



New records of long–distance migratory fish in the São Gonçalo Channel Basin, southern Brazil

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Abstract: Three long-distance migratory fish were reported for the São Gonçalo Channel Basin: *Salminus brasiliensis*, *Prochilodus lineatus* and *Megaleporinus obtusidens*. The presence of juvenile *P. lineatus* and *M. obtusidens* suggests that there might be resident populations in the watershed.

Keywords: *Salminus brasiliensis*, *Megaleporinus obtusidens*, *Prochilodus lineatus*, potamodromous, Mirim lagoon

Resumo. Novos registros de espécies de peixes migradores de longa distância na bacia do canal São Gonçalo, sul do Brasil. Foi registrada a presença de três espécies migradoras de longa distância para a bacia de drenagem do canal São Gonçalo: *Salminus brasiliensis*, *Megaleporinus obtusidens* e *Prochilodus lineatus*. A presença de juvenis de *Prochilodus lineatus* e da *Megaleporinus obtusidens* evidencia possíveis populações na região.

Palavras-Chaves: *Salminus brasiliensis*, *Megaleporinus obtusidens*, *Prochilodus lineatus*, potamodromos, Lagoa Mirim.

The Patos-Mirim hydrological system comprises a drainage basin of 200,000 km² and a lagoon body of 14,227 km² (Seeliger & Odebrecht 2010). In the western part of this system, there are several rivers that flow into the Patos and Mirim Lagoons, which are interconnected with the sea via the Patos Lagoon estuary. Among the main rivers draining from the Atlantic Ridge of the Serra do Sudeste into this lagoon system, both in Brazil and Uruguay, are the Jacuí and Camaquã rivers, in the Patos lagoon, and the Jaguarão and Cebollati rivers, in the Mirim lagoon. Located in the center of this lagoon system, the São Gonçalo Channel interconnects the drainage of the Mirim Lagoon with the southern region of Patos Lagoon. The São Gonçalo Channel is a natural waterbody with 75 km in length and received this denomination because it has no unidirectional hydrological flow (FAO 1972). The main tributaries of this channel are the Piratini River, located in its central region and the Pelotas River, 5 km distant from the estuary of the Patos Lagoon.

Currently, the fish fauna of the Patos-Mirim lagoon system comprises 200 freshwater species (Bertaco *et al.* 2016). Four of them are long-distance migratory fish (exclusively freshwater): o dourado *Salminus brasiliensis* (Cuvier, 1816), *Prochilodus lineatus* (Valenciennes, 1836) e a *Megaleporinus obtusidens* (= *Leporinus obtusidens*) (Valenciennes, 1836) and *Pimelodus pintado* Azpelicueta, Lundberg & Loureiro, 2008 (Alves & Fontoura 2009). *Salminus brasiliensis* is restricted to the hydrographic basin of the rivers Jacuí and Camaquã, in the Patos Lagoon (Ihering 1889, Malabarba 1989, Reis *et al.* 2003). The other species have been recorded in landings of artisanal fisheries at the northern-most part of the Patos Lagoon (Garcez & Sanches-Botero 2005, Milani & Fontoura 2007; Ceni *et al.* 2016). Otherwise, there is no record of the occurrence of long-distance migratory fish in the drainage basins of the São Gonçalo Channel, Mirim Lagoon, and southern Patos Lagoon, either on Brazilian or Uruguayan territories (Malabarba 1989, Reis *et al.* 1994, Garcez & Sanches-Botero 2005,

Burns *et al.* 2006, Teixeira de Mello *et al.* 2011, Moura *et al.* 2012).

New records were obtained from several studies carried out in different periods (1990–2008) in the region of the São Gonçalo Channel. After being captured, individual fish were identified, and their total length (TL) was measured in millimeters. Specimens were deposited in the Ichthyological Collection of the Federal University of Rio Grande (FURG), and the Morevy Cheffe Ichthyological Collection (CIMC) of the Special Study Group for the Protection of the Aquatic Environment of Rio Grande do Sul (GEEPAA-RS).

Three long-distance migratory fish were reported for the São Gonçalo Channel Basin: *Salminus brasiliensis* (Cuvier, 1816), *Prochilodus lineatus* (Valenciennes, 1836) and *Megaleporinus obtusidens* (Valenciennes, 1836) (= *Leporinus obtusidens*) (Figs. 1a – 1b; Table I; Figs. 2 - 4). Between the years 1972 and 2010 a total of 13 individuals were captured and deposited in scientific collections. The largest individuals and the highest number of species were obtained in the Piratini River with the use of gillnets (Table I). *Salminus brasiliensis* was captured at the Passo do Império, on the middle-upper course of the Piratini River,

approximately 90 km from its mouth on the São Gonçalo Channel (Fig. 5). On the other hand, the smallest individuals were captured in the São Gonçalo (both in the channel and adjacent floodplain) and in the Pelotas river (*P. lineatus*: N = 1; TL = 150 mm; *M. obtusidens*: N = 7; TL = 25–177 mm) (Figs. 4a-4c).

The Piratini River holds the southernmost records for long-distance migratory fish for the Patos–Mirim lagoon. Morais Filho & Schubart (1955) inferred that the *dourado* (= *Salminus maxillosus*) occurred throughout the state of Rio Grande do Sul, and indicates the cities of Jaguarão (on the Jaguarão river) and Pelotas (on the Pelotas river and the São Gonçalo Channel) as having records of this species. It is important to highlight that the Piratini River, as other large rivers that flow into the São Gonçalo Channel and Mirim Lagoon, does not have dams, which are the main threat to the maintenance of long-distance migratory fish (Carolsfeld *et al.* 2004, Fontoura *et al.* 2016). The presence of juvenile *Prochilodus lineatus* and *Megaleporinus obtusidens* suggests that there might be resident populations in the watershed and that the floodplain of São Gonçalo channel could be an important reproduction area.

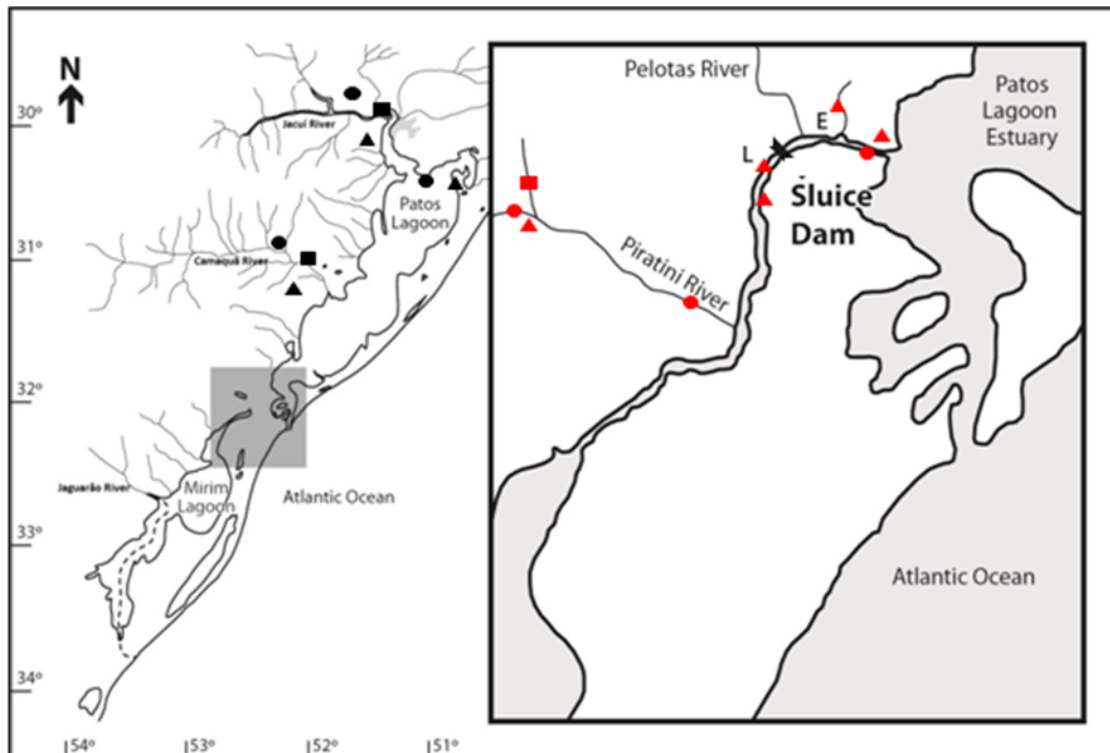


Figure 1. (A) Drainage of the Patos-Mirim lagoon with the location of records of the migratory fish (■) *Salminus brasiliensis*, (●) *Prochilodus lineatus*, and (▲) *Megaleporinus obtusidens*; and (B) the new records (in red) for the northeastern area of the São Gonçalo Channel sectioned by the sluice dam, both in the limnic (L) and estuarine parts (E) of the channel and in the Piratini River.

Table I. Records of long-distance migratory fish and complementary data (Code: N = Total Individuals; TL (min-max) = total length (mm) minimum (Min) and maximum (Max) and weight (W, g) in the São Gonçalo Channel watershed..

Order/Family/ Species	Locality	Coordinates	Date of Record	Type of Gear	N	TL min-max	W (g)	Voucher
Characiformes								
Bryconidae								
<i>Salminus brasiliensis</i>	Piratini River	31°43'14"S; 52°54'04"W	February, 1972	Gillnet	1	860	8000	CIMC 58015
Prochilodontidae								
<i>Prochilodus lineatus</i>	Piratini River	32° 0'36"S; 52°26'10"W	November, 2006	Gillnet	1	600		FURG 2721
	Piratini River	31°51'43"S; 52°47'59"W	February, 1999	Gillnet	1	286		CIMC 58073
	Floodplain of São Gonçalo channel	31°47'01"S; 52°14'29"W	July, 2010	Casting net	1	150		CIMC 58110
Anostomidae								
<i>Megaleporinus obtusidens</i>	Floodplain of São Gonçalo channel	31°50'21"S; 52°23'25"W	April, 1993	Hand net	4	25-35		CIMC 58194
	Pelotas River	31°45'04"S; 52°16'34"W	July, 2010	Not identified	1	122		CIMC 58132
	São Gonçalo Channel	31°50'56"S; 52°23'18"W	April and December, 2007	Beach Seine	2	65-177		CIMC 58160
	Piratini River	31°51'43"S; 52°47'59"W	February, 1999	Gillnet	2	465-512	825- 916	CIMC 58182



Figure 2. Skull of the dourado *Salminus brasiliensis* captured in the Piratini River, tributary of the São Gonçalo Channel.



Figure 3. Individual of *Prochilodus lineatus* captured in the Piratini River in 2006.

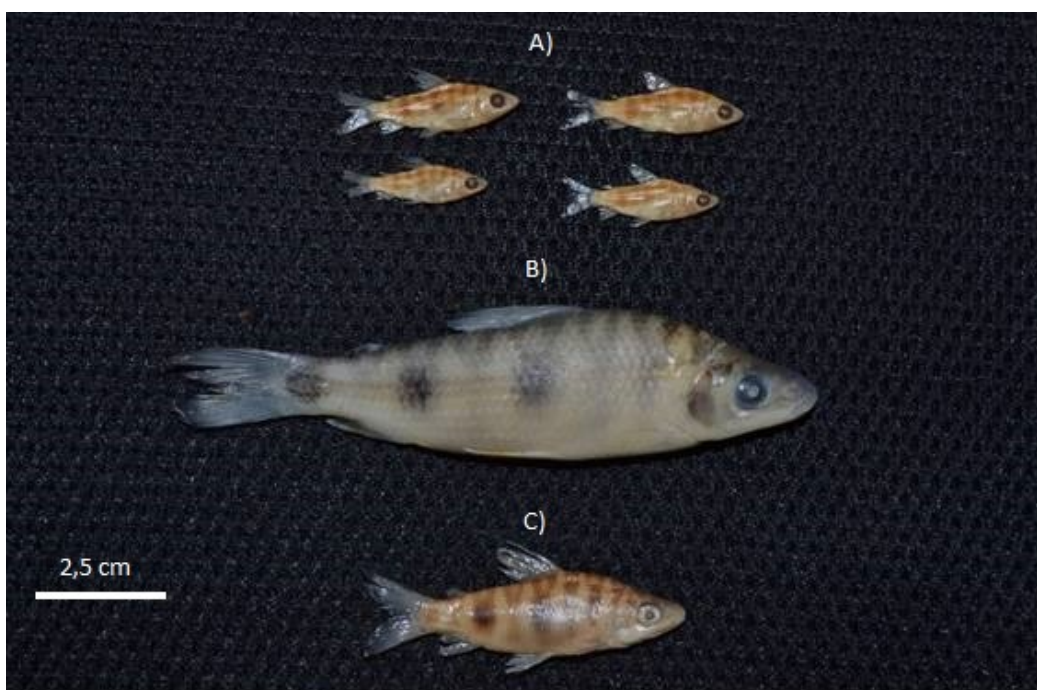


Figure 4. Individuals of *Megaleporinus obtusidens* from (A) Pontal da Barra, a wetland along the São Gonçalo Channel, and (B) the lower course of the Pelotas River, and (C) the littoral zone of the São Gonçalo Channel above the sluice dam.



Figure 5. Passo do Império, in the middle-upper course of the Piratini River, at the border of the municipalities of Cerrito and Pedro Osório.

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