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Study of Female Reproductive Performance of Sirohi Goat Managed under Farm and Field Cluster in Southern Rajasthan, India

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A B S T R A C T

The present study was aimed to investigate the reproductive performance of female Sirohi goat managed at farm and field cluster under All India Coordinated Research Project (AICRP) on Sirohi goats, livestock Research Station LRS Vallabhnagar, LRS Bojunda (Chitorgarh), Rajsamand and Dabok areas of Udaipur, Rajasthan. The data were collected on reproductive performance on farm management and utilized for this study. The overall mean for reproduction traits viz., age at first conception, age at first kidding, weight at first conception and weight at first kidding were 444.18 ± 13.05, 594.88 ±13.05days and 26.77 ±0.21, 30.90 ±0.18 kg respectively. Cluster had a significant effect on age at first conception and age at first kidding. Highly significant on weight at first conception and weight at first kidding. Age at first conception and age at kidding were highest in Farm cluster. Whereas highest weight at first conception and weight at first kidding was observed in Field cluster. It was concluded that reproductive performance of Sirohi goat were suitable and indicating efficient reproductive performance and this breed can be utilized for sustainable goat farming in southern Rajasthan.

Introduction

Goat production is an attractive livestock enterprise particularly for small and marginal farmers and landless laborers in India and in other developing countries. The success of goat husbandry largely depends on the environment where the goats are reared, and their management system. Goat is a household animal of Rajasthan. It plays an important role in livelihood of small and marginal farmers of Rajasthan as a source of cash, meat and milk because it can affectively survive on available shrubs and trees in harsh environmental conditions all over the world Khan *et al.,* (2006).

Rajasthan with its 57.7 million livestock population ranks second in the country and shares more than 11% of India's total livestock population (Animal Husbandry Department Rajasthan, 2016). The state ranks first with 18% share in total goat population of the country.

Reproductive efficiency of goat is considered as one of the vital factors that ensures better productivity in certain environmental conditions. It is obvious that better production efficiency can be obtained from goats when they have a high reproductive efficiency with the potentials for increased litter size and shorter generation interval specifically having higher fertility rate in comparison to other farm animals Haque *et al.,* (2013). Reproductive efficiency of doe is determined by different processes, like age at first conception, age at first kidding etc. Sirohi is a promising dual purpose breed distributed in arid and semi-arid regions of central and southern Rajasthan. Sirohi goat is known to be famous for their excellent adaptability, fertility, meat, milk and the prolificacy of the breed is within acceptable limits. As stated earlier that reproductive efficiency is one of the important prerequisites for increasing production potential in goat, it seems rationale to investigate influence of specific environmental factor on some selective reproductive traits considering different clusters in southern Rajasthan.

Materials and Methods

Experiment site

The present study was conducted at College of Veterinary and Animal Science, Vallabhnagar, Udaipur, Rajasthan.

Management of animals

Flock was allowed to graze freely during the day time in free range grazing areas on pastures under the supervision of herdsman. On return at home goats were fed green grasses or green fodder according to the season. The formulated concentrate ration was given and drinking water was provided ad libitum. Routine clinical examination and vaccination was done for herd health maintenance. Only clinically healthy goats were included in this experiment.

Data collection procedure

Data on reproductive performance of Sirohi goats were obtained from the farm and farmer's field maintained under All India Coordinated Research Project (AICRP) on Sirohi goats, livestock Research Station (LRS), Vallabhnagar, LRS, Bojunda, (Chitorgarh), Rajsamand and Dabok areas of Udaipur, Rajasthan. All the clusters are the breeding tract of Sirohi goat. The data recorded regarding age at first conception (AFC), weight at first conception (WFC), age at first kidding (AFK) and weight at first kidding (WFK) were analyzed for reproductive performances.

Statistical analysis

The data were analyzed using Mixed Model Least-Squares and Maximum Likelihood method designed by (Harvey, 1990) to study the reproductive performance across different cluster.

Results and Discussion

The overall least square means for female reproductive traits viz., AFC, WFC, AFK and WFK are presented in Table 1 and 2 respectively.

Age at first conception (AFC)

The overall least square means for age at first conception was estimated as 444.18 ± 13.05days (Table 1). The results of present findings corroborated with the values reported by Singh and Roy (2003) in Jamunapari, Pathodiya (2004) in Sirohi, Rai and Singh (2005) in Jakhrana, Deokar *et al.,* (2007) in Sangamneri, Singh *et al.,* (2009) in Mehsana, Rao *et al.,* (2009) in Ganjam and Yadav *et al.,*

(2017) in Sirohi goats. The lower figures were reported by Pathodiya (2003) in Sirohi, Yadav and Khada (2009) in crossbred of local x Sirohi, Sabapara *et al.,* (2010) in Surti and Ekambaram *et al.,* (2011) in Mahabubnagar goats respectively. However the higher results were reported by Kumar *et al.,* (2006) in Kutchi, Patel and Pandey (2013) in Mehsana and Dudhe *et al.,* (2015) in Sirohi goats respectively.

Weight at first conception (WFC)

The overall least squares means for weight at first conception was estimated as 26.77 ±0.21kg (Table 2). The results of present study fall in close range reported by Kumar *et al.,* (2005) and Kumar *et al.,* (2012) in Sirohi, Patel and Pandey (2013) in Mehsana goats. However the results recorded in current study for WFC were higher than the results reported by Patel (2005) in Marwari, Yadav and Khada (2009) in crossbred of local x Sirohi and Rao *et al.,* (2009) in Ganjam goats respectively. On

the contrary higher WFC than that observed in present study were reported by Patel (2005) in Parbatsari, Kumar *et al.,* (2006) in Kutchi, Maroof *et al.,* (2007) in Beetal and Dudhe *et al.,* (2015) in Sirohi goats respectively.

Age at first kidding (AFK)

The overall least squares means for age at first kidding was estimated as 594.88 ±13.05days (Table 1). The finding are in close agreement with the values reported by Pathodiya (2004) in Sirohi, Rai and Singh (2005) in Jakhrana and Yadav *et al.,* (2017) in Sirohi goats. However the lower estimates were reported by Pathodiya (2003) in Sirohi, Hassan *et al.,* (2010) in Jamunapari, Ekambaram *et al.,* (2011) in Mahabubnagar and Dash and Sethi (2017) in Raighar goats respectively. Comparatively higher values were reported by Pathodiya (2005) in Sirohi, Swami *et al.,* (2006) in Sirohi ×Beetal crosses, Singh *et al.,* (2009) in Mehsana and Dudhe *et al.,* (2015) in Sirohi goats respectively.

Table.1 Means (± SE) for age at first conception and kidding in Sirohi goats

Effect	268	Mean ± SE	
		Age at first conception (kg)	**Age at first kidding (kg)**
Overall mean (μ)		444.18 ±13.05	594.88 ±13.05
Cluster		*	*
Farm	59	417 ± 13.05[a]	568.74 ± 23.04 [a]
Field	209	470 ± 23.05[b]	621.01± 12.24[b]

Means with different superscript within the columns differ significantly (P<0.05) with each other

Table.2 Means (± SE) for weight at first conception and kidding in Sirohi goats

Effect	268	Mean ± SE	
		weight at first conception (kg)	**weight at first kidding (kg)**
Overall mean (μ)		26.77 ±0.21	30.90 ±0.18
Cluster		**	**
Farm	59	26.08± 0.38 [a]	30.40± 0.17 [a]
Field	209	27.46 ±0.20 [b]	31.41 ±0.32 [b]

Means with different superscript within the columns differ significantly (P<0.01) with each other

Weight at first kidding (WFK)

The overall least squares means for weight at first kidding was estimated as 30.90 ±0.18 kg (Table 2). The present falls in close range with the results reported by Kumar *et al.,* (2005) in Sirohi goats. The present estimates were higher than the results reported by reported by Kumar *et al.,* (2012) in Sirohi, Rao *et al.,* (2009) in Ganjam, Patel and Pandey (2013) in Sangamneri and Dash and Sethi (2017) in Raighar goats respectively. Whereas, lower than that reported by Dudhe *et al.,* (2015) in Sirohi goats.

Effect of cluster

The present study revealed that the cluster-wise variation was significant (P≤ 0.05) on age at first conception and age at first kidding. Whereas, highly significant (P≤ 0.01) on weight at first conception and weight at first kidding. The findings corroborated with the results reported by Dudhe *et al.,* (2015) who observed highly significant (P≤ 0.01) effect on weight at first conception and weight at first kidding, significant (P≤ 0.05) effect on age at first conception and age at first kidding, yadav *et al.,* (2017) reported highly significant (P≤ 0.01) on age at first conception and age at first kidding in Sirohi goats. Singh *et al.,* (2009) reported significant (P≤ 0.05) effect on age at first conception in Mehsana goats. Ekambaram *et al.,* (2011) reported significant (P≤ 0.05) effect on age at first conception and age at first kidding in Mahabubnagar goats and Hasan *et al.,* (2014) in Black Bengal. He also reported non-significant effect on age at first conception in Black Bengal and Rawat *et al.,* (2017) on age at first kidding in Bundelkhandi goats. Age at first conception was lowest in farm cluster than field cluster. It indicates that animals in farm cluster get early sexual maturity than field cluster. This variation might be due to more stressful conditions and lower heat detection at field cluster. Likewise age at first kidding was lowest in farm cluster than field cluster. Whereas, highest weight at first conception and weight at first kidding observed in present study was in field cluster than farm cluster. The present findings indicate that influence of the cluster might be attributed to the variations in feeding, housing and health care management.

This study concludes that goats can be reared under farm and field conditions with improved feeding and better management practices may help in better reproductive performances of Sirohi goats, which can be profitable at rural areas in Rajasthan. In order to optimize the productive potential of goat, it is essential that reproductive management programme should be implemented for improvement of reproductive aspects of goat. This study can be beneficial for those who are interested to establish goat farm in the rural areas of Rajasthan, which may help in alleviating poverty.

Acknowledgements

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