Life Science Bulletin, **Vol. 9(2) 2012 : 269-273** ISSN : 0973 5453 (Print)

BIO-DIVERSITY OF FISH FAUNA AT NIPANI RESERVOIR FROM BELGAUM DISTRICT WITH RESPECT TO PHYSICO-CHEMICAL PARAMETERS

A. S. DONAR and K. R. REDDY

Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.)

ABSTRACT : The present paper deals with the study of diversity and seasonal fluctuation in the population of fishes in relation to different physico-chemical parameters at *Nipani* reservoir from Belgaum district. The present investigation was carried out from February,2010 to January,2011. The species of the family *Cyprinidae, Siluridae, Bagridae, Claridae, Notopteridae, Channidae* and *Mastacembelidae* were reported from this reservoir. It was found that seasonal fluctuations in the physico-chemical parameters play a vital role in distribution of the fishes. The physico-chemical parameters of the reservoir were also analyzed and the results were interpreted with the fluctuations of the available fish fauna. The present work undertaken to enlighten the biodiversity of fishes and their importance at *Nipani* reservoir.

Key words : *Biodiversity, Nipani, Cyprinidae, Siluridae.*

INTRODUCTION

In the natural resources food is one of the most important renewable natural resource. Today world's food come from mainly three sources Agriculture, Animal husbandry and Fishery. Fresh water fish can provide large quantities of high quality protein. There are big rivers and ponds which can be utilized for the cultivation of additional food supplies to the human being. Fishes make up about 88.6% of the total weight of harvest from aquatic system. Global production of fish from aquatic system has suffered serious setbacks following 1970 A.D. Indian inland fisheries suffering from a number of disadvantages like pollution of water bodies, lack of scientific management. However growth of aquaculture which involves rearing and husbandry of fishes under human care has raised the harvest from aquatic system substantially (Revelle,1985). In connection with efforts there is a pressing need of diversification. The entire basis of fish production in fresh water is about a dozen species among which carps are predominate. We can enlarge our fisheries potential by careful storage and management of the enormous quantities of water. Fishes of the fresh or inland water bodies of the Indian sub-continents have been a subject of study since last century; Hamilton Buchanan (1822), Day (1878), Talwar & Jhingran (1991), Paik *et al.* (2003). Present investigation was undertaken to study the status of fish fauna diversity from *Nipani* reservoir. *Nipani* reservoir is situated at 16°.23'.54''(N) latitude and 74°.21'.48''(E) longitude. The reservoir is situated on the border of Maharashtra and Karnataka. Water qualities of reservoir must be in permissible limit to proper growth of biological things like Phytoplankton, Zooplankton and Ichthyofauna. Physico-chemical parameters affects the life of fishes.

MATERIAL AND METHODS

Physico-chemical analysis of water sample of selected four sites from reservoir was carried out as described by APHA (1998), Trivedi & Goel (1988) and Kodarkar (1992). For the estimation of physico-chemical parameters surface water sample were collected monthly at morning hours. The analysis of water temperature, pH, dissolved oxygen and free carbon dioxide was made on site. For the analysis of other parameters the sample were brought into laboratory and stored in refrigerator till the completion of analysis. The fishes were collected with the help of local fisherman from reservoir for one year. The collected fishes treated with 10% Formaldehyde solution. For identification of fish species stress was mainly given on stable characters both meristic and morphometric. The authentic books on fish systematics like Day (1878), Jayaram (1981-1995), Menon (1964) and Talwar & Jhingran (1991) were referred for identification of fishes.

RESULTS AND DISCUSSION

The physico-chemical parameters for one year (Atmospheric temperature, Water temperature, pH, Conductivity, Transparency, Turbidity, TDS, Dissolved oxygen, Dissolved carbon dioxide, Alkalinity, Chloride, Sulphates, Hardness and Biological Oxygen Demand) are given in the Table.1. Temperature plays an important role in the thermal stratification. It affects on chemical and biological activities of aquatic media like Dissolved oxygen and Carbon dioxide. The water temperature observed from 14°C to 31°C. Maximum temperature was recorded in the month of May. pH is the scale of intensity of acidity

*Author for correspondence (email : ravibamu@yahoo.in) Received 11.06.2012 Accepted 30.07.2012

Table. 2 Diagnostic features of Ichthyofauna.

S.	Genus	Species	Author	Family	Diagnostic Character's	Fin formula
1.	*Labeo*	*rohita*	Hamiltion (1822)	Cyprinidae	Dorsal Finray's 14 to 16, pectoral Fins as long as head Excluding snout Body ablong, mouth terminal narrow Jayaram (1999)	D.16 (3/13) : p.17: V.9: A.7 (2/5), c-19, L.I.40; L.tr. 7 ½. Barbels 1 pair Datta munshi and Shrivastava,1988.
2	*Pantius*	*ticto*	Hamilton (1822)	Cyprinidae	Lateral line scales 22 to 26; anterior colour spot always present, scales present 11-14, Jayaram (1999)	Biii, d.11 (3/8) ; p.15 ; v.9. A.7 (2/5), c-19 ; L.I. 23-26 L.tr. 5- 6/6, Days volume I (1986)
3.	*Catla*	*catla*	Hamilton (1822)	Cyprinidae	Upper lip absent lower lip moderately thick lower jaw with a movable articulation at the symphysis but without a prominent knob, no barbles. Dorsal fin is long inserted above tip of pectoral fin with 17-19 rays and without any spine (Jayaram,1981.)	D.18 (3/15) ; p.19 (1/18) ; V-9C, (1/8) A.8 (3/5), C-19, L.I. 40-42. L.tr. 7.5-5 (Gupta,2006).
4.	*Cyprinus*	*carpio*	Linnaeus (1758)	Cyprinidae	Body fully covered by regularly arranged rows of scals. This is supposed to be the original (Jayaram,1999)	Diii-N, 18-20, Aiii 5, P; 15 V; 8 (Shrivastava,1985).
5.	*Cirrhinus*	*mrighala*	Hamilton (1822)	Cyprinidae	Dorsal fin with 15 to 16 rays and lateral line scales are 40-45 (Jayaram,1981)	D.15 (3/12) : P-18, V.9 A.8 (2/6) C.19. L.I. 41-43 L.tr. 6 (1/2) 7/6. ½ , Barbles 1 pair (Dattamunshi and Shrivastava,1988)
6.	*Ctenopharyngodan*	*idellus*	Valenciennes (1841)	Cyprinidae	No Barbles, Dorsal fin inserted slightly ahead of pelvic fins near tip of snout, then caudal fin base with ten rays (three simple seven branched) and without a spine (Jayram,1999).	D.10, P-18, A.10-11, V.9 L.L. 4-42.
7.	*Hypothalamichthys*	*molitrix*	Valenciennes (1844)	Cyprinidae	Entire abdominal edge keeled. Gill rakers continuous, forming a crecentic, horny membrane (Jayaram,1999)	D.10-11, P.20-21, A.14-15, V.8, LL.115-1120.
8.	*Walllago*	*attu*	Bloch and Schneider (1801)	Siluridae	Gape of mouth very wide, extending beyond eyes posteriorly (Jayram,1999).	D.15, P.15-16 (1/14-15) V.9-10, A.86-88 (4/82-84), C-17, Barbles are 2 pairs (Dattamunshi and Shrivastava,1988).
9.	*Mystus (Aorichthey)*	*seenghala*	Sykes (1839)	Bagridae	Snout spatuate, width of gape of mouth 1/3 of head length, caudal fin with 19-21 rays, maxillary barbes extended to the (reaching) anal fin. Adipose dorsal short and about as long as rayed dorsal	D.1/7/0, P(1/9), V-6, A.11-12 (3/8-9) C.19-21, Barbels four pairs (Datta munshi Shrivastava,1988)
10.	*Clarius*	*batarahus*	Linnaeus (1758)	Claridae	Distance from dorsal fin bsre to base of occipital process 4.5 to 6.0 times in head length measured along upper median line from tip of snout to base of occipital process (Jayaram,1999)	D.65-72, P-9 (1/8), V-6 (1/5), A.47.55, C-17, (Gupta and Gupta,2004).
11.	*Notopterus*	*chitala*	Hamilton (1822)	Notopteridae	Craniodorsal profile, strongly concave jaws increasing in length through out life reaching far beyond posterior border of eyes in larger specimen's pre opercular scalers rows more than-10 (Dattamunshi and Shrivastava,1988)	D.9 1/8, P.16, V.6 A.110-118, C-12, L.I. 169-180 (Dattamunshi and Shrivastava,1988).
12.	*Channa*	*punctatus*	Bloch (1793)	Channidae	Pelvic more than half length of pectoral fins pectoral fins plain (Jayaram,1999)	D.29-31, P-16, V-6, A.20-22, C-12, L.I.36-40 L.tr.4-5/7-8 (Dattamunshi and Shrivastava,1988).
13.	*Mastacembelus*	*armatus*	Laceped (1800)	Mastace-mbelidae	Dorsal and anal fins are confluent with the caudal. Gape of mouth extending to below posterior nostrils or beyond (Dattamushi and Shrivastava,1988).	D.34-37/74-90, P-23-25, A(3/75-8) C-20 (confluent with dorsal and anal) (Dattamunshi and Shrivastava,1988).

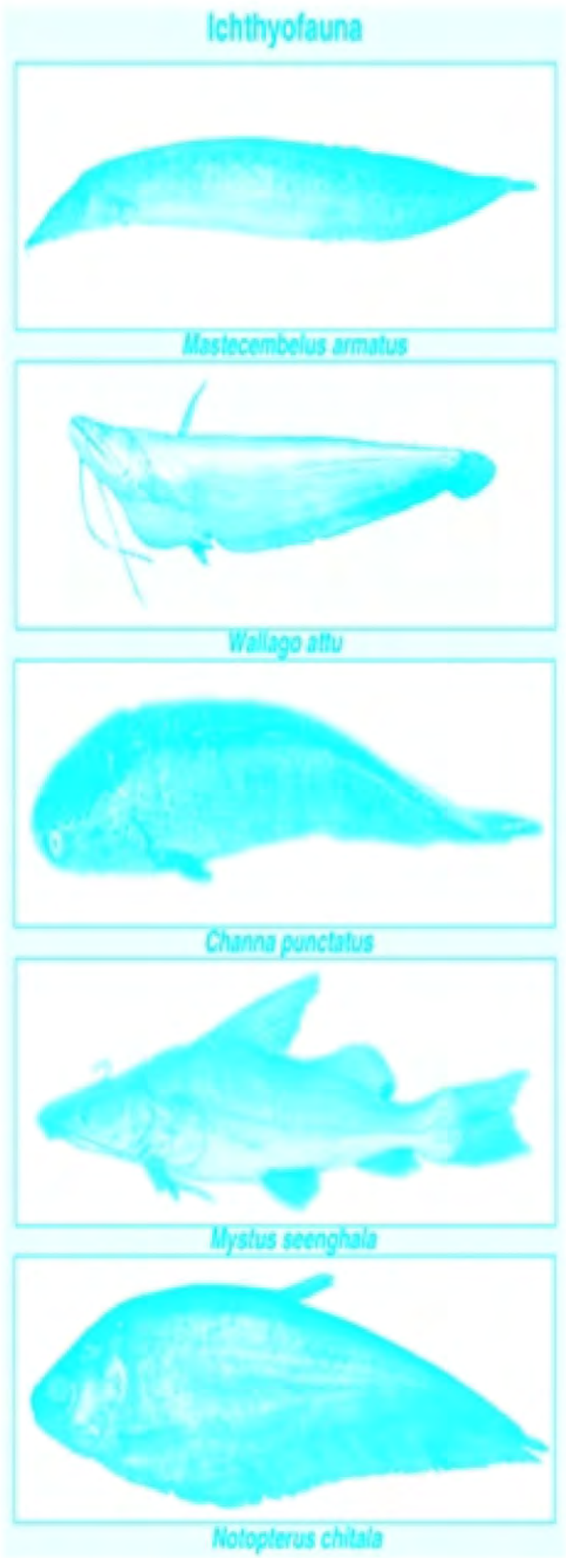

Plate 1

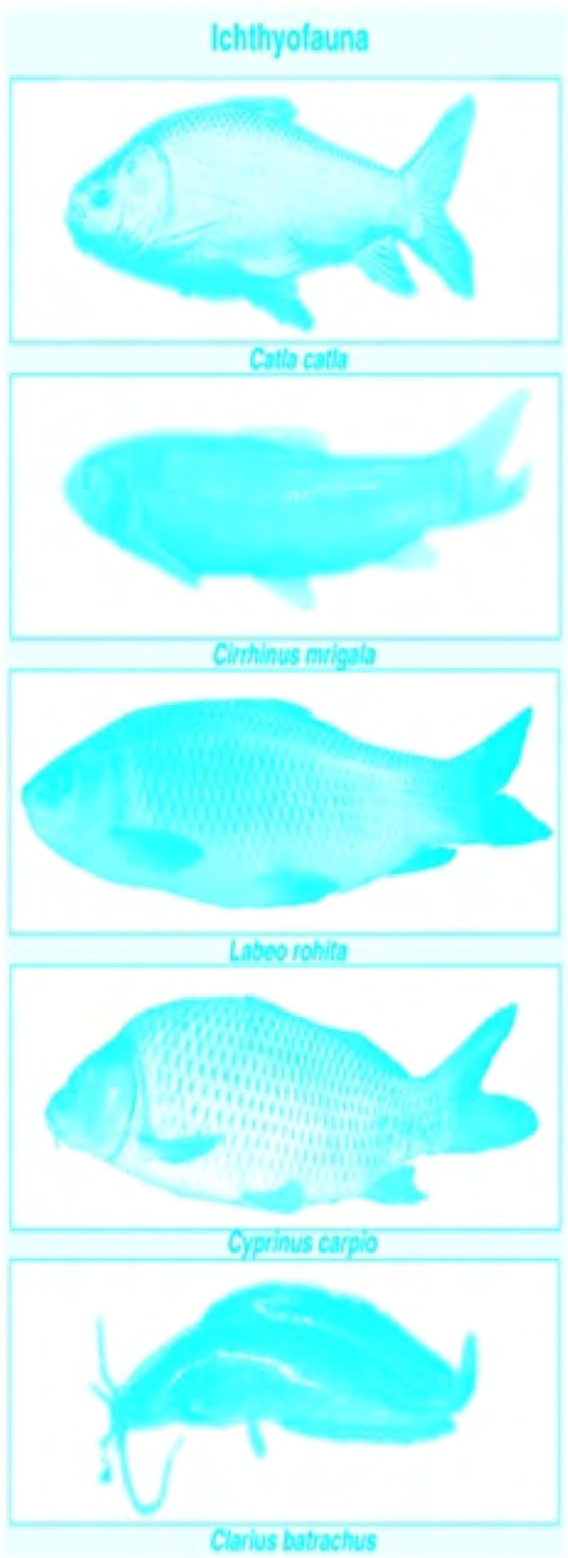

Plate 2

Table. 1 Monthly variations in physico-chemical parameters of fresh water reservoir Nipani from February,2010-January,2011.

Months	Temperature Water	pH	Transparency cm	Turbidity NTU	TDS mg/lit	Conductivity µmho/cm	Dissolved O_2 mg/lit	Free CO_2 mg/lit	Alkalinity mg/lit	Chloride mg/lit	Sulphates mg/lit	Total Hardness mg/lit	BOD mg/lit
Feb,09	24.28	7.97	70.75	5.50	206.50	226.50	4.27	4.92	138.75	20.00	21.75	158.00	2.92
Mar.09	29.48	8.10	62.50	13.75	202.50	312.50	3.475	6.70	166.25	23.50	23.00	156.75	4.37
Apr.09	30.48	8.30	49.25	15.25	185.75	275.75	2.12	8.67	174.25	26.00	9.12	154.75	5.80
May09	30.78	8.37	46.25	21.25	197.75	422.00	3.37	Absent	201.00	27.50	10.17	151.75	4.65
Jun.09	29.20	8.40	41.50	20.50	261.00	292.75	4.00	Absent	200.00	33.25	15.00	148.75	3.60
Jul.09	18.95	8.50	26.00	22.75	277.75	267.00	4.97	Absent	211.75	31.25	20.00	145.00	3.22
Aug.09	17.22	8.37	33.75	22.50	274.75	254.25	6.22	Absent	190.25	36.25	21.50	141.75	2.65
Sep.09	17.28	8.25	43.75	18.75	267.00	274.00	6.70	Absent	170.75	34.00	26.00	140.00	3.00
Oct.09	16.00	8.05	64.75	15.25	194.50	203.50	7.12	Absent	149.25	25.50	28.25	138.25	1.32
Nov.09	15.20	7.55	91.00	11.75	188.50	297.75	7.80	Absent	126.00	21.25	25.25	136.25	2.05
Dec.09	14.00	7.12	101.50	16.25	149.75	323.75	8.72	Absent	93.25	28.00	17.00	139.25	0.55
Jan.10	19.22	7.57	99.75	9.75	199.50	292.00	4.32	3.82	129.50	19.50	31.00	146.25	2.30

and alkalinity of water and measures the concentration of H^+ ions. Most of the biochemical reaction is pH dependant. Swingle (1967) stated that water having a pH range of 6.5 to 9.5 as recorded before day break are most suitable for pond culture. The pH ranged from 7.1 to 8.5 at all the four stations. The transparency of water ranged between 26 cm to 105 cm. The minimum transparency was recorded in the month of July which was 26 and maximum was recorded in the month of December, which was 105 cm. The Turbidity of reservoir was ranged between 5.0 to 23 NTU. The Turbidity of reservoir water is minimum in winter season and maximum in rainy season.

Total dissolved solids fluctuated between 149 mg/l in the month of December and 278 mg/l in the month of July. Seasonal variations in TDS was observed. Chemically pure water does not conduct electricity. Any rise in the Electric Conductivity of water indicates pollution. In present investigation Electric Conductivity ranging between 203 (m mho/cm) to 422 (m mho/cm). It was observed that conductivity goes on decreasing from June to November but constant rise from December to May. Electric conductivity values was high due to water receive sewage and domestic waste. Trivedy and Goel (1988) and Ramakrishna & Pandey (2002). In present investigation DO values fluctuated from 2.1 mg/l to 8.8 mg/l. The higher values was obtained in December 8.8 mg/l and minimum was recorded in the month of April, which was 2.1 mg/l. The variation in the Dissolved oxygen was dependent upon the temperature and organic contents of the reservoir water. In present study lower DO value was in summer, which creates favorable conditions for development of blue green algae. It is in accordance with Fritish (1907). It was helpful for growth of fishes. Free Carbon dioxide ranged between 3.8 mg/l to 8.6 mg/l in present investigation. From May,2010 to December,2010 the Carbon dioxide was not detected in the *Nipani* reservoir. The occurrence of Carbon dioxide during early rainy season may be due to fluctuation of Dissolved oxygen and increase in the buildup of free CO_2 by the process of anaerobic digestion of dead aquatic plant. The alkalinity of water was usually interpreted as the quantity and kinds of compounds such as bicarbonates, carbonates present that collectively shift the pH to the alkaline side of neutrality. The reservoir was moderately alkaline throughout the year. Total alkalinity was ranged between 92 mg/l to 213 mg/l. In present water body alkalinity values were higher than 100 mg/l, which indicates water is nutritionally good. Philipose (1959) pointed out 100 ppm alkalinity as separation point for high productivity and low productive water. During the present investigation chlorides in the reservoir was ranged between 19 mg/l to 37 mg/l. During rainy season higher values of chlorides were recorded where as lower values were recorded in winter and summer season. The water of reservoir was moderately hard in the period of investigation. Total hardness was ranged between 136 mg/l to 159 mg/l. During the period of investigation sulphates in the reservoir was ranged between 9.1 mg/l to 31 mg/l.

Biochemical oxygen demand from reservoir water was recorded 0.5 mg/l to 5.8 mg/l. The BOD was higher during summer and rainy season while lower during winter. All the recorded physico-chemical parameters of water of reservoir are within range of prescribed limit, hence the water of reservoir is most suitable for fishes. The diversity and density of fishes from *Nipani* reservoir is good. Thirteen (13) different species of fishes obtained from reservoir. The obtained species of fishes from *Nipani* reservoir are *L.rohita, Catla catla, Cirrhina mrigala, Silver carp, Grass carp, Cyprinus carpio, C.batrachus, Mastacembalus armatus, Wallgo attu, C.punctatus, Mystus seenghala, Barbus ticto* and *Notopterus chitala*. They are mainly belonging to two orders, six families, thirteen genera and thirteen species. Out of 13 fish species *Catla catla, Cirrhina mrigala, Labeo rohita, Wallgo attu, Channa punctatus, Mastacembleus* spp. and *Clarius batrachus* have a high demand in the fish market of Nipani, Chikodi, Murgud and Kolhapur. The market prices of Indian major carps and other fishes are not constant. The fishes like *Wallago, Clarius and Mastcembelus* spp. are sold in all the four fish markets invariably at higher prices as compared to Indian major carps. Fish species belonging to different families like Cyprindae, Claridae, Mastacembelidae, Siluridae, Channidae, Bagridae, Cyprindae and Notopteridae were identified. Among all identified species the family Cyprinidae were dominant as compared to other. The work is supported by number of earlier studies on similar lines. Das and Nath (1996a,b) were first to describe 23 fish species belonging to 7 families and 14 genera inhabiting in river Tawi and its tributaries.

ACKNOWLEDGEMENT

The authors are thankful to Professor and Head Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad for providing laboratory facilities during the course of this work.

REFERENCES

APHA (1998). *Standards methods for the Examination of water and waste water* - 20 th ed. APHA, AWWA and WEF, N.W.

Das, S. M. and Nath, S. (1966a). *Proc. 53 rd Ind. Sci Congress*, **3** : 374-375.

Das, S. M. and Nath, S. (1966b). *Science*, **2(1-2)** : 65-780.

Day, F. S. (1878). *The fishes of India.* William and Sons Ltd., London.

Fritish, F. E. (1907). *Ann. Bot.*, **21** : 235-275.

Hamilton-Buchanan (1822). *An account of the fishes found in the river Ganga and its branches*. Edinburg and London. Vii +405 pp. 39 pic.

Jayaram (1981-1991). *The freshwater fishes of India, Pakistan, Bangladesh, Burma and Srilanka*. Handbook of Z.S.I. No. 2 xii, 475 pp. Jayaram,

K. C. (1991). *Rec. Zool. Surv. India. Occ. Paper*, **135** : 1-178.

Jayaram, K. C. (1995). *Rec. Zool. Surv. India, Occ. Paper*, **160** : 1-167.

Kodarkar (1992). *Methodology for water analysis* (Phsyicochemical, Biological and Microbiological). IAAB Publication No. 2.

Menon (1964). *The fauna of India and adjacent countries, pisces*. Vol.4 Teleostomi, Cabitoidae, pt I Homalopteridae, ZSI. p. 259. Paik,

Tapas Kumar and Susanta Kumar Chakraborty (2003). *J. Aquatic Biol.*, **2** : 55-60.

Philipose, M. T. (1959). *Chlorococcales*. ICAR, New Delhi.

Ramkrishna, E. V. and Pandey, A. K. (2002). *Limnology Zool. Sur India Wetland Ecosystem* Series 4 fauna of Kabar Lake, pp. 15-21.

Swingle, H. S. (1967). *FAO Fish. Rep.*, **(44)/4** : 397-421.

Talwar and Jhingran (1991). *Inland fishes of India and adjacent countries* - Vol. I&II. Oxford and IBH Publ. Co. Pvt. Ltd., New Delhi, p. 1158.

Talwar, P. K. and Jhingran, A. (1991). *Inland fishes of India and adjacent countries*. Oxford - IBH Publishing Co. Pvt. Ltd., New Delhi, **1&2** : 115-116.

Trivedy, R. K. and Goel, P. K. (1988). *Biol.*, pp. 215-235.