

The first record of *Pterygoplichthys pardalis* (Castelnau, 1855), Amazon sucker mouth catfish from the Northwestern Himalayan region of India

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ABSTRACT

The present study demonstrated the first record of armored catfish *Pterygoplichthys pardalis*, a native of the South American Amazon river belonging to the family Loricariidae from River Tawi, an important tributary of River Chenab, Jammu, J&K, India. Various incidences of occurrence of different species of this exotic catfish outside its native place have been reported earlier from South India, i.e. Telangana state, Tamil Nadu, Kerala, Andhra Pradesh, West Bengal, Uttar Pradesh, and Bihar by different authors. The report of the occurrence of this species is for the first time from the Northwest Himalayan region of India. This species was caught as a by-catch during the collection trip. About 31 morphometric and 5 meristic characters were studied along with the taxonomic identification. This species was characterized by the presence of leopard ornamentation on the dorsal side of the body, triangular sucker mouth on the ventral side, and geometrical patterns of lines on the head region.

Key words: First record, Armoured sailfin catfish, *Pterygoplichthys pardalis*, River Tawi, Loricariidae.

Introduction

The introduction of alien fish species is a matter of grave concern as it poses a serious threat to aquatic diversity, particularly in freshwater ecosystems. In India, around 300 alien fish species, 291 ornamental species, 31 aquacultural species, and 3 larvicidal fishes are reported. In the last few years, exotic fish species were introduced in India either intentionally or unintentionally for the purpose of increasing aquaculture production, filling the unoccupied niches (Singh, 2014; Strayer, 2010), therapeutic value, aquarium trade, and biological control (Singh and Lakra, 2011).

In numerous cases, diverse issues including the effect of alien species on the environment, economy, local biodiversity, and possibilities of transmission

of various diseases had been no longer evaluated before importing (Singh and Lakra, 2006). Around one-third of the worldwide aquatic intrusive species are mostly related to the ornamental fish trade. (Markusknight, 2010)

With over 80 genera and 700 species, the loricariidae is the most diverse and largest family of catfishes around the globe. Loricariids are endemic to South America, Costa Rica, and Panama. They are characterized by ventral suckorial mouths with barbels. Genus *Pterygoplichthys* is a group comprising 15 valid species which are naturally distributed in South America.

Over the last few decades, various *Pterygoplichthys* species and their presumptive hybrids have been extensively introduced outside of their local habitat. Till date, out of South America,

they have been reported in Central and North America, various islands of the Indo-Pacific, Caribbean regions, and Southeast Asia. Genus *Pterygoplichthys* varies from other members of the family Loricariidae as it possesses a large dorsal fin with ten or more dorsal fin rays due to which they are also commonly known as sailfin catfish (Nico and Martin, 2001; Nelson *et al.*, 2004). The members of the family Loricariidae are mostly bottom dwellers. These fishes are having a depressed body which is covered by large bony plates, and ventral suckorial mouth that enables them to adhere to the substrate even in fast-moving water. The suckorial mouth is also aided with specialized teeth which are used for feeding by scratching various substrates such as organic sediments, small invertebrates, and algae attached to rocks (Nico *et al.*, 2009 a).

Various biological and ecological attributes of *Pterygoplichthys* make it competent to survive in the most extreme conditions where other fishes cannot. For example, they have a high fecundity rate, extended spawning season, rapid growth, a life span of more than five years, and the ability to tolerate mesohaline conditions, they are also air breathers and can survive in oxygen deficit water and an extended stretch of time out of the water if kept moist, because they can withdraw oxygen through the gut lining in anoxic conditions, they also produce large sized eggs which gives rise to the stronger armored

body, potential to survive several hours of dehydrated conditions favor these fishes to well establish themselves in wild conditions (Orfinger and Gooddig, 2018).

The presence of sailfin catfish in India has been reported by various authors: *Pterygoplichthys multiradiatus* from Tamil Nadu and Kerala (Ajithkumar *et al.*, 1998); *Pterygoplichthys disjunctivus* and *Pterygoplichthys pardalis* from West Bengal, Andhra Pradesh, Uttar Pradesh and Bihar (Singh, 2014).

In the current study, we document the recent discovery of *Pterygoplichthys* in the North-Western Himalayan Region. We also speculate on the origin of the Tawi river population and discuss management options and potential impacts, including the possibility of eradication.

Materials and Methodology

Study area The present study was based on a collection trip carried out on the river Tawi, Jammu, J&K, India during the month of May-June, 2022 as shown in Fig. 1.

Sample Collection

A total of 50 local fish species were collected from the study area using the cast net. During the collection trip, two new species (both males) which mor-

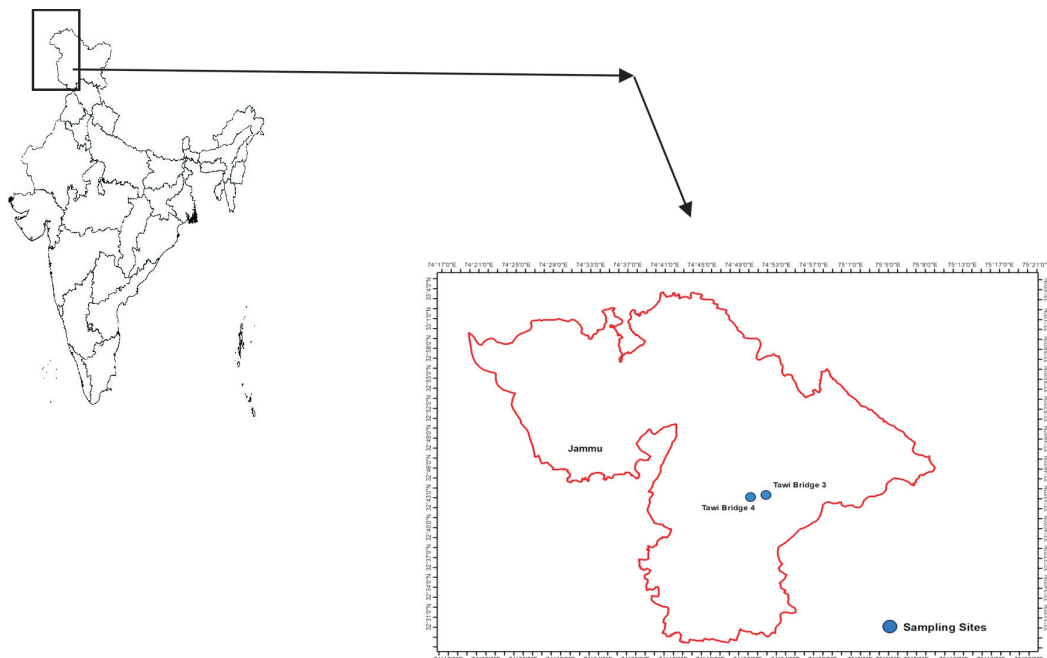


Fig. A. Map depicting collection sites

phologically resembled the armoured catfish, a native of the South-American Amazon River belonging to the genus *Pterygoplichthys* and the family Loricariidae were reported. Members of Loricariidae family are known to have a depressed body with armored bony plates, leopard patterns, the presence of a sucker, pair of maxillary barbels, and geometric patterns on the head region (Nico *et al.*, 2001). These specimens were caught as by catch along with other local fishes of the Jammu region. The newly reported species were brought live to the Fisheries Lab, Department of Zoology, University of Jammu, and were transferred to the large water tub, well equipped with an aerator and other necessary conditions for detailed study. The temperature of the water was maintained between 25 °C -30 °C. The specimen was thoroughly washed with Potassium permanganate solution to disinfect the fish and to treat any kind of injury and then taxonomic identification was done. The specimens were treated with MS 222 (Tricane Methanesulfonate) to anesthetize the fish. Morphometric characters such as length were measured using a digital Caliper and weight using a digital weighing balance (RADWAG electronics, Poland (EU); Model-PS 360.R2). Five meristic and thirty-two morphometric characters (shown in Table 1 and 2) were measured and compared with the previously published data by Rao and Sunchu, 2017; Meena *et al.*, 2006; Makhan, 2017 and keys given by Ambruster and Page (1996), Ambruster (2003), and Nico *et al.* (2012).

Results and Discussion

The various morphometric and meristic characteristics of the first-time reported loricariidae sucker mouth catfish species from River Tawi are depicted

Table 1. Represents the scientific classification of *Pterygoplichthys pardalis* (Rao and Sunchu, 2017)

Scientific	Classification
Kingdom	Animalia
Phylum	Chordata
Class	Actinopterygii
Superorder	Ostariophysi
Family	Loricariidae
Subfamily	Hypostominae
Genus	<i>Pterygoplichthys</i>
Specie	<i>pardalis</i>
IUCN	Vulnerable (VU)

in Tables 2 and 3 respectively.

Table 2. Morphometric characters of *Pterygoplichthys pardalis*

S.No	Morphometric characters	Cm
1	Total Length (TL)	24.2
2	Standard Length(SL)	17.2
3	Head Length (HL)	3.4
4	Snout Length (S _L)	2.8
5	Mouth Length (ML)	2.0
6	Barbel Length (BL)	1.2
7	Head depth (HD)	2.8
8	Orbit Diameter (OD)	0.6
9	Body depth (BD)	3.1
10	Snout to pectoral fin distance (SPD)	4.0
11	Snout to pelvic fin distance	8.3
12	Snout to Caudal fin distance	1.0
13	Snout to anal fin distance	1.28
14	Caudal peduncle length (CPL)	4.4
15	Dorsal fin base length (DFBL)	6.3
16	Dorsal pectoral distance (DPD)	2.6
17	Dorsal adipose distance (DAD)	2.4
18	Caudal peduncle depth (CPD)	1.9
19	Post orbital length (POL)	3.0
20	Pre dorsal length (PDL)	6.5
21	Pre pelvic distance (PPD)	8.7
22	Pre pectoral distance (PPD)	2.3
23	Fork length (FL)	7.4
24	Dorsal spine length (DSL)	2.6
25	Pectoral spine length (PSL)	5.6
26	Pelvic spine length (P _{el} SL)	4.4
27	Anal spine length (ASL)	2.7
28	Adipose fin length (AFL)	1.3
29	Pectoral base length (PBL)	1.3
30	Pelvic base length (P _{el} BL)	1.2
31	Anal base length (ABL)	0.7

Table 3. Meristic Characters of *Pterygoplichthys pardalis*

S.No	Meristic Characters	Count
1	Dorsal fin rays	1 + 12
2	Pectoral fin rays	1 + 5
3	Pelvic fin rays	1 + 5
4	Anal fin rays	1 + 3
5	Caudal fin rays	2 + 14

P. pardalis is an exotic, highly invasive species native to the Amazon river basin of Brazil and Peru. This sailfin sucker mouth fish species is known by various other names such as *Hypostomus pardalis*, *Liposarcus varius*, *Liposarcus jeansianus*, and *Liposarcus pardalis*. It is also commonly called fake pleco, Common Pleco, or leopard pleco by the aquarists. *P. pardalis* possesses two maxillary barbels

with a triangular sucker mouth on the ventral side, numerous tubercles around the three lips meant for attachment, and hard bony plates on the dorsal side of the body (Figure 1). The body is flat bottom with dark spots on the light background in the abdomen region (Figure 2). The body is ventrally smooth and ornamental up to the anal region after which it is covered by hard bony plates containing spines that extends up to the caudal peduncle (Figure 3). The number of rays in *P. pardalis* listed as Dorsal fin (1 ± 12) (4), pectoral fin (1 ± 5) (Figure 5), Pelvic fin (1 ± 4) (Figure 6), Anal fin (1 ± 3) (Figure 7), and Caudal fin ($a! \pm 14$) (Figure 8) respectively as depicted in Table 2. The second dorsal fin is adipose while the first dorsal fin contains 12 fin rays.



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9

Fig. 2-9. Images representing the various morphological features of the *Pterygoplichthys pardalis*

P. pardalis is often confused with its three other closely related species namely *P. multiradiatus*, *P. disjunctivus*, and *P. anisitsi*. However, all these four closely related species can be distinguished on the basis of patterns on the abdomen and geometrical patterns on the head region. *P. pardalis* differs from other species in having dark ventral spots coalescing to form vermiculation. *P. pardalis* usually possess short vermiculation formed by coalescing of not more than five dark spots. *P. pardalis* also possess geometrical patterns of light lines on the head region.

The close examination of specimens of exotic *P. pardalis* showed the absence of hypertrophied cheek odontodes and elevated supraoccipital. Buccal papillae which act as an accessory sensory organ are single, non-bifurcated, and tongue-shaped. It showed the presence of dark spots on the light background and the coalescing of lateral spots forming chevrons that outline the posterior borders of the lateral plate. The identification of the specie was done by referring to the keys of Ambruster and Page, 2006. The Gill arch is crescent-shaped and rests over the pectoral fin. Eyes are depressed and move up and down when at rest. The head possesses tubercles with spines and the lateral sides are covered with hard bony plates arranged in five rows all of which reach to the base of the caudal peduncle.

The occurrence of different species of *Pterygoplichthys* in different parts of India has earlier been published by different authors e.g. reports of the occurrence of *P. multiradiatus* in Southern India from Kerala and Chennai, Tamil Nadu by Daniels, 2006; Krishna Kumar *et al.*, 2009 and Knight, 2010 respectively, *P. pardalis* species from Namakkal district of Tamil Nadu and Telangana state by Muralidharan *et al.*, 2015 and Rao and Sunchu, 2017, *P. anisitsi* from Bihar by Sinha *et al.*, 2010, *P. disjunctivus* and *P. pardalis* from Andhra Pradesh, West Bengal, Bihar, and Uttar Pradesh by Singh, 2014. This sudden rapid expansion of these exotic sailfin suckermouth catfishes from their native place to the sub-tropical, tropical, and intercontinental warm water regions has sparked concern and tension in different countries due to their tendency to act as a potential pest and threat to the natural local

flora and fauna. The incidences of occurrence of different exotic fish species belonging to the genus *Pterygoplichthys* have increased in India over the past few years. It is the first time that any member belonging to the family Loricariidae and genus *Pterygoplichthys* was reported from the North-Western Himalayan region (River Tawi, Jammu, J&K) of India.

Conclusion

The present paper documented the presence of *P. pardalis* in the river Tawi, Jammu, J&K(UT) for the first time. The pathway through which it entered the ecosystem of river Tawi is still unknown. It might have been introduced through fish seed from other states of India or voluntarily or involuntarily by the aquarist for ornamental purposes. The genus *Pterygoplichthys* is highly invasive in nature and can pose serious threats to the native flora and fauna of the river Tawi in the near future if no action is taken by the authorities to control its spread. The presence of this invasive species in the tributary of river Chenab hints at the fact that this specie might be present in the entire region of the river Tawi which is a matter of concern and require future investigation. Males of this fish are potential river bank eroders and therefore can potentially destroy the natural habitats making them prone to siltation. Moreover, insufficient information on the means of the introduction of *Pterygoplichthys* species in India and their associated ecological and socio-economic impacts has always remained a topic of debate. It is highly recommended that the state government along with the assistance of the Government of India should enforce strict laws and legislature to keep a check on the population of this species and take all necessary actions to eradicate this invasive species from the natural aquatic ecosystems.

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Conflict of Interest

The authors declare no conflict of interest.

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