

Research Article

Fish Diversity and Productivity of Isapur Reservoir, Maharashtra State

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Abstract

Isapur reservoir is a large project built across the Penganga river basin. It comprises the fishery of 9 species belonging to 6 families. It includes Prawn and Major carps, Catla, Rohu, Mrigal, Pabda, Murrel, Silver carp, Eel and Sandkhol. Out of 9 species 7 are commercially important. Annual fish production during 2011-12 was 4,43,939 kg and the productivity of the reservoir was estimated as 65.04 kg /ha/ yr.

Keywords: Fish, Productivity, Isapur, Maharashtra

1. Introduction

India is one of the mega biodiversity countries in the world and occupying ninth position in terms of freshwater biodiversity¹. There are about 450 families of freshwater fishes globally. Roughly 40 are represented in India (warm freshwater species). About 25 of these families contain commercially important species. Number of endemic species in warm water is about 544. Freshwater fishes are a poorly studied group since information regarding distribution, population dynamics and threats is incomplete, and most of the information available is from a few well-studied locations only^{2,3}.

India's inland water resources are diversified, as they are plentiful. Reservoirs contribute the single largest inland fishery resources both in terms of size and production potential⁴. Fish fauna of a reservoir basically represents the fish diversity and their abundance. Indian reservoirs preserve a rich variety of fish species, which supports to the commercial fisheries⁵. Fish species are also an important indicator of ecological health. The abundance and health of fish will show the health of water bodies⁶. The objectives of the present study were to document the fish diversity and productivity in Isapur reservoir and suggest appropriate conservation and management strategies.

2. Material and Methods

The Isapur Reservoir (6,660 ha), located in Yavatmal District of Maharashtra was selected to study the fish diversity and productivity from June 2012 to May 2013. Fish sampling was done at four landing centres of Isapur reservoir namely; Isapur (Dam site), Sawargaon, Salwadi and Mop using gillnet, cast net, prawn trap and angling needles and the commercially important species were only taken into consideration. The selected landing centres represents all the three stretches of the reservoirs i.e. Lower, Middle and Upper. The fishes were either collected personally or fishermen were instructed to collect during every sampling operation and preserved in 5% formalin solution for further studies. Fishes were identified based on standard taxonomic literature,^{7,8,9,10} and grouped into two categories based on their abundance viz., Major and Minor.

The fish productivity was calculated by using following formula given by Agarwal,¹¹.

$P = NS$

Where, P = Fish Productivity (kg/ha/yr)

N = Constant including natural mortality 0.25 and accidental mortality 0.40 i.e. 0.65

S = Number of fish seed stocked per hactor per year

3. Results and Discussion

The ichthyofaunal diversity of Isapur reservoir comprises 9 species belonging to 6 families (Table 1). The Giant Freshwater Prawn and Major carps, Catla, Rohu, Mrigal were dominating due to regular seed stocking and the similar results were also obtained by Kamble and Mudkhede⁴ in Loni reservoir of Maharashtra. The other fish group which increases the species diversity of reservoir are Pabda, Murrel, Silver carp, Eel and Sandkhol. The fresh water prawns and Carps are considered as Major fishes where, Pabda, Murrels and Vam are considered as minor fishes as per their abundance. The major carps, Pabda, Murrel, Silver carp, Eel and sandkol etc. have great food value. Out of 9 species 7 are commercially important and according to reservoir leasee about 80% of its catches are directly marketed in distant markets like, Mumbai, Delhi and Kolkata.

Table 1 Species composition at Isapur reservoir

S.N.	Local name	Scientific name
1.	Catla	<i>Catla catla</i>
2.	Rohu	<i>Labeo rohita</i>
3.	Mrigal	<i>Cirrhinus mrigala</i>
4.	Zinga	<i>Macrobrachium rosenbergii</i>
5.	Pabda	<i>Ompok pabda</i>
6.	Murrel	<i>Channa spp.</i>
7.	Silver	<i>Hypophthalmichthys molitrix</i>
8.	Eel (Vam)	<i>Mastacembelus armatus</i>
9.	Sandkhol	<i>Thynnichthys sandkhol</i>

Isapur reservoir comes under large reservoir category but the species diversity in reservoir is very less as compared to other reservoirs like, Nath Sagar Dam, Maharashtra 43 fish species reported by Hiware and Pawar¹², Govindsagar reservoir, Himachal Pradesh 51 fish species reported by Kumar¹³, Bori reservoir in Maharashtra 21 fish species reported by Sakhare and Joshi¹⁴, Rawanwadi Lake, Maharashtra 29 fish species reported by Kalbande *et al.*¹⁵, Rana Pratap Sagar Lake, Rajasthan 39 fish species reported by Verma *et al.*¹⁶, Gandhi Sagar Reservoir, Madhya Pradesh 72 species of fishes belonging to 9 orders, 20 families and 43 genera reported by Ridhi¹⁷ etc.

The present productivity of the reservoir was worked out to be 64.05 kg/ha/year, which is very good as compared to national average catch from large reservoir i.e. 11.43 kg/ha/yr¹⁸ and other reservoirs as pinioned by Srivastava and Tamot¹⁹ Pong dam 4.1 to 25.08 kg/ha/yr, Rihand – 3.7 to 14.24 kg/ha/yr, Tenughat – 0.53 to 1.471 kg/ha/yr, Kangsabati – 0.55 to 1.10 kg/ha/yr, Kodana 6 kg/ha/yr. Gandhisagar 0.52 to 13.3 kg/ha/yr, Hirakud – 10.5 kg/ha/yr, Santhamur 3.5 to 11 kg/ha/yr, Tungabhadra 5.54 kg/ha/yr. Pilit 08 – 35.30 kg/ha/yr and Shardarsagar 42 to 56 kg/ha/yr. The fish production of 7 kg/ha/yr in Nizamsagar, 8 kg/ha/yr in Bhadha and 6 kg/ha/yr in Panam reservoirs. The present fish production was much less than Indian and different states reservoirs average production. The present production was many times less than the average fish productivity in Indian reservoirs, 29.70 kg/ha/yr. Dehadrai²⁰ & Gowda²¹, recorded only 15.6 kg/ha/yr in Hirakud reservoirs and 5.10 kg/ha/yr in other major reservoirs in Orissa and concluded that there was scope for increase the yield rate to 100 kg/ha/yr by proper management cited in Kamble and Mudkhede⁴. Still there is enough scope for increasing fish production from Isapur, which could be easily achieved by scientific management practices. The similar view point is reported by Srivastava and Tamot¹⁹ in the case of Tawa reservoir.

Though the fish fauna from reservoir is less as compare to other reservoirs but the fish productivity from the reservoir is doing well and there is enough scope to increase it in future. The management body at reservoir should plan some future development strategies for booming the fish production of reservoir.

Table 2 The Total Fish Catches at Isapur Reservoir during 2011-12

Sr. No.	Type of Fish	Total Quantity in Kg	Percentage	Fish catch (kg/ha/yr.)
1	Freshwater Prawn	1,92,080	43.26	64.05
2	Catla	72,610	16.35	
3	Rohu	55,800	12.57	
4	Mrigal	40,889	9.21	
5	Pabda	40,800	9.19	
6	Silver Carp	31,500	7.09	
7	Murrel	5,220	1.18	
8	Vam	5,040	1.14	
	Total	4,43,939	100	

References

- Mittermeier, R.A., Mitemeir, C.G. In Global freshwater biodiversity sea wind cemex Mexico City (Mc Allister D.E., Lttamilton A., Harvery B. eds.), 1997: 1-140.
- www.zooreach.org/conservation/CAMP/CAMP-freshfish.html 2010.
- Chaudhuri, S.K. Fresh water fish diversity information system as a basis for sustainable fishery. Department of Library and Information Science, Jadavpur University, Kolkata, 2010: 32.
- Kamble, A.T., Mudkhede, L.M. Study of fish fauna and productivity of Loni reservoir, Tq. Kinwat (Maharashtra). *International Journal of Biomedical and Advance Research*, 2013: 04 (03), 155-159.
- Thirumala, S., Kiran, B.R., Kantaraj.G.S. Fish diversity in relation to physico-chemical characteristics of Bhadra reservoir of Karnataka, India. *Advances in Applied Science Research*, 2011, 2 (5):34-47.
- Hamzah N. Assessment on water quality and biodiversity within Sungai Batu Pahat. *Master of thesis*. Universiti Teknologi Malaysia, 2007: 124.
- Day, F. The fauna of British India including Ceylon and Burma, *Fishes*, 1889, 1: 548: 2: 509. The London, Taylor and Francis. Misra, K.S. (1962) An aid to the identification of the common commercial fishes of India and Pakistan. *Rec. Indian Mus.* 57 (1-4): 320.
- Qureshi, T.A. and Qureshi, N.A. Indian Fishes, BRU Brothers, Sultana Road, Bhopal, 1983.
- Talwar, P. K. and Jhingran, A. G. *Inland fishes of India and adjacent countries*, Vol. I and II. Oxford and IBH Co. Pvt. Ltd., New Delhi, 1991: 1158.
- Jayaram, K.C. The freshwater fishes of Indian region, Narendra Publishing House, New Delhi, 1999.
- Agarwal, S.C. Fishery Management. Ashish Publishing House, New Delhi, 1990.
- Hiware, C.J. and Pawar, R.T. Ichthyofauna of Paithan Reservoir (Nath Sagar Dam) in Aurangabad Dist. Of Marathwada region Maharashtra, *Ecology and Environment*, 2006, APH Publishing Corporation, New Delhi.
- Kumar, K. Management and development of Gobindsagar reservoir. A case study. Proc. Nat. workshop reservoir Fish, 1990: 13-20.
- Sakhare, V. B. and Joshi P. K. Ecology of Palas - Nilegaon reservoir in Osmanabad District, Maharashtra. *J. Aqua. Biol.*, 2002: 12 (1): 28-31.
- Kalbande S., Telkhade P., Zade S. Fish Diversity of Rawanwadi Lake of Bhandara District Maharashtra, India. *Journal of Reasearch in Science & Technology*, 2007: 2 (2), 30-33.
- Verma, P.C., Sharma, L.L., Hegde, A.G. Aquatic Biodiversity of Rana Pratap Sagar Lake. The 12th World Lake Conference: 1967-70: Proceedings of Taal 2007.
- Ridhi, Jha, B.C., Parashar, A., Das, A.K., Bose, A.K. Fishes of Gandhisagar Reservoir in Madhya Pradesh. *Journal of Chemical, Biological and Physical Sciences*, 2013: 3 (1), 390-398.
- Ayyappan, S. *Handbook of Fisheries and Aquaculture*. ICAR publication, 2011: 238-248.
- Srivastava, A. and Tamot, P. Liminified status of Kernian Reservoir with special reference to Socio-economic survey of threatened fish Mahseer. AE-9, The Sixth Indian Fisheries forum, CIFE, Mumbai, India, 2002: 90.
- Dehadrai, Reservoir fisheries in India. *Proc. Nat. Sem. Reverine and Reservoir Fishers*, 2001: 97 – 104.
- Gowda, H.S.V. Status of Fisheries Development in Karnataka. *Fishing Chimes*, 2002: 22 (1): 86-94.