

## AGE BASED CLASSIFICATION OF MORPHOMETRIC TRAITS OF DIFFERENT NIGERIA GOAT BREEDS

P.F. Abolusoro<sup>\*1</sup>, A.J. Shoyombo<sup>2</sup>, O.O. Alabi<sup>2</sup>, J. Izebere<sup>2</sup>, R.A Animashahun<sup>2</sup>, S.O Olawoye<sup>2</sup>, H. Yakubu<sup>3</sup>, A. A Musa<sup>4</sup> & M. Wheto<sup>5</sup>

<sup>1</sup>*Department of Agric Education, Kogi State College of Education Technical, Egbeda, kabba, Kogi State, Nigeria*

<sup>2</sup>*Department of Animal Science, College of Agricultural Sciences, Landmark University Omu-Aran, Kwara State, Nigeria*

<sup>3</sup>*Department of Animal Science, Faculty of Agriculture, Ahmadu Bello University, Zaria, Kaduna State, Nigeria*

<sup>4</sup>*Department of Animal Science, Faculty of Agriculture, Kogi State University, Anyigba, Kogi State, Nigeria*

<sup>5</sup>*Department of Animal breeding and Genetics, Federal university of Agriculture Abeokuta, Ogun State, Nigeria*

### ABSTRACT

A total of nine hundred (900) goats comprising of three hundred Sahel goats from Borno state, three hundred Red Sokoto goats from Sokoto state and three hundred West African Dwarf goats from Ogun state were used for the study. Each breed consisted of three hundred goats each, made up of fifty males and fifty females distributed in the following age groups <1, 1-2 and 2-3 years. These were evaluated for morphometric characteristics. The pairs of permanent incisors in the dentition of the goat were used to determine age. The effects of age, breed, and sex on linear measurement were estimated using the GLM procedure of the statistics analysis software package. These were computed on the basis of interaction with age groups. Means were separated within age groups using Duncan multiple range test. The result of this study indicated that the Sahelian breed was superior to other breeds across all age groups in body weight, while the red Sokoto was intermediate followed by the West African Dwarf.

### INTRODUCTION

Goats are the largest in number among ruminant livestock in Nigeria totaling about 58.3 million (FAOSTAT, 2008). Goats, predominantly are kept by the rural household and ownership is spread across all human age groups and sexes (Akpa, 1999). The importance of goat stem from its ability to convert forages and household by-product into high quality human food and their role as locally available source of food, fibre, power and other products to suit local community needs. The indigenous breeds found in Nigeria are, Red Sokoto, Sahel, and West African Dwarf (WAD) goat (Adu and Ngere, 1979). These differ considerably in size, coat colour, horn length, etc. Their broad genetic variability enables them to survive under stressful environmental condition including high disease incidence, poor nutrition which may increase animal susceptibility to disease, high temperature, and traditional husbandry system.

### MATERIALS AND METHODS

The study was carried out in Borno, Sokoto and Ogun States. These states were selected because they are locations having close to pure breeds of the goats. Animals used for this study were sampled in the abattoir, of Borno, Sokoto and Ogun states when brought for slaughter either by the owner or by the slaughter man. It is believed that all animals find their way into the abattoir from villages and local markets, where they are kept in small numbers by local farmers; they are raised under the extensive system of management. A total of nine hundred (900) goats comprising of three hundred Sahel goats from Borno state, three hundred Red Sokoto goats from Sokoto state and three hundred West African Dwarf goats from Ogun state were used for the study. Each breed consisted of three hundred goats each, made up of fifty males and fifty females distributed in the following age groups <1, 1-2 and 2-3 years. These were evaluated for morphometric characteristics. The pairs of permanent incisors in the dentition of the goat were used to determine age.

The following metric characters were measured on each animal: Body Weight (BW), Age, Horn Length (HL), Ear length (EL), Shoulder width (SW), Neck circumference (NC), body length (BL), Withers Height (WH), Heart Girth (HG), Pouch Girth (PG), Tail Length (TL) and Scrotal

circumference (SC). Weights of the animals were taken using a spring balance and Walk-in weighing scale. Flexible measuring tape was used to take the body measurement. During body measurement, animals were made to stand upright and restrained by two assistants in such a way that their heads, necks, and chest were stretched almost in a straight line. Each measurement was taken at least three times and the mean recorded to the nearest centimeter or kilogram. Reference marks used for body measurement according to the method of and Salako and Ngere (2002).

#### Data analysis

The effects of age, breed, and sex on linear measurement were estimated using the GLM procedure of the statistics analysis software (SAS, 1990) package. These were computed on the basis of interaction with age groups. Means were separated within age groups using Duncan multiple range test.

### RESULTS AND DISCUSSIONS

Mean body weight in Red Sokoto, Sahel and West African Dwarf goats less than one year are presented in Table 1. The Sahel breed is superior to the other breeds with a body weight of  $13.56 \pm 0.56$  Kg and  $14.94 \pm 0.52$  Kg in does and bucks respectively. Within the Red Sokoto population, body weight in doe and buck was  $13.73 \pm 0.51$  Kg and  $12.86 \pm 0.42$  Kg respectively while in West African Dwarf,  $10.44 \text{ Kg} \pm 0.22$  and  $10.62 \pm 0.21$  Kg for does and bucks. Coefficient of variation ranges between 13.98% and 29.40% suggesting the influence of major genes on this trait.

Summarized in Table 2 are Sahel goats had a mean weight of  $17.13 \pm 0.43$  Kg and  $16.86 \pm 0.49$  Kg followed by West African Dwarf goats with  $15.45 \text{ Kg} \pm 0.54$  and  $17.65 \pm 0.44$  Kg for does and bucks respectively. Red Sokoto goats weighed  $13.60 \pm 0.46$  Kg (does) and  $13.51 \pm 0.43$  Kg (bucks).

Live weight is important for assessing the condition of the animal and represents a criterion of selection. Mean live weight of 13.73 Kg, 13.56 Kg, 10.44 Kg and 12.86 Kg, 14.94 Kg and 10.44 Kg for does and bucks for the three breeds respectively for age less than one year are within the range of 12-18 Kg reported by Katongole *et al.* (1996) for indigenous goats in Kenya. Mean live weight of 13.60 Kg, 17.13 Kg, 15.45 Kg and 13.51 Kg, 16.84 Kg and 17.65 Kg for does and bucks between the age one through two years are lower than values of 20-40kg reported by several authors (Akpa *et al.*, 1998, Otoikhan *et al.*, 2008 and Salako *et al.*, 2006) in different breeds of goat. Mean live weight of 18.95 Kg, 23.60 Kg, 19.13 Kg and 19.21, 25.12 Kg and 19.35 Kg for does and bucks above two years are closer to the range reported by several authors (Akpa *et al.*, 1998, Osuhor *et al.*, 2002 and Otoikhan *et al.*, 2008), with Sahel breed fell within the specified range of 20-40 Kg. The average body weight at different ages fell within the range of 16-30 Kg specified by Hassan and Ciroma (1990) for both does and bucks from age 1-5 years in different breeds of goats.

### CONCLUSION

Present results showed that age has strong influence, as there were consistent increases in all the traits studied as the animals aged. The scenario is however not surprising since the size and shape of the animal is expected to increase as the animal is growing with age. There was wide variability as the age of the animals increased most particularly in the bodyweight. This was in consonance with the report of Orheruata and Olutogun, (1984) in cattle.

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## Morphological traits among Red Sokoto, Sahel and WAD goat (&lt; 1 year)

|           |    | RED SOKOTO |       |        | SAHEL |       |       | WAD   |       |       |
|-----------|----|------------|-------|--------|-------|-------|-------|-------|-------|-------|
| Parameter |    | Doe        | Buck  | Total  | Doe   | Buck  | Total | Doe   | Buck  | Total |
| BW        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 13.73      | 12.86 | 13.30  | 13.56 | 14.94 | 14.25 | 10.44 | 10.62 | 10.53 |
|           | SD | 3.62       | 3.00  | 3.33   | 3.90  | 3.70  | 3.89  | 1.53  | 1.49  | 1.50  |
|           | CV | 26.38      | 23.36 | 25.12  | 29.40 | 24.78 | 27.30 | 14.65 | 13.98 | 14.27 |
| EL        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 10.22      | 9.86  | 10.04  | 11.52 | 11.06 | 11.29 | 9.56  | 9.43  | 9.49  |
|           | SD | 1.17       | 1.07  | 1.13   | 1.79  | 1.88  | 1.83  | 1.08  | 1.20  | 1.13  |
|           | CV | 11.46      | 10.81 | 11.24  | 15.53 | 16.96 | 16.28 | 11.27 | 12.70 | 11.95 |
| SW        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 13.34      | 13.83 | 13.59  | 18.18 | 18.59 | 18.39 | 12.75 | 12.99 | 12.87 |
|           | SD | 3.94       | 3.40  | 3.68   | 3.02  | 2.57  | 2.79  | 3.02  | 3.40  | 3.20  |
|           | CV | 29.57      | 24.65 | 27.06  | 16.60 | 13.80 | 15.20 | 23.70 | 26.21 | 24.90 |
| NC        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 22.69      | 23.43 | 23.06  | 21.02 | 23.31 | 22.17 | 23.47 | 24.39 | 23.93 |
|           | SD | 5.10       | 4.30  | 4.71   | 3.67  | 4.53  | 4.26  | 4.16  | 4.16  | 4.16  |
|           | CV | 22.48      | 18.35 | 20.41  | 17.47 | 19.43 | 19.22 | 17.73 | 17.04 | 17.40 |
| BL        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 41.92      | 41.97 | 41.95  | 35.36 | 39.56 | 37.46 | 42.04 | 41.88 | 41.96 |
|           | SD | 4.70       | 3.99  | 4.33   | 7.16  | 9.25  | 8.50  | 5.85  | 5.13  | 5.48  |
|           | CV | 11.20      | 9.50  | 10.33  | 20.25 | 23.39 | 22.68 | 13.92 | 12.27 | 13.06 |
| WH        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 52.06      | 51.63 | 51.85  | 42.47 | 45.80 | 44.13 | 47.93 | 48.07 | 48.00 |
|           | SD | 6.13       | 5.69  | 5.89   | 10.04 | 9.44  | 9.84  | 7.98  | 7.53  | 5.33  |
|           | CV | 11.78      | 11.03 | 11.36  | 23.64 | 20.62 | 22.30 | 16.65 | 15.67 | 16.08 |
| HG        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 53.33      | 57.53 | 55.43  | 49.90 | 48.77 | 49.33 | 50.15 | 49.71 | 49.93 |
|           | SD | 9.24       | 8.29  | 8.98   | 3.46  | 4.68  | 4.14  | 5.51  | 5.18  | 5.33  |
|           | CV | 17.33      | 14.40 | 16.21  | 6.74  | 9.60  | 8.39  | 10.98 | 10.43 | 10.67 |
| PG        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 55.37      | 59.61 | 57.49  | 52.20 | 50.63 | 51.41 | 51.42 | 50.99 | 51.19 |
|           | SD | 9.32       | 8.40  | 9.08   | 3.50  | 4.68  | 4.18  | 5.48  | 5.05  | 5.25  |
|           | CV | 16.83      | 14.09 | 15.79  | 6.70  | 9.24  | 8.14  | 10.65 | 9.91  | 10.25 |
| TL        | N  | 50         | 50    | 100    | 50    | 50    | 100   | 50    | 50    | 100   |
|           | X  | 12.08      | 11.71 | 11.807 | 11.62 | 11.97 | 11.79 | 10.29 | 10.27 | 10.28 |
|           | SD | 1.84       | 2.13  | 1.99   | 2.27  | 2.28  | 2.27  | 1.33  | 1.46  | 1.39  |
|           | CV | 15.24      | 18.17 | 16.71  | 19.52 | 19.06 | 19.25 | 12.90 | 14.24 | 13.52 |

Horn Length (HL), Ear Length (EL) Shoulder Width (SW) Neck Circumference (NC) Body Length (BL) Wither Height (WH) Heart Girth (HG), Pouch Girth (PG), tail length (TL), scrotal circumference (SC) and Body Weight (BW)