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Studies on the growth performance of Deccani sheep under the organized farm unit

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Abstract

The data pertaining to body weights at birth, 3, 6, 9 and 12 months of age on 1099 Deccani female lambs born during year 2011 to 2019 were collected from the Network Project on Sheep Improvement, Deccani farm Based Unit, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India. The least squares means for body weights at birth, 3, 6, 9 and 12 months of age in Deccani sheep were 3.22 ± 0.01 , 13.94 ± 0.06 , 21.58 ± 0.10 , 23.44 ± 0.11 and 25.66 ± 0.11 kg, respectively. The effect of period of birth was significant on all body weights except six months body weight. The effect of season of birth was non-significant on all body weights except nine months body weight. The significant effect of various non-genetic factors on growth traits indicated the necessity of consistent feeding and management interventions for better growth performance.

Keywords: Deccani sheep, growth traits, non-genetic factors

Introduction

Western India's Deccani sheep breed is a dual purpose in nature. In sheep, growth is a crucial economic feature. The importance of quickly developing lambs has begun to be recognized by sheep farmers in light of the recent increase in meat prices in the Indian market and the notable increase in mutton exports in recent years.

Lamb growth performance is closely linked to the flock's economic viability, which is crucial to farm profitability. Various effects influence growth of lambs and subsequently affect the farm income to farmers. Additionally, an increasing demand of fast-growing lambs with excellent meat yields warrants the possible ways for improving the growth traits in early age of life. The non-genetic effects like period of birth and season of birth have been influencing the growth performance of lambs. The study of those factors is essential for directing management practices at the farm for improving the growth of lamb.

In addition to this, the knowledge of potential factors is crucial for performing genetic analysis for setting the breeding programs. Therefore, the goal of the current study was to assess the growth performance along with the effect of non-genetic factors in Deccani sheep under organized farm.

Materials and Methods

The data for the present investigation were recorded on 1099 female lambs born during the year 2011-2019 at Network Project on Sheep Improvement, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India. The animals were maintained under the project are improved for growth traits through selection. The farm managerial practices followed at the project were almost uniform throughout the year. The grazing of flock along with feeding of green and dry fodders was followed routinely at farm. Concentrate was also fed to animals according to nutritional requirements of animals. The traits considered were live body weights (kg) at birth, 3, 6, 9 and 12 months of age. The data on growth were classified according to period and season of birth. The data were analyzed by the least squares analysis method (Harvey, 1990) ^[5] to estimate the effects of different factors using following model:

$$Y_{ijk} = \mu + A_i + B_j + e_{ijk}$$

Where,
 Y_{ijk} = k^{th} record of trait of progeny in i^{th} period of birth and j^{th} season of birth, μ = population mean, A_i = Effect of i^{th} period of birth, B_j = effect of j^{th} season of birth, e_{ijk} = Random error NID (0, $\sigma^2 e$).

Duncan’s multiple range test as modified by Kramer (1957) [5] was used to make pair-wise comparisons between least squares means.

Results and Discussion

Table 1: Least squares means along with standard error of body weight (kg) at different stages of age in Deccani sheep

Source of variation	Birth		3 months		6 months		9 months		12 months	
	d.f	MSS	d.f	MSS	d.f	MSS	d.f	MSS	d.f	MSS
Period of birth	2	3.82**	2	59.06**	2	3.55	2	281.08**	2	251.78**
Season of birth	1	0.06	1	1.57	1	6.30	1	100.92**	1	0.08
Error	1095	0.13	997	4.06	869	7.49	759	8.59	705	8.46

Different superscript indicate significant difference; *= $p < 0.05$, **= $p < 0.01$ and NS= non-significant. Figures in parenthesis indicate number of observations

The least square means along with standard error and analysis of variance for body weights are presented in Table 1 and 2. The overall least square means for body weight at birth, 3, 6, 9, and 12 months of age were 3.22 ± 0.01 , 13.94 ± 0.06 , 21.58 ± 0.10 , 23.44 ± 0.11 and 25.66 ± 0.11 kg, respectively. The

present findings were in consonance with the reports of Bangar *et al.* (2017) [4] and, Nimase and Kandalkar (2023) [6] in Deccani sheep for birth, 3, 6, 9 and 12 months body weights.

Table 2: Least squares analysis of variance of body weight (kg) at different stages of age in Deccani sheep

Effect / Trait	Body weight (kg) at different stages of age				
	Birth	3 months	6 months	9 months	12 months
Overall mean	3.22 ± 0.01 (1099)	13.94 ± 0.06 (1001)	21.58 ± 0.10 (873)	23.44 ± 0.11 (763)	25.66 ± 0.11 (709)
Period of birth	**	**	NS	**	**
P1 (2011-2013)	3.33 ± 0.02^c (320)	14.23 ± 0.11^b (296)	21.46 ± 0.16 (270)	22.37 ± 0.18^a (249)	24.73 ± 0.19^a (239)
P2 (2014-2016)	3.22 ± 0.01^b (401)	14.13 ± 0.10^b (360)	21.67 ± 0.15 (320)	23.44 ± 0.18^b (269)	25.47 ± 0.19^b (237)
P3 (2017-2019)	3.12 ± 0.02^a (378)	13.45 ± 0.11^a (345)	21.61 ± 0.17 (283)	24.51 ± 0.19^c (245)	26.79 ± 0.20^c (233)
Season of birth	NS	NS	NS	**	NS
Main	3.23 ± 0.01 (753)	13.98 ± 0.07 (688)	21.49 ± 0.11 (604)	23.05 ± 0.12^a (520)	25.68 ± 0.13 (473)
Off	3.27 ± 0.02 (346)	13.89 ± 0.11 (313)	21.67 ± 0.16 (269)	23.84 ± 0.19^b (243)	25.65 ± 0.19 (236)

*= $p < 0.05$ and **= $p < 0.01$

Analysis of variance indicated significant ($p < 0.01$) effect of period of birth on all body weights, except body weight at 6 month of age. No definite trend over the period of birth was observed because of variable inputs in terms of feed / fodder, physical environment and other managerial factors prevailing in different periods. Similar results were reported by Anamika *et al.* (2018) [1] in Rambouillet sheep and Reddy *et al.* (2018) [7] in Nellore Jodipi sheep for birth, 3, 9 and 12 months body weight.

Season of birth had non-significant effect on all body weights except body weight at 9 months of age. It might be due to abundant availability of green and nutritious grass and forages during main and off season. Similar observations were reported by Anamika *et al.* (2018) [1] in Rambouillet sheep for birth, 3, 6 and 12 months body weight. Significant effect of season of birth on 9 month body weight was also observed by Balasubramanyam and Kumarasamy (2011) [2] in Madras Red sheep and, Nimase and Kandalkar (2023) [6] in Deccani sheep.

Conclusion

The study presents least square means, standard errors, and analysis of variance for body weights at different stages of growth. The findings, consistent with prior research, highlight significant effects of birth period on most body weights, except at 6 months, attributed to varying management factors. Season of birth insignificantly impacted weights, except at 9 months, possibly due to ample forage availability. These

results echo similar trends observed in other sheep breeds, indicating the broader applicability of the findings. Overall, the study underscores the multifaceted influence of birth period and season on sheep body weights, contributing valuable insights to livestock management strategies.

Conflict of Interest

Not available

Financial Support

Not available

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