

## Effect of Non-Genetic Factors on Birth Weight and Growth Performance of Kilakarsal Sheep

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### ABSTRACT

A study was conducted to evaluate the effect of non-genetic factors on birth weight, weaning weight and growth performance in Kilakarsal sheep. A period of five years data of Kilakarsal lambs born between 2010 and 2014 at Livestock Farm Complex, Veterinary College and Research Institute, Tirunelveli, Tamil Nadu were utilized for analysis. The average birth weight was  $2.682 \pm 0.04$  and  $2.498 \pm 0.05$  kg respectively for male and female of season I (September – January) lambs and  $2.539 \pm 0.04$  and  $2.350 \pm 0.05$  kg respectively for male and female lambs born during season II (March – July). From the results, it was observed that the season of lambing has significant influence ( $P < 0.05$ ) on birth weight of lambs. Similarly, sex of the lambs also had a highly significant ( $P < 0.01$ ) influence on birth weight and male had a higher birth weight irrespective of the season of birth. However, sex and season of birth had no influence on weaning weight and average daily gain at pre-weaning period. Whereas, sex of the lambs had an influence on post weaning and overall average daily weight gain.

**Keywords:** Non-genetic factors, Kilakarsal sheep, Growth performance

### INTRODUCTION

Sheep rearing plays an important role in the rural economy; it provides income to the rural people through sale of meat, manure and animals, hence contributes greatly to the livelihood of resource poor rural farmers. Profitability of sheep rearing is mainly influenced by growth and reproductive performance traits. Birth weight is an

important economic trait that determines growth, production and reproduction performance in small ruminants. The animals weighing heavier at birth and weaning have a faster growth rate, breed early and thereby increased overall productivity (Momoh et al., 2013). Weight of lamb at birth, weaning and pre-weaning weight gains are important components of overall flock productivity.

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The production traits of small ruminants are highly influenced by both genetic and non-genetic factors. Non-genetic factors, especially season of birth, year, parity, sex of the lamb and ewe weight at lambing affect the growth traits significantly and effective managerial practices helps to overcome these non-genetic factors (Mahala et al., 2019). The productive and reproductive performance of sheep flock depends on the availability of green fodder in the grazing area, which is determined by climatic and monsoon conditions.

Kilakarsal sheep is a medium sized, meat type breed, distributed mostly in Tirunelveli and Thoothukudi districts of Tamil Nadu. It has high adaptability to harsh environmental conditions and can thrive well in drought prone areas (Ravimurugan et al., 2010). In the present study an attempt was made to investigate the influence of non-genetic factors such as season of lambing and sex, on birth weight and growth performance of Kilakarsal sheep reared under semi intensive system.

#### MATERIALS AND METHODS

The data on birth weight, weaning weight and post weaning weight of Kilakarsal lambs born at Livestock Farm Complex, Veterinary College and Research Institute, Tirunelveli, Tamil Nadu over the period of 5 years from 2010 to 2014 were collected and analyzed in this study. The kilakarsal sheep were reared under semi intensive system of management, allowed for eight hours grazing in a day and provided with *ad libitum* cultivated green fodder during poor grazing conditions. The animals were supplemented with 50 – 300 g of concentrate mixture to fulfill the requirements for different physiological stages recommended by BIS. All animals were ear tagged for identification. Lambs were weaned at the age of three months. Managerial practices like vaccination, deworming and dipping was carried out periodically. The period of birth was divided into two lambing season i.e. season I (September - January) and season II (March to July). The data was subjected to least-square analysis (Harvey,

1990) and the effect of season of birth was considered as potential source of variation.

#### RESULTS AND DISCUSSION

The least-square means of birth weight, pre weaning and post weaning average body weight gain of Kilakarsal lambs are presented in Table 1. The season of lambing has significant influence ( $P < 0.05$ ) on birth weight of lambs. The average birth weight was  $2.682 \pm 0.04$  and  $2.498 \pm 0.05$  kg respectively for male and female of season I lambs and  $2.539 \pm 0.04$  and  $2.350 \pm 0.05$  kg respectively for male and female lambs born during season II. Higher birth weight of lambs at season I might be due to availability of pasture in the grazing land during September to January months and favorable environmental conditions. Similarly, Siddalingamurthy et al. (2017) reported that season of birth had highly significant ( $P < 0.01$ ) effect on birth weight in Mandya sheep. Lambs born during main lambing season (June- September) was significantly heavier ( $2.14 \pm 0.02$ , kg) than lambs born during off lambing season (October-January) ( $2.06 \pm 0.01$ , kg) and lean lambing season (February – may) ( $2.01 \pm 0.02$ , kg). Significant effect of season on birth weight were also recorded by Ramesh saravana kumar et al. (2007) in Mecheri sheep, Mallick et al. (2017) in Bharat Merino sheep and Meena et al. (2019) in Sonadi sheep. In contrary to the present findings, non significant effect of season of lambing on birth weight were reported by Balasubramanyam and Kumarasamy (2011) in Madras Red lambs and Dass et al. (2014) in Muzaffarnagri sheep. Moreover, in this study season of birth did not show any significant effect on weaning weight, pre weaning, post weaning and overall average daily weight gain. Devendran et al. (2009) in Madras red sheep and Chopra et al. (2010) in Bharat Merino sheep, reported non significant effect of season of birth on pre weaning average daily weight gain but significant ( $P < 0.05$ ) effect on post weaning average daily gain. Whereas, highly significant effect ( $P < 0.01$ ) of season of birth on average daily gain up to 6 months and non significant effect from 6-12

months was reported by Mahala et al. (2019) in Avikalin sheep.

The sex of the lamb had highly significant ( $P < 0.01$ ) effect on birth weight. The male lambs had higher birth weight than females irrespective of season of birth. The possible reason for this is that male fetus grows heavier in their prenatal development. Balasubramanyam and Kumarasamy (2011) also showed that the birth weight of male lamb ( $2.89 \pm 0.005$ ) was highly significant ( $P < 0.01$ ) than female lamb ( $2.76 \pm 0.005$ ) in Madras red sheep. Similarly, higher birth weight in male lambs was also reported by Viroji rao et al. (2004) in Nellore sheep and Thiruvankadan et al. (2008) in Mecheri sheep. The sex of lambs did not show any significant effect on weaning weight and pre weaning average daily weight gain, however had a highly significant

influence ( $P < 0.01$ ) on the post weaning average daily weight gain of the lambs born during season I and significantly influence ( $P < 0.05$ ) on post weaning average daily weight gain of lambs born during season II. The overall average daily weight gain differ significantly higher ( $P < 0.01$ ) between sex in both the season. The possible reason for this is male have higher growth rate than female due to anabolic effect of hormones and they compete better than female for the allocation of resources (Mahala et al., 2019). Significant effect of sex on different growth traits were also reported by Sivakumar et al. (2009) in Madras red sheep, Chopra et al. (2010) in Bharat Merino sheep and Ekambaram et al. (2014) in Nellore sheep, whereas Kumar et al. (2017) reported non significant effect of sex on growth traits in Deccani sheep.

**Table 1: Birth weight (kg), Weaning weight (kg) and Average daily weight gain (gms) of Kilakarsal lambs born during different seasons (Mean  $\pm$  SE)**

Effect	Birth weight(kg)		P value	Significance	Weaning weight (kg)		P value	Significance	Average daily weight gain (gm) (Pre weaning)		P value	Significance	Average daily weight gain (gm) (Post weaning)		P value	Significance	Average daily weight gain (gm) (Overall)		P value	Significance								
	Male	Female			Male	Female			Male	Female			Male	Female			Male	Female			Male	Female						
Season 1	2.682	2.498	0.003	**	9.12	8.79	0.36	NS	73.28	70.93	0.58	NS	41.17	35.48	0.00	**	44.54	38.37	0.00	**								
	$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$
	0.04	0.05			0.26	0.25			3.22	2.75			2.39	2.02			1.38	0.84			(75)	(65)	(65)	(60)	(31)	(40)	(31)	(40)
Season 2	2.539	2.350	0.003	**	9.07	8.85	0.59	NS	73.36	69.66	0.42	NS	50.29	35.86	0.01	*	48.07	38.44	0.001	**								
	$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$			$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$	$\pm$
	0.04	0.05			0.30	0.26			3.49	2.95			4.46	3.02			1.49	1.88			(47)	(49)	(42)	(41)	(13)	(16)	(13)	(16)
P Value	0.014	0.033			0.92	0.85			0.99	0.307			0.058	0.91			0.140	0.97										
Significance	*	*			NS	NS			NS	NS			NS	NS			NS	NS										

\*\*  $P < 0.01$ ; \*  $P < 0.05$ ; NS– Not significant, Figures in the parenthesis indicate the number of observation.

### CONCLUSION

From this study it was concluded that the season of birth and sex of the lambs had influence on birth weight of Kilakarsal lambs and the post weaning and overall average daily body weight gain were influenced by the sex of the lambs. During adverse climatic conditions, implementation of effective managerial practices helps to overcome the influence of non-genetic factors on growth performance of sheep.

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