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Physico-chemical parameter and fish diversity of Gangulpara dam in balaghat (M.P.), India

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Abstract
The present study is aimed to investigate some of the important physical and chemical parameters along with fauna of the dam. The is very productive. There are several types of fresh water fishes present in the dam. *Labeo rohita, Cirrhina mrigal, Catla catla, Cyprinus carpio, Silver carp, Wallago attu, Mystancenbelus armatus, Notopterus chital, Barbus ticto, Channa staitus, Mystus seenghala, Mystus cavassius, Eutroplus suratensis, Belon concila, Chela, Tilapia mossambica, Rohtee alfrediana, Gobius giuris etc.* species of fishes were identified during June 2017-May2018. Hence the present work is an attempt to accumulate information pertaining to various aspect of hydrobiology of standing water bodies from this part of peninsular India.

Keywords: Physico-chemical, Gangulpara dam

1. Introduction
Water is the basic need for fish culture and its specific properties as a cultural medium of great significance in the productivity of a pond or reservoir. Pure water is unable to support living organism but it contains nitrogen, phosphorus, potassium and calcium salts, dissolved organic matter and gases like oxygen, nitrogen and carbon dioxide determine to a large extent the productivity. In water of lakes and reservoir fishes are reared more as a part of a general fishery improvement programme than as pure fish culture. Only 61.3% of the readily cultivatable water area in the country is presently utilized for culture with regard to inland fish culture. The culture of Indian major carps and exotic species have been very popular in recent time. The study of fishes known as 'Ichthyology' is one of the least popular branches of natural History.
Economically fishes are very important used as food. For successful fish forming in dams and reservoirs, it is essential to make a detailed hydrological study of the water body. Suitable species that are stocked in dams are the major carps. These are capable of adjusting successfully to ecological condition of the reservoir. The exotic carps also Thrives in man made lakes or dam are suitable species for culture.

2. Result and Discussion
A large number of dams and reservoir are constructing during the recent year to provide water for irrigation and power production. These bodies of water offer immense scope for fish culture for successful fish farming in dam and reservoir.
Gangulpara dam reservoir is very productive more work has been carried out of fish fauna. The distribution of fish species is quite variable because of geographical and geological condition. The Eleven species of the fish fauna in this study belonging to four order and six families are given in the table No. 2 among them order Cypriniformes was dominant with eight species to be followed by the Mastalimbeliformes, Osteoglossifomes, and Ophiocephalus each with one species.
Hence the present work is an attempt to accumulate information pertaining to various aspect of hydrobiology of standing water bodies from this part of peninsular India. The present investigation has been carried out on Gangulpara dam and Waterfall is located in the Balaghat district of the central Indian state of Madhya Pradesh. It is at a distance of 14 kilometers away from Balaghat. It is a part of Godavari basin and was completed as reservoir in the year 1960. It is situated 21°53'00" longitude and 80°17'00" latitude. The height of dam is 19.51 m and length 3009m. The catchment area is 28.5 sq.km. The water of this dam is used for irrigation and fish culture. It is a marvelous mixture of natural beauty and splendor, feasting the eyes of the onlooker! An ideal picnic spot for the locals, it is frequently visited by them for their weekend getaways. Nature lovers appreciate this water body, which also serves as a storage tank for the waters of Ghysri Nala. This water reserve fulfills the irrigation needs of the farmers of the local village nearby, Tekadi.

Sampling of Fishes
Different kind of fishes were collected from the selected sites with the help of fisherman of the work on the dam by using different types of craft, gears and nets and after noting down color and other external feature were preserved in 4% formalin, seasonal collection were made from Nov. 2017-Oct. 2018.
Standard identification key were used for identification of specimen up to species level, using standard key and literature (Day Francis. 1971; Agarwal SC. 1994 and Jhingran VG 1982) [1-3]. The classifications of fishes on economic importance were done by following the proforma given by Jhingran, VG (1982) [3] and Lagler, KF (1956) [4].

Hydrobiological parameters
Lake, reservoirs and pond constitute a great source of Inland fisheries in India. Productivity of pond and reservoirs depends upon the quality of water and soil. Variation of

Temperature has an important influence an all the organisms including fishes. The oxygen content of water is reduced with the rise in Temperature. pH of reservoir water may be alkaline, acidic or neutral and is an important environmental factor influencing the species and metabolism of all animals and plants inhabiting it. pH of reservoir water having 6.5 to 9.0 is most suitable for culture. Dissolved oxygen is most for the animals and plants life in a pond, on cloudy day photosynthesis is reduced and causes oxygen deficiency at night is fatal to the fish. A balance of oxygen content is maintained the reservoir water through plants and all animals consume oxygen during respiration. Oxygen deficiency of reservoir causes migration, attack of parasites, fungal diseases and death due to suffocation

Table 1: Fluctuation range of Physico-chemical Parameters on Gangulpara dam reservoir during 2017-2018

S.No.	Parameters		Stations				Avg.	SD
			A	B	C	D		
1.	Water temp. (°C)	Min.	22.8	23.9	23.4	24.2	23.58	0.61
		Max.	30.2	30.5	30.3	31.2	30.55	0.45
2.	pH	Min.	7.3	7.4	7.2	7.5	7.35	0.13
		Max.	8.4	8.7	8.6	8.8	8.63	0.17
3.	Total Solid mg/lit.	Min	221	223	236	224	226.00	6.78
		Max.	310	396	384	406	374.00	43.60
4.	Dissolved oxygen mg/lit.	Min.	3.8	4.4	4.2	4.8	4.30	0.42
		Max.	10.3	10.4	10.1	10.5	10.33	0.17
5.	Total hardness mg/lit.	Min.	96	99	94	97	96.50	2.08
		Max.	145	188	160	143	159.00	20.77
6.	Calcium mg/lit.	Min.	57	52	56	58	55.75	2.63
		Max.	88	74	84	76	80.50	6.61
7.	Magnesium mg/lit.	Min.	4.82	6.55	8.06	8.46	6.97	1.65
		Max.	17.5	18.1	18.8	17.6	18.00	0.59

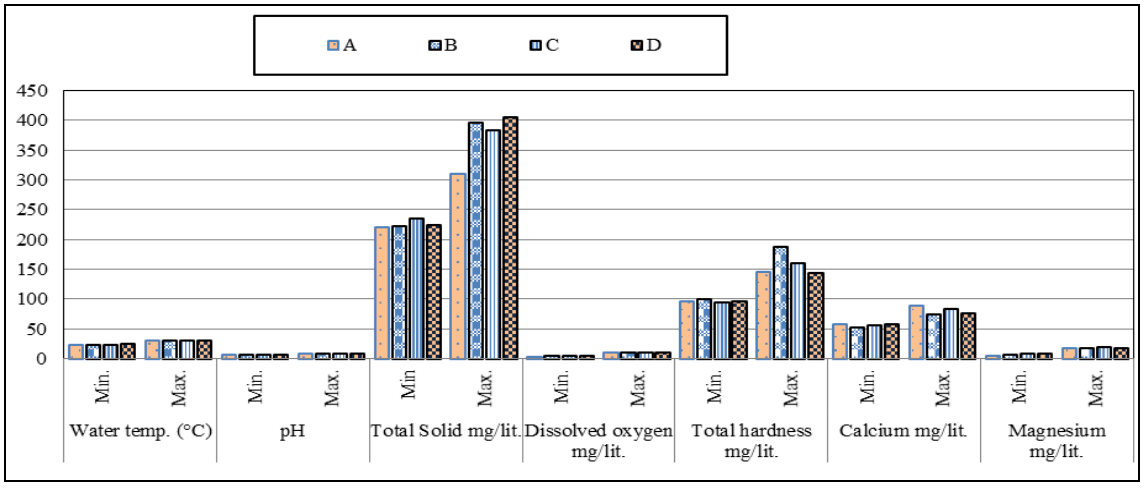

Fig 1: Graphics analysis of Fluctuation range of Physico-chemical Parameters on Gangulpara dam reservoir during 2017-2018

Fish fauna on Gangulpara dam reservoir

The local fish fauna are abundance and distribution of Gangulpara Dam reservoir are as 1. *Labeo rohita* 2. *Cirrhina mrigal* 3. *Catla catla* 4. *Cyprinus carpio* 5. *Silver carp* 6. *Wallago attu* 7. *Mastacembelus armatus* 8. *Notopterus chitala* 9. *Barbus ticto* 10. *Channa* 11. *Mystus seenghala* 12. *Eutroplus suratensi* 13. *Belon concila* 14. *Chela* 15. *Tilapia mosambica* 16. *Rohtee alfrediana* 17. *Gobius giuris*

Hydrobiological study and features of the fisheries of Gangulpara Dam reservoir of its self-sustained ecosystem is described. Alikhuni, KH (1957) [5] stated that the water alkalinity over 100 ppm are called as productive water body.

Table 2

Class – Pisces	
Sub-class – Teleostomi	Family -3 – Siluridae
Order 1 – Cypriniformes	*Species – 8 – Wallago attu*
Family 1 – Cyprinidae	*Order – 2 – Mastaembeliformes*
Species – 1 – *Catla catla*	*Family 4 – Mastamecembelidae*
Species 2 – *Labeo rohita*	*Species 9 – M. armatus*
Species 3 – *Cirrhina mrigal*	*Order 3 – Osteoglossiformes*
Species 4 – *Cyprinus carpio*	*Family 5 – Notopteridae*
Species 5 – Silver carp	*Species 10 – N. chital*
Species 6 – *Barbus ticto*	*Order 4 – Ophiocephaliformes*
Family 2 – Bagridae	*Family 6 – Channidae*
Species 7 – *Mystus seenghala*	*Speices – 11 – Channa staitus*

Fishing on Gangulpara dam reservoir

Commercial fishing was done by the fisherman of the society. Fishing started after monsoon and it was done day as well as night. Hooks and line gear used for fishing of Carnivorous fishes. Drag net, gill net cast net are used for fishing. The size of the net depends upon the area of fishing and size of the mesh depends upon the size of fish.

Fishing was done with the help of wooden plates, thermocole sheets, tubes and coracle etc. as well as transportation the coracle was made from bamboo splits and covered with fisherman. The size of thermocole, wooden sheet varies from 5 to 6 feet in the length and 3 to 4 in breadth.

Fish Production on Gangulpara **Dam**

It was very difficult to find out the exact fish production of the Gangulpara Dam reservoir because fisherman never maintains the record noted of their catches. It was very difficult to find out the growth rate of fish from the reservoir because of non-availability of scientific data.

Table 3: Total Fish Capturing on Gangulpara Dam Reservoir.

S. No.	Months	Total fish catches kg/year		
		2015-16	2016-17	2017-18
1.	Aug.	8104.40	3471.50	6742.00
2.	Sept.	9300.00	2895.00	3661.00
3.	Oct.	4825.00	2014.00	3781.00
4.	Nov.	3848.00	1420.50	4493.50
5.	Dec.	2888.50	2761.00	4127.75
6.	Jan.	1903.00	2405.00	5223.00
7.	Feb.	2173.00	2021.50	7099.00
8.	Mar.	1862.75	3557.00	7220.25
9.	Apr.	6334.00	2527.50	2080.75
10.	May	2722.50	8750.00	5736.25
11.	Jun.	6462.50	14754.00	10621.00
12.	Jul.	6260.50	12489.50	10498.00
	Total	51983.5	59066.75	71285.75

Marketing of Fish

Fisherman themselves catch the fishes and sold them at distance market at local market. Fishes, after assembling, were sold to the merchant and send them to distance market. While transporting, fishes are packed with ice in bamboo boxes.

Future Scope for Development of Fisheries of Gangulpara Dam Reservoir

Adequate stocking of fish seed is necessary. They were stocked *C. mrigal, Cyprinus carpio*. If fish seed of *Ciprous, Rohu, Mrigal* and *Catla catla* is stocked then it will increase the production. Marketing should be done through the co-operative society only instead marketing through agents. Illegal fishing should be prevented. Mixed fish culture should be adopted such as culture of Indian major carps and exotic carps to increase production. Removal of predatory fishes is necessary. Fisherman should be educated for the development of reservoir fishery.

Suggestions for Improvement of Fisheries and Socio-economic Condition of the Fisherman

The fisherman community should be tread in modern methods of fish culture and fishing, so that production can be increased of the reservoir. The well-equipped fish seed production center highly progressively of fish seed production. They should be a constant cold storage plant to keep the fishes for sell in different seasons. Fisherman should be provided with educational and health facilities, so that their children can be learnt and heath of fisherman should be normal. Fisherman should be educated so that they can leave away their addiction. Illegal fishing should be stopped, so that loss of fish can be checked.

3. Conclusion

Productivity of reservoir is depending on physicochemical parameters & biological aspect. Maintain socio-economic condition and Management of reservoir etc.

4. References

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