Physico-chemical parameter and ichthyofaunal diversity of Majalgaon Dam in Maharashtra state, India

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Abstract
Majalgaon Dam was constructed on the River Sindphana which is tributary of River Godavari, in Beed District (Maharashtra, India) in 1987. Which falls 16° 16 N latitude and longitude 73° 26 E. The River Sindphana has been under constant threat of pollution by sewage and industrial wastes, disposal of dead bodies, deforestation, excessive use of fertilizers and pesticides, bathing and water development programs. The dam has a catchment area is 3840 sq. km. It is of great Importance for the region because its water is used for human and cattle consumption, it is multipurpose type like irrigation and power production (Hydro Electric Project). As a representative of these 'Majalgaon Dam' was selected for the limnology studies. As a representative of these 'Majalgaon Dam' was selected for the limnology studies. The present study is aimed to investigate some of the important physical and chemical parameters along with the flora and fauna of the reservoir. The reservoir is very productive. There are several types of fresh water fishes present in the dam. *Labeorohita, Cirrhinamrigal, Catlacatla, Cyprinuscarpio, Silver carp, Wallagoattu, Mystancenbelusarmatus, Notopterus chital, Barbusticto, Channastaitus, Mystusseenghala, Mystuscavassius, Eutroplussuratensis, Belonconcila, Chela, Tilapia mosambica, Rohteealfrediana, Gobiusgiuris etc.*17 species of fishes were identified during june2011-may2012.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, Majalgaon Dam, River Sindphana

1. Introduction

Water is the basic element in 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-technically known as 'Ichthyology' is one of the least popular branches of natural History.

Fish is economically a very important group of animals, beside being used as food. Fish liver is an important source of oil containing vitamins A and D. Several minerals especially if the bones can be eaten. Fish is also a source of Vitamin B. It is rich in protein, specially preferred for containing essentially amino acid such as Lysine and Methiomine abundantly required for formation of phospholecithine in gray matter of the brain. Unsaturated fat in fish also reduce the risk of formation of high blood cholesterol. Body oil from fish is extensively used in soap industries and tanning. Fish also yield fish meal. Fish manure and several other product of commerce. 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 and is suitable species for culture.

Majalgaon dam in located at Majalgaon Dist. Beed (M.S.) on river Sindphana. River Sindphana is the main tributary of Godavari river on the right bank its origin in the Balaghat range 40-50 km away from Majalgaon Dist. Beed (M.S.). On the river Sindphana the well-known Majalgaon Dam has been built near 2 km. U/S from Majalgaon city, Beed District in Maharashtra state. Which fall under $16°16^{8}$ N latitude and longitude 73° 26 E. It is a multipurpose type of project like irrigation and power production (Hydro Electric Project). In 1977, dam construction started and the completed in the year 1987. The catchment area is 3840 sq. km. Majalgaon dam is a second stage of 'NathSagar' at river Godavari valley at Paithan District, Aurangabad, Maharashtra. Majalgaon dam has a submerged area 7813 hectare and the length of Dam is 6488 meter. The reservoir is very productive. There are several types of fresh water fishes present in the dam.

The Fresh water fish resource of Maharashtra constitutes 6 orders 25 families and 160 species. There are many species like Oriochromis, Grass carp, common carp, silver carp, etc. that have been introduced in the inland water of Maharashtra. The entire region comes under 4 basins viz. Narmada, Tapti, Godavari and Krishna.

2. Result and Discussion

Fish as constitute economically a very important group of animals. A large number of dams and reservoir has been 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.

Majalgaon 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 Ophiocephalifomes each with one species. Sakhare [1] recorded 23 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district. Ingole [2] recorded 11 fish species occurrence in the during research work at Majalgaon dam reservoir.

2.1 Godavari River basin

The Godavari River is a major waterway in central India, originating in the Western Ghats and flowing eastwardly across the Deccan Plateau between the states of Maharashtra and Andhra Pradesh, then crossing the latter state and turning to flow in a southeast direction until it empties into the Bay of Bengal through two mouths. Its tributaries include Indravati River, Manjira River, Sindhaphana, Bindusara River, Sabari River etc. Although the river arises only 80 kilometres from the Arabian Sea, it flows 1,465 km to empty into the Bay of Bengal. Just above Rajahmundry there is a dam that provides water for irrigation.

Below Rajahmundry, the river divides into two streams that widen into a large river delta which has an extensive navigable irrigation-canal system, Dowleswaram Barrage that links the region to the Krishna River delta to the southwest. The Indrawati, the Wainganga, the Wardha, the Pench, the Kanhan and Penganga rivers, discharge an enormous volume of water into the Godavari system. The Godavari River has a drainage area of 313,000 km^2 in seven states- Maharastra, Andhra Pradesh, Karnataka, Madhya Pradesh, Chattisgarh and Orissa.

2.2 Study area of Majalgaon Dam reservoir

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 'Majalgaon Dam' located on river Sindphana (Godavari Basin) near 2 Km. U/s from Majalgaon city (Taluka place) of Beed districts in Maharashtra State. Which falls 16° 16 N latitude and longitude 73° 26 E.

2.3 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 June 2011-May 2012 for two years, the period of research work.

Standard identification key were used for identification of specimen up to species level, using standard key and literature [3-5]. The classifications of fishes on economic importance were done by following the proforma given by Lagler and Jhingran [5-6].

2.4 Physico-Chemical parameters and Biological Characteristics and Biodiversity of Fish Fauna

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 6.5to 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 Majalgaon dam reservoir during 2011-2012

SN	Parameters	Min. / Max.	Site-S1	Site-S2	Site-S3	Site-S4
1	Water (^{0}C) Temperature	Min.	23.1	24.0	23.5	24.1
		Max	30.0	29.9	29.2	31.0
2	pH	Min.	7.4	7.3	7.4	7.5
		Max	8.5	8.5	8.4	8.9
3	Total Solid mg/lit.	Min.	220	222	237	221
		Max	311	399	381	402
4	Dissolved oxygen mg/lit.	Min.	4.2	3.0	4.0	4.9
		Max	10.1	10.2	10.3	10.3
5	Total Hardness mg/lit.	Min.	95	98	95	94
		Max	147	191	155	141
6	Calcium mg/lit.	Min.	59	50	51	55
		Max	90	77	89	79
7	Magnesium mg/lit.	Min.	4.86	6.56	8.01	8.74
		Max	18.2	19.1	17.9	17.4

2.5 Fish fauna on Majalgaon dam reservoir

The local fish fauna are abundance and distribution of Majalgaon 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 Majalgaon Dam reservoir of its self-sustained ecosystem is described. Alikhuni [7] stated that the water alkalinity over 100 ppm are called as productive water body

Table 2: Highlight of Majalgaon dam reservoir and fish fauna.

Name	**Majalgaon dam Jaikwadi project Stage – II**
Type	Multipurpose (Irrigation and Power production)
River	Sindphana
Basin	Godavari
Location	2 Km. u/s of MajalgaonDist-Beed (M.S.)
Year of start of Construction	1977
Year of completion	1987
Catchment area	3840 Sq.Km.
A.V. Rainfall in C.A.	800 mm.
Submerged area	7813 Ha.

Class – Pisces	**Family -3 – Siluridae**
Sub-class – Teleostomi	*Spcies – 8 – Wallagoaltu*
Order 1 – Cypriniformes	*Order – 2 – Mastaembeliformes*
Family 1 – Cyprinidae	*Family 4 – Mastamecembelidae*
Speices – 1 – *CatlaCatla*	*Species 9 – M. armatus*
Species 2 – *Labeorohita*	*Order 3 – Osteoglossiformes*
Species 3 – *Cirrhinamrigal*	*Family 5 – Notopteridae*
Species 4 – *Cyprinuscarpio*	*Species – 10 – N. chital*
Speices 5 – Silver carp	*Order 4 – Ophiocephaliformes*
Species 6 – *Barbusticto*	*Family 6 – Channidae*
Family 2 – Bagridae	*Speices – 11 – Channa Staitus*
Species 7 – *Mystusseenghala*	

2.6 Fishing on Majalgaon 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 polythene sheet. It was light in weight and used in single fisherman. The size of thermocole, wooden sheet varies from 5 to 6 feet in the length and 3 to 4 in breadth.

2.7 Fish Production on Majalgaon Dam

It was very difficult to find out the exact fish production of the Majalagaon 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 Majalgaon Dam Reservoir.

Sr No	**Months**	**Total Fish Catches Kg/Year**		
		2009-2010	**2010-2011**	**2011-2012**
1.	August	8104.40	3471.50	6742.00
2.	September	9300.00	2895.00	3661.00
3.	October	4825.00	2014.00	3781.00
4.	November	3848.00	1420.50	4493.50
5.	December	2888.50	2761.00	4127.75
6.	January	1903.00	2405.00	5223.00
7.	February	2173.00	2021.50	7099.00
8.	March	1862.75	3557.00	7220.25
9.	April	6334.00	2527.50	2080.75
10	May	2722.50	8750.00	5736.25
11	June	6462.50	14754.00	10621.50
12	July	6260.50	12489.50	10498.00
Total		51983.5	59066.75	71285.75

2.8 Marketing of Fish

Fisherman themselves catch the fishes and sold them at distance market at Aurangabad, Hyderabad, Mumbai, Gulbarga, Nizamabad. They also sold fishes at local market Majalgaon. Nitrud, Talkhed, Patrud, Takarwan, Rajegaon, Dharur, Wadwani, Telgaon, Georai, Parli, Beed and Pathri. Fishes, after assembling, were sold to the merchant and send them to distance market. While transporting fishes, fishes are packed with ice in bamboo boxes.

2.9 Co-Operative Society

Manik Shah Fish Business Co-operative Society Bhatwadgaon Tq. Majalgaon Dist. Beed. State Maharashtra.

1 Date of Registration - 15 Dec. 1987. 2. Registration No. - BHR / MGN / RSR / CN / 1053. 3. Total no. of member - 41.

2.10 Future Scope for Development of Fisheries of Majalgaon 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.

2.11 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

1. Sakhare VB. - Ichthyofauna of Jawalgaon Reservior in Solapur district of (M.S) Aqua Biol. 2001; 16(1) 31-33.
2. Ingole SB. Some aspect of Hydro biological studies of Majalgaon dam Dist. Beed (M.S.) Ph.D. Thesis, S.R.T.M.U. Nanded (M.S.), 2005.
3. Day Francis. The fishes of India. 1971, I(II).
4. Agarwal SC. A handbook of fish farming Narendra Publishing House, Delhi-11, FF, 1994, 8-16.
5. Jhingran VG. 'Fish and fisheries of India' Hindustan publishing corporation, New Delhi, India, 1982, 54, 86, 167, 261, 283, 292.
6. Lagler KF. Freshwater fishery biology W.M. C. Brown and Co Jowa, 1956.
7. Alikhuni KH. Fish culture in India Form Bull. India Coun. Agri Resi. 1957; 20:144.