

COMPARISON OF SCALE WEIGHTS TO TAPE ESTIMATES AND THEIR RELATIONSHIPS WITH CONDITION SCORES IN BUNAJI CATTLE.

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ABSTRACT

Animal weighing facilities are not available in many African farming conditions. Indirect methods of estimating animals weights have been compared with scale weights and, in some cases, condition scores. The use of calibrated weigh bands is not widely practised probably because calibrations were based on temperate breeds. A study was carried out to determine the relationship between scale, tape measurement and weighband estimates of Bunaji cattle. These were then related to the animals' condition scores. Both the tape measurement and weigh band weights significantly ($P < 0.001$) correlated ($r = 0.95$ and 0.94 respectively) with the scale weight. Condition score significantly ($P < 0.001$) correlated with the tape measurement, scale and weighband weights ($r = 0.62$, 0.67 and 0.64 respectively). The correction factors of the regression coefficients of determining weight from condition score for the three methods varied by only 3.92. It is suggested that in the absence of weighing facilities, reliable estimates can be obtained by either tape measurement or weighband methods. Condition score can also reliably be used to estimate the weight using the regression coefficients obtained. Weighbands will be easier to use in field conditions. The need to calculate the weight from a formula could introduce errors when using the tape measurement method.

Key words: Bunaji, cattle, weigh scale tape, weighband, correlation and regression.

INTRODUCTION

Animals are conventionally weighed with scales but attempts have been made to develop methods of weight estimation (Ross, 1958; Williamson and Payne, 1978; Buvanendran, *et al* 1980) for situations where weighing facilities are not available as is common in many African farm

ing conditions. Studies have been carried out to validate the relationship between scale weights and estimates based on tape linear measurements especially at the heart girth. The estimates have also been related to condition scores of both temperate (Nelsen *et. al.*, 1985) and tropical (Nicholson and Sayers, 1987) cattle breeds. The latter study did not make a comparison of the estimate from girth measurement to actual (scale) weights. Such validation is necessary if indirect methods of weighing are to be adopted for management and research purposes. When used with condition scoring, the tape weight estimates may then provide reliable data for livestock evaluation. The use of weighband tapes is relatively new in Nigeria because the tapes available in the market were calibrated on temperate breeds and were not compared with indigenous Zebu animals. There is a need, therefore, to evaluate their accuracy when used on the local breed.

This paper reports on the results of a comparison of the weights obtained by scale and two tape estimating methods used on Bunaji cattle in the sub-humid zone of Nigeria. The three weights were then related to condition score values given to the animals at the same time. The study was made in order to validate the use of linear tape measurements and weighband to estimate cattle weights and establish the degree of correlation between the weights and condition scores.

MATERIALS AND METHODS

Random numbers were used to randomly assign twenty 3.5 year old Bunaji (*Bos indicus*) heifers to one of three methods of fortnightly weighing from August 1988 to May 1989. The period coincided with the peak of the wet to the end of the dry season. Weight 1 (TW) was obtained by taking linear measurements of the scapulo-is-

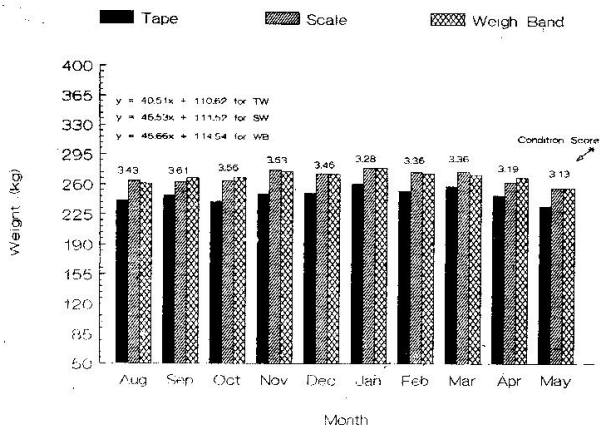


Figure 1. Weights of Bunaji cattle determined by three methods and related to their condition score.

chial length and hearth girth using a tailors' measuring tape. The values were converted to weight using the formula ($W = G_2 \times L/C$) developed by Ross (1958) where $C = 528.3\text{cm}$.

Weight 2 (WB) was an estimate of the animal's weight from a calibrated tape weighband (Farmer's Boy^R) distributed by Dalton Supplies of England. For both tape and weighband measurements, the animals were made to stand erect and well balanced on all four legs with the neck straight before the measurements were taken.

Weight 3 (SW) was obtained by weighing on a scale. The scale weighing was done after the tape and weighband measurements had been taken. The animals were weighed fortnightly. The scale was re-calibrated before each weighing session using constant weights. The animals were condition-scored (CS) independently by a field assistant during the weighing. The assistant was non-resident and came in contact with the

herd only during the fortnightly observation. The six point method of condition score used by Pullan (1978) for the breed was followed. Animals were scored on a 0 to 5 scale depending on the degree of fatness and appearance of the spinous process in the lumbar region. The lowest animal which would have prominently protruding spinous process and ribs conspicuously visible would be scored 0. Such an animal would have flabby thighs with very little muscle. Score 1 would be an animal whose appearance would be better than 0, with more intercoastal muscle and less exposed ribs. Scores 2, 3 and 4 have higher degrees of thigh muscle deposition and rib cover. The fattest would be scored 5 and is hardly found among females. This would be a well fed animal with full and smooth muscles and no loose skin. Full description of the different classes are as detailed by Pullan (1978). A total of 40 weights and condition scores were obtained over the experimental

Table 1. Average weights (kg) and condition core of Bunaji cattle measured by three different methods.

N	Variable	Initial \pm s.e.	Final \pm s.e.	Wt. Change (kg)
40	TW (kg)	240.81 \pm 6.89	235.04 \pm 5.94	- 5.77
40	SW (kg)	264.18 \pm 6.78	257.10 \pm 6.41	- 7.08
40	WB (kg)	260.93 \pm 6.99	256.35 \pm 6.22	- 4.58
40	CS	3.43 \pm 0.10	3.19 \pm 0.11	- 0.24

period. The data were subjected to regression analysis using SAS statistical package. (SAS, 1988).

RESULTS

The average weights and condition scores of the animals at the beginning and end of the trial are shown in Table 1. Weight changes and condition score over the ten month period are shown in Figure 1. The correlation coefficients of the four variables as well as the regression equations predicting the weights (y) from the condition scores (x) are shown in Table 2. The four variables were significantly ($P < 0.001$) correlated to one another over the 10 month period. The correlation coefficients of the scale weight (SW) to TW and WB were 0.95 and 0.94, respectively. The condition score correlation coefficients to TW, SW and WB were 0.62, 0.67 and 0.64, respectively. These were also significant ($P < 0.001$).

Table 2. Correlation coefficients of three weight determining methods and condition score of Bunaji cattle ($n = 40$).

	Correlation coefficients (r)				Regression Equation Wt. (y) from Cs (x)	Regression s.e.
	TW	SW	WB	CS		
TW	1.0	0.95	0.94	0.62	$y = 40.51x + 110.62$	2.14
SW		1.00	0.96	0.67	$y = 46.53x + 111.52$	2.78
WB			1.00	0.64	$y = 45.66x + 114.54$	2.33
CS				1.00		

TW = Tape weight estimate, SW = Scale weight,

WB = Weighband weight, CS = Condition score.

DISCUSSION

The high correlation (r) obtained for the three weighing methods showed that both tape measurement and weighband estimates were close to the actual weight recorded by the scale. Similar relationships were obtained by Ross (1958) and Thompson *et al.* (1985). However, the values obtained by the weighband in this study were more closely related to the scale weight than the tape measurement estimate (figure 1). This apparent difference was, however, not statistically significant with the tape measurement. Overall mean weight losses of 7.08, 5.77 and 4.58 were recorded by the scale,

tape and weighband methods, respectively. There was also a 0.24 point decline in the condition score of the animals over the ten month period.

This change was mild despite the dry season because of the weight gains due to the pregnancy of the animals. Thirteen of the 20 animals calved during the trial. The coefficients of correlation (r) of the condition score with the three methods of weighing (Table 2) were lower than the 0.76 obtained by Nicholson and Sayers (1987) for the Boran cattle. They, however, fell within the range reported by Thompson *et al.* (1983). The difference with the Nicholson and Sayers results (1987) could be due to their adopting a 9 point scale for the condition score compared to the 6 point one used in this study.

From the equations in Table 2, a point change in condition score was equivalent to 46.5, 40.5 and 45.7kg of scale, tape and weighband weights respectively. The correction factors of the three methods varied only by 3.92.

CONCLUSION

This study has shown that accurate estimates of weights of Bunaji cattle can be obtained by using tape measurement and weighband. Condition scores were also found to correlate at the same level with all three methods of weight determination. The weighband gave almost

exact weight while the tape estimate slightly underestimated the values.

It will be not only easier but more accurate to adopt the use of the weighbands in field situations. Although the tape measurement gave an acceptable estimate, the need to calculate the weight from a formula introduces chances for greater errors.

In the absence of any weighing facility, the condition score can be used to predict the weight of the animal by using of the appropriate equations since correction factors showed little variation. This can be a very useful method at the markets. Its accuracy, however, is subject to proficiency in the scoring which can only be obtained through practice. A uniform standard of scoring needs to be followed like the one developed by Pullan (1978) and adopted in this study. Consistent relationships were obtained with all three methods of weight determination and condition scoring in this study. It is possible that a different relationship could be obtained when other classes of animals of the same or different breeds are used. There is therefore a need for further studies to obtain an acceptable method of estimating livestock weights in Nigeria.

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