Available online at www.pelagiaresearchlibrary.com

Pelagia Research Library

Advances in Applied Science Research, 2014, 5(5):237-248

ISSN: 0976-8610
CODEN (USA): AASRFC

Ichthyo faunal bio diversity in the lower Manair Dam at Karimnagar district; Telangana State: India

Rama Rao K.

Department of Zoology, Govt. Degree College, Satavahana University, Jammikunta, Karimnagar, Dt. Telangana, India

---

ABSTRACT

Pisces, faunal bio diversity in the Lower Manair Dam was studied from June-2013 to May-2014. Samples were collected bimonthly with help of local fishermen by using fishing Craft and Gear. A total of 64 species of fishes belonging to 8 orders such as Cypriniformes (27 species) Siluriformes (13species), Perciformes (14 species), Channiformes (4 species) Beloniformes(2 species), Angulliformes (2 species) Osteoglossiformes (one species) and Mogiliformes(one species). The number and percentage composition of population status were calculated to 32.81% common, 29.69% abundant, 21.86% moderate, and 15.63% rare species were identified in the Lower Manair Dam. Of these, 52 species of fish are least concerned (LC), 4 are data deficient (DD), 2 are not evaluate (NE), 2 species of fish were endangered (ED) and 1 species of fish is vulnerable (VU). IUCN (2004.2), CAMP (1998) status and Shannon-Weiner diversity (H-), Evenness (E), H_{max} = ln(S) Maximum diversity possible and species richness (S) for different months were calculated.

Key words: Pisces diversity, Shannon-Weiner diversity (H-), Evenness (E) and species richness (S), H_{max} = ln(S) Maximum diversity possible.

INTRODUCTION

Lower Manair Dam (LMD) is situated in Karimnagar District of Telangana state. This is a large new impoundment of Godavari basin with medium productive potential. The Lower Manair Dam is built across the Manair River, a tributary of the Godavari River. The construction of the dam was started in 1974 and was finished in 1985. The Lower Manair Dam is situated at Kakatiya Canal about 146.00 km to 234 kms and Distributaries D 84 to D 94 and DBM 1 to DBM2. LMD water goes up to 2, 62,326 ac s. The maximum height of the dam is around 27 m and the catchment area of river 6,475 sq.km. Reservoir full level is 280.416 mt. Full capacity of reservoir is 0.68 TM Cusmecs. Water spread area is 81.024 sq. km. LMD is used to provide employment to over 1000 Fisher men every year. Fishing license is issued to 311 fishermen during fishing season. The water of this Reservoir is used for drinking, agriculture and supports fish culture. The total area of the reservoir is about 8,103 hectare and maximum depth is 21.9m.

Indian region fishes are about 2500 species; freshwater fishes 930 species and remaining 1570 are marine reported by K.C Jayaram [1]. Present freshwater fishes are recorded 801 (Fish base 2004). Biodiversity is the degree of variation of life forms within a given ecosystem, biodiversity is essential for stabilization of ecosystem protection of overall environmental quality for understanding intrinsic worth of all species on the earth represented by Ehrlich *et a* [2].The rapid environment change on earth therefore has its impact on the biodiversity, that's why the united nation

declares the year 2010 as the international year of biodiversity. India consists of six drainage system. These are Indus river system, upland cold water bodies, Gangetic river system, Bramhaputra river system, east flowing river system, and west flowing system studied by Pandey *et al* [3]. In this river ecosystem fishes play a very important role to maintain ecosystem. Fish biodiversity of river essentially represents the fish faunal diversity and their abundance. River conserves a rich variety of fish species which support to the commercial fisheries. Kumar Varun [4] studied Icthyofaunal Diversity of Dhaura Reservoir, Kichha. Menon [5] reported Check list - freshwater fishes of India, Records of the Zoological Survey of India.

Biodiversity may be broadly defines as the variety and variability among living organisms and the ecological complexes in which they occur. Biodiversity can be considered at different scales ranging from the gene to ecosystem. The most commonly used meaning of biodiversity is at the level of species (Organismal biodiversity). India's inland water resources are diversified, as they are plentiful. Reservoirs contribute the single largest inland fishery resources both in terms of size and production potential. Fish fauna of a reservoir basically represents the fish diversity and their abundance. Indian reservoirs preserve a rich variety of fish species, which supports to the commercial fisheries. The objectives of the present study were to document the fish species in relation to physico-chemical characteristics of water and suggest appropriate conservation and management strategies.

The two most common measures of species diversity index are Simpson index and Shannon-Weiner index. The Simpson index is the measure of diversity which takes into account both the number of species and the evenness of occurrence of individuals in the various species. It is an expression of the number of times one would have to take pairs of individuals at random from the entire aggregation to find a pair from the species. Shannon- Weiner Index is a widely employed index. The Shannon index is also an expression of how many equally abundant species would have diversity equal to that in the observed collection. It measures the degree of uncertainty in a sampling event. That is if diversity is low, then the certainty of picking a particular species is high. If diversity is high, then it is difficult to predict the identity of a randomly picked individual.

Fig: 1. Lower Manair Dam Map (Google courtesy)

MATERIALS AND METHODS

Fish samples were collected from different corners of LMD surrounding areas mainly by fishermen, fish collectors, local fish markets, and fish sellers. Different types of nets (Drag nets, Push nets, Cast nets Stationary gill nets) and Bamboo baskets (Traps) were used for collection of fishes reported by Rama Rao. K [6]. The photographs of the collected fishes were taken at fresh condition immediately and preserve in 10% formalin without any post-mortem stages and recorded vernacular name Hamilton-Buchanan, F [7], Mishrs, K.S, [8] Munro, ISR [9]. Sample fishes were brought to the laboratory and fix in this solution in separate glass jars according to size. Smaller fishes were directly placed in the 10% formalin solution and larger fishes were given an incision on the abdomen and removed

the gut content before they were preserved. The fishes collected and fixed were labelled giving serial numbers, date of collection, exact locality from where collected. Identification was done based on keys for fishes of the Indian subcontinent reported by Day.F , [10,11] Jairam, K.C, [12,13,14], Talwar, PK and Jhingran,A. [15] and classification was carried out on lines of Day.F [10, 16], Jairam, K.C [13], Nelson [17]. Identification of the species was done mainly on the morphometric and meristematic characters.

Data analysis

The mathematical expression of Shannon - Wiener Diversity Index is
Shannon-Wiener Index denoted by

$H = -SUM [(p_i) \times \ln(p_i)]$

SUM = summation
p_i = proportion of total sample represented by species *i*
Divide no. of individuals of species *i* by total number of samples
S = number of species, = species richness
H_{max} = ln(S) Maximum diversity possible
E = Evenness = H/H_{max}

RESULTS AND DISCUSSION

The results of the present study revealed that the occurrence of sixty four fish species belong to eight orders, 19 families and 39 genera. List of LMD fish including their order, family, genus, species, common name, vernacular name, IUCN and CAMP status were recorded in the present investigation was given in Table 1. The listed species are *Notopterus notopterus, Catla catla, Labeo ariza, Labeo bata, Labeo calbasu, Labeo fimbriatus, Labeo porcellus, Labeo rohita, Cirrhnus mrigala, Cirrhnus reba, *Ctenopharyngodon idella, Garra gotyla gotyla, *Cyprinus carpio, Osteobrama cotio cotio, Puntius chola, Puntius ticto, Puntius sarana sarana, Puntius sophore, Rasbora daniconius, Rasbora elanga, Salmostoma bacaila, Salmostoma phulo, Amblypharyngodon microlepis, Amblypharyngodon mola, Danio devario, Lepidocephalicthys berdmorei, Lepidocephalicthys guntea, Schistura cirica, Mystus bleeker, Mystus cavasius, Mystus tengra, Mystus vittatus, Spherata seenghala, Spherata oar, Ompok bimaculatus, Wallago attu, Eutropneustes vacha, Pseudeutropius atherinoides, Clarias batrachus, *Clarias gariepinus, Heteropneustes fossilis, Anguilla bengalensis bengalensis, Anguilla bicolor bicolor, Xenentodon cancila, Hyporhampus gaimardi, Channa marulius, Channa orienalis, Channa panctatus, Channa striatus, Glosogobius giuris, Awaous grammepomus, Mastacembelus armatus, Mastacembelus pancalus, Trichogaster faciatus, Colisa lalio, Anabas testudineus, Nandus nandus, *Oreochromis mossambicus, *Oreochromis variables, Etroplus suratensis, Etroplus maculatus, Chanda nama, Ambassis ranga, Rhinomugil corsula*. In the present study the rear species of ***Awaous grammepomus*** were identified first time in LMD Telangana region (Fig: 2, 3), the live fish video record can watch on you tube https://www.youtube.com/watch?v=qf0nNSKUX1Q. And FishBase link: http://www.fishbase.us/summary/Awaous... | Uploaded by: Dr. K. Rama Rao.

Fig: 2. *Awaous grammepomus*

Fig: 3. Difference between *Awaous grammepomus* and *Glosogobius giuris*

Out of 64 species five are exotic species are available in Lower Manair Dam. (* indicates exotic fish species). Biju Kumar [18] was studied exotic fishes and Freshwater fish diversity in 2000. Rama Rao. K. [19, 20], reported 53 ornamental and 58 larvivorous fish species belonging to 8 orders, 19 families and 34 genera, out of the total fishes.

Mahapatra [21] recorded abundance of catfishes in Hirakund reservoir. Total of 43 species were present in which 18 were commercially important. Sakhare and Joshi [22] reported 34 species of fishes in reservoirs of Parbhani Dist. of Maharashtra (India). Pisca *et al*., [23] reported a genera fish belonging to four orders and 28 species from Ibrahimbagh reservoir of Hyderabad. Sugunan and Yadava, [24] mentioned 40 fish species from Hirakhud reservoir of Orissa forming the commercial fishery.

In the present investigation the number and percentage composition of families, genera and species under different orders are shown in Table 2 and Fig 4. Order cypriniformes was dominant with 27 species which contributed to 42.19% of the total species followed by Perciformes with 14 (21.86%), Siluriformes 13 (20.31%), Channiformes 04 (6.25%), Anguilliformes and Beloiniformes each 02 (3.13%), Osteoglossiformes and Mogiliformes each 01 (1.56%). Recorded families out of 19, Perciformes contributed 06 (31.58%) families followed by Siluriformes 05 (26.32%), Cypiniformies and Beloiniformes each with 02 (10.53%), Osteoglossiformes, Anguilliformes, Channiformes and Mogiliformes each with 01 (05.26%). Recorded genera out of 39, Cypiniformies contributed 14 (35.90%) species followed by Perciformes 11 (28.21%), Siluriformes 08 (20.51%), Beloiniformes with 02 (5.13%), Osteoglossiformes, Anguilliformes, Channiformes and Mogiliformes each with 01 (2.56%).

Sandeep et al [25] reported during the study period different fish varieties can be observed in the Godavari River, India. Fishes belonging to nine orders and twenty one families were collected during the study period. Many collected fishes were having economic, medicinal and cultural, ornamental importance and sold after collection in the local fish market. In the present fish biodiversity study 53 species of 37 different genera 21 families and 9 orders were recorded from the Godavari River during January 2008- December 2009. The members of Order Cypriniformes were dominated with 40 species followed by Perciformes with 7 species, Siluriformes with 6 species, Beloniformes with five species each, Osteoglossiformes with 2 species and Synbranchiformes with 1 species. In Rajahmundry Dam there found nine orders representing by 47 fish species, order Cypriniformes was dominant group with 16 species in the assemblage composition in which *Osteobrama vigorsii* were found most abundant. Ahirrao[26] recorded 32 fish species belonging to 25 genera and 8 families from Parbhani district of Maharashtra. Joshi [27] reported the ichthyofauna of Bori reservoir in Maharashtra. Krishna & Ravi Shankar [28] reported 31 ichthyo fauna in secrete lake, Durgamcheru, Ranga Reddy District. Hiware and Pawar [29] recorded 43 fish species from Nath Sagar Dam Paithan in Aurangabad district. Battul *et al* [30] recorded 18 fish species in Ekrukh Lake near Solapur, Maharashtra. Jayabhaye *et al* [31] recorded 25 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district of Maharashtra.

In the present study the number and percent composition of genera and species under various families were represented in Table-3. Fig. 5. The generic composition of fishes belonging to different families shows that twelve genera under Cyprinidae contributed to 30.77%, three genera under Anabantidae contributed to 7.69%, two genera each under Cobitidae, Bagridae, Siluridae, Schilbeidae, Gobiidae, Cichlidae and Ambassidae contributed to 05.13% each and one genus under Notopteridae, Clariidae, Heteropneustidae, Anguillidae, Belonidae, Exocoetidae, Channidae, Mastacembelidae, Nandidae and Mugilidae contributed to 02.56% each. The species composition of fishes belonging to different families has revealed that 24 species belong to family Cyprinidae that made up to 37.50%, 6 species to family Bagridae that contributed to 9.38%, four species each to families Channidae and Cichilidae contributed to 06.25%, three species to family Cobitidae and Anabantidae constituted 04.69%, two species to families Siluridae, Schilbeidae, Clariidae, Anguillidae, Gobiidae, Mastacembelidae, and Ambassidae making to 03.13%, one species to families Notopteridae, Heteropneustidae , Belonidae, Exocoetidae, Nandidae and Mugilidae contributed 01.56 each of total fish species.

Thirumala et al [32] the hydro-biological features of the collection centres also play an effective role in fisheries output to a greater extent. Among 33 species of fishes, the family Cyprinidae was the most dominant in the assemblage composition with 54.55% followed by Bagridae and Siluridae with 9.09%, Channidae with 6.06 %, Mastacembalidae, Ambassidae, Cichlidae, Claridae, Notopteridae, Cobitidae and Heteropneustidae each with 3.03 % respectively.

Table: 1. List of fishes and their order, family, genus, species, common name, vernacular name, feeding habitat, population status, IUCN and CAMP status at Lower Manair Dam

Order / Family	No.	Scientific Name	Common Name	Vernacular Name	Feeding Habitat	Population Status	IUCN Status (2014.2)	CAMP Status
Osteoglossiformes/	**I**							
1. Notopteridae (1)	1	*Notopterus notopterus*	Grey feather back	Vellenka	Demersal, insects, fish crustaceans roots of aquatic plants	C	LC	LRnt
Cypriniformies/	**II**							
2. Cyprinidae (24)	2	*Catla catla*	Catla	Botchea	Surface layer and zooplankton	C	LC	LRnt
	3	*Labeo ariza*	Reba carp	Arju	Benthopelagic, Feeds on diatoms, algae, insects and detritus	C	LC	NE
	4	*Labeo bata*	Bata labeo	Yerrakandla chepa	Bottom dwellers, Crustaceous and insect larvae at early stages	R	LC	LRnt
	5	*Labeo calbasu*	Black rohu	Chintara Kakibonda	Bottom dweller & Scavenger	A	LC	LRnt
	6	*Labeo fimbriatus*	Gangetic latia	Chintara	Benthopelagic, Feeds on diatoms, algae, insects and detritus	M	LC	LRnt
	7	*Labeo porcellus*	Bombay Labeo	Moyya	Benthopelagic, Feeds on diatoms, algae, aquatic plants, insects and detritus	R	LC	DD
	8	*Labeo rohita*	Rohit	Ravvu	Middle layer/ plant matters	C	LC	LRnt
	9	*Cirrhinus mrigala*	Mrigal	Meriga	Bottom dweller & detritus eater	C	LC	LRnt
	10	*Cirrhinus reba*	Reba carp	Moyya	Demersal, feed on vegetables, crustaceans and insect larvae	A	LC	VU
	11*	*Ctenopharyngodon idella*	grass carp	Gasscutter	All substratum's, feed on vegetables, crustaceans and insect larvae	R	LC	NE
	12	*Garra gotyla gotyla*	Goytala, Sucker head	Banda pakuru	Benthopelagic algae, plants and detritus	R	LC	A1 ac
	13*	*Cyprinus carpio*	Common carp	Banraruteega	Bottom dweller feed on plankton and detritus	M	VU	NE
	14	*Osteobrama cotio cotio*	Cotio	Kagitamparaka	**B**enthopelagic & Larvicide	A	LC	LRnt
	15	*Puntius chola*	Swamp barb	Paraka	Benthopelagic, feed on crustaceans, insects and plant matter	A	LC	VU
	16	*Puntius ticto*	Ticto barb	Paraka	Surface feeder, feed onDiatom, Algae, Crustaceans, Rotifer, insects	A	LC	LRnt
	17	*Puntius sarana sarana*	Olive barb	Gandeparaka	Surface habitat & Ominivorous	A	LC	VU
	18	*Puntius sophore*	Spot-fin swamp barb	Buddaparaka	Benthopelagic, feed on Surface phytoplankton and zooplankton	A	LC	LRnt
	19	*Rasbora daniconius*	Slender rasbora	Katte kodipe	Surface, feed on algae, aquatic insects	M	LC	LRnt
	20	*Rasbora elanga*	Bengala barb	Katte kodipe	Demersal, feeds on Aqutic insects, algae and protozoans	M	LC	NE
	21	*Salmostoma bacaila*	Large razorbelly minnow	Chandamama	Surface feeder & a useful larvivorous fish	A	LC	DD
	22	*Salmostoma phulo*	Fine scale razor belly minnow	Chandamama	Surface feeder & a useful larvivorous fish	C	NE	NE
	23	*Amblypharyngodon microlepis*	Indian carplet	Kodipe	Surface feeder & a useful larvivorous fish	A	LC	NE
	24	*Amblypharyngodon mola*	Mola carplet	Imam Kodipe	Surface feeder, Phyto and zooplankton	A	LC	LRlc
	25	*Danio devario*	Devario danio, Dind Danio	Eela Kodipe	Benthopelagic feeds on Worms, crustaceans and insects	C	EN	NE
3. Cobitidae (3)	26	*Lepidocephalichthys berdmorei*	Leopard Loach	Vulicha	Demersale	M	EN	NE
	27	*Lepidocephalus guntea*	Guntea Loach	Vulicha	Demersale	M	LC	NE
	28	*Schistura corica*	Polka Dotted Loach	Vulicha	Benthopelagic feeds on Worms, crustaceans and insects	R	LC	NE
Siluriformes/	**III**							
4.Bagridae (6)	29	*Mystus bleeker*	Day's mystus	Guddi jella	Demersal, feed on Crustacean, Algae	A	LC	VU
	30	*Mystus cavasius*	Gangetic mystus	Kode Jella	Demersal, feed on Crustacean, Algae	A	LC	LRnt
	31	*Mystus tengara*	Tengara mystus	Karri Jella	Demersa, predatory	A	LC	NE
	32	*Mystus vittatus*	Striped dwarf catfish	Natta Jella	Demersal, feed on Crustacean, Algae	A	LC	VU
	33	*Spherata seenghala*	Giant river catfish	Pedda Jella	Demersal, Carnivore	A	LC	DD
	34	*Spherata oar*	Long-whiskered catfish	Pedda Jella	Bottom, Carnivore	A	LC	DD
5.Siluridae (2)	35	*Ompok bimaculatus*	Butter Catfish	Bugga damma	Demersal, Crustacean, Algae	C	NT	EN
	36	*Wallago attu*	Boal	Waaluga	Benthopelagic feeder, carnivorous	C	NT	LRnt
6.Schibeidae (2)	37	*Eutropiichthys vacha*	Air breathing catfishes/ Magur	Seerva jella	Surface feeder, carnivorous	C	LC	VU
	38	*Pseudeutropius atherinoides*	Indian potasi	Seerva jella	Surface feeder, carnivorous	C	LC	NE
7.Claridae (2)	39	*Clarias batrachus*	Batchwa vacha	Marpoo	Demersal, Omnivorous	R	LC	NE
	40*	*Clarias gariepinus*	African catfish	Catfish	Demersal, Omnivorous	R	DD	DD
8.Heteropneustidae (1)	41	*Heteropneustes fossilis*	Stinging catfish	Inglikam	Demersal, Omnivorous	M	LC	VU
Anguilliformes/	**IV**							
9. Anguillidae (2)	42	*Anguilla bengalensis bengalensis*	Indian Long fin eel	Malugu papera	Demersal, small fishes, crustaceans, molluscans	M	LC	EN
	43	*Anguilla bicolor bicolor*	Short fin eel	Malugu papera	Demersal, small fishes, crustaceans, molluscans	R	LC	EN
Beloiniformes/	**V**							
10. Belonidae (1)	44	*Xenentodon cancila*	Freshwater garfish	Kongamuti chapa	Pelagic, voracious	C	LC	LRnt
11. Exocoetidae (1)	45	*Hyporhamphus gaimardi*	Congaturi halfbeak	Okkamuti chapa	Pelagic, Zooplankton	C	DD	NE
Channiformes/	**VI**							
12. Channidae (4)	46	*Channa marulius*	Spotted snakehead	Pubomme	Bottom, Carnivorous	M	LC	LRnt
	47	*Channa orienalis*	Walking snakehead	Malapankiri	Bottom, Voracious and predatory	C	NE	VU
	48	*Channa panctatus*	Giant snakehead	Korramatta	Bottom, Carnivore	C	LC	LRnt
	49	*Channa striatus*	Banded snakehead	Bomme	Bottom, carnivorous	C	LC	LRnt
Perciformes/	**VII**							
13. Gobiidae (2)	50	*Glossogobius giuris*	Tank/Bar-eyed goby	Uske donthi Salegada	Benthopelagic, Omnivorous	A	LC	LRnt

	51	*Awaous grammepomus*	Scribbled goby	Uske donthi	Benthopelagic, Omnivorous	R	LC	NE
14.Mastacembelidae (2)	52	*Mastacembelus armatus*	Zig zag spiny eel	Papera	Bottom, crustaceans	A	LC	VU
	53	*Mastacembelus pancalus*	Barred spiny eel	Chinna papera	Benthopelagic, insect larvae	A	LC	LRnt
15. Anabantidae (3)	54	*Trichogaster faciatus*	Banded gaurami	Papera	Surface, carnivorous	M	LC	LRnt
	55	*Colisa lalio*	Dwarf gaurami	Paraka	Surface, mosquito larvae	C	LC	NE
	56	*Anabas testudineus*	Climbing perch	Goraka	Demersal Feed on macrophytic, shrimps and fish fry	M	DD	DD
16. Nandidae (1)	57	*Nandus nandus*	Mud perch	Ganga getchu	Benthopelagic feed on aquatic insects and fishes	M	LC	LRnt
17. Cichlidae (4)	58*	*Oreochromis mossambicus*	Mozambique Tilapia	China guraka	Surface dweller, omnivorous	C	NT	NE
	59*	*Oreochromis variables*	Tilapia	Pedda guraka	Surface dweller, omnivorous	R	DD	DD
	60	*Etroplus suratensis*	Green chromid	Pamplete	Benthopelagic, Omnivorous	C	LC	NE
	61	*Etroplus maculatus*	Ornage chromid	Pandi paraka	Benthopelagic, omnivorous	M	LC	NE
18. Ambassidae (2)	62	*Chanda nama*	Elongate glass perchlet	Sirabara	All substratum's of water, checks mosquito breeding	C	LC	NE
	63	*Ambassis ranga*	Indian glassy fish	Podugu sirabara	All substratum's of water, checks mosquito breeding, Oarnivorous	M	LC	NE
Mogiliformes	***VIII***							
19. Mugilidae (1)	64	*Rhinomugil corsula*	Corsula mullet	Meedhi kandla chapa	Surface dweller, Insects & plant leaves	C	LC	NE

A= Abundant (76-100%); C = Common (51-75%); M = Moderate (26-50%); R = Rare (1-25%) of the total catch.
EN- Endangered; VU- Vulnerable: LRnt- Lower risk near threatened; LRlc- Lower risk least concern; LC- Least concern; DD- Data Deficient; NE- Not evaluated, NT: Near threaten.
**Exotic fishes Nos: 11,13, 40, 58, 59*

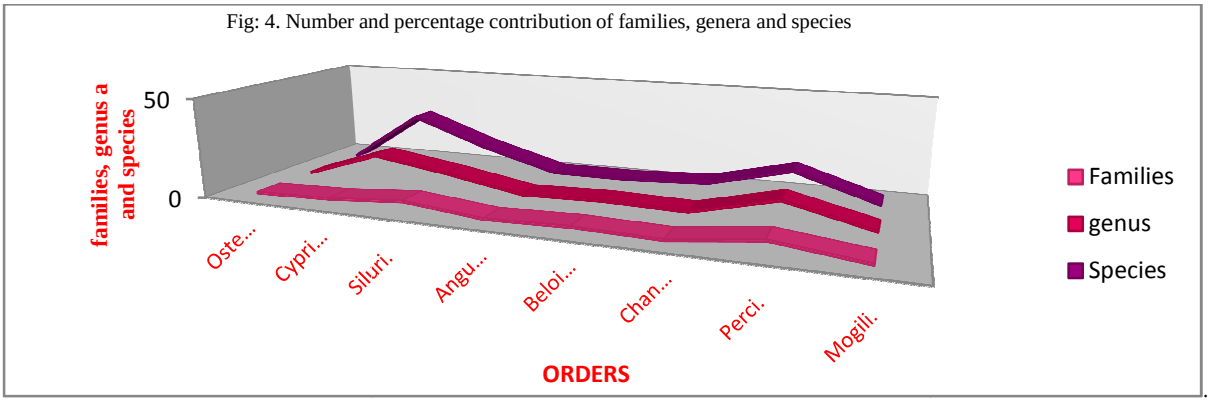
Table: 2. Number and percent composition of families, genera and species of fishes under various orders

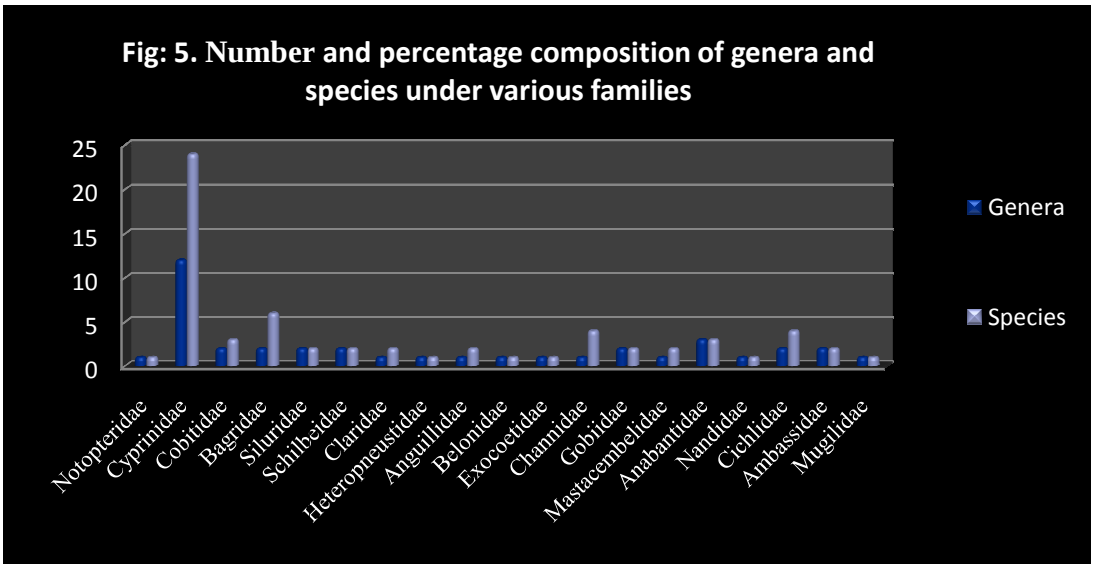
S.No	Orders	Families	genus	Species	% of families in an order	% of genera in an order	% of species in an order
1	Osteoglossiformes	01	01	01	5.26	2.56	1.56
2	Cypriniformies	02	14	27	10.53	35.90	42.19
3	Siluriformes	05	08	13	26.32	20.51	20.31
4	Anguilliformes	01	01	02	5.26	2.56	3.13
5	Beloiniformes	02	02	02	10.53	5.13	3.13
6	Channiformes	01	01	04	5.26	2.56	6.25
7	Perciformes	06	11	14	31.58	28.21	21.86
8	Mogiliformes	01	01	01	5.26	2.56	1.56
Total		19	39	64			

Table: 3. Number and percentage composition of genera and species under various families

S.No	Families	Genera	% of genera in a family	Species	% of species in a family
1	Notopteridae	01	2.56	01	1.56
2	Cyprinidae	12	30.77	24	37.50
3	Cobitidae	02	5.13	03	4.69
4	Bagridae	02	5.13	06	9.38
5	Siluridae	02	5.13	02	3.13
6	Schilbeidae	02	5.13	02	3.13
7	Claridae	01	2.56	02	3.13
8	Heteropneustidae	01	2.56	01	1.56
9	Anguillidae	01	2.56	02	3.13
10	Belonidae	01	2.56	01	1.56
11	Exocoetidae	01	2.56	01	1.56
12	Channidae	01	2.56	04	6.25
13	Gobiidae	02	5.13	02	3.13
14	Mastacembelidae	01	2.56	02	3.13
15	Anabantidae	03	7.69	03	4.69
16	Nandidae	01	2.56	01	1.56
17	Cichlidae	02	5.13	04	6.25
18	Ambassidae	02	5.13	02	3.13
19	Mugilidae	01	2.56	01	1.56
Total		39		64	

Fig: 4. Number and percentage contribution of families, genera and species





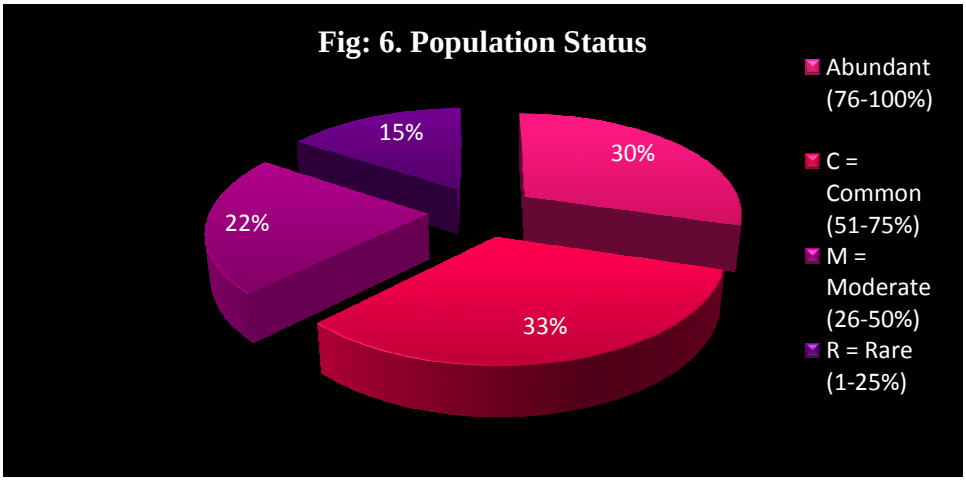
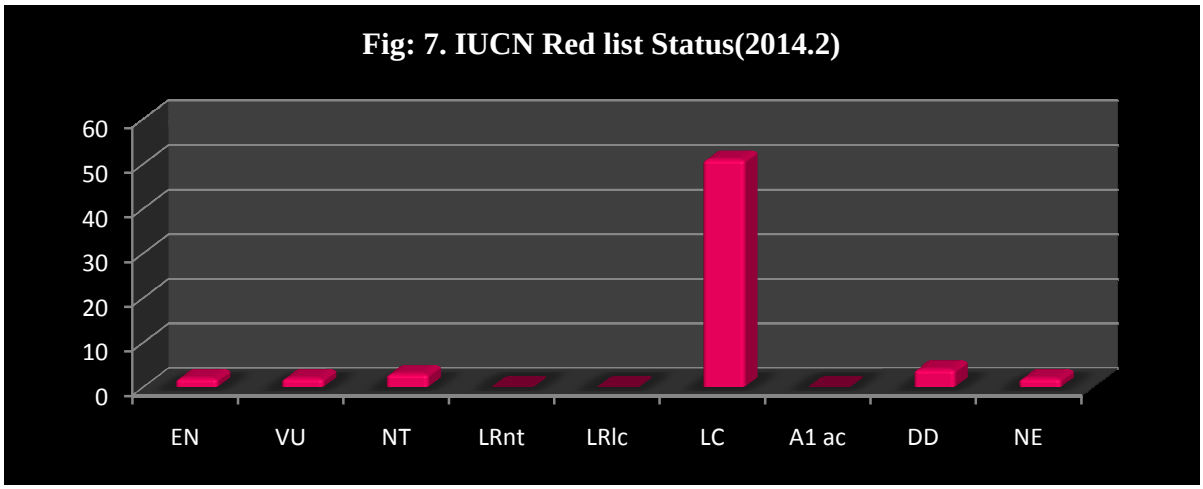


Table: 4. Number and Percentage composition of Population Status in the total catch

Population Status	Abundant (76-100%)	C = Common (51-75%)	M = Moderate (26-50%)	R = Rare (1-25%)
Number of species	19	21	14	10
% Composition	29.69	32.81	21.86	15.63

Table: 5. Percentage occurrence of fish species in LMD under the conservation status IUCN (2003.2) and CAMP (1998)

Category		EN	VU	NT	LRnt	LRlc	LC	A1 ac	DD	NE
IUCN (2004.2)	No. of species	02	01	03	-	-	52	-	04	02
	% contribution	3.13	1.56	4.69	-	-	81.65	-	6.25	3.13
CAMP (1998)	No. of species	03	09	-	21	01	-	01	07	22
	% contribution	4.69	14.06	-	32.81	1.56	-	1.56	10.94	34.38



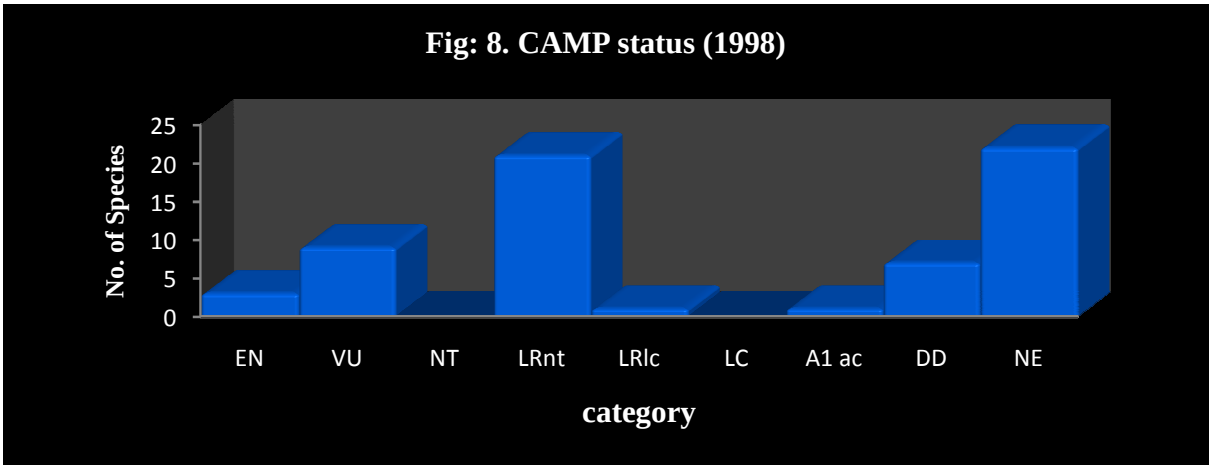


Table: 6. Fish Population Diversity Index

Fish Population / Monthly	Jun-2013	Jul 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013	Dec 2013	Jan-2014	Feb 2014	Mar 2014	April 2014	May 2014
Species richness	44	43	39	43	43	53	56	36	37	39	41	38
H	2.91	2.49	2.75	3.31	2.27	2.73	2.34	2.47	2.24	2.43	2.37	2.29
Maximum diversity possible **ln(S)**	3.78	3.76	3.66	3.76	3.76	3.97	4.03	3.58	3.61	3.66	2.37	3.64
Evenness **E**	0.77	0.66	0.75	0.88	0.60	0.69	0.58	0.69	0.68	0.66	0.64	0.63

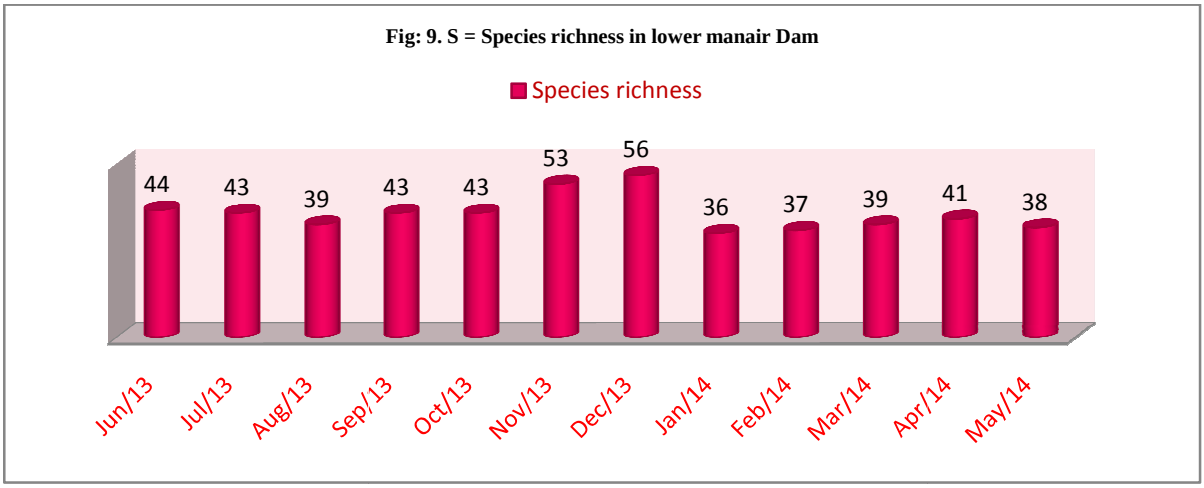


Fig: 9. S = Species richness in lower manair Dam

Fig: 10. Shannon - Wiener Diversity Index

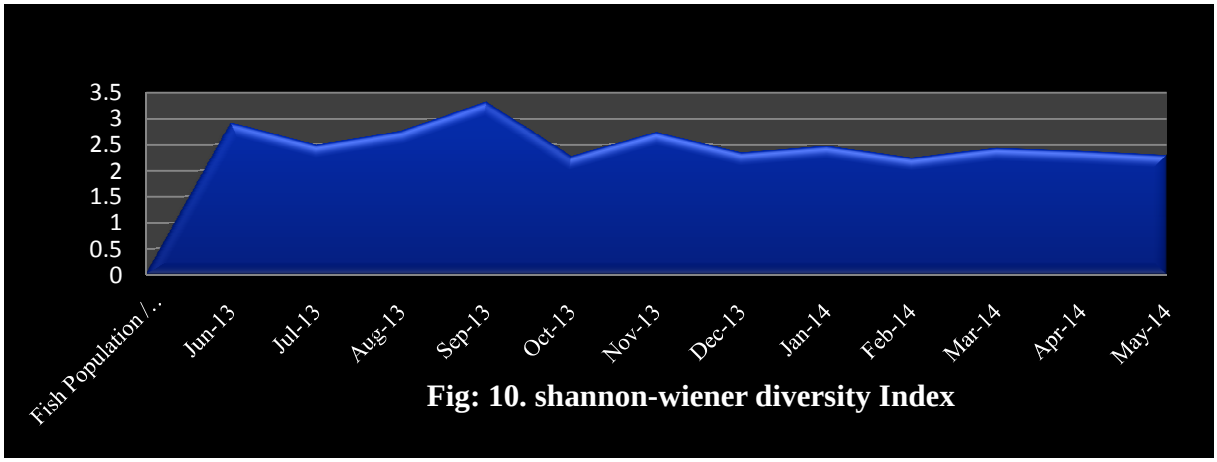


Fig: 11. Maximum Diversity Possible In(S)

Fig: 12. Evenness (E)

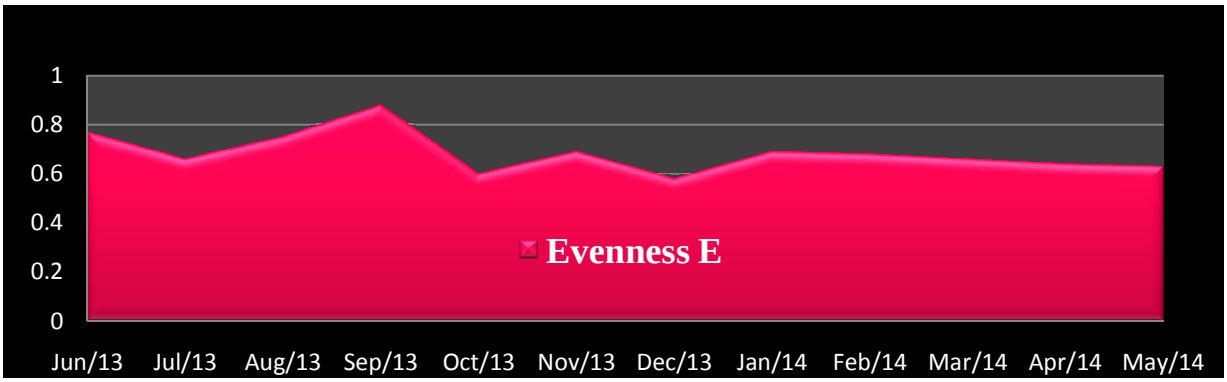


Table: 4. Number and Percentage composition of Population Status in the total catch

Population Status	Abundant (76-100%)	C = Common (51-75%)	M = Moderate (26-50%)	R = Rare (1-25%)
Number of species	19	21	14	10
% Composition	29.69	32.81	21.86	15.63

The number and Percentage composition of Population Status is 19 species were abundant which contributed to 29.69%, 21 species common which contributed to 32.81%, 14 species moderate which contributed to 21.86% and 10 species rare which contributed to 15.63% in the total catch (Table. 4. Fig. 6). According to IUCN [33] fifty one species contributed to 79.69% are least concern (LC), three species contributed to 4.69% are not evaluated (NT), four species contributed to 6.25% are data deficient (DD) two species each contributed to 03.13% are endangered (EN), vulnerable (VU) and not evaluated (NE) (Table. 5. Fig. 7). According to CAMP status [34] twenty one species of fish are each with Low risk near threatened (LR nt) and 22 species are not evaluated (NE) contributed to 34.38%, nine (14.06%) species of fish are vulnerable (VU), seven species (10.94%) data deficient (DD), three (04.69%) species of fish is endangered (EN) and one species of fish each with (1.56%) low risk least concern (LRlc) and A1 ac. (Table. 5, Fig. 8).

In Lower Manair Dam a total of 44 species of fishes belonging to 8 orders such as Cypriniformes (18 species) Siluriformes (11species), Perciformes (6 species), Channiformes (4species) Beloniformes(2 species), Angulliformes (one species) Osteoglossiformes (one species) and Mogiliformes(one species). Of these, 24 species of fish are least concerned, 8 are data deficient (DD), 10 are not evaluate (NE), 1 species of fish is vulnerable and 1 species of fish is near threatened was reported by Thirupathaiah et al [35].

Shannon-Wiener Index diversity indices of fish species in Lower Manair reservoir represented in Table-6. The richness of fish species was highest in December 2013 and lowest in January 2014 (Fig: 9), the fish species diversity (H) ranged from 2.24 to 3.31. The highest diversity was recorded in September 2013 the lowest in February 2014. These results indicated that good diversity index having in the Lower Manair Dam (Fig. 10). Tirupathaiah et al [35] found variation that highest diversity was recorded in June 2011 and the lowest in January 2011. Barthem [36] found variation in the Shannon-Weiner index of from 2.2 to 3.2. According to Wilhm and Dorris [37] Shannon index (H-) values ranged from >3 indicates clean water. 1.00 to 3.00 indicates moderate water and <1.00 indicates heavily polluted water. The results indicated that the maximum diversity possible ln(S) ranged from 2.37 to 4.03 (Fig: 11).The fish species diversity evenness (E) is 0.58 to 0.88 (Fig: 12). It is clearly indicate that there is evenly distribution of the fish fauna. Shinde et al [38] observed Fish Diversity of Pravara River at Pravara Sangam District Ahmednagar.

Nunoo et al [39] studied the species diversity of 1.67 indicates a highly complex community, for a greater variety of species allows for a lager array of species interactions. Among ecologists, high species diversity is correlated with community stability; the ability of community structure to be unaffected by disturbance of its components. However, a few maintain that there is no simple relationship between diversity and stability. Mookappa Naik and Hina Kousar [40] his results of the present study depicted the occurrence of 23 species of fishes belonging to 6 orders, 18 genera of 10 families. The order Cypriniformes was dominant with 13 species followed by order Siluriformes with 4 species while, the order Channiformes was represented with 3 species and the remaining orders viz., Perciformes,

Osteoglossiformes and Mastacembeliformes were represented with one species respectively. Among the fish families, Cyprinidae was dominant with 12 species followed by Channidae with 3 species and rest of the families consists of single species.

Anuradha Bhata [41] studied the Western Ghats (India) is a region of high biological diversity and endemicity of terrestrial fauna, but very little is known about its freshwater species distributions. Four rivers, Sharavati, Aghanashini, Bedti and Kali, of the central Western Ghats were studied for their fish diversity and composition. A total species richness of 92 species (and an endemicity of 25%) was reported. A comparison of expected species richness (SR) estimates using different statistical estimators was made – these showed the expected SR to be in the range of 92–120 species. Many of the species were found to be shared with those belonging to the southern Western Ghats, but the study also unearthed new findings in terms of description of a new species and extension of the known distribution range of some of the species.

CONCLUSION

The conservation of Icthyo faunal biodiversity is one of the major environmental challenges. The present work will provide a latest database for reservoir authorities and fisheries department to help them for conservation of Icthyofaunal diversity of Lower Manair reservoir. The control and eradication of unnecessary aquatic weed, predatory birds and fishes is must. Fishing of threatened species should also restrict for fishermen. Fishing should be strictly banned during the breeding season and using of large eye size gears. Conservation steps have been found during present investigation that the stopping illegal fishing, identifying illegal protecting crucial breeding habitats, creating mass awareness are need to save the threatened fish fauna of this reservoir, also fishermen and protecting divers fish resources. Anthropogenic stress also impacts a negative impression on fish production as well as on entire reservoir ecology. Reservoir authorities should take necessary steps to minimize the human activities in and around the reservoir and they have to regularly check the physicochemical and biological parameters to prevent any duplication on reservoir ecology. The biotic indices of Shannon-Weiner, Evenness and richness were fairly significant in during study period. The diversity of fish fauna is more in Lower Manair reservoir. It is recommended that further the reservoir can be consider being in good condition for fish production.

Acknowledgements
The author would like to thank University Grant Commission for rendering financial assistance and Commissioner Collegiate Education Telangana, Govt. Degree College, Jammikunta, for providing necessary facilities.

REFERENCES

[1] Jairam, K. C., The freshwater fishes of the Indian region. Narendra Publicatin New Delhi, India, 551 pp. **1999**
[2] Ehrlich PR and Wilson EO., *Science* 253:758-762.Gautam D., Saund T.B. and Shrestha J., *Nepal Journal of Science and Technology* **(11),**229-234. **2010**
[3] Pandey K and Shukla JP., Fish & Fisheries II edition, 328-329. **2007**
[4] Kumar Varun and Kumar Kamad ., *Research Journal of Animal, Veterinary and Fishery Sciences.* **Vol. 1(5),** 1-4, June **2013**
[5] Menon A.G.K., Check list - freshwater fishes of India, Records of the Zoological Survey of India, Occasional, **175**, 366. **1999**
[6] Rama Rao. K., *International Journal of Multidisciplinary Educational Research*. **Vol 3,** Issue 5(2), May **2014**
[7] Hamilton- Buchanan, F. 1822. An account of the fishes of river Ganges and its branches. Edinburgh and London, vii + 450p
[8] Mishra, S., *Rec. Ind. 1. Mus*., **57**: 1 – 320. **1962**
[9] Munro, I. S. R.., The Marine and Freshwater Fishes of Ceylon. Biotech Books, Delhi, **2000**
[10] Day, F., The fishes of India, being a natural history of the fishes known to inhabit the seas and freshwater of India, Burma and Ceylon, text and atlas, London, William Dawson and Sons Ltd., pp. 195-198, **1958**
[11] Day F., The Fishes of India, Being a Natural History of The Fishes Known to Inhabit the Seas and Freshwaters of India, Burma and Ceylon, Bernard Quaritch, 15 Piccadilly, London, **Vol. I and II, 1878**
[12] Jairam, K. C., The freshwater fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka- A Handbook. Zoological Survey of India, Culcutta, 475pp, **1981**
[13] Jairam, K. C., *J. Zoo. Soc. India*, **12(2):** 239 – 242, **1961**

[14] Jayaram K.C., The Freshwater Fishes of Indian Region Narendra Publication House, New Delhi, 2nd Edition, **2011**
[15] Talwar P.K. and Jhingran A.G., Inland fishes of India and Adjacent Countries, Balkemra, Rotterdam, **Vol. A. 1991**
[16] Day, F., The fauna of British India including Ceylon and Burma. Fishes. 1: 548: 2: 509. The London, Taylor and Francis, **1889**
[17] Nelson., Fishes of the World. 3rd Edn. John Wiley and Sons, New York, p. 416, **1976**
[18] Biju Kumar., Exotic fishes and Freshwater fish diversity. Zoos Print Journal. Vol XV, No.11, RNI 2:2, **2000**
[19] Rama Rao. K., Diversity of Ornamental Fishes in Lower Manair Dam at Karimnagar Dt. ndhra Pradesh. IOSR *Journal of Pharmacy and Biological Sciences* **Vol 9**, Issue 1 Ver. I, PP 20-24. **2014**
[20] Rama Rao K.,*Advances in Applied Science Research*, **5(2):**133-143, **2014**
[21] Mahapatra D K., *Fishing chimes*. **22 (10&11)**:76-79, **2003**
[22] Sakhare VB and Joshi PK., *Fishing Chimes* **24(8):**56-60, **2004**
[23] Pisca Ravi Shankar, Saraladevi B and Divakara Chary K., *Fishing Chimes* **20(2):**41-43, **2000**
[24] Sugunan VV and Yadava YS., *Bulletin* CIFRI, Barrackpore, India. 66, **1992**
[25] Sandeep R. Rathod and Gulab D. Khedkar: *Journal of Research in Biology* 269-275 | JRB | **Vol 1** | No 4/**2011**
[26] Ahirrao, S.D. and A.S. Mane., *J. Aqua. Biol*., **15(1&2):** 40-43, **2000**
[27] Joshi, P.K. and Sakhare, V.B., *Fishing Chimes*. **22(4):** 40– 41, **2002**
[28] Krishna S.M. & Ravi Shankar Piska., *J. Aqua. Bio.* **Vol.21(1),** 77-79, **2006**
[29] Hiware, C.J. and Pawar, R.T., Ichthyofauna of Paithan Reservoir (Nath Sagar Dam) in Aurangabad Dist. Of Marathwada region Maharashtra, *Ecology and Environment*, APH Publishing Corporation, New Delhi, **2006**
[30] Battul, P.N., Rao, K.R., Navale, R.A., Bagale, M.D., Shah, N.V., *J. of Aquatic Biology* **Vol.22(2), 2007**
[31] Jayabhaye U.M. and G.D. Khedkar., *J. Aqua. Biol.* **Vol.23(1**): 26-28, **2008**
[32] Thirumala. S, Kiran. B.R, and Kantaraj.G.S., *Advances in Applied Science Research*, **2 (5):**34-47, **2011**
[33] IUCN Red List of threatened species, version 2013.2. www.iucnredlist.org down loaded on December **2013**
[34] CAMP., Conservation and Management Plan for Freshwater Fishes of India". Organized by Zoo Outreach Organisation, NBFGR, Lucknow **1998**
[35] Thirupathaiah, M. Ch. Samatha and Ch. Sammaiah., *Advances in Applied Science Research*, **4(2):**203-211, **2013**
[36] Barthem R. B., *Consideracoes sobre a Pesca experimental com rede de espera em lagos da Amaxonia Central*. Dissertacao de Mestrado, INPA/FUA, Manaus, **1981**
[37] Wilhm, J.L. and T.C. Doris., *Amer. Midl. Nat.* **76**:427-449, **1966**
[38] Shinde S.E., Pathan T.S., Raut K.S., Bhandare R.Y. and Sonawane D.I., *World Journal of Zoology*, **4(3),** 176-179, **2009**
[39] Nunoo, J. N. Agbo, M. Ackah F *Proceedings of the International Academy of Ecology and Environmental Sciences*, 2(1):21-26, **2012**
[40] Mookappa Naik C. K. And Hina Kousar., *The Ecoscan*. **6(3&4):** 149-151, **2012**
[41] Anuradha Bhata: *Environmental Biology of Fishes* **68**: 25–38, 2003