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# ENVIRONMENTAL INFLUENCES ON GROWTH TRAITS OF NALI SHEEP

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## ABSTRACT

**The objective of this study was to evaluate the effect some environmental factors on birth weight, weaning weight and daily gain weight in Nali lambs. Data from 77 records were analysed. Results showed that birth weight (BW), weaning weight (WW), average daily gain at pre-weaning (ADG1) and average daily gain at post-weaning (ADG2) were influenced by year and season of lambing, sex of lambs, and parity of dam. Birth weight of lambs born during the year 2008 was significantly heavier (2.49± 0.04 kg) than year 2007 (2.21± 0.05 kg). Also WW and ADG1 in 2008 were significantly (P< 0.05) heavier than lambs born in 2007. The W6 of lambs born in rainy season was higher than of those born in winter and summer ADG1 and ADG2 of lambs born in rainy season and winter were higher than those born in summer. BW, WW, ADG1 and ADG2 of males were higher than female. The significant influence of ewe parity on lamb growth performance up to weaning stage.**

**Key words:** Birth weight, Environmental factors, Nali sheep growth.

## INTRODUCTION

Sheep are important species of livestock in India. They contribute greatly to the agrarian economy, especially in areas where crops, play an important role in the livelihood of a large proportion of small and marginal farmers and landless labourers.

The productivity of Indian sheep is low, which is due to the number of factors, including genetic factors besides environmental factors which affect productive and reproductive traits (Acharya, 1982).

There are a number of well-known influences that significantly affect body weight of lambs at birth and weaning such as year and season of lambing, sex of lamb, type of birth (Dixit *et al.*,2001and Rastogi, 2001) and parity of ewe (Mishra *et al.*, 2007). Previous studies have shown that production performance is dependant on growth performance and productivity indices (Gbangboche *et al.*, 2006). Weight of lamb at birth, weaning and pre-weaning weight gains are important components of overall flock productivity because of its association with weight at sale (Rajab *et al.*, 1992).

Hence, present investigation describes growth performance of Nali lambs to determine the effects of various non-genetic (environmental) factors on body weight at birth weight, weaning weight, weight at six month of age and daily average gain under agro-climatic conditions in Naughar region, India.

## MATERIALS AND METHODS

Present work was undertaken to study the growth performance of 77 Nali lambs from birth to six month of age and the influence of environmental factors on this traits at the Sheep Breeding Farm, Bhasoda, Naughar, Chanduli, (UP). Nali lambs born in summer (March to June), autumn (July to October) and winter (November to February) during the period between 2007 and 2008 were considered. The lambs were weighed in 4-6 hours after birth. All lambs were reared under intensive system of standard management practices. The newly born lambs were reared with dams in lambing pens for individual care for up to 3 days after lambing. Lambs suckled their dams and were also allowed *ad libitum* feeding of greenish succulent fodder and creep mixture from the age of one month. Data were analyzed by least-squares methods to identify significant sources of variation, using the general linear model (GLM) procedure of the SAS computer package (SAS,

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2003) to examine the effect of year, season, six, parity, weight of dam during lambing and age of dam on birth weight, weaning weight, weight at six month of age and pre-and post-weaning weight gain.

## RESULTS AND DISCUSSION

Overall mean with standard error for the effect years of lambing, season of lambing, sex of lamb on birth weight, weaning weight, weight at six month of age and pre-and post-weaning weight gains are presented in Table 1. The average BW, WW and W6 of Nali lambs were 2.42± 0.01kg, 8.51± 0.04 kg and 10.80± 0.01kg, respectively and the average pre-weaning and post weaning daily gain were 67.97± 0.56g and 22.77± 1.33g, respectively. These values were higher than the reported earlier values in the breeding tract (Acharya,1982) but, lower than the reported by (Bappaditya Dey and Poonia, 2005).

Birth weight of lambs born during the year 2008 was significantly heavier (2.49± 0.04 kg) than year 2007 (2.21± 0.05 kg). The weaning weight had lower values during year 2008 (8.62± 0.11 kg) than year 2007 (8.34± 0.10 kg) but there was no significant difference. The weight of lamb at six months of age was significant heavier in year 2008 (11.50± 0.25 kg) than year 2007(10.65± 0.24 kg). The average daily gain at pre weaning and post weaning was significantly (P< 0.05) higher in year 2008 as compared to year 2007. Variation in the weather, nutrition and farm management from year to year might be responsible for the increased weaning weight for year 2008 than year 2007. Bappaditya Dey and Poonia (2005) and Rashidi *et al.* 2008) reported that year of birth had significant influence on weight gain up to 6 months of age.

TABLE 1: Least squares means (LSM) and standard errors (± SE) of factors affecting birth weight, weaning weight, weights of lambs at 6 month of age and average daily gain of lambs

| Fixed Effect | BW, (kg) | | WW, (kg) | | W6, (kg) | | ADG1 at Pre-weaning, (g) | | ADG2 at post-weaning, (g) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | LSM±SE | No. | LSM±SE | No. | LSM±SE | No. | LSM±SE | No. | LSM±SE |
| **Overall mean μ** | 71 | 2.42±0.01 | 68 | 8.51±0.04 | 68 | 10.80±0.01 | 70 | 67.97±0.56 | 68 | 22.77±1.33 |
| **Year of lambing** | | * | | ns | | * | | * | | ** |
| 2007 | 35 | 2.21±0.05$^{b}$ | 32 | 8.34±0.10$^{a}$ | 32 | 10.65±0.24$^{b}$ | 34 | 67.33±1.64$^{b}$ | 32 | 20.69±3.04$^{a}$ |
| 2008 | 36 | 2.49±0.04$^{a}$ | 36 | 8.62±0.11$^{a}$ | 36 | 11.50±0.25$^{a}$ | 36 | 68.71±1.35$^{a}$ | 36 | 25.75±3.12$^{a}$ |
| **Season of lambing** | | ** | | ns | | ** | | * | | * |
| **Summer** | 33 | 2.18±0.04$^{a}$ | 32 | 8.44±0.11$^{a}$ | 32 | 9.97±0.27$^{b}$ | 32 | 64.92±1.75$^{b}$ | 32 | 17.01±3.96$^{b}$ |
| **rainy** | 14 | 2.59±0.05$^{b}$ | 13 | 8.42±0.14$^{a}$ | 13 | 11.90±0.35$^{a}$ | 14 | 69.28±1.35$^{a}$ | 13 | 27.60±3.07$^{a}$ |
| **Winter** | 24 | 2.30±0.04$^{b}$ | 24 | 8.59±0.12$^{a}$ | 24 | 10.86±0.28$^{b}$ | 24 | 69.86±1.49$^{a}$ | 24 | 25.20±3.54$^{a}$ |
| **Sex of lamb** | | * | | * | | ns | | * | | * |
| Male | 41 | 2.34±0.03$^{a}$ | 39 | 8.25±0.09$^{a}$ | 39 | 10.80±0.24$^{a}$ | 44 | 69.40±1.12$^{a}$ | 39 | 24.39±2.54$^{a}$ |
| Female | 30 | 2.29±0.04$^{a}$ | 29 | 8.71±0.10$^{b}$ | 29 | 10.33±0.24$^{a}$ | 30 | 66.64±1.25$^{b}$ | 29 | 22.14±2.85$^{b}$ |
| **Party** | | ** | | * | | ns | | ns | | ns |
| first | 39 | 2.02±0.6$^{b}$ | 36 | 8.23±11$^{a}$ | 36 | 10.67±35$^{a}$ | 38 | 67.78±1.51$^{a}$ | 36 | 23.93±4.29$^{a}$ |
| second | 32 | 2.52±0.6$^{a}$ | 32 | 8.67±13$^{b}$ | 32 | 10.48±40$^{a}$ | 32 | 68.26±1.72$^{a}$ | 32 | 22.61±4.89$^{a}$ |

Means (LSM) within the same column, with the same letters are not significantly different (P< 0.05).

*Significant (P< 0.05), ** Significant (P < 0.01), *** Significant (P < 0.001)

WB: birth weight, WW: weaning weight, W6: weight at six month, ADG: average daily gain at pre-waning, ADG2: average daily gain at post-waning

Effect season of lambing was significant on all traits except weight of lamb at six month of age. Birth weight of lambs born during rainy and winter seasons were of higher value than summer season. Also lambs born during the rainy season at six month of age showed the highest value(11.90± 0.35 kg) than lambs born during summer and winter season (9.97± 0.27 and 10.86± 0.28 kg). The maximum values of growth rate at pre-and post-weaning were observed high by significant at rainy and winter (69.28± 1.35, 27.60± 3.07 g) season (69.86± 1.49 g, 25.20± 3.54 g) than summer (64.92± 1.75 g, 17.01± 3.96 g). Similar findings were reported by Rastogi (2001) and Hassen *et al*., (2004). The minimum pre-and post-weaning gain in summer was due to poor feed intake accompanied by physiological stress caused by excessive heat and inadequate environmental conditions and according to El Fadili *et al.*, (2000), the decrease of ADG with the age of lambs could be due to a decrease in nursing and milk feeding of lambs by their mothers.

Male lambs were heavier ($P< 0.05$) than female lambs for WB, WW, ADG1 and ADG2 traits. Weight differences between male and female lambs have been reported by other authors (Rajab *et al.*, (1992); Dixit *et al.*, (2001); El Fadili *et al.*, (2003); Gbangboche *et al*., (2006); Mishra *et al.*, 2007). The higher weight of males in comparison to female lambs could be due to the hormonal differences in their endocrinological and physiological functions (Gbangboche *et al*., 2006).

The significant influence of ewe parity on lamb growth performance up to weaning (Table1) Similar, results have been reported by Mishra *et al. (*2007). Generally growth performance is higher for lambs born to older ewes. Indeed first parity ewes are still growing, so the competition between fetal growth and maternal growth could be an explanation for this phenomenon (Gbangboche *et al.,* 2006).

**Conclusion:** This study showed the importance of non-genetic factors on growth traits. The BW, WW and W6, as well as AG1 and ADG2 were influenced by year of lambing, season of lambing, sex of lamb, and parity. Efforts should be made for better management of ewes when the climatic conditions are not conducive to them.

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