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Diversity Status of Fishes Fauna in Bihar: Review Article

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ABSTRACT

The present study was conducted on some stretches of Kosi River in, Bihar. It is an important tributary of the Ganga River system and serves as a basis of livelihood and employment for many surrounding fishing communities. Despite of its fisheries and agricultural importance, studies concerning the ichthyofaunal diversity, eco-fishery status and ecology are limited. The present communication deals with ichthyofaunal diversity in this river. The fish fauna of this stretch of Kosi River is comprised of 35 species, which belongs to 15 families and 8 orders were reported. Extensive field survey and fish sampling was done to assess the abundance and distribution of fishes in flood plain wetlands specially Kosi River area in Bihar. The survey result showed that among the total fish species collected, Order Cypriniforms held a major portion of the district's fish fauna. Wanton fishing methods such as fish poisoning, uses of restricted fishing gear and small mesh sized fishing net were also observed.

Keywords: Fish diversity, Fishing community, Kosi River, Livelihood, Wanton fishing.

INTRODUCTION

Exploration of the components of biodiversity is an important step in recognising the existence of varied units of the biological architecture of the ecosystem as well as helps to assess the status its units so that precise management plans can be put in place. Wetlands are the natural resources known for its high biological diversity. These are fragile but productive and vital ecosystems for their role in conservation of biodiversity. Fishes are one the key group of these water bodies. Large variety of fishes flourishes these ecosystems exploiting the varied niches available there in. The group supports other species of varied animal diversity and act as a good indicator of healthy ecosystems. Though fish is largely explored vertebrate group but still a number of fish species are unexplored in wetlands.

Kosi River is an important tributary of mighty Ganga River system. It originates from Himalaya, Nepal and flow through the different districts of Bihar and meets the Ganga River system at Supaul, Saharsa, Madhepura, Katihar in Bihar. It harbours rich diverse fauna of many commercially important fishes. India is blessed with vast water resources in the form of sea, estuary, rivers, canals, reservoirs, streams and associated wetlands. Rivers are playing an important role in the country's inland fish production and thereby helping the country to meet the challenges of nutritional security of the people, besides providing opportunities for livelihood and new employment generation. Despite this fact, rivers are one of the most threatened habitats. Inland fish production as well as fish diversity is decreasing because of pollutions, wanton fishing methods and other anthropogenic activities. However, scientific and eco-friendly approaches of development, coupled with an integrated management plan are the right options for increasing fisheries production of the country. Pinkey (2016) conducted surveys during August 2015 to January 2016 to predict the diversity of the fishes in Koshi Barrage; species diversity was found to be higher in winter (1.47) than in rainy season (1.18). Koshi River and their catchment area serves as an important source of fish, irrigation that supports the livelihood and employment for many surrounding fishing communities. Despite its fisheries importance, studies about the ichthyofaunal diversity, eco-fishery status and ecology are limited. The present communication deals with ichthyofaunal diversity in this Kosi River in different districts of Bihar.

The Bihar is endowed with rich aquatic and fisheries resources in the form of rivers, flood plains, wetlands, ox-bow lakes, River's reservoirs, tanks and ponds. Bihar is the fourth largest inland fish producing states in India. As many as 87 species of fishes belonging to 20 different families were recorded from this region. Quite a large number of air-breathing fishes had made their permanent abode in the , swamps and wetlands of the Kosi belt. However, in past few decades the wetlands have witnessed severe stress owing the increasing anthropogenic activities and this has resulted into environmental degradation and loss of units of biodiversity including freshwater fishes.

RESEARCH REVIES

Fishes are one of the most important and diverse groups of vertebrates, with an estimated 34,300 species (Fishbase, 2020), and are directly related to human well-being (Leveque et al., 2008). An estimated 3000 species are found in Asia (Lundberg et al., 2000), with Carps (Cypriniformes) and Catfishes (Siluriformes) representing the major freshwater fish taxa from South Asia (Berra, 2007). Nelson et al. (2016). However, the knowledge of fish faunal diversity in tropical Asia, including Nepal, is still in its primal phase, where survey works are still fragmentary and sporadic, with many species yet to be discovered or to be described (Leveque et al., 2008). Nepal is one of the richest countries in terms of freshwater resources with altitudinal variation ranging from 50 m elevation to the world's highest peaks exceeding 8000 meters. There are as many as 6000 rivers and rivulets in Nepal. About 70% of the country is drained by four major river systems, all originating from the higher Himalayas greater than 5000 m asl (meter above sea level), with some of their tributaries entering from Tibet as well (Bricker et al., 2014; Bhandari et al., 2018). These are the Sapta Koshi in the eastern part, the Sapta Gandaki (Narayani) in the central, the Karnali in the western

part and the Mahakali in the far-western part of the country. Besides these, many medium and small-sized rivers originate from the Midhills (1200- 3000 m asl) and the Mahabharat range (3000 to 5000 m * Corresponding author: khatriku.kk@gmail.com asl) and the Churia range (900-1200 m asl) (WECS, 2011; Bricker et al., 2014; Bhandari et al., 2018). Freshwater habitats - natural and manmade- in the country covers an estimated area of about 826,818 ha (GoN/NPC, 2019; Table 1). Along with freshwater resources (WECS, 2011), the country's geographical position linking the eastern and western Himalaya combined with varied topographical features with different climatic and ecological zones support rich fish diversity (Shrestha, 2000; HMGN/MFSC, 2002). Despite being rich in water resources, the knowledge of fish diversity in Nepal is still very inadequate and unorganized. Most of the studies have focused on inventory only on selected stretches of rivers and tributaries; and some lentic systems such as lakes, ponds, and pools irrigation canals in the country. There are even more limited studies on fishes from marshy lands (Ghols in Nepali) in Nepal (Jha & Shrestha, 2000). The lack of systematic studies and information on the ichthyofauna in the country is a big obstacle for exploring the fish variety and strategizing any means of conservation. In addition, the provision for deposition of voucher specimens and museum specimens are still lacking which further pose obstacle in conducting sound taxonomic studies. Genetic and molecular studies, which have been proven to be effective in resolving taxonomic resolution (Zhang & Hanner, 2012), are also lacking in the country. Therefore, the main objectives of this review are to generate comprehensive information on fish diversity, their present conservation status; threats; and to identify the knowledge gap

MATERIAL& METHODS

The some stretches of Kosi River in the Kosi area districts in Bihar were selected for the study of fish diversity for a period of one year from June 2023 to May 2024. Fish samplings were carried out through the cast net as well as gillnet as per suitability of the location. The fishes were collected personally by above said method and also collected from the local fish market too. The collected samples of fishes were identified based on standard taxonomic literature (Jayaram, 1981; Talwar and Kacker, 1984; Talwar and Jhingran, 1991) and categorised based on their family.

Photographs: Fishes of Kosi River, Bihar, India

Cyprinidae Family: -

1.Catla catla (Hamilton-Buchanan) 2. Labeo rohita (Hamilton-Buchanan) 3. Cirrhinus mrigala (Hamilton-Buchanan) 4. Cirrhinus Reba (Hamilton) 5. Puntius sophore (Hamilton-Buchanan) 6. Puntius conchonius (Hamilton-Buchanan) 7. Puntius phutunio (Hamilton-Buchanan) 8. Puntius terio (Hamilton-Buchanan) 9. Puntius sarana sarana (Hamilton-Buchanan) 10. Amblypharyngodon mola (Hamilton-Buchanan) 11. Parluciosoma daniconius (Hamilton-Buchanan) 12. Esomus danricus (Hamilton-Buchanan)

Clupidae Family: -

1.Gudusia chapra (Hamilton-Buchanan)

Bagridae Family: -1. Mystus vittatus (Bloch) 2. Aorichthys seenghala (Sykes) 3. A. aor (Ham-Buch) 4. M. cavasius (Ham-Buch)

Schilbeidae Family: -1. Pseudeutropius atherinoides (Bleeker)2. Eutropiichthys vacha (Hamilton,)

Siluridae Family: - 1. Wallago attu (Schneider) 2. Ompok bimaculatus (Bloch

Mastacembelidae Family: - Mastacembelus armatus

Belonidae Family: Xenentodon cancilla

Cobitidae Family: -1. Lepidocephalichthys guntea ,2. Botia lohachata

RESULTS AND DISCUSSION

The fish species found in the river during the entire study period were categorized based on family and listed. Seasonal variations in water level were observed in the river. Water level was maximum during monsoon season because of heavy rain during the rainy season. Kosi River is an important source of fish catch for the local fishermen and also the good source of irrigation for different agricultural crops in the different district. Still, these are underutilized as far as fishery development is a concern. Capture fishery is prevalent in the river where natural seed grow from natural fish food organism present in the water body. The Kosi River had some native fish species of adjacent rivers, the fish fauna is comprised of 35 species, which belongs to 15 families. The catch was seen to be low from January to May. During these months, fishing frequency is less and mainly done by gillnet and caste net. Wanton fishing methods such as fish poisoning, use of small mesh sized fishing net and application of restricted fishing gear were also observed in Kosi River at Supaul district of Bihar. These wanton fishing methods are very harmful for the existing fish population in this particular River, adversely affected the fish abundance and recruitment process. Mesh size regulation and monsoon fishing ban must be practised to ensure the fish recruitment process (Chandra and Saxena, 2013). Fisheries recourses are experiencing alarming pressure of extinction due to combined effect of environmental degradation, overexploitation, un-judicial use various crop protection pesticides, different type of aquatic pollution and lack of proper management (Chandra and Saxena, 2014). Srivastava (2013)

researched fish diversity and conservation perspectives of Gandak River in Uttar Pradesh, India and found 54 commercially important species of fishes in this tributary of the Ganga River system. Estimation of fish genetic diversity is essential for the conservation of fish population in a particular water body and molecular marker is an excellent tool for such purposes (Chandra et al 2010). Photographs: Fishes. The study was conducted every last week of each month, between 6.00 and 812.00 a.m. The fish samples were captured with the help of local skilled fishermen in three pre-selected sampling sites. Dragnet, Castanet, Scoop net, Basket trap, and so forth were used for capturing fish. Fish markets were monitored regularly for commercial fish collection Fish species available at the local market and caught by local fishermen from the koshi River, lakes and chaurs were also purchased.

The collected specimens were preserved in 5-10% formalin according to the size and brought to laboratory. The fishes were identified with the help of standard taxonomic literature. The identification of the species was done mainly on the basis of the colour pattern, specific spots or marks on the surface of the body, shape of the body, structure of various fins, mouth shapes etc.

CONCLUSION

The mentioned stretch of Kosi River, Medhepura, Saharsa.Katihar Supaul, Bihar, India is rich in fish biodiversity and source of livelihoods for the residing fishing community. Besides, it a source of quality fish protein for neighbouring populations thus helpful in providing nutritional security. However, the fish populations are decreasing day by day and cause a serious threat to the ecology of riverine ecosystem. Pollutions, overexploitation and indiscriminate fishing methods have been observed throughout the study period, which has resulted in a drastic decrease of fish populations. Awareness of fishing community and enforcements of inland fishing rule and regulations is very much important for the conservation of these valuable fish recourses. Further research about reproductive biology, bionomics and genetic diversity of inhabiting fishes is essential for effective utilization and conservation of fisheries resources of this river.

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