

Occurrence of Suckermouth Armoured Sailfin Catfishes in Vellayani Fresh Water Lake, Kerala, Southwest Coast of India

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Abstract: The sailfin catfish belonging to the genus *Pterygoplichthys* of the Loricariidae family has been widely introduced to tropical and subtropical freshwater environments worldwide. It caused serious ecological impacts. Vellayani Lake is the largest fresh water lake in Thiruvananthapuram district, and is the second largest fresh water lake in Kerala. About 42 species of freshwater fishes have been documented from the lake by various authors, primarily from the Department of Aquatic Biology and Fisheries, University of Kerala. A report on the occurrence of exotic South American suckermouth armoured catfish *Pterygoplichthys pardalis* (Castelnaud, 1855), and *Pterygoplichthys disjunctivus* (Weber, 1991) from this lake is presented in this paper. Morphological study (Weber, 1991 & 1992 and Armbruster et al. 2006) was used for the fish identification.

Keywords: Suckermouth armoured catfish, Loricariidae, *P. Pardalis*, *P. disjunctivus*

1. Introduction

The sailfin catfish are among one of the exotic fish groups most seriously threatening tropical and subtropical freshwater regions have been introduced all around the world from South America by the aquarium trade. Nevertheless, occasional escapes due to carelessness of owners provided a chance for these fish to establish populations in tropical and subtropical freshwater bodies. South American suckermouth armoured catfishes (Loricariidae), are popular throughout the world as aquarium pets because of their characteristic attractive appearance and „use“ in aquarium as a „cleaner“ to remove the algae. The genus *Pterygoplichthys* is one of the fast dispersing species in the invaded countries, introduced primarily through uncontrolled pet trade and their invasion results in serious ecological and economic consequences (Nico et al. 2012). During the study period, from June 2013 to May 2015, a few specimens were collected from Vellayani Fresh water Lake. This study established the invasion of *P. Pardalis*, *P. disjunctivus* and their intermediates in this lake.

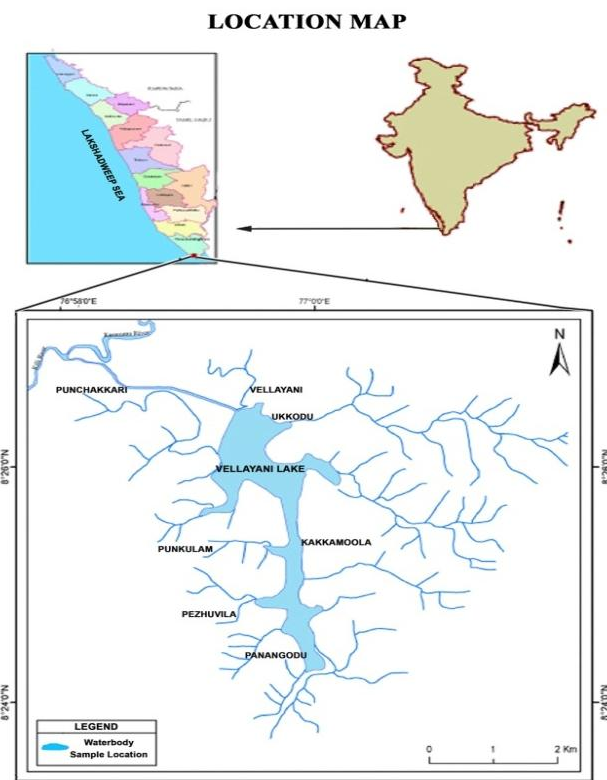


Fig. 1
Figure 1: Map of the Vellayani Freshwater Lake

2. Materials and Methods

2.1 Study Area

The Vellayani Freshwater Lake (8° 24' 09" - 8° 26' 30" N and 76° 59' 08" - 76° 59' 47" E) Thiruvananthapuram District in Kerala (Fig.1), is located 19 km away from the Thiruvananthapuram city. The Lake is situated 29 meters above mean sea level with a length of 3.15 km and width of 1km. The depth of the lake varies from 2 to 6 m. The lake is a rich repository of flora and fauna which support the livelihood of local people around it. The livelihood of about

100 traditional fishermen depends on the fish resources of the lake. Vellayani Lake is an important wetland in south India used by waterfowls, both as feeding and breeding grounds.

2.2 Sample Collection

During a fish biodiversity survey of Vellayani Freshwater Lake, observed a few morphologically similar species from the suckermouth armored catfish of Loricariidae family, among the catches of local fishers. Samples were collected using „Pattu Vala“, a type of seine net; during night. The specimens of this species were collected and brought to the Laboratory for taxonomic identification. Previously published descriptions of species and morphometric data were used to make comparison with the newly collected species. Specimens were identified based on the keys provided by Weber (1991, 1992) and Armbruster et al. (2006). The identified specimen is preserved at the Laboratory of the Fatima Mata National College, Kollam, under the University of Kerala.

3. Results and Discussions

According to Weber (1991, 1992) and Armbruster et al. (2006), the key characters of *P. Multiradiatus* has discrete dark spots on the lateral and caudal peduncle, never coalescing or forming chevrons. *P. pardalis* has dark spots on the lateral and caudal peduncle coalescing or forming chevrons, with ventral spots mostly discrete. *P. disjunctivus* has dark spots on the lateral and caudal peduncle coalescing or forming chevrons, while ventral spots coalesce to form vermiculations. As per the key, exotic individuals collecting from the lake were identified as *P.pardalis* (Castelneau, 1855), *P.disjunctivus* (Weber1991) and the intermediate forms of unknown identity (Fig.2 & Fig.3).

Sailfin suckermouth catfishes (*Pterygoplichthys* spp.) are capable of surviving mesohaline conditions (up to 10 ppt) for extended periods of time, allowing for the use of estuarine and coastal areas for dispersal (Capps et al. 2011). South American suckermouth sailfin catfish *Pterygoplichthys* spp. have successfully invaded inland water bodies of various countries across the world, including Philippines, Japan, Taiwan, Vietnam, Sri Lanka, Indonesia, Malaysia and Singapore, Israel, Turkey, Bangladesh, Mexico, Europe and USA. In India, the suckermouth armoured catfishes reported the species of *Pterygoplichthys anisitsi* from Bihar, *P. multiradiatus* from Kerala and Tamil Nadu, *P. disjunctivus* and *P. pardalis* from Andhra Pradesh, West Bengal, Bihar and Uttar Pradesh. Recently, *P.pardalis*,

P.disjunctivus, and intermediary forms of unknown identity were recorded from the drainages of Thiruvananthapuram City, Kerala (Bijukumar et al.2015).

Scientific Classification

Kingdom	: Animalia
Phylum	: Chordata
Subphylum	: Vertebrata
Superclass	: Osteichthyes
Class	: Actinopterygii
Subclass	: Neopterygii
Infraclass	: Teleostei
Superorder	: Ostariophysii
Order	: Siluriformes
Family	: Loricariidae
Subfamily	: Hypostominae–armoredcatfishes
Genus	: <i>Pterygoplichthys</i>
Species	: 1 <i>Pterygoplichthys pardalis</i>
Common name	: Amazon sailfin catfish
	2 <i>Pterygoplichthys disjunctivus</i>
Common Name	: Vermiculated Sailfin Catfish
Taxonomic status	: “valid”

Pterygoplichthys pardalis (Castelneau, 1855) is a freshwater tropical fish in the armored catfish family, Loricariidae. It is one of a number of species commonly referred to as the common pleco or "leopard pleco" by aquarists. It will grow to a maximum length of 42.3 centimetres (16.7 in) SL. *P.pardalis* is sometimes confused with the *Hypostomus plecostomus* (another armored catfish known as the "common plecostomus"). The two species can be distinguished by their number of dorsal rays. *P. pardalis* has 11–13, while the *H. plecostomus* has only 5–8 dorsal rays.

P.pardalis is native to the Amazon River Basin of Brazil and Peru. Although normally a bottom-dwelling fish, they have the ability to breathe air from the surface of the water during dry periods and those in which dissolved oxygen is too low. There is also an albino color variation of this species, usually referred to as an "Albino Plecostomus". Synonyms are *Hypostomus pardalis*, *Liposarcus pardalis*, *Liposarcus varius* and *Liposarcus jeanesianus*.

P.disjunctivus is native to South America. *Pterygoplichthys* spp. are thought to create large, novel nutrient sinks in invaded streams. They sequester the majority of nitrogen and phosphorus of systems in their body armor.

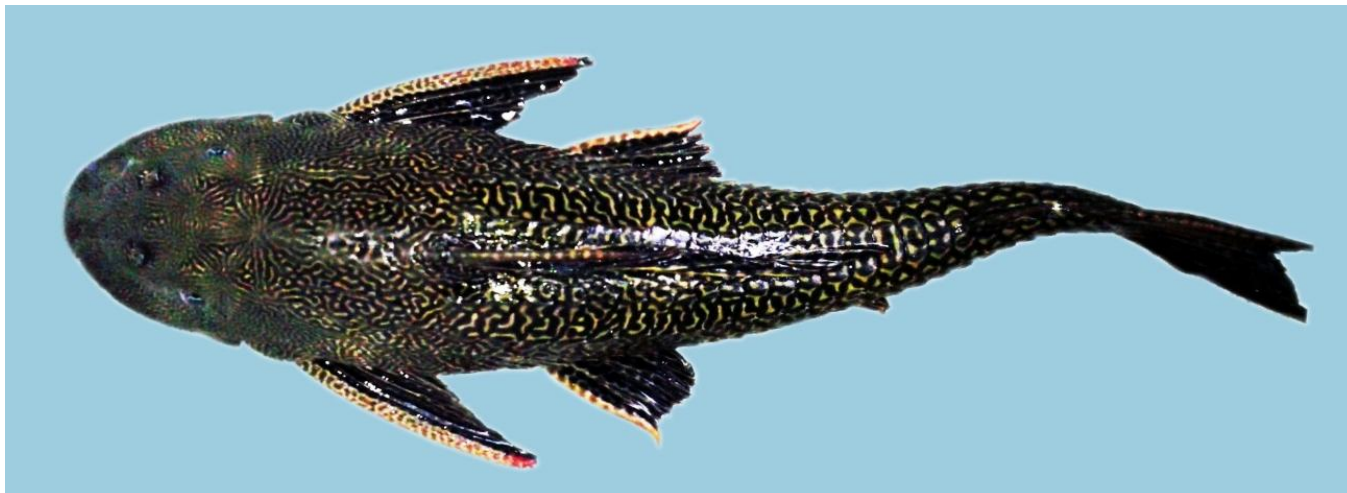


Figure 2: Pterygoplichthys Pardalis (Castelnau, 1855)



Figure 3: Pterygoplichthys disjunctivus (Weber, 1991)

Potential effects of *Pterygoplichthys* spp. include alteration of bank structure and erosion, disruption of aquatic food chains, competition with native species, mortality of endangered shore birds, changes in aquatic plant communities, and damage to fishing gear and industry. Environmental impacts of *Pterygoplichthys* spp. are not fully understood, but in locations where they are introduced and abundant, their feeding behaviours and burrowing activities can cause considerable disturbance. Their burrows have been reported as contributing to siltation problems and bank erosion and instability (Hoover *et al.* 2004).

The ability to withstand water pollution (Welcomme *et al.* 2003), toleration of poor oxygen content in water by means of accessory respiration with diverticula of the gastrointestinal tract (Armbruster 2006), lower number of predators and less vulnerability to predation due to spiny fins and hard external „armour“ (Zworykin *et al.* 2013), occasional migrations across land and low current velocity (Nico *et al.* 2012), peculiarities in reproduction and development such as prolonged reproductive period, batch spawning, development of eggs at very low water levels and active parental care (Hoover *et al.* 2004), coupled with greater feeding opportunities in smaller streams (Nico *et al.*

2012) help them to invade a variety of ecosystems and to establish successfully. A survey conducted among the ornamental fish traders and hobbyists in Thiruvananthapuram City revealed an interesting fact that when the specimens grow in size, the traders and hobbyists find it difficult to keep them in tanks and therefore release them into the natural drainages (Bijukumar, *et al.* 2015).

In Vellayani Freshwater Lake, the intermediary forms of unknown identity are also present. There may be the possible hybridisation in this lake or the hybrids are released into the lake by the ornamental fish traders and hobbyists due to the unexpected or undesirable size growth of the fishes. To understand the possible threats due to invasion of *Pterygoplichthys* spp., the detailed study is need.

4. Conclusion

Pterygoplichthys spp. has damaged the fishing gear and gill nets in various locations. They have destroyed cages and nets. They were causing a decline in native, more desirable fishes in Laguna de Bay, Philippines. The effect of invading armoured catfishes on the indigenous fish stock in India is not clear. Vellayani Freshwater Lake is an important wetland

in south India used by waterfowls, both as feeding and breeding grounds. The livelihood of about 100 traditional fishermen depends on the fish resources of the lake. These fishes have damaged the fishing nets of fishermen in this lake also. Therefore, more systematic studies are warranted in this lake to document the impacts on indigenous species and environmental effects due to the invasion. To prevent the introduction of invasive species, need for legislation to the aquarium traders as a precautionary principle. Awareness about the ecological implications of these species, to the local people especially, aquarium hobbyists and fish breeders is one of the best way to prevent the invasion of unwanted species.

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