



## Prediction of Body Weight From Body Linear Measurement In Pre-Weaning Castrates And Non-Castrates Of Savanna Brown Goats (Kids)

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### Abstract

Prediction of body weight from linear measurements in pre-weaning castrates and non-castrate of Savanna Brown goats (kids) raised semi intensively was studied. Non-castrates obtained highest mean values in the body weight linear measurements. Among the castrate group, goats castrated at six (6) weeks had the highest mean values in neck circumference (20.55cm) and circumference of horn base (5.03cm). Goats castrated at 2 weeks recorded lowest mean values in most of the body parameters measured. The correlation between live-weight and other body measurements among the various treatments were highly significant ( $P < 0.05$ ). The highest correlation values were observed between body weight and body length (0.91) and next to the highest were tail length (0.89) and chest length (0.89) respectively. The lowest correlation value was obtained in neck circumference (0.61). From these results, it is possible to predict body weight of savanna brown goats (kids) from body length, tail length and chest length.

### Introduction

International development organization considers goats as the most important domestic animals in the tropics today (Hatcher, 1984). This is particularly so where supplies are limited, such as small farms in developing countries. Goats contribute about 17% (65,000) of the total meat supply and offers the cheapest source of domestically produced meat in Nigeria because of their fecundity and low food requirement, when compared with cattle and sheep (Macrae, 1997). Body growth is an important phenomenon in animal production. It determines the farmers' economic returns from his investment of feeding farm animals. The growth of the body as a whole is most commonly measured as an increase in weight and size such as height. Various other body dimensions are frequently employed to predict body weight of kids. Body length and height at withers could be used for predicting live weight of goats at 1-2 years and 3 years and above respectively Hassan, (2004). Linear measurement have been used as tools for characterization of breeds, evaluation of breed performance, describing the size and shape of farm animals and live weight prediction (Ozoje and Herbert, (1997). Very few studies have been carried out on the linear measurements of castrates and their possible use for estimating live weights. The ability of the producers and buyers of livestock to relate live animal measurements to growth characteristics is essential for optimum production and value based trading systems. This ability will also adequately reward livestock farmers rather than the middleman that tend to gain more profit in livestock production business, especially in developing countries.

This study was carried out to establish further the relationship between live weight and some linear body measurements in the castrated savanna brown goats (kids) as a means to predict live weight on which the market value of an animal largely depends.

### Materials and methods

The data for the study were obtained from sixteen (16) Savanna Brown goats (kids) of which 12 were

castrated. The goats were assigned to four treatments, which included castrates at two, four, and six weeks and non-castrates (males). Body weight and linear body measurements were taken at birth and subsequently at 2 weeks interval using weighing scale and flexible measuring tape respectively for up to 12 weeks of age. The animals were sourced from Minna and Paiko, Niger State. Open castration method was used. The body linear measurements that were taken included body weight, body length and height at wither, chest length, neck circumference, neck length, fore limb length, tail length, and circumference of horn base.

Data collection and analysis: Data on the body weight gain and body linear measurements of 16 Savanna brown goats (Kids) assigned to 4 treatments were collected over 12 weeks and analyzed statistically by the analysis of variance (ANOVA) using a computer package (Statgraphics 2002)

### Results and discussion

A significant ( $P < 0.05$ ) difference in body weight between non castrates and castrates in favour of non castrates was observed table 1. This agreed with the findings of Bhushan and Ghei (1994) and Tsado and Adama (2003). Non castrates were observed to have obtained higher mean values in all parameters measured. Tsado *et al.*, (2009) reported that twin non-castrates obtained highest mean values in body weight. Solomon *et al.*, (1991) reported that castration had no significant effect ( $P > 0.05$ ) on body weight and that the entire goats had better overall average gain than castrates. The results of this study show that goat castrated at two weeks obtained lower mean values in all parameters measured except in fore leg length and hind leg length. Among the castrates, kids castrated at six weeks obtained higher mean values in most of the parameters measured. This could be attributed to the effect of age at castration. This further suggests the superiority of goats castrated at 6 weeks compare to other castrates with respect to rate of live weight gain, linear measurements and efficiency of

Good conversion. Tsado *et al.*, (2009) reported that singles castrated at six weeks recorded the highest mean value (7.89kg) of body weight than those castrated at 4 and 8 weeks. Goat (kids) castrated at 4 weeks obtained higher mean values in neck circumference and circumference of horn base (20.55cm) and (5.05cm) respectively.

The correlation between live weight and other body parameters were highly significant ( $P < 0.001$ ) Table 2. Afolayan *et al.*, (2006) observed that live weight was highly ( $P < 0.001$ ) correlated with body dimensional traits. A high correlation value of 0.91 and 0.89 between live weight and body length, and between live weight and chest length respectively were recorded in this study. Tsado and Adama (2008) reported a strong correlation values between body weight and body length (0.97).

Mukherjee *et al.*, (1981:1986) and Singh *et al.*, (1981) reported high and significant ( $P < 0.001$ ) correlation values to body weight with chest length in various Indian goat breeds. Similarly, a strong correlation values between height at wither and fore leg length (0.91) and between height at wither and hind leg length (0.88) were observed.

**Conclusion**

This study has established a high correlation between body weight and body dimensions. The positive and high correlation between body weight and body length and between body weight and chest length indicated that any one of them can be used in selection in place of other in pre-weaning castrates of Savanna Brown goats (kids).

**Table 1:** Mean body weight and linear measurements of castrates and non castrates goats from birth to 12 weeks

Parameters	Treatments			
	castrates at 2 weeks	castrates at 4 weeks	castrates at 6 weeks	Non-castrates
Body weight (kg)	5.16 <sup>a</sup>	5.36 <sup>a</sup>	6.04 <sup>a</sup>	7.76 <sup>b</sup>
Body length (cm)	46.43 <sup>ab</sup>	44.69 <sup>a</sup>	50.57 <sup>b</sup>	56.37 <sup>c</sup>
Heath at wither (cm)	36.00 <sup>a</sup>	37.78 <sup>ab</sup>	39.62 <sup>bc</sup>	48.85 <sup>c</sup>
Chest length (cm)	40.96 <sup>a</sup>	40.78 <sup>a</sup>	43.20 <sup>a</sup>	46.97 <sup>b</sup>
Fore leg length (cm)	36.58 <sup>ab</sup>	35.48 <sup>a</sup>	38.66 <sup>bc</sup>	40.45 <sup>c</sup>
Hind leg length (cm)	38.91 <sup>a</sup>	38.16 <sup>a</sup>	40/34 <sup>a</sup>	43.67 <sup>b</sup>
Neck length (cm)	14.57 <sup>a</sup>	14.88 <sup>a</sup>	17.06 <sup>ab</sup>	17.74 <sup>b</sup>
Tail length (cm)	11.23 <sup>a</sup>	11.98 <sup>a</sup>	12.46 <sup>a</sup>	14.38 <sup>b</sup>
Neck circumference (cm)	18.64 <sup>a</sup>	20.55 <sup>b</sup>	20.33 <sup>b</sup>	20.81 <sup>b</sup>
Circ. of horn base (cm)	2.33 <sup>a</sup>	5.03 <sup>bc</sup>	3.62 <sup>ab</sup>	6.43 <sup>c</sup>

abc-means in the same row with different letters are significantly different ( $P < 0.05$ )

**Table 2:** Correlation between live weight and some body parameters of all the animals

Parameters	BW	BL	HW	CL	FLL	HLL	NL	TL	NC	CHB
BW	1									
BL	0.9	1								
HW	0.81	0.82	1							
CL	0.89	0.87	0.84	1						
FLL	0.75	0.80	0.91	0.78	1					
HLL	0.74	0.79	0.88	0.78	0.93	1				
NL	0.81	0.85	0.80	0.74	0.79	0.70	1			
TL	0.89	0.88	0.80	0.87	0.75	0.75	0.87	1		
NC	0.69	0.69	0.63	0.57	0.61	0.57	0.78	0.76	1	
CHB	0.80	0.71	0.78	0.76	0.70	0.68	0.67	0.75	0.71	1

**References**

Abdullah A.R., Sokunbi, O.A., Omisola, O.O., and Adewumi, M.K.(2003). Interrelations between body weight and body linear measurement in domestic rabbit (*Oryctolagus cuniculus*). Proceedings of 28<sup>th</sup> Annual Conference of Nigerian Society for Animal Production March, 2003. p 133-136.

Afolayan, R.A., Adeyemi, I.A. and Lakpini, C.A.M. (2006). Prediction of live weight from objective live dimensional traits in Yankasa Sheep. Proceedings of the 31<sup>st</sup> Annual Conference of Nigerian Society for Animal Production 12 – 13 March, 2006. p 9-11.

Bhushan ,B.and Ghei, J.C. (1994).Effect of age at castration on carcass traits in sikkin Local male goats. *Indian Journal of Hill Farming* 7:163 – 168.

Hassan, A and Ciroma. A. (2004) Body and Weight Measurement Relationship in Nigeria Red Sokoto Goat. Relation Livestock Research for Rural Development.

Hatcher G. (1984). A Planning Guide for Small Scale Livestock Project . Little Rock, Arkansas: Heifer Pro. International.

Macrea, R., Robinson, R.K. And Suddar, M.J. (1997), Encyclopedia of food technology and nutrition vol 4 . Academic press. Pp 2231-2242

Mukherjee D K. Singh S K and Mishra H R, (1981) Phenotypic correlation of body weight with body measurements in Grey Bengal goats. *Indian Journal of Animal Science* 51: 682-694.

Ozoje, M.O and Herbert, U. (1997) Linear Measurement of Fully Goat Nigeria *Journal of Animal Production* 24(11):13-19.

Singh N.R., Mohanty S.C., and Mushra, M. (1987). Prediction of body weight from body measurements in Black Bengal goats. A note. *Indian Journal of Animal Production and Management* 3:46-49.

Solomon G, Fletcher I, Gizaw K, Yibrah Y (1991) Effects of castration and supplementary feeding on

growth , carcass characteristics, and market value of Adal goats: In: IAR Proceedings of the Fourth National Livestock Improvement Conference, Addis Ababa, Ethiopia. Pp. 159-164

Statgraphic, (2002). Statistical Graphics System, STSC, inc. and Statistical Graphics Corporation

Tsado, D.N., Aremu, A., Alabi, J.O. and Imam, A.S. (2009). Effect of Age at castration and type of birth on weight gain of savanna brown goat. Proceeding of 34<sup>th</sup> Annual conference of Nigerian society for animal Production. March 15<sup>th</sup> - 18<sup>th</sup> 2009. p 559-561

Tsado, D.N. and Adama, T.Z. (2003). Effect of castration and type of birth on pre weaning performance of savanna brown goat kids. Proceeding of 8<sup>th</sup> Annual Conference of Animal Science Association of Nigeria (ASAN), Sept. 16-18, 2003. federal University of Technology, Minna, Niger State, Nigeria.

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