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Record of the freshwater stingrays *Potamotrygon brachyura* and *P. motoro* (Chondrichthyes, Potamotrygonidae) in the lower Uruguay River, South America

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ABSTRACT

Freshwater stingrays, or potamotrygonids, are restricted to Neotropical river drainages. These elasmobranchs are well adapted to freshwater environments and the number of described species gradually increases as further research is carried out. Some of the first studies on their systematics and natural history were carried out in the 1960s and 1970s in southern South America. However, there is no new published data on potamotrygonids from Uruguayan waters since then (except for local journal reports from sportive fishermen and specimens deposited in Uruguayan collections). The present study aims to record the recent occurrence of two species of potamotrygonids caught by sport fishermen, with comments on other published historical records for the same area. As many other elasmobranchs, these species have an important, but not always well understood, role in the Uruguayan rivers ecosystems.

KEYWORDS: Potamotrygonidae, Nuevo Berlín, Paysandú, matrotrophy, potamotrygonid

Registro das raias de água doce *Potamotrygon brachyura* e *P. motoro* (Potamotrygonidae) no Baixo Rio Uruguai, America do Sul

RESUMO

As raias de água doce ou potamotrigonídeos estão restritas às drenagens dos rios Neotropicais. Estas raias tem se adaptado bem aos ambientes de água doce e o número de espécies descritas aumenta gradualmente conforme as pesquisas na área se intensificam. Alguns dos primeiros estudos sobre a sistemática e a historia natural deste grupo foram realizados nas décadas de 1960 e 1970 na região Sul de América do Sul. Porém, há poucos dados publicados sobre potamotrigonídeos em águas uruguaias desde então (com exceção de registros de pescadores esportivos publicados em jornais locais, e espécimes depositados em coleções uruguaias). O presente estudo, portanto, tem como objetivo registrar a ocorrência de duas espécies de potamotrigonídeos no Uruguai capturados por pescadores esportivos assim como realizar uma compilação de ocorrências anteriores presentes na literatura. Como muitos outros elasmobrânquios, estas espécies possuem um papel importante nos ecossistemas dos rios uruguaios, embora não completamente compreendido.

PALAVRAS-CHAVE: Potamotrygonidae, Nuevo Berlín, Paysandú, matrotrofia, potamotrigonídeo

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The genus *Potamotrygon* Garman, 1877 (Family Potamotrygonidae Garman, 1877) comprises freshwater stingrays endemic to South American rivers of Argentina, Bolivia, Brazil, Colombia, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Rosa 1985, Compagno 2005). The genus has thirty one nominal species of which 23 are possibly valid (Rosa *et al*. 2010). So far, most information on the habitat and ecology of freshwater stingrays comes from the Brazilian Amazon region but more studies are being pursued in other South American countries. It is known that *P. motoro* is a widely distributed, habitat generalist species (Rosa *et al*. 2010). Freshwater stingrays living usually on muddy bottoms have been already recorded, as well as over other diverse substrates, including sandy and rocky bottoms and all possible combinations (Charvet-Almeida 2006).

Although the presence of freshwater stingrays in Uruguayan rivers was previously confirmed, actual scientific records are scarce. Oddone *et al*. (2008) recorded the occurrence of specimens of the Shorttailed river stingray *Potamotrygon brachyura* (Günther 1880) in the Uruguay River and its tributaries in Paysandú, western Uruguay. The aim of the present study was to contribute to the knowledge of the distribution and life history of freshwater stingrays in the Uruguayan rivers with comments on these previous records and complementary data on the occurrence of two additional specimens caught in 2009.

Distribution patterns of freshwater stingrays in Uruguay are virtually unknown. In view of this, Oddone *et al*. (2008) carried out a survey based on newspaper records and on anecdotal data provided by local sport fishermen in the city of Paysandú (Uruguay) and also from the Argentinean side of the Uruguay River, specifically the province of Entre Ríos (Figure 1). The aim of the newspaper survey was bringing to light anecdotal record of species occurrence from 1934 to 2004. Such anecdotal reports are actually the only published factual data available for freshwater stingrays from the area in question, apart from specimens deposited in collections. In addition, data on size (disc width), total weight, sex, date and local of occurrence were recorded. The fishing gear used in all these cases was hook and line or bottom-longline. Details on the bait historically used are unknown, but nowadays fishermen use mainly small Characiformes fishes or earthworms. Neither data on the depth of capture nor bottom characteristics were provided. Depth is mostly unknown by fishermen, and the river bottom is mostly muddy-sandy in the Uruguay River.

Regarding the complementary unpublished data, on February 28th 2009, two specimens of freshwater stingrays were accidentally caught by sport fishermen at the harbor of Nuevo Berlín, an Uruguayan settlement, in the Río Negro Department, on the shore of the Uruguay River, the natural border of the country with its neighbor, Argentina (~32° 58' 42"S and 58° 03' 50"W, Figure 1). Fishermen contacted the authors soon after the caught providing information on the fishing site (geographical position, water temperature, depth) and photographs (Figures 2 and 3). The fishing gear used was hook and reel and the bait was corn, livestock heart and liver, and small fishes (Characiformes). Water temperature at the site was 25-30 °C, and the bottom was muddy with pebbles. At the time of the capture, the Uruguay River was flowing with the water level particularly low due to a drought. Stingrays were caught at a distance of ~50 m from the shore, at depths ranging between seven and 10 m. Disc width (cm) was recorded with the aid of a measuring tape. Total weight (g) was estimated

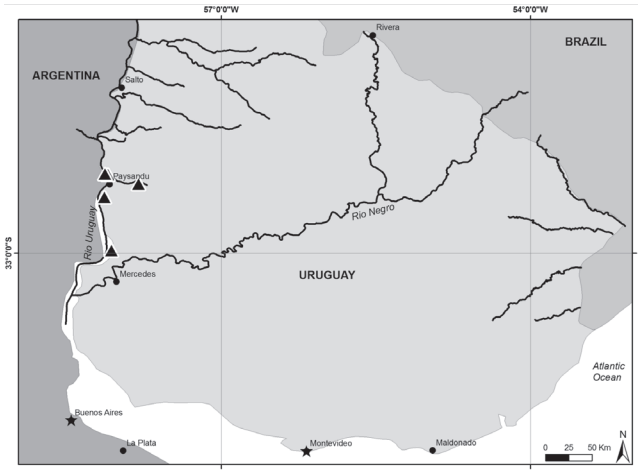

Figure 1 - Map of Uruguay showing the Uruguay River and its tributaries. Symbol indicates the capture sites for the six specimens considered.

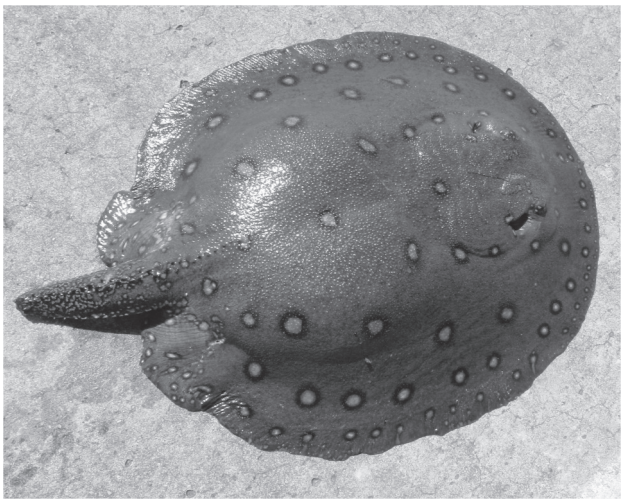

Figure 2 - Pregnant female of *Potamotrygon motoro* with total disc width of 52 cm and total weight of 4 kg captured at the Nuevo Berlín harbor, Río Negro Department, Uruguay, shore of the Uruguay River (~32° 58' 60"S and 58° 2' 60"W) on February 28th, 2009, with hook and reel.

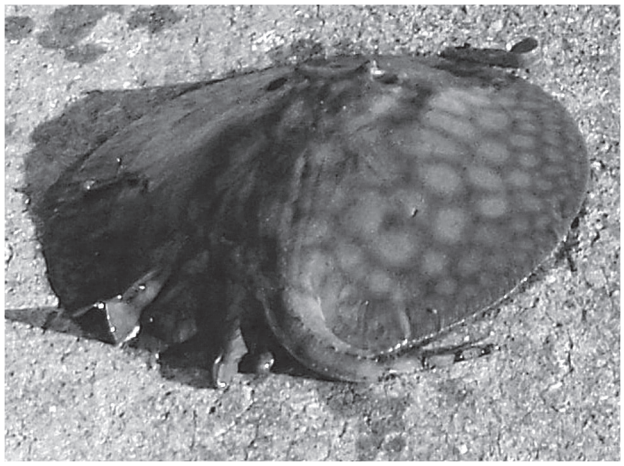

Figure 3 - Subadult male of *Potamotrygon brachyura* with total disc width of 42 cm and total weight of 3 kg captured at the Nuevo Berlín harbor, Río Negro Department, Uruguay, shore of the Uruguay River (~32° 58' 60"S and 58° 2' 60"W) on February 28th, 2009, with hook and reel.

by the fishermen as no scale was available at the time. Sex and maturity stage (assessed by external characteristics) were inferred through the photographs, *sensu* Castex (1963), Castex and Maciel (1965) and Achenbach and Achenbach (1976). Specimens were returned alive to the stream, for this reason further biological sampling did not take place.

A total of six specimens of potamotrygonids were recorded for this region (Table 1). The specimens were identified as *Potamotrygon brachyura* (specimens #1 to #5) and *P. motoro* (specimen #6) considering their dorsal coloration pattern and, mainly, body morphology and dimensions, according to Castex (1963) and Rosa *et al.* (2010).

Regarding the additional data, the first specimen of these new records (#5), was a sub adult male with 3.0 kg of TW and 42.0 cm of DW (Figure 2). In this specimen, the claspers were elongated and flexible indicating the transitional stage from juvenile to adult. The second one (#6) was a female specimen of *P. motoro* with 4.0 kg TW and 52.0 cm DW, pregnant and probably near term (Figure 3).

Table 1 - Data on the specimens of freshwater stingrays collected in the Uruguay River, Uruguay, South America. Specimen number (#), species, locality (fishing site), geographical coordinates (latitude and longitude), date, total weight (g), total width (cm), fishing gear used and observations (when available).

Specimen #	Species	Locality	Approximate geographical coordinate	Date	Total weight (kg)	Disc width (cm)	Sex	Fishing gear	Observations
1	*P. brachyura*	San Francisco Stream, mouth of the Uruguay River, Diecinueve de Abril town, city of Paysandú, Uruguay	32°14'25"S 58°05'54"W	1934	120	150	unknown	unknown	-
2	*P. brachyura*	mouth of the San Francisco Stream, Uruguay River, Uruguay	32°14'25"S 58°05'54"W	1998	50	103	unknown	hook and line	-
3	*P. brachyura*	Caraballo Stream (Argentinean shore of the Uruguay River), across from Paysandú City)	32°14'06"S 58°07'28"W	January 2001	114	110	male	long-line	The Uruguay River was over 1.5 m above the mean level for the season, due to the release of water from the Salto Grande hydroelectrical dam, some 80 km upstream
4	*P. brachyura*	Negro Stream, southern Paysandú, Uruguay	32°27'40"S 58°07'49"W	October 26 2004	11	80	female	hook and line	-
5	*P. brachyura*	harbor of Nuevo Berlín, Río Negro Department, Uruguay	32° 58' 60''S and 58° 2' 60''W	February 28 2009	3	42	male	hook and reel	subadult specimen, bait was corn, livestok heart and liver and small fishes
6	*P. motoro*	harbor of Nuevo Berlín, Río Negro Department, Uruguay	32° 58' 60''S and 58° 2' 60''W	February 28 2009	4	52	female	hook and reel	Pregnant (near term), tail cut off, bait was corn, livestok heart and liver and small fishes

Gestation in freshwater stingrays can be easily detected externally when close to term (P. Charvet, pers. obs.). The reproductive mode observed so far in potamotrygonids is lipidic histotrophy, a kind of matrotrophic viviparity (Charvet-Almeida 2001, 2006). A uterine fecundity of 21 pups per litter was previously recorded for *P. motoro* (Almeida 2008). This is the highest value recorded for freshwater stingrays. For *P. brachyura*, Achenbach and Achenbach (1976) reported a uterine fecundity of 19 embryos.

The fact that fishermen returned the specimen to the river may have important conservational implications. An ongoing project with these fishes carried out in Uruguay by the authors, aims to encourage sport fishermen to do so. Several species of freshwater stingrays have their reproductive cycles associated with the hydrologic cycle of each region or river basin (*e.g.*, Achenbach and Achenbach 1976; Charvet-Almeida *et al*. 2005; Rincon 2006). Since this can make them more vulnerable in some specific periods, catch and release is to be encouraged.

Specimens #2, #5 and #6, had their tail cut off and well healed (Figure 2 and Figure 4 in Oddone *et al*. 2008). This practice by fishermen is commonly seen in freshwater stingrays and is due to negative fishery. Mutilated potamotrygonids have already been recorded for other areas and the reasons for this practice are related to the painful wounds they may cause with the sting (Charvet 2006, Rincon 2006). Because of the potential danger to people, they represent , they are either killed or discarded having their stings removed or even their tails cut off before release (Compagno 1990; Compagno and Cook 1985), as in these two cases, here reported.

Freshwater stingrays are exported for ornamental purposes from several South American countries and so far, Brazil is the only one having specific regulations for the exportation of these species (Rosa *et al*. 2010). In Uruguay, freshwater stingrays have traditionally not been studied, and because of this, ornamental practices have never been previously reported. No regulations regarding freshwater stingrays traffic and/or exportation exist in Uruguay, as the status of the population is completely unknown. *Potamotrygon motoro* and *P. brachyura* are currently listed in the IUCN Red List of Threatened Species as Data Deficient (Charvet-Almeida *et al*. 2003; Drioli and Chiaramonte 2005). For these reasons, urgent monitoring of the regional fisheries is recommended, altogether with sampling programs in order to gather data on the distribution, abundance and life history of *Potamotrygon* spp. in Uruguay.

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