

Fish diversity of Veeranam Lake in Cuddalore District, Tamil Nadu, India

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Abstract

In the present study, to identify the fish diversity in the Veeranam Lake in Cuddalore district Tamilnadu, which is providing drinking water to Chennai city. Fishes are very important source of protein as well as an integral component of the food chain of an aquatic ecosystem. Fishes are the best bio-indicators of a water body. The Vadavar River is bringing water to the Veeranam Lake from the Cauvery tributary through distributary river Kollidam. The cement concretes have been made in the bottom of Vadavaar River by the new veeranam project from lower Anaicut to Veeranam Lake for overcoming wastage of water flow to the Veeranam Lake. The natural habitats such as sandy and muddy surface which is more vital for fish diversity of the river and also veeranam lake system,

The fish diversity has been slightly reduced particularly muddy and sandy habitats fishes such as *Anguilla bengalensis*, *Tenualosa ilisha*, *Anguilla bicolor*, *Oreochromis mossambicus* and *Anabas testudineus*. It's also observed that fresh water aquatic weed diversity has maximum decreased due to habitat destruction. It has been reported in the present study. The results presents here, strongly suggest that the mechanism of effect on habitats which has been affected the fishes living environments by the anthropogenic activities near the lake system. The present study listed the fish diversity in the Veeranam Lake.

The results indicate that the fish diversity has been slightly reduced particularly sandy and muddy habitats fishes. The fish taxonomy is an important tool which helps to evaluate fishery potential of a lake. Fisheries development, sustainable use of fishery assets and thereafter implementation of suitable conservation measures become successful only when ichthyofaunal diversity of an aquatic ecosystem is known to researchers, fishery managers and policy makers. It is suggested that before implementing any project on river or lake environment which

should be ensured that the project should not be affected the natural habitats of the river and ecosystems.

Key words : Vadavaar, lower Anaicut, veeranam lake, fish, habitats.

The Veeranam lake is situated ($11^{\circ} 15' \text{ N}$ and $11^{\circ} 25' \text{ N}$; $79^{\circ} 30' \text{ E}$ & $79^{\circ} 35' \text{ E}$) in Cuddalore District, Tamilnadu, Southern India about 25 km West of the Temple town Chidambaram and around 2 kilometre near kattumannarkoil (Fig. 1). It is situated about 30 km inland from the Bay of Bengal. This lake was dug by the Chola King (Paranthaga I) during the 10th Century A.D. The lake is about 16 km length and 8 km width with the water holding area of about 15 km² and capacity of 930 million cu. ft. There are 34 sluices in the lake through which about 45,000 acres of two taluks viz., Chidambaram and Kattumannarkoil are getting irrigation. The lake receives water from the river "Vadavar river". The Veeranam Lake has to depend often on the release of water from the Mettur Dam and Grand Anaicut. The lake area offers a wide variety of micro habitats which provide suitable substrates for a variety of seasonal water birds. The Veeranam lake and its watershed are situated in the rain shadow regions of Southwest Monsoon (June – August) and receive Northeast monsoon (September – December) only. The climate is tropical. Hot weather prevails in the months of March to June, and the Maximum temperature varies from 29° C to $39^{\circ} \text{ Celsius}$ in the veeranam lake area.

Fishes are very important source of protein as well as an integral component of the food chain of an aquatic ecosystem. Fishes are the best bio-indicators of a water body. Freshwater riverine fishery is one of the

important economic constituents of the fishery sector of many countries including India. India possesses great biodiversity and ranks ninth in the world in terms of fresh water biodiversity Harinder Singh Banyal and Sanjeev Kumar¹³, Mittermeier *et al.*²³. Jayaram¹⁶ has listed 852 species of freshwater fishes from the Indian region. India has 14 major and 44 medium river sand innumerable streams, flood plains, riparian zones, mangroves and estuaries. These inland water bodies make India one of the richest fish germplasm bank in the world.

Tamil Nadu is a state with diverse water resources including rivers, lakes, reservoirs and tanks. Stony and muddy landscape of Tamil Nadu encompasses good vegetal cover and also harbours ideal habitat for water resource and potential for development particularly agriculture and also aquaculture fields³³.

Fish fauna of India is mainly known to us due to the work of Hora *et al.*¹⁴, Datta *et al.*⁸, Johal *et al.*¹⁷ and Mohan, *et al.*²⁴ whereas southern and south eastern part of the state is surveyed for fish diversity primarily by Dubey and Mehra⁹, Jayaram¹⁶, Vijayaragavan³³, Sharma and Johal^{26,27}, Gupta and Kulshreshta¹², Khatri *et al.*²⁰, Johal and Sharma¹⁷, Kumar and Rathore^{21,22}, Juyal and Chaudhary¹⁸, Vyas and Singh³⁴, Sharma and Choudhury²⁸, Srivastava³⁰, Sivakumar and Choudhury²⁹ and Banyal and Kumar¹⁻⁷. Dubey and Mehra⁹ described 71 species, Ridhi, *et al.*²⁵ have

recorded 22 species of fish from Madhya Pradesh portion of River Chambal, Verma *et al.*³² have documented 39 fish species from Rana Pratap Sagar reservoir part of Chambal River whereas, Banyal and Kumar 2015 have recorded 54 species of fish from Rajasthan portion of River Chambal.

The Veeranam lake which has providing water for agri2cultural land in the district of cuddalore and also border of Ariyalur district in Tamilnadu and around 45,000 acres of two taluks viz., Chidambaram and Kattumannarkoil are getting irrigation from the water stored in the lake for agricultural practice and also improving ground water levels in the Cuddalore district belt. The Veeranam Lake in Cuddalore district is providing drinking water to Chennai City through big pipeline. The Veeranam Lake is also preventing the water wastage to reach bay of Bengal during rainy season and useful for the paddy and sugarcane agricultural practice in the Cuddalore district.

Sampling was mainly done in Veeranam Lake at two locations namely one is vadavar mouth end at Veeranam Lake and second station veeranam lake water outlet area which is located around two kilometres from the vadavar mouth station during monsoon season in 2025. Fishes were collected mainly by using cast and gill nets. Hand, scoop and drag nets were also used. The fishes were preserved in 5-10% formalin. The collected fishes were identified following Talwar and Jhingran³¹, Jayaram¹⁶ and Froese and Pauly¹⁰ *i.e.*, [www. Fish base.org](http://www.Fishbase.org), [version (02/2014)].

The Veeranam Lake (or Veeranarayana Lake) is receiving water from the Kollidam river system (a cauvery tributary) through

from Vadavar River. The Veeranam Lake is a semi perennial lake which supports moderate fishery and also agricultural practice particularly paddy cultivation in Cuddalore district in Tamil Nadu. This lake is a good diversity of fresh water fishery as capture fishery and contributes to peoples in Kattumannarkoil Taluk border area for livelihood of the local peoples.

The fish taxonomy is an important tool which helps to evaluate fishery potential of a river and lake. Fisheries development, sustainable use of fishery assets & thereafter implementation of suitable conservation measures become successful only when ichthyofaunal diversity of an aquatic ecosystem is known to researchers, fishery managers and policy makers. The present work deals with fish diversity, taxonomy and also 29 fishes recorded from the Veeranam Lake located in Cuddalore district in Tamil Nadu (Table-1). Most of the fishes recorded during the course of present work are commonly found in the inland water bodies of India. However, some species were under various categories of threatened species and cypriniformes order was with maximum species (14), and perciformes, represented with 4 spp., clupeiformes represented with 3 spp. each, whereas, beloniformes represented only by 2 species. Anguilliformes represented 2 spp, Siluriformes represented 3 and mugiliformes represented 1.

Amongst all the families' cyprinidae was most dominant family which is followed by perciformes, Siluriformes, clupeiformes beloniformes, anguiliformes and mugiliformes respectively. **All the fish species described in the manuscript are reported from Veeranam lake. (Table-1).**

Systematic list of the fishes which are identified are as follows			
Order	Family	Scientific Name	Vernacular Name (Tamil)
Anguilliformes	Anguillidae	<i>Anguilla bengalensis</i> (Gray 1831)	Aaara meen
		<i>Anguilla bicolor</i> (McClelland 1844)	Vilaangu meen
Beloniformes	Hemiramphidae	<i>Hyporhamphus xanthopterus</i> (Valenciennes 1847)	Kokkurali, Kokku meen
		<i>Hyporhamphus limbatus</i> (Valenciennes 1847)	Kokkurali meen
Clupeiformes	Clupeidae	<i>Tenualosa ilisha</i> (Hamilton 1822)	Oolam, Karuva ulam, Sevva, Ullam
	Pristigasteridae	<i>Ilisha novacula</i> (Valenciennes)	Naattu matti
	Engraulidae	<i>Thryssa dussumieri</i>	Keela, Semporuva
Perciformes	Ambassidae	<i>Ambassis dussumieri</i> (Cuvier 1828)	Kannadi thattai
		<i>Chanda nama</i> (Hamilton 1822)	Velicha podi,
	Cichlidae	<i>Etroplus suratensis</i> (Bloch 1790)	Sella kasu, Setta Kendai meen, Puradi, Salladai podi
		<i>Oreochromis mossambicus</i> (Peters 1852)	Jelebi kendai, Tilapi
Mugiliformes	Mugilidae	<i>Mugil cephalus</i> (Linnaeus 1758)	Madavai, Manalei, meen
Cypriniformes	Cyprinidae	<i>Gibelion catla</i> (Hamilton 1822)	Kanavi, Kora kendai, Thoppa kendai,
		<i>Garra mulya</i> (Sykes 1839)	Kallu koravai, Kallu kendai
		<i>Ctenopharyngodon idellus</i> (Valenciennes 1844)	Pullu kendai meen
		<i>Devario aequipinnatus</i> (McClelland 1839)	Vannathipodi
		<i>Cirrhinus mrigala</i> (Hamilton 1822)	Mirigal kendai
		<i>Puntius cauvei</i> (Hora 1937)	Saani podi, Salli podi
		<i>Puntius amphibius</i> (Valenciennes 1842)	Kulla kendai meen
		<i>Puntius conchonus</i> (Hamilton 1822)	Chenna kunni meen

		<i>Labeo rohita</i> (Hamilton 1822)	Kannadi kendai
		<i>Labeo calbasu</i> (Hamilton 1822)	Selkendai,
		<i>Hypothalmichthys molitrix</i> (Valaenciennes 1844)	Velli kendai
		Catla catla (Hamilton 1822)	Kendai meen
	Anabantidae	<i>Anabas testudineus</i> (Bloch 1792)	Panaiyeri Kendai
Siluriformes	Channidae	<i>Channa striata</i> (Bloch 1793)	Karuppu viral, Viral
	Bagridae	<i>Mystus cavasius</i> (Hamilton 1822)	Nai keluthi meen
		<i>Mystus vittatus</i> (Bloch 1794)	Vella keluthi meen Cutta keluthi, meen
		<i>Mystus bleekeri</i> (Day 1877)	Naattu Keluthi meen

The listing, monitoring and frequent documentation of biodiversity has become an essential tool to understand dynamics of different ecosystem and influences on them. Analysis of the fish diversity revealed that Veeranam lake ecosystem possesses varied fish diversity which is a testimonial that this lake is quite healthy and productive. Majority of the recorded fish species except cat fishes which are strictly carnivorous, have diverse food habits like herbivorous, carnivorous omnivorous and detritus consumers which are enormously supported by this water body. Rampant poaching of fishes by natives particularly during spawning period, deregulation of mesh size of fishing nets, removal of bed material, effluents and other household pollutants, frequent water flow disconnection to veeranam lake from the lower Anaicut channels and cement concrete bottom of the Vadavaar River are the potential threats which can affect the diversity of ichthyofauna in the veeranam lake. It's also observed that the habitat destruction of the lake has severely affected the entire aquatic organism including fishes and aquatic freshwater weeds in the Veeranam Lake. Cauvery water issue also one

of the major cause for decreasing the fishery diversity in the south Indian rivers those are tributary of Cauvery River.

Presence of trash fishes such as *Oreochromis mossambicus* (Peters, 1852) in Veeranam Lake is also a matter of concern for Indian major carps and other commercially important fishes. Moreover, the Veeranam Lake is also suffering from the effects of Cauvery issue which is providing water to Tamilnadu from neighbour state as its main source of water from the Cauvery tributary rivers. This barrier is accounting for loss in the breeding and nursery grounds of important freshwater fishes due to sometime low water source during summer. Hence, to conserve this vital lake treasure, a long term management plan should be prepared and implemented. Besides, large scale awareness of all the stakeholders would be crucial to conserve the fish fauna of this lake. Some of the cultivated fishes like Mrigal, Rohu and Catla important major carps (IMC) also mostly observed/identified in the Veeranam Lake as the fishes may be came from local aqua cultural ponds nearby during rainy season beyond the natural breeding sources.



VEERANAM LAKE (Fig. 1)



VEERANAM LAKE (Fig. 2)

Summary :

Twenty nine species of fishes belonging to 12 families and 7 orders were recorded from the Veeranam Lake. This is the first comprehensive attempt to describe fish diversity of the Veeranam Lake in the Tamil Nadu state. The results indicate that the fish diversity has been slightly reduced particularly on sandy and muddy habitats fishes. It's observed that some of the muddy substrate living fishes unable to live or sustain in the habitat distraction made by the new veeranam project. It's also observed that most of the freshwater weeds also been disappeared due to habitats destruction of the river. It is suggested that before implementing any project on river environments which should be scientifically ensured that the project should not be affected the natural habitats of the river, lake system and also the freshwater ecosystems.

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