 mm SL, ZSI / SRC F. 6628.

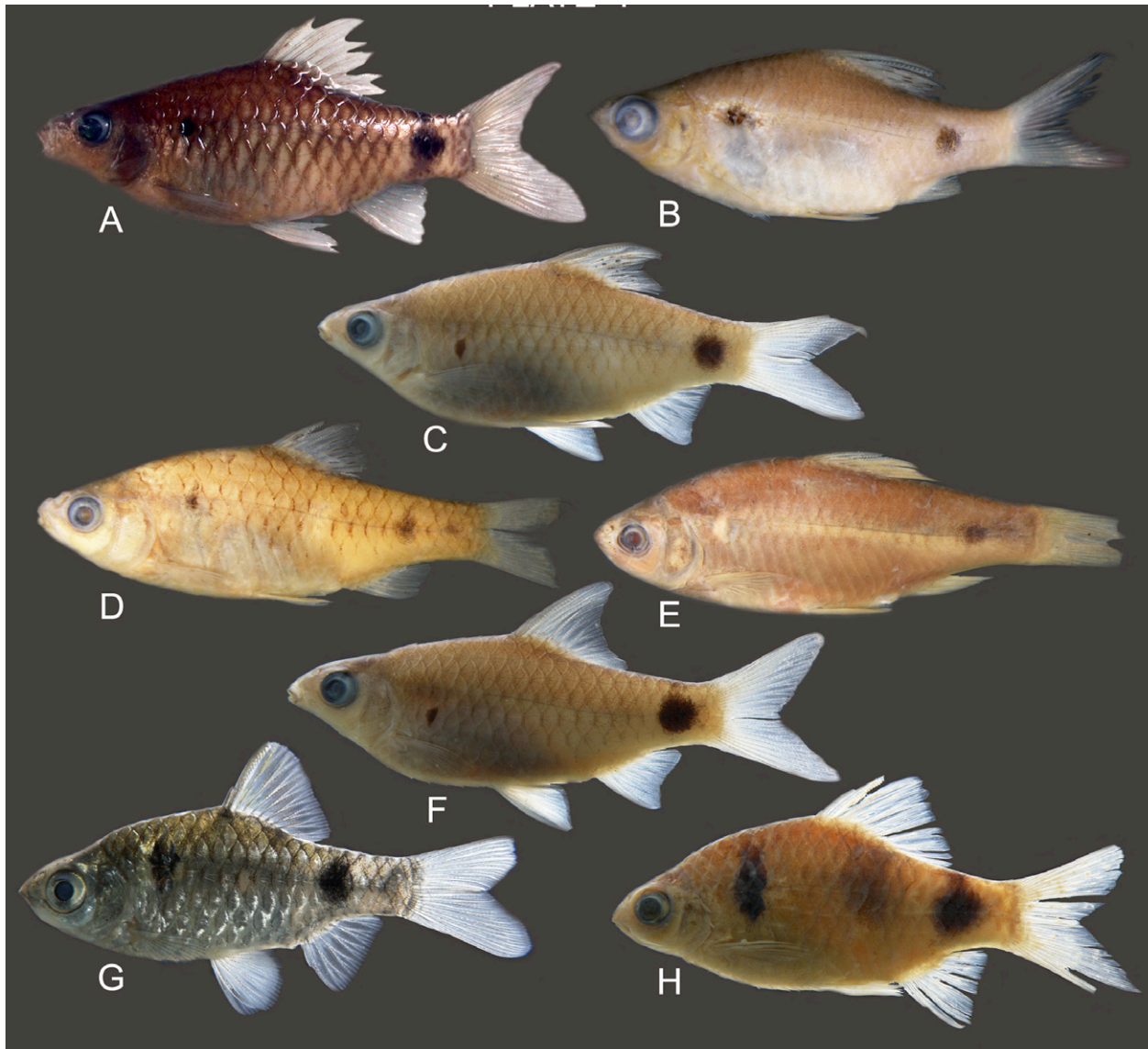


Image 2. A - *Puntius nigripinnis* sp. nov. paratype (female), ZSI/SRC F. 6629; B - *P. ticto*, ZSI/SRC F6630; C - *P. punctatus*, ZSI/SRC F 8272; D- *P. pookodensis*, paratype, ZSI/SRC F 7636; E - *P. manipurensis*, ZSI/SRC F8550; F - *P. muvattupuzhaensis*, ZSI/SRC F8465; G - *P. phutunio*, PCJDMK 045; H - *P. setnai*, ZSI/SRC F6127

at nape, slightly convex anterior to dorsal-fin origin, tapering gradually posterior to dorsal-fin insertion; ventral profile equally convex anterior to pelvic-fin origin, curving gently up to anal-fin origin, thence sloping upward towards caudal peduncle; caudal peduncle deep, its depth a little less than its length, concave in both dorsal and ventral profiles. Head small, snout rounded. with a small hump at the end. Mouth sub-terminal, lateral fold on the snout present. Barbels absent, lips thick, U-shaped. Distance from snout tip to posterior edge of maxilla approximately 8% SL. Eye large, its centre placed in the upper half of the head, approximately 30% HL. Dorsal-fin with

three simple and eight branched rays, the last simple ray strongly serrated posteriorly. Dorsal-fin origin slightly behind pelvic-fin origin, inserted midway between tip of snout and base of caudal fin. Pelvic fin with one simple and 7(1) or 8(5) branched rays. Anal fin with three simple and five branched rays. Pectoral fin with 1 simple and 12(5) or 13(1) branched rays. Pectoral and pelvic fins short, not reaching pelvic and anal-fin origins respectively. Caudal fin with 19 rays, deeply forked. Scales in lateral series 20(3) or 21(3); lateral line incomplete, piercing only the anteriormost 3–5 scales. Transverse scales from dorsal-fin origin to ventral fin origin $\frac{1}{2}4+1+2(4)-2\frac{1}{2}$ (2). Predorsal scales

Table 1. Morphometric data for *Puntius nigripinnis* sp. nov. holotype (ZSI SRC F 6628) and paratypes (ZSI SRC F 6629, 3 exs. and ZSI SRC F 6578, 2 exs.)

Characters	Holotype	Range	Mean (\pm SD)
Standard length [mm]	45.0	33.0–45.0	
% SL			
Head length	31.6	27.9–31.6	29.8 \pm 1.4
Head depth	25.0	21.7–25.1	23.7 \pm 1.3
Body depth	40.1	37.2–41.7	40.0 \pm 1.5
Body width	17.5	15.2–18.6	17.3 \pm 1.2
Snout length	10.2	8.2–10.9	9.3 \pm 1.1
Eye diameter	8.1	8.0–9.7	8.9 \pm 0.5
Inter orbital width	10.0	9.7–10.5	10.0 \pm 0.2
Pre–dorsal distance	52.8	51.0–54.4	52.2 \pm 1.2
Dorsal to hypural distance	50.1	48.2–54.1	50.7 \pm 2.2
Pre pelvic distance	49.7	46.1–52.4	49.4 \pm 2.4
Pre anal distance	72.0	67.1–76.5	72.1 \pm 3.2
Pre pectoral distance	32.4	27.4–33.2	30.1 \pm 2.2
Dorsal fin height	26.2	20.2–26.6	24.8 \pm 2.4
Pectoral fin length	25.3	23.9–28.8	25.5 \pm 1.7
Anal fin depth	19.7	15.8–19.7	18.0 \pm 1.2
Caudal peduncle length	14.0	14.0–17.3	15.9 \pm 1.4
Caudal peduncle depth	15.3	14.2–15.9	15.1 \pm 0.5
% HL			
Head depth	79.2	70.4–89.9	80.1 \pm 6.9
Head width	56.3	51.1–60.5	56.0 \pm 3.9
Snout length	32.3	28.4–35.4	31.2 \pm 2.6
Eye diameter	25.6	25.6–33.3	30.1 \pm 2.9
Inter orbital distance	31.6	31.5–36.7	33.9 \pm 2.1

eight, prepelvic scales 9(4) or 10(2); 18 circumferential scales and 10(1), 11(3) or 12(2) circumpeduncular scales. Pelvic axillary scale present, its length less than half length of pelvic fin. Gill rakers 2–3 + 5–6 on first gill arch.

Coloration

Formalin-fixed and alcohol-preserved male specimens are dark brown with a black humeral spot on the 4th lateral-line scale, with a larger black spot on the 18th and 19th scale, that has the appearance more of a black band, forming a ring around the caudal peduncle. Dorsal, pectoral, pelvic and anal fins black in mature males. The outer edges of each scale heavily pigmented. Female specimens are not as dark as males and all fins are hyaline.

Etymology

Named for the black fins in males; niger (Latin) = black and pinna (Latin) = fins. The name is a noun in apposition.

Distribution

Puntius nigripinnis sp. nov. is at present known only from Kakkana Halla, Moyar River drainage in the Nilgiris, and the Kalindi Stream in the Wyanad area of the southern Western Ghats (Image 4).



Image 3. Adult male *Puntius nigripinnis* sp. nov. (unregistered live), 35.0mm SL, collected from Kalindi River, Kerala, India (~11°54'N & 75°59'E), coll. Rahul G. Kumar.

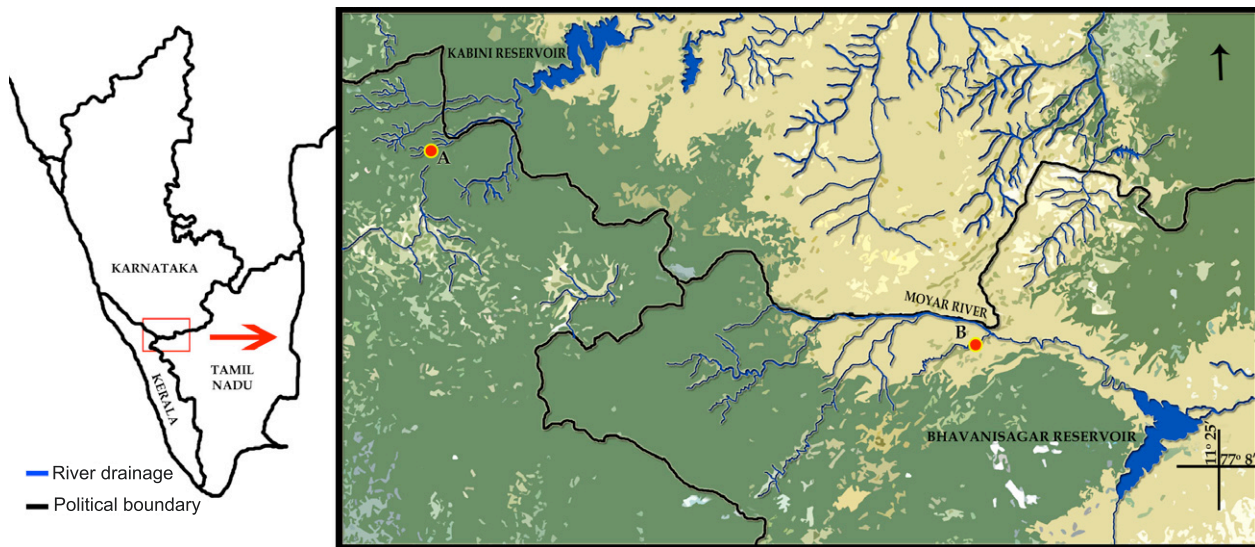


Image 4. Currently known distribution of *Puntius nigripinnis* sp. nov.
A - Kalindi stream in Wyand (~ 11°47'N & 76°4'E); **B** - Kakkan Halla, Moyar River (~11°34'N & 76°49'E).

DISCUSSION

Puntius ticto Hamilton (1822) (Image 2B) is a small fish with a spotted dorsal fin and two spots on the body, one on the lateral line above the pectoral fin and the other near the end of the tail, previously believed to be widespread across the Indian subcontinent. Subsequent researchers have shown that there are a few more species similar to *P. ticto*, having two spots on the body. The first being *P. punctatus* (Day, 1865) (Image 2C) followed by *P. stoliczkanus* (Day, 1871). More recently, species such as *P. manipurensis* (Menon et al., 2000) (Image 2E), *P. muvattupuzhaensis* (Beevi & Ramachandran, 2005), *P. pookodensis* (Mercy & Jacob, 2007) (Image 2D) *P. ater* (Linthoingambi & Vishwanath, 2007) and *P. khugae* (Linthoingambi & Vishwanath, 2007) were added to this species group. *Puntius nigripinnis* sp. nov. is evidently a distinct species as it can be clearly distinguished from all the above superficially similar-looking congeners. *Puntius nigripinnis* sp. nov. can be easily distinguished from *P. punctatus*, *P. stoliczkanus* and *P. muvattupuzhaensis* by the presence of an incomplete lateral line (vs. complete in the other species). It can be further distinguished by its lower number of scales in the lateral series (20–21 vs. 22–26 in *P. ticto*, 23–24 in *P. punctatus*, 21–24 in *P. stoliczkanus*, *P. manipurensis* and *P. muvattupuzhaensis*). *Puntius nigripinnis* sp. nov. can also be distinguished from *P. ticto*, *P. pookodensis* and *P. manipurensis* by the lower

number of lateral transverse scale rows, 2–2½ between lateral-line scale row and ventral fin (vs. 5½ in *P. ticto* and *P. stoliczkanus* and 3½ in *P. manipurensis* and *P. pookodensis*).

The location of the spots on the body also distinguishes *P. nigripinnis* from similar-looking congeners: the humeral spot is present on the 3rd–4th scale of the lateral line, vs. 4th–5th scale below the lateral line in *P. punctatus* and *P. muvattupuzhaensis*. The larger second spot on the caudal peduncle on the 18th and 19th scale is more of a band, forming a ring around the caudal peduncle and only two scales between the spot on the caudal peduncle and the root of the caudal fin compared to a clear spot not forming a band and 4–5 scales in between the spot on the caudal peduncle and the root of the caudal fin in *P. ticto*, *P. stoliczkanus*, *P. manipurensis*, and *P. pookodensis*. *Puntius nigripinnis* sp. nov. possesses only eight predorsal scales compared to nine in *P. stoliczkanus* and *P. manipurensis*, and 9–10 in *P. ticto*.

Puntius nigripinnis sp. nov. can also be distinguished from *P. setnai* (Image 2G) by having an incomplete lateral line vs. complete; having eight predorsal scales vs. seven. It further differs from *P. setnai* in body markings, by having the humeral mark spread two scales wide and one scale high, vs. 2–3 scale wide and 3–4 scale high in *P. setnai*. It also differs from *P. setnai* in the absence of the grey patch below the dorsal-fin, which is prominent in the latter.

Two other barbs similar to *P. nigripinnis* from

northeastern India are *P. phutunio* (Image 2F) and *P. bizonatus*. *Puntius nigripinnis* sp. nov. can be distinguished from these by possessing two spots, a humeral spot and a caudal-peduncle spot, vs. four spots on the body in *P. phutunio*, the humeral spot replaced by a bar transversely on the 3rd and 4th scale in *P. bizonatus* (Vishwanath & Laisram 2004). It can further be distinguished from the other two species by having 2–2½ scales between the lateral line scale row and ventral fin, and eight predorsal scales, vs. three scales between lateral line scale row and ventral fin and nine predorsal scales in *P. phutunio*. *Puntius nigripinnis* sp. nov. also differs from *P. bizonatus* in having 2–3 + 5–6 gill rakers vs. 5 + 15–18 in the latter (Vishwanath & Laisram 2004).

The other barbs from northeastern India that can be compared to *P. nigripinnis* sp. nov. are *P. shalynius*, *P. ater* and *P. khugae*. However all these three species can be readily distinguished from *P. nigripinnis* sp. nov. by the absence of the humeral spot vs. presence in *P. nigripinnis* sp. nov. It can further be distinguished from *P. shalynius* by the presence of a single spot in the caudal peduncle vs. two and eight predorsal scales vs. 9–10 in *P. shalynius*. *Puntius nigripinnis* sp. nov. can also be distinguished from *P. ater* and *P. khugae* by the lesser number of lateral-line scales (20–21 vs. 25–29 and 28–30 in *P. ater* and *P. khugae* respectively); 2½ scales between lateral line and ventral fin origin of *P. nigripinnis* sp. nov. can further distinguish it from *P. ater* and *P. khugae* which have 5½ scales between lateral line and ventral-fin origin (Linthoingambi & Vishwanath 2007). The characteristic dark longitudinal band present in both *P. ater* and *P. khugae* (Linthoingambi & Vishwanath, 2007) is absent in *P. nigripinnis* sp. nov.

Similarly, *P. nigripinnis* can be distinguished from the closely resembling Sri Lankan congeners, *P. cumingii* and *P. reval* by having ½4+1+2–2½ transverse scales from dorsal fin origin to mid-ventral scale row vs. ½3+1+3½ in the other two species. Moreover, *P. nigripinnis* sp. nov. differs from *P. cumingii* and *P. reval* by having the humeral spot covering only two scales compared to the humeral spot being more of a bar being 3 scale wide in *P. cumingii* and *P. reval*. The dorsal fin of male *P. nigripinnis* sp. nov. is black while the dorsal fins of *P. cumingii* and *P. reval* are either yellow or red (Meegaskumbura et al. 2008).

The other species with two spots on the body from

Myanmar are *P. macrogramma* and *P. tiantian*, which can be distinguished from *P. nigripinnis* sp. nov. by complete lateral line scales vs. incomplete in the latter (Kullander & Fang 2005; Kullander 2008). *Puntius nigripinnis* sp. nov. can further be distinguished from *P. macrogramma*, *P. tiantian* and *P. didi* by having 2–2½ scales between lateral line scale row and ventral fin vs. four scales in *P. macrogramma*, and 3½ scales in *P. tiantian* and *P. didi* (Kullander & Fang 2005; Kullander 2008). In addition, *P. nigripinnis* sp. nov. differs from *P. tiantian* and *P. didi* by having a humeral spot compared to the humeral blotch being more of a bar gradually becoming narrower at the level of pectoral fin in *P. tiantian* and *P. didi*. The dorsal fin of male *P. nigripinnis* sp. nov. is black while the dorsal fins of *P. tiantian* and *P. didi* are either yellow or pinkish with one or two rows of spots (Kullander & Fang 2005). *Puntius nigripinnis* sp. nov. can also be differentiated by its thick and strongly serrated unbranched dorsal fin ray compared to the flexible and short serrated unbranched dorsal fin ray of *P. tiantian* (Kullander & Fang 2005).

Puntius ticto which was earlier known to be a single species is quite evidently a complex of many closely related species. The hill streams of Western Ghats have been inadequately explored. Systematic surveys are likely to add more species to this interesting group of fishes.

Conservation importance

As *Puntius nigripinnis* sp. nov. is known only from a small pocket of the southern Western Ghats, the area needs considerable protection. As Western Ghats are already known to have high levels of endemism, especially amongst lower vertebrate animals, conservation of specialized ecosystems is of high priority. Protection of fast-flowing streams, prevention of the use of pesticides and other agrochemicals in the upper catchments and regulation of tourism in critical habitats would play an important role in protecting the unexplored freshwater habitats of the Western Ghats.

Comparative material

***Puntius ticto*:** ZSI/SRC F8546, 3 exs. 16.0–18.0 mm SL, Barjuri Dhan Shree River, coll. D.K. Gupta, 23.xi.1994; ZSI/SRC F6630, 5 exs. 24.0–33.0 mm SL, Kulsi River, coll. Lal Mohan, 4.xi.1994; ZSI/SRC F6579, 3 exs. 47.0–60 mm SL, Megna River;

ZSI/SRC F8547, 5 exs. 27.0–36.0 mm SL, coll. D. K. Gupta, 14.xi.1994; ZSI/SRC F8548, 2 exs. 46.0–48.0 mm SL Dibruigarh ox bow lake, coll. D.K. Gupta, 24.xi.1994; ZSI/SRC F8549, 1 ex. 37.0mm SL, Nimati Ghat, Majuli, Brahmaputra River, coll. D.K. Gupta, 22.xi.1994.

***Puntius pookodensis*:** Paratypes, ZSI/SRC F 7636, 21 exs. 26.0–42.0 mm SL, Pookode Lake, Kerala, coll. Eapen Jacob, Nov. 2004.

***Puntius manipurensis*:** ZSI/SRC F8550, 4 exs, 54.0–62.0 mm SL, Loktak Lake, Manipur, coll. W. Vishwanath, April 1995.

***Puntius punctatus*:** ZSI/SRC F 8272, 3 exs. 38.0–40.0 mm SL, Mangai Malai, Kulasekaram, Kanyakumari WLS, coll. Aengals, 21.xii.2008; ZSI/SRC F8545, 2 exs. 40.0–42.0 mm SL, Pookode Lake, Kerala, coll. Anna Mercy; ZSI/SRC F4339, 13 exs. 29.0–37.0 mm SL, Mathalamparai, Tirunelveli District, coll. Ravichandran, 17.iii.1995.

***Puntius muvattupuzhaensis*:** ZSI/SRC F8465, 5 exs. 39.0–45.0 mm SL, Muvattupuzha River, Kerala, coll. Zeena, 8.ix.2010.

***Puntius setnai*:** ZSI/SRC F6127, 10 exs. 18.0–40.0 mm SL, Kukke Subramanya, Karnataka, coll. G. Thirumalai, 15.iv.1999; ZSI/SRC F8544, 3 exs. 36.0–41.0 mm SL, Stream in Agumbe, coll. P. K. Pramod, Jan. 2008; ZSI/SRC F6113, 1 ex. 39.0mm SL, Sowparnika River, coll. G. Thirumalai, 13.iv.1999.

***Puntius phutunio*:** PCJDMK 045, 20 exs. 14.0–19.0 mm SL, Ponds in Udayrampur Village, P.S. Bishnupur, south 24 Parganas District, West Bengal, Coll. Andrew Rao, February 2011.

***Puntius shalynius*:** ZSI/SRC F 7150, 1 ex. 40mm SL, Ri-bhoi district, Meghalaya-Asssam border, coll. S.K.Das, 2002.

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Key to the fishes similar to *Puntius ticto* with two spots on the body (humeral and peduncular) from India.

1. Lateral line complete.....2
Lateral line incomplete.....5
2. Humeral spot one scale below lateral line.....3
Humeral spot on lateral line.....4
3. Dorsal fin with rows of spots.....*P. punctatus*
Dorsal fin without spots.....*P. muvattupuzhaensis*
4. Predorsal scales 7 and 20 lateral line scales.....*P. setnai*
Predorsal scales 8-10 and 25 lateral line scales*P. stoliczkanus*
5. Humeral spot large covering more than one scale transversely.....6
Humeral spot small covering one scale or less transversely7
6. 2 scales between lateral line scale row and ventral fin.....*P. bizonatus*
3 scales between lateral line scale row and ventral fin.....*P. phutunio*
7. Lateral line with 21 scales or less..... ***P. nigripinnis* sp. nov.**
Lateral line with 22 or more scales.....8
8. 5- 5 ½ scales between lateral line scale row and ventral fin.....*P. ticto*
3 ½ scales between lateral line scale row and ventral fin.....9
9. Humeral spot on lateral line and 22-23 lateral line scales*P. pookodensis*
Humeral spot slightly above lateral line and 24-25 lateral line scales.....*P. manipurensis*



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