***Natural Resources**, Aquidabã, v.1, n.2, august, 2011.*

*ISSN **2237-9290***

*Section: **Articles***
*Theme: **Aquatic Megafauna***

DOI: 10.6008/ESS2237-9290.2011.002.0009

FOOD PREFERENCE OF THE AMAZONIAN MANATEE IN CAPTIVITY

ABSTRACT

Studies on one endangered species´ feeding contribute to the more complex knowledge about its ecology, as also its preservation and/or management. By this means, aiming to obtain one better development and food supply for the animals kept in captivity in the *Instituto Nacional de Pesquisa da Amazônia*, one experiment was conducted to verify their food preferences. Aiming to observe the Amazonian manatee´s feeding behavior, eight animals were used kept inside one pool with 28,26 m^2 and 1,0 m deep. Each animal was identified with colored ribbons and weighed at the beginning and at the end of the experiment. Simultaneously, equal quantities of 11 species of aquatic macrophytes were daily provided. Among the provided items, the animals showed more interest for the emerging plants (57,4% of the time), like the grasses *Paspalum repens* e *Oryza grandiglumis*, where differences on choosing the macrophytes due to the age bracket were detected. It was also known that the Amazonian manatees, when fed with plants presenting inlays of microorganisms are getting in your diet a calcium supplementation which content, comparing with the plants of the Central Amazon, are extremely low.

PALAVRAS-CHAVE: *Trichechus inunguis*; Amazonian Manatee; Feeding; Diet; Aquatic Macrophyte.

PREFERÊNCIA ALIMENTAR DO PEIXE-BOI DA AMAZÔNIA EM CATIVEIRO

RESUMO

Estudos sobre alimentação de uma espécie em perigo de extinção contribuem para o conhecimento mais complexo sobre sua ecologia, bem como sua preservação e/ou manejo. Dessa maneira, visando obter um melhor desenvolvimento e melhor oferta de alimentos aos animais mantidos em cativeiro no Instituto Nacional de Pesquisa da Amazônia foi realizado um experimento para determinar suas preferências alimentares. Para a observação do comportamento alimentar do peixe-boi da Amazônia foram utilizados oito animais, sendo estes mantidos em uma piscina com 28,26 m^2 de área e 1,0 m de profundidade. Cada animal foi identificado com fitas coloridas e pesado no início e no final do experimento. Foram oferecidas, simultaneamente, 11 espécies de macrófitas aquáticas por dia, em quantidades iguais. Entre os itens ofertados, os animais demonstraram maior interesse pelas plantas emergentes (57,4% do tempo), tais como as gramíneas *Paspalum repens* e *Oryza grandiglumis*, sendo encontradas diferenças na escolha das macrófitas em virtude da faixa etária. Constatou-se ainda, que os peixes-bois amazônicos, ao alimentarem-se de plantas com incrustações de microorganismos estejam obtendo em sua dieta uma suplementação de cálcio, cujos teores, para as plantas da Amazônia Central, são extremamente baixos.

PALAVRAS-CHAVE: *Trichechus inunguis*; Peixe-boi Amazônico; Alimentação; Dieta; Macrófita Aquática.

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Published: 1992

Originally published:

COLARES, I. G.; COLARES, E. P.. Preferência alimentar do Peixe-Boi da Amazônia em cativeiro. *Peixe-Boi, João Pessoa, v.1, n.1, p.26-32, 1992.*

Referencing well:

COLARES, I. G.; COLARES, E. P.. Food preference of the amazonian manatee in captivity. *Natural Resources, Aquidabã, v.1, n.2, p.74-80, 2011.*

INTRODUCTION

Studies on food preference with sirenians in natural environment were much developed. Allsoppp (1969) cited that the in Guiana the *Trichechus manatus* eat many types of vegetation, showing one clear preference for determined species, but, according to an order of preference, eat submerged, floating and emergent vegetation. Domning (1981) mentions manatees eat different species of submerged, floating and emergent plants, in Pará, Maranhão, Amazonas and Amapá (Brazil). Gonçalves Colares (1991) notes that the *T. inunguis*, in natural environment, also presents one clear preference for specific species, and, according to an order of preference, eats emergent, floating and submerged vegetation. Experiments involving food preferences, with sirenians in captivity, also were developed (Domning, 1980).

Primary studies about feeding of one endangered species are important as a base for a more complete knowledge about its ecology, as also its preservation and/or management. By this means, aiming to obtain a better development and food supply for animals kept in captivity in the *Instituto Nacional de Pesquisas da Amazônia (INPA)*, one experiment was conducted to verify their food preferences.

METODOLOGY

Aiming to observe the feeding behavior of the Amazonian manatee in captivity, 8 animals kept in captivity in *INPA* were used: two juvenile males, two adult males, two juvenile females and two adult females.

Before the experiment, those animals´ feeding was only consisted on one type of earth grass (*Brachiaria mutica*), supplied in sufficient quantities to guarantee a daily 7% of the body weight for each individual. The animals were grouped in one total of 15 manatees inside one tank with 78,45 m² and 0,6 m deep. The eight ones were transported, in two distinct groups, to one round pool, with 28,26 m² and 1,0 m deep. Each animal was weighed in the beginning and in the end of the experiment and identified with one specific colored ribbon attached to the tail base. Another ribbon part in same color was glued with acrylic glue in the head.

Initially, a group of four animals chosen randomly, two males (adult and juvenile) and two female (adult and juvenile), being the experiment repeated with the other animals. Each repetition lasted 15 days: 5 for their adaptation and 10 days for the experiment, between July and August, 1987. This period was chosen because it was verified an enhancing of the aquatic macrophytes production in the rivers of the Amazonian Basin (Fittkau et al., 1975).

Eleven species of aquatic macrophytes, in equal quantities (3 kg each, wet weight), were simultaneously offered, totalizing the quantity in weight, needed for each animal daily feeding. Each plant was put into two separate gutters 0,80m x 0,60m, diametrically opposing positioned, and offered in the morning (when the animals were fasting). The plants parts to be offered to the

animals were selected according to previous observations when the animals were feeding in captivity in the *INPA* (Table 1).

Table 1 – Parts of the plants that were supplied for the animals during the experiment.

SPECIES	SUPPLIED PART
Pistia stratiotes	All plant
Scirpus cubensis	Leaves
Echinochloa polystachya	Leaves
Oryza grandiglumis	Leaves
Paspalum repens	Leaves
Neptunia oleracea	All plant
Phaseolus pilosus	Leaves and stalks
Utricularia foliosa	All plant
Ludwigia helmintorriza	All plant
Eichhornia crassipes	Leaves
Salvinia auriculata	All plant

The time for observing the animals in contact with the food was 60 minutes, where their general behavior and the type of consumed food were verified, the animals´ position in the water column while feeding and possible rejections to any type of plant were minute by minute wrote down.

The data for the variations analyses (ANOVA) were reunited by gender and age, in four distinct groups: adult male, juvenile male, adult female, juvenile female, applying the Bartlett test to check the variations homogeneity (S. P. S., 1983). The parametric Tukey test was applied to that homoscedastic variations and, when necessary, multiple comparison test (S. P. S. op. cit.) to - identify the differences between the groups. The frequency distribution of the observations related to certain plants, which Bartlett analysis detected were not parametric, were tested by the Kruskal-Wallis variation analysis non parametric (Zar, 1984), applying the nonparametric Tukey test for multiple comparison analyses (Zar, op. cit.).

RESULTS AND ARGUMENTS

Experiments involving feeding habits with sirenians in captivity were conducted in lower scale than with the animals in natural environment. Domning (1980) determined the food preference of the *Trichechus manatus* and *Trichechus inunguis*, observing the behavior and time spent or feeding in different levels of the water column, matching the major preference for feeding in the lowest levels of the water column with the preference for some types of plants. This study proved that the animals search for specific plants and present a major tendency to feed in the lowest levels of the water column. One greater searching for emergent plants by the animals can be recorded, with 57,4% of the total time showing animals feeding, expressed in minutes, against

34,6% for the floating and submerged plants (Table 2). The animals stayed 173 minutes (8%) of the total time wandering round the pool, without eating.

Table 2 – Time the animals spent for feeding, where **N** = Time in minutes.

Specie	Emergent		Specie	Floating	
	N	%		N	%
Paspalum repens	488	22,6	*Pistia stratiotes*	253	11,7
Dryza grandiglumis	325	15,1	*Salvinia auriculata*	202	9,3
Phaseolus pilosus	234	10,8	*Eichhornia crassipes*	80	3,7
Echinochloa polystachya	182	8,5	*Ludwigia helmintorriza*	75	3,5
Scirpus cubensis	9	0,4	*Neptunia oleracea*	70	3,2
			Utricularia foliosa	69	3,2
Total		**57,4**	**Total**		**34,6**

Among the supplied plants, only five species were totally consumed (*Paspalum repens, Pistia stratiotes, Salvinia auriculata, Eichhornia crassipes e Utricularia faliosa*), which are cited by Gonçalves-Colares (1991) as integrating the normal Amazonian manatees´ diet in natural environment. Among the leftovers (x) of the other plants, ending the final 60 minutes of the experiment, it was seen that only the leaves were consumed, the stalks always remaining (x1,3 kg per day), these presenting hard and brittle constitution, probably difficult to intake, so being discharged. *Ludwigia helmintorriza* e *Neptunia oleracea* when ate, all consumed (leaves, stalks and roots), with leftovers x = 1,7 and x = 2,3 kg per day, respectively. These two species own a less fibrous stalk, with parenchymatous tissue, possibly easier to be eaten. *Scirpus cubensis* was the plant less consumed by the animals, remaining almost all the supplied plant (x = 2,5 kg per day), being totally rejected by the juvenile males. This plant is very fibrous, with hard and tough leaves, and probably rejected due to its intake difficult.

During the experiment it was observed that the animals kept a same constant rhythm of feeding, although their weights had varied. All the adult animals lost weight, 5 kg in average. One juvenile had its weight increased and the others kept in constant weights. Small oscillations, in average 2 kg, can be attributed to the variations of the weighing scale. Major differences can come from the proper animals´ management and the supplied food variation. The animals were being fed with only one species of terrestrial grass (*Brachiaria mutica*), that owns high nutritious tenors (Menéndez, 1986), having a good accepting by the manatees in captivity. Since during the experiment different species of plants were offered and although a period of acceptance had occurred, the diet changing should have be the cause for the animals´ weight loss.

The plant the animals spent most time eating (percentage in minutes) was the grass *Paspalum repens*, doing 22,6% of the total time of the experiment (Table 2). The results of the statistical analyses indicated significant differences ($p<0,05$), when comparing the sex, showing that the adult males´ more seeking for *Paspalum repens*. Similar result was observed by

Gonçalves-Colares (1991) when studying the manatees in natural environment was indicated that the males sought more for *P. repens*. This species likely the *Eichinochloa polystachya* was considered one of the more found plants in the rivers of the Amazonian Basin (Junk, 1970; Piedade, 1988), what means one supply for the animals which live in natural environment. However, in this work, the plants supply was the same for all the species, what reinforces the major seeking by the males for *P. repens.*

Echinochloa polystachya, however considered very abundant in the rivers of the Amazonian Basin (Junk, 1970; Piedade, 1988) and, consequently, very accessible, to the manatees in natural environment, corresponding to the second plant more present in their normal diet, was not much chosen by the captive animals in this experiment, occupying the sixth place in animals feeing in minutes (Gonçalves-Colares, 1991), always seen leftovers in the end of the experiment (Table 2). As the quantity of the offered plants in this experiment was the same, the animals could really select the one to be eaten, according to their nutritious needs, or even due to their palatability and own preferences for determined species, discharging the others.

The second plant the animals spent most time eating was the grass *Oryza grandiglumis* (15,1% of the total time), remaining its stalks (x = 1,0 kg per day). The statistical analyses showed that the juvenile females most chose this specie ($p<0,05$). Adult females, in their turn, showed they most chose for these plants *Neptunia oleraea, Utricularia foliosa e Pistia stratiotes* ($p<0,05$), without any specific preference. Similar situation was found by Gonçalves-Colares (op. cit.) in the animals´ diet in natural environment, what may show that the female manatees do not have a feeding selectivity, like the males. When the analyses of the nutrients of these plants were done during the flood, time the experiment was taken, it was found a larger concentration of fatties in the *Pistia stratiotes*, while from the *Utricularia foliosa* e *Neptunia oleracea* a larger concentration of ashes was obtained (Gonçalves-Colares, 1991). There is the possibility of these animals ingest larger quantities of these plants trying to supply their nutritious deficiencies, or even, really preferring these species.

Adult individuals showed tendency to intake larger quantities of the plant *Utricularia foliosa* ($p<0,05$), while the juveniles chose the plant *Salvinia auriculata* ($p<0,05$), when the analyses according comparison per age were done. Both presented larger concentrations of ashes in their constituent parts, what can represent one possible need from these animals to intake calcium (Gonçalves-Colares, op. cit.). Considerable quantities of organisms (diatoms, algae and crustaceans) adhered to floating and submerged plants, can be found (diatoms, algae and crustaceans) (Junk, 1973; Best, 1981). Possibly, the manatees when eating these plants which offer higher ashes tenors, caused by microorganisms incrustations (Boyd, 1968), are adding calcium supplementation in their diet, which tenors are extremely low in the Central Amazonian plants (Howard-Williams & Junk, 1977).

ACKNOWLEDGEMENTS

To the technician Raimundo Manuel da Silva and the trainee Aldeniza Cardoso de Lima for collaborating in the aquatic plants selection, as also to all members of the Aquatic Mammals Laboratory for the material collection and the animals observation during the experiment. We also thank to Dr. Kesa Lehti. The study was funded by the *Conselho Nacional de Desenvolvimento de Pesquisas da Amazônia (INPA)*.

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