DIVERSITY OF ICHTHYO-FAUNA



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DIVERSITY OF ICHTHYO-FAUNA IN RELATION TO PHYSICO-CHEMICAL CHARACTERS OF TUNGABHADRA RESERVOIR, HOSPET.

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introduction

- The health of aquacultural ecosystem depends on the inter-relationships between living & non-living components prevailing in the locality.
- Fisheries sector plays a predominant role not only in terms of food value but also generates income and employment to the public.
- However the fish yield from the reservoir fishery is frustratingly low (Sinha, 2001).

- The sustainability of fish diversity and its abundance is based on the quality of water existing in that locality.
- All the hydrological parameters as well as plankton diversity influences the production of fish species.
- Stocking of economically viable native species of fishes in the reservoirs may convert the reservoirs more productive and is important measure from aquabiotic conservation point of view.

- The species diversity, amount of biomass and abundance of plankton can be used to determine the health of the ecosystem with respect to the quality of water which in turn influences the diversity of ichthyo-fauna (fin-fishes).

- The present investigation is aimed at studying hydro-biological status of TungaBhadra Reservoir (TBR) with special reference to the diversity of fin-fishes.

methodology

- Tungabhadra reservoir is geographically located at 76º 21’ 10” E latitude and 15º 15’ 19” N longitude, near Mallapur village about 5 kilometers away from Hospet.

- Three sampling stations (S1, S2 & S3) were chosen for collection of samples from June 2008 to May 2009 for the period of 12 calendar months.

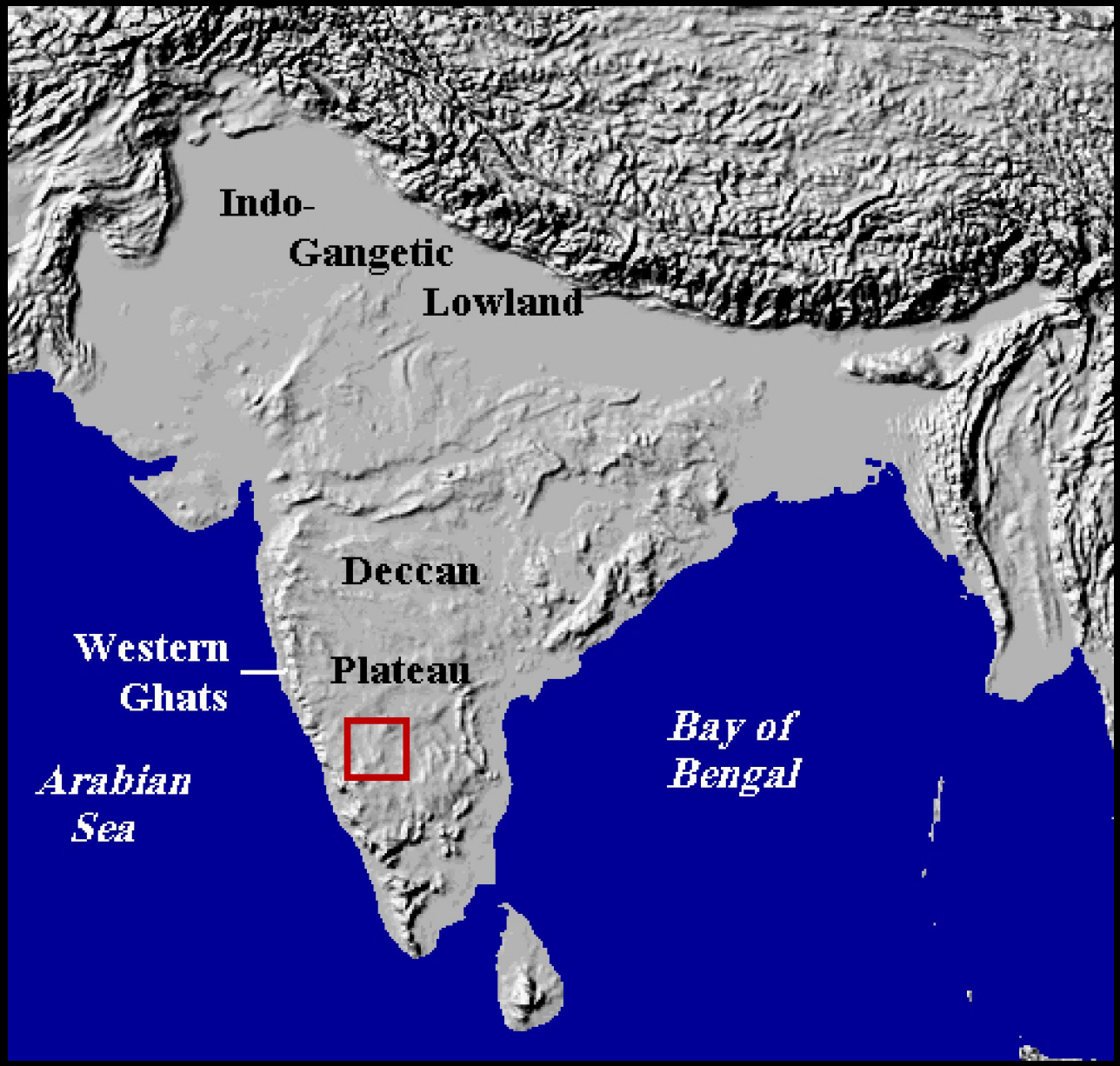

Indo-
Gangetic
Lowland
Deccan
Western
Ghats
Plateau
Arabian
Sea
Bay of
Bengal

Fig.. 1. Satellite pictograph of TBR (source:NASA).

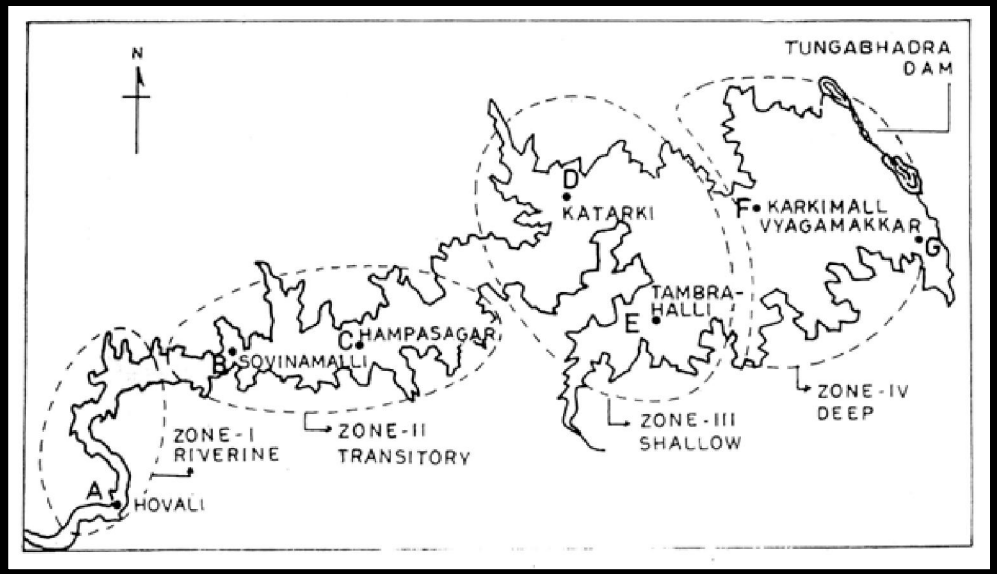


Fig.. 2. The entire stretch of Tungabhadra reservoir.

analytical methods & laboratory procedures

- Air and water temperatures were measured at the sampling site itself at 8 a.m. and recorded. pH of water body was also recorded at the sites using pH meter. Further analysis of water parameters such as free CO2, Dissolved Oxygen (DO), Total alkalinity (TA), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), phosphates, sulphates, nitrates, total hardness, electrical conductivity, fluoride, chloride, turbidity, iron, magnesium, calcium including BOD & COD were carried out as per the standard methods (APHA, 1992)

No	Parameter	Method (APHA, 1998)	Instrument used	Unit
1	Air temp	Direct method	Mercury thermometer	ºC
2	Water temp	Direct method	Mercury thermometer	ºC
3	turbidity	Photometer	Nephelo-turbidity meter	NTU
4	TDS	Evaporation method	Conductivity meter	Mg/L
5	TSS	Evaporation method	Conductivity meter	Mg/L
6	Toal alkalinity	Electrometric method	Conductivity meter	µmhos/cm
7	COD	Titrimetric method	Titrimeter	mg/L
8	BOD	Potassium Dichromate method	COD reflex	mg/L
9	D O	Winkler's modified method	Titration	mg/L
10	Sulphate	Winkler's modified method	Titration	mg/L
11	Nitrate	Barium Chloride method	UV visible spectrophotometer	mg/L
12	Phosphate	Phenol Disulphonic acid method	UV visible spectrophotometer	mg/L
13	Ca	Ammonium Molybdate method	UV visible spectrophotometer	mg/L
14	Mg	EDTA titrimetric method	Titration	mg/L
15	Fe	EDTA titrimetric method	Titration	mg/L
16	Flouride	1-10 Phenanthrolene	UV visible spectrophotometer	mg/L
17	Free CO2	Titrimetric method	Titration	mg/L
18	pH	Titrimetric method	Titration	mg/L
19	Cl	Electrometer	pH meter	--
20	Total Hardness	Argentometric method	Titration	mg/L
21		EDTA titrimetric method	Titration	mg/L

- Similarly fish samples were caught using alavi (a giant-seine net) and drag nets.

- The fish species were collected and preserved in 4% formaldehyde solution and were identified based on the key characters (Jayram & Talwar 1991, Jhingran 1999).

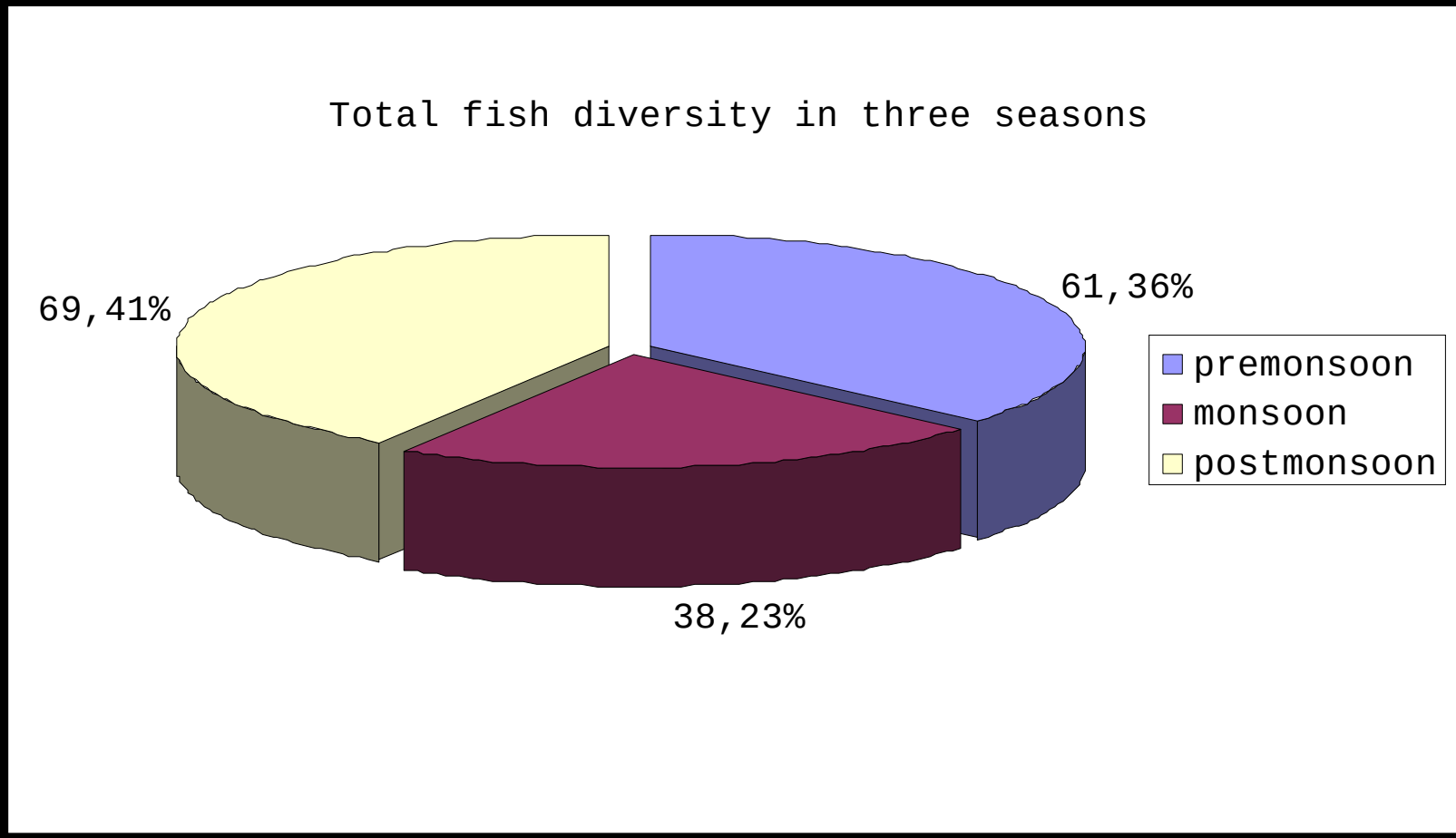
results

- Tungabhadra is the largest tributary of the river Krishna, contributing an annual discharge of 14,700 million m3 at its confluence point to the main river
- At the full level of 497.7 m above MSL, the reservoir extends over 37,814 ha.
- The average water spread areas being and 23,504ha
- lowest being 9,194 ha

results

- Altogether 35 fin fishes were represented in the selected three stations in the TBR.
- Amongst *Cirrhinus cirrhosa, Puntius dobsoni, Puntius sarana, Puntius ticto, Barilius bendelensis, Danio aequipinnatus, catla catla, Labeo fimbriatus, Labeo calbasu, Cyprinus carpeo commun, Silonia childrenii, Pseudotropius taakree,Wallago attu, Mastacebelus armatus,Ambassis nama, Bagarius bagarius, Osteobrama virgosii,Aorichthys seenghala* were found in all the landing centres.

Seasonal percentage composition of total fish diversity.



fish families represented in TBR

- Ambassidae,
- Bagridae,
- Clupeidae,
- Cyprinidae,
- Mastacembellidae,
- Notopteridae,
- Schilbeidae &
- Siluridae.

ichthyofaunal representation

- Ambassidae — *Ambassis nama*
- Bagridae — *Aorichthys seenghala*
- Clupeidae — *Oxygaster clupeoides*
- Cyprinidae — *Cirrhinus cirrhosa*, *Puntius sarana*

- *Labeo kontius*
- *Puntius carnaticus*
- *Puntius dobsoni*
- *Osteobrama vigorsii*
- *Puntius pulcellus*
- *Esomus danrica*
- *P sophore*
- *P ticto*
- *Osteobrama cotio*
- *O. phulo*
- *Barilius bendelensis*
- *B. barila*
- *Danio aequipinnatus*
- *Catla catla*

Labeo rohita

Labeo fimbriatus

Cirrhinus mrigal

Labeo calbasu

Cyprinus carpio specularis

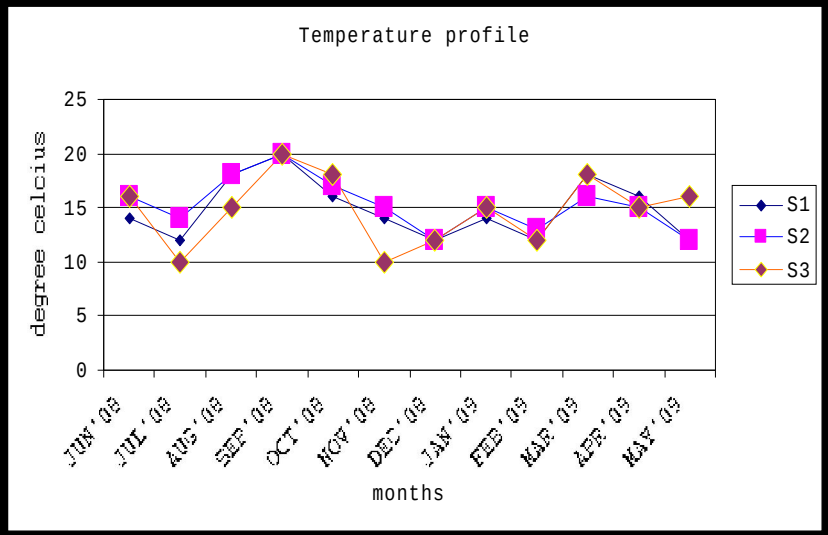
Cyprinus carpeo commun

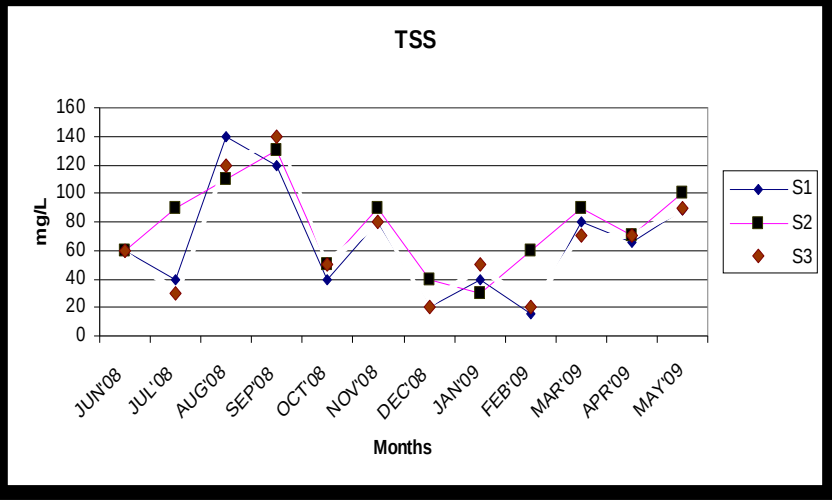
Ctenopharyngodon idella

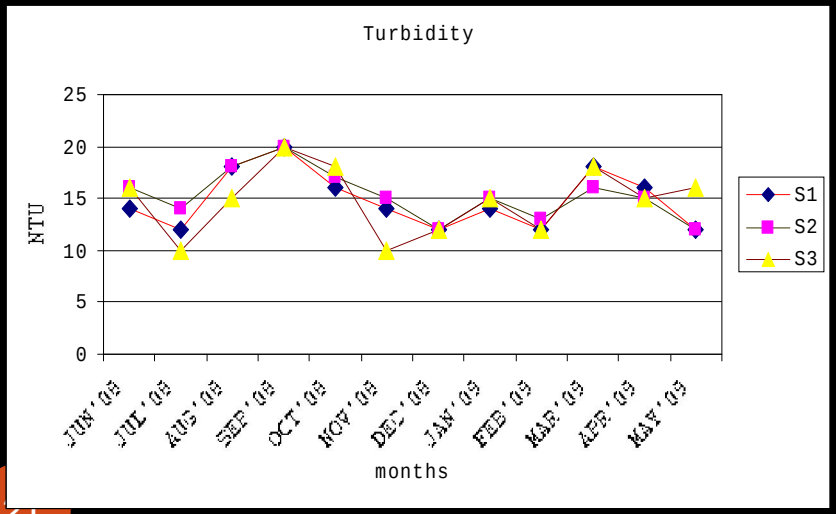
Amblypharyngodon mala

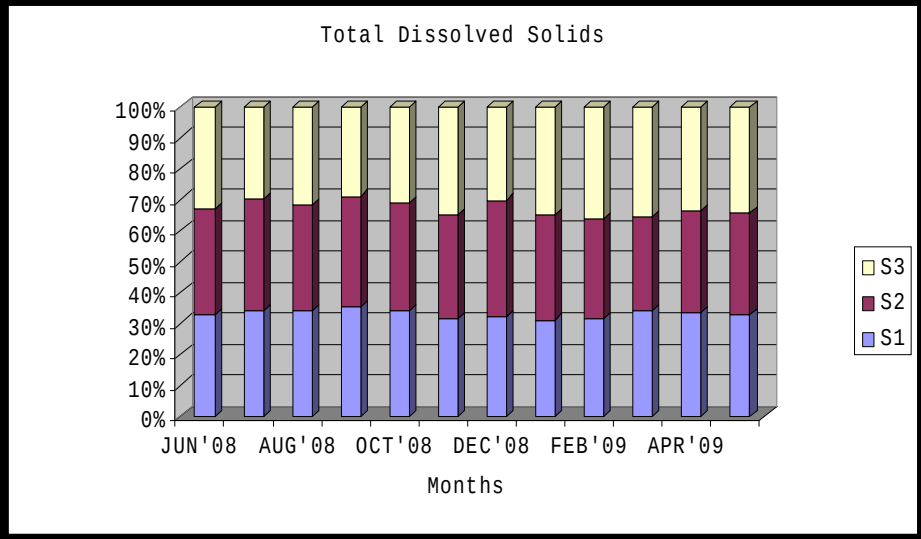
- Mastacembellidae — *Mastacembelus armatus*
- Notopteridae — *Notopterus notopterus*
- Schilbeidae
  - *Silonia silondra*
  - *Silonia childrenii*
  - *Pseudotropius taakree*
- Siluridae
  - *Wallago attu*
  - *Pangassius pangassius*
  - *Bagarius bagarius*

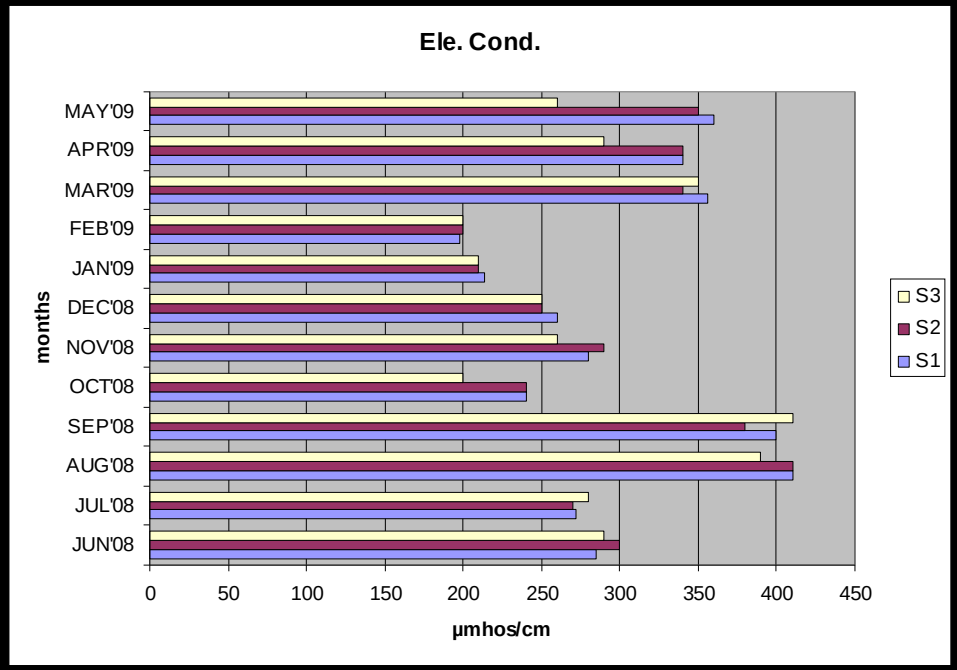
hydrological parameters

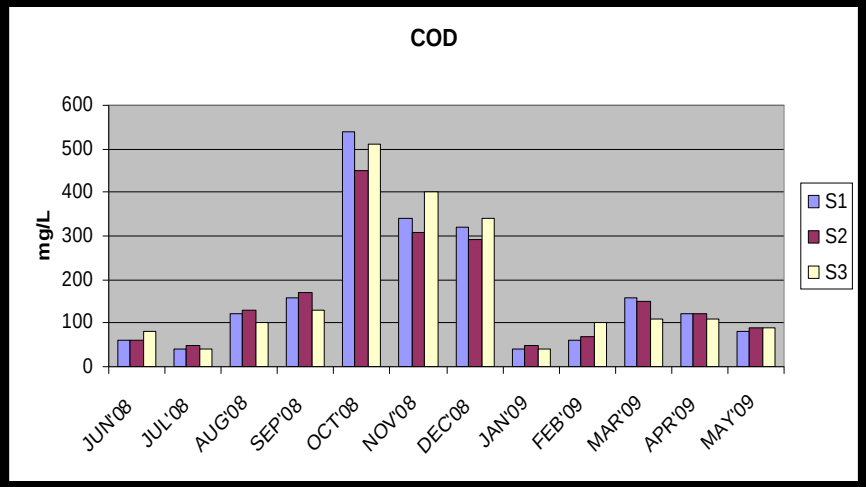


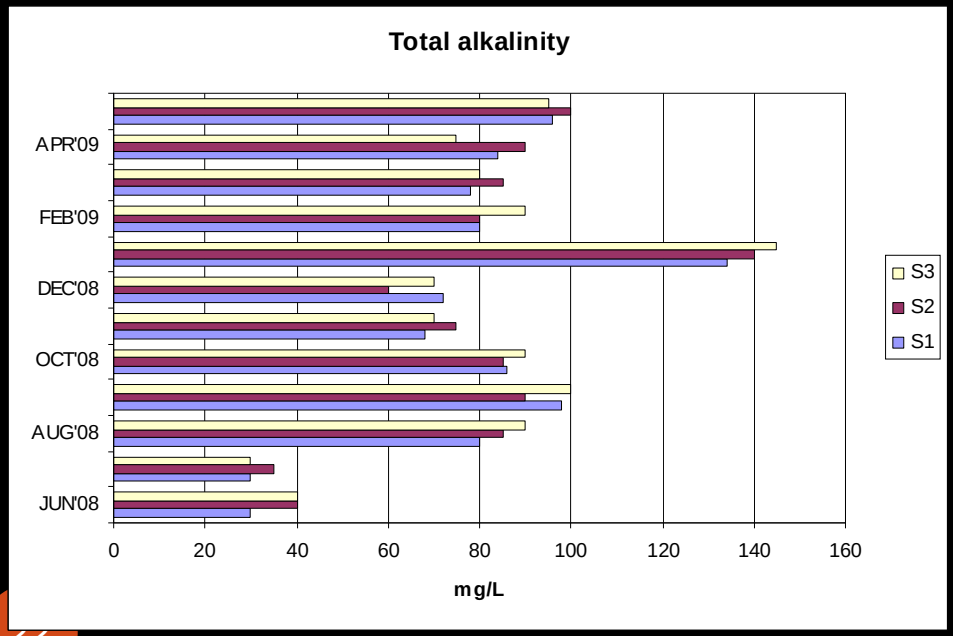


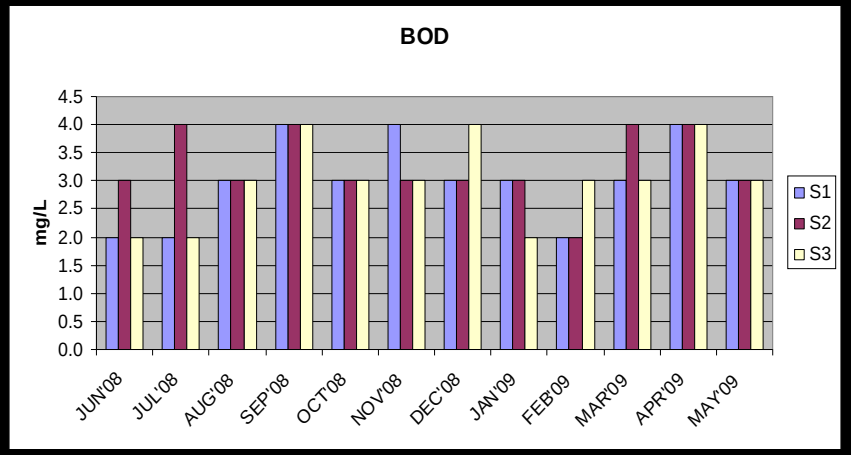


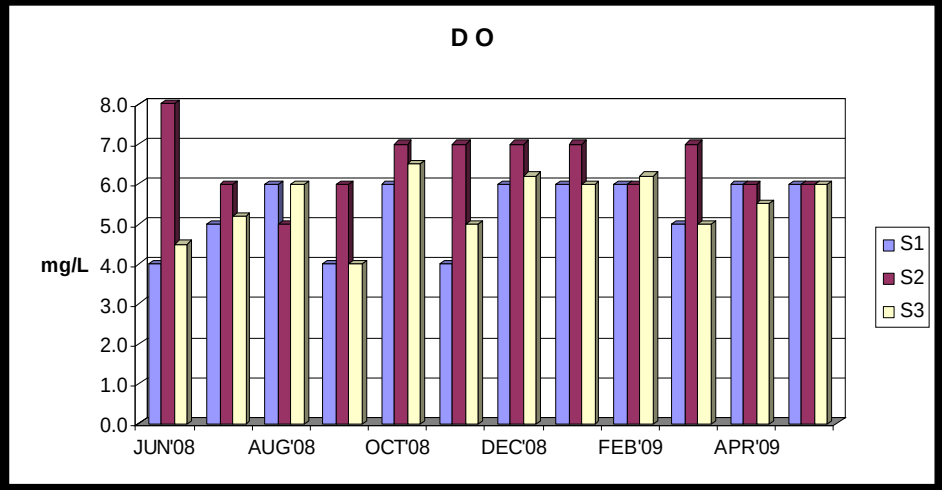


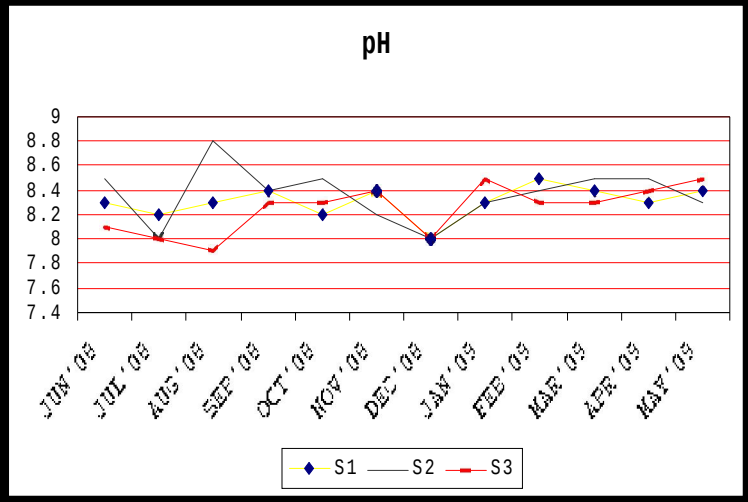

Ele. Cond.
MAY'09
APR'09
MAR'09
FEB'09
JAN'09
DEC'08
NOV'08
OCT'08
SEP'08
AUG'08
JUL'08
JUN'08
months
0
50
100
150
200
250
300
350
400
450
µmhos/cm
S3
S2
S1

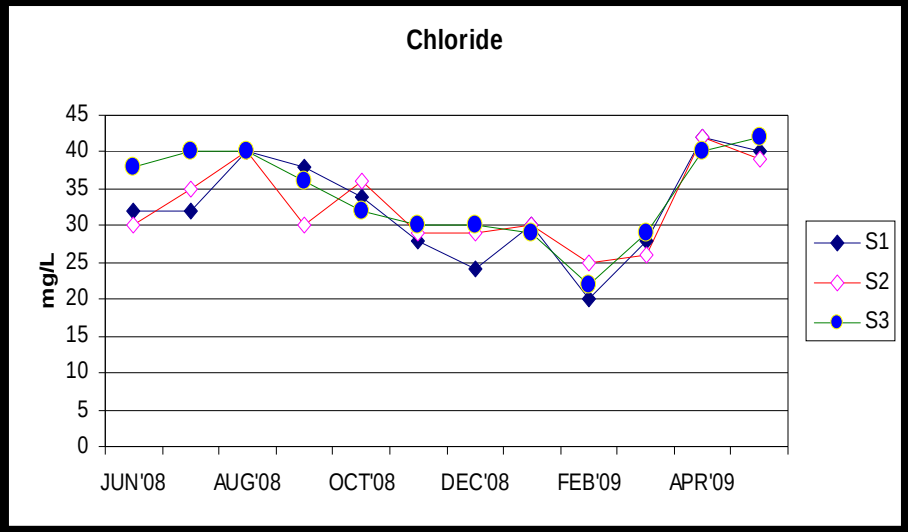

COD
600
500
400
300
200
100
0
mg/L
JUN'08
JUL'08
AUG'08
SEP'08
OCT'08
NOV'08
DEC'08
JAN'09
FEB'09
MAR'09
APR'09
MAY'09
S1
S2
S3

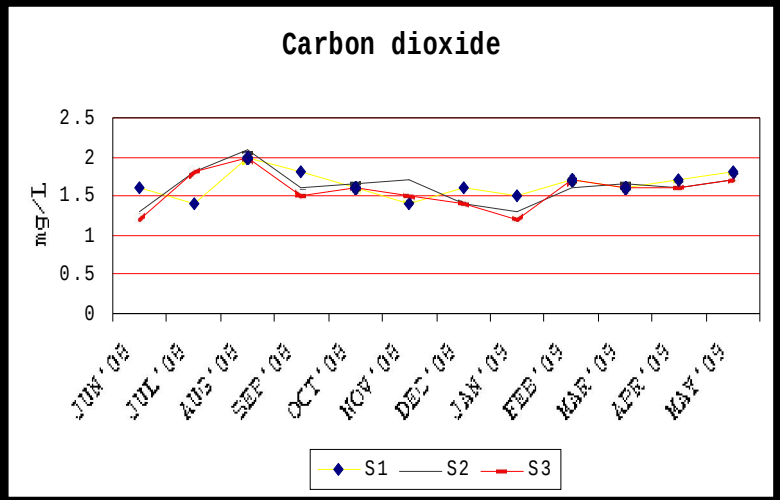

Total alkalinity
APR'09
FEB'09
DEC'08
OCT'08
AUG'08
JUN'08
0
20
40
60
80
100
120
140
160
mg/L
S3
S2
S1


BOD
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
mg/L
JUN'08
JUL'08
AUG'08
SEP'08
OCT'08
NOV'08
DEC'08
JAN'09
FEB'09
MAR'09
APR'09
MAY'09
S1
S2
S3

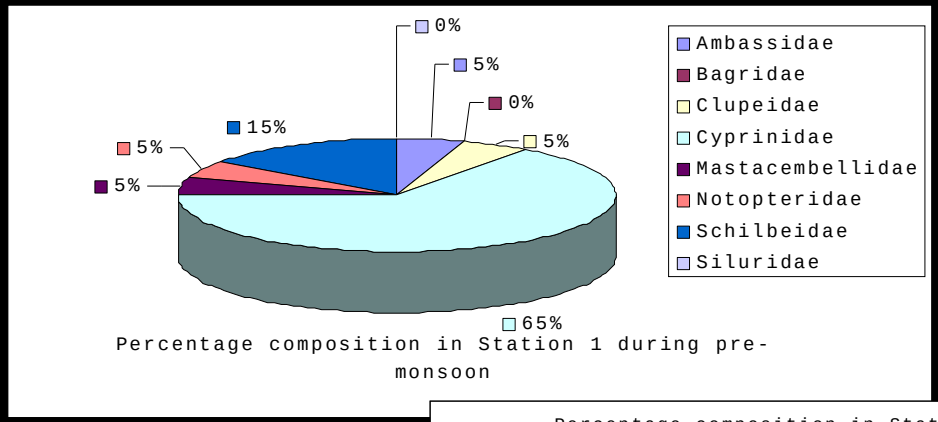

D O
mg/L
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
JUN'08
AUG'08
OCT'08
DEC'08
FEB'09
APR'09
S1
S2
S3


pH
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
JUN'08
JUL'08
AUG'08
SEP'08
OCT'08
NOV'08
DEC'08
JAN'09
FEB'09
MAR'09
APR'09
MAY'09
S1
S2
S3

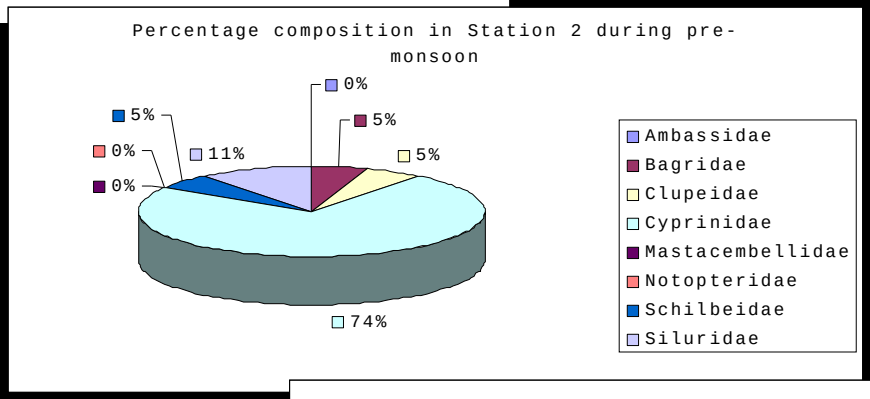

Chloride
mg/L
45
40
35
30
25
20
15
10
5
0
JUN'08
AUG'08
OCT'08
DEC'08
FEB'09
APR'09
S1
S2
S3

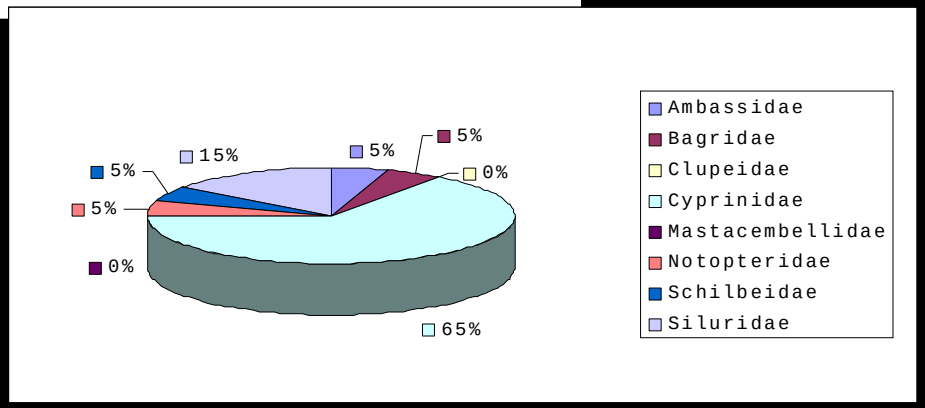

Carbon dioxide
mg/L
2.5
2
1.5
1
0.5
0
JUN'08
JUL'08
AUG'08
SEP'08
OCT'08
NOV'08
DEC'08
JAN'09
FEB'09
MAR'09
APR'09
MAY'09
S1
S2
S3

SC in pre-monsoon

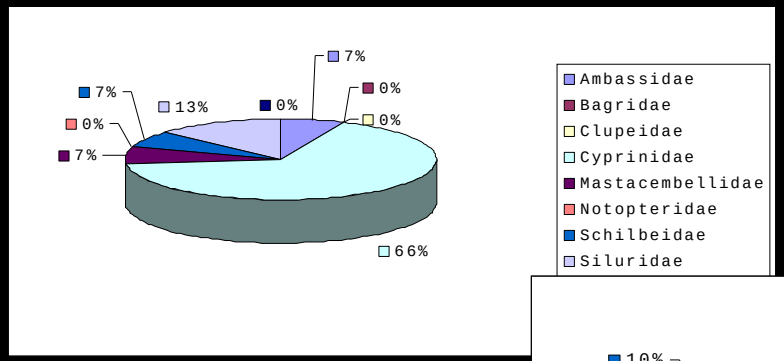


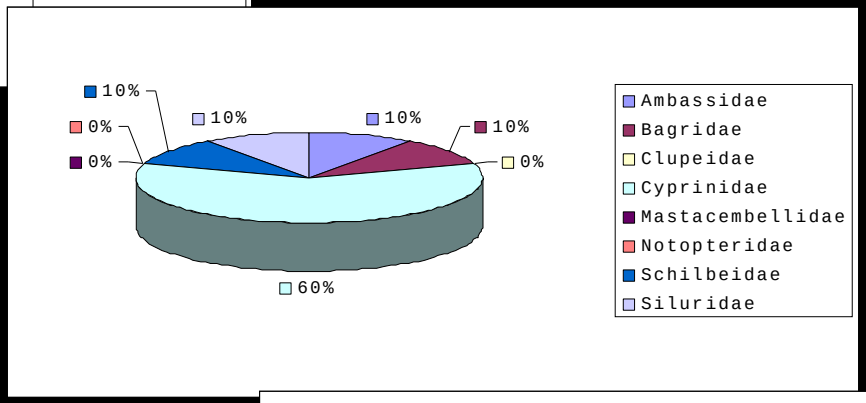
Percentage composition in Station 1 during pre-monsoon

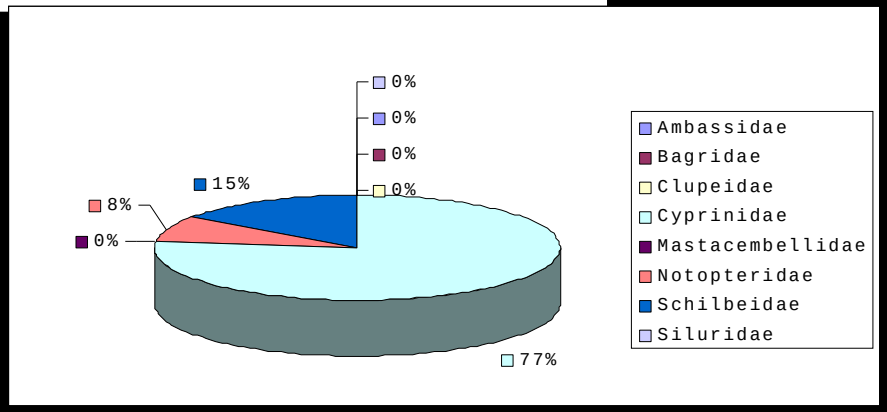




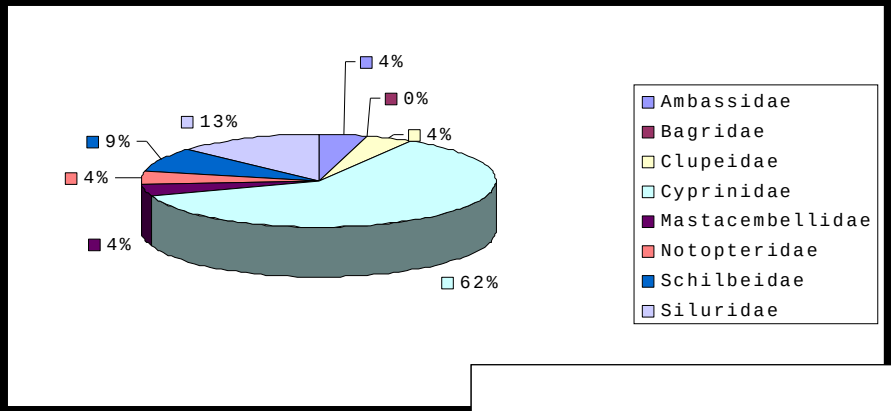
SC in monsoon

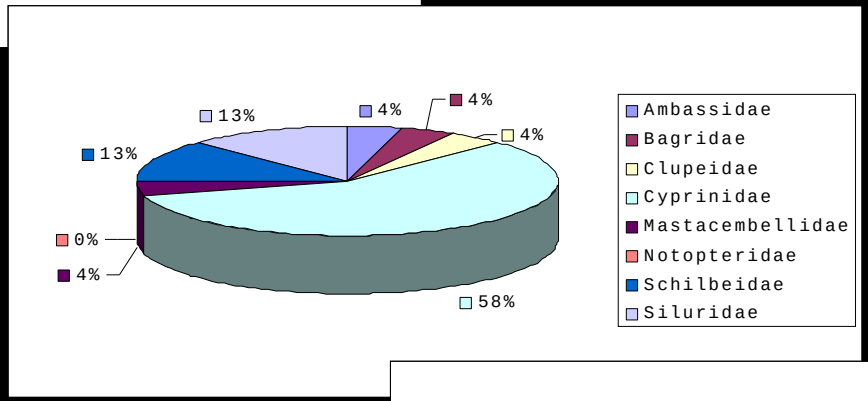


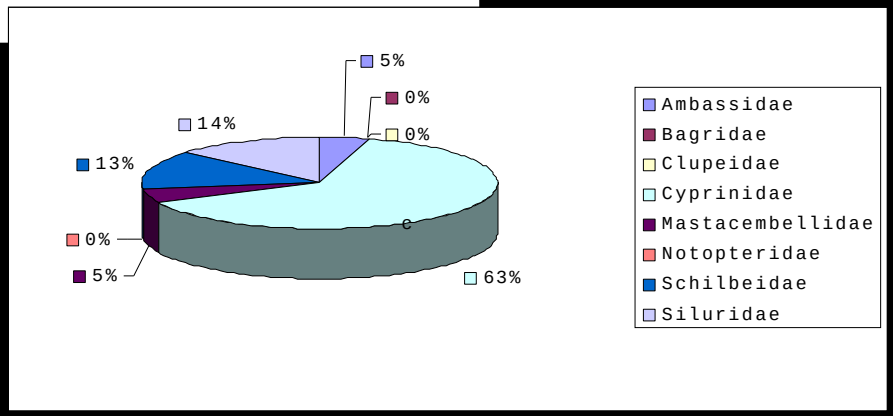




SC in post-monsoon







thus

- study revealed that species diversity of fishes depend on the quality & quantity of the water. High DO, low BOD, rich nutrients and micro flora & fauna influenced the diversity of fin fishes in the TBR.
- The rate of abundance was Major carps > minor carps > cat fishes > trash fishes were observed in TBR

conclusion

- The TungaBhadra Reservoir was found to be having rich fishery potential in its natural hydrological conditions
- Introduction of Indo-Gangetic major carps could utilize the vacant niches created by trash fishes so as to obtain better yield.
- Fishing holidays are advisable during june-august months where majority of commercially important fishes breed.
- Yearly documentation is required for further study.
- Check on industrial effluent discharge is in need.

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