Original Research Article

Morphology and bait preference of Black rat (*Rattus rattus*) in University community in Nigeria: Obafemi Awolowo University as case study

Abstract

Aims: This study assessed the morphology and the bait preference of black rat (*Rattus rattus*) in Obafemi Awolowo University student hostel with the aim of controlling the population of black rat in the students' hostels.

Place and Duration of the Study: The study was carried out at Obafemi Awolowo University which is situated in Ile-Ife, an ancient city in the Southwestern Nigeria and lies between latitudes 7°28′N and 7.467°N and longitudes 4°34′E and 4.567°Ewith a landmass of 5,506 hectares between December 2017 and February 2018

Methodology: Locally made metal traps (cage traps) (Plate 1) contains baits were placed fortnightly in various sampling locations (Awolowo, Fajuyi, Angola, Akintola, Mozambique and Moremi halls of residence) for a period of 3 months between the months of December, 2017 to February, 2018. The traps were set around the dark corners of the sites in the evening and collected the following morning between 21.00- 6.00 hour.

Results: A total of 236 black rat (*Rattus rattus*) were caught (81 male & 155 female), with the female having the highest weight (238.30 g). Among the baits used, fried fish caught the highest number of black rat (58%) followed by beans cake (akara) (28%) and the locust bean (14%). There is positive correlation in the morphology of the black rate caught in all the hostels.

Conclusion: The black rats in the University student hall of residence are of the same family and genus, and fried fish is the best preferred bait.

Keywords: *Rodents, Morphology, Baits,* Black rat**, Obafemi Awolowo.** ~~*PCA, Measurement*~~

Introduction

The black rat is one of the most widespread animal species in the world due to their adaptability to a wide range of habitats (1). *Rattus rattus* is able to utilize most terrestrial habitat types on continents and islands. In urban areas, they are found around warehouses, residential buildings, and other human settlements. Roof rat (*R. rattus*), house rat (*Mus musculus*) and Norway rat (*R.*

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norvegicus) play a significant role within public health sector (2) such as carriers of many infectious and parasitic diseases that can be transmitted to human being (3).

In urban areas, the damage caused by rodent incisor activity cannot be underestimated, most especially to power cable leading to blackout and fire in most cases (4). At home and hostels, black rat (*R. rattus*) caused damage to clothes, foods, books, household materials that are stored and sometimes in use. At home, the tips of fingers and toes are biting by black rat if they are not properly washed before going to be (5). If not control, rodent pests are connected to considerable economic losses and become a considerable conservation threat to life, indigenous flora and fauna in most part of the world (2).

In various hostel and staff quarters in the Obafemi Awolowo Universities, black rat (*R. rattus*) has been the major rodent causing damage to both students and staff properties. The population of black rat kept increasing due to availability of shelter, food and water (6). The University community has defined many means of controlling black rat (*R. rattus*), but to no avail.

In line of the damage cause by rodent (Black rat), continuous control of rodent population ~~are~~ is important especially in human populated area (Hostel) where risks to health and security are greater due to the presence of rats pests (2). Alteration of environment can produce substantial changes in vertebrate population, since they depend~~s~~ upon the environment for shelters, food and water (7).

~~Morphometric analysis is a tool used in extracting information about biological material and biological processes. It is defined as the quantitative characterization, analysis, and comparison of biological forms (Roth and Mercer, 2000). According to Linzey (9), the~~

Black rat is a medium sized, slender brownish-or grayish-black rat with a coarse fur, grayish-white under part, large eyes and ears, and whiskers around the nose which is pointed. ~~They~~ he possesses a tail that is sparsely scaly and longer (approximately 110 percent) than the combined length of the head and body. The total length is about 32.5-42.5 cm long, tail length about 19-24 cm long, hind foot length 3.5-3.8 cm long and weight is about 140-280g. In the other hand, Black rats (*R. rattus*) is an omnivore but a selective feeder and eat a wide range of foods including seeds, fruits, stems, leaves, fungi and a variety of invertebrates and vertebrates (10). They are not

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specific in their preference for food, they have been observed to feed on anything ranging from stored food to cooked food, to plastic, wood and many other food sources. ~~They are~~ He is therefore called generalists (11). However, human being often provides rodents with an abundance of food, water, shelter and favourable microclimatic condition, which allow them to be comfortable and multiply easily (12). The number of rats that are able to exist in any given location depends on availability of foods, water and harbourage (13).

These factors are commonly found among students in University where both shelter and food are being provided for black rat *(R. rattus*). Since ~~rodents~~ rodent populations has being attributed to risk of health in high densities of human inhabitants (such as University hostels), it is important to look for way to control them without endangering them. Hence, this study is aimed at assessing the morphological variation of black rats (*Rattus rattus*) found in some locations on Obafemi Awolowo University Campus; and determine the most effective bait that can be used to capture black rats to prescribe to University authority the best bait to use in controlling black rat in the University community.

2.1 Materials and Methods

2.1.1 Description of study area

The study was carried out at Obafemi Awolowo University which is situated in Ile-Ife, an ancient city in the Southwestern Nigeria and lies between latitudes 7°28′N and 7.467°N and longitudes 4°34′E and 4.567°Ewith a landmass of 5,506 hectares and altitude of 300m above sea level (Encyclopedia Britannica, 2014). The climate of the area is humid tropical with distinct dry and wet seasons. The wet season starts from around mid-March to late October and the rainfall pattern is bi-modal with peak periods in July and September. The dry season runs from November to March but a short spell usually occurs in August. The mean annual rainfall is about 1400mm. The mean ambient temperature ranges from 20 °C to 30 °C with a mean temperature of 26 °C.

2.2 Sampling sites

The location of the survey includes three male hall of residence and three female hall of residence on Obafemi Awolowo University Campus. These sites were chosen in order to note

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and record the food consumed and mostly preferred by the black rats in the halls of residence. Three traps were used for one week interchangeably to ensure random sampling of the captured rats. The trapping activities were carried out during the months of December, 2017 to February, 2018. The various hall of residence includes;

2.2.1. Awolowo hall

This is a male hall and is known to be the most populated hall in Obafemi Awolowo University with a maximum capacity of 2,032 legal occupants (students). Trees and bushes of varying sizes are found around this hall of residence. It consists of 8 blocks of 42 rooms each, and annex of 8 blocks with 10 rooms each.

2.2.2. Fajuyi hall

This is a male hostel and the known 2nd most populated hall in Obafemi Awololwo University with a maximum capacity of 1,788 legal occupants (Students). It is very close to a female hostel known as the Akintola hall. It consists of 5 main blocks with 60 rooms each and annex of 10 blocks with 10 rooms each.

2.2.3. Angola hall

This is a male hall which is really close to Awolowo hall and really distant from academic environment. It has a maximum capacity of 1,320 legal occupants (Students). The hall consists of 11 blocks with 10 rooms each.

2.2.4. Moremi hall

This is the female hall of residence. It has a maximum capacity of 1,228 legal occupants. The hall is divided into two parts altogether containing 8 blocks with 30 or 33 rooms each.

2.2.5. Ladoke Akintola hall

This is the female hostel which is very close to Fajuyi hall of residence. It has a maximum capacity of 640 students. This hall of residence consists of 4 blocks with 30 rooms each.

2.2.6. Mozambique Hall

This is a female hall located adjacently to Angola hall. It has a maximum capacity of 1,722 legal occupants (students). It consists of 14 blocks with 10 rooms each and 2 annex at the lower part of the hall. There are a lot of small grasses and bushes around it.

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~~**2.3. Materials**~~ This section is not necessary because the materials are describing in the methodology

~~Materials used for rats' collection include the following:~~

~~1. Locally made metal traps (cage traps) for trapping one rat at a time (Plate 1).~~

~~2. Latex Examination glove to prevent one from direct contact with them.~~

~~3. Rubber gloves to protect against rat bite.~~

~~4. Baits which include locust beans (*Iru*), beans cake (*Akara*) and fried fish.~~

~~In the laboratory, the materials used were:~~

~~1. Killing jar with chloroform to anaesthetize the specimen.~~

~~2. A top loading weighing balance (Salter, model 250, England made) and an electronic weighing scale to measure the weights of collected samples.~~

~~3. A measuring board to measure the morphometric data.~~

~~4. Thick Hand gloves to prevent contamination with germs while working in the laboratory.~~

~~5. Thread for easy measurement.~~

2.3.1. Sampling method

Locally made metal traps (cage traps) (Plate 1) contains baits which are the locust beans, beans cake and fried fish hooked to an iron rod attached to it in order to attract the rats were placed fortnightly in various sampling locations (Awolowo, Fajuyi, Angola, Akintola, Mozambique and Moremi halls of residence) for a period of 3 months between the months of December, 2017 to February, 2018. The traps were set around the dark corners of the sites in the evening and collected the following morning between 21.00- 6.00 hour. The trapped black rats (*R. rattus*) were taken to the laboratory for measurement and further analysis.

2.3.2. Data collection

The captured rats were anaesthetized in a close jar containing chloroform, tagged, and weighed on a scout weighing balance (Plate 2) and placed on the measuring board (Plate 3) for morphometric determination. The tag carried the specimen number along with other information which included place of collection, date of capture and sex of the rat which was determined by checking the scrotal sacs (only males have scrotal sacs) were documented.

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Plate 1: A trap set at one of the study site

Plate 2: Black rat on a Scout ™ Pro weighing scale (Top loading)

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Plate 3: Black rat on a measuring board ~~to measure the morphometric parameters~~

The morphometric parameters such as the Body length (BL), Tail length (TL), Ear length (EL), Sex, Hind-foot length (HL) and the Body weight (BW) were recorded. The body length was taken by measuring from the tip of the mouth to the tip where the tail attaches to the body. The tail length is measured from where the tail attaches to the body. The ear length is measured from the tip where the ear attaches itself to the head to the longest end of the ear. The hind length is measured from its point of attachment to the leg to the tip of the longest toe.

2.3.3. Data analysis????

3.0 Results

A total of sixty-nine (236)??? black rats belonging to the family Muridae, order Rodentia ~~were~~ was caught from the various sampled halls of residence (Table 1). Of the total catch, 23.31 % (55) ~~of it~~ was recorded in Moremi hall which was the highest while the lowest percentage ~~of the~~

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~~catch were~~ was recorded in Awolowo Hall with 12.71 % (30). The highest number (20) of male black rats *(R. rattus*) ~~were~~ was caught in Moremi Hall, while the least number (10) ~~were~~ was caught in both Angola and Akintola respectively. The highest number (35) of female black rat *(R. rattus*) ~~were~~ was caught in both Moremi and Mozambique Hall, while the least number of female black rat (21) ~~were~~ was caught in Akintoal Hall. Irrespective of the sampling point, higher percentage (65.68%) of female black rats ~~were~~ was collected during the period of study when compared with male (34.32%).

The morphometric parameter of the female black rat specimens is shown in Table 2. In the table, the statistical analyses revealed that the mean Hind-foot length (HL) and Ear length (EL) of the female black rats collected from Mozambique and Angola were statistically different ($p \leq 0.05$) from that of the female black rat specimens collected from other halls of residence.

The Hind-foot length of the female black rats collected from halls of residence on OAU Campus which ranged from 2.10 cm (Mozambiqueand Fajuyi) to 4.70 cm (Moremi) had the highest mean Hind-foot length value of 3.64 ±0.18 cm recorded in the female black rat~~s~~ specimens collected from Moremi hall. This was closely followed by the specimens collected from Awolowo hall with a length value of 3.62 ±0.16 cm while the lowest mean Hind-foot length was recorded in the female black rat~~s~~ specimens collected from Mozambique hall with a value of 2.70 ±0.60 cm (Table 2)

Table 1: The abundance of black rats *(Rattus rattus*) caught in various halls residence on Obafemi Awolowo University, Ile-Ife

S/N	Halls of residence	Catch Frequency		Total caught	Percent (%)
		Males	Females		
1	Akintola	10	21	31	13.14
2	Moremi	20	35	55	23.31
3	Mozambique	18	35	53	22.45
4	Awolowo	11	19	30	12.71
5	Angola	10	22	32	13.56
6	Fajuyi	12	23	35	14.83

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7	**Total**	**81**	**155**	**236**	**100**

S=??; N=??

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Table 2: The morphometrics parameters of female Black rats (*Rattus rattus*) caught in various halls of residence on???????

S/N	Halls of residence	Statistics	Hind-foot Length (cm)	Ear Length (cm)	Body Length (cm)	Tail Length (cm)	Body Weight (g)
1	Akintola						
		Range	2.20-4.00	2.00- 3.50	11.20 - 23.50	12.80 - 26.70	55.90 - 207.30
		Mean	3.51 [a]	2.86 [a]	18.64 [a]	21.67 [a]	146.51 [a]
		±S.E	±1.61	±0.12	±1.18	±1.54	±5.30
2	Moremi	Range	2.90 - 4.70	2.40 - 3.40	13.90 - 25.30	15.70 - 27.40	85.50 - 238.30
		Mean	3.64 [a]	2.89 [a]	18.91 [a]	21.99 [a]	145.53 [a]
		±S.E	±0.18	±0.09	±1.09	±1.17	±17.25
3	Mozambique	Range	2.10 - 3.30	1.70 - 3.00	8.30 - 21.90	9.20 - 23.00	12.50 - 153.80
		Mean	2.70 [b]	2.35 [b]	15.10 [b]	16.10[ab]	83.15[ab]
		±S.E	±0.60	±0.65	±6.80	±6.90	±7.65
4	Awolowo	Range	3.00 - 3.90	2.30 - 3.20	15.10 - 20.30	21.80 - 23.00	125.60 - 143.80
		Mean	3.62 [a]	2.82 [a]	18.26 [a]	22.52 [a]	134.80 [a]
		±S.E	±0.16	±0.15	±0.91	±0.22	±3.30
5	Angola	Range	2.30 - 3.50	1.90 - 3.00	9.60 - 19.50	11.50 - 21.80	25.30 - 126.30
		Mean	2.80 [b]	2.38 [b]	14.16 [b]	16.18[ab]	70.34[ab]
		±S.E	±0.24	±0.22	±1.85	±2.14	±7.81
6	Fajuyi	Range	2.10 - 3.80	1.80 - 3.20	10.20 - 20.80	11.10 - 25.20	18.90 - 178.30
		Mean	3.04[ab]	2.58[ab]	15.28 [b]	17.14 [b]	92.67[ab]
		±S.E	±0.35	±0.31	±2.26	±2.73	±3.80

[a, b] Means within column with different Superscript are significantly different (P≤0.05) from each other. **S=??; N=??**

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The Ear length (EL) of the female black rat specimens which ranged between 1.70 cm (Mozambique) and 3.50 cm (Akintola) was reported to have highest mean Ear length value of 2.89 ±0.09 cm (Moremi) and a lowest mean Ear length value of 2.35 ±0.65 cm (Mozambique). The statistical analyses however revealed a significant difference (P≤0.05) in the Ear length of the female black rat specimens collected from various hall of residence (Table 2).

The female black rat specimens collected from Moremi hall had the highest range (13.90 cm - 25.30 cm) of the Body length (BL) and the highest mean Body length (18.91 ±1.09 cm). The lowest mean Body length of the female black rat specimens was however recorded in the sample collected from Angola hall (14.16 ±1.85 cm). The mean Body lengths of the black rats specimens collected from Akintola (18.64 ±1.18 cm), Moremi (18.91 ±1.09 cm) and Awolowo (18.26 ±0.91 cm) which were not statistically different from each other (P≥0.05) were however different statistically (P≥0.05) when compared with Body length of the female black rat specimens collected from other halls of residence (Table 2).

The Tail length of the female black rat specimens ranged between 9.20 cm (Mozambique) and 26.70 cm (Akintola). The highest mean Tail length of the female black rat specimens was however recorded in the specimens collected from Awolowo hall with a value of 22.52 ±0.22 cm, followed closely by 21.99 ±1.17 cm in specimens from Akintola hall. The lowest mean Tail length 16.10 ±6.90 cm in the female black rat specimens was recorded in the specimens collected from Mozambique hall. Statistical variation (P≤0.05) was however recorded in the Tail length of the female black rats collected from various halls of residence (Table 2).

The Body weight (BW) of the female black rat specimens which ranged between 12.50 cm (Mozambique) and 238.30 cm (Moremi) had the highest mean value of 146.51 ± 5.30 cm (Akintola) and least mean value of 70.34 ±7.81 cm (Angola) which was however statistically different (P≤0.05) from all the recorded mean Body weight value (Table 2).

The morphometric parameters of the collected male black rats in halls of residence on Obafemi Awolowo University is shown in Table 3. As shown in the table, Hind-foot length, Ear length, Body length,

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Table 3: The morphometric parameters of male Black rats (*Rattus rattus*) caught in various halls ofresidence on Obafemi Awolowo University, Ile-Ife

S/N	Halls of residence	Statistics	Hind Length (cm)	Ear Length (cm)	Body Length (cm)	Tail Length (cm)	Body Weight (g)
1	Akintola	Range	1.70 - 3.80	2.20 - 3.20	10.50 - 25.00	11.50 - 25.60	19.30 - 187.50
		Mean	3.30[ab]	2.81 [a]	18.68 [a]	20.18 [a]	116.13[ab]
		±S.E	±0.21	±0.11	±1.39	±1.49	±5.55
2	Moremi	Range	3.30 - 4.70	2.60 - 3.40	17.20 - 24.30	22.00 - 26.70	106.70 - 226.50
		Mean	3.94 [b]	2.98 [a]	21.14 [a]	23.82 [a]	160.46 [b]
		±S.E	±0.26	±0.14	±1.32	±0.88	±3.77
3	Mozambique	Range	2.50 - 3.50	2.10 - 2.80	11.70 - 18.90	13.80 - 20.20	57.70 - 114.30
		Mean	3.03[ab]	2.53 [a]	15.77 [a]	17.93 [a]	83.17 [a]
		±S.E	±0.29	±0.22	±2.13	±2.07	±6.58
4	Awolowo	Range	2.90 - 3..90	1.50 - 3.60	9.80 - 20.50	9.00 - 23.80	17.70 - 152.30
		Mean	3.57[ab]	2.93 [a]	17.07 [a]	19.98 [a]	109.3[ab]
		±S.E	±0.18	±0.34	±1.54	±2.24	±9.39
5	Angola	Range	2.00 - 3.40	1.18 - 2.90	11.20 - 18.70	11.90 - 23.40	23.20 - 145.80
		Mean	2.70 [a]	2.35 [a]	14.95 [a]	17.65 [a]	84.50 [a]
		±S.E	±0.70	±0.55	±3.75	±5.75	±.6.1
6	Fajuyi	Range	2.80 - 4.20	2.30 - 3.80	15.70 - 24.30	18.10 - 28.40	65.70 - 200.70
		Mean	3.59[ab]	3.09 [a]	20.13 [a]	23.76 [a]	150.61[ab]
		±S.E	±0.19	±0.20	±1.09	±1.34	±8.96

[a, b] Means within column with different Superscript are significantly different (P≤0.05) from each other. **S=??; N=??**

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Tail length and Body weight ranged from 1.70 cm (Akintola) - 4.70 cm (Moremi); 1.18 cm (Angola) - 3.50 cm (Fajuyi); 9.80 cm (Awolowo)- 25.00 cm (Akintola); 11.50 cm (Akintola) - 28.40 cm (Fajuyi); and 17.70 cm (Awolowo) - 226.50 cm (Moremi) respectively.

The highest mean hind-foot length value (3.94 ±0.26 cm) of the male black rats caught was recorded in Moremi hall while the lowest hind-foot length value (2.70 ±0.70 cm) of the male black rat specimens was recorded in Angola hall. The statistical analyses of the hind-foot length values for the male black rat specimens collected from Moremi and Angola hall showed a statistical difference ($P \leq 0.05$).

Similar to the values recorded in the hind-foot length of the male black rats collected from various halls of residence, highest ear length (2.98 ±0.14 cm), mean body length (21.14 ±1.32 cm) and mean tail length (23.82 ±0.88 cm) was recorded in the male black rat~~s~~ specimens collected from Moremi hall while the least value of these parameters 2.35 ±0.55 cm; 14.95 ±3.75 cm and 17.65 ±5.75 cm respectively were recorded in the specimens caught in Angola hall. Statistical analyses showed that there were no significant differences ($P \geq 0.05$) in all the values recorded for these parameters (Table 3).

Male black rat specimens collected from Moremi hall had the highest mean body weight value of 160 ±3.77 cm which was closely followed by the specimens caught in Fajuyi hall with a value of 150 ±8.96 cm. The lowest mean body weight value (83.17 ±6.58 cm) of the male black rat specimen~~s~~ was recorded in Mozambique hall. Comparative analyses however showed that the mean body weight of the male specimens collected from Moremi was significantly different ($P \leq 0.05$) from the mean body weight of the rat~~s~~ specimens collected from Mozambique 83.17 ± 6.58 cm and Angola 84.50 ±6.10 cm which were not statistically different ($P \geq 0.05$) from each other (Table 3).

Morphometric parameters subjected to a Principal Component Analysis (PCA) showed correlations and variance occurred among the six (6) Halls of Residence where the black rat specimens were captured. The Principal Component divided the Black Rats into five (5) Components namely the PC (1, 2, 3, 4, and 5) representing (BW, TL, BL, EL and HL) respectively which have an Eigen value each and percentage variance in Table 4a. From this

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table only PC1 (BW) of Eigen value 3040.6 and percentage variance of 99.69 had the most significant being higher than the Joliffe cut- off of 4.27.

Also, in Table 4b, it is observed that PCI (BW) had the highest Eigen value of 4.29646 and

PC	Eigen Value	% variance
1	3040.6	99.69
2	6.69493	0.2195
3	2.56926	0.084237
4	0.142177	0.0046615
5	0.0397171	0.0013022

percentage correlation of 85.929 compared to all other parameters. Here in correlation the Joliffe cut-off is 0.7. The loading plot in Table 4b showed clearly the variance that occurred.

Table 4a: The Eigen value and percentage variance of each Principal Component of Black rats captured from all Halls of Residence under the Joliffe cut-off of 4.27

Table 4b: The Eigen value and Percentage Correlation of each Principal Component of Black rats captured from all the Halls of Residence with a Joliffe cut-off of 0.7

PC	Eigen value	% Correlation
1	4.29646	85.929
2	0.309825	6.1965
3	0.177207	3.5441
4	0.129337	2.5867
5	0.0871757	1.7435

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A scatter plot diagram in Figure 1 showed a cluster eclipse of all the halls of residence (Akintola, Moremi, Mozambique, Awolowo, Angola and Fajuyi) represented with different color such as (Red, Blue, Purple, Deep green, Green and Indigo) respectively. The plotting showed that all the black rats in the six different Hall of Residence belong to the same homogeneous population, though there might be a very little variation which is statistically insignificant.

The black rats preferences for the bait used in this study is shown in Figure 2. In the figure, preference for bait showed that most of the catches were from the trap baited with fried fish (58%), followed by beans cake (28%). The trap baited with locust beans recorded the least number of catch (14%). Figure 3A showed that the frequency of male caught by bait in halls of residence had traps with fried fish with a total of 41, followed by beans cake which caught 27 and locust beans which caught 13. Figure 3B also showed that 95 female rats were caught by fried fish, followed by Beans cake which caught a total of 40 and locust beans with a total of 20.

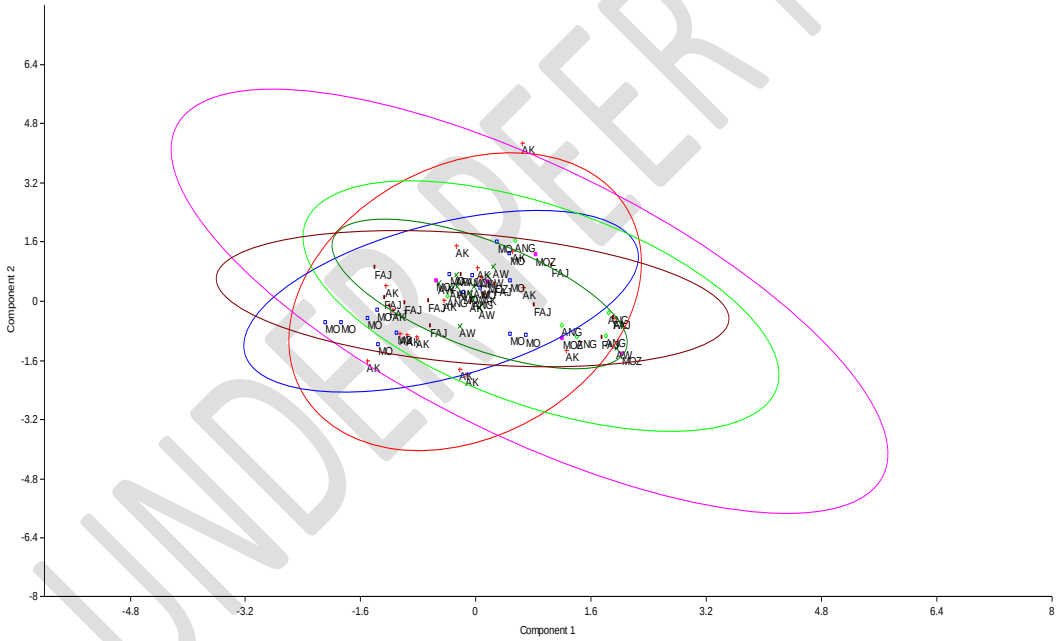

Figure 1: Principal Component Analysis (PCA) Scatter Plot showing Morphometric relationship in Black rats captured from all the six (6) halls of residence.

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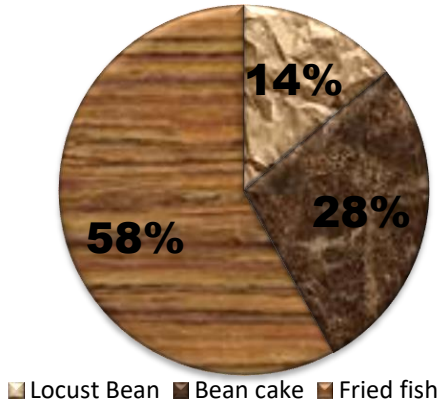

Figure 2: Effects of bait preference on percentage of Black rats caught in all the halls of residence based on food-bait preference.

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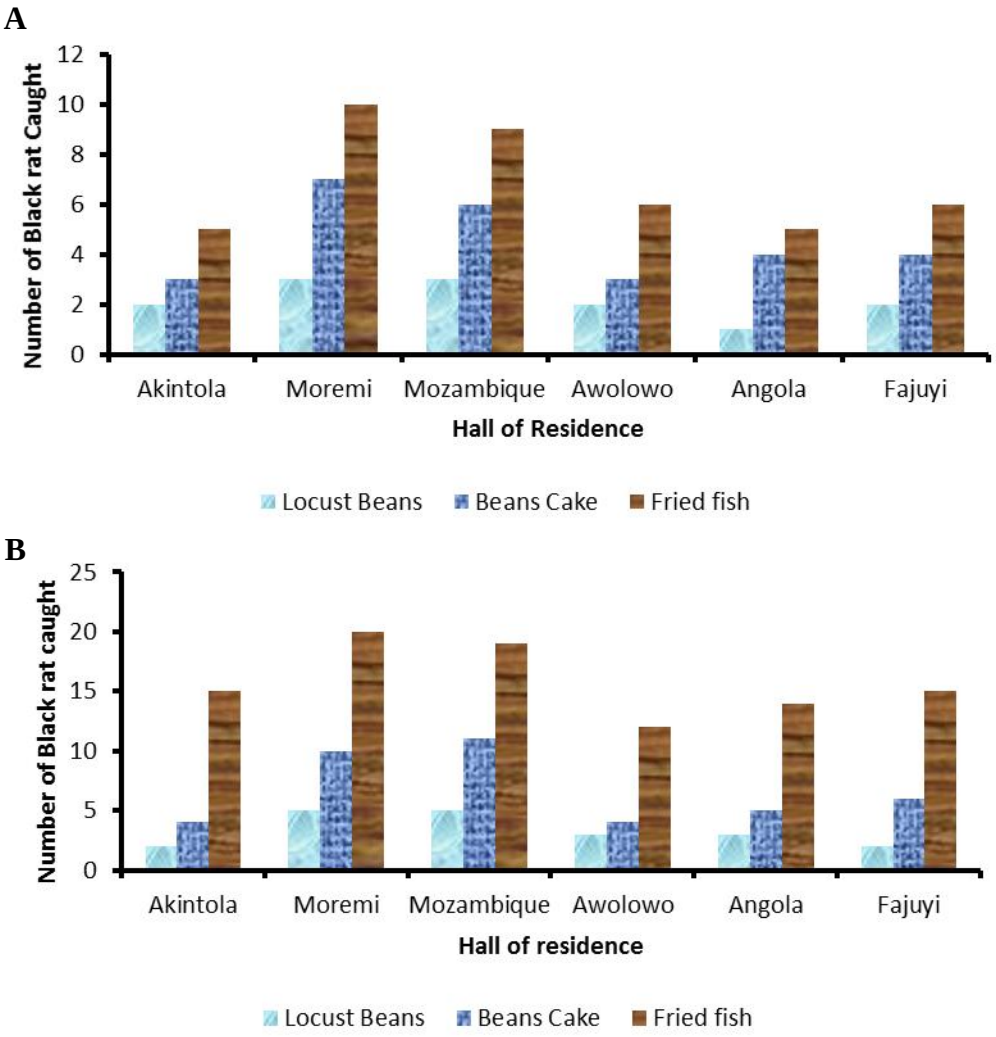

Figure 3: Effects of different baits on the quantity of Black Rat (Rattus rattus) caught in different student~~s~~ residence~~s~~ in the University. (A) Male Black rat, (B) Female Black rat

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379 **4.0 Discussion**

380 The abundance and composition of black rats collected in various hall of residence, Obafemi
381 Awolowo University, Ile-Ife corroborates the findings and submission of several authors that
382 black rats are cosmopolitan (14;15). However, the sex ratio in this study was not equilibrated
383 (81 males to 155 females) and was differ from the findings of Ben Faleh *et al*.~~,~~ (16). The
384 reduction in the number of male black rat may be due to competition and their territorial
385 behavior (17).

386

The various variation exhibited by the black rats in the measured morphometric have been reported to be hypothetically due to climatic factors, metabolism rate, competition and mating success (18 and 19). However, size variation is generally considered more liable to environmental gradients than shape (19).

Generally, a very strong positive correlation (0.97) exhibited among the determined parameters in this study corroborates the findings of morphometric characters of Albino rats by Aguha *et al*. (20) which showed that there were satisfactory correlations between the body length and their respective parameters.

However, there were indications that the body length and tail length may have better link with the body weight than the rest of the parameters (20). This study also showed that there was an increase in variation between body weight and body length when their values increased, this meant that some black rat might have higher body weight but a smaller body length.

Virtually, in this study it can be deduced that all the parameters when compared with the body weight had a very positive correlation coefficient except in ear length which is apparently low compared to others. This was also similar to what was reported by Jimmy *et al*. (21) who determined the variability in body morphometric measurements and relationship between body weight and other morphometric measurements in Albino rats (*Rattus norvegicus*). Where correlation between Body weight and Ear length was low and other parameters had high significant ($P < 0.001$) positive correlation.

Black rat (*Rattus rattus*) possesses the ability to select favourable food, which even displays their potential for local difference in the choice of food (6). One food is eaten among other alternatives, based on factors such as taste; nutritional value and texture (22). This could be one of the reasons why the rat specimens opt for the food used as bait in this study.

The preference for fried fish used as bait in this study by the black rats could be due to its flavour. Fishes are known to be flavoured food with high nutritional value (23). Myers (24) reported that rats preferred food with high flavour. Also Brooke's and Lavoie (25), Sarwar *et al*. (26) confirmed in their research that additives like sugar and vegetable oils at 1% to 3% concentration increases the food intakes of black rats and makes it acceptable and palatable to

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them. In this study it was observed that both fried fish and beans cake (akara) had the highest rate of acceptability and preference amidst the black rats because they both contain additive like oil.

Conclusion

The morphology of the black rat (*R. rattus*) from the residence in the university are similar which means they are of the same family and genus. Fried fish out of three baits (Fried fish, beans cake & locust bean) used for the study proof efficient in catching black rat in students all of residence. Although, it may be expensive to use, since it is the fried fish flavour that attract the black rat, fried fish flavour however can be used with other food material in catching black rat.

Competing Interests

Authors have declared that no competing interests exist

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