



Mating Systems and Artificial Insemination in Sheep

1. Introduction

A fundamental driving force in sheep breeding is the **efficient use of rams**. By maximizing the number of ewes fertilized per ram, farmers achieve higher productivity, improved genetics, and better flock management. Artificial insemination (AI) is a key method for achieving this efficiency.

2. Reasons for Using AI

Artificial insemination offers several advantages compared to natural mating systems:

- **Improved ram efficiency:** A single ejaculate can fertilize a lot more ewes than natural service.
- **Genetic improvement:** Enables selective breeding from superior rams, accelerating flock progress.
- **Disease control:** Reduces the risk of venereal disease transmission.
- **Flexibility:** Allows semen to be transported, stored (fresh or frozen), and used across different seasons and locations.

3. Comparison of Mating Systems

System	Ram efficiency	Ewes per ram	Notes
Natural mating	Low	30-40 per season	Rams run with ewes for 6 weeks; simple but inefficient
Group mating	Moderate	5 per ram, twice weekly	Controlled mating; labour-intensive; ensures mating but on limited scale
Cervical AI with fresh semen	High	30-40 ewes per ram per day	10 ewes can be inseminated with 1 ml good quality semen
Laparoscopic AI	Very high	100-300 ewes per ram: fresh Frozen: any amount	Special trained veterinarian; fewer sperm needed; frozen semen allows wide distribution

4. Types of Artificial Insemination

There are two main approaches to AI in sheep:

- **Cervical insemination:** Semen is deposited at the cervix. This method is simpler but less efficient. Cannot be used with frozen semen.

- **Laparoscopic insemination:** Semen is placed directly into the uterus horns. This technique requires a special trained veterinarian and achieves much higher conception rates. Fresh or frozen semen can be used.
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5. Cervical Insemination Procedure

Equipment

- Speculum with built-in light source
- Pipette connected to a 1 ml syringe (plastic disposable pipettes are common)
- Lubricant, cotton wool/tissues, gauze swabs

Animal Restraint

- Hindquarters elevated over a rail (80–90 cm high) with head downwards
- Front legs remain on the floor
- One assistant secures hind legs and steadies the ewe

Procedure

1. Wipe vulva with cotton wool or tissue.
2. Insert lubricated speculum into vagina (10–13 cm depth).
3. Identify cervix opening (varies by ewe age).
4. Assistant loads pipette with semen (kept at 30–32 °C in water bath).
5. Withdraw plunger to 0.2 ml to create air space, then draw semen.
6. Insert pipette gently into cervix; avoid force.
7. Deposit semen by depressing syringe plunger.
8. Withdraw speculum first, then pipette to prevent backflow.

Notes:

- In sheep, penetration deeper than 1 cm into the cervix canal is very rare.
- In goats, deeper penetration or intrauterine insemination is easier.
- Avoid forcing the pipette to prevent cervical damage.

Handling Mucus

- If excess mucus accumulates, lift ewe's front end to drain through speculum.
 - Clean instruments between inseminations: wipe speculum, disinfect regularly with alcohol or mild disinfectant (rinse thoroughly afterward).
 - Wipe Pipettes with gauze between ewes.
 - Use new pipettes for different rams
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6. Semen Dilution

- Diluent: **skimmed milk** (sterilized cow skimmed milk or UHT long-life milk).
- Purpose: Extends semen lifespan for 1–2 hours and increases volume for easier AI.
- Dilution ratios:
 - Thick cream semen (motility 4-5): dilute 1+2. Dosage: 0,2 ml per ewe
 - Cream semen (motility 4-5): dilute 1+1. Dosage 0,2 ml per ewe

- Thin cream semen (motility 4-5): do not dilute. Use 0,2 ml per ewe
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7. Transport of Fresh Semen

- Diluted semen can be cooled to 15 °C and stored for 8 hours.
 - **Ampoule method:** Acetic acid frozen-thawed ampoules (IMV-France) at 15 °C in a thermos flask (3 ampoules per flask).
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8. Conclusion

Artificial insemination — particularly laparoscopic methods — offers unmatched efficiency in sheep breeding. Cervical insemination remains practical for fresh semen use, while proper dilution and transport techniques ensure semen viability. By adopting AI, farmers maximize ram usage, improve genetics, and enhance flock productivity.