VS Birhade
P. G. Student, Department of Animal Husbandry and Dairy Science, MPKV, Rahuri, Maharashtra, India

YB Kandalkar
Assistant Professor (AHDS) and Research Guide, Department of Animal Husbandry and Dairy Science, MPKV, Rahuri, Maharashtra, India

MU Tanpure
Assistant Professor (AHDS), College of Agriculture, Badnapur, VNMKV, Parbhani, Maharashtra, India

SA Dhage
Associate Professor (AHDS), Department of Animal Husbandry and Dairy Science, MPKV, Rahuri, Maharashtra, India

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

VS Birhade, YB Kandalkar, MU Tanpure and SA Dhage

Abstract
The overall reproductive performance of 538 Deccani sheep reared in an organized farm was recorded. The least squares means for least squares means for age at first lambing, service period and lambing interval were 745.08 ± 10.72, 170.28 ± 5.75 and 320.77 ± 5.90 days, respectively.
The data on reproduction performance of Deccani sheep available at Network Project on Sheep Improvement, (Deccani farm Based Unit) MPKV, Rahuri (Maharashtra) was used to study reproduction traits. The effects of period of birth and season of birth on reproduction traits were studied. The overall least squares means for age at first lambing, service period and lambing interval were 745.08 ± 10.72, 170.28 ± 5.75 and 320.77 ± 5.90 days, respectively. The period and season of birth had non-significant effect on all the reproduction traits.

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

Introduction

Sheep is one of the most important livestock species providing food and nutritional security to a large resource-scarce section of the human population of India belonging to the small, marginal farmers and landless laborers. Sheep farming, which needs less initial investment, is suitable for a low input system, and adapted to adverse climatic conditions. Thus, it is an important tool of poverty alleviation. Sheep are contributing to the livestock sector through the production of mutton, wool, milk, skin, manure, etc. Besides domestic consumption mutton is being exported to foreign countries.

Reproduction is an important factor in determining the productivity of the ewe. The attainment of age at first lambing at an early age and lambing at a regular interval help not only in quick buildup of the flock through high rate of replacement, but also enhances the rate of genetic progress by way of reduction in generation interval. The age at first lambing may be reduced by proper feeding and management of growing ewe lambs. The lambing interval may also be improved mainly through the management tools. Therefore, the present investigation was undertaken to evaluate the reproductive performance and to assess the non-genetic factors affecting the reproduction traits of Deccani sheep for making future breeding plan for the improvement of this breed.

Materials and Methods

The data for the present investigation was recorded on 538 female lambs born during the year 2011-2019 at Network Project on Sheep Improvement, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India. The ewes were bred throughout the year. The females were detected in oestrous twice daily using aproned rams and mating was allowed by pre-assigned rams to different ewes. Flushing was done 10 to 15 days prior to start of breeding season. During flushing period 150 to 200 g of maize grain soaked in 2 percent urea water for a period of 10 to 12 hours were offered.

The ewes in last four weeks of pregnancy were separated and provided additional concentrate ration of 150 g per day per head. The ewes before 3-4 days of expected parturition was kept in lambing pen for proper care and of dam during parturition as well as newly born lambs.

Corresponding Author:
VS Birhade
P. G. Student, Department of Animal Husbandry and Dairy Science, MPKV, Rahuri, Maharashtra, India

Rams were kept separately and mostly stall fed to avoid stray mating in the grazing field. The reproduction traits considered for evaluation were age at first lambing, service period and lambing interval. The effect of period and season of birth statistically studied on age at first lambing, service period and lambing interval. The data were analyzed by the least squares analysis method (Harvey, 1990) [4] 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 ith period of birth, B_j = effect of jth 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 for reproduction traits in Deccani sheep

Effect/ Trait	Age at first lambing (days)	Service period (days)	Lambing interval (days)
Overall mean	745.08 ± 10.72 (538)	170.28 ± 5.75 (397)	320.77 ± 5.90 (397)
Period of Birth	NS	NS	NS
P1 (2011-2013)	767.77 ± 17.18 (185)	172.12 ± 8.79 (151)	322.54 ± 9.02 (151)
P2 (2014-2016)	752.59 ± 16.05 (198)	171.74 ± 8.62 (144)	322.91 ± 8.84 (144)
P3 (2017-2019)	714.88 ± 19.14 (155)	166.98 ± 10.76 (102)	316.86 ± 11.04 (102)
Season of birth	NS	NS	NS
Main	754.82 ± 11.50 (379)	177.03 ± 6.22 (277)	327.47 ± 6.38 (277)
Off	735.34 ± 18.14 (159)	163.53 ± 9.66 (120)	314.07 ± 9.90 (120)

NS= non-significant; Figures in parenthesis indicate number of observations

The least squares means along with standard error and analysis of variance exhibiting the effect of non-genetic factors on reproduction traits are summarized in Table 1 and 2, respectively. The overall least square means for age at first lambing, service period and lambing interval were 745.08 ± 10.72, 170.28 ± 5.75 and 320.77 ± 5.90 days, respectively. The above observations were in consonance with the findings reported by Reddy *et al.* (2017) [8] in Nellore Brown sheep for age at first lambing, service period and lambing interval.

The effect of period of birth was found non-significant on age at first lambing, service period and lambing interval. Similar finding was reported by Panda *et al.* (2012) [7] in Edka sheep for age at first lambing and lambing interval.

Table 2: Least squares analysis of variance of reproduction traits in Deccani sheep

Source of Variation	Age at first lambing		Service period		Lambing interval	
	d.f	MSS	d.f	MSS	d.f	MSS
Period of birth	2	121737.35	2	921.83	2	1276.77
Season of birth	1	41071.28	1	14686.09	1	14447.15
Error	534	50087.83	393	10587.10	393	11130.43

The analysis of variance indicated non-significant effect of season of birth on all reproduction traits. Similar observations were noted by Das *et al.* (2014) [2] in Kashmir Merino and Reddy (2017) [8] in Nellore Brown sheep for age at first lambing, Dixit *et al.* (2002) [3] in Bharat Merino sheep for service period and Balsubramanyam *et al.* (2012) [1] in Madras Red sheep and Mandakmale *et al.* (2013) [6] in Deccani sheep for lambing interval.

Conclusion

The study evaluated the reproductive performance and non-genetic factors influencing reproduction traits in Deccani sheep. The findings highlighted the importance of early age at first lambing and regular lambing intervals for flock expansion and genetic progress. The management practices, including proper feeding, flushing, and separation during pregnancy, significantly impacted reproduction. While period and season of birth showed non-significant effects on reproduction traits, the overall means were consistent with previous studies in other sheep breeds. These insights contribute to the formulation of effective breeding plans aimed at enhancing the productivity and sustainability of Deccani sheep farming, thereby bolstering food security and livelihoods in India.

Conflict of Interest
Not available

Financial Support
Not available

References
1. Balasubramanyam D, Raja TV, Kumarsamay P, Sivaselvam SN. Estimation of genetic parameters and trends for body weight traits in Madras Red sheep. Indian J Small Ruminants. 2012;18(2):173-179.
2. Das AK, Chakraborty D, Kumar N, Gupta P, Khan NN, Bukhari S. Effect of non-genetic factors on performance traits of Kashmir Merino sheep. Indian J Anim Res. 2014;48(2):106-108.
3. Dixit SP, Dhillon JS, Singh G. Sources of variation in reproductive traits Bharat Merino sheep. Indian J Anim Sci. 2002;72(4):328-331.
4. Harvey WR. User's guide for LSMLMW PC-2 Version. Mixed Model Least Squares and Maximum Likelihood Computer Program. USA: ARS; 1990.
5. Kramer CY. Extension of Multiple Range Test to group correlated adjusted means. Biometerics. 1957;13:13-18.

6. Mandakmale SD, Birari DR, Shinde SD, Sakhare PS. Effect of non-genetic factors on reproductive performance of Sangamneri strain of Deccani sheep. Int J Small Ruminants. 2013;19(2):83-84.
7. Panda P, Rao PK, Kumar P. Performance of Edka sheep of Puri district of Odisha. Indian J Small Ruminants. 2012;18(2):188-190.
8. Reddy DVV, Sreenivas D, Gnanaprakash M, Harikrishna CH. Genetic analysis of growth rates of Nellore Brown Sheep. Int. J Curr Microbiol Appl. Sci. 2017;6(3):832-836.