TAXONOMIC CHECK LIST OF ICHTHYOFAUNAL DIVERSITY IN GOSTHANI RIVER AT TAGARAPUVALASA, VISAKHAPATNAM, ANDHRA PRADESH, INDIA

ABSTRACT

The current study examined the taxonomy and assortment of fish species in the Gosthani River in Andhra Pradesh from April 2023 to March 2024. A total of 47 fish species were documented at the two landing sites of Gosthani River. The fish samples were carefully cleansed, and photos were taken on location. These fish were fixed in glass jars and kept in a 10% formalin solution. Following that, the samples were identified up to the species level using classical taxonomic techniques.Order Cypriniformes was observed to have the highest contribution to the species diversity: 15.78% families, 38.23% genera, and 40.42% species, followed by Siluriformes (26.31% families, 17.64% genera, and 21.73% species); Beloiniformes (10.52% family, 5.88% genera, and 4.25% species); Cichliformes (1 family, 3 genera and 3 species); Perciformes and Synbranchiformes (1 family, 2 genera and 2 species); Anguilliformes (1 family, 1 genera and 2 species); Channiformes (5.26% family, 8.82% genera, and 6.38% species); Cyprinodontiformes, Gobiiformies, Osteoglossiformes, and Anabantiformes (5.26% family, 2.94% genera, and 2.12% species). The taxonomic trophic levels were found to have the largest percentage of omnivores have 46.81%, followed by carnivorous 34.04% and herbivorous 19.14%. The composition of taxa, population status, trophic levels, and IUCN status were reported in this research paper.

Key words: Ichthyofauna, Population status, Trophic level,Herbivorous, Omnivorous, Carnivorous, IUCN

INTRODUCTION

The Gosthani River is a medium-sized, east-flowing river in Andhra Pradesh, India. It originates in the Ananthagiri Hills of the Eastern Ghats and flows for 120 kilometers acrossThatipudi reservoir before entering the Bay of Bengal at Bheemunipatnam to form an estuary. The Gosthani River is a minor river basin with a total drainage area of less than 2000 km^2. The depth of the river's deepest point varies by location and 1.5-2 meters in the river's middle part. The Vizianagram and Vishakhapatnam districts rely heavily on the Gosthani River for drinking water. The water from this River has been diverted for commercial and agricultural use. Riverine fisheries are a sort of inland fishing where fish are caught straight from river systems using scientifically designed gear. India has vast riverine fisheries resources due to the presence of several fertile riverine systems.

According to Kar et al., (2003), the Indian subcontinent has around 2500 fish species, 930 of which are freshwater and 1570 of which are marine. There are 801 freshwater fishes present (Fish base 2004). Ichthyofaunal diversity refers to the diversity of fish species that exist depending on context and magnitude; it can relate to alleles or genotypes within life forms within a fish community as well as species or life forms that exist throughout aquaculture environments (Burton et al., 1992). There are approximately 21,723 extant fish species in the world, including 8,411 freshwater species and 11,650 marine forms. India is one of the world's mega-biodiversity countries, ranking ninth in

terms of freshwater mega-biodiversity (Mittermeier &Mitemeir, 1997). Biodiversity is the degree of variation of living forms within a particular ecosystem; biodiversity is necessary for ecological stabilization, conservation of overall environmental quality, and comprehending the inherent worth of all species on the planet, as expressed by Ehrlich et al., (1991). Traditional fishers in Gosthani river and surrounding regions, fisher families from Scheduled and Backward Castes, have fishing rights in these bodies of water, which have been recognized by the Panchayats or Fisheries Department as Fishermen Cooperative Societies. The current study provides the most recent database of fish species and is the first documentation of fish fauna in Gosthani River.

MATERIAL AND METHODS

The fish samples werecollected out fortnightly from April, 2023 to March 2024 fom three landing stations (Thagarapuvalasa (17.937486N, 83.420869E). Padmanabham (17.966390N, 83.355637E) Fig 1& 2. Representative species collected carefully with the help of local fishermen by using different types of gears and baskets traps (Rama Rao 2014). In the laboratory, the samples were washed thoroughly and images were captured. These fish were fixed in glass jars before being preserved in a 10% formalin solution. Following that, the samples were recognized up to the species level using classical taxonomic methods such as morphometric features, meristic counts, and descriptive characters. Fish species identification was validated using guidelines produced by Day (1958), Talwar and Jhingran (1991), Jayaram (1999. 2011), Menon 1999, and Munro 2000).

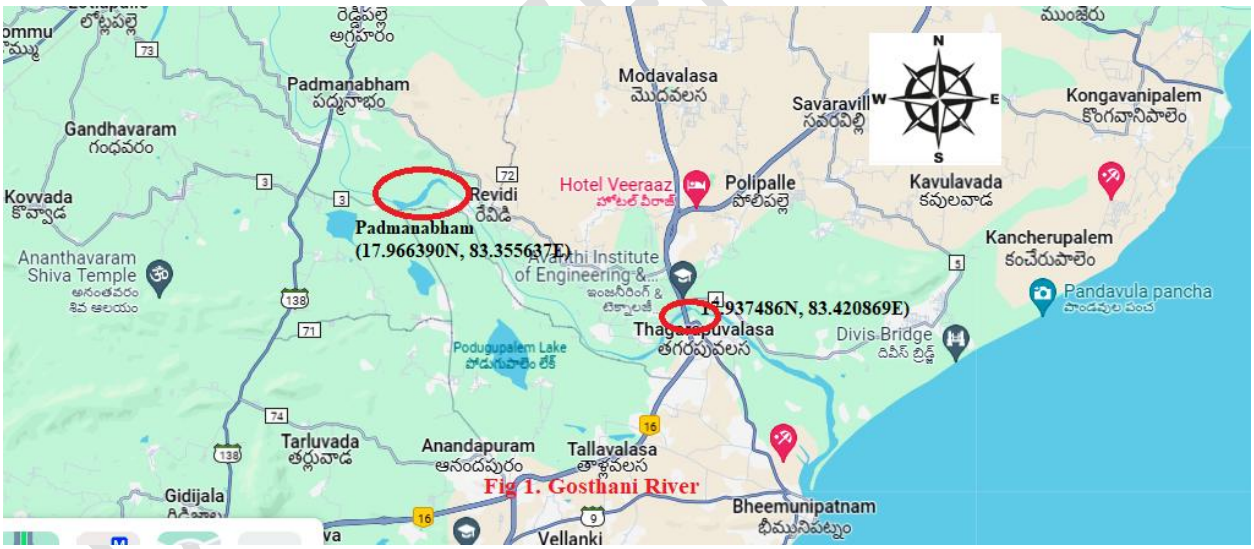


Fig 1. Gosthani River

Fig 1. Gosthani River

Fig 2.Gosthani River at Tagarapuvalasa and Padmanabham

RESULTS & DISCUSSIONS

The current study assessed the taxa and diversity of fish species in the Gosthani River in Andhra Pradesh from April, 2023 to March 2024. A total of 47 fish species were documented in the two selected landing stations. An updated, comprehensive checklist of finfish with their current scientific names, trophic level, fishery status, and IUCN status was prepared after verification with published literature and web-based information such as Froese and Pauly, 2020, (FishBase), Eschmeyer 2023 (Catalog of Fishes) (Table 1). According to CIFE (2011), there are 64 fish species in the Godavari River in Maharashtra, belonging to 15 distinct families and 38 genera, from Gangapur Dam to Raher. Chinnababu et al., (2021) reported a total of 50 fish species from the selected locations of the Godavari river at Rajamahendravaram, which was significantly fewer than the current documented species.

In the present study, a total of 47 finfish species belonging to 11 orders, 19 families and 34 genera were recorded from Gosthani River. Among the 11 orders, the order Cypriniformes was observed to have the highest contribution to the species diversity (15.78% families, 38.23% genera and 40.42% species), followed by Siluriformes (26.31% families, 17.64% genera and 21.73% species); Beloiniformes(10.52% family, 5.88% genera and 4.25% species); Cichliformes (1 family, 3 genera and 3 species), Perciformes and Synbranchiformes (1 family, 2 genera and 2 species); Anguilliformes (1 family, 1 genera and 2 species); Channiformes(5.26% family, 8.82% genera and 6.38% species); Cyprinodontiformes,Gobiiformies, Osteoglossiformes, and Anabantiformes(5.26% family, 2.94% genera and 2.12% species) Table 2; Fig 3. Chandra Sekhara Rao et al., (2014) identified 66 fish species from 9 orders, 22 families, and 38 genera. Order Cypriniformes had the most dominant group with 26 species, followed by Siluriformes and Mugiliformes each with 11 species, Perciformes with 7 species, Anguilliformes, Cyprinodontiformes, and Mastacembeliformes each with 3 species, and Osteoglossiformes and Elopiformes each with 1 species. Rama Rao (2014b) reported at Lower Manair Dam at Karimnagar Dt

The taxonomic trophic levels in the present study was classified into herbivorous (2.0-2.5), omnivore (2.5-3.5), and carnivorous (3.5-4.5) based on their trophic level. The omnivores have a highest percentage of 22 (46.81%), followed by the carnivorous 16 (34.04%), and the herbivorous 09 (19.14%) (Tab. 3, Fig. 4). A similar study was observed by Rama Rao (2023) reported the highest number of omnivores (51.02%, followed by carnivores (26.53% and herbivores (18.36%) in Gotta Barrage at Hiramandalam. The trophic level community structure of recorded fish species

demonstrated the dominance of top-level carnivores (39%), followed by mid-level carnivores (28%), predators (17%), omnivores (14%), and herbivores or planktivores (2%), according to Haojie Su (2021). The majority of the finfish species identified as omnivorous throughout this study.In the present investigation the number and percentage composition of Population Status was 25 species were common which contributed to 53.19%, followed by 11 species were abundant which contributed to 23.40%, 7 species were abundant which contributed to 14.89% and 04 species are moderate which contributed to 08.51% in the total taxa (Table 4, Fig. 5). Rama Rao (2023)the similar results were reported to 25 species were common which contributed to 51.02%, 12 species were abundant which contributed to 24.48%, 7 species are moderate which contributed to 14.28% and 5 species were moderate which contributed to 10.20% in the total catch at Gotta Barrage. Rama Rao (2014b) represented the number and percentage composition of Population Status is 19 species were abundant contributed to 29.69%, 21 species common (32.81%), 14 species moderate (21.86%) and 10 species rare (15.63%) in the total catch at Lower Manair Dam,

According to IUCN status 39 species contributed to 82.97% are least concern (LC), six species contributed to 12.76% are near threaten (NT), one species were not evaluated (NE) and data deficient (DD) with 2.12%, Table 4, Fig 6. The similar study was reported by Priyanka et al., (2021) represents the IUCN red list categories, 52.5% of the species are least concern, 20% are not evaluated, 10% are near threatened, 5 % are data deficient, 5% are lower risk near threatened and vulnerable, and2.5% are lower risk least concern (Rama Rao and Vinod Kumar, 2017). RamaRao andRamachandra Rao (2021) observed the Ichthyofaunal diversity at Narayanapuram Anicut at Nagavali River.Further species diversity was found to be the highest during Monsoon season compared to other seasons. Rama Rao (2018) reported more Least concerned fish species at KalingaDalreservoir.Rama Rao (2014b) identified 51 species (79.69%) are least concern (LC), 3 species (4.69%) are not evaluated (NT), 4 species (6.25%) are data (EN), vulnerable (VU) and not evaluated (NE) in Lower Manair Dam at Karimnagar Dt. In the present study the ichthyofauna species percentage contribution was nearly similar and *Labeorohita and Catlacatla* are found to be dominant species in total catch in the sampling stations.

Table: 1. Taxa of fishes and their order, family, genus, species, population status and IUCN status at Gosthani River

No.	Order / Family	Scientific Name	Trophic level	Population Status	IUCN Status
1	Anguilliformes/ Anguillidae	*Anguilla bengalensis*	3.8	R	NT
2	Anguilliformes/ Anguillidae	*Anguilla bicolor*	3.6	R	NT
3	Beloiniformes/ Belonidae	*Xenentodoncancila*	3.9	R	DD
4	Beloiniformes/ Hemiramphidae	*Hyporhamphuslimbatus*	3.1	R	LC
5	Cypriniformes/ Cyprinidae	*Cirrhinusmrigala*	2.4	A	LC
6*	Cypriniformes/ Cyprinidae	*Ctenopharyngodonidella*	2.0	M	LC
7*	Cypriniformes/ Cyprinidae	*Hypopthalmicthys molitrix*	2.0	R	NT
8	Cypriniformes/ Cyprinidae	*Labeocatla*	2.8	A	LC
9	Cypriniformes/ Cyprinidae	*Labeocalbasu*	2.0	C	LC

10	Cypriniformes/ Cyprinidae	*Labeorohita*	2.2	A	LC
11	Cypriniformes/ Cyprinidae	*Osteobramacotio*	2.9	C	LC
12	Cypriniformes/ Cyprinidae	*Puntius chola*	2.5	A	LC
13	Cypriniformes/ Cyprinidae	*Puntius ticto*	2.2	A	LC
14	Cypriniformes/ Cyprinidae	*Puntius sophore*	2.6	A	LC
15	Cypriniformes/ Cyprinidae	*Systomussarana*	2.9	C	LC
16	Cypriniformes/ Cyprinidae	*Garragotyla*	2.0	R	LC
17	Cypriniformes/ Danionidae	*Amblypharyngodonmicro lepis*	3.3	A	LC
18	Cypriniformes/ Danionidae	*Amblypharyngodon mola*	3.3	A	LC
19	Cypriniformes/ Danionida	*Salmostomabacaila*	3.2	C	LC
20	Cypriniformes/ Danionida	*Salmostomaphulo*	3.2	C	LC
21	Cypriniformes/ Danionida	*Rasbora daniconius*	3.1	C	LC
22	Cypriniformes/ Danionidae	*Danio devario*	3.0	C	LC
23	Cypriniformes / Cobitidae	*Lepidocephalichthysgunt ea*	2.7	M	LC
24	Cyprinodontiformes/ Aplocheiidae	*Aplocheilus panchax*	3.8	C	LC
25	Channiformes/ Channidae	*Channa orienalis*	3.8	C	NE
26	Channiformes/ Channidae	*Channa panctata*	3.8	A	LC
27	Channiformes/ Channidae	*Channa striatus*	3.6	C	LC
28	Gobiiformies/ Gobiidae	*Glossogobiusgiuris*	3.7	C	LC
29	Osteoglossiformes/ Notopteridae	*Notopterusnotopterus*	3.5	C	LC
30	Siluriformes/ Bagridae	*Mystusbleekeri*	3.3	C	LC
31	Siluriformes/ Bagridae	*Mystuscavasius*	3.4	C	LC
32	Siluriformes/ Bagridae	*Mystusgulio*	4.0	R	LC
33	Siluriformes/ Bagridae	*Mystustengara*	3.2	A	LC
34	Siluriformes/ Bagridae	*Mystusvittatus*	3.1	A	LC
35	Siluriformes/ Claridae	*Clarias batrachus*	3.4	C	LC
36	Siluriformes/ Heteropneustidae	*Heteropneustesfossilis*	3.6	C	LC
37	Siluriformes/ Siluridae	*Ompokbimaculatus*	3.9	C	NT
38	Siluriformes/ Siluridae	*Wallago attu*	3.7	C	NT
39	Siluriformes/ Schibeidae	*Eutropiichthysvacha*	3.9	C	LC
40*	Anabantiformes /Anabantidae	*Anabas testudineus*	3.0	M	LC
41	Cichliformes / Cichlidae	*Oreochromis mossambicus*	2.2	M	NT
42	Cichliformes/ Cichlidae	*Pseudetroplus maculates*	2.7	C	LC
43	Cichliformes/ Cichlidae	*Etroplussuratensis*	2.9	C	LC
44	Synbranchiformes / Mastacembelidae	*Mastacembelusarmatus*	2.8	C	LC
45	Synbranchiformes / Mastacembelidae	*Macrognathuspancalus*	3.5	C	LC
46	Perciformes /Ambassidae	*Chanda nama*	3.9	C	LC
47	Perciformes /Ambassidae	*Parambassisranga*	3.6	C	LC

A= Abundant (76-100%); C = Common (51-75%); M = Moderate (26-50%); R = Rare (1-25%) of the total catch.

EN- Endangered; VU- Vulnerable: LC- Least concern; DD- Data deficient; NE- Not evaluated, NT: Near threaten.

*Exotic fishes No.s: 4, 5 and 37

Table: 2. Number and percent composition of families, genera and species of fishes under various orders

S.No	Orders	% of families in an order	% of genera in an order	% of species in an order
1	Anguilliformes	5.26	2.94	4.25
	Beloiniformes	10.52	5.88	4.25
2	Cypriniformies	15.78	38.23	40.42
3	Cyprinodontiformes	5.26	2.94	2.12
4	Channiformes	5.26	2.94	6.38
5	Gobiiformies	5.26	2.94	2.12
6	Osteoglossiformes	5.26	2.94	2.12
7	Siluriformes	26.31	17.64	21.73
8	Anabantiformes	5.26	2.94	2.12
9	Cichliformes	5.26	8.82	6.38
10	Synbranchiformes	5.26	5.88	4.25
11	Perciformes	5.26	5.88	4.25

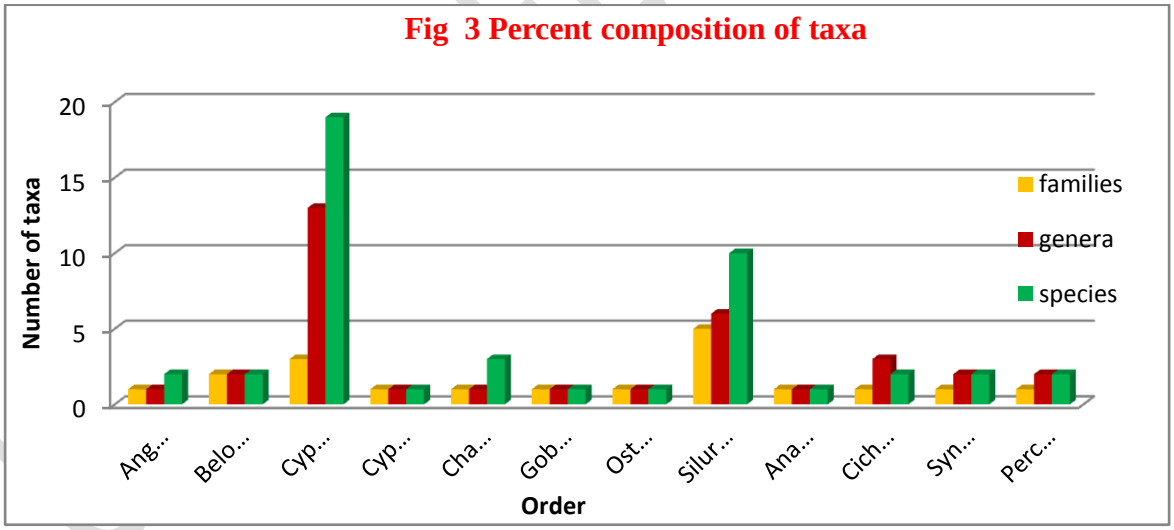
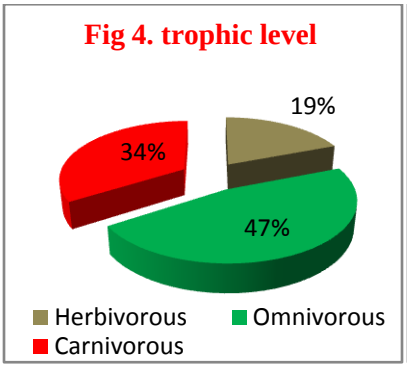


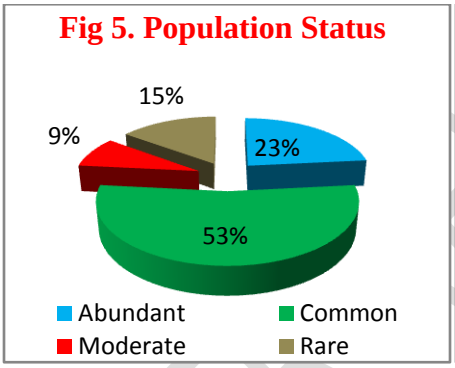
Table: 3. Taxonomic trophic level of fish species at Gosthani River

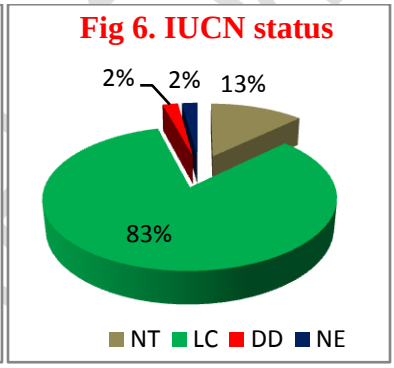
Trophic level	Herbivorous (2.0–2.5)	Omnivorous (2.6–3.5)	Carnivorous (3.6–4.50
Number of species	09	22	16
% Composition	19.14	46.81	34.04

Table: 4. Taxonomic composition of population status and IUCN (2024)

Population Status	**Abundant (76-100%)**	**Common (51-75%)**	**Moderate (26-50%)**	**Rare (1-25%)**
Number of species	11	25	4	7
% Composition	23.40	53.19	8.51	14.89
IUCN (2024)	**NT**	**LC**	**DD**	**NE**
No. of species	06	39	01	01
% contribution	12.76	82.97	2.12	2.12







Ethical approval

This study was conducted according to international ethical standards set by the Institutional Plant care and Use Committee

Consent to participate

Not applicable as commercial gear operating reservoir, the local men and women were involved in the sampling study.

Data availability statement

The authors confirm that the data used to support the findings of this study are available within the manuscript.

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