

# ECOLOGY, DISTRIBUTION, FOOD, TRAPPING AND DOMESTICATION TECHNIQUES OF CANE RATS *Thryonomys* SPP IN SOUTHEASTERN NIGERIA

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## ABSTRACT

The ecology, distribution, food and feeding habits and domestication techniques of cane rats were studied in seven states of southeastern Nigeria, between January, 1996 and January, 2003. The presence of footprints, faecal pellets, food remnants and trails of cane rats were observed monthly along 56 500 x 2.0 m transects. The food, feeding habits and behaviour in the wild were observed from the top of trees using binoculars. Methods of capturing cane rats alive were studied. Their food, feeding habits and behaviour in captivity were also studied in pens 2 x 2

x 2 m. Two species of cane rats *Thryonomys swinderianus* and *Thryonomys gregorianus* occur in southeastern Nigeria. The former is abundant at swampy and lowland areas especially at abandoned *Manihot esculenta* farmlands over 3 years old, which had 26.3 per cent of the total number of mammals, observed at Umudike, Nigeria. The latter occurs at highland area. The box trap measuring 0.5 x 0.3 x 0.3 m was very efficient for trapping of cane rat. Cane rats feed mainly on stems of *Oryza sativa*, *Pennisetum purpureum* and *Zea mays*, and tubers of *Manihot esculenta*. They feed at all times. Enough and adequate food is required to prevent them from feeding on cement, zinc and polythene material which block the alimentary canal and cause their death. On their trail, the males lead. In the pen the males eat first before the females join them in feeding. Cane rats between 2 and 6 weeks old easily get adapted to the pen.

**KEYWORDS:** *Thryonomys swinderianus*, domestication, capturing techniques, feeding habits.

## INTRODUCTION

Cane rat is a rodent of the animal family, *Thryonomidae*, and genus *Thryonomys*. One species of cane rat *Thryonomys swinderianus* has been reported existing in Nigeria (Happold, 1978). However, according to National Research Council (NRC, 1991) two species of cane rat, *Thryonomys gregorianus* and *Thryonomys swinderianus* exist in Cameroon, a country with common boundary with Nigeria. Cane rat is found in tropical savanna regions and secondary forest regrowth. With the destruction of the Nigerian rainforest at a rate of 3.0 per cent per annum (Okojie, 1998) and the unassured natural methods of regenerating the rainforest (Dike, 2000), the habitat of cane rat appears to be on the increase. Seeds of many plant weeds (Akobundu and Agyakwa, 1998), which do not readily germinate and establish under closed forest canopy germinate and establish in degraded secondary forest regrowth. Moreover, many farmers do not plant canopy tree species listed as economic in degraded abandoned farmlands (Lancaster, 1960; Dike, 2003). It appears that, some of these weeds sustain and protect cane rats and their litters. There is paucity of literature on the distribution, food and feeding habits of cane rat in southeastern Nigerian rainforest.

The meat of cane rat is acceptable to Nigerians and it is regarded as a delicacy. With more than 1.4 per cent annual increase in Nigerian population (Madu, 2001), there is high demand for the meat of cane rat and the rodent is being hunted by using various types of snares, traps and guns. The low animal protein intake per person per day in Nigeria is below the recommended world standard (Oyenuga, 1974). Any affordable and inexpensive sources of increasing the availability of animal protein is being looked into. Many institutions and farmers would like to rear cane rat at the backyard mainly to supplement for the low animal protein intake of 8.3 g per person per day in Nigeria (Oyenuga 1974). Adequate nutrition is essential for proper development of a child. According to Omololu (1974), a child suffering from protein deficiency is unlikely to attain full expression of his genes especially in the brain. Some of these poor expressions

could be very difficult to correct in adulthood. There is the need to domesticate cane rat as a source of increasing the availability of animal protein before cane rat is classified as either endangered or extinct.

Meduna and Ayodele (1987) described two stage techniques of 'search-chase and grip' and 'search and grip' for capturing cane rat in the savanna zones. These techniques are difficult to apply in the rainforest zone especially in the swampy areas where snakes are abundant. Also the techniques involve the burning of the experimental site. The burning often led to the destruction of the niches of other animals especially some endangered ones. Moreover, some of the cane rats caught died after some days as a result of the stress caused to them during the chasing and gripping operations. There is the need to search for a more appropriate method of catching cane rat alive.

Ajayi (1979) recorded that cane rat is highly productive. In Ghana, a cane rat litter between 2 and 6 (Asibey, 1974; NRC, 1991) and breeding is throughout the year. There is scanty literature on the techniques of domesticating cane rats in southeastern Nigeria. This paper reports on the ecology, distribution, food, trapping and domestication techniques of cane rats in southeastern Nigeria. This paper would guide institutions and farmers wishing to rear cane rats.

## MATERIALS AND METHODS

The study areas covered seven out of a total of nine states in southeastern Nigeria. These states are Abia, Akwa Ibom, Anambra, Cross River, Ebonyi, Enugu and Imo states. These states lie between latitudes 4° 25' and 7° 10' N and longitudes 6° 45' and 8° 15' E. The climate is equatorial type. The topsoil temperature ranges between 19°C and 45°C. The humidity is high and often above 60 per cent (Dike, 2000). There are two seasons; a wet and a dry season. Each year the wet season starts from mid-March and ends in mid-November. The dry season continues till the following March. The total annual rainfall ranges between 1500 and 3500 mm. There are two peaks in rainfall, which occur in June/July and September. The total monthly rainfall is less than 30mm in the



*Thryonomys gregorianus* lives mainly at upland areas. This agrees with the record provided by (NRC, 1991). Few *Thryonomys swinderianus* were found at upland and a lot more at the lowland areas. In all cases, *Thryonomys swinderianus* was frequent at swamps and abandoned *Manihot esculenta* farmlands (Table 1).

The presence of footprints, faecal pellets, food remnants and trails of cane rats were observed along all of the studied 56 500 x 2.0 m transect, during the wet and dry seasons (Table 1). It was observed that one *Thryonomys swinderianus* could drop its faecal pellets at two or more places within one hour. The footprints were more visible at the swampy sections of transects and one could easily determine

the number of cane rats and their directions of movement. The faecal pellets are fairly flat on one side and the other side has a depression at the central portion. The faecal pellets of a mature cane rat ranged between 11.81 and 18.06 mm in length and between 8.51 and 16.39 mm in width. The thickness also ranged between 6.88 and 9.89 mm. These are longer than those of either giant rat (*Cricetomys gambianus*) or West African dwarf goat (*Capra species*) (Table 2). In this study, many faecal pellets were seen near to cane rat food remnants. Cane rat trails are circular and have a maximum diameter of 100mm (Table 3). As a result of the dentation of cane rats, they cut stems and tubers of plants at an angle ranging from 43 to 46 degrees.

Table 2: Measurement of faecal droppings of cane rat (*Thryonomys swinderianus*) ; giant rat, (*Cricetomys gambianus*) and west African dwarf goat (*Capra species*) at Umudike, Nigeria.

Species Name	Common (mm)	Dimension Replicates						Total	Mean	
		1	2	3	4	5	6			
<i>Thryon. swind.</i>	Cane rat	L	18.06	17.33	16.39	16.58	17.00	17.02	102.38	17.06
		W	10.16	10.94	9.89	11.80	11.80	11.02	65.79	10.97
		T	6.88	8.51	7.68	8.22	8.00	6.01	45.30	7.55
<i>Crice. gambi.</i>	Giant rat	L	10.65	6.23	5.97	7.16	8.05	6.76	44.82	7.47
		W	3.29	2.92	3.16	3.41	3.36	3.42	24.18	4.03
		T	3.14	2.45	3.98	2.66	3.05	2.62	16.9	2.82
<i>Capra species</i>	Goat	L	10.21	10.30	10.49	10.71	11.86	10.48	64.05	10.68
		W	7.10	8.45	6.18	8.33	8.47	8.30	46.83	7.81
		T	4.77	4.88	5.40	4.80	3.83	4.00	27.68	4.61

Where L represents Length; W represents Width; T represents Thickness; *Thryo*, *Thryonomys swinderianus*, and *Crice*, *Cricetomys gambianus*.

Table 3: Measurement of diameter of trails of cane rats at Umudike, Nigeria.

Trail No.	Diameter (mm) of cane rat trails
1	68
2	74
3	82
4	10.
5	68
6	41
7	100
8	100
9	98
10.	95
Total	736
Mean	73.6
Range	10 – 100

Cane rats were abundant in abandoned farmlands upto 3 years old (Table 4), especially in areas where Tropical *Manihot* Selection (TMS) 4 (2) were harvested. There were not found at abandoned farmlands less than 2 years old because in most of such farmlands adequate vegetation cover

has not been formed. However, evidence from their foot prints and food remnants showed that they search for their food even in farms with little or no vegetation cover and return to a thicker vegetation before day break.

Table 4: The total number of cane rats and other mammals recorded when each one hectare abandoned farmland of different ages were cleared with a tractor equipped with a slasher at Umudike, Nigeria. The percentage of the total number of mammals is in parenthesis.

Age of farmland (years)	0.5	1-	2-	3-	4-
Cane rat	0	0	11	16	23
Other mammals	6	12	15	14	11
Replicate					
Cane rat	0	0	8	14	19
Other mammals	3	8	6	9	5
Total					
Cane rat	0 (0)	0 (0)	19 (11.9)	30 (18.8)	42 (26.3)
Other mammals	9 (5.6)	20 (12.5)	21 (13.1)	23 (14.4)	16 (10)
Mean					
Cane rat	0	0	9.5	15	21
Other mammals	4.5	10	10.5	11.5	8

The number of cane rats found in abandoned farmlands increased from 11.9 per cent in farmlands upto two years to 18.8 per cent in farmlands upto 3 years. At the fourth year they were the most abundant having 26.3 per cent of the total number of mammals. (Table 4). It was observed that in the wild, cane rat, moved in a single file along their trails. The males led the females. In distance farms, cane rats searched for food both during the day and night. At compound farms and farm 500 m or less towards human dwellings, cane rats searched for their food mainly at night. At the plot where they are to feed, each one moved on its own. However, the female cane rat with her litters often moved solitarily at a denser part of the vegetation. The mother led them and broke their food into smaller pieces for them to pick. When a noise was heard, the mother made a sound 'kur-kur' and all took to their heels. It was observed that cane rats hid in shallow holes, thick

debris and under grasses. It was observed that in the wild, cane rats showed preference for the stems of these plants in a preferential order: *Zea mays*, *Oryza sativa*, *Oryza glaberrima*, *Pennisetum purpureum*, *Andropogon tectorum*, *Andropogon gayanus*, *Vetiveria zizanioides*, *Saccharium officinarum*, *Panicum maximum*, *Rhynchospora corymbosa*, *Ipomea patatas*, *Elaeis guineensis*, *Raphia hookeri*, *Acroceras zizanioides*, and *Sorghum* species. They fed frequently on stems and tubers of *Manihot esculenta*. They fed very little on seeds of *Arachis hypogaea*, *Centrosema pubescens*, *Phaseolus* species, *Pueraria phasealoides*, *Telfaria occidentalis*, *Tetracarpidium conophorum*, *Vigna unguiculata*. In the wild they cut the plant and draw it to a safe place before eating. In the pen they fed on any of the plants served to them (Table 5).

Table 5: Materials used in feeding cane rats in some pen each measuring (2.0 x 2.0 x 2.0 m) at the University of Agriculture, Umudike, Nigeria.

Age of cane rat (week)	Essential Food Required
0.28 - 2.0	Any milk, young stems of <i>Pennisetum purpureum</i> , <i>Zea mays</i> and <i>Oryza sativa</i> .
2.00 - 4.0	Leading shoots of <i>Zea mays</i> , <i>Pennisetum purpureum</i> , <i>Andropogon gayanus</i> , <i>Andropogon tectorum</i> , <i>Oryza sativa</i> and vitamins. Tubers of <i>Manihot esculenta</i> .
4.14 - 12.0	<i>Oryza sativa</i> , <i>Zea mays</i> , <i>Pennisetum purpureum</i> soya beans (grinded) water and calcium salt.
12 - 52.0	<i>Pennisetum purpureum</i> , <i>Zea mays</i> , <i>Oryza sativa</i> , Soya beans (grinded) water, calcium salt, vitamin supplement, and stone.

During the search for their food, cane rat could be caught with different types of traps. In this study, cane rats often detected improperly set gin traps and snares on their trail. A box trap placed carefully on the trail especially where the vegetation was thicker caught the rodents within two days. The main advantage of the box trap is that animal enclosed within it could be released without much injury. However, a cane rat enclosed within the box trap should be released from the box within 48 hours because it was observed that the rodent made desperate attempts to escape thereby sustaining

injuries especially at the nose and mouth regions. In 19 per cent of the time observed at Umudike, *Rattus rattus*, *Archachitina marginata* and millipedes triggered off the box trap. When the fruit of *Zea mays* was used as bait, *Rattus rattus* triggered off the trap in 98 per cent of the time. The gin trap broke the limb of cane rats in 85 per cent of the time and caught undesirable animals in 10 per cent of the time. In 5 per cent of the time, the cane rats were found dead on the gin trap. The snare caught *Rattus rattus* (Table 6).

Table 6. The number of times 10 box traps, 10 gin traps and 10 snares were triggered off by animals within 100 days of observation at Umudike, Nigeria.

Bait used	Box trap		Gin trap		Snares	
	<i>Manihot esculenta</i>	<i>Zea mays</i>	<i>Manihot esculenta</i>	<i>Zea mays</i>	<i>Manihot esculenta</i>	<i>Zea mays</i>
Triggered off by	<i>Rattus rattus</i> 11%	<i>Rattus rattus</i> 98%	<i>Rattus rattus</i> 5%	<i>Rattus rattus</i> 95%	<i>Rattus rattus</i> 25%	<i>Rattus rattus</i> 40%
	<i>Archachitina marginata</i> 3%					
	Millipedes 5%	Millipede 2%	dead <i>Thryonomys swinderianus</i> 8%			
	<i>Thryonomys swinderianus</i> 60%		Limbs of <i>Thryonomys swinderianus</i> 85%			
	<i>Cricetomys gambianus</i> 5%		<i>Cricetomys gambianus</i> 5%			
Trap was not triggered off	16%			5%	75%	60%

It was observed that for the first two days after capture, the rodent remained at its hiding place for several hours. They fed very little at night. Within four days, normal feeding commenced. The males were seen on top of the heap during the day. They quickly ran into the heap as an observer approached the pen. In captivity cane rats that were less than 4 weeks old prefer to feed on few drops of concentrated milk solution mixed with some drops of multivitamin shrub. Two drops per hour gave the best result (Table 5). They also fed on stems of seedlings of *Oryza sativa* and *Zea mays*. Cane rats between 4 and 12 weeks old in addition to the above fed on tubers of *Manihot esculenta* that were not upto 2 months old. They fed on seedlings of *Pennisetum purpureum* and *Andropogon tectorum*. It was observed that the growth rate was increased when the rodent was fed with maize grain that was mixed with a solution of grinded soya bean and some quantity of *Pantominovit* (a water soluble powder, containing essential vitamins). At 12 weeks of age cane rats could feed on any of the food it eats in the wild. There was need for excess food in the pen. This is because the males always came out first to feed before the females. It was observed that fighting and biting of each other occurred when they were poorly fed. Various diseases attacked the rodents as a result of flies pecking on the wounds. Inside the pen, calcium salt, water and stones should be kept. It was observed that when these were lacking, the rodent in addition to feeding on its food also fed on cement and zinc material within the pen. These do not easily pass through the alimentary canal. Loss of hair and other diseases set in resulting to the death of the rodent. It was observed that removing the food remnants, cleaning the pen and changing the water in a clay bowl every two days helped to increase the rate of growth of cane rats.

The result obtained from the questionnaire administered revealed that all of the respondents agreed that cane rats were purchased from hunters who kill the rodent mainly at night using guns. It was only 8.4 per cent of the respondents that agreed that they had seen people rearing one to three cane rats. All of the respondents were willing to rear cane rats at the backyard both for selling at the markets and for use as protein supplement at home.

CONCLUSION AND RECOMMENDATION

Two species of cane rat *Thryonomys swinderianus* and *Thryonomys gregorianus* exist in Nigeria. The inability of many farmers to plant seedlings of emergent and economic tree species when a piece of farmland is abandoned (Aweto, 1981; Dike, 2003) and the rapid rate of destruction of the rainforest (Okojie, 1998) have created a conducive environment for the growth of grasses in most degraded areas of Nigeria rainforest. Cane rats feed on many of these grasses.

The wide distribution of *Thryonomys swinderianus* in the rainforest is similar to the observation made by Onabeko et al (2000). They recorded that out of a total of 35 wild animals they observed at Alabata-Abeokuta, Nigeria, *Thryonomys swinderianus* and *Zerus erythropus* with 43.77 and 14.64 relative abundance, respectively, were the most abundant. The box trap is efficient for trapping cane rats alive in the rainforest. Cane rats caught feed well and readily got adapted to the pen.

It is recommended that government should train and support financially farmers who wish to learn the techniques of rearing cane rats at their back yard. Universities should also sell cane rats to farmers at reduced prices and provide the medicine for treating the rodent when it is sick. The use of tractor equipped with a slasher in chasing cane rats should be minimized because most pregnant female cane rats and the young litters were crushed by the wheel of the tractor.

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