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ENVIRONMENTAL FACTORS AFFECTING GROWTH PERFORMANCE UP-TO WEANING IN KASHMIR MERINO SHEEP

M.A Rather[1], J.A. Baba[2], S.A. Ahanger[3], M. M Shah[4], R. Razvi[5], I. Bashir[6]

[1] In-charge Assistant Research Officer, Kralpathri, Department of Sheep Husbandr,(J&K). [2]DSHO-Ganderbal, Department of Sheep Husbandry(J&K). [3]DSHO-Bandipora, Department of Sheep Husbandry(J&K). [4]Deputy Director Research, D.I.L., Department of Sheep Husbandry(J&K). [5]Research Assistant, D.I.L, Department of Sheep Husbandry(J&K). Veterinary Assistant Surgeon Kralpathri, Department of Sheep Husbandry(J&K). VAS Kralpathri,

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ABSTRACT

The data pertaining to 292 Kashmir Merino lambs born during 2019-20 were analyzed with the Mixed Model Least Squares and Maximum Likelihood algorithms, PC-2 version computer programme (Harvey. 1990) to assess some non-genetic factors on birth weight (BW) and weaning weight. The overall means of 3.66±0.05 and11.54±0.18, respectively for BW and WW were observed during the present study. The effect of sex and season of birth was significant ($p<0.05$) and highly significant ($p>0.01$) on weaning weight. The effect of age of dam was non-significant on both the traits under study. The sexual dimorphism of 1.05 and 1.18 was observed for BW and WW, respectively, in the present study. The results obtained in this study have demonstrated sex of animal and season of birth as important sources of variation for BW and WW. Therefore, effects of non- genetic factors need to be corrected for estimation of breeding values and genetic parameters.

Key words: Sheep pox, Morbidity, Mortality

Birth weight and weaning weight are early available trait of great economic interest in sheep production system because of their positive genetic correlations with further live weights. Further, knowledge of accurate estimates of genetic parameters and breeding values of these traits is of utmost importance for improving overall growth performance of sheep (Safari *et al.*, 2005). However, genetic improvement programs are based on utilization of genetic variation, identification of superior animals for particular traits or combinations of traits, and extensive exploitation of these selected animals in a breeding program (Akhtar,et al.,2012). The variation in each trait can skillfully be exploited if the extent of genetic and environmental causes of variation in these traits is precisely known. The observed performance of each animal in each trait is the result of the genetic potential of animal that it receives from both parents and the environment in which it is raised (Babar *et al.*, 2003). There are many non-genetic factors, which influence the phenotypic expression of these traits (Dixit *et al.*, 2011). Such random environmental factors thereby cause differences in the expression of economically important traits (Babar *et al.*, 2003). Hence, investigation and determination of environmental factors that have effect on these and correction of records for these factors cause estimated genetic parameters and breeding value to show animal's genetic worth (Rashidi *et al.*, 2008). Therefore, present study was undertaken to study the effect of non-genetic factors on birth and weaning weights of Kashmir Merino sheep. Kashmir Merino is a major synthetic breed of Jammu and Kashmir.

Material and methods

Data on birth and weaning weights ware collected from body weight registers maintained at Sheep Breeding Farm Kralpathri (Jammu and Kashmir). The farm is located at 33 53' N latitude and 74 37' E longitude. The topography of the farm is undulating hills covered by forest land spread over a vast area. The sheep are stall fed from 15th November to 15 th April. The sheep were vaccinated against enterotoxaemia. Endoparasitic and ectoparasitic control measures were also followed regularly. The data was suitably classified to study the major effect of non-genetic factors like seasons (2 groups; autumn and spring born), gender (2 groups; Male, Female), and age of dam (7 groups; groups presented in Table 1). The data were analyzed with the Mixed Model Least Squares and Maximum Likelihood algorithms, PC-2 version computer programme (Harvey. 1990). The statistical significance of various fixed effects in the least squares model was determined by 'F' test.

Results and discussion

Least squares means for the birth weight (BW) and weaning weight (WW) along with effects of non-genetic factors are presented in Table 1. The overall means of 3.66±0.05 and11.54±0.18, respectively for BW and WW were observed during the present study. The effect of sex and season of birth was significant ($p<0.05$) and highly significant ($p>0.01$) on weaning weight. The effect of age of dam was non-significant on both the traits under study. The sexual dimorphism of 1.05 and 1.18 was observed for BW and WW, respectively, in the present study. More or less similar estimates for BW and WW were observed by Rather et al. (2019) in Kashmir Merino x NARI Swarna Merino crossbred. However, lower estimates were reported by Mishra et al. (2008) in Garole × Malpura crossbred whereas Mallick et al. (2015) in Bharat Merino × Bannur (126) crossbred reported higher estimates. Significant effect of sex on BW and WW with males heaver at all ages was also reported by Nehra et al. (2006) Marwari sheep, Singh et al. (2006) in crossbred sheep and Rather et al. (2019) Kashmir Merino x NARI Swarna Merino crossbred. Differences in sexual chromosomes, position of growth related genes and difference in endocrinal physiology might be some factors responsible to difference in growth between two sexes. The significant effect of season on BW and WW was in consonance with the findings of Momoh et al. (2013) in Balami and Uda sheep. The higher body weight in autumn born lambs as compared to spring born lambs could be attributed to good body condition scores of dams during autumn season owing to availability of grazing and exercise. Negi et al., (1987) in Gaddi sheep and its crosses also reported non-significant effect of season of birth on BW and WW. However, Garcia et al., (1985) in Corriedale sheep and Ahn et al., (1990) reported a s significant effect on of age of dam on BW and WW.

Conclusion

The results obtained in this study have demonstrated sex of animal and season of birth as important sources of variation for BW and WW. Therefore, effects of non- genetic factors need to be corrected for estimation of breeding values and genetic parameters.

Table 1. Least squares means of body weight traits at birth and weaning

Particulars	N	Average	N	Average
Overall	292	3.66±0.05	281	11.54±0.18
Sex		0.012*		0.000**
Male	153	3.74±0.06^{b}	143	12.47±0.22^{b}
Female	139	3.57±0.06^{a}	138	10.61±0.22^{a}
Age of dam		0.551^{NS}		0.148 ^{NS}
>1.5-2.5	9	3.63±0.19	6	11.20±0.81
>2.5-3.5	82	3.59±0.06	80	11.48±0.23
>3.5-4.5	45	3.70±0.07	44	11.23±0.31
>4.5-5.5	82	3.68±0.06	80	12.07±0.23
>5.5-6.5	30	3.76±0.10	29	12.04±0.37
>6.5-7.5	24	3.71±0.12	23	11.05±0.44
>7.5	20	3.62±0.13	19	11.72±0.46
Season		0.021*		0.000**
Autumn	71	3.75±0.07^{b}	71	12.35±0.27^{b}
Spring	221	3.57±0.05^{a}	210	10.74±0.74^{a}

Means with different superscripts in the columns differ significantly.
NS indicates non-significant.
* indicates significant at 5% &
** indicates significant at 1% level.

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