Artificial Insemination Technology for Sheep and Goats

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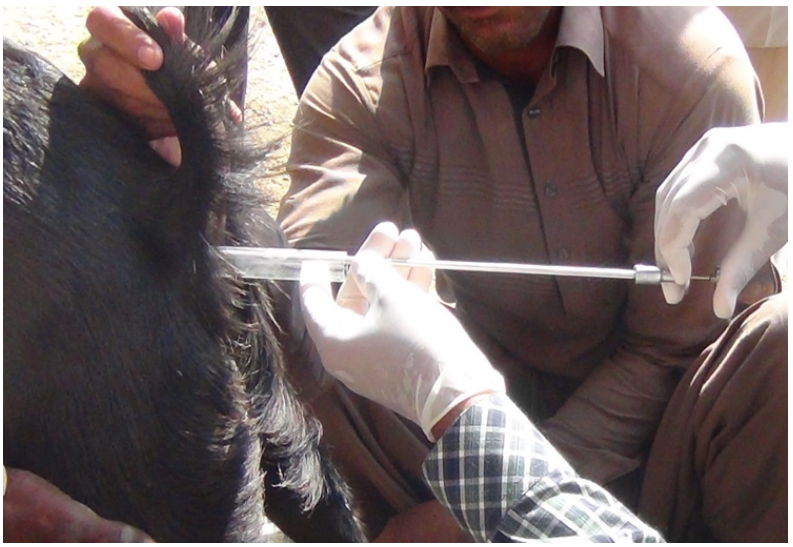
Cryopreservation of spermatozoa and depositing them artificially into reproductive tract of females is a routine procedures being used in all farm livestock species. This not only helps disseminate good genetics at a mass scale, farmer's problem of access to quality sires is resolved and genetic improvement can be enhanced to achieve desired breeding goals. More number of off-springs per male as compared to natural mating helps in exploitation of genetic material and evaluation of genetic potential of male. Artificial Insemination (AI) using frozen semen is therefore being used for breeding cattle and buffaloes in Pakistan since 1970s. In sheep and goats however, it is not a norm. Best males are sacrificed every year. Synchronization of breeding cycle can allow kidding and lambing in a particular time eroding valuable gene pool and improve efficient use of genetic resources.
Insemination protocols for sheep and goats have improved the recent past as Intra and Trans-cervical insemination is now a routine method, depositing the semen in the cervix or even in the uterus using AI gun. The selection of adequate technique for breeding sheep and goats and the early diagnosis of pregnancy can lead to efficient reproductive management. Early pregnancy diagnosis by non-return rate after AI to estrus and measuring the serum progesterone level of animal using enzyme immune essay has been advocated. Abdominal palpation by experienced hands can be equally valid. In Pakistan AI in sheep using liquid semen has been reported at an experiment station. In goats however, it has never been attempted at Government level. In the recent past some experimental work was done on fresh goat semen and on comparison of goat semen extenders. Therefore, it was envisioned to introduce and optimize AI technology using frozen semen in goat and sheep.

Artificial Insemination Technology



Artificial Insemination in Goat

It is a well-established technique and being used widely in cattle and buffalo in Pakistan. We attempted to test the possibility of AI in goat at University of Agriculture, Faisalabad. We used Beetal bucks for semen collection. The semen was collected from Beetal bucks using Artificial Vagina technique. The microscopic examination was carried out for fresh, unwashed diluted and washed diluted semen. We compared quality parameters of fresh and frozen semen and subsequent conception rate using artificial insemination in Beetal goats (Faisalabadi strain). The mean values of goat semen parameters are presented in Table 1. For fertility component a total of 60 Beetal goats were synchronized using prostaglandin (PGF2α) hormone. Pregnancy was confirmed using non return to estrus and by blood progesterone level at day-30 post insemination. The average conception rate in females inseminated with washed semen, unwashed frozen semen and fresh semen remained quite satisfactory (Table 2).

AI in sheep using frozen semen was experimented in 2015 at SPU Qadirabad, LPRI Bahadurnagar, Okara and LES Khushab. Semen freezing method was optimized by testing different protocols. Artificial insemination was carried out using frozen semen and pregnancy rate was documented in Kajli and Lohi sheep. The mean values of semen parameters recorded for both breeds are presented in Table 3. The conception rate in sheep breeds was determined by using teaser ram and commercially available progesterone EIA kit (Table 4).

Table 1. Semen parameters in Beetal Goat

Parameter	Beetal Bucks
Semen volume per ejaculate	1.5 ml
Sperm concentration	1624 Million/ml
Mass activity (Average)	2.8
Individual motility	80%
Average individual motility for washed diluted semen	69%
Average individual motility for un-washed semen diluted	73%
Post thaw motility for washed semen	51%
Post thaw motility for un-washed semen	56%

Table 2. Conception Rate in Beetal goat using fresh and frozen semen

Parameter	Beetal Does
Conception Rate (Fresh Semen)	73%
Conception Rate (Washed Semen)	69%
Conception Rate (Un-washed Semen)	68%

Table 3. Semen parameters in Kajli and Lohi Sheep

Parameter	Kajli Rams	Lohi Rams
Semen Volume per ejaculate	1.4 ml	1.1ml
Sperm concentration	1838 Million/ml	2193 Million/ml
Mass Activity (Average)	2.72	2.72
Individual Motility	73.5 %	79%
Post Thaw Motility	51%	51%

Table 4. Conception Rate in Kajli and Lohi Sheep using frozen semen

Parameter	Kajli Ewes	Lohi Ewes
Conception Rate (Determined by Teaser Ram)	68%	60%
Conception Rate (EIA Kit)	70%	69%

Conclusions

Artificial insemination of goat and sheep using frozen semen is fairly practicable with acceptable results as semen from goat bucks and sheep rams can be collected, frozen and stored for long term. Wide dissemination of semen from superior bucks and rams can bring genetic improvement in both species at large scale.

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