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Report on the occurrence of invasive alien fish, *Cichlasoma trimaculatum* (Günther, 1867) at freshwater Lake of Chennai

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Abstract

A sampling was carried out at Madambakkam Freshwater Lake, Chennai, Tamil Nadu, India (12°56'54.0672" N; 79°55' 17.1012"E) to study the fish biodiversity. It was found that the lake was infested with an exotic Cichlid, *Cichlasoma trimaculatum* native to South America. *Cichlasoma trimaculatum* is a predacious invasive fish that eats any smaller fishes. The occurrence of this species was earlier reported from Rettai Eri Lake at Chennai. In spite of the earlier report, it is surprising to note that a vast population of the same has infested the natural waters of Madambakkam Lake, which is located far away from the Rettai Eri Lake. This paper records the occurrence of *C. trimaculatum* in the natural waters of Madambakkam Lake, Chennai and discusses its potential impact on the native aquatic biodiversity.

Keywords: *Cichlasoma trimaculatum*, Chennai, invasive species, Madambakkam Lake, non-native fish

Introduction

Globally, fish biodiversity is being exhausted with the aid of the introduction of invasive alien species because of its capability to destroy the natural habitat and endemic fish diversity [15; 18]. Invasive species would cause following issues to the native fish biodiversity: (i) resource exploitation (outcompete for food and space that decline the indigenous populations (ii) alter the surroundings that favourable to them (Ecological facilitation) (iv) entry of new pathogens end in the outbreak of new diseases that consequently have an effect on the fish eaters and, (iv) killing large numbers of endemic species via damaging the egg and predate the larvae and adults of native fishes [1]. Previous workers reported that the invasive species are the second largest explanation for species extinctions in the United States [4, 5, 11, 18]. It has also been reported that alien fish crossbreed with the native fishes and transfer their genetic information through introgression of genes, which ends up to dilute the wild genetic stock [11].

Although there is a negative outcome of the introduction of alien fish into the natural waters, India deliberately introduced various exotic fishes into the natural waters for the food and ornamental purposes. However, the infestation of *C. trimaculatum* into the natural waters were not deliberate, but an accidental introduction through aquarium hobby. *Cichlasoma trimaculatum* is commonly called as three spot cichlid, in the aquarium trade, the same is being retailed to aquarists as "Flower horn fish." This species may be hormone manipulated or selectively bred between the genus of *Cichlasoma* and *Amphilophus* to enhance its colour and body shape [10]. The occurrence of this species was first recorded in the natural waters of Florida [13]. From India, it was first reported from Rettai Eri Lake, Chennai, Tamil Nadu [10]. However, the information regarding the occurrence and invasion of this exotic invasive fish into other natural waters of Chennai went unnoticed. The present paper documents the occurrence of *C. trimaculatum* in the natural waters of Chennai, Madambakkam Lake (12° 56'54.0672" N and 79°55' 17.1012"E), India and discusses its possible impact on the aquatic biodiversity.

Study area, sampling, collection and identification

The sampling was carried out at Madambakkam Lake, Chennai (12°56'54.0672"N and 79°55' 17.1012"E) [Fig. 1]. The fish collection was employed using gill net as well as cast net. The samples were collected and identified as *C. trimaculatum* [fig. 2 and 3] following standard literature [10, 20].

Results and Discussion

India possesses huge amounts of freshwater fish resources for both edible and ornamental varieties. The deliberate release and accidental entry of exotic fish into the natural waters are frequently observed because of the unregulated aquaculture and ornamental fish culture practices. The regular reports on the occurrence of several exotic fish varieties cause a threat to the native fish population in the country. Till now, around 27 exotic ornamental fishes have been reported to be a concern to the native fish population [12].

There is a considerable amount of literature available on the invasion of native fishes by exotic fishes of ornamental varieties [2, 15, 17, 18, 19] and cultivable fishes such as Nile/red tilapia (*Oreochromis niloticus*), African catfish (*Clarias gariepinus*), Thai pangus (*Pangasiandon hypophthalmus*) and common carp (*Cyprinus carpio*) [2, 15, 16]. Previous findings in the literature stated that the accumulation of alien fish varieties keeps increasing in the Indian waters [15, 16]. In the freshwaters of Kerala, an extinction stage of native species (*Puntius dubius* and *Labeo kontius*) was mainly due to the presence of vast populations of tilapia species [8]. The similar consequences were also witnessed by the presence of few non-native invasive species viz. *Poecilia reticulata*, *Pterygoplichthys multiradiatus* and *Pterygoplichthys pardalis* from the freshwaters of Kerala, Tamil Nadu [3; 16] and other natural waters of India [2, 6, 18, 19].

Cichlasoma trimaculatum reported in the present study grows more than 36 cm in length [9]. When compared to other exotic invasive fishes reported from India, *C. trimaculatum* is more

hazardous to native fish biodiversity because of their predacious nature. The predatory behaviour of this fish has been intensively noticed in the aquarium shops when it is stocked along with the other fish species. The vast population of *C. trimaculatum* reported in the Chennai, natural waters in the present study indicates that the species have already infested the lake with a breeding population. According to the earlier authors, the probable reason for the entry of this species into the natural waters of Chennai may be due to the improper management of ornamental trade or would be a result of the natural calamities and repeated floods in Chennai.

India has limited numbers of the legislative act for ornamental fish trading. Ornamental fish traders, hobbyists, and entrepreneurs most often clandestinely import the non-native fishes and release them into the natural water for their economic benefits [8, 14]. Such practices often pay way to mix non-native fishes with the native fishes and cause damage to the indigenous fish populations [7]. The critical awareness for the release of the exotic fish into the natural waters must be taken into account by ornamental fish traders, public, policymakers and researcher scholars. With no doubt, the release of the exotic fish species into the natural waters would demolish the native fish populations.

The invasion of *C. trimaculatum* into the Indian water is a threat to the native fish population. Therefore, it is recommended that proper and necessary governing actions must be executed to ensure for the management and eradication of invasive fish species.

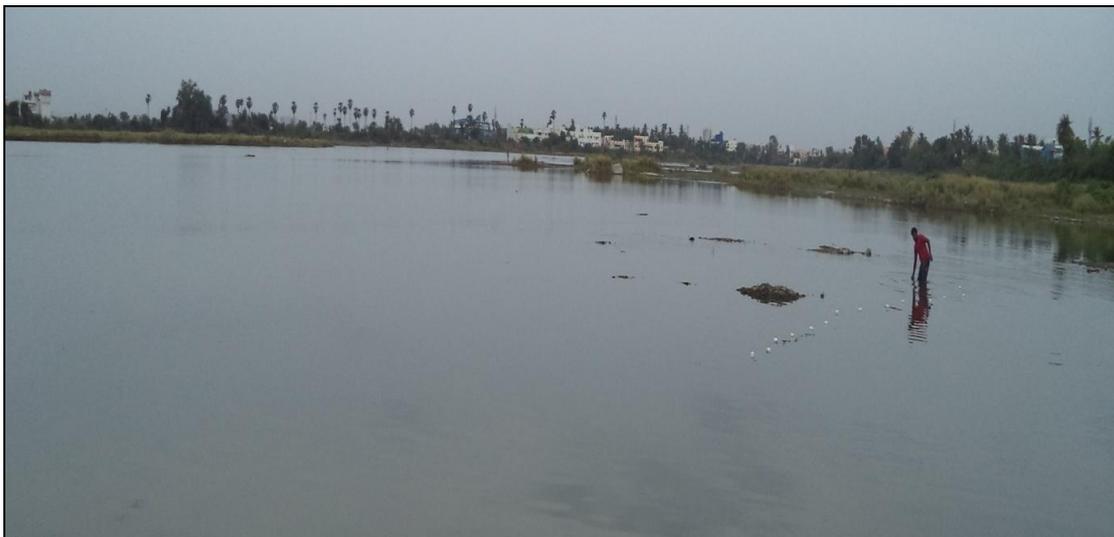


Fig 1: View of the Madambakkam Lake, Chennai where *A. trimaculatum* was reported



Fig 2 and 3: Few specimens of *Cichlasoma trimaculatum* collected from Madambakkam Lake, Chennai during the field survey

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