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# EXTERNAL INJURIES AND MORTALITIES AMONG CAGED JUVENILE FEMALE GRASSCUTTERS (*THRYONOMYS SWINDERIANUS* TEMMINCK, 1827) HOUSED IN VARIOUS LOCATIONS DURING ACCLIMATIZATION

***J. A. Ogunjobi and B. W. Adu**

Department of Biological Sciences, Ondo State University of Science and Technology, Okitipupa, Ondo State, Nigeria.

*Corresponding author e- mail: ogunjonson02@gmail.com ogunjonson@yahoo.com

**ABSTRACT**

Effects of cage position on external injuries sustained by captive grasscutters and incident of mortality during acclimatization was studied at Grasscutter Domestication unit of the Federal College of Wildlife Management, New Bussa, Niger State. Forty eight (48) juvenile female grasscutters (307±3.57g) were allotted inside 120cm X 60cm X 90cm floor hutch constructed in three positions that formed treatments ($T_1$, $T_2$, $T_3$). Treatments $T_1$ (Behind entrance door, BED), $T_2$ (Adjacent entrance door, AED) and $T_3$ (Far from entrance door, FED). Each treatment housed four animals and replicated four times. They were fed *ad libitum* with *Pennisetum purpureum* as basal diet and supplemented with concentrate containing 16% crude protein for three months. The highest percentage of external body injured (75%) was observed among the grasscutters positioned behind the entrance door (BED) while the least injured (31.25%) was observed among animals housed far from the entrance door (FED). Animals displayed injuries on six body locations irrespective of cage positions. The highest (11) injury was displayed on the snout while the least (1) was observed at the hind-limb. Cage position had significant ($p \leq 0.05$) effect on the locations of the external injury sustained. This study recommended placement of grasscutter cage far away from entrance door.

**Keywords:** Juvenile female grasscutters, captivity, acclimatization, external injuries, mortalities

## INTRODUCTION

Ever since the early domestication thousands of years ago, animals have been kept in captivity for numerous reasons (Jensen, 2002). One of such animals that are kept in captivity in many parts of Africa for different motives is the grasscutters (*Thryonomys swinderianus*). Grasscutters, also known as cane-rats, belong to the order Rodentia and is the second largest rodent in Africa after the crested porcupine (Mensah and Okeyo, 2005). Despite the fact that it was reported that grasscutter farming had a high potential in generating employment, income, wealth creation and increase nutritional protein intake for man (Adu, 2002), it is unfortunate that participation in grasscutters farming is very low. This may be linked with dearth of information on accommodation the welfare needs of grasscutters particularly during early stage of captivity.

The choices of grasscutter housing systems by farmers' are determined either by purpose of production or financial capability (Akinola, 2008). Ogunjobi (2012) further noted that other than financial ability of the grasscutter farmer, space, materials available, nearness to materials, prevailing ecological situation(s) and durability are strong determinants for grasscutter housing designs. Two common types of grasscutter houses are the floor hutch and the cages systems (Ikpeze and Ebenebe, 2004; Mensah and Okeyo, 2005; Ogunjobi, 2008; Akinola, 2008).

In captivity, animals frequently experience aversive mental state despite the fact that the environment meets all of their physiological needs. They may therefore be motivated to escape or hide from perceived threats, even when their survival is not threatened (Dawkins, 1990). Alternatively, the animals may attempt to perform behaviours which are physiologically unnecessary in the captive environment (Shepherdson, 1998). When these are informed by internally motivated factors, they could be inherently pleasurable (Hughes and Duncan, 1988). As grasscutters farming is gaining public interest, it is imperative to conduct studies on their captive wellbeing at different production stages. This paper examined external injuries and mortalities in juvenile female grasscutters in varied compartments during acclimatization.

## MATERIALS AND METHODS

### Study Location and animal management

This study was carried-out inside the Grasscutter Domestication Unit of the Federal College of Wildlife Management, New Bussa, Niger State, Nigeria (latitude $7^0$ 08ˡand $1^0$ 00ˡ N and longitude $4^0$ 30ˡ and $4^0$ 33ˡ E; Ogunjinmi *et al*., 2007). Prior to the experiment, Dettol antiseptic solution (7.5ml/l of water) was used to clean the compartments three weeks before the commencement of the experiment. During the study, cages, feeding and watering troughs were cleaned each day before feeding the animals. Feed and water were supplied in compliance with the guidelines provided by Ayodele and Meduna (2007). They were fed *ad libitum* with elephant grass (*Pennisetum purpureum)* as basal diet and supplemented with concentrate containing 16% crude protein.

### Experimental Design

The experiment was conducted using the Completely Randomized Design (CRD). Forty-eight (48) juvenile female grasscutters with mean live-weight of 307±3.57g were allotted as a group of four individual inside 120cm X 60cm X 90cm floor hutch compartments constructed with cement block and wood in three locations that formed treatments ($T_1, T_2, T_3$). Treatments $T_1$ (Behind entrance door, BED), $T_2$ (Adjacent entrance door, AED) and $T_3$ (Far from entrance door, FED). Each treatment housed four animals and replicated four times. The study lasted for three months.

### Data Collection and Analysis

For the purpose of this study, grasscutter external body was divided into six parts vizs: snout, loin, hind quarter, fore-quarter, hind-limb and fore-limb. External injuries were monitored by direct visual observation. Injury rates were expressed as proportion of injured individuals per treatment in percentages. The position of the injury on the body was also noted and cumulative injuries per body part was calculated and compared per location. The number of dead grasscutters from the inception of the experiment to the last day were noted per treatment and expressed as mortality rates in percentages.

Data were analyzed using Analysis of Variance (ANOVA) and General Linear Model (GLM) procedures of Statistical Analysis System (SAS, 2008). Duncan Multiple Range Test (DMRT) was used to detect true differences between means of significant effects (SAS, 2008).

## RESULTS

### External injuries and its body locations in juvenile grasscutters during acclimatization

The experimental captive grasscutters sought for escape during acclimatization by running, jumping or gnawing the wooden parts of the floor hutch. From table 1, the highest percentage of external body injured (75%) was observed among the grasscutters located behind the entrance door (BED) while the least injured (31.25%) was observed among those housed far from the entrance door (FED). It is evident from table 2 that experimental grasscutters displayed injuries on six regions of their external body during acclimatization. Irrespective of cage locations, injured grasscutters recorded injuries on their snout, loin, fore-quarter and fore-limb. The highest (11) injury was displayed on the snout while the least (1) was observed at the hind-limb. Effects of cage position on the locations of the external injury sustained by the experimental grasscutters were significant ($p \leq 0.05$) different (Table 3).

**Table 1: Rate of injured grasscutters per replicate**

| Treatments | Frequency injured (n=4) Replicates | | | | Total injured | % injured | SE |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | | |
| BED | 2 | 3 | 4 | 3 | 12 | 75.00 | 0.41 |
| AED | 2 | 4 | 3 | 1 | 10 | 62.50 | 0.65 |
| FED | 2 | 1 | 1 | 1 | 5 | 31.25 | 0.25 |

BED= Behind the entrance door
AED= Adjacent the entrance door
FED= Far from the entrance door

**Table 2: Experimental treatments in response to Grasscutters injuries regions**

| Injuries regions | BED (n=16) | AED (n=16) | FED (n=16) | Total |
|---|---|---|---|---|
| Snout | 4 | 6 | 1 | 11 |
| Lion | 3 | 2 | 1 | 6 |
| Hind quarter | 1 | - | 1 | 2 |
| Fore quarter | 2 | 1 | 1 | 4 |
| Fore limb | 1 | 1 | 1 | 3 |
| Hind limb | 1 | - | - | 1 |
| Total | 12 | 10 | 5 | 27 |

**Table 3: Effect of cage positions on injured displayed by juvenile female Grasscutters**

| Variables | SS | df | MS | F | Sig level |
|---|---|---|---|---|---|
| Between Groups | 4.148 | 1 | 4.148 | 6.851 | 0.012 |
| Within Group | 27.852 | 46 | 0.605 | | |
| Total | 32 | 47 | | | |

**Table 4: Rate of mortalities among experimental grasscutters per replicate**

| Treatments | Frequency injured (n=4) Replicates | | | | Total Mortalities | % Mortalities | SE |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | | |
| BED | 1 | 2 | 2 | 1 | 6 | 37.50 | 0.58 |
| AED | 1 | 1 | 1 | 1 | 4 | 25.00 | 0.00 |
| FED | 1 | - | 1 | - | 2 | 12.50 | 0.58 |

**Table 5: Causes of mortalities in juvenile female grasscutters during acclimatization**

| Causes of mortalities | Number of cases | | | |
|---|---|---|---|---|
| | BED | AED | FED | Total (%) |
| Internal bleeding | 2 | 2 | 2 | 6(42.86) |
| Septicaemia | 1 | - | - | 1(7.14) |
| Pulmonary congestion | 1 | 2 | - | 3(21.43) |
| Unknown | 2 | - | 2 | 4(28.57) |
| Total | 6 | 4 | 4 | 14 (100) |

**Table 6: Effect of cage position on locations of injuries during acclimatization**

| Variables | SS | df | MS | F | Sig level |
|---|---|---|---|---|---|
| Between Group | 0.087 | 1 | 0.087 | 0.126 | 0.725 |
| Within Group | 31.913 | 46 | 0.697 | | |
| Total | 32.000 | 47 | | | |

**Mortalities among experimental grasscutters**

Highest mortalities 6(37.5%) was recorded among the animal positioned at BED while the least 2(12.5%) was counted among those positioned FED (Table 4). Mortalities occurred in both injured and un-injured grasscutters. Five (5) out of eleven (11) grasscutters that sustained injuries on their snouts died. Internal bleeding was responsible for the highest (42.86%) mortalities while the least (7.14%) was caused by Septicaemia (Table 5) The position of the cage however had no significant effect ($p > 0.05$) on the injuries displayed (Table 6).

## DISCUSSION

External body injuries sustained may be as a result of the temperament in animals which measure relative docility, wildness or aggression towards unfamiliar situation, handlers or management interventions reported by Kirkpatrick (2004). The findings of this study agreed with the report of Hemmer (1993) that grasscutters have nervous temperament which makes them difficult to rear in captivity. Varying external injuries observed was as a result of adaptive behaviours to the new environment reported by Annor *et al.* (2013). The injuries displayed by these grasscutters may be connected to stress condition experienced by the animals which was in line with the findings of Fraser and Broom (1990). Mortalities recorded in this study agreed with the findings of Adu *et al.* (2005) that one of the factors that led to mortalities in grasscutters was self-inflicted trauma due to the nervous temperament of the animals or response to environmental challenges reported in zoo mammals by Selye (1980) and confirmed by Zulkifli and Siegel (1995). It was reported that new stock grasscutters recorded high mortality due to inappropriate handling, self-inflicted trauma, nervous temperament of the animal and disease (Adu *et al*., 2005). Septicaemia caused about 13.6% (Djang-Fordjour *et al*., 2012) and 12.0% (Jori and Cooper 2001) of deaths in grasscutters as a result of injuries. Interpretation of some of the causes of mortality from post-mortem result was unknown. Similar findings were reported by Jori and Copper (2001) that trauma was the most prevalent causes of death in sub-adult animal to about 40%. Emphasis was placed on physical trauma through intra-specific aggression (55%), transport (7%) and attempts by particular stressed animals to escape (38%). Although grasscutters at their early stay in captivity irrespective of the accommodation placements within the housing unit sustained injuries at different body regions, those housed far from the entrance sustained minimal injuries. Mortalities were not limited to injured animals but were more severe among injured animals. This study therefore, encouraged placement of grasscutter cages far from entrance door during acclimatization and encourage more research work on suitable housing units for different categories of captive grasscutters.

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