

Popular Article

Artificial insemination can prove to be a revolutionary step in dairy sector

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Abstract

Dairying is an effective tool for rural development, employment and sustained income and it acts as an insurance against several odds (Prasad 2011). India is blessed with the highest population of dairy animals (302.79 million) in 2019 reports of the Department of animal husbandry & dairying under Ministry of Fisheries, Animal Husbandry & dairying, but has very poor productivity (milk production), which may be due to lack of improved breeding and feeding services, access to markets, capital, inputs and technology. Although professionals have pointed out artificial insemination (AI) as an emerging technology of socio-economic importance, the ground realities or practices about AI is entirely different

Introduction:

Artificial insemination (AI) is technique in which semen is collected from elite bull then processed, stored and finally introduced in healthy female reproductive tract at appropriate time. Artificial insemination (AI) was one of the first biotechnologies used in farm animal species to improve reproduction. The first reported AI success in a domestic animal was performed by Lazzaro Spallanzani in 1784 with successful AI in a dog. However, it was only in the early 1900s that a Russian scientist named E.I. Ivanhow accomplished the first successful AI in cattle. First successful artificial insemination in India is done by S. kumaran in 1939 at palace of dairy mysore farm. Current techniques for AI have improved drastically with the development of semen evaluation techniques, semen extenders, and proper methods for freezing semen.

Advantage of artificial insemination

- Extensive use of superior sires possible to sire for a bull 20,000 - 200,000 or more progeny in its lifetime
- Facilitates progeny testing of sires

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- inferior bull for breeding purpose, so it saves labor, time and money. This saving can be utilized for effective detection of estrus or purchase of new cow
- Reduces the risk of spreading sexually transmitted diseases
- The farmers can get their cows inseminated in his own farm so there is a saving of time, labor and money. It protects the cows from accidental breeding and exposure to infection. Accidental injuries of male or female during transport is also avoided
- Preserved the semen by refrigeration or cryopreservation for longer duration. Even after the death of the male his semen can be utilized for insemination to many estrus females.
- More number of females coming in heat on one or same day or successive day can be served by this method
- During A.I. the cows are examined per rectum carefully this allows close monitoring of the reproductive health of the cow and take remedial measures accordingly. The females who do not conceive are also detected early and this reduces economic loss.

Selection of male animal for semen collection

- Bull should be free from sexually transmitted disease
- Bull Should belong to pedigree having superior traits (high milk yield, disease resistance power).
- Bull should have good libido along with physical fitness

Steps for A.I

- Collection of semen from elite bull, there
- Evaluation of semen quality
- Dilution and cryopreservation of semen
- Artificial insemination

Time of artificial insemination

Cattle and buffalo

During mid estrus to end of estrus. Or, 10-12 hours from the onset of estrus Or, last 8 hours of estrus.

Thumb rule: Morning heat is given A.I. in the evening of the same day, while afternoon or evening heat is given A.I. in the next morning.

Sign of estrus in cattle and buffalo

- Increased secretion of clear, stringy mucus by the uterine, cervical and vaginal glands
- Frequent micturation and bellowing
- Tonocity of the horns and body of uterus
- Hyperaemia and congestion of the endometrium and the vaginal epithelium
- Presence of a mature graffian follicle on the ovary and production of estrogen (Kumar et al., 2013).



Fig- 1 Vulvar swelling with mucus discharge (Kumar et al.,2013)

Method of artificial insemination in cattle and buffalo

In cattle and buffalo artificial insemination should be done by using recto-vaginal method.

What should be taken care of during artificial insemination

Appropriate detection of heat before Artificial insemination for successful conception because improper and inaccurate detection of heat is one of the most reason for failure of conception, sometime animal show silent and false heat so artificial inseminator or A.I worker should have thorough knowledge about it. Always get artificial insemination by technical sound AI worker.

Future of artificial insemination technology

It is highly probable that the use of AI in livestock will continue to increase. AI not only facilitates more effective and efficient livestock production. Apart from some specialist sheep or goat units focussing on milk production for cheese, farming of these species tends to be confined to marginal land that is unsuitable for crop production or grazing for dairy cattle. There has been limited selection for production traits. However, there is a resurgence of interest in them now in developed countries because of growing awareness that small ruminants could represent better utilization of scarce resources than larger ones, such as cattle, while producing less methane and effluent. In many developing countries, sheep and goats are better suited to the climate than cattle, and it is culturally acceptable to eat their meat and milk products. Thus it is likely that there will be an upsurge in the use of AI in sheep and goats in the future, with an emphasis on improving production traits by the introduction of superior genes. However, it is essential that any A.I. scheme aimed at large scale improvement of the national herd must be supported by improved animal husbandry and animal health, otherwise the pregnancies resulting from AI will not go to term, and the offspring will either not survive or will fail to thrive. Many of the advanced ART are of little help in areas where basic husbandry skills are inadequate.

Conclusion

From the many years artificial insemination is receiving attention in dairy industry. AI technology not only maximizes animals' productivity and exposes individual sires with traits of superior quality, but also reduces the risk of spreading coital transmitted diseases and accidental injury due to natural breeding. It is the most suitable technology for upgradation of non-descript cattle. Government must design and implement clear policies for AI through alleviating the most important causes of failure. Economic incentive should be provided to farmers to breed improved animals for the successful introduction or extension of AI in developing countries like India. AI is best technique of insemination over natural breeding.

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