

**RELATIONSHIP BETWEEN AGE AND BODY WEIGHT ON SOME LINEAR  
BODY MEASUREMENT OF WHITE BORNU GOATS REARED UNDER SEMI-  
INTENSIVE SYSTEM IN A SOUTHERN NIGERIA ENVIRONMENT**

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**ABSTRACT**

*Studies on the effect of age on body weight parameters of twelve White Bornu (WB) goats were carried out to determine whether age affects their rate of growth (weight gain). Data were collected on weekly basis for three (3) months. Parameters measured include distance between eyes, ear length, ear width and length, tail, and body weight. The results of this study showed that age has effect on body parameters measured and that growth was fast between 0.5 to 1 years old and dropped between 1½ to 2 years of age.*

**Key words:** Age, body weight, goats, growth parameters

**DOI:** <http://dx.doi.org/10.4314/jafs.v13i1.5>

**INTRODUCTION**

Ruminant livestock occupy a major position in the supply of meat to Nigerians (Asafa *et al*, 2004). However, the problem of livestock production in developing countries are becoming more critical with population explosion, such as obtains in Nigeria, estimated at above 140 million ( National Population Commission 2006) as well as the inconsistencies in government policy formulation and implementation (Asafa *et al*, 2004). This has resulted in inadequate protein intake by Nigerians. Efforts by the government at various levels and other relevant agency in the country have not produced meaningful results; only 8 percent of Delta State government budget for 2011 was earmark for agriculture, with little emphasis on livestock, for instance. Goats play a very important role in the economy of the small holder farmers. Goat is often referred to as the poor man's cow (Aromolaran and Oyeboode, 1998). Goats are kept mainly for meat and milk (Malu-Aduli and Anlade, 2001). It is estimated that goat meat accounted for about 20% of all the meat eaten in Nigeria. Goat is one of the most populated ruminants in Nigeria, Rim, (1992) reported an estimated goat population of 34.5 million out of this White Bornu (WB) goats is about 3.7 million.

The growing popularity of the WB goats as a source of protein and its importance in the custom of the people has raised the need to investigate their productivity. These productive  
*Journal of the Faculty of Agriculture and Veterinary Medicine, Imo State University Owerri*  
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traits include live weight, linear body parameters and age which constitutes an important economic trait in meat animals.

At present, limited information is available in the literature on the relationship between body weight and linear measurements in WB goats which is important in the area of selection for frame size, drug administration, feeding and in the marketing of live weight and carcasses of this farm animal. Brown *et al* (1993) stated that body measurements in addition to body weight give a more complete description of an animal than the conventional method of weighing and grading of beef cattle bulls. Body measurement at certain age, are among the data needed in characterization and establishment of breed standards in WAD goat production (Oseni *et al*, 2006). However, in other farm animals body measurements and their relationship with body weight have been reported in cattle (Orheruata and Olutogun, 1994) and in sheep (Adewumi *et al*, 2003). Therefore, the objective of this study is aimed at evaluating the effect of age on the body measurement and body weight in white bornu goat.

### **Materials and Methods**

The experiment was carried out at the goat and sheep unit of the Teaching and Research farms of the Delta State University, Asaba Campus. Asaba is located at latitude 06<sup>o</sup>49" North of the equator. Asaba has its rainy season from March, with a mean annual rain fall of 1500 – 1849.3mm. It has a moderate climate with a very high temperature during the dry season with its mean annual temperature and precipitation of 28<sup>o</sup>C  $\pm$  6<sup>o</sup>C and 1117mm respectively. Twelve white Bornu goats were used for this experiment. The goats were purchased from the Hausa-Fulani herd men at Oko Cattle market Asaba Delta State. The ages of the goats range from 0.5 to 2 years old and were provided by the farmers and verified by using the dentition estimation method (Sastry and Thomas, 1980).

### **Animal Management**

The goats were allowed to graze on mixed pasture for 6 – 8 hours daily and were given 0.3 – 0.5 kg per day of 17 – 20% crude protein concentrate supplement depending on the live weight. The supplement, consist of wheat offal dry brewers' grain, bone meal and common salt. All animals were vaccinated against PPR, and dipped regularly. Cool, clean drinking water was provided.

### **Data Collection**

Data obtained were collected on the tail length. Ear length, ear width and distance between eyes. Distance between Eyes. This was the length in centimeters (cm) between the two eyes across the nose of the goat using a pair of divider and then determined by a transparent ruler. A flexible tape rule was used to take the measurement of the tail length, ear length and ear width. The body weight was measured with a weighing scale and a cage to confine the animal while weighing.

Data collected were subjected to analysis of variance as described by Steel and Torrie (1980). Significant means were separated using SAS/STAT, 1999) software to compare the relationship among parameters.

## **Result and Discussion**

The effect of age on body measurement parameters is shown on the table below

From the table above, the results shows that difference between eyes, ear length, ear width were not significantly ( $P>0.05$ ) affected by age grouping among treatment means. Tail length and body weight were significantly ( $P>0.05$ ) affected by age grouping among treatment means. White Bornu goats at 2 – 2.5 years of age were significantly ( $P>0.05$ ) higher in tail length than those between the age group 1 – 1.5 years and 1.5 – 2 years were not significantly ( $P>0.05$ ) different in tail length from either of those in group 0.5 – 1.5 years and 2 – 2.5 years respectively. For body weight, White Bornu goats at 2 – 2.5 years of age were significantly ( $P>0.05$ ) higher than those between the age groups 0.5 – 1 year, 1 – 1.5 years and 1.5 – 2 years.

Body measurement parameters measured include distance between eyes (DBE) ear length (EL), ear width (EW), tail length (TL) and body weight increased progressively as goat increases in age. The growth rate however reduces with a slight decrease between 1½ - 2 years. When there seems to be a slow increase in body size not statistically different from growth rate in the proceeding age group. The rate of growth of White Bornu goat increases rapidly again between 2 – 2½ years measuring up to full maturity. Growth rate of the distance between eyes, ear length and ear width, though increase with increasing age of WB goat, with a drop between 1½ - 2 years, shows no significant difference amongst measurement across the age groups.

Tail length of WB goat showed that the highest rate of growth (weight gain) occurred between 2 – 2½ years which was shown to be significantly highest. There was also a significant difference in tail length as the goat grew from 0.5 – 1 year. Body weight measurement was significantly highest between 2 – 2½ years. Weight gain between the age of 0.5 – 1 year, 1 – 1½ years and 1½ - 2 years do not show any significant ( $P<0.05$ ) difference. It could be analyzed that WB goat grows faster between 0.5 – 1 year with a drop of increase in growth rate between 1½ - 2 years, growth rate however, increase again between 2 – 2½ years. From the result, it is shown that there is a positive correlation between increase in body parameters measured and weight gain. This means animals at different age groups will have difference in measurement of body parts. This is in line with report of Mcnih (1983), who reported similar trend.

The slow growth that may occur in goat between the age of 1½ - 2 years is not an indication that goat has attained maturity, it can be explained that in this period (1½ - 2) years in goat, energy is centered towards weight gain than elongation of body parts. This is seen in the study as the weight of goat doubled from 15.75 in 1½ - 2 years to 32.00 in 2 – 2½ years.

Thus, by measurement of some linear body parameters, the age of WB goat can be assessed and the timing for different management practice can be pegged as agreed and reported by Janesseus and Vandepitte (2004). The body measurement parameters i.e. distance between eyes, ear length, ear width, tail length and body weight increased progressively as White Bornu goats increases in age.

### **Conclusion**

It was discovered that tail length and body weight were significantly affected while distance between eyes, ear length and ear width were not significantly affected by the age group. The slow growth that was recorded between the ages of 1½ to 2 years is not an indication that WB goat has attained maturity.

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### APPENDIX

#### Effect of age on body measurement parameters in White Bornu goat

Variables	0.5 – 1 year	1 – 1½ years	1½ - 2 years	2 – 2½ years
Distance between eyes	6.82 ± 0.57 <sup>a</sup>	7.78 ± 0.86 <sup>a</sup>	6.89 ± 0.75 <sup>a</sup>	7.81 ± 0.15 <sup>a</sup>
Ear length	8.57 ± 0.43 <sup>a</sup>	9.10 ± 0.49 <sup>a</sup>	8.00 ± 0.49 <sup>a</sup>	9.20 ± 0.69 <sup>a</sup>
Ear width	4.97 ± 0.54 <sup>a</sup>	5.44 ± 0.94 <sup>a</sup>	5.25 ± 0.69 <sup>a</sup>	5.71 ± 0.34 <sup>a</sup>
Tail length	7.80 ± 0.79 <sup>b</sup>	9.60 ± 0.62 <sup>ab</sup>	9.39 ± 0.73 <sup>ab</sup>	11.21 ± 0.43 <sup>a</sup>
Body weight	11.33 ± 0.92 <sup>b</sup>	16.73 ± 0.96 <sup>b</sup>	16.85 ± 0.78 <sup>b</sup>	33.00 ± 0.46

ab, means within same row with different superscripts are significantly ( $P < 0.05$ ) different.