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Diversity of Fish Fauna and Their Threats in Ousteri Lake, Puducherry, India

R. Alexandar and R. Siva Sankar

Department of Ecology and Environmental Sciences,
Pondicherry University, Puducherry, India 605 014

Abstract: The freshwater fish fauna of Ousteri Lake, Puducherry were studied for a period of two months from January to February 2011. We recorded 15 species belonging to 14 families and 17 genera. The status of fish species compared with IUCN-the International Union for Conservation of Nature species category. Though the fish fauna of Ousteri Lake is threatened by anthropogenic activities, the study proposes that it can be considered as a refuge for conservation of some endemic and threatened freshwater fishes of the Puducherry region. The efforts must be maintained to reduce anthropogenic intervention and avoiding an introduction of alien species.

Key words: Fresh water wetland % Fish fauna % Wetland conservation % Eutrophication % Exotic species

INTRODUCTION

Fishes are one of the important elements in the economy of many nations as they have been a stable item in the diet of many people [1]. Freshwater fishes are important livelihood of poor people as it contains the important protein. Fishes are an integral part of freshwater ecosystem. Fishes play an important role in energy flows, nutrient cycling and maintaining community balances in fresh water ecosystems [2, 3]. An estimated 126,000 described species rely on freshwater habitats, including species of fishes, molluscs, reptiles, insects, plants and mammals. Freshwater fishes comprise almost 45% of all fishes. An estimated 15,000 fish depends on freshwater habitats. Fish forms highest among all vertebral groups apart from its economic importance. India is one of the mega biodiversity hotspots contributing about 11.72 global fish diversity mainly from the greater Himalayan range on the north eastern plains, long stretches eastern and Western Ghats.

The Indian subcontinent, occupying a position at the confluence of three bio geographic realms, viz., the Palaeartic, Afro-Tropical and Indo-Malayan, exhibits a great variety of ecological habitats, harbouring rich fish faunal diversity, comprising about 2500 species of which 930 species are freshwater inhabitants and 1570 are marine. The Indian species represent about 8.9% of the known fish species of the world [4].

The fish fauna of Ousteri Lake is more threatened by various human activities due to a high level of eutrophication, siltation and a minor degree of pollution by surrounding industrial sewage and high level agricultural activities in marginal areas of lake and illegal fishing activities using nylon nets leads to destruction of various fresh water fauna. The main objective of this study was to assess the diversity of the fish species of Ousteri Lake and to identify its major threats for suggesting the conservation of fresh water fish species.

Puducherry (study area) is situated on the Coromandal Coast between 11°52'N; 79°45'E and11°59'N, 79°52'E. Ousteri Lake is located towards north at a distance of 10 km from Puducherry town (Fig. 1).

Fig. 1: Map locating the study area of Ousteri fresh water Lake, Puducherry

Corresponding Author: R. Alexandar, Department of Ecology and Environmental Sciences, Pondicherry University, Puducherry, India 605 014. E-mail: enviroalexandar@gmail.com.

The wetland covers an area of about 390 ha (lies in both Tamil Nadu and Puducherry) with a wide range of aquatic species and is mainly a bird sanctuary. The study area experiences mean annual temperature of 30.0°C and mean annual rainfall of about 1311 to 1172 mm. The mean number of annual rainy days is 55 and the mean monthly temperature ranges from 21.3°C to 30.2°C. The climate is tropical dissymmetric with the bulk of the rainfall during northeast monsoon (October to December). The Lake has been recognized as one of the important wetlands of Asia by the International Union for Conservation of Nature and Natural Resources [5]. The lake declared as a first bird sanctuary in Puducherry region by the Government of Puducherry. The lake diversified with a wide variety of floral and faunal diversity. Recently, the Government of Puducherry taking various steps to protect and conserve its biological diversity and its ecosystem with a sustainable manner, as a result of the action plan the Comprehensive Management Action Plan for Conservation of Ousteri Lake has been prepared and the draft report has provided various conservation action plans and sustainable ecotourism specially bird watching.

MATERIALS AND METHODS

The study was conducted during the month of January to February 2011. Fishes were caught and identified using the drag nets and traditional fishing device (Fig. 2) so as to reduce mortality and then they were released into the lake after identification. Fish species reaching the markets from the lake fish catchers of local fisher were also included in the list. Fish identification was based on [6]. The status of fish species was compared with IUCN categorization.

Fig. 2: The traditional fishing device used for fish catch from the running water

RESULTS AND DISCUSSIONS

As a result of fish survey a total of 15 fish species (Figure 3 to 9 and Table 1) were recorded during the survey. The previous study [7] reported over twelve species were identified in Ousteri Lake. The Salim Ali Centre for Ornithology (SACON) conducted the extensive survey for the Government of Puducherry forest department 2010 were reported 25 fish species including one prawn species from this lake. The fish species included in the earlier studies was same with the present study, there are no different species were identified in the present study. The fish species were then compared with IUCN category, Among the 14 fish species found in the Ousteri Lake, *Etroplus maculates* are falling under an endangered category (Table 1). Species such as *Catla catla, Mystus vittatus, Heteropneustes fossilis, Channa orientalis*, are classified under a vulnerable category. *Channa striatus* are falling under Low Risk-least concern category. Three species such as *Oreochromis mossambica* and *Hypophthalmichthys molitrix* are introduced species by forest department government of Puducherry. Remaining 6 species are included under Low Risk-near threatened category.

Fig. 3: *Anabuas testudineus*

Fig. 4: *Anguilla bengalensis*

Table 1: List of fish species in Ousteri Lake, Puducherry

Scientific name	English name	Local Name (Tamil)	Status in India
Angulliformes			
Anguilidae			
1. *Anguilla bengalensis*	Indian long fined Eel	Vilangu meen	EN
Gonorhynchiformes			
Chanidae			
2. *Chanos chanos*	Milk fish	Kulla kendai	LR-nt
Siluriformes			
Bagridae			
3. *Heteropneustes fossilis*	Stinging catfish	Theli	VU
4. Mystus gulio	Long whiskered catfish	Keluthi	X
Persiformes			
Cichlidae			
5. *Etroplus maculates*	Orange chromide	Sellakaachi	EN
6. *Oriochromis mosambica*	Egyptian mouth breeder	Zilebi kendai	Invasive
Gobidae			
7. *Glossogobious giurus*	Tank goby	Ulluvai	LR-nt
Anabantidae			
8. *Anabuas testudineus*	Climbing perch	Panangkottai meen	VU
Channidae			
9. *Channa puntatus*	Spotted snakehead	Koravai	LR-nt
10. *Channa sriatus*	Striped/banded snakehead	Viral meen	A
Cypriniformes			
Cyprinidae			
11. *Ctenopharyngodon idella*	Grass carp	Kulla Kendai	LRnt
12. *Cyprinus carpio*	Common carp	Kendai	VU
13. *Hypophthalmichthys molitrix*	Silver carp	Silver Kendai	Ex
14. *Labeo rohita*	Rohu	Rogu Kendai	LRnt
15. *Catla catla*	Catla	Korak kendai	VU

VU-Vulnerable; LRlc-Low risk-least concern; LRnt-Low Risk-near threatened; EN-Endangered; Ex-Exotic species; A-Absent

Fig. 5: *Channa orientalis*

Fig. 6: *Channa striatus*

Fig. 7: *Ctenopharyngodon idella*

Fig. 8: *Oreochromis niloticus*

Fig. 9: *Heteropneustes fossilis*

CONCLUSION AND RECOMMENDATION

Common carp (*Cyprinus carpio*) is highly adaptable to a suite of environmental conditions [8, 9] which in part has led to its widespread distribution worldwide. Although a highly prized sport fish in its native range [10, 11], common carp has become a nuisance in many areas of introduction as a result of its ability to achieve high densities and impose deleterious effects on aquatic ecosystems and native fauna [12, 13]. In its native range, common carp is rigorously managed as a sport fish [10, 11], whereas an intensive management effort has been directed at control or eradication in the areas of introduction [13-15]. In either case, accurate and precise age information is needed to evaluate common carp population dynamics (recruitment, growth and mortality) for successful management.

The Ousteri Lake highly threatened by anthropogenic activities, due to illegal fishing activities, the lake also effected by minor degree of pollution by surrounding industrial areas such as developmental activities along the lakeside, intensive agricultural activity leads to contamination of pesticide and chemical fertilizers pollution, eutrophication and excessive growth of macrophytic plants and algae. The presence of low available phosphorous and high organic phosphorous in the Ousudu Lake is indicative of highly eutrophic nature of the lake. The abundance of nutrients and favourable pH, has promoted the phytoplankton growth [16, 17], as a result of immense growth of phytoplankton the penetration of light is reduced leading to low DO levels in the lake. These lowered oxygen levels would have created conditions that were stressful for certain fish to tolerate resulting in their low species richness. The lake is dominated by small fish; this may be attributed to the presence of dense mats of suspended and submerged macrophyte provides protection for the small fish reducing their predation [17]. In addition, the excessive turbidity in the water is also known to decrease the efficiency of predator that relies on visual use to capture prey. The fish fauna of Ousteri Lake is threatened by alien fish species, The common carp which feeds on extensively on the benthos, disturb the lake sediments and thereby increase the turbidity of the water [3] this fish was introduced in 1996 into Ousteri Lake by the department of fisheries (Puducherry), these alien species must not be reintroduced into the Ousteri Lake. The low species richness of grass carp is a voracious feeder of aquatic plants, particularly pond weed (*Potamogetan* spp.), naids (*Najas* spp.) and Hydrilla (*hydrilla* spp.) this species last introduced by the department of fisheries (Puducherry) but is reducing its population now [7] the conservation efforts should ensure that the current status of the fish fauna is maintained by minimising anthropogenic impacts, especially the introduction of alien fish species. Enactment and enforcement of laws and orders by regulating agencies in the management and conservation of the resources of our natural waters should be considered a top priority [17]. Unsustainable fishing activities and sewage dumping into the lake is a major threat to fish diversity [18]. The excessive application of pesticides should be synchronised to maintain the healthy freshwater fish diversity in the lake ecosystem [19].

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