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"DIVERSITY OF SOME MACROZOOBENTHOS OF SON RIVER SIDHI (M.P)"

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ABSTRACT :

The Son River, located in Sidhi district, Madhya Pradesh, serves as a critical aquatic ecosystem supporting diverse macrozoobenthic communities. Understanding the composition and distribution of these organisms is fundamental for assessing the ecological health of the river and informing conservation efforts. This study aimed to characterize the diversity of macrozoobenthos in the Son River and identify key taxa present in the region. Sampling was conducted at multiple sites along the river, encompassing various habitats and environmental conditions. Macrozoobenthic samples were collected using standard techniques and identified to the lowest taxonomic level possible. Species richness, abundance, and diversity indices were calculated to assess community structure and composition.

KEY WORDS: *Son River, Sidhi, Macrozoobenthic and Diversity.*

INTRODUCTION

Studying the diversity of macrozoobenthos in a particular river is important for understanding the health of the aquatic ecosystem and its overall biodiversity. It can provide insights into environmental conditions, water quality, and habitat suitability for different species. Ecosystem is a geographical system in which living as well as nonliving components are working together to form a cluster of life. Based on their geographical conditions they are classified as terrestrial and aquatic. Based on the quality of water aquatic ecosystems are classified as fresh water (River, Stream, Lake, Pond etc.) and marine types (Seas and Oceans) and on the basis of flow they are classified as either lentic ecosystems, or lotic ecosystems. Different ecosystems have different types of biodiversity depending upon their land use catchment type. Aquatic ecosystems harbour high levels of biodiversity and support important ecosystem services (Luo *et al*., 2018; Song *et al*., 2018), yet these ecosystems are currently being altered and stressed by various anthropogenic activities (Flitcroft *et al*., 2019; Reid and Tippler, 2019). With the onset of Anthropogenic, global economy increased 30- folds and the human population exceeding 7.6 billion (Steffen *et al*., 2015), anthropogenic activities have degraded the quality of freshwater and depleted its resources from finite to limited quantity. These anthropogenic activities include industrialization (Kim *et al*., 2019; Mishra *et al*., 2020 urbanization (Zhang *et al*., 2018) and intensive agriculture (Chen and He, 2014).

Globally more than two-third of river and stream ecosystems are highly impacted by human interference (Giller, 2005). Human interferences that induce drastic changes in riverine ecosystems include altering hydrological conditions (Zhao and Yang, 2009), habitat attributes (Maddock, 1999) and increasing pollution load (Pinto *et al*., 2013). For the global sustainability of stream water ecosystems, it

thus becomes imperative to adopt ecologically sound conservation and management practices (Sofi *et al*., 2020).

Water is one of the basic element of life without which no form of life can exist (Mishra, 1990 and Reddy, 2003). However, the urbanization and industrialization have significantly impacted aquatic systems and ultimately disturbed the ecological balance and loss of aquatic biodiversity (Jewitt, 2002 and Hassan *et al*., 2005). From the past half century, urban expansion and industrialization leads to the release of hazardous materials into fresh water bodies resulting in harmful effects not only on its biodiversity but also effects the terrestrial plants and animals, including human beings (Hassan *et al*., 2005). Streams and rivers, which have high diversity of both flora and fauna are among the most endangered ecosystems worldwide (Armitage *et al*., 1983), face severe threat due to various anthropogenic activities (Hellawell, 1986; Metcalfe, 1989 and Wright *et al*., 2007).

Macrobenthic fauna are important in the aquatic ecosystem because they form part of the aquatic food chain and are also used to assess water quality by being indicators of pollution (APHA, AWWA and WEF, 1998). Most benthic organisms feed on debris that settle on the bottom of the water and in turn serve as food for a wide range of fishes (Idowu and Ugwumba, 2005). They also accelerate the breakdown of decaying organic matter into simpler inorganic forms such as phosphates and nitrates (Gallep *et al*., 1978). They constitute the link between the unavailable nutrients in detritus and useful protein materials in fish and shellfish's.

The macrobenthic community plays a key role in the trophic web mainly in the energy and nutrient transfer between trophic levels of the pelagic and the littoral habitats (Devine and Vanni, 2002). Macroinvertebrates are increasingly considered as key components in the structure and functioning of streams and rivers through their interaction with fish, periphyton and plants (Jones and Sayer, 2003), as well as with pelagic zooplankton (Burks *et al*., 2001). Macrobenthic organisms are affected positively or negatively by physicochemical parameters of the environment depending on their sources (Aura *et al*., 201l). Major factors responsible for aquatic macroinvertebrates abundance and diversity in an aquatic ecosystem include, water temperature, water velocity, transparency and turbidity (Stanford and Ward, 1983). According to (Sarker *et al*., 2016) temperature is the most crucial parameter in water body because it has major influence on biological activities and dissolved oxygen influencing the abundance of organisms.

Tak *et al*. (2015) studied on faunal diversity of macrobenthic invertebrates in two different fresh water ecosystems in Kolayat and Pushkar, Rajasthan and revealed that the sacred lakes are shallow with turbid, alkaline, hard, slightly saline and well oxygenated water and reported 21 and 22 species belonging to annelida (class oligochaeta and hirudinea), arthropoda (class insecta) and mollusca (class gastropoda).

MATERIALS AND METHODS :

Study Area: Son River, is a perennial river located in central India. It originates near Amarkantak Hillin Pendra (Gaurela-Pendra-Marwahi district), Chhattisgarh and finally merges with the Ganga river near Maner in Patna, Bihar. The Son River is the second-largest southern tributary of the Ganges after the Yamuna River. India's oldest river bridge Koilwar Bridge over Son River connects Arrah with Patna. Son river is famous for its sand across country. Multiple dam(s) and hydro-electric projects run on its course towards Ganges.

Collection: Utilize standardized sampling techniques such as kick-netting, Surber sampling, or sediment coring to collect macrozoobenthic organisms from different substrates and depths.

Identification: Sort collected samples in the laboratory to separate macrozoobenthic organisms from debris and sediment.

Data Analysis: Calculate species richness indices (e.g., species richness, Shannon diversity index) to quantify the number of different macrozoobenthic species present in the samples.

DISCUSSION:

Rivers are the main freshwater resource for humans and are often vulnerable to heavy exploitation. River systems in the world can be considered as arteries of the land supplying life giving water to an abundance of organisms even as at the same time supporting modern civilizations (King *et al*., 2003). Ecological studies on benthic macroinvertebrates have been of keen interest to various aquatic biologists throughout the globe, especially in North America and Europe (Cairns and Pratt, 1993). Annandale and Prasad (1919) were probably the first to study abundance of benthic insects of Indian running waters. Notable contributions on Indian macroinvertebrates of streams are those of (Dubey and Kaul 1971; Kumar and Prasad 1981; Gupta and Michael 1992; Julka *et al*., 1999; Balasubramanium *et al*., 1992; Hussain 2012; Kripa *et al*., 2013; Habib and Yousuf 2014; Sharma *et al*., 2015; Barman and Gupta 2015 and Nautiyal *et al*., 2015). The ecological of benthic macroinvertebrates indirectly or directly, is a reflection of the adjoining geological formation, watershed recharge characteristics, chemical composition of minerals and soil resources, various anthropogenic factors, farm practices, patterns of drainage, land use patterns and waste disposal methods. The following discussion takes into account for the various parameters monitored in this work, one by one and tries to analyze their impact as a whole.

During the present study, a total of 50 species of macrozoobenthic were recorded from Son River comprising of three phylum viz., mollusca, arthopoda and annelida. The maximum species were recorded for arthropod (30 species), followed by mollusca (16 species) and annelida (4 species). Similar results were recorded for Narmada River Madhya Pradesh, India (Vyas *et al*., 2012). The dominance of arthropods is attributed to favorable habitat conditions and food availability along the Son River. Sharma *et al*., (2013) and Khan, (2013) are also of the opinion that favorable habitat conditions and food availability results in the dominance of arthropoda diversity. During the present survey class insecta (arthropoda) and class gastropoda (mollusca) were main representatives of macrozoobenthos from the river Son. The similar observations were recorded from Ganjal River (Sharma *et al*., 2013), Ken River (Nautiyal and Mishra, 2013) and Streams of Yedigoller National Park (Turkmen and Kazanci, 2010).

During the study, least seasonal diversity of macrozoobenthos was observed in monsoon with 40 taxa. In the present study, during the monsoon season a decreasing trend was observed in the abundance of macrozoobenthos except *Hagnius* sp., *Bembidium* sp., Hirudiniaria whose number remained almost unchanged. These organisms have the inbuilt capacity to quickly recover from localized disturbances (Resh, 1993).

The Son River, situated in Sidhi district, Madhya Pradesh, India, is a vital component of the region's aquatic ecosystems. This study aims to investigate the diversity of macrozoobenthos in the Son River, shedding light on the composition, distribution, and ecological significance of these organisms. Sampling was conducted at multiple sites along the river, covering various habitats and environmental conditions.

Macrozoobenthic samples were collected using standardized techniques and subsequently identified to the lowest taxonomic level feasible. Species richness, abundance, and diversity indices were calculated to assess community structure and composition. Additionally, environmental parameters such as water quality, sediment characteristics, and habitat features were recorded to understand their potential influence on macrozoobenthic communities. Preliminary findings indicate a rich and diverse assemblage of macrozoobenthos in the Son River, comprising a variety of insect larvae, crustaceans, mollusks, and annelids. Certain taxa displayed preferences for specific microhabitats, underscoring the importance of habitat heterogeneity in supporting biodiversity. Furthermore, anthropogenic activities, including pollution and habitat modification, were observed to impact the distribution and abundance of certain taxa. This study contributes valuable insights into the macrozoobenthic biodiversity of the Son River in Sidhi, emphasizing the need for ongoing monitoring and conservation efforts to safeguard these ecologically significant communities and their associated habitats.

REFERENCES :

1. APHA. (2005). Standard Methods for the Examination of Water and Wastewater. 21st Edition, American Public Health Association/American Water Works Association/Water Environment Federation, Washington DC.
2. APHA., AWWA. and WEF, (1992). Standard Methods for the Examination of Water and Wastewater. American Public Health Association, Greenberg, A.E., Clesceri, L.S., and Eaton, A.D., (eds) 18th Edition, 120-123.
3. Archna, A., Sharad, S. and Pratibha, A. (2015). Seasonal biological water quality assessment of river Kshipra using benthic macro-invertebrates. *Social Issues and Environmental Problems,* **3(9):**1-7.
4. Brraich, S. O. and Kaur. (2017). Temporal composition and distribution of benthic macroinvertebrates in wetlands CURRENT SCIENCE, **112:** 1-10.
5. Buragohain, M., Bhuyan B. and Sarma, P. H. (2010). Seasonal variations of lead, arsenic, cadmium and aluminium contamination of groundwater in Dhemaji district, Assam, India. *Environ Monit Assess,* **170:**345–351.
6. Camargo, J. A., Alonso, A. and Salamanca, A. (2005). Nitrate toxicity to aquatic animals of fresh water. *Chemosphere*, **58:**1255-1267.
7. Carvalho, E. M. D. and Uieda, V. S. (2009). Diet of invertebrates sampled in leaf-bags incubated in a tropical headwater stream. *Zoologia*, **26(4):**694–704.
8. Dalal, A. and Gupta, S. (2015). Rapid Bioassessment of Magura haor (Floodplain wetland), Cachar District, Assam, India using Aquatic Insects. *In Current World Environment,* **10(1):** 296-304.
9. Das, M., Goswamy, S. and Goswamy, A. (2006). Effect of jute retting on the physicchemical and biological condition of water. *Indian Journal of Fisheries,* **53(4):** 455-457.
10. Dave, V. (2008). Limnological studies of Krisnapura lake with special references to population dynamics. Ph.D. Thesis, D.A.V.V., Indore (M.P.).