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Fish Diversity of Selected Areas of Flood Affected Chalakudy River

Krishna A.M.[1] RevathyBabu[1]*, Ashitha Animon[1], HaripriyaRenjeev[1] and Arjun C.P. [2]

[1]Department of Zoology, Sree Sankara College, Kalady, Kerala,India.

[2]Ph.D Research Scholar, C.V Raman Laboratory of Ecological Informatics, Indian Institute of Information Technology and Management (IITM-K), Technopark campus, Karyavattom, Trivandrum.

Abstract

The freshwater biodiversity of the world is declining due to pollution, habitat loss, introduction of exotic species, over-exploitation etc., Several studies reported that the fish fauna of Chalakudy river, the fifth longest of the 44 rivers of Kerala, is at risk primarily due to pollution and introduction of exotic species. The recent flood in Kerala also had a devastating effect on Chalakudy river basin. In this regard, the present study was conducted to analyzethe fish diversity status of Chalakudyriver after flood. The study was conducted during the period August to December, 2018. Sampling was done twice a month from the selected three sites.A total number of 30 species, belonging to 10 orders, 22 families and 28 genera were recorded during the study period. Among the documented species, the order Perciformes was dominant (11 species) followed by Siluriformes (6species) and Cypriniformes (5 species). The order Anguilliformes was represented by 2 species and orders Beloniformes, Clupeiformes, Characiformes, Tetradontiformes, Mugiliformes and Elopiformes were represented by 1 species each. Of the 30 species recorded 3 are listed under various threatened categories on the IUCN Red List of Threatened Species. The present study also reported the occurrence of some coastal and estuarine species in the river. Rare species like *Pristolepis rubripinnis*, *Chelonodon patoca* were collected during the study period. 3 exotic fishes were also recorded from the study area.The study point to the fact that the Chalakudy river is rich in terms of fish faunal diversity however, the exotic fishes may pose threat to the native fish fauna and the associated biodiversity. We recommend performing periodic surveys in various regions of the river to get an accurate data of the fish diversity of Chalakudy river after flood.

Key words: Fish diversity, Chalakudy river, exotic species, critically endangered, *Pristolepis rubripinnis*.

Introduction

Fishes form a major vital part of the aquatic biodiversity. In the Western Ghats region, fresh water fishes form an important endemic vertebrate group. Rivers of Western Ghats region are exceptionally rich in biodiversity and a number of authors have described the icthyofaunal diversity in this region[1,2,3,4,5,13].The Chalakudy river which originates from the Western Ghats is one of the richest river systems in Kerala with regard to freshwater fish diversity and 71 fish species have been reported[1]. 83 fish species were recorded from Chalakudy river and altogether the biodiversity studies carried out in this river pointed that the icthyofaunal diversity encompasses 98 fish species[2]. Many taxonomists tried to explore the fish fauna of Chalakudy river to identify native, non-native and new species in order to prepare checklists of fish faunal resources. Several new species were recorded from this river during the 1990s, *Garra surendranathanii*, *Horabagrus nigricollaris*, *Osteochilichthys longidorsalis*, *Puntius chalakkudiensis* and *Travancoria elongata*. *Glyptothorax lonah* (Karappara tributary of Chalakudy river), *Barilius bendelisis* (Thekkady tributary) and *Macrospinosa cuja* were reported from Kerala fresh waters. Three new species namely

* *Corresponding author, E-mail: souparnika13revathy@gmail.com*

Osteochilichthys longidorsalis, Travancoria elongate and *Horabagrus nigricollaris* have been identified from the Chalakudy river in 1994[3]. *Hypselobarbus kurali, Euryglossa orientalis, Puntius dorsalis, Travancoria jonesi, Ompokma labaricus, Nemacheilus guentheri* and *Tetraodontravan coricus* were reported from Chalakudy River in 2000[4]. A new species *Pristolepis rubripinnis* was identified from Chalakudy River[5]. *Sahyadria chalakkudiensis* is a new fish species of cyprinidae family endemic to the Chalakudy[6]. The richest fish family in Chalakudy river is Cyprinidae, followed by Bagrid cat fishes and hill stream loaches[7]. Arunkumar *et al*, reported the presence of 6 endangered fish species in the Chalakudy river system which includes *Hypselobarbus curmuca, Hypselobarbus dubius, Tor malabaricus, Tor khudree,Travancoria jonesi*[8]. There are probably many more to be discovered here. Anyway, this is a good indication of the rich fish faunal diversity of Chalakudy river.

However, the fish fauna of Chalakudy river, is at risk due to habitat alteration, pollution, introduction of exotic species indiscriminate collection of threatened ornamental and endemic fish species and over exploitation of endangered food fishes by forest inhabitants and local fishers[9,10].The presence of exotic fishes like *Oreochromis mossambicus, Gambusia affinis, Osphronemus goramy, Xiphophorus maculates* and *Poecilia reticulata* has been reported in the Chalakudy River[1,11]. Illegally imported carnivorous fish species like African cat fish (*Clarias gariepinus*) and Red piranha has recently entered this river system and impacted the native species. It is generally agreed that exotic fishes are a menace to the indigenous freshwater fish fauna and it has been a major factor determining the overall health and functioning of the affected ecosystem. Apart from these, Chalakudy River basin was one of the badly hit river systems in Kerala flood,2018. Though, several researchers have assessed the fish faunal diversity of this river earlier no study was carried out after flood in 2018. Therefore, the current study was aimed to collect and identify the fish fauna from a few regions of Chalakudy river after the flood.

Materials and Methods

Study Area

Three flood affected sites (Site1: Pulikkakadavu;Site2:Thiruvarambikadavu ; Site3: Paneerkadavu) of Chalakudy River in a stretch of 5 km were sampled for the study. Site selection was based on convenience and sites were situated downstream to the Nitta Gelatin India Limited, Kathikudam.

Fish Sampling and Identification

Fish samples were collected from the selected three sites twice a month from August to December 2018. Fish fauna were collected with the help of local fishermen using cast nets, dip nets, drag nets of different mesh sizes. Fishing was noted along with the date and location. Fish fauna were photographed in their original color and morphological

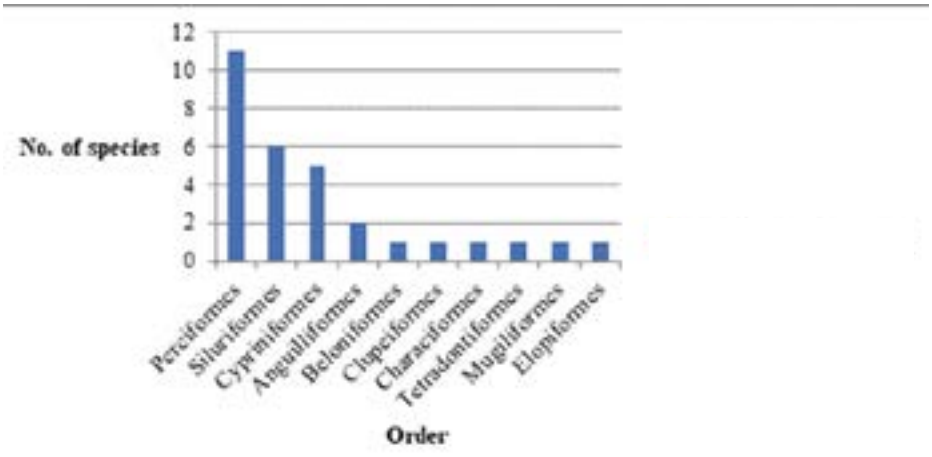

Fig.1. Distribution of the fish species recorded from the study areas

Fig. 2. Fish fauna of Chalakudy river a. Stolephorus commersonni b. Megalops cyprinoides c. Pangasius pangasius d. Hypselobarbus thomassii e. Labeo cussumierri f. Glossogobius giuris g. Hyporhamphus limbatus h. Congresox sp.

Fig. 2. Fish fauna of Chalakudy river a. Pygocentrus nattereri b. Mystus gulio c. Channa marulius d. Ambassis gymnocephalus e. Gerres filamentosus f. Lates calcarifer g. Anguilla benalensis h. Hetropneustes fossilis.

Fig. 4. Fish fauna of Chalakudy river
a. Etroplus maculatus b. Etroplus suratensis c. Rasbora daniconius d. Pristolepis rubripinnis e. Horabagrus brachysoma f. Lutjanus argentimaculatus g. Chelonodon patoca h. Channa striata.

Fig. 4. Fish fauna of Chalakudy river
a. Oreochromis mossambicus b. Dawkinsia filamentosa c. Systomus sarana d. Clarias gariepinus e. Ompok malabarius f. Mugil cephalus

characters were noted. Systematic identification of the fish species were carried out by using the standard keys[12] handbooks, and in consultation with experts. The conservation status of the fish species according to the IUCN Red List of Threatened Species was mentioned in our results.

Results

In the present study a total of 30 species, belonging to 10 orders, 22 families and 28 genera were recorded (Table.1). Among the documented species, the order Perciformes was dominant (11 species) followed by Siluriformes (6species) and Cypriniformes (5 species). The order Anguilliformes was represented by 2 species and orders Beloniformes, Clupeiformes, Characiformes, Tetradontiformes, Mugiliformes and Elopiformes were represented by 1 species each (Figure.1). Fishes listed under threatened categories on the IUCN Red List were *Hypselobarbus thomassi*,- belong to critically endangered category, *Horabagrus brachysoma*,belonging to vulnerable category and *Anguilla bengalensis* comes under near threatened category. Some estuarine and coastal

Table1.The list of fishes recorded during the study period in the selected areas and their conservation status

Sl. No.	Order	Family	Scientific name	Common name	IUCN red list category *DD,LC, VU, NT, NE, CR
1.	Anguilliformes	Muraenesocidae	*Congresoxsp* (Blecker,1853)	Indian Pike Conger	NE
2.	Anguilliformes	Anguillidae	*Anguilla bengalensis (J. E Gray, 1831)*	Indian mottled eel	NT
3.	Cypriniformes	Cyprinidae	*Hypselobarbus thomassiiF. Day, 1784)*	Red canarese barb	CR
4.	Cypriniformes	Cyprinidae	*Labeo dussumieri* (Valenciennes, 1842)		LC
5.	Cypriniformes	Cyprindae	*Rasbora daniconius* (Hamilton, 1822)	Black line rasbora	LC
6.	Cypriniformes	Cyprinidae	*Dawkinsia filamentosus (Valenciennes, 1844)*	Filament barn, Black spot barb.	LC
7.	Cypriniformes	Cyprinidae	*Systomussarana (F.Hamilton, 1822)*	Olive barb	LC
8.	Siluriformes	Siluridae	*Ompok malabaricus (Valenciennes, 1840)*	Goan catfish	LC
9.	Siluriformes	Clarridae.	*Clarias gariepinus (Burchell,182)*	African sharp tooth catfish	LC
10.	Siluriformes	Bagridae	*Horabagrus brchysoma* (Gunther ,1864)	Sun catfish	VU
11.	Siluriformes	Heteropneustidae	*Heteropneustes fossilis* (Bloch ,1794)	Asian Stinging Catfish	LC
12.	Siluriformes	Pungasiidae	*Pangasiuspangasius (Hamilton, 1822)*	Shark cat fish	LC
13.	Siluriformes	Bagridae	*Mystusgulio* (Hamilton,1822)	Long whispered catfish	LC
14.	Perciformes	Cichlidae	*Etroplus maculates* (Bloch,1795)	Orange chromidae	LC
15.	Perciformes	Cichlidae	*Etroplus surstensis* (Bloch, 1790)	Pearl spot	LC
16.	Perciformes	Cichlidae	*Oreochromis mossambicus* (Peters, 1852)	Mozambique tilapia	VU
17.	Perciformes	pristolepididae	*Pristolepis rubripinnis* (Britz, kumar&Baby, 2012)	Leaf fish	NE
18.	Perciformes	Lutjanidae	*Lutjanus arjentimaculatus* (Forsskal, 1775)	Mangrove Red snapper	NE
19.	Perciformes	Ambassidae.	*Ambassis gymnocephalus* (Lacepede, 1802)	Bald glassyperchlet	LC

Sl. No.	Order	Family	Scientific name	Common name	IUCN red list category *DD,LC, VU, NT, NE, CR
20.	Perciformes	Gerreidae	*Gerres filamentoses* (Cuvier, 1892)	Whipfin silver biddy	LC
21.	Perciformes	Latidae	*Lates calcarifer* (Bloch, 1790	Baramundi or Asian sea bass	NE
22.	Perciformes	Channidae	*Channa striata* (Bloch, 1793)	Banded snake head	LC
23.	Perciformes	Channidae	*Channa marulius* (F.Hamilton, 1822)	Bulls eye snake head	LC
24.	Perciformes	Gobiidae	*Glossogobius giuris* (Hamilton, 1822)	Tank goby	LC
25.	Beloniformes	Hemiramphidae	*Hyporhamphus limbatus* (Valenciennes, 1847)	Congaturi halfbeak	LC
26.	Clupeiformes	Engraulidae	*Stolephorus commersonni* (Lasepede ,1803)	Commerson's anchovy	LC
27.	Characiformes	Serrasalmidae	*Pygocentrus nattereri* (Kner,1858)	Red bellied piranha	NE
28.	Tetradontiformes	Tetradontidae	*Chelonodon patoca (Hamilton, 1822)*	Puffer fish	LC
29.	Mugiliformes	Mugilidae	*Mugil cephalus* (Linnaeus,1758)	Flathead grey mullet	LC
30.	Elopiformes	Megalopidae	*Megalops cyprinoides* (Broussonet, 1782)	Indo-Pacific tarpon	DD

*DD-data deficient LC- least concern NT- Near Threatened NE- not evaluated VU – Vulnerable CR- Critically endangered

fishes collected in the study were *Gerres filamentoses, Congresox sp. Stolephorus commersonnii, Lates calcarifer, Ambassis gymnocephalus* and *Lutjanus argentimaculatus,* Rare species documented were *Pristolepis rubripinnis* and *Chelonodon patoca*. Exotic species like *Oreochromis mossambicus, Clarias gariepinus, and Phygocentrus nattereri* were also recorded in the study.

Discussion

In the rivers of Western Ghats region biodiversity has been negatively impacted by industrial pollution, invasive species, agriculture and aquaculture practices[13]. Chalakudy river ecosystem, providing a habitat for stunning array of biodiversity and supporting the livelihood of many local people has been altered due to the construction of dams (Sholayar,Peringalkuthu) for hydroelectric projects and affected the local migration of fish species like Tor[8]. During the study period we could collect 30 species of fishes from the 3sampling sites. Here we reported the presence of some coastal and estuarine fishes which include *Gerres filamentoses, Congresox sp. Stolephorus commersonnii*, *Lates calcarifer* and *Ambassis gymnocephalus.* The presence of *L.argentimaculatus,G. filamentoses,S.commersonnii* have been reported in the Chalakudy river[1].However, we could collect fishes like *A. gymnocephalus, L.calcarifer* and *Congresox sp*. after the flood and this might have happened due to their displacement from the natural habitats as a consequence of flood. Flood impact assessment carried out by the Kerala state Biodiversity Board reported the presence of Red

bellied Pacu, Malaysian catfish, African Mushi, Sucker catfish, Giant gourami, Carps etc. in several water bodies of Kerala during flood[14]. 10% of the fishes collected were categorized as exotic species. It is reported that introduction of exotic species, intentionally or unintentionally, has resulted in the depletion of many native fish fauna in several parts of the world[15,16]. Moreover, several studies have reported the occurrence and the impact caused by exotic fish species in Kerala freshwaters, *Oreochromis mossambicus* in the Chalakudy river system[2,10,11], *Clarias gariepinus* in Vembanad Lake[17]. Predatory feeding habits and high growth rate helped *Clarias gariepinus* to establish in the reservoirs of South India[18]. According to the local fishermen these exotic species probably escaped from the local fish farms and entered the river system. Exotic fishes introduced in to the Poringalkuthu dam for enhancing fish production from the reservoir is also an important source of non-native fishes[9]. In order to conserve the biodiversity of freshwater ecosystems like Chalakudy river it is necessary to control the illegal introduction as well as culturing of exotic species by local farmers. Of the 30 species 3 species belong to the threatened categories of IUCN Red List of Threatened Species. *Hypselobarbus thomassi* is a critically endangered species endemic to the Western Ghats in Kerala and Karnataka.*Anguilla bengalensis*is a catadromous fish listed as a near threatened species. *Horabagrus brachysoma* has been assessed as a vulnerable species. Preferential cultivation of *Clarias gariepinus*in the Western Ghats region has been identified as the major reason for their declining population[15].

Conclusion

Chalakudy river is noted for the rich icthyofaunal diversity and presence of many endemic fish species. Our study revealed the current fish faunal diversity which encompasses many estuarine, exotic and threatened species. Therefore, Chalakudy river should be considered as a sensitive ecosystem and there is an urgency to conduct periodic surveys which are needed to unveil the actual biodiversity and to evaluate the impact of species invasion.

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References

1. Raghavan R., Prasad G., Ali A., and Pereira B., 2008a. Fish fauna of Chalakudy river, part of Western Ghats biodiversity hotspot, Kerala, India: Patterns of distribution, threats and conservations needs. *Biodiversity and conservation.*,17, 3119-3131.
2. Ajithkumar C.R., Remadevi K., Thomas R., and Biju C.R., 1999. Fish fauna, abundance and distribution in Chalakudy river system, Kerala. *J. Bombay Nat. Hist. Soc*., 96 (2), 244-251.
3. Pethiyagoda R., and Kottelat M., 1994. Three new species of fishes of the genera OsteochilichthysCyprinidae, TravancoriaBalitoridae and HorabagrusBagridae from the Chalakkudy river, Kerala, India. *J. South Asian Nat. Hist.*, 11: 97-116.
4. Ajithkumar C.R., Sunny.Gand Nayar C.K.G., 2000. Fish Genetic Resources of ChalakudyRiver System, Kerala.157-159 In: Ponniah A.G., and Gopalakrishnan A., (Eds.). Endemic Fish Diversity of Western Ghats. NBFGR - NATP Publication - 1, 347. National Bureau of Fish Genetic Resources, Lucknow, U.P., India.
5. Britz,R. Kumar .K and F. Baby,2012c. Pristolepisrubripinnis, a new species of fish from Southern India (Teleostei: Percomorpha:Pristolepididae). *Zootaxa*3345: 59–68.
6. Raghavan, R., Philip, S., Ali, A., & Dahanukar, N. (2013). Sahyadria, a new genus of barbs (Teleostei: Cyprinidae) from Western Ghats of India. *Journal of Threatened Taxa*, *5*(15), 4932-4938.
7. Report of Pre- project study on conservation of riparian and river biodiversity of chalakudy river,March 2016.Tropical institute of ecological sciences, Kottayam & Apollo Tyre Foundation.

8. Arunkumar, A. A., & Manimekalan, A. 2018. Freshwater fish fauna of rivers of the southern Western Ghats, India. *Earth System Science Data*, *10*(3), 1735-1752.

9. Roshni K., Renjithkumar C.R. and Kurup B.M., 2016.Fishery of mozambique tilapia *Oreochromismossambicus*(peters) in poringalkuthu reservoir of chalakudy river, kerala, India.*J. Aquatic Biology & Fisheries*.4,110-114.

10. RaghavanR., Prasad,G., AliP. H. A., PereiraB. 2008. Exotic fish species in a global biodiversity hotspot: observations from River Chalakudy, part of Western Ghats, Kerala, India. *Biological Invasions*. 10, (1), 37–40.

11. Biju Kumar A., 2000. Exotic fishes and freshwater fish diversity.*Zoos' Print Journal* 15(11), 363-367.

12. Talwar P.K., Jhingran A.G.,1991. Inland fishes of India and adjacent countries. Vol I & II, Oxford & IBH Publishing Co., Pvt. Ltd., New Delhi, 1158.

13. IUCN: https://www.iucn.org/ (last access: 24 August 2018), 2015.

14. Report-Impact of flood/landslides on biodiversity -community perspectives, August 2018, Kerala state Biodiversity board, Thiruvananthapuram.

15. Lakra W. S., Singh A. K and Ayyappan S. (Eds) 2008.Fish Introduction in India: Status Potential and Challenge. Narendra Publishers, New Delhi, India, 303 pp.

16. Barua, S. P., Khan, M. M. H., & Reza, A. H. M. A. 2001. The status of alien invasive species in Bangladesh and their impact on the ecosystems. In *Alien Invasive Species-Report of workshop on Alien Invasive Species. Colombo, Sri Lanka: IUCN Regional Biodiversity Programme of Asia* , 7-1.

17. Krishnakumar K., Ali A.., Pereira B., andRaghavan R., 2011. Unregulated aquaculture and invasive alien species: a case study of the African Catfish Clariasgariepinus in Vembanad Lake (Ramsar Wetland), Kerala, India. *J.Threatened Taxa*, *3*(5), 1737-1744.

18. Singh A.K., Lakra W.S., 2006. Alien fish species in India: Impact and emerging scenario, *J. Ecophysiology and Occupational Health* 6(3), 165-174 ·

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