BODY MORPHOLOGY AND CHEVON YIELD OF INDIGENOUS BREEDS OF GOATS (BUCKS) IN NIGERIA

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ABSTRACT
A total of eighteen yearling bucks containing six each of Sahel Bucks-SB, West African Dwarf Bucks-WAD bucks and Red Sokoto Bucks-RSB averagely weighing 9.9±0.3kg *were used to evaluate body morphology and its implication on meat yield and other quality parameters of chevon from indigenous goat breeds in Nigeria. Prior to the start of the study, their relative ages were determined using incisors appearance. They were managed on iso calorie diets for 210 days in an experiment laid out in a Complete Randomized Design, (CRD). Body morphology, primal cuts and chevon yield according to the breeds were determined. Results showed that height varied significantly (P<0.05) and SB and RS bucks, elicited closed values of Height at Withers (HW) of (53.33cm) and (52.33cm), respectively which were significantly higher than the37.33 cm for WAD bucks. On the other hand, Chest Width (CW) of 27.09 cm and Heart Girth (HG) of 59.03 cm of WAD bucks were significantly higher than 21.00 and 50.04 and 23.4 and 52.6 cm in SB and RSB, respectively. Although both wholesale cuts for hind and fore legs were significantly (P<0.05) higher in Sahel and RS bucks than WAD bucks, they were enough to predict higher meat yield over WAD bucks. The study concluded that there was an inverse relationship in terms of meat determining characteristics and height in goat breeds. WAD bucks reportedly yielded more chevon while tallness characteristics were higher in both RS and Sahel bucks.*
Keywords: Indigenous goat breeds, Bucks, Chevon yield, Heart girth

Introduction

Ruminant animal production is no longer run on a subsistent basis as witnessed in the recent past (Daskiran *et al*., 2006). This may be traced to the proportional returns from the investment in one hand and also to the ease of managing the small ruminant animals, their ability to make use of some kitchen waste as characterised by their anatomy and the chevon yield per animal relative to the other. Also, proportional returns compared with large ruminants within a smaller confinement had made goat rearing a golden opportunity especially to the rural farmers. Moreover, there has been a tremendous increase in goat population (FAO, 2001) due to their wide adaptability and tolerance to varying climatic regions (Dhanda, *et al*., 2003). In Nigeria for example, from the intense dry region of Sahel to the extremely humid region in the South, small ruminant animals thrive well even under free range or poor management system (*Ameha Sebsibe et al*., 2006; Anurudu, 2011). Goats' domestication thereby becomes a poor man's investment, (Singh *et al.,* 2009). Its preference may not be only because of their wide range of adaptability and survivability to different climatic regions of the world, but essentially because they can be easily converted to cash within the rural settings of most of the Sub Saharan African countries usually with minimal inputs (Punch Newspaper, 2017)). A goat is fundamentally important whether dead or alive, it is on record that a bride price in not complete until a goat is given. In fact, it was reported that livestock account for over 40% of global Agric GDP (Webb *et al*., 2005) with particular reference to small ruminant animals. The carcass yield is an important yardstick in estimating the economic gains of livestock animals relative to the live weights and the production cost (Adeyinka, 2006). So also are the weights of the non-carcass components of the animal, but more importantly they determine the viability of the enterprise if breed specific is included. Sadly, there is no adequate documentation on breed influence on the chevon yield vis a vis the body part measurements in Nigeria. Therefore this study evaluated the animal body parameters in relation to chevon yield and wholesale (primal) cuts with a view to identifying proven breed that yield more, increase productivity and better the lives of livestock farmers.

Materials and Methods

The yearling bucks with an average weight of 9.9±0.3kg were used for the study. Breed identification principle of Okpeku *et al*. (2011) was adopted. The animals were assigned into three treatment groups based on breed and were ear tagged and managed in separately equipped pens with watering and feeding assets throughout the 210 days feeding trial in a Completely Randomized Design (CRD). The animals were dewormed against both internal and external parasites and were also vaccinated against viral diseases during the period of first 7 days acclimatization and adapted for 21 days. Feeding was twice daily in a ratio 40 to 60% of hay and concentrate, respectively at 3% of their body weight consisting of similar diets for all bucks. The animals were given access to salt-lick with fresh

clean and cool water on free choice basis. Groundnut haulms was the basal diet; the formulation for the concentrate feeds is in Table 1 below.

Table 1: Ingredient Composition of Concentrate Feed on % Dry Matter basis

Ingredients	Percentage (%) g/kg
Dusa*	30.38
Brewer's dried grain	29.38
Peeled cassava meal	5.69
Wheat offal	19.56
Palm Kernel Cake	10.00
Dicalcium phosphate	3.00
Salt	1.00
Premix mixture	1.00
Total	100:00
Calculated value	
Crude Protein	14.00
Crude Fiber	13.71
Ether Extract	5.30
Digestible Energy	2200

*By-product of local (gin factory) grain processing

Table 2: Chemical Composition of the Concentrate Feed and Hay

Components (g/100g)	Concentrate	Hay
Dry Matter	88.05	91.40
Crude Protein	11.95	9.15
Ether Extract	4.50	0.90
Crude Fiber	11.75	18.65
Ash	4.80	4.00
Neutral Detergent Fiber	53.50	68.70
Acid Detergent Fiber	35.20	49.01
Acid Detergent Lignin	9.89	15.20
Hemicellulose	18.30	19.69
Cellulose	25.31	53.50
Nitrogen free extract	56.95	58.70
Digestible Energy (kcal/kgDM)	3410.30	3960.10

Table 3. Linear body measurements of three indigenous Goat (Bucks) breeds in Nigeria

	BREEDS				
Parameters (cm)	**Sahel**	**WAD**	**Red Sokoto**	**SEM**	**P-value**
Body length	48.89^{a}	39.35^{b}	47.86^{a}	0.0433	0.0001
Height at wither	53.33^{a}	37.33^{b}	52.33^{a}	0.0261	<0.0001
Height at pelvis	63.20^{a}	49.66^{b}	62.00^{a}	0.457	0.0009
Width of pelvis	20.50	21.91	20.54	0.80	0.5466
Depth of chest	20.45^{b}	24.42^{a}	20.41^{b}	0.0272	0.0020
Heart girth	50.04^{b}	59.03^{a}	52.30^{b}	0.3580	0.0307
Width of chest	21.00^{c}	27.09^{a}	23.24^{b}	0.0307	0.0003

^{a,b,c}: means with different superscripts in the same row differ significantly ($p<0.05$).

Table 4. Primal cuts to hot carcass weight of three goat (buck) breeds in Nigeria

Parameters (%)	Sahel	WADB	Red Sokoto	SEM	P-value
Hind leg	25.82[a]	23.65[c]	24.02[b]	0.0243	<0.0001
Fore leg	24.46[a]	22.45[c]	23.61[b]	0.0314	0.0968
Brisket	12.31[b]	13.30[a]	12.33[b]	0.0214	0.0043
Neck	11.80[a]	10.64[b]	12.25[a]	0.0294	0.3620
Rack	13.74[c]	15.85[a]	15.06[b]	0.0413	0.0009
Loin	5.50[c]	6.99[a]	6.16[b]	0.0200	<0.0001
Flank	3.95[c]	7.09[a]	4.27[b]	0.0232	<0.0001

[a,b,c]: means within same row with different superscripts differ significantly ($p<0.05$).

The Fourie *et al*. (2002) method was employed to measure the morphological parameters (skeletal and muscular dimensions). Usually, it may give a prediction of animal weight, meat to bone proportion in life animals and probably the value of external part relative to internal ones. The body length was determined using the distance from anterior shoulder point to the pinbone of the posterior blade while heart girth was measured using body circumference at the breast level. The height at pelvis was taken from the surface ground to the pelvis.

Statistical analysis

The data were collected and the analysis of variance using SAS (2002) package was employed to separate the means.

RESULTS AND DISCUSSION

Presented in Table 3 are the linear body characteristics of the goat breeds. Both Sahel and RS bucks respectively showed closed value of (53.33cm) and RS (52.33cm) for body length and were significantly ($P<0.05$) higher than that of WAD bucks with 37.33 cm. These findings are similar to those reported by Kadurumba (2021) who gave a range of 50-70 cm for indigenous goat breeds. On the other hand, WAD bucks had significantly ($P<0.05$) higher values of heart girth (58.31cm), depth of chest (24.42 cm) and width of chest (26.88cm) and were significantly ($P<0.05$) higher than 50.55 cm, 20.45cm and 21.87cm for Sahel and 52.60cm, 20.41cm and 23.41cm for the RS bucks, respectively. Furthermore, report from this work showed the height at withers and that at pelvis fell within 52.43 - 55.05cm for tall goat breeds which were reported by both Mohammed (2004) and Muchenje *et al*. (2005) with no corresponding increase in carcass yield. Similarly, in spite of higher hind and fore leg values exhibited by both Sahel (25.82 vs 24.46) and Red Sokoto bucks (24.02 vs 23.61), they were not indicative of any significant difference in chevon yield over that from WAD bucks with 23.65 vs 22.45. However, the loin (6.99) and flank (7.09) values which were higher in WAD bucks than the other two breeds correspondingly revealed high meat yield. Even though most early workers reported breed influence on meat yield, height traits were not in any way a major determinant in chevon yields from the different carcasses (Dereje et al., 2013).

CONCLUSION

The study concluded that the characteristics tallness was prominent in both Sahel and Red Sokoto breeds but yielded less chevon than that from the West African Dwarf bucks.

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