International Journal of Innovation and Applied Studies
ISSN 2028-9324 Vol. 5 No. 1 Jan. 2014, pp. 43-48

http://www.issr-journals.org/ijias/

Pre-Weaning Performance of Lambs under Traditional System of Production in Northern Ghana

Jakper Naandam and Kwaku Amoah-Otchere

Department of Animal Science, University for Development Studies,
P. O. Box TL 1882 Tamale, Ghana

ABSTRACT: The study was carried out in three communities namely, Pekyi, Kokpong and Cheyohi in the Tolon Kumbungu District (TKD) to assess the growth performance of lambs kept under the traditional system of production. The parameters studied were birth weight, pre-weaning weight gain, ewe weight at birth, and pre-weaning ewe weight. Data was collected from 26 animals (14 lambs and 12 ewes) and analysed using anova, regression and graphs. The study lasted 12 weeks. Lambs had a mean birth weight of 1.6 kg, pre-weaning average weekly gain was 742 g and pre-weaning mean weight at 12 weeks was 10.7 kg. Mean birth weight (1.5 kg), mean pre-weaning weekly gain (730 g) and mean pre-weaning weight at 12 weeks (10.2 kg) of male lambs were lower than those of females which were 1.9 kg, 770 g and 11.2 kg respectively. Also single born male lambs had significantly higher birth weight (1.7 kg), pre-weaning average weekly gain (773 g) and pre-weaning weight at 12 weeks (11.1 kg) than female lambs which were 1.4 kg, 620 g and 9.3 kg respectively. With better management practices by the farmer, lambs under the traditional system could be improved greatly.

KEYWORDS: Communities, growth, lambs, pre-weaning, conventional system.

1 INTRODUCTION

Studies by [1] revealed that, animals do not only serve as a buffer in times of crop failure but also as a temporary and long term store of wealth. Again animal protein for growth and development in our human bodies is not only provided by the livestock sector, but livestock also offers opportunities like employment for millions of rural and urban dwellers engaged in any form of livestock production and marketing [2]. In spite of the potential productivity per unit of sheep, their contribution to the national economy is relatively low. Reference [3] stated that inadequate feeding and poor quality feed are regarded as major factors limiting sheep and goat production in the tropics.

Reference [4] noted that with a gestation of 5 months and an interval of 1 to 2 months from parturition to the resumption of estrous activity (in the breeding season), sheep have the potential to lamb every 6 months. Two good reasons for various weaning ages include cost reduction and rapid growth but these must be balanced against feed intake stress and labour. Since overall productivity may be determined by several factors such as numbers of lambs surviving from birth through pre-weaning and post-weaning, growth performance, feed cost, labour, medication, overheads etc. it is critical to have an idea of pre-weaning performance as this is ultimately linked to post-weaning performance.

Information on traditional pre-weaning performance that reflect the actual situation of the small scale production systems prevailing in the rural setting is scanty in Ghana. This study therefore set out to investigate how the pre-weaning performances of lambs fare *in sittu* under the tradition system of production.

Corresponding Author: Jakper Naandam (jaknaan@yahoo.com)

2 METHODS AND MATERIALS

2.1 STUDY AREA

The study was conducted in three communities in the Tolon-Kumbungu District of the northern region of Ghana between the months of November 2011 to January 2012. The communities included Pekyi, Kokpong and Cheyohi. The District lies on latitude 9^{o} 25'N and longitude 1^{o} 00'E and at altitude of 183m above sea level in the Guinea Savannah ecological zone of Ghana. The area experiences a unimodal rainfall pattern which begins from April/May to September/October respectively. The average annual rainfall is about 1043mm and a monthly mean of 88mm with the peak in August and September. The temperature generally fluctuates between 15^{o} C (minimum) and 42^{o} C (maximum) with a mean annual temperature of 28.3^{o} C. The mean annual day relative humidity is 54% [5]. The dry season sets in around October and runs to March. The vegetation cover of the study area is mainly woody Guinea Savannah. The predominant grasses found in the area include *Panicum maxicum* (Guinea grass) and *Andropogon gayanus* (Gamba grass).

2.2 SAMPLING PROCEDURE

Purposive sampling was used because only farmers that had at least one pregnant ewe in their flock were considered. These ewes were adjudged to be close to lambing by the farmers themselves. A total of 12 farmers (4 from each of the 3 communities) constituted the sample size.

2.3 TRADITIONAL MANAGEMENT SYSTEM

The animals were housed only during the nights to protect them from harsh weather conditions, predators and thieves. Animals were tethered in bushes and under tree shades near their homes to avoid damage to crops. They were fed with fresh grass and leaves. After the cropping season, animals were allowed to browse and scavenge freely along roadsides and pockets of grazing lands and got back to owners' homes during the night either by themselves or by the help of the village children. There was no supplementation neither was there any routine health regime in place.

2.4 PARAMETERS CONSIDERED IN THE STUDY

2.4.1 BIRTH WEIGHT

This is the body weight of a newborn lamb at birth. This was taken within 24 hours post-partum.

2.4.2 TYPE OF BIRTH

This was classified into either singles or twins.

2.4.3 SEX

This is observed as maleness/masculinity or femaleness/femininity of a lamb.

2.4.4 AGE OF EWE

Age of ewes were determined by the number of lower incisors.

2.4.5 AVERAGE PRE-WEANING WEEKLY WEIGHT GAIN

The difference in weight of lambs between the week in question and the previous week was determined and considered as the weight gain for the week. At the end of the experiment (12 weeks after birth), the weekly gains were summed up and the average taken to determine the average weekly weight gain.

2.4.6 DAILY WEIGHT GAIN

The average weekly gain was then divided by the number of days in a week (7 days) .

2.5 STATISTICAL ANALYSIS

The data was analyzed using Analysis of Variance (ANOVA) and regression using the generalized linear model.

3 RESULTS

3.1 SEX, BIRTH WEIGHT, WEIGHT AT 12WEEKS AND PRE-WEANING AVERAGE DAILY WEIGHT GAIN OF LAMBS

There were more male lambs (71%) compared to females (29%). Most lambs (72%) had birth weight between 1.5 kg and 2.0 kg (Fig. 1) with the mean birth weight being 1.67kg. Also 21% of the lambs had their birth weight from 0.5 – 1.0 kg while the remaining (7%) had birth weight of 2.5 kg to 3.0 kg.

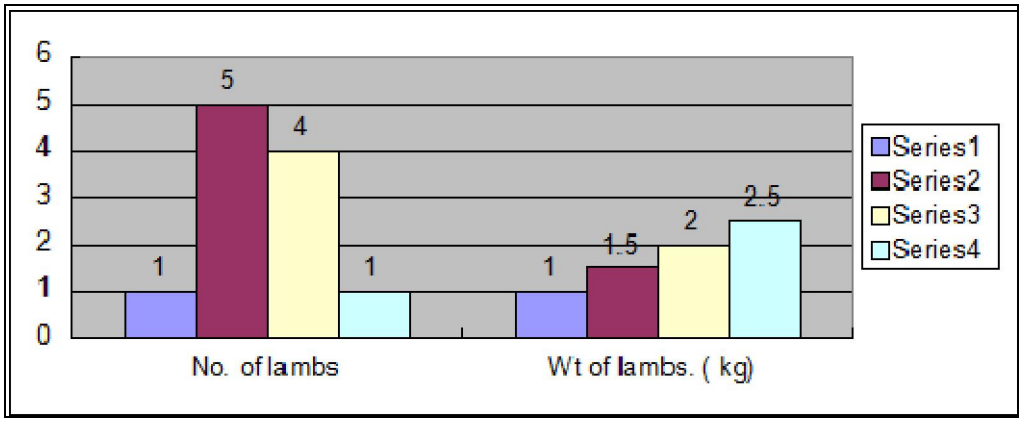

Fig. 1. Birth weight distribution of lambs

At twelve weeks, about 7 lambs (77%) had pre-weaning weights between 8.5 kg and 12.5 kg. About twenty three percent (2 lambs) had weights of 13 kg and 14 kg respectively.

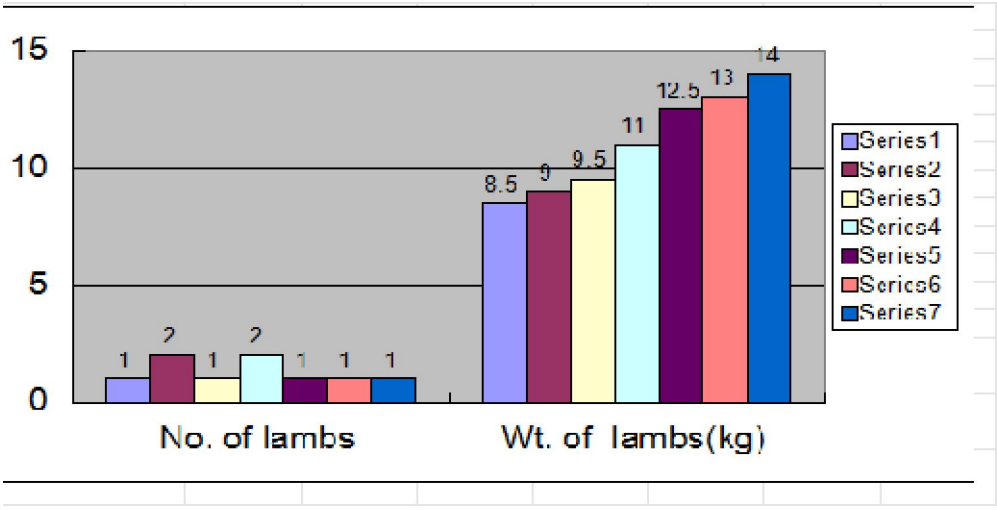

Fig. 2. Distribution of pre-weaning weight in lambs at twelve weeks

The study also indicated that half (50%) of the lambs had their pre-weaning average daily weight gain between 81 g and 100 g. Thirty percent had pre-weaning average daily weight gain of 101 g to 120 g. The highest range of pre-weaning average daily weight gain recorded was between 121 g and 160 g for 20% of lambs.

3.2 BIRTH TYPE AND APPROXIMATE AGES OF EWES

Majority (83%) of ewes had single births as against twin births for 17% of ewes. Ages of ewes were estimated by dentition method to be in the ranges of 3.5-4 years (58%), 2.5-3 years (34%), and 1.5-2 years (8%).

3.3 MEAN GROWTH PERFORMANCE OF LAMBS

Mean birth weight was 1.6 kg and mean pre-weaning average weekly gain was 742 g. At twelve weeks, mean pre-weaning weight gain of the lambs was 10.7 kg.

Table 1. Mean growth performance in lambs

Parameters	Number of animals	Average
Birth weight (kg)	14	1.6
AWWG (g)	10	742
APWWG at 12 Wk	10	10.7

3.4 REGRESSION ANALYSIS

Response variate: WtL1_kg

Fitted terms: Constant + WtE_kg + Farmer + Wks

Summary of analysis

Table 2. Anova table for regression analysis

Source	d.f.	s.s.	m.s.	v.r.	F pr.
Regression	23	1116.96	48.5636	103.65	<.001
Residual	91	42.64	0.4685		
Total	114	1159.60	10.1719		

Percentage variance accounted for 95.4

Table 2 show the analysis of the various fitted terms; the constant, weight of ewe, farmer and weeks, with a very high R^2 value of 95.4%

The summary clearly shows statistically that there was a significant relationship between the weight of ewe, farmer and weeks ($p < .001$).

3.5 MORTALITY

Four (28.5%) out of the 14 lambs died and 3 (25%) out the 12 ewes also died.

4 DISCUSSION

The birth weight of lambs was varied, ranging from 1.5kg to 3.0kg (Fig.1). Reference [6] reported that birth weight is affected significantly by the birth year, age of dam, sex and type of rearing of flock. Similarly [7] mentioned that the birth weight of lambs differed significantly due to year and season of birth, age of the dam, birth type and sex of lambs. In addition birth weight is influenced by breed, sex of lamb, birth type, age of dam, feeding conditions and production system [8]. In this

study factors that could affect birth as alluded to by these researchers were easily applicable and may thus explain the observed differences.

There were more ewes aged 2½ to 4 years in this study. Since parity of a dam has high influence on lamb pre-weaning growth rate [9], [10], it could be said that the pre-weaning growth rate (above 77.0kg/day) in this study compared to findings by [11] who stated that pre-weaning growth rate of lambs increased from the first parity (67.1g/day) to the fourth parity (72.1g/day) after which it began to decline, suggests that the higher pre-weaning growth rate recorded in this study may be due to ecological or breed differences.

Reference [9] stated that lambs born to multiparous ewes had significantly higher weaning weight than those born to primiparous ewes. This assertion is similar to that made by [12] in Djanlloke lambs. In this study pre-weaning growth rates on average were high i.e.106g/day (Table 1) compared to findings by [11]. Pre-weaning weights reported from West Africa on Djallonke sheep, were 1.9 kg for birth weight (BWT) and 10.2 kg for weaning weight at 90days (WT90) in improved village flocks located in the Ivory Coast [13]. Reference [11] reported 2.2 ±0.02 kg for BWT and 9.1 ± 0.05 kg for WT80 for participating farms of an open nucleus improvement programme in the Ivory Coast. Mean weaning weight at 84 days (WT84) i.e. 12 weeks was 10.7 kg (Table 1 and Fig. 2) in this study. This figure fell within the range 10.2 kg and 17.0 kg of weaning weights observed by [13] and [14]. Notwithstanding, it was slightly higher than what was found in Ivory Coast, even though weaning was at 90 days in Ivory Coast as against a lesser period of 84 days in this study.

Reference [15] found that the lambs born as singles were heavier by 15.1%, 19.4%, 19.7%, 9.40% and 7.14% as compared to lambs born as twins for weight at 60, 120, 180, 240 and 300 days weight, respectively. This fact of singles being heavier than twins agreed with the results of other authors in the tropics [16], [17] and as in this study too.

Lamb and ewe mortalities were low, 28.5% vrs 25% respectively compared to findings by [18] where lamb mortality was up to 50% but in agreement with findings by [19].

The R^2 (the explanatory power of the model) of 95.4% showed a highly fitting model (Table 2). It also confirms findings by [6] that birth weight is affected significantly by the management practice which is represented by the farmers in this model. Whereas models from other researchers [6], [7], [8] have concentrated on the age of the dam, this model has clearly shown that the birth weight of the lamb is significantly affected by the weight of the ewe (Table 2).

5 CONCLUSION AND RECOMMENDATION

Birth weight, pre-weaning daily weight gain, and pre-weaning weight at 12 weeks of lambs under the traditional system compared favorably with performance of lambs elsewhere. Mortality of both lambs and ewes were also comparatively low. The birth weight and pre-weaning weight of lambs could be predicted with a high degree of accuracy when the weights of ewe and farmer management types are known.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the participating farmers for their willingness in making available their animals and also for the support given during the data collection for the period of the entire study.

REFERENCES

[1] Wilson, *Livestock Production Systems, Tropical Agriculturalist*, Macmillan/CTA., 1995.
[2] A. Asnakew, *Feedlot fattening performance and carcass characteristics of intact male Hararghe highland goats feed different level of hay to concentrate Ratios,* Alemaya University of Agriculture, Haramaya, Ethiopia. 65p, 2005.
[3] I. S. Kosgey, G. J. Rowlands, J. A. M. Van Arendonk, and R. L Baker, "Small ruminant production in smallholder and pastoral/extensive farming systems in Kenya," *Small Ruminant Research* 77:11–24, 2008.
[4] A. Pala, *Effects of three twice-a-year breeding schedules in four breeds of sheep,* Faculty of North Carolina State University, 2001.
[5] Savanna Agriculture Research Institute (SARI), *Annual agro-meteorological report,* Tamale, Nyankpala, 2002.
[6] N. Unal and H. Akcapinar, "Some important production traits of central Anatolian Merino sheep and possibilities of improving through selection of these traits I. Important production traits," *Lalahan Hayvancilik-Arastirma- Enstitusu-Dergisi.* 41(1):45-58, 2001.
[7] M. E. Barbar, Z. Ahmad, A. Nadeema, and M. Yaoob, "Environmental factors affecting birth weight in Lohi sheep," *Pak. Vet. J.* 24: 5-9, 2004.

[8] D. R. Notter, R. C. Borg, and L. A.Kuehn, *Adjustment of lamb birth and weaning weights for continuous effects of ewe age,* Department of Animal and Poultry Sciences, Virginia Polytechnic Institute and State University, Blacksburg 24061, USA, 2005.

[9] K. P. Abassa, J. Pesinaba, and A. Adeshola-Ishola, "Croissance Pre-Senge des agneaux Djanlonke (Togo)," *Revue d'Elevage et de medicine veterinaire des pays Tropidaux* 45. 49-54, 1992.

[10] Koney, *Livestock Production and Animal Health in Ghana,* Advent Press, Osu Accra p. 37-68, 1992.

[11] C. V. Yapi-Gnaoré, A. Oya, J E. O. Rege, and B. Dagnogo, "Analysis of an open nucleus breeding programme for Djallonke sheep in the Ivory Coast. I. Examination of non-genetic factors," *Animal Science* 64:291- 300, 1997.

[12] W. A. Benjil, O. A. Osinowo, O. W. Ehoche and O. A. Aduku, "Birth Weight and Litter in Yankasa sheep; Environmental Factors and Heritability estimates," *Nigeria Journal of Animal Production*, 23:5-11, 1996.

[13] T. Armbruster, K. J. Peters and T. Metz , "Sheep production in the humid zone of West Africa: II—Growth performance and live weighs of sheep in improved and traditional production systems in Côte-d'Ivoire," *Journal of Animal Breeding and Genetics* 108: 210–219, 1991.

[14] M. Senou, P. Tobada, M. Dahouda, C. Adandédjan, V. Aboki, S. Alimy and P. M. Tondji, *Pre- and post-weaning growth in Djallonké lambs*, Département de Production Animale, Faculté des Sciences Agronomiques, Campus Universitaire d'Abomey Calavi, Cotonou, 2009.

[15] B. Bela and A. Haile, "Factors affecting growth performance of sheep under village management conditions in the south western part of Ethiopia," *Livestock Research for Rural Development* 21 (11), 2009.

[16] M. Nawaz andA. M. Khalil, "Comparison of Lohi and crossbred Ewes: productive and reproductive traits," *Small Ruminant Research* 27: 223-229, 1998.

[17] R. K. Rastogi, "Production performance of Barbados black belly sheep in Tobago, West Indies," *Small Ruminant Research* 41: 171-175, 2001.

[18] B. Awumbilla and Z. Sumani, "Kid and lamb mortality in selected areas of Western Dagomba, Ghana," *Proceedings of Western Africa Commonwealth Veterinary Medical Association*, Accra. September 7-12, 1992, p 47-64, 1992.

[19] M. Munir, A. W. Jasra and S. Rafique, "Lamb Production under Different Systems of Management on Rangelands of Balochistan," *Pakistan Vet. J.*, 28(2): 68-70, 2008.