

Effect of Age, Hair Type and Body Condition Score on Body Conformation Traits in Yankasa Rams

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Target Audience: Animal Geneticists, Sheep Farmers, Sheep Marketers

Abstract

The study was conducted to determine the influence of age, hair type and body condition score on body weight and body conformation traits using 62 Yankasa rams. The ages of the rams were categorized into three; 12-18, 19-24 and 25-36 months. The hair types which were determined through touching and feeling were categorized according to the length and texture of the hairs as thus; short-smooth (SS), long-curly (LC), long-smooth (LS) and short-rough (SR). The body condition was scored on a scale of 1 to 5. The linear body measurements {heart girth (HG), stature (ST), chest width (CW), withers height (WH), body depth (BD), body length (BL) and rump width (RW)} were measured in centimeters (cm) using flexible tape. The results showed that the mean BW, HG, ST, CW, WH, BD, BL and RW were 20.31kg, 66.35cm, 62.35cm, 10.41cm, 61.83cm, 38.99cm, 59.30 and 21.26cm, respectively. Age, hair type and BCS significantly ($P < 0.01$) influenced body weight and body conformation traits in Yankasa rams. The BW and body conformation traits increased with increase in age of the rams. The short haired rams (short rough and short smooth hair) were relatively taller (HW, ST), longer (BL), broader (HG, CW) and deeper (BD) with higher BW than the long haired rams (long curly and long smooth hair). Rams with BCS 4 were bigger in size (HW, ST, CH, WH, BL, BD and RW) and weight (BW) than those with BCS of 3. The results therefore, suggest that age, hair type and body condition score are important sources of variation in body conformation of Yankasa sheep.

Keywords: Age, Body condition score, Body conformation traits, Yankasa rams

Description of Problem

In Nigeria, increased productivity is one of the primary goals in production, as well as a major concern to livestock farmers. At the smallholder level, sheep play a very important role in the socio-economic and cultural life of the farmers. Yankasa sheep are raised for meat and skin. Their high productivity in terms of growth performance and prolificacy are paramount to the farmer [1]. A quantitative measure of animal

conformation is desirable, as it will enable reliable genetic parameters for traits to be estimated and permit its inclusion in breeding programme [2]. Linear body measurement is important in prediction of carcass weight and determination of certain body conformation traits that can be taken into consideration in selecting animals for genetic improvement. Growth, which is the sum total of increase in size of

different structural body components as noted by Ibe and Nwakalor [3], was measured from gain in both body weight and linear body measurements. Therefore, the objective of this study is to determine the effect of age, hair type and condition score on body weight and conformation and their relationships in Yankasa ram.

Materials and Methods

The study was conducted at the Teaching and Research Farm of the Animal Science Department, Faculty of Agriculture, Ahmadu Bello University, Zaria, located within the Northern Guinea Savannah zone, between latitude 11° and 12° N and on altitude of 640m above sea level [4]. Sixty-two Yankasa rams were used for this study. The ages of the rams were categorized into three; 12-18, 19-24 and 25-36 months. The hair types which were determined through touching and feeling were categorized according to the length and texture of the hairs as thus; short-smooth (SS), long-curly (LC), long-smooth (LS) and short-rough (SR). The body condition was scored on a scale of 1 to 5 as described by Allen [5].

The linear body measurements {heart girth (HG), stature (ST), chest width (CW), withers height (WH), body depth (BD), body length (BL) and rump width (RW)} were measured in centimeters (cm) using flexible tape as described by [6] and [7]. The body weight of each animal was taken by carrying the animal individually and standing on a weighing scale. The difference between this weight

and observer's weight was taken as the weight of the animal [8].

Data Analysis

Descriptive statistics and the effect of age, hair type and condition score on body conformation traits were determined using General linear Model Procedure of SAS [9] and significant differences in means were separated using Duncan's Multiple Range Test. Correlation analysis was used to assess the relationship between variables.

Results and Discussion

The summary statistics for body measurements in Yankasa rams are presented in Table 1. The mean BW, HG, ST, CW, WH, BD, BL and RW were 20.31kg, 66.35cm, 62.35cm, 10.41cm, 61.83cm, 38.99cm, 59.30 and 21.26cm, respectively. These values are within the earlier estimates by Akpa *et al.* [1] in the same breed. The body weight of the rams was highly variable (CV=52.64%); while the body conformation traits were moderately variable ranging from 14.14% to 23.96%. Body condition score is a management technique used routinely to appraise the body fat reserves and energy status on animals [10]. The average body weight of 20.3kg and BCS ranging from 3 to 4 indicate that the rams were in good breeding condition.

The results of the effect of age, hair type and body condition score on body conformation traits are shown in Table 2. Age, hair type and body condition score

significantly ($P < 0.01$) influenced body weight and body conformation traits. The trends showed that BW and body conformation traits increased with increase in age of the rams. These increases in BW and body conformation traits with age indicate that body weight and size of the rams depend on age. This agrees with the results of [2], [11] and [1]. It is also consistent with the earlier observations in Djallonke rams by [12]. On the basis of hair type, the short-haired rams (short rough and short smooth hair) were relatively taller (HW, ST) longer (BL), broader (HG, CW) and deeper (BD) with heavier BW than the long

haired rams (long curly and long smooth hair). Rams with BCS 4 were bigger in size (HW, ST, CH, WH, BL, BD and RW) and weight (BW) than those with BCS of 3. Brown *et al.* [13] observed that body measurements or body conformation traits in addition to the body weight gave a more complete description of an animal than the conventional method of weighing and grading. The significant influence of hair type on the BW and body conformation traits suggests that hair type could serve as a selection indicator for improving body size of Yankasa sheep.

Table 1: Summary statistics of body measurements in Yankasa rams

Body measurement (cm)	Mean	SE	CV (%)	Min.	Max.
Body weight (BW)	20.31	1.36	52.64	8.00	50.40
Heart girth (HG)	66.35	1.36	16.18	54.00	96.50
Stature (ST)	62.35	1.12	14.14	50.20	83.80
Chest width (CW)	10.41	0.30	22.95	75.60	19.10
Withers height (WH)	61.83	1.15	14.59	46.50	88.90
Body depth (BD)	38.99	0.76	15.39	27.90	55.10
Body length (BL)	59.30	1.45	19.22	41.90	88.90
Rump width (RW)	21.26	0.65	23.96	15.80	33.00

This finding agrees with the report of Odubote [14] that hair type or coat colour might likely exert influence on body weight and conformation traits.

The relationships between body weight and body conformation traits are presented in Table 3. The association of BW with BCS, and body conformation traits were strongly positive and highly

significant ($P < 0.01$; $r = 0.70-0.99$). Body weight was strongly related with all the

body conformation traits ($r = 0.80-0.99$). This therefore, suggests that the improvement of body weight within a selection objective may be achieved through the use of linear conformation traits [15, 16, 1].

However, the single closest related conformation trait to BW was HG ($r = 0.99$). This suggests that HG can be used

with high degree of certainty to predict body weight. This agrees with the report of [15] that BW provides criteria against which other variables may be set or correlated. The relationships between BCS and body conformation traits were highly positive and significant ($P<0.01$; $r=0.51-0.68$), except the correlation between BCS and HG which was high ($r=0.70$). However, the relationships amongst the body conformation traits were positive and highly significant ($P<0.01$; $r=0.68-0.92$). The observed high positive relationship amongst these body

size characteristics are an indication that any developmental change in one affects the other, thus selection in one of these traits would lead to correlated response in the others. Therefore, it may not be necessary to incorporate all these traits in the selection index for improving them. The highly positive correlations between BCS and body conformation traits suggest that selection for good body condition would increase the chances of having genetic merit for desired conformation.

Table 2: Effect of age, hair type and body condition score on body conformation traits in Yankasa rams

Factor	N	Body Weight (kg)	Heart Girt (cm)	Stature (cm)	Chest Width (cm)	Wither Height (cm)	Body Depth (cm)	Body Length (cm)	Rump Width (cm)
Age (month)	62	**	**	**	**	**	**	**	**
12 – 18	45	15.7 ^c	61.7 ^c	59.4 ^b	9.5 ^c	58.3 ^b	36.3 ^c	54.6 ^c	19.4 ^b
19 – 24	7	19.8 ^b	65.6 ^b	59.4 ^b	11.2 ^b	59.4 ^b	40.4 ^b	60.8 ^b	20.2 ^b
25 – 36	10	41.7 ^a	87.7 ^a	77.9 ^a	14.6 ^a	79.2 ^a	50.0 ^a	80.4 ^a	30.4 ^a
SEM		0.63	0.64	0.71	0.20	0.61	0.43	0.79	0.40
Hair Type	62	**	**	**	**	**	**	**	**
Long-Curly	10	16.9 ^b	62.9 ^b	58.5 ^c	9.4 ^b	58.6 ^c	36.0 ^c	54.9 ^b	19.6 ^b
Long-Smooth	7	15.5 ^b	61.4 ^b	60.3 ^c	8.6 ^c	57.3 ^c	35.4 ^d	53.9 ^b	17.5 ^c
Short-Rough	8	22.5 ^a	68.6 ^a	68.6 ^a	11.4 ^a	66.0 ^a	38.1 ^b	59.7 ^a	19.8 ^b
Short-Smooth	37	21.8 ^a	67.9 ^a	63.4 ^b	10.9 ^a	63.2 ^b	40.3 ^a	61.2 ^a	22.3 ^a
SEM		1.4	1.4	1.1	0.3	1.1	0.7	1.4	0.6
Body Condition Score	62	**	**	**	**	**	**	**	**
3	33	13.6 ^b	59.5 ^b	56.9 ^b	9.3 ^b	56.9 ^b	35.9 ^b	53.4 ^b	18.8 ^b
4	29	28.5 ^a	74.6 ^a	68.9 ^a	11.7 ^a	67.9 ^a	42.7 ^a	66.4 ^a	24.2 ^a
SEM		1.0	1.0	0.8	0.3	0.9	0.6	1.2	0.6

a, b, c: Means within the same column and factor with different superscripts differ significantly ($P<0.05$);
** = $P<0.01$

Table 3: Correlation analysis between body measurements in Yankasa ram

	BCS	HG	ST	CW	WH	BD	BL	RW
BW	0.70**	0.99**	0.93**	0.80**	0.92**	0.84**	0.89**	0.84**
BSC	-	0.70**	0.68**	0.51**	0.61**	0.57**	0.57**	0.53**
HG	.	-	0.93**	0.80**	0.92**	0.84**	0.89**	0.84**
ST	.	.	-	0.73**	0.92**	0.74**	0.84**	0.78**
CW	.	.	.	-	0.79**	0.73**	0.74**	0.89**
WH	.	.	.	.	-	0.73**	0.74**	0.89**
BD	.	.	.	.	.	-	0.87**	0.68**
BL	.	.	.	.	.	.	-	0.78**

BW = body weight, BCS = body condition score, HG = heart girth, ST = stature. CW = chest width, WH = withers height, BD = body depth, BL = body length, RW = rump width.** = P<0.01

Conclusion and Application

- The result of this study showed that age, hair type and body condition score had significant influence on body weight and conformation traits.
- There were strong positive relationships between body condition score, weight and conformation traits.
- Therefore, age, hair type and body condition score could determine body conformation in Yankasa rams.

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