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Research Article

FISH DIVERSITY AND PRODUCTIVITY OF KAKADDHABA DAM, DISTRICT HINGOLI, MAHARASHTRA, INDIA

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ABSTRACT

The present study was conducted to assess the fish diversity and production potential of Kakad Dhaba Dam, Hingoli District, Maharashtra, during January 2022 to December 2023. A total of 15 fish species belonging to 13 genera, 7 families, and 5 orders were recorded. Among these, the order *Cypriniformes* was dominant, comprising 7 species, followed by *Siluriformes* with 4 species, *Channiformes* with 2 species, and one species each from *Mastacembeliformes* and *Perciformes*. The fish production of the dam was estimated at 288,824 kg in 2022 and 284,340 kg in 2023. Correspondingly, the annual productivity was calculated as 68.57 kg/ha/yr in 2022 and 57.14 kg/ha/yr in 2023. The findings highlight the dam as a potential source of diverse fish fauna and a significant contributor to local fisheries. Sustainable management practices are essential to conserve this diversity while maintaining fish yield for socio-economic benefits.

Keywords: Fish diversity, Fish productivity, Maharashtra, Kakad Dhaba Dam, Survey.

INTRODUCTION

The world's third-largest producer of fish is India. An estimated 17.54 million metric tons (MMT) of fish were produced in 2022–2023, of which 13.11 MMT came from the inland sector and 4.43 MMT from the marine sector (Ministry of Fisheries, Animal Husbandry & Dairy, 2023). Although the potential of inland fisheries is sometimes disregarded, fishing operations in inland waters typically constitute a significant source of income for the well-being of impoverished residents. Approximately 7000 metric tons (0.007MMT) of fish were produced in the north Indian state of Uttarakhand in 2022–2023 due to its abundant inland water resources (Hand book of Fisheries Statistics, 2023).

India has an abundance of diverse inland water resources. The main inland fisheries resources in terms of size and prospective productivity are reservoirs. Kamble et.al. (2013). A reservoir's fish fauna essentially reflects the variety and quantity of its species. Commercial fisheries are supported by the diverse range of fish species that are preserved in Indian reservoirs. In 2011, Thirumala S. *et al*. Another crucial indicator of the health of an ecosystem is the species of fish. According to Paul *et al*. (2017), the average fish productivity in Indian reservoirs is predicted to be 30 kg/ha/yr, while the production potential is 250 kg/ha. Fish abundance and diversity are reflected in reservoirs. Underutilized and lacking adequate water utility management are the freshwater reservoirs established for this purpose. Although the primary uses of reservoirs are for irrigation and electricity production, fish farming is practically a given in India. Understanding fish faunal diversity is crucial for the sustainable and cost-effective management of lakes in India as well as the use of freshwater reservoirs, according to Battul *et al*. (2007).

According to Oliveira *et al*. (2004), the reservoirs provide an excellent chance to investigate fish diversity and the relative significance of the factors that affect fish abundance and variety. Additionally, species from the past revered fish fauna are transplanted into newly constructed water bodies, such as reservoirs, making them valuable resources. Today, fish diversity is declining, with a few species gone from India's freshwater ecosystem and others under endemic, endangered, and threatened conditions due

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to irrational fishing practices and environmental issues like declining water levels, the disposal of solid waste in water bodies, increased sedimentation, and water pollution over time.

Reservoir is not only an important source of water for drinking, agricultural operations, recreation, and sewage disposal but also considerably supports a substantial fishery. It not only supplements to nutritious diet but also is a source of livelihood for local or poor fishing community. Hence, information about fish fauna inhabiting wetlands and other aquatic ecosystems is prerequisite for the development of culture as well as capture fishery. The freshwater fish diversity is changing and getting depleted alarmingly fast as a result of the combined and interacting influences of over exploitation, water pollution, flow modification, destruction or degradation of habitat and invasion by exotic species (Revenga *et al*., 2005).

No report is available on the fish production from the Kakad Dhaba Dam. Information on the fish yield from the water body plays a significant role in the sustainable development, optimum production and management of fish wealth. The present study describes the present status and management strategies for fish production enhancement from the Kakad Dhaba Dam.

MATERIALS AND METHODS

Study area

The dam location about 20 km. away from Hingoli district. The basin bounded by Latitude 770-8-10" Longitude 190-34-5'. The Basin is Godavari River and Sub-Basin is Kayadhu River. The dam is constructed during 1985. The catchment area of dam is 23.60 Sq. Km., Gross storage 2.48 mm^3. The study of the basin area related with Biodiversity and Ecological features on afferent aspects.

The present study was conducted on the fish diversity and productivity from January 2022 to December 2023. Fish sampling was done at four landing centers of Kakad Dhaba Dam. Fishes were collected at different sites of the reservoir with the help of local fisherman using gill net, cast net, drag net, hooks and line. Fishes were also collected from local fish markets located on the banks of reservoir and Purna River. The collected fishes were preserved in 10% formalin according to their size and labeled them. Fishes were identified up to the species level using standard keys developed by Jayaram (1981), Talwar and Jhingran (1991), Jayaram (1999), Jayaram (2010) and Hiware et.al. (2015). The present study also crosschecked with the standard literature Theurkar S.V.et.al. (2013), Ridhi (2013), Theurkar, S.V. et.al. (2015). Identified fishes were confirmed by the experts in the field of fish taxonomy. Classification was carried out on lines of Day (1989), Jayaram (1961) and Nelson (1976).

The fish productivity was calculated by using following formula given by Agarwal, (1990).

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

RESULT AND DISCUSSION

The present study results are confirming the occurrence of a total 15 fish species belonging to 13 genera, 7 families to 5 orders and the similar results were also obtained by Kamble and Mudkhede[4] in Loni reservoir of Maharashtra. List of fish diversity status was given in (Table 1). Out of 13 fish species order Cypriniformes was dominant with 7 species to be followed by order Siluriformes with 4 species, Channiformes with 2 species, Mastcembeliformes 1 species and Preciformes with 1 species. The Major carps, Catla, Rohu, Mrigal and two exotic carps *Cyprinus carpio* and *Hypothalamichthyes molitrix* were dominating due to regular seed stocking. The other fish group which increases the species diversity of reservoir is catfishes, Murrel, tilapi, Eel and minor carps. (Table-1).

Table 1. Fish diversity of Kakad Dhaba Dam during January 2022 to December 2023.

Order/Family/Species		Local names
Order	Cypriniformes	
Family	Cyprinidae	
	1. *Chela phulo*	Chital
	2. *Chela sladoni*	
	3. *Cyprinus corpio*	Super
	4. *Catla catla*	Katla
	5. *Cirrhinus mrigala*	Mrigal
	6. *Labeo rohita*	Rohu
	7. *Hypothalamichthys molitrex*	Silver
Order	Siluriformes	
Family	Bagridae	
	8. *Mystus cavasius*	Catrana

Family	Clariidae	
	9. *Clarias batrachus*	Mangur
Family	Siluridae	
	10. *Wallago attu*	Balu
	11. *Ompak bimaculatus*	Babda
Order	Channiformes	
Family	Channidae	
	12. *Channa gaucha*	Maral
	13. *Channa marulius*	
Order	Mastacembaliformes	
Family	Mastacembelidae	
	14. *Mastacembelus armatus*	Wam
Order	Preciformes	
Family	Cichlidae	
	15. *Oreochromis mossambica*	Tilapi

Table 2. The Total Fish Catches at Kakad Dhaba Dam.

Sr. No.	Fish Species	Total Quantity in Kg		Percentage		Fish catch (kg/ha/yr.)	
		2022	2023	2022	2023	2022	2023
1	*Catla catla*	69230	70320	23.96	24.73		
2	*Cirrhinus mrigala*	58940	56240	20.40	19.77		
3	*Labeo rohita*	45490	46267	15.75	16.27		
4	*Hypothalamichthys molitrex*	35450	35260	12.27	12.40		
5	*Cyprinus corpio*	42270	40939	14.60	14.39		
6	*Mystus cavasius*	3780	4595	1.30	1.61		
7	*Clarias batrachus*	2551	2391	0.88	0.84	68.57	57.14
8	*Wallago attu*	4580	4250	1.58	1.49		
9	*Ompak bimaculatus*	5798	5391	2.00	1.89		
10	Channa Sp.	6290	5928	2.17	2.08		
11	*Mastacembelus armatus*	6291	4228	2.17	1.48		
12	*Oreochromis mossambica*	6932	7231	2.40	2.54		
13	*Chela* Sp.	1222	1300	0.42	0.45		
Total		**288824**	**284340**	**100**	**100**		

Kakad Dhaba Dam falls under the minor reservoir category and has a considerable species variety. The present study compared to other reservoirs, such as Nath Sagar Dam in Maharashtra, Hiware and Pawar (2006) reported 43 fish species. Kumar (1990) recorded 51 fish species from Maharashtra's Bori reservoir. Sakhare and Joshi (2002) reported 21 fish species in Rawanwadi Lake, Maharashtra. Kalbande *et al*. (2007) reported 29 fish species in Rajasthan's, Rana Pratap Sagar Lake. Verma *et al*. (2007) reported 39 fish species from Madhya Pradesh's Gandhi Sagar Reservoir. According to Ridhi (2013), there are 72 fish species in 20 families, 9 orders, and 43 genera.

The present productivity of the reservoir was worked out to be during 288824 kg in 2022 and 284340 kg in 2023, while the dam's productivity was estimated to be 68.57 kg/ha/year in 2022 and 57.14 kg/ha/year in 2023. The productivity of Kakad Dhaba Dam which is very good as compared to national average catch from large reservoir i.e. 11.43 kg/ha/yr[18] and other reservoirs as pinioned by Srivastava and Tamot (2002) 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, Shardarsagar 42 to 56 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, Pilit – 35.30 kg/ha/yr and Tungabhadra 5.54 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 good than the average fish productivity in Indian reservoirs, 29.70 kg/ha/yr. Dehadrai (2001) & Gowda (2002), 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 Mudkhede (2013). 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 Tamot (2002) in the case of Tawa reservoir.

CONCLUSION

Though the fish fauna of Kakad Dhaba Dam is smaller than that of other reservoirs, the reservoir's fish production is good, and there is plenty of room for growth in the future. The reservoir's management should design some future development measures to boost Kakad Dhaba Dam's fish production.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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