
ORIGINAL ARTICLE

Taxonomic Notes on Native Cyprinid Fishes of Southern Kerala

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ABSTRACT

Cyprinids are the most diverse of all freshwater fishes of Kerala state. Even though a number of biodiversity studies were done, systematic studies conducted on cyprinid fishes of the state are rare. To solve this, taxonomic studies were conducted on cyprinid fish species collected from southern parts of Kerala. Their meristic counts, metric characters and other morphological features were taxonomically analyzed.

KEY WORDS: Taxonomy, Meristic counts, Cyprinids, Puntius, Pethia

Received 12.09.2017

Revised 23.11.2017

Accepted 29.12.2017

How to cite this article:

Mathews Plamoottil. Taxonomic Notes on Native Cyprinid Fishes of Southern Kerala. Adv. Biores., Vol 9 [1] January 2018.240-248.

INTRODUCTION

Cyprinids are most common and dominant group of primary freshwater fishes distributed in the aquatic bodies of Asia, Africa, north and central America, Australia, New Zealand, New Guinea and Madagascar. They comprise a major element of the piscifauna of Asian countries. Rainboth [1] listed 177 genera of Asian cyprinids and grouped them under 7 subfamilies. Cyprinids are characterized by a compressed body with rounded abdomen. Their mouth is transverse, protractile, toothless and frequently with barbels; pharyngeal teeth occur on the pharyngeal arch of the throat. A labial fold present. They have no sub ocular spine. Air bladder not surrounded by a bone capsule. Only one dorsal fin present with first two or three rays bony and undivided. Ventral fins placed behind pectorals. They have no adipose fin.

In India Cypriniformes is the largest and morphologically diverse order of freshwater fishes. It includes many economically important freshwater fishes under Cyprinidae, Balitoridae, Cobitidae and Nemacheilidae. In Kerala Cyprinidae is the largest family of freshwater fishes comprised of barbs, carps and minnows. Genera namely Barilius, Devario, Rasbora, Amblypharyngodon, Osteobrama, Puntius, Systomus, Pethia, Haludaria, Dawkinsia, Gonoproktopterus, Labeo and Garra are distributed in the water bodies of southern Kerala. It is an endeavor to study systematic details of various species of the above genera.

MATERIALS AND METHODS

The Study was conducted during the period from January 2010 to January 2013. Fishes were collected using gill net and cast net and preserved in 10% formalin. Methods used are those of Jayaram [2, 3, 4] and measurements follow standard practices. Body depth and body width were measured both at dorsal-fin origin and anus, vertically from dorsal fin origin to belly and from anus to dorsum, respectively. Systematic identification is based mainly on meristic, morphometric and descriptive characters. Relevant measurements were taken and they were worked out as percentage of head length or standard length.

Abbreviations Used: D- Dorsal fin rays; P- Pectoral fin rays; V- Ventral fin rays; A- Anal fin rays; C- Caudal fin rays; LLS- Lateral line scales; PDS- Pre dorsal scales; PRPLS- Pre pelvic scales; PRAS- Pre anal scales; LL/D- Scales between lateral line and dorsal fin; LL/V- Scales between lateral line and ventral fin; L/TR- Transverse scales; LL/A- Scales between lateral line and anal fin; CPS- Circumpeduncular scales; HD- Head depth; HW- Head width; BDD-Body depth at dorsal fin; BDA- Body depth at anal fin; BWD-Body width at dorsal fin; BWA-Body width at anal fin; PRD-Pre dorsal distance; POD-Post dorsal distance; PRP-Pre pectoral distance; PRPL- Pre pelvic distance; PRA- Pre anal distance; LD- Length of dorsal fin; LP-

Length of pectoral fin; LPL- Length of pelvic fin; LA- Length of anal fin; LBD- Length of base of dorsal fin; LBA- Length of base of anal fin; LCP- Length of caudal peduncle; DCP- Depth of caudal peduncle; WCP- Width of caudal peduncle; DAV- Distance from anal to vent; DVV- Distance from ventral to vent; DP-PL- Distance from pectoral to pelvic fin; DPL- A- Distance from pelvic to anal fin; DA- C- Distance from anal to caudal fin; ED- Eye diameter; IOW- Inter orbital width; INW- Inter narial width; WGM- Width of gape of mouth; STL- Snout Length.

RESULT AND DISCUSSION

Twenty eight species (Fig. 1- 28) of fishes belong to 13 genera were collected during the study period. All these fishes are edible; but five species namely *Pethia ticto*, *Pethia punctatus*, *Puntius vittatus*, *Haludaria fasciata* and *Garra mullya* are not consumed due to its small size. All the fishes can be used as aquarium fishes. Among all the cyprinid fishes collected from southern Kerala, *Dawkinsia filamentosa* was found to be most abundant. Taxonomic details of the fishes collected are as follows:

***Barilius bakeri* Day**

Barilius bakeri Day [5], *Proceedings of Zoological Society of London*, 305 (type locality; Mundakkayam, Kerala).

Diagnosis: Lower jaw with a knob at its extremity. Single row of 9-11 large metallic silvery bluish black spots along sides; deep body; barbels absent; maxilla reaches below orbit.

Meristic counts: D- ii, 10; P- i, 14; V- i, 8; A- iii, 14; C- 17; LLS- 37; PDS- 14-16; PRPLS- 15; PRAS- 23; LL/D- 10; LL/V- 3½; L/TR- 10/3½; LL/A- 3½; CPS- 7.

Metric characters: TL (mm)- 135.0; SL (mm)-110.0; HL (mm) - 30.0. % SL: HL- 27.3; HD- 21.8; HW- 15.0; BDD- 34.5; BDA- 24.7; BWD-17.3; BWA-14.5; PRD-54.5; POD- 50.0; PRP-27.3; PRPL-49.0; PRA- 64.5; LD- 16.4; LP- 18.6; LPL-12.5; LA- 15.5; LBD- 16.8; LBA- 20.0; LCP- 12.7; DCP- 10.5; WCP- 6.4; DAV- 16.4; DVV- 16.4. % HL: HD-80.0; HW- 55.0; ED- 23.3; IOW-33.3; INW- 23.3; WGM- 26.7; STL-30.0

Other features: Gape of mouth large. Lateral line strongly concave. Caudal deeply forked; the lower lobe longer. Dorsal side of the body bluish; ventral side white; bases of dorsal, anal and pectoral fins dark; their margins white.

***Devario (Danio) aequipinnatus* (McClelland)**

Perilampus aequipinnatus McClelland [6], *Asiat. Res.*, 19 (2): 393 (type locality: Assam).

Diagnosis: 14- 15 scales present before the dorsal fin; lateral line scales 35- 37; three well marked dark blue bands run along the flanks through the entire length from head to caudal fin.

Meristic counts: D- iii, 9- 12; P- I, 11- 12; V- I, 6; A- iii, 14- 16; LLS- 35- 37.

Metric characters: TL (mm) - 95.0 SL (mm) - 74.3; HL (mm)-10.6. % SL: HL-21.5; HD-18.8; HW-10.8; BDD-29.6; BDA-21.5; BWD-10.8; BWA-8.1; PRD-56.5; PRA-71.3; PRPL-47.1; PL-22.8; LPL-15.5; LA-14.8; LC-30.9; LBD-20.2; LBA-21.5; LCP-17.8; DCP-10.8; DP-PL- 29.6; DPL- A-22.8; DA- C-36.3; % HL: HD- 87.5; HW-10.8; STL-32.5; WGM-25.0; IOW-27.0; INW-23.0.

***Devario (Danio) malabaricus* (Jerdon)**

Perilampus malabaricus Jerdon [7], *Madras J. Lit. and Sci.*, 15: 325. (Type locality: Malabar).

Diagnosis: Lateral line complete with 32- 34 scales; fourteen to fifteen scales are present before the dorsal fin; three well- marked lateral bands of dark blue color run along the sides covering along the entire length from head to caudal fin.

Meristic counts: D- iii, 13; P- i, 14; V- i, 7; A- iii, 13; C 16; LLS- 33; PDS 16; PRPLS 8; PRAS 15.

Metric characters: TL (mm) - 95.5; SL (mm) - 74.0; HL (mm) - 17.0. % SL: HL-22.9; HD-17.6; HW-12.2; BDD-28.4; BDA-24.3; BWD-10.8; BWA-8.4; PRD- 58.1; PRA-68.9; PRPL-47.3; LP-23.0; LPL-15.5; LA-16.2; LC-29.1; LBD-19.6; LBA-21.6; LCP-17.8; DCP-10.8; DP-PL-27.7; DPL- A-22.9; DA- C-37.8. % HL: ED-35.3; STL-32.3; WGM-26.5; IOW-28.2; INW-23.5.

***Rasbora (Parluciosoma) daniconius* (Hamilton- Buchanan)**

Cyprinus daniconius Hamilton- Buchanan [8], *Fishes of Ganges*: 327, 391 (type locality: Rivers of Southern Bengal).

Diagnosis: Barbels absent; mouth terminal and upturned; a gold bordered dark lateral band runs from eye to the base of caudal fin; lateral line complete with 32 scales, situated on the lower lateral side; 1½ scales between lateral line and ventral fin; dorsal fin located nearer to caudal fin than snout tip.

Meristic counts: D- 8; P- 12; V- 9; A- 5; C-17; LLS- 32; PDS- 14; LL/D- 5½; LL/V- 1½; LL/A- 2½; PRPLS- 7; PRAS- 17.

Metric characters: TL (mm)- 93.5; SL (mm)-73.0; HL (mm)- 19.0. % SL: HL-26.0; HD- 16.4; HW-13.7; BDD-21.9; BDA-17.8; BWD-15.1; BWA-10.9; PRD-53.4; POD-45.2; PRP-26.0; PRA- 79.5; PRPL-47.9; LP- 17.8; LPL-16.4; LA-17.8; LC-28.8; DVV-23.3; DAV-2.7; DP-PL-23.3; DPL-A-26.0; DA-C-23.3; % HL: HD- 63.2; HW-52.6; ED-31.6; WGM-26.3; STL-26.3; IOW- 31.6; INW-26.3.

Rasbora ataenia Plamoottil

Rasbora ataenia Plamoottil, M. [9]. *International Journal of Innovative Studies in Aquatic Biology and Fisheries*, 12 (5): 20-24.

Diagnosis: A medium sized *Rasbora* without any lateral color stripe; body is slender (depth 19.4 - 21.7 % SL), have 7 branched rays in dorsal fin, 5 branched rays in anal fin, shorter (26.1- 28.6 % HL) snout and deeper head (HD 58.4- 62.2 % HL).

Meristic counts: D-ii, 7; P- ii, 11; V- i, 7-8; A- ii, 5; C- 19; LLS- 31-32; PDS- 13; LL/D - ½ 4½; LL/V- 1½; PRAS- 16; PRPLS- 7- 8.

Metric characters: TL (mm)- 98.1; ; SL (mm)- 77.1; HL (mm)- 29.5; % SL: HL-; HD-16.9; HW-13.3; BDD- 20.5; BDA-16.2; BWD-14.7; BWA- 10.0; PRD-54.4; POD-45.1; PRP-26.7; PRA-76.2; PRPL-51.6; LP-18.0; LPL-15.6; LA-16.8; LC-27.6; DVV-20.9; DAV-3.5; DP-PL-27.6; DPL-A-24.5; DA-C-25.1; % HL: HD-59.9; HW- 45.2; ED-25.5; WGM-26.6; STL-27.2; IOW-35.1; INW-29.0.

Amblypharyngodon melettina (Valenciennes)

Leuciscus melettinus Valenciennes [10], *Hist. nat. Poiss.*, 17: 304 (type locality: Bombay).

Diagnosis: Lateral line incomplete, ceasing after 23 scales; fifty seven scales present in longitudinal series. A bright greenish yellow band divides the yellowish ground color of the back.

Meristic counts: D- ii, 6; P- I, 13- 14; V- I, 8; A- ii, 5.

Metric characters: TL (mm)- 70.0; SL (mm)- 90.0; HL (mm)- 18.0. % SL: HL- 20.0; HD- 12.0; HW- 9.0; BDD-13.0; BDA- 12.0; BWD- 9.0; BWA- 5.0; PRD-35.0; POD-30.0; PRP-20.0; PRPL-27.2; PRA-42.1; LD-15.0; LP-11.2; LPL-11.2; LA- 9.2; LC- 18.0; LCP-13.0; DCP- 7.6; LBD-7.5; LBA - 6.5. % HL: HD- 60.0; HW- 45.0; ED- 25.0; IOW-25.0; INW- 20.0; WGM- 20.0; STL-18.0.

Amblypharyngodon microlepis (Bleeker)

Leuciscus microlepis Bleeker [11]. *Verh. Batav. Genoot. Kunst. Wet.*, 25: 141 (type locality: Bengal).

Diagnosis: Dorsal fin located nearer to caudal base than snout tip; a brownish band passes just above mid lateral region of the body. Head length 4.7 and body depth 5.7 in SL.

Meristic counts: D- ii,7; P- i, 13; V- i, 8; A- ii, 5, C- 21, LLS- 47; PDS- 32; LL/D- 11, LL/V- 4½, PPLS-14.

Metric characters: TL (mm)- 74.0; SL- 94.0; HL (mm)- 20.0. % SL: HL- 21.3; HD- 15.0; HW- 10.6; BDD- 18.1; BDA- 15.0; BWD- 10.6; BWA-7.4; PRD-41.5; POD-35.1; PRP-21.3; PRPL-37.2; PRA-52.1; LD-17.0; LP- 13.8; LPL-12.8; LA-11.7; LC-20.2; LCP-16.0; DCP-9.6; LBD-8.5; LBA-8.5; LBC-9.6; WCP-4.3; DP-PL-18.1; DA-C-22.3; DAV-17.0; DVV-16.0. % HL: HD- 70.0; HW- 50.0; ED-30.0; IOW-35.0; INW- 25.0; WGM- 25.0; STL-20.0.

Osteobrama bakeri (Day)

Rohtee bakeri Day [12]. *Proc. Zool. Soc. London*: 240 (type locality: Kottayam, Kerala).

Diagnosis: Fifteen to sixteen scales present before dorsal fin; forty four to forty five lateral line scales present along lateral line; Spines of dorsal and outermost rays of caudal scarlet colored; eyes can be seen from below ventral side; two minute maxillary barbels.

Meristic counts: D- II, 8-9; A-iii, 12; C- 18-20; V- i, 9; P- I, 14; LLS- 44- 45; PDS- 15- 16; LL/D- 7½; LL/V- 4½; PRAS- 19; PRPLS- 8; CPS- 6.

Metric characters: TL (mm)- 108.5; SL (mm) - 81.5; HL (mm)- 22.0. % SL: HL- 27.0; HD-17.2; HW-14.7; BDD-29.4; BDA-24.5; BWD-14.7; BWA-11.0; DOD-33.1; DOST- 20.8; PRD-51.5; POD-4.9; PRP-26.9; PRPL- 46.6; PRA-67.5; LD-25.8; LP- 19.5; LPL-18.4; LA-13.5; LC-34.4; LBD-12.0; LBA-17.2; LBC-11.0; LCP-17.2; DCP-11.0; DP- PL-21.1; DPL- A-20.9; DA-C-34.4. % HL: HD- 63.6; HW-54.5; ED- 36.4; STL-31.8; WGM- 22.7; LRB-9.1; LMB-13.6; INW-22.7; IOW-31.8.

Puntius amphibius Valenciennes

Capoeta amphibia Valenciennes [10]. *Hist. nat. Poiss.*, 16: 282 (type locality: Bombay). *Puntius amphibius* Pethiyagoda & Kottelat, 2005, *Raffles Bulletin of Zoology*, 12: 145-152.

Diagnosis: Dorsal fin inserted distinctly near to tip of snout than the base of caudal peduncle; its last unbranched ray is smooth and weak. Seven to eight scales are 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.

Metric characters: TL (mm)- 75.0; SL (mm)- 57.0; HL (mm) - 17.0.

% SL: HL- 29.8; HD- 29.8; BDD-31.6; PRD- 50.8; POD- 49.1; PRP- 50.8; PRA- 78.9; LD- 22.8; LP-26.3; LPL- 21.1; LA- 7.0; LBD- 19.3; LBA- 19.3; LCP- 15.8; DCP-13.2. % HL: HD- 100.0; ED- 11.7; IOW- 35.3; IOW- 35.3; STL-29.4.

Puntius mahecola Valenciennes

Leuciscus mahecola Valenciennes [10]. *Hist. Nat. Poiss.*, 17: 305 (type locality: Mahe, India); *Puntius mahecola*, Pethiyagoda & Kottelat, 2005, *Raffles Bulletin of Zoology*, 12: 145-152.

Diagnosis: *Puntius mahecola* is distinguished from all other *Puntius* species 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.

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. Metric characters: TL (mm)- 107.0; SL (mm)-83.0; HL (mm)- 21.0. % SL: HL-25.3; HD-20.5; HW-15.7; BDD-30.1; BDA-19.3; BWD-21.7; BWA-13.3; PRD-47.0; POD-56.7; PRP-26.5; PRPL-53.0; PRA-77.1; LD-21.7; LP-19.3; LPL-18.1; LA-14.5; LBD-16.8; LBA-8.4; LCP-15.7; DCP-14.5; WCP-6.0; DAV-4.6; DVV-21.7; DP-PL-28.9; DPL-A-26.5. % HL: HD-81.0; HW-62.0; ED-33.3; IOW-39.0; INW-23.8; WGM-33.3; STL-33.3.

***Puntius parrah* Day**

Puntius parrah Day [5]. *Proc. Zool. Soc. London*, 301 (type locality: Karavannoor River, Trichur, Kerala).

Diagnosis: Last unbranched dorsal ray osseous, smooth and strong; lateral line complete with 25- 26 scales; 8 scales present before the dorsal fin; a bluish band present along the lateral line.

Meristic counts: D_ ii- iii, 7-8; P- I, 14; V- I, 8; A- ii- iii, 5; LLS- 25- 26.

Metric characters: TL (mm)- 86.0- 100; SL (mm) - 65.0- 78.0. % SL: HL- 25.0- 26.0; HD- 21.0- 24.0; HW- 15.0- 17.0; BDD- 32.0- 33.0; BDA- 3.0- 24.0; BWD- 17.0- 19.0; PRD- 50.0- 52.0; POD- 48.0- 53.0; PRP- 27.0- 28.0; PRPL- 47.0- 53.0; PRA- 70.0- 73.0; LD- 22.0- 24.0; LP- 17.0- 19.0; LPL- 20.0- 21.0; LA- 13.0- 16.0; LBD- 18.0- 20.0; LBA- 12.0- 15.0; LCP-19.0- 20.0; DCP- 12.0- 13.0; WCP- 4.0- 5.0; DVV- 23.0- 25.0. % HL: HD- 84.0- 88.0; HW- 60.0- 68.0; ED- 32.0- 360.0; IOW- 42.0- 43.0; WGM- 28.0- 30.0; STL-26.0- 29.0.

***Puntius madhusoodani* Kumar et al.**

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

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

Metric characters: TL (mm)- 90.0- 118.0 ; SL (mm)- 67.0- 91.0.% SL: HL- 27.0- 29.0; HD- 20.0- 23.0; HW- 15.0- 16.0; BDD- 34.0- 36.0; BDA- 22.0- 23.0; BWD- 15.0- 16.0; PRD- 49.0- 50.0; POD- 50.0- 58.0; PRP- 26.0- 28.0; PRPL- 46.0- 50.0; PRA- 67.0- 74.0; LD- 25.0- 28.0; LP- 17.0- 19.0; LPL- 20.0- 21.0; LA- 19.0- 21.0; LBD- 19.0- 20.0; LBA-9.0- 12.0; LCP- 12.0- 17.0; DCP- 12.0- 14.0; WCP- 6.2- 6.6; DAV- 4.0- 6.0; DVV- 22.0- 23.0. % HL: HD- 95.0- 100.0; HW- 55.0- 61.0; ED- 27.0- 33.0; IOW- 37.0- 41.0; WGM- 25.0- 27.0; STL- 28.0- 30.0.

Remarks: Krishnakumar and his colleagues described it as a fish with a diffuse black spot on caudal base; but when this researcher examined the type specimens of this fish, it was found that one fish with a deep caudal spot and other specimens' spot might have been faded.

***Puntius nelsoni* Plamoottil**

Puntius nelsoni, Plamoottil [13]. *Int. J. Fauna and Biol. Studies*, 1 (6): 135-145 (type locality, Thiruvalla, Kerala).

Diagnosis: A narrow, elongated light bluish green mark present on the summit of occiput, outer to operculum numerous fine black dots in the form of a thin band which of both sides join together at occiput; upper margin of dorsal fin straight except the last ray.

Meristic counts: D- iii, 8; P- i, 14-15; V -ii, 7; A - iii, 5; C - 19; LLS - 25-26; L/Tr - 5/3½; LL/D- 5 ; LL/V- 3; PDS- 9.

Metric characters : TL- 86- 117; SL- 62-91. % SL: HL- 25.7-26.7; HD- 23.8-28.4; HW- 17.3-18.7; BDD-32.9-33.7; BDA- 23.0- 25.9; BWD- 18.5- 21.4; BWA-13.6- 15.7; PRD- 50.0- 53.1; POD- 53.0- 55.4; PRP- 26.4- 27.9; PRPL- 49.4-51.8; PRA- 73.8- 81.8; LRD- 21.8- 23.5; LP- 17.3- 18.5; LPL- 18.5-19.4; LA- 16.1-17.6; LBD- 19.0-21.8; LCP- 17.8-20.0; DCP- 13.1- 14.4; WCP- 7.4- 7.7; DAV- 2.4- 3.1; DVV- 23.8- 27.2. % HL: HD- 89.3- 96.2; HW- 68.2-70.9; ED- 26.8- 33.3; IOW- 40.2- 43.3; INW- 26.8- 28.8; STL- 22.7- 28.8; WGM- 29.2- 30.9; LMB- 12.4- 14.4.

***Puntius viridis* Plamoottil & Abraham**

P. viridis, Plamoottil & Abraham [14]. *Journal of Research in Biology*, 2013 (3): 1093- 1104. (Type locality: Kallumkal)

Diagnosis: Eyes clearly visible from below ventral side; one row of prominent elongated black spots present on the middle of dorsal fin; a black band formed of dark spots present outer to operculum. 25- 26 lateral line scales; 4½- 5½ scales between lateral line and dorsal fin; moderate scales on the breast region.

Meristic counts: D- iii, 8; P- i, 14; V- i, 8; A- iii, 5; C- 18- 19; 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.

Metric characters: TL (mm)- 91.2-103; SL (mm)- 72-81. % SL: HL- 26.4- 31.1; HW-15.8- 17.8; HD-19.7- 22.9 ; BDD-31.5- 33.8; BDA-21.1- 23.9; BWD-16.2- 19.1; BWA-10.8- 13.2; PROD-18.9- 23.0; D- OD-30.4- 31.7; PRD-48.2- 54.8; POD-48.2- 54.8; PRP-25.8- 29.7; PRPL-47.9- 50.0; PRA-72.2- 76.6; LD-22.4- 26.5; LP-16.7- 19.7; LPL- 17.3-20.3; LA-14.8- 18.9; LC-29.3- 30.0; LBD-17.6- 19.2; LBA- 9.8- 11.1; LBC-13.5- 14.2; LCP-16.3- 17.8; DCP-13.5-14.5; WCP-77.0- 88.0; DP- PL- 21.0-21.6; DPL- A- 23.8- 25.0; DA-C-25.9- 27.5; DAV-2.6- 4.1; DVV- 19.1- 22.8. % HL: HD-68.2- 80.0; HW-56.5- 63.2; ED- 26.1- 31.6; IOW-31.6- 40.9; INW-23.9- 28.9; STL- 22.7- 31.8; WGM-23.0- 27.3; LMB- 13.0- 21.1.

***Puntius dolichopterus* Plamoottil**

Puntius dolichopterus Plamoottil [15]. *International Journal of Pure and Applied Zoology*, 3 (3): 226- 231.

Diagnosis: *Puntius dolichopterus* can be distinguished from its congeners in having longer head, operculum extends out beyond pectoral fin base as a soft membranous flap, 8 pre dorsal scales, 23- 24 + 1- 2 lateral line scales, short dorsal fin located behind ventral fin origin, spinous portion of third dorsal spine unusually longer; pectoral fin reaches pelvic fin and 3- 4 longitudinal lines present below lateral line

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

Metric characters: TL (mm)- 81.2; SL (mm)-62.9; % SL: HL-31.7; HD-23.7; HW-15.6; BDD-32.9; BDA-23.4; BWD-15.8; BWA-11.7; PRD-51.8; POD-51.8; PRP-30.8; PRA-73.2; PRPL-49.8; LP-20.9; LPL-21.2; LA-18.1; DVV-22.2; DAV-1.6; DP-PL-20.3; DPL-A-25.0; DA-C-28.6; % HL: HD-73.1; HW-48.3; ED-27.8; WGM-22.0; STL-26.0; IOW-28.3; INW-20.9.

***Puntius vittatus* Day**

Puntius vittatus Day [5]. *Proc. Zool. Soc. London*, 303 (type locality: Mysore).

Diagnosis: Barbels absent; last unbranched ray of dorsal fin non- osseous, weak and smooth; lateral line incomplete; a round black blotch present on the base of caudal peduncle; another distinct black spot at anal front; an elongated black bar present on dorsal 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.

Metric characters: TL (mm)- 35.0; SL (mm)- 28.0; HL (mm) - 9.0. % SL: HL-32.1; HD-25.0; HW-17.8; BDD- 32.1; BDA-21.4; BWA-35.7; BWD-21.4; LP-14.3; LPL-21.4; LA-17.8; LD-17.8; LBD-17.8; DP-PL-25.0; DPL- A-28.6; DA-C-21.4; PRD-53.6; POD-53.6; PRP-28.6; PRPL-53.6; PRA-75.0. % HL: HD- 77.8; HW- 55.6; ED- 33.3; IOW-33.3; STL- 44.4.

***Pethia ticto* (Hamilton- Buchanan)**

Cyprinus ticto Hamilton [8]. *Fishes of Ganges*, pp.314 (type locality: South- eastern parts of Bengal).

Diagnosis: Mouth with highly protractible lips; no barbels. A black spot present behind the gill cover above the base of pectoral fin; another one on the rear half of the body above the highest point of anal fin.

Meristic counts: D-I, 8; P- i, 12; V-i, 8; A- iii,5; C- 18; LLS-23; PDS- 8; LL/D- 5 $\frac{1}{2}$; LL/V- 3 $\frac{1}{2}$; PPLS- 5; PRAS- 13; LL/A- 3 $\frac{1}{2}$.

Metric characters: TL (mm)- 66.0; SL (mm)- 49.0; HL (mm)- 14.0. % SL: HL- 28.6; HD-22.4; HW-14.3; PRD-53.1; POD-53.1; LP-38.8; LPL-22.4; LA- 18.4; LBD-16.3; LBA-12.2; DP-PL-28.6; DA-C-24.5; BDD-38.8; BDA-28.6; BWD- 20.4; BWA-14.3; LCP-22.4; DCP-14.3; WCP-6.1. % HL: HD-78.6; HW-50.0; ED-35.7; WGM-21.4; STL-28.6; IOW-28.6; INW-28.6.

***Pethia punctatus* (Day)**

Puntius punctatus, Day, F [5]. *Proc. Zool. Soc. London*, 302. (Type locality: Malabar)

Diagnosis: No barbels; two distinct black spots- one above pectoral fin and one above pelvic fin origin; a large deep black blotch present on caudal peduncle just behind the posterior base of anal fin. Dorsal fin with distinct black spots; dorsal spine strong and its inner margin distinctly toothed; teeth on its tip prominent; lateral line distinct throughout.

Meristic counts: D- I, 7; P- 9; V- i, 8; A- iii, 5; C- 17; LLS- 24; LL/D- 4 $\frac{1}{2}$; LL/V- 3 $\frac{1}{2}$; PDS- 7; PPLS- 6; PRAS- 13; LL/A- 3 $\frac{1}{2}$.

Metric characters: TL (mm)- 62.0 ; SL (mm)- 46.0; HL (mm)- 13.0. % SL: HL-28.3; HD-19.6; PRD-52.2; POD- 56.5; PRP- 26.1; PRPL-30.4; PRA-76.1; LP-24.0; LPL-21.7; LA-17.4; LC-34.8; DP-PL-28.3; DPL-A- 26.8; DA-C-28.3; BDD-34.8; BDA-28.3; BWD-19.6; BWA- 34.8; LCP-17.4; DCP-15.2; WCP-8.7; DVV-24.0; DAV-2.2. % HL: HD-69.2; ED-38.5; WGM-30.8; STL-23.1; IOW-30.8.

***Haludaria fasciatus* (Jerdon)**

Cirrhinus fasciatus Jerdon [7]. *Madras Journal of Literature and Science*, (Type Locality: Malabar).

Diagnosis: Last unbranched dorsal ray non osseous, weak and smooth. Lateral line with 20 scales; seven scales present before dorsal fin; three vertical bands descending up to a little below the lateral line.

Meristic counts: D- i, 8; P- I, 14; V- i,7; A- ii,5; C-16; LLS- 21; PPLS- 5; PRAS- 11; LL/D- 3 $\frac{1}{2}$; LL/V- 2 $\frac{1}{2}$; LL/A- 3 $\frac{1}{2}$; PDS- 7.

Metric characters: TL (mm) - 54.0; SL (mm) - 41.0; HL (mm)- 12.0.% SL: HL-29.3; HD-24.4; HW-17.1; PRD-53.6; POD-53.7; LP-22.0; LPL-22.0; LA- 19.5; LC-31.7; LBD-22.0; LBA-12.2; DP-PL-26.8; DA-C-22.0; BDD-36.6; BDA-22.0; BWD-22.0; BWA-14.6; LCP-17.1; DCP-14.6; WCP-7.3. % HL: HD-83.3; HW-58.3; ED-33.3; WGM-33.3; STL-33.3; IOW-33.3; INW-25.0; LMB- 33.3; LRB-58.3.

***Dawkinsia filamentosa* (Valenciennes)**

Leuciscus filamentosus Valenciennes [10]. Hist. Nat. Poiss., 17: 495 (type locality: Alleppey, Kerala).

Diagnosis: Barbels are minute maxillary pair only; lateral line complete with 21 scales; a deep oval blotch present above anal fin; caudal fin with two oblique red bands bordered with black bands.

Meristic counts: D- iii, 8; P- I, 14; V- I, 8; A- ii- iii, 5; LLS- 21; PDS-7½; PRPLS- 9; PRAS-16; LL/D-5½; LL/V-2½; L/Tr- 5½/3½; LL/A-3½;CPS- ½5½.

Metric characters: TL (mm)- 153.0; SL (mm)-120.0; HL (mm)-27.0. % SL: HL-22.5; HD-18.3; HW-15.0; BDD-33.3; BDA-20.8; BWD-18.3; BWA-11.7; PRD-45.8; POD-53.3; PRP-24.2; PRPL-48.3; PRA-71.7; LD-22.5; LP-18.3; LPL-17.5; LA-13.3; LBD-15.8; LBA-9.2; LBP-5.0; LBPL-5.0; LCP-15.8; DCP-12.5; WCP-5.8; DAV-5.0; DVV-21.7; DP-PL-25.8; DPL-A-25.0. % HL: HD-81.5; HW-66.7; ED-29.6; IOW-48.1; INW-29.6; WGM-33.3; STL-33.3.

***Systomus rufus* Plamoottil**

Systomus rufus Plamoottil [13]. *Int. J. Fauna and Biological Studies*, 2014; 1 (6): 135-145 (Type locality: Manimala River).

Diagnosis: *Systomus rufus* differs from its congeners in having dorsal fin situated nearer to caudal fin base than snout tip, a little behind ventral fin origin, dorsal fin green, other fins red, 11-12 pre dorsal scales, 30 lateral line scales and 6½ scales between lateral line and dorsal fin base.

Meristic counts: D- iii-8; P- 15-16; V- ii-6-7; A- iii-5; C- 19; LLS-30; CPS- 7; PDS- 11-12; LL/D- 6½; LL/V-4½; LL/A- 4½.

Metric characters: SL (mm)-102.0-139.0. % SL: HL-25.9- 28.3; HD- 20.8-24.5; HW-15.1-15.7; BDD-36.7-41.5; BDA-25.5- 28.3; BWD- 18.6-19.4; BWA-10.4- 11.8; PRD-50.3- 51.9; POD- 45.1-46.7; PRP-25.5- 28.3; PRPL-50.0-56.6; PRA- 73.5- 82.; LD- 18.6- 20.8; LP-15.7- 16.0; LPL-13.7-14.7; LA-10.8-12.9; LBD-12.7-14.4; LBA- 7.8- 8.6; LCP-13.7- 16.6; DCP-12.7-13.2; WCP-5.8- 7.2; DVV- 19.6- 21.5; DAV- 2.9- 3.7. % HL: HD- 81.0- 86.7; HW-53.3- 59.7; ED-19.4- 20.4; IOW- 40.0- 44.4; INW-23.3-27.8; STL-29.6-36.7; WGM-29.6- 33.3.

***Systomus chryseus* Plamoottil**

Systomus chryseus Plamoottil [13]. *Int. J. Fauna and Biol. Studies*, 2014; 1 (6): 135-145 (Type locality: Manimala River)

Diagnosis: Dorsal and ventral profiles nearly straight; a golden to yellowish golden color on flanks; pectoral, pelvic and anal fins reddish; lateral line scales 28- 30 and pre dorsal scales 11.

Meristic counts: D- ii- iii, 8; P- i, 16; V- i, 8; A- iii-5; C- 19; LLS- 28-30; CPS- 7; PDS-11; L/Tr- 5½-6½ / 3½- 4½; LL/D- 5½ - 6½; LL/V- 3½ - 4½; LL/A- 4½.

Metric characters: TL (mm) - 129- 195; SL (mm) - 99-152. % SL: HL-23.4-27.2; HD-19.8-23.5; HW-16-18.2; BDD-25.0-31.4; BDA-19.0-22.7; BWD-15.5- 21.3; BWA-11.4-14.9; PRD-46.1- 54.6; POD-45.9- 54.6; PRP-23.0- 26.8; PRPL-43.9-51.8; PRA- 68.0- 77.8; LD- 21.4- 25.0; LP-19.8-22.3 ; LPL-15.0-19.0; LA-12.3- 15.5; LBD-13.4- 18.0; LBA- 7.0-10.5; LCP-12.7-22.2; DCP-12.3-14.8;WCP-4.6-7.8; DVV-20.3-24.7; DAV- 33-2.8. % HL: HD- 77.5-93.5; HW-62.9- 71.8; ED- 20.0- 31.5; IOW-40-43.8; INW- 21.8- 27.5; STL-22.2-29.3; WGM-28.1- 35.0.

***Systomus laticeps* Plamoottil**

S. laticeps Plamoottil [16]. *International Journal of Fauna and Biological Studies*, 3 (5): 92- 96. (Type Locality: Thiruvalla) .

Diagnosis: Lateral line scales 27, pre dorsal scales 9. Body elongated, round and wide; head small and wide; fins hyaline; a prominent hump on the post occipital region. Inter-radial membrane of anal fin fleshy, thick and prominent.

Meristic counts: D-iii, 8; P-I, 14; V-I, 8 ; A- iii, 5; C-19; LLS-27; PDS-9; LL/D-6½; LL/V-3½; CPS-7.

Metric characters: SL (mm)- 130.0; % SL: HL-23.8; HD-23.1; HW-20.4; BDD-32.3; BDA-23.1; BWD-26.1; BWA-18.5; PRD-50.8; POD-51.5; PRP-23.8; PRPL-50.0; PRA-73.1; LD-19.2; LP-18.1 ; LPL-15.4; LA-13.8; LBD-16.1; LBA-10; LCP-16.5; DCP-15.3 ; WCP-8.8; DVV-24.2; DAV-0.7; % HL: HD-96.8 ; HW-85.5; ED-27.4; IOW-42.0; INW-22.6; STL-32.2 ; WGM-42.0; LMB- 27.4; LRB- 17.7.

***Gonoproktopterus kurali* (Menon & Rema Devi)**

H. kurali Menon & Remadevi [17]. *Journal of Bombay natural History society*, 92 (3): 389- 393 (Type locality: Mallappally).

Mathews Plamoottil

Diagnosis: Last unbranched dorsal ray weak and smooth; Lateral line with 42 scales; two pairs of maxillary barbels present, the upper pair seemingly absent as it is hidden under labial groove. Caudal fin is with an oblique red band bordered with black; a black band present outer to operculum.

Meristic counts: D-I, 9 ; P-I, 13-14; V-I, 8 ; A-I, 6 ; C-19; LLS-42 ; PDS-13 ; PRPLS-10; PRAS-21 ; LL/D-8½; LL/V- 4½; L/ Tr- 8½/6½; LL/A-5½ ; CPS-7.

Metric characters: TL (mm)- 236.5; SL (mm)-184.0; HL (mm) - 48.5. % SL: HL- 26.4; HD-15.8; HW-15.5; BDD-21.7; BDA-15.8; BWD-18.0; BWA-12.2; PRD-47.3; POD-49.5; PRP- 24.0; PRPL-47.8; PRA-72.3; LD-21.7; LP-18.5; LPL-16.3; LA-24.0; LBSOD-14.7; LBA-8.0; LCP-15.2; DCP-9.2; WCP-5.4; DVV-22.2. % HL: HD- 59.8; HW-58.8; ED-22.7; IOW- 35.1; INW-24.7; WGM-18.6; STL-45.4

***Labeo dussumieri* (Valenciennes)**

Rohita dussumieri Valenciennes [10]. Hist. nat. Poiss: 16: 258 (type locality: Alleppey, Kerala).

Diagnosis: A diffused black spot present on caudal base; eight reddish black bands present on lateral sides; these bands are formed by the presence of scales with reddish centre edged with dark shade.

Meristic counts: D- iii, 11; ; P- i, 15; V- i, 8; A- ii, 5; C- 19; LLS- 53; LL/D- 9½; LL/V-6½; LL/A- 6½; PPLS-21; PRAS- 38; CPS- 9; PDS- 20.

Metric characters: TL (mm) - 273.0; SL (mm) - 210.0; HL (mm) - 54.0. % SL: HL- 25.7; BDD- 24.8; BDA-16.7; BWD-17.1; BWA-11.4; PRD-42.8; POD-54.3; PRP-24.8; PRPL-52.9; PRA-77.6; LD-19.0; LP-19.0; LPL-16.7; LA-7.6; LC- 29.5; LBD-21.0; LBA-7.6; LBC-11.9; LCP-15.7; DCP-12.0; WCP-4.8; DP-PL-27.1; DPL-A-25.7; DA-C-21.0. % HL: ED- 24.1; IOW-50.0; INW-35.2; WGM-29.6.

***Labeo filiferus* Plamoottil**

Labeo filiferus Plamoottil, M [18]. Bioscience Discovery, 8 (3): 301- 306 (Type locality: Edakadathy, Kerala)

Diagnosis: Black colored body and fins, prominent barbels, smaller eyes, longer snout, elongated dorsal fin, filamentous tip of which reach above caudal fin base, longer pelvic fin reaching behind anal fin origin, unusually elongated anal fin reaching the tip of middle caudal fin rays and deeper caudal peduncle. The new species further differs from its relative species in having 15 pre dorsal scales, 8½ scales between lateral line and dorsal fin, 5½ scales between lateral line and ventral fin and 39 lateral line scales.

Meristic counts: D- ii, 15; P- i, 17; V- i, 8; A- ii, 5; C- 19; LLS- 39+2; PDS- 15; PRPLS-11; PRAS- 25; CPS-19; LL/D-8½; LL/V- 5½; LL/A- 6½

Metric characters: TL (mm)-208.0; SL (mm)-200.0; % SL: HL-25.0; HD-20.0; HW-16.5; BDD-33.0; BDA-22.0; BWD-19.0; BWA-12.5; PRD-48.5; POD-54.5; PRP-23.5; PRA-81.6; PRPL-53.0; LP-24.5; LPL-33.0; LA-34.0; LC-40.0; DVV-21.5; DAV-6.0; DP-PL-30.0; DPL-A-27.0; DA-C-22.0; % HL: HD-80.0; HW-66.0; ED-18.0; WGM-29.0; STL-47.6; IOW-54.0; INW-46.0

***Labeo rohita* (Hamilton- Buchanan)**

Cyprinus rohita, Hamilton- Buchanan [8]. Fishes of Ganges: 301, 388 (type locality: Gangetic Provinces).

Diagnosis: which are concealed in the lateral groove; mouth sub terminal; 6½ scales between lateral line and dorsal and anal fins; lateral line straight; anal tip reach near to caudal base.

Meristic counts: D- iii, 11; P- i,17; V- i, 8; A- ii, 5; C- 19; LLS- 41; LL/V- 6½; LL/D- 6½; LL/A- 5½; PDS- 13; PRPLS- 15; PRAS- 30.

Metric characters: TL (mm) – 176.0; SL (mm)- 137.0; HL (mm)- 39.0. % SL: HL- 28.5; HD-19.7; HW- 16.1; BDD-28.5; BDA- 16.8; BWD-17.5; BWA-11.0; PRD-50.4; POD-57.0; PRP-27.0; PRPL-51.8; PRA- 78.1; LBD-21.2; LBA- 6.6; LBC-13.1; DP- PL-27.0; DPL- A- 27.0; DA-C- 21.7; LC-28.5; LCP-16.1; DCP- 13.1; WCP-5.1; DVV-21.2; DAV- 5.8. % HL: HD- 69.2; HW-56.4; ED-28.2; STL-28.2; WGM-30.8; IOW-46.2; INW-35.8.

***Garra mullya* (Sykes)**

Garra Hamilton- Buchanan [8]. Fishes of Ganges: 343, 393 (type species, *Cyprinus lamta*, by subsequent designation). (Type locality: Pune, Maharashtra)

Diagnosis: Lateral line scales 32; pre dorsal scales 9; a black spot present behind opercular angle; a black band extends from head to tip of tail;

Meristic counts: D- ii, 8; P- i, 12; V- i, 8; A- ii, 5; C- 18; LLS- 33; LL/D- 5½; LL/V- 3½; LL/A- 4½; PRPLS- 8; PRAS- 16; CPS- 7; PDS-10.

Metric features: TL (mm) - 172.0; SL (mm) - 142.0; HL (mm) -30.0. % SL: HL-21.1; HD-14.8; HW-17.0; BDD-20.4; BDA-15.5; BWD-19.7; BWA-11.3; PRD-40.1; POD-49.3; PRP-17.6; PRPL-47.2; PRA- 74.0; LD-18.3; LP-21.8; LPL- 19.7; LA-17.0; LC-22.5; LBD-14; LBA-7.0; LBC-12.0; LCP- 14.8; DCP-12.0; WCP-4.2; DP-PL-31.0; DPL- A-24.6; D- AC-21.1; WGM-8.4; % HL: HD-70.0; HW-80.0; ED-20.0; IOW-43.3; INW-33.3.



Fig. 1. *Barilius bakeri* Fig. 2. *D. malabaricus* Fig.3. *D. aequipinnatus* Fig.4. *Rasbora dandia* Fig.5. *R. ataenia*



Fig. 6. *A. melettina* Fig. 7. *A. microlepis* Fig. 8. *O. bakeri* Fig. 9. *P. amphibious* Fig. 10. *P. mahecola*



Fig. 11. *P. parrah* Fig. 12. *P. madhusoodani* Fig. 13. *P. nelsoni* Fig. 14. *P. viridis* Fig. 15. *P. dolichopterus*



Fig. 16. *Puntius vittatus* Fig. 17. *Pethia ticto* Fig. 18. *P. punctatus* Fig. 19. *H. fasciatus* Fig. 20. *D. filamentosa*



Fig. 21. *S. chryseus* Fig. 22. *S. rufus* Fig. 23. *S. laticeps* Fig. 24. *G. kurali* Fig. 25. *L. dussumieri*

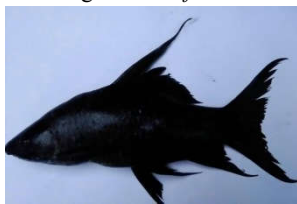


Fig. 26. *L. filiferus*



Fig.,27. *L. rohita*



Fig. 28. *G. mullya*

CONCLUSION

Cypriniformes is the largest order of freshwater fishes comprising more than 3,000 extant species [19]. Systematic studies on this order have been the subject of a long debate since the 19th century. Due to vast zoogeographic distribution of its taxa, great number of species and difficulty of obtaining species of critical taxa, taxonomic relationships of its various groups are still obscure. Therefore systematic classification of cypriniformes is complex [20]. Even though some taxonomic clarity has been created by molecular phylogenies, there are still many unresolved nodes in its tree of life. Great ambiguity still exists in many cyprinid genera. Many are considered as synonyms of other recognized taxa. It is hoped that many sincere taxonomic works will be conducted in these fishes in days to come.

ACKNOWLEDGEMENT

The author acknowledges Principal, Baby John Memorial Government College for providing the necessary facilities.

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