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A checklist offishes of koshi river of Nepal

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Abstract
Fish survey were undertaken during august 2015 to October 2015 to predict the checklist of fishes in Koshi Barrage. An attempt has been made to survey the existing fish species in three months of duration. Fishes caught alive or in fresh condition were preserved in 9-10% formalin solution. The fishes were collected, fixed and labeled giving serial numbers, the name of exact locality from where they have been collected; date of the collection and the common local name on each jar. The fishes were identified using a website www.fishbase.com.Thirty seven species of fishes belonging to eighteen families, thirty two genera were recorded. Out of these ten species, Canthophrys gongota, Mystus cavasius, Mystus vittatus, Nangra assamensis, Clupisoma montana, Parambassis lala, Macrognathus aral, Chaca chaca, Ompok bimaculatus and leiodon cutcutia were identified to be the new species.

Keywords: Fishes, koshi river.

1. Introduction

Nepal covers an area of 147,181 square kilometres, that resides more than 6000 rivers and streams with three main river systems, viz., the Koshi, the Gandaki and the Karnali. The indigenous and exotic fishes of Nepal in total were found to be 186 species (Shrestha, J., 1995; Subba and Ghosh, 1996) [6, 5]. Out of these there were fifty-nine coldwater indigenous and two exotic fish species in Nepal as investigated by Shrestha. The latest data reveals about 200 fish species, of which 191 are indigenous and 9 exotic.

1.1. Fish and fish diversity in Nepal

Fish constitutes almost half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats. They exhibit enormous diversity of size, shape and biology, and in the habitats they occupy. Of the 39,900 species of vertebrates in the world, Nelson (1984) estimated 21,723 extant species of fish under 4,044 genera, 445 families and 50 Orders in the world, compared to 21,450 extant tetrapods. Of these, 8,411 are freshwater species and 11,650 are marine. Other researchers, have arrived at different estimates, most of which range between 17,000 and 30,000 for the numbers of currently recognized fish species. The eventual number of living fish species may be close to 28,000 in the world. Day (1889) described 1418 species of fish under 342 genera from the British India. The fish fauna of the major tropical regions, Southern Asia, Africa, South and Central America are generally different with respect to genera; but, some families have members in two or all of the continents. In Southern Asia the predominant fish groups are the carps (Cyprinidae) and the cat fishes (Siluroidea) (Berra, 1981).

The inland water resources of Nepal totalling 745,000 ha. consist of river systems, lakes, reservoirs, village ponds, wetlands and irrigated rice fields. Nepal has more than 6000 rivers and streams with three main river systems, viz., the Gandaki, the Koshi, and the Karnali. Besides these, Mahakali, Kankai, Kamala, Mechi, Rapti, Babai and Tinau are equally important rivers. There are 185 fish species in Nepal belonging to 79 genera, 31 families and 11orders (Shrestha, 1995) [9]. The indigenous and exotic fish of Nepal total 186 species (Shrestha, J., 1995; Subba and Ghosh, 1996) [6, 5]. They are distributed from the lowland plains (Terai), through the hills to the Himalayan mountains up to an altitude of approximately 4000 m. Nepal is rich in water resources and fish diversity. The main sources of water of Nepalare rivers originating from Himalayas and their tributaries. In addition to rivers, there are several lakes, ponds, reservoirs, etc. which provide shelter and feeding habitats to fresh water fishes. The initial taxonomic work of fishes of Nepal goes back towards eighteenth century when Hamilton (1822) [1], Hickel (1843), Gumther (1861, 1868) and Day (1869) [10] made expeditions to survey fish of India and its adjoining countries. They addressed the fishes of Nepal for the first time. Since then, the inception of taxonomic works on fish of Nepal took place so far the literature are concern. Still a through survey of fishes of Himalayan waters of Nepal is incomplete. Among a good numbers of contributors to taxonomical works on fishes of Nepal, the works of Shrestha (1981), Talmar and Jhingran (1991) [3], Tereshima (1984) [9] and Subba (1995, 1996) [7, 5] deserve special mention. The authors have made an attempt to collect and identify the fishes of eastern Terai of Nepal.

The Nepal Himalayas are well known for their running and standing waters supporting about 200 species of fish are described from the Himalayan drainage system of Nepal (Shrestha 1995) [8]. High diversity fishes in the rivers of Nepal calls for concerted efforts to preserve them for posterity. The lotic water mass of the Himalayan region comprises many torrential rivers and streams, which provide a wide variety of ecological niches for important fresh water fishes. However, the effects of land use on fresh water systems are growing. In the Nepalese rivers, the ecological studies of these water bodies have started only recently. The rivers of Himalayan

region differ from the other rivers in carrying much larger sediment loads and having more frequent floods.

2. Materials and Methods

Koshi is the biggest river of Nepal. It is also known as saptakoshi river Koshi flows from eastern Nepal. Different branches of koshi are originated from different mountains with different names and they are flowing towards southeast, southwest and direct south. After reaching near Triveni, Arun and Sunkoshi and later on Tamor join each other and flow downward to the south with the name Saptakoshi. The water, east from Goshainkunda of central Nepal and to the west of Kanchangunjha of eastern Nepal collects to this river covering a large area of high mountains and hills. Out of its main seven branches, Arun and Bhotekoshi are originated from Tibet. Hence, Arun River enters Nepal from Kimathanka pass or boarder and the Bhotekoshi River enters Nepal from Tatopani pass. Latter on the Saptakoshi River enters towards India, Bihar from Bhimnagar.

Therefore, the water-shared area for Koshi River is very big. It covers 60420 square kilometer in three countries. Out of this area, Nepal bears 27883, India 11410 and Tibet bears 21127 square kilometer. Therefore, it is an international river. After reaching it in Ganga River, it flows up Bangladesh and falls down in Indian Ocean. Koshi falls in Ganga river from Kurshila of India, Bihar. The length of this river is 729 lometer from Tibet to India Bihar. It is 254 kilometer long from Koshi Barrage to Kursila in India and 68 kilometer from Triveni to Koshi Barrage in Nepal. The capacity of producing hydro-electricity is 22500-mw in this river. Varahakshetra, Chatara, Mainamain, Bishnupaduka, Manakamana, Ramdhuni and Pindeswara are some of the famous religious centers of Kausiki region. Some important religious sites are there in Bihar India also at the bank of Kausiki River (Khatiwada, 2014) [2]. The field study was carried out in the koshi barrage area that encloses three districts namely saptari, sunsari and udayapur.

All the fishes were collected from the koshi barrage, the part of which lies in sunsari and saptari district, of Nepal and also from the landing sites and market area close to it. The fishes were collected for observation and identification during the period of August 2015 to October 2015 by using different types of 'Nets and Gears' commonly used in fisheries and through the help of fisherman. Photographs of the fishes were taken on the spot, as the colour of the fishes may change after fixation in the formalin. Fishes were collected with the help of local fisherman using cast nets, scoopnet, hooks, Dhadiya etc. Fishes caught alive or in fresh condition were injected with 40% formalin through their mouth and vent and finally preserved in 10% formalin. The fishes collected and fixed, were then labeled giving serial numbers, the name of exact locality from where they were collected; date of the collection and the local name on each jar. and finally brought in AUCST (Andhra University College of Science and Technology), Department of Zoology, in India for further identification and investigation. The fishes were identified using a website www.fishbase, articles and journals of Nepal and Talwar and Jhingran, 1991 [3].

3. Results and discussion

In the present study about 37 species of the fishes were identified belonging to the 18 families. Prakash *et al*., 2011 selected water bodies such as rivers (Kamala, Koshi, Londhra, Keshaliya, Singhia, Babai, Ratua, Kamlamai, Biring and Mechi) and lentic water bodies such as (oxbow lakes, man made ponds, reservoirs, cannals, ditches, pools) of eastern Nepal to make maximum representations of fish species where only 53 species, belonging to 20 families were identified.

As compared to the study time and number of sites, the present study reveals maximum number of species and families compared to Prakash *et al*., 2011. New species that is Canthophrys gongota, Mystus cavasius, Mystus vittatus, Nangra assamensis, Clupisoma montana, Parambassis lala, Macrognathus aral and Chaca chaca were recorded which were absent in 2011.

Checklist of fishes

S.no	Family	Name of the fishes
1.	Cyprinidae	Labeo rohita (Hamilton, 1822) [1]
2.	Ambassidae	Parambassis ranga (Hamilton, 1822) [1]
3.	Bagridae	Mystus cavasious (Hamilton, 1822) [1]
4.	Mastecembelidae	Mastacembelus armatus (Lacepede, 1800)
5.	Schilbidae	Clupisoma montana (Hora,1937)
6.	Cyprinidae	Catla catla (Hamilton, 1822) [1]
7.	Cyprinidae	Labeo bata (Hamilton, 1822) [1]
8.	Cyprinidae	Salmophasia bacaila (Hamilton,1822) [1]
9.	Mastecembelidae	Macrognathus pancalus (Hamilton, 1822) [1]
10.	Cobitidae	Botia lohachata (Chaudhuri, 1912)
11.	Cyprinidae	Puntius sophore (Hamilton, 1822) [1]
12.	Mastecembelidae	Macrognathus aral (Bloch and Schneider,1801)
13.	Cyprinidae	Cirrhinus mrigala (Hamilton,1822) [1]
14.	Channidae	Channa punctatus(Bloch, 1793
15.	Osphronimidae	Trichogaster fasciata (Bloch & Schneider, 1801)
16.	Badidae	Badis badis (Hamilton, 1822) [1]
17.	Heteropneustidae	Heteropneustes fossilis (Bloch, 1794)
18.	Ambassidae	Parambassis lala (Hamilton, 1822) [1]
19.	Tetradontidae	Leiodon cutcutia (Hamilton, 1822) [1]
20.	Sisoridae	Gagata cenia (Hamilton, 1822) [1]
21.	Bagridae	Mystus vittatus (Bloch, 1794)
22.	Chacidae	Chaca chaca (Hamilton, 1822) [1]
23.	Bagridae	Sperata aor (Hamilton, 1822) [1]
24.	Cyprinidae	Chagunius chagunio (Hamilton, 1822) [1]
25.	Cyprinidae	Raiamas guttatus (Day, 1870)
26.	Cyprinidae	Tor tor (Hamilton, 1822) [1]
27.	Schilbidae	Eutropichthys vacha (Hamilton, 1822) [1]
28.	Bagridae	Mystus tengara (Hamilton, 1822) [1]
29.	Belonidae	Xenentodon cancilla (Hamilton, 1822) [1]
30.	Siluridae	Ompok bimaculatus (Blotch, 1794)
31.	Cyprinidae	Labeo fimbriatus (Bloch,1795)
32.	Synbranchidae	Monopterus cuchia (Hamilton, 1822) [1]
33.	Channidae	Channa orientalis (Bloch and Schneider,1801)
34.	Gobiidae	Glossogobius giuris (Hamilton,1822) [1]
35.	Ambassidae	Chanda nama (Hamilton,1822) [1]
36.	Sisoridae	Nangra assamensis (Sen and Biswas,1994)
37.	Cobitidae	Canthophrys gongota (Hamilton, 1822) [1]

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