Int. J. Aquat. Biol. (2015) 3(1): 14-18
E-ISSN: 2322-5270; P-ISSN: 2383-0956
Journal homepage: www.ij-aquaticbiology.com

Original Article

Extended distribution of the invasive Sucker catfish *Pterygoplichthys pardalis* (Pisces: Loricariidae) to Cauvery river system of Peninsular India

Murugan Muralidharan*[1], Kaliappan Manikandan[1], Muthukaruppan Gobi[2]

[1]Sri Paramakalyani Centre for Environmental Sciences, Manonmaniam Sundaranar University, Alwarkurichi – 627 412, Tamil Nadu, India.
[2]School of Bio-Engineering, SRM University, Kattankulathur – 603 203, Tamil Nadu, India.

Abstract: This report provides the first record of the exotic sucker fish *P. pardalis* from the Cauvery River system, Tamilnadu State, India. Information on the assumed presence of this invasive species based on sightings of a hitherto unknown species by local people and fishermen in stretches of Cauvery River has been confirmed by our study. Sailfin sucker fishes are popular among pet traders and aquarists in southeast Asian countries and have been regarded as invaders worldwide. Occurrence of *P. pardalis* in newer habitats due to its potential invasion in the South Indian waters issues threat to native fauna.

Article history:
Received 7 November 2014
Accepted 21 December 2014
Available online 25 February 2015

Keywords: Sailfin fish, *Pterygoplichthys*, Exotic species, Cauvery River, India.

Introduction

Invasion of aquatic systems by exotic fishes, widely recognized as the consequence of human mediated environmental intervention, has become the prominent threat to biodiversity in the recent years. Aquaculture and aquariums are responsible for introduction of ornamental and economically important fish species to newer environments (Chavez et al., 2006). The family Loricariidae includes catfish generally referred to as “Plecs” that are widespread throughout South America. Though the majority of the species available are from wild, these are also being bred through commercial breeding farms for the aquarium trade. As the reason they are often hybridized among stocks for better varieties, hence, the identity of individual species is always uncertain (Wu et al., 2011).

Pterygoplichthys pardalis, suckermouth armored catfish of the family Loricariidae is native to Tropical America, occurring in the lower, middle and upper Amazon River basin of Brazil and Peru (Weber, 2003; Page and Robins, 2006). This species is characterized by bony plates covering the body, a pair of subterminal barbels, sucking lips, usually a spine in front of the adipose fin, a flat-bottom body (Page and Burr, 1991) and uncoalesced dark spots on a light background (Page and Robins, 2006). Being voracious algal feeders, the introduction of this species was solely for the aquaria. Species of *Pterygoplichthys* are widespread invasive fish known from many areas outside their native ranges, including Hawaii, Mexico, Puerto Rico and the continental United States (Ludlow and Walsh, 1991; Page and Burr, 1991; Bunkley-Williams et al., 1994; Chavez et al., 2006). Species of this genus have been recorded from several Southeast Asian countries, including Singapore, Malaysian Peninsula, Java, Sumatra, Vietnam and Taiwan (Liang et al., 2005; Page and Robins, 2006: Levin et al., 2008), Bangladesh (Hossain et al., 2008) and India (Daniels, 2006; Krishnakumar et al., 2009; Knight, 2010; Sinha et al., 2010). In addition, *P. pardalis* has

* Corresponding author: Murugan Muralidharan
E-mail address: muralistream@gmail.com

Figure 1. Dorsal and ventral view of *P. pardalis* collected from Cauvery River, India.

been recorded from Lake Matano, Sulawasi, Indonesia (Herder et al., 2012), Malaysian Peninsula (Samat et al., 2008), Phillipines (Chavez et al., 2006) and Sri Lanka (Sumanasinghe and Amarasinghe, 2013). Further, it has been regularly bred and exported from Singapore. *Pterygoplichthys pardalis* and *P. multiradiatus* are among the most popular and intensively marketed varieties of tropical aquarium fish species in South India (Knight, 2010).

The ecological impacts upon introduction of this species to the aquatic habitat are disruption of food chain by overgrazing of benthic algae (Liang et al., 2005; Chavez et al., 2006), competing with native species (Nico and Martin, 2001), modifying substrates and disrupting benthic communities (Hoover et al.,2004) and damaging the banks by burrowing (Bunkley-Williams et al., 1994). Information on the new ranges occupied and extension in distribution range would enable effective management. Herein, we report the occurrence of *P. pardalis* in Cauvery River of Peninsular India.

Materials and methods

Fish collection was accomplished with cast nets. Specimens were preserved in 10% buffered formalin and stored at Sri Paramakalyani Centre for Environmental Sciences, Manonmaniam Sundaranar University, Alwarkurichi. Meristic characters and morphometric measurements were carried out following the methods of Armbruster (2003). Measurements were taken with digital slide calipers up to the nearest 0.1 mm and expressed as percentage of standard length. Other external features and coloration were also examined. Abbreviations of meristic counts: D - Dorsal, A - Anal, P - Pectoral, V - Ventral, C - Caudal, L.L - Lateral line scales.

Results

Eight specimens of *P. pardalis* (Fig. 1) were collected from Cauvery River (11°02'10.4"N, 78°08'45.2"E) at Mohanur (Fig. 2), Namakkal district, Tamilnadu on 24 October 2013. *Pterygoplichthys pardalis* is 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. Fin ray counts for the fishes are D: I 12, A: I 4; P: I 6; V: I 5; C: 14; L.L: 26-32. Morphometric details of the samples as provided in Table 1. Body behind head completely plated dorsally and laterally. Belly naked, with the plates occurring on the ventral side of the body only at the caudal peduncle region.

Table 1. Morphometric measurements of *P. pardalis* collected from Cauvery River, India.

Measurements	Range	Mean	S.D.
Total Length (mm)	142.5 - 189.1	163.91	12.8
Standard Length (mm)	107.3 - 138.4	125.38	10.0
Expressed as %SL			
Predorsal Length	40.07 - 45.90	42.36	2.1
Head Length	22.46 - 27.03	24.50	1.6
Snout Length	10.55 - 14.42	12.23	1.3
Mouth Length	9.45 - 13.40	11.56	1.4
Barbel Length	4.03 - 6.50	5.10	0.8
Pectoral Spine Length	28.13 - 31.48	29.01	1.0
Pelvic Spine Length	17.61 - 23.62	20.25	1.8
Anal Fin Spine Length	11.62 - 15.46	13.49	1.8
Dorsal Spine Length	25.79 - 32.14	28.33	2.0
Dorsal fin base length	36.41 - 39.29	38.23	1.0
Caudal Peduncle depth	9.10 - 11.42	9.97	0.9
Head depth	12.46 - 17.36	15.29	1.7
Mouth width	10.63 - 13.22	12.01	0.8
Orbit diameter	2.17 - 3.52	3.01	0.3
Pre adipose length	83.72 - 90.34	86.87	2.5

Figure 2. Distribution of the genus *Pterygoplichthys* in South India. Collection site *of P. pardalis* (Red star). Previous records of *P. multiradiatus* (Black star).

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. Edge of snout covered with plates. Postdorsal ridge inconspicuous, with the single, median, unpaired preadipose plate. Body coloration, particularly on the abdomen, consists of dark spots on light background, however head exhibit linear patterns forming geometric shapes. Most of the samples have a base color of light gray usually becoming lighter towards the ventral side. This is the first report of *Pterygoplichthys pardalis* in a South Indian river system.

Discussion

In Southern India, *P. multiradiatus* another species of the genus has been reported from Vylathur and the Chackai Canal Kerala (Daniels 2006; Krishnakumar et al., 2009) and wetlands of Chennai, Tamilnadu (Knight, 2010). Being a generalist with a wide spectrum of food, this opportunistic invader could be a threat to native species. It is hence regarded as potential threat to native fish diversity in Western Ghats (Molur et al., 2011). Occurrence of *P. pardalis* in open waters of peninsular India is concerning in terms of the mounting pressure on the already dwindling indigenous fishes. Distribution of *Pterygoplichthys* species along the stretches of the Cauvery River basin may be expected as there are few news reports on the occurrence of this species in Mettur reservoir and of being caught in the

downstream 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.

Acknowledgements

First author (M.M) acknowledges the financial support from UGC available through major research project (F. No. 39-332/2010 SR). We thank M. Sankar, Mohanur for his assistance in the collection of specimens. We gratefully acknowledge L. M. Page, University of Florida Museum of Natural History for helping with the taxonomic identification. Map of Cauvery River was downloaded from Open Street Map contributors.

References

Armbruster J. (2003). The species of the *Hypostomus cochliodon* group (Siluriformes: Loricariidae). Zootaxa, 249: 1-60.

Bunkley-Williams L., Williams Jr. E.H., Lilystrom C.G., Corujo-Flores I., Zerbi A. J., Aliaume C. (1994). The South American sailfin Armored Catfish, *Liposarcus multiradiatus* (Hancock), a new exotic established in Puerto Rican fresh waters. Caribbean Journal of Science, 30(1-2): 90-94.

Chavez M.J., De La Paz R.M., Manohar S.K., Pagulayan R.C., Vi C. (2006). New Philippine record of South American sailfin catfishes (Pisces: Loricariidae). Zootaxa, 1109: 57-68.

Daniels R.J.R. (2006). Introduced fishes: a potential threat to the native freshwater fishes of Peninsular India. Journal of the Bombay Natural History Society, 103(2 and 3): 346-348.

Herder F., Schliewen U.K., Geiger M.F., Hadiaty R.K., Gray S.M., McKinnon J.S., Walter R.P., Pfaender J. (2012). Alien invasion in Wallace's Dreamponds: records of the hybridogenic "flowerhorn" cichlid in Lake Matano, with an annotated checklist of fish species introduced to the Malili Lakes system in Sulawesi. Aquatic Invasions, 7(4): 521-535.

Hoover J.J., Killgore K.J., Cofrancesco A.F. (2004). Suckermouth catfishes: threats to aquatic ecosystems of the United States? Aquatic Nuisance Species Research Program. Engineers Research and Development Center, Vicksburg, MS. ANSRP Bulletin 4 (1): 1-13.

Hossain M.Y., Rahman M.M., Ahmed Z.F., Ohtomi J., Islam A.B.M.S. (2008). First record of the South American sailfin catfish *Pterygoplichthys multiradiatus* in Bangladesh. Journal of Applied Ichthyology, 24: 718-720.

Knight J.D.M. (2010). Invasive ornamental fish: a potential threat to aquatic biodiversity in peninsular India. Journal of Threatened Taxa, 2(2): 700-704.

Krishnakumar K., Raghavan R., Prasad G., Bijukumar A., Sekharan M., Pereira B., Ali A. (2009). When pets become pests – exotic aquarium fishes and biological invasions in Kerala, India. Current Science, 97: 4-25.

Liang S.H., Wu H.P., Shieh B.S. (2005). Size structure, reproductive phenology, and sex ratio of an exotic armored catfish (*Liposarcus multiradiatus*) in the Kaoping River of southern Taiwan. Zoological Studies, 44(2): 252-259.

Levin B.A., Phuong P.H., Pavlov D.S. (2008). Discovery of the Amazon sailfin catfish *Pterygoplichthys pardalis* (Castelnau, 1855) (Teleostei: Loricariidae) in Vietnam. Journal of Applied Ichthyology, 24: 715-717.

Ludlow M.E., Walsh S.J. (1991). Occurrence of a South American armored catfish in the Hillsborough River, Florida. Florida Scientist, 54: 48-50.

Nico L., Cannister M., Neilson M. (2012). *Pterygoplichthys pardalis*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.

Nico L.G., Martin R.L. (2001). The South American sucker mouth armored catfish, *Pterygoplichthys anisitsi* (Pisces: Loricariidae), in Texas, with comments on foreign fish introductions in the American Southwest. The Southwest Naturalist, 46: 98-104.

Molur S., Smith K.G., Daniel B.A., Darwall W.R.T. (2011). The status and distribution of freshwater biodiversity in the Western Ghats, India. Cambridge, UK and Gland, Switzerland: IUCN, and Coimbatore, India, Zoo Outreach Organisation, 110 p.

Page L.M., Burr B.M. (1991). A field guide to freshwater fishes of North America north of Mexico. Peterson Field Guide Series, Houghton Mifflin Company, Boston, MA, 432 p.

Page L.M., Robins H.R. (2006). Identification of sailfin catfishes (Teleostei: Loricaridae) in Southeastern Asia. Raffles Bulletin of Zoology, 54: 455-457.

Samat A., Shukor M.N., Mazlan A.G., Arshad A., Fatimah M.Y. (2008). Length-weight relationship and condition factor of *Pterygoplichthys pardalis* (Pisces: Loricariidae) in Malaysia Peninsula. Research Journal of Fisheries and Hydrobiology, 3: 48-53.

Sinha R.K., Sinha R.K., Sarkar U.K., Lakra W.S. (2010). First record of the southern sailfin catfish, *Pterygoplichthys anisistsi* Eigenmann and Kennedy, 1903 (Teleostei: Loricariidae), in India. Journal of Applied Ichthyology, 26: 606-608.

Sumanasinghe H.P.W., Amarasinghe U.S. (2013). Population dynamics of accidentally introduced Amazon sailfin catfish, *Pterygoplichthys pardalis* (Siluriformes, Loricariidae) in Pologolla reservoir, Sri Lanka. Sri Lanka Journal of Aquatic Sciences, 18: 37-45.

Yamamoto M.N., Tagawa A.W. (2000). Hawaii's native and exotic fresh water animals. Mutual Publishing, Honolulu, Hawaii, 200 p.

Weber C. (2003). Subfamily Hypostominae (armored catfishes). In: R.E. Reis, S.O. Kullander, C.J. Ferraris, Jr. (eds.). Check List of the Freshwater Fishes of South and Central America. EDIPUCRS, Porto Alegre. 729 pp.

Wu L., Liu C., Lin S. (2011). Identification of exotic sailfin catfish species (Pterygoplichthys, Loricariidae) in Taiwan based on morphology and mtDNA sequences. Zoological Studies, 50(2): 235-246.