

## **Study on the biodiversity of fishes of Trisuli River with reference to ecological changes.**

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### **Abstract**

*The present paper deals with the Biodiversity of the fishes of Trisuli river with reference to the ecological changes. In total 23 species of fishes were reported from different parts of the Trisuli river. Long distance migratory fishes like *Tor putitora*, *Clupisoma gaur*, *Anguilla bengalensis*, *Bagarius bagarius* and short distance migratory fishes like *Schizothorax progastus*, *Labeo dero*, *Acrossocheilus hexagonolepis*. are found in Trisuli river. The upstream of Trisuli river is inhabited by *Schizothorax richardsoni*, midstream by *Barilius*, *Garra*, *Crossocheilus* and downstream by *Tor putitora*, *Acrossocheilus hexagonolepis*.*

### **Keyword:**

**Trisuli river, biodiversity, fish migration, distance**

### **Introduction:**

Nepal is blessed by nature with a varying array of water bodies supporting biological diverse fish fauna. The Trisuli watershed is one of the main important fishing centres of Nepal. It is lying at an latitude of 200 to 1400 m. Trisuli is one of the seven main streams draining the Gandaki river (Narayani).

Trisuli originates from Tibet and crosses into Nepal at Rasuwa. Lanntang khola is joined to it at Syabrubesi and Mailung khola a little down. Trisuli flows towards south and joins with Tadi Khola at Battar bazaar. It then takes a west course touching Battar bazaar and

joins Bhuri gandaki at Benighat. It further joins Marsyagdi and Darondi at Tribeni ghat Ultimately, it joins with the seti and Kali river at Gaughat (Shrestha 1981).

A total of 34 species of fish have so far been reported for Trisuli river (Shrestha 1990). Among important fish species occurring in this area are Golden Mahseer (*Tor putitora*), Fresh water Eel (*Anguilla bengalensis*), Mud Eel (*Amphiphorus cuchia*), Catla (*Catla catla*), Rohu (*Labeo rohita*), River Rohu (*Labeo angara*), Jalkapoor (*Pseudeutropius antherinoids*), Garfish (*Xenentodon cancila*), Spiny eel (*Macragnathus aceleatus*) and Gouch (*Bagarius bagarius*) may be fished with little effort during winter and summer.

The Trisuli river is broken into pools and is composed of boulders, gravel and silt. Water surface temperature ranges from 16-20°C, PH value ranges from 5-8. Fish habitat condition is poor due to barrier effects of dam over silting and pollution. Generally fishing is done by, gill net, cast net, loop line etc. Fish migration is caused by various parameters like temperature PH, Soil erosion, dam construction, sexual behavior, availability of food etc. Present paper deals with the biodiversity of Fishes of Trisuli river with reference to the ecological changes (Shrestha 2008).

## Materials and Methods:

For the present investigation, both direct sensing and remote sensing methods were used. Direct sensing was used by unaided eye. Remote sensing was done by using polarized eye glasses. Observations were aided by binoculars. The various methods like as following

- (a) Information sampling
- (b) Direct observation
- (c) Photography and
- (d) Netting suitable capture was used in the study.

Fishermen of the study are readily given all useful information regarding the history of fishing and changes which have taken throughout the year. The fisherman pointed out the changes in the Trisuli river, which have altered the general environment of the fishes such as the flowing of the water current, the drying up of spring, land erosion, siltation, severe floods, bank erosion and irrigation dams.

Regular visits fishes were collected in the different season from Trisuli River. In each visit different gears and appliances used by fishermen and catch composition were recorded and ecological observations were made.

The live specimens of fishes were collected with the help of local fisherman. Generally, fishes were collected from the main river and its tributaries with the help of gills nets, cast nets scoop nets and other devices were made. The fishes collected were carefully then killed with the help of ethanol. After killing fishes they were fixed in 10% formalin and preserved in 4% formalin, which was made by one part of concentrated formalin with one part of water. The larger fishes were given longitudinal incision along the abdomen where as the smaller specimens were directly put into the formalin and brought to the laboratory of the

Central Department of Zoology, Tribhuvan University, Kirtipur. The live fry and fingerlings, fishes were brought to the laboratory and they were put into the aquarium for the study of feeding behavior of fishes.

Fishes were identified with the help of book "Fishes of Nepal" (Shrestha, 1981) and fishes of U.P and Bihar (Srivastava, 1980) in the laboratory. The maximum size (nearest to mm) weights (nearest to gm), local name, zoological name of fishes were noted down in the field with the help of the local people.

Water temperature was recorded by centigrade thermometer; pH value was also recorded directly by pH meter. Various kinds of fishing technique were observed closely. Photographs of the study area and fishes were also taken. Interview regarding kind occurrence, distribution, feeding behavior, spawning of fish and fish practices were made with the local fisherman in different area.

## Result:

The present investigation deals with the biodiversity of fishes of Trisuli river with reference to ecological changes. Trisuli River is dominated with snow trout, middle reaches by mahaseer, and lower reaches by slow moving river carp and catfishes, in the different section of the Trisuli river.

Fishes of Trisuli River are well adapted to specific biotopes. Fishes which partially bury themselves in sandy bottoms such as stone loach (*Noemacheilus beavani*), cat fish (*Heteropneustes fossilis*), snake head (*Channa striatus*). Fishes that school mid water column for predation includes (*Barilius bendelisis*), *Acrossocheilus hexagonolepis*, *Puntius ticto*. Fish that live permanently at the bottom of the stream floor, includes *Glyptothorax telchita*. Some species of the fishes living permanently or temporary underneath the rock and gravels, such as *Pseudecheneis sulcus*, *Glyptothorax cavia* etc.

Typically, fish in Trisuli migrate up stream in early monsoon (May and June) and migrate downstream during September and October. Seasonal movement of fish in the Trisuli river system occurs both as local migrations from the main stream to the head streams and as long distance migrations. Local migrant includes Snowtrout, Copper Mahseer, Mahseer, fresh water eel. It is not fully understood whether Mahseer and Copper Mahseer must reach the head water to spawn. Jalkapoor migrate, upstream in schools after the start of monsoon rain in May-June. In mid-September as flood water recedes, these fishes migrate downstream.

The fresh water eel spawn in the Bay of Bengal migrate to fresh water and reach Narayani and Trishuli water system. However, variability in spawning and migratory behavior warrants further investigation. Some fisheries experts are of the opinion that this eel is the local migrant or that it may even survive as a landlocked species.

Based on present samplings and information of fisherman, habitat preferences of important species of Trisuli river. Small fishes such as *Schizothorax plagiostomus*, *Glyptothorax telchitta*, *Barilius barna* have suction disc for clinging to stones and rocks and are found in rapid flow of head water streams. Small loaches like *Noemacheilus* species hide

under stones, and large fish such as a river Rohu(*Labeo dero*), Mahseer (*Tor Putitora*), and Copper Mahseer (*Acrossocheilus hexagonolepis*) prefer stony rapids and pools.

Marked habitat preferences are displayed by many species during spawning season, which usually occurs in conjunction with monsoon flooding. For example, major and medium river carps breed in confined canals but spawn flooded field during the monsoon at depth of 0.5m to 1m. The snow trout breed in slight gravel depressions on shallows bank vegetated.

## Appendix I

### Habitat Preferences of Important Fish Species of Trisuli River

Family	Scientific Name	Common name	Fishes Habitat Preference
Belonidae	<i>Xenutodon cancila</i> (Ham)	Kabai	Pools,Rapids,Back Water
Cyprinidae	<i>Tor tor</i> (Ham)	Golden Mahseer	Pools,Rapids,Back Water
Cyprinidae	<i>Tor putitora</i> (Ham)	Deep bodied Mahseer	Pools,Rapids,Back Water
Cyprinidae	<i>Acrossocheilus hexagonolepis</i> (McClell)	Copper Mahseer	Pools,Rapids,Back Water
Cyprinidae	<i>Schizothorax progastus</i> (McClell)	Point nosed snow trout	Rapids, Riffles, Runs
Cyprinidae	<i>S.richardsoni</i> (Gray)	Blunt nosed snow trout	Rapids, Riffles,Runs
Cyprinidae	<i>S.plagiostomus</i> (Heckel)	Spotted snow trout	Rapids, Riffles, Runs
Cyprinidae	<i>Labeo dero</i> (Ham)	River Rohu	Rapids, Pools
Cyprinidae	<i>Labeo rohita</i> (Ham)	Rohu	Rapids ,Pools
Cyprinidae	<i>Barilius bendelesis</i> (Ham)	Carp-minnow	Shallow, Pools, Riffles
Cyprinidae	<i>B.vagra</i> (Ham)	Carp-winnow	Shallow, Pools, Riffles
Cyprinidae	<i>B.barana</i> (Ham)	Carp-winnow	Shallow, Pools ,Riffles
Cyprinidae	<i>Garra golya</i> (Gray)	Sucker head	Pools, Swift runs
Cyprinidae	<i>G.annandelei</i> (Ham)	Sucker head	Pools ,Swift runs
Cyprinidae	<i>Crossocheilus latius</i> (Ham)	Mud sucker	Pools ,Swift runs
Cyprinidae	<i>Puntius sarana</i> (Ham)	River Barbs	Pools, Riffles, Runs
Cyprinidae	<i>P.ticto</i> (Ham)	River Carp	Pools, Runs
Cyprinidae	<i>Chagunius changumio</i> (Ham)	River Carp	Pools,Runs
Cyprinidae	<i>Catla catla</i> (Ham)	Vakur	Pools,Runs
Cyprinidae	<i>Cirrhina mrigala</i> (Ham)	Minar carp	Pools,Runs
Cyprinidae	<i>Noemacheilus beavani</i> (Gunther)	Stone loach	Shallow pools,Riffles,Gravel bed,Rooks
Cyprinidae	<i>N.botia</i> (Ham)	Stone loach	Gravel beds,Brooks creaks,shallow pools,Riffles

Cyprinidae	<i>N.rupicola</i> <i>var.inglisi(Hora)</i>	Stone loach	Gravel beds,Brooks creaks,shallow pools,Riffles
Cyprinidae	<i>N.corica(Ham)</i>	Stone loach	Shallow pools,Riffles
Cyprinidae	<i>Botia</i> <i>lohachata(Chaudhari)</i>	Mud loach	Rapids,Pools
Cyprinidae	<i>Glyptothorax</i> <i>trilimeatus(Ham)</i>	Sucker catfish	Gravelled areas,Runs,Rapids
Cyprinidae	<i>G.cavia(Ham)</i>	Sucker catfish	Gravel bed areas,Runs
Cyprinidae	<i>G.horai(shaw and</i> <i>shebbeare)</i>	Sucker catfish	Gravel bed areas,Runs,Rapids
Cyprinidae	<i>Euchiloglanis</i> <i>hodgrati(Hora)</i>	Torrent Cat fish	Pools,Rapids,Runs
	<i>Wallago attu(Bl.schnn)</i>	Buhari	Pools,Rapids,Runs
	<i>Pseudecheneis</i> <i>sulcatus(McClell)</i>	Torrent Cat fish	Deep water,Runs,Riffles
	<i>Channa gachua(Ham)</i>	Snake head	Pools,Runs
	<i>C.striatus(Bloch)</i>	Snake head	Pools,Runs
	<i>Heteropneustes</i> <i>fossilis(Bloch)</i>	Spiny cat-fish	Runs,Shallow Pools
	<i>Anguilla bengalensis(Gray</i> <i>and Hard)</i>	Fresh water eel	Pools,Rapids,Runs

## Conclusion:

In total 23 species of the fishes were collected from different sections of the Trisuli river. Migratory and resident species were studied according to mobility and appearances and disappearance in the rare local migratory stocks of fishes includes, *Tor tor*, *Schizothorax richardsoni*, *Pseudeutropius antherinoids*, Resident fishes includes *schizothorax progastus*, *Schizothorax Plagiostomus*, *Garra gotyla*, *Garra annandelei*, *Barilius barna*, *Puntiusticto*, *Crossocheilus latius* etc.

Long distance migratory fish includes *Tor putitora*, *Anguilla*, *Bengarius bagarius*. The status, abundance and distribution of fishes were tabulated. Relative abundance and rarity of the fishes in terms of abundance are given as follows: *Channa gachua*, *Semiplotus semiplotus*, *Labeo dero*, *Crossocheilus latius*, *Pseudecheneis sulcatus* etc. These are represented in a very few samples in catch which is regarded as rarity.

Fishes of Trisuli river are well adapted to scientific biotopes. Fishes which partially bury themselves in sandy bottoms such as stone loach (*Noemacheilus beavani*), Cat fish (*Heteropneustes fossilis*), snake head (*Channa striatus*). Fishes that school mid water column for predation includes *Barilius bendelisis*, *Acrossocheilus hexagonolepis*, *Puntius tecto*. Fish that live permanently at the bottom of the stream floor, includes *Glyptothorax telchitta*. Some species of the fishes living permanently or temporarily underneath the rock and gravels are *Pseudecheneis sulcatus*, *Glyptothorax cavia* etc.

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