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ARTICLE

Occurrence of a <i>Pterygoplichthys disjunctivus</i> (Weber, 1991) population in Cauvery River System, Tamil Nadu, South India	62
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Full Length Research Paper

Occurrence of a *Pterygoplichthys disjunctivus* (Weber, 1991) population in Cauvery River System, Tamil Nadu, South India

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This study reports the first occurrence of exotic loricariid catfish *Pterygoplichthys disjunctivus*, introduced for aquarium, in tributaries and fed pond of Cauvery River, Thiruvengadu, Tamil Nadu (South India). The morphological features of *P. disjunctivus* samples are given and compared with closely related species of the same genus. The observed invasive species is highly aggressive in nature and it was reported to represent about 80% of the total fish community of the study area, reflected the depletion of fish. The impacts of this species on the biodiversity of native fishes in inland water body are also reported.

Key words: Loricariid catfish, Cauvery basin, native species, alien fish species.

INTRODUCTION

Loricariidae is a family of catfishes (Siluriformes) endemic to South America (absent in Chile), Panama and Costa Rica. They are characterized by dermal plates and ventral suckorial mouth with or without noticeable barbells (Armbruster and Page, 2006). Seven loricariid catfishes of South American are described as alien fish in many areas around the world like Hawaii, Mexico, Puerto Rico and the continental United States (Ludlow and Walsh, 1991; Page and Burr, 1991; Chavez et al., 2006, Moroni

et al., 2015), South Africa, Philippines, Taiwan and other parts of Southeast Asia (Chavez et al., 2006; Page and Robins, 2006; Jones et al., 2013). Members of the genus *Pterygoplichthys* differ from most other loricariids, having a large dorsal fin with 10 or more dorsal fin rays, which gives them their common name sailfin catfish (Nico and Martin, 2001; Nelson et al., 2004). Introduction of exotic species has caused many negative impacts to biodiversity, natural environments, economics and even

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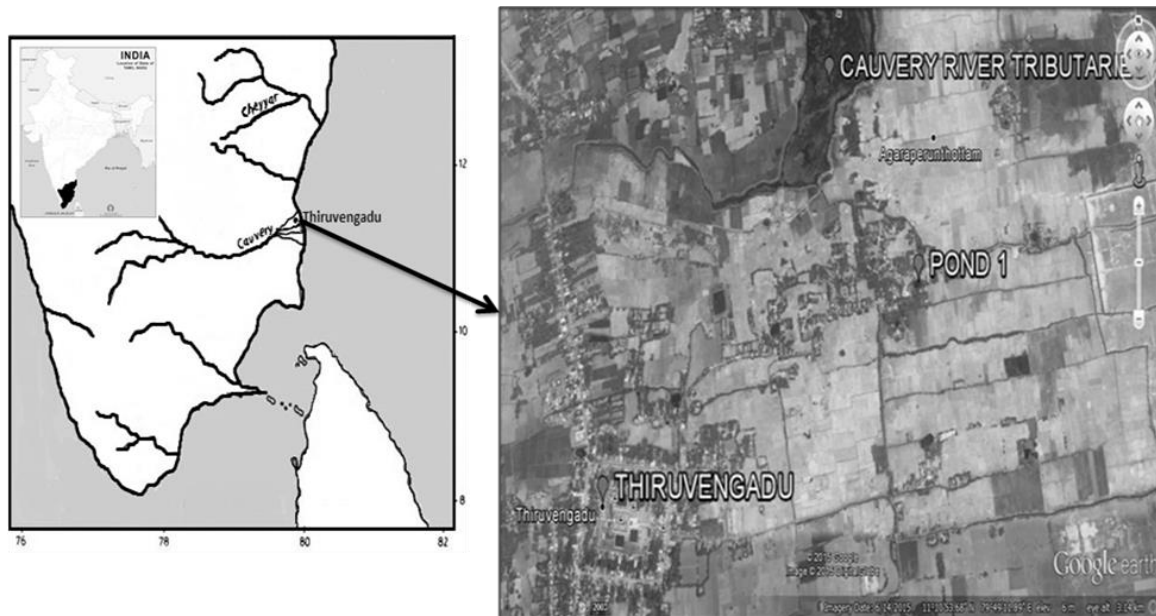


Figure 1. Map showing the collection spot Thiruvengadu, Nagapattinam District South India.

human health also. The armoured catfishes have been reported in India by few authors: *P. anisitsi* from Bihar (Sinha et al., 2010), *P. multiradiatus* from Kerala and Tamil Nadu (Ajithkumar et al., 1998); *P. disjunctivus* and *P. pardalis* from Andhra Pradesh, West Bengal, Bihar and Uttar Pradesh (Singh, 2014). Vermiculated sailfin catfish, *P. disjunctivus* is native from Madeira River basin (South America). The species was introduced in different countries and it is currently assessed as potential pest (Froese and Pauly, 2015). The main aim of this study was to describe the occurrence of several specimens of the exotic loricariid catfish *P. disjunctivus*, by morphological method, in freshwater pond of Cauvery River Basin, Thiruvengadu, Tamil Nadu (South India).

MATERIALS AND METHODS

Study area and collection

A total of 56 specimens were collected during the study from Thiruvengadu, Tamil Nadu, South India (Figure 1) during February and March 2015. Specifically two specimens were collected from the Uppanar river (by using the cast net), which is one of the tributaries of river Cauvery and 54 specimens were collected from the natural pond (by surrounding net) (lat.11°.18'16" N and long. 79°.82'40"E). In the natural pond, the specimens were obtained as by-catch along with murrel (*Channa striata*), and carps (*Catla catla*, *Cirrhinus cirrhosis*, *Labeo rohita*). The specimens of *P. disjunctivus* were preserved in 10% buffered formalin and brought to the laboratory for further analysis. Meristic and morphometric

characters were studied and subsequently, the species was identified as *P. disjunctivus* according to the descriptions of Armbruster (2003), Armbruster and Page (1996), and Nico et al. (2012). Then the specimen was submitted to CAS in Marine Biology Museum, Parangipettai, South India (Voucher number - MB/R (MUS)/ F01/2016).

RESULTS AND DISCUSSION

Diagnostic characters

Classification of the specimen:

Class: Actinopterygii
 Subclass: Neopterygii
 Infraclass: Teleostei
 Superorder: Ostariophysi
 Order: Siluriformes
 Family : Loricariidae
 Subfamily: Hypostominae
 Genus : *Pterygoplichthys*
 Species: *Pterygoplichthys disjunctivus*

Loricariids are characterized by depressed body covered with large bony plates, unique pair of maxillary barbells and a ventral suction mouth. The genus *Pterygoplichthys* is recognized from the majority other loricariids by a large dorsal fin with 10 or more dorsal fin rays (Armbruster and Page, 2006). This species was

Table 1. Morphometric measurement of *Pterygoplichthys disjunctivus*.

Measurements	Range (cm)	Mean	SD
Total length	22-37	28.76	5.12
Standard length	16-31	21.51	5.32
Head length	5-14.2	9	3.55
Pre dorsal	7-22.4	12.6	5.14
Snout length	2.3-5.2	3.41	1.13
Pre dorsal spine	5-7.5	5.96	0.78
Pre adipose fin	1.5-3.7	2.53	0.78
Pectoral spine length	5.3-13.1	8.55	3.03
Pelvic spine length	5-12.9	8.08	2.89
Anal fin spine length	3.5-9.4	5.94	2.23
Caudal height	9.5-14.9	9.5	3.88
Dorsal fin base length	5.5-7.3	6.37	0.63
Mouth length	2-4.5	3.13	0.65
Caudal peduncle depth	1.7-4.7	3.23	1.15
Pre dorsal length	6.3-21	12.48	5.43
Barbel length	1.2-2.3	1.57	0.35
Head depth	2.3-3.9	2.97	0.5

Number of specimens used – 56; SD = Standard deviation.

Table 2. Meristic count of *P. disjunctivus*.

Meristic	Number
Dorsal fin rays	12
Pectoral fin rays	6-7
Pelvic fin rays	5-6
Anal fin rays	4
Caudal fin rays	13-14

characterized by hard bony plates in the dorsal side and suctorial mouth with two maxillary barbells at the ventral side (Covain and Muller, 2007). Morphometric measurements are listed in Tables 1 and 2. The numbers of rays was: Dorsal fin (12), Pectoral fin (6-7), Pelvic fin (5-6), Anal fin (4), and Caudal fin (13-14) respectively represented at Figure 2A to C.

The existing available keys are useful for generic level identification, species description within the genus *Pterygoplichthys* remains confused because of four closely related species like *P. anisitsi*, *P. multiradiatus*, *P. pardalis* and *P. disjunctivus*. These species can be differentiated only based on the nature of their abdominal patterns. *P. disjunctivus* shows dark spots on the lateral and caudal peduncle coalescing or forming chevrons, while ventral spots coalesce to form vermiculations (Figure 2A to C), which was explained by Nico et al.

(2012) and further confirmed by both morphological and mtDNA Sequencing method (Wu et al., 2011; Bijukumar, 2015).

Conclusion

P. disjunctivus (Weber, 1991) is native to the Amazon River basin of South America (Weber, 1992). Environmental degradation or ecological disruption by the introduction of *Pterygoplichthys* species in Southeastern Asia and North America was already recorded (Hoover et al., 2004). In Southern India, *P. multiradiatus* has been reported from Vylathur and the Chackai Canal, Kerala (Daniels, 2006; Krishnakumar et al., 2009) and wetlands of Chennai, Tamil Nadu (Knight, 2010). *P. pardalis* species was identified in Namakkal district, Tamil Nadu (Muralidharan et al., 2015). *P. disjunctivus* has rapidly expanded its range as it was introduced from South America in 1991 and was found widely in Asia within ten years (Phelps et al. 2005). In the best of our knowledge this is the first report of *P. disjunctives* in the Cauvery River. The interaction made with the traditional fisher-folk of this region reveals, proliferation of this fish cause depletion of the native species like murrel and other carp species in the pond and also this invasive fish species destroyed more than 80% of the native fish species. Most of the *Pterygoplichthys* appear in the pond were more than



Figure 2. *Pterygoplichthys disjunctivus* Weber (1991) collected at Thiruvengadu, Tamil Nadu (A) Dorsal view, (B) Ventral view and (C) Lateral view.

500 g in weight. The way in which they enter in to ecosystem is unknown. It might be the introduction of aquarium fishes for ornamental purposes. Ozdilek (2007) and Molur et al. (2011) stated that, due to its rapid and aggressive feeding habit of this species it is a nuisance form in the aquatic habitat and very dangerous for the native fish fauna. The occurrence of this invasive catfish *P. disjunctivus* in the tributary of river Cauvery and nearby pond suggests that this species may be found in the entire region of River Cauvery, which needs further investigation. The establishment of *Pterygoplichthys* in this region can create a serious environmental issue in the near future, representing an alarming threat to the natural fauna. Thus, to prevent the spread of the introduced fish species and the consequential negative effects, the pathways of introduction and dispersal must be thoroughly controlled. In addition, awareness about the ecological implications of this species should be given to the local fisherman and also to create educations campaigns direct to hobbyists for not releasing this fish alive directed into bodies of water. If we fail in controlling this species expansion in inland water body, probably it will create a serious threat to the native biodiversity and livelihood of the traditional inland fisher folks.

Conflict of Interests

The authors have not declared any conflict of interests.


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