

Full Length Research Paper

Wildlife harvesting and bushmeat trade in Rivers State, Nigeria: The resilience of the African civet, *Civettictis civetta* (Carnivora: Viverridae) and records of rare species

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Received 4 June, 2020; Accepted 9 July, 2020

The first step in making exploitation of wildlife more sustainable is to determine the sustainability of current levels of harvest, which has two components: determining the offtake from an area and appraising the effect that this offtake has on species. The exploitation of wildlife from the catchment area of a major bushmeat market at Omagwa, in the eastern Niger Delta was initiated in 2005. Analyses of 2019 results are presented. The vegetation in the catchment area is not uniform lowland rainforest. Data on numbers of different species brought to the market were collected daily; after counting, the unsold carcasses were dismembered smoked and sold. Weekly numbers were pooled and monthly totals obtained. The sums of the 2-monthly totals collected in the rainy season of 2005, 2009, 2014 and 2019 were analyzed. Standard keys were used for identification. In 2005, *Thryonomys swinderianus* was dominant. The dominance of *T. swinderianus* was repeated in 2009. In 2014, there was no dominant species, although *T. swinderianus* constituted approximately 30%; the addition of the numbers of *Tragelaphus spekei*, *Cercopithecus mona*, *Xerus erythropus* and *Atherurus africanus* increased the figure to about 90%. In 2019, *Civettictis civetta* rose to 43.12%, a 7-fold increase over the 2014 figure while that of *T. swinderianus* was 32%. Two rare species *Panthera pardus* and *G. alleni*, which had not been collected, were recorded. *Civettictis civetta* conservation is recommended. It may serve as a flagship or ambassador species for the conservation of the large carnivore *Panthera pardus* and the primate *Galago alleni*.

Key words: Carnivores, conservation, *Civettictis civetta*, resilience, ambassador species, Niger Delta.

INTRODUCTION

Bushmeat is an African term for the meat of wildlife. These animals are captured by indigenous people for

income and subsistence (Colishaw et al., 2004). In Sub-Saharan Africa, the proportion of wild animal meat in total

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Table 1. Numbers of Carcasses at Omagwa over 2 months in the rainy season (2005-2019)

S/N	Species name		Year of study			
	Common	Scientific	2005	2009	2014	2019
1	African Civet Cat	<i>Civettictis civetta</i>	89 (3.98%)	226(3.37%)	457 (6.88%)	2040 (43.12%)
2	Brush-tailed Porcupine	<i>Artherurus africanus</i>	320 (14.31%)	557(8.30%)	608 (9.15%)	280 (5.91%)
3	Bush Baby	<i>Galago alleni</i>				10 (0.21%) [#]
4	Emin's Giant Rat	<i>Cricetomys emini</i>				396 (8.37%)
5	Forest Genet	<i>Genetta poensis/G. cristata</i>	68 (3.04%)	179(2.67%)	54 (0.81%)	14 (0.29%)
6	Geoffrey's Ground Squirrel	<i>Xerus erythropus</i>	49 (2.19%)	99(1.48%)	983 (14.80%)	9 (0.19%)
7	Greater Cane Rat	<i>Thryonomys swinderianus</i>	1356 (60.67%)	4160 (61.98%)	1975 (29.74%)	1523 (32%)
8	Guinea Fowl	<i>Numida meleagris galeata</i>	69 (3.09%)	294(4.38%)	170 (2.56%)	116 (2.15%)
9	Leopard	<i>Panthera pardus</i>				7 (0.14%)
10	Maxwell's Duiker	<i>Cephalophus maxwelli</i>	123 (5.50%)	737(10.98%)	187 (2.81%)	206 (4.35%)
11	Mona Monkey	<i>Cercopithecus mona</i>	49 (2.19%)	136(2.02%)	1246 (18.76%)	21 (0.44%)
12	Red River Hog	<i>Potamochoerus porcus</i>	47 (2.10%)	92(1.37%)	210 (3.16%)	34 (0.71%)
13	Rufus Mouse-eared Bat	<i>Myotis alleni</i>				24 (0.50%)
14	Sitatunga	<i>Tragelaphus spekei</i>	65 (2.91%)	231(3.44%)	750 (11.29%)	51 (1.07)
Total			2235	6711	6640	4731

Sources: Okiwelu et al. (2008, 2010); Nzeako et al. (2016); Noutcha et al. (2017), [#]percent of annual total of all species.

protein supplies is exceptionally high. The determining factor influencing wild animal consumption appears to be the adequacy of supply. African civet *Civettictis civetta* is a small carnivore found in countries across equatorial and eastern Africa. It is sought after because it is the source of civetone, an important fixative in perfume manufacture (Rails, 1971), which is extracted from "civet", a waxy substance produced by the perineal glands of both sexes for scent marking (Eisenberg and Kleiman, 1972; Mateos et al., 2015). Only one species of the genus *Civettictis* has been recorded in Nigeria. The distribution extends throughout the rainforest and savannah zones of the country. They are nocturnal, terrestrial and secretive carnivores. *C. civetta* also consumes maize (Mateos et al., 2015). They are well camouflaged by their distinctive pelage which blends with the light and dark patches in dense vegetation (Happold, 1987).

In 2005, the African civet number over a 2-month period was 89 and constituted 3.98% of all mammals recorded at the Omagwa bushmeat market. In 2009, there was a 2.5-fold increase to 226 which constituted 3.37% of all mammals collected. In 2014, there was, a 2-fold increase to 457, over the 2009 total of African civet and it constituted 6.88% of all mammals collected (Table 1), (Okiwelu et al., 2008; 2010; Nzeako et al., 2016; Noutcha et al., 2017). This study was undertaken to assess changes in populations of fauna in the catchment area of the bushmeat market in 2019, 5 years later.

MATERIALS AND METHODS

The Omagwa bushmeat market, the largest in the eastern Niger

Delta, Nigeria receives carcasses from as far afield as a radius of approximately 80 km. The vegetation of the catchment area is not uniform lowland rainforest. It consists of deforested plantation-savannah, flood forest, secondary rainforest, Marsh deltaic forest, Mangrove and barrier islands (Luiselli et al., 2015). The detailed keys of Happold (1987) and Kingdom (1979) were used for the identification of wildlife. Data on numbers of different species brought to the market were collected daily; after counting, the unsold carcasses were dismembered, smoked and sold. Weekly numbers were pooled and monthly totals obtained. The sums of the 2-monthly totals collected in the rainy season of 2005, 2009, 2014 and 2019 are presented in Table 1 (Okiwelu et al., 2008; 2010; Nzeako et al., 2016; Noutcha et al., 2017).

RESULTS

In 2005, there was a dominant species, *Thryonomys swinderianus*, constituting 60.67%; when the number of *Artherurus africanus* was added, this percent rose to 75% of the total carcasses. In 2009, that same species, *T. swinderianus*, constituted more than 60% of carcasses and when the numbers of *A. africanus* and *Cephalophus maxwelli* were added the total rose to more than 80%. In 2014, five species (*T. swinderianus*, *Cercopithecus mona*, *Xerus erythropus*, *Tragelaphus spekei*, *Artherurus africanus*) constituted about 90% of carcasses. In 2019, *Civettictis civetta* carcasses rose to 43.12%, a 7-fold increase over the 2014 figures; when the percent of *T. swinderianus* was added, both species constituted 75.12% of all carcasses. The numbers of *C. civetta* carcasses in 2005 were 89 (3.98%), 226 (3.37%) in 2009, 457 (6.88%) in 2014 and 2040 (43.12%) in 2019. Two rare species, a large carnivore (*Panthera pardus*) and an ape (Galagos), *Galago alleni* were also collected in 2019.

DISCUSSION

Over the 15-year period, there were approximately 2-fold increases in the numbers of *C. civetta* in 2005, 2009 and 2014. In 2019, the increase was about 7-fold over the 2014 figure, constituting more than 43.12% of total carcasses collected in the late rainy season. The numbers would probably have been higher, if the collections were made in the dry season, the reproductive season (Happold, 1987). The resilience might also be partly dependent on the ability of *C. civetta* to occupy varied vegetation zones. In the eastern Niger Delta, it was recorded in extensively deforested plantation-savanna mosaic, flood forest, marsh deltaic forest, mangrove forest, barrier islands (Luiselli et al., 2015). The significant increase in the number of *C. civetta* might also not be unconnected with the sudden discovery by entrepreneurs of the economic importance of *C. civetta*. The dominance of a wildlife community by a few generalists had been described by Petrozzi (2015) as a process of biotic homogenization. The outcome is often a reduction and simplification of community richness (La Sorte, 2006; Devictor et al., 2008).

This was the first record of *P. pardus* carcasses at the Omagwa bushmeat market, the dominant market in the eastern Niger Delta, over a 15-year period. Carcasses were received from locations approximately 80Km far afield in the rainforest-savanna ecotone. Leopard skins, skulls, bones and reliable hunters' accounts had indicated the presence of the species in the Niger Delta (Angelici et al., 1998; Ikemeh, 2007a, b). The Africa civet *C. civetta* may serve as ambassador species (Macdonald et al., 2017) for the conservation of larger carnivores that include leopards. The elusive nature of *G. alleni* may be related to their behavior. They are nocturnal, live in rainforest undergrowth of saplings, shrubs, creepers and occasionally in leaf litter. The earliest record of *G. alleni* from the area was at Elele, 15 km north of Omagwa (Jewell and Oates, 1969). Since identification was exclusively morphological, the forest genet could have been *Genetta cristata* because of speciation of genets in West Africa (Gaubert, 2013).

Conclusion

Conservation of *C. civetta* is recommended. It may serve as flagship or ambassador species for the conservation of the large carnivore, *P. pardus* and the primate, *G. alleni*.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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