INFLUENCE OF BIRTH WEIGHT, YEAR AND PARITY ON PREWEANING MORTALITY IN YANKASA SHEEP

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ABSTRACT

The influence of lamb birth weights, year of birth and parity on preweaning death were observed in Yankasa sheep over a period of 4 years (1989-1992) in Misau, Bauchi State, Nigeria. Of the 150 lambs observed, birthweight fell into 4 categories; upto 1.5; 1.6-2.0; 2.1-2.5 and 2.6-3.0 Kg, with percentage deaths in each being 33, 34, 16 and 0, respectively. The overall mean birthweight was 2.3 ± 0.03 , and overall percentage mortality was 18%. Significant correlation ($P < 0.05$, $r = 0.49$) was observed between birthweights and deaths incidence. Significant year and parity differences existed in lamb birthweights ($P < 0.05$). 90% of the ewes lambing were in their 1st parity, while 6% and 4% respectively were in the 2nd and 3rd parities. Mean birthweights were heaviest for lambs with ewes in their 2nd parity 2.6 (0.46), followed by those in their 1st parity 2.3 (0.27) and those in their 3rd parity 2.2 (0.27). Percentage mortality increased with parity, being 14, 27 and 50 for 1st, 2nd and 3rd parities respectively. Chi-square analysis showed no significant differences between the ratio of ram to ewe lambs, though ram lambs were significantly heavier than ewe lambs. Low lamb birthweight was found to be a major cause of preweaning mortality in Yankasa sheep in Misau, Nigeria.

Key words: Birthweight, Preweaning, Mortality; Yankasa Sheep.

INTRODUCTION

Sheep play a significant role in the socio-economic life of the Nigerian populace, supplying meat and ready source of finance. Of the four main breeds of sheep in Nigeria; Balami, Uda, Yankasa and West African dwarf, the Yankasa is most numerous and widely distributed, being found in the Sahel, Sudan and Guinea Savannah zones (Adu and

Ngere, 1979; Osinowo, 1990). Perinatal lamb mortality has been identified as a major limit to sheep productivity (Jordan *et al.*, 1989) and profitability (Holmes, 1983a,b). Few incidences of lambing, weaning and mortality of Nigerian indigenous sheep breeds have been reported in and for various localities and breeds. Balami in Marguba, Katsina and Shika; Uda in Kwotorkoshi, Katsina and Shika (Adu and Ngere, 1979); West African dwarf in Ibadan (Dettmers *et al.* 1976; Ngere *et al.* 1979; Taiwo *et al.* 1982); West African dwarf in Ile-Ife (Ademosun, 1973); Yankasa in Katsina and Shika (Adu and Ngere, 1979). The major causes of mortality in these localities have been identified. Birthweight and type of birth (Nwagbogu, 1969; Adu and Ngere, 1979), lamb sex and season of the year (Nwagbogu, 1969), diseases (Adu and Ngere, 1979), year and season of lambing (Buvanendran *et al.*, 1981).

However, there is paucity of information concerning autopsy investigation into perinatal mortality in Yankasa sheep in Bauchi state. The present report, therefore, looked at the influence of birthweight, year and parity on preweaning mortality in Yankasa sheep over a period of four years on a government farm in Misau, Bauchi State.

MATERIALS AND METHODS

Location, climate and Vegetation:

The data used for this study were extracted from Misau government sheep flock records, Bauchi state. Misau is on latitude $11^{\circ} 20'$ North, longitude $10^{\circ} 27'$ East and at an altitude of 434.8 metres above sea level. The annual rainfall is between 800-900mm. The mean monthly hours of sunshine is highest in December, (300.3 hours) and lowest in August (150.1 hours). April is the hottest month with mean maximum and minimum temperatures of 34.1°C and 24.5°C

respectively. Mean relative humidity is highest in August (60.3%) and lowest in February (13.4%) (Kowal and Knabe, 1972).

The vegetation of Bauchi State is made up of open savannah woodland with trees up to six or more metres tall. The trees normally occur singly or in clusters, while the spaces inbetween are occupied by a layer of non-woody herbaceous species up to three metres high. The grasses which consist of gamba, elephant grass, *Pennisetum spp.*, *Cynodon spp.*, spear grass, etc., are generally green and nutritive during the rainy season (May- October) but brown and low in nutritive value during the dry season (November-April).

Description and management of the animals

The breed of sheep studied is the Yankasa. This breed has been described (Adu and Ngere, 1979; Osinowo, 1990). The Yankasa breed of sheep have a predominantly white coat colour, with black patches around the eyes, ears, muzzle and hooves. Mature rams have curved horns and heavy white mane. The females are hornless. It is hardy and of medium body size. At maturity, the breed weighs 30 to 40 kg. It is the most numerous and most widely distributed of the Nigerian sheep breeds, and is found throughout the Guinea and Sudan Savannah zones. It adapts well to intensive production and it has a relatively high growth rate.

The animals were grazed on rangeland during the day and supplemented with compounded concentrate mixture in the evenings, so that a semi-intensive system of management is employed. They have access to water *ad libitum* and veterinary care when needed.

Lamb birthweights

Lamb weights were taken within 24 hours of birth. A total of 150 birth weights, preweaning mortality, sex of lambs and parity of lambing were taken between 1989 and 1992. 18,39,29 and 64 records were taken in 1989, 1990, 1991 and 1992, respectively.

Data analysis

The general linear model was used to analyse variance for weight categories and differences in weight with year and parity as factors. Simple percentages were used for mortalities. Chi-square analysis for lamb sex segregation was carried out and correlation analysis between weight and death incidence done. A pooled variance estimate was obtained by weighing each sample variance whenever the number of items in each treatment was not the same.

RESULTS

The effects of birthweight, year and parity on preweaning lamb mortality data are presented in Table 1. Of 150 lambs observed, birthweight fell into 4 categories: up to 1.5; 1.6-2.0; 2.1-2.5 and 2.6-3.0kg, with percentage death in each being 33, 34, 16 and 0, respectively. The histogram (figure 1), shows the percentage of animals that died in each weight category. Higher percentage deaths were observed at lower birthweights (1.5 to 2.0 kg) than weights higher than 2.0kg. The mean birthweight of ram lambs (2.5) was significantly ($P < 0.05$) heavier than that of ewe lambs (2.2) (Table 1).

The overall mean (s.e.) birthweight was 2.3 (0.03) and overall mortality was 18%. Significant differences were observed between the birthweight categories. Correlation analysis of birthweight and mortality was significant ($P < 0.05$, $r = 0.49$). The analysis of variance, using the general linear model, for birthweight with year revealed significant ($P < 0.05$) differences between years. The mean birthweight for 1990 was better but not significantly different from that of 1992 although it was significantly ($P < 0.05$) better than those of 1989 and 1991. The mean birthweight for 1991 was significantly ($P < 0.05$) heavier than that of 1989.

The results on parity show that most animals (90%) were in the 1st parity, while few were in the 2nd and 3rd parities, 6% and 4% respectively. Mean birthweights were heaviest for lambs with ewes in their 2nd parity $2.6 \pm$

FACTORS AFFECTING PREWEANING MORTALITY IN LAMBS

TABLE 1: BIRTHWEIGHT, YEAR, PARITY AND MORTALITY DATA OF SHEEP IN MISAU, (1989-1992)

Characters		Parameters	
Birthweight (Kg) Categories	Number of Lambs	Birthweight Mean (s.e*)	% Deaths
Overall	150	2.3 (0.03)	18
Upto 1.5	6	1.5 (0.0)	33
1.6-2.0	38	1.8(0.12)	34
2.1-2.5	83	2.3(0.09) ^c	16
2.6-3.0	23	2.8 (0.10) ^d	0
Year			
1989	18	2.0(0.29) ^a	44
1990	39	2.4(0.24) ^b	0
1991	29	2.2(0.33) ^c	28
1992	64	2.3(0.25) ^{bc}	17
Parity			
1	135	2.3(0.27) ^a	14
2	9	2.6(0.46) ^b	27
3	6	2.2 (0.27) ^a	50
Sex of lambs			
Males	74	2.5 (0.35) ^a	15
Females	76	2.2 (0.37) ^b	22

Values within each subclass with different superscripts differ significantly ($P < 0.05$).

*Where s.e. = standard error.

TABLE 2: CONFIDENCE INTERVALS FOR WEIGHT OF LAMBS THAT SURVIVED AND THOSE THAT DIED.

No.	Animals	LSmean	Arith. mean	SE mean	95% confid. interval
Alive	123	2.33	2.36	0.029	2.30
Dead	27	1.85	1.89	0.057	1.78

Where SE = standard error, and LS = least square.

Figure 1. Death rates of lambs.

0.46, followed by those in their 1st parity 2.3 ± 0.27 and 3rd parity 2.2 ± 0.27 . Percentage lamb mortality increased with parity, being 14, 27 and 50, for 1st 2nd and 3rd parities, respectively. Chi-square analysis showed no significant differences between the ratio of ewe lambs to ram lambs, hence there was normal segregation.

DISCUSSION

The incidence of lamb loss after birth of 18% as recorded in this study is within the range reported for the breed elsewhere in Nigeria, 4% (Adu and Ngere, 1979), 24% (Adu and Buvanendran, 1982), but above the 15% level where reduction of the overall loss by attention to losses from major factors can be accomplished (Watson, 1972). The overall mean birthweight of 2.3 ± 0.03 as observed in this study compares favourably with those reported by Taiwo *et al.* (1982), but below that reported by Buvanendran *et al.* (1981), and Adu and Buvanendran (1982). This may reflect differences in management.

The higher mortality incidence in the lower birthweight categories as observed in this study is similar to that reported by Buvanendran *et al.* (1981) and Taiwo *et al.* (1982). This suggests a need to improve lamb birthweight. Lamb birthweight and survival could be significantly improved by increasing the level of nutrition of late pregnant and lambing ewes (Smith, 1965; Buvanendran *et al.* 1981; Taiwo *et al.* 1982). This is more so as positive associations have been shown between liveweight gain during late pregnancy and lamb birthweights (Curl *et al.* 1975). In this study the critical weight for lamb survival seems to be 2.0kg (Table 2). Those with weights above it have more chances of survival, therefore, management methods ought to be geared towards attaining that lamb weight at birth.

The significant ($P < 0.05$) year differences in lamb birthweight and percentage mortality is consistent with previous studies (Jordan and Mayer, 1989; Jordan *et al.* 1989; Buvanendran *et al.*, 1981; Taiwo *et al.* 1982), in which good seasonal conditions in some years resulted in higher percentage lambings and survivals

compared to dry years. The seasonal conditions in 1989, might have thus been less favourable compared with the rest.

90% of the ewes lambing were in their 1st parity and more incidences of twinning were observed in ewes in their 2nd and 3rd parities. However, percentage mortality increased in that order, being 50, 27 and 14 for those in 3rd parity, those in 2nd parity and those in 1st parity, respectively. This and other previous reports (Buvanendran *et al.* 1981; Taiwo *et al.* 1982; Ganai and Pandey, 1990; Mukasa *et al.* 1991), suggest that with increase in twinning rate, more lamb mortality is experienced, and it could be due to the fact that birthweight decreased in that order, from singles to twins, and lambs with lower birthweights are lost much more than those with heavier weights.

Chi-square analysis shows that the ratio of ram lambs was not significantly different from those of ewe lambs, hence there was normal segregation. Although sex did not significantly affect birthweight in Yankasa lambs (Adu and Buvanendra, 1982), and in D'man ewes (Bourfia, 1992), birthweights were significantly ($P < 0.05$) higher in males than females in this study as in other studies (Taiwo *et al.* 1982; Ganai and Pandey, 1990; Ramachandran *et al.* 1991).

This study has shown the significance of the influence of birthweight on lamb mortality in Yankasa sheep in Bauchi. The critical weight that lambs ought to attain at birth to ensure higher chances of survival is 2.0kg, and ewe management should aim at attaining at least, this lamb birthweight for the breed. The mortality found from the study is above the 15% level where reduction of the overall loss by attention to losses from major factors can be accomplished (Watson, 1972). Salvaging of this lamb loss would allow much higher selection differentials, faster genetic progress and provide more surplus sheep for sale, thus adding significantly to the returns from sheep enterprise in Bauchi and indeed Nigeria, but more autopsy investigation is needed.

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