

ECOLOGICAL FEATURES OF A FRESHWATER STREAM NEAR PECHIPPARAI RESERVOIR, KANYAKUMARI DISTRICT

Prateek¹, S. David Kingston² and T.Francis¹

Received:5.2.2016

Accepted:27.2.2016

ABSTRACT

The prime objective of the study was to analyze the ecological features and to identify the fish species present along the upstream region of Pechipparai reservoir. Seventeen species of freshwater fishes belonging to 11 genera and 8 families have been recorded. Cyprinidae was the dominant family (6 species) in the study area. Of the 17 species, Dawkinsia arulius belong to the endangered category, Hyporhamphus xanthopterus and Dawkinsia rohani to vulnerable and Ompok bimaculatus to near threatened category. All the 17 fish species are found to be endemic to India and ornamentally appreciated.

Keywords: Fish Diversity, streams, Pechipparai Reservoir, Western Ghats.

INTRODUCTION

Kanyakumari district is situated at the southernmost part of Tamilnadu which has a network of rivers and reservoirs. The reservoirs harbour a rich source of endemic fishes. The Pechipparai reservoir is the largest impoundment in Kanyakumari district (Lat. 8°26'59.48" N, Long. 77°18'26.84" E) and the streams of this reservoir are rich in indigenous varieties of freshwater fishes. Studies so far conducted in Kanyakumari district show that the region harbours a diverse group of fishes (Murugan *et al.*, 2015; Mogalekar *et al.*, 2015 and Rema Devi and Indra, 2000). In the present study, the ecology of a stream near Pechipparai was analysed in detail along with its faunal diversity with respect to its conservation.

DESCRIPTION OF THE STUDY SITE

Pechipparai reservoir is located at Pechipparai village, 43 km from Nagercoil town

in Kanyakumari District of Tamil Nadu, India. The reservoir was built across the Kodayar river about 1.6 km below the confluence of the Kallar, Chittar and Kuttiyar tributaries. The catchment area of the reservoir is 207.19 km² and the average depth is about 14.63 m.

MATERIALS AND METHODS

Physical features at the study site were assessed during each time of sampling. Sampling was done once in every month. The present study site is situated near the mouth of the reservoir which receives water from the channel connecting the sluice gate of the reservoir with the outgoing rivulet. The ecology of the stream covering a total length of 38.41m were studied in detail. The stream elements studied were total depth, flow rate and substrate. The stream has open canopy and the adjacent littoral / vegetation includes rubber plantation and social forestry. The temperature was

¹ Fisheries College and Research Institute, Tamil Nadu Fisheries University, Thoothukudi- 628 008, Tamil Nadu, India.

² Fisheries Training and Research Center, Tamil Nadu Fisheries University, Parakkai- 629 601, Kanyakumari, Tamil Nadu, India.

measured using a thermometer. The total depth of the water column was measured using a meter scale. The flow rate was measured using an electric flow meter (TAD, W. Germany). Substrate categories were estimated based on Wentworth particle size as detritus, mud, silt, sand, gravel cobble, boulders and bed rock (Moyle and Senanayake, 1984).

Fishes were collected using gill nets of varying mesh size (6mm to 10mm). Trap nets were used along shoreline areas with boulder and gravel bottom. Trap nets were made of steel plates of 30 cm dia. covered with net and trap of 8mm and 10mm mesh size. The sampling points were distributed throughout the upstream waters of the study site. Monthly sampling was carried out for a period of 9 months from April 2015 to December 2015. Fishes were collected, anaesthetized, stored in 5% formalin and brought to the laboratory for

identification. The collected fishes were identified upto species level following the identification keys of Talwar and Jhingran (1991); Jayaram (2010). Information on the conservation status of all taxa were retrieved from the IUCN Red list of threatened species, whose underlying assessments were based on the IUCN red list categories and criteria (IUCN 2015 Version 2015.2).

RESULTS AND DISCUSSION

The morphometry of the stream was measured as follows. The total depth of water column was measured at an interval of 1meter along the breadth of the stream at selected points. Similarly measurements were made for other stream elements (flow rate and substrate). The percentage availability of every element is quantified and given in table 1.

Table 1: Ecological features of Pechipparai reservoir

STREAM ELEMENT			
Total depth of water column (Feet)	Flow rate		Substrate categories
	Distance from the dam site	Velocity (m/s)	
0.1-1.0" -57.5 %	1-10mt	1.0 m/s	Bed rock (5%)
1.1-2.0" -30.0 %	11-20mt	0.5m/s	Boulders (78.87%)
2.1-3.0" -7.5 %	21-30mt	0.6m/s	Gravel (10%)
3.1-4.0" -5.0 %	31-40mt	1.5m/s	Cobble (5%)
-	-	-	Sand (1%)

Seventeen species of freshwater fishes were identified in the upstream waters of Pechipparai reservoir. Among them, 6 species [*Dawkinsia arulius* (Jerdon, 1849); *Dawkinsia filamentosa* (Valenciennes, 1844); *Dawkinsia rohani* (Rema Devi, Indra & Knight, 2010); *Puntius amphibius* (Valenciennes, 1842); *Rasbora daniconius* (Hamilton, 1822) and *Garra mullya* (Sykes, 1839)] belong to Cyprinidae family, 1 species [*Aplocheilus panchax* (Hamilton, 1822)] to Aplocheilidae, 2

species [*Etroplus maculatus* (Bloch, 1795) and *Etroplus suratensis* (Bloch, 1790)] to Cichlidae, 1 species [*Glossogobius giuris* (Hamilton, 1822)] to Gobiidae, 3 species [*Mystus vittatus* (Bloch, 1794); *Mystus armatus* (Day, 1865) and *Mystus cavasius* (Hamilton, 1822)] to Bagridae, 2 species [*Ompok bimaculatus* (Bloch, 1794) and *Ompok malabaricus* (Valenciennes, 1840)] to Siluridae, 1 species [*Hyporhamphus xanthopterus*

(Valenciennes, 1847)] to Hemiramphidae and 1 species [*Macrogathus aral* (Bloch & Schneider, 1801)] to Mastacembelidae (Table 2).

Murugan *et al.* (2015) recorded 30 species of fishes belonging to 13 families from Periyakulam riverine wetland, Kanyakumari district of Tamil Nadu. A total of 36 species of fishes have been recorded from Tambaraparani river by Martin (1994) and 18 species belonging to 14 genera and 8 families known to occur from Suthamalli pond in Tirunelveli District of Tamilnadu (Xavier Innocent *et al.*, 2012). Sixteen species were recorded from Pantikal river in Kanyakumari district by Thampi Jeyaraj *et al.* (2001). However, the present record of 17 species of fishes are lower compared to all

the above reports. Lower number of fish species in upstream waters of Pechipparai reservoir is comprehensible, as all the above reports covered larger area as well as longer study period than the present one. Cyprinidae was the dominant family (6 species) in the study area followed by Cichlidae, Siluridae, Hemiramphidae and Mastacembelidae.

Of the 17 species, *Dawkinsia arulius* belong to the endangered category, *Hyporhamphus xanthopterus* and *Dawkinsia rohani* to vulnerable and *Ompok bimaculatus* to near threatened. All the 17 species of fishes are found to be endemic to India with ornamental value. Extensive and elaborate study will reveal the presence of more number of species from this region.

Table 2: Diversity of fish species along the upstream waters of Pechipparai reservoir.

Order/Family/Species	Length Range	Endemic / Exotic	IUCN Status	Category
Order: Beloniformes				
Family: Hemiramphidae				
<i>Hyporhamphus xanthopterus</i> (Valenciennes, 1847)	7.2 - 9.0 cm	Endemic	VU	Ornamental
Order: Cypriniformes				
Family: Cyprinidae				
<i>Dawkinsia arulius</i> (Jerdon, 1849)	3.0 - 6.8 cm	Endemic	EN	Ornamental
<i>Dawkinsia filamentosa</i> (Valenciennes, 1844)	2.0 - 11.0 cm	Endemic	LC	Ornamental
<i>Dawkinsia rohani</i> (Rema Devi, Indra & Knight, 2010)	3.5 - 7.0 cm	Endemic	VU	Ornamental
<i>Puntius amphibius</i> (Valenciennes, 1842)	6.0 - 14.0 cm	Endemic	DD	Ornamental
<i>Rasbora daniconius</i> (Hamilton, 1822)	4.0 - 12.0 cm	Endemic	LC	Ornamental
<i>Garra mullya</i> (Sykes, 1839)	2.6 - 6.0 cm	Endemic	LC	Ornamental
Order: Cyprinodontiformes				
Family: Aplocheilidae				
<i>Aplocheilus panchax</i> (Hamilton, 1822)	1.8 - 5.0 cm	Endemic	LC	Ornamental
Order: Perciformes				
Family: Cichlidae				
<i>Etroplus maculatus</i> (Bloch, 1795)	5.0 - 7.9 cm	Endemic	LC	Ornamental / Food

<i>Etrophus suratensis</i> (Bloch, 1790)	8.0 – 9.0 cm	Endemic	LC	Ornamental / Food
Order: Perciformes				
Family: Gobiidae				
<i>Glossogobius giuris</i> (Hamilton, 1822)	30.2-35.2 cm	Endemic	LC	Ornamental / Food
Order: Siluriformes				
Family: Bagridae				
<i>Mystus vittatus</i> (Bloch, 1794)	9.0- 21.0cm	Endemic	LC	Ornamental / Food
<i>Mystus armatus</i> (Day, 1865)	7.0-14.5cm	Endemic	LC	Ornamental / Food
<i>Mystus cavasius</i> (Hamilton, 1822)	25.5-30.2cm	Endemic	LC	Ornamental / Food
Order: Siluriformes				
Family: Siluridae				
<i>Ompok bimaculatus</i> (Bloch, 1794)	10.0 - 19.0 cm	Endemic	NT	Ornamental / Food
<i>Ompok malabaricus</i> (Valenciennes, 1840)	5.0 - 15.4cm	Endemic	LC	Ornamental / Food
Order: Synbranchiformes				
Family: Mastacembelidae				
<i>Macrognathus aral</i> (Bloch & Schneider, 1801)	7.5 - 26.0 cm	Endemic	LC	Ornamental / Food

EN – Endangered; VU – Vulnerable; NT – Near Threatened; LC – Least Concern;

DD – Data Deficient and NE – Not Evaluated.

CONCLUSION

Of the 17 species of freshwater fishes identified from this region, 4 are listed under threatened category. All are ornamentally appreciated of which 9 species have food value.

ACKNOWLEDGEMENT

The authors are thankful to Dr. G. Sugumar, Dean, Fisheries College and Research Institute, Tamil Nadu Fisheries University, Thoothukudi-628 008, Tamil Nadu, India for providing necessary facilities.

REFERENCES

- IUCN (2015). The IUCN Red List of Threatened Species. Version 2015.2. IUCN, Gland, Switzerland and Cambridge, UK, <http://www.iucnredlist.org>. 15 October 2015.
- Jayaram, K.C. (2010). The freshwater fishes of the Indian Region. Narendra Publishing House, New Delhi, India, 616.
- Martin, P. (1994). Pollution studies in the perennial river, Tambaraparani. Ph. D thesis, Manonmaniam Sundaranar University. Tirunelveli.

- Mogalekar, H. S., Jawahar, P., Francis, T., Karal Marx, K., Sujathkumar, N.V., Canciyal, J. & Pavinkumar, P. (2015). Review on New Records of Freshwater Fishes from India with Note on Distribution and Conservation Status. *Journal of Aquaculture in the Tropics*, 30(3-4): 203-224.
- Moyle, P.B. & F.R. Senanayake (1984). Resource portioning among the fishes of rainforest streams in Srilanka. *J. Zool.* (London).202:295-305.
- Murugan, M., Murugan, T. & Albino Wins, J. (2015). Study of freshwater fish fauna in Periyakulam Riverine Wetland, Kanyakumari district, Tamilnadu. *International Journal of Fisheries and Aquatic Studies*, 2(5): 150-152.
- Rema Devi, K. & Indra, T.J. (2000). Freshwater ichthyofaunal resources of Tamil Nadu. Pp. 77-97. In : Ponniah, A.G. and Gopalkrishna, A. (Eds). Endemic Fish Diversity Of Western Ghats. NBFGR-NATP Publication- 1, 347 p. National Bureau of Fish Genetic Resources, Lucknow, U.P., India.
- Talwar, P.K. & A.G. Jhingran (1991). Inland Fishes of India and Adjacent Countries, Vol I & II. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1158pp.
- Thampi Jeyaraj, C., Selvaraj, D., Stevens Jones, R.D. & Chithra, G. (2001). Coconut husk retting effluent and fish species diversity in the river Pantikal, Kanyakumari district. *Indian J. Fish*, 48(3):249-254.
- Xavier Innocent, B., Karuthapandi, M. & Syed Ali Fathima, M. (2012). Fish faunal diversity of Suthamalli pond, Tirunelveli District, Tamilnadu. *International Journal of Advanced Life Sciences*, Vol. 1, 73-79.