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Research Article

ECONOMIC IMPARATNCE, HYDROGRAPHY AND ICTHYOFAUNA OF ASALU CHERUVU IN TEMBURU, TEKKALI DIVISION, SRIKAKULAM DISTRICT, ANDRAPRADESH, INDIA

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ABSTRACT

Check list of freshwater fishes in the Asalu cheruvu in Temburu, in Tekkali division of Srikakulam district was studied from December 2013 to August 2014. Samples were collected monthly with help of local fishermen by using fishing nets. A total number of 15 species fishes belongs to 4 orders such as Cypriniforme with 8 species, Siluriformes with 3 species, Perciformes with3 species Cyprinodontiformes with 1 species respectively. Out of the 15 species most of the fishes were economically importance one hence it is helpful for so many peoples who has depends on fisheries.The range of different physico –chemical parameters were Temperature 27^0-32^0, pH 6-8, Dissolved Oxygen 5.5-8.3 mg/l, Total alkalinity46– 210 mg/l, Chloride 48.98 –86.75 mg/l and Nitrate 0.10 – 1.35 mg/l. in view of the above species of icthyofaunal diversity proper conservation measures were required.

Keywords: Asalu Cheruvu, Checklist, Physic- Chemical Parameters, Fishes, Commercial, Fine Food, Coarse, Aquarium, Forage.

INTRODUCTION

Wetlands are the ecotones or transitional zones between permanently aquatic and terrestrial ecosystems. Asalu cheruvu (fig 1) is located in Temburu village, Tekkeli mandal of Tekkali division on 18^0.37 latitude 84^0.7 longitudes. It is a natural and impartant wetland with water spread area nearly 2000 acres and served as drinking water hub for nearly 50 villagers. It is a rich potentional habitat for icthyo, avi faunal diversity and fed by rain water. Ichthyo faunal diversity referes to the variety of fish species alleles or genotypes within fish population to species of life forms within a fish community and to species or life forms across aqua regimes (Burton *et al.,* 1992[1]). Biodiversity is essential for stabilization of ecosystems, protection of overall environmental quality for understanding intrinsic worth of all species on the earth. Positive correlations between biomass productions and species abundance have been recorded in various earlier studies

Fishes form a rich source of food. They provide many products and bye products. Fishing is a major source of livelihood of many fishermen in the area. About 450 families of freshwater fishes have been recorded in the world. Kar. D[2] estimated about 2500 species of fishes which 930 freshwater and 1,570 marine in India. Jayaram[3] listed 742 freshwater fish species of India region. Devi and Indra[4] reported the checklist of 667 fresh water fish species of India. The fish fauna of Andhra Pradesh has been reported by several workers. Present investigations were under taken to study the checklist and economic classification of freshwater fishes of the Asalu cheruvu and their status was evaluated.

MATERIALS AND METHODS

The fishes were collected with the help of local fishermen by using different types of nets viz. hand nets, cast nets, stake nets, drag nets and gill nets. A Collection of catch and statistics based on regular surveys to make an assessment of the stock of the different species and the important varieties. February onwards water in the shallow areas which are likely to be exposed in the immediate future is bailed out and cross bunds are raised across the wetland areas, so that fish get congregated near the shore into pits. The fish are caught by dragnets or hand picking. The fishes caught were examined for their colour bands or spots present on the body and recorded in the field. They were brought to laboratory noting down the colour and other morphological features and the specimens were preserved in 4% formalin. Seasonal collections were made from December2013 to August 2014 spanning over a period of above one year.

The sampling was usually carried out at 10:00 am to 3:00 pm. The water samples were collected directly from the surface

layer in plastic canes as possible avoiding the unpredictable changes. The physico-chemical analysis of samples was done according to the procedure prescribed by APHA (1998)[5] and Adoni (1985)[6,7].The specimens brought to laboratory were further studied for their species identification. The species were ascertained on the basis of various morphometric characters and meristic counts following criteria given by Jayaram (2002) and Talwar and Jhingran (1991). Standard identification keys were used for identification of specimen's upto species level (Das and Srivastava, 1956, Misra 1962, Dutta Munshi and Srivastva1968, Dutta and Malhotra 1984, Dutta etal., 1987, Jhingran 1982 and Nath 1986). The classification of fishes based on economic importance (Lagler, 1956).

RESULTS AND DISCUSSION

During the study period the total number of 15 species of fishes (check list, Table 1, images a,b) belongs to 4 orders, 7 families and 12 genera were recorded during the present study. Order Cypriniformes was the dominant species abundance with 8 species followed by Siluriformes, Perciformes with 3 species, Cyprinidontiformes with 1 species respectively. In the view of economic impartance Out of the 15 species 10 were commercial, 5 were (coarse, fine) food, 2 were aquarium, 3 were fine food and 1 is medicinal value.

The order-wise percentage of fishes composition, Cypriniformes with 53.3%, Siluriformes with Perciformes with 20 %, Cyprinodontiformes 4.5% Seasonal dynamics of the fish population showed that high value of fish diversity during rainy season and lowest values in summer and winter seasons.

Seasonal dynamics of the fish population showed that high value of fish diversity during rainy season, which implied that the pond receive large volume of less polluted and high oxygenated water which favoring the improvement of fish growth and most of the fishes migrate for breeding. The lowest diversity values of fish in summer and winter seasons. I was recorded; out of the15 species 5 species were considered as food value (fine, coarse) as well as 1 species is aquarium ,10 as commercially important fish as well as food fish, 1 species is medicinal valued. Biwas & Sugunan reported 151 species of fishes in Brahmaputra River and 73 ornamental fish as well as food fish, 21 as commercially important food fish as well as ornamental, seven commercially important exotic food fish.

PHYSICO-CHEMICAL PARAMETERS

Physico-chemical analysis is the prime consideration to assess the quality of water for its best utilization like drinking, irrigation and fisheries and is helpful in understanding the complex processes, interaction between the climatic and biological processes in water. Marshal (1984) used physico-chemical data to predict ecology and fish yield in reservoirs. The ranges of variations in different parameters are given in Table 1.

During the present study water temperature ranged from 28°C to 32°C. Das *et al.,* (2008) reported a range for water temperature between 19.7°C to 29.5°C. The variation in water temperature may be due to different timing of collection and influence of season (Jayaraman *et al.,* 2003). pH (Hydrogen Ion Concentration) indicates acidity or alkalinity of water and plays a significant role in productivity of a water body. Water pH varied from 7.1 to 9. Higher values of pH were recorded during summer months. This may be due to increased photosynthetic activity and decomposition of allochthonous matter present in the pond which increase the nutrient concentration at higher temperature. Input of sewage and agricultural wastes are also responsible for higher values of pH in water. Similar observations were reported by Singh and Mahajan (1987), Tamot and Bhatnagar (1989). pH range from 6.4 to 8.3 is favorable for fish growth (Robert, 1940).

Table 1: Ranges of Variations in Different Parameters

Water temperature	21°C - 28°C
pH	7.1 – 9
Dissolved Oxygen	6 – 9.8 mg/l
Total alkalinity	56 – 236 mg/l
Total hardness	50 – 120 mg/l
Chloride	57.99 – 96.99 mg/l
Orthophosphate	0.122 – 1.06 mg/l
Nitrate	0.16 – 1.12 mg/l.

Dissolved Oxygen in water is of great importance to all aquatic organisms and is considered to be the lone factor which to a great extent can reveal the nature of whole aquatic system. It is important in the production and support of life. It is also necessary for the decomposition and decaying of organic matter. This parameter can be used as an index for net production (Heyman, 1983). In the present study its range varied from 5 to 7.8 mg/l. higher values of Dissolved Oxygen were recorded during raining season due to churning of water by heavy wind action and mixing of monsoon rains (Tamot and Bhatnagar, 1989), Hannan *et al.,* (1978). Dissolved Oxygen has been attributed a great significance as an indicator of water quality especially the magnitude of Eutrophication. Dissolved Oxygen concentration in water depends mainly upon temperature, dissolved salts, velocity of wind, pollution load, photosynthetic activity, and respiration rate Tamot *et al.,* (1990), Zutshi *et al.,* (1990). The total alkalinity is the sum total of carbonates and bicarbonates alkalinity. Bicarbonates are mainly responsible for variation of total alkalinity concentration. Total alkalinity may be used as a tool for the measurement of productivity, conditions of water bodies. In the present investigation its range varied from 48 to 212 mg/l.

The hardness of water is mainly governed by the content of Calcium and Magnesium salts, largely combined with bicarbonates and carbonates (temporary hardness) with sulphates, chlorides and other anions of minerals (permanent hardness). In the present study, its range varied from 41 to 105 mg/l. Chlorides occur naturally in all types of water. In natural fresh waters, however, their concentration remains quite low and generally less than that of sulphate and bicarbonate. High concentration of Chloride in water is considered to be the indicator of pollution especially due to higher organic waste of animal origin or industrial effluents. Higher Chloride content is due to contamination through large quantity of sewage input. Chloride values in asalu cheruvu varied from48.65 to

87.54mg/l. sewage from surrounding villagers which is also responsible for higher concentration of Chloride in water.
In the present investigation the Nitrate values ranged from 0.9 to 1.02 mg/l. In asalu cheruvuthe the higher values of Nitrate were observed in March and July. This may be due to the high decomposition of organic matter and concentration of nutrients owing to the evapotranspiration of the reservoir water with subsequent increase in Nitrate value

CONCLUSION

In the present investigation, it was concluded that the Asalu cheruvu is a healthy water body providing a habitat for fresh water fishes of diverse type. However, there is constant threat to fish population due to eutrophication and illegal fishing activities. The illegal fishing activities should be banned to prevent depletion of fresh water fish resources and further studies should be conducted to generate more details regarding seasonal production and ecology of fishes. In the light of present study, it is time to make proper measures to take necessary steps to implement so that the future generation can get the fishes lively on earth rather than photographs in literature.

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Figure 1; Study area

CHECK – LIST OF FISHES

Grade : Pisces
Class : Osteichthyes
Sub – Class : Actinopterygii
Sub-division : Teleosti
Order : Cypriniformes
Family : Cyprinidae (Carps)
Sub- family : Cyprininae
Genus : Catla Valenciennes

1. *Catla catla* (Hamilton-Buchanan) **(Catla)**
   Genus: Cirrhinus Cuvier
2. *Cirrihinus mrigala* (Hamilton-Buchanan
   Genus: Ctenopharyngodon Steindachner
**3. *Ctenopharyngodon idellus* (Valenciennes)
   Genus: Cyprinus Linnaeus
4. *Cyprinus carpio* Linnaeus **(Common Carps)
   Genus: Labeo Cuvier
5. *Labeo calbasu* (Hamilton-Buchanan)
   Genus: Puntius Hamilton-Buchanan
6. *Puntius amphibious* (Valenciennes)
7. *Puntius chola* (Hamilton-Buchanan)
   Sub- family: Leuciscinae
   Genus: Hypophthalmichthys bleeker
**8. *Hypophthalmichthys molitrix* (Valenciennes)
   Family: Clariidae **(Air- breathing catfishes)**
   Genus: Clarias Scopoli
9. *Clarius batrachus* (Hamilton-Buchanan)
   Family: Heteropneusstidae **(Stinging catfishes)**
   Genus: Heteropneustes Muller
10. *Heteropneustes fossilis* (Bloch)
   Family: Poeciliidae **(Live bearers)**
   Genus: Gambusia poey
11. *Gambusia affinis* (Baird & Girard)
   Order: Perciformes
   Family: Anabantidae **(Climbing perches)**
   Genus: Anabas Cuvier & Cloquet
12. *Anabas testudinenus* (Bloch)
   Family: Channidae **(Snake- heads/ Murrels)**
   Genus: Channa Scopoli
13. *Channa marulius* (Hamilton-Buchanan)
14. *Channa striatus* (Bloch)
   Order: Anguilliformes
   Family: Angullidae **(Freshwater eels)**
   Genus: Anguilla schrank
15. *Anguilla nebulosa* Mc Clelland

**Introduced fishes; ***Invasive alien species.

Table 1: Economic classification of fishes of srikakulam wetlands

	Name of the fish	Commercial	Fine food	Coarse food	Aquarium fish	Forage fish	Others
1	*Catla catla*	X	-	-	-	-	C
2	*Cirrhinus mrigala*	X	-	-	-	-	C
3	*Ctenopharymgodon idellus*	X	-	-	-	-	C
4	*Cyprinus carpio*	X	-	-	-	-	C
5	*L.calbasu*	X	-	-	-	-	-
6	*Puntius amphibious*	-	-	-	X	-	-
7	*P. chola*	-	-	X	X	-	-
8	*Hypophthalmichthys molitrix*	X	-	-	-	-	C
9	*M. vittatus*	-	-	X	-	-	
10	*Clarias batrachus*	X	X	-	-	-	BP&SV
11	*Heteropneustes fossilis*	X	X	-	-	-	MV
12	*Gambusia affinis*	-	-	-	-	-	LV
13	*Anabas testudineus*	-	-	X	-	-	-
14	*Channa marulius*	X	-	-	-	-	C
15	*C. striatus*	X	-	-	-	-	C

Key to Table: X-Use, - - Not in use,
Commercial - Species which are prolific breeders, can be cultured and have market value**,**
Fine food - Having good taste and protein value,
Coarse food - Have less food value and preferred as a food by the poor people,
Aquarium fish - Can be maintained in aquarium for aesthetic and recreational value,
Forage fish - Food for predatory fishes**,**
Others - Having some extra qualities such as
MV-Medicinal value,
B - Bait,
SV - Scientific value,
BP - By-product,
PH - Public Health,
LV - Larvivorous,
C – Cultivable

Images: Images of fishes in study area (a, b)

(a) Clarius batracus

(b) **Catal catla**

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