

## THE IDENTITY OF THE SOUTH INDIAN BARB *PUNTIUS MAHECOLA* (TELEOSTEI: CYPRINIDAE)

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**ABSTRACT.** – *Leuciscus mahecola* Valenciennes has long been placed in the synonymy of *Leuciscus filamentosus* Valenciennes (both species are currently referred to *Puntius* Hamilton). An examination of the syntype series of *P. mahecola* together with specimens collected recently in Kerala, India, shows however, that it is a valid species that has been referred in the current literature to *P. amphibius* (Valenciennes). *Puntius mahecola* is distinguished from other southern Indian and Sri Lankan *Puntius* species by having the last simple dorsal ray smooth; body depth 27.2–32.0% SL; a single pair of (maxillary) barbels, about ½ eye diameter long; and a horizontally-elongate black blotch about 1½ times as wide as it is high across 3½ scales of the lateral line immediately behind the anal-fin base. Lectotypes are designated for *Leuciscus mahecola* and *Capoeta amphibia*, and the former species redescribed based on the type specimens and a recently-collected series. A lectotype is designated for *Barbus melanostigma* Day, which is a junior subjective synonym of *P. mahecola*.

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### INTRODUCTION

*Leuciscus mahecola* Valenciennes (in Cuvier & Valenciennes, 1844: 305) has been considered a synonym of *Leuciscus filamentosus* Valenciennes (in Cuvier & Valenciennes, 1844: 96) by many authors, e.g. Sundara Raj (1916), Hora (1937), Talwar & Jhingran (1991) and Jayaram (1981, 1991). Both species are now placed in *Puntius* Hamilton, 1822. In the course of studying material for a revision of fishes closely related to *P. filamentosus* (see Pethiyagoda & Kottelat, 2005, this volume), we examined also the six syntypes of *P. mahecola* and found that they represent a species clearly distinguishable from and not even closely related to *P. filamentosus*. *Puntius mahecola* turns out to be a valid species that is distributed widely throughout Kerala State, and is in fact the species described and illustrated as *P. amphibius* by Jayaram (1991: 61–64), who evidently followed the description and illustration provided by Day (1878: 575, pl. 142, fig. 8; see Fig. 1).

Here we redescribe *P. mahecola* based on the syntypes and recent collections from Kerala, India, discuss its synonymy and comment on the identity of *P. amphibius*.

### MATERIALS AND METHODS

Methods for taking counts and measurements follow Pethiyagoda & Kottelat (2005) (this volume). Acronyms: International Commission on Zoological Nomenclature (ICZN); The Natural History Museum, London (BMNH); Muséum National d'Histoire Naturelle, Paris (MNHN); Collection of Maurice Kottelat, Cornol, Switzerland (CMK); Naturhistorisches Museum Wien (Vienna), (NMW); Wildlife Heritage Trust of Sri Lanka, Colombo (WHT); Zoological Survey of India, Calcutta (ZSI).

Spellings for Indian and Sri Lankan place names follow the “Map for Southern India including Sri Lanka” by Nelles Verlag, München (ISBN 3-88618-606-7; no year of publication).

**TAXONOMY**

***Puntius mahecola* (Valenciennes, 1844)**

(Figs. 2, 3; Table 1)

*Leuciscus mahecola* Valenciennes, in Cuvier & Valenciennes, 1844: 305, pl. 502.

**Material examined.** – Lectotype - (present designation) MNHN 3896, 50.7 mm SL, “Mahé (Inde)” [India: Kerala: Mahe], Dussumier, coll. 1835.

Paralectotypes – MNHN 2005-0007, 5, 48.7–56.5 mm SL, same data as lectotype.

Others - (all from Kerala State, India). WHT 0367, 1 ex., 71.0 mm SL; WHT 0330, 1 ex., 89.0 mm SL, Chalakudy River at Parambikulam, 26 km from Chalakudy on Valparai road, 9 Jun.1993. WHT 0333, 4 ex., 50.0–75.6 mm SL, Veliyandi, near Alleppey, 16 Sep.1993. WHT 6256, 1 ex., 77.1 mm SL; WHT 6254, 3 ex., 55.2–80.0 mm SL, Vembanad Lake, at Kumarakom (near Kottayam), 20 Mar.1996. WHT 0360, 1 ex., 57.7 mm SL, Thrissur, on road to Peechi Dam, 5 Jun.1993. WHT 0325, 4 ex., 58.5–66.9 mm SL, Chalakudy Market, 9 Jun.1993. CMK 8739, 3 ex., 51.0–87.7 mm SL, Koodel, between Punalur and Pattanampuram, 50 km north of Trivandrum, 12 Mar.1992. CMK 8361, 7 ex., 48.3–64.8 mm SL, Alleppey, SW corner of Vembanad Lagoon, 28 Mar.1992. CMK 9371, 5 ex., 34.2–60.7 mm SL, Kaidhappoil, 51 km east of Calicut on road to Vyrthry, between Kedavur and Vyrthry, 15 Nov.1992. CMK 8671, 11 ex., 59.8–68.5 mm SL, Kumaram, SE corner of Vembanad Lagoon, about 12 km from Kottayam, 17 and 28 March 1992. CMK 8572, 5 ex., 43.0–51.2 mm SL, river 5 km south of Pathanamthitta, approx. 120 km north of Trivandrum, 13 Mar.1992. CMK 8736, 3 ex., 47.6–54.7 mm SL, about 1 km upstream of Panamkulam, approx. 27 km from Chalakudy on Chalakudy–Valparai road, 20 Mar.1992. CMK 8651, 1 ex., 54.6 mm SL, Minmutti, a waterfall on Kallar River approx. 30 km NE of Trivandrum; and a 2 km stretch upstream, altitude 300 m, 9 Mar.1992. CMK 8606, 5 ex., 71.7–87.0 mm SL, Periyar River at Rani, approx. 15 km N of Pathanamthitta, 13 Mar.1992. CMK 8688, 3 ex., 49.2–58.7 mm SL, Kalladar River near Pattanampuram, 13 Mar.1992.

**Diagnosis.** – *Puntius mahecola* is distinguished from all other *Puntius* recorded from southern India and Sri Lanka by the following combination of characters: last simple dorsal ray smooth; body depth 27.2–32.0% SL; a single pair of (maxillary) barbels, about ½ eye diameter long; 22–23 +1–3 lateral-line scales; ½4+1+3½ transverse rows of scales; a horizontally-elongate black blotch about 1½ times as wide as it is high across 3½ scales of lateral line immediately behind anal-fin base. Furthermore, *P. mahecola* differs from the lectotype of *P. amphibius* in having a snout length of 7.2–9.7% SL (vs. 10.7% SL). It differs from *P. filamentosus* by not having the dorsal-fin branched rays elongated into filament-like extensions; by having a body depth of 27.2–32.0% SL (vs. 32.6–39.9); and by having the caudal blotch entirely posterior to the anal-fin origin (vs. above anal-fin origin).

**Description.** – For general body shape and appearance see Figs. 2–3. Morphometric data for lectotype, 5 paralectotypes and 18 recently-collected specimens are given in Table 1. Head and body elongate: depth of body 3.1–3.7 times in SL. Dorsal profile from snout to dorsal-fin origin more rounded than

ventral profile from snout to pelvic-fin origin, almost flat between interorbital and nape, arched thereafter. Snout subequal to eye, shorter than interorbital width. Mouth subterminal, arched, angled at about 50° to horizontal. Angle of gape slightly anterior to or immediately below nares. Rostral fold present, not overhanging upper lip. Upper and lower lips smooth. Postlabial groove of lower lip interrupted medially. Tubercles absent. A pair of maxillary barbels about half an eye diameter long; no mandibular barbels.

Dorsal-fin origin over eighth or ninth lateral-line scale. Dorsal fin located slightly closer to snout than to caudal-fin base, with 3 simple rays (last one ossified, not serrated) and 8½ branched rays. Posterior profile of dorsal fin slightly concave. Anal fin with 3 simple and 5½ branched rays. Pectoral fin with one simple and 14 branched rays. Pelvic fin with 1 simple and



Fig. 1. Reproduction of the illustration of *Puntius amphibius* in Day, 1878 (pl. 142, fig. 8).



Fig. 2. *Leuciscus mahecola*, a, paralectotype, MNHN 2005-0007, 48.7 mm SL; b, lectotype, MNHN 3896, 50.7 mm SL.



Fig. 3. *Puntius mahecola*, WHT 0325, 77.1 mm SL, in life.

Table 1. Measurements as a percentage of standard length of *Puntius mahecola*, lectotype, MNHN 3896, 50.7 mm SL, and 5 paralectotypes, MNHN 2005-0007 (48.7–56.5 mm SL); WHT 0367, 71.0 mm SL and WHT 0330, 89.0 mm SL, Chalakudy River at Parambikulam, 26 km from Chalakudy on Valparai road, 9 Jun. 1993; WHT 0333, 4 ex., 50.0–75.6 mm SL, Veliyandi, near Alleppey, 16 Sep. 1993; WHT 6256, 77.1 mm SL and WHT 6254, 3 ex., 55.2–80.0 mm SL, Vembanad Lake, at Kumarakom (near Kottayam), 20 Mar. 1996; WHT 0360, 57.7 mm SL, Thrissur, on road to Peechi Dam, 5 Jun. 1993; and WHT 0325, 4 ex., 58.5–66.9 mm SL, Chalakudy Market, 9 Jun. 1993; CMK 8739, 3 ex., 51.0–87.7 mm SL, Koodel, between Punalur and Pattanampuram, 50 km north of Trivandrum, 12 Mar. 1992 (all material from Kerala State, India); and *P. amphibius*, lectotype, MNHN 73, 92.5 mm SL and paralectotype, MNHN 2005-0006, 74.3 mm SL, from Bombay [presumed to be former Bombay Presidency, now Maharashtra State], India. “—” indicates absent measurement due to damage.

	<i>P. mahecola</i>				<i>P. mahecola</i>			<i>P. amphibius</i>	
	(18 recent ex.)				lectotype and 5 paralectotypes			lecto-type	paralecto-type
	Mean	s.d.	Min.	Max.	Mean	Min.	Max.		
Standard length [mm]			48.7	56.5		50.0	89.0	92.5	74.3
Total length	129.6	2.0	127.4	134.2	136.1	131.9	140.6	125.4	126.4
Head length	26.8	1.0	24.8	29.2	28.6	27.2	30.1	28.3	26.4
Dorsal-fin length	28.1	1.4	26.0	31.0	31.1	29.8	32.4	30.1	31.3
Maxillary barbel length	3.8	0.4	3.0	4.8	3.5	2.5	4.3	3.1	3.4
Snout length	8.7	0.9	7.2	9.7	8.9	7.8	10.0	10.7	7.5
Eye diameter	7.1	0.5	6.2	8.2	8.6	8.2	9.2	6.6	7.3
Postorbital head length	11.7	0.5	10.8	12.8	12.5	12.1	13.1	13.9	13.2
Interorbital width	10.3	0.6	8.9	11.6	10.7	10.0	11.7	10.4	10.9
Snout-dorsal fin origin distance	50.0	1.3	46.6	52.1	51.0	48.0	54.1	51.5	47.4
Dorsal-fin origin to hypural distance	55.6	1.5	52.4	59.6	53.3	52.0	54.8	54.0	54.1
Maximum body depth	29.9	1.7	27.2	32.0	33.8	31.7	36.0	30.1	—
Internarial width	6.5	0.2	6.4	6.9	6.9	5.8	7.7	6.8	6.5
Caudal peduncle length	16.7	2.0	13.2	19.9	15.7	14.6	16.9	19.8	18.1
Maximum body width	16.2	1.5	13.3	18.6	14.4	13.2	15.3	—	—
Caudal peduncle depth	13.5	0.7	12.6	14.9	14.5	13.4	15.0	13.5	12.5

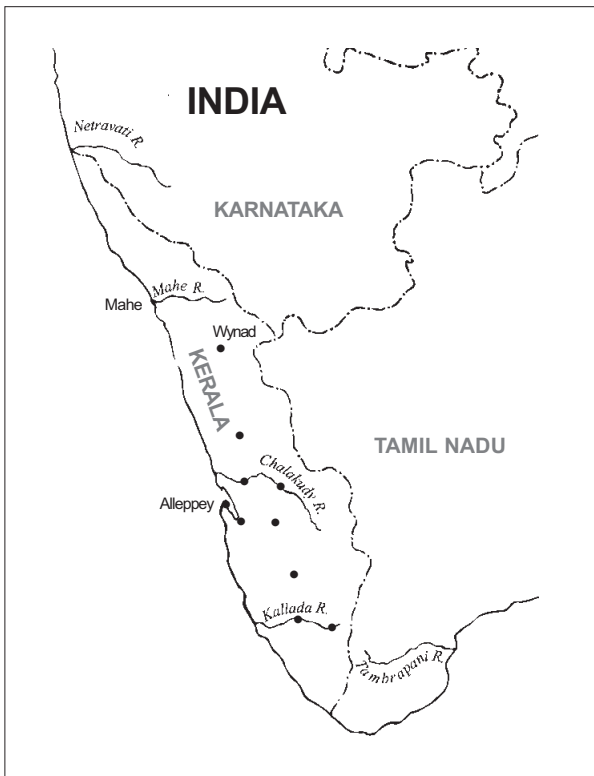


Fig. 4. Distribution of *Puntius mahecola* in Kerala, India, based on WHT and CMK accessions.



Fig. 5. Reproduction of the illustration of *Puntius mahecola* in Day, 1878 (pl. 140, fig. 5).



Fig. 6. Reproduction of the illustration of *Leuciscus mahecola* in Valenciennes, 1844 (pl. 502).

8 branched rays. Pectoral and pelvic fins short, their tips separated from pelvic and anal fin origins by 2 and 3 scale-widths respectively. Caudal fin with 1+9+8+1 rays, forked, lobes more or less equal, tips rounded and longest rays about twice as long as median rays. Caudal peduncle length 1.2–1.4 times its depth.

Lateral line complete, with 22 (21 ex.) or 23 (2) scales, curving downward gradually from its origin until about ninth or tenth pored scale, then ascending gradually to middle of caudal peduncle, and 1–3 scales at base of caudal fin. Predorsal scales 7. Transverse scales between dorsal-fin origin and mid-ventral scale row  $\frac{1}{2}4+1+3\frac{1}{2}$ ; between lateral line and pelvic fin origin  $2\frac{1}{2}$ . Scales in transverse line on caudal peduncle  $\frac{1}{2}5\frac{1}{2}$ . An axillary pelvic scale present, its exposed length about  $\frac{3}{4}$  of eye diameter.

**Coloration.** – Adult specimens in life (see Fig. 3) olive dorsally, silvery on sides, white below. A black, horizontally-elongate blotch about  $1\frac{1}{2}$  times as wide as high across  $3\frac{1}{2}$  scales on caudal peduncle, bisected symmetrically by lateral-line scales 20–22, immediately behind anal-fin base, sometimes extending to first scale on caudal-fin base. Dorsal, caudal and anal fins yellowish in females, reddish in males. Pectoral and pelvic fins hyaline. Sides suffused with pink; a diffuse pink spot present on opercle in mature males.

In alcohol, upper half of body dark brownish-olive green; lower half brownish yellow; ventral side between pectoral fins and caudal fin orange-brown. A black spot on caudal peduncle (see colour in life, above). Fins hyaline, anteriorly olive-brown, distal part of dorsal fin sometimes greyish.

**Distribution.** – *Puntius mahecola* is widely distributed in Kerala, South India (Fig. 4) and appears to be restricted to the coastal flood plain and possibly the foothills (e.g. CMK 9371). It was found in the slow-flowing sand-mud substrate parts of rivers, in water up to about 2 m deep. It was nowhere common, although occasional specimens were seen together with *P. filamentosus* in fish markets. We have no collections of this species from outside Kerala.

## DISCUSSION

**Validity of *Puntius mahecola*.** – While Day (1878) recognized *P. mahecola* as a valid species, he considered it to differ from *P. filamentosus* only by the presence of barbels (Day, 1878: 582). Both Day and Valenciennes however, overlooked the small but distinct maxillary barbels present in *P. filamentosus* (present also in all 6 syntypes and material in ZSI assigned to *P. filamentosus* by Day—see Sundara Raj, 1916). Day (1878: 575) stated, “Having examined the type of *Leuciscus mahecola*, I find it to be this species” (i.e. the one illustrated in Day, 1878, pl. 140, fig. 5: reproduced here as Fig. 5). The specimen figured by Day, however, does not resemble any of the syntypes of *P. mahecola* (see Figs. 2) and is immediately distinguished also from Valenciennes’ illustration (Fig. 6) by the position of the tail spot. While Day’s reference to “the type” appears to imply there was only one type specimen,

Valenciennes’ (1844) original description explicitly mentions several specimens (by use of the plural “Les individus”). It is uncertain therefore that Day actually examined the syntypes of *P. mahecola*.

The syntypes are well enough preserved for the melanophores of the caudal blotch to be discernible (Fig. 2). The blotch commences just above or a little behind the base of the last anal-fin ray and continues on to the hypural fan. In all the members of the *P. filamentosus* group however, the caudal blotch commences above or anterior to the anal fin base, never posterior to it (Pethiyagoda & Kottelat, 2005, this volume). *Puntius filamentosus* also differs from the original description and illustration of *P. mahecola*, and its syntypes, by having a black band proximal to the caudal-fin lobe tips — not actually at the tip (see Pethiyagoda & Kottelat, 2005). In the syntypes of *P. mahecola*, the caudal fin is hyaline, with no distinctive markings.

We note that some of the syntypes of *P. mahecola* show a somewhat larger eye than in the recently collected material (see Table 1; Fig. 2 cf. Fig. 3). The eye diameter measured in the recent material relates to the diameter of the exposed sclera, which is usually less than that of the orbit. In the type series however, the eyes have sunk, leaving the diameter of the bony rim of the orbit as the most convenient measurement.

Valenciennes’ (1844) illustration of *Leuciscus mahecola* (see Fig. 6) differs significantly from his text description and syntype series. The figure does not show barbels, and placement in the genus *Leuciscus* implies that the specimens had no barbels or that Valenciennes overlooked them, whereas all the syntypes have barbels approximately half an eye-diameter long. The figure shows an elongate caudal blotch about  $2\frac{1}{2}$  times as wide as it is high, while the width of the caudal blotch in the syntype series is only about  $1\frac{1}{2}$  times its height. While the lobes of the caudal fin are tipped in black in Valenciennes’ figure (a character he mentions also in the text (p. 305): “on voit un peu de noir à la pointe des lobes de celle-ci”), there is no trace of this character in the syntypes. The shapes of the snout, caudal peduncle and dorsal fin too, differ significantly between the syntypes and figure.

Further, in his description, Valenciennes (1844) mentions a lateral-line scale count of 22, whereas the figure shows 27 scales. Our counts for the syntypes are 22 (4 ex.) – 23 (1) + 1(1) – 2(4) (counts inferred when scales on sides have fallen off). Our recent material has 22(17) – 23(1) + 1(5), 2(11) or 3(2).

In comparing various accounts and plates (see below), it seems that Valenciennes’ (1844) lateral-line scale counts possibly did not include (all of) the small scales on the base of the caudal fin. The accuracy of the figures in this work is variable. The drawings were prepared by various artists, and while many of them seem accurate, others are not. The text and figure give about the same counts for some species (see below). We note, however, that figures signed by Forget seem less detailed, with scale rows very regularly disposed, with individual scales not properly outlined and in an unlikely shape and disposition along dorsal and ventral midlines, and



that the lateral line is drawn as a line on the flank, without respect for the natural position of the tubes on the scales. The figure of *L. mahecola* is one of Forget's figures. We have checked the lateral-line counts given by Valenciennes in the text of volume 17 against Forget's figures and have found the following discrepancies:

	page	scales (in text)	figure	scales (in fig.)
<i>Leuciscus harengula</i>	303	60	500	~ 73
<i>Leuciscus melettinus</i>	304	> 50	501	~ 66
<i>Leuciscus gatensis</i>	309	38	503	~ 43
<i>Leuciscus dussumieri</i>	342	70	508	~ 80
<i>Leuciscus apiastus</i>	351	42	510	48

(Inaccuracies are due to the very small size of the scales, or part of the lateral line being hidden under the pectoral fin; counts are for transverse scale rows crossing the lateral line.)

For species drawn by other artists, we have the following counts (obtained only for species with large scales—making drawing and counting easier—shown with lateral line tubes in natural position):

	page	scales (in text)	figure	scales (in fig.)	artist
<i>Leuciscus stigma</i>	93	22	488	28	Francoz
<i>Leuciscus duvaucelii</i>	95	27	491	26	Annedouche
<i>Leuciscus filamentosus</i>	96	21	492	22	Francoz
<i>Leuciscus storeri</i>	319	50	505	50	Francoz
<i>Chondrostoma lipocheilos</i>	400	26	513	37	Lebrun
<i>Catostomus carpio</i>	457	45	517	47	Lebrun

(The *C. lipocheilos* value in the text seems to be a lapsus for 36.)

We conclude that the discrepancies between the lateral-line scale count in the text and in the figure in *P. mahecola* results either from inaccuracy of the drawing or from the exclusion of some scales from the count. Nevertheless, the question remains unanswered as to whether the specimens presently treated as syntypes of *P. mahecola* (MNHN 3896) are indeed the ones Valenciennes had before him when he described and illustrated this species.

Valenciennes (1844) did not give an explicit locality in his account of *P. mahecola*, except for the name of the species and the heading "Able de Mahé" ("able" is a French vernacular name used by Valenciennes for a number of cyprinids lacking barbels). There is no way of knowing whether this is intended to convey that the fish was collected precisely at Mahé, or in a wider area surrounding that town. Mahé was a French settlement (from 1721–1956) occupying a quite small area and the fish was likely to have been caught in the hinterland. Indeed, mention of Mahé might well mean that the fish was part of a shipment received from Mahé, not that it was collected in Mahé. Valenciennes' observation that the species was a food fish ("Il est assez bon à manger") may suggest that it was available in abundance. Collections made by RP around Mahé (11°35'N, 75°35'E) on 21 February 1996, however, failed to yield any freshwater fishes: the town is

situated on the coast and only one river (the Mahé) occurs in its vicinity. This is subject to strong tidal influence: even as far as 11 km upstream of Mahé, mangrove plants were found growing on the river margins, the water was saline to the taste, and estuarine species such as *Lutjanus argentimaculatus* (Lutjanidae) and *Chanos chanos* (Chanidae) were present (no cyprinid species were collected). The river was followed about 40 km upstream and sampled at the point it crosses the Tellicherry (Pondicherry)-Wynaad road about 20 km east of Kuthuparamba. Here the stream bed was dry, with occasional pools of stagnant water. These were sampled intensively and yielded a large number of freshwater fish species, but the only *Puntius* species were *P. fasciatus* (Jerdon, 1849) and *P. punctatus* Day, 1865. The former is immediately distinguished from the species illustrated by Valenciennes as *P. mahecola* by its distinctive colour pattern of two black bars on the side, one below and one behind the dorsal-fin base; and the latter differs by having the snout length less than eye diameter and two black stripes and/or horizontal rows of spots on the proximal part of the dorsal fin (vs. snout length greater than eye diameter and dorsal fin clear and reddish according to Valenciennes' description).

In view of the syntype series being broadly consistent with Valenciennes' description, we conclude that either his figure of *P. mahecola* is faulty in the above-mentioned respects, or that it in fact represents a different species (the series of syntypes possibly included more material than the six now remaining, the others having been used for exchanges—this might also explain why Day commented on having seen "the type"). This does not, however, affect the availability of the name *Leuciscus mahecola*.

To clarify the identity of *P. mahecola*, we designate the 50.7 mm SL syntype as the lectotype (MNHN 3896). The identity of the fish on Valenciennes' (1844) Plate 502 (as a distinct species or as an inaccurate drawing) can only be resolved with additional work; the designation of the lectotype makes it irrelevant as far as nomenclature is concerned.

**Identity of *P. melanostigma*.**— We also considered the possibility that the specimen figured by Valenciennes (1844, pl. 502) might be *P. melanostigma* (Day, 1878: 573). Day's plate 143 fig. 1 (see Fig. 7) shows a fish with the general appearance of *P. mahecola*, with the black blotch on the caudal fin, a single pair of barbels, and a non-serrated last simple dorsal ray. It however, differs from Valenciennes' description in having 26 lateral-line scales in total, which, on the other hand agrees with Valenciennes' plate 502 and is close to the range of  $22-23 + 1-3 = 23-25$  that we observed. We consider the specimen figured by Day as *P. mahecola*. Day's (1878) description is based on an unstated number of specimens from the Wynaad hills, and he also referred to it specimens of *Systomus carnaticus* of Jerdon (1849: 315) from the east-flowing Cauvery and Bhavani drainages.

We note that Day's (1878) figure shows a fish slightly deeper-bodied than most of our material of *P. mahecola*, except for CMK 9371 (Fig. 8), which comes from further inland than all our other material and, indeed, closer to Wynaad. As we have



Fig. 7. Reproduction (L-R inverted) of the illustration of *Puntius melanostigma* in Day, 1878 (pl. 143, fig. 1).



Fig. 8. *Puntius mahecola*, CMK 9371, 60.7 mm SL, from Kaidhapoi, Kerala.

only a single sample from that area and with this body shape, we are unable to make further comments on possible variability in this species, and so for the present recognise all as conspecific.

From Day's (1878) account, it seems clear that he intended *B. melanostigma* to be a replacement name for *Systomus carnaticus* Jerdon 1849: 3159, which became a simultaneous secondary homonym of *Barbus carnaticus* Jerdon, 1849: 311, when both were placed in *Barbus* by Günther (1868) and Day (1878). New replacement names should be explicitly stated so as to be valid (ICZN, Glossary p. 109). Day did not explicitly state that *B. melanostigma* was a replacement name: he only listed *S. carnaticus* in synonymy and added a description of his own material. This means that *P. melanostigma* has its own type series, which includes Day's material and the type series of *S. carnaticus*. Jerdon's description is uninformative and could apply to several species—a definitive determination of its identity is beyond the scope of the present paper. It is also noteworthy that Jerdon's material was from the Bhavani and Cauvery drainages, while Day's material was from the Wynaad hills.

It is thus necessary to fix the name *B. melanostigma* for a single nominal species. No material of Jerdon's is known to survive. Nevertheless, the fish depicted on Day's figure can be identified and there is therefore no justification for a designation of a neotype (ICZN arts. 75.2., 75.3). We designate here the model of Day's figure (1878: pl. 143 fig. 1) as lectotype of *B. melanostigma*. Whether the specimen is extant or not is irrelevant to the validity of a lectotype designation (ICZN art. 74.4). As we consider this specimen to belong to *P. mahecola*, we consider *P. melanostigma* to be a junior subjective synonym of *P. mahecola*.

We note in passing that Jayaram (1991: 73) and Talwar & Jhingran (1991: 275) recognize *P. melanostigma* as a valid species, with 26–28 lateral line scales, which is in disagreement with Day's description and figure (their descriptions do not appear to be based on an actual examination of specimens).

The name *Systomus carnaticus* Jerdon, 1849 has simply vanished from the Indian literature and has been overlooked apparently by all authors since, probably because of confusion with the name *Barbus carnaticus* Jerdon, 1849. The figure of *Barbus carnaticus* in Day (1878: pl. 137) possibly illustrates a species of *Neolissochilus*. Menon (1999: 68) lists *B. carnaticus* as member of *Barbodes* (for which he erroneously gives the type species as "*Barbodes belinka* McClelland"): *Systomus belinka* was in fact described by Bleeker, 1860, and is a member of *Barbonymus* Kottelat, 1999). The type species of *Barbodes* Bleeker, 1859, is *Barbus maculatus* Valenciennes, in Cuvier & Valenciennes, 1842 (see Kottelat, 1999) and, based on such information as can be extracted from the literature, *B. carnaticus* is unlikely to belong to that genus.

Although the names *S. carnaticus* and *B. carnaticus* have been known as simultaneous synonyms since Day, there has never been a first reviser decision formally to fix priority between them. We here give priority to *Barbus carnaticus* Jerdon (1849: 311), over *Systomus carnaticus* Jerdon (1849: 315).

**Identity of *P. amphibius*.** – Day's description and illustration make it clear that *P. amphibius* sensu Day (1878: 574, pl. 142, fig. 8; see Fig. 1) is in fact *P. mahecola* sensu stricto, following which many subsequent authors (e.g. Talwar & Jhingran, 1991; Jayaram, 1991) have confused the two species. The question arises then as to the identity of *Capoeta amphibia* Valenciennes, in Cuvier & Valenciennes, 1842: 282, pl. 478. An examination of the two syntypes (MNHN 73, 74.3 and 92.5 mm SL; see Fig. 9 and Table 1) and comparison with Valenciennes' (1842) description and figure shows (unlike in Valenciennes' (1842) plate 478; reproduced here as Fig. 10) that neither syntype has the last simple dorsal ray serrated. While Valenciennes (1842: 282) did not mention this ray in his species description, he placed the species in a subgroup of his genus *Capoeta* which he diagnosed (p. 280) as having a smooth ray. The larger of the syntypes, MNHN 73, 92.5 mm SL, apparently the model of Valenciennes' Plate 478, is here designated as lectotype (the smaller 74.3 mm SL example, MNHN 2005-0006, is paralectotype). The lectotype of *P. amphibius* is distinguished from *P. mahecola* by having a smaller eye diameter (61.6% of snout length, vs. 68.4–100.0%) and by lacking a caudal blotch (lacking also in Valenciennes' figure). The 74.3 mm SL paralectotype shows a faint caudal blotch (Fig. 9), and may indeed be an example of *P. mahecola*, though the poor condition of the specimen and the lack of detail in the original description and illustration of *P. mahecola* make a definitive determination difficult. We note also that the type specimens of *P. amphibius* were from Bombay (probably a reference to the colonial Bombay Presidency, now part of the state of Maharashtra), which is almost 900 km distant from Mahé.



Fig. 9. *Capoeta amphibia*, a, paralectotype, MNHN 2005-0006, 74.3 mm SL; b, lectotype, MNHN 73, 92.5 mm SL.



Fig. 10. Reproduction of the illustration of *Capoeta amphibia* in Valenciennes, 1842 (pl. 478).

The notes on colour provided in the original description of *P. amphibia*, however, make it clear that there was no dark marking of any kind on the body; the pink side-stripe referred to by Valenciennes, above the lateral line is common to many species of *Puntius*, especially in breeding males. We were also unable to discern the blackish pigmentation that Valenciennes states was present on the margins of the dorsal and caudal fins (“toutes les nageoires restent blanches, seulement les bords de la dorsale et de la caudale ont du noirâtre”). Further, although Valenciennes’ figure of *P. mahecola* shows the dorsal-fin margin as convex, it is not possible to discern this character in the type specimens of *P. mahecola* and *P. amphibia* as the inter-radial membrane of the dorsal fin is now disintegrated.

A character relevant to distinguish *P. mahecola* (see species description, above) from *P. amphibia* is the eye spot on the caudal peduncle of the former. Although he does not mention having examined the types of *P. amphibia*, Day (1878) explained the presence of a caudal blotch on some of his specimens as against absence in others as follows: “[There is] sometimes a black spot on either side of the tail anterior to the caudal fin, this becomes indistinct after specimens have been long macerated, but is very apparent in fresh ones especially those from the Malabar coast; it is not well marked, and often absent in those taken in Bombay.” As the type series of *P. amphibia* (from Bombay) and *P. mahecola* (from Malabar coast [Kerala]) were collected approximately at the

same time and by the same collector (1830 and 1835, respectively; see also Bauchot et al., 1990), a prominent mark, if it was indeed present in the syntypes of *P. amphibia*, should still be visible, as it indeed is in the entire type series of *P. mahecola*.

“*Puntius amphibia*” is considered to be widely distributed throughout peninsular India (Talwar & Jhingran, 1991) and Sri Lanka (Pethiyagoda, 1991). We have been unable however, to match any extant species from Kerala or Sri Lanka with its original description, illustration and lectotype: the species presently assigned to this name may in fact be distinct and possibly new. The identity of *P. amphibia* therefore remains in question and warrants further investigation; it cannot, however, be resolved without fresh collections from near the type locality.

**Synonymy of *Puntius mahecola*.** – Hora (1937, 1941) considered *P. mahecola* to represent female specimens of *P. filamentosus*, and was followed in this synonymy by most subsequent authors. Hora (1941) examined specimens of “*P. filamentosus*” from different parts of Kerala, but paid attention mainly to the barbels and did not mention other characters.

Based on a collection of fishes from the Aliyar Reservoir (within the east-flowing Aliyar River drainage of southern India) in Tamil Nadu, Selvaraj & Abraham (1987) validated *P. mahecola*, diagnosing it from a species they assigned to *P. filamentosus* from the same locality. The whereabouts of the material studied by these authors is not known, but it is clear from their Fig. 1 and Table 1 that their *P. mahecola* is misidentified. *Puntius mahecola* sensu Selvaraj & Abraham may readily be distinguished from *P. mahecola* sensu stricto by having filament-like extensions to the branched dorsal-fin rays in males, and by having a body depth of 35.1–43.8% of SL, (vs. branched dorsal-fin rays without filament-like extensions and body depth 27.2–32.0% of SL in recently-preserved examples of *P. mahecola*). We suspect Selvaraj & Abraham were guided by Day’s figure of *P. mahecola*, which is evidently a species closely related to *P. filamentosus*. Their data and Fig. 1 suggest however, that they were indeed dealing with two distinct species closely related to *P. filamentosus*.

Jayaram (1991: 77–84) dismissed the evidence provided by Selvaraj & Abraham (1987) for treating *P. mahecola* as distinct from *P. filamentosus* and treated them as conspecific. Interestingly, none of these authors examined types or topotypes of these two nominal species, although Menon (1967) had reported on a series of *P. filamentosus*-like fishes from Mahé, which he considered to be topotypes of *P. mahecola*; this led him to confirm the synonymy with *P. filamentosus* (through comparison however, with Sri Lankan material of *P. singhala* (Duncker, 1912) that he mistakenly assigned to *P. filamentosus*). These authors also overlooked Günther’s (1868: 146) observation: “Surgeon Day believes that *Leuciscus mahecola*... is the young of this species [*P. filamentosus*]; we hesitate to adopt this opinion, because the black caudal spot is more advanced in *B. filamentosus* than in the figure of *L. mahecola*.”



Day (1878: 575) placed *Puntius (Capoeta) lepidus* Day, 1868, in the synonymy of *P. mahecola*. The type locality of *P. lepidus* is the east-flowing “Bowany [Bhavani] River at Mettapoliam”, now Mettupalayam (11°18'N, 76°57'E) in Tamil Nadu State. The two syntypes of this species listed by Whitehead & Talwar (1976) at the ZSI could not be traced during visits to that institution in 1993 and 1996. The BMNH syntype (BMNH 1868.10.27.22; 44.4 mm SL) however, is distinguishable by the shape and location of the caudal blotch and its greater body depth (40.8% of SL) (see Pethiyagoda & Kottelat, 2005).

Although we failed to collect *P. mahecola* in the vicinity of Mahé, the species was collected at several other locations in Kerala (Fig. 4), and occasionally from amongst piles of *P. filamentosus* in fish markets. It was, however, nowhere as common as *P. filamentosus*.

### COMPARATIVE MATERIAL

*Leuciscus filamentosus* Valenciennes, 1844: syntypes, MNHN 3908, 10, 76.4–107.5 mm SL, from “Alipey (Inde)” [= Alleppey, present-day Alappuzha, situated between Vembanad Lake (a brackish-water estuary) and the Arabian Sea, 9°20'N, 76°25'E, in Kerala State, south-western India].

*Capoeta amphibia* Valenciennes, 1842: MNHN 73, lectotype, 92.5 mm SL and MNHN 2005-0006, paralectotype, 74.3 mm SL, from Bombay [= Mumbai, possibly a reference to the former Bombay Presidency, now part of the State of Maharashtra].

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