

Study of freshwater fish fauna and water quality at Paintakli dam from Buldhana district, (M.S) India

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Abstract

Present investigation is carried out during the study period Jun 2010 to May 2011 to study the fish fauna from Paintakli dam. It is a perennial water resource which used for human consumption, agriculture and fisheries in taluka Chikli and Mahekar, district Buldhana. It is situated approximately 45 km from district Buldhana. In the present study it was observed that the ichthyofauna belong to 07 order 10 families, 19 genus and 21 species, were Cyprinidae family is dominant with 10 (47.61%) species followed by Channidae and Mastacembelidae with 02 (9.52%) species, Balitoridae, Bagridae, Clariidae, Belonidae, Notopteridae, Cichlidae, and Poeciliidae contribute 01(4.76%) species each. Finally it may be concluded that the water parameters are within permissible limit and support fish diversity of Paintakli dam were Cyprinidae family which is dominant and still in a position to set a good example of conservation and sustainable management of fish and fishery.

Keywords: Ichthyofauna, diversity, Cyprinidae, Paintakli dam, Buldhana

INTRODUCTION

Biodiversity is essential for stabilization of ecosystem protection of overall environmental quality for understanding intrinsic worth of all species on the earth [10] Fishes are the only major group of vertebrate which very much effect on human civilization from ancient time to date. It is one of the good and cheapest sources of proteins food for economic as well as high class people so it is essential to study the distribution and the availability of fish from freshwater reservoirs and tanks [38]. Painganga river is one of the major rivers from Viderba region which successfully contribute the biological diversity of this region

From the 18th century to date various workers have studied about Taxonomy, ichthyofaunal diversity i.e., [13] [9] [27] from Himalayan Rivers, [8] from Godavari and Krishna river, [19] studied fishes of Cavery river. However scanty information is available of fishes regarding Paintakli dam of Buldhana district. Hence an attempt has been made here to present piscine inventory from Paintakli dam.

STUDY AREA

Paintakli dam is a medium irrigation project constructed by Irrigation department of Government of Maharashtra and constructed on River Painganga, basin Godavari near Paintakli village (at the upper side of the village) Taluka Mahekar, District Buldhana (M.S) India. The study area was 45 km away from Buldhana district and

200 km from fishery research laboratory, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad having latitude 20°16' 09.42" N and longitude 76°28' 27.52" E [15] The irrigation area is 794.35 Sq. km. Average rain fall is 761.32 mm and climate is cold in winter and hot in summer season. The water storage capacity of dam is 67.355 Mcum. The basic purpose of dam is for drinking water, irrigation, domestic use and fishing to nearby villages.

Objectives

To Report the freshwater fish diversity from Buldhana district (Vidarbha region)

To analysis the present status, categories of freshwater fish and fishery from Paintakli dam Buldhana district.

To generate gainful rural employment with special reference to fishing communities.

Material and methods

To study the ichthyofauna of Paintakli dam from Jun 2010 to May 2011, fish samples were collected from dam which represents the ichthyofaunal composition of Paintakli dam.

Fish samples were collected every week during the study period from the fish landing centers with the help of skilled local fishermen by various fishing crafts, gears with variable mesh size. Sampling points were distributed throughout the site to cover its whole area and location was changed for the collection of fish fauna according to the season.

Identification of fishes was done up to species level at fish landing center to get its natural color, pattern of scales, fins, mouth pattern, identification marks like black spot, blotch on operculum, paired and unpaired fins and body parts with the help of standard literature by [7] [13] [39] [9] [19][20][21] (1999); [18] [43] [27] [22] and etc. According to the season, locations were changed for successive fishing operation.

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Fish species which were not identified on the field (landing center) were preserved in 10 % formalin .These fish samples were brought to Fishery research laboratory, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad for further identification.

Specimen with doubtful identifying characters was sent to Zoological Survey of India (ZSI) Pune, regional branch (ZSI) Kolkata for identification.

To study the water quality, which define as physical, chemical parameters Water samples were collected monthly at 2 feet depth from the surface area of the water body from the two sampling points in between 7 to 11 am during the study period. The first sampling point (S₁) near the wall of the dam and second sampling site (S₂) at the river entry point and the distance between two sampling points were approximately 2 to 5 km.

Study of physical parameters

Physical parameters were analyzed by the standard methods described by APHA (1992), [41]

pH (Hydrogen ion concentration)

pH of water was recorded by field pH Meter Hanna –Model champ during study period on sampling sites.

Temperature

Air temperature of Paintakli dam was recorded from June 2010 to May 2011. The temperature was recorded with a centigrade mercury thermometer (graduated from 0.0 °C to 110 °C) in the field.

Study of Chemical parameters

Water samples from Paintakli dam during the study period June 2010 to May 2011 were collected monthly and brought to the Fishery research laboratory, Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, for analysis of various chemical parameters.

Chemical parameters like dissolved oxygen, free CO₂, determined by standard methods as described by [41]

Dissolved oxygen

Dissolved oxygen was estimated in the laboratory by using Winklers iodometric method as described by [41]

Free Co₂

Free Co₂ was estimated in the laboratory by using titration method by [41]

Systematic position of fish species at paintakle dam from Buldhana district (M.S) India

Sr.No	Order	Family	Genus	Species
01	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>rohita</i>
			<i>Puntius</i>	<i>stigma</i>
				<i>ticto</i>
			<i>Salmostoma</i>	<i>phulo</i>
			<i>Garra</i>	<i>lamta</i>
			<i>Rasbora</i>	<i>daniconius</i>
			<i>Catla</i>	<i>catla</i>
			<i>Cyprinus</i>	<i>carpio communis</i>
				<i>mMrigala</i>
			<i>Cirrhinus</i>	<i>molitrix</i>
			<i>Hypothalmichthys</i>	
				Genus :- 9
				Species:-10
				Balitoridae
				<i>Nemacheilus</i>
		<i>beavani</i>		
		Genus :- 01		
		Species:- 01		
	Result	Family :- 02	Genus :- 10	Species :- 11
02	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	
				<i>armatus</i>
				<i>pancalus</i>
				Genus :- 02
				Species:- 02
	Result	Family :- 01	Genus :- 02	Species :- 02
03	Siluriformes	Bagridae	<i>Mystus</i>	
				<i>bleekeri</i>
				Genus :- 01
				Species:- 01
		Claridae		

			<i>Clarias</i>	
				<i>batrachus</i>
			Genus :- 01	Species:- 01
	Result	Family :- 02	Genus :- 02	Species :- 02
04	Osteoglossiformes			
		Notopteridae		
			<i>Chitala</i>	
				<i>chitala</i>
			Genus :- 01	Species:- 01
	Result	Family :- 01	Genus :- 01	Species :- 01
05	Perciformes			
		Channidae		
			<i>Channa</i>	
				<i>orientalis</i>
				<i>punctatus</i>
		Cichlidae		
			<i>Oreochromis</i>	
				<i>mossambica</i>
	Result	Family :- 02	Genus :- 02	Species :- 03
06	Beloniformes	Belonidae		
			<i>Xenentodon</i>	
				<i>cancila</i>
			Genus :- 01	Species:- 01
	Result	Family :- 01	Genus :- 01	Species :- 01
07	Cyprinodontiformes	Poeciliidae	<i>Poecilia</i>	<i>reticulate</i>
	Result	Family :- 01	Genus :- 01	Species :- 01
	Order : 07	Family : 10	Genus :19	Species: 21

Fish status at paintakle dam from Buldhana district(M.S) India

Sr.No	Name of Fish	FF	HEI	HNF	CF	HSF	OF	LF	EXPT F	MCF	TR	EN	VU	R	LR-NT	C	UNC	EX
01	<i>Labeo rohita</i>	✓	✓	✓												✓		
02	<i>Puntius stigma</i>	✓					✓		✓							✓		
03	<i>Puntius ticto</i>	✓			✓		✓	✓	✓	✓					✓	✓		
04	<i>Salmostoma phulo</i>	✓					✓									✓		
05	<i>Garra lamta</i>	✓				✓	✓		✓							✓		
06	<i>Rasbora daniconius</i>	✓				✓	✓	✓	✓	✓						✓		
07	<i>Catla catla</i>	✓	✓	✓												✓		
08	<i>Cyprinus carpio communis</i>	✓	✓	✓					✓							✓		✓
09	<i>Cirrhinus mrigala</i>	✓	✓	✓												✓		
10	<i>Hypthalmichthys molitrix</i>	✓	✓	✓												✓		✓
11	<i>Nemacheilus bevani</i>	✓	✓	✓			✓	✓	✓								✓	
12	<i>Mastacembelus armatus</i>	✓	✓	✓			✓				✓					✓		
13	<i>Macrognathus pancalus</i>	✓	✓				✓						✓			✓		
14	<i>Mystus bleekeri</i>	✓				✓										✓		
15	<i>Chitala chitala</i>	✓	✓	✓			✓				✓		✓			✓		
16	<i>Channa orientalis</i>	✓						✓	✓	✓						✓		
17	<i>Channa punctatus</i>	✓					✓	✓	✓	✓					✓	✓		
18	<i>Xenentodon cancila</i>	✓					✓	✓	✓	✓						✓		
19	<i>Oreochromis mossambica</i>	✓	✓	✓			✓	✓	✓	✓						✓		✓
20	<i>Clarias batrachus</i>	✓				✓		✓	✓				✓			✓		
21	<i>Poecilia reticulata</i>						✓	✓		✓								✓

Sr.No	Name			Name	
1	Food Fish	FF	8	Exotic Fish	EX
2	Highly Native Fish	HNF	9	Coarse Food fish	CF
3	Mosquito Control Fish	MCF	10	Forage Fish	FR
4	Highly economic IMP	HEI	11	Experimental Fish	EXPTF
5	Hill Stream Fish	HSF	12	Threatened fishes	TR
6	Larvivorous Fishes	LF	13	Vulnerable fishes	VU
7	Ornamental Fish	OF	14	Endangered fishes	EN
8	Lower risk near threatened	LR-nt	15	Rare	R
9	Common	C	16	Uncommon	U n C

Ref:- [12], [32][7][21] [25][14][33][1][11] [12] [6][28][16]

Physico-chemical parameters of Paintakle dam, 2010-2011

Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Air Temp.	32.0	26.5	25.5	27.5	23.5	21.75	22	22.25	26	33.1	37	40
pH	7.35	7.8	7.85	7.05	8.1	8.3	7.3	7.55	7.95	7.45	7.25	8.25
DO	4.45	5.2	5.4	5.0	10.9	11.0	11.2	8.6	7.8	6.0	4.0	3.8
CO ₂	6.6	3.0	3.2	4.0	3.0	4.2	4.0	3.6	4.1	5.4	7.5	7.6

All values are expressed in mg/L except Temperature (°C) and pH.

RESULT AND CONCLUSION

During the study period it was observed that the ichthyofauna belong to 07 order 10 families, 19 genus and 21 species, where Cyprinidae family is dominant with 10 (47.63%) species followed by Channidae and Mastacembelidae with 02(9.52%) species, Balitoridae, Bagridae, Clariidae, Belonidae, Notopteridae, Cichlidae, and Poeciliidae contribute 01(4.76%) species each.

Similar result were found by [25] reported 36 species under 19 genera under the family Cyprinidae from Nathasagar reservoir, Paithan. [14] recorded 07 species under 07 genera under the family Cyprinidae from Thodga reservoir Ahmedpur district Latur, Maharashtra. [17] Reported 25 species under 11 genera under the family Cyprinidae from Solapur district Maharashtra. [42] Reported 06 species under 04 genera under the family Cyprinidae from Bheema river Gulbarga district, Karnataka. [29] reported 26 species under 12 genera from fresh water of Northern – Sumatra, Indonesia. [37] reported 87 species under 36 genera under the Cyprinidae family from freshwater of Nepal. [38] observed 11 species under 10 genera under the Cyprinidae family from Harsul Savangi dam dist Aurangabad (M.S).[34] [17] [36] and [5]studied fish diversity of Ujani wetland , Koyna river northern western ghat , Upper Dudna dam ,Jalna district and Kasar sai dam, Hinjewadi Pune recorded Cyprinidae family is dominant on other families respectively.

During the study period the maximum temperature was recorded in the month of may 40 °C and minimum in November 21.75 °C, [33] reported air temperature range between 27.0°C to 35.0°C where minimum temperature was recorded in winter season and maximum temperature in summer season from Nagapur near Parli Vaijanath, Beed district. [25] reported similar results from Manar river, Nanded district, Air temperature was minimum in winter season and maximum in summer season at paintakle dam ,this change in temperature may be related to the photoperiod. Maximum pH was 8.3 in November and minimum in the month of September 7.05 the high range of pH may be due to the biological activity and temperature changes. Significant changes in pH also occur due to disposal of drainages, seasonal variation may be due to variation in the photosynthetic activity which increases pH due to consumption of carbon dioxide in the photosynthetic process.

These results are identical to those reported by [30] from Pauna river, Pune district, [40] from Sikandrapur reservoir, Basti (U.P.), [35] from Bhadra river of western Ghats (India), [3]The maximum CO₂ was observed in the month of may 7.6 and minimum was recorded in December 3.0 the free CO₂ concentration was minimum in winter, this might be due to high photosynthesis activity and maximum in summer which may be due to less photosynthetic activity because of low phytoplankton population [3]recorded similar result , maximum DO was recorded in the month of December 11.2 and minimum was recorded in the month of may 3.8. These results are identical to those reported by [24] [40]; [35] from Bhadra River of western Ghats India, Martin, (2004) from South Indian River Tamiraparani, Munwar,. The 6 mg/L to 9 mg/L range of DO is supported for portability and aquaculture, [41] DO is inversely proportional to CO₂.

Paintakle dam contribute 20 food fishes,18common fishes12 ornamental fishes, 10 highly economic and experimental fishes each,09 highly nutritive fishes, 07 larvivorous and mosquito control fishes, 06 hill stream fishes, 04 exotic fishes ,03 vulnerable,02

threatened ,01 uncommon, coarse food fish and lower risk near threatened fishes are recorded [12], [32][7][21] [25][14][33][1][11] [12], [6][28][16]

During the study period it was observed that all the water parameters are within the permissible limit and shows supportive correlation to the ichthyofaunal diversity were Cyprinidae family is dominant and still in a position to set a good example of conservation and sustainable management of fish and fishery.

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REFERENCES

- [1] Ahirrao, S.D., and A.S Mane. 2000. The Diversity of Ichthyofauna, Taxonomy and Fisheries from freshwater of Parbhani district. *J. Aqua. Biol.* Vol. 22 (1&2) 40-43.
- [2] APHA 1992. Standard Methods for the Examination of Water and Wastewater, 18th ed. American Public Health Association, Washington DC.
- [3] Ashashree H.M., Srinivasa, A and Swamy Renuka, H.M. (2008):- Bio-Diversity of fishes in Savalanga pond Davangere District Karnataka. *J. Aqua. Biol.*, Vol. 23 (2), 2008: 36-39.
- [4] Bapurao Jadhav;Sanjay Kharat and Neelesh Dahanukar 2011. Freshwater fish fauna of Koyna River, northern Western Ghats ,India., *Journal of Threatened Texa* January 2011 3(1): 1449-1455.
- [5] Bhalerao S.N 2012. study of Fish Diversity and Water Quality at Kasar Sai Dam, Hinjewadi Pune India., *International research journal of Biological Sciences* vol 1(4),51-55 August.
- [6] Chandra G., Bhattachorjee I., Chatterjee S.N. & Ghosh. 2008. Mosquito Control by Larvivorous fish; *Indian J. Med Res.* 127: PP 13-27.
- [7] Datta Munshi J.S and Shrivastava 1988. Natural History of fishes and Systematic of freshwater fishes of India. Narendra Publishing House New Delhi- 110006.
- [8] David A 1963. Studies on fish and fisheries of Godavari and Krishna river system. *Pt .I .proc. Matur. Acad. Sci., India, Allahabad.* 33 B (2): 263-286.
- [9] Day, F.1878. The fishes of India, being A natural history of the fishes known to inhabit the seas and fresh waters of India, Burma and Ceylon. Vol. I and II. Ceylon text and atlas in 4 pts., London.
- [10] Ehrlich P.R. and Wilson E.O.1991. Biodiversity studies: Science and policy, *Science*, 253: 758-762.
- [11] Elvira B. and Almodovar A. 2001. Freshwater Fish introductions in Spain: Facts and figures at the beginning of the 21st century. *J. of Fish. Biol.* 59 (Supplement A): 323-331.
- [12] Gupta S.K. and Gupta P.K. 2006. General and Applied

- Ichthyology (Fish and fishery). S. Chand and Company Ltd., new Delhi-110055 ISBN: 81-219-2629-7.
- [13] Hamilton F. 1822. An account of the fishes found in the river Gangas and its branches. I-VII. Printed for Archibald constable and company, Edinburgh and Hurst, Robinson and Co - 90, Cheapside London. pp: 405.
- [14] Hiware C.J. and Pawar R.T.2006. Ichthyofauna of Paithan reservoir (Nathsagar Dam) in Aurangabad district Marathwada region, Maharashtra state. Ecology of Env.APH, 5, Ansari road, Darya Gung, New Delhi-110002 Chapter 22: 209-215.
- [15] [http://www. Google Earth.com](http://www.GoogleEarth.com). 2012. Europe Technologies Data SIO, NOAA, U.S. Navy, NGA, GEBCO.
- [16] IUCN 2003. The IUCN Red List of Threatened Species International Union for Conservation of Natural Resources, Cambridge, U.K.
- [17] Jadhav S.S. & Yadav B.E. 2009. A note on the Ichthyofauna of Solapur district, with first report of a Cyprinid fish *Rasbora caveirii* (Jerdon) from Maharashtra State India ; *Journal of Threatened Taxa* (4) : 243-244.
- [18] Jayaram K.C and Sanyal Anuradha. 2003. A taxonomic revision of the fishes of the genus *Mystus scopoli* (Family : Bagridae) Records of the Zoological survey of India occasional paper no 207 ZSI Culcutta 141 pp.
- [19] Jayaram K.C 1981. The freshwater fishes of India, Pakistan, Bangladesh, Burma and Sri lanka .A handbook. Zoological survey of India, Calcutta, 475 pp.
- [20] Jayaram K.C 1991. Revision of the genus ,*Puntius* Hamilton from the Indian region (Pisces: Cypriniformes: Cyprinidae :Cyprininae) Records of Zoological Survey of India, Occasional Paper no 135, ZSI, Culcutta 178 pp.
- [21] Jayaram K.C 1999. The freshwater fishes of the Indian region Narmada publishing House New Delhi. 551 pp.
- [22] Jyoti .M.K and Sharma .A. 2006. Fishes Aid to Collection, Preservation and Identification Daya Publishing House Delhi.
- [23] Khedkar G.D. 2005. Studies on fish diversity in relation to the bird habitat from Nathsagar bird sanctuary Area, Nathsagar Reservoir, Paithan, Aurangabad. *J. Aqua. Biol.* Vol. 20 (2):231-238.
- [24] Korai A.L., Sahato G.A. & Lashari K.H. 2008. Biodiversity in relation to physico-chemical properties of Keenjhar Lake (District, Thatta), Sindh, and Pakistan. *Turkish journal of fisheries and aquatic sciences* 8: 259-268.
- [25] Mane A.M. & Pawar S.K. 2007. Some Physiochemical properties of Manar River of Nanded district. Maharashtra. *J. Aqua. Biol.* Vol. 22 (2), 2007: 88-90.
- [26] Martin P. 2004. Impact of pollution on the species diversity of fin fishes in the South Indian River Tamiraparani *Indian. Journal of Environmental science.* 8 (2): 147-151.
- [27] Menon A.G.K. 1987. *Fauna of India and the Adjacent countries Pisces* (Part I) Homalopteridae ZSI, Culcatta.
- [28] Menon A.G.K. 1999. Check List of Freshwater fishes of India (ZSI)Culcutta Occasional paper no.175 .ZSI Culcutta pp-306., ISBN: 81-858774-15-8.
- [29] Muchlisim Z.A. and Siti Azizah M.N. 2009. Diversity and Distribution of freshwater fishes in Aceh water, Northern Sumatra, Indonesia; *International Journal of Zoological Research* (5): 62 -79.
- [30] Muley D.V. and Patil I.M. 2006. A Study of Water quality and Fish Diversity of pauna River Maharashtra. *J. Aqua Biol.* Vol. 21 (1): 68 -75.
- [31] Munde A.V. and Hiware. C.J. 2006. Diversity of fauna from Thodga reservoir, Ahemedpur taluka from Marathwada region, Maharashtra state, *Flora and fauna*, Vol 12 No. 1 pp: 54-56.
- [32] Prasad R. and Rao L.M. 1999. Ecology and Ichthyofauna of the hill streams of Araku A.P. *J. Aqua Biol.* Vol. 14: 31-33.
- [33] Salve B.S; PawarR.T .and Hiware C.J. 2006. Ichthyofauna of Wanaprakalpa ,Nagapur near Parli Vaijanath in Beed district of Marathwada region. India, *AQUACULT* Vol. 7(2) :322-326.
- [34] Sarwade J.P and Y.K Khillare. 2010. Fsih diversity of Ujani Wetland M.S, India.,Paper presented in international conference Sambalpur University Department of EVS, Energy Special issue vol 1: 173-179.
- [35] Shahnawaz A., Venkateshwarlu M., Somashekar D.S. & Santosh K. 2009. Fish Diveristy with relation to water quality of Bhadra River of western Ghats (India), *Environ. Monit. Assess. DOI.* 10. 1007/s 10661-008-0729-0, Accepted 23 December 2008, published online: 320 January 2009.
- [36] Shaikh H.M. Kamble S.M and Renge A.B. 2011. The study of ichthyofaunaldiversity in upper dudna project water reserviour near somthana in Jalna District india *Journal of Fisheries and Aquaculture* vol.2 issue 1,2011,pp-8-10.
- [37] Sharma Chhatra M. 2008. Freshwater Fishes, Fisheries and Habitat prospects of Nepal, *Aquatic ecosystem, health and management* vol. 11 (3).
- [38] Shinde S.E., Paithane Bhandare R.Y and Sonawane D.L. 2009. Ichthyofaunal diversity of Harsool Savangi Dam District, Aurangabad, (M.S) India. *World Journal of fish and Marine sciences* 1 (3): 141-143.
- [39] Talwar P.K. and Jhingran A.1991. *Inland fishes of India and adjacent countries*, Vol. 1 and II. Oxford and IBH Publisher, New Delhi.1158 pp.
- [40] Tripathi Namrata Nath, Shukla J.P., Mishra, M. 2008. Seasonal variations in hydrological parameters biodiversity of Ichthyofauna of Sikandrapur reservoir, Basti (U.P.) *J. of Ecophysiology occupational Health.* Vol. 8 issue 1 & 2.
- [41] Trivedy R. K. and Goel P. K. 1986. Chemical and Biological methods for Water Pollution Studies, *Env. Publications*, Karad: 247.
- [42] Vijaylaxmi C., K. Vijaykumar, Zeba Parveen and Anil Kumar Chavan. 2008. Fish Fauna of Bheema river, Gulbarga district, Karnataka. *J. Ecophysiol. Occup. Hlth*, 8: 237-240.
- [43] Yazdani G.M. 1985. Fishes of Khasi Hills records of Zoological survey of India Occasial paper no. 70. Issued by the Director ZSI,Calcutta, 40 pp.