Ingestion of catfish by freshwater stingray: possible mistake or inexperience

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Abstract: We report an individual of the freshwater stingray *Potamotrygon falkneri* caught with a decomposing catfish, *Pimelodella gracilis*, stuck in its oral cavity. The ingestion of catfishes by stingrays is possibly rendered difficult or hazardous due to the serrated spines on the dorsal and pectoral fins of this prey type. There are at least two possible explanations for the rotting catfish we found stuck in the mouth of a potamotrygonid ray: mistake or inexperience of the analyzed specimen. Both possibilities may be due to the fact that the ray was a young individual.
Keywords: *Potamotrygon, catfishes as prey, feeding behavior, trophic ecology, Potamotrygonidae.*

GARRONE NETO, D. & UIEDA, V.S. **Consumo de bagre por raia de água doce: possível engano ou inexperiência.** Biota Neotrop., 9 (4): http://www.biotaneotropica.org.br/v9n4/en/abstract?short-communication+bn01609042009.

Resumo: Registramos um indivíduo da raia de água doce, *Potamotrygon falkneri*, com a cavidade oral parcialmente obstruída por uma espécie de bagre, *Pimelodella gracilis*, já em processo de decomposição. A ingestão de bagres possivelmente é dificultada e pode se tornar arriscada devido aos espinhos serrilhados nas nadadeiras dorsal e peitorias desse tipo de presa. Duas possíveis explicações para o fato observado podem ser apresentadas: erro ou inexperiência do exemplar analisado. As duas possibilidades podem estar relacionadas ao fato do exemplar capturado ser um indivíduo juvenil.
Palavras-chave: *Potamotrygon, bagres como presas, comportamento alimentar, ecologia trófica, Potamotrygonidae.*

Introduction

The freshwater stingrays of the family Potamotrygonidae feed on aquatic insect larvae, mollusks, crustaceans and small fish (Lasso et al. 1996, Charvet-Almeida 2001, 2006, Lonardoni et al. 2006, Rincon 2006, Garrone Neto et al. 2007, Silva & Uieda 2007, Garrone Neto 2009). Fish is infrequent in the diet of potamotrygonids (Silva & Uieda 2007, D. Garrone Neto & V.S. Uieda unpublished data), which is probably related to their mouth apparatus morphology and their main hunting tactics (Garrone Neto & Sazima 2009). Apparently, consumption of fishes is an individual characteristic, that could be related to individual preferences or even skills, in which case small tetras (Characiformes) being the best represented fish prey type consumed (D. Garrone Neto & V.S. Uieda unpublished data). Armored catfishes (Loricariidae) and cichlids (Cichlidae) are also occasionally found in the diet of potamotrygonids (Lonardoni et al. 2006, Silva & Uieda 2007, D. Garrone Neto & V.S. Uieda unpublished data).

On the other hand, Pimelodidae (long-whiskered catfishes) and Heptapteridae (heptapterids) are rare among fish prey taken by potamotrygonid rays (Charvet-Almeida, 2001, 2006, Lonardoni et al. 2006, Rincon 2006, Silva & Uieda 2007, Garrone Neto 2009). The capture of these catfishes may be harmful due to the serrated spines present on the dorsal and pectoral fins, which actually can act as a defensive mechanism. We present here the case of a potamotrygonid stingray captured with a decomposing heptapterid catfish stuck in the oral cavity of the ray and preventing it from further feeding. Based on this record and on the analysis of stomach contents of other individuals, we examine the apparently little ability of potamotrygonid stingrays to handle and feed on catfishes with spiny fin rays.

Materials and Methods

The record was made in the Upper Paraná River, near Três Lagoas – Mato Grosso do Sul State (20° 47' 34" S and 51° 37' 24" W), in April 2006, during our studies of the stingray species that inhabit the river section comprised between the Foz do Iguaçu, Paraná State, and Ilha Solteira, São Paulo State (Southeastern Brazil). The stingray was captured, photographed, anesthetized, sacrificed and fixed in formalin 10% for later identification. To support the suggestion that freshwater stingrays have little ability of ingesting catfishes with spiny fin rays, we used data gathered from gut contents of 189 individuals of two species that inhabit the study area, *Potamotrygon falkneri* and *Potamotrygon motoro*. Additionally, we used literature data including observations of feeding behavior of these two species in their natural environment (Garrone Neto 2009, Garrone Neto & Sazima 2009).

Results and Discussion

A female of *Potamotrygon falkneri* (disk length 37 cm) was found with an individual of the heptapterid *Pimelodella gracilis* (total length 12 cm) obstructing the ray's oral cavity (Figure 1). The barbels of the catfish projected through the ray's spiracle (Figure 1a) and most of the prey body was hanging out of the ray's mouth (Figure 1b). The prey was partially decomposed and its pectoral girdle had the two pectoral spines erected and locked (Figure 1c).

Only 21 individuals (11%) out of 189 whose gut contents we analyzed yielded fish prey. Of these, 71% (n = 15) were tetras (Characiformes), mainly species of the genus *Bryconamericus*. No catfishes (Heptapteridae, Pimelodidae, or specimens of other families armed with spines in their fins) were found in our analysis, which indicates that this type of prey may be actively excluded from potamotrygonid diet.

The consumption of fishes by potamotrygonid rays as stressed by Shibatta & Dias (2006), who rated specimens of *Potamotrygon*

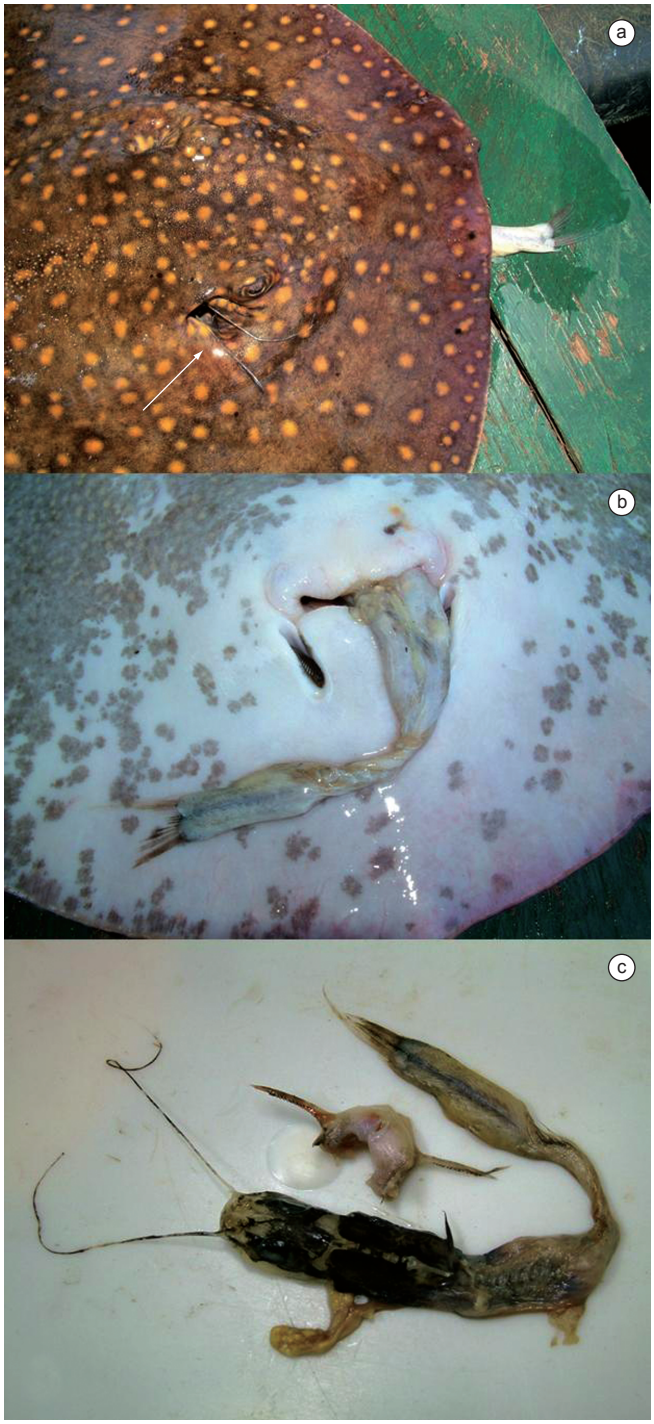

Figure 1. *Potamotrygon falkneri* female with the oral cavity obstructed by a specimen of *Pimelodella gracilis*. In dorsal view, it is possible to observe the *mandi*'s barbels projected from the stingray's right spiracle (a) and, in ventral view, the part of the prey partially decomposed projected from the mouth (b). After the removal of the catfish, you can see the scapular waist and the two pectoral spines erected and locked (c) (Photos: Domingos Garrone Neto).

Figura 1. Fêmea de *Potamotrygon falkneri* com a cavidade oral obstruída por um espécime de *Pimelodella gracilis*. Na visão dorsal, é possível observar os barbilhões do mandi projetados para fora do espiráculo direito da raia (a) e, na visão ventral, parte da presa parcialmente decomposta no lado de fora da boca (b). Após remover o mandi, é possível observar a cintura escapular e os dois espinhos peitorais eretos e travados (c) (Fotos: Domingos Garrone Neto).

motoro from Paraná River as piscivorous, does not seem to play an expressive role in the diet of the rays that inhabit the region of Upper Paraná River and other Brazilian hydrographic basins studied with some detail (Charvet-Almeida 2001, 2006, Lonardoni et al. 2006, Rincon 2006, Garrone Neto et al. 2007, Silva & Uieda 2007, Garrone Neto 2009). The rare consumption of fishes by potamotragonids rays may be related to their hunting tactics, since they primarily revolve the substratum with their pectoral fins to disclose insect larvae and mollusks (Garrone Neto & Sazima 2009). Fish hunting by potamotrygonids occurs mostly at night, when small characins assemble in shallow places, likely an antipredatory strategy. At these places, the rays charge at the assembled fishes and possibly stun them before swallowing (Garrone Neto & Sazima 2009). To capture fish, especially armored catfish (Loricariidae), the ray press them against the bottom using the ventral face of its body; then it moves its pectoral fins to guide the fish into its mouth and the fish is ingested by suction (Achenbach & Achenbach 1976, Garrone Neto & Sazima 2009). This latter probably was the tactic used to capture the armed *Pimelodella gracilis* reported here.

Pimelodidae and some Heptapteridae species have strong, serrated spines in their dorsal and pectoral fins (Bockmann & Guazelli 2003, Lundberg & Littmann 2003), with a locking mechanism that holds them in position and thus they can be used as a defense mechanism against predators (D. Garrone Neto & V.S. Uieda unpublished data). This defensive mechanism probably hinders or renders difficult the ingestion of spine-armed catfishes by potamotrygonid rays. There are at least two possible explanations for the rotting catfish we found stuck in the mouth of a potamotrygonid ray: mistake or inexperience of the analyzed specimen. Both possibilities may be due to the fact that the ray was a young individual.

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