Original Article

Heart Girth Reflect Live Body Weight in Sudanese Shogur Sheep under Field Conditions

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ABSTRACT

The reflections of heart girth measurement to live body weight of Sudanese Shogur sheep under field conditions have been studied. Ninety males(90) of each three age groups were randomly selected(With a total population number of 270) in herds from different native areas where the animals were reared and evaluated using live body weight(kg) and heart girth measurement(cm). Means of live body weight and heart girth for the three age groups were calculated (P≤0.05). There were positive correlation coefficients (0.54, 0.66 and 0.81) between live body weight and heart girth. A predictive indices of (W= -4.62 + 0.45(HG), W= -23.78 + 0.73(HG) and W= -55.14 + 1.17(HG)) where more than (55%, 66% and 65%) of the population falls in respectively for the three studied age groups. It was therefore conclude that heart girth measurement is a useful tool in reflecting live body weight of Sudanese Shogur sheep under field conditions.

KEY WORDS: Heart girth, Live weight, Shogur sheep, Sudan.

INTRODUCTION

In Sudan, Sheep are important component of livestock agricultural, the animals are primarily for meat, milk and other by-products(Skins, hairs and fertilizers). Shogur are moderately large sheep ranging in color from light to dark brown. They have occasional patches of wool under the hair Sulieman et al, (1990). They are found mainly along and west of the White Nile, and are most common in the western part of the Gezira, where they graze on cotton residues and other agricultural by-products. There is sometimes a need to estimate live body weight of animals and with the production of animals in remote areas where weighing machines and scales are unavailable or far from the reach of the peasant breeders due to their high prices, it may even be very essential to estimate the weight of animals from measure parameters such as heart girth(Mayaka et al., 1995).

A lot of techniques, which are simple or sophisticated and expensive or inexpensive, are available to get information on animal's body traits. The easiest way to assess an animal's body mass is to weigh the animal. However, under some situations scale may not be available and prediction of body weight from body measurements could be preferred practically (Latshaw and Bishop, 2001). Using heart girth measurement to estimate live body weight of the sheep's would help the breeders to calculate the amount of ration to feed and dose rate for medication. To increase meat yield from this type requires genetic improvement of its live body weight. Proper and accurate measurement of this morphometrical trait is requisite for achieving this objective.

The need for estimation of live body weight from similar and more easily measurable variable such as heart girth therefore arises. Many breeders gave an attention to the live body weight of livestock animals the object being observed and measured. Several breeders reported a strong inter-relation between body measurements with some quantitative traits such as live weight. There is a need for estimation of quantitative traits from simple and more easily measurable variable such as body measurements. Measurements of various body conformations are of value in judging quantitative characteristics of meat and are also helpful in developing suitable selection criteria. Moreover, because of the relative ease in measuring linear dimensions they can be used as an indirect way to estimate live weight(Getachew, 2008).

This study determinated the reflection value of heart girth for live weight in Sudanese Shogur sheep regardless of age group. Simple linear regression of each age group was also determinated.

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MATERIAL AND METHODS

Research site, animals and management

The animals included in this present research were located at Elgazira State. This area is inhibited by different tribes who raise this local breed. Live weight(kg) and heart girth(cm) measurement of (N=270) Sudanese males Shogur sheep were taken under field condition in one visit survey. Live weight was estimated using small ruminant weighing scale. Heart girth measurement was made using the measuring tape and is the circumference of the measure from a point slightly behind the shoulder blade, down the fore-ribs and under the body behind the elbow all the way around. All the animals were managed under a traditional system, the animals were led out to graze freely on the natural pastures during the day and return to pens from local materials in the evening where their feeding was supplemented with whole grained and dry grass forage. Fresh water was given adlibitum. Animals used in this research were divided into three groups according to age (3, 4 and 5 months). Data for all parameters investigated were collected and taken from(N=270) animals from different householders in one visit surveillance.

Data Analysis

All data collected in this research were summarized, coded and subjected to various Statistical analysis tools in General linear Model(GLM) procedures, Univariate analysis of variance, Pearson's correlation and simple linear regressions were performed using Statistical Packages for Social Sciences (SPSS) release 15.0 (2006) software to compare the relationship among parameters studied. All analysis of variance, bi-variate correlations and regressions were done at 95% confidence interval. Accuracy of prediction equations was assessed by using the coefficient of determination (R^2) for each analysis.

RESULTS AND DISCUSSION

The aim of this research was to assess the relationship between an easily recorded measurement (Heart girth) and the metrical character(live weight) of Sudanese Shogur sheep. Live body weight is important metrical character in animal breeding and husbandry due to selection criteria and economical profit. The predictive value of the heart girth of animals has been used to determine weight in sheep (Dale and Bunnell; Attah et al., 2004). In the present research, results were expressed as means and standard errors. Live weight and heart girth measurements increase with advances of age Table-1. The correlation is one of the most common and most useful statistics that describes the degree of relationship between two variables. In this research we attempted to calculate accuracy live body weight from heart girth by using of these characteristics of correlations. The results of this research revealed that in the different age groups of Sudanese Shogur Sheep a significant ($P\leq0.05$) and highly coefficients of correlation between live weight and heart girth Table-1. The correlation coefficient values were all positive which means that as any one heart girth or live body weight is increasing a corresponding increase is expressed in the other. The values also showed relatively high significance at the probability value this means that live body weight is possible to be determining using heart girth at 95 trial time. These findings in accord with those of (Topal and Macit, 2004; Atta and Khidir, 2004; Afolayan et al., 2006) whom reported that heart girth was found to be highly correlated with body weight in Sheep. No matter in this results suggest that heart girth which have relatively high correlation coefficients in all age groups might be used to reflect live body weight in Sheep.

Table 1. Least square (means ± SE) and correlation coefficients of quantitative parameters in Sudanese Shogur sheep according to age groups

Parameters	Age groups(months)		
	Four (n=90)	Five (n=90)	Six (n=90)
Live weight(kg)	28.37±0.91[a]	29.18±0.91[ab]	31.25±0.91[b]
Overall		29.60± 0.53 (n=270)	
Heart girth(cm)	72.22±0.85[a]	73.92±0.85[a]	73.56±0.85[a]
Overall		73.23± 0.49 (n=270)	
Correlation coefficients	0.54	0.66	0.81

The differences between means of quantitative parameters are marked by various letters in the same rows are significant ($P\leq 0.05$).

Table 2. Regression modes for predicting live weight (kg) of Sudanese Shogur sheep according to age groups using heart girth(cm)

Parameters	Age groups(months)		
	Four(n= 90)	Five(n = 90)	Six(n = 90)
R^2	0.55	0.66	0.65
B_1	0.45	0.73	1.17
B_0(Constant)	-4.64	-23.78	-55.14
Sig ($P\leq 0.05$)	**	***	***
Predictive equations	W= -4.64+0.45(HG)	W=-23. 78+ .73(HG)	W=-55.14+1.17(HG)

R^2= Coefficient of determination, B_1= Factor, B_0= Constant, Sig= Significant levels(* = significant, ** = highly significant and ***= very highly significant), W= predictive live body weight(kg) and HG= heart girth(cm).

The simple regression equations of Sudanese Shogur sheep were calculated to predict live weight from heart girth measurement in reference to age groups lead us to prediction a very good application of simple formulations for live body weight Table 2.

The coefficients of determination values from the regressions show that heart girth measurement is highly related to live weight Table 2. The use of easily obtainable measures such as heart girth, which allows an accurate estimate of the live weight to be made, could create the basis for the assignment of performance recording to the breeders and allows a more efficient planning of the selection programs and also allows an adequate economical qualification of the studied breed.

CONCLUSION

Consequently, it could be said that there were a positive and significant correlations between live body weight and heart girth in Sudanese Shogur Sheep. Using these correlations, body weight can be estimated from heart girth more accurately. It could be said that the best heart girth measurement is the best measurement of estimate live body weight in Sudanese Shogur Sheep. Further research is necessary in various locations in the country to provide a comprehensive studies and data on morphometric traits of this indigenous breed.

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