

## Tor Putitora, the Extinct Fish Species in River Swat Khyber Pakhtunkhwa, Pakistan

<sup>1</sup>Naveed Akhtar, <sup>1</sup>Kausar Saeed, <sup>2</sup>Jehan Sher Khan,  
<sup>1</sup>Adil Khan, <sup>1</sup>Waheed Akhtar and <sup>1</sup>Basit Akhtar

<sup>1</sup>Department of Zoology, Abdul Wali Khan University Mardan,  
Khyber Pakhtunkhwa, Pakistan

<sup>2</sup>Director Fisheries District Swat, Khyber Pakhtunkhwa, Pakistan

---

**Abstract:** Current study was conducted on River Swat and its tributaries to study the current status and distribution of *tor putitora* in the period of January to December 2015. During this study it was found that the July 2010 flood occurred in the whole province of Khyber Pakhtunkhwa was the main reason of extinction of *tor putitora* specie in the river swat and its tributaries.

**Key words:** Survey • *Tor putitora* • River Swat

---

### INTRODUCTION

The contamination of natural aquatic property, with heavy metals released from industrial, domestic and other anthropogenic actions has become a matter of concern over the past few decades [1]. Harmful effects of heavy metals on aquatic organisms can be detected by performing toxicity tests that allow establishing a dose-response relationship [2, 3] which help us in predicting acute damage to aquatic fauna as well as in regulating toxic chemical discharges into the water bodies [4].

A third of all freshwater fishes globally are threatened with extinction [5, 6] making them one of the most important vertebrate groups in need of urgent conservation attention. Freshwater fishes are increasingly threatened by a range of factors, including habitat loss, overexploitation and biological invasions [5, 7].

Khan and Sinha [8] treated all mahseers as 'endangered', [9] notably *Tor putitora* [10-12], which is now included in the Red List Category as Endangered [13]. The major threats are rapid urbanization, industrialization and other development activities along the river ecosystems, especially the ecologically insensitive hydropower development. Although, mahseer is listed in the Schedule 'I' of Wildlife Protection Act 1972, stakeholders are not fully aware of the legislation

and the importance of this indicator species. The extinction of mahseer species is inevitable, if these threats are not addressed immediately and measures to halt the present declining trends are not implemented. In light of these facts the existing state of knowledge important for its 'ex situ' and 'in situ' conservation and management has been reviewed. The review will also highlight the importance and attention accorded to mahseers by anglers, scientists, conservationists, policy makers and managers. World Wide Fund for Nature (WWF)—India initiated afresh wave of enthusiasm [14].

Mahseers (Tor species) are distributed in Southeast Asian and Himalayan regions including trans-Himalayan countries like Pakistan, India, Nepal, Myanmar and South-east Asian countries like Malaysia, Thailand, Cambodia, Lao-PDR, Vietnam etc. [15]. The golden mahseer in Indus River System is *Tor macrolepis*, found in four ichthyogeographic provinces of Pakistan [16]. Unfortunately natural mahseer populations are declining throughout its geographic distribution. The fish has now been identified as critically endangered in many countries and depletion of mahseer populations is reported from various parts of Pakistan, Bangladesh and India [17-19]. To protect mahseer from elimination and to conserve its natural stocks, the development of breeding, rearing and culture techniques of this fish are very essential [20].

Natural population of Mahseer is declining in all parts of its geographic distribution [21]. This fish is now recognized as a critically endangered species in many countries. The major possible factors for the depletion of Mahseer stocks are degradation of environmental conditions of water bodies, indiscriminate fishing, industrial pollution, use of explosives, poisons and electro fishing, introduction of exotic fish species and low fecundity rate [22, 23].

Different species or age classes of same specie vary considerably in vulnerability to flooding [24]. Juvenile life stages are particularly susceptible to heavy losses during extreme floods in high-gradient systems [25]. Floods can alter both assemblage structure and abundance of fishes in stream reaches [26].

Floods which occur over much shorter periods of time than drought can alter stream channel morphology, kill or displace biota downstream [24]. Flood causes major disturbances to stream ecosystems that kill or displace organisms and modify habitats [27]. The highest flood ever recorded in the River Swat was the mighty flood of July, 2010. The water discharges of River Swat recorded were 355,000 cusecs [28].

Due to that flood the whole province of Khyber Pakhtunkhwa was drowned in water which badly affected the aquatic fauna of the area. The current study was conducted to study the current status of fish species *tor putitora* in the river swat and its tributaries.

## MATERIALS AND METHODS

**Description of Study Area:** Swat is a beautiful valley of KPK formally called as (NWFP), Pakistan and lies between 34° 34" and 35° 55" north latitudes and 72° 08" and 72° 50" east longitudes. The total area of the district is 5337 Km<sup>2</sup>. Swat is located in the lap of mountainous ranges, which are the off shoots of Hindukush; so the larger part of Swat is covered with mountains and hills. True plain is not found in Swat, yet local people call some areas plain surfaces. These plain surfaces receive water from River Swat and its tributaries for irrigation.

**Field work and Methodology:** River swat is a beautiful river flowing in the district Swat and finally falls in river Indus. On the way many small rivers meet with rivers swat. The current study was conducted on river swat and its tributaries in the period of January 2015 to December 2015 for collection of *tor putitora*. The study was conducted with the help of different cast nets, dragon nets, hooks, automatic rods, gill nets and hand nets.

Table 1: different parameters of river swat

Parameters	Mean and S.E	Standard values
Water temperature	20.5+7.88	16-40
pH	7.15+0.122	6.5-9.0
Hardness	121.75+6.01	10-400
Chloride	16.2+1.014	10-600
Alkalinity	96.8+4.456	10-400
Nitrate	0.0092+0.00335	0.1

## RESULT AND DISCUSSION

During current study the River Swat and its tributaries were surveyed for its current status and distribution. It was found that due to the flood occurred in July 2010 results in the minimizing of the *tor putitora* species and gradually after that the numbers of this species becomes dwindling in the rivers of swat.

Akhtar *et al.* [29] reported this species from manglawar valley of swat. Ishaq *et al.* [30] reported *tor macrolepis* from River Swat. During current study the *tor putitora* species were not recorded and are found that they had become extinct from river swat. This might be because of the environmental factors like water temperature, dissolved oxygen, electrical conductivity, calcium hardness, magnesium hardness, sodium, potassium, alkalinity, chloride, nitrite etc, due to which fish become unable to survive in that area and these factors compel the species on migration. In our study the mean values recorded for physico- chemical parameters were, water temperature 20.5°C, pH 7.15, total hardness 121.75 mg/l, total alkalinity 96.8 mg/l, chloride 16.2 mg/l and nitrite 0.0092 mg/l. All the values were found within the tolerating range as shown in Table 1.

Large numbers of young fish are even lost during average seasonal flooding in systems where the timing of high flows coincides with fragile life stages [31]. Our result is supported this statement because most of the fish species of the *tor putitora* and other fish species were found dead on the sides of River Swat due to flood occurred in July 2010.

Very young fishes may be particularly vulnerable to floods because of their poor swimming ability and small size [32]. This might be one of the possible cause of *tor putitora* extinction in river Swat because this was the spawning period of the *tor putitora* and some small fishes were unable to swim and were flushed away by the tides which was a step toward its extinction in river Swat.

Floods cause a sudden dramatic change in all environmental parameters and all these changes influence the organisms inhabiting the reservoir ecosystem from microorganisms to fish [33]. The July 2010 flood results in

the destruction of feeding, breeding and spawning habitats because discharge of River Swat at that time was recorded as 355,000 cusecs and most of these habitats were buried under the debris in which most of the small fishes and eggs were also destroyed.

Freshwater fishes are increasingly threatened by a range of factors, including habitat loss, overexploitation and biological invasions [5, 7]. *Tor putitora* in River Swat and its tributaries had faced many harmful activities due to which its natural habitats were destroyed and its population continuously dwindles, which become one of the main reasons of extinction in River Swat.

*Tor putitora* fish has now been identified as a critically endangered in many countries and depletion of mahseer populations is reported from various parts of Pakistan, Bangladesh and India [17-19]. To protect mahseer from elimination and to conserve its natural stocks, the development of breeding, rearing and culture techniques of this fish are very essential [20]. *Tor putitora* is the national fish of Pakistan and this specie is becoming extinct in many parts of Pakistan due to many reasons like biological invasions, natural disasters, over hunting, electric current, dynamite, chemicals and many others harmful gears. The notable authorities are requested that develop breeding and rearing cultures centers for the *tor putitora* to save this precious species because they have the right to live and also save them for our next generation.

## CONCLUSION

It is concluded from the present study that *tor putitora* had become extinct in the river swat and its tributaries. Protective measurements are required like developing breeding and rearing cultures centers to save the national fish of Pakistan.

## REFERENCES

1. Waqar, K., I. Ahmad, R. Kausar, T. Tabassum and A. Muhammad, 2013. Use of bioremediated sewage effluent for fish survival. *Int. J. Agric. Biol.*, 15: 988-992.
2. Akter, M.S., K. Ahmed, A.A. Akhand and M. Islam, 2008. Acute toxicity of arsenic and mercury to fresh water climbing perch, *Anabas testudineus* (Bloch). *World J. Zool.*, 3: 13-18.
3. Javed, M., 2013. Chronic effects of nickel and cobalt on fish growth. *Int. J. Agric. Biol.*, 15: 575-579.
4. APHA, AWWA, WPCP, 2005. Standard methods for the examination of water and wastewater". 21<sup>st</sup> Ed. American Public Health Association, Washington, DC.
5. Dudgeon, D., 2012. In The Status and Distribution of Freshwater Biodiversity in Indo- Burma (compilers: Allen, D. J. *et al.*), IUCN. Cambridge, UK and Gland, Switzerland, pp: 158.
6. Gray, R., 2013. The Telegraph, 30 July 2011; <http://www.telegraph.co.uk/earth/wildlife/8672417/Third-of-freshwater-fish-threatened-with-extinction.html> (accessed 10 February 2013).
7. Gozlan, R.E., S. St-Hilaire, S.W. Feist, P. Martin and M.L. Kent, 2005. Biodiversity: disease threat to European fish. *Nature*, 435: 1046.
8. Khan, M.A. and M. Sinha, 2000. Status of mahseer fisheries in north and north eastern India with a note on their conservation. *J. Inland Fish Soc. India*, 32: 28-36.
9. Thomas, H.S., 1897. The rod in India being hints how to obtain sport with remarks on the natural history of fish and their culture, 3<sup>rd</sup> edn. W. Thacker and Co., London (First Indian Edition 1984, Natraj Publishers, Dehradun).
10. Sehgal, K.L., 1992. Review and status of cold water fisheries research in India. Special Publication No 3, National Research Centre on Coldwater Fisheries (ICAR), Haldwani.
11. Johnsingh, A.J.T., V.P. Ajith and M.V. Nair, 2006. In troubled waters: mahseer at Parambikulam and its conservation. Wildlife Institute of India, Dehradun, pp: 4-6.
12. CAMP, 1998. Report of the workshop, Conservation, assessment and management plan for freshwater fishes of India 1997, organized by Zoo Outreach Organization (ZOO) and National Bureau of Fish Genetic Resources (ICAR), Lucknow.
13. Jha, B.R. and A. Rayamajhi, 2012. *Tor putitora*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. C ' <http://www.iucnredlist.org/>. Accessed 3 May 2012.
14. Nautiyal, P., S. Babu and S. Behera (compiled, eds), 2013. Mahseer conservation in India: status, challenges and the way forward. WWF-India, supported by Water Program HSBC.
15. De Silva, S.S., I. Brett, S. Stephen, T. David, Geoff and S.Y. Sim, 2004. Artificial propagation of indigenous tor species, empurau (*T. tambroides*) and semah (*T. douronensis*), Sarawak, East Malaysia. *Research and Farming Techniques*, IX. 4: 15-20.

16. Pervaiz, K., Z. Iqbal, M.R. Mirza, M.N. Javed and M. Naeem, 2012. Meristic and Morphometric studies of Indus mahseer *Tor macrolepis* (Heckel) (Teleostei: Cyprinidae) from Attock, Pakistan. Int. J. Agric. Biol. Sci., 14: 169-175.
17. Mirza, M.R., M.N. Javed and M. Tariq, 1994. A note on the fish of the river Zhob, Pakistan. Pak. J. Biol. Sci., 26: 189.
18. Kulkarni, C.V., 1991. Mahseer, the mighty game fish of India. Fish Chimes., 11(3): 43-49.
19. Dubey, G.P., 1994. Endangered, vulnerable and rare fishes of West Coast river system of India. Threatened Fish of India. Proceedings of the National Seminar on Endangered Fishes of India Held at National Bureau of Fish Genetic Resources, Allahabad, India, (1992). Nature Conservators, pp: 77-95.
20. Rahman, M.A., M.R. Rahman and M.S. Rahman, 2007. Evaluation of growth and production of mahseer, *Tor putitora* (Ham.) in polyculture with indigenous major carps. Mahseer: The Biology, Culture and Conservation. Proc. International Symposium on the "Mahseer 2006", Kuala Lumpur, Malaysia, pp: 161-175.
21. Bista, J.D., K.W. Suresh and P.B. Arun, 2006. Maturity stage and spawning performance of Mahseer *Tor putitora* in ponds of Mid Hills Nepal (Abstract) International Symposium on the Mahseer Kuala Lumpur, Malaysia. (March 29-30).
22. Das, P. and K.D. Joshi, 1994. Mahseer conservation - present and future, *P. Nautiyal* (com. & ed.) Mahseer the Game Fish", pp: D3-D9.
23. Rahman, M.A., M.A. Mazid, M.R. Rahman, M.N. Khan, M.A. Hossain and M.G. Hussain, 2005. Effect of stocking density on survival and growth of critically endangered mahseer, *Tor putitora* (Hamilton) in nursery ponds. Aquaculture, 249: 275-284.
24. Harrell, H.L., 1978. Response of the Devil's River (Texas) fish community to flooding. Copeia, pp: 60-68.
25. Elwood, J.W. and T.F. Waters, 1969. Effects of floods on food consumption and production rates of a stream brook trout population. Trans. Am. Fish. Soc., 98: 253-262.
26. Ross, S.T., W.J. Matthews and A.A. Echelle, 1985. Persistence of stream fish assemblages: effects of environmental change. Am. Natural., 126: 24-40.
27. Franssen, N.R., K.B. Gido, C.S. Guy and J.A. Tripe, 2006. Effects of floods on fish assemblages in an intermittent prairie stream. Freshw. Biol., 51: 2072- 2086.
28. Yousafzai, A.M., W. Khan and Z. Hasan, 2013. Fresh Records on Water Quality and Ichthyodiversity of River Swat at Charsadda, Khyber Pakhtunkhwa. Pakistan J. Zool., 45(6): 1727-1734.
29. Akhtar, N., S. Khan and K. Saeed, 2014. Exploring the Fish Fauna of River Swat, Khyber Pakhtunkhwa, Pakistan. World Journal of Fish and Marine Sciences, 6(2): 190-194.
30. Ishaq, M., S. Khan, J. Khan, N. Akhtar and K. Saeed, 2014. Study on Ichthyofaunal Biodiversity of River Swat. World J. Fish & Marine Sci., 6(4): 313-318.
31. Nehring, R.B and D.D. Miller, 1987. The influence of spring discharge levels on brown and rainbow trout recruitment and survival, Black Canyon of the Gunnison River, Colorado, as determined by IFIM, PHABSIM models. Proceedings Annual Conference, Western Association of Fish and Wildlife Agencies, Salt Lake City, Utah, pp: 388-397.
32. Harvey, B.C., 1987. Susceptibility of young-of-the year fishes to downstream displacement by flooding. Trans. Am. Fish. Soc., 116: 851-855.
33. Godlewska, M., G.M. Boron, A. Pocięcha, E.W. Wozniak and M. Jelonek, 2003. Effects of flood on the functioning of the Dobczyce reservoir ecosystem. Hydrobiologia, 504: 305-313.