Volume : 3 | Issue : 3 | March 2014 • ISSN No 2277 - 8179

Research Paper

THE behaviourAL and morphometric features of West African manatee: *Trichechus senegalensis* in a semi-wild environment

Zoology

KEYWORDS : Trichechus senegalensis, behavioural, morphometric and semi-wild environment.

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ABSTRACT

The behavioural and morphometric features of West Africa manatee; Trichechus senegalensis, in a semi-wild environment was study from July 2008 to November 2008. Surface water was measured to determine the physico-chemical parameters of the stream. Mean values of surface water temperature of 26.56±1.08oC; pH, 6.47±0.25; Free carbon dioxide, 8.83±1.44mg/L; total alkalinity, 10.35±1.85 mg/L; Dissolved Oxygen, 7.35±1.42 mg/L and Biological Oxygen Demand (BOD) 2.41±0.47 mg/L were within stipulated ranged as safe for aquatic organism. Eleven macrophytes belonging to eight families were fed to the manatee daily. The morphometric measurement showed total length 192cm, standard length 152cm, body weight 265kg, fluke width 36cm, flipper length 36cm, head length 34cm, girth at umbilicus 120cm, girth at genital pore 82cm, girth at anus 64cm. The results indicate that the semi-wild environment provides favourable conditions for the survival of the manatee.

INTRODUCTION

The West African manatee; (Trichechus senegalensis), belongs to one of only three living species in the order Sirenia (Reynolds and Odell 1991). It is found in the coastal areas of tropical and subtropical western African. The second species, Amazonian manatee (T. inunguis) is found only in freshwater areas of the Amazon basin, while the third; the West Indian manatees (T. manatus) are found from the southern United States to the north-eastern coast of Brazil (IUCN 2006).

The West African manatee is an aquatic mammal with a robust, fusiform body that is compressed dorso-ventrally. Although the West Indian manatee and Amazonian manatee appear grey-brown and with white/pink patches on the belly and chest, their thick tough skin is sparsely covered with small thick hair. The body of the manatee has no hind limbs, but a paddle-like forelimbs or flippers with three to four nails that are present on the dorsal surface of each flipper. The body tapers to a spatulate, dorso-ventrally flattened tail (Lefebvre et al., 2000).

The West African manatees live in quite coastal areas, large rivers and lakes that connect with rivers (Happold, 1987). Manatees are herbivores that feed on a wide variety of submerged and emergent vegetations (Deutsch 2000). The distribution and abundance of manatees are affected by water temperature and availability of aquatic vegetation (Deutsch et al., 2003). Antonion et al., (2003) reported that manatees are restricted to rivers and estuaries with temperature of 24.4 °C, while Perrin (2001) reported that the West African manatees are limited to waters of 18 °C and 27 °C. Additionally, Deutsch et al., (2003) also reported that increase in salinity greatly influence the distribution of manatees and also reproduction, feeding and calving.

The adult manatees are between 3-5m in length, weight 363-460kg, flippers length 0.58m and circumference of body 2.25m (Rathbun, 1984). However, studies on the Manatees have only been carried out in the natural environment in the creeks of the Niger Delta region of Nigeria (Happlod, 1987) and with little or no study of the mammal in a semi wild environment, hence, the need for the present study.

Materials and Methods

Study Area

The study area lies between latitude 4° 50¹ and 5° 00¹N and longitude 7°45¹ and 8° 00¹. The semi-wild environment is characterised with natural flowing streams, a tributary of the Eyong River in Akwa Ibom State, Nigeria. It is characterized with rainy season which begins in April and lasts till early November and a brief dry season which starts from November and ends in March. Relative humidity is high in the rainy seasons and low in the dry season. The Little stream Farm support subsistence crop farming such as *Abelmoschus esculentus* (Okra), *Zea mays* (Corn), *Manihot esculentus* (Cassava), *Telfauria occidentalis* (Pumpkin), *Talinum triangulare* (Water leaf) and *Cucueropsis mannii* (Melon). The local indigenes involved in activities such as artisanal fishing, using fish nets and hook and lines, illegal sand mining and hunting of small mammals in the Little Stream Farm.

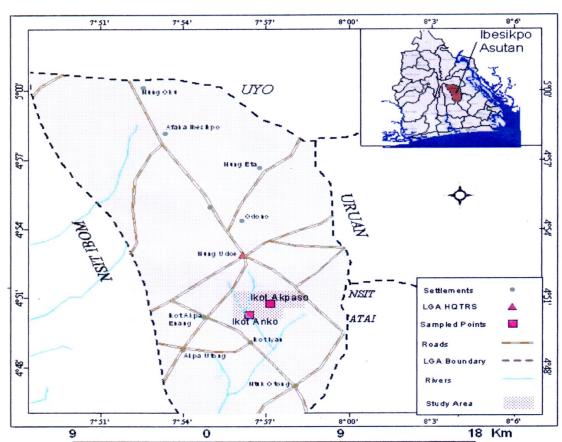

Fig. 1: Map showing study area

The physico-chemical parameters measured included; water temperature, hydrogen ion concentration (pH), free carbon dioxide, total alkalinity, Dissolved Oxygen (DO) and Biological Oxygen Demand (BOD). The water temperature was measured in-situ using mercury-in-glass thermometer calibrated in degree centigrade, pH was measured using electronic pH meter Kent 7020. Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), total alkalinity and free carbon dioxide were measured titrimetrically according to APHA, (1998) and recorded as mg/L.

The manatee was captured in the Wild with fishing net and transported to a semi-wild environment, occupied by submerged and emergent aquatic plant such as water lily (Nymphaea odorata). The canal was measured to be 99.625m² in length, 5.4m² in width and 1.2m² in depth.

The manatee behaviours where observed using the focal animal sampling method by Martin and Bateson (1998) from the hours of 7am – 7pm: morning (7am – 10am), noon (12noon- 3pm) and late afternoon (4pm – 7pm). The time intervals were taken using a Diamond mechanical stop watch and recorded in minutes. Plants harvested from the environment at designated locations,

Volume : 3 | Issue : 3 | March 2014 • ISSN No 2277 - 8179

where introduced into the canal for the manatee to forage on. The morphometric feature of the manatee were measured and these included body weight (kg), total length of manatee (TL), standard length (SL), flipper length (FL), head length (HL), girth at umbilicus, girth at genital pore and anus, eye diameter, and fluke width. The eye diameter was measured using digital vernier caliper while other lineal and girth measurements were recorded using tape metre and recorded in centimetre (cm).

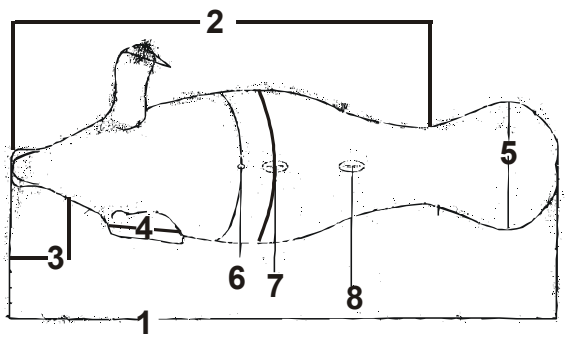

Fig 2: Diagram showing morphometric measurement of the manatee

Keys: **1.** Total Length (TL) **2.** Standard length (SL)
3. Head length (HL) **4.** Flipper Length (FL)
5. Fluke Width (FW) **6.** Girth at umbilicus
7. Girth at genital pore **8.** Girth at anus

Results

Physico-chemical parameters

The mean values and standard error of physico-chemical parameter is shown in table 1, while table 2 show the different observed behaviours of the manatee in the semi-wild environment.

Table 1: Mean and standard error of physico-chemical parameter measured during the study period.

Physico-chemical Parameters	August	October	November
pH	5.95±0.24	6.23±0.46	7.23±0.05
Temperature (°C)	27.00 ±0.41	26.05±1.28	26.62±1.55
Free $C0_2$ (mg/L)	8.40±1.25	9.30±1.33	8.80±1.74
Total alkalinity (mg/L)	10.5±0.70	10.52±2.06	10.02±2.78
Dissolved oxygen (mg/L)	6.52±0.22	7.77±2.41	7.77±1.62
Biochemical Oxygen Demand (mg/L)	1.92±0.41	2.9±0.08	2.49±0.93

Table 2: Observed behaviours of T. senegalensis, with time taken in the canal.

s/no	Behaviour	Description	Time
1.	Bottom Rest (BR)	Resting and sleeping at the bottom of the canal	4: 05min
2.	Mill (M)	Slow, non-directional travel in the same area.	-
3.	Surface feeding (SF)	Feeding on the floating bundle of plants tied to wooden poles in the water column of the canal.	-
4.	Slow swim (SS)	Steady movement in one direction at a slow to moderate pace, using its flippers and tail to steer itself.	1: 40min
5.	Fast Swim (FS)	Steady movement in one direction at fast pace, without using the flippers and tail to steer itself.	1:05min
6.	Feeding and surface for air	Submerged in the water column and surfacing for air in-take while feeding.	2: 35min
7.	Rest and surface for air	Submerged in the water column and surfacing for air in-take while resting.	3: 55min
8.	Bubble	The manatee release air from nostrils without surfacing.	-

Morphometric measurement

The morphometric measurements of the manatee from wild environment (initial) and during the studies in the semi-wild environment (final) are shown in table 3, while table 4 shows plants species fed to the manatee.

Table 3: Morphometric measurement of *T. senegalensis*

Morphological Features	Initial measurement	Final Measurement
Total length (TL)	190 cm	192 cm
Fluke width (FW)	34 cm	36 cm
Eye diameter (ED)	34 cm	36 cm
Flipper length (FL)	33 cm	36 cm
Standard length (SL)	150 cm	152 cm
Head length (HL)	33 cm	34 cm
Girth at umbilicus	126 cm	129 cm
Girth at genital pore	80 cm	82 cm
Girth at anus	63 cm	64cm
Body weight	255 kg	265 kg.

Table 4*:* Plant species fed to *T. senegalensis* and their preference level.

Family	Scientific Name	Common Name	Preference Level
Acanthaeceae	Asystasia gangetica	Tropical Primrose, Hunter's weed	++++
Commelinaceae	Conmelina diffusa	Spreading day flower	++++
Asteraceae	Chromoleaena odorata Emilia sonchifolia	Awolowo's weed Shraving brash	+ ++++
Poaceae	Eleusine indica Panicum laxum	Bull Grass; Goose grass Water bamboo grass	++++ ++++
Musaceae	Musa sp (leaves)	Plantain	++
Dryopteridaceae	Nephrolepis undulata	Sword fern	+++
Nymphaeaceae	Nymphaea odorata	Water lily	++++
Amaranthaceae	Pandiaka involucrata	Velvet bush willow	++
Fabaceae	Rhynchosia sp	Cover crop	++++

Keys:
++++ High
+++ Moderate
++ Low
+ Uncertain

Discussion

The water temperature was within stipulated ranged as recommenced safe for aquatic fauna. This result is similar to Perrin (2001) that West African manatees are limited to waters temperature of 18°C and 27°C, while Worthy, (2000) also reported that manatee limited to water temperature value of 27°C will eat properly, increase in weight, and become nourished and mature fast. The pH range shows that the stream is tending towards al-

kalinity. This suggests that the stream is good for fish production. The dissolved oxygen value for the stream was high. The high dissolved oxygen level could be due to exposure to enough sunlight and atmospheric air resulting in an increase in the rate of photosynthesis by the submerged plants in the water. Similar findings of high dissolved oxygen were reported by Williams (1998).

The manatee; Trichechus senegalensis exhibited different behaviours such as feeding and resting which are similar to those exhibited in the wild. Although, it reframe from surface feeding and bottom resting as human disturbance increased, but however, adapted to present condition in the semi-wild environment. Hartman (1979) reported that the behavioural activities of the West African manatee consist of feeding, resting, idling, travelling and socializing. Horikoshi, (2004) also noted that the performance of these behaviours depend upon efficiency and availability of energy and nutrient intake.

The canal (holding facility for the manatee) is devoid of luxuriant aquatic vegetation except those sought for in the semi-wild environment. The manatee fed on any plant soft enough to be torn by the muscular upper lip and exhibited two feeding behaviours. First, rooting, where virtually the entire plant is consumed and second, grazing, where only leaves are eaten without consuming the roots. The manatee preferred certain species of plants to others based on taste and nutritional value. According to Robert *et al.,* (2004), the manatee's mode of nutrition (herbivore) indicates that the manatee is low on the food chain (i.e. primary consumer) of freshwater ecosystem.

The low time interval taken by the manatee to hold its breath while submerged and surface for air agrees with Reynolds (2000), that smaller and active manatee can not stay under water for longer time and needs to breathe every two to three minutes.

The morphometric measurement indicates that the manatee has increased in body size and weight. The result also suggests that the manatee is a calf and conform with Odell (1982) that manatee calves range in total length of 1.6m (160 cm) to 1.8m (180 cm) and weight 270 kg.

CONCLUSION

The little stream is threatened by anthropogenic activities such as washing of cloths and motorcycle, and sand mining. There is urgent need to closely monitor these activities in other to properly incorporate the manatee into the semi-wild environment.

REFERENCE

Antonio, A., Mignucci-Giannoni, R., Montoya-Ospina, A. and Mario, V. 2003. Status | of Semi-captive manatee in Jamaica. LAJAM 2(1): 7-12. ISSN 1676 – 7497. | | APHA, AWWA, WEF, 1998. Standard Methods for the Examination of Water and Wastewater. Greenberg. A. E., Clesceri, L. S. and Eaton, A. O., (eds) 20th Edition. | Deutsch, C. J. 2000. Winter movements and use of warm-water refugia by radio-tagged West Indian manatees along the Atlantic coast of the United States. Final Report. Florida Power and Light Company and U.S. Geological Survey, Gainesville, Florida, USA. | Deutsch, C. J., Reid, J. P., Bonde, R. K., Easton, D. E., Kochman, H. I. and O'Shea, T. J. 2003. Seasonal movements, migratory behavior, and site fidelity of West Indian manatees along the Atlantic coast of the United States. Wildlife Monographs 51: 1–77. | Happold, D.C.D. 1987. The mammals of Nigeria. Oxford Science Publications. 184-5pp | | Hartman, D. S. 1979. Ecology and behaviour of the manatee (Trichecius manatus) in Florida. American society of mammalogists 5:.153pp. | | Horikoshi, C. 2004. Effect of Hormonal and temporal factors on captive Female manatee (Trichechus manatus latrostris) Behaviours. Unpublished. 117p. | | IUCN 2006. IUCN Red List (Species Search Page). | Lefebvre, L. W., Reid, J. P., Kenworthy, W. J. and Powell, J. A. 2000. Characterizing manatee habitat use and seagrass grazing in Florida and Puerto Rico: implications for conservation and management. Pacific Conservation Biology 5: 289-298. | Martin, P. and Bateson, P. 1998. Measuring behaviour; An Introductory Guide. Cambridge University Press. Cambridge, 20-37pp. | | Odell, D. K. 1982. The West Indian manatee Trichechus manatus Linnaeus. Pages 828- 837 in J.A.Chapman and G.A. Feldhamer (eds.). Wild Mammals of North America. Johns Hopkins University Press, Baltimore. 1184 pp. | | Perrin, W. F. 2001. Conservation status of the West African Manatee. Sirenews 36: 34-40. | | Rathbun, G. B. 1984. Sirenians. Pages 537-547 in S. Anderson and J. K. Jones, Jr. eds. Orders and Families of recent mammals of the world. John Wiley and sons, Inc. New York, NY. | Reynolds III, J. E. 2000. Possible locations for long-term warm-water refugia for manatees in Florida: alternatives to power plants. Final Report prepared for the Department of Environmental Services, Florida. Florida Power and Light Company, Juno, Florida. | Reynolds III, J. E. and Odell, D. K. 1991. Manatees and Dugongs. Facts on File, Inc. New York, NY. 231pp | Robert, C., Smith, G. W., Packard, J. M. and LaCommare, K. S. 2004. Seasonal occurrence of male Antillean manatees (Trichechus manatus manatus) on the Belize Barrier Reef. Aquatic Mammals 29(3): 342–254. | William, A. A 1998. Investigating aquatic ecosystem. Prentice Hall Canada Inc. Scar borough, Ontario 83: 95p. | | Worthy, G. A. J. 2000. When is it too cold for a manatee? Save the Manatee Club, The Manatee Zone. 4pp. |