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Breeding Options in the Bitch

Natural Cover

Natural breeding is best used for young fertile females and males with good fertility. It is typically performed every other day beginning one day post ovulation and repeated two to three times total between 1 and 4 days after ovulation. Natural breeding should be supervised to ensure the bitch is receptive and that no fighting occurs between the dog and the bitch during the tie. In young or inexperienced males, assistance may be required with intromission. The hair should be trimmed from the end of the prepuce in males and from the vulva in females of long coated breeds. Semen cannot be evaluated with natural cover, so pregnancy rates and litter size should be monitored as an indicator of semen quality. It is also not possible to ensure that ejaculation has actually occurred with natural service.

Vaginal Artificial Insemination

Vaginal insemination allows for the evaluation of the semen prior to insemination. The ejaculate is collected with enough prostatic fluid to facilitate the AI and then prepared for insemination into the bitch. The volume required will depend on the size of the bitch with the goal being to flood the paracervical area with enough fluid to bathe the cervix in fluid.

The bitch's hind end is elevated to 45 degrees. An insemination pipette is inserted into the vagina of the bitch and gently pushed forward using a twisting action until resistance is met indicating that the front of the vagina has been reached. Feathering of the vagina can facilitate passage of the pipette to the full extent of the vaginal canal. Once the pipette is in place the syringe loaded with semen is attached and then the semen deposited slowly into the vaginal vault. Feathering is continued during and immediately after the insemination to increase forward contractions that help the sperm move forward into the bitch's uterus. The bitch's hind end remains elevated for 15 minutes to allow the spermatozoa time to move forward through the cervix and into the uterine body. Vaginal AI is usually performed 2 and 4 days after ovulation.

Transcervical Insemination (TCI)

Transcervical insemination typically involves the use of an endoscope (camera) to visualize the cervix and facilitate passage of a catheter through the cervix and into the uterus. Placing the semen directly into the uterus increases the number of spermatozoa that will reach the oviducts by reducing loss of sperm in the vaginal and cervical folds. Use of TCI will also decrease the number of sperm required in a breeding dose since there is less sperm loss associated with this type of breeding. Semen is collected and centrifuged to concentrate the ejaculate. The pellet of sperm is re-suspended in semen extender which contains sugars for energy, fats for protection of the sperm and antibiotics. The volume of semen that will fit in the depends on the size of the bitch and the speed that the semen is inseminated. If the insemination is performed slowly significantly more volume can be inseminated, which is more like natural breeding, thus facilitating sperm transport in the uterus.

TCI is performed in the standing, unspayed (in most cases) bitch. With the newer endoscopes size of the bitch is not a factor in the use of TCI. With the older scopes, there may not be enough room to pass the scope up to the cervix in small and toy breeds and the scope may not be long enough in some giant breeds. TCI can be more difficult in maiden bitches than in bitches that have had at least one litter due to the stretching of the vagina that occurs with whelping. This stretching provides additional room in the vagina in which the endoscope can be manipulated. Other problems with visualization can occur as a result of excess blood, discharge or urine accumulating near the cervix. These difficulties can usually be overcome by using air to stretch the vaginal tissues when the scope is being passed up the vaginal canal.



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The benefits of TCI include: a lower breeding dose is required; higher conception rates and litter size than with vaginal AI (especially in bitches or dogs with fertility problems). The disadvantages include higher cost compared to vaginal AI due to the cost of the equipment used and extensive training is required to have good conception rates. TCI can be performed with fresh; fresh, chilled; or frozen semen. TCI is usually performed twice on days 2 and 4 post ovulation for fresh and chilled semen or days 5 and/or 6 after ovulation with frozen semen.

The ease of insemination with TCI and the increased pregnancy rates and litter size seen with this technique make it our preferred method of insemination for all types of semen.

Surgical Insemination (SAI)

Surgical insemination is performed under general anesthesia. A small incision is made in the abdominal wall between the umbilicus and the pelvis and the uterus is located. The uterine body and horns are lifted out of the incision and the uterus is examined for the presence of any cysts that can be felt within the lining of the uterus or other abnormalities. Any cysts that are large enough to be felt can be ruptured prior to the insemination. Then a small needle or catheter is placed either in each horn and a small volume of semen is inseminated directly into the uterus. The entire procedure takes less than 30 minutes.

The semen volume instilled is quite small (usually less than 2-3 ml) because uterine capacity is limited and the uterus cannot be distended during a surgical AI like it can be with natural breeding or TCI. Therefore, the semen must be centrifuged to concentrate the ejaculate and then re-extended with semen extender to the desired volume, unless the volume is already small enough (i.e. as with frozen semen).

The benefits of SAI include: the ability to evaluate the uterus for pathology and potentially treat uterine cysts to result in increased conception rates. If a practitioner does not have an endoscope this is the only other way to get an intra-uterine insemination accomplished. The disadvantages include the cost, the need for general anesthesia, the risk of general anesthesia and abdominal surgery and the recovery time from surgery. SAI is typically used for frozen semen and for subfertile males or females. In males with fertility problems, SAI can be performed using fresh or fresh chilled semen to increase chances of conception even further. SAI is usually performed only once 3 - 4 days after ovulation.

Heterospermic (Dual Sire) Insemination

Heterospermic insemination is becoming increasingly popular in dog breeding. It involves using 2 or more males to inseminate or breed one bitch on a single cycle. The anticipated goal of heterospermic insemination is to be able to obtain puppies from multiple genetic backgrounds in a single litter and/or the improvement of fertility in subfertile males when in the presence of a more potent sire. In reality, the majority of the time we perform dual sire inseminations, a single sire is responsible for fertilizing all the eggs. It is impossible to know which sire will be the more potent one prior to the breeding.

Dual sire breedings are often performed if the desired sire has poor fertility and we want to minimize the chance of losing a cycle for the bitch if possible. In these cases, the lesser quality semen is inseminated 12 – 24 hours prior to the higher quality semen. This allows the poorer fertility semen to fertilize as many eggs as possible before the higher quality semen is inseminated. In some cases, the semen from the subfertile male will block the eggs from being fertilized by the second sire but are unable to complete fertilization themselves, resulting in non-



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pregnancy. Inseminating both sires at the same time will inevitably end up with all the puppies being sired by the sire that is more prepotent. Some consideration of the type of semen being used must also be made, since semen that has been more manipulated (chilled or frozen) will be ready to fertilize eggs prior to fresh semen because the initial part of the preparation process for the sperm (capacitation) is started by cooling or freezing, thus shortening the time from insemination to fertilization with these types of semen compared to fresh semen.

DNA typing is required of both the sire and dam and all the puppies for parentage determination for all dual sire litters.