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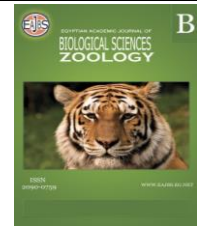
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### Taxonomic Notes on *Puntius* species of South India

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#### ABSTRACT

*Puntius*, the most common cyprinids of south India, are widely used as ornamental and food fishes; they are abundantly distributed in diverse freshwater bodies of Kerala and adjacent states of India. Various taxonomic studies have been conducted on them during the last decade; discovery, description, redescription, splitting of taxa *etc.* are more common in it compared to other taxa; it may be due to the unique species richness and high variability prevailing in the genus. Even though a lot of research works had been done on the genus, a consolidated account of all the species of *Puntius* is currently lacking; it is an endeavour for solving this difficulty. An account of all currently recognised *Puntius* species of Kerala, Tamil Nadu, Karnataka, Pondicherry, Andhra Pradesh and Telangana are included; their essential taxonomic details such as diagnostic characters and current status are inserted; a brief account of insufficiently known and forgotten fishes also entailed.

#### INTRODUCTION

Cyprinids are food and aquarium fishes found throughout Asia, most of Africa, Europe, and North America. They are included in Cyprinidae, the largest and most diverse fish- family belonging to the ostariophysian order Cypriniformes and appear in all sizes ranging from 12 mm to 3 m. *Puntius*, the most common cyprinid genus comprises small to medium-sized ornamental and food fishes widely distributed in the inland bodies of countries west to Pakistan and south to Sri Lanka.

Hamilton (1822) placed some *Puntius* species under *Cyprinus* and others under *Puntius* itself. Jerdon (1849) included the present-day *Puntius* species under *Systemus*. Species of *Puntius* were variously named as *Barbus* Cuvier (1816), *Capoeta* Valenciennes (1842), *Leuciscus* Cuvier (1816) and *Systemus* McClelland (1839) on different taxonomic grounds; fin ray counts (Hamilton, 1822), body proportions and meristic counts (Day, 1865, 1878, 1889; Jerdon, 1849), geography (Gunther, 1868), colour (Taki *et al*, 1978), osteology, barbels, karyotypes (Magtoon & Arai, 1939), morphometry (Jayaram, 1991), *etc.* were some of the criteria used in the classification of *Puntius* species. In his revision, Jayaram (1991) treated the current *Dawkinsia*, *Haludaria*, *Systemus*, *Pethia*, *Hypselobarbus*, *Barbodes*, *Sahyadria*, *Oreochthys*, and *Cyclocheilichthys* as synonyms of *Puntius*.

Works of Jayaram (1991) and Pethiyagoda *et al.* (2012) were followed by a handful of taxonomic studies on *Puntius* including many new descriptions of species and genera;

splitting, splicing, and revision of certain genera have also ensued. Lately, by rediscovering from the type localities, several species have been resurrected from its synonymy with congeners. Many insufficiently known and forgotten species are still existing in the genus *Puntius*. A clear idea on all existing *Puntius* species is inevitable for all taxonomic studies pertaining to the genus. Enough information is lacking on many taxa described in foreign languages especially Dutch and French. Currently, compiled information on the latest taxonomic developments in the genus is unavailable in the literature. It is an endeavour for recounting consolidated information on the present status and primary taxonomic details on all *Puntius* species described from south Indian states.

## TAXONOMIC ACCOUNTS

### ***Puntius nigronotus* Plamoottil (Fig. 1):**

Plamoottil, M. 2014. *Journal of Research in Biology* (2014), 4(8): 1581-1588.

**Diagnosis:** Blackish dorsal side, shorter maxillary barbels (12.3 % HL), shorter width of mouth gape (22.6 % HL), a higher body (BDD 35.8 % SL), a row of elongated tiny black dots on the 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 the anal fin, 27 lateral line scales, greater pre pelvic distance (52.6 % SL), wide caudal peduncle (9.1 % SL) and straight lateral line.

**Meristic counts:** LLS-27; PDS-11; PRPLS-10; PRAS-18; CPS- 10; LL/D-5 1/2 ; LL/V-31/2 ; LL/A-41/2; L/TR-5 1/2- 3 1/2; D- II, 9; P-I, 15; V-I, 8; A-ii, 6; C- ii, 17.

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

**Type Locality:** Mananthavady River, Wayanad, Kerala, India.

### ***Puntius dolichopterus* Plamoottil (Fig.2):**

Plamoottil, M. 2015. *International Journal of Pure and Applied Zoology*. 2015: 3 (3): 226-231.

**Diagnosis:** Longer head, 30.0- 34.6 % SL, operculum extends out beyond pectoral fin base as a soft membranous flap, short dorsal fin located behind ventral fin origin, third dorsal ray osseous, rigid and strong, its spinous portion longer, 51.2- 52.2 % HL; an elongated pectoral fin reaching pelvic fin and the latter reaching vent, 3- 4 longitudinal lines present below the lateral line and a narrow and short depression present on occiput, 8 predorsal scales and 23-24 + 1- 2 lateral line scales.

**Meristic counts:** LLS-23-24; PDS-8; PRPLS- 6-7; PRAS-13-14; CPS-10; LL/D-1/2 4 1/2; LL/V-3 1/2; LL/A-3 1/2 - 4 1/2; D-III, 8; P-i, 14; V-i, 8; A- iii, 5; C-19.

**Etymology:** The specific epithet '*dolichopterus*' is a Greek word ('*dolikhos*' meaning elongated and '*pteron*' meaning wing or fin) refers to elongated pectoral fin.

**Type Locality:** Kayamkulam, Kerala, India.

### ***Puntius sanctus* Plamoottil (Fig. 3):**

Plamoottil, M. 2020. *Bioscience Research*, 17 (1): 560-567.

**Diagnosis:** One pair of long maxillary barbels which reach to lower border of orbit; 24- 25 lateral line scales, 10 predorsal scales, a distinct black spot and 1-2 rows of tiny black dots present surrounding it on the front of the base of dorsal fin; dorsal part of the head, above and in front of orbit, has a distinct depression and another small, thin and elongated finger shaped mark present just behind the level of the posterior border of the orbit and reaching to occiput.

**Meristic counts:** LLS-24- 25; PDS-10; PRPLS- 7; PRAS-13- 14; CPS-14; LL/D-4½ – 5½; LL/V- 3 ½- 4½; LL/A-4½; D- iii, 8; P- i, 14; V- i, 8 ; A- ii, 5; C- i, 17, i.

**Etymology:** The specific epithet *sanctus* in Latin means sacred; referring to the type locality of the new fish, Velankanni, a Pilgrimage, and holy place for some religious people.

**Type Locality:** Velankanni, Tamil Nadu.

***Puntius kyphus* Plamoottil (Fig. 4):**

Plamoottil, M. 2019. *J. Exp. Zool. India*, 2019: 22 (2): 713-718.

**Diagnosis:** *Puntius kyphus* can be distinguished from its congeners in having a prominent hump on the post occipital region, non-osseous last undivided dorsal fin ray, 23-24 lateral line scales, 3½ scales between lateral line and ventral fin, longer caudal fin and short maxillary barbels which never reach orbit

**Meristic Counts:** LLS- 23-24; PDS- 8; PRPLS- 6; PRAS-14; CPS- 12; LL/D- 5 1/2; LL/V- 3 1/2; LL/A- 3 1/2; D- ii, 8; P- i, 14; V- i, 8; A- ii, 5; C- 18.

**Etymology:** The specific epithet *kyphus* (in Greek '*kyphos*' means a hump) refers to the unusually convex curvature of the post occipital region.

**Type locality:** Thiruvalla, Kerala, India.

***Puntius euspilurus* Plamoottil (Fig.5):**

Plamoottil, M. 2016. *International Journal of Research Studies in Biosciences*. 4, 9, 1-6.

**Diagnosis:** *Puntius euspilurus* can be differentiated from all its congeners in having a slender body (BDD 23.8- 26.3 % SL), last undivided dorsal fin ray feebly osseous and flexible, elongated pectoral fin reaching to ventral fin, 23- 24 lateral line scales and 2½ scales between lateral line and ventral fin .

**Meristic Counts:** LLS- 23- 24; PDS- 7-8; LL/D- 4½; LL/V- 2½; LL/Tr- 4½/3½; LL/A- 3½; PPLS- 5; PRAS- 12; D- iii, 8; P- i, 14; V- i, 8; A- iii, 5; C- 19.

**Etymology:** The species name '*euspilurus*' is a Greek word, (*eu*- well; *spilos*- blot; *urus*- tail), referring to distinct black basal spot on the caudal fin.

**Type Locality:** Wayanad, Kerala, India.

***Puntius nelsoni* Plamoottil (Fig. 6):**

Plamoottil, M. 2014. *International Journal of Fauna and Biological Studies*, 2014; 1 (6): 135-145

**Diagnosis:** Maxillaries feeble, short and never reach orbit, nostrils inserted in the middle of orbit and snout tip, head deeper (89.3- 96.2 % HL), mouth gape wider (29.2- 31.0 % HL) and snout shorter (22.7- 28.8 % HL). Body and fins yellowish; a narrow light bluish-green mark present on summit of occiput; outer to operculum numerous fine black dots present in the form of a thin band which of both sides join at occiput.

**Meristic Counts:** LLS-25; PDS-9; LL/D- 5 ½; LL/V- 3 ½; D-iii, 8 ; P-i, 14-15; V-ii,7 ; A- iii, 5; C-19.

**Etymology:** Named after Dr. Nelson P. Abraham, a naturalist and Zoology Professor.

**Type Locality:** Manimala River, Kerala, India.

***Puntius viridis* Plamoottil & Abraham (Fig. 7):**

Plamoottil & Abraham. 2013. *Journal of Research in Biology*, (3): 1093- 1104.

**Diagnosis:** One row of prominent elongated black spots occur on the middle of dorsal fin; a black band formed of dark spots present outer to operculum. 25 lateral line scales; 4½- 5½ scales between lateral line and dorsal fin; head depth lesser (19.7- 22.9 % SL).

**Meristic counts:** LLS- 25- 26; PDS- 9; PRPLS- 5; PRAS- 10- 12; CPS-9-10; LL/D- 4½- 5½; LL/V- 3½; LL/A- 3½; L/TR- 5-5½/3½.; D- iii, 8; P- i, 14; V- i, 8; A- iii, 5; C- 18- 19

**Etymology:** Specific epithet (Latin word *viridis* means green) refers to the greenish coloured body and fins of the species

**Type Locality:** Manimala River of Kerala, India.

***Puntius parrah* Day (Fig.8):**

Day, F. 1865. *Proc. Zool. Soc. Lond.*, P. 301, 1865.

**Diagnosis:** It is a *Puntius* without any special characters; no spots on the body except on caudal base; lateral line scales 25; single pair of maxillary barbels.

**Meristic counts:** D- III, 8; P- 15; V- i, 7; A- iii, 5; C- 19; LLS- 25; PDS- 8; PRPLS- 6; PRAS-14; CPS- 10; LL/D- 5 ½; LL/V-3½; LL/A- 3½.

**Etymology:** Species name was taken from its local name 'para paral'.

**Type Locality:** Karavannoor River, Kerala.

***Puntius dorsalis* Jerdon (Fig. 9):**

*Systomus dorsalis*. Jerdon. 1849. *Madras J. Litt. Sci.*, 316. 1849. 314.

Plamoottil, M 2020. *Journal of Zoology, Rajshahi Univeristy*, Bangladesh, 37, 43-47.

**Diagnosis:** An elongated snout, 2 ½ scales between lateral line and ventral fin, caudal colour spot lacking, and a black spot occur on the base of the dorsal fin.

**Meristic counts:** D- ii-, 8; P-i, 14; V-i,8; A- iii, 5; C-i, 17, i; LLS- 24; L/D- 4 ½; LL/V-2 ½; PDS- 8

**Etymology:** specific name denotes the higher dorsal fin of the fish.

**Type Locality:** Chennai, Tamil Nadu.

***Puntius cauveriensis* (Hora) (Fig. 10):**

*Barbus cauveriensis* Hora, S.L. 1937. On three collections of fish from Mysore and Coorg, South India, *Records of Indian museum*, 39 (1): 20.

**Diagnosis:** *P. cauveriensis* can be distinguished from its congeners in having small eyes, elongated snout, one pair of barbels, osseous, strong and smooth last undivided dorsal ray, 25-26 lateral line scales, 3 ½ scales between lateral line and ventral fin and 8-9 branched dorsal rays.

**Meristic counts:** D- III,8-9; A- ii, 5-6; P- 15-16; V- 7; C- 18; LLS- 25-26; LL/V- 3 ½

**Etymology:** Named after Cauvery River, its type locality.

**Type locality:** Cauvery River, Coorg State.

**Remarks:** Jayaram (1991) considered it as a distinct species. Menon (1999) synonymised it with *Barbodes carnaticus* (Jerdon). *P. cauveriensis* is a valid cyprinid fish species.

***Puntius amphibius* (Valenciennes) (Fig. 11):**

*Capoeta amphibia* Valenciennes 1842. *Hist. nat. Poiss.*, 16: 282.

*Puntius amphibius*: Pethiyagoda & Kottelat, 2005, *Raffles Bulletin of Zoology*, 12: 145–152.

**Diagnosis:** Last simple dorsal ray smooth and weak; 7-8 scales present before the dorsal fin; lateral line complete with 23- 24 scales.

**Meristic counts:** D- iii, 8; P- 15; V- 9; A- 7; C- 19; LLS- 23; L/Tr- 5/4; PDS- 8; CPS- 3.

**Type Locality:** Bombay.

***Puntius mahecola* (Valenciennes) (Fig. 12):**

*Leuciscus mahecola* Valenciennes 1844. *Hist. Nat. Poiss.*, 17: 305

*Puntius mahecola*, Pethiyagoda & Kottelat, 2005, *Raffles Bulletin of Zoology*, 12: 145–152.

**Diagnosis:** Last undivided dorsal ray unossified; 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; ¼+1+3½

transverse rows of scales; a horizontally elongate black blotch occurs immediately behind the anal-fin base.

**Meristic counts:** D- iii, 8; P- I, 14; V-i, 8; A- iv, 5½; LLS- 22-23; PDS-7; LL/V-2½; L/Tr- 5½/3½; CPS- ½5½.

**Type locality:** Mahe

***Puntius vittatus* Day (Fig. 13):**

Day, F. 1865. *Proc. Zool. Lond.* P. 303.

**Diagnosis:** A small fish with the incomplete lateral line having 22 lateral line scales; a vertical streak on the dorsal fin, 4 black spots on the body- one each below the front and back of the base of the dorsal fin, on the base of the anal and caudal fin.

**Meristic counts:** D-ii, 7; P- i-9; V- i, 8; A- ii, 5; C- 19; SLS- 20; PDS- 8; PRPLS- 5; PRAS- 11.

**Etymology:** Specific name denotes the banded nature of dorsal fin

**Type locality:** Mysore.

***Puntius madhusoodani* Kumar et al. (Fig. 14):**

*Puntius madhusoodani*, Kumar et al. 2011. *Biosystematica*, 2011, 5(2): 31-37.

**Diagnosis:** Lateral line scales 25- 26; 4 scales between lateral line and dorsal fin; 7 branched dorsal-fin rays and 6 branched rays in the anal fin.

**Meristic counts:** D- III, 8; P- i, 14; V- ii, 8; A- ii, 6; C- 19; LLS- 25- 26; PDS- 9; PPLS- 6; PRA- 14; CPS- 10; LL/D- 4; LL/V- 3; LL/A- 3½; L/Tr- 5/3½..

**Etymology:** Named after Dr. Madhusoodhan, an ichthyologist

**Type Locality:** Manimala River.

***Puntius stigma* Valenciennes (Fig. 15):**

*Leuciscus stigma*. Valenciennes. 1844. *Hist. nat. Poiss.* 17, 93.

Plamoottil, M. 2018. *Journal of Applied Zoological Researches.* 29 (1): 73-77.

**Diagnosis:** 21-22 lateral line scales, ossified, strong and smooth last simple dorsal-fin ray, presence of a deep black spot on dorsal fin base, and another spot-on caudal-fin base.

**Meristic counts:** D- iii-, 8; P-i, 13; V-i,8; A- iii, 5; C-i, 16, i; LLS- 21-22; L/D- ½ 4 ½; LL/V-3 ½; PDS- 8-9.

**Etymology:** specific epithet denotes a black spot on the dorsal fin base.

**Type Locality:** Mysore.

***Puntius mudumalaiensis* Menon & Devi**

Menon, A.G. K. & Rema Devi. 1992. *Journal of Bombay Natural History Society*, (89) 2: 229-231.

**Diagnosis:** Large head, deep body, one pair of maxillary barbels; fleshy lips that folded back encloses a deep groove; lateral line incomplete, 26 scales on lateral line; two dark blotches on body, one at the dorsal-fin base, second on caudal peduncle; weak and feebly osseous last simple dorsal ray.

**Meristic counts:** D- iii-vi, 8; P- 13; V-i,8; A- iii, 5; C-i, 17, i; LLS- 26; L/TR- 5 ½ / 3 ½ ; PDS- 9-10.

**Etymology:** Named after the type locality

**Type Locality:** Kakkanhalla Road, Mudumalai, Tamil Nadu.

***Puntius melanostigma* (Day) (Fig. 16):**

*Barbus melanostigma* Day. 1878. *Fishes of India*, P. 573, pl. 143.

**Diagnosis;** Last simple dorsal ray weak and inferiorly osseous, lateral line complete with 23-26 scales.; a light band on the lateral side and a caudal blotch.

**Meristic counts:** LLS-23-26; PDS-8 / 9; PRPLS-5-7; PRAS-11-14; CPS-9 /10; LL/D-4 ½ - 5 ½ ; LL/V-2 ½- 3 ½; LL/A-2 ½- 3 ½; D-II, 8; P-15-16; V-i, 7-8; A-i-ii, 4-5; C- 15.

**Etymology:** Specific epithet denotes a distinct black spot on caudal-fin base.

**Type locality:** Wayanad, Kerala.

***Puntius ambassis* (Day) (Fig. 17):**

*Barbus ambassis*. Day. 1868. *Proc. Zool. Soc. Lond.*, P. 583.

**Diagnosis:** Dorsal spine, osseous strong and posteriorly serrated; dorsal fin inserted in advance of the ventral fin, scales small; lateral line incomplete and passes through 36 scales; 6 scales between lateral line and ventral fin; 15 scales before dorsal fin; a mid-lateral silvery band present; a small black spot on the base of anterior dorsal rays and another at the caudal base.

**Meristic counts:** D-iii,8; P-11; V-9; A-ii, 5; C-19; L/Tr- 6.8; LL/V- 6' PDS- 15; LLS- 36;

**Type locality:** Kurnool, Andhra Pradesh.

***Puntius arenatus* (Day) (Fig. 18):**

*Barbus arenatus* Day. 1878. *Fish, India*. P. 574. Pl. 142. Fig. 7.

**Diagnosis:** Moderately deep, silvery without colour markings, with a single pair of barbels, dorsal spine weakly osseous and inserted in advance of the ventral fin, lateral line complete, and 3 ½ scales between lateral line and ventral fin.

**Meristic counts:** D-II, 8; P- 15; V- i, 8; A- iii, 5; C- 19; LLS- 26; PDS- 11; PRAS- 10-13; PRPLS- 6-8; LL/D- 4 1/2 -5; LL/V- 3 ½; LL/A- 2 ½- 3 ½; CPS- 10-11.

**Type locality:** Madras.

**Remarks:** Jayaram (1991) considered, in addition to Holotype of *P. arenatus* (ZSI F2737), 5 specimens collected from Vaiga Dam as *P. arenatus*. But the latter specimens may not be *arenatus*; it may be a different species.

**Forgotten And Insufficiently Known *Puntius* Species**

***Puntius puckelli* (Day)**

*Capoeta puckelli*. Day. F. 1868. *Proc. Zool. Soc. Lond.* P. 197.

**Diagnosis:** One pair of thick maxillary barbels reaching to the anterior border of eyes; dorsal fin located in advance of ventral fin; last undivided dorsal fin ray weak; 10 predorsal scales and 2 ½ scales in between the lateral line and ventral fin. A deep black spot on dorsal fin from its 3<sup>rd</sup> to

6<sup>th</sup> branched rays, A scarlet band on the mid-lateral side.

**Meristic counts:** D- ii, 7; P- 15; V- 9; A- iii, 5; C- 19; LLS- 24; L/TR- 4/5; PDS- 10; LL/V- 2 ½.

**Etymology:** Named after Major Puckell who donated the type specimens.

**Type Locality:** Bangalore.

***Puntius perlee* Day**

Day, F. 1865. *Fishes of Malabar*. 1865, 211.

**Meristic counts:** D- iii, 8; P- 15; V- 10; A- ii, 5; C-19; LLS- 24; L/Tr- 5/3

**Diagnosis:** 10 rays in ventral fin, the body greatly deeper, *ie*, height 1.5 in standard length; a considerable rise from snout to the dorsal fin, maxillary barbels 2/3 of head length, pectoral fin extends beyond the origin of the ventral fin, the latter reach to the base of the anal fin, last anal-fin ray reach to the caudal-fin base and lateral line is convex from 6<sup>th</sup> -26<sup>th</sup> scales.

**Etymology:** 'Perlee' may be taken from 'paral' the Malayalam word of *Puntius*

**Type Locality:** south India.

***Systemus tristis* Jerdon**

Jerdon. 1849. *Madras J. Litt. Sci.*, 316.

Jerdon (1849) described it based on a single specimen from Cauvery.

Its characters: LLS- 24; D-IV, 8; A-7; 2 pairs of barbels; body compressed, plain olive-green above and silvery beneath, fins plain.

Jerdon (1849) not mentioned the main taxonomic characters including the nature of the last simple dorsal ray and height of the specimen. Therefore, it is difficult to take it in a taxon directly.

Menon (1999) treated it as a synonym of *P. dorsalis*.

***Leuciscus sulphureus Valenciennes***

Valenciennes, 1844. *Hist. Nat. Poiss.* 17. P. 96.

It was a *Puntius* species described from Mysore. Uniform colour of the body and fins. No spots on the caudal fin. The profile of the back and belly is regulatory and slightly curved; the last simple dorsal ray is not serrated; it forms 1/3 of the length of head; snout sharper. The shoulder is short. D - 10; A-7. This species is so briefly and generally described that it can not be even synonymised with other species. Jayaram (1991) treated it as a synonym of *Puntius sophore*.

***Systemus carnaticus (Jerdon)***

*Systemus carnaticus*. Jerdon (1849) *Madras. J. Litt. Sci.* 315

**Diagnosis:** 24 Lateral line scales; 3 simple rays in the dorsal fin, a large black blotch on caudal

base; dorsal fin reddish stained with black.

**Etymology:** Specific name denotes the type locality

**Type locality:** Bhavani River at the base of Nighteries and in Cauvery

***Puntius hamiltoni Jerdon***

? *Systemus chola*, Jerdon, T.S. 1849. *Madras Jour. of Lit, Sci*, 316.

*Puntius hamiltoni*, Day, F. 1865. *Fishes of Malabar.* 213.

Gunther, A. 1868. *Cat. Fish Brit. Mus.* VII, 146.

D- 11, A- 8; LLS- 24; LL/TR- 5/3.

It was described by Day in his 'Fishes of Malabar' and was based on Jerdon's (1849) mention in his article. But Day himself considered it as a variety of *Puntius chola*. Unlike *P. chola* it has no distinct colour spot on the dorsal fin base; moreover, its last unbranched dorsal ray is weak and non-osseous; so it cannot be treated as a synonym of *P. chola*. As it does not bears any specific diagnostic character it cannot be currently regarded as a distinct species. This author treats it as a synonym of *P. amphibius*.

***Barbus polydori Cuvier***

Cuvier & Valenciennes, 1842. XVI, P. 170

Gunther, A. 1868. *Cat. Fish Brit. Mus.* VII, 122.

It was a cyprinid species described from Bombay. It is with 27 lateral line scales, 12 (3 undivided and 9 divided) dorsal-fin rays, 7 (2 unbranched and 5 branched) anal fin rays and 2 pairs of barbels; its last undivided dorsal fin ray is slender and finely serrated. Its type specimens are unavailable in any museums of the world. Its 4 barbels and serrated dorsal spine do not allow it to be included in it along with *Puntius*. It may be a *Systemus* species.

***Leuciscus presbyter Cuvier***

Cuvier G., Valenciennes A. 1844. *Histoire Naturelle des Poissons.* Cyprinoïdes. v. 17: 497+2

It was originally described from Bombay. Lateral line concave and passes through 26 scales; no barbels; last undivided dorsal fin ray non-ossified and weak; dorsal fin edged with black. It is an insufficiently known species. No record of it after its original description.

But this species may be a distinct species. It is related to *Puntius mahecola*, *P. amphibius*, *P. euspilurus*, and *P. kyphus*. Redescription of it based on collection from its type locality will make it a valid species.



***Barbus thermalis* (Valenciennes)**

*Leuciscus thermalis*, Cuvier & Valenciennes 1842. XVII, P. 94, P. 490.

D- 11; A-8; LLS-25; L/TR- 5/ 4 ½; LL/V- 3 ½;

Body compressed, oblong; snout length equals orbit diameter; upper jaw overlapping the lower jaw; last undivided dorsal ray is non-ossified; body brownish above, silvery beneath; a black blotch present on caudal-fin base and another black spot near the base behind osseous ray in dorsal fin. Beavan (1877) wrote that *Barbus thermalis* is found at Mysore and Cachar. But Gunther (1868) stated that it is found in Cachar only. Characters mentioned by Valenciennes are of general in nature. Gunther (1868) wrote that this species is *Systemus (Puntius) carnaticus* Jerdon (1849).

***Puntius modestus* Kner**

*Puntius modestus*, Kner, 1867. *Novara, Fische*, P. 348, Taf. 15, Fig. 3

*Puntius modestus*, Gunther (1868) *Cat. Fish Brit. Mus.* VII, 156.

*Puntius modestus*, Beavan (1877) *Handbook, FW fishes. India*, 57.

D- 10, 11; A-7; V-9; LLS- 22, 23.

Dorsal fin without osseous ray; snout shorter than eye; body with indistinct silvery band along sides; dorsal fin crossed by a black band.

**Type locality:** Madras.

This species was treated as a synonym of *P. sophore* by Menon (1999). It can be distinguished from *P. sophore* in having a non-osseous dorsal fin ray. This species is related to *Puntius mahecola*, *P. amphibius*, *P. euspilurus*, *P. kyphus* and *P. puckelli*. The collection of fresh specimens from Chennai (formerly Madras) alone can prove the identity of this fish.



Fig. 1. *P. nogronotus*



Fig. 2. *P. dolichopterus*



Fig. 3. *P. sanctus*



Fig. 4. *P. kyphus*



Fig. 5. *P. euspilurus*



Fig. 6. *P. nelsoni*



Fig. 7 *P. viridis*



Fig. 8. *P. parrah*



Fig. 9. *P. dorsalis*



Fig.10. *P. cauveriensis*



Fig. 11. *P. amphibius*



Fig. 12. *P. mahecola*



Fig. 13. *P. vittatus*



Fig. 14. *P. madhusoodani*



Fig. 15. *P. stigma*



Fig. 16. *P. melanostigma*  
(Day, 1878)



Fig. 17. *P. ambassis*  
(Day, 1868)



Fig. 18. *P. arenatus*  
(Day, 1878)

## DISCUSSION

*Puntius* species can be broadly classified into two categories: those with osseous, rigid, and strong last simple dorsal-fin ray and those with feebly osseous or non-osseous, weak and flexible last unbranched dorsal-fin ray (Plamoottil, 2016). The first category of fishes also bears 24- 26 lateral line scales, 3 1/2 scales between lateral line and ventral fin, 8-9 predorsal scales, and moderately deeper body with a diffused or distinct black caudal spot. In India, among *Puntius*, this group of fishes preponderates in diversity and abundance. The second category of fishes is further characterized by possessing 2½ scales between lateral line and ventral fin, 7 predorsal scales, and 22 lateral line scales. These *Puntius* species are usually lesser in number.

*Puntius kyphus* Plamoottil (2019), *P. euspilurus* Plamoottil (2016), *Puntius mudumalaiensis* Menon & Devi (1992), *P. arenatus* Day (1878), *P. melanostigma* Day (1878), *P. puckelli* Day (1868), *P. vittatus* Day (1865), *P. amphibius* (Valenciennes, 1842; Plamoottil, 2018) and *Puntius mahecola* (Valenciennes, 1842; Pethiyagoda and Kottelat, 2005) belongs to this category. All the remaining *Puntius* species are with osseous and strong last simple dorsal ray; in *P. nigronotus* Plamoottil (2014) also last simple dorsal ray is not much strong. It was thought, after Pethiyagoda *et al.*, (2012), that branched rays in the dorsal fin of *Puntius* species are only eight and that of anal fin are 5. But it cannot be taken as a rule owing to the exceptions in various species of *Puntius*. *Puntius nigronotus* has nine branched rays in the dorsal fin and additionally its last branched ray is divided to root; its anal fin has 6 branched rays. *Puntius madhusoodani* has also 7 branched rays in the dorsal fin and 6 branched rays in the anal fin. *Puntius puckelli* Day is also with only 7 branched rays in the dorsal fin.

*Puntius vittatus* was described by Day (1865) from Mysore. But many confusions still exist in its type locality and body features. Even though it is not an uncommon species in south India, this species shows many apparent differences from the original description of *Puntius vittatus* by Day (1865). As per Day (1865), in adult specimens, one black spot presents just before the dorsal fin and another one under its posterior margin, one at the base of caudal and one at the base of the anal fin. The dorsal fin has one dark streak down it, and a black tip with orange margins. Photo given by Day, the author of the fish, is also not matching with his original description; description and photo given by Jayaram (1991) also not matching with the original description. Moreover, Jayaram (1991) had taken his specimens from Chilka Lake of Orissa for his taxonomic analysis, which is far away from the type locality, Mysore. *Puntius vittatus* had been recorded from different states of India; most of them are with different structures and colourations. It is not an uncommon fish in Kerala; but Kerala *vittatus* is not matching with the original description in some respects.

Currently *Puntius puckelli* Day (1868) is not considered as a distinct species; it is treated as a synonym of *P. dorsalis* or *P. bimaculatus*. Moreover, it has not been collected from any part of the world after its original description. But Day (1889) described it as a distinct species. *P. puckelli* is closely related to *P. amphibius*, *P. mahecola*, *P. euspilurus* and *P. kyphus*. The non-ossified last unbranched dorsal-fin ray is the common character in all these species. *P. puckelli* differs from its congeners in having an anteriorly located dorsal fin with a deep black horizontal mark on it. The black spot also occurs on dorsal fin base in *P. chola*, *P. dorsalis*, *P. stigma* etc. but in *P. puckelli* it is not on base but on dorsal fin itself.; anteriorly located dorsal fin is also a distinguishing feature. Its mid-lateral colour band may be a character appearing during breeding time; but in all other essential features it differs from its congeners.

Name and details of *Puntius puckelli* have been disappeared from most of the taxonomic literature; it can currently be considered as a forgotten species. *Puntius puckelli*

Day (1868) was previously considered as a synonym of *P. dorsalis*. *P. puckelli* can be distinguished from *P. dorsalis* in having longer maxillary barbels reaching to the anterior border of eyes (vs. shorter maxillary barbels which never reach to orbit), 7 (vs. 8) branched rays in the dorsal fin, a non-osseous and weak (vs. osseous and strong) last unbranched dorsal ray, shorter snout (vs. longer), 10 (vs. 8) predorsal scales and a deep black mark on the dorsal fin (vs. a diffuse black spot present on dorsal fin base). Hora (1936) thought *P. puckelli* as a juvenile form of *P. dorsalis*. Menon and Devi (1992) reckoned that *P. puckelli* was distinct from *P. dorsalis* and placed it under *P. bimaculatus* of Sri Lanka. *P. puckelli* can be distinguishable from *P. bimaculatus* in having 10 (vs. 8) predorsal scales and a black band on the dorsal fin (vs. a black spot on the base of the dorsal fin). This author strongly believes that *Puntius puckelli* is a distinct species residing in the inland bodies of Karnataka. Day (1865) described *Barbus perlee* from water bodies of south India as a distinct species; it was shown to have marked differences from its congeners. *P. perlee* differs from its relative species in having 10 rays in ventral fin, the body greatly deeper, *i.e.*, height 1.5 in standard length, a considerable rise from snout to the dorsal fin, maxillary barbels 2/3 of head length, pectoral fin extends beyond the origin of the ventral fin, ventral fin reaches to the base of the anal fin, last anal-fin ray reaches to the caudal-fin base and lateral line is convex from 6<sup>th</sup> - 26<sup>th</sup> scales. His species was also peculiar in having fine dots on dorsal and caudal fins. Later Gunther (1868) after examining the type specimens deposited in the British Museum, stated that *Barbus perlee* is a synonym of *P. parrah*. He was of opinion that type specimens of Day (1865) do not agree with his description. Later Day (1889) himself treated *B. perlee* as a synonym of *P. chola* described by Hamilton (1822) from West Bengal. It is because the body of his specimens is highly comparable to *P. chola*. Jayaram (1991) reckoned *P. perlee* as a synonym of *P. parrah*. From the description it was clear that Day's fish is a distinct one; but his specimens might have been lost and the deposited specimens were not *P. perlee*. He could not insert an image of this species in *Fishes of Malabar* (Day, 1865) and his later volumes (Day, 1878, 1889) due to lack of original specimens and images.

Jerdon (1849) described *Systemus carnaticus* as a distinct species, but this species has now been disappeared from all taxonomic literature. Currently this name is not even used as synonymic species by most of the taxonomists. Not a single specimen of it has been recorded from India after its description by Jerdon (1849). In his article, on page 315, he described it as '*Systemus carnaticus*'; On pages 312 and 313 he described another species, '*Barbus carnaticus*'. As per the current taxonomic standards, *Systemus carnaticus* must be called as *Puntius carnaticus* and *Barbus carnaticus* as *Hypselobarbus carnaticus*. Actually, both *Systemus* and *Barbus* of Jerdon (1849) are *Puntius* species; so the above two species will become *Puntus carnaticus*; but these two species show considerable taxonomic differences; it has created confusion in many systematists; so most of the researchers deliberately avoided *Systemus carnaticus*. Gunther (1864) mentioned that *Systemus carnaticus* is nothing but *Leuciscus thermalis* Cuvier. Still, others treat it as a synonym of *Barbus carnaticus* (now *Hypselobarbus carnaticus*). *Puntius (Systemus) carnaticus* differs from *Hypselobarbus (Barbus) carnaticus* in having 24 (vs. 32 in *H. carnaticus*) lateral line scales, 2 (vs. 4) unbranched dorsal fin rays, a large black spot on caudal base (vs. absent) and dorsal fin reddish stained with black (vs. yellowish dusky). *Systemus (Puntius) carnaticus* is a distinct species residing in water bodies of hill ranges of Kerala. It is expected that it will be rediscovered and redescribed in the near future.

*Puntius arenatus* Day is a distinct species; but not many collections of it had been received from its type locality after its original discovery. Day (1889), in his description, wrote some specimens of *P. arenatus* were with a black band on the dorsal fin, this author believes that those specimens with a black band on dorsal fin may be *Puntius modestus* Kner which had also been described from Madras.

Indeed, *Puntius ambassis* described by Day from Andhra Pradesh is not an undeniable *Puntius* species because its diagnostic taxonomic characters such as 36 lateral line scales, 15 predorsal scales, 6 scales between lateral line and ventral fin *etc* are beyond the range of the genus *Puntius*. Collection and analysis of its specimens from the type locality in Andhra Pradesh will surely turn it out as a new genus. Many taxonomists enlist *P. chola* and *P. sophore* among south India species; actually, these are species of west Bengal (Plamoottil, 2018; Plamoottil & Maji, 2020).

### CONCLUSION

In this review, endeavour was taken to consolidate taxonomic details of all distinct, synonymic, and forgotten *Puntius* species described from south India; it includes species described from Kerala, Karnataka, and Tamil Nadu; *Puntius* species described from Pondicherry has been shifted to other genera. Currently we have only one recognised *Puntius* species from Andhra Pradesh and not having a representative of this genus from Telangana. It is expected that some of this synonymic species will be resurrected from its synonymy with their close congeners in the near future; certain species were described very briefly and generally; so its redescription will continue to be retained as a hurdle. Even though a lot of taxonomic studies had been conducted on the *Puntius* species of south Indian states, during the last three decades, many of the species remain as undescribed. All unexplored water bodies must be sincerely searched for unknown and new species of this genus; we have the possibility as we have no freshwater bodies without the presence of these small cyprinids. It is expected that more sincere scientific studies will be conducted on *Puntius* species in days to come.

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