

AGRICULTURE NOTES

FORM 3 SIMPLIFIED VERSION

QUICK REVISION NOTES

*An Updated Well-Organized Detailed Revision Notes for the
Current Form 3 Syllabus.*

SERIES 1

THIS IS A FREE SAMPLE OF THE
ORIGINAL NOTES

CONTACT US FOR FULL VERSION OF THE NOTES

Mr Isaboke 0746 222 000

MWALIMU CONSULTANCY

Copyright ©Mwalimu

All rights reserved. This book or any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of the publisher except for the use of brief quotations in a book review.

Printed in Kenya

00100

Nairobi

0746-222-000

mwalimuconsultancy@gmail.com

Mwalimu Consultancy Ltd.

TABLE OF CONTENTS

- ❖ **17.0.0 Livestock Production (Selecting and Breeding) (12 Lessons)**
- ❖ **18.0.0 Livestock Production (Livestock Rearing) (10 Lessons)**
- ❖ **19.0.0 Farm Structures (18 Lessons)**
- ❖ **20.0.0 Agricultural Economics II (Land Tenure and Land Reform) (20 Lessons)**
- ❖ **21.0.0 Soil and Water Conservation (19 Lessons)**
- ❖ **22.0.0 Weeds and Weed Control (15 Lessons)**
- ❖ **23.0.0 Crop Pests and Diseases (14 Lessons)**
- ❖ **24.0.0 Crop Productivity VI (Field Practices II) (17 Lessons)**
- ❖ **25.0.0 Forage Crops (9 Lessons)**
- ❖ **26.0.0 Livestock Health III (Diseases) (20 Lessons)**

LIVESTOCK PRODUCTION III

(Selection and Breeding)

Introduction

- The breeding of animals is under human control, and the breeders decide which individuals shall produce the next generation.
- The breeder makes a choice.
- The breeding of animals is based upon the fact that certain qualities are genetic ,hence valuable qualities are passed on from parents to off -springs.
- The qualities can be maintained or improved in the next generation.

The performance of an animal is influenced by two major factors;

- Genetic potential
- The environment, which includes:
 - Feeding,
 - Health,
 - Care
 - The ecological conditions.
- The genetic potential of an animal is inherited from its parents.
- In selection and breeding animals with superior characteristics are selected and allowed to mate.
- In the process they transmit the superior characteristics to their offspring.
- When this is done over a long period of time, it results in livestock improvement.

Reproduction and Reproductive Systems

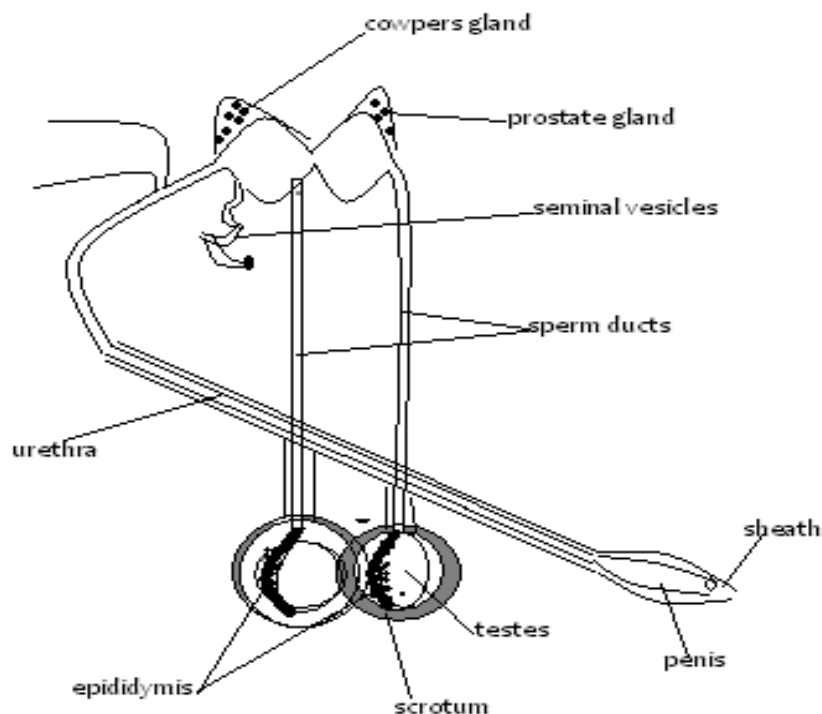
- Reproduction is the process by which off-springs are produced.
- All farm animals multiply by means of sexual reproduction.
- It begins with fertilization which is the fusion of male and female gametes to form a zygote.
- Fertilization takes place internally in the body of the female.

- The embryo(zygote) formed develops inside body of mother, fed and protected until end of gestation period.
- In poultry, the process is different in that eggs are fertilized internally but laid and development of the chick takes place outside during incubation.
- In both male and female, certain organs are specialized for the process of reproduction.
- Some of these organs secrete fluids which are necessary for the movement and survival of the gametes(reproductive cells.)

Reproduction in Cattle

- The male reproductive organs produce the male gametes, the spermatozoans.
- These are introduced into female reproductive system, where they fuse with the sperm to form zygote.

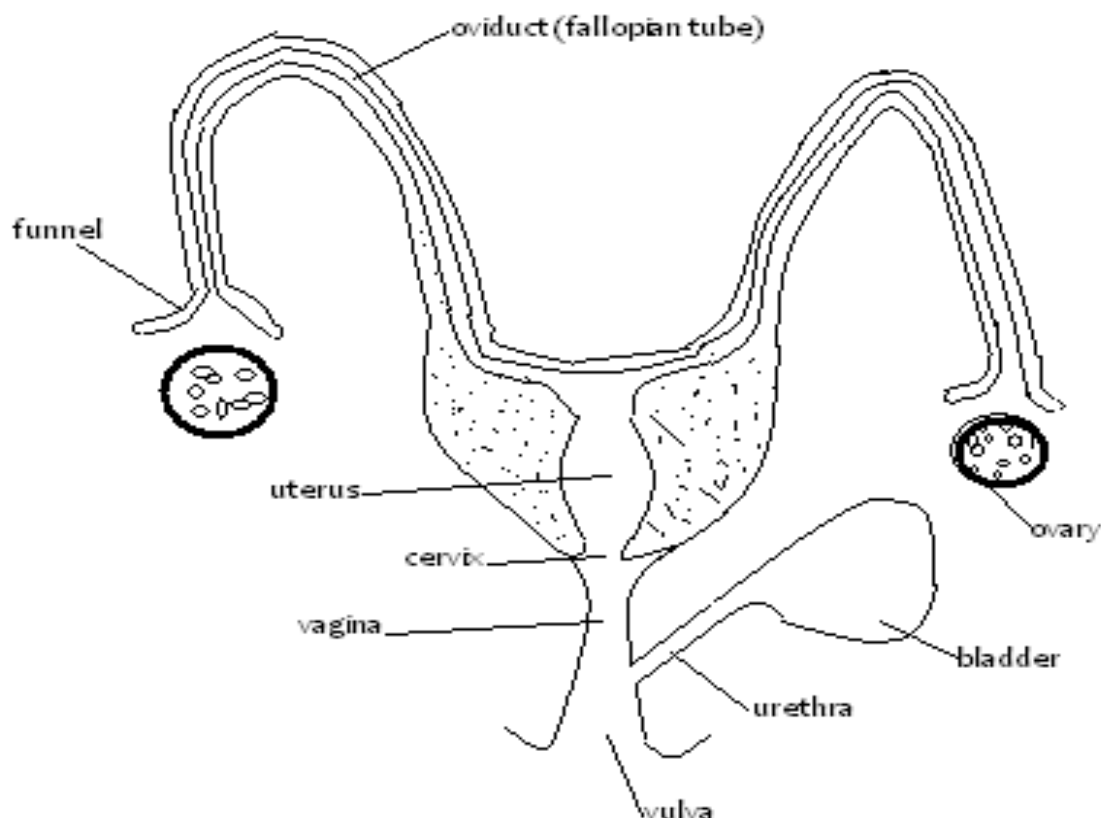
Reproductive system of a bull



- ***The testis:***
 - There are two testes hanging loosely between hind legs.
 - Enclosed by loose skin (scrotum) scrotum regulate temperature of testis for optimum production of sperms.
 - Produce spermatozoa(sperms) which are stored in coiled tube called epididymis.

- **Epididymis:** Storage of spermatozoa.
- **Sperm ducts:**
 - Conveys sperm from the testis and urine through the penis.
 - sphincter muscles contract to allow each to pass separately.
- **Seminal vesicles produce fluid called semem.**
- semen carries sperms out of penis in fluid form.
- **Prostate gland** -produce fluid that neutralize the acidic effects of urine in the urethra preventing death of sperms.
- **Accessory glands:** Include seminal vesicles cowpers gland and prostate gland.
- **Urethra:** Conveys urine and semen.
- **Penis:**
 - Surrounded by a sheath which is an extension of skin.
 - It introduces sperms into the vagina of a cow through the vulva during mating.
 - It is a copulatory organ, also used for urination.

Reproductive system of a cow



Ovaries and fallopian tubes(oviduct)

- Two ovaries located in abdomen, left and right.
- Produce ova/eggs and hormones which control sexual cycle.
- Oestrogen produced by graafian follicle inside ovary induces oestrus
- ie. Heat period so that the cow shows signs of heat
- After every 21 days the ovary releases a mature ovum and the cow comes on heat.
- The ovum travels through the fallopian tubes to the uterus.
- The release and movement of the ovum down to the uterus is called **ovulation**.
- If mating is done at this time, fertilization will take place.
- The fertilized egg implants itself onto the endometrium(walls of uterus)and develops into foetus.

Fallopian tubes:

- Fertilization takes place here.
- Also a passage for the egg from the ovary to the uterus.

The uterus:

- Embryo develops here.
- *The cervix:* Closes the uterus.

The vagina and Vulva:

- Vulva is the external opening of female reproductive system.
- It allows mating to take place so that sperms are deposited into the vagina.
- The foetus and urine are removed through the vulva.

Pregnancy

- Is period between fertilization of ova and the expulsion of the foetus through the vulva.
- Also called **gestation period**.
- In cattle gestation period is 270-285 days.
- Ends with the birth of a calf.

- The reproductive tract undergoes a period of rest during which it is repaired and returns to normal.
- During pregnancy, hormone called **progesterone** is produced by the placenta to maintain the foetus in the uterus.

Parturition(giving birth)

- Act of giving birth called parturition.
- This time the foetus expelled through the birth canal.

When an animal is about to give birth, it shows signs;-

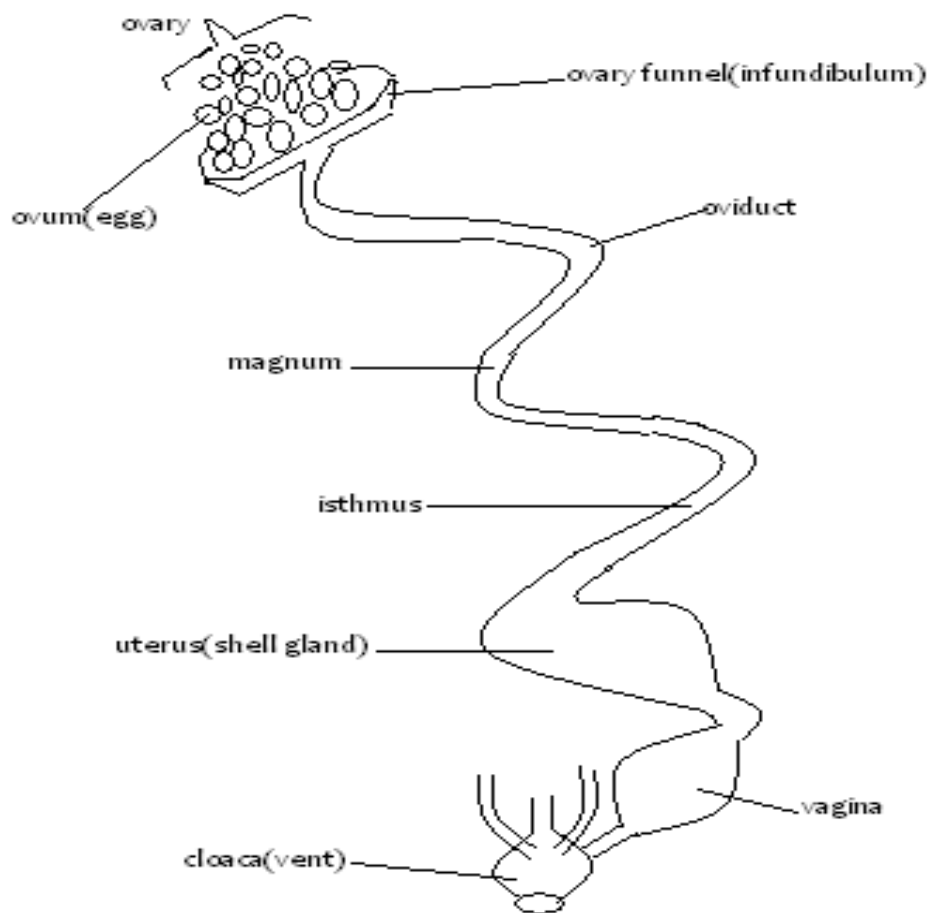
- Distended udder which produces thick milky fluid called colostrums.
- Swollen vulva producing thick mucus.
- Loose and slackened pelvic girdle.
- Visible pin bones.
- General restlessness.
- Animal parturates within 2-3 hours after this signs.
- The correct presentation is with the front feet first ,and the head outstretched and resting in between the fee.
- Any other presentation called **mal-presentation or breech presentation** and requires assistance.

Reproduction in Poultry

- The cock has no penis but a small opening near the vent through which sperms are emitted.
- Cock has testes within the body.
- The hen has elongated oviduct for formation of an egg.
- Fertilization occurs internally.
- During mating the cloaca of the hen and the vent of the cock fit into each other and then semen is poured into the cloaca,then sucked to the oviducts.

The Reproductive System of a Hen

Reproductive system of a hen



Ovary

- Hen has two ovaries but one functional.
- Ova formed in ovaries.
- 3500-4000 ova present inside ovary held by follicle.
- Mature ovum released via rapture of follicle.
- It moves into oviduct received by the funnel.

Funnel(infundibulum)

- Fertilization occurs here.
- Chalazae also added to yolk.
- Time here is 15 minutes.
- It is 11.6cm long.

Magnum

- Thick albumen is added.
- Stays for 3hrs.its 33cm long.

Isthmus

- Its 10.6cm long.
- Shell membranes added.
- Determines shape of egg.
- Water, mineral salts and vitamins added.
- Takes 15 minutes.

Uterus(shell gland)

- Calcium deposited 9ie.shell added around the egg.
- Pigments added.
- Addition of albumin finished.
- Stays here for 18-22hours.

Vagina

- Short, 6.9cm long.
- For temporal storage of egg before laying

Cloaca

- Egg moves out of cloaca through the vent.
- The cloaca extents out to prevent the egg from breaking.

NB;

- Egg formation not depended on fertilization.
- Egg formation takes 24-26hours.
- The components of egg are obtained from body reserves of the hens body.

Selection of a Breeding Stock

- Selection is used as a tool for livestock improvement.
- A breeding stock is a group of males and females which act as parents of future generations.
- Selection is the process of allowing certain animals to be parents of future generations while culling others.
- Culling is the removal of animals which do not perform to the desired level, from the herd.
- The animals retained have certain desirable characteristics which make them produce more.
- Selected animals make up the breeding stock.
- The breeding stock should pass the good qualities to their offsprings for better performance, to improve the livestock.
- Selection process repeated for many generations increases chances of formation of desirable qualities in an animal.
- Genetically termed as gene frequency(occurrence of the genes that carry desirable characteristics.)
- Selection increases occurrence of desirable genes and decreases occurrence of undesirable genes.
- During selection, the characteristics to be selected for are first studied closely to ascertain that it is not influenced by the environment, but mainly by the genetic make-up.
- Selection helps improve characteristics which are highly heritable.
- Heritability means the likelihood of a particular trait to be transmitted to the offspring and they are strongly inherited.
- A character like milk yield is lowly heritable, i.e. it is weakly inherited and a bigger percentage of the character is affected by the environment.

The degree to which selection affects a character depends on the following factors;

- The heritability of the character
- The intensity with which the selection is done
- The interval between generations and kind of selection being practiced.

Factors To Consider When Selecting A Breeding Stock.

- Age
- Level of performance
- Physical Fitness
- Health
- Body Conformation
- Temperament or Behaviour
- Quality of products
- Mothering Ability
- Adaptability
- Proliferation

- **Age**

- Young animals,
- Those that have not parturated for more than 3-times, should be selected.
- They have a longer productive life.
- Old animals are poor breeders and low producers.
- Production and breeding efficiency decline with age.

- **Level of performance**

- Animals with highest production level selected.
- Performance best indicated by records.

Good performance of animal indicated by;

- High milk, wool and egg production,
- Good mothering ability
- High prepotency which is the ability of a parent to pass good qualities to their offsprings.
- The animals with poor performance should be culled.

- Good records kept and used by the farmer for this purpose.

• **Physical Fitness**

Animals selected should be free from any physical defect

e.g.

- mono-eyed,
- limping,
- irregular number of teats,
- scrotal hernia,
- defective and weak backline

• **Health**

- Sick animals do not breed well and are expensive to keep.
- Animals that are resistant to diseases pass these characteristics to their offsprings

• **Body Conformation**

- Animals for breeding to be selected according to proper body conformation.
- A dairy cow should be wedge-shaped with a large udder, thin legs, long neck.

• **Temperament or Behaviour**

- Animals with bad behaviors should be culled.eg
- Cannibalism, egg eating, aggressiveness, kicking

• **Quality of products**

- Select animals that give products of high quality.

• **Mothering Ability**

- Animals selected should have a good mothering ability,
- That is animals with good natural instinct towards their young ones.
- This will enable them to rear the young ones up to weaning.

• **Adaptability**

- Animals selected should be well adapted to the prevailing climatic condition in the area.

- **Prolificacy**

- Animals selected should be highly prolific.
- That is, animals with the ability to give birth to many offsprings at a time (larger litter).
- This is a quality that should be considered when selecting pigs and rabbits.

Selection in cattle, and sheep,

Selection in cattle

Consider the following;

- Level Of Performance Which Include;
 - Milk Yield Buter Content.
 - Length Of Lactation Period.
 - Calving Intervals.
- Age Of The Animal,
- Fertility,
- Physical Fitness,
- Health Of The Animal,
- Body Conformation,
- Suitability Of The Enterprise-Milk Or Beef

Selection in sheep

Consider the following;

- Level of performance which includes;
 - Mothering ability
 - Growth rate
 - Wool quality
 - Carcass quality
 - Twining rate
- Age
- Suitability to the enterprise-wool or mutton
- Flocking instinct

- Health of the animal
- Physical fitness
- Inheritable defects
- Fertility
- Inheritable defects.
- Fertility.

Selection in Goats

Consider the following:

- Fertility.
- Mothering ability.
- Growth rate.
- Twinning rate
- Carcass quality/dressing percentage.
- Growth rate.
- Suitability to the enterprise - milk or mutton.
- Health of the animal.
- Age.

Selection in Pigs

- Consider the following:
- Carcass quality/dressing percentage.
- Suitability to the enterprise (bacon or pork)
- Growth rate.
- Health of the animal.
- Mothering ability.
- Prolificacy.
- Number of teats.
- Temperament.
- Body formation.

- Age.
- Heredity defects

Selection in Camels

- Health of the animal.
- Age.
- Temperament.
- Foraging ability.
- Fertility.
- Level of performance-milk, meat, fur and transport.

Methods of Selection

These include:

- **Mass selection** - Animals with superior characteristics are selected from a herd and then allowed to mate among each other.
- **Progeny testing** - assessing on the breeding value of an animal on the basis of performance of its offsprings.
- **Contemporary comparison** -comparison of performance between heifers of the same age and sexual maturity.

Breeding

- Process of mating selected males and females to produce offspring with the desired characteristics.

Reasons:

- To expand the inherited potential of the animal.
- To improve production.
- To overcome production problems created by the environment.
- To satisfy consumers taste.
- For economic reasons.

Terms Used in Breeding

Inheritance

- Genetic transmission of characteristics from parents to offsprings.
- The mechanism of inheritance is carried by the sex cells (gametes) and is controlled by genes found in the chromosomes.
- Genes are very tiny units of inheritance carrying particular characteristics, such as colour, body shape and amount of milk production.
- Chromosomes are genetic materials which carry genes.
- They exist in pairs (paternal and maternal) in the nucleus of the body cells.
- They are always constant in number.

Dominant and Recessive Characteristics

- A dominant gene is one that suppresses the other.
- It produces a dominant characteristic.
- A *recessive gene* is one that is suppressed by the other.
- It produces a recessive characteristic.

Hybrid and Hybrid Vigour

- A **hybrid** is an animal which is the product of crossing animals of two different breeds.
- **Hybrid vigour or heterosis** is increased vigour and performance resulting from crossing two superior breeds.

Epistasis

- This is the masking of the effect of one gene by another gene which is non-allelic, that is situated on different locus.

Breeding Systems

Inbreeding

- Mating of animals which are related. *Reasons:*
- To increase genetic uniformity in a herd.
- Used to fix the required characteristics in new breeds.
- To increase phenotypic uniformity.
- To get proven sires.

Limitations

- It can bring about loss of hybrid vigour.
- It may lead to decline in fertility.
- It may lead to high rate of pre-natal mortality.

Systems of Inbreeding

- **Close Breeding:** mating between very closely related animals, for example sib-mating and parents sib-mating.
- **Line Breeding:** mating of distantly related animals that had a common ancestor for example cousins.

Outbreeding

- Mating of animals which are not related.

Reasons:

- To introduce new genes in an existing breeding herd.
- To exploit heterosis resulting from a cross between two breeds.
- To develop a new breed or a grade animal.

Limitations

- Lack of uniformity in animals that result from outbreeding.
- Desirable characteristics may be lost due to variation.

Systems of Outbreeding

- ***Cross-breeding***

Mating of animals from two different pure breeds.

- ***Out-Crossing***

Mating of unrelated animals from the same breed.

- ***Upgrading/Grading up***

Mating where the female of a cow grade stock (locals) is mated with a pure breed sire.

The resultant animal is referred to as a high grade.

Mating in Livestock

Mating in Cattle

- Heat signs occur every 21 days.

- The heat period last for 18-30 hours on average 24 hours.
- Cow should be served 12-18 hours after showing the first heat signs.

Heat Signs

- Restlessness.
- Mounting on others and when mounted on she stands still.
- Rise in body temperature.
- Drop in milk production in lactating cows.
- Vulva swells and becomes reddish.
- Clear or slimy mucus from the vulva.
- Bellowing or mooing frequently.

Mating in Pigs

- Heat signs in pigs occur after every 21 days.
- The heat lasts about 72 hours.
- Sows or gilts should be served in 18- 36 hours of the heat period.

Signs of Heat

- Restlessness.
- Frequent urination.
- Swelling and reddening of the vulva.
- Clear or slimy discharge from the vulva.
- Frequent mounting on others.
- It responds very well to the 'riding test'.

Mating in Rabbits

- Does are ready for mating 6-7 months of age.
- Heat signs occur every 14 days.
- The doe should be taken to the buck and not vice versa.

Signs of Heat

- Restlessness.
- Frequent urination.
- Swollen vulva.
- The doe throws herself on the side.

- The doe rubs herself against the wall or any other solid object.
- The doe tries to contact other rabbits in the next hutch by peeping.

Methods of Service in Livestock

Natural Mating

Advantages:

- It is more accurate.
- It is less laborious.
- Useful when heat signs of females cannot be easily detected.

Disadvantages

- Inbreeding is not easily controlled.
- Transmission of breeding diseases.
- Extra feed for the male is required.
- Large males can injure small females.
- Wastage of semen.
- It is cumbersome and expensive to transport a bull to remote areas.

Artificial insemination

- Introduction of semen into the female reproductive tract by artificial means.

Advantages

- There is economical use of semen.
- It controls transmission of breeding diseases.
- Sires that are unable to serve cows due to heavy weight or injury can produce semen to serve cows.
- It prevents large bulls from injuring small cows.
- It reduces the expenses of keeping a male animal.
- A small scale farmer who cannot afford to buy a superior bull can have the cows served at a low cost.
- Semen can be stored for long.
- It helps to control inbreeding.
- It eliminates the threat of keeping dangerous bulls from the farm.

• makes research work easier.

Disadvantages

- Harmful characteristics can be spread quickly by one bull to the offsprings.
- It requires skilled labour.
- Low chance of conception due to death of semen during storage.
- It is laborious:

Embryo Transplant

- It is the implantation of an embryo (fertilized ova) from a high quality female (donor) in the uterus of a low grade female (recipient).

Advantages

- Faster multiplication of an animal with superior characteristics .
- It is easier to transport embryos than the whole animal.
- Embryos can be stored for a long period awaiting the availability by recipient females.
- It stimulates milk production in a female (recipient) that was not ready to produce milk.
- Low grade animals can be used in production and rearing of high quality animals.
- Offsprings of a superior female can spread quickly in an area.

Disadvantages

- It is expensive.
- It requires skilled personnel.
- It requires special equipment for fertilization and storage of embryos.

Signs of Parturition in Livestock

- Parturition is the act of giving birth in female animals.

Parturition in Cattle

- The gestation period in cattle is 270-285 days averaging 280days.

Signs of Parturition

- Restlessness
- Enlarged or swollen vulva.
- Clear mucus discharge from the vulva.
- Slackening of the pelvic muscles.

- Full and distended udder.
- Thick milky fluid from the teats.
- A water bag appears and bursts just before calving.

Parturition in Pigs

- The gestation period in pigs is about 4 months or 3 months, 3 weeks and 3 days.

Signs of Parturition

- Restlessness.
- The vulva turns red and swells.
- The udder becomes full with a milky fluid the sow starts to prepare a nest by collecting some beddings at one corner of the pen.

Parturition in Rabbits

- The gestation period in rabbits is 28-32 days.

Signs of Parturition

- Preparing a nest by plucking off hair from her belly.
- Goes off feeding
- Restlessness.
- The udder distends.

NOTE!

This is a Sample of the Well Organized Detailed Simplified Notes Available.

Call/Text/WhatsApp 0746-222-000 for the Complete Notes.

CONTACT MR ISABOKE

0746-222-000

FOR THE FOLLOWING;

- ✓ **ONLINE TUITION**
- ✓ **REVISION NOTES**
- ✓ **SCHEMES OF WORK**
- ✓ **SETBOOKS VIDEOS**
- ✓ **TERMLY EXAMS**
- ✓ **QUICK REVISION KITS**
- ✓ **KCSE TOPICALS**
- ✓ **KCSE PREMOCKS**
- ✓ **TOP SCHOOLS PREMOCKS**
- ✓ **JOINT PREMOCKS**
- ✓ **KCSE MOCKS**
- ✓ **TOP SCHOOLS MOCKS**
- ✓ **JOINT MOCKS**
- ✓ **KCSE POSTMOCKS**
- ✓ **TOP SCHOOLS PREDICTIONS**
- ✓ **KCSE PREDICTIONS**
- ✓ **KCSE REVEALED SETS**

CALL/TEXT 0746 222 000

[*mwalimuconsultancy@gmail.com*](mailto:mwalimuconsultancy@gmail.com)

**THIS IS A PROPERTY OF MWALIMU
CONSULTANCY LTD.**

**POWERED BY MR
ISABOKE**

SUCCESS