ON THE FISHES OF PUYANKUTTY RIVER, KERALA, INDIA

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Abstract

A hydroelectric project is proposed on the river Puyankutty in Idukki District of Kerala. In view of the proposed project an attempt was made to survey the fish species of the river during January 1998 to January 1999. The entire course of the river and its tributaries were covered and samples were collected using cast net and seine. Thirty-four species belonging to 11 families were collected of which *Puntius melanampyx, P. filamentosus, P. ticto, Garra mullya, Danio aequipinnatus, D. malabaricus, Barilius bakeri* and *B. gatensis* were seen in abundance. Instances of epizootic ulcerative syndrome were seen in some individuals of *Mastembelus armatus*.

Keywords

Puyankutty River, fish, hydroelectric project, Epizootic ulcerative syndrome, survey

Introduction

The river Puyankutty is located in Idukki District of Kerala. Its catchment extends to 232 km^2 falling within 10^{0}0' and 10^{0}10' N and 76^{0}45' and 76^{0}55' E. The catchment is an undulating terrain with a mosaic of moist deciduous, semi-evergreen, low elevation evergreen and riverine forests. Scattered agricultural patches are also present. The catchment is rich in reeds and bamboo, which has been commercially exploited extensively for decades. In recent years a major hydroelectric project proposed in the river Puyankutty attracted considerable public interest. The Puyankutty Hydro Electric Project (PHEP) is the largest among the currently proposed hydroelectric projects in Kerala in investment and power generation capacity. A survey of the fish fauna in the river Puyankutty and its tributaries was undertaken along with the comprehensive assessment of the ecological impacts of the hydroelectric project (Azeez *et al*., 1999).

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The Puyankutty River, a tributary of the Idamalayar River, ultimately joins the Periyar River, the longest river in the state (244km) (Centre for Water Resources Development and Management, 1991). The Puyankutty River originates from Anamala ranges at an altitude of 2500m. The major tributaries joining the river upstream of the proposed dam site are Karinthiriar, Kallar, Anakkulumar, Kunjiar and Tudupiar (Fig. 1). The Karinthiriar joins the Puyankutty River about 15km downstream of its origin. The Karinthiriar is formed by Kadalar, Kallar-kuttiar and Kaduvakadu-thodu. These three major tributaries of Karinthiriar originate from Elavanji Mala, about 1826m. Further 7km downstream, Kallar River originating from Parvathimala at an elevation of about 1750m joins the Puyankutty River. This river later known as Melaseriar drains the Mankulum area and joins Karinthiriar at Anakkulum. A smaller stream namely the Tudupiar, which drains the surroundings of the Parivara Mala, Manmudikkunnu, Karikallu and Ilampilacheri, joins the river about 3km upstream of the proposed dam site. The Puyankutty River, downstream of the dam site, before its confluence with the Idamalayar at 160m, is joined by the Pichiar. The Pichiar taps surroundings of Varium (1095m) and Kolattapati (1205m) in the Puyankutty catchment.

Methodology

The river Puyankutty was surveyed for fish fauna from January 1998 to January 1999. Samples were collected using cast net and seine. Surveys were conducted along the entire course of the river and its tributaries. Specimens caught during the survey were examined and released at the same location.

Observations

The fish fauna in Puyankutty is diverse. From the river and its tributaries coming under the study area, 34 species belonging to 11 families (Table 1) were collected. *Puntius melanampyx, P. filamentosus, P. ticto, Garra mullya, Danio aequipinnatus, D. malabaricus, Barilius bakeri* and *B. gatensis* were seen in abundance. *Oreochromis mossambica* an exotic species has reached upper reaches of the Puyankutty River and is seen in large numbers. The species poses a threat to the native fish fauna because of its ability of prolific breeding. Incidentally,

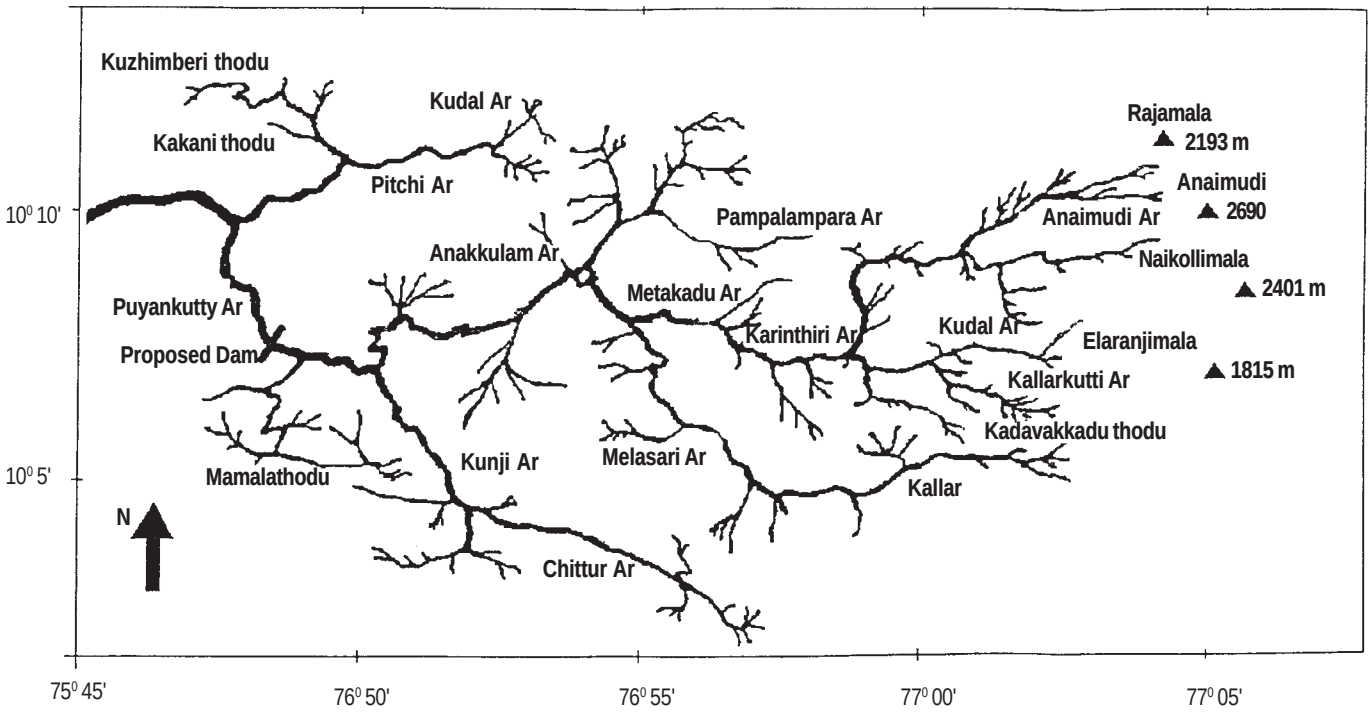

Figure 1. Map of Puyankutty River system

some individuals of *Mastembelus armatus*, collected from the upper reaches of the river, were found seriously infected with Epizootic Ulcerative Syndrome (EUS). These individuals had deep and wide wounds with rotten tissue, typical of EUS (Chinabut & Roberts, 1998; Lilley *et al*., 1998). Although a number of pathogens are known to be present in EUS wounds, environmental quality degradation plays an important role in initiating and sustaining the infections.

Compared to the fish fauna (Easa & Basha, 1995) of other river systems of Kerala such as Chaliyar (50 species), Kunthi (11 species), Bhavani (24 species) and Kabani and Vythiripuzha (58 species) that of Puyankutty River system is fairly diverse with 34 species belonging to 21 genera and 11 families. Comparisonn of the fish fauna of Puyankutty River with that of the Kerala part of Nilgiri Biosphere Reserve (Easa & Basha, 1995) shows that 29 of the 34 species recorded in Puyankutty were common to both the areas, while *Hypselobarbus kurali*, *H. periyarensis*, *Parluciosoma daniconius*, *Garra surendranathanii* and *Macrognathus guentheri* were recorded only in the Puyankutty area.

Two species, namely *Hypselobarbus periyarensis* and *Garra mcclellandi* are confined to select pockets in the Periyar basin. *Garra surendranathanii*, a species recently described by Shaji *et al*. (1996) from the upstreams of river Chalakkudy, was seen in certain pockets in the study area. This species is so far reported only from the rivers Periyar, Chalakkudy and Achenkoil (Shaji *et al*., 1996). Sixteen species are distributed only in southern Western Ghats while the rest are very widely distributed elsewhere in India. Only *Garra mcclellandi*, recorded from the area, is listed among the 12 species reported as endemic to NBR by Daniels (1993). Some species listed as endemic to Western Ghats by Easa and Basha (1995) were seen in the Puyankutty area.

Conservation status and implications

Menon (1997) has listed 18 species of fishes in Malabar region as threatened. Two species, namely *Hypselobarbus kurali* and *H. periyarenesis* seen in Puyankutty River are also included among the endangered by Menon (1997). Five species (*Anguilla bengalensis*, *Punitus arulius*, *Garra surendranathanii*, *Bhavania australis* and *Mystus malabaricus*) are Endangered; four species are Vulnerable (*Tor khudree*, *Barilius bakeri*, *Pristolepis marginata* and *Macrognathus guentheri*); and four species are near threatened (*Puntius carnaticus, P. ticto, Danio aequipinnatus* and *Parluciosoma daniconius*) in India according to the 1994 IUCN Red List Categories (Molur & Walker, 1998).

Aquatic fauna, especially fishes, are one of the first victims of dams, diversions and impoundments across a river or a water course. Such constructions drastically alter the hydrologic regime of the system, the flow pattern and the original aquatic habitats. The constructions destroy the specific habitats that most upstream fishes essentially require. Fishes of the lower

Table 1. Fish recorded in the Puyankutty area and their general distribution.

Anguillidae	
Anguilla bengalensis	Throughout India
Cyprinidae	
Barilius bakeri	Western Ghats of Kerala, Tamil Nadu and Karnataka
Barilius gatensis	Western Ghats - Kerala, Nilgiris, Karnataka and Maharashtra
Danio aequipinnatus	Throughout India
Danio malabaricus	Western Ghats
*Garra mcclellandi**	Western Ghats of Kerala and Tamil Nadu
Garra mullya	Throughout India except Assam and Himalaya
*Garra surendranathanii***	Chalakudy, Periyar and Achankovil rivers in Kerala
Hypselobarbus kurali	Kerala and Tamil Nadu
Hypselobarbus periyarensis	Periyar, Kerala
Parluciosoma daniconius	Throughout India
Puntius amphibius	Peninsular India up to Orissa, Madhya Pradesh and Rajasthan
Puntius arulius	Tamil Nadu, Kerala and Cauvery river system
Puntius carnaticus	Cauvery and Krishna rivers, Wynaad, Nilgiri and Canara hills
Puntius filamentosus	Goa, Karnataka, Kerala, Tamil Nadu and Maharashtra
Puntius melanampyx	Western Ghats
Puntius ticto	Throughout India
Salmostoma boopis	Western Ghats
Tor khudree	Madhya Pradesh, Deccan and Peninsular India
Balitoridae	
Bhavania australis	Southern Western Ghats, also Karnataka
Nemacheilus guentheri	Western Ghats
Nemacheilus triangularis	Western Ghats of Kerala and Tamil Nadu
Cobitidae	
Lepidocephalus thermalis	Kerala, Karnataka, Tamil Nadu and Mahe
Bagridae	
Mystus armatus	Western Ghats and Nagaland
Mystus malabaricus	Western Ghats
Mystus oculatus	Kerala and Tamil Nadu
Aplocheilidae	
Aplocheilus lineatus	Western and South-Eastern regions
Belontidae	
Macropodus cupanus	Karnataka, Kerala and Tamil Nadu
Nandidae	
Pristolepis marginata	Western Ghats of Karnataka, Kerala and Tamil Nadu
Cichlidae	
Etroplus maculatus	Kerala, Tamil Nadu and South Karnataka
Oreochromis mossambica	Introduced
Gobiidae	
Glossogobius giuris	Indo-West Pacific
Mastacembelidae	
Macrognathus guentheri	Kerala
Mastembelus armatus	Throughout India

* recorded only in Periyar River, ** recorded only in Periyar, Chalakudy and Achankovil rivers

order (such as first and second order) streams show higher habitat fidelity than species of lower stretches along a river continuum. Those types of fishes are not capable of living in larger stagnant pools and reservoirs and mostly get eliminated with inundation of the submergence area of hydel projects. Although fish ladders and similar structures, to facilitate fish movements, are generally conceived with proposals for hydroelectric projects, such measures are found insufficient in eliminating the impacts in many cases (Roberts, 1993), especially in case of high dams. Fish ladders are also inadequate in conserving resident species of first and second order hill streams.

References

Anon. (1991). *Water Atlas of Kerala*. Center for Water Resources Development and Management, Calicut.

Azeez, P.A., S. Bhupathy, A. Rajasekaran, P.R. Arun, D. Stephen and P. Kannan (1999). *Rapid environmental impact Assessment of the proposed Puyankutty Hydroelectric Project, Kerala*. SACON, Coimbatore.

Chinabut, S. and R.J. Roberts (1998). *Pathology and histopathology of Epizootic Ulcerative Syndrome (EUS)*. The Aquatic Animal Health Research Institute, Bangkok.

Daniels, R.J.R. (1993). The Nilgiri Biosphere Reserve and its role in conserving India's biodiversity. *Current Science* 64: 706-708.

Easa, P.S. and S.C. Basha (1995). *A survey on the habitat and distribution of stream fishes in the Kerala part of Nilgiri Biosphere Reserve*. Report No. 104, Kerala Forest Research Institute, Peechi.

Lilley, H., R.B. Callinan, S. Chinabut, S. Kanchanakhan, I.H. MacRae and M.J. Phillips (1998). *Epizootic Ulcerative Syndrome (EUS): Technical Handbook*. The Aquatic Animal Health Research Institute, Bangkok.

Menon, A.G.K. (1997). Rare and endangered fishes of Malabar, India. *Zoos' Print* 12: 6-19.

Molur, S. and S. Walker (1998). *Report of the workshop "Conservation Assessment and Management Plan for freshwater fishes of India"*. Zoo Outreach Organisation, Conservation Breeding Specialist Group India, Coimbatore 102 pp.

Roberts, T.R. (1993). Just another dammed river? Negative impacts of Pak Mun dam on fishes of the Mekong basin. *Natural History Bulletin of Siam Society* 41: 105-133.

Shaji, C.P., L.K. Arun and P.S. Easa (1996). *Garra surendranathanii* - A new Cyprinid fish from the southern Western Ghats, India. *Journal of the Bombay Natural History Society* 93: 572-575.