

Unveiling the Complexity of Fish Diversity in River Aami

Arpita Singh and Ajay Singh

Department of Zoology, D.D.U. Gorakhpur University, Gorakhpur-273009 (U.P.)

Abstract

The goal of the current study was to evaluate River Aami's ichthyofaunal richness. The current conclusion, when compared to previous data, shows that the Aami River's indigenous fish fauna has declined with time, possibly as a result of riverine natural habitat degradation and fractures brought on by a variety of environmental anthropogenic human-caused actions. Fishery resources in the Aami River are declining primarily due to environmental changes in the natural water flow pattern of rivers and hydrological features, including irresponsible fishing methods and other natural disasters. It can be concluded that the creation of a zone-by-zone database of this information and its implementation through governmental and non-governmental organizations would be the primary tools for the conservation of freshwater fish biodiversity as overfishing, industrial, chemical, agricultural runoff, and other types of pollution are the most significant factors that should be limited for the preservation of freshwater fish diversity.

Keywords

Fish diversity, Industrial effluents, Aami River, Past Present Status.

I. INTRODUCTION

For the quantity of living things, especially fish, freshwater bodies are one of the most important resources. mainly rivers. Rivers make up the majority of the freshwater ecosystem discusses the variety of fauna and its makeup (Kumar et al, 2020). Almost half of all vertebrates in the world are fish. The diversity of ichthyofauna found in India's fresh and marine waters makes up around 9.7% of the approximately 33,059 species of fish that are known to exist worldwide (Eschmeyer and Fong, 2014). Native freshwater fish are frequently a staple food for villagers that reside close to freshwater bodies. "Indigenous" denotes that it originated in and is a feature of a specific country, region, or native territory. The native freshwater fishes can be divided into two major categories. Fishes that reach the size of 25–30 cm in the mature or adult stage of their life cycle are classified as small indigenous fish (SIF). The second group is the larger one, reaching a size of over 25 to 30 cm when they reach the mature or adult stage of their life cycle. Rivers and tributaries, floodplains, ponds, tanks, lakes, beels, streams, lowland regions, wetlands, and paddy fields are the native habitats of both freshwater fish species. In favorable conditions, native fish may breed and grow quickly, even in adverse environmental conditions. These species provide an important source of micronutrients like calcium, zinc, iron, and fatty acids in addition to providing the rural poor with essential protein (Roos et al., 2007; Halwart 2008). Studies have demonstrated that calcium from small native freshwater fish species has a bioavailability comparable to that of calcium from cow's milk. With its enormous potential for aquatic bioresources, Uttar Pradesh provides a significant opportunity for the development of inland fisheries and aquaculture. According to Lakra (2010), the state provides resources in the form of 28,500 km of rivers and canals, 1.38 lakh ha of reservoirs, 1.61 lakh ha of ponds and tanks, 1.33 lakh ha of floodplain lakes, and abandoned water. The state also supplies roughly 14.68% of the nation's total fish diversity.

II. MATERIAL AND METHODS

As part of an evaluation of the shifting riparian habitats in the Aami River system, the goal of this study was to determine the current state of fish variety and fishing activity. The study's methodology was founded on field studies, analysis of fish catches, and a social assessment of the traditional fishing settlements all along the Aami River. Local fishermen assisted with the fishing, which was done with hooks and lines and gill nets, cast nets, drag nets, and scoop nets (Bose et al., 2013). The study concentrated on the socioeconomic standing of the fishing communities, ecological changes in the riparian system, risks to fish habitats, and the current state of fish variety. The fieldwork was conducted between January 2024 and July 2024. In 19 villages where traditional fishing communities are still actively involved in fishing, a survey of 40 fishermen was undertaken.

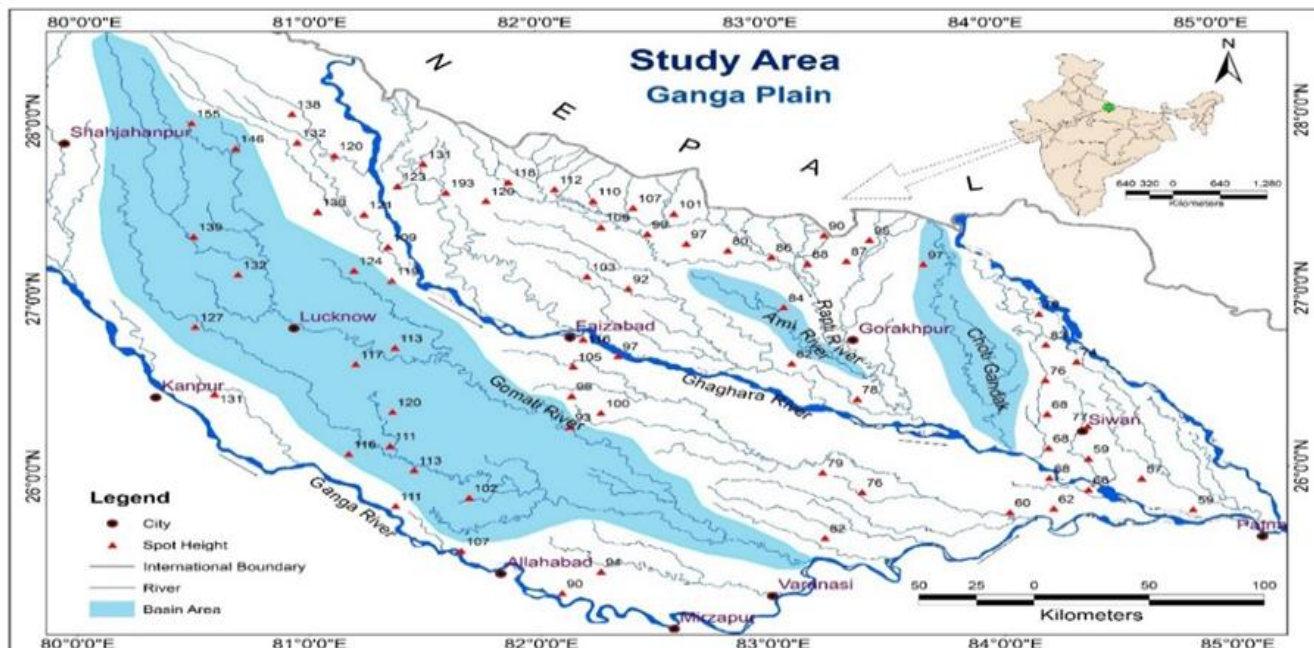


Figure 1: Study Area (Aami River)

The Ghaghara and Rapti rivers intersect in the middle Ganga plain, which is where the Aami River basin is situated. Between latitudes 26° 29' N and 27° 09' N and longitudes 82° 03' to 83° 02' E, the basin is located. The river has a total length of 223 km and joins the Rapti River. In a NW-SE direction, the Aami River's basin is extended.

III. RESULT AND DISCUSSION

Table 1: Past and present status of fish species in Aami River (A: Abundant, C: Common, R: Rare)

Sr.no	Scientific name	Family	Local name	Past status			Present status		
				A	C	R	A	C	R
1.	<i>Bagarius bagarius</i>	Sisoridae	Gonch	+	-	-	-	+	-
2.	<i>Catla catla</i>	Cyprinidae	Bhukur	-	+	-	+	-	-
3.	<i>Chana punctatus</i>	Ophiocephalidae	Girai	-	+	-	-	+	-
4.	<i>Cirrhina mrigala</i>	Cyprinidae	Mrigal	-	+	-	-	+	-
5.	<i>Clarioides batrachus</i>	Clariidae	Mangur	-	+	-	-	+	-
6.	<i>Labeo calbasu</i>	Cyprinidae	Karonch	+	-	-	-	-	+
7.	<i>Puntius conchonus</i>	Cyprinidae	Kharoli	+	-	-	-	+	-
8.	<i>Labeo rohita</i>	Cyprinidae	Rohu	+	-	-	-	+	-
9.	<i>Mystus bleekeri</i>	Clariidae	Tengra	+	-	-	-	+	-
10.	<i>Wallago attu</i>	Siluridae	Padhani	-	-	+	-	+	-
11.	<i>Ompok bimaculatus</i>	Siluridae	Wanz	-	+	-	-	-	+
12.	<i>Gudusia chapra</i>	Clupeidae	Suhia	-	+	-	-	-	+
13.	<i>Amphipnoides</i>	Amphipnoidae	Cuchia	+	-	-	-	+	-
14.	<i>Chela atpar</i>	Cyprinidae	Chelhwa	-	+	-	-	-	+
15.	<i>Ambly phryngodonmola</i>	Cyprinidae	Dhawai	-	+	-	-	-	+
16.	<i>Heteropneustes fossilis</i>	Saccobranchidae	Singhi	-	+	-	-	+	-
17.	<i>Macroglyptothorax aculeatus</i>	Mastacembelidae	----	-	+	-	-	-	+
18.	<i>Chanda hama</i>	Centropomidae	Chanri	-	+	-	-	+	-

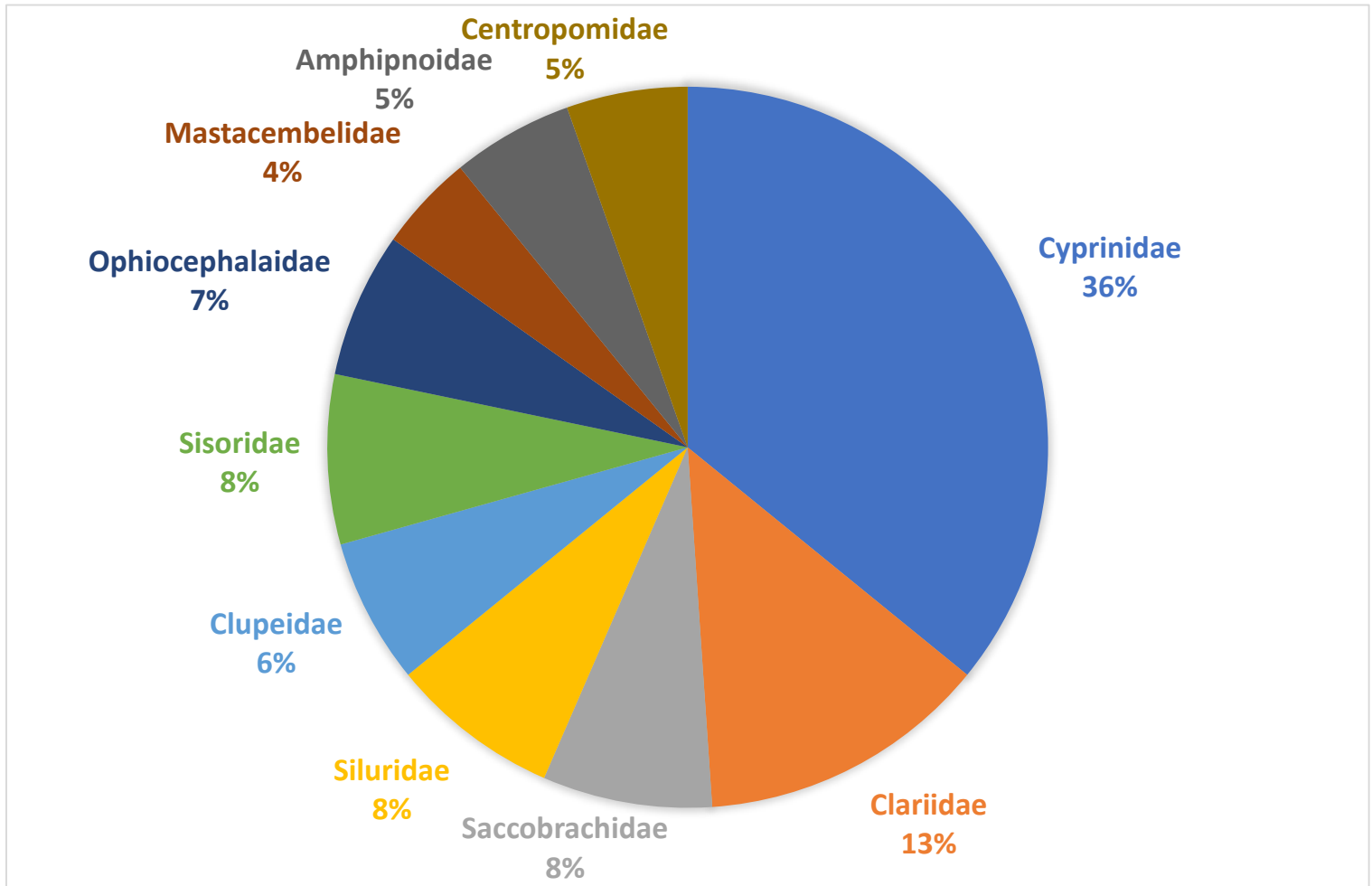


Figure 2: % occurrence of fish families (present scenario) in Aami River

In essence, the diversity and quantity of fish fauna in a river are represented by its fish biodiversity. A wide range of fish species are preserved by rivers, supporting commercial fisheries (Shinde et al, 2009). Fish variety in the research area is declining as water pollution levels rise, according to the study's findings. Eventually, native species' fish production declines due to the diminished fish diversity, leading to the extinction of many species. It shows a sharp drop in fish diversity in the Aami River's discharged (polluted) zone. With the growing human population, our growing reliance on aquatic fisheries resources, such as water, and the ongoing introduction of exotic species into natural water bodies, the loss of aquatic fish diversity is expected to worsen unless appropriate conservation measures are put in place. This study would be used as a tool to control water pollution at the Aami River and conserve the fish species in the Aami River.

Fish catches in the river have progressively decreased over the last fifteen years, according to the majority of fishermen. Fishermen's perceptions of the Aami River's fish diversity were ascertained using the significance test (Z test) of proportionality. The computed Z value was determined to be higher than the tabulated Z value at the 5% level of significance ($Z_{cal} 6.8 > Z_{tab} 1.96$) This suggests that over time, there has been a decline in fish variety. Fish quality and capture quantity have significantly declined among middle-aged (36–45 years old) fisherman (90%) who have been actively fishing over the past 20 years. With the increasing rate of pollution, the fish diversity is drastically declining. Places where the industrial effluents are dumped face extreme high BOD and anaerobic condition persists (Francis et.al,2006).

IV. CONCLUSION

Fish populations are being negatively impacted by the Aami River's riparian ecosystems and biodiversity, which are gradually declining. In the Aami River, riparian area reclamation is a significant issue. Significant challenges to the riparian ecology include pollution, population growth, agricultural development, and shifting land use practices. The socioeconomic standing of fishermen in this area is solely dependent on the variety and abundance of fish in the river system. As a result of the recent sharp decline in fish diversity and yield, many fishermen's families have abandoned fishing as their primary traditional source of income and turned to other sources. The findings from the present research work provides a real scenario of the fish diversity status in River Aami. There is an urgent need for the implementation of conservation strategies as soon as possible.

V. ACKNOWLEDGEMENT

Authors are thankful to The Higher Education Council U.P., Government of Uttar Pradesh, for its financial assistance throughout the experiment.

VI. REFERENCES

- [1] Bose, A.K., Jha, B. C., Suresh, V. R., Das, A. K., Parasar, A. and Ridhi. (2013) Fishes of the Middle Stretch of River Tawa, Madhya Pradesh, India. *J. Chem. Biol. Phys. Sci.*, 3, 706–716.
- [2] Eschmeyer W N and Fong J D (2014) Species by family/subfamily. Available from: <http://research.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp>
- [3] Francis O. Arimoro, Robert B, Ikomi and Efe C. Osalor, 2006. The Impact of Sawmill wood waste on the water quality and Fish community of Benin River, Niger Delta area, Nigeria, *World Journal of Zoology*, 1(2): 94-102.
- [4] Halwart, M., 2008. Biodiversity, nutrition and livelihoods in aquatic rice – based ecosystems. *Biodiversity: Journal of Life on Earth*, 9: 36-40.
- [5] Kumar D, Maurya A K, Prasad L, Singh C P, Radhakrishnan K V and Somasekara S R (2020) Fish biodiversity and its diversity indices in the Himalayan River Ghaghara at Northern India. *J. Entomol. Zool. Stud.* 8(6), 1559-1564.
- [6] Lakra, W. S. (2010) Fish biodiversity of Uttar Pradesh: issues of livelihood security, threats and conservation. In: National Conference on Biodiversity, Development and Poverty Alleviation (May 22, 2010). Uttar Pradesh State Biodiversity Board, Lucknow, 40–45.
- [7] Roos et al., [2007a]. The role of fish in food – based strategies to combat vitamin A and mineral deficiencies in developing countries. *Journal of Nutrition*, 137, 1106-1109.
- [8] Shinde, S.E., T.S. Pathan, K.S. Raut, R.Y. Bhandare and D.I. Sonawane, 2009. Fish biodiversity of Pravara River at Pravara sangam Dist Ahmednagar (M.S) India, *World Journal of Zoology*, 4(3): 176-179.