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Body Measurements and Carcass Characteristics of Aged Buck Grasscutter in (*Thryonomys swinderianus*) Captivity

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Abstract: Linear body measurements and carcass characteristics of four buck grasscutters of three years old of average body weight of 4462.5±425g were investigated. The linear body measurements revealed the mean body length of 54.25±3.70cm, the colon with rectum had the longest linear body measurement value of 201.25± 8.5cm and the least measurement of 0.34±1.0cm obtained for skin thickness. The indices showed that the body length was 200.9% of dressed carcass length. Average dressing percentage was 66.22±0.80%. The study revealed the leg to be highest cut-part (39.45±5.69%) and the rib had the least value of 11.06±0.66% of live body weight. Among dissected cut-parts into meat, skin and bone investigated there were no significantly ($P<0.05$) between loin, leg, shoulder, ribs but varied with breast,flank,shank (BSF) of chilled left halved carcass expressed as percent live body weight. The meat to bone ratio was in the order BSF>rib> shoulder> leg >loin while skin to lean was in order BSF>rib>loin>shoulder> leg.
Keywords: Body linear measurements, carcass, cut-parts, buck and grasscutter

INTRODUCTION

There has been a significant short fall between the production and supply of animal protein to feed the ever increasing population [1]. The quest to solve the problem, unconventional livestock such as grasscutter (*Thryonomys swinderianus*) or canerat should be exploited. Grasscutter (*Thryonomys swinderianus*) is a wild hystricomorphic rodents widely distributed in the African sub-region and exploited in most areas as a source of animal protein [2,3]. The grasscutter was reported by Clottey [4] as the most preferred among wild rodents of wider domestication as well as an alternative with a promising future.

Cane rat can be investigated for its qualitative and quantitative traits; this can serve as fore hand information, tools for genetic improvements and production management. Linear body measurements are useful in assessing growth rate, weight, feed conversion and carcass characteristics Brown *et al*, [5]. The aim of the study is to investigate the skeletal, tissue measurements and carcass characteristics of aged buck grasscutter raised in captivity.

MATERIALS AND METHODS

Linear body measurements

Four adult buck grasscutters aged three years of average body weight of 4462.5±425g were obtained from Forest Research Institute, Ibadan, and Oyo state. The animals were individually measured by placing flexible measuring tape on the reference point following the procedure of Latimer and Sawin [6]. All measurements were taken twice per animal in centimeters.

Carcass characteristics

Prior slaughtering animals were weighed individually and fasted over night to empty their gastro intestinal tracts. Each animal were mechanically immobilized, the jugular vein severed for bleeding, scalded in hot bath at 75^{o}C for 15minutes. Heads and feet were removed and weights determined separately. All visceral were excised by procedure of De Boer *et al*, [7] and the weight expressed as percentage of live body weight. The carcasses were eviscerated, weighed, hung by archilles tendon to enhance draining and meat setting.

The ready to eat carcass weight determined and carcass yield percentage was calculated by dividing the ready to cook by the live body weight of the animal multiplied by 100. The carcasses were chilled at 18 ^{o}C for 24h.The carcass length was determined from the cranial face of the first rib close to the vertebral axis to the tip or edge of the pubic symphysis. The chilled carcass was splitted by cutting through the vertebral

axis and middle of the spinal column into right and left halves.

Dissection of cut-parts

The right half carcass was dissected into sub standard cuts. The shoulder was separated from the rib by cutting between the 5^{th} and 6^{th} ribs, the leg from the loin by cutting between the lumber and the first sacral bone or at the tip of ilium. The breast, shank and flank (BSF) was separated from loin. The cut-parts were weighed and expressed as percent live body weight. The cut-parts were separated into skin, lean and bone. The skin to lean ratio and lean to bone ratio were determined

STATISTICAL ANALYSIS

All data obtained were taken in triplicate and descriptive analysis was to determine the mean and standard deviation .Carcass means was separated using one way analysis of variance, using Minitab Release 11.21 statistical package[18].

RESULTS AND DISCUSSION

Table 1a showed the average linear body measurements. The mean length of the body was 54.25±3.7cm, fore limb 17.98±1.0cm, hind limb 24.70±1.2cm, head length 14.50±1.3cm, head width 9.75±3.0cm, chest depth 7.50±1. 3cm and carcass length 29.0±3.6cm. Table 1b, revealed body index that head width was 67.24% of head length, fore limb was 72.77% of hind limb length and total body length was 187.1% of carcass length. Body measurements are indices of skeletal development and indirectly help in determination of carcass composition Srivastava *et al*, [17].The body index value obtained for grasscutter is a good indication that the animal is a large rodent and will easily attain market weight at little or no cost. The body linear measurements can be used to assess the genetic traits of the rodents and can serve as baseline information for its genetic improvements.

Table-1a: Mean Body linear measurements of buck grasscutter (cm)

Traits	Mean± S.D
Body length	54.20±3.7
Fore limb length	17.98±1.0
Hind limb length	24.70±1.2
Head length	14.50±1.3
Head width	9.80±3.1
Chest width	7.10±1.3
Hearth girth	37.18±1.3
Chest depth	1.30±0.8
Width of pelvis	7.50±0.6
Dressed carcass length	29.00±3.7
Small intestine length	181.25±12.9
Colon with rectum length	201.25±8.5
Skin thickness	0.34±0.0
Ear length	3.83±0.8
Tail length	10.70±1.0

SD- standard deviation

Table-1b: Indices of Body linear measurements of buck grasscutter (%)

Variables (cm)	%
Head width/Head length X100	67.24
Fore limb length/Hind limb length X100	72.77
Chest width/Chest depthX100	54.23
Small intestine length/Colon with rectum lengthX100	90.06
Body length/carcass lengthX100	187.10

Table 2 shows the percentage of visceral organs of buck grasscutter. The results obtained for the visceral organs were considerably low. The percentage weight of liver was 1.13±0.13%, 0.39±0.13% heart, 11.77±4.96% stomach and 2.65±0.04% abdominal fat. The values of visceral organs from the study were very close to ranged values obtained by Henry *et.al*,[10] for heart(0.58-0.69), liver(1.95-2.93)and kidney(0.38-0.42%), but falls within ranged value reported for lung(0.56-0.67%) for grasscutter. The value of fat (2.65±0.04%) obtained was a good indication that the visceral is safe for consumption without constituting any threat to human health.

Table-2: The percentage of visceral organs of buck grasscutter (% live body weight)

Visceral organs (%)	Mean ±SD
Liver	1.13±0.13
Kidney	0.30±0.09
Lung	0.58±0.17
Heart	0.39±0.13
Spleen	0.10±0.02
Stomach	11.77±4.96
Caecum	2.86±0.82
Colon with rectum	2.55±0.64
Bladder	0.56±0.32
Small intestine	1.37±0.14
Diaphragm	0.33±0.16
Testis	0.15±0.04
Abdominal fat	2.65±0.04
Head	7.76±0.25
Feet	0.53±0.01

Table 3 reveals the mean live weight, dressing percentage and cut- parts of the buck grasscutter raised in captivity. The mean live weight of 4462.5±425g was obtained, this lower than live weight (5872.1±122.1g) reported by Ajayi and Tewe [8] for cane rat. The dressing percentage of the animal was 66.43±0.80%.The dressing percentage obtained in the study was higher than value obtained by Karikari and Nyameasem [9], (55.0-61.3%) hot dressed percentage and 63.8% [8], lower than values of 88.83 to 89.07% [10], 68.51% [11] and 76.96.00 to 76.98% [12] but falls within the range of 65 to 80% [13] for grasscutters. Dressing percentage depends on factors such as gut weight, carcass weight, degree of muscling [14, 15] degree of fatness, age at slaughter and nutrition of the animal. Meat assessment depends on factors such as, dressed carcass, visceral weights and total body weight. The cut-parts of grasscutter in the study show that the leg had the highest carcass value of 12.68%, while the rib had the least value of 3.61%. The carcass characteristics compares favorably with domesticated animal species [8, 16]. The cut-parts can serve as useful tool for meat assessment and grading of grasscutter for marketing.

Table-3: reveals the mean live weight, dressing percentage and cut- parts of the buck grasscutter raised in captivity.

Variables	Mean±SD
Live weight (g)	4462.50±425
Dressing percentage(%)	66.22
Cut-parts	
Leg (%)	12.68±3.01
Loin (%)	5.20±1.22
Shoulder	6.86±2.75
Breast,shank and flank	4.23±3.51
Rib	3.61±0.66

Table-4a: Shows the means of lean, skin and bone expressed as percentage weight of cut-parts (%)

Cut-parts	lean	skin	bone
Leg	69.04±3.40$^{a(©)}$	17.88±2.28$^{a(d)}$	13.09±1.67$^{a(d)}$
Loin	64.06±8.39 $^{a(©)}$	21.79±5.98 $^{a(d)}$	14.15±2.55$^{a(e)}$
Shoulder	69.11±4.48 $^{a(©)}$	17.78±4.79 $^{a(d)}$	13.10±2.81$^{a(d)}$
Rib	61.66±3.29 $^{a(©)}$	24.62±7.12 $^{a(d)}$	13.72±5.31$^{a(e)}$
Breast, shank and flank(BSF)	52.21±8.78$^{b(©)}$	43.96±6.09 $^{b(©)}$	6.33±1.62 $^{b(c)}$

Mean ± SD; Means with different superscripts (a, b) within the same column and (in parenthesis) within the same row are significantly different (P<0.05)

Table-4b: Lean to bone ratio and skin to lean ratio

Cut-parts	Lean to bone ratio	Skin to lean ratio
Leg	6.74:1	0.26:1
Loin	6.24:1	0.36:1
Shoulder	6.86:1	0.27:1
Rib	7.33:1	0.40:1
Breast, shank and flank	15.58:1	0.90:1

Table 4a shows the means of lean, skin and bone of cut-parts. The mean weight of lean present in leg, loin, shoulder and rib were not significantly different (P<0.05) among cut-parts, but varied significantly (P>0.05) in BSF. The mean percentage of skin were significantly differ (P>0.05) in the order BSF> rib > loin > leg >shoulder. The percentage weight of bone was significantly (P>0.05) different in BSF as compared with other cut-parts. The lean ranged 52.21to 69.11%, 17.88 to 43.96% skin and 6.33 to 4.15% bone for all cut-parts.. The value obtained from the study can be used in quantification of lean (meat) that can be obtained from each cut-part for grasscutter meat grading. Table 4b, the lean to bone ratio was high in the order BSF> rib> shoulder> leg >loin while skin to lean was in order BSF> rib>loin>shoulder> leg. This implies that the amount of lean (meat) present in each cut parts is higher than bone which constitute to availability of high animal protein in human diets. The highest quantity of skin can be derived from BSF than every other cut-part.

CONCLUSION

The dressing percentage of grasscutters reared in captivity on forages or grasses, dressing percentage is appreciable as obtained in the study. Body linear measurement can serve as baseline tools for morphogenetic improvements. The carcass characteristics showed that it contained more of lean (meat) than bone, since the meat is generally acceptable to Nigerian, modality for an affordable commercial production, should be put in place.

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