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MEAT POTENTIAL INDICATORS OF RED SOKOTO AND WEST AFRICAN DWARF GOAT

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Abstract

Goats form an integral part of livestock production in the tropics. Meat potential is determined subjectively by resource poor livestock keepers, using hand to measure the rump width (RW). Objective evaluation of meat potential in different breeds of goat can overcome problems associated with subjective evaluation. Hence, the objectives were to predict meatiness in Red Sokoto (RS), and the West African Dwarf (WAD) goats, using product of the body length (BL), wither height (WH) and (RW) and to indicate the inherent size of each breed, using WH: BL ratio. These three parameters were used because they are less environmentally sensitive. A total of 18497 goats were sampled purposefully from the Akinyele and Oranyan markets in Ibadan, Oyo State Nigeria. RS showed no significant difference for BL and WH but different from the RW of both sexes ($p < 0.01$). Similarly WAD showed no significant difference for the BL and WH, but differed ($p < 0.01$) between sexes for RW. Using the ANOVA, BL:WH ratio showed no significant difference between the breeds. WAD goats have the highest mean for BL:WH ratio. Western meat livestock is primarily identified using BL:WH. The combinations of these body parameters as indicator for meat type in meat animals showed that WAD goat has more potential to lay down meat, than RS.

Keywords: Descriptive analysis, Goats, Meatiness, Morphological traits, Quantitative

Introduction

Goat is a healthy meat source that has become popular in restaurants and stores, its meat has been consumed around the world for centuries. Goats, due to their naturally endowed physiological adaptation and general lower husbandry requirements, form an integral part of livestock production in the tropics and subtropics (Acharya and Battacha, 1992; Knight and Garcia, 1997; Glboa *et al.*, 2000; Silanikove, 2000; Morand-Fehr *et al.*, 2004; Mengistu, 2007). Globally goat meat consumption has increased over the years, in part due to its unique nutritional value when compared to the meat of other livestock (Singh-Knights and Knights, 2005). In Nigeria, goats are kept mainly for meat although the skin is also valuable (Omojola *et al.*, 2004). There are three main breeds of goats in Nigeria. Red Sokoto, Sahel and the West African Dwarf goats (WAD). Variation in body size is one of the criteria used in classifying breeds of goats. Traditionally, meat animals are visually assessed, which is a subjective method of judgment. In goats, objective evaluation of body weight and linear body measurements for describing and evaluating size, and conformation characteristics would overcome many of the problems associated with subjective evaluation (Abanikannda *et al.*, 2002 and Yakubu *et al.*, 2011). In this study, the body length, wither height and rump width of the goat, were used to predict the meatiness in Red Sokoto, and WAD goats to determine which of these breeds is meatier.

Materials and Methods

Study animals

A total of 1847 goats were used in this study. The breeds were made up of goat mainly found in Nigeria. This consisted of, 1138 goats of Red Sokoto and 709 of the West African Dwarf goat. Animals were randomly selected from herds from private market in Akinyele and Oranyan goat Markets in Ibadan Oyo state Nigeria.



Morphometric data

Body length (BL) – measured from the external occipital protuberance to the base of the tail, Withers height (WH) -measured on a platform from the surface to the withers and Rump width (RW)- The distance between the hip bones (tuber coxae) (Yakubu *et al.*, 2010).

Sex	RS	WAD
M	1.27±0.31 ^b	1.32 ±0.17 ^a
F	1.24±0.1 ^b	1.37 ±0.18 ^a

Statistical analysis

Descriptive Analysis: Mean, Standard

deviation Coefficient of Variation, Standard Error using the following procedure.

Analysis of Variance

Body Ratios: The ratio of the body length to wither height was determined by Body length/ wither height (BL/WH)

Regression: Regression of Withers Height on Body Length was accomplished

Table 1: Comparison of means for body measurements (cm) of the breeds of both sexes of RS and WAD

Body parameter	Sex	RS	WAD
BL	M	69.13±8.93 ^b	52.00±7.21 ^c
	F	70.77±8.76 ^b	60.24±8.42 ^c
WH	M	54.77±6.20 ^b	39.85±5.35 ^c
	F	57.19±5.18 ^b	44.16±4.82 ^c
RW	M	24.36±2.40 ^c	25.23±3.62 ^b
	F	26.96±3.05 ^a	28.27±3.62 ^a

RS = Red Sokoto WAD = West African Dwarf Goat; M = Male; F Female

Mean with the same superscript are not significantly different

Table 2: Comparison of BL: WH of the Two breeds

Table 3: Comparison of WH: BL ratios in RS and WAD

	WAD	RS	SEM
WH:BL	0.755 ^c	8.828 ^b	0.0034

RS = Red Sokoto; WAD = West African Dwarf Goat; M = Male; F Female

Discussion and results

Comparison of BL, WH and RW

Results showed that WAD does showed the highest coefficient of Variation (CV=13.89) in the BL, the least amount of CV. RS does has the lowest CV of 9.06 for WH. WAD bucks showed the highest CV in the RW of

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the does (CV =14.38) and the lowest CV for RW was observed in RS does (CV=9.86).RS bucks varies highly (CV=12.92) in the BL and least (CV=9.06) in the WH of the does. WAD does show the highest CV, (14.38) in the RW and lowest CV, (10.92) in the WH of the does. Table 1 Show the result of the comparison of means for body measurements (cm) of the breeds of both sexes of RS, SH and WAD. The mean value of does in this study were generally higher than the mean values of bucks for BL, WH and RW, this could be as a result of a hormone processed by female goat, or a gene could be responsible for this, however this is contrary with the study of (Adewunmi *et al.*, 2008) who reported lower mean values for BL, WH and RW in ewes than in rams. This disparity could be due to species differences between goat and sheep. Moreover, the superiority of does to bucks in this research corroborates the reports of (Abdullah *et al.*, 2004) in WAD goats and (Katongole *et al.*, 1996) in Twswana goat. In fact, similar trends were reported in southern Nigeria with WAD goat, (Ifut *et al.*, 1991) and Northern Guinea Savanna of Nigeria with Red Sokoto goat (Akpa *et al.*,1998). The non- significant ($p<0.0001$) effect of sex of each breed on BL, and WH recorded in this study could be attributed to the fact that each breed were raised in a different ecological zone or agro ecological zone in view of adaptability to the environmental conditions prevailing in the area, this is in line with the work of Brown *et al* (2006) who reported that temporal and spatial variation in weather, plant productivity and subsequent nutrition could have major impacts on the physical growth of animals. Although this finding is at variance with the work of Abdullah *et al* (2004) with WAD goats in the derived savanna zone of Nigeria in which the sexes were significantly ($p<0.0001$) different from each other. The higher mean values of the RW in does as compared to bulks might be due to the developed pelvic girdle (sex hormone influenced) which is an adaptive feature of dams for parturition. This finding is in accordance with the reports of Ngere (2006) and Idowu (2002) in red Sokoto goats. The BL: WH is significantly different from in the two breeds of goats. Higher ratio of BL to WH implies that the animal is longer than it is tall, this is also an indication that the animal with higher BL: WH will have more tendencies to lay down meat. The BL: WH of WAD is the highest. This might be due to its shortness and lowest wither height of the two breeds, which is inversely proportion to the BMI thereby given the animal the capacity to lay down more meat. This is in agreement with report of FLDPCS (Federal Dept. Livestock and Pest Control Services).1992 that the higher the wither, the lesser the BMI. This also implies that the different breeds have different capacity to lay down meat, according to western meat livestock the higher the ratio the more capacity for the animal to lay down meat. The graphs illustrate the relationship of the WH: BL for each of the breeds, it was observed from the graph that RS has higher values for BL than WH, making the slope tilt towards the right of the graph. WAD goat showed higher values for BL than the WH, this takes the slope above the center of the graph. Results show that RS is $Y = 0.3646x + 30.123$ with $R^2 = 0.3051$ and WAD is $Y = 0.3768x + 20.961$ with $R^2 = 0.3769$. R^2 show how predictable BL can be from WH. From these results, it was observed that WAD has the highest mean for BL: WH and the lowest mean for WH: BL. According to western meat livestock, with this result, it can be said that WAD goat has the highest chances to lay down more meat than RS.

Conclusion and recommendation

There are several steps that should be taken when selecting goats for meat production. In this research the wither height, body length and rump width was used to determine which of these breeds have the capacity to lay down much meat. While any breed of goat is a potential meat producer, there are some breeds which have comparative advantage that makes them more suitable for profitable meat production than others. The different body dimensions that was measured was used to determine the surface area of the goat for meat lay down, in breeding and in goat market surface area is very important, giving the animal enough room to grow and gain effectively. It is therefore recommended that the BL, WH and RW should be given attention when selecting goat for meat production.

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