

## INTRODUCTION

Artificial insemination (AI) involves collection of semen from a buck and transfer of the semen to the reproductive tract of the doe. Does can be inseminated with either fresh semen or with commercially available frozen semen. This publication discusses the use of frozen semen to artificially inseminate does.

Reasons the dairy goat producer may consider using AI include the following:

1. Eliminate or reduce the cost of maintaining bucks.
2. Increase the rate of genetic improvement.
3. Increase the number of does to which a buck could be bred.
4. Breed several does the same day through use of AI and estrous synchronization.

Whatever the reasons for using AI, it is important that the producer fully understands the reproductive cycle of the doe and correct semen handling and insemination procedures.

## REPRODUCTIVE CYCLE OF THE DOE

In general, dairy goats are seasonal breeders. The breeding season is initiated by decreasing daylight and runs from late August to January in the United States. Estrous cycles can be initiated out of season by controlling artificial lights to simulate decreasing daylight. The goat's average estrous cycle is 21 days. However, individual does can have either longer or shorter intervals between heat periods. For this reason, it is important to keep individual reproductive records on each doe. The duration of heat or estrus is typically 24 to 36 hours, with ovulation occurring near the end of estrus.

## HEAT DETECTION

A producer's heat detection program is an important factor in determining whether an artificial insemination

program will succeed. Knowing when a doe comes into estrus lets the technician time insemination so it more nearly coincides with ovulation.

Symptoms of does in heat are:

1. Does that are unusually aggressive, noisy, or active.
2. Females that stand to be mounted by herdmates.
3. Decreased appetite and milk production.
4. A clear mucous discharge from the vulva.

It is important to establish a heat detection schedule during the breeding season. Does that are to be inseminated should be observed twice daily for 15–20 minutes. Early morning and late afternoon are good times to observe estrus. Observing does for heat detection only during chore time may result in estrus ewes being overlooked because of their change in behavior as they anticipate feeding.

Accurate records should be maintained, including time of heat, length of heat, and length of time between heat periods. These records will help a producer accurately anticipate and detect heat in individual does, and time insemination with ovulation.

## TIME OF INSEMINATION

As discussed earlier, a doe is a seasonal breeder that cycles about every 21 days. The average heat or estrus will last from 24 to 36 hours, with ovulation occurring near the end of estrus. The standard AI recommendation is to breed does two (or three) times at 12-hr intervals. This breeding schedule increases the possibility of a healthy sperm contacting a healthy ovum. It is essential that does be inseminated before ovulation so that sperm cells can undergo a process called capacitation. If records establish the average length of a particular doe's heat period, one can breed the doe once using the schedule shown in Table 1 and probably achieve satisfactory fertility.

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**Table 1. Breeding Time Chart\***

If doe's normal heat period length is:	Breed her at this time after first observed signs of heat:
24 hr	As soon as the doe shows estrus
36 hr	Within 12 hr of estrus
48 hr	24 hr after estrus
72 hr	48 hr after estrus

\* In all cases, if doe is still in heat 24 hrs after first breeding, breed her again.

## EQUIPMENT NEEDED TO INSEMINATE DOES WITH FROZEN SEMEN

1. Liquid nitrogen tank
2. Speculum (25 x 175 mm for doelings or 25 x 200 mm for does)
3. AI light or headlight
4. Straw tweezers
5. Sterile lubricant (non-spermicidal)
6. Insemination gun (for straws)
7. Breeding stand or facilities to restrain the doe
8. Thaw box
9. Paper towels
10. Straw cutter
11. Thermometer

These supplies can be obtained from several livestock supply companies. The liquid nitrogen tank will be the largest single expense and will cost approximately \$500.

## SEMEN THAWING AND INSEMINATION PROCEDURES

The first step is to restrain the doe to be inseminated. This can be done with a breeding stand or any other satisfactory facility.

After the doe is restrained, the semen is thawed and the insemination gun is prepared. Frozen semen should be thawed according to the processor's recommendations. If these recommendations are not available, remove the frozen straw from the liquid nitrogen tank with the straw tweezers and place it in a thaw box filled with warm water (95°F) for 30 seconds. After thawing, dry the straw thoroughly with a paper towel. Semen must be kept warm and must not be exposed to sunlight or water during the thawing and inseminating process to

prevent damaging or killing sperm cells. Pull the plunger back 4 to 6 inches on the insemination gun and place the straw into the gun with the cotton plug toward the plunger. After the straw has been secured in the gun, the sealed end of the straw must be cut off with the straw cutter. The cover sheath should now be placed over the insemination gun and secured with an O ring.

The next step is the actual insemination process. It may be necessary to lift the doe's hindquarters if she will not stand. If working alone, hold the insemination gun in your mouth, or have an assistant hand the insemination gun to you at the appropriate time. Turn your headlight on.

Lubricate the speculum with a non-spermicidal lubricant. Clean the doe's vulva with a dry paper towel and insert the lubricated speculum slowly into the vulva. Insert the speculum at an upward angle to prevent vaginal irritation.

Once the speculum has been inserted, visually locate the cervix. The cervix should have a red-purple color, and white mucus will be present if the doe is in heat. Center the speculum over the opening of the cervix.

Insert the insemination gun into the speculum and thread it into the opening of the cervix. Use a circular motion and slight pressure to work the insemination gun through the rings of the cervix. Do not penetrate the cervix more than 1.5 inches. It is a good idea to draw a red ring around the cover sheath of the insemination gun 1.5 inches from the tip. This mark lets you to know how far you have penetrated the cervix.

Deposit the semen slowly by pushing the plunger forward. Remove the insemination gun slowly and remove the speculum.

Record all important information in a breeding journal.

Artificial insemination is a powerful tool that can allow dairy goat breeders the flexibility to increase the rate of genetic improvement in their herds. Although AI is a powerful tool, it requires proper technique and attention to detail for a high level of success. With good heat detection, records, and semen handling techniques, individuals can become successful AI technicians.

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