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Discovery of the Amazon sailfin catfish *Pterygoplichthys pardalis* (Castelnau, 1855) (Teleostei: Loricariidae) from Manimuthar dam, Tamiraparani River system, India

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Abstract
In this communication, we documents the first record of the exotic South American suckermouth armoured catfishes (Loricariidae) of the genus *Pterygoplichthys* spp. from Manimuthar dam on river Tambaraparani in southern Tamil Nadu. Based on morphometric measurements and meristic counts, the specimen was identified as *Pterygoplichthys pardalis* (Castelnau, 1855). Occurrence of *P. pardalis* from Manimuthar dam in the Tamiraparani River system could be a concerning threat to the dwindling indigenous fishes. Henceforth, unintentional releases of *P. pardalis* in the wild need to be prevented by strict legislation and appropriate awareness programmes.

Keywords: Invasive alien species, *Pterygoplichthys pardalis*, Manimuthar dam, Tamiraparani River system

1. Introduction
Loricariidae (suckermouth armored catfishes), is the largest family of the order Siluriformes represented by 950 recognized species in South and Lower Central America [1, 2]. Loricariid species-richness witnessed in diversity of habitats vary from near sea level to 3000 meters in elevation, often surviving in conditions that exclude other fishes [3, 4]. Their adult body size ranges from just a few centimetres to over a meter in total length [3, 5]. They are popular ornamental fishes generally characterized by having a depressed body covered by large bony plates, flat-bottomed body shape, usually a spine in front of the adipose fin and a ventral suction-like mouth with sucking lips and pair of sub-terminal maxillary barbels to thrive in benthic and or lotic environments [6]. Loricariids have rows of fine specialized villiform teeth, which in combination with their sucker-like mouth, allow them to scrape submerged substrates to consume algae, small invertebrates and organic sediments [7, 8].
The popularity of loricariids catfishes in the aquarium trade has facilitated the introduction and subsequent establishment of several species outside their native ranges [9]. *P. pardalis* was recorded for first time from India in 2008 from the East Calcutta Wetlands, a Ramsar site in India [10]. Introduced populations of *P. pardalis* have been reported in India from Kerala, Tamil Nadu and West Bengal [10, 11, 12]. The ecological effects of *P. pardalis* introduction in the aquatic habitat were disruption of food chain by overgrazing of benthic algae [13, 14], reduction of native fish populations [14], modifying substrates and disrupting benthic communities [9] and damaging the banks by burrowing [9, 15]. The purpose of this paper is to describe the discovery of *P. pardalis*, a member of Loricariidae family, for the first time from the Manimuthar dam on Tamiraparani River system in an Indian state Tamil Nadu.

2. Materials and methods
The Manimuthar is a small sized dam, located in the eastern slope of Western Ghats in Tirunelveli district of Tamil Nadu at 345 m altitude. It was constructed in 1958, across the river Tambaraparani with the primary objective of storing water for irrigation purpose. The water spread area of this manmade lake is 940 ha. One living individual of *P. pardalis* (24.4 cm) was sampled on 14 June 2017 in a monofilament gill net (mesh size 60 mm) near Perungal Canal in Manimuthar dam on Tamiraparani River system, Tamil Nadu, India (8°38'34.49"N

latitude and 77°25'7.04"E latitude). Specimen was taken live to laboratory and retained in aquarium for further analysis. Specimen was studied for meristic and morphometric features and identified based on the keys and variations in ventral spots provided by Armbruster [16], Armbruster and Page [17], Page and Robins [18], Levin *et al*. [19], Wu *et al*. [20]. All morphometric measurements were taken on the left side of the fish with callipers to the nearest one mm and weight to the nearest one gram using a balance.

2.1 Taxonomic Hierarchy

Kingdom: Animalia
Phylum: Chordata
Class: Actinopterygii (ray-finned fishes)
Order: Siluriformes (Catfish)
Family: Loricariidae (Armored catfishes)
Genus: Pterygoplichthys
Species: *Pterygoplichthys pardalis* (Castelnau, 1855) (Amazon sailfin catfish)

3. Results

One living individual of *Pterygoplichthys pardalis* was captured along with *Garra mullya* (Sykes, 1839); *Dawkinsia filamentosa* (Valenciennes, 1844); *Labeo calbasu* (Hamilton, 1822); *Systomus sarana* (Hamilton, 1822); *Chanda nama* Hamilton, 1822; *Etroplus maculatus* (Bloch, 1795); *Oreochromis mossambicus* (Peters, 1852); *Glossogobius giuris* (Hamilton, 1822) and *Mystus bleekeri* (Day, 1877) in a monofilament gill net near Perungal Canal in Manimuthar dam. *P. pardalis* was diagnosed by discrete dark spots on the lateral and caudal peduncle with a pattern of uncoalesced dark spots on a light background, stout pectoral fins with rough surfaces and inferior disc-like protrusible mouth. Body coloration, particularly on the abdomen, consists of dark spots on light background, however head exhibit linear patterns forming geometric shapes. Body behind head completely plated dorsally and laterally. Naked belly with plates occurring on the ventral side of the caudal peduncle region. Ventral surface of the pectoral girdle covered in skin mesial to the coracoid strut. Caudal peduncle round in cross section. Adipose fin present in the peduncle region. Lateral, dorsal and ventral views of *P. pardalis* indicated in figure 1. Main morphometric measurements and meristic counts of the one specimens at the time of capture are presented in Table 1. This is the first report of *P. pardalis* in a South Indian dam Manimuthar.

Fig.1: Lateral, dorsal and ventral views of *Pterygoplichthys pardalis* captured in the Manimuthar dam

Table 1: Morphometric measurements and meristic counts of *Pterygoplichthys pardalis* collected from Manimuthar dam

Features	Measurement / counts	Features	Measurement / counts
1) Total weight	159 gm	20) Dorsal fin base length	6.5 cm
2) Total length	24.4 cm	21) Caudal peduncle depth	2.2 cm
3) Standard length	19.2 cm	22) First caudal fin ray length	7.3 cm
4) Pre-dorsal length	6.9 cm	23) Last caudal fin ray length	8.2 cm
5) Head length	5.7 cm	24) Pectoral fin base length	1.3 cm
6) Head depth	3.9 cm	25) Pectoral fin spine length	5.8 cm
7) Mouth length	2.6 cm	26) Adipose fin base length	0.9 cm
8) Mouth width	2.3 cm	27) Adipose fin spine length	1.2 cm
9) Barbel length	1.8 cm	28) Pelvic fin base length	1.2 cm
10) Snout length	2.9 cm	29) Pelvic fin spine length	3.9 cm
11) Eye diameter	0.7 cm	30) Anal fin base length	0.8 cm
12) Inter-orbital space	2.6 cm	31) Anal fin spine length	1.9 cm
13) Body depth	3.5 cm	32) Dorsal fin rays	12 No.
14) Body width	3.1 cm	33) Pectoral fin rays	6 No.
15) Dorsal pectoral distance	4.8 cm	34) Pelvic fin rays	6 No.
16) Dorsal pelvic distance	3.6 cm	35) Anal fin rays	5 No.
17) Dorsal adipose distance	2.9 cm	36) Caudal fin rays	14 No.
18) Dorsal anal distance	2.4 cm	37) Lateral line plates	29 No.
19) Dorsal fin spine length	4.9 cm	38) Dorsal-adipose plates	6 No.

4. Discussion

Invasions of sailfin catfishes into natural waters of South India has led to their noticeable naturalization [11, 12, 21]. Based on morphometric measurements and meristic counts, the specimen was identified as *P. pardalis*. According to Muralidharan *et al*. [12], occurrence of *P. pardalis* from Cauvery river system in Tamil Nadu issues threat to native fauna. The populations of *P. pardalis* thrive well in the drainages of Thiruvananthapuram City from Kerala [11].

Occurrence of *P. pardalis* in Manimuthar dam and Tamiraparani River may be probably due to unintentional releases in the wild by ornamental fish traders or hobbyists from Tirunelveli City. In a discussion with fishermen from Tirunelveli city revealed news on the occurrence of this species in Tamiraparani River. The reason for successful expansion and establishment could be due to the suitable habitat for feeding and nesting and the polluted segments with fewer disturbances from humans [12]. Occurrence of *P. pardalis* in Manimuthar dam in the Tamiraparani River system could be a concerning threat to the already dwindling

indigenous fishes such as *Garra mullya* (Sykes, 1839); *Dawkinsia filamentosa* (Valenciennes, 1844); *Labeo calbasu* (Hamilton, 1822); *Systomus sarana* (Hamilton, 1822); *Chanda nama* Hamilton, 1822; *Etroplus maculatus* (Bloch, 1795); *Oreochromis mossambicus* (Peters, 1852); *Glossogobius giuris* (Hamilton, 1822) and *Mystus bleekeri* (Day, 1877). The ecological effects of *P. pardalis* invasions in the Tamiraparani River could disrupt food chain by overgrazing of benthic algae, reduce of native fish fauna and damag the banks by burrowing.

5. Conclusion

Unintentional releases of Amazon sailfin catfish in the wild need to be prevented by strict legislation and awareness programmes explaining the ecological effects of this species need to be conducted targeting ornamental fish traders or hobbyists.

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