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Shaglawa technical college

Veterinary department

Stage Two/Morning

Characteristics of Artificial Insemination in Farm Animals

A Graduation Research Project Submitted to the Council of the College of Shaqlawa at Erbil Polytechnic University in Partial Fulfillment of the Requirements for the Degree of Doploma in Technical Veterinary

PREPEARED BY

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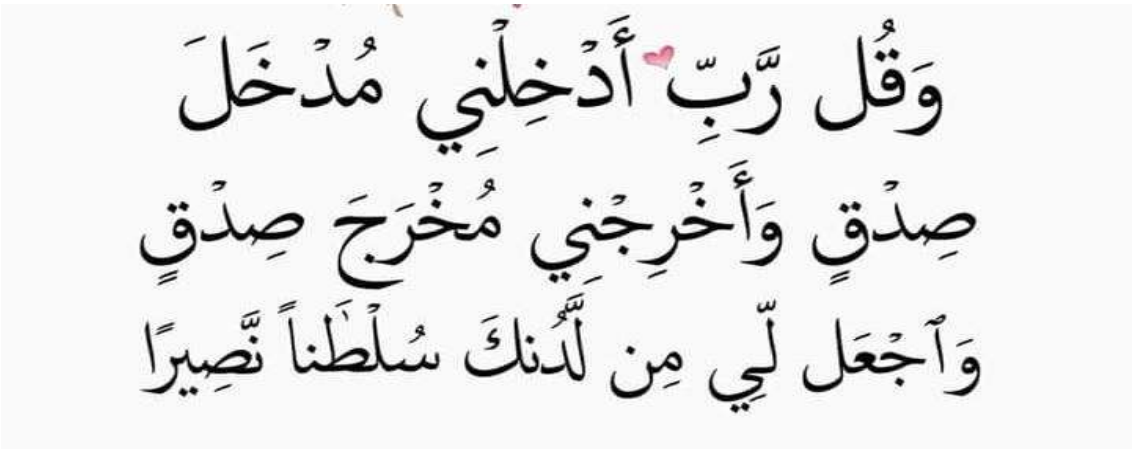
بسم الله الرحمن الرحيم



صدق الله العظيم

Declaration of Supervisor

I certify that this research is under the title (Non nutrient additive on poultry diet).Presented by the students:

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It took place under my superv the Shaqlawa Technical College as part of the requirements for obtaining a diploma in veterinary medicine.

Signature:

The name: Assist.Proff. Dr Hassan

Date:6 /5/ 2024

Based on the available recommendations, I nominate the research for discussion.

Signature:

The name: Assist.Proff. Dr Hassan - Head of department

Date:6 /5 / 2024

The Approval of he Discussion Committee

We hope that we have given full rights to our project and we hope that the supervisory committee will consider this project good and we will get a good certificate.

Bnawsh Ajil

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Warda Samir

Zhino Muhammed

We have discussed with the students its contents and what is related to it as part of the requirements for obtaining a diploma in (veterinary), and we found it fulfilling the requirements of the certificate.

Head of committee: Dr. Kamaran Muhammed Husien

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Member:	**Member:**	**Member:**
2024	**2024**	**2024**

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Abstract

Artificial insemination (AI) was the first great biotechnology applied to improve reproduction and genetics of farm animals. It has had an enormous impact worldwide in many species, particularly in dairy cattle. The acceptance of AI technology worldwide provided the impetus for developing other technologies, such as cryopreservation and sexing of sperm, estrous cycle regulation, and embryo harvesting, freezing, culture and transfer, and cloning. New, highly effective methods of sire evaluation were developed. The history of development of AI is reviewed, particularly in dairy cattle, in which the impact on genetic improvement and control of venereal diseases have been greatest. Other species briefly included are swine, horses, sheep, goats, dogs, rabbits, poultry, and endangered species. Major landmarks in AI development are cited, along with the people most closely associated with these developments. Many of these pioneers helped to develop a new generation of reproductive physiologists and biotechnologists. A bit of the flavor of the times is included, along with the historical facts. Many of the references will take the reader back to an era before electronic networks were available, so these citations of classical studies will not be found with the press of a key on the electronic keyboard. Readers are invited to explore these historical treats that have provided a springboard for the future.

Chapter one

Introduction

1.1The history of artificial insemination.

dates back thousands of years, with early evidence found in ancient texts and practices. In agricultural societies, such as ancient Egypt and Rome, methods involving the manual collection and transfer of semen from males to females were used to improve livestock breeding [1]

However, it wasn't until the late 18th and 19th centuries that scientific experimentation and documentation of Al began. In the late 1700s, scientists like Lazzaro Spallanzani conducted experiments on animal reproduction, including artificial insemination in dogs and frogs [3].

The 20th century marked significant advancements in Al techniques, particularly in animal husbandry. Pioneering work by scientists like Ivanov in Russia and Hunter in the United States led to successful artificial insemination in various animal species, including cattle, pigs, and poultry.

These developments revolutionized agricultural practices, allowing for selective breeding and improved genetics.

Artificial insemination spread to most European, American and Third World countries, but in Iraq (artificial insemination) began due to experimental efforts To repair the government cows, to use the products of these repairs (goats) for their department's program of animal breeding, by distributing them on animal breeding enters in districts, for the purpose of natural repair to change the breed of domestic cows In 1962, the turning point in Iraq was the establishment of the Artificial Repair Base Unit in Abu Ghraib, responsible for the repair of the government's cows[2].

1.2 Aim of the study

1. Learn the breeding system followed on cow farms.

2. Learn how to form sperm and eggs.

3. Know the reproductive organs of cows and other animals (male and female).

4. Understand the phenomenon of puberty, know the factors that affect this Phenomenon

5. Understand the phenomenon of constipation.

6. Learn how to raise cattle.

7. Learn how to collect and store sperm.

8. How to assess the amount and type of sperm fluid and various ways to determine the ability of the COW.

9. Learn the stages of fertilization and the factors affecting it.

10. How to clean the seeds, and with various cleaners, after insertion until used for prosthetic repair.

Chapter two

Preparation for sperm collection

2.1There are several requirements that must be met before collection such as:

1. Cleaning the cow, especially the genitals

2. Preparation of the artificial vagina for collection

3. A cow or bull and an artificial calf should be prepared so that the cow can jump on it and stimulate more mating.

4. The cow used for collection should be monitored from the time it approaches (a cow, or bull, or artificial cow) until the collection is completed **[3]**

Chapter three

Methods of semen collection

3.1 Electro-ejaculation method

• In this method weak alternating current is provided to sacral and pelvic nerves through electrodes placed in rectum.

• Accessory gland secretion takes place at lower voltage and ejaculation at higher voltage.

• Although semen has less contamination in this method but it causes discomfort to animal and variable reaction.it is only preferred when male cannot be trained for artificial collection of semen. **[4]**

3.2Massage method (outdated method

• Massaging of rectum of vesicular gland and ampullae of vas deferens can induce semen flow.

• But it has more chances of contamination with urine and get imbalance in its composition.

3.3 Collection on dummy cow or manikin

• A dummy cow is prepared by heavy steel frame covered with hard leath give appearance of normal cow.

• An artificial vagina is prepared and fixed at suitable height at rear of dummy cow

• Although it has advantage over teaser cow being disease resistance but male male does not show interest in such dummy cows. **)[5-6]**

3.4 Live mount and teasing procedure

• Live mounts using a teaser is most successful procedure.

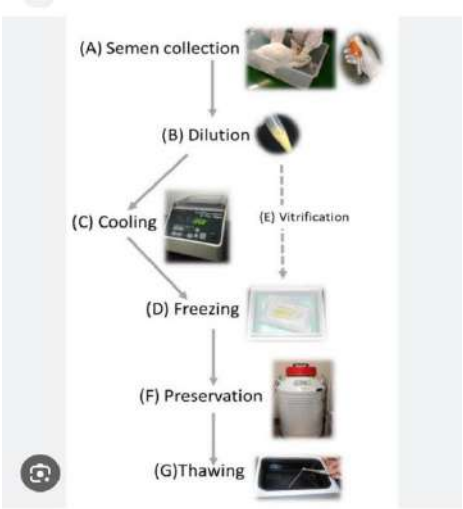
• Estrogen treated females are selected for semen collection.

• Cow should be of same breed and color [7]

• Cow should be of medium height as bulls feels difficulty on mounting.

• It is better to select cow which has done 2-3 calving.

• A pregnant cow or cow on heat should be avoided.



4-Sperm testing after collection

4.1Seminal fluid clarification:

The purpose of sperm clarification is to mix it into a suitable medium selected to provide suitable conditions for the survival of live sperm for a long time without reducing fertility throughout the storage period, expanding the volume of sperm fluid and wrapping a large number of females[8]

4.2Estimation of sperm movement:

Microscopic tests for estimating seed viability should be performed immediately after collection of seed fluid for more than 10 minutes and at a temperature of 37

cm3 We can put a sheet of glass on a hot glass, or heat it over low heat to bring it to near body temperature. In this way we can identify the living seeds that are able to move and get rid of them. There are many different ways to measure your sperm count, and they are all true if one person does them and evaluates them in the same way each time. 3. They can often be used for repair, although their density is low, but the ratio of clarification should not exceed (1: .1) and the clarification method should be observed In the long run.[9]

4.3Size:

The average sperm size for adult cows is 5c3 and 2.5c3 for young cows, including 2.8c3 for adult cows. The total sperm size is effective for several reasons[10-11]

4.4. colour:

The natural color of cow's semen is normally thick milk. The more saturated the color, the more dense the semen is. Yellow means the presence of lipochrome. This is natural, but sometimes it is yellow due to urine.

5-What is the method of sperm cryopreservation?

"Sperm has to stay frozen at a constant temperature of minus 196 degrees centigrade," says Herati. Each patient's sperm is typically split into several vials and kept in multiple storage tanks. If one freezer fails, the remaining sperm samples remain safe.[12]

6-Methods of preparing prosthetic repairs

6.1Cows

Collection of sperm in the front of the front all need to choose a good cow and have good genetic characteristics 13-17]

Inside, you must respect the work of the team attributes such as: increased milk production, such as increased milk containing milk, or increased meat production,

6.2 (Place) The place used for collecting the seed liquid must meet the following conditions[14]

1. Keep the place away from noise and quiet.
2. Avoid dust.
3. The area must be covered.
4. The location should be near the laboratory.

5. The collection field should be wide.

6. Rough laid ground.

7-Different preparation methods for prosthetic repair

1. The way of opening the river.

2.How to use the Kislif agency.

3.Gelatin capsule method.

4.Deep repair method is the best and most common method used for artificial repair.

The summary of this method is that the repairman sends one hand into the cow's vagina and cleans it Forward and with mixing upwards, backwards in the right horizontal direction to the back of the vagina and opposite the neck of the puppy, and the repairman touches the fingers in the path and helps the camel to enter the outer hole of the puppy's neck This method is very useful because it ensures that the sperm is in place and helps us to touch and examine the genitals for paralysis, or for diagnostic purposes Namely, but this method requires expertise and practice so let's train and be efficient[18]

8-

8. Artificial Insemination techniques in sheep

Artificial Insemination (Al) of sheep is by no means a new technique. It has been practiced

of 50 years, originally in the Soviet Union, and has been in routine, if sometimes limited, lyrical use in other Eastern European countries, and in France, Ireland, Australia, New wow.and and many other countries for several decades. Until recently, however, inseminations were performed with fresh diluted semen, since the efficacy of using semen frozen, thawed and inseminated by the best available technology was low. The development of a method of intrauterine insemination with the aid of a laparoscope has now rendered the use of frozen semen in sheep a viable proposition [14-5-16]

8.1.Intrauterine Laparoscopic Insemination in Sheep

For intrauterine laparoscopic insemination in sheep, food and water should be withheld from the ewe for ~12 hours. Ewes should be sedated with 1.5-2 mg xylazine, IM, and placed in cradles that restrain and invert them, first in dorsal recumbency for preparation of the abdomen. Local anesthetic may be injected SC at two sites (~4 cm on each side of the ventral midline and ~6 cm cranial to the udder). The cradle is then raised at the caudal end so that the ewe is tilted at ~45° with the lateral abdomen presented to the operator. The anesthetized sites allow for entrance of two trocars and cannula; carbon dioxide is insufflated through the first cannula to

distend the abdomen. The laparoscope is inserted through the near cannula, the uterine horns are visualized, and a glass or plastic inseminating pipette, or sheathed inseminating gun, is inserted through the second cannula. Semen is deposited into the lumen of the uterus. Conception rates are similar whether semen is deposited into one or both horns of the uterus[15-18]

9-Artificial insemination in cattle

9.1Artificial insemination technicians

the proper heat cycles. They must store, thaw, transport, and deposit semen correctly for the maximum likelihood of pregnancy. They must understand reproductive protocols on each client farm and provide consultation as needed. Al technicians must also perform proper animal handling techniques and monitor animals for proper health and welfare[19-20]

9.2The Al process

The insemination gun should be inserted into the vulva upwards at a 30° angle. This helps to prevent the gun from accidentally being inserted into the bladder. When the gun is 6 to 8 inches inside the vagina, raise the rear of the gun to level position and slide forward until it contacts the beginning of the cervix[21]

10-Artificial insemination gun in cattle equipment Usage

This Artificial insemination gun in cattle equipment is designed for straw semen insemination for cow as a better replacement as Cassou gun. There are two norms, 0.25ml and universal, for the gun .It is made by stainless steel and with a wire lock on it.

This half ring wire lock make it rather easy to put a sheath on the gun. After put a sheath through the lock, push the fixing ring up, the sheath will be fixed. When insemination is done, put back the fixing ring and take the sheath off[22].

11-Characteristics of poultry semen

Usually cock start producing semen from the age of 16 weeks but the fertilizing capacity of the semen is low. So, the cocks from 22 or 24 weeks of age are used for semen collection.The natural color of poultry semen is white or pearly white. Heavy breed male can produce 0.75 to 1 ml semen and light breed male can produce 0.4 to 0.6 ml of semen.A male can be used thrice in a week for semen collection with a gap of one day.Although everyday semen collection will not change the fertilizing capacity, but the volume of semen will be low[12-22]

11.1What are the advantages of Al in chicken?

The Al usually requires less than 0.1 ml of semen

(100 -200 × 10 6 viable sperm per insemination) within the hen's vaginal canal (Gordon, 2017), which is a valuable tool because a single sperm ejaculate covers 30 -100 hens (Das et al., 2004) , which reduces the cost of production through maintaining a few roosters [23]

12-Disadvantages of artificial insemination [24-25]

- Requires well-trained operations and special equipment.
- Requires more time than natural services.
- 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.
- Necessitates the knowledge of the structure and function of reproduction on the part of operator.

Conclusion

According to the research and results we have obtained, we have come to the conclusion that artificial repair is a better technique and more extensive production because it has several important advantages

1.Make the most of the genetic traits of good production cows, because advanced cows can repair 70-100 naturally per year, but using artificial cows can repair1000-5000 cows.

2.Use of good yielding trait cows by using frozen clarified seed liquid or instead of transporting them to the repair shop.

3.Using cows for good production, by collecting as much liquid as possible, and then cleaning, storing and producing them for a long time.

4. cows have good production characteristics, but some may be sick and prevent them from ejaculating due to their age and other reasons, but using an electric alarm can be collected, cleaned and used for repair.

5.It is preferable to repair small or young cows by artificial repair, rather than naturally, for fear of accidents due to the expensive body of the cows and used or.

6.The long-term value of a cow is determined very early by progeny testing of many cows that are repaired per year.

7. Improve the economic aspects of cow breeders, because artificial improvement allows them to stop breeding cows and instead raise cows to benefit from it and avoid the danger of cow thorns, especially as they grow up.

8.Increased fertilization rate due to sequential tests of clarified sperm fluid before use to determine the degree of viability and type of deformity in the sperm before repair.

9.Prevention of diseases transmitted by natural repair such as (embryonic tubes) and (embryonic hair) that cause a large number of cows infertile, but artificial repair limits these diseases and prevents the transmission to cows and then to healthy cows.

10.Increase and revival of national production because artificial repair very quickly a generation of cows produce good milk and high fat content, the reports published information that the cost of artificial repair is half the cost of.

Prosthetic repair requires

further research because it is a modern jobAnd your fluid storage skills are very important. We can make artificial repairs much more animalisticProduce good and useful products

Recommendation

Artificial insemination (AI) in animals can offer numerous benefits in various contexts such as agriculture, conservation, and research. Here are some recommendations for its use:

1. **Genetic Improvement**: AI allows breeders to utilize superior genetics from a wide range of animals without the need for physical transport. This can lead to enhanced traits such as increased milk production, better meat quality, or disease resistance.
2. **Disease Control**: AI can help prevent the spread of diseases that can be transmitted through natural mating, especially in cases where animals need to be moved over long distances.
3. **Efficiency**: It's often more efficient than natural mating because it allows a single male to fertilize multiple females, reducing the need for keeping multiple males on a farm or in a breeding facility.
4. **Record Keeping**: AI facilitates accurate record-keeping of breeding data, which is essential for maintaining and improving breeding programs over time.

5. **Conservation**: In endangered species, AI can be a crucial tool for maintaining genetic diversity and preventing inbreeding, especially when natural mating is difficult or risky.
6. **Flexibility**: AI enables breeders to overcome geographical barriers, as semen can be stored and transported long distances, allowing access to superior genetics from around the world.
7. **Economic Benefits**: Although there are initial costs associated with AI equipment and training, it can ultimately lead to cost savings through improved breeding efficiency and genetic gains.

However, it's essential to consider some challenges and limitations:

1. **Skill and Training**: Proper training is crucial for successful AI implementation. It requires skilled technicians who can properly handle semen and perform the insemination procedure.
2. **Infrastructure**: Adequate facilities and equipment are necessary for collecting, processing, and storing semen, as well as for performing inseminations.
3. **Quality Control**: Maintaining the quality of semen during collection, processing, and storage is critical for achieving high conception rates.
4. **Cost**: While AI can lead to long-term cost savings, there are initial costs associated with equipment, training, and maintenance.

5. **Genetic Diversity**: Overreliance on AI with a limited number of sires can lead to decreased genetic diversity within a population, which may increase the risk of genetic disorders and reduce adaptability to environmental changes.

Overall, when used appropriately, artificial insemination can be a valuable tool for improving breeding outcomes in animals, but it should be implemented as part of a comprehensive breeding strategy that considers genetic diversity, welfare, and long-term sustainability.

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پوختە

پیتاندنی دەستکرد (AI) یەکەم بایۆتەکنەلۆژیای گەورە بوو کە بەکارهات بۆ باشترکردن

زاوزێ و جیناتی ئاژەڵەکانی کێڵگە. کاریگەرییەکی زۆری لە سەرانسەری جیهاندا هەبووە لە زۆرێک لە جۆرەکانیدا، بەتایبەتی لە ئاژەڵە شیردەرەکاندا. قبوڵکردنیAI

تەکنەلۆژیا لە سەرانسەری جیهاندا پاڵنەرێکی بۆ پەرەپێدانی تەکنەلۆژیای دیکە دابین کرد، وەک پاراستن لە بەستوو و ڕەگەزکردنی سپێرم، ڕێکخستنی خولی ئیسترۆس، و دروێنەکردنی کۆرپەلە، بەستن، کشتوکاڵ و گواستنەوە، و کلۆنکردن. شێوازی نوێ و زۆر کاریگەر بۆ هەڵسەنگاندنی باوک پەرەی پێدرا. مێژووی گەشەکردنی AI پێداچوونەوەی بۆ دەکرێت، بەتایبەتی لە ئاژەڵە شیردەرەکاندا، کە تێیدا کاریگەری لەسەر باشتربوونی بۆماوەیی و کۆنترۆڵکردنی نەخۆشییە سێکسییەکان زۆرترین بووە. جۆرەکانی دیکە کە بە کورتی وەرگیراون بریتین لە بەراز، ئەسپ، مەڕ، بزن، سەگ، دوپشک، پەلەوەر و جۆرەکانی مەترسی لەناوچوون. هێما سەرەکییەکانی گەشەپێدانی AI ئاماژەیان پێکراوە، لەگەڵ ئەو کەسانەی کە زۆرترین پەیوەندییان بەم

پێشهاتانەوە هەیە. زۆرێک لەو پێشەنگانە یارمەتیدەر بوون بۆ پەرەپێدانی نەوەی نوێ لە فیزیۆلۆژیستەکانی زاوزێ و بایۆتەکنەلۆژیستەکان. کەمێک لە تامی سەردەمەکە لەخۆدەگرێت، لەگەڵ ڕاستییە مێژوویییەکان. زۆرێک لە ئاماژەکان خوێنەر دەگوازنەوە بۆ سەردەمێک پێش ئەوەی تۆڕە ئەلیکترۆنییەکان بەردەست بن، بۆیە ئەم وەرگێڕانە لە لێکۆڵینەوە کلاسیکییەکان بە فشاردان لەسەر کلیلێک لەسەر کیبۆرد ئەلیکترۆنییەکە نادۆزرێتەوە. خوێنەران بانگهێشت دەکرێن بۆ گەڕان بەدوای ئەم خواردنە مێژوویییانەی کە تەختەیەکی پەڕینەوەیان بۆ داهاتوو دابین کردووە.