# VARIATION IN BODY WEIGHT, BODY CONDITION SCORE AND LINEAR BODY MEASUREMENTS AS AFFECTED BY LOCATIONS IN KANO STATE

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## ABSTRACT
The study was conducted to assess the variation in body weight, body condition score (BCS) and linear body measurements in Yankasa sheep in some selected local government areas of Kano State, namely, Bebeji (BBJ), Dawakin Kudu (DKD), Wudil (WDL), Shanono (SNN) and Dambatta (DBT). The animals were weighed using a 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 across the locations; BBJ recorded the highest average sheep weight of 26.27±0.80 kg while the lowest (22.80±0.84 kg) was observed in DBT. The highest BCS was also recorded in BBJ (2.37±0.10) while the least (1.60±0.11) was observed in DKD. It is concluded that, variations exist in body weights, BCS and linear body measurements among Yankasa sheep within Kano state due to selection criteria, feed supplementation and forage availability. Emphasis should be given to linear body measurements during selection for increased body weight in sheep breeding.
**Key words:** Sheep, Variation, body weight, locations

## INTRODUCTION
In Nigeria, small ruminants contribute an estimated 35% to the total meat supply, they are more important in the north than in the south, and more important in rural than in urban areas. They are mainly kept for meat, milk, wool, skin and manure production (Payne, 1990). Sheep raising has become one of the most important means of livelihood and food security for the rural population.
The Yankasa sheep is a meat breed found in north and north central Nigeria. In size it is intermediate between Uda and the West African Dwarf sheep. There coat colour is typically white with black patches around the eyes, ear, muzzle and sometimes the feet. The tail is long and thin, the ears moderately long and somewhat droopy. Rams have curved horns and a hairy white mane and ewes are polled (Aganga, Umunna, Oyedipe and Okoh, 1988).

## MATERIALS AND METHODS
The study was carried out in some selected local government areas of Kano State, namely, Shanono, Dawakin Kudu, Bebeji, Wudil and Dambatta. Multistage sampling was adopted in the study. The first stage involved the selection of five local governments based on their suitability for sheep production, market and road access and willingness of people to participate. The second stage involved purposive selection of two villages from each local government making a total of ten villages. Third stage was the identification and selection of six households from each village that kept at least ten sheep. The fourth stage was random selection of five animals from each selected household making a total of 300 animals.
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 effect of location on body weight, body condition score and linear body measurements is presented in Table 1. There were significant ($P<0.05$) differences between the locations in terms of body weight with BBJ and SNN recording the highest values (26.27kg and 26.00kg, respectively) that were statistically similar, followed by DKD and WDL that were also statistically the same (25.10kg and 24.58kg respectively) followed BBJ and SNN, while DBT had the lowest value of 22.80 kg. There were also significant ($P<0.05$) differences in BCS, where the highest condition score (2.37) was observed in BBJ, followed by WDL (1.95), SNN and DBT that were statistically similar (1.73 and 1.60, respectively), whereas DKD was the least (1.60). On the other hand, there was no significant differences in BL across all the locations. However, the results for CD showed significant ($P<0.05$) variations between the locations, where WDL and SNN recorded the highest means (37.50 and 37.56 respectively), while BBJ, DKD and DBT recorded the lowest being statistically similar. There were significant ($P<0.05$) differences in HG between the locations with WDL having the highest (69.68) followed by SNN (69.07), DKD (66.63) while BBJ and DBT recorded the lowest means (64.27 and 66.20 respectively) and were statistically similar. Height at withers was found to be highest in WDL and SNN (68.52 and 67.20 respectively) which differed ($P<0.05$) from DBT (65.13), while BBJ and DKD had the least values (61.46 and 63.03 respectively) and were similar statistically. In terms of RH the results showed significant ($P<0.05$) differences between the locations, where the highest was observed in WDL (67.45) followed by DKD and SNN (64.33 and 65.37 respectively) then BBJ and DBT (63.03 and 64.23 respectively). Similarly, significant ($P<0.05$) differences were observed in HW between the locations with BBJ recording the highest mean (15.33) followed by DKD, WDL and SNN (14.27, 13.92 and 13.50 respectively) while DBT recorded the least (12.87). Significant ($P<0.05$) differences were also observed in EL between the locations where WDL was found to have the longest ear (13.87) followed by DKD (13.83) SNN (12.97), BBJ (12.67) and DBT with the lowest (12.03). Similarly, significant ($P<0.05$) variations in TL were found between the locations where WDL (34.70) was found to be highest, followed by SNN and DKD (34.37 and 32.67 respectively), and BBJ and DBT that were statistically similar (31.27 and 31.60 respectively). HL was also found to be significantly different ($P<0.05$) across the locations, where WDL recorded the highest mean (22.58), followed by BBJ, DKD and SNN with no significant differences while DBT recorded the lowest (19.93). Result for HC showed no significant variations between WDL and SNN which were found to have the highest means, followed by DKD and DBT ,while BBJ had the least (38.73). For FLL, the result showed significant differences between the locations except for between DKD and WDL,with SNN recording the highest value (39.80) while DBT had the lowest (37.73). There were no significant differences between all the locations in HLL except for SNN which recorded the highest mean.

Table 1: Effect of Location on Body Weight, Body Condition Score and Linear Body Measurements

| | Locations | | | | | |
|---|---|---|---|---|---|---|
| VARIABLES | BBJ | DKD | WDL | SNN | DBT | MS |
| BW | 26.27±0.80$^{a}$ | 25.10±0.83$^{ab}$ | 24.58±0.70$^{ab}$ | 26.00±0.79$^{a}$ | 22.80±0.84$^{b}$ | 117.24 |
| BCS | 2.37±0.10$^{a}$ | 1.60±0.11$^{c}$ | 1.95±0.10$^{b}$ | 1.73±0.10$^{cb}$ | 1.63±0.11$^{bc}$ | 3.39 |
| BL | 66.60±0.76$^{a}$ | 65.33±0.80$^{a}$ | 65.97±0.67$^{a}$ | 65.63±0.76$^{a}$ | 65.40±0.80$^{a}$ | 67.94 |
| CD | 34.80±0.35$^{b}$ | 35.93±0.37$^{b}$ | 37.50±0.31$^{a}$ | 37.56±0.35$^{a}$ | 35.83±0.37$^{b}$ | 51.42 |
| HG | 64.27±0.80$^{c}$ | 66.630.82$^{bc}$ | 69.68±0.69$^{a}$ | 69.07±0.78$^{ab}$ | 66.20±0.82$^{c}$ | 226.38 |
| HAW | 61.47±0.59$^{c}$ | 63.03±0.62$^{c}$ | 68.52±0.52$^{a}$ | 67.20±0.59$^{a}$ | 65.13±0.62$^{b}$ | 288.95 |
| RH | 63.03±0.96$^{b}$ | 64.33±1.00$^{ab}$ | 67.45±0.84$^{a}$ | 65.38±0.95$^{ab}$ | 64.23±1.00$^{b}$ | 89.87 |
| HW | 15.33±0.21$^{a}$ | 14.27±0.22$^{b}$ | 13.92±0.19$^{bc}$ | 13.50±0.21$^{cd}$ | 12.87±0.22$^{d}$ | 36.49 |
| EL | 12.67±0.22$^{cd}$ | 13.83±0.23$^{ab}$ | 13.87±0.19$^{a}$ | 12.97±0.21$^{bc}$ | 12.030.23$^{d}$ | 50.61 |
| TL | 31.27±0.59$^{c}$ | 32.67±0.621$^{bc}$ | 34.70±0.52$^{a}$ | 34.37±0.59$^{ab}$ | 31.60±0.62$^{c}$ | 104.72 |
| HL | 21.30±0.21$^{b}$ | 21.27±0.22$^{b}$ | 22.58±0.29$^{a}$ | 21.33±0.21$^{b}$ | 19.93±0.22$^{c}$ | 35.39 |
| HC | 38.73±0.45$^{b}$ | 39.83±0.47$^{ab}$ | 40.40±0.39$^{a}$ | 40.57±0.45$^{a}$ | 39.67±0,57$^{ab}$ | 22.70 |
| FLL | 38.47±0.38$^{bc}$ | 39.20±0.39$^{ab}$ | 39.53±0.33$^{ab}$ | 39.80±0.38$^{a}$ | 37.73±0.39$^{c}$ | 36.54 |
| HLL | 44.83±0.58$^{b}$ | 46.07±0.60$^{b}$ | 45.37±0.51$^{b}$ | 48.00±0.57$^{a}$ | 44.37±0.61$^{b}$ | 137.78 |

Means in the same row with different superscripts are significantly different (P<0.05). MS= Mean squares, BBJ= Bebeji, DKD= Dawakin Kudu, WDL= Wudil, SNN= Shanono, DBT= Danbatta. 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

A number of factors are responsible for variation in live body weight, as reported by Hussaini *et al.* (2013). Variation in body weight is a factor of genotype, feeding, management and environmental conditions. Several researches are in agreement with the findings of this study that location of animals affects its live body weight (Demiroren, Shretha and Boylan 1995, Sormunen and Suvela, 1999; Hansen and Shrestha, 2002; Fisher 2004; Rosa and Bryant, 2003). Majority of findings on the effect of location on body weight have shown that location has significant influence on important economic body features. The mentioned factors can be connected with vegetation growth (as a food source), temperature and day length, all of which depend on seasonal characteristic for different geographic locations. Year of production as well as season were similarly observed to exert significant influence on animals body weight as well (Dixit, Dhillon and Singh, 2001).

The current study revealed variation in body condition score across the locations. Since this trait is factor of nutritional status of an animal, this variation is understandable because different geographical areas have different supplementation according to the availability of feed and individual farmers manage their animals differently from each other, even though the management systems is similar across the locations. Mona (2007) had stressed the fact that contribution of supplementation was an important factor affecting BCS, hence the supplementation serve as the major source of variation in the trait from one geographical region to another

The environment by which an animal lives' significantly influences its linear body measurements, as the phenotype is the function of gene and environment. This study revealed a significant influence of location of an animal on its body measurements. Adejoro and Salako (2013) reported similar findings which indicated significant differences in withers height, body length, foreleg length, thorax depth, horck length, rump length, face length, face width, rear leg length, Cannon bone length measurements of Yankasa sheep across different location. Momoh *et al.* (2013) also reported that breed and non-genetic factors (environment inclusive) are the sources of variation in body weight, growth rates and body measurements of sheep. Hussaini *et al.* (2013) reported that variation in body weight and body measurements is a factor of genotype, feeding, management and environmental conditions. Milan *et al.* (2011) also reported that location had significant influence on important economic body features due to vegetation growth (as a food source), temperature and day length, all of which depend on seasonal characteristic for different geographic locations.

## CONCLUSION AND RECOMMENDATION

This study revealed noticeable variations in body weights, BCS and linear body measurements among Yankasa sheep within Kano state due to selection criteria, feed supplementation and forage availability due to variation locations. It is important to emphasize that, even within a same environment but selection criteria and forage availability will exert an effect on linear body traits of an animal. Emphasis should be given to linear body measurements during selection for increased body weight in sheep breeding.

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