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Taxonomic studies on the exotic fishes of Manimala River, Kerala, India

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Abstract

Taxonomic studies conducted on five exotic fishes of Manimala River. They were domesticated varieties imported from foreign countries; *Cyprinus carpio communis*, *Pangasinodon hypophthalmus*, *Clarias gariepinus*, *Tilapia mossambica* and *Osphronemus goramy* were examined for meristic and metric characters; search was also conducted on their origin and present distribution.

Keywords: Manimala River, Exotic fish, Taxonomy, Meristic counts, Metric characters.

Introduction

Manimala River is a small mountainous river, originating from the Thattamalai hills of the Western Ghats mountain ranges at an elevation of 1156 m above MSL. It is with a length of about 90 km and a catchment area of about 847 km². Manimala River is famous for its ichthyofaunal resources; *Mesonoemacheilus triangularis*^[1], *Barilius bakeri*^[1], *Sahyadria denisonii*^[1] and *Hara malabarica* Day (= *Mystus canarensis*^[2]) were originally described from this river. During the last four years 14 new fishes were discovered, described and named from this River.

This author could conduct studies on the diversity and taxonomy of ichthyofaunal resources of Manimala River for the last five years. During this research a few exotic fishes were also collected from this aquatic body. As its taxonomic details are unavailable in the literature, studies conducted on its meristic, metric and morphometric characters.

Materials and methods

This study was based on examination of freshly collected fish species from Manimala River. In this context, four low level regions of Manimala River such as Kallumkal, West Venpala, Kuttoor and Manackachira were visited and collected all types of fishes. Gill nets and caste nets were used for collecting fishes. Measurements and counts used are as per Jayaram^[3, 4].

Abbreviations Used: D- dorsal fin rays; P- pectoral fin rays; V- ventral fin rays; A- anal fin rays; C- caudal fin rays; PDS- pre dorsal scales; LLS- lateral line scales; L/Tr- transverse scales; LL/D- scales between lateral line and dorsal fin; LL/V- scales between lateral line and ventral fin; LL/A- scales between lateral line and anal fin; CPS- circum peduncular scales; VR- vertebrae; 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 length; PRP- pre pectoral length; PRPL- pre pelvic length; PRA- pre anal length; POD- post dorsal length; LD-length of dorsal fin; LP-length of pectoral fin; LPL- length of pelvic fin; LSOA- length of soft anal fin; LAD- length of adipose dorsal fin; LA- length of anal fin; LBSD- length of base of spinous dorsal fin; LBA- length of base of anal fin ; LBSOD- length of base of soft dorsal fin; DP- PL-distance from pectoral to pelvic; DPL- A- distance from pelvic to anal fin; LCP- length of caudal peduncle; DCP- depth of caudal peduncle; WCP- width of caudal peduncle; HD- head depth; HW-head width; ED- eye diameter; STL- snout length; IOW-inter orbital length; INW-inter narial width; LMB- length of maxillary barbels; LOMB- length of outer mandibular barbels; LNB- length of nasal barbels; LBRD- length of base of rayed dorsal fin; LBP-length of base of pectoral fin; LBPL- length of base of pelvic fin; DAV- distance from anal to vent; DVV- distance from ventral to vent.

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Results

Five exotic fish species were collected from low level sites of Manimala River; taxonomic analysis was done for these fishes; most of the taxonomically relevant meristic counts and metric characters were taken into consideration for the studies.

Cyprinus carpio communis Linnaeus

Cyprinus Linnaeus, 1758, Systema Naturae, Ed. 10, 1: 320 (type species, *Cyprinus carpio* Linnaeus, by subsequent designation; type locality; Europe).

Diagnosis: Body is fairly deep. Dorsal profile more convex than ventral. Abdomen rounded. Snout obtuse. Well-developed rostral and maxillary barbels present; maxillary barbels twice as long as rostral pair. Last unbranched dorsal and anal fin osseous and serrated. Caudal fin deeply emarginate.

Meristic counts: D- iii, 19; P- i, 15; V- i, 8; A- iii, 5; C- 19; LLS- 36; L/Tr- 8/5½; PDS- 11; CPS- 5.

Metric characters: TL (mm) - 300.0; SL (mm) - 235.0. % SL: BDD- 40.4; HL-28.5; PRD- 56.2; POD-48.9; PRP- 48.9; LD-18.3; LBSD-36.6; LBA-9.4; LP-20.0; LPL-19.1; LCP-12.8; DCP-14.0; HL (mm) - 67.0; % HL: HD-119.4; ED-13.4; STL-35.8.

Other features: Head triangular and rounded at the snout, with a small oblique, terminal, tubular and protrusible mouth having thick fleshy lips. Nostrils situated near to eyes and they have large pits. A number of minute grooves present on opercle. Pectoral fins large. Lateral line complete and concave. Color silvery. Dark spots present between scales give an appearance of having 8 lateral longitudinal lines; it takes a bright red color during breeding season; fins reddish; it turns to golden yellow after preservation in formalin.

Pangasinodon hypophthalmus (Sauvage)

Helicophagus hypophthalmus, Sauvage, H.-E. 1878. *Bulletin de la Société philomathique de Paris* (7th Série) v. 2: 233-242.

Diagnosis: Head dorso- ventrally flattened; rest of the body laterally compressed; pelvic fins with 8 rays; maxillaries and mandibulars short; maxillaries never reach base of pectoral or outermost part of opercle.

Meristic counts: D- I, 7; P- I, i, 9; V- i, 7; A - iv, 29; C - 18.

Metric characters: SL (mm)- 375.0; HL (mm) – 100.0; % SL: HL - 26.7; BDD- 40.0; BDA-34.7; BWD-18.7; BWA-13.3; PRD-37.9; POD-61.3; PRP- 22.9; PRPL-49.3; PRA-61.3; LAD- 5.6; LPL-12.3; LA-12.0; LBRD-7.2; LBA-29.1; LBP- 5.1; LBPL-5.9; LCP- 13.3; DCP-13.1; WCP- 6.1; DAV-1.1; DVV-9.8; % HL: HD- 65.0; HW- 58.0; ED- 10.0; IOW-55.0; STL- 35.0; LMB- 32.0; LOMB- 19.0.

Other features: Snout length shorter than inter orbital width; barbels short and feeble; dorsal spine roughened externally and serrated internally; adipose dorsal is far back, short based and small. Pectoral spine deeply serrated internally and roughened externally. Tip of pelvic fin reaches anal fin.

Clarias gariepinus (Burchell)

Silurus gariepinus, Burchell, W. J. 1822. Travels in the interior of southern Africa. 2 vols. London. v. 1: i-xi + 1-582 + 1-4, 1 Map. v. 2: 1-648. [Fishes in v. 1: 280, 284, 425, and 445.]

Diagnosis: Cephalic groove divided into two fontanels; of this, anterior one is elongated and posterior one is round and deep; in addition to this a small groove present on occiput also; occipital process never reach dorsal fin front; nasal barbels short and never reach occiput; maxillaries and outer mandibulars reach just behind pectoral base, inner mandibulars never reach pectoral base. Tip of pelvic fin reach behind the origin of anal fin. Dorsal and anal fin long but never fused to caudal.

Meristic counts: D- 63; P- I, 8; V- 6; A- 52; C- 19.

Metric characters: TL (mm)- 352.0; SL (mm)- 307.0; % SL; HL- 21.5; HD-11.4; HW-18.6; BDD-14.0; PRD-30.5; POD-63.5; LD-3.3; LBA-44.0; LP-10.7; LPL-11.1; LA-5.2; LC-14.6; DP- PL- 22.1; DPL- A- 9.4; DAV- 3.3; DVV- 4.6; HL (mm)- 66.0; % HL: HD-53.0; HW-86.4; ED-10.6; STL-37.8; IOW-48.5; INW-34.8; LMB-92.4; LNB-47.0; LOMB-74.2; LIMB-55.3.

Oreochromis (Tilapia) mossambica (Peters)

Chromis mossambicus Peters, *Montab. Akad. Wiss., Berlin:* 681 (type locality: Mozambique).

Diagnosis: It can be readily identified by its blackish blue coloration and its fins that are beautifully bordered with red. Its large head and wide mouth are further evidences. Dorsal and anal fins have prolonged and pointed tips and the tail is round. Lateral line scales 31. Dorsal fin with 17 spines and anal fin with 3 spines.

Meristic counts: D- XVII, 11; A- III, 9; V- I, 5; P- I, 12; C- 15; LLS- 31 (16/15); PDS- 9; CPS- 7.

Metric characters: TL (mm) -263.0; SL (mm)- 215.0; HL (mm) -70.0; % SL: HL-32.6; HD-37.2; BDD-38.6; PRD-35.3; POD-61.4; PRP-67.4; LD-25.6; LP-30.2; LPL-28.0; LBSD-21.8; LBA-20.0; LCP-16.3; DCP-14.0; % HL: HD-114.3; ED-17.1; STL-35.7.

Other features: Three or four blotches present along the flanks; teeth are in 3- 5 rows on jaws. Head compressed with concave upper profile; spinous portion of dorsal fin is longer than soft part.

Osphronemus (Osphromenus) goramy Lacepede

Osphronemus goramy Lacepede, 1801, *Hist. Nat. Poiss.*, 3: 116 (type locality: Mauritius).

Osphronemus goramy Roberts, 1992. Revision. *Ichthyol. Explor. Freshwat.* 2(4):351-360.

Diagnosis: 12 dorsal spines and 10 anal spines; 1 ventral spine; 2nd ray of pectoral fin elongated to form very long filament extending beyond caudal fin; inter orbital region fairly concave.

Meristic counts: D- XII, 11; P- 13; V- I, i, 4; A- X, 20; C- 16; LLS- 34+3; L/Tr- 6½/12½; LL/D- 6½; LL/V- 12½; CPS- 5½/4½; LL/A- 12½; VR- 31.

Metric characters: TL (mm)- 175.0; SL (mm) – 135.0; % SL: HL- 32.6; HD-31.8; HW-17.8; BDD-49.6; BDA-44.4; BWD-16.3; PRD-47.3; POD-51.8; PRP-32.6; PRPL-40.0; PRA-50.4; LD- 26.7; LP-23.7; LPL-23.7; LSOA-6.0; LBSOD-26.7; LBA-55.6; LBP- 6.0; LBPL-3.7; LCP-6.0; DCP-17.0; WCP-2.9; DAV-3.0; DVV-7.4.

Other features: Soft dorsal fin elongated and reach to middle of caudal fin; anal and ventral fin located close to each other. Tip of pectorals reach 5-6 anal spine; soft anal fin broad and elongated, reach to hind part of caudal fin. A black blotch presents at the base of pectoral fin; inter orbital region fairly concave.

Discussion

Cyprinus carpio communis is a domesticated variety of common carp (scale carp) (Malayalam Bhavani) (Order Cypriniformes: Cyprinidae). It was initially, imported in 1939 from Ceylon and was transplanted in Nilgiris. Another variety was brought from Bangkok to Cuttack (Orissa) in 1957. In Periyar Lake *Cyprinus carpio* have established breeding populations and contribute more than 70 percent of the exploited stock. A high percentage of diet overlap exists between it and native fish species [5]. *Pangasinodon hypophthalmus* is the Tra cat fish (Siluriformes: Pangasiidae) (Malayalam: valakkoori). It resides in the freshwater bodies of Mekong, Chao Phraya and Thailand. *Clarias gariepinus* is the African cat fish (Siluriformes: Clariidae) (Malayalam African musi); it is an exotic fish imported from Africa; It is now cultured in various ponds and manmade water bodies. *Tilapia mossambica* (Perciformes: Cichlidae) (commonly known as Mozambique tilapia, blue or Kurper bream; Malayalam-silopi) is a native of rivers on the East coast of Africa. The first consignment of *Tilapia* was brought to India in August 1952 from Bangkok and was introduced in Mandapam. Now *Tilapia* has established its populations in almost all rivers of Kerala. *Osphronemus goramy* is commonly known as Giant Gowrami (Perciformes: Osphronemidae). It is a native of fresh water ponds and streams of Indonesia, Thailand, Malaysia, Cambodia and Veitnam. It was brought to India from Java to Calcutta and then from Mauritius to Madras in 1916.

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