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Artificial Insemination in Goats: Paving a New Path

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Introduction

The country is the largest exporter of Sheep & Goat meat to the world. The country has exported 8,695.97 MT of sheep & goat meat to the world for the worth of Rs. 447.58 Crores/ 60.04 USD Millions during the year 2021-22 according to APEDA. Sheep and goat together contributes 20% (13 and 7) of total meat production in the country. Goats constitute 26.40% of the total livestock population and the 19th Livestock Census puts the number of goats in the country at 135.17 million. The local goats are blessed with high fecundity combined with ability to breed throughout the year. The locally available goats are small in size, mature relatively late and milk production is also low in comparison to the other Indian Goat breeds. Thus, increasing the high genetic merit population by way of introduction of Artificial Insemination, ETT and other modern breeding techniques are the way ahead.

Artificial insemination (A.I.) involves collection of semen from a buck (male goat) and transfer of the semen to the reproductive tract of the doe (female goat) for successful conception. The does can be inseminated with either fresh semen from the buck or with commercially available frozen semen from insemination centres. There are a number of reasons that a goat rearer may consider for using A.I. such as:

1. To eliminate or reduce the cost of maintaining bucks.
2. To increase the rate of genetic improvement.
3. To increase the number of does to which a buck could be bred.
4. To breed several does the same day through use of A.I. and estrus synchronization.

The Doe's Estrous Cycle

Before understanding the importance and relevance of A.I. in goats. We must know about the doe's estrous cycle. It is the interval between two estrus or heat periods that lasts for an average of twenty-one days. The estrus or heat can last from twelve to forty-eight hours. During estrus, the does are receptive to be mounted by bucks. For artificial insemination, it is important to detect when a doe is in heat. Producers are encouraged to utilize teasers, usually a vasectomized buck to detect a doe in heat. The signs of heat in a doe are:

- Restlessness
- Reduced appetite
- Tail wagging from side to side and up and down (most reliable sound)
- Swelling of the vagina
- Seeking the buck
- Standing for mating by the buck, teaser or by other does
- Frequent urination
- Vocalization (bleating)
- Mucus discharge in vagina that appears crystalline at the beginning, but may have a cheesy appearance near ovulation time.

A goat farmer's heat detection program is a key factor in determining whether an artificial insemination program will succeed. Knowing when a doe comes into estrus allows the technician with timely insemination so that it more nearly coincides with ovulation.

It is important to establish an intensive heat detection schedule early during the breeding season. Does that are to be inseminated should be observed twice daily for estrus. Early morning and late afternoon are generally considered good times to observe estrus in goats. Observing goats only during their meal times may result in overlooking of estrus. The farmer or the worker should keep a close eye on the herd.

Accurate records should be maintained, including time of heat, length of heat and length of time between heat periods. These records will help a farmer accurately anticipate and detect heat in individual does and timely insemination with ovulation. Thus, keeping proper records at the farm is an important aspect pertaining to success of artificial insemination in goat.

Why should one adopt AI in Goat?

1. Only method to have the cross breed and selective breeding of prolific local goat which brings optimum economic benefits in commercial goatry production.

2. Shortage of male of superior genetic make up for natural service. A.I. can help multiply the number of services in manifold from a valuable buck.
3. An average farmer's flock is small hence they cannot afford to bear the cost of maintaining the breeding buck.
4. Symptoms of heat are pronounced in goats and it is easy to detect a doe in estrus.
5. The contraception rate is fairly satisfactory with A.I. technology in goat.
6. Considerable potential exists in obtaining two kids from each doe in 13-14 months.

Breeding Season: Most of the Indian breeds exhibit estrous (heat) throughout the year.

Best time for A.I.: At the beginning of heat, very little mucus is present. As the estrous progresses the mucus is transparent and observed on the floor of vagina. Towards the end of estrous it becomes cloudy which is the best time for breeding (24-30 hrs. after onset of estrous or 24-30 hrs. after showing the heat symptoms.). At the end of heat period the mucus becomes cheesy. While in case of cattle when the clear thick mucus is hanging from the vulva to the floor, is the best time for A.I. (16-18 hrs). Double insemination is also practiced in case of doe. First insemination at 24 hrs. of onset of heat and second insemination at 12 hrs. after first insemination.

Advantages of A.I.

- A.I. is the best way to spread elite genetic material throughout a population. Semen can be collected from top bucks, frozen, and then transported throughout the world where it can be utilized by large populations to facilitate progeny testing. Progeny testing involves breeding offspring to determine their genetic merit.
- In case of goats, the biggest merit that A.I. holds is the cost efficiency as the superior quality elite buck is unaffordable to many small and marginalized farmers.
- A.I. helps producers to utilize their elite bucks that may be physically injured and unable to mate.
- A.I. allows producers to increase their herds without purchasing and maintaining bucks or losing them to predators, injury, or illness.
- A.I. is effective in controlling diseases.
- A.I. is an important breed preservation process.
- A.I. reduces the possibility of spreading sexually transmitted diseases between the male and the female.

Disadvantages of A.I.

- The technician must be well trained to manipulate the reproductive function and estrus synchronization of the doe.
- A.I. requires special equipment, facilities and technical know-how.
- It requires a great deal of time to detect heat which is crucial for a successful insemination.
- A.I. increases capacity to disseminate undesirable genes in a population.

Schemes/ programs on Artificial Insemination in goats in India:

State governments have also been taking keen interest in improving goat fertility. The Governments of Haryana, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Uttarakhand, Goa and Rajasthan in collabration with Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya evam Go-Anusandhan Sansthan, Mathura (DUVASU) are working to promote goat farming in their respective states to improve breeding efficiency. Meanwhile, states like Karnataka, Kerala and Tamil Nadu have started work on artificial insemination goats. Haryana has become the first state to start a pilot project for goat insemination.

Conclusion

Artificial insemination has proved to be a boon in case of bovines. However, in case of goats the technique has a long way to go for development and proper field application. Recent advancements in technology and reported studies clearly show A.I. in a new light as a technique to improve fertility in goats. Central and state governments taking futuristic initiatives such as planning A.I. breeding programs and establishing A.I. centers for goats might have a new path for future.