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DISTRIBUTION OF FRESH WATER FISHES IN VALIYAKULAM POND, NEYYATINKARA THALUK, KERALA

Divya T. Dharan
Department of Zoology, University of Kerala, Kariavattom Campus, Thiruvananthapuram

ABSTRACT
India is rich with inland freshwater fish, with about 940 species known from its rivers, lakes and estuaries. This constitutes about 38% of the Indian Ichthyofauna and are of considerable economic and scientific value. The present study was carried out to assess the distribution, abundance, poorly known freshwater fish species occurring in the pond Valiyakulam near Neyyatinkara In the current study fishes were collected. we a employed a diverse array of active as well as passive gear including cast net, scoop net, drag net, gill net and traps for collection of fish. A total of 17 species of fishes were recorded from the pond. All the 17 species including 11 families found during the survey at valiyakulam. In total of 17 species fishes collected belong to diverse families with maximum representation of Cyprinidae (5 Taxa). The largest group of cyprinidae with 5 species and cichildae represented with 3 species. The only way for a fish enthusiast to save the fish and its habitats is creating awareness among the people. In this context, knowledge of the fish fauna of a region is the first step towards conservation.

KEYWORDS: Distribution. Family, Fish, Fresh water, Pond.

I N T R O D U C T I O N

India is rich with inland freshwater fish, with about 940 species known from its rivers, lakes and estuaries. This constitutes about 38% of the Indian Ichthyofauna and are of considerable economic and scientific value. Of these about 500 species are primary freshwater fish with around 65% endemic, cloistered in the two hot spots of India, the Western Ghats and the North East. Many of these are unique to certain stretches of the various rivers especially the upper reaches and many more new species are being reported from these forested hills. However, threats to these fauna are aplenty, with urbanization, deforestation, habitat loss, pollution, over-harvesting, and culture of exotics. Talwar and Jhingran, 1991; Kowtal, 1994.The only way for a fish enthusiast to save the fish and its habitats is creating awareness among the people. In this context, knowledge of the fish fauna of a region is the first step towards conservation. Freshwater fish are those that spend some or all of their lives in fresh water, such as rivers and lakes, with a salinity of less than 0.05%. These environments differ from marine conditions in many ways, the most obvious being the difference in levels of salinity. Freshwater fish differ physiologically from salt water fish in several respects. Their gills must be able to diffuse dissolved gasses while keeping the salts in the body fluids inside. Their scales reduce water diffusion through the skin: freshwater fish that have lost too many scales will die. They also have well developed kidneys to reclaim salts from body fluids before excretion.

Many species of fish do reproduce in freshwater, but spend most of their adult lives in the sea. These are known as anadromous fish, and include, for instance, salmon, trout, sea lamprey [1] and three-spined stickleback. Some other kinds of fish are, on the contrary, born in salt water, but live most of or parts of their adult lives in fresh water; for instance the eels. These are known as catadromous fish. Species migrating between marine and fresh waters need adaptations for both environments; when in salt water they need to keep the bodily salt concentration on a level lower than the surroundings, and vice versa. Many species solve this problem by associating different habitats with different stages of life. Both eels, anadromous salmoniform fish and the sea lamprey have different tolerances in salinity in different stages of their lives. ; Babu *et al*. (2004).Among fishers in the United States, freshwater fish species are usually classified by the water temperature in which they survive. India is rich with inland freshwater fish, with about 940 species known from its rivers, lakes and estuaries. This constitutes about 38% of the Indian Ichthyofauna and are of considerable economic and scientific value. Of these about 500 species are primary freshwater fish with around 65% endemic, cloistered in the two hot spots of India, the Western Ghats and the North East. ; Mercy et al, 2007; Dahanukar et al, 2011 Many of these are unique to certain stretches of the various rivers especially the upper reaches and many more new species are being reported from these forested hills. However, threats to these fauna are aplenty, with urbanization, deforestation, habitat loss, pollution, over-harvesting, and culture of exotics. The only way for a fish enthusiast to save the fish and its habitats is creating awareness among the people. In this context, knowledge of the

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fish fauna of a region is the first step towards conservation. The rivers and streams of Kerala have exceptional fish biodiversity with a high degree of endemism due to the presence of many rare and localised forms. These areas are conspicuous among the biodiversity hot spots of the world and therefore call for protection and preservation as bio reserves. Long-term management plans are needed to conserve and preserve this treasury of fish germplasm; Mercy *et al*. (2007); Dahanukar *et al*. (2011). Measures should include standar disation of captive breeding and seed production technology of endangered and critically endangered fishes and their massive ranching in the rivers. Efforts should be made to regulate various human interventions that are being imposed in the freshwater habitats of the fishes and strict regulations should be imposed on the introduction of exotic and alien fish species in the natural waters. The present study was carried out to assess the distribution, abundance, poorly known freshwater fish species occurring in the pond Valiyakulam near Chenkal Neyyatinkara

MATERIALS AND METHODS

In the current study fish were collected from Valiyakulam pond near Chenkal Neyattinkara Thaluk, about 35 km from south of Thiruvananthapuram. The pond is a large and it is situated near the Western Ghats of Thiruvananthapuram. In the current study fishes were collected during the month of February 2018 (Fig. 1). we a employed a diverse array of active as well as passive gear including cast net, scoop net, drag net, gill net and traps for collection of fish. . A total of 17 fishes were examined during the study period and identified with the help of standard keys and preserved in 5% formaldehyde. (Day, 1865, 1878; Silas,; 1952 Jayaram, 1981, 1999, 2010; Talwar and Jhingran, 1991; Kowtal, 1994; Babu *et al*. (2004); Mercy *et al*. (2007); Dahanukar *et al*. (2011); Gopalakrishnan *et al*.(2012). A standard fish species data collection format was prepared and collected information on scientific name with author's name, common name, taxonomy , economic importance, fishery, morphological characters and colouration etc d with the latest scientific name as per Fish Base 2014 with (Froese and Pauly, 2014). The threatened status of the fishes was revised as per the IUCN Red List (2012).

RESULTS

The study was conducted to determine the occurrence of fishes in the valiyakulam pond. A total of 17 species of fishes were recorded from the pond. All the 17 species including 11 families found during the survey at valiyakulam are shown in the table along their common name, English name and scientific name and also taxonomic positions.

Table 1: Annotated list of fishes of Valiyakulam pond

Sl no	Common Name	Scientific Name	Malayalam Name	Endemicity	IUCN status
1	Pearl Spot	*Etroplus suratensis (Bloch, 1790)*	Karimeen, Kariyamplachi	Endemic	Interminate
2	Climbing Perch	*Anabas testudineus (Bloch,1792)*	Chempally, Kallemutti	Non-endemic	DD
3	Banded Snake Head	*Channa striatus (Bloch, 1793)*	Varal, Varaal	Non-endemic	LC
4	Thilapia	*Oerochromis mossabicus (Peters, 1852)*	Tilapia, Kerala Karimeen	Introduced	NE
5	Stinging Cat Fish	*Heteropneustes fossilis (Bloch, 1794)*	Kaari	Non-endemic	LC
6	Walking Cat Fish	*Clarias batrachus (Linnaeus, 1758)*	Mushi, Muzhi	Non-endemic	LC
7	Yellow Cat Fish	*Horabagrus brachysoma (Gunther, 1864)*	Manjakkoori	Endemic	VU
8	Giant Danio	*Danio malabaricus (Jerdon, 1849)*	Panchala	Non-endemic	LC
9	Indian Mottled Eel	*Anguilla bengalensis bengalensis (Gray, 1831)*	Malanjil, Mananjil	Non-endemic	LC
10	Orange Chromide	*Etroplus maculatus (Bloch, 1795)*	Pallathi	Non-endemic	LC
11	Tiger Panchax	*Aplocheilus lineatus (Valenciennes, 1846)*	Poonjan, Manathukanni	Non-endemic	LC
12	Gara Mullya	*Garra mullya (Sykes, 1839)*	Sucker Fish	Non endemic	LC
13	Greenstripe barb	*Puntius vittatus Day (1865)*	Kaili	Non-endemic	LC
14	Swamb barb	*Puntius chola(Hamilton, 1822)*	Paral	Non-endemic	LC
15	Commen Spiney Loach	*Cobitis taeniaLinnaeus, 1758*	Manalaron	Non endemic	LC
16	Catla Fish	*Catla Catla(Hamilton, 1822)*	Catla	Non-endemic	LC
17	Guppy	*Poecilia reticulataPeters (1859)*	Guppy	Non-endemic	NE

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In total of 17 species fishes collected belong to diverse families (table 2.1 and 2.2) figure 2.7 with maximum representation of Cyprinidae(5 Taxa)Followed By Cichildae(4taxa), Anabantidae, Channidae, Heteropneustidae, Clariidae, Bargridae, Anguillidae, Aplocheilidae, Cobitidiae, Poecilidae. The largest group of cyprinidae with 5 species and cichildae represented with 3 species. Other group represent only one speies by other families. The present compilation documented, 17 fish species belonging to 11 families and 17 genus covering 2(12%) endemic, 14 non-endemic(82%) and 1 (6%) exotic fish species (Table 2). According to IUCN status about 10 species were least concern and 2 species were non evaluated were data deficient, vulnerable and intermediate are consist of only one species.

Table 2: Endemic status of the fishes of valiyakulam pond.

S. No.	Endemicity	Number of species	Percentage
1	Endemic	2	12
2	Non-endemic	14	82
3	Introduced	1	6

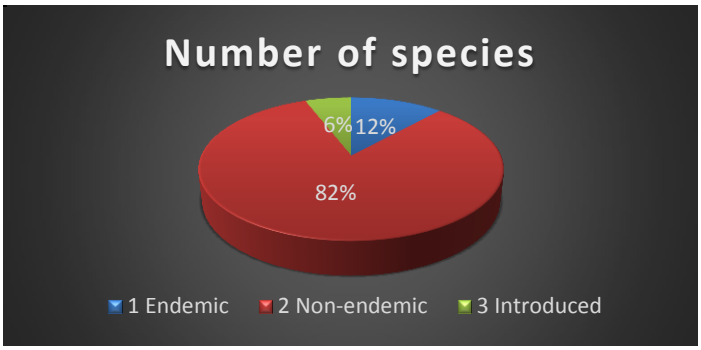

Fig 3 percentage of Endemic status of the fishes of valiyakulam pond

Table 3. Conservation status of fishes of Western Ghats.

S. No.	IUCN status	Number of species
1	Least Concern (LC)	10
2	Not evaluated (NE)	2
3	Data Deficient (DD)	1
4	Vulnerable (VU)	1
5	Indeterminate	1

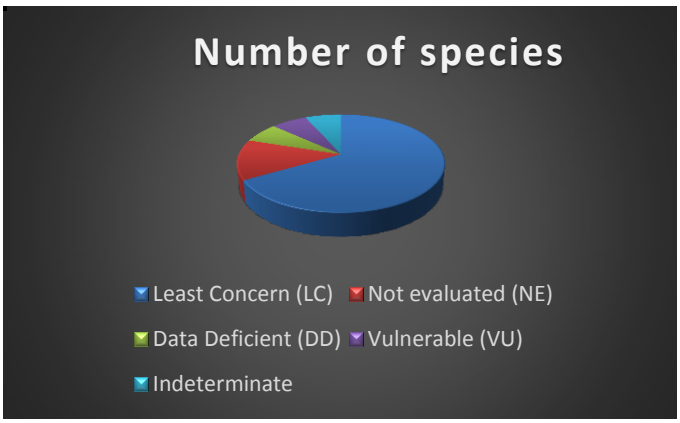

Fig 4. Percentage of Conservation status of fishes of Western Ghats.

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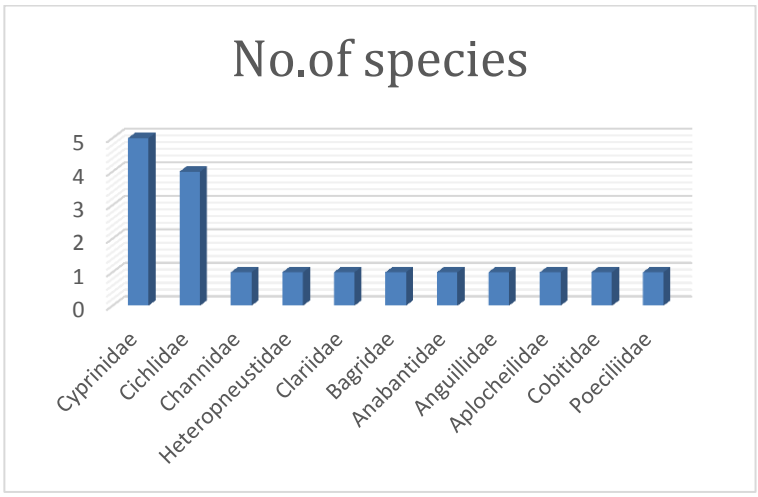

Fig 5. Distribution of species under different families

Table 3 : Taxonomic distribution of species under different families

Phylum	Class	Order	Family	Genus	Species name
Chordata	Actinopterygii	Cichliformes	Cichlidae	*Etroplus*	*Etroplus suratensis*
Chordata	Actinopterygii	Anabantiformes	Anabantidae	Anabas	*A. testudineus*
Chordata	Actinopterygii	Anabantiformes	Channidae	Channa	*C. striata*
Chordata	Actinopterygii	Siluriformes	Heteropneustidae	Heteropneustes	*H. fossilis*
Chordata	Actinopterygii	Siluriformes	Clariidae	Clarias	*C. batrachus*
Chordata	Actinopterygii	Siluriformes	Bagridae	Horabagrus	*H. brachysoma*
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Devario	*D. aequipinnatus*
Chordata	Actinopterygii	Anguilliformes	Anguillidae	Anguilla	*A. bengalensis*
Chordata	Actinopterygii	Perciformes	Cichlidae	Pseudetroplus	*P. maculatus*
Chordata	Actinopterygii	Cyprinodontiformes	Aplocheilidae	Aplocheilus	
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Garra	*G. mullya*
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Puntius	*P. vittatus*
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Puntius	*P. chola*
Chordata	Actinopterygii	Cypriniformes	Cobitidae	Cobitis	*:C. taenia*
Chordata	Actinopterygii	:Cypriniformes	Cyprinidae	Gibelion	*G. catla*
Chordata	**Actinopterygii**	**Cyprinodontiformes**	**Poeciliidae**	**Poecilia**	***P. reticulata***

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DISCUSSION

All these water bodies are home to a vast variety of fish species. The fresh water fishes are normally found in more than one habitat, ie, paddy fields, ponds, lakes, canals, streams, rivers and backwaters. The backwaters that is saline for most part of the year turns fresh during monsoon. Similarly so many ecological changes happen throughout the year, but the fishes are well adapted to survive the extreme conditions. Studies have revealed that there are 210 species of freshwater fishes identified in Kerala, of which more than 26 are endemic. Most of these are ornamental varieties used in aquariums, having high potential in domestic and international markets. Most of the freshwater fishes are well adapted to survive in the differing climates and environments. Many fishes have got additional respiratory organs to enable breathing air while crawling through land, that enable them to migrate from one habitat to another, or from one pond to another. Many fishes inhabiting the paddy fields bury themselves in mud during drought, and remain there in dormant stage, till the next monsoon comes.

Perciformes is regarded as a highly esteemed food fish for its fine flavour, restorative values and prolonged freshness out of water. The species is naturally distributed in India, Bangladesh, Pakistan, Burma, Ceylon, Thailand, China, Philippines and Malaysia(Talwar and Jhingran, 2001; Rahman,2005).It inhabits both fresh and brackish waters and occurs mainly in low lying water bodies like swamps, marsh lands, lakes, canals, ponds, paddy fields, pools, main river channels and estuaries. Anabas species possess a special accessory air breathing labyrinthine organ, situated just above the gills in a large extension on the upper part of each gill chamber, which facilitates the utilization of atmospheric air for their respiration (Graham, 1997) and can live out of water for extended periods of time. It is a very hardy fish, can thrive in oxygen depleted waters and is of considerable fisheries interest. They are also well known for their ability to migrate between ponds over land (Davenport and Abdul Matin, 1990). They are chiefly predatory and carnivorous, mostly consumes invertebrates and their larvae and the species is also been reported as one of the successful biological control organisms in controlling mosquitoes in sewage waters (Chandra *et al*. 2008).

The eel *A. anguilla* is the most abundant of the genus of *Anguilla*. The epidermal layer of fishes are contains specialised glandular cells that produce mucins and alarm substance (Smith, 1992). These substances having potential of antimicrobial and noxious properties (Knouft *et al.*2003). Skin club cells or sacciform cells of the eel fishes have produced noxious substances that exhibit very lesser toxicity to higher venomous activity (Mittal *et al*. 1981). The mucus gives the physical production of the skin and also serves as an anti-predator role in fishes (Fishelson, 1996). Mucus products the skin from pathogens and suspended particles (Knouft *et al*. 2003). The epidermal; mucus is advantages not only to fish but also in mankind for various purposes like defense, cultural ponds.

In this study 17 taxa with 82% nonendemic specis and 6%introduced species and 2%endemic species form the valiyakulam pond.a study of Kharat *et al*. (2012)also described 52 taxa with 13 endemic species, (25%) from the river Krishna, Abraham *et al*. (2011) mentioned 25 endemic species (24%) out of 103 taxa from Ashambu hills landscape in Western Ghats, Sreekantha *et al*.(2006) listed 318 taxa with 136 endemic species (43%), Dahanukar *et al*.(2011) described 290 taxa with 189 endemic species (65%), Bhat (2003) has reported 92 species with 25% endemicity from 4 rivers Sharavati, Aghanashini, Bedti and Kali. In the present study, it appears that 12% fishes are endemic to this region. Daniels (2001) in his commentary on endemic fishes of the Western Ghats mentioned that out of 298 freshwater species found in India, 114 species are endemic to Western Ghats and even African catfish are now available in the natural waters of this region (Sugunan, 1997; Rema Devi *et al*. 2010; Kharat *et al*. 2012). The present study has been conducted along the south east coast of India and documented 17 fish species Results of the study corroborate the observations of Researchers (Bell, 1983) and greater sizes of individuals in protected areas (Bell, 1983; Bayle-Sempere and Ramose-Espla, 1993; Dufour et al. 1995), both of which in turn result in greater biomass Francour, 1991have shown higher fish population densities in forest protected areas compared to unprotected areas.

In India, efforts have been made recently in bringing together the studies of fish diversity in various rivers with regard to fresh water habitat. However, fish diversity of many water bodies within protected area network and their importance in conservation of biodiversity is not studied well. Based on the pattern of species diversity and distribution it may be proved that a protected riverine ecosystem can benefit unprotected areas of the river in terms of maintaining of

diversity up to certain longitudinal range. The difference observed here between fish densities, diversity and sizes inside and outside the protected area is most probably largely a consequence of several anthropogenic and ecological factors.

CONCLUSION

The rivers and streams of Kerala have exceptional fish biodiversity with a high degree of endemism due to the presence of many rare and localised forms. These areas are conspicuous among the biodiversity hot spots of the world and therefore call for protection and preservation as bio reserves. The available information on the freshwater fishes of Kerala is mostly on systematics, distribution and abundance The present database is compared against past data to determine the degree to which the fishes have become depleted over the last 50 years. The study was conducted to determine the occurrence of fishes in the Valiyakulam pond. A total of 17 species of fishes were recorded from the pond. All the 17 species including 11 families found during the survey at Valiyakulam are shown in the table along their common name, English name and scientific name and also taxonomic positions. According to IUCN status about 10 species were least concern and 2 species were non evaluated were data deficient, vulnerable and intermediate are consist of only one species. The present study also revealed that the physical habitat variables play a leading role in the distribution of fishes in streams and the habitat alteration brought about in contribute significantly to the endangerment of freshwater pond of Kerala. Freshwater fishes require immediate conservation action in the Western Ghats, yet they are poorly studied and documented.

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