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**Artificial Insemination Technique Takes Care and Practice**

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Proper deposition of frozen bull semen is a critical artificial insemination (AI) skill which is learned through hands-on training and a great deal of practice. Look for AI schools or short courses in the local area. These are usually 3- to 5-day training sessions that teach basics of reproductive management while providing practice in semen handling and passing an insemination rod through the cervix. The Mississippi State University Extension Service offers AI schools each year. Information about this program is available online at <http://msucares.com/livestock/beef/aischool.html>.

Start with proper, low stress restraint of cattle to be inseminated. Do this before thawing semen. Covered cattle handling facilities are important for protection from weather. Make sure that the shelter extends far enough beyond the semen handling and cattle insemination areas to prevent blowing precipitation from causing problems for the AI process.

Breeding boxes specifically designed to accommodate cattle restraint for insemination are available for purchase or can be built on the farm. In the absence of a breeding box, a squeeze chute is important to immobilize the animal for insemination. It allows for animal and inseminator safety as well as ease of insemination. A head catch is useful to prevent the animal from backing up in the squeeze chute. A palpation cage located immediately behind the squeeze chute allows the inseminator access to the back end of the animal while protecting that person from animals lined up in the chute leading up to the palpation cage. It also provides a quick escape route for the inseminator if needed. Good traction in the squeeze chute or breeding box is also important to prevent the cow or heifer from slipping down during the insemination process.

Sanitation is an important part of the recto-vaginal insemination process. Poor sanitation increases risk of metritis (uterine inflammation) and infertility of cattle. Store breeding supplies in original packaging until time for use. Insist that everyone handling AI equipment and semen thoroughly wash their hands to minimize bacteria transfer to cattle being inseminated using these items. Before inserting the insemination rod into the animal, use clean paper towels to wipe manure, mud, and other foreign material from the female's vulva and surrounding area. Prevent the insemination rod from becoming soiled prior to insertion.

Wear a plastic obstetrical sleeve on the arm being inserted through the anus (external opening at the end of the digestive tract where feces exit) and into the female's rectum (terminal part of the large intestine). Secure the open end of the sleeve to clothing at the shoulder with a clip to prevent the sleeve from slipping down during palpation. Turn the sleeve inside-outside to put any abrasive seam edges towards the interior of the sleeve

and not in contact with the animal's rectum. This can help reduce irritation of the rectum during the insemination process. Be generous in obstetrical lubrication use, coating both the rectum and sleeve prior to arm insertion into the animal. However, do not allow lubricant to contact the vulva region, as lubricants are generally spermicidal.

Inseminating technicians may choose to use their less dominant arm and hand for rectal palpation on the premise that touch sensitivity may be better for the fingers of the less dominant side. Less muscle mass in one arm may also help ease arm insertion and lessen muscle tiring during the palpation process. Yet, it is often easier for a technician to use the left arm for rectal palpation to locate and manipulate the reproductive tract. That is because the rumen, the largest compartment of the cow's or heifer's digestive tract, is located on the animal's left side. This slightly displaces the reproductive tract to the animal's right side. Reaching a left palpating arm towards the right is typically less awkward than the reverse scenario.

Gently touch the animal on the rump to avoid startling it when approaching for AI. Then insert one sleeved, lubricated arm through the anus and into the cow's or heifer's rectum. Cup the hand with the fingers and thumb together during insertion, and gently work the arm into position to locate the cervix from above through the rectal wall. Place the animal's tail on the outside of the palpating arm to keep it from interfering with insemination, or use a second person to hold the tail out of the way. Another person assisting is particularly useful when an animal exhibits excessive tail movement during AI.

Circular muscle contractions may move along the rectal wall toward the tail. These contractions can be strong and make it difficult to maneuver within the rectum. They also contribute to inseminator arm fatigue. To relax a rectal constriction ring, insert two fingers through the ring center and massage it back and forth. In the event of defecation, keep the palpating hand flat against the floor of the rectum to allow manure to pass over the hand and arm.

Spread the lips (folds) of the cow's or heifer's vulva apart by placing a clean, folded paper towel into the lower portion of the vulva if working alone or have another person spread the vulva lips. This allows insertion of the insemination rod into the vagina without contacting the vulva lips. Insert the loaded insemination rod into the vagina at a slight (30 to 40 degree) upward angle taking care not to enter the urethra and bladder. Straighten the rod to a more level position once about 6 to 8 inches inside the vagina.

Locate and secure the cervix with the hand used in the rectal palpation. It is sometimes described as feeling like a "turkey neck" with several hard circular rings and can vary greatly in width and length from animal to animal. In some cattle, the cervix has more crooks or bends than others. Straighten any vaginal folds by grasping the cervix and pushing it forward.

Where the cervix joins the front end of the vagina, there is a circular blind pouch approximately  $\frac{1}{2}$  to 1 inch deep. Make sure the rod enters the cervical opening instead of this blind pouch. Back the rod up as needed if this obstacle is encountered.

Place the cervix over the rod, and do not jab or force the rod. Gently maneuver the rod through the folds of the cervix by manipulating the cervix slightly ahead of the rod while maintaining slight forward pressure on the rod. Once through the cervix successfully, the tip of the rod can be felt with a finger placed at the far opening of the cervix.

Depress the insemination rod plunger slowly to deposit the semen into the animal. Deposit the semen over a period of about 5 seconds in the body of the uterus to ensure that semen flows evenly into both uterine horns. Deposit semen just in front of the cervix rather than in the vagina or cervix. Make sure the rod tip is only  $\frac{1}{4}$  inch past the internal end of the cervix. The proper deposition location is very important in AI because the number of sperm in a single dose of semen is greatly reduced when a single ejaculate is extended. Normally, when the bull deposits an ejaculate in the cow's vagina, the semen volume is 4 to 5 cc and there are 1 to 1.5 billion sperm per cc. The normal volume of frozen semen in the U.S. is 0.5 cc with a total of 30 to 40 million sperm. Many of these sperm die before reaching the oviduct, so giving them a "head start" through the cervix greatly improves conception rates.

Cervical mucous could be encountered in females previously inseminated. The presence of this mucous may indicate that the female is pregnant. Cervical mucous feels thick and sticky on the insemination rod. If it is encountered, deposit the semen halfway through the cervix.

Take care not to inadvertently block a uterine horn or otherwise misdirect semen flow with the palpating hand during semen deposition. Do not pull the insemination rod back through the cervix until after semen deposition is complete. If the cow or heifer moves during semen deposition or if the rod moves, stop the deposition. Then correctly reposition the rod tip and continue semen deposition.

Inseminate the female within 15 minutes or less from the time the semen is removed from the storage tank. Insemination generally takes from 30 seconds to 2 minutes for a proficient inseminator. After insemination, briefly stimulate the female's clitoris via gentle squeezing motions at the base of the vulva. This may improve conception rates.

Although one person can perform record keeping, semen handling, and insemination duties, use more than one person for these tasks when possible. This allows each person to concentrate on the task at hand and to assist the others when needed. It also allows inseminators to take shifts to prevent excessive tiring of arm muscles from the palpation process.

To become proficient at AI, follow supervised training with continuous practice and possibly periodic retraining. Experienced technicians typically have better conception rates than inexperienced technicians, so it may be worth hiring a reputable technician until a newly trained inseminator develops a reliable insemination technique. Monitor returns to heat and use pregnancy diagnosis and calving records to evaluate the success of an AI program. For more information on cattle reproduction or related topics, contact an office of the Mississippi State University Extension Service.