EFFECT OF PHYSIOLOGICAL STATUS ON BODY WEIGHT, BODY CONDITION SCORE AND MORPHOMETRIC TRAITS OF YANKASA SHEEP

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ABSTRACT
This work was conducted to evaluate the effect of physiological status on body weight, body condition score (BCS) and linear body measurements in Yankasa sheep. The study was carried out in some selected locations of Kano State on rams, pregnant, lactating and dried ewes. The animals were weighed using a measuring scale, the body condition score were assessed based on the scale of 0-5 and linear body measurements were taken using measuring tape. Variation in the traits were analyzed using analysis of variance as contain in SAS 2002, The study revealed significant ($P<0.05$) variations between the physiological states, pregnant and lactating ewes are significantly heavier than rams and dry ewes. It is concluded that, physiological status exert variations in body weights, BCS and linear body measurements among Yankasa sheep. It is recommended to consider physiological state of sheep during selection especially with respect to breeding ewes selection.
Key words: Sheep, Ram, Ewe, Pregnant, Lactating

INTRODUCTION
Sheep (*Ovisaries*) are quadruped ruminant mammals typically kept as livestock. Like all ruminants, sheep are members of the order Artiodactyla, the even toed ungulates. It is one of the earliest animals to be domesticated for agricultural purpose. Sheep is raised for fleece, meat (lamb, hogget or mutton) and milk. Sheep has continued to be important for wool and meat today and are also occasionally raised for pelts, as dairy animals or as model organisms for science. Sheep husbandry is practiced throughout the majority of the inhabited world and has been fundamental to many civilizations. Specific terms for the various life stages of sheep exist, generally related to lambing, shearing and age. Being a key animal in the history of farming, sheep has a deeply entrenched place in human culture (Olufunmilayo, Williams, Sara and Bardara, 2000).
The Yankasa is a meat breed found in north and north central Nigeria. In size it is intermediate between Uda and the west African Dwarf sheep. The milk yield (kg) per lactation is between 30 and 56 kg and has a lactation length of 91 days. The peak milk yield per day is 960 grammes (Adu and Ngere, 1979). It is important to evaluate the effect of physiological status on body weight, body condition score and morphometric traits of the breed for ease of selection.

MATERIALS AND METHODS
The study was carried out in some selected local government areas of Kano State. Multistage sampling was adopted in the selection of 300 animals of different physiological state, sex, and age used for the study.
The animals were weighed using small ruminants weighing scale, the BCS was carried out using the system describe by Abebe (2009) used in sheep based on a scale of 0 to 5. The linear body measurements were measured by one person using flexible measuring tape graduated in centimeter and they included the following:

1. Body length (BL): Refers to the distance from the base of the ear to the base of the tail (where it joins the body).
2. Chest depth (CD): Measures the distance from the backbone at the shoulder (standardize on one of the vertical processes of the thoracic vertebrae) to the brisket between the front legs.
3. Heart girth (HG): A circumferential measure around the chest just behind the front legs and withers
4. Head length (HL): Distance from external occipital protuberance to the tip of the nasal bone
5. Head circumference: A circumferential measure around the head just after the ear
6. Ear length (EL) Distance from base to tip of ear
7. Fore leg length (FLL) Distance from the surface of the ground level to front of sternum

8. Hind leg length (HLL): Distance from the bottom of the leg to the pin bone of hip
9. Height at withers (HAW): The distance from the surface of a platform on which the animal stands to the withers
10. Rump height (RH): The distance from the surface of a platform to the rump
11. Hip Width (HW): The distance between the outer edges of the major hip bones on the right and left side.
12. Tail length (TL): Distance from the dock to the tip of tail

The data collected were subjected to analysis of variance (ANOVA) in SAS 2002, the means were separated using Duncan Multiple Range Test (DMRT).

RESULT AND DISCUSSION

The physiological status as it affected body weight, linear body measurements and body condition score is presented in Table 1: the result showed no significant difference in BW between males and dry females as well as pregnant and lactating ewes, but pregnant and lactating recorded the highest values (30.35 and 30.11, respectively) than male and dry females (21.50 and 22.09 respectively). On the other hand, the result for BCS showed no significant variations between the males (2.00), dry females (1.71), pregnant (2.04) and lactating ewes (2.01). Findings on BL shows no significant differences in between males and dry females (62.62 and 64.09 respectively) as well as between pregnant and lactating (69.23and 70.97 respectively), but the latter were significantly longer than the former. For CD, it was observed that pregnant and lactating had significantly higher means (38.73 and 38.46 respectively) than male and dry so also between pregnant and lactating than males and dry females (35.25 and 34.54 respectively). Significant ($P<0.05$) variations in HG due to physiological status of sheep were observed with pregnant ewes recording the highest heart girth (73.23), followed by lactating ewes (70.17), dry ewes (64.64) while males recorded the lowest. In the same, a significant influence of physiological status on HAW was observed with pregnant and lactating ewes recording the highest values (66.97 and 67.76 respectively) that were statistically similar, but significantly ($P<0.05$) higher than dry ewes (64.37) and males (62.71). Pregnant and lactating ewes recorded significantly ($P<0.05$) higher means for RH (67.55 and 67.84 respectively) than males and dry ewes (63.43 and 62.90 respectively). Similarly, considerable ($P<0.05$) variations in HW caused by the animal's physiological status were detected with pregnant, lactating and dry ewes having respective means of 15.70, 16.17 and 13.23, while males had 12.47. Significantly ($P<0.05$) longer ears were observed among lactating ewes (14.20) compared to males (12.72), dry ewes (12.83) and pregnant ewes (12.79) that were statistically similar. With respect to TL, it was observed that males, pregnant and lactating ewes had averages of 33.19, 33.08, and 34.46, respectively) while dry ewes the lowest value of 31.61. It was also observed that significant variations existed in HL with lactating ewes recording the highest value (22.66), followed by pregnant ewes (21.94),and males (21.09),while dry ewes recorded the lowest value. Males had the highest value for head circumference (41.43) that significantly ($P<0.05$) differed lactating ewes (40.48), pregnant ewes (40.05) and dry ewes (37.35) Lactating ewes had significantly ($P<0.05$) higher FLL (41.28), followed by pregnant ewes (39.73), males (38.31) while the lowest mean (37.83) was recorded among dry ewes. Significant ($P<0.05$) differences were observed HLL with lactating ewes recording the highest value (47.73) but there were no significant differences between males (45.66), dry ewes (44.64) and pregnant ewes (45.82).

Table 1: Effect of Physiological Status on Body Weight, Body Condition Score and Linear Body Measurements.

VARIABLES	Physiological status				MS
	Male	Dry	Preg.	Lact.	
BW (kg)	21.50±0.62[b]	22.09±0.70[b]	30.35±0.69$_a$	30.11±0.89[a]	161.75
BCS	2.00±0.08[a]	1.71±0.09[a]	2.04±0.13[a]	2.01±0.11[a]	0.46
BL	62.62±0.59[b]	64.09±0.67[b]	69.23±0.66[a]	70.97±0.85[a]	60.63
CD	35.25±0.27[b]	34.54±0.31[b]	38.73±0.31[a]	38.46±0.39[a]	49.81
HG	63.91±0.61[c]	64.64±0.69[c]	73.23±0.68[a]	70.17±0.87[b]	268.97
HAW	62.71±0.46[c]	64.37±0.52[b]	66.97±0.51[a]	67.76±0.66[a]	69.82
RH	63.43±0.75[b]	62.90±0.84[b]	67.55±0.83[a]	67.84±1.07[a]	85.18
HW	12.47±0.17[c]	13.23±0.19[b]	15.70±0.18[a]	16.17±0.24[a]	22.60
EL	12.72±0.17[b]	12.83±0.19[b]	12.79±0.19[b]	14.2±0.25[a]	69.29
TL	33.19±0.46[a]	31.61±0.52[b]	33.08±0.52[a]	34.46±0.66[a]	61.59
HL	21.09±0.16[c]	20.26±0.19[d]	21.94±0.18[b]	22.66±0.24[a]	8.08
HC	41.43±0.35[a]	37.35±0.31[c]	40.05±0.39[b]	40.48±0.50[ab]	49.66
FLL	38.31±0.29[c]	37.83±0.33[c]	39.73±0.33[b]	41.28±0.42[a]	43.49
HLL	45.66±0.45[b]	44.64±0.51[b]	45.82±0.50[b]	47.73±0.65[a]	107.43

Means in the same row with different superscripts are significantly different (P<0.05).
Preg.= pregnant, Lact.= lactating, MS= Mean squares, BW= body weight, BCS= body condition score, BL=body length. CD= chest depth, HG= heart girth, HAW= height at wither, RH= rump height, HW= hip width, EL= ear length, TL= tail length, HL= head length, HC= head circumference, FLL= fore leg length HLL= hind leg length.

DISCUSSION

Genetic improvement programs applied to livestock are conducted on the basis of two main approaches: selection and breeding systems. The potentials for genetic progress largely depends on the genetic variation in the traits and its relationship with other economic traits (Ceyhan, Kaygisiz & Sezenler, 2011)

In contrast to some findings (Jamssems and Vandepitte,2004; Hussain *et al.*,2013) which found that rams were significantly heavier than ewes, this study revealed that females (ewes) were heavier than males (rams) .This could be attributed to the fact that data for the current study were generated after most of the matured rams were slaughtered during Ed-el-kabir festival, as Kano is a predominantly muslim state. On the other hand, Otoikhian, *et al.*, (2008a) reported no significant difference in body weight between the males and females in Uda sheep, with respective means of 23.15±1.51 and 22.00±2.22 kg that did not differ significantly. The authors explained that this might be as a result of additional weight gain of some of the females as a result of pregnancy as selection of the experimental animals did not include any form of pregnancy test. In another study on goats, Otoikhian, *et al.*, (2008b) reported that sex did not have any considerable influence on weight gain of the animals.

The fact that physiological status of Yankasa sheep in the study area had no influence on its condition score, may not be unconnected to the nature of feeding, as the animals were fed randomly regardless of their physiological requirements. Body condition of pregnant and lactating ewes fall within the score of two (2) though it is within the normal but slightly low, Mona (2007) reported similar value of 2.56. However, Atti (1991) had shown that with certain phases of the reproductive cycle (pregnancy), the mobilization of fat deposits is inevitable in order to compensate the feed deficits caused by the physiological state of the female. Kabbali *et al.* (1992) reported that the rate of mobilization of fat reserves is function of the severity and the duration of feed shortage, the maturity of the animal and its physiological state. Similarly, Molina, *et al.,* (2007) reported that ewes of the traditional system showed a notable reduction of body condition scores during pregnancy and lactation.Sezenler *et al.*, (2011) in their findings on some indigenous sheep breeds in turkey reported that BCS between breeds in different physiological periods were significantly different. The average minimum BCS was observed in Gokceada ewes for all physiological periods while the average minimum BCS was

observed in 2 years old ewes in breeding and weaning periods and in 5 years old ewes in lambing period. Maximum BCS values were observed for 6 years old ewes in breeding period.
Brawn and Swan (2012) reported that the phenotypic variance and heritability of BCS varied significantly throughout the year. The phenotypic variance increased from the dry period through to a maximum at weaning.

CONCLUSION AND RECOMMENDATION

The current studies established that, change in physiological status (ram or different class of ewes like pregnant, lactating and dry ewes) exert variations in body weights, BCS and linear body measurements among Yankasa sheep, lumping them during selection can mislead the goal of brreding. It is recommended to consider physiological state of sheep during selection especially with respect to breeding ewes selection.

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