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STUDIES ON THE PHYSICO-CHEMICAL PARAMETER OF GRANT ANICUT (KALLANAI), THANJAVUR DT, TAMILNADU, INDIA.

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ABSTRACT

Water quality degradation by various sources becomes an important issue around the world. Knowledge of the physic-chemical properties would help in understanding its suitability in surimi production. The present experiment was aimed the analysis of Rain fall Maximum (average2.2 mm), humidity (average 77.7%), wind velocity(7.3 km/h), Temperature (Mean 30.1C°), Co_2 (0.4865±0.1ppm), O_2(5.3±0.4 mg/l), pH(8.3),salinity (0.1495±0.05 ppt) characters at Grand Anicut (reservoir), Cauvery ,Thanjavur.

INTRODUCTION

Water quality is a major economic and environmental issue in developing countries. The quality of the river systems these countries acceptable levels for many uses. Rivers due to their role in carrying off the municipal and industrial waste water and run off from agricultural land in their vast drainage basins are among the most vulnerable water bodies to pollution (yerel, 2010). Water quality parameters of pH, dissolved oxygen, temperature, and salinity changes in water quality parameters studied by Tepe et al., (2004). Water quality degradation by various sources becomes an important issue around the world. Usage of more land for agricultural purposes, soil salinization, increase in the use, and erosion have becomes problems threatening natural water source reported by Zalidis et al., (2002). The evaluation of physical and chemical parameters of river Cauvery, Tiruchirappalli (Raja *et al.,* 2008). Jaya raju *et. al.,* (1994) found the seasonally variations in physico chemical parameters and diversity in the flora and fauna of the river, munneru, temperature and Dissolved oxygen were to be the major controlling factors in the distribution of fishes. The physicochemical parameters investigation (Haldar *et al.,* 2006) made on Doyang reservoir in Nagaland, to propose an effective fishery management.

MATERIALS AND METHODS

The water samples were collected from the surface layer (0.2m depth) of reservoir (Grand Anicut, **Fig-1 and Fig-2**) once in a month as recommended by saad (1979), for estimation of environmental variables. Precleaned and rinsed polythene water canes of 5 litre capacity and a 500ml BOD bottles (which were used for the dissolved O_2 fixation) were used for collection of water samples for the analysis of physicochemical characteristics. Samples were protected from direct sun light and immediately transported to the laboratory of Department of

Zoology and Biotechnology, AVVM Sri Pushpam College, Poondi for further analysis.

Physico – Chemical characters

Rainfall, humidity and wind velocity

Rainfall, humidity and wind velocity data were collected from meterology department of Tamil Nadu water Board, Thanjavur.

Temperature

Water temperature was recorded by a sensitive 0-50^{o}C mercury thermometer graduated to 0.02^{o}c. It was measured 0.2m below the water surface (sjoberg and Danell 1982; Michael 1986).

pH

PH was measured using a portable systronics 323 PH meter.

Dissolved Oxygen O_2

The Alsterberg (Azide) modification of winkler's method was adopted (Michael, 1986).

Dissolved Co_2

Dissolved Co_2 was estimated in laboratory by adopting the standard procedures APHA (1989).

Salinity

Salinity was measured by APHA (1989).

RESULTS AND DISCUSSION

Average rainfalls the reservoir (Grand anicut) were (2.2 mm). Maximum rainfall (6.2 mm) was recorded in the month of July, 2012, while in the month February, May, there was no rainfall, (**Table-1**) (**Fig-3**). Sporadic rains could be observed in January and June month. (**Table.1**). Seasonal variation in Physico Chemical parameters Jayaraju *et al.,* (1994) total monthly rainfall varied from 6.15 mm to 255mm. The width of water flow ranges between 2m in summer to 920 m in rainy season.

Atmospheric humidity fluctuated between 69.0 and 97.0% during the study period. Maximum humidity could be observed in January 2012; however, humidity was less in May 2012. (**Table.1**), (**Fig.4.**). Rao *et al.,* (1998) Deals with the hydrobiology together with the ichthyfauna in Viskahapatnam, the range of humidity 66% to 84% profuse vegetation and abundant fauna associated.

Average wind velocity at the reservoir (7.3km/h), June, and July were the windy month (speed 10.2 – 13.6 km/h), and the other months wind velocity more (or) less equal (4.4 – 8.0 km/h). (**Fig.5**). Monthly variations in water temperature high temperature could be observed in the month of April (32.7^{o}C), and low temperature observed in January (25.0^{o}C), (**Fig.6**), and other months fluctuated. The annual average temperature, recorded (30.1^{o}C), (**Table.2**). Muley and Patil (2006) study of water quality and fish diversity of river, temperature ranged from 24.5^{o}C to 30.5^{o}C. pH of the water varied 6.9 and 8.9 (**Table.2**). Higher values of pH could be observed from March to June 2012, (**Fig.7**). Muley and Patil (2006) investigated the range of pH 7.3 to 10.

TABLE – 1 ANNUAL TOTAL RAINFALL, HUMIDITY AND WIND VELOCITY OF THE GRAND ANICUT RESERVOIR, DURING JANUARY 2012 – JULY 2012. (n =7)

Month and year	Total rainfall (mm)	Humidity (%)	Wind velocity (km/h)
January 2012	3.7	97.0	4.4
February	0	96.0	5.0
March	0	70.3	4.6
April	0	69.7	5.5
May	0	69.0	8.0
June	5.9	69.4	10.2
July	6.2	73.0	13.6
Average	2.2	77.7	7.3

TABLE – 2 ANNUAL VARIATIONS IN THE PHYSICOCHEMICAL PARAMETERS OF THE GRAND ANICUT RESERVOIR, DURING JANUARY 2012 – JULY 2012 (n=7)

Month and Year	Temperature (C^o)	pH	Dissolved oxygen (O_2) (mg/l)	Carbon dioxide (CO_2)(ppm)	Salinity (ppt)
January 2012	25.0	8.6	4.8	0.00056	0.179
February 2012	31.0	7.8	4.7	0.00059	0.159
March 2012	32.2	8.9	5.7	0.00029	0.169
April 2012	32.7	8.7	4.9	0.00031	0.180
May 2012	30.0	8.8	5.8	0.00030	0.160
June 2012	31.0	8.7	5.8	0.00043	0.179
July 2012	29.2	6.9	5.8	0.00042	0.182
Mean	30.1±2.37838	8.3±0.67793	5.3±0.4865	0.4865±0.10384	0.1495±0.05156

Values for ±SD

FIG: 1 - GEOGRAPHICAL LOCATION OF STUDY AREA

FIG 1 . MAP SHOWING STUDY AREA

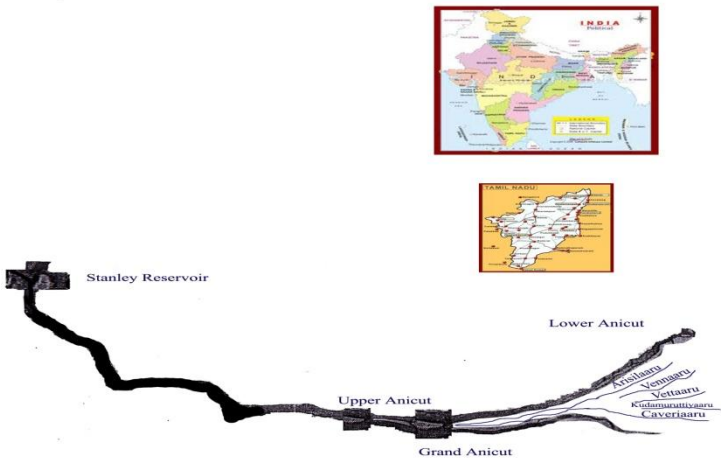


FIG: 2-RANT ANICUT

FIGURE - 3ANNUAL TOTAL RAINFALL OF THE GRAND ANICUT RESERVOIR, DURING JANUARY 2012 – JULY 2012. (n =7)

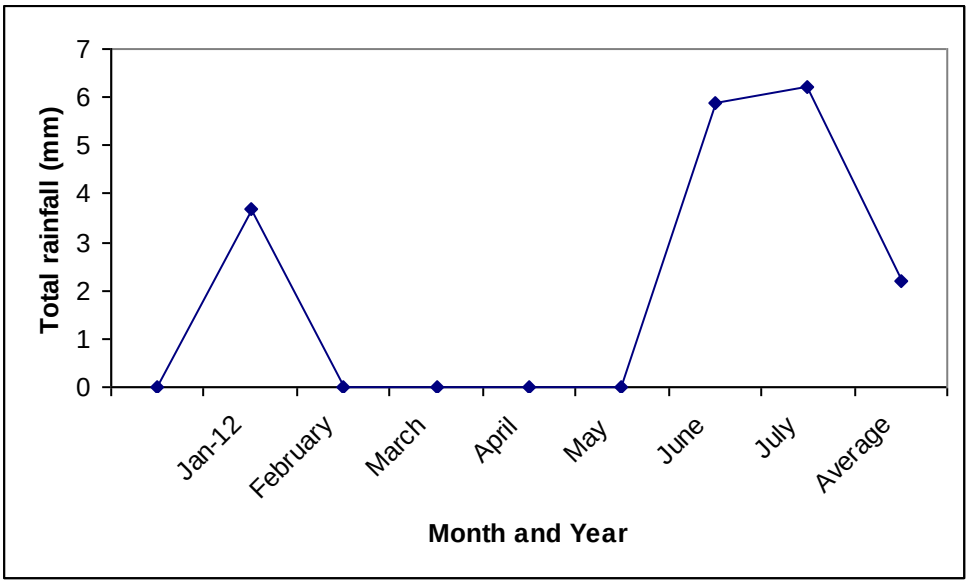


FIGURE – 4-HUMIDITY OF THE GRAND ANICUT RESERVOIR, DURING JANUARY 2012 – JULY 2012. (n =7)

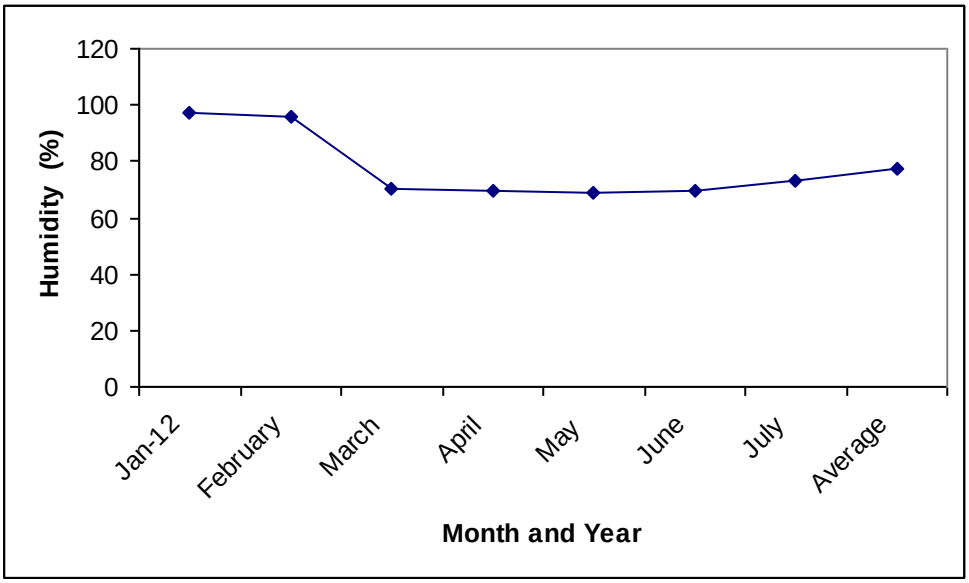


FIGURE – 5 WIND VELOCITY OF THE GRAND ANICUT RESERVOIR, DURING JANUARY 2012 – JULY 2012. (n =7)

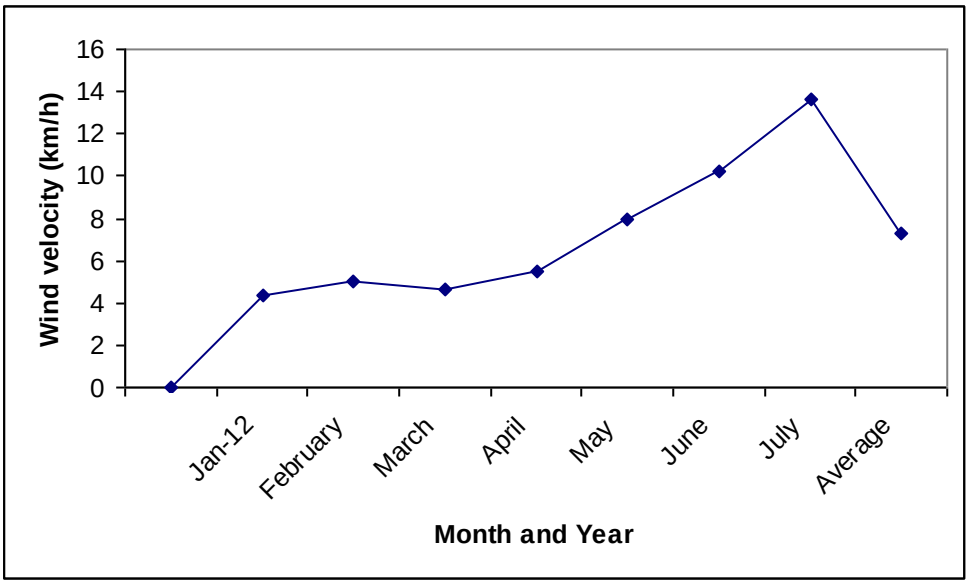


FIGURE – 6 MONTHLY VARIATION OF SURFACE TEMPERATURE (^{O}C) OF THE RESERVOIR

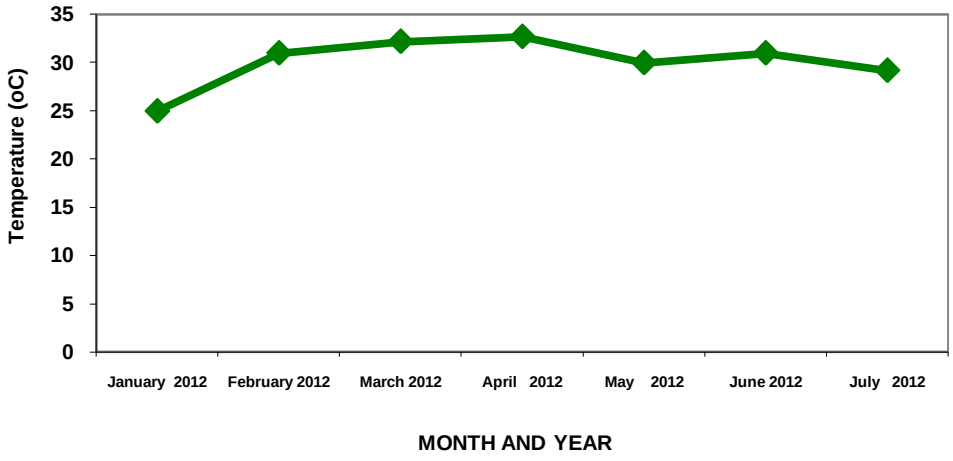


FIGURE – 7 MONTHLY VARIATIONS OF pH IN THE GRAND ANICUT

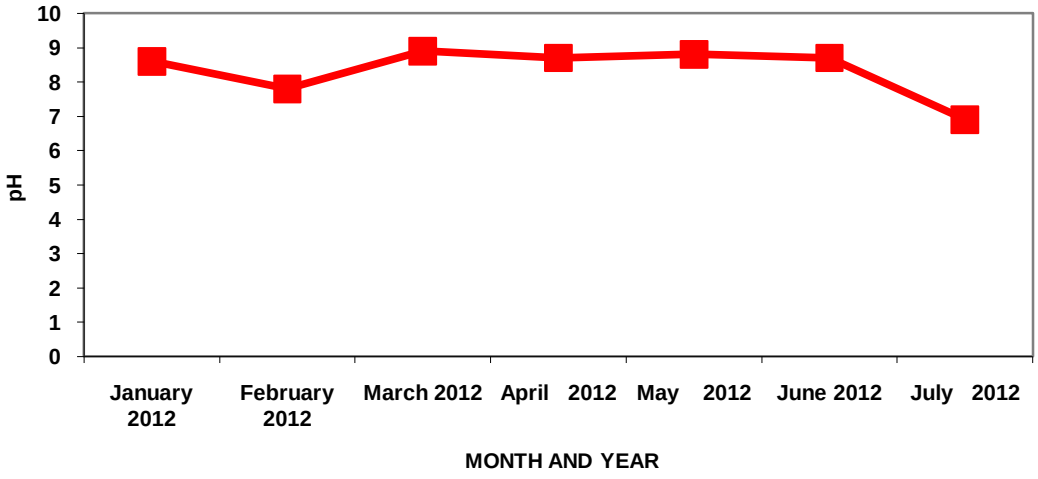


FIGURE – 8 Monthly variations in dissolved oxygen (DO) (mg/l) of the reservoir

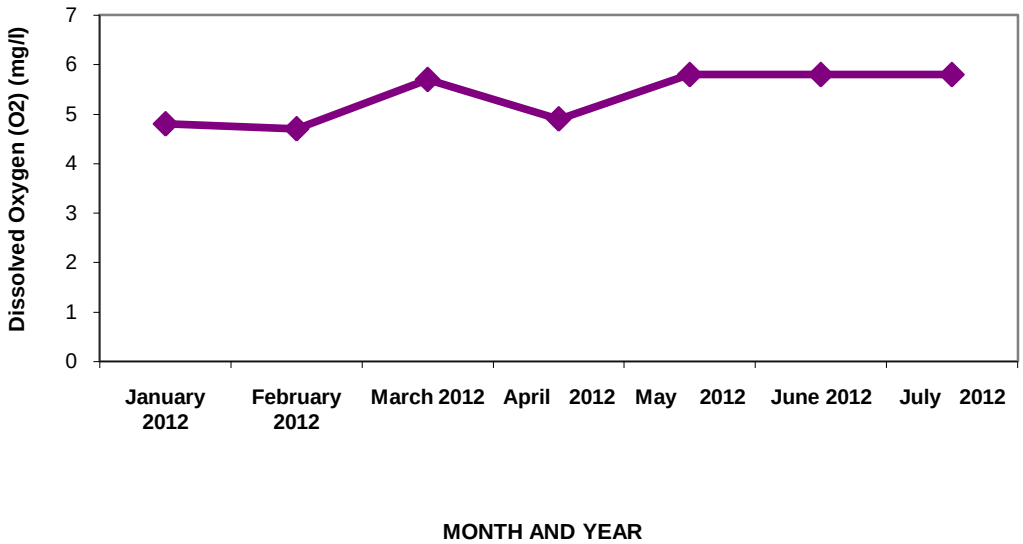


FIGURE – 9 Carbon-di-oxide levels (ppm) in the Grand Anicut during the study period.

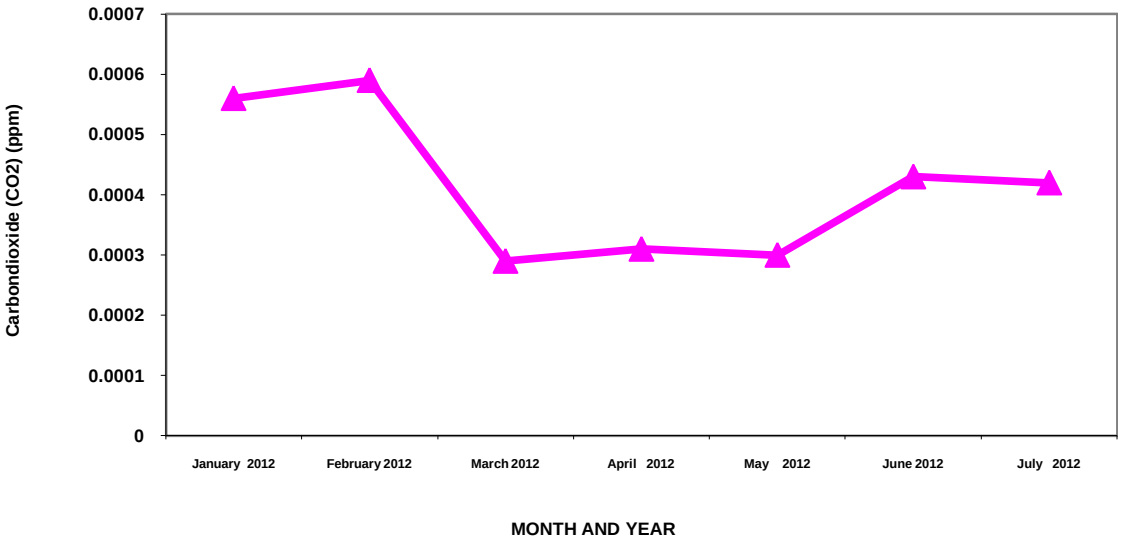
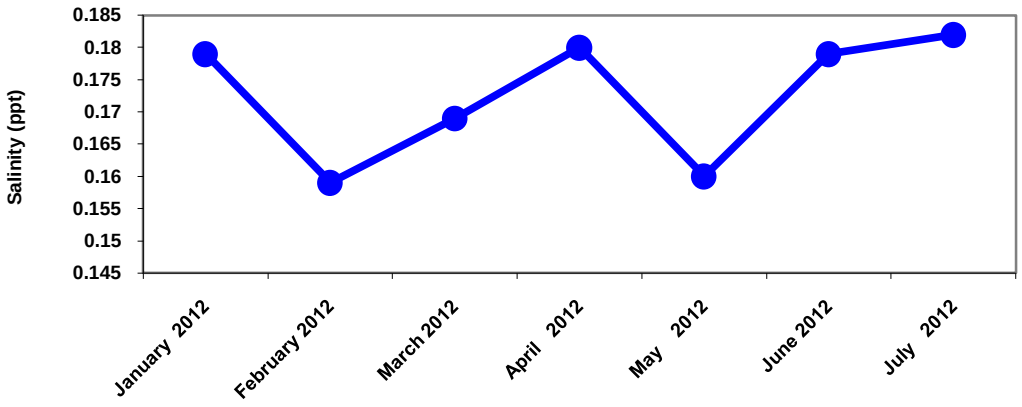


FIGURE – 10 Salinity (ppt) variations in reservoir during the study period.



The dissolved oxygen concentration in the water of the grand anicut reservoir were in the range of 4.7 – 5.8 mg/l (**Fig.8**), monthly O_2 values, showed that May, June and July 2012 maintained highest dissolved oxygen, while January, February and April 2012 the lowest (**Table.2**). Carbondioxide levels were different in the reservoir (**Fig.9**), and the levels varied between 0.00039 and 0.00059ppm during the study period. High values of free Co_2 may result from breakdown of organic matter (Anantharaj *et al.,* 1987). Deshmukh (1964), Prakash (1982) and Lohar *et al.,* (1998) reported that concentration of Dissolute O_2 is inversely proportional of the concentration of Co_2. Muley and Patil (2006). The high value of Co_2 and low value of Dissolved O_2 at discharge Zone indicates increase in Organic pollution. Salinity levels were in the range: 0.159 – 0.182 ppt (**Fig.10**), and the average salinity at grand anicut reservoir 0.149 ppt (**Table.2**). The high value salinity is observed February month. Ali *et al.,* (2001) reported effect of salinity and food ratio level on the growth of Nile tilapia, the range of Salinity 10 to 20 ppt.

CONCLUSSION

The present study suggests that all the parameters deal with are important for fish management ventures to the taken up in reservoirs. Indicate a variation in the water quality parameters such as pH, humidity, salinity, temperature, dissolved oxygen; Co_2 etc., Hydropower dams and reservoir have drastically changed the fish habitats and local fish communities. The environmental survey will help to maintain the quality of the water in reservoirs ideal for human utilization and fishery development.

REFERNCES

1. Ananthraj, B.V. Bhagalakshmi and R.Lakshmi 1987. Limnology of river coocum with special reference to sewage and heavy metal pollution. *Proc. Acad Sci (Anim. Sci)* 96, 141-149.
2. Ali, M.S. 2001. The effects of Salinity and food consumption on growth and protein turnover in nile tilapia (oreochromis niloticus) Ph.D., thesis Department of zoology, University of Aberdeen U.K.
3. Jayaraju, P.B. Prasad Rao G.D. and Sharma S.V. 1994. Seasonal variations in Physico – Chemical parameters and diversity in the flora and Fauna of the river

munnery. A Tributaru to river Krishna Andhra Pradesh, *India J.Aqua. Biol.* 9. 19-22.

4. Haldar. R.S.Vass, K.K. and Raina H.S., 2006. Limnology and Fisheries of Doy and reservoir in Nagaland. India. *J.Fish* 53 (4): 475-479.
5. Michael, P. 1986. Ecological methods for Field and laboratory investigations. New Delhi. Tuta McGraw Hill Publishing, Co. Ltd.
6. Muley, D.V. and Patil. M 2006. A study of water quality and Fish Diversity of punna river Maharashtra *J. Aqu. Biol.* 21(1): 68-75.P.Raja A. Muhindhar Amarnath. R.Elangovan and M.Palanivel 2008. Evaluation of Physical and Chemical parameters of river kaveri, Triuchirappalli, Tamil nadu. Indian September, 29[5], 765-768.
7. Rao. L.M. Rao G.V. and G.Sivani 1988. Hydrobiology and Chthyofauna of Mahadrige dda. Stream of visakhapatinam, Andhra Pradesh, *J.Aqua. Biol.* 13 (1 & 2) 25-28.
8. Saad, M.A.H. 1979. Seasonal variations of some physico-chemical conditions of shatt al-Arab estuary, *Irag. Estuarine coast. Mar. Sci.* 10: 503-513.
9. Sjoberg. K. and Danell. K., 1982 Feeding activity of ducks in relation to diel emergence of Chironomids. *Canadia J. Zool.* 60: 1383-1387.
10. Tepe, Y. and Muthu, E.2004. Physico-Chemical Characteristics of Hatay Harbiye Spring Water. *Journal of the Institute of Science and Technology and Dumlupinar University*, 6: 77-88p.
11. Yerel. S., 2010. Water quality assessment of Porsuk River. Turkey. *E.J.Chemis.,* 7[2]; 593-599.
12. Zalids. G.Stamatiadis. S. Takavakoglou V.EskridgeK. and misopolinos N. 2002. Impacts of Agricultural practiceson soil and water quality in the Mediterranean region and proposed assessment methodology agriculture ecosystems and Environment 88: 137 -146.

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