



ADDRESSING THE WALLACEAN SHORTFALL: AN UPDATED CHECKLIST OF ICTHYOFAUNA OF CHEMBARAMPAKKAM TANK

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Abstract

Fish fauna of Chennai has been systematically surveyed for the past 100 years. Subsequent surveys have not been as comprehensive as the first study. As a result premature conclusions about species extinctions and species displacement by introduced species have emerged in publications from time to time. In this paper, I present a comprehensive survey of Chembarampakkam tank, one of the freshwater tanks in Chennai which has been surveyed for the past 100 years. The results highlight the significance of Wallacean shortfall.

Key words: Diversity, Freshwater fish, Chembarampakkam, Chennai, Madras, Non-native

Introduction

Conservation efforts are often challenged by the Wallacean Shortfall. Wallacean Shortfall concerns the adequacy of knowledge of species distribution at different geographical scales. The deficiency in distribution data is not only a common problem in poorly studied organisms but also for well studied organisms like mammals and vascular plants, which sometimes emerge as an embarrassment to the scientific community (Kozłowski, 2008).

Data on the distribution of freshwater fish in India is relatively more complete than that of other lower vertebrates. However when specific localities are in

focus the Wallacean Shortfall tends to glare at the investigator. Checklists when updated, are the best tools that can be used to deal with the Wallacean Shortfall. Here in this paper, I describe how updated checklists can add to the knowledge of species distribution. I have chosen the Chembarampakkam tank for the case study presented in this paper. Chembarampakkam tank is a manmade reservoir located in Kanchipuram district (formerly Chengalpattu), about 40 km west of Chennai (Daniels & Rajagopal, 2004; Raghunathan, 1978). It is the largest reservoir that supplies drinking water to Chennai and has been a subject of study for the

past 100 years with particular reference to its fish fauna. The earliest published source of information of the fish fauna of Chembarampakkam tank dates back to 1910 (Raj, 1916) and has since been a source of interest to ichthyologists due to its diversity.

Materials and methods

The present study was carried out during a period of one year from April 2009 to March 2010 with field surveys conducted minimum twice a month. The major habitats mentioned in Daniels and Rajagopal (2004) were taken into consideration and a few additional habitats were identified and surveyed during the present study. The habitats are: 1) the large channels coming out of the dam shutters with dense vegetation both terrestrial and aquatic. 2) The small shallow channels without vegetation. 3) The stagnant shallow pools with clay substrate and aquatic vegetation. 4) The concrete lined channels with sandy substrate without vegetation and 5) the permanent deep waters of the reservoir.

Collection of fish samples was done using dip nets, dragnets and cast nets in the first four habitats. For the deep waters, fishes caught by the fishermen using gill nets and hook and line were recorded. The samples that were collected were identified using Daniels (2002), Jayaram (1999), and Talwar & Jhingran (1991).

The checklist is updated primarily with data from the present study. Species which were not recorded in the present study, but reported in earlier published works have been included only after validation with the help of local fishermen who were shown photographs of the species.

Results and Discussion

The updated checklist includes 71 species of fish recorded from Chembarampakkam (Table: 1) of which 69 species were collected during this study. Of the 69 species, 36 have been recorded for the first time. Raj (1916), in his early study of the fishes of Madras (Chennai) in 1910-11 had mainly focused on the Adyar and Cooum rivers. He however mentions the large outlying tanks such as the Sembarambakkam (Chembarampakkam) in his work while discussing two species namely *Chela cachius* and *Mystus cavasius*. After Raj's pioneering study Raghunathan (1978) surveyed the lake over a period of ten months and listed 19 species of fish of which all but one namely *Macrogathus aral*, were recorded during the present study. The reason *M. aral* was not recorded in this study may be because of its burrowing habit, by which it may have eluded

capture. However the presence of this fish in the lake is definite as it was recently collected from the lake by Eric Ramanujam (pers. com.).

The next work was done by Rema Devi *et al.* (1999) in which sampling was done on two separate days in the year 1995. Rema Devi *et al.* (1999) reported a total of 14 species, all of which were also recorded during the present study. More recently Daniels and Rajagopal (2004) updated the previous list based on their brief study that spanned just two days. They reported a total of 32 species of which 30 species were recorded in the present study. Of the two species not recorded during the present study *Puntius amphibius* has subsequently undergone major taxonomic revisions (Pethiyagoda & Kottelat, 2005). As the fish earlier identified as *P. amphibius* is now shown to be *P. mahecola*, the fish recorded by Daniels and Rajagopal (2004) is uncertain. Due to lack of clarity, I retain the name *P. amphibius* in the checklist as it is still a valid species. However *P. mahecola* which is described in Pethiyagoda & Kottelat (2005) was recorded in this survey. Nevertheless the other *Puntius sp* reported by Daniels and Rajagopal (2004) is excluded from the list.

Earlier taxonomic revisions have replaced *O. melastigma* with *Oryzias dancena* and *O. carnaticus* (Daniels, 2002; Parenti, 2008). *Oryzias sp.* reported in the other surveys is being treated as *O. dancena* as the male specimens collected during the present study had filamentous extensions of the anal fin (Daniels, 2002) and smaller adult size (Parenti, 2008).

Another two species which form a complex worth mentioning is *Puntius fraseri* and *P. sharmai* (Menon & Rema Devi, 1992). Specimens collected in Chembarampakkam have overlapping characters of both the species. As Chennai is the type locality of *P. sharmai*, I identify the collected specimens as *P. sharmai*.

The present study has added eight non-native species namely, *Oreochromis niloticus*, *Hemichromis bimaculatus*, *Ctenopharyngodon idellus*, *Cyprinus carpio*, *Hypophthalmichthys nobilis*, *Clarias gariepinus*, *Pterygoplichthys pardalis* and *Pterygoplichthys disjunctivus* to the ones reported earlier; *O. mossambicus*, and *Trichogaster trichopterus*. *O. niloticus*, *C. idellus*, *C. carpio*, *H. nobilis* and *C. gariepinus* could have been introduced accidentally or intentionally through aquaculture and *H. bimaculatus*, *P. pardalis*

and *P. disjunctivus* have certainly come in through the aquarium trade just as *T. trichopterus*.

It is interesting that some of the freshwater fish considered as North Indian Species are common in Chembarampakkam tank. *Colisa lalia* is an aquarium species that probably naturalized in the wetlands of Chennai as early as 1960 (Daniels & Rajagopal, 2004). *Lepidocephalichthys guntea* may have colonized naturally due to river linking as it is not very popular in the aquarium trade. The occurrence of *Badis badis* (Knight & Rema Devi, 2009) *Puntius gelius* (Knight, 2010) and *Puntius orphoides*, all North Indian species, is however puzzling. While *Badis badis* and *Puntius gelius* are both popularly traded in the European aquariums, I have not seen them in local aquariums. The claim that *L. guntea* displaced *L. thermalis* (Daniels & Rajagopal, 2004, Daniels, 2006) needs to be further investigated as both species were collected in good numbers during the present study.

North Indian carps like *Gibelion catla*, *Labeo rohita*, *Labeo calbasu* and *Cirrhinus cirrhosus* are being stocked for fisheries purpose in the Chembarampakkam tank. Despite the presence of these and other non-native species it is remarkable that there are atleast 69 species belonging to 22 families in the Chembarampakkam tank. The high diversity may be attributed to the diversity of habitats sustained by the vast water spread. Premature claims of local extinction of fish species should be cautiously verified before any conservation measures are prescribed. This is precisely what the Wallacean Shortfall addresses.

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Table 1: Checklist of Fish recorded from the Chembarampakkam tank for the past 100 years

Family	Scientific name	Year of record
Notopteridae	<i>Notopterus notopterus</i> (Pallas)	2004, 2010
Clupeidae	<i>Ehirava fluviatilis</i> (Deraniyagala)	2010
Cyprinidae	<i>Amblypharyngodon microlepis</i> (Bleeker)	1999, 2004 & 2010
	<i>Amblypharyngodon mola</i> (Hamilton)	2010
	<i>Chela cachius</i> (Hamilton)	1916, 2010
	<i>Cirrhinus cirrhosus</i> (Bloch)	2010
	<i>Ctenopharyngodon idellus</i> (Cuvier & Valenciennes)	2010
	<i>Cyprinus carpio</i> Linnaeus	2010
	<i>Esomus barbatus</i> (Jerdon)	2010
	<i>Esomus danricus</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Esomus thermoicos</i> (Hamilton)	2010
	<i>Gibelion catla</i> (Hamilton)	2010
	<i>Rasboroides atukorali</i> Deraniyagala	2010
	<i>Hypophthalmichthys nobilis</i> (Richardson)	2010
	<i>Labeo calbasu</i> (Hamilton)	2010
	<i>Labeo rohita</i> (Hamilton)	2010
	<i>Laubuca laubuca</i> (Hamilton)	2004, 2010
	<i>Osteobrama cotio peninsularis</i> (Silas)	2010
	<i>Parluciosoma daniconius</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Puntius amphibius</i> (Valenciennes)	2004
	<i>Puntius chola</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Puntius conchonius</i> (Hamilton)	1978, 2004 & 2010
	<i>Puntius dorsalis</i> (Jerdon)	1978, 1999, 2004 & 2010
	<i>Puntius filamentosus</i> (Valenciennes)	2004 & 2010
	<i>Puntius gelius</i> (Hamilton)	2010
	<i>Puntius mahecola</i> (Valenciennes)	2010
	<i>Puntius orphoides</i> (Valenciennes)	2010
	<i>Puntius sarana subnasutus</i> (Valenciennes)	2004 & 2010
	<i>Puntius sharmai</i> Menon & Rema Devi	2010
	<i>Puntius sophore</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Puntius ticto</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Puntius vittatus</i> (Day)	2004 & 2010
	<i>Rasbora caverii</i> (Jerdon)	2004 & 2010
	<i>Salmophasia clupeoides</i> (Bloch)	1978, 1999, 2004 & 2010
Cobitidae	<i>Lepidocephalichthys guntea</i> (Hamilton)	2004 & 2010
	<i>Lepidocephalichthys thermalis</i> (Valenciennes)	1978 & 2010
Bagridae	<i>Mystus bleekeri</i> (Day)	2010
	<i>Mystus cavasius</i> (Hamilton)	1916, 2004 & 2010
	<i>Mystus keletius</i> (Valenciennes)	2004, 2010
	<i>Mystus vittatus</i> (Bloch)	1978, 1999, 2004 & 2010
Siluridae	<i>Neotropius atherinoides</i> (Bloch)	2004 & 2010
	<i>Wallago attu</i> (Bloch & Schneider)	2010
Clariidae	<i>Clarias gariepinus</i> (Burchell)	2010
Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch)	2010
Loricariidae	<i>Pterygoplichthys disjunctivus</i> (Weber)	2010
	<i>Pterygoplichthys pardalis</i> (Castelnaud)	2010
Adrianichthyidae	<i>Oryzias dancena</i> (Hamilton)	1999, 2004 & 2010
Hemiramphidae	<i>Hyporhamphus limbatus</i> (Valenciennes)	2010
Belontiidae	<i>Xenentodon cancila</i> (Hamilton)	2004 & 2010
Aplocheilidae	<i>Aplocheilus parvus</i> (Sundara Raj)	2010
Poeciliidae	<i>Gambusia affinis</i> (Baird & Girard)	1978 & 2010
Mastacembelidae	<i>Macrognathus aral</i> (Bloch & Schneider)	1978
	<i>Macrognathus pancalus</i> Hamilton	1978, 1999, 2004 & 2010
	<i>Mastacembelus armatus</i> (Lacepede)	2010

Chandidae	<i>Chanda nama</i> Hamilton	2010
	<i>Parambassis lala</i> (Hamilton)	2010
	<i>Parambassis ranga</i> (Hamilton)	1978, 2004 & 2010
	<i>Pseudambassis baculis</i> (Hamilton)	2010
Nandidae	<i>Badis badis</i> (Hamilton)	2010
Cichlidae	<i>Etroplus maculatus</i> (Bloch)	1978, 1999, 2004 & 2010
	<i>Hemichromis bimaculatus</i> Gill	2010
	<i>Oreochromis mossambicus</i> (Peters)	1978, 1999, 2004 & 2010
	<i>Oreochromis niloticus</i> (Linnaeus)	2010
Gobiidae	<i>Glossogobius giuris</i> (Hamilton)	1978, 2004 & 2010
Anabantidae	<i>Anabas testudineus</i> (Bloch)	2010
Belontiidae	<i>Colissa lalia</i> (Hamilton)	1978, 1999, 2004 & 2010
	<i>Pseudosphromenus cupanus</i> (Cuvier)	2010
	<i>Trichogaster trichopterus</i> (Pallas)	2004 & 2010
Channidae	<i>Channa gachua</i> (Hamilton)	2010
	<i>Channa punctatus</i> (Bloch)	1978, 2004 & 2010
	<i>Channa striatus</i> (Bloch)	2010

Note- **1916** – Raj; **1978** – Raghunathan; **1999** – Rema Devi *et al.*; **2004** – Daniels & Rajagopal; **2010** – Present study.

PLATE 01

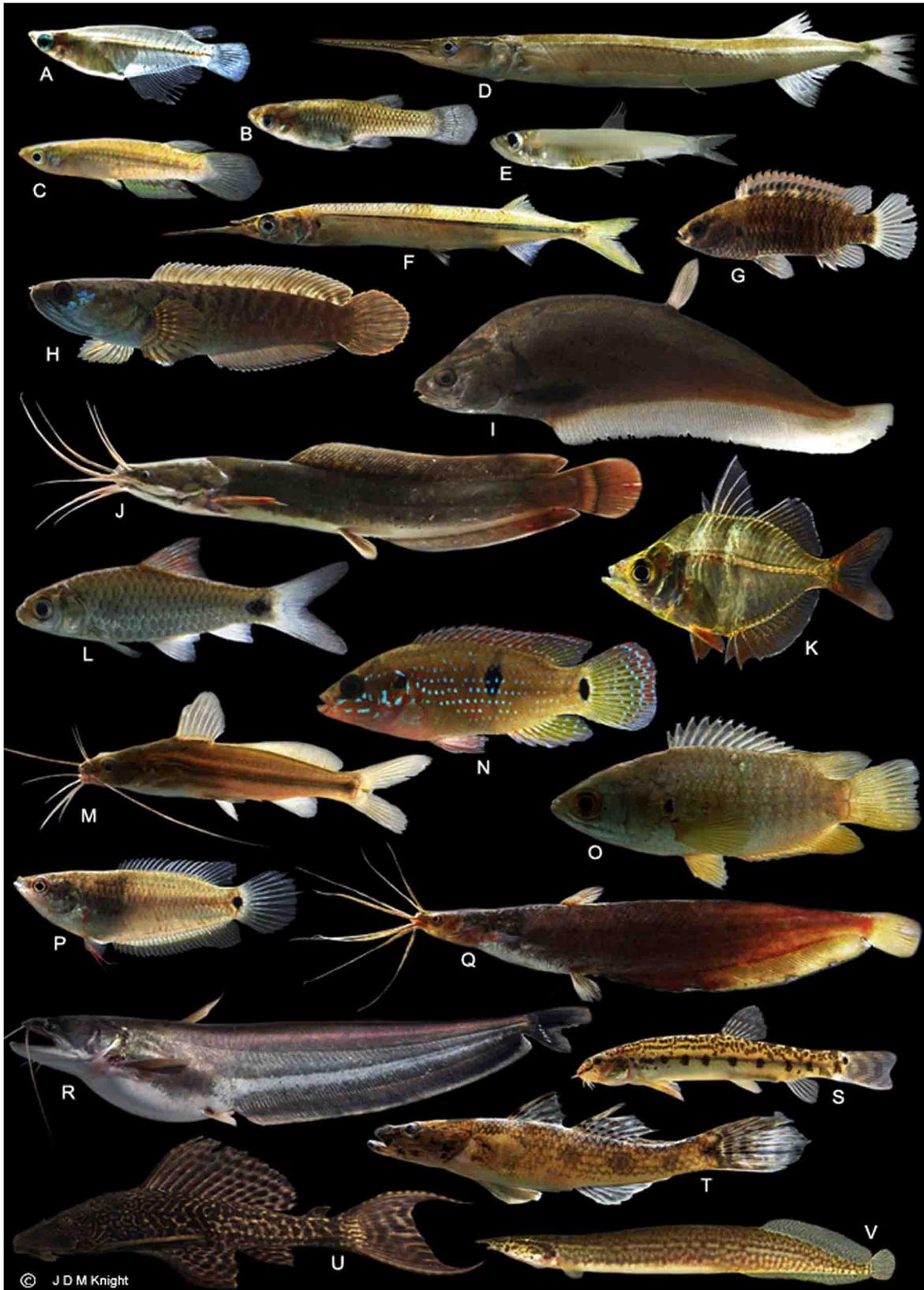


Fig. 1: Various families of Fish collected from Chembarampakkam tank; **A-** Adrianichthyidae *Oryzias dancena* (25 mm); **B-** Poeciliidae *Gambusia affinis* (30 mm); **C-** Aplocheilidae *Aplocheilus parvus* (25 mm); **D-** Belonidae *Xenentodon cancila* (250 mm); **E-** Clupeidae *Ehirava fluviatilis* (40 mm); **F-** Hemiramphidae *Hyporhamphus limbatus* (150 mm); **G-** Nandidae *Badis badis* (25 mm); **H-** Channidae *Channa gachua* (100 mm); **I-** Notopteridae *Notopterus notopterus* (220 mm); **J-** Clariidae *Clarias gariepinus* (490 mm); **K-** Chandidae *Parambassis lala* (30 mm); **L-** Cyprinidae *Puntius mahecola* (41 mm); **M-** Bagridae *Mystus bleekeri* (95 mm); **N-** Cichlidae *Hemichromis bimaculatus* (60 mm); **O-** Anabantidae *Anabas testudineus* (90 mm); **P-** Belontiidae *Pseudosphromenus cupanus* (30 mm); **Q-** Heteropneustidae *Heteropneustes fossilis* (250 mm); **R-** Siluridae *Wallago attu* (800 mm); **S-** Cobitidae *Lepidocephalus thermalis* (55 mm); **T-** Gobiidae *Glossogobius giuris* (200 mm); **U-** Loricariidae *Pterygoplichthys disjunctivus* (245 mm); **V-** Mastacembelidae *Macrognathus pancalus* (150 mm).