

The Process of Artificial Insemination



Artificial insemination is a technique that deposits semen into a cow's reproductive tract with an inseminating rod or instrument. The use of AI allows a producer to utilize a larger variety of genetically superior bulls than he or she could with natural service. In addition to this, there is no danger of keeping a bull (always a serious concern) and expenses are lowered because the producer does not have to feed or house the bulls that provide the semen.

A good AI program requires a well-trained and experienced inseminator, good herd management and records, suitable handling facilities, and a well-trained, responsible, and interested herdsman. Miss even one of these aspects and a good AI program becomes impossible.

Cows in estrus should be quietly sorted from the herd or separated by use of a catch-lane upon exiting a parlor. The calmer the cow, the higher the success rate. The cow to be inseminated should be restrained in squeeze chute or working chute. The cow should not be able to move forward or backward.

1. ID the cow in heat and record her number and other pertinent information (name, age, etc.).
2. Cows observed in estrus in the evening should be bred in the morning, and cows in heat in the morning should be bred in the evening. This schedule allows the sperm to reach the egg at the optimum time.
 - a. *E.g. if you see her in heat at 5 am, breed her at 5 pm*
 - b. Accurate diagnosis of heat is more important than time of breeding!
3. Prepare a thaw box for the semen; a warm water thaw box is used for straws. The AI tech or semen supplier will give you specific instructions on water temp and thaw time – these instructions should be followed as closely as possible.
 - a. The thaw box should be a widemouth thermos with a thermometer.
 - b. The temp should be checked before the straw is dropped into the water, and a thermos of hot water should be prepared to adjust thaw box water temperature as needed. The straws should not be thawed in a shirt pocket – this can reduce semen quality.
4. Open the liquid nitrogen tank and remove the circular plug.
5. Lift the wire that holds the canister with the semen to be used for insemination. Pull the canister out only far enough to ID the cane containing the semen to be used.
6. Lift the cane out with one hand and use a pair of tweezers to remove a straw from the goblet. This should be done in the neck of the tank. After the straw is removed, quickly replace the cane in the canister, check the ID on the straw, and place it in the thaw box. Replace the circular plug in the tank and close the lid.
 - a. **DO NOT** replace a straw once it has been removed from the cane and lifted out of the tank! Straws thaw very rapidly – if it is accidentally removed, discard the exposed semen. Quick replacement of the cane in the canister is very important to maintain the quality of the semen remaining inside.
7. Thaw the semen; you will have to warm the inseminating instrument before loading it. Do this by rubbing a paper towel briskly along the insemination instrument.
8. Assemble the breeding gun – tube and plunger – and place it between your teeth. Keep the breeding gun clean to

reduce the possibility of uterine infection (remember, this is one of two times the cervix is open!).

9. Remove the straw from the thaw box and dry it with a paper towel (water can kill sperm).
10. Cut off the sealed end of the straw (opposite the cotton wad). This cut has to be a square cut, otherwise the straw will not fit snugly against the sheath.
11. Insert the cotton wad end of the straw into the breeding gun. The size of the breeding gun must fit the size of the straw. The cut end of the straw will stick out of the breeding gun and the plunger will be behind the cotton wad of the straw when properly inserted. Slide the plastic sheath over the breeding gun and secure it with retainer rings. Make sure that the straw fits snugly and squarely into the sheath to prevent semen from leaking back into the sheath.
12. In warm weather, place the loaded inseminating instrument between your teeth to free both hands. In cold weather, the inseminating instrument should be wrapped inside several paper towels and placed inside the front of the inseminator's coveralls to prevent cold shock to the semen.
13. Put on a disposable glove and lubricate the hands and fingers. It is most important to lubricate the fingers, back of the hand, and wrist area because they receive the most contact. Liquid soap or mineral oil can be used as a lubricant.
14. Stand perpendicular to the cow (to minimize danger from kicking) and grasp the tail with the ungloved hand. With the gloved hand, wipe lubricant across the anus. DO NOT get lubricant on the lips of the vulva – it can be carried into the tract and kill the sperm.
15. From the gloved hand into a wedge and insert it with a thrust into the anus as far as possible. As the hand enters the anus, it should be folded for more a loose fist. This will present a blunt surface (instead of pointed fingers) and will straighten the rectum without damage. The cow will exert a fair amount of pressure against the hand and arms – she will try to expel them.
 - a. Moving the hand into the rectum gradually will irritate the cow and rectal contractions will be greater. Once the hand is inside the rectum, the cow will gradually arch her back and danger from kicking will be minimized.
16. Manually remove feces from the rectum so that the feces are not deposited on the inseminating instrument. Wipe the vulva area with a clean paper towel. Always wipe the vulva from top to bottom – never make two wipes with the same towel.
17. Move the tail to the outside of the palpating arm so that the ungloved hand is free to guide the inseminating instrument without fear of contamination.
18. Keep your fingers close together and gently work forward and side to side in the tract without digging the fingers. If rectal contractions are encountered, it may be necessary to relax the contracting ring by inserting two fingers through the center of the ring and gently massaging back and forth.
 - a. Some bleeding may occur during the palpation process. This results from scraping the mucosa and rupturing small blood vessels at the surface of the rectum wall. This is not serious but extreme care should be taken that the inseminator does not rupture the rectum wall. The rectum wall is fairly thick and it is unlikely that a rupture will result if the tract is carefully palpated. If a rupture does occur, it usually leads to peritonitis and the death of the animal. When a rupture is identified, it is usually best to send the cow to slaughter as soon as possible.
19. ID Landmarks:

- a. The forward (anterior) portion of the pelvis (pelvic rim) is the best landmark because it is a bone and does not move. The pelvis forms a cradle for the non-pregnant reproductive tract.
 - b. The cervix is the second landmark to be located. The cervix is one inch in diameter, four inches long, and has a gristle-like feel resembling a turkey neck. Locating the cervix is not as easy as locating the pelvic rim because it does not remain in one area.
 - c. With the palm of the hand down, the fingers extended, and the thumb pointing forward, the hand can be pressed downward.
 - d. With downward pressure, the hand can be moved from side to side to locate the thick-walled cervix. This process may have to be repeated several times if the cervix is not located the first time.
20. Once the cervix is located, it must be grasped and controlled so that the inseminating instrument can be inserted. Encircle the cervix with the thumb and fingers in such a way that the thumb is on top of the cervix and the fingers are under the cervix. The thumb should stay on top without rotating the wrist. This can be difficult and tiring – it takes effort to stretch the rectal wall.
21. Once the cervix is grasped and controlled, spread the lips of the vulva by applying downward pressure in the region of the vagina with the heel of the gloved hand.
22. Insert the tip of the inseminating instrument through the vulva without touching the lips. The tip of the instrument should be pointed upward at a 30-40° angle to avoid entering the suburethral diverticulum (urethral opening from which urine is expelled) on the floor of the vagina. After the tip of the instrument is inserted 3-4 inches into the vagina, it can be straightened so that it is approximately parallel to the plane of the rectum.
23. As the inseminating instrument is slid forward, the cervix must be pushed forward to straighten out the vaginal folds. Remember, the cow is trying to force the cervix toward the vulva and thus creates more folds.
- a. If the cervix is not pushed forward, the tip of the instrument can get caught in a fold and stretch or puncture the vagina. If the tip should become caught in a fold, withdraw the instrument a short distance and point it in a slightly different direction. Be patient and keep trying.
24. To enter the cervix, encircle the end of the cervix nearest the vagina with the thumb and first two fingers. Again, the thumb will be on top with the first two fingers wrapped around the cervix. This allows the base of the hand and last two fingers to form a funnel to guide the tip of the instrument into the cervix. The opening of the cervix protrudes into the vagina and toward the vulva, creating a blind pouch called a fornix. It usually helps to push the cervix forward to reduce the size of the fornix.
25. Locate the opening of the cervix with the tip of the breeding instrument. The opening of the cervix is generally, but not always, in the center of the cervix. When the tip of the instrument comes in contact with the cervix, a gristle-like texture will be felt. It may be necessary to probe lightly with the tip of the instrument to locate the opening of the cervix.
- a. If the opening of the cervix is not located with the tip, do not force the instrument. Try placing the first two fingers on top of the cervix and pinning the cervix to the pelvic floor. Try to locate the opening with your thumb. Maneuver the tip of the instrument until it strikes your thumb, remove the thumb, and insert the tip of the instrument into the cervix.

26. Once the rod or gun is inside the opening of the cervix, apply slight forward pressure on the instrument and re-grasp the cervix as previously. The thumb and first two fingers should always be in front of the instrument tip to manipulate the cervix.
27. Manipulate the cervix as the inseminating instrument is slid forward. The cervical rings often hinder the passage of the instrument, and this will require turning and twisting the cervix. It may be necessary to bend or turn the cervix at a right angle to move past some cervical rings.
 - a. On the first service, the semen will be deposited as outlined below. On a second service, it is recommended that the length of the cervix be estimated and the semen deposited at the midpoint of the cervix. The midcervical deposition is done to prevent interruption of a pregnancy in cows that show estrus after conception.
28. After it has been inserted through the cervical rings, the inseminating instrument will slide without resistance. This indicates that the tip is in the uterus or uterine horns. Do NOT deposit semen here! Rotate the hand on the cervix so that the index finger can be used to locate the front edge of the cervix and the tip of the instrument.
29. Slowly pull the inseminating instrument back until it is flush with the front edge of the cervix. If this is not done, the semen can be deposited deep in the uterus, and uterine contractions will carry the semen to only one horn. Conception may not occur if ovulation has taken place in the opposite ovary and horn!
30. Deposit the semen slowly over at least five seconds. Make sure that the thumb or index finger is not over the tip when the semen is deposited, or some of the semen will be deposited in the cervix and vagina.
31. Remove the arm and inseminating instrument from the cow.
32. Record the cow ID number, bull ID number, and date in a record book.
33. Release the cow and dispose of the rod/sheath, straw, paper towels, and disposable glove.

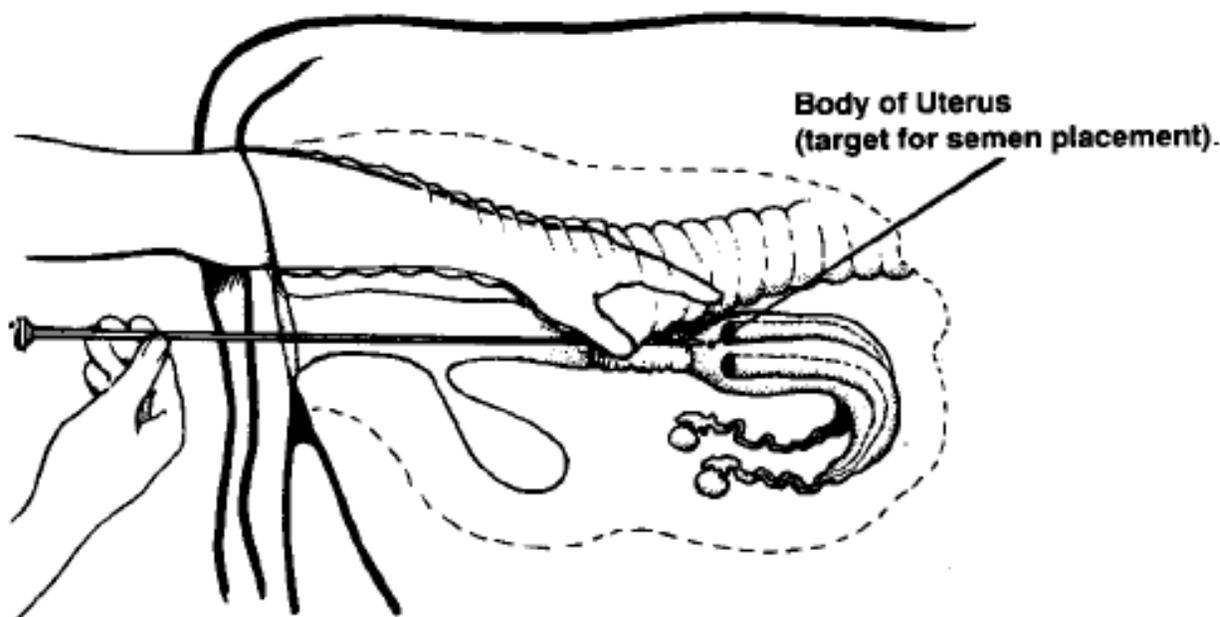


Figure 2. Proper placement of insemination gun to deposit semen in the body of the uterus