

Study of Fish Fauna, Species Diversity and Relative Abundance of Fishes in River Asan in Western Dehradun, Uttrakhand

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ABSTRACT

During the present investigation a total of 10 genera, 4 families and 3 orders were reported from the Asan River. *Tor pituitoria* was the most abundant fish it has 18.6 percentage compositions, it constitutes 0.169 and 18.65 percentage relative abundance. *Tor tor* was least abundant with percentage composition of 1.20, it constitutes 0.011 abundance and with 1.21 percent as relative abundance. The fish species diversity during study period was 0.889 which indicates the good diversity of the River Asan during study period.

Key words: Realtive abundance, species diversity, percentage composition

INTRODUCTION

Uttrakhand is rich in terms of fish diversity due to two major important perennial rivers of India i.e. Ganga and Yamuna supported by many other tributaries. it has also many fish production seed and farms like Bhimal and Dakhrani where culturing of many species like Mahasheer and common crap is practiced in order to enhance the fish productivity in the state . Doon valley acts as connective link between the plains and hill stream fishes. Geographically Dehradun district can be divided into Eastern and Western Doon valley. Eastern part is supported by Ganga with number of tributaries and western part is supported by Yamuna with number of tributaries as Asan and tons etc. however the western part of the Doon valley remains less

explored as compared to eastern Doon valley as the accessibility in western Doon valley. As per the review of literature, the research work on fishes was carried out on Eastern Doon valley^{3,4,5,6,7,8,9,12,16,17,18,20,21,22,23,24}. Whereas Western Doon Valley (Yamuna drainage) remains less Explored due to tough terrain and poor accessibility of roads Singh¹⁸ for the first time surveyed the western Doon Valley Recently by some researchers^{1,25,26,27,28}. They conducted the survey of western Doon valley and worked on the taxonomy, ecology, food and feeding, breeding habitat, hydro-biology, fishing methods, GIS and Remote sensing application and conservation and management approach related to the fish and fisheries of the area.

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In the present study attempt has been made to find out the fish fauna, fish species diversity and relative abundance in River Yamuna.

MATERIALS AND METHODS

The study is carried out from February, 2015 to February, 2016. For the collection of fishes, cast net of 1-2 m diameter with mesh size of 0.05 cm knot to knot with heavy sinkers, which allow rapid settling of the net at the bottom is used. At the each study site, at a time 10-15 throws were casted at different sites of the lake between mid-morning and late afternoon on a fixed day every month. Representative specimens of different fish species were preserved in 10 % formaldehyde solution and identified in the laboratory using standard references^{2,19,10}.

RESULTS

Total 166 fishes were collected from Asan River during February 2015 to February 2016. During the present investigation a total of 10 genera, 4 families and 3 orders were reported from the Asan River. *Tor pituitora* was the most abundant fish it has 18.6 percentage compositions, it constitutes 0.169 and 18.65 percentage relative abundance. *Tor pituitora* was followed by *Barilius bendelisis* with percentage composition of 17.47, its abundance was 0.158 and with 17.44

percentage relative abundance. Of all the fishes *Tor tor* was least abundant with percentage composition of 1.20, it constitutes 0.011 abundance and with 1.21 percent as relative abundance. *Chagunius chagunio* with percentage composition 10.24, abundance 0.093 and 10.26 percent relative abundance. *Danio devario* with 15.66 percentage composition, 0.142 abundance and relative abundance 15.67 percent, *Puntius ticto* with 10.24 percentage composition, 0.093 abundance and 10.26 relative abundance, *Mastacembalus armatus* with 5.24 percent composition, 0.049 abundance and 5.40 percent relative abundance, *Mystus bleekeri* with 3.61 percent composition, 0.033 abundance and 3.53 percent relative abundance, *Glyptothorax pectinopterus* with 7.23 percent composition, 0.065 abundance and 7.17 percentage of relative abundance, *Puntius sophore* with 4.22 percentage composition, 0.038 abundance and 4.19 percentage of relative abundance and *Garra lamta* with 6.02 percentage composition, 0.055 abundance and 6.07 percentage of relative abundance. As per the commercial values of the fishes are concerned the fishes like genus *Barilius*, *Puntius* and *Tor* are food fishes. As per the conservation status is concern *Tor pituitora* and *Mastacembalus armatus* are endangered. The fish species diversity during study period was 0.889 which indicates the good diversity of the River Asan during present investigation.

Table: Diversity Index, Percentage Composition, Abundance and relative Abundance of fishes in River Asan

S. No.	Fish Species	(%)	Abundance	Relative Abundance
01	<i>Chagunius chagunio</i>	10.24	0.093	10.26 %
02	<i>Barilius bendelisis</i>	17.47	0.158	17.47 %
03	<i>Danio devaria</i>	15.66	0.142	15.67 %
04	<i>Puntius ticto</i>	10.24	0.093	10.26 %
05	<i>Tor pituitora</i>	18.67	0.169	18.65 %
06	<i>Tor tor</i>	1.2	0.011	1.21 %
07	<i>Mastacembalus armatus</i>	5.42	0.049	5.40 %
08	<i>Mystus bleekeri</i>	3.61	0.032	3.53 %
09	<i>Glyptothorax pectinopterus</i>	7.23	0.065	7.17 %
10	<i>Puntius sophore</i>	4.22	0.038	4.19 %
11	<i>Garra lamta</i>	6.02	0.055	6.07 %

*Shannon-Wiener (H') = 0.952



Fig. 1: *Chagunius chagunio*



Fig. 2: *Barilius bendelisis*



Fig. 3: *Danio devaria*



Fig. 4: *Puntius ticto*



Fig. 5: *Tor putitora*



Fig. 6: *Tor tor*



Fig. 7: *Mastacembalus armatus*



Fig. 8: *Mystus bleekeri*



Fig. 9: *Glyptothorax pectinopterus*



Fig. 10: *Puntius sophore*



Fig. 11: *Garra lamta*

DISCUSSION

The study depicted presence of 10 species contributing about 20.58% of total fish diversity published from western Doon Valley¹¹ and about 14.89 percent of total fish species from an entire Doon Valley¹⁸. During the present investigation order cypriniformes has emerged as the most abundant group. This finding was in accordance to the finding of earlier workers^{8,13} who reported the cypriniformes as the most abundant group with the total fish catch of 35 percent and reported the cypriniformes the most abundant group. Similar results have been reported by other researchers^{14,15}. They reported 13 fish species from the Nainital Lake in which order Cypriniformes was abundant. The result was in accordance to another ichthyologists²⁹. They have studied 12 high altitude lakes of Jammu

and Kashmir to obtain information on the status of limnology and fish stocks and reported the dominance of Cypriniformes order among the all fish population. Similar observations were reported from the Asan River where the order Cypriniformes was the dominant among the fish population.

CONCLUSION

Species diversity in different sampling sites indicated that altered habitat support less fish species while variety habitat like shallow pool and deep pools are the primary habitats contributing to the maximum diversity, order Cypriniformes emerged as the most dominant group therefore, protection of these particular habitats is recommended for conservation and management of the fish biodiversity.

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REFERENCES

1. Bahuguna, S.N., Uniyal, D.P., Kumar, A. and Bahuguna, M., Fishing method and related problem in the tribal area of Jaunsar-Bawar (Uttaranchal) Western Himalaya, India. *Ann. For.* **9(1)**: 152-162 (2001).
2. Day, F., The Fishes of India: Being a Natural History of the Fishes Known to Inhabit the Seas and Fresh Waters of India, Burma and Ceylon Text and atlas, London, 1829, 1889; B. Quaritch, 1875-1878.
3. Grover, S.P. and Tripathi S.A., study of sexual dimorphism in *Barilius bendelisis* (Hamilton) (Cyprinidae: Cypriniformes). *Cheetal*, **26(3-4)**: 49-53 (1985).
4. Grover, S.P., Agarwal B.S. and Rauthan J.V.S., Ichthyofauna of Doon valley. *Him. J. Env. Zool.*, **38(2)**: 133-136 (1994).
5. Hora, S.L. and Mukherjee, D.D., Fishes of Eastern Doon, United provinces. *Rec. Indian Mus.*, **38(2)**: 133-146 (1936).
6. Husain, A. and Tilak, R., Fishes (Pisces) fauna of conservation area: Rajaji National Park. *Zoological Survey of India Publication*, **5**: 115-193 (1995).
7. Husain, A., On the hill stream Loach, *Nemacheilus rupecola* (McClelland) with bifurcated rostral barbell and deformed caudal fin. *Bull. Zool. Surv. India.*, **7(2&3)**: 337-339 (1985).
8. Husain, A., Pisces: In Fauna of Western Himalaya (U.P.) *Zool. Surv. of India. Him. Eco. Series.* **9 (Part-I)**: 117-150 (1995).
9. Husain, A., Studies on the fish fauna of some streams of Dehradun with notes on systematic, ecology and zoogeography. **1&2**: 7. (D. Phil, Thesis submitted to H.N. B. Garhwal University, Srinagar, Unpublished (1987).
10. Jayaram, K.C., The Fresh Water Fishes of the Indian Region, New Delhi, Narendra Publishing House (1999).
11. Mehta, H.S. and Gupta, S.K., Faunal diversity Western Doon Shiwaliks. *Zoological Survey of India*, Kolkata, pp: 41-59 (2007).
12. Mishra, D.N. and Joshi, D.P., Working plan for the West and East Dehradun forest division Uttar Pradesh, **part-I**: 1-55 (1970).
13. Negi, R.K. and Mamgain, S., Species diversity, abundance and distribution of fish community and conservation status of Tons River, Uttarakhand state, India. *J. Fisheries and Aquatic Sciences*, **8**: 617-626 (2013).
14. Negi, R.K. and Rajput, V., Fish Diversity in two lakes of Kumaon Himalaya Uttarakhand, *India. Res. J. Biol.*, **2(5)**: 157-161 (2012).
15. Pant, M.C. and Bisht, J.S., Impact of changing environment on the lacustrine fisheries of Nainital. *Science and Rural Development in Mountains. Nainital Gyanodaya Prakashan*, 437-448 (1980).
16. Prakash, K.O. and Grover, S.E., Factors responsible for the dwindling fish fauna of Doon Valley. 4th All India Seminar Ichthyol, Dehradun, 619 (Abstract) (1983).
17. Rauthan, J.V.S., Rawat, G., Joshi, V. and Grover, S.V., Taxonomy account and field observation and biology of trout, *Barilius vagra vagra* (Ham.) in Doon Valley. *Cheetal*, **39(3-4)**: 62-66 (2000).
18. Singh P.P., Fishes of Doon Valley. *Ichthyologica*, **(1-2)**: 86-92 (1964).
19. Talwar, P.K. and Jhingran, A.G., Inland Fishes, vol. 1&2, New Delhi, Oxford and IBH Publishing Co Pvt. Ltd (1991).
20. Tilak, R. and Husain, A., Description of a new Cyprinid, *Barilius dimorphicus* (subfamily; Rasborinae) from Rajaji National Park, Uttar Pradesh. *J. Bombay Nat. Hist. Soc.*, **87(1)**: 102-105 (1990).
21. Tilak, R. and Husain, A., Description of a new species of the Genus *Glyptothorax blyth* from the river Yamuna, India

- (Pisces: Siluriformes: Sisoridae). *Annal. Zool. Warszwa.* **33(14)**: 229-234 (1976).
22. Tilak, R. and Husain, A., Description of new species of Genus *Nemacheilus* from District Dehradun (U.P.). *Sci. & Cult.* **43(3)**: 133-135 (1977).
23. Tilak, R. and Husain, A., Description of new Species of the Genus *Lepidocephalus bleeker* from Uttar Pradesh (Cobitidae: Cypriniformes). *Matsya*, **3**: 60-63 (1978).
24. Tilak, R. and Husain, A., Notes on fishes of Doon Valley, Uttar Pradesh, I. Distributional and morphological studies on some glyptothoracid fishes, Family Sisoridae. *Rec. Zool. Surv. India*, **67(1-4)**: 391-399 (1973).
25. Uniyal, D.P. and Kumar A., Fish diversity in selected streams of Chakrata and Shiwalik hills (District Dehradun, Uttrakhand) India. *Rec. Zool. Surv. India*, **253**: 1-120 (2006).
26. Uniyal, D.P. and Kumar, A., Strategy for conservation of fish diversity of Uttaranchal. In: National Biodiversity Strategy action Plan for Uttaranchal (ed. A.S.Negi and A. Kumar), 74-76 (2002).
27. Uniyal, D.P., Bahuguna S.N. and Kumar, A., Fishery potential in Doon Valley. In Proceeding Natural Wealth of Uttaranchal, Seminar organized by Lucknow University Alumni Association, Dehradun. (Ed. N. K. Verma) Technology Publication, Dehradun, pp: 59-71 (2002).
28. Uniyal, D.P., Bahuguna, S.N., Kumar, A., and Bahugana, M., Bleaching powder meance for fish of Amlawa River of Western Doon Valley. *Cheetal.*; **40(3&4)**: 67-68 (2001).
29. Vass, K.K., Wanganeo, A., Raina, H., Zutshi, D.P. and Wanganeo, R., Summer limnology and fisheries of high mountain lakes of Kashmir Himalaya. *Arch. Hydrobiology*, **114(4)**: 603-619 (1989).