RELATIONSHIP OF LIVE BODY WEIGHT AND HEART GIRTH MEASUREMENT IN DORPER SHEEP

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ABSTRACT. The relationship of live body weight with heart girth measurement in sheep was investigated. The live body weight of a total of 212 Dorper ewes was recorded using a weighing scale and the heart girth measurement for each animal was taken using a measuring tape. The average live weight of the animals was 34.37 kg and the average heart girth measurement was 71.93 cm. The correlation coefficient between the live body weight and heart girth measurement was 0.959 and there was a strong correlation between the live body weight and heart girth measurement. The live body weight can be estimated using the regression equation of $Y = -45.098 + 1.105X$ ($r^2 = 0.959$). The finding suggests that heart girth measurement can be used to predict the live body weight of sheep that have a short coat of wool or hair. This method of measuring live body weight is quick, cheap and practical under field conditions.

Keywords: Live body weight, heart girth, Dorper sheep

INTRODUCTION

Small ruminant farming provides income to many small scale farmers in Malaysia. Dorper is a meat producing breed of sheep commonly reared in Malaysia. Measuring the live body weight of these sheep is essential to monitor the growth performance and to assess several economically important characteristics of the animals (Alade *et al.*, 2008). Livestock owners and veterinarians often use the live weight of these sheep to determine proper feed rations, administer proper dosage of medication or to monitor the weight gain of the animals (de Villiers *et al.*, 2009). The most accurate method of determining the live weight is by using a weighing scale, but this may not be always available on the farm. Weighing live animals can also be difficult because they generally do not stay still during the weighing. In the absence of the weighing scale, farmers generally rely on visual observations to estimate the live weight and this usually leads to inaccurate results (Samuel Fajemilehin *et al.*, 2008).

Estimating the live weight by using body measurements in rural areas and in field conditions is practical, quick, easy

to conduct and cheap (Atta and El Khidir, 2004, Thys and Hardouin, 1991). Heart girth measurement has been commonly used for weight prediction in cattle and pigs (de Villiers *et al*., 2009). Live body weight can be estimated by several means but the measurement of heart girth circumference seems to be the simplest and most accurate technique (Olatunji–Akioye and Adeyemo, 2009). Studies have shown that the live weight of sheep and goats can be estimated accurately under field conditions by measuring their heart girth (Hamayun Khan *et al*., 2006 and Pesmen *et al*., 2008).

This study was conducted to determine the correlation between live body weight and heart girth measurement in sheep and to determine a practical and reliable method to determine the weight of sheep under the Malaysian field conditions. The result obtained in this study will be useful to farmers and researchers involved in the small ruminant industry.

MATERIAL & METHODS

A total of 212 Dorper ewes of age ranging from 10 months to 2 years were used in

Table 1. Comparison of live body weight and heart girth measurement of Dorper ewes

	N	Minimum	Maximum	Mean	Std. Deviation
Live weight (kg)	212	20.2	60.9	34.37	7.586
Heart girth (cm)	212	57.7	90.2	71.93	6.723

Table 2. Live weight value and corresponding heart girth width of Dorper sheep

Heart girth (cm)	Live weight (kg)	Heart girth (cm)	Live weight (kg)
50	10.15	80	43.30
52	12.36	82	45.51
54	14.57	84	47.72
56	16.78	86	49.93
58	18.99	88	52.14
60	21.20	90	54.35
62	23.41	92	56.56
64	25.62	94	58.77
66	27.83	96	60.98
68	30.04	98	63.19
70	32.25	100	65.40
72	34.46	102	67.61
74	36.67	104	69.82
76	38.88	106	72.03
78	41.09	108	74.24

the study. The animals were raised on an intensive farming system. Good veterinary and sanitary measures were followed. The live body weight of each sheep was recorded using a weighing scale. The heart girth measurement was taken using a tailor's measuring tape. The chest circumference was measured just behind the scapula blade.

The data were analysed using SPSS 14.0 computer software. The relationship between the live body weight and heart girth was calculated by establishing the Pearson correlations and regression equation. All regressions were done at 95% confidence interval.

RESULTS

The weights of sheep were found too range from 20.2 kg to 60.9 kg. The mean weight was 34.37 and the mean heart girth measurement was 71.93 as shown in Table 1.

The live body weight values that predict the corresponding heart girth measurements are shown in Table 2.

The correlation coefficient between the hearth girth measurement and body weight of sheep was 0.979. Since the correlation coefficient was high, there was a strong positive correlation between the live body weight and heart girth measurement.

The regression of weight on scale reading and the heart girth measurement indicated a straight line relationship (Figure 1). A regression equation was determined to predict the live body weight from the heart girth measurement. The equation was $Y = -45.098 + 1.105X$ ($r^2 = 0.959$) [Y= estimated live weight (kg) and X=the heart girth width (cm)].

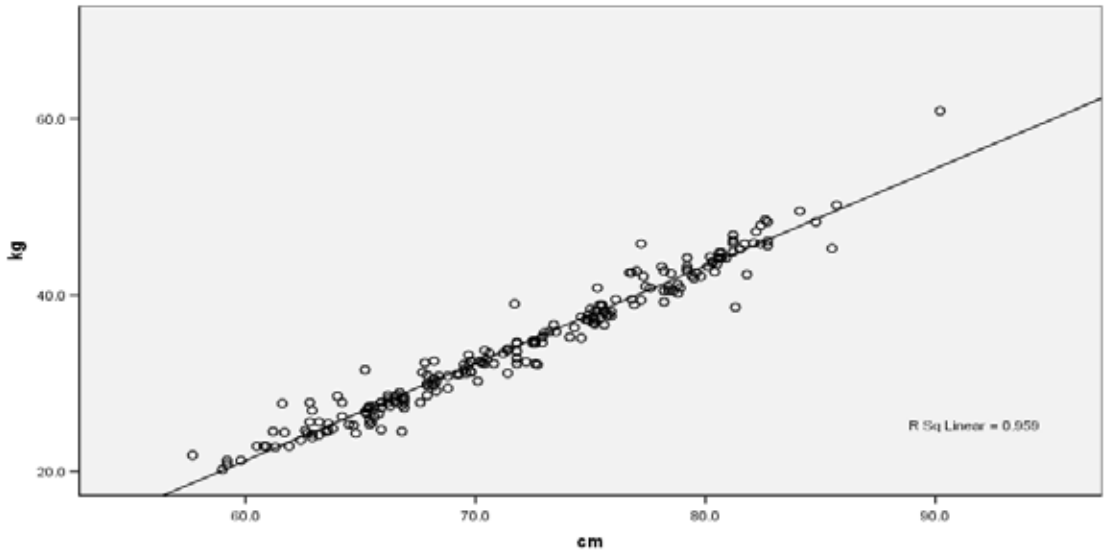

Figure 1. Regression of heart girth measurement (cm) on live body weight (kg) of Dorper ewes.

DISCUSSIONS

Sheep are weighed in animal management for many different purposes including assessment of the growth rate, determination of the market value, selection of breeding stock, calculation of drug dosage as well as for general health record. Weighing in the morning is common practice because it will minimize the variation due to full gut weight. The high correlation coefficients (r=0.979) obtained in this study suggests that heart girth measurement can provide a good estimation of body weight in the absence of a weighing scale. To avoid the errors of visual estimation of weight of the animal, live body weight can be determined or estimated using several linear body measurements such as heart girth, height at withers and body length. Among all this, it has been shown that heart girth is the best measurement for predicting live body weight in small ruminant (Alade *et al*., 2008). Besides, heart girth is the most convenient method to be used under field conditions as it requires minimal handling and fast.. According to the previous reports, the correlation between live weight and heart girth is generally higher in sheep and goats (Pesmen and Yardimci, 2008).

Live body weights of animals depend on many factors such as their genetic makeup, the farm management, the environment and feeding habits. Gender is an important factor of body weight variation and differs among male and female animals (Thys and Hardouin, 1991). In this study, only female animals were available because the male animals were sold off for meat. Therefore, the accuracy of the predictive values may not apply to male animals.

CONCLUSION

The average live weight of the 212 sheep ewes was 34.37 kg and the average heart girth circumference was 71.93 cm. The correlation coefficient between the live weight and heart girth width was 0.959, suggesting a strong positive correlation between the live weight and heart girth circumference. Live weight can be estimated using the regression equation of $Y = -45.098 + 1.105X$ ($r^2 = 0.959$). The finding suggests that heart girth width can be used to predict the live weight of sheep that have a short coat of wool or hair, as is the case with Dorper sheep. This technique of measuring live weight is quick, cheap and practical under field conditions.

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