

Melanosuchus niger* (CROCODYLIA: ALLIGATORIDAE) AS OPPORTUNISTIC TURTLE CONSUMER IN ITS NATURAL ENVIRONMENT**Melanosuchus niger* (CROCODYLIA: ALLIGATORIDAE) COMO CONSUMIDOR OPORTUNISTA DE TORTUGAS EN SU AMBIENTE NATURAL**

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Abstract

The Present work observations were driven of potential natural predators of existent chelonians in the Negro river, municipality of Barcelos, Amazonas, Brazil. We worked in two areas of the municipality of Barcelos: Igarapé of the Rio Negro Lodge and Arirá. For the scientific capture of the chelonians were used meshes and net traps, in which fish and some black caiman were also caught because entered to eat, they were registered visually and for the evidence of damage caused in the turtles. In general the Crocodylia includes in their diet turtles, being *Melanosuchus niger* (black cayman) registered for the first time for this work area as predator of turtles: *Podocnemis erythrocephala* (red-headed river turtle) and especially of *Peltocephalus dumerilianus* (big head Amazon turtle). The existent relationship between predator and prey in this case shows few documentation, in spite of existing a wide variety of related studies.

Key words: *Melanosuchus niger*, *Podocnemis erythrocephala*, predation, turtles, Amazonas, Brazil.

Resumen

En el presente trabajo se hicieron observación de depredadores potenciales de quelonios existentes en el medio río Negro, municipio de Barcelos, Amazonas, Brasil. Se trabajó en dos localidades del municipio de Barcelos: Igarapé del río Negro Lodge y Arirá. Para la captura científica de los quelonios se utilizaron mallas y trampas de red, en las cuales además se atrapaban peces y algunos caimanes negros que entraban para comer y que eran registrados visualmente y por la evidencia de daño causado en las tortugas. En general los Crocodylia

incluyen en su dieta quelonios, siendo *Melanosuchus niger* (caimán negro) registrado por primera vez para esta área de trabajo como depredador de tortugas: *Podocnemis erythrocephala* (irapuca) y en especial de *Peltocephalus dumerilianus* (cabezudo). La relación existente entre depredador y presa en este caso muestra poca documentación, a pesar de existir una amplia variedad de estudios relacionados.

Palabras clave: *Melanosuchus niger*, *Podocnemis erythrocephala*, depredación, tortugas, Amazonas, Brasil.

Introduction

Species composition's diet in a natural environment is a ecological indicator that helps to understand what is the function of this species within its habitat and how it can influence the structure of the ecosystem; the selectivity of the diet, furthermore, can suggest the present availability in this environment when the greater components ingested are examined throughout of a representative time period (FIELDS *et al.*, 2003). For the interested ones in the wildlife conservation, the knowledge of the natural diet of a species has practical application, with which is feasible to understand the roll fulfill within the occupied niche and allows to predict to medium and long term the theoretical results of the handling programs which they are applied (NAGY, 2001).

The natural diet in Crocodylia, in agreement with the age, is composed by different elements that keep relation with the ingestion capacity, has narrows ontogenical association, as its indicated for *Alligator mississippiensis* (GREGORY *et al.*, 2003), being reboundable the consumption of invertebrates specially when one is youthful individuals, whereas the adults, without letting exhibit a consumption of invertebrates like Pomacea sp. (Mollusca), that is increased with the size (MEDEM, 1981, 1983).

MAGNUSSON *et al.* (1987); DA SILVEIRA and MAGNUSSON (1999), in reference to *M. niger* finds that its diet includes vertebrates of which the fish show an important percentage. FITZGERALD (1988) considered the caymans as generalist opportunists and in their nutritional habits, because they consume a wide variety of prey; the youthful ones consume insects mainly and the adults include great proportions of mollusks, fish and other vertebrates. Of specific way in *M. niger* register the presence in the stomach content of invertebrates and vertebrates rest, like frogs, birds and mammals (HORMA *et al.*, 2001), also this type of alimentary behavior explicitly appears mentioned in the works of MEDEM (1981, 1983).

Occasional ingestion of some noncommon prey in the standard diet represents an important aspect for predator feeding, that can be defined as an exerted opportunistic behavior on neglected prey or with incapacity to defend (CRESSWELL *et al.*, 2003); are understood that this mechanism allows to replace nutritional requirements at critical moments and can be meant like a behavior associated with the role that carnivorous have in their habitat, which they contribute within the ecosystem in the specific diversity processes (MILLER *et al.*, 2001).

This work presented information about the opportunist consume in two individual of two species of turtles carried out by *M. niger*, during the experimental captures driven in two tributaries of the middle Río Negro, Amazonas, Brazil.

Materials and methods

During the research carry out in the Municipality of Barcelos, Amazon, Brazil, one of the places in where being developed to the study of the chelonies with economical interes for the Amazon; were registered in two occasions predation by *M. niger* in two individuals of two species of turtles: *P. dumerilianus* (big headed Amazon river turtle), gives 28 of October of 2005, in igarape that happens through behind of the Hotel Rio Negro Lodge (1), located to 00°35'20" S and 63°28'11" W; and *P. erythrocephala* (red-headed river turtle), gives 6 of February of 2005, in the middle part of Arirá River (2), located to 00°36'15" S and 63°04'50" W, both tributaries of the Amazonian river basin (Fig. 1).

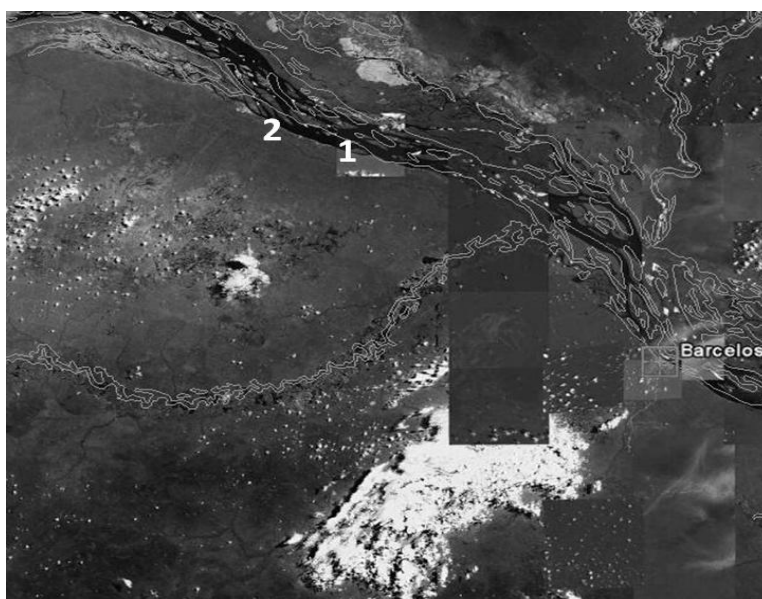


Figure 1. Localization of the study area (1) Rio Negro Lodge, (2) Arirá River (Google Earth)

For the capture of *P. dumerilianus* were used fikenet with length of 20m length and 1.0m diameter; whereas for *P. erythrocephala* were used trammel nets of 100m x 4m and 45cm outer and 10cm inner (VOGT, 1980). For determination of injuries caused, macroscopic analyses were made and to determine the internal damage the animals were opened and the internal organs affected by the bites were observed. For the registry of size of both individual of *M. niger*, the work of MAGNUSSON (1983) was considered.

Results

The related turtles were predated during the day, while were captives and they were in the water. In the case of *P. dumerilianus*, was an adult female with eggs, total carapax length 23.5cm, total plastron length 26cm and 3.3kg weight. As far as *P. erythrocephala*, was an adult male of which single to recover two thirds of the back body (Fig. 2), and by means of morfometrical calculation supported in individual presents in Amphibians and Reptiles Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), was established a total length caparax of 22 cm and total length plastron of 17.5cm, and approximated 0.8Kg weight. The registry of size of both individual of *M. niger* were: 3m total length for the animal observed in igarapé of the Hotel rio Negro Lodge and of 3.5m total length for the animal was sighted in the Arirá river. In both cases *M. niger* get into the traps to catch the turtles.



Figure 1. Remains of *Podocnemis erythrocephala* (A), *Peltocephalus dumerilianus* bitten (B)

P. dumerilianus female was found within the fikenet trap, the mesh resistance and the rigidity of the aluminum rods did not allow obtained the prey, but the caused bites perforated as much plastron as well as the carapax, jeopardizing seriously internal organs: oviducts, intestines, stomach and liver, caused it the death. On the

other hand, *P. erythrocephala*, was predated partially, with consumption of a third of the totality body, leaving the rest adhered to the mesh, not present consumption of other captured prey (Table 1).

Was evident the permanence of the caymans nearest of the work place, showing perfectly visible during 25 and 30 min, respectively; the medium distance range the separation space maintained in both cases was between 20m and 25m, and did not present aggressive behavior displays, were only registered passive and permanent watching behavior.

Table 1. Fish captured by Trammel nets in the Arirá river

Species	Common name	N	Mean Weight (Kg)	Biomassa total (Kg)
<i>Pseudoplatystoma tigrinum</i>	Surubim	1	7.50	7.50
<i>Practocephalus hemiliopterus</i>	Pírara	3	2.60	7.80
<i>Cichla temensis</i>	Tucunaré	3	3.00	9.00
<i>Acestrorhynchus sp</i>	Cachorrinho	10	0.15	1.50
<i>Potamotrygon sp.</i>	Arraia	4	0.75	3.00
Total				28.8

Discussion

MEDEM (1981) recognized *M. niger* as species in which the adults of greater size tend to remains in the place which they occupy with apparent indifference in the presence of the humans, with which we agreed in the present study, wich it is infer for the times of observation and the mean time of sighting. MEDEM (1983), describes the territoriality behavior of this species, indicating that it is less aggressive than other species of Crocodylia, because in the its natural environment cut tails, mutilated extremities or scars in the head are not observed, common in other cases with other caymans species, specially when crocodylian are placing together with individuals of another species. *M. niger* is more or less shy and easily frightened (MEDEM, 1983).

In the adults, the diet of *M. niger* is varied, includes diverse zoological groups of which the fish are very important, furthermore include amphibians, reptiles and mammals (MEDEM, 1981; FITZGERALD, 1988; DA SILVEIRA and MAGNUSSON, 1999; HORMA *et al.*, 2001); the consumption of invertebrates is prominent, stand out the presence of mollusks as the Pomacea genera (MEDEM, 1983; MAGNUSSON *et al.*, 1987), that is increased with the individual increase size (HORMA *et al.*,2001).

MEDEM (1983), indicate that *M. niger* in Bolivia is registered like consumer of fresh water turtles: *Podocnemis expansa* and *Podocnemis unifilis*, which from the point of view of inclusion in the diet of fresh water turtles resembled the found thing in the present study, despite does not know if this consumption was carry out directly or if its were opportunistic feeding, like were observed in the present study. MAGNUSSON *et al.* (1987) suggest that the prey types available depend on the habitat occupied is trivial and obvious, but to what extent habitat selection influences the foraging mode of Amazonian crocodilians is completely unknown. In present study the foraging mode of *M. niger* during predation of turtles in trammel nets and fikknet revealed this opportunist behavior of this specie in caught aquatic vertebrates abundant in Negro River.

The great chelonian abundance and the behavior opportunist of the caymans possibly contribute so that this foraging form exists, like were registered in the Abufarí Biological Reserve (PANTOJA-LIMA *et al.*, 2010) and Jaú (PEZZUTTI, 2003), Amazon, Brazil.

In general the Crocodilians includes in their diet turtles, is had for example, according MEDEM (1981, 1983), *Caiman crocodilus* is a consumer of *Trachemys scripta callirostris* and that exemplary of 187cm total length can capture turtles of this species until 23cm total length carapax; *Crocodylus acutus* eating *Podocnemis lewyana*; *Crocodylus intermedius* captures and consume *Podocnemis unifilis*, *Podocnemis vogli* and *Phrynops geoffranus*; *Caiman jacare* includes in its diet *Podocnemis expansa* and *Podocnemis unifilis*, which shows a clear tendency within the order in which to depredation of chelonia it makes reference. Also, there are registries turtles consumption for *Alligator mississippiensis* (BRISBIN *et al.*, 1986; RICE, 2004), *Crocodylus porosus* (MESSEL and VORLICEK, 1989; WEBB *et al.*, 1991), and *Crocodylus rhombifer* (VARONA, 1986); besides *Crocodylus moreletii* specifically act as predator of *Kinosternon sp.* (ÁLVAREZ del TORO, 1974).

The absence of information respect to stomach content studies in some species of Crocodylia, specially in the case of *M. niger* and particularly respect to ingestin of turtles, it can be related to the fast digestion of the osteoderm, which does not happen to the elements that have queratin as scales and hair, that have a slow digestive degradation, nevertheless the corneals grudges maybe present (MEDEM, 1983), like the claws of the turtles; however, *Alligator mississippiensis* can digest the bone shields of the ingested turtles, wich has direct relation with environmental factors like temperature, between 30°C and 35°C, retention of these bones at gastric level will be not affected (JANES and GUTZKE, 2002).

It is possible to be established in this case, that lacks detailed information about the turtles predation by caymans it is insufficient illustrate; whereas for other items that will feed are well documented, as well as *Pomacea sp.* (Mollusca) for species, such as: *Caiman crocodilus*, *Caiman jacare*, *Caiman latirostris*, *Melanosuchus niger*, *Paleosuchus trigonatus* and *Paleosuchus palpebrosus* (MEDEM, 1981; MAGNUSSON *et al.*, 1987; DA SILVEIRA and MAGNUSSON, 1999; HORMA *et al.*, 2001), and the fish consumption for all Crocodylia are well established (ÁLVAREZ del TORO, 1974; MEDEM, 1983; MAGNUSSON *et al.*, 1987; FITZGERALD, 1988; WEBB *et al.*, 1991; DA SILVEIRA and MAGNUSSON, 1999; HORMA *et al.*, 2001).

The reason by which it occurs a nutritional preference can struggle from different points of view, also different hypothesis can be raised on the opportunistic behavior and the possibility from escape of the prey when it is not sufficiently alert; also can be related with the opportunity of shortage or by the facility of access to the prey (CRESSWELL, 2003); nevertheless, it is to write down that within the net, in which was a single individual of *P. erythrocephala* there were 29.60 Kg of biomass, composed in a 97.30 percent by fish that were easily accessible and that represented with respect to turtle a highly significant value and they were not eating.

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