# ICTHYOFAUNAL DIVERSITY OF KAVVAI BACKWATERS, MALABAR COAST OF INDIA: A PRELIMINARY STUDY.


## ABSTRACT

Fish faunal diversity studies are of great importance for the effective utilization of valuable natural resources and to plan different conservation strategies. Studies on the diversity and richness of fish in Kavvai backwaters are very rare. Hence, this study is aimed at exploring the fish resources, diversity and species richness of the fish fauna of Kavvai backwaters of the Kerala coast, which has not received very little attention hitherto. Monthly sample collections were made from four stations regularly for a period of one year, and the collection was done by netting with cast net and gill net. A total of 65 species under 51 genera, comprising 36 families belonging to 17 orders of fin fish fauna, were recorded from the Kavvai backwater . Further studies are required to identify other fish species and to ascertain the reasons for variations in fish faunal diversity in the Kavvai backwater ecosystem.



*Keywords: Kavvayi backwater; fish fauna; Back water fishery ;diversity*


## 1.INTRODUCTION

Inland water resources, such as lakes, rivers, canals, reservoirs, ponds, streams , springs, cave waters, floodplain wetlands, estuaries, coastal lagoons, mangrove creeks, marshes, backwaters, and swamps, provide habitat for fish, amphibians, water birds, semi-aquatic animals and plants, as well as highly endemic and endangered taxa. Climate regulation, flood mitigation, nutrient recycling, water purification, and waste management are all supported by these dynamic ecosystems. Millions of people around the world rely on them for food, nutrition, and survival [1]. Proper understandings of the fish fauna and their habitats are of great importance for the effective utilization of the valuable ecosystem and to plan out developmental and successive Management Programs for their conservation [2].Today, fishing remains the largest extractive use of wildlife in the world. In 2010, the annual capture, combining both wild capture and aquaculture, was 149 million tones [3]. Fish is widely regarded as a super food around the world. Fisheries and aquaculture is one of the fastest expanding food sectors, and it has played an important part in economic development due to its contributions to food and nutritional security, national income, job possibilities, and livelihood options. Fisheries sector occupies a very important place in the socio-economic condition of a country[4].Fish from India's fresh and marine waterways number 3231 legitimate species, accounting for 9.7% of the world's total of 33,059 species of fish, with marine fish diversity accounting for 7.4%.Marine fishes account for 75.6 percent of India's total fish variety, with 2443 species divided into 927 genera and 230 families divided into 40 orders[5]. India is the world's third-largest fish producer and the world's second-largest aquaculture fish producer. India accounts for roughly 7% of global fish production. The country is also home to more than 10% of the world's fish biodiversity and is one of the 17 countries with the most biodiversity. Around 14 million people work in the fishing industry and related industries[6]. The backwaters of Kerala are a unique ecosystem in Kerala wherein lagoons, lakes, canals, estuaries and deltas of several rivers meet the Arabian Sea.

The backwaters are made up of over 900 km of interconnected waterways, rivers, lakes and inlets [7]. The Kavvayi backwaters, also known as the Kavvayi Kayal, are a 21-kilometer-long elongated water body produced by drainages from four rivers: the Karingote, Nileswar, Kavvayi, and Peruvarnba. It is possibly the most visible element of the lacustrine system in northern Kerala's coastal tract. Edayilakad, Madackal, Vadakkekad, Chembantemedu, Oari, Thekkekad, Purathal, Kockal, and other significant islets can be found in the backwater system [8].The ichthyofaunal diversity is a good indicator of health of aquatic ecosystem. A good piscine diversity represents the balanced ecosystem [9]. Proper understandings of the fish fauna and their habitats are of great importance for the effective utilization of the valuable ecosystem and to plan out developmental and successive management programs for their conservation. Studies on the diversity and richness of fishes of Kavvai backwaters are rare. Likewise, fishery resource of Kavvai back water, Malabar region of Kerala coast has received only little attention hither to. This paper aims to explore the fish faunal diversity of Kavvai back water. This study also aims to find out various threats to fish fauna in Kavvai back waters.

## 2. MATERIALS AND METHODS

**2.1.STUDY AREA** : The Kavvai backwater (12.0929° N and 75.1677° E) is situated in the northern part of Kerala, in Kannur and Kasargod District of Kerala and has a permanent connection with the Arabian Sea on both in northern and southern side.Table-1, (Fig.1)[10]. The Karyamkode river, Peruvamba river, Kuniayan river and Valapattanam river drains into this water system .The backwater Kavvayi connected to Arabian Sea with the river mouth at the north at Azhithala, Nileswaram and connected to Palakkode river mouth in the south. There are 7 islands in the Kavvayi backwaters. Five (Kavvayi, Madakkal, Edayilekkad, Thekkekad and Vadakkekad ) among them are having human settlements and two (Kocha Thuruthi and Kurippad Thuruthi) are not human settlements.

Table.1. study locations

| Collection sites | Descriptions |
|---|---|
| **Station 1** | 12.08185 N, 75.17608 E |
| **Kavvay** | 12.10082 N, 75.17633 E |
| **Point 2** | 12.10082,N 75.17633 E |
| **Point 4** | 12.08185N, 75.17608 E |

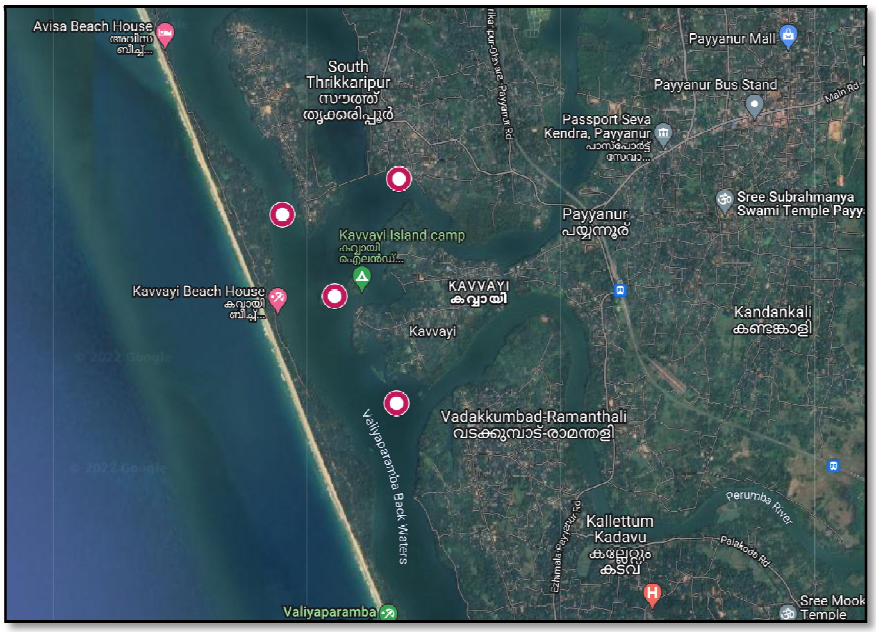


Fig. 1 : Map showing study locations

## 2.2.COLLECTION AND IDENTIFICATION OF FISHES

With the aid of local fishermen and using a variety of nets, including gill nets, cast nets, and dragnets, fish were collected from four locations in the Kavvayi backwater (Figs. 2.a, 2.b, 2.c, and 2.d). For a year, monthly collections were taken on a regular basis from four stations (2020-21). After being cleaned, the fish were preserved in 7% formalin. The 10% formalin solution was used right away to treat little fish. While large fishes were given an incision in their abdomen and preserved in the laboratory. Specimens were examined in detail characters were measured and fishes were identified up to the species level, with the help of standard keys given by Day (1878) [11]., Munro (1955) [12]., Talwar and Jhingran (1991) [13]., Jayaram (1981) [14]. , and Fischer and Bianchi (1984) [15].

.a. b.

c. d.

Fig.2. a,b,c and d Collection sites

## 3. RESULTS AND DISCUSSION

In the present study 65 species of fishes belonging to 36 families were found to occur in the study area. Among fishes Engraulidae was the most dominant family followed by Lutjanidae , Platycephalidae , Leiognathidae, Cichlidae and Clupeidae .The information collected in the present study are expected to act as a baseline data for future studies on the impact of the various factors, on the aquatic environment.The common name ,scientific name , family in which the fish belongsand the IUCN status is given in the Table -2. Out of sixty five species identified six species belongs to Engraulidae ,followed by Lutjanidae (5),Platycephalidae (4) Leiognathidae(4), Cichlidae(3), Clupeidae(3), Ophichthidae(3) and Mugilidae (3).Order Ambassidae, Bagridae ,Cynoglossidae ,Gerreidae, Gobiidae , and Scatophagidae having two species each.The Composition of various family of fishes in Kavvai back is given in the table.-3. Out of the 65 species listed 25 species belongs to the order Perciformes,followed by Clupeiformes (10), Siluriformes (4) and Pleuronectiformes (4). Order Acanthuriformes, Anguilliformes,Cichliformes and Mugiliform having three species each,Beloniformes,Carangiformes,Centrarchiformes,Elopiformes,Gobiiformes, Gonorynchiformes and Mulliformes with one species each..Percentage composition of various orders of fishes in Kavvai back water is showed in Fig. 3. Ashtamoorthy, Sreejith[19]

reported 27 species belongs to the order Perciformes,followed by Cypriniformes (9), Tetraodontiformes (6) and Siluriformes (4). Order Clupeiformes, Beloniformes, Mugiliformes, Synbranchiformes and Pleuronectiformes having three species each, Cyprinodontiformes and Anguilliformes having two species .Order Batrachoidiformes, Scorpaeniformes, Atheriniformes and Lophiformes are with one species each. According to IUCN status, of the 65 species described, 43 are classified as Least Concern (LC), four are vulnerable, twelve have not been evaluated, and six are classified as data deficient.According to Out of this 68 species one species, According to Ashtamoorthy, Sreejith[16] Oreochromis mossambica (Peters, 1852), is coming under the IUCN category Near Threatened. 43 species were least concern, 18 species were not evaluated and 6 species were data deficient. One species of belongs to invasive category namely *Oreochromis mossambicus*, was collected during the study.Invasive fishes may change the aquatic environment by altering the water quality and may drive native fish to extinction through predation and resource competition [17]. Fish life can be harmed by changes in the environment. Human activities affect backwater fish fauna in a variety of ways. Chemical pollution and littering, as well as urbanization, industrialization, dam construction, river diversion, and sand mining, have all been discovered to have a substantial impact on the fate of thousands of back water fish species. More knowledge on this aquatic ecosystem in sustaining fisheries is required.

**Table-2.Table showing common name ,scientific name , family of identified fish species and their IUCN status**

| Sl No | COMMON NAME | SCIENTIFIC NAME | FAMILY | IUCN STATUS |
|---|---|---|---|---|
| 1 | Asiatic glassfish. | *Ambassis ambassis (Lacepède, 1802)* | Ambassidae | LC |
| 2 | Bald glassy | *Ambassis gymnocephalus (Lacepède 1802)* | Ambassidae | LC |
| 3 | Thread fin sea catfish | *Arius arius (Hamilton 1822)* | Ariidae | LC |
| 4 | Kerala mystus | *Mystus armatus (Day 1865)* | Bagridae | LC |
| 5 | Long whiskered mystus | *Mystus seengtee (Sykes 1839)* | Bagridae | LC |
| 6 | Coastal trevally | *Carangoides coeruleopinnatus (Rüppell 1830)* | Carangidae | LC |
| 7 | Milkfish | *Chanos chanos (Forsskål 1775)* | Chanidae | |
| 8 | Orange chromide | *Pseudetroplus maculatus (Bloch 1795)* | Cichlidae | |
| 9 | Mozambique tilapia | *Oreochromis mossambicus (Peters 1852 )* | Cichlidae | VU |

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|---|---|---|---|---|
| 10 | Pearlspot | *Etroplus suratensis (Bloch 1790)* | Cichlidae | LC |
| 11 | Toli shad | *Tenualosa toli (Valenciennes 1847)* | Clupeidae | VU |
| 12 | Arabian gizzard shad | *Nematalosa arabica Regan 1917* | Clupeidae | DD |
| 13 | White sardine | *Escualosa thoracata (Valenciennes 1847)* | Clupeidae | LC |
| 14 | Malabar tonguesole | *Cynoglossus macrostomus Norman 1928* | Cynoglossidae | VU |
| 15 | Bengal tongue sole | *Cynoglossus cynoglossus (Hamilton 1822)* | Cynoglossidae | LC |
| 16 | Surf perch | *Amphistichus sp.* | Embiotocidae | LC |
| 17 | Moustached thryssa | *Thryssa mystax (Bloch & Schneider 1801)* | Engraulidae | LC |
| 18 | Indian anchovy | *Stolephorus indicus (van Hasselt 1823)* | Engraulidae | LC |
| 19 | Malabar thryssa | *Thryssa malabarica (Bloch 1795)* | Engraulidae | DD |
| 20 | Hamilton's thryssa | *Thryssa hamiltonii Gray 1835* | Engraulidae | LC |
| 21 | Orangemouth anchovy | *Thryssa vitrirostris (Gilchrist & Thompson 1908)* | Engraulidae | LC |
| 22 | Short anchovy | *Anchoa curta (Jordan & Gilbert 1882)* | Engraulidae | LC |
| 23 | long-rayed silver biddy | *Gerres filamentosus* (*Cuvier, 1829)* | Gerreidae | LC |
| 24 | Deep-bodied mojarra | *Gerres erythrourus (Bloch 1791)* | Gerreidae | LC |
| 25 | Racer goby | *Babka gymnotrachelus (Kessler, 1857)* | Gobiidae | LC |
| 26 | Yellowfin goby | *Acanthogobius flavimanus (Temminck & Schlegel 1845)* | Gobiidae | LC |
| 27 | Lutke's halfbeak | *Hemiramphus lutkei (Valenciennes, 1847 )* | Hemiramphidae | NE |
| 28 | Günther's catfish | *Horabagrus brachysoma (Günther 1864)* | Horabagridae | VU |
| 29 | False trevally | *Lactarius lactarius (Bloch & Schneider 1801)* | Lactaridae | NE |
| 30 | Barramundi | *Lates calcarifer (Bloch 1790)* | Latidae | LC |
| 31 | Deep pugnose ponyfish | *Secutor ruconius (Hamilton, 1822)* | Leiognathidae | NE |

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|---|---|---|---|---|
| 32 | Common Ponyfish | *Leiognathus equulus (Forsskal, 1775)* | Leiognathidae | LC |
| 33 | Twoblotch ponyfish | *Nuchequula blochii (Valenciennes 1835)* | Leiognathidae | NE |
| 34 | Shortnose ponyfish | *Leiognathus brevirostris (Valenciennes 1 835)* | Leiognathidae | NE |
| 35 | Mangrove red snapper | *Lutjanus argentimaculatus (Forsskål 1775)* | Lutjanidae | LC |
| 36 | John's snapper | *Lutjanus johnii (Bloch 1792)* | Lutjanidae | LC |
| 37 | Blacktail snapper | *Lutjanus fulvus (Forster 1801)* | Lutjanidae | LC |
| 38 | Mangrove red snapper | *Lutjanus argentiventris (Peters1869)* | Lutjanidae | LC |
| 39 | Onespot Snapper | *Lutjanus monostigma (Cuvier 1828)* | Lutjanidae | LC |
| 40 | Indo-Pacific tarpon | *Megalops cyprinoides (Broussonet, 1782)* | Megalopidae | DD |
| 41 | Flat-tail mullet | *Gracilimugil argenteus (Quoy & Gaimard, 1825)* | Mugilidae | NE |
| 42 | Flat head grey mullet | *Mugil cephalus Linnaeus 1758* | Mugilidae | LC |
| 43 | Bluespot mullet | *Crenimugil seheli (Forsskål 1775)* | Mugilidae | LC |
| 44 | Sulphur goatfish | *Upeneus sulphureus Cuvier 1829* | Mullidae | LC |
| 45 | Indian pike conger | *Congresox talabonoides (Bleeker 1853)* | Muraenesocidae | NE |
| 46 | Serpent eel | *Ophisurus serpens (Linnaeus 1758)* | Ophichthidae | LC |
| 47 | Snake eel | *Muraenichthys gymnopterus (Bleeker 1853)* | Ophichthidae | NE |
| 48 | Rice-Paddy Eel | *Pisodonophis boro (Hamilton, 1822)* | Ophichthidae | LC |
| 49 | Bartail flathead | *Platycephalus indicus (Linnaeus 1758)* | Platycephalidae | DD |
| 50 | Dusky flathead | *Platycephalus fuscus Cuvier 1829* | Platycephalidae | NE |
| 51 | Southern bluespotted flathead | *Platycephalus speculator Klunzinger 1872* | Platycephalidae | NE |
| 52 | Small-eyed flathead | *Cymbacephalus bosschei (Bleeker 1860)* | Platycephalidae | NE |

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|---|---|---|---|---|
| 53 | Peppered flounder | *Paralichthodes algoensis Gilchrist 1902* | Pleuronectidae | LC |
| 54 | Indian pellona | *Pellona ditchela Valenciennes, 1847* | Pristigasteridae | LC |
| 55 | Spotted scat | *Scatophagus argus (Linnaeus )* | Scatophagidae | LC |
| 56 | Spotbanded scat | *Selenotoca multifasciata (Richardson 1846)* | Scatophagidae | LC |
| 57 | Southern meagre | *Argyrosomus hololepidotus (Lacepède, 1801)* | Sciaenidae | DD |
| 58 | Indo-Pacific king mackerel | *Scomberomorus guttatus (Bloch & Schneider 1801)* | Scombridae | DD |
| 59 | Malabar grouper | *Epinephelus malabaricus (Bloch & Schneider, 1801)* | Serranidae | LC |
| 60 | Vermiculated spinefoot | *Siganus vermiculatus (Valenciennes 1835)* | Siganidae | LC |
| 61 | Silver sillago | *Sillago sihama (Forsskål 1775)* | Sillaginidae | LC |
| 62 | Oriental sole | *Brachirus orientalis (Bloch & Schneider 1801)* | Soleidae | LC |
| 63 | TheYellowtail Barracuda | *Sphyraena obtusata Cuvier, 1829* | Sphyraenidae | NA |
| 64 | Jarbua terapon | *Terapon jarbua (Forsskål 1775)* | Terapontidae | LC |
| 65 | Largehead hairtail | *Trichiurus lepturus Linnaeus 1758* | Trichiuridae | LC |

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Fig.3.Percentage composition of various orders of fishes in Kavvai backwater

**Table.3.Composition of various family of fishes in Kavvai back water**

| Sl.No. | FAMILY | Number |
|---|---|---|
| 1 | Ambassidae | 2 |
| 2 | Ariidae | 1 |
| 3 | Bagridae | 2 |
| 4 | Carangidae | 1 |
| 5 | Chanidae | 1 |
| 6 | Cichlidae | 3 |
| 7 | Clupeidae | 3 |
| 8 | Cynoglossidae | 2 |
| 9 | Embiotocidae | 1 |
| 10 | Engraulidae | 6 |
| 11 | Gerreidae | 2 |

| | | |
|---|---|---|
| 12 | Gobiidae | 2 |
| 13 | Hemiramphidae | 1 |
| 14 | Horabagridae | 1 |
| 15 | Lactaridae | 1 |
| 16 | Latidae | 1 |
| 17 | Leiognathidae | 4 |
| 18 | Lutjanidae | 5 |
| 19 | Megalopidae | 1 |
| 20 | Mugilidae | 3 |
| 21 | Mullidae | 1 |
| 22 | Muraenesocidae | 1 |
| 23 | Ophichthidae | 2 |
| 24 | Platycephalidae | 5 |
| 25 | Pleuronectidae | 1 |
| 26 | Pristigasteridae | 1 |
| 27 | Scatophagidae | 2 |
| 28 | Sciaenidae | 1 |
| 29 | Scombridae | 1 |
| 30 | Serranidae | 1 |
| 31 | Siganidae | 1 |
| 32 | Sillaginidae | 1 |
| 33 | Soleidae | 1 |
| 34 | Sphyraenidae | 1 |

| | | |
|---|---|---|
| 35 | Terapontidae | 1 |
| 36 | Trichiuridae | 1 |

## 4. CONCLUSION

The Kavvayi backwater, is kerala's third largest and the largest in north kerala and are rich in religious, ecological, genetic, environmental, and economic potentials. This backwater, known as kavvayi kayal, is supplied by five rivers: the river kavvayi and its tributary streams Kankol, Vannathichal, Kuppithodu, and Kuniyan.the backwater of kavvayi and its surrounding region are deemed ecologically significant. The current study was carried out to establish an inventory of fish faunal diversity in this major ecological variety rich location. The diversity of the ichthyofauna is a reliable measure of the health of the aquatic ecosystem. A diverse population of fish indicates a healthy ecosystem.in the present study 65 species of fishes belonging to 36 families were found to occur in the study area. Among fishes engraulidae was the most dominant family followed by lutjanidae , platycephalidae , leiognathidae ,cichlidae and clupeidae. The data gathered in this study will serve as a baseline for future research on the effects of numerous influences on the aquatic environment. Effective use of this data in policy creation, management, research, and conservation could, at many levels, assist to alleviate the current situation in light of the growing pressure that diverse human activities are placing on water resources. The current research and development plan is insufficient for the conservation, development, and management of this complex aquatic environment. To maintain the fish faunal diversity of this aquatic ecosystem continuous monitoring is needed.

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