

PERFORMANCE OF FATTENING CANE RATS (*Thryonomys swinderianus* Temminck) REARED IN DIFFERENT CAGE SIZES IN THE SWAMP FOREST ZONE OF NIGERIA

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ABSTRACT

Sixteen cane rats, all 16 weeks old were used in the experiment which lasted 16 weeks. There were four treatments in a completely randomized design. The control (treatment 1) was an enclosure 1.73m x 1.24m x 0.66m (length x breadth x height). Treatments two (0.7m x 0.65m x 0.45m), three (0.6m x 0.55m x 0.35m) and four (0.50m x 0.45m x 0.25m) were vertical cages with four compartments each. Treatment two gave highest intake of supplementary feed, forage intake and weight gain that were significantly ($P < 0.05$) different from all the other treatments and the control except in the forage intake in which it was similar to treatment four ($P > 0.05$). Treatment four gave the highest feed conversion ratio of 2.15 followed by treatment two (1.98). Mean weight gain of the cane rats was highest in treatment two (0.47kg). Treatment four cage was the cheapest to construct costing only ten thousand Nigerian naira (N10 000.00 or US\$62.50), while treatment two was the most expensive cage costing N16 000.00 (US\$100.00). No mortality of the animals was recorded in any of the treatments. It was concluded that fattening cane rats can be successfully reared in compartments as small as 0.50m x 0.45m x 0.25m (L x W x H) arranged vertically on a cage. It was recommended that this size of compartments and cages should be used where space is limiting in backyard rearing of cane rats.

Keywords: Cage size, Fattening Cane Rats, Swamp Forest Zone, Nigeria.

INTRODUCTION

The grass cutter or cane rat is widely distributed and heavily exploited in most areas of the Southern Sahara, particularly West Africa (Mensali and Baptist, 1986). It is the preferred and perhaps the most expensive meat in West Africa (National Research Council, 1991; Asibey and Addo, 2000). The high demand for grass cutter meat and the economic benefits that accrue from its sale have resulted in aggressive hunting with complete disregard for the conservation of the species and the environment. Some of the unwholesome practices used include: indiscriminate bush burning while hunting the animals which contributes to climate change, the use of traps that do not discriminate between the ages and pregnancy state of females and the use of poisons like "furadan" in the capture of the animals. Cane rat farming is relatively easy. This is because caring for the cane rats is not exerting as they are relatively noiseless, can cope with high temperature and humidity and are not as prone to diseases as rabbits (Adu, et. al., 1999). Also, feed requirements in captivity are very low and they do not compete with man for foodstuff.

However, the high cost of initial inputs (cages, breeding stock and space) and limited technical expertise have hampered the adoption of backyard cane rat farming by rural households and the development of large scale commercial ventures.

This work was undertaken in order to determine the minimum cage size that can be used in the rearing of the cane rat without significant reduction in the output, thus helping to solve the problem of space and cost of cages for the rearing of cane rats, thereby contributing to poverty reduction and environmental conservation.

RESEARCH METHODS

Sixteen cane rats, all of the same age (16 weeks old) obtained from one farm (Pavenigo Grass cutter farm, Badagry Lagos State) were used in the experiment. Their weights ranged between 0.800kg and 1.2kg. There were three treatments and a control. The animals were randomly distributed four each to each treatment and the control in a completely randomized design (CRD).

Treatment one (Control)

This was an enclosure measuring 1.73m x 1.24m x 0.66m Length by Breadth by Height (L x W x H) and fenced with wooden planks with an open top. It occupied a ground space of 2.14m² and the cost was twelve thousand naira (N12 000.00 or US\$75.00). Jute bags were placed on the floor of the enclosure to prevent the animals from making direct contact with bare floor. This prevented them from catching pneumonia. A small transportation cage measuring 60cm x 30cm by 20cm (L x W x H) with two unconnected compartments was

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placed inside the enclosure to provide a hiding place for the animals. Four cane rats* (i.e. four replicates) were introduced into the enclosure.

Treatment two

The compartments of this cage measured 0.7m x 0.65m x 0.45m (L x W x H). The compartments were joined vertically, one on top of the other to form one cage, the first compartment starting 0.18m from the ground. It occupied a ground space of 0.46m² and the cost of the cage was sixteen thousand naira (N16 000.00 or US\$100.00). There were four compartments in this cage. Each compartment was occupied by one cane rat giving a total of four replicates.

Treatment three

This was a cage made up of four (4) compartments of the same dimensions joined vertically. Each compartment measured 0.6m x 0.55m x 0.35m, (L x B x H). The first compartment started at 0.18m from the ground. The cage occupied a ground space of 0.33m² and the cage cost twelve thousand naira (N12 000.00 or US\$75.00). One animal was introduced into each of the compartments, giving a total of four replicates in this treatment.

Treatment four

This was a cage made up of four (4) compartments of the same dimensions joined vertically. Each compartment measured 0.5m x 0.45m x 0.25m, (L x B x H). The first compartment started at 0.18m from the ground. This cage occupied a ground space of 0.22m² and the cost of the cage was ten thousand naira (10 000.00 or US\$62.50). One animal was introduced into each of the compartments, giving a total of four replicates in this treatment.

The cages in all the treatments were made of hard wood which covered the sides, back and floor of each compartment. The floor of each compartment was perforated to permit drainage of urine. There was a space between two adjoining compartments 0.25cm high. This allowed a plastic tray to be inserted under each cage for the collection of urine.

All the compartments in all the cages had a door that opened sideways, measuring 0.3m by 0.3m (Height by breadth) except the enclosure that had no door but was accessed from the open top. The control and the cages in all the treatments were placed in the animal house of the Department of Forestry and Wildlife resources management, university of Calabar.

Feeding of the cane rats

Supplementary feed

The animals were all given the same diet which consisted of a mixture of cassava flour (52.5%), soy bean meal (32.0%) bone meal (14.0%), Vitamin premix (1.0%) and salt (0.5%) by weight blended into a feed mash as recommended by Meduna *et al.* (1995). Just enough water was added to the feed mash and the mixture was blended into a paste and molded into pellets and sun dried. The dried pellets were then given to the animals.

Forage

The animals were also given forage consisting of elephant grass (*Pennisetum purpureum*) guinea grass (*Pennisetum maximum*), Pueraria (*Pueraria phaseoloides*) and Centrosema (*Centrosema pubescens*). The stems of elephant grass were cut from a nearby swamp, sun dried for a day, chopped into lengths of about 11 to 17 cm, weighed and administered to the cane rats. Other forage species were equally cut and left overnight before being fed to the animals. This was to ensure that the moisture content of the forage was reduced to avoid causing the animals bloat. It also ensured that any weevils in the forage were expelled to prevent them from causing the animals to purge if ingested. The feeding regime was as follows: 7.00am to 9.30 am, elephant grass and water only were provided to the animals. 10.30am to 1.00 pm: supplementary feed was given. 3.00pm to 4.00 pm: elephant grass and mature but unripe fruits e.g. pawpaw (*Carica papaya*), guava (*Psidium guajava*) were given and between 6.00pm and 7.00pm, supplementary feed with elephant grass (*Pennisetum purpureum*) was given the animals as recommended by (Ogogo, 2008)

Some quantity of feed was weighed with an electronic weighing balance with 50kg maximum weight and placed in a feeding trough in the cage. Water was served in a water trough which was also placed in the cage. The quantity of feed left over including the chaff at the time the next feed was being introduced was collected weighed and recorded. For the control, only a mean of the feed intake could be obtained as the animals were not separated from each other.

The experiment lasted for sixteen (16) weeks. Measurements taken included: (1) Daily feed intake (kg): This was obtained by subtracting the weight of the left over feed plus the chaff from the weight of feed given to the animals. Mean daily feed intake were obtained at the end of each week. (2) Weekly body weight (kg): the animals were weighed once a week. The four animals in each treatment were weighed individually and a

mean weight obtained for that treatment and recorded. The number of animals that died in each treatment if any was also recorded.

For body weight, the animal being weighed was placed in a bag which had been weighed while empty, and a spring balance (10kg maximum capacity) was used to weigh the animal by attaching its hook to the mouth of the bag and the bag held vertically by the handle of the spring balance. A reading was quickly taken when the animal calmed down in the bag and was at rest.

Hygiene

The feeding troughs were washed regularly, three times a week and sun dried. This was done to remove feed remnants which could support bacterial growth and the sun drying allowed ultra violet rays to kill existing bacteria. Water troughs were washed daily.

Data Analysis

The data obtained were analysed using the analysis of variance (ANOVA) method. Where the ANOVA table showed significant differences, the Least Significant Difference (LSD) was used to separate the means. Mean values with different superscripts in the tables indicated significant ($P < 0.05$) differences between each other. Weight gain was obtained by subtracting the initial mean weight from the final mean weight for a particular treatment. Feed conversion ratio was obtained by dividing mean feed intake by mean weight gain for the treatment in question.

RESULTS

Table 1 shows mean supplementary feed intake of cane rats in the four treatments. Mean values with different superscripts are significantly different ($P < 0.05$). Treatment two had the highest mean feed intake of 0.93kg which was significantly ($P < 0.05$) higher than the mean feed intake of all the other treatments followed by treatment four (0.71kg). Treatment three had the least mean feed intake (0.32kg). There was a significant difference ($P < 0.05$) in the feed intake between all the treatments.

Table .1 Mean feed intake of cane rats reared in different cage sizes.

Week	T1	T2	T3	T4
1	0.30	0.80	0.65	0.85
2	0.51	0.88	0.43	0.77
3	0.54	1.00	0.52	0.56
4	0.42	0.83	0.35	0.68
5	0.53	1.05	0.54	0.75
6	0.52	1.86	0.24	0.75
7	0.45	0.73	0.24	0.50
8	0.48	0.96	0.28	0.77
9	0.48	0.88	0.26	0.65
10	0.48	1.05	0.24	0.82
11	0.48	0.79	0.21	0.62
12	0.52	0.80	0.19	0.67
13	0.46	0.96	0.24	0.74
14	0.49	0.75	0.26	0.76
15	0.51	0.78	0.26	0.76
	0.54	0.74	0.27	0.75
Total	7.71	14.86	5.18	11.40
Mean	0.48^c	0.93^a	0.32^d	0.71^b

Note: Mean values with different superscripts are significantly different ($P < 0.05$).

Mean forage intake of cane rats in the experiment is given in table 2. (0.79kg) with no significant difference ($P > 0.05$) between them, but were significantly ($p < 0.05$) different from treatments one (0.50kg) and three (0.34kg).

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Table 2. Mean forage intake of cane rats reared in different cage sizes.

Week	T1	T2	T3	T4
1	0.41	0.83	0.56	0.68
2	0.46	1.10	0.45	0.83
3	0.42	0.76	0.42	0.65
4	0.75	0.34	0.78	1.08
5	0.22	0.67	0.42	0.68
6	0.48	1.00	0.28	0.86
7	0.74	1.37	0.32	1.03
8	0.45	0.92	0.19	0.56
9	0.58	1.02	0.24	0.80
10	0.41	0.97	0.20	0.68
11	0.46	1.06	0.29	0.80
12	0.60	1.12	0.27	0.86
13	0.53	0.96	0.24	0.66
14	0.46	0.79	0.24	0.77
15	0.45	0.70	0.22	0.74
16	0.51	0.78	0.26	0.76
Total	8.00	14.48	5.14	12.61
Mean	0.50^b	0.90^a	0.31^a	0.79^a

Note: Mean values with different superscripts are significantly different ($P < 0.05$).

Mean body weight gain of cane rats at the end of the experiment is given in table 3. Treatment two had the highest mean body weight gain (0.47kg) which differed significantly ($P < 0.05$) from that of treatments one (0.33kg), three (0.32kg) and four (0.33kg). Body weight varied widely in the four treatments throughout the duration of the experiment.

Table 3. Mean body weight of cane rats reared in different cage sizes.

Week	T1	T2	T3	T4
1	1.00	0.78	1.33	1.23
2	1.05	0.83	1.23	1.23
3	1.00	0.86	1.31	1.23
4	1.06	0.87	1.27	1.28
5	1.04	0.86	1.26	1.26
6	1.10	0.90	1.37	1.29
7	1.17	0.96	1.45	1.39
8	1.22	1.00	1.49	1.46
9	1.25	1.02	1.50	1.46
10	1.27	1.03	1.55	1.51
11	1.29	1.05	1.55	1.52
12	1.29	1.03	1.57	1.52
13	1.33	1.06	1.57	1.52
14	1.23	1.23	1.60	1.57
15	1.32	1.29	1.68	1.52
16	1.33	1.25	1.65	1.56
Total	18.95	16.02	23.38	22.55
Mean	1.18^b	1.00^c	1.46^a	1.41^a
Weight gain (kg)	0.33	0.47	0.32	0.33
Feed conversion ratio	1.45	1.98	1.00	2.15

Note: Mean values with different superscripts are significantly different ($P < 0.05$).

Feed conversion ratio of the cane rats in the treatments including the control is also given in table 3. Treatment four had a significantly ($P < 0.05$) higher feed conversion ratio than the other treatments and the control.

DISCUSSION

The ideal cage for rearing cane rats is the enclosure which is the semi intensive farming method. However, few prospective grass cutter farmers have the resources to employ this method especially in the cities where land is very expensive. The cost of constructing an enclosure that is secure enough to prevent the animals from escaping as well as keep away thieves is an added problem. This makes the cage system a better alternative in this situation.

The significantly ($P < 0.05$) higher intake of both forage and supplementary feed in treatment two was perhaps due to the free movement of animals within the enclosure as this was larger than the other cages. This gave the animals enough room to move freely within the cage. They also performed better than the control because the cages gave them more cover than the open nature of the enclosure where the animals in the control treatment were kept.

The best feed conversion ratio observed in treatment four could be a positive result for animals being fattened, as it will ensure that they attain table size quickly with minimal wastage of feed, making the business profitable. According to Fanuvi, (personal communications), the smaller cages also ensure that wastage of feed is minimized. This could explain the best feed conversion ratio observed in treatment four which was the smallest cage. Lameed (2008) recommended dimensions of 0.5m x 0.45m x 0.3m (L x W x H) for individual cages which was only 0.05m bigger in height than the compartments of treatment four in this experiment.. The low cost of this size of cages (N10 000.00 or US\$62.50), can encourage would-be cane rat farmers who are often poor and complain of high cost of inputs in cane rat farming, to start the business. The bigger cage (treatment two) was more expensive (N16 000.00 or US\$100.00) and occupied greater ground space. This was also observed by Meduna and Ayodele, (1995). The cane rats reared in them however gave a significantly higher weight gain than the other treatments but had a lower feed conversion ratio than the animals in the smallest cage (treatment four). While the bigger cage may be good for rearing cane rats where space is not a limiting factor, the smaller cages have a comparative advantage of being cheaper and requiring a smaller space especially where this is a limiting factor.

CONCLUSIONS AND RECOMMENDATIONS

No animals died in any of the treatments in the course of the experiment. It was concluded that cane rats can easily adapt to very small cages that take very small ground space.

It was recommended that cages with compartments as small as 0.50m x 0.45m x 0.25m with one compartment on top of the other in an upright position could be used to rear fattening cane rats where ground space is limiting. The technology could be extended to the rural populace to encourage cane rat rearing in order to alleviate poverty and enhance the conservation of the cane rats and their environment.

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