Productive Performance of the Grasscutter (Rodentia: Thryonomyidae) Reared Under Three Different Housing Systems

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Abstract

The floor housing, open-cage and closed-cage housing systems for rearing grasscutters in captivity were respectively used to evaluate the performance of the grasscutter (*Thryonomys swinderianus,* Temminck, 1827) in the humid tropics of southern Nigeria. There was no significant difference (P>0.05) in the average initial weights of the grasscutters reared under the three different housing systems. But there were significant differences (P<0.05) in the average final weights, average weight gains, average daily weight gains, average total feed intakes, and feed efficiency in favour of the floor (3434g, 2634g, 8.75g/d, 287230g, and 0.00914) over the open-cage (2985g, 2181g, 7.27g/d, 278580g, and 0.00782) and the close-cage (2972g, 2167g, 7.22g/d, 279810g, and 0.00774) housing systems, respectively. Performance evaluation of the resultant grasscutter rats showed no significant differences (P>0.05) in the mean litter sizes, average litter mortality, and average number of litters weaned. But the numerical values of mean litter sizes and average number weaned were floor housing (2.85 and 2.44) greater than closed-cage (2.65 and 2.22) greater than open-cage (2.45 and 1.88) housing systems. The mortality rates (%) occurred in the reverse order of floor-housing (21.50) less than the closed-cage (22.60) less than the open-cage (24.90) housing systems. There were significant differences (P<0.05) in the mean litter birth weights, average weaning weights, weight gains, and average daily weight gains in favour of the floor-housing (149.25g, 451g, 301.75g, and 7.18g/d) over closed-cage (135g, 410.70g, 275.70g, and 6.56g/d) and open-cage (133.75g, 383.50g, 249.75g, and 5.95g/d) housing systems, respectively. This result is an indication that the Floor is superior to the Cage housing systems for rearing the grasscutter in captivity.

Keywords: *Captive grasscutter, Housing systems, Performance evaluation, Nigeria.*

Introduction

The existing acute shortage of animal protein in the diets of many Nigerians has necessitated a search into alternative sources of animal protein. The average daily consumption of 10.6g of animal protein per person in Nigeria represents a shortfall of about 31.17% of the recommended 34.9g per person per day (FAO/WHO, 1983). FAO (1980) had suggested the integration of wildlife farming into conventional farming system as a strategy to improve animal protein supply. Ajayi (1983) called for the domestication of the grasscutter (*Thryonomys swinderianus*) - a wild species that could be suitable for farming, based on its adaptability to captive management, growth performance and acceptability (Hemmer, 1992).

Grasscutter farming in Nigeria is still at its rudimentary stage and few of the existing Farms rear grasscutters in metal cages. But the high cost of rearing grasscutters in metal cages would be a deterrent to prospective grasscutter farmers in Nigeria and elsewhere. This study was therefore undertaken to evaluate the performance of captive grasscutters under the floor housing, open-cage, and closed-cage housing management systems in Nigeria.

Materials and Methods

Thirty-six 2-months-old newly weaned grasscutters of different sexes that originated from Adagro Grasscutter Farms Ijegun, Lagos-Nigeria were used in the present study. Twelve animals were randomly assigned to each of the housing systems namely, the Floor, Open-cage, and Closed-cage housing systems, respectively. There were three replicates per housing system, with one male to three females per replicate to simulate the colony behavior of grasscutters in the wild. The floor housing system was a high-walled building. The floor space, measuring 3m long and 4m wide were equally partitioned into three with expanded metal frames. Each partition had a separate entrance and was lined with strong wire netting. The cages, which were constructed with steel metal rods, were covered with strong wire netting. The dimension of each cage was 2m by1m by 0.5m as proposed by Awah (2000). The inlet to each cage, which had a sliding 'door', measured 30cm by 25cm while the base was made from perforated galvanized metal sheet – the openings being large enough to permit the dropping of fecal pellets into aluminum receptacle placed under each cage. The major difference between the open-cages and the closed-cages was the wooden boards used to cover both ends of the closed-cages, in order to stimulate nocturnal habits of grasscutters, and provide hiding places for the animals when frightened.

All animals were identified and allowed one-month pre-conditioning period in their respective housing systems. They were also subjected to similar management and husbandry conditions of feeding and hygiene except that liter materials and feacal pellets accumulated in the floor housing system. Animals in each replicate were fed *ad libitum* for 300 days with the same quantity and quality of forage and concentrates.

Data collected on individual and group treatments were subjected to statistical analysis of variance (ANOVA) and Student's t-test at 5% level of significance (Mmaduakonam, 1998).

Results

Productive performance of grasscutters in the three different housing systems is presented in Table 1. There was no significant difference (P>0.05) in the average initial weights of the grasscutters reared under the three different housing systems. But there were significant differences (P<0.05) in the average final weights, average weight gains, average daily weight gains, average total feed intakes, and feed efficiency in favour of the floor (3434g, 2634g, 8.75g/d, 287230g, and 0.00914) over the open-cage (2985g, 2181g, 7.27g/d, 278580g, and 0.00782) and the close-cage (2972g, 2167g, 7.22g/d, 279810g, and 0.00774), respectively.

Table 1: Mean performance of grasscutters in different housing systems

Housing system	Initial weight (g)	Feed intake for 300 days (g)	Final weight (g)	Weight gain (g)	ADG* (g/d)	Feed efficiency (gain/feed)
Floor	807	287230^{a}	3434^{a}	2627^{a}	8.75^{a}	0.00914^{a}
Open cage	804	278500^{b}	2985^{b}	2181^{b}	7.27^{b}	0.00782^{b}
Closed cage	805	279810^{b}	2972^{b}	2167^{b}	7.22^{b}	0.00774^{b}

**ADG = Average daily weight gain. Means within the columns with different superscripts are significantly different (P<0.05)*

Table 2: Litter size, Birth weight, mortality and weaning weight of grasscutters in different housing systems

Housing system	Litter size	Birth wt. (g)	Mortality (%)	No. Weaned	Weaning wt. (g)	Weaning wt. gain (g)	ADG* for 1st 42 days (g/d)
Floor	2.85	149.25^{a}	21.50	2.44	451.00^{a}	301.75^{a}	7.18^{a}
Open cage	2.45	133.75^{b}	24.90	1.88	383.50^{b}	249.75^{b}	5.95^{b}
Closed cage	2.65	135.00^{b}	22.60	2.22	410.70^{b}	275.70^{b}	6.56^{b}

**ADG = Average daily weight gain. Means within the columns with different superscripts are significantly different (P<0.05)*

Productive performance of resultant grasscutter rats in the three different housing systems is shown in Table 2. There were no significant differences (P>0.05) in the mean litter sizes, average litter mortality, and average number of litters weaned. But the numerical values of mean litter sizes and average number weaned were floor housing (2.85 and 2.44)>closed-cage (2.65 and 2.22)>open-cage (2.45 and 1.88) housing systems. Young rats' mortality rates (%) occurred in the reverse order of floor-housing (21.50) < closed-cage (22.60) < open-cage (24.90) housing systems. Mean litter birth weights, average weaning weights, weight gains, and average daily weight gains for the first 42 days, were significantly higher (P<0.05) in floor-housing (149.25g, 451g, 301.75g, and 7.18g/d) than the closed-cage (135g, 410.70g, 275.70g, and 6.56g/d) and open-cage (133.75g, 383.50g, 249.75g, and 5.95g/d) housing systems.

Discussion

Results from this study showed that with the same levels of feeding there were significant average final weight and weight gains for grasscutters in Floor over those in open-cage system and closed-cage housing system. This is in line with the observation of Fielding (1991) on rabbits. According to Fielding (1991) rabbits in the floor system translated their instinctive 'wisdom' to augment their feed by eating the fibrous litter materials to balance their fiber requirements. Ndor (1995) and Timibitei (1998) have reported that the rabbit obtained about 18% of digestible crude fiber from this source. This instinctive 'wisdom' may be in operation in grasscutters in floor system. Stress inherent in the cage housing system, may also be responsible for the lower weight gains recorded for grasscutters in cages. Hemmer (1992) observed that stress factors which operate in caged animals caused reduction in food utilization and decreased body weight. This observation may explain the significantly higher total feed intake, average daily weight gain, and feed efficiency in grasscutters in the floor housing system than those in open-cage and closed-cage housing systems (P<0.05). Mean litter birth-weight was significantly different (P<0.05) in favour of the floor system, but this parameter could be influenced by litter size and sexes of littermates. Birth weight for males was generally higher than for females. However, litter sizes and mean birth weights are all inversely related, but the optimal litter size and birth weight were not investigated in this study. The floor environment, which encourages mothering ability (Mobolaji-Bukola *et al*., 2000) may explain the differences in weaning weights in favour of the floor system. It is possible that cage-housing systems restrain natural attributes and free expression of grasscutters' biology hence the significant difference in daily body-weight gain for the first 42 days in favour of the grasscutters which were reared with reduced stress level in the floor-housing system. This may explain the pattern of mortality rate (open-cage>closed-cage>floor housing systems) reported in this study.

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