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Artificial Insemination: A New Horizon for Scientific Goat Breeding in Kashmir's Backyard Farming Sector

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ABSTRACT

Background: Artificial insemination a well-established technique in cattle and buffalo farming, now increasingly adopted in goat farming involves collecting semen from male animals and transferring it to female animals, to disseminate valuable genetic material to bring genetic upgradation, increases milk production, and enhances breeding efficiency of flocks.

Methods: Artificial insemination (AI) was performed on 266 goats using fresh and frozen semen from 2021 to 2024 on experimental basis. The data obtained were analyzed on percentage basis.

Result: The overall kidding percentage of 30.08% was observed in the present study. Notably, fresh semen yielded a higher kidding percentage (32.69%) compared to frozen semen (29.44%). This study demonstrates the potential of AI in enhancing the genetic quality of backyard goat farming in Kashmir, where quality bucks are often sold at a young age for meat production. By leveraging AI, farmers can improve the genetic makeup of their goat flocks, leading to better productivity and sustainability.

Key words: Artificial insemination, Fresh semen, Frozen semen, Kidding percentage.

INTRODUCTION

Goat rearing is a long-standing tradition in Jammu and Kashmir (J and K), with tribals exhibiting exceptional expertise in this field (Alam *et al*., 2023, Sarma *et al*., 2024). Given the shrinking pastures, goats play a crucial role due to their ability to thrive on limited land and diverse feed sources. Goat rearing significantly contributes to the socio-economic development of marginalized communities in the region (Rather *et al*., 2020; 2022). In the Kashmir valley, farmers typically maintain small goat herds for milk production. However, high-quality bucks are often sold for slaughter at a young age, forcing farmers to breed their good-quality goats with inferior bucks (Rather *et al*., 2020). Additionally, many goats remain untupped due to the scarcity of breeding bucks. To address these challenges and enhance milk yield, artificial insemination (AI) can be employed as an option. AI, a well-established technique in dairy cattle and buffalo farming, involves collecting semen from male animals and transferring it to female animals (Smith, 2009). This method has significantly contributed to India's achievement of the highest milk production globally. Goat producers are increasingly adopting AI to disseminate valuable genetics and control sexually transmitted diseases, making it a valuable tool for improving goat rearing practices.

MATERIALS AND METHODS

A study was conducted by the Department of Sheep Husbandry Kashmir in Bandipora, where artificial insemination (AI) was performed on 266 goats using fresh and frozen semen from 2021 to 2024 on experimental basis. Fresh liquid semen was used for 52 goats, while frozen semen was used for 214 goats. Semen collection was done using a dummy and an artificial vagina (AV) made of plastic with an inner latex liner. The AV was inflated to maintain optimal pressure and temperature (42-45°C) for proper ejaculation. To prevent cold shock, the collecting tube was pre-warmed to 30-37°C before collection. The collected semen was diluted with egg yolk tris buffer and approximately 0.5ml of the diluted semen was deposited into the cervix using a sterile syringe and pipette. The frozen semen from improved goat breeds was obtained from BAIF (Bharatiya Agro Industries Foundation) in Pune.

AI in goats

Does in estrus were positioned with their rear quarters elevated by lifting their hind limbs. A lubricated glass speculum was then inserted into the vagina, after sterilizing the vulvar region. Using a head torch for illumination, the cervix was located and the external os was identified.

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Table 1: Kidding percentage with AI.

Year	Semen used	No of does inseminated	No of does conceived	Kidding percentage
Overall using fresh semen		52	17	32.69
Overall using frozen semen		214	63	29.44
Overall kidding percentage		266	80	30.08

The insemination gun was carefully inserted through the speculum, fixed into the external os and maneuvered deeply into the cervix. Semen was released slowly and the females were held in position for 2-3 minutes. Insemination was performed 10-12 hours after detecting standing heat, followed by a second AI dose 12 hours later.

RESULTS AND DISCUSSION

The present study observed a kidding percentage of 30.08% (Table 1). In contrast, Apu *et al*. (2012) reported a higher kidding rate. Our study found a higher kidding percentage of 32.69% using fresh semen compared to 29.44% with frozen semen. This aligns with Apu *et al*. (2012) findings, which showed a higher kidding percentage for liquid fresh semen (59.8%) versus frozen semen (43.9%). The higher success rate with fresh semen may be due to lower sperm abnormalities in fresh semen. Conception rates in AI vary depending on the protocol, breed and size of the goat (Dhara *et al*., 2023). Different AI techniques have varying conception rates *viz*: Vaginal (peri-cervical) insemination: 5-15% (Evens and Maxwell, 1987; Nuti, 2007), Cervical (intra-cervical) insemination: 40-80% (Nuti, 2007), Laparoscopic intrauterine insemination: 60-80% (Shipley *et al*., 2007; Parkinson, 2009) and Trans-cervical intrauterine insemination: 71% (Sohnrey and Holtz, 2005). Arangasamy *et al*. (2018) reported an overall pregnancy rate ranging from 7 to 79% in AI using frozen-thawed goat semen.

CONCLUSION

AI has potential for genetic improvement of goats reared in backyard system as quality bucks are sold at earlier ages by farmers. As the pregnancy rate varies with technique used and size and breed of goat, therefore, it is recommended that the insemination protocol should be standardized according to size and breed of goat in the valley before its mass application in field.

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Conflict of interest

All authors declare that they have no conflicts of interest.

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