DOWNLOAD PDF THE ARTIFICIAL INSEMINATION OF FARM ANIMALS

Chapter 1 : The Sexual Violation of Dairy Cows in 14 Steps

Artificial insemination is used instead of natural mating for reproduction purposes and its chief priority is that the desirable characteristics of a bull or other male livestock animal can be passed on more quickly and to more progeny than if that animal is mated with females in a natural fashion.

It is a useful technique devised for the genetic improvement of farm animals. Artificial insemination is widely used for breeding cattle, buffaloes, sheep, goats, horses, dogs and a variety of laboratory animals. Advantages of artificial insemination The greatest advantage of artificial insemination is the opportunity to spread superior germ plasm by the wide use of carefully tested and selected sires. On average, a bull can sire 50, progeny per year through artificial insemination compared to 40 - 50 progeny through natural mating. Artificial insemination plays an important role in the control of various diseases, particularly the venereal diseases disseminated by natural mating. It helps to maintain complete and accurate breeding records, leading to better herd management and the identification of infertility problems. Artificial insemination is more economical than natural mating. The mating of animals of different sizes becomes possible without any accidental injury. Artificial insemination extends the usefulness of sires of high genetic merit which for physical reasons are unable to copulate normally. Limitations of artificial insemination There are few disadvantages of artificial insemination even if it is properly performed. The major limitations are due to lack of trained personnel to provide proper service. Poor breeding efficiency may occur in herds when owners do not watch their animals closely for estrus and the inseminator does not breed them at the proper time. The inseminator may be, if not careful, a means of spreading infections from one herd to another. Herd owners should avoid intensive use of a limited number of sires, which may increase inbreeding in the herd. Increased inbreeding is usually associated with low fertility and decrease in vigor and overall productivity. Semen and its collection One of the most important steps in an artificial insemination program is the collection of semen and its proper handling. The following methods are used for the collection of semen from bulls. Artificial vagina method Massage Method Electro-ejaculation method The best procedure and practical method for collecting semen is with an artificial vagina. Various sizes and shapes of artificial vagina are used, but all consists of a heavy rubber cylinder with a rubber lining inside. This enables a clean, complete ejaculate to be collected in the glass tube fitted on the lower end of the artificial vagina. The vesicular glands are picked up with the fingers by carefully feeling the rectal wall. They are then massaged gently causing a slightly turbid fluid to appear which cleanses the path for semen. Then the operator massaages the ampulla of the vas deferens until the sperm containing semen appears. The semen is collected in a test tube placed in front of the sheath. Electro-ejaculation is the method used for males that refuse to serve the artificial vagina or when injuries makes this impossible. A rectal probe with either a ring or straight electrode is used to provide the necessary electrical stimulation. After the semen is collected, it is evaluated for quality live and dead sperm, motility etc and diluted with suitable extenders diluent. Then it is stored in liquid form in the refrigerator at 5 Degrees Celsius or in frozen form in liquid nitrogen at below Degrees Celsius. Detection of heat estrus of the female is the first step. Part of the semen is deposited in the uterus, just inside the cervix, and the remainer in the cervix while the rod is withdrawn. Extra care must be exercised in the case of those animals that have been inseminated previously. If pregnancy is suspected in an animal, insemination should not be repeated. Spermatozoa can survive in the genital tract of a cow or buffalo for a little over 24 hours. The egg has a short survival time, about 6 hours at the most. Optimum fertility is obtained when inseminations are performed hours before ovulation. Reasonably good results are obtained even during the period hours before ovulation. The cows should be checked twice daily with a teaser bull to detect estrus. As a rule of thumb, cows showing estrus in the morning should be bred the same day in the afternoon, and cows showing estrus in the afternoon should be inseminated the next morning.

Chapter 2 : Meaning, Pros, and Cons of Artificial Insemination in Cattle

Several methods of obtaining bull semen for artificial insemination in farm animals have been developed, the most common of which are electro-ejaculation and the use of the artificial vagina.

Linkedin Share Button Research in Assisted Reproductive Technologies Various techniques have been developed and refined to obtain a large number of offspring from genetically superior animals or obtain offspring from infertile or subfertile animals. Artificial Insemination and Cryopreservation Artificial insemination AI has been used to obtain offspring from genetically superior males for more than years. Improvements in methods to cryopreserve freeze and store semen have made AI accessible to more livestock producers. In the same manner as cryopreservation of semen, embryo freezing allowed for the global commercialization of animals with high genetic qualities. Semen from bulls is especially amenable to freezing and long-term storage. In the dairy industry, where large numbers of dairy cows are managed intensely, AI is simple, economical, and successful. More than 60 percent of dairy cows in the United States are bred by AI. However, the situation is different for beef cattle, where breeding populations are usually maintained on range or pasture conditions. In the United States beef industry, AI accounts for less than 5 percent of inseminations. For reasons that are not yet well understood, it is more difficult to freeze and store semen from other livestock species, including horses, pigs, and poultry, than it is to freeze cattle semen. Multiple Ovulation and Embryo Transfer Development of embryo transfer technology allows producers to obtain multiple progeny from genetically superior females. Depending on the species, fertilized embryos can be recovered from females also called embryo donors of superior genetic merit by surgical or nonsurgical techniques. The genetically superior embryos are then transferred to females also called embryo recipients of lesser genetic merit. In cattle and horses, efficient techniques recover fertilized embryos without surgery, but only one or sometimes two embryos are produced during each normal reproductive cycle. In swine and sheep, embryos must be recovered by surgical techniques. To increase the number of embryos that can be recovered from genetically superior females, the embryo donor is treated with a hormone regimen to induce multiple ovulations, or superovulation. Immature oocytes female eggs can be obtained from ovaries of infertile or aged females, or from regular embryo donors described above. Ovum egg pick up is a nonsurgical technique that uses ultrasound and a guided needle to aspirate immature oocytes from the ovaries. Sex Determination of Sperm or Embryos The beef industry in the United States prefers male calves, which tend to have higher body weights and higher feed efficiency compared to female or heifer calves when placed in feedlots for the growing and finishing stages of meat production. In contrast, the dairy industry prefers heifer calves, which will ultimately produce offspring and milk for human consumption. Thus, methods are needed to determine the sex of sperm or embryos so producers can control the sex of the offspring of their livestock. In cattle, the X-bearing sperm contain 3. In mammals, the presence of a Y chromosome and one X chromosome determines that the individual will be a male. Female mammals contain 2 X chromosomes. Although the process to sort the X and Y bearing sperm is slow approximately 10 million live sperm of each sex can be obtained per hourâ€”this is about the number of live sperm required for one conventional dose of frozen semen for artificial insemination , this procedure determines the sex with higher than 95 percent accuracy. Nuclear Transfer or Cloning Since the mid s, technology has been developed to transfer the nucleus from either a blastomere cells from early, and presumably undifferentiated cleavage stage embryos or a somatic cell fibroblast, skin, heart, nerve, or other body cell to an enucleated oocyte unfertilized female egg cell with the nucleus removed. This process is also referred to as cloning. To date, somatic cell nuclear transfer has been used to clone cattle, sheep, pigs, goats, horses, mules, cats, rabbits, rats, and mice. The technique involves culturing somatic cells from an appropriate tissue fibroblasts from the animal to be cloned. Nuclei from the cultured somatic cells are then microinjected into an enucleated oocyte obtained from another individual of the same or a closely related species. Through a process that is not yet understood, the nucleus from the somatic cell is reprogrammed to a pattern of gene expression suitable for directing normal development of the embryo. After further culture and development in vitro, the embryos are transferred to a recipient female and ultimately result in the birth of live offspring. The

success rate for propagating animals by nuclear transfer is often less than 10 percent and depends on many factors, including the species, source of the recipient ova, cell type of the donor nuclei, treatment of donor cells prior to nuclear transfer, the techniques used for nuclear transfer, etc.

Chapter 3 : Artificial Insemination

Artificial insemination (AI) is the process of collecting sperm cells from a male animal and manually depositing them into the reproductive tract of a female. Artificial insemination is commonly used instead of natural mating in many species of animals because of the many benefits it can reap.

Find articles by W. Van Robays Find articles by J. Author information Copyright and License information Disclaimer Copyright: This article has been cited by other articles in PMC. Abstract Artificial insemination with homologous AIH or donor semen AID is nowadays a very popular treatment procedure used for many subfertile women worldwide. The rationale behind artificial insemination is to increase gamete density at the site of fertilisation. Modern techniques used in human artificial insemination programmes are mostly adapted from the work on cattle by dairy farmers wishing to improve milk production by using artificial insemination with sperm of selected bulls with well chosen genetic traits. The main reason for the renewed interest in artificial insemination in human was associated with the refinement of techniques for the preparation of washed motile spermatozoa in the early years of IVF. The history of artificial insemination is reviewed with particular interest to the most important hurdles and milestones. Artificial insemination, assisted reproduction, history, human, intrauterine insemination, semen Introduction The rationale behind artificial insemination is increasing the gamete density at the site of fertilization. Since many centuries different pioneers contributed to the history of artificial insemination, not only in humans but even more pronounced in farm animals. The primary reason for using this technique in farm animals was to speed up the rate of genetic improvement by increasing the productivity of food producing animals. This was accomplished by improving the selection differential wherein one highly selected male is mated with thousands of females. The AID industry was born. For humans the situation is different: Nowadays artificial insemination with homologous semen is most commonly used for unexplained and mild male factor subfertility. In the previous century donor insemination was mainly used for male infertility due to azoospermia or very low sperm count and for inherited genetic diseases linked to the Y-chromosome. Nowadays donor insemination is more commonly used in women with no male partner lesbians or single women. Milestones in the history of artificial insemination Unofficial history claims that the first attempts to artificially inseminate a woman, were done by Henry IV , King of Castile, nicknamed the Impotent. After six years of marriage she gave birth to a daughter, Joanna. Many contemporary historians and chroniclers assumed Henry was impotent. The possibility of artificial insemination was launched. Later on it was claimed that the princess was not the daughter of the king. Spermatozoa were first seen and described by Antoni van Leeuwenhoek and his assistant Johannes Ham in in the Netherlands. He draws the conclusion that the tails must be operated by means of muscles, tendons and joints Mol, ; Kremer, Nevertheless, his paper amazed and perhaps amused the reigning King of England. More than years later, in , the first artificial insemination in a dog was reported by the scientist Lazzaro Spallanzani Italian physiologist, It is believed that Spallanzani was the first to report the effects of cooling on human sperm when he noted, in , that sperm cooled by snow became motionless. A cloth merchant with severe hypospadias was advised to collect the semen which escaped during coitus in a warmed syringe and inject the sample into the vagina. J Marion Sims reported his findings of postcoital tests and 55 inseminations in the mid s. Only one pregnancy occurred but this could be explained by the fact that he believed that ovulation occurred during menstruation. In he began writing his innovative work Clinical Notes on Uterine Surgery, which was controversial but widely read. Its revolutionary approach to female diseases was refreshing and its emphasis on treatment of sterility, including artificial insemination, was ahead of its time. In Heape, an outstanding reproductive biologist from Cambridge, reported the use of AI in rabbits, dogs and horses. Heape also studied the relationship between seasonality and reproduction, as a result of his research Cambridge became a world centre for reproductive studies. In the first attempts to develop practical methods for artificial insemination were described by Ilya Ivanovich Ivanoff Russia, Although Ivanoff studied artificial insemination in domestic farm animals, dogs, rabbits and poultry, he was the first to develop methods as we know today in human medicine. He was a pioneer in the selection of superior stallions multiplying their

progeny through AI. The work of Ivanoff was taken over by Milovanov, another Russian scientist. Milovanov established major projects for cattle breeding and designed the first artificial vaginas, very similar to those used today. November 1, , the first animal, a rabbit, conceived by artificial insemination was exhibited in the United States at the 12th Annual Graduate Fortnight at the New York Academy of Medicine. Gregory Pincus, an American biologist, removed an egg from the ovary of a female rabbit and fertilized it with a salt solution. The egg was then transferred to the uterus of a second rabbit, which functioned as an incubator. Pincus conducted his experiments at Harvard University. Considering humans, only after the introduction and availability of donor sperm, artificial insemination became very popular AID. For many years homologous artificial inseminations were only indicated in cases of physiologic and psychological dysfunction, such as retrograde ejaculation, vaginismus, hypospadias and impotence. With the routine use of post-coital tests other indications were added such as hostile cervical mucus and immunologic causes with the presence of antispermatozoal antibodies in the cervical mucus. The first reports on human artificial insemination originated from Guttmacher , Stoughton and Kohlberg a; b. It was the real start of a new era in assisted reproduction. Other important research discoveries in animal studies undoubtly influenced the development of artificial insemination, also in human. Phillips and Lardy were the first to use egg yolk to protect bull sperm cells from temperature shock upon cooling. This protection was explained by the effect of phospholipids and lipoproteins in the egg yolk. Polge and co-workers were the first to freeze fowl and bull spermatozoa by using glycerol in the extender media. In Cornell University scientists New York discovered the benefit of antibiotics added to the sperm solution in artificial insemination processes. The so-called Cornell extender Foote and Bratton, contained the antibiotic mixture of penicillin, streptomycin and polymyxim B and was used for many years as the standard. Antibiotics are still used for the protection against possible contamination. Sherman, an American pioneer in sperm freezing, introduced a simple method of preserving human sperm using glycerol. He combined this with a slow cooling of sperm, and storage with solid carbon dioxide as a refrigerant. Sherman also demonstrated for the first time that frozen sperm, when thawed, were able to fertilize an egg and induce its normal development. As a result of this research, the first successful human pregnancy with frozen spermatozoa was reported in Considering the hostile climate for DI at the time the Cook County Supreme Court ruled that artificial insemination with donor semen was contrary to public policy and good morals it is not surprising that nearly a decade passed before the first successful birth from frozen sperm was announced in public, a major breakthrough in history. Considering all these new developments, it could be expected that in the s the sperm bank industry became very popular and commercialized, especially in the United States. The IVF revolution The main reason for the renewed interest in artificial insemination in human was undoubtly the introduction of in-vitro fertilisation IVF in by Steptoe and Edwards. In the early days the ejaculate of the husband was inseminated intrauterine without preparation resulting in uterine cramps and increasing the probability of tubal infections. With the arrival of IVF, semen preparation techniques were developed and IUI regained its popularity, being more safe and painless. These washing procedures are necessary to remove prostaglandins, infectious agents and antigenic proteins. Another substantial advantage of these techniques is the removal of nonmotile spermatozoa, either leucocytes or immature germ cells. Sperm preparation techniques should isolate and select sperm cells with intact functional and genetic properties, including normal morphology, minimal DNA damage, and intact cell membranes with functional binding properties. The final result is a better sperm fertilising ability in vitro and in vivo Aitken and Clarkson, and an increasing number of motile sperm that are morphologically normal at the site of fertilization. Bypassing the cervix, which acts as a reservoir for sperm, increases the importance of adequate timing of the insemination. Most popular are the swim-up procedure, the discontinuous Percoll gradient method, the mini-Percoll small volume gradient technique and the use of Sephadex columns. Novel sperm selection methods based on sperm surface charge or nonapoptotic sperm selection show promising results. However, they have not yet established themselves in routine practice, and their purpose for AIH is unknown; more evidence is needed Fig. At this moment AIH is probably one of the most applied assisted reproductive techniques worldwide. Nevertheless, there is still an on-going debate whether or not AIH is an effective treatment option for various indications. AIH should be abandoned in case of unexplained and moderate male infertility. Extended expectant management was

recommended although the evidence-based data supporting this recommendation were not convincing at all. Recent studies, including a large prospective randomized multicentre study, have shown that AIH remains a useful and cost-effective first-line treatment in case of mild male infertility and unexplained infertility with an unfavourable prognosis as compared to the more aggressive techniques such as IVF and ICSI Van Rumste et al. Legal, socio-cultural and religious considerations surrounding artificial donor insemination The moral and social implications of artificial insemination were debated in both the medical and popular press in the United States since , in Europe the debate started in the s. The Catholic Church objected to all forms of artificial insemination, saying that it promoted the vice of onanism and ignored the religious importance of coitus. The main criticism was that artificial insemination with donor semen was a form of adultery promoting the vice of masturbation. Other critics were concerned that AID could encourage eugenic government policies. Nevertheless, the demand for donor sperm increased tremendously. After the first successful pregnancy from frozen sperm, reported in , the development of a thriving sperm-bank industry starting in the s and the commercialization of AID became unavoidable. Because of the possible transmission of sexually transmitted diseases, including HIV, when using fresh sperm screening for infections of donors became mandatory. The use of fresh donor semen samples almost disappeared. Another concern is the possibility to donate semen many times. Sociocultural concerns with biological paternity and the maintenance of the heterosexual, married couple as the basis of the family remain important in many countries. A lot of countries all over the world have not approved the use of AI with donor semen for single women and lesbian couples yet. Another point of debate is whether the donor has to be anonymous or non-anonymous, and when to inform and what to tell AID children about their biological parentage, if non-anonymous donors are used. Whether or not to pay the donors and sexing of sperm by DNA quantification using flow cytometry instrumentation became a point of discussion. Conclusion The historical story of artificial insemination is a successful one; the worldwide acceptance of artificial insemination in animals provided the impetus for the innovation and development of many technologies which we are nowadays familiar with such as gamete cryopreservation, ovarian stimulation and cycle regulation, embryo freezing and cloning. Many of the principles nowadays used in human artificial insemination are adapted from domestic animal studies, especially from cattle. The increasing demand of lesbians and single women for AI with donor semen is another challenge in many countries worldwide. Many debates, socio-cultural and ethical, are to be expected in the near future. Acknowledgments I gratefully acknowledge Jeannick Gelissen for her technical support in preparing this manuscript. Cellular basis of defective sperm function and its association with the genesis of reactive oxygen species by human spermatozoa. The science of reproduction and its traditions. Intra-uterine insemination for male subfertility.

Chapter 4 : How To Carry Out Artificial Insemination In Farm Animals

Artificial insemination is the process of forcibly impregnating an animal, often to achieve reproduction to maintain or increase the supply of animals in a farm to keep up with demand.

This has been found to result in a normal offspring. In this process, the semen is inseminated into the female by placing a portion of it either in a collected or diluted form into the cervix or uterus by mechanical methods at the proper time and under most hygienic conditions. The first scientific research in artificial insemination of domestic animals was performed on dogs in by the Italian scientist, Lazanno Spalbanzani. His experiments proved that the fertilizing power reside in the spermatozoa and not in the liquid portion of semen. Few further studies under research station conditions helped this technique to be used commercially allover the world including India. Artificial insemination is not merely a novel method of bringing about impregnation in females. Instead, it is a powerful tool mostly employed for livestock improvement. In artificial insemination the germplasm of the bulls of superior quality can be effectively utilized with the least regard for their location in far away places. By adoption of artificial insemination, there would be considerable reduction in both genital and non-genital diseases in the farm stock. The animal will be in restlessness and nervousness. The animal will be bellow frequency. The animal will reduce the intake of feed. Peculiar movement of limbo sacral region will b observed. The animals which are in heat will lick other animals and smelling other animals. The animals will try to mount other animals The animals will standstill when other animal try to mount.. This period is known as standing heat. This extends hours. Frequent maturation urination will be observed. Swelling of the valva will be seen. The tail will be in raised position. Milk production will be slightly decreased. On Palpation uterus will be turgid and the cervix will be opened. There are several advantages by artificial insemination over natural mating or servicing. There is no need of maintenance of breeding bull for a herd; hence the cost of maintenance of breeding bull is saved. It prevents the spread of certain diseases and sterility due to genital diseases. By regular examination of semen after collection and frequent checking on fertility make early detection of interior males and better breeding efficiency is ensured. The progeny testing can be done at an early age. The semen of a desired size can be used even after the death of that particular sire. The semen collected can be taken to the urban areas or rural areas for insemination. It is helpful to inseminate the animals that are refuse to stands or accept the male at the time of oestrum. It helps in maintaining the accurate breeding and cawing records. It increases the rate of conception. It helps in better record keeping. Old, heavy and injured sires can be used. Requires well-trained operations and special equipment. Requires more time than natural services. Necessitates the knowledge of the structure and function of reproduction on the part of operator. Improper cleaning of instruments and in sanitary conditions may lead to lower fertility. If the bull is not properly tested, the spreading of genital diseases will be increased. Market for bulls will be reduced, while that for superior bull is increased. Various methods of collection of semen have been devised from time to time. The older unsatisfactory methods have gradually replaced by the new modern techniques. There are three common methods. Use of artificial vagina By Electro-stimulation method. By massaging the ampulae of the duct us differences through rectal wall. The ideal method of semen collection is use of artificial vagina which is safe for sire and the collector also. A heavy hard rubber 2" lose, open at both ends with a nostle for air and water in and outlet. Inner sleeve of rubber or rubber liner. The semen receiving cone or rubber cone. Semen collection tube made of glass or plastic graduate in cc and its fraction correct to 0. Now the space between the hard rubber hose and inner rubber liner forms a water tight compartment. The nostle at one end of the hose can be fixed. The graduated semen collection tube is fixed to the narrow end of the artificial vagina hose, and fastened by a rubber band. The inner side of the rubber liner on the anterior side of the artificial vagina is lubricated with sterile jelly to a length of 3 to 4 inches. Air is blown through the nostle into the water jacket, to create pressure in if, and the same is exerted the rubber linear, to simulate natural vagina. The temperature of the artificial vagina is to be checked, at each collection, and it should simulate natural vagina at mounting time. If the artificial vagina is to mount later. If it is too cold ejaculate may not be there after a thrust, or even if ejaculate is there; it may be contaminated with urine, and becomes unfit for use.

The cow or dummy is secured in service create. The artificial vagina is held with the left hand by a right handed person; and when the bull mounts the cow, the sheath of the bull will be graphed by the operator, directing the gland penis into the artificial vagina, and then the bull gives a thrust to ejaculate. The operator should evince care so as not to touch the exposed past of the penis. After the bull dismounts, the artificial vagina is taken off from penis and the air vent is opened to release the pressure from the jacket. The water from the jacket is also drained by opening the nostle. This allows the ejaculate to flow from the cone to the semen collection tube. The semen collection tube is detached from the cone, plugged with cotton wool, and taken to the laboratory for examination. The rubber cone and the semen collection tube can be protected from external contamination or heat or higher, by covering with an insulation bag with zip. In , British scientists discovered that addition of glycerol to the semen extender improved resistance of sperm to freezing. Glycerol acts to remove water from the sperm cell prior to freezing and prevents the formation of cellular ice crystals which would damage the sperm. There are two methods of freezing and storing semen: Liquid nitrogen is preferred because there is no evidence of fertility deterioration with age. Fertility gradually declines in semen stored in dry ice-alcohol. Frozen semen can be stored indefinitely if proper temperature is maintained. A recent report told of a calf born from frozen semen stored for 16 years. Fresh, liquid semen can be successfully stored for 1 to 4 days at 40 degrees F. Semen is usually stored in glass ampoules. Other methods appear promising, particularly the French-straw. Several AI organizations have gone to this method exclusively. Artificial coloring is frequently added to semen extenders in order to distinguish one breed from another. Complete identification of the bull is required on each individual semen container. Cow which is in heat is well controlled placing it in a Travis. The inseminator will get ready by wearing a plastic apron, gumboots and gloves. The semen straw after thawing keeping the semen straw in warm water for a minute to convert the freezed semen into liquid and the sperms become motile is loaded in a sterilized A. The inseminator will insert the gloved left hand into the rectum after applying the soft soap or other lubricant on the glove and back racked the animal, and the hand is further inserted and will catch hold the cervix through rectal wall. I gum loaded with semen straw is passed. I gum reaches the cervix, then the semen is deposited by injecting the gun, and after depositing the semen the gun is removed, the empty straw and sheath are disordered. Here there is a risk of contamination and injury of female genitalia. Now a day if farmer wants to use of an outstanding size for inheritance of high milk yield, he can go in for frozen semen service provided his area is, covered by Artificial insemination, with supply of frozen semen. At present frozen semen is used in most of the states in India. The technique of semen preservation in straws was developed in France. Freezing of semen is done with a special diluents, which has the following composition. Sodium citrate dihydrate angular 2. Distilled water double glass distilled The addition of glycerol to the dilulent makes the cells more resistant to the rigours of freezing and icy crystals, which form are smaller and smoother thus creating less damage to the spermatozoa. The addition of fructose to the diluent luprores sperm resistance to glycerol; and also provides nutrition. The final level of glycerol should be 7. The antibiotics are added to inhibit bacteria and to kill pathetic organisms. The semen to be diluted in such a way that one ml. The semen must be cooled carefully for spermatozoa to remain with life. Frozen semen facilitates the percent use of the semen diluted and frozen, and thus the delivery price is reduced, and it can be supplied with the gaps of months to the A.

Chapter 5 : Livestock:: Cattle:: Artificial InseminationAnimal Husbandry :: Home

The Artificial Insemination of Farm Animals. by Perry, Enos J. (Editor). and a great selection of similar Used, New and Collectible Books available now at blog.quintoapp.com

Benefits of artificial insemination in livestock What is artificial insemination and why would a livestock producer want to AI his breeding stock? Artificial insemination AI is the process of collecting sperm cells from a male animal and manually depositing them into the reproductive tract of a female. Artificial insemination is commonly used instead of natural mating in many species of animals because of the many benefits it can reap. These benefits include increased safety of the animals and producer, increased production efficiency and better genetics. Artificial insemination can reduce many of the risks involved with breeding. Natural mating is a stressful process that has a much higher tendency to result in injuries or accidents of both the animals and producer. Particularly in cattle, males tend to be very large and sometimes aggressive. Artificial insemination removes all risks involved with keeping a male on the premise. Furthermore, artificial insemination reduces the risk of transmitting diseases. The entire artificial insemination procedure is much more hygienic than natural mating. All the tools and equipment are sterilized both before and after. The entire procedure is altogether a much cleaner and sanitary process. Artificial insemination also increases efficiency. Most males usually produce enough sperm in a single ejaculate to be diluted and extended enough to create over one hundred doses. These straws of frozen semen are typically stored in a nitrogen tank where they will last for years and can be used as needed. The semen can also be shipped to various livestock producers around the United States, allowing them to artificially inseminate their herds. This gives many producers the opportunity to avoid keeping a male on the farm or potentially having to take their breeding animals to a male. Lastly, artificial insemination can drastically improve the genetics of your herd. With artificial insemination becoming increasingly popular, many producers collect semen from their herd sires and make it available to other producers for purchase. This gives producers the opportunity to select what they want to breed their animals to. Proven and better genetics are becoming readily more available across the nation, and the quality of livestock in the Unites States continues to increase.

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Chapter 6 : Technical & Learning Resources, Animal Production and Health, APH - NAFA

Artificial insemination (AI) is the process of collecting sperm cells from a male animal and manually depositing them into the reproductive tract of a female. One can cite a number of potential benefits from the use of artificial insemination.

Check new design of our homepage! Meaning, Pros, and Cons of Artificial Insemination in Cattle Artificial insemination in cattle is a technique by which the semen from a bull, is artificially introduced into the vaginal opening of a cow, with the purpose of conception. This article provides information on this technique and its pros and cons. AnimalSake Staff Last Updated: Apr 22, Artificial insemination AI is a popular, simple and inexpensive treatment of infertility in animals, in which the sperm from the male is collected and introduced artificially, into the reproductive tract of the female for conception. It was in that the first scientific research in AI of domestic animals, was carried out on dogs. Lazanno Spalbanzani, an Italian scientist, conducted experiments that proved the power of fertilization vested with the spermatozoa and not with the liquid portion of the semen. These studies spearheaded the commercial utilization of this technique for breeding across the globe. Today, AI has emerged as one of the best techniques devised for genetic melioration of farm animals. This is a remarkable method of breeding quality cattle, in the most natural way possible. AI is being carried out in a large number of buffaloes and cows and is extremely useful in countries like India, wherein quality sires have been scarce. Artificial insemination in cattle has taken care of this major obstacle in the path of cattle improvement. Artificial Insemination Technique The process of artificial insemination in cattle involves the deposition of semen, in the vagina of the cow, at the most appropriate time for acceptable conception rates. This is the same way conception is achieved after natural mating. However, this technique has been altered due to its low conception rates and high requirement of sperms. This technique involves the insertion of a disposable, sterile catheter containing thawed semen into the vagina of the cow. The catheter is then guided into the spiral folds of the cervix into the uterus, with the help of a gloved hand in the rectum. Some part of the semen is deposited inside the uterus, while the rest of it is left in the cervix as the catheter is withdrawn. Some people recommend deposition of semen in the cervix canal, with no further deposition in the uterus, of previously inseminated cows. This is because there are chances of pregnancy. This rectovaginal technique is quite complex and requires patience and practice to achieve successful insemination. The timing of insemination also plays a crucial role, as there is a time when maximum conception can be expected. Advantages of Artificial Insemination Quality Sires: AI method involves dilution of collected semen so as to create hundreds of doses from one ejaculate. Thus, AI makes superior sire semen to be available to hundreds of female cows. Artificial insemination in dairy cattle, leads to sires of inheritance for butter fat and milk production. Prior to AI, only few cows could have the advantage of good bulls. Decreased Costs and Increased Safety: Bulls are bigger and stronger than cows and generally quite difficult to handle around the farm. Their aggressive nature can make them potential threats on the farm. However, AI eliminates the need to have a bull on the farm, as semen can be easily transported to various geographical areas. Since maintaining males costs quite a bit, AI decreases the overall costs on the farm. Reduction in Disease Transmission: The transfer of venereal diseases is quite likely to happen during natural mating. Certain pathogens can be transferred via the semen into the female, during AI as well, however, the screening done after semen collection prohibits this transfer. This helps maintain the vigor of the cattle breed. Artificial insemination in beef cattle helps maintain the genetic pool, thereby obtaining the right strain of beef cattle, required for meat production. Bulls of high genetic merit are available with AI. Despite all the pros, AI does have its share of cons. It requires dexterity, patience, knowledge, experience, as well as specialized equipment. Improper ways of carrying out AI in animal species, such as improper sterilization of equipment, unsanitary conditions, etc. The severe climatic conditions prevalent in most parts of India makes transportation and preservation of semen difficult. Moreover, the need for superior germ plasm has reduced the market for bulls.

Chapter 7 : ARTIFICIAL INSEMINATION

Artificial insemination (AI) is one of the most effective tools available to cattle producers to improve productivity and profitability of their cattle operation. Artificial insemination has been commercially available for more than 65 years and utilized very effectively in the dairy industry.

This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. September History[edit] The first reported case of artificial insemination by donor occurred in Pancoast , a professor in Philadelphia, took sperm from his "best looking" student to inseminate an anesthetized woman. The woman was not informed about the procedure, unlike her infertile husband. The case was reported 25 years later in a medical journal. If the procedure is successful, the woman will conceive and carry a baby to term in the normal manner. A pregnancy resulting from artificial insemination is no different from a pregnancy achieved by sexual intercourse. In all cases, the woman is the biological mother of any child produced by AI, and the male whose sperm is used is the biological father. There are multiple methods used to obtain the semen necessary for artificial insemination. Some methods require only men, while others require a combination of a male and female. Those that require only men to obtain semen are masturbation or the aspiration of sperm by means of a puncture of the testicle and epididymus. There are a number of reasons why a woman with a male partner would use artificial insemination to achieve pregnancy. In the case of heterosexual couples who are finding it difficult to conceive, before artificial insemination is turned to as the solution, doctors will require an examination of both the male and female involved in order to remove any and all physical hindrances that are preventing them from naturally achieving a pregnancy. From these tests, the doctor may or may not recommend a form of artificial insemination. Preparations[edit] Timing is critical, as the window and opportunity for fertilization is little more than twelve hours from the release of the ovum. To improve the success rate of AI, drugs to create a stimulated cycle may be used, but the use of such drugs also results in an increased chance of a multiple birth. Sperm can be provided fresh or washed. Pre- and post-concentration of motile sperm is counted. Sperm from a sperm bank will be frozen and quarantined for a period, and the donor will be tested before and after production of the sample to ensure that he does not carry a transmissible disease. For fresh shipping, a semen extender is used. If sperm is provided by a private donor, either directly or through a sperm agency, it is usually supplied fresh, not frozen, and it will not be quarantined. Donor sperm provided in this way may be given directly to the recipient woman or her partner, or it may be transported in specially insulated containers. Some donors have their own freezing apparatus to freeze and store their sperm. The human female reproductive system. The cervix is part of the uterus. The cervical canal connects the interiors of the uterus and vagina. Semen used is used either fresh, raw, or frozen. Where donor sperm is supplied by a sperm bank, it will always be quarantined and frozen, and will need to be thawed before use. Intracervical insemination[edit] Intracervical insemination ICI involves the introduction of unwashed or raw semen into the vagina at the entrance to the cervix , usually by means of a needleless syringe. ICI is painless and is the easiest and most common insemination technique. This method closely replicates the ejaculation of semen by the penis during sexual intercourse, with fresh sperm being directly deposited into the vagina, and onto the neck of the cervix. It is the simplest type of artificial insemination, and unwashed or raw semen is normally used, but semen supplied by a donor through a sperm bank which has been prepared for IUI use may also be used. The procedure is commonly used in home, self-insemination and practitioner insemination procedures, and for insemination where semen is provided by private donors. In order to perform an ICI insemination, air must be expelled from a needle-less syringe which is then filled with semen which has been allowed to liquify. Any further enclosed air must be removed by gently pressing the plunger forward. The woman lies on her back and the syringe is then inserted into the vagina. Care is optimal when inserting the syringe, so that the tip is as close to the entrance to the cervix as possible. A vaginal speculum may be used for this purpose. The plunger is then slowly pushed forward and the semen in the syringe is gently emptied deep into the vagina. It is important that the syringe is emptied slowly for best results. The syringe may be left in

place for several minutes before removal. The woman is advised to lie still for about half-an-hour to improve the success rate. One insemination during a cycle is usually sufficient. Additional inseminations may not improve the chances of a pregnancy. This procedure is therefore sometimes referred to as intravaginal insemination IVI. The sealed end of the straw itself must be cut off and the open end of the straw is usually fixed straight on to the tip of the syringe, allowing the contents to be drawn into the syringe. Sperm from more than one straw can generally be used in the same syringe. Where fresh semen is used, this must be allowed to liquefy before inserting it into the syringe, or alternatively, the syringe may be back-loaded. A conception cap, which is a form of conception device , may be inserted into the vagina following insemination and may be left in place for several hours. Using this method, a woman may go about her usual activities while the cervical cap holds the semen in the vagina close to the entrance to the cervix. Advocates of this method claim that it increases the chances of conception. One advantage with the conception device is that fresh, non-liquefied semen may be used. The partner or donor may ejaculate straight into the cap and this can be immediately inserted into the vagina. Other methods may be used to insert semen into the vagina notably involving different uses of a conception cap. This may, for example, be inserted filled with sperm which does not have to be liquefied. The male may therefore ejaculate straight into the cap. Alternatively, a specially designed conception cap with a tube attached may be inserted empty into the vagina after which liquefied semen is poured into the tube. These methods are designed to ensure that donor or partner semen is inseminated as close as possible to the cervix and that it is kept in place there to increase the chances of conception. Intrauterine insemination[edit] Intrauterine insemination IUI involves injection of washed sperm into the uterus with a catheter. If unwashed semen is used, it may elicit uterine cramping, expelling the semen and causing pain, due to content of prostaglandins. Prostaglandins are also the compounds responsible for causing the myometrium to contract and expel the menses from the uterus, during menstruation. Resting on the table for fifteen minutes after an IUI is optimal for the woman to increase the pregnancy rate. A female under 30 years of age has optimal chances with IUI; for the man, a TMS of more than 5 million per ml is optimal. Enabling the sperm to be inserted directly into the womb will produce a better chance of conceiving. It is also a method used by couples using donor sperm in a fertility centre. Still, advanced maternal age causes decreased success rates; women aged 38â€”39 years appear to have reasonable success during the first two cycles of ovarian hyperstimulation and IUI. However, a randomized trial of insemination after ovarian hyperstimulation found no difference in live birth rate between single and double intrauterine insemination. The cervix is then clamped to prevent leakage to the vagina, best achieved with a specially designed double nut bivalve DNB speculum. The sperm is mixed to create a volume of 10 ml, sufficient to fill the uterine cavity , pass through the interstitial part of the tubes and the ampulla , finally reaching the peritoneal cavity and the Pouch of Douglas where it would be mixed with the peritoneal and follicular fluid. IUTPI can be useful in unexplained infertility , mild or moderate male infertility, and mild or moderate endometriosis. Pregnancy rate[edit] Approximate pregnancy rate as a function of total sperm count may be twice as large as total motile sperm count. Values are for intrauterine insemination. Old data, rates are likely higher today [citation needed] Main article: The success rate increases with increasing TMSC, but only up to a certain count, when other factors become limiting to success. However, although more cost-efficient, using a lower TMSC also increases the average time taken to achieve pregnancy. Women whose age is becoming a major factor in fertility may not want to spend that extra time. Samples per child[edit] The number of samples ejaculates required to give rise to a child varies substantially from person to person, as well as from clinic to clinic. However, the following equations generalize the main factors involved:

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Assisted Reproductive Techniques in Farm Animal - From Artificial Insemination to Nanobiotechnology male infertility due to various abnormalities of biopsied embryos also reflects the minimal damage of.

Farm Animal Production 0 Several methods of obtaining bull semen for artificial insemination in farm animals have been developed, the most common of which are electro-ejaculation and the use of the artificial vagina. The artificial-vagina method is most widely use today. The bull is allowed to mount a teaser cow and ejaculates when the penis is directed into the artificial vagina. The artificial vagina consists of a firm cylindrical tube with a thin-walled holding a collection receptacle which is attached to one end of the artificial vagina is lubricated and applied carefully, it yield a high degree of success. In recent years the collection of bull semen by electrical stimulation has come into use. A bipolar rectal probe is use to electrically stimulate the nerves in the region near the accessory glands and the base of the penis; this produces erection and ejaculation. This method is especially useful with bulls that are unable to mount and thus cannot use an artificial vagina. Precaution To Take while carrying Out Artificial Insemination In Farm Animal are; What ever method of collection is used, cleanliness is essential to prevent contamination of the semen. Proper and careful treatment of bull is necessary for adequate pre-collection stimulation, which will increase the quantity and quality of semen obtained. If sex drive is to remain unimpaired, the teasers and the environment may need to be changed frequently. Adequate facilities for controlling the bull and the teaser must be maintained so that the danger of injury to the collection as well as the animal is minimized. Method of Semen Collection The method of collecting bull semen have undergone several changes over the years, and many of these changes have been important steps in the advancement of artificial insemination. This leadwas followed by Miller and Evans who used the massage method to collect bull semen Foote The massage method is useful in that it provides a means of obtaining semen from bulls that cannot mount or frombulls that, for some reason, will not mate either naturally or with the artificial vagina. However, semen collected by this method is apt to be contaminated with urine, have too high a proportion [oof seminal vesical secretion, or be otherwise less well balance in its componates than ejaculation semen this method is also used in semen collectionfrom cocks. The Aritificial Vagina Method: The artificial vagina eliminatws several of the disadvantages of collection from the vagina and of collection by massage. The artificial vagina is simple to construct and use. Semen cllected with it is fairly clean, and the ejaculate is more normal. Types of Atificial Vagina: Apparently, the first aritficial vagina for bulls was design in russia. It consisted of a rigid cylider of rulinder was a thin-walled rubber tube, the ends of which were turned back over the outer cylinder, forming a water-tight jacket. Into one end of the atificial vagina was fitted a graduated, glass semen receptacle of slightly smaller diameter then the cylineder. The jacket was filled through a screw-plug hole with water hot enough to bring the inside of the atificial vagina to a few deggrees above body temperture. Apparently, the first attempts at including ejaculation by electricalk stimulus were made by Battelli in , who introduced an electrical shock 30 volts, 47 cycles alternation current at the base of a brain of a mature male guinea pig. After that a number of investigation of electro-ejaculation was carried out with laboratory animals. Gunn, of Australia, Pioneered the investigations of eletro-ejaculation of farm anmial with his work on rams, which he reported in By passing few 5 to 10 second rhythmic stimuli 30 volts, 50 cycles alternating current through the electrodes, ejaculation was produced and semen was collected in a glass tube. This method is effective in semen collection from boars. In this, the boar is brought to a teaser or dommy sow while the technican wearing the hand glove stand-by. As soon as the boar mounts applied a mild pressure. The boar then ejaculates and the semen collected with a collection vial.

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Within the cattle industry there has been a shift away from hiring professional technicians to artificially breed cattle and toward artificial insemination by owner-inseminators. Such a trend should not suggest that artificial insemination (AI) is an easy technique or that all owner-inseminators are.

Artificial insemination AI of cattle Artificial insemination AI is the process of collecting sperm cells from a male animal and manually depositing them into the reproductive tract of a female. One can cite a number of potential benefits from the use of artificial insemination. Increased efficiency of bull usage: During natural breeding, a male will deposit much more semen than is theoretically needed to produce a pregnancy. In addition, natural breeding is physically stressful. Both of these factors limit the number of natural matings a male can make. However, collected semen can be diluted and extended to create hundreds of doses from a single ejaculate. Also, semen can be easily transported, allowing multiple females in different geographical locations to be inseminated simultaneously, and semen can be stored for long periods of time, meaning that males can produce offspring long after their natural reproductive lives end. Increased potential for genetic selection: Because artificial insemination allows males to produce more offspring, fewer males are needed. Therefore, one can choose only the few best males for use as parents, increasing the selection intensity. Furthermore, because males can have more offspring, their offspring can be used in a progeny test program to more accurately evaluate the genetic value of the male. Finally, individual farmers can use artificial insemination to increase the genetic pool with which his or her animals can be mated, potentially decreasing effects of inbreeding. Male animals often grow to be larger than females and can consume relatively larger amounts of feed. Also, male animals are often more strong, powerful, and potentially ill-mannered and thus require special housing and handling equipment. Increased safety for animals and farmers: As mentioned, male animals can become large and aggressive. These factors mean that maintaining a bull on a farm may be dangerous. Also, because of the relatively larger size of adult males than females, natural mating is more likely to result accidents and injury to either the cow or the bull than is artificial insemination. Natural mating allows for the transfer of venereal diseases between males and females. Some pathogens can be transmitted in semen through artificial insemination, but the collection process allows for the screening of disease agents. Collected semen is also routinely checked for quality, which can help avoid problems associated with male infertility. Artificial insemination has some potential drawbacks, however, that must be considered. First, it can be more labourious. Male animals instinctively detect the females that are in the correct status for conception. With artificial insemination the detection work falls on the responsibility of the farmer. Poor detection results in decreased rates of fertility. Also, increasing the number of offspring per male has selective advantages only if the best males can be accurately determined. Otherwise this process only decreases the genetic variability in a population. Increasing the number of offspring per male always reduces the gene pool. The benefits of more intense selection must be balanced against the negative effects of decreased variation.