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Fish Diversity and Water Quality in Munroe Island, Kollam District, Kerala

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ABSTRACT
Munroe Island, located in the Kollam district of Kerala, is renowned for its rich biodiversity and picturesque landscapes. The present study aimed to assess the fish diversity and water quality in the Munroe Island region of Kollam District, Kerala. The ichthyofaunal survey conducted in the area (3 sites) revealed the presence of 23 fish species belonging to 18 families, indicating a diverse fish community in the region. However, threat status assessment using IUCN criteria identified several species as vulnerable or near threatened to anthropogenic pressures. The analysis of physico-chemical parameters of water quality (from 10 sites) highlighted various factors influencing ecosystem dynamics, including temperature fluctuations, pH levels, dissolved oxygen concentrations, and levels of organic pollutants, BOD and COD. Additionally, the presence of ions such as chloride, sulphate, and nitrate suggested potential sources of contamination and pollution due to anthropogenic activities. These findings emphasize the importance of integrated conservation and management strategies to preserve the ecological integrity of Munroe Island's aquatic ecosystems and ensure the long-term sustainability of fish populations.

Key words: Water quality assessment, Munroe Island, Ichthyofaunal survey, Physico-chemical parameters, Threat status assessment, Pollution control.

INTRODUCTION

Munroe Island, nestled within the tranquil waters of the Ashtamudi Lake and cradled by the Kallada River, stands as a testament to Kerala's remarkable biodiversity and ecological richness. Munroe Island is a significant ecological hotspot in Kerala. Its diverse habitats, including mangroves, backwaters, and wetlands support a wide array of flora and fauna, including numerous fish species. This picturesque island, situated in the Kollam district of Kerala, has long captivated the imagination of researchers and nature enthusiasts alike, drawing attention to its vibrant ecosystems and diverse aquatic life. The convergence of freshwater and brackish water habitats, coupled with the intricate network of mangroves, backwaters, and wetlands, provides a haven for a plethora of flora and fauna, particularly fish species. These aquatic organisms play a pivotal role in maintaining the ecological balance of the region, serving as indicators of environmental health and vitality.

However, the pristine landscapes of Munroe Island are not immune to the pressures of anthropogenic influences. Rapid urbanization, industrialization, and agricultural practices have exerted significant stress on the island's fragile ecosystems, threatening the integrity of its aquatic habitats and the sustainability of its biodiversity (Dani et al. 2021). Despite the ecological significance of Munroe Island and its surrounding water bodies, there exists a notable gap in scientific assessment of fish diversity and water quality in the region. Existing studies primarily focus on broader ecological surveys or specific aspects of the island's biodiversity (Kar et al. 2003) often overlooking the intricate relationship between fish communities and water quality parameters. Thus, there is a critical need for research that systematically examines the fish diversity and water quality of Munroe Island; identify potential threats and stressors, and provide insights into effective conservation and management strategies.

STUDY AREA

Envisioned amidst the verdant landscapes of Kerala's picturesque Kollam district, lies the captivating Munroe Island, ensconced within the embrace of the enchanting Ashtamudi backwater system. Expanding across 13.4 km^2, it graces the confluence of the majestic Ashtamudi Lake and the meandering Kallada River. Locally, it's referred to as Mundrothuruth and comprises eight small islands.

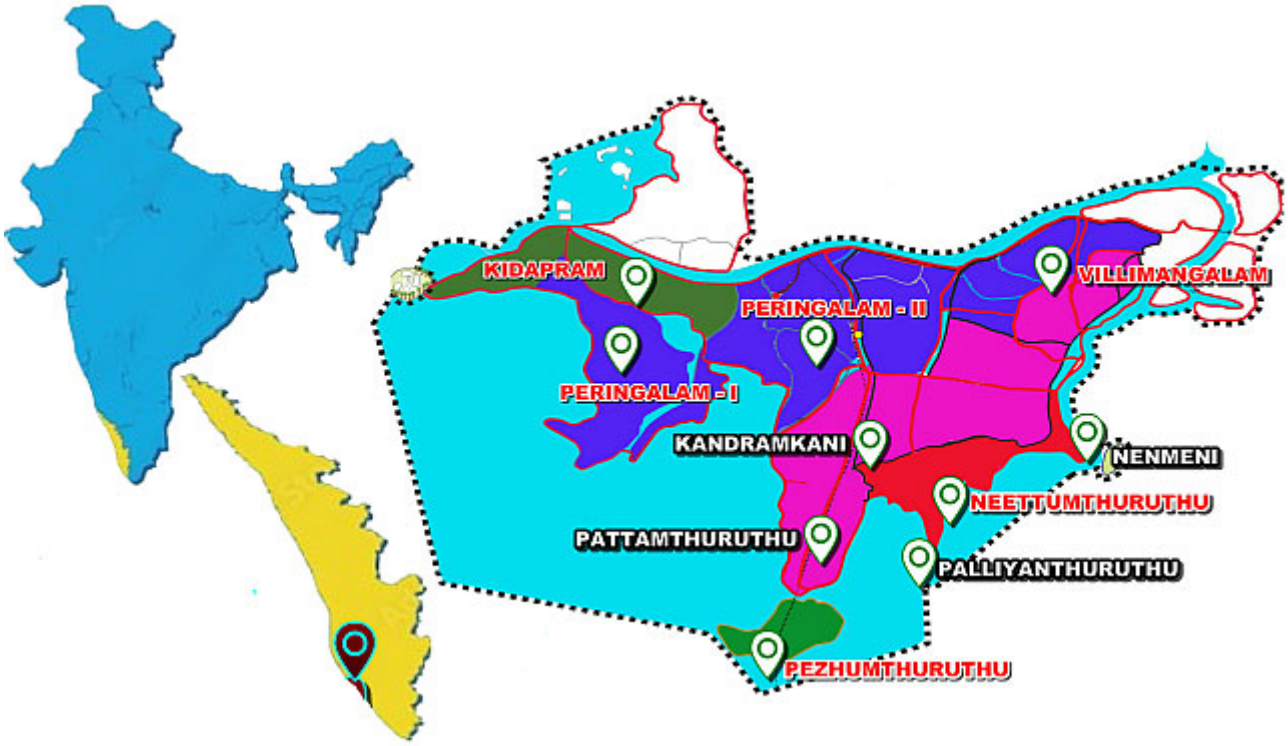

Figure 1. Sampling locations and study area

Administered by the Mundrothuruth Panchayat within the Chittumala Block division of Kollam Taluk, Munroe Island is geographically situated between 8°59'35"N to 8°99'33"N latitude and 76°35'0"E to 76°40'0"E longitude, featuring 12 wards (Fig. 1).

MATERIALS AND METHODS

Collection of water samples

Water samples were collected from the ten sites covering Munroe Island. From each sites eight samples were collected in plastic bottles (depth 20-40 cm), ensuring necessary precautions to avoid contamination, and were transported to the laboratory for physico-chemical analysis. Collection was done before setting up of first monsoon (February-May 2023). The analytical experimental procedures employed for assessing the environmental variables such Temperature, pH, Electrical Conductivity, Turbidity, Dissolved Oxygen, BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), Alkalinity, Chlorides and Total Dissolved Solids (TDS) adhered to the guidelines outlined by the American Public Health Association (Anonymous 2012).

Collection and identification of fishes

This investigation focused on the entirety of Munroe Island, Kerala, India. Three sites Pattamthuruthu (site 1), Palliyanthuruthu (site 2), Pezhumthuruthu (site 3) were chosen for fish diversity sampling based on two key criteria: (1) Accessibility: Sites were selected to ensure safe and efficient sampling efforts throughout the study period. (2) Physical habitat similarity: The three sites were chosen to represent similar physical habitat characteristics within Munroe Island to minimize variability due to habitat differences. The sites were selected based on water quality parameters sampled from ten sites. The fish diversity study was conducted during a four-month period, spanning February to May 2023. This timeframe was chosen to capture potential seasonal variations in fish populations. Fish sampling was carried out in each site by employing a combination of fishing gears to capture a comprehensive range of fish sizes and minimize gear bias. Local fisher folk expertise was utilized to ensure effective gear selection and deployment. Two cast nets of different mesh sizes (90 mm x 1/200 mm and 100 mm x 1/200 mm), three gill nets with varying mesh sizes and lengths (75 mm x 1.3 mm x 200 m, 50 mm x 1 m x 300 m, and 30 mm x 1 m x 2500 m) and drag nets

with varying mesh sizes were used. These samples underwent meristic and morphometric analyses, and species identification was done using standard keys by Day (1967), Jayaram (1999), Talwar and Jhingam (1991). Upon collection, the samples underwent washing, wiping, and photographic documentation. Both identified and unidentified specimens were then preserved in a 10% formalin solution with appropriate labeling (including precise species name, date, location, gear used, photograph number, etc.) and transported to the laboratory for further confirmation.

Statistical analysis

Fish diversity indices at different sites were calculated using Shannon-Wiener index (Shannon and Weaver 1949), Berger-Parker index (Berger and Parker 1970), Pielou index (Pielou 1969) Margalef index (Margalef 1958).and Simpson index D.

RESULTS

Fish diversity

The ichthyofaunal survey identified twenty three species belonging to 18 families, highlighting the richness of fish diversity in the Munroe Island. The ichthyofaunal diversity in Munroe Island, IUCN status, CITES, CMS and threat to humans is depicted in Table 1. The most abundant family is Cichlidae, contributing 20.24% of the fish fauna. It is followed by Clariidae (14.58%), Anabantidae (13.89%), Chanidae (13.72%), and Mugilidae (10.12%). The families Ambassidae, Hemiramphidae, and Polynemidae each contribute 0.17% and are the least abundant (Table 2). IUCN status shows majority of fish species (19 species) of Monroe Island are least concern but some (3 species) comes under vulnerable category and one fish species are nearly threatened.

The present study revealed distinct patterns of fish species dominance across the three investigated sites. At site 1, five species emerged as dominant contributors to the overall fish assemblage: *Oreochromis mossambicus* (14.77%), *Anabas testudineus* (14.20%), *Clarias batrachus* (10.23%), *Puntius sarana* (10.23%), and *Channa striata* (11.93%). These five species collectively comprised approximately 61.36% of the total fish abundance at site 1. Site 2 displayed a slightly different dominance pattern, with four key species: *Oreochromis mossambicus* (20.18%), *Clarias batrachus* (18.81%), *Anabas testudineus* (11.47%), and *Mugil cephalus* (11.47%). Notably, *Mugil cephalus* was absent from site 1. Together, these four dominant species constituted roughly 61.93% of the fish assemblage at site 2. Site 3 exhibited a dominance pattern most similar to site 2, with four dominant species: *Anabas testudineus* (16.40%), *Clarias batrachus* (13.76%), *Oreochromis mossambicus* (12.70%), and *Mugil cephalus* (10.58%). Interestingly, the relative abundance of *Mugil cephalus* was lower at site 3 compared to site 2 (Table 3). Overall, these four dominant species contributed approximately 53.44% of the total fish abundance at site 3. In terms of species presence across sites, *Clarias batrachus*, *Anabas testudineus*, and *Oreochromis mossambicus* were ubiquitous, being found in all three locations. *Mugil cephalus* assumed a dominant role at both sites 2 and 3, while *Channa striata* and *Puntius sarana* were prominent only at site 1. These observations suggest variations in habitat suitability and resource availability across the three sites, influencing the composition and dominance patterns of the fish assemblages Family and site wise icthyofaunal diversity in Munro island are shown in Figure 2 and 3, respectively. Among the estimated bio diversity indices Berger-Parker index is 6.77 at Pattathuruthu and is 6.10 at Pezhumthuruthu. Simpson index is 10.95 at Pattathuruthu and is 10.77 at Pezhumthuruthu (Table 4).

Water quality assessment

Water quality parameters of the water samples collected were analyzed to assess water quality. Table 5 provides details of the parameters measured and their respective results. The analysis revealed values for parameters such as pH, turbidity, total dissolved solids (TDS), alkalinity, and dissolved oxygen, among others. The results offer insights into the overall health and ecological condition of the water body.

DISCUSSION

Building on the established link between biodiversity and ecosystem stability (Ehrlich and Wilson 1991),

Table 1. Ichthyofaunal diversity of Munroe Island, IUCN status, CITES, CMS and Threat to humans

Family	Species	Common Name	IUCN status	CITES	CMS	Threat to humans
Heteropneustidae	*Heteropneustes fossilis*	Asian stinging catfish	VU	NE	NE	Traumatogenic
Clariidae	*Clarias batrachus*	Catfish	LC	NE	NE	Potential pest
Anabantidae	*Anabas testudineus*	Climbing perch	LC	NE	NE	Harmless
Gerreidae	*Gerres oyena*	Common Silver-biddy	LC	NE	NE	Harmless
Ehiravidae	*Dayella malabarica*	Day's round herring	LC	NE	NE	Harmless
Drepaneidae	*Konosirus punctatus*	Dotted gizzard shad	LC	NE	NE	Harmless
Anguillidae	*Anguilla bicolor bicolor*	Eel	NT	NE	NE	Harmless
Mugilidae	*Mugil cephalus*	Flat head grey Mullet	LC	NE	NE	Harmless
Chanidae	*Chanos chanos*	Milkfish	LC	NE	NE	Harmless
Cyprinidae	*Amblypharyngodon mola*	Mola Carplet	LC	NE	NE	Harmless
Cyprinidae	*Puntius sarana*	Olive barb	LC	NE	NE	Harmless
Cichlidae	*Pseudetroplus maculatus*	Orenge chromidae	LC	NE	NE	Harmless
Polynemidae	*Polynemus paradiseus*	Paradise Threadfin	LC	NE	NE	Harmless
Cichlidae	*Etroplus suratensis*	Pearlspot	LC	NE	NE	Harmless
Hemiramphidae	*Hyporhamphus xanthopterus*	Red-tipped halfbeak	VU	NE	NE	Harmless
Chanidae	*Channa striata*	Snakehead murrel	LC	NE	NE	Potential pest
Belongidae	*Pseudosphromenus cupanus*	Spiketail paradisefish	LC	NE	NE	Harmless
Bagridae	*Mystus vittatus*	Striped dwarf catfish	LC	NE	NE	Harmless
Aplocheilidae	*Aplocheilus lineatus*	Striped panchax	LC	NE	NE	Harmless
Terapontidae	*Terapon jarbua*	Tiger Perch	LC	NE	NE	Harmless
Ambassidae	*Parambassis thomassi*	Western Ghat glassy perchlet	LC	NE	NE	Harmless
Gerreidae	*Gerres filamentosus*	Whip fin Silver-biddy	LC	NE	NE	Harmless
Cichlidae	*Oreochromis mossambicus*	Tilapia	VU	NE	NE	Potential pest

LC: Least Concern, VU: Vulnerable, NT: Near Threatened, NE: Not Evaluated

Table 2. Family wise relative abundance

Family	Percentage of catch
Cichlidae	20.24
Clariidae	14.58
Anabantidae	13.89
Chanidae	13.72
Mugilidae	10.12
Cyprinidae	8.75
Terapontidae	3.95
Heteropneustidae	3.09
Anguillidae	2.92
Bagridae	2.92
Gerreidae	2.06
drepaneidae	1.03
Aplocheilidae	0.86
Ehiravidae	0.86
Belongidae	0.51
Ambassidae	0.17
Hemiramphidae	0.17
Polynemidae	0.17

fish diversity emerges as a powerful indicator of broader aquatic faunal richness and abundance. Additionally, fish populations can function as keystone species, exerting a significant influence on the distribution and abundance of other organisms within their shared ecosystem (Moyle and Leidy 1992). This pivotal role positions them as valuable tools for assessing overall ecosystem health and water quality.

The presence of diverse fish species indicates the ecological significance and productivity of the Munroe island and its surrounding areas. However, certain physico-chemical parameters such as total hardness, chloride content, and BOD levels raise concerns regarding water quality and potential pollution sources. The observed values necessitate further investigation into the underlying causes and implementation of appropriate management strategies to mitigate adverse impacts.

Table 3. Site wise catch (%)

Species	Pattamthuruthu	Palliyanthuruthu	Pezhumthuruthu
Clarias batrachus	10.23	18.81	13.76
Anabas testudineus	14.2	11.47	16.4
Mugil cephalus	7.95	11.47	10.58
Puntius sarana	10.23	7.8	6.35
Channa striata	11.93	7.8	9.52
Oreochromis mossambicus	14.77	20.18	12.7
Gerres oyena	0	3.21	0.53
Dayella malabarica	0.57	0	2.12
Konosirus punctatus	0	1.83	1.06
Amblypharyngodon mola	0	0	2.12
Pseudetroplus maculatus	0.57	0.46	0
Polynemus paradiseus	0	0.46	0
Hyporhamphus xanthopterus	0.57	0	0
Pseudosphromenus cupanus	1.14	0	0.53
Aplocheilus lineatus	0.57	1.38	0.53
Parambassis thomassi	0	0	0.53
Gerres filamentosus	0.57	1.38	0
Heteropneustes fossilis	3.41	3.67	2.12
Anguilla bicolor bicolor	4.55	1.38	3.17
Chanos chanos	3.41	2.75	6.35
Etroplus suratensis	6.82	1.83	3.17
Mystus vittatus	4.55	1.38	3.17
Terapon jarbua	3.98	2.75	5.29

Table 4. Biodiversity indices fish species in Munroe Island

Biodiversity index	Pattathuruthu	Palliyanthuruthu	Pezhumthuruthu
Berger-Parker index	6.77	4.95	6.10
Margalef index	3.29	3.16	3.43
Simpson indexë	0.09	0.12	0.09
Simpson index (D)	0.91	0.88	0.91
Simpson index (Dr)	10.95	8.63	10.77
Shannon index	2.50	2.39	2.53
Pielou index	0.87	0.83	0.86

Fish diversity

The assessment of fish diversity is crucial for understanding the ecological health and functioning of aquatic ecosystems. Fishes, as key species within these ecosystems, serve as indicators of environmental quality and are integral to ecosystem stability (Ehrlich and Wilson 1991). The present study documented 23 fish species belonging to 18 families in Munroe Island, highlighting the rich ichthyofaunal diversity of the region. This finding aligns with previous studies on nearby water bodies, such as Vattakkayal (Seethal et al. 2013) and Kadavu lake (Sahib 2017), which reported 22 and 19 species, respectively. This collective data underscores the significance of these estuarine ecosystems for sustaining a diverse fish fauna. The observed

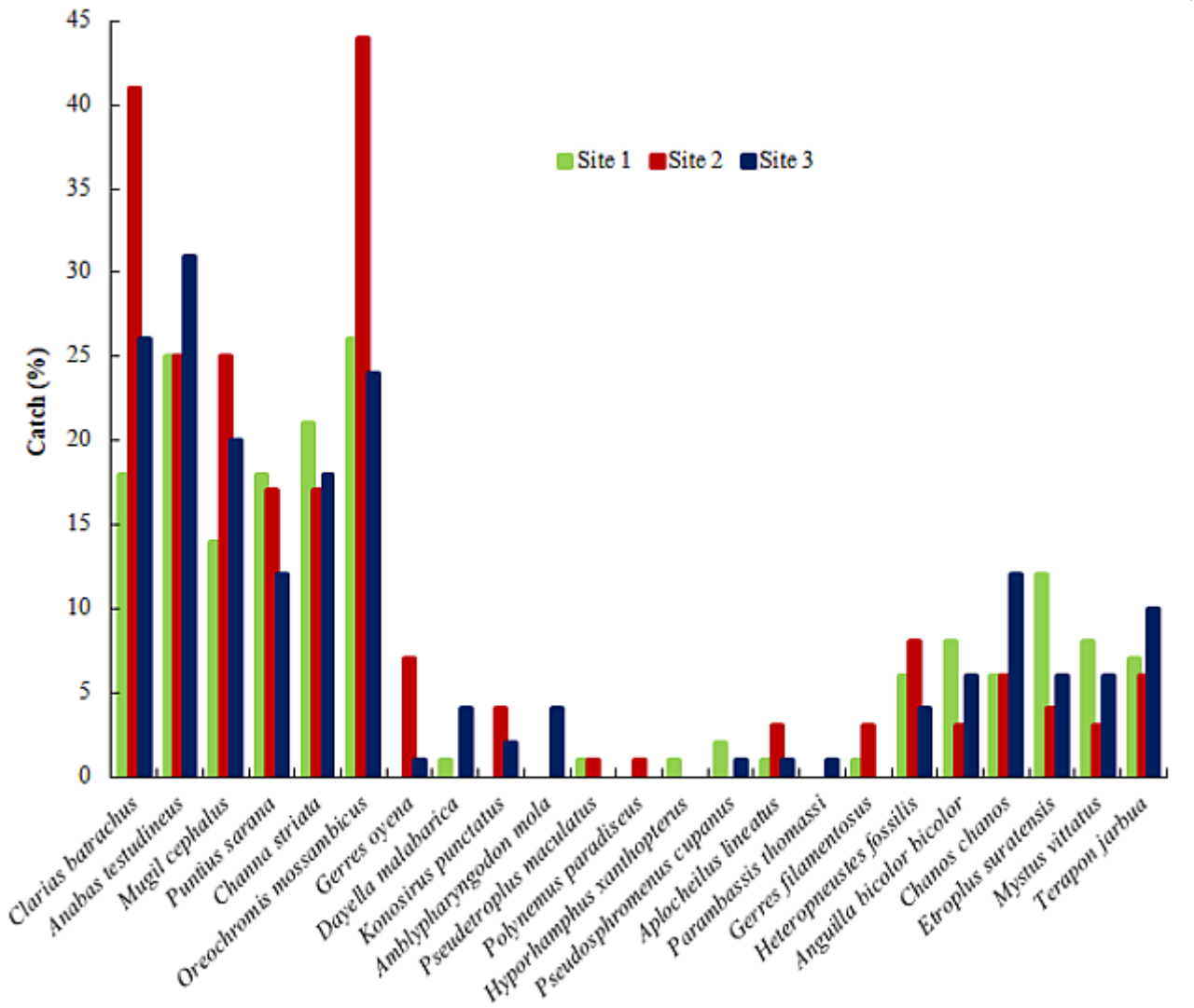

Figure 2. Family wise icthyofaunal diversity in Munro Island

diversity can be attributed to several factors, including the unique ecological conditions of these water bodies. Estuaries, like Munroe Island, experience a salinity gradient due to the mixing of freshwater and seawater. This creates a variety of habitats suitable for various fish species with specific salinity tolerances.

The presence of diverse fish species, as documented in this study, highlights the ecological significance and productivity of Munroe Island's aquatic habitats (Bijukumar 2000). The recorded species richness, encompassing representatives from various taxonomic groups, reflects the island's diverse aquatic environments and the connectivity of its water bodies with the surrounding ecosystems (Raghavan et al. 2008). The assessment of fish diversity is essential for understanding the ecological health and functioning of aquatic ecosystems (Pielou 1969). Fishes serve as key indicators of environmental quality and are integral to ecosystem stability (Moyle 1992). The present study indicates a diverse fish community in the region, accentuating the importance of conserving these habitats to maintain biodiversity.

This study revealed a diverse fish fauna in Monroe Island, with a majority (19 species) categorized as Least Concern by the IUCN. However, the presence of three Vulnerable species and one Near Threatened species highlights the need for conservation measures to ensure the long-term persistence of these populations. Studies by Raghavan et al. (2008), Radhakrishnan and Kurup (2010), and Ali et al. (2011) reported Critically Endangered, Vulnerable, and Near Threatened fish species in nearby water

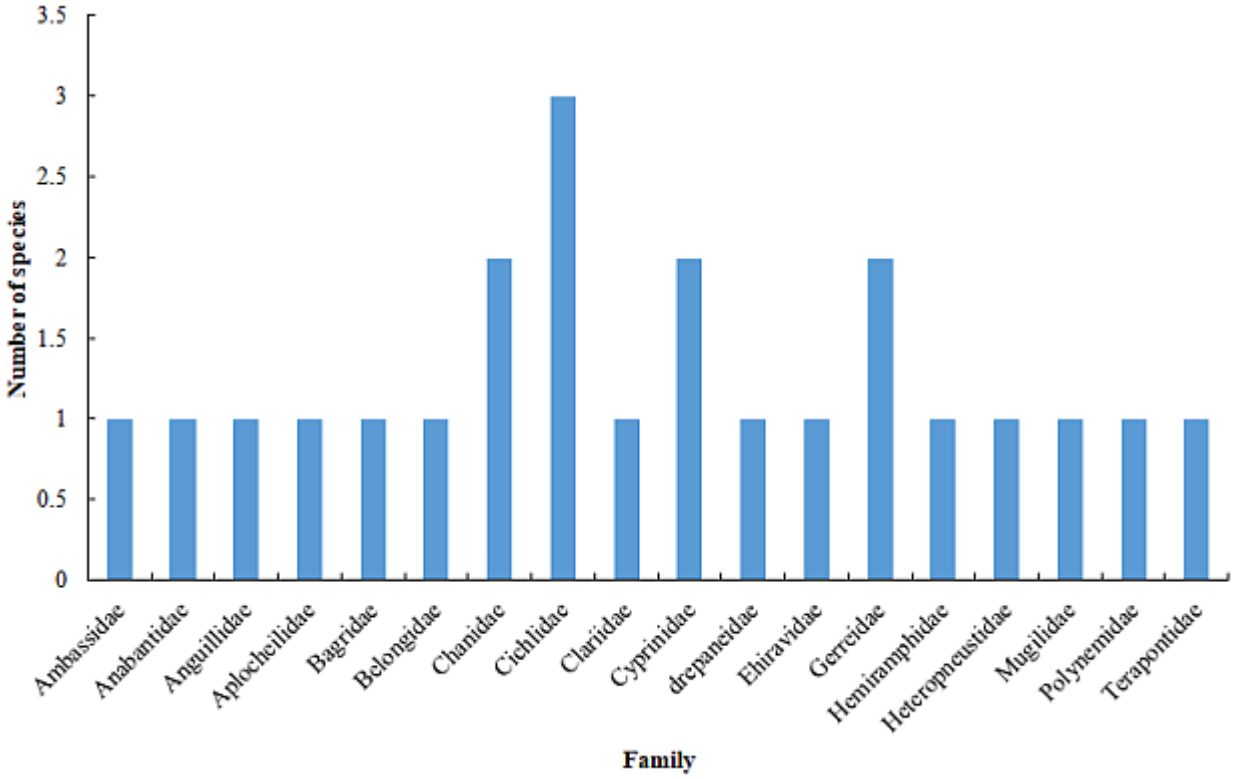

Figure 3. Site wise ichthyofaunal diversity in Munro Island

bodies like the Chalakkudi River and Periyar Tiger Reserve. These findings suggest potential discrepancies between IUCN Red List statuses and the actual vulnerability of fish populations within these specific ecosystems.

The observed fish diversity in the present study features the urgency of addressing pollution and habitat degradation in the region. Similar issues have been addressed in prior research endeavors conducted within the freshwater ecosystems of Kerala (Kurup 1994, Easa and Shaji 1995, Radhakrishnan and Kurup 2010, Ali et al. 2011, Sen Gupta 2022).

Water quality assessment

The physico-chemical parameters of water quality play a crucial role in shaping the ecological dynamics of aquatic ecosystems. Temperature, pH, dissolved oxygen, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and various ions such as chloride, sulphate, and nitrate serve as important indicators of water quality (Kataria et al. 1996, Divya et al. 2011, Arya et al. 2022). In this study, the analysis of water samples from the 10 sites of Munroe Island revealed several key findings regarding water quality parameters. Changes in temperature can influence different facets of water chemistry and biological functions, ultimately altering the movement and behavior of aquatic organisms. The average temperature of 28.28±0.07°C indicates warm aquatic conditions. This parameter is crucial as it influences metabolic rates, reproduction, and habitat preferences of aquatic organisms. Temperature fluctuations can impact various aspects of water chemistry and biological processes, affecting the distribution and behavior of aquatic organisms (Mohan and Ignatius 2016).

The pH value of 7.98±0.02 suggests slightly alkaline conditions within the lake. pH plays a vital role in regulating biochemical processes and affects the solubility of various chemical compounds, thereby influencing the overall health of aquatic ecosystems. The pH value falls within the acceptable range prescribed by WHO standards, indicating neutral to slightly alkaline conditions (Zhi et al. 2021). However, acidic pH levels can adversely affect aquatic organisms and alter ecosystem dynamics.

With a mean turbidity of 5.53±0.02 NTU, the water in the Munroe island exhibits moderate clarity.

Table 5. Water quality parameters (Physico-chemical parameters)

Parameter	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	ALL
Temperature (^{0}C)	27.98±0.11	28.94±0.09	27.83±0.08	28.5±0.07	29.04±0.1	29.14±0.09	27.65±0.09	27.45±0.09	28.05±0.09	28.2±0.13	28.28±0.07
pH	7.92±0.04	8.14±0.03	7.84±0.03	8.05±0.02	8.2±0.05	8.24±0.04	7.84±0.04	7.76±0.04	7.91±0.04	7.94±0.05	7.98±0.02
Turbidity (NTU)	5.53±0.02	5.75±0.02	5.54±0.03	5.66±0.02	5.78±0.04	5.81±0.04	5.53±0.02	5.46±0.03	5.55±0.03	5.58±0.05	5.62±0.02
TDS (g/L)	26.55±0.12	27.55±0.09	26.59±0.13	27.21±0.09	27.78±0.18	27.96±0.18	26.59±0.12	26.28±0.17	26.71±0.14	26.84±0.25	27.01±0.08
EC (mΩ)	47.68±0.22	49.55±0.17	47.84±0.24	48.96±0.16	49.98±0.33	50.31±0.32	47.85±0.22	47.29±0.3	48.08±0.25	48.3±0.45	48.58±0.14
Alkalinity (mg/L)	4.03±0.02	4.15±0.02	4.04±0.03	4.16±0.02	4.28±0.04	4.31±0.04	4.09±0.03	4.03±0.04	4.11±0.04	4.14±0.05	4.13±0.01
Total hardness (mg/L)	4093.43 ±25.43	4227.95 ±19.26	4076.08 ±26.57	4202.3 ±18.48	4315.89 ±36.95	4353.76 ±35.37	4126.61 ±29.79	4063.49 ±41.58	4151.867 ±35.3	4177.11 ±53.77	4178.85 ±14.54
Chloride (as Cl) (mg/L)	13680.68 ±84.98	14130.4 ±64.37	13622.8 ±88.81	14044.7 ±61.78	14424.35 ±123.49	14550.95 ±118.22	13791.78 ±99.57	13580.78 ±139	13876.18 ±118.23	13960.58 ±179.72	13966.32 ±48.6
Nitrate (as NO^{3}-) (mg/L)	2.92±0.02	3.05±0.02	2.94±0.03	3.04±0.03	3.11±0.03	3.15±0.03	3.03±0.03	2.96±0.03	3.05±0.03	3.08±0.05	3.03±0.01
Sulphate (as SO_4) (mg/L)	259.15±2.02	271.85±1.68	261.84±2.34	270.74±2.34	277.41±2.63	280.75±2.38	269.63±2.79	264.06±2.88	271.85±2.38	274.08±4.68	270.14±1.09
DO (mg/L)	4.21±0.02	4.35±0.02	4.24±0.03	4.34±0.03	4.41±0.03	4.45±0.03	4.3±0.04	4.24±0.03	4.33±0.03	4.35±0.06	4.32±0.01
BOD (mg/L)	7.43±0.05	7.7±0.04	7.38±0.05	7.58±0.05	7.73±0.06	7.8±0.05	7.53±0.07	7.4±0.06	7.58±0.06	7.63±0.11	7.57±0.02
COD (mg/L)	18.36±0.11	18.95±0.09	18.29±0.13	18.79±0.13	19.16±0.15	19.35±0.13	18.68±0.18	18.36±0.16	18.8±0.14	18.93±0.27	18.77±0.06

Turbidity impacts light penetration, which in turn affects photosynthesis, primary productivity, and habitat quality for aquatic organisms. The recorded TDS of 27.01±0.08 mg/L and EC of 48.58±0.14 mΩ reflect the concentration of dissolved ions in the water. High TDS and EC levels can indicate pollution (Neilson et al. 2003) and salinity issues, potentially impacting aquatic life and water quality. The alkalinity (4.13±0.01 mg/L) and total hardness (4178.85±14.54 mg/L) values provide insights into the buffering capacity and mineral content of the water. These parameters influence pH stability, nutrient availability, and the health of aquatic organisms. The measured parameters, including pH, turbidity, dissolved oxygen, and nutrient concentrations, offer insights into the overall health and ecological condition of the water body (Shahnawaz 2010). Elevated chloride (13966.32±48.6 mg/L), nitrate (3.03±0.01 mg/L), and sulphate (270.14±1.09 mg/L) levels may indicate anthropogenic inputs such as urban runoff and agricultural activities. Excessive nutrient concentrations can lead to eutrophication, algal blooms, and oxygen depletion, posing risks to aquatic biodiversity.

The Dissolved Oxygen level (4.32±0.01 mg/L) is essential for supporting aerobic life forms. However, elevated BOD (7.57±0.02 mg/L) and COD (18.77±0.06 mg/L) values indicate organic pollution and the presence of biodegradable substances. Low dissolved oxygen levels can lead to hypoxic conditions, negatively impacting fish health and biodiversity (Nürnberg 1995). Similarly, high BOD and COD values indicate the presence of organic pollution, highlighting potential sources of contamination and the need for remedial measures (Kataria et al. 1996). These observations suggest potential anthropogenic influences and point towards the need for effective management strategies to mitigate pollution and preserve water quality (Rahman et al. 1992, Neilson et al. 2003). Overall, the water quality parameters emphasis the intricate relationship between water quality and the ecological health of the Munroe island ecosystem. The observed variations in water quality parameters across different sampling sites highlight spatial heterogeneity and the influence of local environmental factors (Suji et al. 2018). Understanding these factors is crucial for

implementing effective management strategies to conserve and restore aquatic biodiversity in Munroe Island.

CONCLUSIONS

The comprehensive assessment of fish diversity and water quality in the Munroe Island of Kollam District, Kerala, has provided valuable insights into the ecological health of the aquatic ecosystems in this area. The findings of this study features the intricate relationship between fish diversity and water quality parameters, highlighting the importance of maintaining pristine freshwater habitats for sustaining biodiversity and ecosystem integrity. The ichthyofaunal survey revealed the presence of a diverse array of fish species, indicating the richness of aquatic biodiversity in the region. However, the assessment of threat status using IUCN criteria revealed that several species are vulnerable to anthropogenic pressures, emphasizing the urgent need for conservation measures to protect these valuable aquatic resources. The analysis of physico-chemical parameters of water quality identified various factors influencing the ecological dynamics of the studied water bodies. Temperature fluctuations, pH levels, dissolved oxygen concentrations, and levels of organic pollutants such as BOD and COD were found to impact the health and viability of aquatic ecosystems. Additionally, the presence of ions such as chloride, sulphate, and nitrate highlighted potential sources of contamination and pollution in the region. In conclusion, the findings of this study underline the importance of integrated approaches to conservation and management in Munroe Island's aquatic ecosystems.

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