

New records of anadromous catfish *Genidens barbatus* (Lacépède, 1803) in the Paraná Delta (South America): evidence of extension in the migration corridor?

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The catfish Genidens barbatus (Siluriformes: Ariidae) is an anadromous species from South America. It has been classified as vulnerable in Argentina and Uruguay due to its complex life cycle, its restricted distribution in fresh or estuarine waters and the critical levels of fishery harvesting of this species. In this work, we report the occurrence of G. barbatus in three great rivers, which could represent the evidence of an extension in its migration corridor in the Paraná River Delta (Argentina).

Keywords: anadromous, *Genidens barbatus*, Paraná River Delta, Argentina

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INTRODUCTION

The marine catfish *Genidens barbatus* (Lacépède, 1803) (Siluriformes: Ariidae) is an anadromous species inhabiting estuaries and the marine continental shelf from Bahía, in Brazil, to San Blas Bay, in Argentina (17°00'S–40°32'S) (López & Bellisio, 1965). It is considered as one of the most important fish resources in Argentina, Brazil and Uruguay (Velasco *et al.*, 2007; Silva Junior *et al.*, 2013). This species can live as long as 36 years, attaining a length of 120 cm, and reaches its maturity at the size of 40 cm (over seven or eight years old) (Velasco *et al.*, 2007). Adult inhabitants of the sea ascend rivers and estuaries during the months of September to December for reproductive purposes (Velasco & Reis, 2004; Velasco *et al.*, 2007) moving up to 500 km inland in Paraná River (freshwater environments) (Liotta, 2005). After females spawn in these areas, males return to the estuarine portion of the lagoon, carrying the eggs in the oropharyngeal cavity (Velasco & Reis, 2004). Cappato & Yanosky (2009) classified the species as vulnerable due to its complex life cycle (low fecundity, oral incubation), its restricted distribution in fresh or estuarine waters during the reproductive period, the unknown environments that it inhabits afterwards and the critical harvesting rate of this species in fisheries.

In Argentina and Uruguay (South America), the known migration corridor was restricted to the De la Plata and Paraná Guazú Rivers (Figure 1) (Liotta, 2005; Cappato & Yanosky, 2009). In this article, we report for the first time the presence of *G. barbatus* in three great rivers of the Paraná River Delta.

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MATERIALS AND METHODS

The Paraná River Delta (Argentina and Uruguay) discharges into the De la Plata River estuary (30,362 km²) at an average flow of 23,000 m³/s towards the Atlantic Ocean. The most important rivers in the Paraná River Delta are the Paraná Guazú, Sauce and the Uruguay Rivers (Figure 1). The conductivity in these rivers ranges from 40 to 173 $\mu\text{S m}^{-1}$ (north–south) and the maximum depth ranges between 5 and 33 m (Guerrero *et al.*, 2010; Avigliano *et al.*, 2014).

Fish were collected with longlines on November 4 2014 in Sauce (N = 2), Paraná Bravo (N = 1) and the Uruguay Rivers (N = 1) (Paraná River Delta, Argentina) at a depth ranging from 10 to 33 m (Figure 1). The fish species were determined according to the diagnosis proposed by Marceniuk (2005) and Marceniuk & Menezes (2007).

According to these authors, the following characteristics should be observed in each specimen: (1) lateral processes of urohyal short, (2) posterior portion of second basibranchial short, (3) posteroventral portion of opercle little pronounced posteriorly, (4) dorsal process of pharyngeal tooth plate and (5) the maxillary barbels clearer and sharper sideline.

Finally, the specimens were deposited as voucher specimens in the ichthyological collection of the Universidad de Buenos Aires (COLV/Fish-UBA).

RESULTS

A total of four adult fish (females with oocytes in an advanced stage of development) were collected (Figure 2). The data and the voucher numbers of the specimens are given in Table 1. These represent the first record of *Genidens barbatus* in the Paraná Guazú, Sauce and Uruguay Rivers (Figure 1) (Paraná River Delta, Argentina).

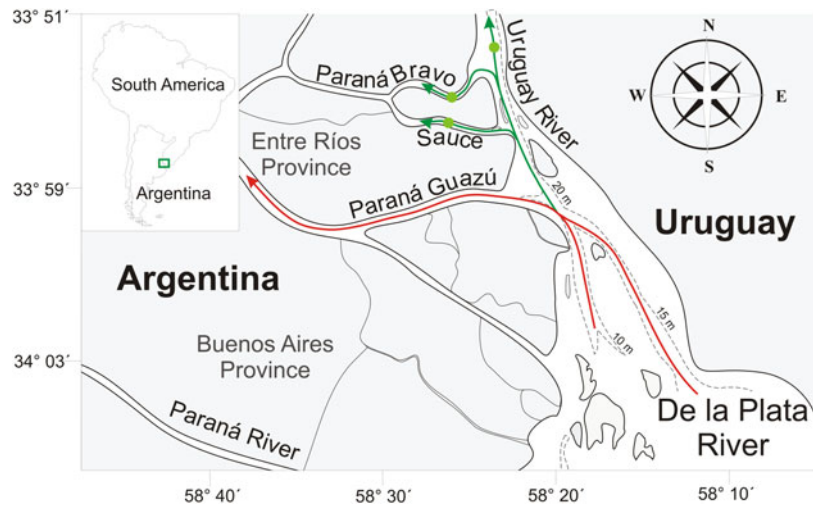


Fig. 1. New records and migratory corridors of *Genidens barbuis* in Paraná River Delta (Argentina). Red line represents the known reproductive migration corridor (Liotta, 2005); green line represents the new proposed migration corridor; green points represent new records.



Fig. 2. *Genidens barbuis* collected in Paraná River Delta (Buenos Aires province, Argentina). Scale bar = 6 cm.

Table 1. New water body and data of the specimens of *Genidens barbuis* collected in the Parana River Delta.

Water body	Voucher	Sex	TW (gr)	TL (mm)	Coordinates
Sauce River	GB-015-1B11	Female	4950	740	33° 56' 35.13" S 58° 27' 11.36" W
Sauce River	GB-016-5B11	Male	2765	629	33° 56' 35.13" S 58° 27' 11.36" W
Paraná Bravo River	GB-2B11	Female	3960	715	33° 54' 23.97" S 58° 28' 4.50" W
Uruguay River	GB-10B11	Male	1765	560	33° 54' 12.49" S 58° 25' 40.76" W

TW = total weight; TL = total length.

DISCUSSION

The catfish *Genidens barbuis* is a commercially important resource in various commercial and artisanal fisheries operating in Argentina, Brazil and Uruguay (Velasco *et al.*, 2007; Silva Junior *et al.*, 2013). The largest volume of catches occurs in deep natural channels and wells of the Río de la Plata and Paraná Guazú between depths of 10 and 35 m (Avigliano, 2014). These channel systems extend along the Rivers Paraná Bravo, Sauce and Uruguay, connecting them all together; this could provide a migration corridor, which would explain the reported catches in this work. On the other hand, catches that have been observed by artisanal and recreational fishermen in previous years (2010–2014) (per. comm.) indicate that the species uses these systems frequently. These new records could represent an extension of the reproductive migratory corridor of the species in the Paraná River Delta.

The information reported in this research is an important tool to be used in policy management, conservation and monitoring for the sustainable use of this resource throughout the region. A monitoring program should be introduced to the extension of the migratory corridor, where catches are considered rare or scarce, to update information and to set the basis for sustainable use and conservation management policies.

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