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The checklist and abundances of Small Mammals in Idu, Akwa Ibom State, Nigeria

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ABSTRACT: A study of the abundances of small mammals was conducted in Idu, Uruan L.G.A of Akwa Ibom State Nigeria from April to December 2013. Indirect and direct methods for the observation of small mammals were employed in the area under study. A total of 36 individuals, consisting of 3 Orders (Rodentia, Carnivora and Pholidota) and 7 families of small mammals were encountered. The most abundant was *Thryonomys swinderianus* with a percentage of 63.88 followed by *Rattus rattus* 16.66, *Cricetomys gambianus* 8.33 while *Crossarchus obscurus, Atherurus africanus, Xerus erythropus* and *Manis tricuspis* accounted for 2.77 respectively. The *Thryonomys swinderianus* had the highest body mass of 3.9kg while, *Manis tricuspis* has the highest body length of 79.9cm.. The abundance and diversity index of small mammal encountered were low and this may be attributed to deforestation, habitat loss, hunting and other anthropogenic activities in the study area. There is therefore a great need for conservation and management practices to protect these vulnerable mammals and their habitats. © JASEM

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Introduction

Small mammals are the most diverse group of mammals and account for more than half of the total mammalian fauna in any given area (Vieira and de Moraes, 2006; Walker *et al*., 2007; Napolitano *et al*., 2008). Their success is probably due to the fact that they have small body size, short breeding cycle, and the ability to gnaw and eat wide variety of food (Reuben *et. al*., 2013). Small body size enables them to adapt to wide range of macrohabitats such as caves, tree tops (nests), hollows on tree, burrowing etc. Iyawe (1989), reported a total of 392 species of small mammal belonging to five families of rodent and four families of Shrews in Ogba forest reserve in Nigeria. Also, Anadu (2006), reported 75% of rodents and 22% of shrews (small mammals) of the total population of mammals in the Montane forest of Obudu plateau in Cross River State, Nigeria. However, emphasis has been placed on the small mammal species probably because they serve as integral part to the success of terrestrial (forest) ecosystem. For example Rabinowitz and Walker (1991) reported that Rodents and Shrews are characterized by high productivity rates, they served as vital food sources for a large number of medium-sized predators such as mongooses (*Herpestes spp*.), civets (*Nandinia spp*.), raptors likes owls (*Strix spp*.), goshawks (*Accipiter spp*.) and some reptiles like snakes (e.g *Python regius*) (Reuben *et. al.*, 2013). They are therefore a very important link in flow of energy in the food chain of degraded forest ecosystem.

Small mammals are widely distributed to nearly all terrestrial ecosystem, in semi-arid or arid areas (Kerley and Erasmus, 1992; Francis *et al*., 2014). Small mammals' distribution and abundance are influenced by factors such as nature and density of vegetation, climate condition, disease predation and habitat exploitation by humans (Vieira and de Moraes, 2006). Above all, small mammals are good bio-indicators of environmental condition due to their rapid turnover rate, high biotic potential; ability to invade reclaimed areas and sensitivity to environmental disturbance (Happold, 1979). Beside these aforementioned ecological functions, the local people utilize mammals for various ethnological purposes such as folk medicine and for food. With greater acceptance of bush meat in Nigeria urban centres and prevailing poverty in rural areas, hunting has become an all-comers affair. The consumption in Akwa Ibom state has rendered almost any wildlife species liable to be consumed – whether small or large-sized, rare or endangered, protected by international convention, customary taboos or not (Egwali, 2007).

As a result of the pressure mounted on the small mammals and their fragmented and shrinking territories, this study was undertaken to contribute to already existing record on the abundance of small mammals in Akwa Ibom state. It will further provide a checklist of the small mammals fauna occurring within the Idu area of the state, determine their distribution and abundance as well as morphometric data.

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MATERIALS AND METHODS

*Study Area***:** The study area lies between latitude $5^0$1'25" and longitude $8^0$1'0" in Akwa Ibom State, Nigeria (Figure 1). Idu is located in the south east of Nigeria and has an average temperature of 29.7^{o}c and average relative humidity of 66.4% (Umoh *et, al.*, 2012). The topography of the study area is undulating plain with hills and slopes. The vegetation comprises few wetland, shrubland, moderate grassland and trees. The Idu forest has few forest layers with open and closed canopy. Epiphytes grow on most of the trees; this includes mosses, lichens, fern and orchids. Examples of other trees found in the area include bamboo (*Bambusa spp*), Bitter cola (*Garcinia kola),* oil palm (*Elaeis guineensis),* oil bean (*Pentaclethra macrophylla),* Raffia palm (*Raphia hookeri).* The major occupation of the people in the area is farming, fuel-wood cutting, wine-palm tapping, fihing, hunting and trapping of animals. Crops cultivated include cassava (*Manihot* spp.), Maize (*Zea mays*), plantain (*Musa spp*.) and Cocoyam (*Colocasia spp*.)

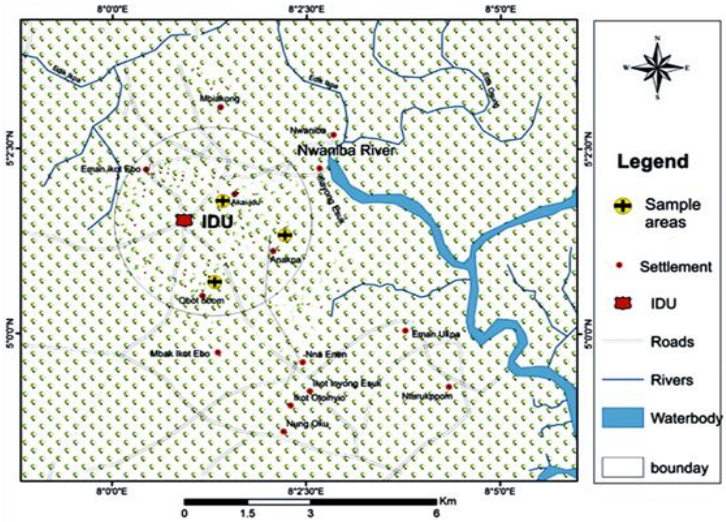

Fig 1: Map of Idu Showing sampling stations

*Sample collection***:** The indirect and direct methods according to Hoffman *et al*. (2010), were adopted in the sampling of small mammals. Indirect method involved the observation of small mammal faecal dropping, remnant of plant parts they consume during their meals. The direct method involves the capturing of small mammals with live-traps as described by Nagorsen and Peterson (1980). They were positioned at the site of small mammals' activities (holes, runs, logs, etc.) and set up few meters away from each other and then checked twice daily, morning and evening, to reduce the stress of capture. The traps were set in the morning and in the night. The morning trapping were checked in the evening by 4-6pm, while the traps set in the night were checked as early as possible in the morning by 5-7am. The traps were baited with foods such as palm fruits, cassava and other fruits to attract them and also to sustain them once they are been caught. In addition, hunters in the host community were consulted for additional information. Captured small mammals were taken to Department of Zoology, University of Uyo for identification using standard guides by Booth (1960), Rosevear (1969), Hutterer and Happold (1983), Happold (1987) and Kingdon (1997). The measurement of the total body length, tail length, hind foot length, head body length and ear length were taken using metre rule and recorded in centimetre. The weight was also taken using weighing balance and recorded in kilograms.

RESULTS DISCUSSION

A total of seven (7) species of small mammals belonging to three (3) orders: Rodentia, Carnivora and Pholidota were encountered (Table 1). Table 2 shows the Percentage abundance and trap success of small mammals encountered**.**

Table 1: Checklist of small mammalian fauna encountered in Idu**.**

Order	Family	Scientific Names	Common Names	Local Names
Rodentia	Thryonomyidae	*Thryonomys swinderianus*	Grass cutter	Ineh
	Muridae	*Rattus rattus*	House rat	Ekpu
	Hystricidae	*Atherurus africanus*	Brush tailed Porcupine	Ebiong
	Cricetidae	*Cricetomys gambianus*	Gambian Pouched rat	Oyot
	Sciuridae	*Xerus erythropus*	Ground squirrel	Adua
Carnivora	Viverridae	*Crossarchus obscurus*	Kusimanse	Nkukwa
Pholidota	Manidae	*Manis tricuspis*	Tree pangolin	Ikara

Table 2: Percentage abundance and trap success of small mammals captured in Idu**.**

Small mammal	Frequency	Percentage Abundance	Trap Success %
Thryonomys swinderianus	23	63.88	7.54
Rattus rattus	6	16.67	1.97
Atherurus africanus	1	2.78	0.33
Xerus erythropus	1	2.78	0.33
Cricetomys gambianus	3	8.33	0.99
Crossarchus obscurus	1	2.78	0.33
Manis tricuspis	1	2.78	0.33

*305 trap night for all species

Table 3. Shows the mean body measurement of small mammal encountered during the study period respectively while Table 4. Shows the diversity index of small mammal, using the Shannon diversity index (H). H=-∑pi X ln (pi).

Table 3: Mean body measurement of small mammals in Idu

Small mammal	B.M(kg)	T.B.L(cm)	H.B.L(cm)	H.F.L(cm)	E.L(cm)	T.L(cm)
Thryonomys swinderianus	3.01	62.61	46.6	5.2	3.2	16.1
Rattus rattus	0.23	13.5	6.5	1.4	1.2	6.1
Atherurus africanus	3.40	64.6	44.6	6.0	3.2	19.9
Xerus erythropus	0.70	40.0	32.9	6.0	2.3	7.1
Cricetomys gambianus	1.28	69.4	32.6	5.1	3.4	37.0
Crossarchus obscurus	0.85	37.0	29.0	6.0	2.0	8.0
Manis tricuspis	2.10	79.9	30.4	4.5	0.9	49.5

Key: B.M = Body mass, T.B.L = Total Body length, H.B.L. = Head Body Length, H.F.L = Hind foot length, E.L. = Ear Length, T.L. = Tail length

Table 4: Diversity index for small mammals observed in Idu

Small mammal	ni	Pi x ln(pi)
Thryonomys Swinderianus	23	0.29
Rattus rattus	6	0.30
Atherurus africanus	1	0.11
Xerus erythropus	1	0.11
Cricetomys gambianus	3	0.19
Crossarchus obscurus	1	0.11
Manis tricuspis	1	0.11
		∑ **1.22**

A total of 36 individuals of small mammals belonging to 3 orders and 7 species were recorded in the study area. The order rodentia contains 5 species and accounted for the most abundant while carnivora and pholidota were the least abundance. The higher value of rodent species over other small mammal fauna in the study may be attributed to the availability of food (rodents feed on large variety of food), and different habitat features and their resilience in readily adapting to modified habitats. This result correspond with reports of Koteler and Brown (1988) and Marcello *et al*., (2008) that food availability influence rodent abundance. *Thryonomys swinderianus* accounted for 63.88% of the percentage abundance followed by the *Rattus rattus* 16.66%, *Cricetomys gambianus* 8.33% while *manis tricuspis, Atherurus africanus, Xerus erythropus, Crossarchus obscurus* accounted for 2.78% respectively. *Thryonomys swinderianus* dominated the study area because they are known as reported by Demeke and Bekele (2013), to feed on large variety of food (cassava stem, maize, sugar cane, grasses-elephant grass) which were quite common in the area.

Shannon diversity index was 1.22 and this is similar to reported by Barnett *et al*. (2000) having a diversity index of 1.23. The low species diversity of small mammals in the study area indicate community instability due to undesirable human practices such as bush fires and fuel - wood cutting. Similar report from Angelici *et al*. (2001), that a large portion of forest in the southern-eastern Nigeria has been lost to other forms of land use over the years with its attendant risk on a wide variety of wildlife. A good percentage of the forest cover of the study area has been lost, while the remaining forest is heavily degraded and exploited. Hunting of mammal species is ongoing at an unsustainable level, because bush meat is considered to taste good by people and can generate revenue to sustain their living. Since there is no enforced control, all size of mammal are hunted with various traps, guns, fires and dogs by professional and non-professional hunters. Pressures imposed on the animals and their habitat by villagers in the study area as they continue to cut trees for firewood, timber and to clear land for agriculture, building of houses and other infrastructural

development, have made most animals that were once common in this area to become either low in diversity or extinct.

Trap success is usually expressed as the number of animal caught per 100 trap night according to Barnette *et al.* (2002). Trap success ranged from 0.4% to 7.54% and this indicated that trap success was low in the study area. Similar result reported by Rowe-Rower and Lowry (1982) accounted for 5.0% trap success in South Africa possibly related to habitat unsuitability and topographic variation of the area, while Demeke and Bekele (2013) reported 12.8% trap success of small mammals in Chebera-Churchura National Park, Ethiopia due to rainy season which was associated with reproduction for most rodent species.

The morphoemetric features of small mammal in Idu varied from species to species. *Atherurus africanus and Thryonomys swinderianus* had body weight of 3.40 and 3.01kg respectively while *Rattus rattus*, *Xerus erythropus* and *Crossarchus obscures* had less than 1kg body weight. The *Manis tricuspis* recorded the highest body length of 79.9cm while *Rattus rattus* had the lowest body length of 13.50cm. This result is similar to report of Anadu (2006) in which *Rattus rattus* recorded the lowest body weight of 18.0cm and body mass of 0.23 kg..

The study revealed that small mammals are sparingly distributed across the Idu community. Recognizing their importance in ecosystem functioning and services, there should be a provision of alternative means of livelihood for the local populace around the study area to reduce their rate of dependence on the forest resources. Alternatively, representative suitable areas should be reserved to form sanctuary for the mammalian fauna of the area.

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