Factors affecting conception rate in goats

S. Bansal, A. Dixit, V.V. Potdar*, S. Joshi, R. Jadhav

BAIF Development Research Foundation, Uruli-Kanchan, Pune, Maharashtra, India
Corresponding Author e-mail: vinod.potdar@baif.org.in

Abstract

The objective of this study was to investigate the potential factors affecting conception rate in Artificially Inseminated goats under field conditions of Rajasthan state. The data used in the present investigation was collected from 72 villages of 6 Clusters. Total 341 artificial inseminations performed in goats owned by 205 farmers were performed during the period June 2020 to July 2021. Overall results showed that the conception rate in Sirohi goat was significantly affected by clusters, season & buck while parity is not having any significant effect over conception rate. The overall conception rate observed was 42.82%. Out of all 6 clusters highest conception rate was observed in Zawar cluster 61.5 ±11.1.Season wise study show highest conception rate in rainy season 46.6±7.94 % followed by winter and summer. In Parity wise study highest conception rate 47.5±10.22 % was found in first parity animals the differences were not significant. Buck play important role in artificial insemination four different bucks semen was used the average conception rate varied from 34.0±15.93 % to 54.9±9.65.For increasing artificial insemination in goat awareness and technical knowledge training to inseminators should be increased, follow-up and guidance about technical and management to goat owners should be given to increase.

Introduction

Goat provides food to rural poor where rain fall is less and large animals like cattle and buffalo have problems of rearing. Goat requires less initial investment, have high profit margin, easy in marketing and require less inputs for survival. As per National Bureau of Animal Genetic Resources, there are total of 34 number of goat breeds registered in India on the basis of phenotypic and genetic characterization (http://www.nbagr.res.in/reggoat.html). These breeds are distributed in different agro climatic zones of India and are maintained by small and marginal farmers of India. Goats are most important species in the small ruminants and second largest species in livestock category and contribute in the production of milk after cattle and buffaloes. As per 19th Livestock census, 26.40% of the livestock population are Goats. Out of 135.04 million of Indigenous Goats (Including Non-descript), 26.97% are pure breed, 11.77% are graded breeds and remaining 61.26% are non-descript breeds. (ESTIMATED LIVESTOCK POPULATION BREED WISE -BASED ON BREED SURVEY 2013,https://dahd.nic.in). Out of these 34 goats breeds for meat and skin – Black Bengal, Kanni adu For Meats, skin and milk – Barvari, Malabari (Tellicherry), Sirohi, Surti. For Meat hair and skin – Gaddi, Kutchi, Marwari & for Milk, meat and skin – Beetal, Jamunabari, are mostly preferred breeds. 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. Goats are mostly raised by land less labourers and marginal farmers. Goats produce lean and juicy meats (chevon) which is preferred by all religious sects. The goat milk contains lower fat percent with smaller fat globules, higher protein and lactose and rich in minerals.

Sirohi is a dual purpose breed of goat native of central and southern regions of Rajasthan distributed in arid and semi-arid regions of central and southern Rajasthan. Meat production is the most important feature of this breed and the prolificacy of the breed is within acceptable limits. This has proved to be an excellent goat breed with respect to disease resistance, adaptability to dry or hot climate, growth and production performance under poor quality range conditions (Tomar et al., 1997).Farmers generally prefer to rear Sirohi goats over other breeds of goat due to beautiful look, colour and its performance. It is a multipurpose animal, with respect to provide milk, meat, hide and manure to enrich soil fertility and play an important role in generating employment, raising income and improving household nutrition. Being medium in size, it can easily be handled by women, children and old members of the family.

As goats are mostly reared by small, marginal and landless farmers, with flock size of 3- 5 goats, it is economically unviable to keep a breeding buck for a small flock. Thus the females are bred by nondescript males' resulting in loss of precious germplasm of the region. To prevent the dilution of valuable germplasm by indiscriminate mating and to preserve its purity and propagate this unique germplasm Artificial insemination (AI) is a simple technique which is getting adopted day by day within goat farmers. BAIF provides key intervention programs in the area to support small farmers within the village. Founded in 1967 by Dr. Manibhai Desai as the Bharatiya Agro Industries Foundation (BAIF), BAIF's mission is to create gainful self-employment opportunities, encourage natural resources management, and improve the quality of life for rural families and communities. The present study was aimed at determining the factors influencing the conception rate in goat reared by poor and marginal farmers of in Udaipur district of Rajasthan.

Material and Methods

Study area

The study area is located in Udaipur which is located between latitude 24°35′N to 24°58′N and longitude 73°41′E to 73°68′E. Udaipur is characterized by semi-arid climatic conditions with undulated topography having an average rainfall of 800 mm mainly during monsoon season from July to September. The maximum temperatures ranges between 35 °C to 42 °C on most of the days during summer season. In winter minimum temperatures remain around 5–10 °C. (https://amssdelhi.gov.in)

Data Description

Data for reproductive traits of 341 healthy non pregnant does belonging to different category of farmers from different locations of Udaipur district was collected during January 2019 to January 2020. Whole data set was classified according to clusters as Zawar, Nya Dariba ,Biliya,Debari ,Rampura & Laxmipura (Figure 1: Map showing Goat AI Clusters), parity of animal (first, second, third & fourth), season of AI (rainy, winter, summer), buck used for AI (Buck-1, Buck-2, Buck-3, and Buck-4). As in dairy cattle and buffalo Artificial Insemination (AI) is having major role in genetic improvement same way in goats also this technology is getting importance day by day as there is shortage of breeding bucks in field level and AI is available at farmers door step . BAIF has established a goat semen lab in Pune, Maharashtra, for developing sustainable AI technology in goats to field levels & has increased efforts to raise awareness about artificial insemination in goats in the field conditions with help of field technicians. Theses technicians are conducting awareness camps, rallies, and campaigns to discuss the need for breed improvement and the advantages of artificial insemination. Technicians

Fig 1: Map showing Goat AI Clusters

Fig 2: Technician inseminating Goat

do artificial insemination of healthy goats which are showing heat symptoms observed by farmers. General sign of heat are shaking of tail, frequent bleating, excitement or restlessness frequent urination, reduction in feed intake, and drop in milk yield. Vulva becomes swollen and edematous. Small quantity of clear discharge from the vagina is also noticed. The semen straw was thawed in clean water at 37 ºC for 30 seconds and the insemination was carried out by lifting up hind quarters of the animal using French model AI gun with locking device and disposable sheath the semen was deposited in mid cervix region (Figure 2: Technician inseminating Goat); conception rates (CR) was estimated from the proportion of pregnancies confirmed by the physical palpation after 45 days of post-insemination The conception rate was estimated by using the following formula

Conception rate (CR) = No. of goats pregnant/ No. of goats inseminated*100
Insemination dates were recorded by each inseminator

Statistical Analysis

Data so collected, tabulated and analyzed as per standard statistical procedures of Snedecor and Cochran (1994) & was analyzed in R- project for statistical computing software (version 3.5.1)

Results and Discussions

The information on total 341 A.I. was available all animals were followed. Since the results of A.I. are presently confirmed on follow-up basis so the overall conception rate was 42.82%. Sharma et.al. (2019) in his study got conception rate of 42.5 per cent Pregnancy rate in Chegu goats. Nimbkar C et.al. (2017) in their study got 47% conception rate while doing artificial insemination in farmers' goats using Osmanabadi breed frozen semen. Similar results were reported by Siqueira et al. (2009), but lower than described under controlled conditions (Roca et al., 1997; Romano et al., 2000). Detail cluster,parity,season & buck wise analysis is given in Table 1 below.

Cluster wise Conception Rate

Out of all 6 clusters highest conception rate was observed in Zawar cluster 61.5 ±11.1 while Debari cluster reported 32.0 ±10.1 % conception rate. The transportation of liquid semen over long distances has been reported as a limiting factor in goat AI programs (Paulenz et al., 2005). Cluster has significant effect over conception rate (P≤0.01)

Parity wise Conception Rate

In Parity wise study highest conception rate 47.5±10.22 % was found in first parity Khadse et. al. (2019) reported parity wise conception rate ranged from 22.17 to 33.71 % and it increased from first to fifth lactations, the differences was not significant.

Season wise Conception Rate

Arrebola et al. (2012) recorded fertility was significantly influenced by AI season while in the present study, conception rate was significantly (P≤0.01) influenced by AI season. Season wise study show highest conception rate in rainy season 46.6±7.94 % followed by winter and summer. Even though it was noted that highest inseminations were recorded during summer season than in other season even though goats conceived round the year. The probability of pregnancy was reduced when insemination took place during the colder seasons. In contrast, the fertility of Mediter-ranean breeds inseminated with cooled semen is reported to be high throughout the year (Roca et al., 1997).

Buck wise Conception Rate

Buck play important role in artificial insemination four different bucks semen was used the average conception rate varied from 34.0±15.93 % to 54.9±9.65. Results showed that the conception rate was significantly affected by buck also. Inseminating bucks affected fertility rates (Paulenz et al., 2005; Salvador et al., 2005).

Overall results showed that the conception rate in sirohi goat was significantly affected by clusters, season & buck while parity is not having any significant effect over conception rate. It was concluded that besides strengthening the training of inseminators, feeding and management of field animals should be updated to improve the conception rate of frozen semen in field.

Table 1: Least-squares means and S.E. for Conception rate % s in Sirohi goats

Particulars	Total Artificial Insemination	Conception Rate%
**Clusters **		
Zawar	121	61.5 ±11.1
Nya Dariba	55	43.5± 10.3
Biliya	50	46.5 ± 10.1
Debari	47	32.0 ±10.1
Rampura	37	37.0 ±11.6
Laxmipura	31	35.6 ± 12.2
Parity(NS)		
1	43	47.5±10.22
2	72	42.0±8.42
3	90	42.1±7.64
4	136	39.1±6.93
Season		
Summer	145	38.0±6.89
Rainy	138	46.6±7.94
Winter	58	43.3±8.42
Buck		
Buck-1	246	39.3±6.26
Buck-2	53	54.9±9.65
Buck-3	25	42.4±12.2
Buck-4	17	34.0±15.93

(** Significant P≤0.01, NS = Non significant)

Conclusion

It was concluded that besides strengthening the training of inseminators, feeding and management of field animals should be updated to improve the conception rate of frozen semen in field. The results indicated that AI with frozen-thawed spermatozoa can be used for upgrading local goats.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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