Evaluation of Hunters' Returns on Major Bush Meat Species in Amansea and its Environs, South Eastern Nigeria

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Abstract

A 4-month survey and interviews on hunters in a central bush meat centre Ugwuoba, an environ of Amansea Awka, Nigeria were undertaken from October through January 2011; when hunting was at its peak due to dry season to evaluate their returns though it was learnt that it occurs all year round. The result shows a total of 1,310 carcasses valued at a gross profit (N1,996,230.3) approximately (12,634.4 USD) belonging to four different species; Thryonomys swinderianus (728), Cephalopus maxwelli (504), Atherurus africanus (72) and Cricetomys gambianus (6) in number. The hunters reported that virtually all major bush meat are hunted for sale since it is their means of livelihood, noting that monkeys are excluded due to traditional reasons. T. swinderianus was found to be the highest in demand and most prominent having a relative abundance (55.5). It was followed by C. Maxwelli (38.5), A. africanus (5.5) and C. gambianus (0.5) being the least. The average length of each species, which were 25.5; 39.5; 22.1; 21.9 respectively revealed a severe hunting pressure in the area as these when compared to average standard length of mature ones are far below standard. A higher number of males were recorded in T. swinderianus (0.52) followed by A. africanus (0.56) and then C. gambianus (0.83) while a higher number of females were recorded in C. maxwelli (0.52). Lunar influences on hunting were also suspected. The result of this experiment when subjected to Simpson's Diversity Index showed that there is an average biodiversity in the area at (D = 0.5). It is hereby recommended that conservation measures should be adopted to enhance sustainability as wildlife do not only support animal protein supply but play a significant role in rural economy.

Keywords: Hunters' returns, Evaluation, Amansea and Environs.

Introduction

Bush meat simply refers to meat from wildlife sources or undomesticated animals normally consumed in place of meat from domestic or livestock origin; that is flesh of wild and undomesticated animals[1]. The average Nigeria love for bush meat is legendary; it is so serious that on sighting any wild animal, thoughts of the cooking pots take centre stage without addressing any other phenomenon. Increasing, as the population of Africa becomes urbanized, and innovations in management and feeding of conventional animals failing apparently in solving the sub-optimal protein consumption[2] the demand for this traditional item is met by commercial hunters and traders. The bush meat trade has become too lucrative due to high demands, thus encouraging hunters to maintain supply from the ever-decreasing wildlife populations. In many communities including Nigeria, bush meat constitutes a large proportion of the animal protein being consumed, up to 84% in communities living near tropical forest[3,4]. Bush meat (wildlife) is also being hunted for its products like meat, hides and skin, horns, tusks etc used for various purposes by the natives and foreigners as well. Although it is socio-economically important, Scientists[5,6,7,8], have decried the unsustainable and illegal hunting and harvesting of bush meat for commercial purposes as a serious threat to the population of these wild animals including trade in them. The economic contribution of these products has actually led to the threatening of these animals with extinction due to the high rate of exploitation, and the regulatory authorities have also appeared lame to tackling it. Studies on hunting and bush meat trade have been conducted in several West and Central African countries; however there is little information from literature about bush meat trade in Nigeria[9]. These include Ghana[10,11,12] Nigeria[13] and Congo-Brazzaville[14]. However, such studies on the evaluation of the different bush meat species in Amansea region have not been carried out or rather no record of such exists, the hunters and traders also attested to this. Thus, the declining status of African wildlife in general prompted this survey to evaluate hunters' return in the region with a view to providing current and relevant data on their rate of exploitation, the various species exploited, the sexes, sizes and ages to protected area managers and policy makers for better biodiversity governance.

Material and Methods

This research was carried out in a rural town Amansea situated in Awka North L.G.A of Anambra State, South Eastern Nigeria and its environs. It is bordered in the North by Ebenebe, Ugwuoba in the East, Isiagu in the South and Awka town in the Southwest and Mgbakwu in the Southeast with Ugwuoba having the bush meat trade centre.
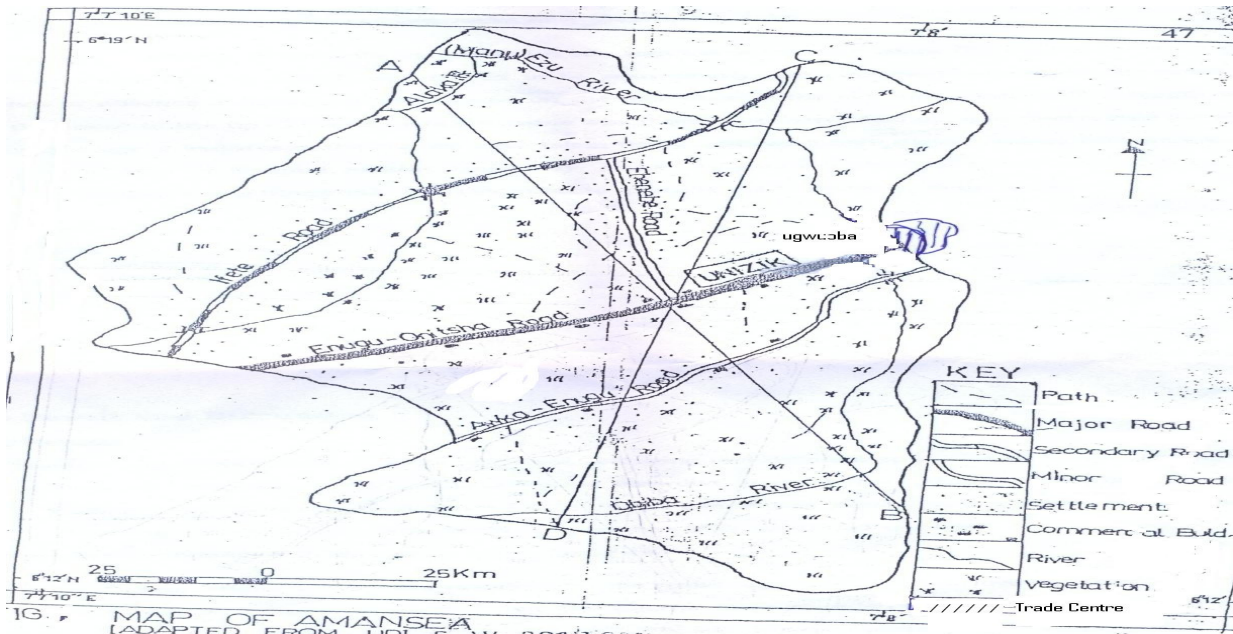
Figure-1
Map of Amansea, its Environs and Key Features

It links to other nearby towns by one major road, Enugu/Onitsha dual carriage way, two minor roads, Awka/Ugwuoba road and Ebenebe road and some major and minor paths[15]. The strategic location of this trade centre within this road system provides easy and ready access as the hunters easily offer their quarries to intermediaries (taxi drivers and passengers) who buy and or supply retailers in markets in the main towns and cities at sizeable profits. It lies within the tropical humid climate zone of South Eastern part of Nigeria with average annual rainfall at 14448mm, the relative humidity ranges from 60-90% while mean monthly temperature is 27.92°C[15]. Amansea is endowed with good water courses, thus providing water for the animals. The soil is sandy loam suitable for agricultural activities and good for animals. The vegetation is of guinea savannah type which is rich in biodiversity. The population density is low and is sparsely settled, all these giving favorable physical conditions for habitation of wildlife.

Counting of the number of animals' carcasses on site was taken on daily bases (7-10 a.m.) for the 4-month period. The ventral side of each animal was placed to be seen clearly and confirmations on the sex were made on the presence or absence of mammary glands and on the difference in the external genitalia. The length was measured from the snout to the tip of the tail using a twine which was later stretched along a metric rule for length readings. The morphological features of the species were taken using 5.5 MP sharp digital camera and were identified in the Identification Unit of Nnamdi Azikiwe University, Awka, Anambra State. The result obtained was subjected to Simpson's diversity index to quantify the biodiversity of the habitat.

$$D = \frac{\Sigma\, n\,(n-1)}{N\,(N-1)}$$

Where D= Species Diversity Index, N = Total number of all species, n = Number of each species

Relative abundance was calculated using $R = \frac{n}{N} \times \frac{100}{1}$

where N and n are the same as in the above.

Results and Discussion

Result: The result revealed that a total of 1,310 carcasses belonging to 4 different species were hunted as major bush meat in Amansea and its environs. Of the 1,310 carcasses recorded, the dominant species was *Thryonomys swinderianus,* (728) in number and a relative abundance (55.5). It was followed by *Cephalopus maxwelli* (504), relative abundance (38.5). *Atherurus africanus* (72) with relative abundance (5.5), preceded the least animal *Cricetomys gambianus* (6) with relative abundance (0.5) as seen in table 1 and 2.

Of the *T. swinderianus,* 48% were females and the remaining 52% males. 47.6% were males in *C. maxwelli* while a greater percentage, 52.4% were females. A higher proportion of males (55.6%) were recorded of *A. africanus* with the remaining 44.4% being females. In the case of *C. gambianus* only 1 (16.7%) female was recorded, the remaining 5(83.3%) were males as seen in figure 2.

The average length of each species for the 4-month revealed that *C. maxwelli* had its highest average length at 39.5cm; *T. swinderianus* 25.5cm, *A. africanus* 22.1cm, lastly *C. gambianus* with average length of 21.9cm as seen in table 3.

Table-1
Monthly variation in carcass number by sex

Common name	Animal species	Month 1		Month 2		Month 3		Month 4		Total
		M	F	M	F	M	F	M	F	
Greater cane rat	*T. swinderianus*	84	92	80	52	96	104	120	100	728
Maxwell's duiker	*C. maxwelli*	28	68	72	52	56	72	84	72	504
Brush-tailed porcupine	*A. africanus*	8	4	-	12	12	8	20	8	72
Gambian pouched rat	*C. gambianus*	-	-	4	-	-	-	1	1	6
		120	164	156	116	164	184	225	181	
		284		272		348		406		
	Total	1,310								

(Where M = Male, F= Female)

Table-2
The relative abundance of the species

Animal species	Total no of carcass	Relative abundance
T. Swinderianus	728	55.5
C. maxwelli	504	38.5
A. africanus	72	5.5
C. gambianus	6	0.5
Total	1310	

The relative abundance shows that *T. swinderianus* (55.5) is highest while *C. gambianus* (0.5) is the least.

The value of D at 0.5 shows that there is average biodiversity using the 4 species
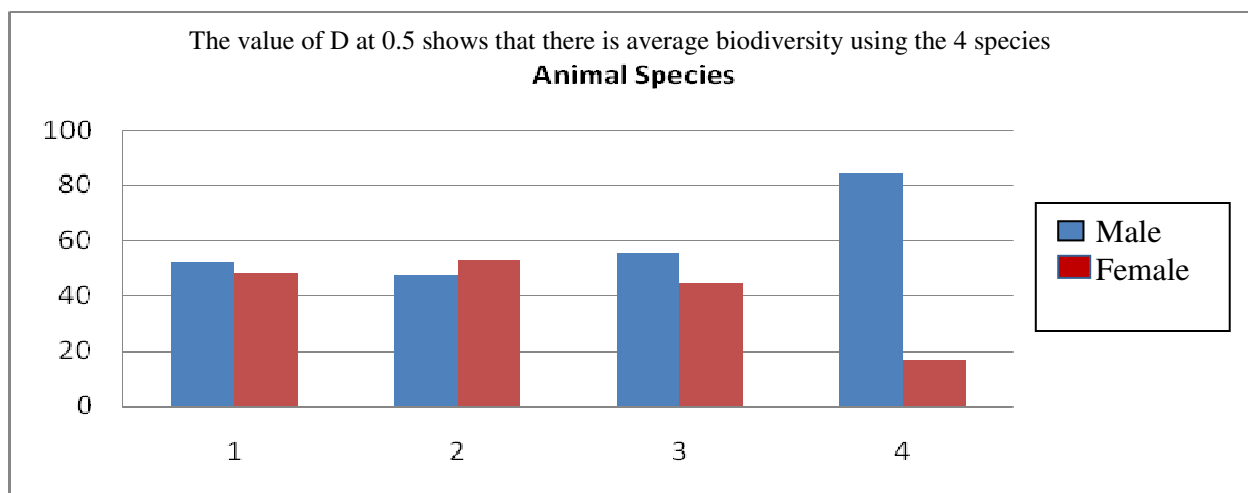
Figure-2
A chart of the percentage of males and females of the individual species

Tables-3
Monthly average length of all species in cm
MONTH

Animal species	1	2	3	4
T. swinderianus	24.6	24.3	24.6	28.3
C. maxwelli	36.4	37.9	37.9	45.7
A .africanus	21.2	23.1	21.4	22.8
C. gambianus	-	22.9	-	20.8

The total average of each species is sub-standard when comparison is made to the standard average length of the fully-mature.

Table-4
Monetary Returns of Bush meat traded within Amansea and its environs during the study period

BUSHMEAT A	Quantity sold B	Gross income(N) /Unit C	Gross Profit/(N) D	Gross Profit (N) E= (C-D)	RORI F = E/D × 100	GROSS RATIO G= D/C
T. Swinderianus	728	4050.20	2870.30	1179.90	41.11	0.71
C.Maxwelli	504	5480.34	3250.20	2230.14	68.62	0.59
A.africanus	72	800.74	620.60	180.14	29.03	0.78
C.gambianus	6	200.50	150.10	50.40	33.5	0.75

Where : RORI = Rate of Return on Investment , N158 = 1USD

Appendix: Biodiversity using Simpsons Index

$$D = \frac{\sum n (n-1)}{N (N-1)}$$

Where N= total number of all species, n= number of each species

The numerical strengths of bush meat species traded within the study area and period revealed that December and January recorded the highest number, 348 and 406 respectively as seen in table 1. In October and December, there was no record of *C. gambianus*.

The channel of bush meat disposal sequence showed that the delivery system comprises the hunters and traders, as well as passengers on transit and the taxi drivers that shuttle the road networks conveying them to Awka, Enugu and other urban cities where profits are highly made. Loggers and forest product gatherers also kill straying animals and make them available to the hunters and traders who convey them to the bush meat centre.

A gross profit of N1,996,230.3 approx. $12,634.4 accrued from the trade within the 4-month period. The gross profit per species was highest in *C.maxwelli* at N2,230.14 and least in *C. gambianus* at N50.40. More so, the gross ratio that measures ability to minimize production cost or increasingly input utilization efficiency to improve profitability was highest in *A. africanus* (0.78) and least in *C. maxwelli* (0.59) as seen in table 4.

The biodiversity of the habitat using the four species was average at (D= 0.5)

Table-5
Table of Biodiversity of the species

Animal species	n	n (n-1)
T. swinderianus	728	529256
C. maxwelli	504	253512
A. africanus	72	5112
C. gambianus	6	30
Total	1,310	7,87910

$$D = \frac{\sum n (n-1)}{N (N-1)} = \frac{787910}{1310(1310-1)} = \frac{787910}{7114790} = 0.5$$

The percentage number of each species according to sex

Discussion: Out of the 1,310 carcasses recorded during the study, *T. swinderianus* (55.5), was the highest in relative abundance. This is as a result of their high reproductive rate, short gestation period of 152-156 days and a high litter size of 2-6; this was in line with Happold who reported that as they move in groups and are restricted to secondary forest, grassland, this makes them susceptible to hunting since their limited ranging area makes their movement predictable- 16. This was also stated by Kuchi kura - 17. This was unlike *A. africanus* which had an occurrence of 5.5%; a lower reproductive rate, gestation period of 100-110 days and just a litter size of 1-2 as stated by Happold -16. *C. gambianus* (0.5) was the least as it is not really hunted as a major bush meat in the area since it requires digging into the soil or trapping. The lowest number of animals was recorded in the 2nd month (November); this was attributed to a number of human activities that went on in the area that month. Generally, the relatively higher number of bush meat seen in the dry season period was attributed to lesser effort required for hunting in dry seasons than in rainy seasons when thicker vegetation adversely affects the easiness. Lunar influences were also observed as higher number of carcasses was recorded in moonlight nights and not in rainy and dark nights. The average length of *T. swinderianus* and *C. maxwelli* recorded in the study area were 25.5cm and 39.5cm respectively; this when compared to the standard average length of the fully grown ones, 35-61cm and 63-76cm as stated for *Thryonomys* and *Cephalopus species* respectively shows that the animals hunted here were not fully mature - 12. This could mean that preferences and high demand on bush meat generated a corresponding high hunting intensity on them to satisfy the demand dismally and make profit. Thus, high profit being the motivating factor that keeps these hunters and traders in this business is expected to affect the wildlife resources and would likely threaten their sustainability- 7.

The Biodiversity Index (0.5), though average will soon be shifted if enough care is not taken to address the hunting pressure in the area.

Conclusion

The result of the present study shows that bush meat in this area is threatened due to over exploitation of their young which reduces the reproductive abilities of the species. Therefore control measures which would regulate the rate and category of

hunted animals are important to conserve wildlife in this region. Providing consumers with access to affordable and acceptable alternatives that could be found in fish, poultry and other livestock sources will also be of help.

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