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SHORT COMMUNICATION

NOTES ON THE DIET OF ADULT YELLOW CATFISH *ASPISTOR LUNISCUTIS* (PISCES: SILURIFORMES) IN NORTHERN RIO DE JANEIRO STATE, SOUTHEASTERN BRAZIL

Ana Paula Madeira Di Beneditto & Maria Thereza Manhães Tavares

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NOTES ON THE DIET OF ADULT YELLOW CATFISH *ASPISTOR LUNISCUTIS* (PISCES: SILURIFORMES) IN NORTHERN RIO DE JANEIRO STATE, SOUTHEASTERN BRAZIL

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Abstract: Diet of adult specimens of Yellow Catfish *Aspistor luniscutis* (Valenciennes, 1840) was determined through stomach contents analysis. The specimens were target of commercial gillnet fisheries in northern Rio de Janeiro State, southeastern Brazil. In this region, *A. luniscutis* is a generalist benthophagous feeder, consuming most available prey species with crustaceans, especially penaeid shrimps, brachyuran crabs, and sciaenid fish dominating.

Keywords: Ariidae, catfish, stomach content, tropical coastal waters.

Ariidae include ~120 species of marine and freshwater catfishes, important to fisheries in tropical and subtropical waters (Froese & Pauly 2018). Many species undertake seasonal movements in different phases of their life cycle, seeking out river mouths and coastal lagoons in the spawning period and/or during the pre-maturation phase (Azevedo et al. 1999; Schmidt et al. 2008). They are generalist benthophagous feeders, consuming fishes and invertebrates, including crustaceans, molluscs and polychaetes (Denadai et al. 2012; Tavares & Di Benedetto 2017; Froese & Pauly 2018).

Along the Brazilian coastal waters, there are 21 species of ariid catfishes, including the Yellow Catfish *Aspistor luniscutis* (Valenciennes, 1840) (Menezes et al. 2003). *Aspistor luniscutis* (Image 1) inhabits marine and brackish waters from French Guiana to southern Brazil, primarily inside bay areas (Marceniuk & Menezes 2007; Schmidt et al. 2008; Possatto et al. 2016), reaching sexual maturity around 17cm length, and growing up to 120cm (Denadai et al. 2012; Froese & Pauly 2018).

Little research has been carried out on the feeding habits of *A. luniscutis*. Mishima & Tanji (1982) recorded crustaceans, mainly decapods, as the preferential food items in the diet of juvenile and adult fish along the Cananéia estuary (~25°S, 047°W). Denadai et al. (2012) and Guedes et al. (2015) observed fish scales as the major dietary component in juvenile specimens from Caraguatatuba Bay (~23°S, 043°W) and Sepetiba Bay (~22°S, 043°W), respectively.

Aspistor luniscutis is the target of artisanal fisheries in the inner estuary of Paraíba do Sul River and adjacent marine coastal waters (FIPERJ 2015), however,

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information about its feeding habits is locally non-existent. In this study, we analyse the feeding habits of adult specimens of *A. luniscutis* from northern Rio de Janeiro State, southeastern Brazil ($\sim 21^{\circ}\text{S}$, 041°W), to evaluate preferential food items.

MATERIALS AND METHODS

The sampling site encompassed the inner estuary of Paraíba do Sul River and adjacent marine coastal waters (Fig. 1). In 2015 (December), 2016 (November) and 2018 (July and August), 95 specimens of *A. luniscutis* (41.5 ± 6.1 cm mean total length; 545.6 ± 194.8 g mean total weight) were obtained for stomach content analysis along this area. The specimens were adults based on their total length.

Stomach of each specimen was removed from the abdominal cavity, and the contents were washed in running water using a $500\mu\text{m}$ mesh-size sieve and preserved in 70% ethanol. The food items recovered were analysed using a stereomicroscope. Partially digested fish, fish bones (e.g., vertebrae, heads/

skulls), scales and crystalline lenses, partially digested crustaceans, crustacean carapaces and mollusc shells were recorded in the stomach contents. The prey species were identified and measured whenever possible. The otoliths of *Cathorops spixii*, *Anchoa filifera*, *Paralonchurus brasiliensis*, *Micropogonias furnieri*, *Isopisthus parvipinnis* and *Symphurus plagusia* removed from the fish skulls confirmed the species identity and back-calculated the original size of the ingested fish using the regression equations proposed by Di Benedetto et al. (2001).

The representation of the food items in the *A. luniscutis* diet was calculated by the percentage of frequency of occurrence (FO%): number of stomachs with a given food item divided by the total number of stomachs with food items. Bias in the interpretation of feeding habits is expected when only FO% is applied, because the presence or absence of a given food item in the stomach contents does not consider the amount of food consumed (Wetherbee & Corte's 2004). This variable, however, represents population-wide feeding

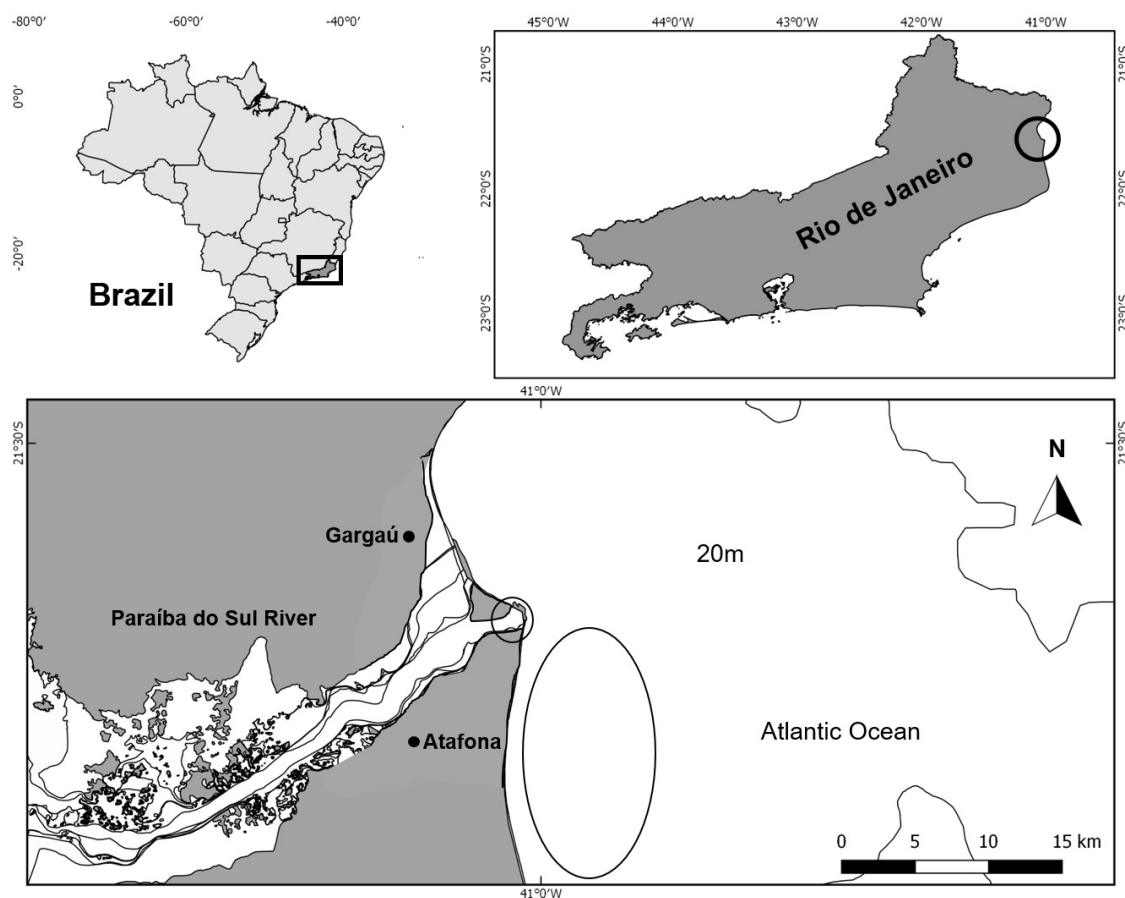


Figure 1. Northern Rio de Janeiro State, southeastern Brazil, where the adult specimens of Yellow Catfish *Aspistor luniscutis* were captured (black circle).



Image 1. *Aspistor luniscutis*.

habits allowing an assessment of food ingestion (Cortés 1997).

RESULTS AND DISCUSSION

From 95 specimens of *A. luniscutis* captured along the study area, 64.2% ($n=61$ specimens) had food remains inside their stomach contents (Table 1). In many stomach contents, only prey remains such as carapace fragments were recovered (Tables 1 and 2). The tooth-plates of ariid catfishes are suitable for dealing with broad classes of prey, conferring dietary flexibility (Blaber et al. 1994). In *A. luniscutis*, tooth-plates associated with vomer are fused as a single large plate, indistinct in adult specimens (Marceniuk & Menezes 2007). The complex mouth apparatus allows catfish to crush their prey, often making it difficult to identify them (Denadai et al. 2012).

Considering all *A. luniscutis* specimens with food remains in the stomach contents ($n=61$), fish (partially digested fish, head/skull, spines, vertebrae, scales and crystalline lenses) occurred in 37.7% ($n=23$) and crustacean remains (partially digested decapod—shrimps and crabs—and their carapace fragments) in 62.3% ($n=38$) (Table 2). The sciaenid fish *P. brasiliensis* was the most frequent prey, present in nine stomach contents, with an additional seven fish species identified. Besides the penaeid shrimp *Xiphopenaues kroyeri*, brachyuran crabs belonging to four species were also recorded. In general, prey species had less than 10cm length/carapace width.

The analysis of stomach contents corroborated previous studies describing ariid catfishes as generalist

Table 1. Items recovered from the stomach contents of adult specimens of the Yellow Catfish *Aspistor luniscutis* in northern Rio de Janeiro State, southeastern Brazil (~21°S). FO: frequency of occurrence.

Items recovered in stomach contents (61 stomachs with food items)	Number of stomachs	FO (%)
Fish	10	16.4
Penaeid shrimp	10	16.4
Brachyuran crab	14	22.9
Mollusc shell	2	3.3
Sediment	9	14.7
Organic material (without identification)	1	1.6
Fish + Penaeid shrimp	11	18.0
Fish + Brachyuran crab	2	3.3
Fish + Sediment	1	1.6
Penaeid shrimp + Brachyuran crab	1	1.6

benthophagous feeder (Mishima & Tanji 1982; Denadai et al. 2012; Guedes et al. 2015; Tavares & Di Benedetto 2017). Most food items consumed by *A. luniscutis* are bottom-associated resources and commonly occurring year-round in the study area (Di Benedetto & Lima 2003; Gomes et al. 2003; Fernandes et al. 2014). *Paralichthys brasiliensis* and the other fish species are by-catch in local shrimp fishery in the marine coastal waters, whose main target is the penaeid *X. kroyeri* (Di Benedetto & Lima 2003; Fernandes et al. 2014). The diversity of brachyuran crabs is high along the study area (Di Benedetto et al. 2010), and therefore the availability

Table 2. Fish and crustaceans identified in the stomach contents of adult specimens of the Yellow Catfish *Aspistor luniscutis* in northern Rio de Janeiro State, southeastern Brazil (~21°S).

Species/ items	Number of stomachs with the species/ items	Size range (cm)
Fish		
<i>Paralichthys brasiliensis</i> Steindachner, 1875	9	4.0–8.0
<i>Micropogonias furnieri</i> Desmarest, 1823	1	12.5
<i>Isopisthus parvipinnis</i> Cuvier, 1830	1	2.4
<i>Cathorops spixii</i> Agassiz, 1829	1	7.0
<i>Trichiurus lepturus</i> Linnaeus, 1758	1	-
<i>Anchoa spinifera</i> Valenciennes, 1848	1	15.0
<i>Symphurus plagusia</i> Bloch & Schneider, 1801	1	12.0–16.0
Diodontidae spines	1	-
Fish partially digested, scales, crystalline lens	12	-
Crustaceans		
Penaeid shrimps		
<i>Xiphopenaeus kroyeri</i> Heller, 1862	6	3.0–7.0
Carapace fragments	18	
Brachyuran crabs		
<i>Eurypanopeus abbreviatus</i> Stimpson, 1860	3	2.0–3.0
<i>Heterocrypta lapidae</i> Rathbun, 1901	1	3.0
<i>Persephona mediterranea</i> Herbst, 1794	1	1.1
<i>Callinectes</i> sp.	1	1.1–3.5
Carapace fragments	13	-

Note: For fish species, the size range is standard length; for penaeid shrimps, the size range is total length; and for brachyuran crabs, the size range is carapace width.

of prey species is a major factor influencing the feeding habit of the fish species.

The record of *A. filifera* in the stomach content of one specimen of *A. luniscutis* could also suggest a pelagic feeding habit, since this prey is an engraulid fish associated with the water column (Froese & Pauly 2018). The saprophagous feeding behaviour (ingestion of dead prey) when the prey is already on the benthic bed/floor is observed in ariid catfishes (Denadai et al. 2012). Thus, it is a plausible explanation for the presence of *A. filifera* in the diet.

The first information on the feeding habits of adult specimens of *A. luniscutis* in northern Rio de Janeiro State reveals that crustaceans, especially penaeid shrimps and brachyuran crabs, and sciaenid fish are the main prey items. According to literature, *A. luniscutis* based its diet on fish scales (Denadai et al. 2012; Guedes et al. 2015) and crustaceans (decapods) (Mishima & Tanji 1982). Meanwhile, in our study area fish scales were rare and present in only one stomach content. Decapods (penaeid shrimps and brachyuran crabs) were more frequent than fish in the stomach contents,

revealing their importance as prey for *A. luniscutis*.

In order to improve the understanding on how *A. luniscutis* uses the habitat and available resources along northern Rio de Janeiro State, further stomach contents analysis should include more ontogenetic phases of the species, as juveniles and subadult specimens. This will allow to investigate intraspecific strategies concerning the use of available food resources.

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