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FACTORS AFFECTING BIRTH AND WEANING WEIGHTS IN LAMBS OF YANKASA, WEST AFRICAN DWARF BREEDS AND THEIR CROSSES

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ABSTRACT

Data on birth weights (BW) and weaning weights (WW) in lambs of Yankasa, West African dwarf (WAD) breeds and their crosses were analyzed. The effects of breed, parity, sex, type of birth, management system and season were determined. Yankasa lambs had the highest mean BW (2.57kg) which was significantly ($P < 0.05$) higher than that of WAD (1.68kg) and their crosses (2.05kg). Breed, parity, sex, type of birth and season had significant ($P< 0.05$) effect BW and WW. Male lambs in comparison with female lambs had higher ($P < 0.05$) BW and WW while single-born lambs in comparison with multiple-born lambs had higher ($P < 0.05$) WW. A highly significant positive correlation (0.719) was estimated between BW and WW of lambs across breed. It was concluded that the differences in factors influencing BW and WW at early phases might have risen from the variation among breeds and factors monitored. Therefore, BW and WW could provide useful information for early selection criteria in breeding programmes, serving as an important role in expression of genetic potential in lambs.

Keywords: Birth weight, weaning weight, Yankasa, West African Dwarf, Sex, Birth type.

INTRODUCTION

The Yankasa and West African dwarf breeds of sheep are the most common in Southern Nigeria and both breeds are well adapted to the environmental conditions under which they live ((Adu and Ngere, 1979). They have great capacity for making good use of low quality feed resources and serve as a source of income generation to many rural farmers through sale of meat and lambs (Fasae *et al.,* 2011). There is a wide diversity in various production traits of these breeds which suggests that there is a great scope for improvement of the performance traits. Any breed development programme is based on the exploitation of genetic variation (Babar *et al.,* 2004).

The importance of birth and weaning weights in evaluating the breeding potentialities of domestic animals at an early age has long been recognized by livestock breeders. Birth and weaning weights of lambs are not only been influenced by genetic factors but also by physiological and environmental factors (Mandal *et al.,* 2006). Birth weight is an important parameter in meat producing animals because it is strongly correlated with

growth rate and adult size and also the viability of new born animals, while weaning weight has a high relative economic importance to the farmer. Hence, more information on these factors is needed to determine the effectiveness of selection based on these characters. This study therefore aimed at gaining information on the relative importance of some factors that influence birth and weaning weight in lambs of Yankasa, West African dwarf and their crosses.

MATERIALS AND METHODS

Experimental Animals and their management

A total of 105 lambs consisting of 42 Yankasa lambs, 38 West African Dwarf lambs and 25 crosses of the Yankasa and West African Dwarf were used for the experiment. The animals belonged to farmers in Odeda local government area of Ogun state, Nigeria. Prior to the experiment, pregnant ewes were identified and monitored after agreement with the owners.

The animals were managed under semi intensive and extensive systems. Those managed semi intensively were allowed to graze freely in the morning to later return to their owners in the late evening. They were also frequently fed with yam and cassava wastes as well as other by-products from processing of agricultural products.

Data Collection

Birth weights of lambs were taken after parturition using a weighing scale. Also, the weekly weight gains were taken and recorded from the first week after birth up to 12 weeks at weaning. Factors such as type of birth (single or multiple births), breed and sex of lamb, dam parity and management system were also obtained through animal observation and from records kept by owners.

Statistical Analysis

The effects of breed, sex, dam parity, birth type and management systems on birth and weaning weights were analyzed (SAS, 1999). Correlation coefficient was used to determine the relationship between the birth and weaning weight.

RESULTS AND DISCUSSION

The effect of breed, sex and management system on birth weight (BW) and weaning weight (WW) of Yankasa, West African Dwarf (WAD) and their crosses are shown in Table 1. There were variations in BW due to breed, sex and management system. This corroborates earlier reports on tropical breeds of sheep and goats (Josephina *et al.,* 1980, Thiruvenkadan *et al.,* 2009). A mean of 2.57kg, 1.68kg and 2.05kg BW were observed for Yankasa, WAD and their crosses, respectively. Yankasa lambs were 1.19kg and 0.82kg heavier ($P<0.05$) than the WAD and their crosses respectively at birth, while the crosses were similar ($P>0.05$) to WAD at birth. However, the values for BW of Yankasa lambs were similar to 2.80 ± 0.19 reported by Adu *et al.* (1979) for the same breed of sheep.

The mean values for WW of Yankasa, WAD and their crosses were 10.87kg, 8.55kg and 9.83kg, respectively. Yankasa lambs were 2.32kg and 1.04kg heavier ($P<0.05$) than the WAD and their crosses, respectively, while the crosses were 1.28kg heavier ($P<0.05$) than the WAD at weaning. These observations may be due to the effect of weight at birth as well as management practices employed on the animals. However, the Yankasa breed of sheep has earlier been reported to be bigger than WAD sheep (Adewumi *et al.,* 2009).

Table 1: Effect of breed, sex and management system on birth and weaning weights in lambs of Yankasa, West African Dwarf and their crosses

Factors	Number of Lambs	Birth weight (kg)	Weaning weight (kg)
Breed			
Yankasa	42	2.87±0.11a	10.87±0.40a
WAD	38	1.68±0.07b	8.55±0.37c
Crosses	25	2.05±0.09b	9.83±0.39b
Sex			
Female	47	2.08±0.08b	9.58±0.30b
Male	58	2.32±0.10a	9.92±0.32a
Management System			
Semi-intensive	56	2.20 ±0.09	9.23±0.29
Extensive	49	2.16 ±0.08	9.77±0.31
Season			
Wet	60	2.51±0.10a	9.69±0.31a
Dry	45	2.19±0.08b	8.86±0.28b

[a,b,c] Mean in the same column with different superscripts are significant ($P < 0.05$)

The sex of lambs also had effect on BW and WW across breed. Rams were 0.24kg and 0.34kg heavier ($P<0.05$) than ewes at birth and weaning, respectively. This is in consonance with the observation of Brown and Jackson (1995) that rams exceeded ewes by 0.2 kg and 0.6 kg at birth and weaning, respectively while Rashidi *et al.* (2008) reported that males had 0.16kg and 1.92kg higher BW and WW in comparison to females in Kermani lambs. High BW of ram lambs and significant effect of sex on BW has also been reported for various breeds of sheep (Iyeghe *et al.,* 1996; Sivakumar *et al.,* 2006; Saghi *et al.,* 2007; Gardner *et al.,* 2007). Higher growth in prenatal stage under the influence of male sex hormones with anabolic effect might be the reason for higher BW in male lambs (Hafez, 1962).

The effect of management system on BW and WW of lambs under semi-intensive and extensive system were similar ($P > 0.05$). The level of management could vary due to the in-ability of sheep rearers to take adequate care of the animals, availability of financial resources and culling strategies. In addition, season had significant ($P < 0.05$) effect on BW and WW of sheep among breeds. Lambs born in the wet season were heavier ($P < 0.05$) than those lambed in the dry season. Lambs born in the wet season could have had a favourable environmental condition with good availability of the fodder during the gestation period, which might have contributed to higher BW. Moreover, the variation in BW and WW of animals across season has been attributed to management, selection of bucks, environmental con-

ditions such as ambient temperature, humidity and rainfall (Thiruvenkadan *et al.,* 2009).

The effect of type of birth and parity on BW and WW across sheep breeds are shown in Table 2. BW for singles and twins were similar (P > 0.05) with 2.20 and 2.19kg, respectively, while WW of single lambs was higher (P < 0.05) than that of twins. This corresponds with the observations of Josephina *et al.* (1980) and Saghi *et al.* (2007) which may be due to competition between the twins for dam's milk and other nutrients. It is therefore suggested that since the type of birth was not significant at birth but ended up being significant at weaning, dams having multiple birth should be given extra concentrate for increased milk production as this will compensate for her higher number of lambs. Also, lambs from multiple births should be given to extra supplement feed to compensate for the shared feed and milk.

Parity had significant effect (P < 0.05) on BW of the lambs. The results showed that BW of lambs at first parity was least and increased significantly to the third parity after which it was consistent till the fifth parity, which contradicts the findings of Mandal *et al.* (2003) and Thiruvenkadan *et al.* (2008) in Muzaffarnagari and Mecheri breeds of sheep, respectively. This could be attributed to breed difference as well as management system. Moreover, an improvement in WW with increased parity agrees with the findings of Osinowo *et al.* (1992). Reproductive efficiency can be said to improve with parity as shown by the improvement in WW of lambs with increased parity. Therefore it may be suggested that it will be unwise to cull an ewe based on the performance of her first parity, rather the ewe should be serviced and used up to the third parity while giving adequate flushing and steaming-up diets before making a decision.

Table 2: Effect of type of birth and parity on birth weight and weaning weight of Lambs of Yankasa, West African Dwarf and their crosses.

Factors	Number of Lambs	Birth weight (kg)	Weaning weight (kg)
Type of Birth			
Single	63	2.20±0.10	10.15±0.24a
Twin	42	2.19±0.07	9.35±0.36b
Parity			
First	16	2.21±0.10b	9.07±0.37b
Second	36	2.28 ±0.07b	9.81±0.26b
Third	28	2.35 ±0.14a	10.37±0.53a
Fourth	14	2.34±0.08a	10.28±0.44a
Fifth	11	2.36±0.08a	10.41±0.54a

a,b Mean in the same column with different superscripts are significant (P < 0.05)

The effect of breed on growth of lambs from birth to weaning is shown in Figure 1. The growth rate of Yankasa lambs was faster compared to WAD and the crosses, while crosses had a better growth rate relative to WAD lambs which may be attributed to heterosis. The observed differences in the various breeds may be due more to the effect of gene rather than environmental factors.

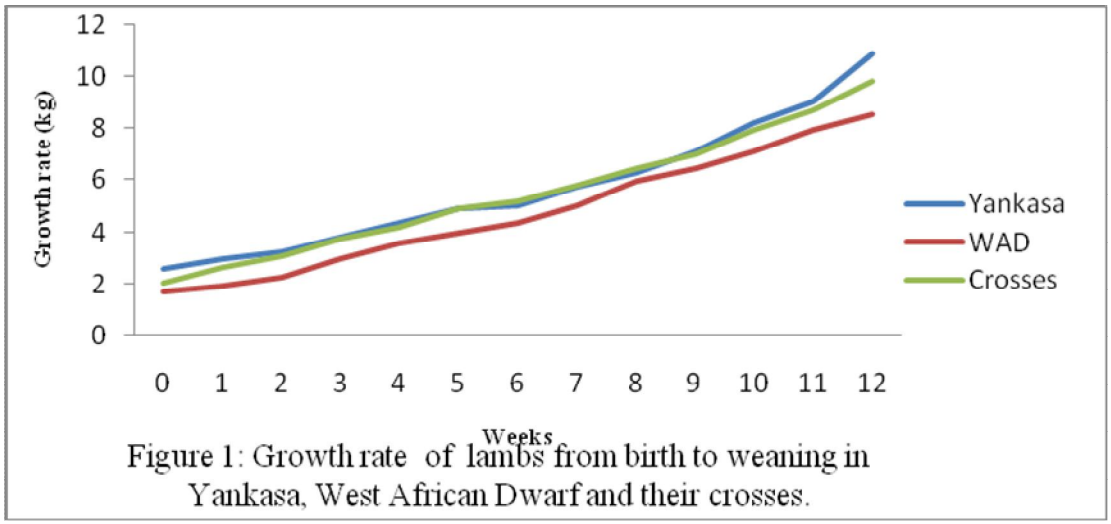

Figure 1: Growth rate of lambs from birth to weaning in Yankasa, West African Dwarf and their crosses.

A simple correlation between the BW and WW of lambs showed a positive correlation (0.719) which was significant ($P < 0.01$) across breeds. This was consistent with the observation of McFee (1985) showing selection can either be done at birth or weaning. Hanford *et al.*(2003) reported a correlation of 0.52 between BW and WW for Targhee sheep.

BW which itself is affected by dam size, dam body condition and litter size, influences the survival rate and pre-weaning growth performance of off springs (Laes-Fettback and Peters, 1995).

CONCLUSION

The results of the study showed that the differences in factors influencing birth and weaning weight at early phases might have risen from the variation among breeds and some factors observed in this study. Animal performance records should therefore be adjusted to reduce known differences between animals so that genetic differences among animals can be recognized and used for effective breeding plan for their improvement. Based on the observed differences in the breed, It was concluded that Yankasa breed of sheep had a better performance and it will be recommended that flocks of West African Dwarf sheep should be cross bred with Yankasa sheep so as to take advantage of heterosis for better productivity in improving the growth rate of the breed.

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