

Artificial Insemination (AI) in Dogs

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Today, many dog breeders and veterinarians have found artificial insemination (AI) to be an invaluable tool. Many of them see it as a way to increase the quality of a breed by overcoming limitations of both time and space. An exceptional male, chosen for his intelligence, personality, and conformation can continue to produce offspring long after his death, or be mated with females from which he is separated by thousands of miles. Additionally, by saving his semen, he will be able to breed with many more females than would be physically possible through normal one-on-one mating. There are also cases where valuable males have been injured and can no longer mount a female. Their genetics are of course unaltered and artificial insemination allows them to continue to contribute to their breed. A bitch that has the same qualities as the above male and has the potential to build a kennel from her progeny, may not yet be in heat, but a suitable mating can be arranged, the semen taken and saved until she is ready to be bred.

Today, the actual technique and methods of artificial insemination are relatively easy and done by many private individuals and most veterinary clinics. Although the field is relatively new in canine medicine, it has been successfully practiced in cattle and other species for many decades. Although we rest on the shoulders of the research and experience developed in bovine practice, we have not yet duplicated their rate of success. This is not because of our technique, but rather the relative instability of canine sperm when frozen or chilled. Additionally, in cattle, the regularity and competency of the reproductive physiology of the female has been consistently selected for breeding, while this is not the case in dogs. Cattle that do not have a predictable estrus cycle or high levels of fertility are eliminated from the herd. It is a very pragmatic business. In canine medicine, breeders are often much more emotionally attached to their animals. They routinely keep and repeatedly attempt to breed problem bitches and those with irregular cycles, thus allowing undesirable traits to maintain themselves in the genetic pool.

Collecting semen

Collecting semen from a stud dog is very simple. A female in heat is brought together with the male. When he tries to mount her, his penis is redirected into an artificial vagina and stimulated to cause an ejaculation. The presence of the female is useful to excite the male and makes collection easier. (During estrus, organic compounds known as 'pheromones' are excreted from the female's vagina. These airborne chemicals are responsible for attracting males from long distances to the female. They even indicate the stage of her heat.) However, such females are not always available when a male is to be sampled. In that case, a common practice is to save and freeze cotton swabs that we have wiped through the vagina of a female when she was in peak estrus. At the time of semen collection, the swabs can be wiped around the tail area of any dog (even a spayed one). The male will then respond to her just as if she were in heat.

Semen evaluation

After collecting the semen, the sperm cells are checked to ensure that they are sufficiently concentrated, adequately motile, and appear anatomically normal. This is done because we know that in many 'sterile' males, the problem is not that they do not produce sperm cells, but rather their quality or quantity is very low. Infertile males may have abnormal sperm cells, which are unable to travel all the way to the oviducts of the female, or cannot penetrate the ovum for fertilization to occur. The microscopic semen evaluation is no guarantee that the sperm present are in fact capable of fertilization. There may be flaws all the way down to the molecular level of the DNA in the sperm that make a male dog sterile.

Insemination

If the sperm cells seem to be adequate in number and appear normal, they may be immediately infused into a female using a long plastic or glass tube. Attempts are made to at least reach the level of her cervix, which in large dogs may be several inches inside the animal.

If the bitch is not going to be bred immediately, the semen may either be chilled or frozen. Chilled semen should be used within 24 hours and can therefore be shipped 'Next Day Air' to anywhere in the country or even overseas, and a female can be bred with it the next day. This has made males available to appropriate females all over the world without either one of them needing to travel.

Freezing semen

Semen can also be frozen in liquid nitrogen canisters and kept that way for years. This allows females to be bred with males who are also miles away or who have even died years before. When we consider the expense of stud fees and or transporting one or both of the breeding animals, frozen and chilled semen is relatively inexpensive. Furthermore, it greatly increases the number of potential mates to choose from.

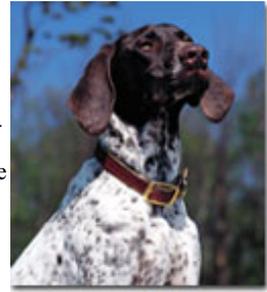
The heat cycle in a bitch

In a typical canine heat cycle (we underline the word typical because in some breeds 'typical' bitches are getting harder and harder to find), the dog's vagina swells and she bleeds for 7 to 9 days. This is the preparatory Proestrus stage. Next, the bleeding diminishes and she becomes receptive to the male and allows him to mate. This is Estrus. Only during the 3 to 7 days of Estrus will the bitch be in the proper stage to become pregnant.

After 3 to 7 days, she moves into the Metestrus stage, is no longer fertile, and will not accept a male's advances.

'Problem breeders'

Sometimes artificial insemination is used even though both dogs are present. This commonly occurs when either the male or female dog is a problem breeder. In these cases, either the male will not mount or show interest in the female or the female will not allow the male to mount her. Often, these are simply problems of inexperienced dogs. In wild dogs, breeding has a learned component where the younger males learn from interactive play behavior and by observing adults. By separating puppies from their family units at 7 to 8 weeks of age, we have eliminated this portion of the learning process. When mating young or first time breeders, it is always best to have one of the pair be experienced. Usually this individual, be it the male or female, will 'take charge.'



In other instances, the two dogs may not seem equally interested in mating. This may result from the female not being in the correct stage of her heat cycle. Therefore, she does not either correctly stimulate the male or will not yet allow him to mount. Over the years, we have been asked to examine and find out why breeding is not occurring as expected, only to discover that the female was not in the correct stage of her cycle. This can sometimes be determined by behavior. However, it is easily and more accurately determined by either a vaginal smear that is examined under a microscope or via a blood test that determines the level of the hormone progesterone.

There are however, instances of behavioral problems where dogs will not breed. The female is in the correct stage of heat, but one or the other of the dogs just lacks the natural desire to mate.

Concerns regarding artificial insemination

One of the problems with selective breeding is that every time we select for one thing, we are probably unknowingly selecting for or against many others. Today, in many breeds, numerous individuals are showing abnormal reproductive physiology and behavior. The Proestrus stage goes on for 3 to 5 weeks, males have abnormal sperm counts, the female never goes into true Estrus, litter numbers decrease drastically, mothers shun their offspring, etc. Sooner or later, good breeders look at their lines and recognize these problems. They must try to eliminate these traits just as they would hip and eye disorders. By using artificial insemination to get around these shortcomings of their dogs, they only potentiate the problem.

Another concern is the use of artificial insemination when one of the two dogs is vicious and constantly attacks the other one. We will not even help out in these cases, and it is not because we are afraid of getting bitten. Behavior is a trait that we should select for just as we do intelligence and conformation. Anyone who has ever tried to help a child overcome their fear of animals after being bitten or has been involved in a lawsuit in one of these cases realizes this.

Many breeders also live under the false sense of security that diseases cannot be transmitted between the mating pair, if artificial insemination is used. Admittedly, the male will not be able to get anything from the female, as he never comes in contact with her. However, the female can contract several conditions via the semen.

Additionally, it must be remembered that artificial insemination in canine medicine does not have the level of success seen in natural intercourse. Depending on the technique and ability of those performing it, breeders should only expect a 65 to 85% success rate and usually somewhat smaller litters would be noted. Part of this disparity is probably due to a shortcoming in either the male or female, but our technique still has room for improvement. We have made giant strides in the last few years, and with continued research, we may approach the levels seen in cattle.

Conclusion

Used correctly, artificial insemination is a useful tool in improving the overall quality of all canine breeds, allowing a wider range of potential breeding partners. If it is used to genetically eliminate undesirable characteristics (rather than bypass them), or to improve or potentiate desirable ones, it will have a positive effect whenever used.