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# POLLUTANTS AND AVAILABILITY OF FISHES IN RIVER JHELUM, KASHMIR

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**ABSTRACT**
Kashmir Valley is well known for its water resources. However these water bodies are facing grave pollution problems. One of the most critical problems of developing countries is improper management of vast amount of wastes generated by various anthropogenic activities. More challenging is the unsafe disposal of these wastes into the ambient environment. The main river of Kashmir known as river Jhelum has been subjected over the years to tremendous pressure due to discharge of untreated sewage from the surrounding human habitation, runoff from the surrounding agricultural fields including paddy fields, floating gardens, residues of pesticides and impartment insecticides. Water bodies especially freshwater reservoirs are the most affected. This has often rendered these natural resources unsuitable for both primary and secondary usage. This study is concerned with the evaluation of pollution influence on fish diversity status and establishing relation between fish diversity and environmental quality.
**Keywords**: Agricultural wastes, communal wastes, fishes, Jhelum, Kashmir

## 1. INTRODUCTION

Domestic untreated sewage of big cities from household is discharged into rivers which increase the amount of sulphates, chlorides, nitrates and phosphates. This causes eutrophication which depletes oxygen content and makes it toxic for aquatic organisms (Hynes 2003). Pollutants increases salinity, osmotic pressure, turbidity, acidity, TDS, nitrate and phosphates which depletes the DO and increases BOD which becomes toxic for fishes. Pollutants affect the mucus membrane of the gills which in turn effects respiration. It also affects the spawing grounds and availability of natural food to fish. Due to bad odour and colour caused by some pollutants the flesh of fish becomes unpalatable and toxic (S.S Khanna and H R Singh 2015). By severe organic pollution fishes are usually eliminated for long distances and some toxic substances like ammonia, sulphides and cyanides kill fishes, as do very low oxygen tensions and we know that low oxygen concentrations enhance the toxicity of most poisons (Hynes 2003). Fishes often disappear without apparently being killed and are repelled by low oxygen concentrations, particularly at higher temperatures (Jones 1952).

## 2. LITERATURE REVIEW

Drainage of concentrated detergents from households and industrial effluents cause sudden fall in dissolved oxygen in lakes resulting in the death of fishes (Zutshi *et al* 2008). While analyzing the physico-chemical parameters and pollution status Kant and Raina 1989 noted that BOD and COD

were beyond the permissible limits and high turbidity and low DO were indicators of pollution in the river Tawi at Jammu. Pollutants reduce the fish immunity to parasites either directly or by changing water quality (Poulin, 1992). Water pollution promotes the spread of parasites and also accelerates their life cycle by providing them favorable conditions (El-Seify *et al*, 2011). According to the Water Framework Directive (EU Directive 200/60/C), for the assessment of the various physical, chemical and biological status of aquatic systems fish is one of the most biological element. Changes in DO, pH, temperature, water hardness and humic acids affect the resistance of fish to toxic chemicals (Zdenka *et al*., 1993).

## 3. METHODOLOGY

### 3.1 Collection of Fishes

Fishes from river Jhelum were collected from the five sampling stations with the help of fishermen using nets and also from the fish market of Bandipora, Sopore, Ningli, Baramulla and sheeri. Fish sampling was mostly done in morning hours and was preserved in a solution of formalin. Fishes longer than 30 cm were injected with undiluted concentrated formalin at several places, fishes 10-30 cm were given a narrow cut on one side of ventral line and fishes less the 10 cm were immersed in a formalin solution without any cut. Specimens from each sampling sites were packed with appropriate labels indicating date, time and locality and were brought to the laboratory for identification. For identification of specimens, standard taxonomic keys on the basis of morphometric characters were used (Kullander et al, 1999).

### 3.2 Physical Assessment of pollutants

The physical appearance of the study area was documented using photographs, physical perception of odour and observation of the different significant human activities likely to cause pollution of the water body. This process was repeated in all the sampling locations and the results documented qualitatively.

## 4. RESULTS AND DISCUSSION

### 4.1 Domestic wastes and sewage effluents

The various domestic pollutants which pollutes the River Jhelum were kitchen wastes, detergents from washing machines, waste water from baths and utensils, wastes from kitchen gardens, etc which were directly discharged into the water body. Domestic sewage mainly contains the infectious micro-organisms, pathogens, bacteria's and **viruses**. The sewage effluents contains the wastes from houses located on the both sides of River Jhelum, these effluents are discharged into the river through channels, pipes, drains, canals and gutters. It also contains the faecal matter and other wastes from hotels, houseboats, hospitals etc.

### 4.2 Plastics

During present study it was observed that plastic and rubber materials are also thrown into river. Plastic bottles and glasses used from different shops and hotels, which are located near or on the banks of river usually through them into the water body.

### 4.3 Polythenes

Polythene bags were also observed during the present study period. As a non biodegradable element, it was present in a huge quantity on the both sides of river.

### 4.4 Municipal wastes

It usually carries the waste materials from the main towns and cities which mainly contains human faeces, rotten food materials from hotels, animal remains, wastes from hospitals, houseboats etc. it also contains dangerous chemical pollutants.

### 4.5 Agricultural wastes

Excessive amount of agricultural wastes was also observed during the present investigation. Pesticides and fertilizers are directly discharged into the river from the apple gardens located on the either sides of river. Different kinds of weedicides, herbicides and rodenticides from rice fields and paddy fields are also entering into river Jhelum. Oil sprays sprayed on orchards also pollutes water which enters into the water body through canals. A large quantity of used containers and polythene bags from agricultural fields were also present at the different sites of river.

1.  2  3. 

(1.2.3.) Pollutants observed at different sites

### 4.6 Fish species studied

A sum of 12 species of fish were collected from the River Jhelum (Table 1) which include *Cyprinus carpio communis* (Linnaeus, 1758), *Cyprinus carpio specularis* (Linnaeus, 1758), *Carassius Carassius* (Linnaeus, 1758), *Schizothorax plagiostomus* (Heckel, 1838), *Schizothorax esocinus* (Heckel, 1838), *Schizothorax curvifrons* (Heckel, 1838), *Schizothorax labiatus* (McClelland, 1842), *Schizothorax niger* (Heckel, 1838), *Schizothorax Richard Soni*, *Crossocheilus diplochilus* (Heckel, 1838), *Triplophysa marmorata* (Heckel, 1838) and *Triplophysa kashmirensis* (Hora, 1922) reported from the Jhelum River. The fish gears used during current study period were cast nets, bag net, long net and gill net and were also collected from

fishermen from the adjoining areas of river Jhelum. The fishes were collected from early hours from 8 to 10 am during summers and 9 to 10:30 am during winters because of seasonal changes in Kashmir.

Table 1.1 Fish species presently encountered from the river Jhelum, Kashmir

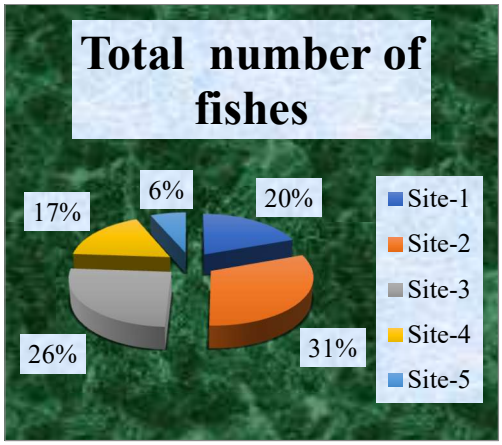
| S. NO | Name of the Fish species | Local name |
|---|---|---|
| 1. | Cyprinus carpio communis (Linnaeus, 1758) | Punjabe gad |
| 2. | Cyprinus carpio specularis (Linnaeus, 1758) | Punjabe gad |
| 3. | Carassius Carassius Linnaeus, 1758 | Lipid |
| 4. | Schizothorax plagiostomus (Heckel, 1838) | Khont |
| 5. | Schizothorax esocinus (Heckel, 1838) | Churru |
| 6. | Schizothorax curvifrons (Heckel, 1838) | Satter gad |
| 7. | *Schizothorax labiatus* (McClelland, 1842) | Chush |
| 8 | Schizothorax niger (Heckel, 1838) | Ale gad |
| 9 | Schizothorax Richard Soni, | Kashir gad |
| 10 | Crossochelius diplochilus (Heckel, 1838) | Zub |
| 11 | Triplophysa marmorata | AraGurun |
| 12 | Triplophysia kashmirensis (Hora , 1922) | Lamba gurun |

During the current research work, a sum total of 12 species of fish were encountered at 5 different sites from the river Jhelum. Results of species diversity indices (fig.3) showed that variety and richness was maximmum in September and October, however there was a seccessive and critical decrease in the wealth of fish diversity in the four months from November to February because seasonal fishing. Similar observation has also made by Pisca *et al* (2000); Salasker and Yeergi (2004) and Srikanth *et al.* (2009). Sreekantha and Ramachandra (2005) noticed the least fish richness because of destroying of favourable places promoting many kinds of aquatic systems from Linganamakk reservoir on Sharavathi River, India. According to Bunn and Arthington (2002) many kinds of aquatic systems have been lost and populations of numerous riverine aquatic species have become profoundly divided because human interferences.

Naikoo *et al* (2015) studied the variety of fishes in relative to Abiotic condition of Vaishav River at Kulgam in Kashmir. They reported 7 fish species from the Vaishav stream kulgam. These were *Schizothorax plagiostomus, Schizothorax esocinus, Schizothorax labiatus, Typhlophysa kashmirensis, Typhlophysa marmorata, Salmo trutta fario and Oncorhynchus mykiss.* Domestic sewage, agricultural effluents were the major cause for depletion of fish species. Brraich and Malik (2016) studied the Fish diversity of Wular Lake at Ramsar site in Kashmir Himalayas, India. They reported twelve fish species of fishes from the Wular Lake. They observed that various anthropogenic activities like deforestation along catchment area, non-point pollution and various

chemicals like insecticides, weedicides, pesticides and fertilizers from agricultural fields were major threat to aquatic biota. They noted that domestic sewage from villages and cities was also discharged into wetland. Rumysa *et al* (2016) reported sixteen fish species viz *Cyprinus carpio specularis, Cyprinus carpio communis, Carassius carassius, Schizothorax niger, Schizothorax esocinus, Schizothorax curvifrons, Schizothorax labiatus, Schizothorax plagiostomus, Crossocheilus diplochilus, Puntius conchonius, Botia birdi, Triplophysa kashmirensis, Triplophysa marmorata, Gambusia affi nis, Glyptothorax kashmirensis, Glyptothorax pectinoptrus* from the Wular Lake belonging to three orders and five families. The factors responsible for declining of biodiversity in Walur Lake were discharge of untreated sewage, agricultural wastes, catchment runoff, sand mining and illegal fishing.

It was observed that low fish diversity was observed at pollutes sites. Decline in fish diversity may be attributed to factors like domestic pollutants, sewages, agricultural runoff, habitat loss, degradation of water quality etc.

1. 

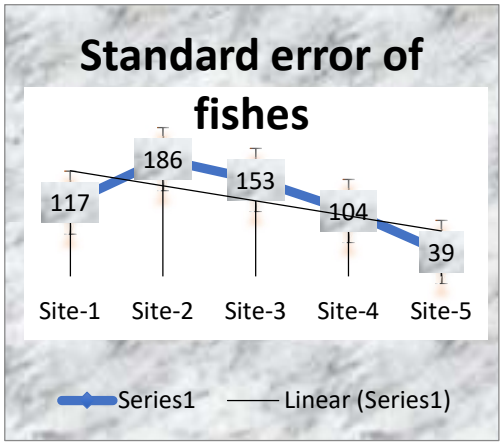

2. 


FIGURE1 : Total no. of fishes at five different sites Fig:2 Standard error of fishes at five different sites

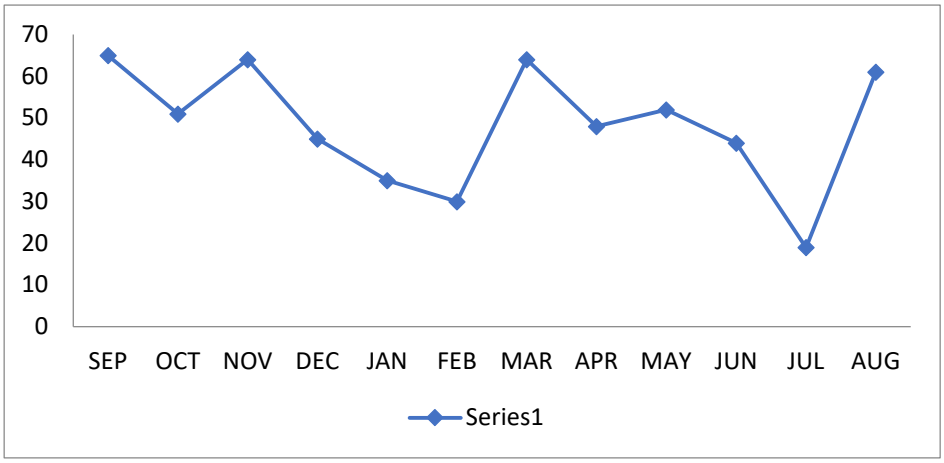



**Fig 3. Number of fishes in different months**

## 5. CONCLUSION

During this study we find that the fish catch as well as the diversity has apparently got reduced in the river Jhelum. Most probably the river ecosystem is not getting the adequate time to recover its natural community structure. Efforts need to be oriented to preserve this important lotic fish habitat which has tremendous economic and ecological significance.

## 6. REFERANCES


Brraich, Onkar Singh, and Irshad Ahmad Malik. (2016). "Short Communication Fish Fauna of Wular Wetland (Ramsar Site in Kashmir Himalayas," 3(September): 218–21.

Bunn S.E, Arthington A.H (2002) Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. *Environ Manag* 30:492–507.

Hynes, H. B.N. (1988). Biogeography and origins of the North American Stoneflies (Plecoptera). M em. *Ent. Soc. Can*., 144: 31-37.

Hynes, H.B.N. (1960). The biology of polluted waters. Univ. Press, Liverpool: 202.

Jones, J.R.E (1952). The reactions of fish to water of low oxygen concentration.f.exp.Bio., 29, 40.3-15.

Kant, S. and Raina, A. (1989). Pollution load on river Tawi at Jammu. In: Trends in Environmental pollution & pesticide toxicology. Proceedings of 8th Annual Session of Academy of Environmental Biology. Published by Jagmander Book Agency: 157-168.

Kullander S.O., Fang F., Delling B. and Ahlander E., (1999). The Fishes of the Kashmir Valley, In: L. Nyman (ed) River Jhelum, Kashmir Valley, Impact on the aquatic environment, SWEDMAR, Sweden, 100-167.

Mahmoud A. El-Seify;Mona S. Zaki; Abdel Razek Y. Desouky; Hosam H. Abbas; Osman K. Abdel Hady and Attia A. Abou Zaid (2011): Some Study on Clinopathological and Biochemical Changes in of Some Freshwater Fishes Infected With External Parasites and Subjected to Heavy Metals Pollution in Egypt. *Life Science Journal*,; 8(3): 401-405.

Naikoo, Bilal Ahmad, Ranju Gupta, and S M Zuber. (2015). "DIVERSITY OF FISHES IN RELATION TO ABIOTIC STATUS OF VAISHAV STREAM KULGAM , KASHMIR." 6(3): 501–5.

Pisca Ravi Shankar, Saraladevi B and Divakara Chary K (2000) The present status of Ibrahimbagh, a minor reservoir of Hyderabad. Fishing Chimes 20 (2): 41-43.

Poulin, R. (1992): Toxic pollution and parasitism of freshwater fish. *Aquatic Toxcology*. Vol4: 23-27.

Rumysa K, Sharique AA, Tariq Z, Farooq M, Bilal A, Pinky K, (2012). Physico-chemical status of Wular Lake in Kashmir. *Journal of Chemistry Biology and Physics Science*. 31:631-636.

Salasker PB and Yeergi SG., (2004). Primary productivity of powailake, Mumbai Maharastra. *J Aqua Biol* 19 (1): 19-22.

Sreekantha K.V., Gururaja and Ramachandra T.V. (2008), Nestedness pattern in freshwater fishes of the Western Ghats: an indication of stream islands along riverscapes, Current Science, 95(12), 25 (2008)

Srikanth K Ramu G and Benarjee G. (2009).The study on fish diversity of Rammappa Lake, Warangal district, Andhra Pradesh, India. *J Aqua Biol*., 24 (2): 57-60.

Zdenka, S., Richard,L.;Jana,M. and Blanka, (1993). Water Quality and Fish Health EIFAC Technical Paper. No 54. Rome, FAO P 59-70.

Zutshi, B., Prasad, S.G., (2008). Impact of Pollution on Fresh and Marine Water Resources. *Poll Res*. 27 (3): 461-466.