Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

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

26 May 2019 | Vol. 11 | No. 7 | Pages: 13920–13924
DOI: 10.11609/jott.4561.11.7.13920-13924

Short Communication

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 May 2019 | 11(7): 13920–13924

ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

PLATINUM OPEN ACCESS

Notes on the diet of adult Yellow Catfish *Aspistor luniscutis* (Pisces: Siluriformes) in northern Rio de Janeiro State, southeastern Brazil

Ana Paula Madeira Di Benedito [1] & **Maria Thereza Manhães Tavares** [2]

[1,2] Universidade Estadual do Norte Fluminense Darcy Ribeiro, Laboratório de Ciências Ambientais, Av. Alberto Lamego 2000, 28013-620, Campos dos Goytacazes, RJ, Brazil.
[1] anadibeneditto@gmail.com (corresponding author), [2] therezamanhes@yahoo.com.br

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 Benedito 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^{0}S, 047^{0}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^{0}S, 043^{0}W) and Sepetiba Bay (~22^{0}S, 043^{0}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,

DOI: https://doi.org/10.11609/jott.4561.11.7.13920-13924

Editor: Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México. **Date of publication:** 26 May 2019 (online & print)

Manuscript details: #4561 | Received 10 September 2018 | Final received 29 April 2019 | Finally accepted 01 May 2019

Citation: Di Benedito, A.P.M. & M.T.M. Tavares (2019). Notes on the diet of adult Yellow Catfish *Aspistor luniscutis* (Pisces: Siluriformes) in northern Rio de Janeiro State, southeastern Brazil. *Journal of Threatened Taxa* 11(7): 13920–13924. https://doi.org/10.11609/jott.4561.11.7.13920-13924

Funding: Universidade Estadual do Norte Fluminense Darcy Ribeiro; Fundação Carlos Chagas Filho de Amparo a Pesquisa do Estado do Rio de Janeiro - FAPERJ; Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq.

Competing interests: The authors declare no competing interests.

Acknowledgements: Silvana Ribeiro Gomes who helped us with Yellow Catfish sampling.

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 (~21^{0}S, 041^{0}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 500µm 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 Beneditto 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

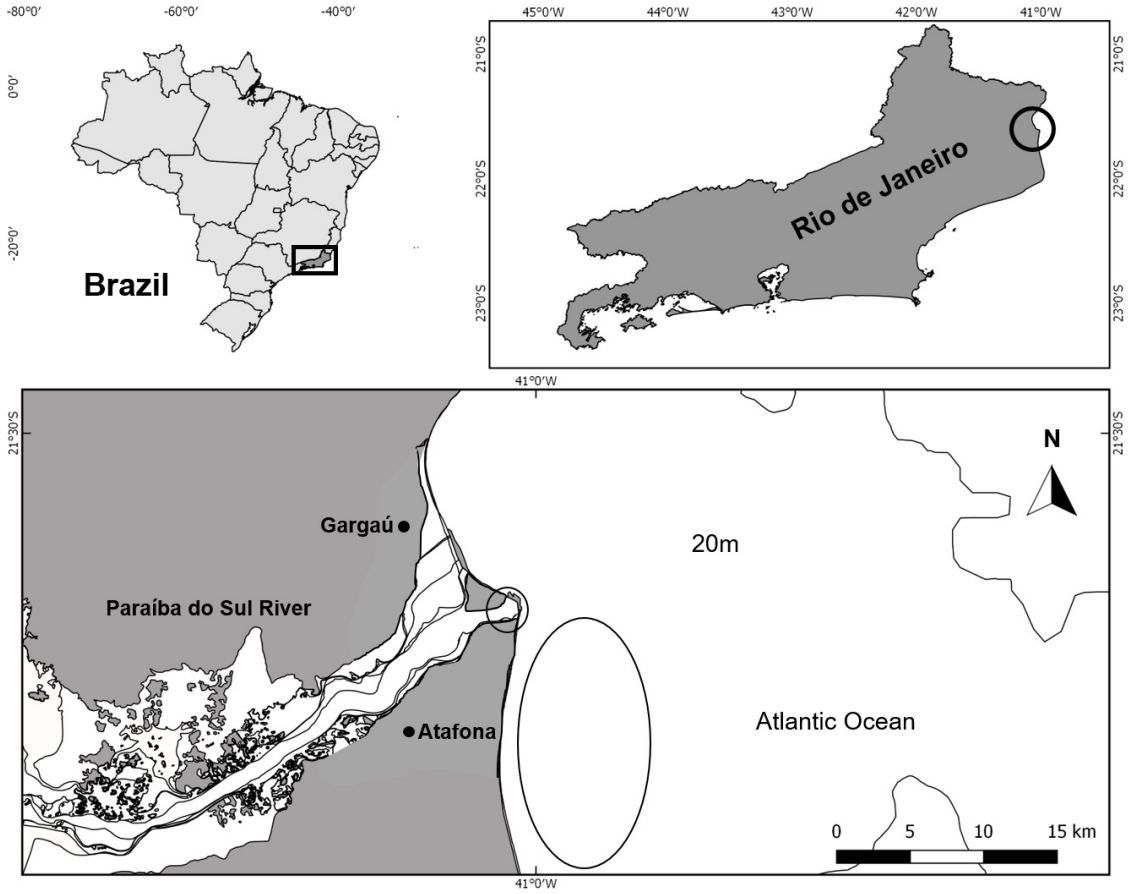

Figure 1. Northern Rio de Janeiro State, southeastern Brazil, where the adult specimens of Yellow Catfish *Aspistor luniscutis* were captured (black circle).

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. brasilensis* 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 benthophagous feeder (Mishima & Tanji 1982; Denadai et al. 2012; Guedes et al. 2015; Tavares & Di Beneditto 2017). Most food items consumed by *A. luniscutis* are bottom-associated resources and commonly ocurring year-round in the study area (Di Beneditto & Lima 2003; Gomes et al. 2003; Fernandes et al. 2014). *Paralonchurus 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 Beneditto & Lima 2003; Fernandes et al. 2014). The diversity of brachyuran crabs is high along the study area (Di Beneditto et al. 2010), and therefore the availability

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

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^{0}S).

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

References

Azevedo, M.C., F.G. Araújo, A.G. Cruz-Filho, I.D. Gomes & A.L.M. Pessanha (1999). Variação espacial e temporal de bagres marinhos (Siluriformes, Ariidae) na Baía de Sepetiba, Rio de Janeiro. *Revista Brasileira de Biologia* 59(3): 443–454. https://doi.org/10.1590/S0034-71081999000300009

Blaber, S.J.M., D.T. Brewer & J.P. Salini (1994). Diet and dentition in tropical ariid catfishes from Australia. *Environmental Biology of Fishes* 40(2): 159–174. https://doi.org/10.1007/BF00002543

Cortés, E. (1997). A critical review of methods of studying fish feeding based on analysis of stomach contents: application to elasmobranch fishes. *Canadian Journal of Fisheries and Aquatic Science* 54(3): 726–738. https://doi.org/10.1139/f96-316

Denadai, M.R., E. Bessa, F.B. Santos, W.S. Fernandez, F.M.C. Santos, M.M. Feijó, A.C.D. Arcuri & A. Turra (2012). Life history of three catfish species (Siluriformes: Ariidae) from southeastern Brazil.

Biota Neotropica 12. http://www.biotaneotropica.org.br/v12n4/pt/abstract?article+bn01912042012

Di Beneditto, A.P.M. & N.R.W. Lima (2003). Biometria de teleósteos da costa norte do Estado do Rio de Janeiro para estudos sobre piscivoria. *Biotemas* 16(1): 135–144.

Di Beneditto, A.P.M., G.V.C. Souza, C.C. Tudesco & A.S. Klôh (2010). Records of brachyuran crabs as by-catch from the costal shrimp fishery in northern Rio de Janeiro State, Brazil. *Marine Biodiversity Records* 3(e77). https://doi.org/10.1017/S1755267210000679

Di Beneditto, A.P.M., R.M.A. Ramos & N.R.W. Lima (2001). *Os Golfinhos: Origem, Classificação, Captura Acidental, Hábito Alimentar*. Editora Cinco Continentes, Porto Alegre, 148pp.

Fernandes, L.P., K.A. Keunecke & A.P.M. Di Beneditto (2014). Produção e socioeconomia da pesca do camarão sete-barbas no norte do estado do Rio de Janeiro. *Boletim do Instituto de Pesca* 40(4): 541–555.

FIPERJ - Fundação Instituto de Pesca do Estado do Rio de Janeiro (2015). *Relatório 2015*. Available at: <http://www.fiperj.rj.gov.br/fiperj_imagens/arquivos/revistarelatorios2015.pdf>. Accessed on 20th August 2018, 172pp.

Froese, R. & D. Pauly (2018). FishBase. http://www.fishbase.org. Accessed on 31 August 2018.

Gomes, M.P., M.S. Cunha & I.R. Zalmon (2003). Spatial and temporal variations of diurnal ichthyofauna on surf-zone of São Francisco do Itabapoana beaches, Rio de Janeiro State, Brazil. *Brazilian Archives of Biology and Technology* 46(4): 653–664.

Guedes, A.P.P., F.G. Araújo, A.L.M. Pessanha & R.R. Milagre (2015). Partitioning of the feeding niche along spatial, seasonal and size dimensions by the fish community in a tropical Bay in Southeastern Brazil. *Marine Ecology* 36: 38–56. https://doi.org/10.1111/maec.12115

Marcenuik, A.P. & N.A. Menezes (2007). Systematics of the family Ariidae (Ostariophysi, Siluriformes), with a redefinition of the genera. *Zootaxa* 1416: 1–126.

Menezes, N.A., P.A. Buckup, J.L. Figueiredo & R.L. Moura (eds.) (2003). Catálogo das espécies de peixes marinhos do Brasil. São Paulo: Museu de Zoologia, 159pp.

Mishima, M. & S. Tanji (1982). Nicho alimentar de bagres marinhos (Teleostei; Ariidae) no complexo estuarino lagunar da Cananéia (25ºS, 48ºW). *Boletim do Instituto de Pesca* 9: 131–140.

Possatto, F.E., M.K. Broadhurst, C.A. Gray, H.L. Spach & M.R. Lamour (2016). Spatiotemporal variation among demersal ichthyofauna in a subtropical estuary bordering World Heritage-listed and marine protected areas: implications for resource management. *Marine and Freshwater Research* 68(4): 703–717. https://doi.org/10.1071/MF15345

Schmidt, T.C.S., I.A. Martins, A.L.D. Reigada & J.F. Dias (2008). Taxocenose de bagres marinhos (Siluriformes, Ariidae) da região estuarina de São Vicente, SP, Brasil. *Biota Neotropica* 8(4): 073–081.

Tavares, M.T.M. & A.P.M. Di Beneditto (2017). Feeding habits and behaviour of *Bagre bagre* and *Genidens barbus*, two ariid catfishes (Pisces: Siluriformes) from Southeastern Brazil. *Journal of Threatened Taxa* 9(10): 10771–10775. https://doi.org/10.11609/jott.3758.9.10.10771-10775

Wetherbee, B.M. & E. Cortés (2004). Food consumption and feeding habits. pp. 223–244. In: Carrier, J.C., J.A. Musick, & M.R. Heithaus (eds). *Biology of sharks and their relatives*. CRC Press, Boca Raton, 596pp.

Journal of Threatened Taxa

www.threatenedtaxa.org

PLATINUM OPEN ACCESS

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

May 2019 | Vol. 11 | No. 7 | Pages: 13815–13950
Date of Publication: 26 May 2019 (Online & Print)
DOI: 10.11609/jott.2019.11.7.13815-13950

Publisher & Host

WILD ZOOREACH Threatened Taxa

Partner

The Mohamed bin Zayed Species Conservation Fund

Member

FJN