Liveweight and Chest Girth Correlation in Commercial Sheep and Goat Herds in Southwestern Nigeria

Correlación entre Peso Vivo y Contorno del Pecho en Rebaños
Ovino y Caprino Comerciales en el Suroeste de Nigeria

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SUMMARY: The correlation between chest girth and weight of sheep and goats have been studied as a predictive guide in homestead farms where equipment to definitively quantify the weight of animals are unavailable and inaccessible. The livestock markets in the South Western part of Nigeria are still very underdeveloped and consist of peasant farmers taking their few animals to more developed areas to offer them for better prices to the consumer or middle men who are in the trade to attain the best profit. Twenty each of sheep and goats were randomly selected in herds from three different commercial locations and evaluated using weight and chest girth measurements as indices. Mean weight for the 3 groups of sheep was between 19.8 and 31.15kg, while for the 3 groups of goats was between 19.6 and 16.35kg. There was correlation (0.39-0.80) between sheep chest girth and weight which does not differ from those already established in literature and a predictive index of $W = (18.9 \pm 0.36)$ CG where in more than 80% of the population are accounted for and in goats, correlation of 0.40-0.76 and a predictive index of $W = (18.51 \pm 0.31)$ CG where more than 76% of the population falls in. It was therefore concluded that chest girth is a useful tool in predicting weight of commercial sheep and goat.

KEY WORDS: Commercial sheep; Chest girth; Weight.

INTRODUCTION

In Nigeria, goats are the most numerous of all types of livestock numbering about 27.6 million (FOS, 1986). The animals are primarily for meat production. There is sometimes a need to estimate weight of animals and with the production of animals in remote areas where weighing scales are either unavailable or beyond the reach of the peasant farmer due to their prohibitive prices, it may even be essential to determine the weight of animals from easily measurable parameters, such as chest girth (Mayaka *et al.*, 1995). while there is information of both farmed animals and those captured in the wild (Bundy *et al.*, 1991; Mayaka *et al.*), there is a dearth of information on commercial sheep and goat which are unique in the sense that they are transported from the northern part of the country to the southern and have to endure the stress of travel and the cramped environment which may affect observed statistics in farmed animals.

Mayaka *et al.* worked on a prediction equation using the heart girth circumference and showed that in West African Dwarf goats, the live-weight can be predicted with satisfactory accuracy. Bundy *et al.*, while working on 11 morphological measurements on carcasses of hunter-killed White tailed deer (*Odocoileus virginianus*) to predict their weight discovered that; chest girth was the best parameter for a predictive equation for live-weight. Dale & Bunnell (1984), also published data on weights and measurements of captured Stone's sheep as part of a study on foraging behaviour and nutrition and found that the chest girth is the best predictive equation for body weight and is applicable without seasonal variation while Fasae *et al.* (2005), found that age and season have tremendous effect on live-weight. To increase meat yield from these breeds requires genetic improvement of its liveweight. Proper measurement of this trait is a requisite for achieving this goal. The need for

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estimation of the trait from simpler and more easily measurable variable, such as linear body measurements therefore arises.

This study determined the predictive value of chest girth for live weight in 3 herds of commercial sheep and goats regardless of breed and sex. Linear regression of each herd compared to others was also determined.

MATERIAL AND METHOD

Chest girth and live weight measurements of twenty randomly selected animals were taken from each herd at three sheep and goat markets in Ibadan, Nigeria. The herds were those located at Bodija market (G1), Iwo Road market (G2) and General Gas market (G3).

Data Collection. Body weight was evaluated using a weighing scale. Chest girth measurement was made using the tailor's tape measure and is the circumference of the chest.

Statistical Analysis. The data were analysed using Sigmaplot and this was also used to plot the graphs and linear regressions. All regressions were done at 95% confidence interval.

RESULTS AND DISCUSSION

The aim of this study was to assess the relationship between an easily recorded measurement (girth of chest) and the character used for selection purposes (weight). The predictive value of the chest girth of animals has been used to determine the weight in sheep (Dale & Bunnell; Attah *et*

al., 2004) and goats (Benyi, 1997) and the chest girth has been found to be a useful tool in this regard. But with the myriad problems associated with commercial sheep and goat in Nigeria (Sumberg & Cassaday, 1984); it can be hypothesised that these animals may not follow the predictive pattern of chest girth for weight estimation.

Fig. 1. Comparison of weight and chest girth of three commercial herds of sheep.

Fig. 2. Comparison of weight and chest girth of three commercial herds of goats.

Table I. Predictive equations for bodyweight in commercial sheep and goat.

	G1sheep	G2sheep	G3sheep
Rsqr	0.80	0.39	0.78
B1	0.36	0.29	0.32
B0	18.59	22.4	20.4
Regression equation	$W=18.59+(0.36)CG$	$W=22.4+(0.29)CG$	$W=20.4+(0.32)CG$
	G1goat	G2goat	G3goat
Rsqr	0.76	0.40	0.50
B1	0.31	0.20	0.28
B0	18.51	20.03	20.71
Regression equation	$W=18.51+(0.31)CG$	$W=20.03+(0.20)CG$	$W=20.71+(0.28)CG$

In the present study, results were expressed as mean and standard deviation. The comparison of weight and Chest girth of three commercial herds of sheep and goats are presented as Figs. 1 and 2, respectively. Comparison of plot and linear regression of three commercial herds of sheep and goat are presented as Figs. 3 and 4, respectively, while the predictive equations for bodyweight in commercial sheep and goat are presented in Table I. The results of this study revealed that in the different groups of sheep; mean weight ranged between $19.8-31.2 \pm 2.3$ (Table I). Varying range of scatter (Fig. 1) was also observed in the weight distribution. This can be attributed to the fact that the animals are all raised under different conditions and are sourced by middle men who purchase them from the farmers and small householders who keep these animals for meat or as a cash source when the need arose. Also, the different markets cater to different target buyers (ceremonial and restaurants) and so the weight range for each herd differs and when the linear regression analysis was conducted, 80% of the population were within the predictive value of weight (18.6 ± 0.36 kg) chest girth, which is a satisfactory predictive index even though lower than values obtained by Benyi, with pure and

crossbred goats but approximates the lower border of values obtained by Fasae *et al.*, with Yankassa ewes.

The results obtained for the West African dwarf goats showed that mean weight ranged between $19.6-16.4\text{kg} \pm 2.1\text{kg}$. Many of the goats were underweight and hidebound. The predictive equation for the liveweight from chest girth only managed to include 50-76% of the population with weight being $18.5+0.31\text{kg}$ chest girth, which is lower than all reported goat predictive indices (Benyi; Fasae *et al.*; Khan *et al.*, 2006). This then suggests that for commercial sheep and goat, a predictive equation separate from the farmstead equation may be utilised to reduce overestimation due to prevailing circumstances of challenges of commercial sheep and goats. Benyi, reported a better reliability with geometric equations than with linear in animals with chest girth less than 30. The use of easily obtainable measures, like the chest girth, which allows an accurate estimate of the weight to be made, could create the basis for the assignment of performance recording to the farmers and allows a more efficient planning of the selection process and also allows an adequate economical qualification of the studied breeds.

Fig. 3. Comparison of plot and linear regression of three commercial herds of sheep.

Fig. 4. Comparison of plot and linear regression of three commercial herds of goats.

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RESUMEN: La correlación entre la circunferencia de pecho y el peso de las ovejas y cabras ha sido estudiada como una guía de predicción en granjas, donde el equipo para cuantificar el peso de los animales no está disponible o es de difícil acceso. Los mercados de ganado en la parte sur-occidental de Nigeria, siguen siendo aún muy subdesarrollados y constan de campesinos que tienen pocos animales, a diferencia de zonas más desarrolladas, para ofrecer los mejores precios para el consumidor quienes están los comercializan para alcanzar el mejor beneficio. Veinte ovejas y veinte cabras fueron seleccionadas al azar entre los rebaños de tres diferentes localidades comerciales, y fueron evaluadas utilizando el peso y la circunferencia de pecho como los índices de mediciones. La media de peso de los 3 grupos de ovejas fue entre 19,8 y 31,15kg, respectivamente, mientras que para los 3 grupos de cabras fue entre 19,6 y 16,35kg. Hubo correlación (0,39-0,80) entre la circunferencia de pecho de las ovejas y el peso, que no difieren de las ya establecidas en la bibliografía y un índice predictivo de $W = (18,9 \pm 0,36)$ CG en donde más del 80% de la población se contabilizan y en el ganado caprino, la correlación de 0,40-0,76 y un índice predictivo de $W = (18,51 \pm 0,31)$ CG donde se encuentra más del 76% de la población. Por lo tanto, se llegó a la conclusión que la circunferencia de pecho es una herramienta útil en la predicción del peso vivo de las ovejas y cabras comerciales.

PALABRAS CLAVE: Oveja comercial; Circunferencia de pecho; Peso.

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