

FIRST RECORD OF THE PIRAPITINGA *PIARACTUS BRACHYPOMUS*, CUVIER, 1818 (ACTINOPTERYGII: SERRASALMIDAE) IN PAMBA RIVER KERALA, INDIA

RANI S. DHARAN* AND E. SHERLY WILLIAMS

PG and Research Department of Zoology, Environmental sciences,
Aquaculture and Fish biotechnology lab, Fatima mata National College (Autonomous), Kollam - 691 001
e-mail: plrrani4@gmail.com

KEYWORDS

Pamba River
Piranha
Threat
Piaractusbrachypomus
Ecosystem

Received on :

19.08.2015

Accepted on :

26.12.2016

*Corresponding
author

ABSTRACT

Pamba River in Kerala, India, is known for its inland fishery resources and great biodiversity. The present investigation has conducted to compare the ichthyofaunal diversity along the lower reaches of Pamba River. During the study two *Piaractus brachypomus* were caught in the gill net from the open waters of river at Muttar, upper Kuttanad, Kerala. The *Piaractus brachypomus* is a tropical fish native to the Amazon and Orinoco basins, which has many similarities with the carnivorous *Piranha natterriwas* reported for the first time from the Pamba River, Kerala, India. *Piaractus brachypomus* are not aggressive carnivore like the piranha, but its aggressiveness towards the native fauna was evident from the interactions with local fishermen. The basic reason behind the presence of this fish in this water medium may be because of the inundation of nearby culture farms. If a large population of *Piaractus brachypomus* enters an eco-system to which it isn't native, the fish can have a very adverse effect on the indigenous ecosystem. The present study showed the importance of monitoring further proliferation of this aggressive species in the Pamba River for the healthy existence of the ecosystem.

INTRODUCTION

Invasion of species is the main reason for global change as it will modify the indigenous environment in various ways. Invasion of exotic fishes and related issues has been gaining attention worldwide. Bhat, *et al.* (2013) studied the distribution pattern and density of exotic brown trout, *Salmo trutta fario* and Ahmed, H. (2011) studied the mortality in a hybrid tilapia (*Oreochromis niloticus* X *O. aureus*) due to a monogenic trematode (*Dactylogyrus* sp.) that was found in the fish gills. Invasion of exotic fishes may also result in community disassembly and will affect species interactions which may ultimately lead to biodiversity loss and species homogenization. The introduction of exotic species is vogue in India, mainly for increasing fish production, but many times the exotic fishes pose a threat to indigenous fishes. Many fishes are carnivorous, which actively prey on juveniles and adults of indigenous species or compete with them for food and habitat also negatively affect native fish populations. The *Piaractus brachypomus* a tropical fish native to the Amazon and Orinoco basins, here it inhabits large flooded rivers and lakes. This is the one of the largest species of scaled fish found in the Amazon basin. It is very valued as an aquaculture species, and is considered to be one of the most significant and prized species in aquarium trade (Saint-Paul, 1992; Jégu, 2003). Outside of its natural distribution range, the *Piaractus brachypomus* is most common in the open waters of the US, due to aquarium related releases and fish farms escapes (Nico and Fuller, 2012). Recently three red bellied

Paccu, *Piaractus brachypomus* were caught from the Vembanat Lake, Kerala, India (Roshni *et al.*, 2014). *Piaractus brachypomus* has many similarities with piranha but have many differences in the form of teeth and jaw alignment. Piranha has pointed, razor-sharp teeth in a pronounced underbite, whereas *Piaractus brachypomus* have squarer, straighter teeth, like a human and a less severe under bite, or a slight overbite. Additionally, full-grown *Piaractus brachypomus* are much larger than piranha, reaching up to 0.9 m (3 feet) and 25 kg (55 pounds) in the wild. When the large fish of the *Colossoma* genus introduced to the aquarium trade in the U.S. and other countries, they were erroneously labeled pacu. The *Colossoma macropomum* fish are known, as tambaqui whereas *Piaractus brachypomus* is known as pirapitinga.

If a large population of pacu enters an eco-system to which it is not native, the fish can have a very adverse effect (Magallanes, Frank, 2006). Most UK dealers are now refusing to stock this species due to the large size and expensive aquarium requirements. Many suspicious reports of illegal release of over sized pacu were reported worldwide (Nico *et al.*, 2012). As it is a tropical fish, *Piaractus brachypomus* will die in cold weather; if it can survive, as newcomers to an ecosystem, it will out-compete native species for available food, habitat, and other resources, or displace them by introducing exotic parasites or diseases (Todd Crowl *et al.*, 2008). Incidental finds of individual pirapitinga have also been recorded in Spain (Leunda, 2010), in Slovakia (Hensel, 2004), in British Columbia (Hanke *et al.*, 2006) and in Poland (Nowak

et al., 2008). All these individuals are assumed to have been released by aquarists. The aim of this paper is to present the first records of an ornamental, aquarium species *Piaractus brachypomus* in the open waters of upper Kuttanad at Muttar where Manimala river meets with Pamba river.

MATERIALS AND METHODS

In July 2013 the sports fisherman caught two piranha like fish with gill net from the open waters of upper Kuttanad at Muttar where Manimala river meets with Pamba river (9°26'00"N 76°32'20"E) (Fig. 1). The captured fish was identified as pirapitinga or red-bellied pacu (*Piaractus brachypomus*) according to Ross (2001) and Marko, C et al. (2011) (Fig 2.a). Body measures were taken using digital calliper (Mitutoyo) with an accuracy of 0.1 mm. Meristic traits like fin rays, scales in lateral line, ventral scutes and gill rays were counted using a binocular microscope.

RESULTS AND DISCUSSION

The captured specimen is compared with that reported in Croatia, (Marko, et al., 2011) and in US (Ross, 2001) for its meristic counts and morphometric measurements and are presented in Tables I and II.

According to Ross (2001) this is a large, silvery deep bodied characin with numerous, small, cycloid scales. Scales lack posterior projections and accessory scales are also absent. The mouth is terminal with molar like teeth on the lower jaw are hidden behind a fleshy lower lip (Fig. 2.b). The body is almost circular in juveniles, becoming more elongate in older fish. The nares are large and anterior to the eyes. The opercle is much deeper than wide (which goes into depth about 2 times). The anal fin is long and an adipose fin is present may be reduced or even absent in large fish. There is a serrated keel running along the belly to the anus. The lateral line is decurved. Counts from three specimen collected in Mississippi are 97-102 SC, 17 GR lower, 13-17 dorsal rays, 23-26 anal rays, 13-16 pectoral rays, 8 pelvic rays, and 58-62 ventral scutes. Counts from Amazonian specimen are 79-89 SC, 15-18 dorsal rays, 24-28 anal rays 16-19 pectoral rays, 8 pelvic rays and 46-63 ventral scutes.

Piaractus brachy pomus is recorded for the first time from the open waters of Pamba River, upper Kuttanad at Muttar, Kerala. The local fisherman reported that three *Piaractus brachy pomus* were caught with gill net. One was big, weighed about 1 kg that he didn't saved. *Piaractus brachypomus* is an edible fish. This fish is oftenly mistaken as *Pygocentrus nattereri*

due to its resemblance in body colour pattern. A possible reason for the occurrence may be a result of fish outgrowing hobbyists' and the indeterminate release into local waters. Red-bellied pacu were introduced to India sometime between 2003 and 2004 from Bangladesh and indicates that the high water levels of the Drava River and its tributaries in spring 2010 lead to a flooding of fish-ponds (in Hungary) where pirapitinga were kept, thus sweeping them into the river course (Marko, et al. (2011).

In the present study the local fisher men confirmed the attack of *Piaractus brachypomus* on other fish populations, and so its existence can be a threat to other fish species. Froese and Pauly (2010) reported that "*Piaractus brachy pomus* started attacking other fishes in the Sepik and Ramu rivers in 1999 when their main food, insects became

scarce. There are also reports on human attacks. It also causes ecological imbalance by killing local fish and wiping out eggs and fry. According to Robert (2006) even if *Piaractus brachycomes* is omnivorous, when its normal food become scarce it may prey on other fish and will attack people. There is also chances for the introduction of exotic parasites or diseases to the native fauna (Todd Crowl et al., 2008). Quite accidentally some type of routing off disease also reported in some fish species like *Labeodissumeri* and *Channa striata* from the same station and same month (Fig.3). So it has to find out whether there is any relationship between the occurrence of this fish and the outbreak of this disease.



Figure 1: Map of upper Kuttanad and the location where *Piaractus brachypomus* was captured.

Table 1: The meristic counts of the *Piaractus brachypomus* from the open waters of upper Kuttanad at Muttar, Kerala is compared with the literary data

	Present study		Marko, et al. (2011)		Ross (2001)
	Specimen 1	Specimen 2	Specimen 1	Specimen 2	
D ray	16	16	III + 14	(III + 14) 17	15-17
A ray	23	23	III + 24	(III + 22) 25	23-26
V ray	8	8	I + 7	I + 7	8
P ray	13	13	I + 16	I + 14	15-16
Ventral scutes	54	45	57	61	58-62
Lateral line scales	106	102	96	99	97-102

Table II: Comparison of the morphometric measurements (in mm) of two pirapitingas (*Piaractusbrachypomus*) from the open waters of upper Kuttanad at Muttar, Kerala with the literature

Measurements	Present study		Marko, C et al. (2011)	
	Specimen 1	Specimen 2	Specimen 1	Specimen 2
TL	133mm	123mm	232	241.5
SL	102 mm	97 mm	179.8	2.3.6
Head length	38 mm	37 mm	52.3	60.3
In % of head length				
Preorbital distance	21.05	21.05	28.5	28
Eye diameter	23.6	23.6	23.9	23.5
Post orbital distance	47.37	47.37	53.7	53.4
Inter orbital width	44.74	44.74	46.3	47.1
Head length	37.25	37.25	29.1	29.6
In % of standard length				
Predorsal distance	38.24	38.24	59.1	58.5
Preventral distance	47.06	47.06	53.7	53.4
Preanal distance	70.59	70.59	75.4	77.1
Distance D- adipose fin	15.69	15.69	16.1	16.7
Caudal peduncle length	8.82	8.82	10.8	11.7
Body depth	55.88	55.88	55.6	53.3
D length	29.41	29.41	22.2	21.7
A length	22.55	22.55	27.8	26
P length	18.63	18.63	21.9	22.2
V length	19.61	19.61	20.1	18.4
Adipose fin base length	3.92	3.92	3.1	2.8

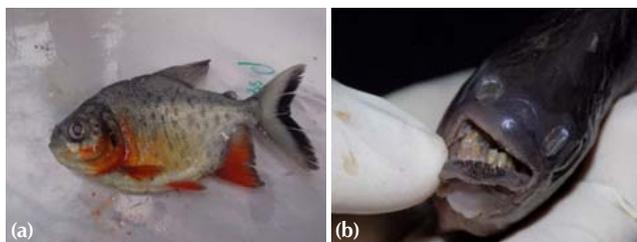


Figure 2: (a) *Piaractusbrachypomus* from the open waters of upper Kuttanad at Muttar, Kerala where Manimala river meets with Pamba, photographed immediately after capture, total length 12.3 cm. (b) *Piaractusbrachypomus* exposing the molar teeth



Figure 3: Routing off disease found in *Channa striata*

Fish fauna were collected from other spots like Kuthiyathodu, Veeyapuram, and Pallathuruthy with an average distance of 30 km to confirm the presence of this species but it could not

be recorded from the landings. This indicates that *Piaractus brachycomes* was not become abundant in the upper Kuttanad area.

Piaractus brachypomus is a tropical fish. Albeit there is no risk for *Piaractusbrachypomus* to thrive in the temperate climates. Optimal water P^H for *Piaractusbrachypomus* is 6.8, with an optimal temperature of 26°C. It is a mid levels swimmer, so can be found at depths of up to 8 meters. The P^H of the site from where the *Piaractusbrachypomus* was caught was 8.02 and the temperature was 22°C. The Pirapitinga can maintain a population only at the areas where warm springs or power plant effluent channels are present.

Pirapitinga stops feeding between 16 and 18°C, with death ensuing at 11-13°C (Lovshin, 1995; Logan et al. 1996). Since the temperature range existing in the spot from where *Piaractusbrachypomus* was caught was between 20-22°C it is possible for this species to establish a permanent population in this open waters as per the report of Lovshin (1995). If its number increase further, it can be a threat for the natural ecosystem present here. So it is inevitable to monitor its further proliferation and the potential threats it can pose on the natural ecosystem.

ACKNOWLEDGEMENT

The authors are grateful to the University Grand Commission, New Delhi for granting F.I.P for doing the research work.

REFERENCES

- Ahmed, H. 2011.** A Monogenic Trematode (*Dactylogyrus* Sp.) Associated With Hybrid Tilapia (*Oreochromis Niloticus* X *O. Aureus*) Mortality. *The Bioscan*. **6(1)**: 01-03.
- Bhat, F. A. et al. 2013.** Distribution Pattern, Density And Morphometric Characteristics of Schizothoracines (Snow Trouts) In

Lidder River, Kashmir. *The Bioscan*. **8(2)**: 363-369.

Froese, and Pauly. 2010. *Piaractusbrachypomus* Ecological Risk Screening Summary U.S. Fish and Wildlife Service, Web Version , 8/21/2012.

Hanke, G. M. et al. 2006. First record of the yellow bullhead, *Ameiurus natalis*, aloricariid catfish, *Panaques uttonorum*, and a silver pacu, *Piaractus cf. P. brachypomus*, in British Columbia. *Canadian Field Naturalist*. **120**: 421-427.

Hensel, K. 2004. First record of the pirapitinga *Piaractus brachypomus* (Actinopterygii: Serrasalminidae) in Slovakia. *Biologia*. **59**: 205-210.

Jégu, M. 2003. Serrasalminae (Pacus and piranhas). In: Checklist of the Freshwater Fishes of South and Central America (Reis R.E., Kullander S.O. & Ferraris C.J. Jr., eds.), Porto Alegre, Brazil: EDIPUCRS. **120**: 182-196.

Leunda, P. M. 2010. Impacts of non-native fishes on Iberian freshwater ichthyofauna: current knowledge and gaps. *Aquat. Inv.* **5**: 239-262.

Lovshin, L. L. 1995. The Colossomids. In: World Animal Science: Production of Aquatic Animals: Fishes (Nash A.C.E. & Novotny A.J., eds), Amsterdam: Elsevier Science. **8**: 153-159.

Magallanes and Frank 2006. Pacu, Tambaqui, Piratinga, Silver Dollars (Website). *Oregon Piranha Exotic Fish Exhibit*.

Marko, C. et al. 2011. How was a Pirapitinga, *Piaractus brachypomus* (Serrasalminidae) introduced in Croatian freshwaters? *Cybium*. **35**: 259-261.

Nico and Fuller 2012. *Piaractus brachypomus* Ecological Risk Screening Summary. U. S. Fish and Wildlife Service - Web Version - 8/21/2012

Nowak, M. et al. 2008. Non-native freshwater fishes in Poland: an overview. *AAFL Bioflux*. **8**: 173-191.

Robert, V. Z. 2006. An assessment of exotic species in the Tonle Sap Biosphere Reserve and associated threats to biodiversity. A resource document for the management of invasive alien species, p. 30.

Roshni, K. et al. 2010. Record of a newly introduced fish, red-bellied pacu *Piaractus brachymopus* (Cuvier 1818) (Characiforms, Serrasalminidae), in a tropical wetland system, India. *Journal of Applied Ichthyology*. **30(5)**: p. 30.

Ross, S. T. 2001. The Inland Fishes of Mississippi. *Univ. Press of Mississippi*. p. 295.

Saint-Paul, U. 1992. Status of aquaculture in Latin America. *Appl. Ichthyol.*, **8**: 21-39.

Todd, C. A. et al. 2008. The spread of invasive species and infectious disease as drivers of ecosystem change. *The Ecological Society of America*. **6(5)**: 238-246.