PASTURES AND PASTURE MANAGEMENT

Pasture:

Pasture is a coverage of natural grasses or selected planted grasses and legumes that animals graze one.

A grass land is a stable mixture of grasses that emerge from the nature plants under the influence of ecological conditions.

Forage refers to green vegetative feeds for livestock

Importance of pastures

- Pastures are the cheapest sources of feeds for animals
- Away protect the soil against erosion and son heat
- Legume pastures add nitrogen hence improving soil fertility
- Roots of pastures bind the soil particles together improving soil structure
- All pastures due and decay to from humus
- Preserved pastures especially hay and silage can be sold to provide income

Classification of pastures

Pastures can be classified into threegroups namely;

Natural pastures

Established pastures

Natural but improved pastures

(1) Natural pastures

These are open areas with a dense cover of nature grasses, legumes and associated herbaceous plant species with scattered trees.

The forage plants found here are indigenous and well adopted to the soil and environmental conditions.

Advantages of natural pastures

- Contain a wide variety of forage plants from which livestock can graze
- They are cheap to maintain since they do not require a lot of care

- ❖ Forage plants found in natural pastures are well adapted and can present under poor management
- ❖ They are found in areas that are considered unproductive
- ❖ Support a wide range of local livestock species live sheep, goats, cattle and wild game.
- ❖ If improvement is to be done, fewer inputs like fertilizers are required.

Disadvantages

- ❖ They are less productive in terms of herbage yield and nutritive value
- ❖ Grasses nature very fast becoming fibrous and woody
- ❖ Disease spread is very common due to communal grazing

(2) Nature but improved pastures

These are natural pastures that have been improved are improvement can be by;

- ➢ Fencing to control grazing.
- ➢ Weeding to remove undesirable plants
- ➢ Over sowing with desirable pasture plants

(3) Established pastures:

These are pastures that are planted following the basic principles of crop production.

The land is cleared, cultivated and later pastures are planted and planting materials are other seeds or cuttings.

Types of pastures

There are two types of pastures namely;

- ➢ Grasses /grass pastures
- ➢ Legumes /legumes pastures

Examples of pastures grasses

Common name	botanical name
- Elephant grass or napier grass	(Pennisetum purpurem)
- Kikuyu grass	(Pennisetum clandestinum)
- Rhodes grass	(Chloris gayana)
- Guinea grass	(Panicum maximum)

- Signal grass (Brachiara spp)
- Jaragua /thatch grass (Hyparrhenia spp)
- Nandi setaria (Setaria anceps)
- Guatemala grass (Tripsacum laxum)
- Star grass (Cynodon dactylon)

Examples of legume pastures

Common name	botanical name
Glycine	(Glycine wightii)
Stylo	(Stylosanthes gracilis)
Grean leaf desmodium	(Desmodium uncinatum)
Silver lead desmodium	(Desmodium infortum)
Gentro	(Centrosema pubescences)
Siratro	(Macropilium atroporpureum)
Lablab	(Dolichos purpureus)
Calliandra	(Calliandra callothrysus)

Features of a good forage species

- It should be drought resistant.
- It should be palatable and attractive to the animals.
- It should have a high nutritive value i.e. high content of carbohydrate.
- It should b e easy to plant, weed and harvest if to feed indoor.
- It should be suitable height for easy picking by grazing animals.
- It should be resistant to grazing i.e. it should be able to regenerate after grazing.
- It should be able to produce large quantities of dry matter or have a high leaf to stem ratio.
- It should have the ability to germinate and grow very fast.
- It should be highly digestible
- It should be compatible or be able to grow together with other species in a mixed strand.

METHODS OF PASTURE ESTABLISHMENT

Much as some pasture plants grow naturally, at times there is need to grow more palatable and nutritive pasture grasses and legumes for farm animals. This can be achieved through:

- Ley farming
- Pure stand pastures
- Mixed pastures

As ley farming

This is when pastures are grown in rotation with crops. Usually the pastures are grown on land from 3-4 years and then the same land is used for crop growing for the same period of time.

Importance's of ley farming

- It improves on social fertility if legumes pastures are grown
- Grass and legume trash not to form organic matter
- Grass effectively covers the soil to conserve water and soil
- Animals benefit from crop residues as feeds
- Crops benefit from animal wastes in form of manure

Establishment of a pure pasture

A pure pasture is when one pasture species is grown on the land. It can consist of either grasses or legumes but not both.

The following steps are followed in establishing a pure pasture

- Slash the land /land clearing
- Plounghing the garden
- Applying fertilizers if needed especially ssp at a rate of 125-250kg/hectare
- Harrowing of the land to break big soil clods.
- Seed treatment through scarification, inoculation etc.
- Broadcasting /drilling seeds. For elephant grass you need to open fimones where the cutting are placed.
- Covering with light soil by dragging a branch of a three over the seed bed.
- Carrying out light grazing after 1 ½ -2 months to encourage filler production.
- After 3 months carry out fill grazing
- As apply nitrogen fertilizers to improve quality
- Carryout weeding by hand pulling or digging out weeds

(4) Establishment of mixed pastures

Mixed pastures have grasses and legumes species growing together.

The following should be done in a bid to establish mixed pastures.

- Proper seedbed preparation
- Harrowing to produce a fine seedbed
- Apply ssp fertilizers by broadcasting or drilling in rows.
- Sow legume and grass seeds by broadcasting and cover with light soil.
- Do not apply nitrogen fertilizers since it will affect the growth of the legumes.
- Firm the seedbed with a roller after sowing.
- Gap will in areas where germination was poor.
- Graze on the mixed pastures in early stages of 1 ½ - 2 months.

Advantages of mixed pastures

- There is faster coverage of the land surface
- Water and nutrients are evenly removed from the soil
- Since grasses and legumes have different maturity periods, they provide ample pasture at different times.
- There is increased production because animals prefer mixed stands and they have m ore crude fibre.
- They ensure suitability of production.
- There is increased energy value e.g. pastures.
- It is easy to suppress the inversion of weeds.

Importance of legumes in a mixture

- They increase the level of crude protein available for grazing animals
- Legumes extend the growing period into the dry season since many legumes remain green throughout much of the dry season.
- Legumes six atmospheric nitrogen to the soil.
- Roots of legumes are deeper than those of grasses hence help in nutrient recycling.
- Legumes are highly digestible and palatable through all growth stages.

Factors influencing the choice of a pasture species to be planted

- Availability of the species in the area.
- Intended use of the pasture.
- Grazing system to be used.
- Life span of the pasture i.e. if it permanent /temporally
- Soil type
- Palatability of the pasture species
- Ability to re-grow after grazing /cutting
- Ability to resist pests and diseases
- Topography of the area
- Climate of the area.

Signs of pastures that need to be improved

- Presence of a layer of undecayed plant residues which prevent movement of our and water into the soil.
- Presence of poor on productive grasses and weeds.
- A low proportion of productive grasses and legumes.
- Wet areas containing marsh plants.
- Poor condition of livestock.
- Livestock hunting for palatable grasses.
- Evidence of erosion in the pasture land.

Methods of pasture improvement

- Controlled burning to reduce the layer of dead materials.
- Clearing shrubs and ring barking unwanted trees to open up the area.
- Perimeter fencing and padlocking to allow controlled grazing.
- Removal of unpalatable or poisonous weeds.
- Application of lime and fertilizers.
- Proper distribution of water points to avoid over grassing and under grazing.
- Conservation of some areas of good grasses in term of standing hey for the dry season.
- Over sowing of nutritious gases and legumes.
- Irrigation of necessary.

NB:

(i) Seed inoculation: This is the addition of a rhizobia to leguminous seeds prior to planting to promote nitrogen fixation.

(ii) Under sowing: This refers to the establishment of pastures under crop cove r usually maize and sorghum.

(iii) Over sowing: This is the introduction of pasture legumes in an existing grass pasture.

(iv) Topping

This is the removal of stemy fibre materials left over after a period of pasture grazing. This stimulates fresh re-growth.

Factors affecting pasture growth

- **Weeds:** They out compete pastures for growth requirements.
- **Carrying capacity:** For each pasture land there is an optimum number of animals to be supported, once the number gives beyond, re-growth of the pasture is difficult.
- **Rainfall distribution:** There is poor pasture growth in areas with low rainfall.
- Types of soil
- Amount of light
- Presence of specific bacteria
- Ability to resist grazing

GRAZING SYSTEMS

A. Rotational grazing

This is where the field is divided into small paddocks, cattle is allowed to graze in one paddock for a given period of time and then the animals are moved to another paddock.

Advantages

- Pastures are given time to re-grow /recover
- Pastures are eaten at their highest feed value.
- It controls soil erosion.
- It control pests, diseases and disease by breaking their life cycle.
- Cow dung and urine are uniformly distributed throughout the year.
- In periods of rapid pasture growth, the excess can be conserved.

- Reduces labour requirements for looking after animals.

Disadvantages

- There is highly a cost of fencing incurred.
- It is labourers in terms of moving water through frem one paddock to another.
- Animals' electricity to feed is resisted.

B. Strip grazing

Animals are enclosed and forced to eat grasses within a smaller area by a movable electric fence. The animals are then transferred to another area by extending the electric fence

Advantages

- Animals get fresh grass everyday.
- Grass is eaten at its greatest value.
- Allows time for recovery of pastures.
- It is very flexible
- It controls soil erosion
- Excess pastures can be conserved

Disadvantages

- Very labouriors in the movement of the fences
- It requires a source of electricity
- Electricity in dangerous to man and livestock especially during lightening
- The chances of bloat are increased as the animals are exposed to fresh grass everyday

Zero grazing

This is when animals are in-door in yards or buildings and the pastures are out and carried to the livestock in yards

Disadvantages

- Reduces wastage of pasture due to trampling and dung by animals
- Pastures from discount and on fenced areas can be used
- It controls erosion

- Prevents animals from piecing of pests and diseases from communal grazing lands
- It avoids excessive walking by animals in search for water and pastures.
- The dung and urine are easily collected for use
- The grass are wiled a bit to reduce bloat

Disadvantages

- It is very laborious
- It is very expensive
- It restricts animals from choice of het feeds
- It requires skills and high levels of management

C. Continuous grazing

This is where all animals are grazed on the same pasture throughout for a prolonged period.

D. Deferred grazing

In this system, a particular pasture is set aside for use in the dry season when forage supply is limited. Animals are not allowed to graze from this paddocie.

E. Tethering grazing

It is a system where an animal is tied with a rope around the neck or leg and the rope is pegged to the ground. The animal can only graze within the length of the rope.
Supplementary feeds and water can be provided by the farmer.

Herbage /pasture conservation

This is the practice of preserving grass/pastures that is plenty in the rainy season so that it can be used during periods of scarcity. Farmers need to put in place measures that ensure proper utilization of pastures:

Pastures can be conserved in two ways i.e.

- Silage
- Hay

Silage

Silage is grass cut before flowering and converted into succulent feed through the process of fermentation. Silage is a fermented product of green forages where the acids produced by an aerobic fermentation of sugars present in these forages preserve them.

It is stored in a structure called a silo until it is needed

A Silo is an air tight container where farm produce or livestock feeds are stored for a long time. They are of various shapes and size e.g. tower, pit and trench etc.

Procedure of making silage (ensiling)

- It should have a sweet smell similar to that of yeast
- The PH should be between 3-8-4.3
- The colour should be light or dark yellowish green
- The content of lactic acid should be 1-5-2.5%

Factors affecting quality of silage

- Water content – excess water causes deteriation and rotting.
- Type of additives used; molasses increases the quality of silage since it gives energy to the micro organisms.
- Types of herbage used
- Extent of compaction to exclude oxygen
- PH of the ensiled material – PH 4 is ideal
- Stage of growth of the ensiled species
- Quality of herbage used
- Speed of preparing silage
- Masture content of the material

Advantages of the silage

- Pastures are preserved in a more less fresh state than it is in hay which is dry.
- Silage has more nutrients by time of feeding while a lot of nutrients are lost in hay processing.
- Pastures may be ensiled when the weather does not permit the processing of hay.

- It requires a small space compared to hay.
- Silage cannot be burnt by fire like hay.

Hay

This is dried herbage that is fed to livestock. Hay is second to silage in importance. Suitable herbage is cut just before flowering and allowed to dry preferably under the son.

Hay making

- Cut the grass
- Leave it to partially dry under the son or using artificial heatt.
- Keep turning it to allow uniform drying avoiding over drying because quality will be lost on the other hand hay will go mouldy hence less palatable.
- After drying, keep the grass in a leave proof shelter in bates.

How to acquire good hay

- Select a nutritive grass and legume species.
- Ensure proper handling and drying
- Cut the forage at the right stage of growth i.e. towards flowering
- Ensure proper storage of hay to protect it from rain and sun light so as to preserve the nutritive value, smell and taste.

Losses made during hay making

- Loss of leaves due to over drying
- Fermentation and oxidation due to poor storage
- Over drying

LIVESTOCK PRODUCTION

Livestock husbandry deals with the management of domesticated animals which are of economic value to mane.

They include goats, cattle, sheep, pigs, camels, rabbits, poultry, fish and bees etc.

Importance of livestock to man

- Animal are sources of food in form of meat, milk and eggs
- They are sources of raw –materials for industries like hides and skins, horns and hooves, etc
- When animals and animal products are sold, people get income
- Some animals provide labour on farms e.g. donkeys, camels and oxen
- Animals are used in cultural practices like payment of dowry e.g. cattle and cows etc
- They help to diversify agricultural production and the economy at large.
- Livestock production is a source of employment to people
- Animals' urine is used by organic farmers to control pests.
- They are sources of recreation like cow fighting and goat racing etc
- Sources of foreign exchange
- They help in re-cycling of low value product for example grass and bran into valuable products like meat, milk and eggs.

Factors affecting livestock distribution in East Africa

- Presence of pests and diseases e.g. Ise Ise flies and other pests like tices in some areas as these transmitted diseases.
- Prevalence of livestock diseases which cause death of animals such as foot and mouth disease, swine fever etc.
- Climate; rainfall influences the distribution of livestock and usually drier areas are used for livestock production while wetter areas for crop growing.
- Religious belief/ factors: some livestock types are not kept in certain areas because of the predominance of a certain religion e.g. the population of pigs will be low in areas with Muslims.
- Population density; livestock production requires large prices of land and as such extensive livestock farming is found in sparsely populated areas like Karamoja and Nakasongola.

- Availability of land; in areas where there is shortage of land, more crops are grown than keeping animals.
- Political instability; cattle wetting and raiding and also insecurity hinders the rearing of livestock in some areas.
- Government policy: the government can encourage a certain type of farming by putting in place the appropriate infrastructures, ranches and reducing taxes on livestock farming inputs
- Soil /edaphic factors: the more fertile soils are usually reserved for crop growing while the less fertile areas are normally for animal rearing.
- Economic factors; these include taxation, availability of infrastructure and market.
- Availability of feeds and pastures influences the number of livestock.

POULTRY

The term poultry refers to all domesticated birds. It includes ducks, turkeys, chicken and geese etc.

Importance's of poultry

- Provide food e.g. meat and eggs
- Provide income through selling of eggs and the birds themselves
- Offers employment opportunities to those who look after the birds and deals in poultry feeds and products.
- They convert value less products like maize brain onto expensive products like egges
- They help in diversify agricultural enter prices
- They are used in cultural and religious practices such as appreasing the spirits of deads and in vital sacrifices
- Are used for recreation and sports e.g. cocke fighting
- Provide a profitable use of otherwise on profitable land e.g. rock land
- Adds beauty to the environment

Advantages of poultry keeping

- Require a small land
- Farmers quickly get their profits
- It provides areas of specialization e.g. layers, broilers, etc

- Chicken meat and eggs are palatable and nutrition's

Problems of poultry keeping/disadvantages

- It requires a lot of skills
- It requires plenty of capital
- Poultry is vulnerable to pests and diseases
- There is lack of organized market
- Scarcity of good quality feeds

Factors considered before starting a poultry farm

- Availability of market facilities for meat and eggs
- Availability of veterinary and extension services especially when the birds get sick
- The availability of inputs e.g. foods, drugs etc
- Availability of labour
- Availability of capital to purchase the bleeding stock, feeds and drugs
- Availability of land
- Availability of clean water
- Availability of transport facilities to carry inputs to the farm and products to the market.

Poultry types

There are three basic types namely;

- Layers
- Broilers
- Dual – purpose

A) Layers – Layer over 250 eggs a year

These are raised mainly for laying eggs

They are light or small bodied chickens weighing about 2-2.5kg

Layers do not have a tendence to go broody i.e. to have the urge to sit on eggs to hatch

They are usually nervous to eat less food than broilers

Examples include;

- Leghorns
- Light Sussex
- Or ping ten
- Plymouth rocie
- Ancona

B) Broilers

These are raised mostly for their meat

They are usually heavy breeds

Broilers have a good food conversion ratio and they grow fast usually mature within 6-10 weeks

Examples

- Black Australor
- Rhode Island red
- New Hampshire

C) Dual purpose

These produce good meat as well as being good layers.

They are heavy birds which produce good quality meat once they stop laying

Some have a tendency to go broody

e.g. - Light Sussex

- Rhode Island red

Characteristics poultry breeders should consider when selecting poultry breeds

- Egg production or carcus weight
- Food consumption ability
- Quality of eggs or carcus
- Adaptation to the environment
- Rate of growth, early maturity ability
- Age at which laying starter or slaughtering age
- Docility to cocies
- Food conversion ability

Breeding in poultry

Breeding is the mating of selected animals. The birds to be bred are selected basing on the characteristics we have seen above.

Reproductive system of a hen

The female bird has one functional ovary and one oviduct

During incubation, the right ovary and oviduct develop to some extent, by the time of hatching, they have degenerated and only rudiments remain.

Egg formation process

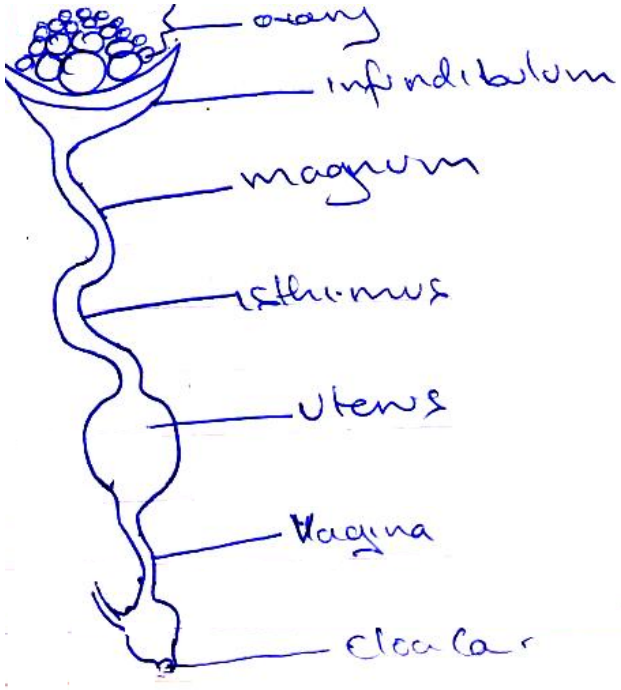
The egg of a bird is formed in the reproductive system before it is laid.

Sexual maturity or laying of the first egg is reached in female at about 6 month.

The whole process of egg formation takes place in 24 hours. This means that a hen can only lay one egg in a day.

The chemical components of the allumen, yoke and egg shell are delivered from the gut or from the reserves found in the body e.g. skeleton, liver and fat deposits.

Reproductive system of a hen



Ovary: It has very many ovules of different stages of development. Ovulation takes place here and after ovulation the yoke moves down to the influndibulum.

Infundibulum (egg funnel)
It receives the yoke from the ovary and this is the sight of fertilization

The infundibulum is about 11cm long and the egg stays here for quarter an hour.

As the fertilized yoke moves down the oviducts, it leads to the formation of the chalaza.

Magnum
The fertilized yoke moves down to this region and it is coated with egg white (albumen)

Isthmus
From the magnum, the coated yoke moves down to the isthmus where water, mineral salts and shell membranes are added.

The shape of the egg is determine here

Uterus (shell gland)
The outer hard calciferous shell is added. Pigmentation of the egg takes place here and the egg stays here for a long period of time.

Vagina
This produces fluids (mucus) which reduces friction during oviposition (laying)
The mucus also prevents water loss from the egg. The egg is inserted upside down, broad end up, to ease laying.

Vent /cloaca
It is a multipurpose organ that is it receives sperms during mating, passes out wastes and enables oviposition of eggs to take place.

The reproductive system of a cock
The male reproductive system lacies a penis and instead, has a vent. Other parts are shown below;

Testes

These are two oval shaped organs found inside the body of a cock along the back line. They are protected by the ribs.

The testes produce sperms and hormones responsible for secondary characteristics

Sperm ducts (vas deferens)

These are tubes which convey sperms from the testes to the cloaca during mating.

Papillae: They are small protrusions in the cloaca where the sperm ducts open out.

Cloaca: This is an organ of copulation. During mating it protrudes outside and comes into contact with the cloaca of the female.

Parts of an egg

Shell:

It is the outer most part of an egg which protects the inner contents. The shell is porous which allows gaseous exchange to take place during incubation.

Shell membrane

There are two membranes i.e. the inner and outer membrane which are also porous and act as semio-permeable membranes and allow gaseous exchange to take place.

The also hold the contents of the egg together.

Albumen (egg volute)

It is a jelly-live liquid in unboiled eggs and white in boiled eggs. It provides food and water for the developing chick/embryo during incubation. It is rich in carbohydrates, water and mineral salts.

Yolk

It is yellow in colour and rich in proteins. It provides proteins to the developing chick during incubation.

It carries on its surface the germinal disc which develop into a chick in fertile eggs

Air space

It appears of the bread end of the egg and enhances gaseous exchange between stored eggs or developing chicks and their surroundings.

Germinal disc/germ cell

Is a fertilized ovum that develop into a chick during incubation.

Chalaza (twisted albumen)

These are strands which hold the yoke in the central position.

They develop from the albumen when the egg is moving down the oviduct.

Characteristics of a good egg

- It should have an oval shape/normal shape without any sign of deformity
- It should have a strong shell
- It should be clean
- It should not have a eraceed shell
- It should have an average weight of (60g)
- It should have no meat /blood spots.

Abnormalities in eggs

Common abnormalities occur in eggs as seen below;

Failing to deposit enough calciferous shell around the egg or lack of ca and Phosphorous in feeds.

Double yoke – Due to physiological defect in the ovary releasing two ova at the same time.

Dwarf eggs - due to hormonal imbalances, poor mixing of feeds of malfunctioning of the magnum.

Blood spots - at ovulation, a drop of blood is shed and comes down with the yoke

Rough surfaced eggs - due to uneven deposition of the shell at the shell gland.

Deformed eggs: due to defects in the isthmus where the shape of the egg is determined.

Meat spots - a placeof tissue rearing from the ovary at the time of ovulation and moves down with the yoke

Abnormal colour /smell of yoke – due to poor mixing of the feeds where a high proportion of fish meal is included in the feeds.

NOTE

Abnormalities of eggs are detecting using an egg candler. The egg is placed at the hole on the candler and a beam of light passes through the eggs. Similarly during incubation, eggs are candled on the 7^{th} and 18^{th} day of incubation.

Factors that may lead to a drop of egg production

Unbalanced feeds; When birds are given feeds that are not properly mixed, egg formation process and production will be affected

Inadequate feeds: if birds are supplied with little mash less than 120g per day, production of eggs is affected.

Disease: Outbreak of poultry diseases affect egg production since birds fail to eat, some may due and production affected.

Vices: Egg eating results into low production as the birds break and eat the eggs.

Parasites: External and internal parasites rob food nutrients needed in egg formation and make birds uncomfortable, enacted, leading to a drop in production of eggs

Change in daily routine: When birds are excited when carrying out practices like vaccination, they stop feeding for sometime hence a drop in egg production.

Broading: When some birds go broody, they stop laying

System of management: With poor management for example, overcrowding, failure to collect eggs regularly, egg production will be affected.

Breed differences: Some breeds are good layers and lay good quality and quantity of eggs e.g. Rhode Island Red compared to others.

Stress: General discomfort in birds due to changes in environment e.g. sudden noise, high temperatures, etc affect growth rate and even egg yield.

Rats: These excite birds causing stress and they eat the feeds thus a drop in egg production.

Measures that farmers should take to produce high quality eggs

- Give the laying birds a high quality balanced feeds that contain mineral salts and grit
- Laying birds should be given adequate clean water.
- Provision of clean and adequate nesting boxes to prevent brakeage and egg eating.
- Collect eggs regularly and keep them at 12^0c to avoid detoriation in quality.
- De-beaking birds to prevent egg eating.
- Cleaning dirty eggs and keep them in a cool place.
- Candle eggs to detect abnormalities
- Grade eggs to case marketing
- Pace eggs on eggs trays with broad end facing up.
- Sell eggs as soon as possible to avoid loss of quality.

INCUBATION OF EGGS

Incubation is the process whereby a fertile egg develops into a chick under suitable conditions of humidity, temperature and ventilation.

OR

It refers to the keeping of eggs warm at a fairly constant temperature. (37.5^0c) for a period of 21 days during which embryonic development of a fertile egg into a chick take place. This is followed by hatching.

Incubation is done in two ways i.e. Natural and artificial incubation.

Qualities of good eggs for hatching

- There should be fertile
- Should have a normal shape
- Should be average sized (not too big or too small)
- Should have a smooth texture
- Should not have a cracked shell
- Should not have double yokes
- Should not have meat and blood spets
- Should have clean shells
- Should have a thick albumen

Conditions necessary for proper hatching of eggs

- Optimum temperature of $37.2 – 37.3^0$c
- Optimum humidity i.e. 60-70%
- Proper ventilation in the room
- Constant turning of the eggs
- The eggs must be fertilized
- The eggs must not have defects
- Good feeding of the laying hens

Natural incubation

Natural incubation is when a broody hen sits on the eggs for 21 days and provides the suitable conditions such as temperature, turning of eggs, etc for proper hatching of egg.

For ducks and turkeys, incubation period is 28 days.

During this period, the hen is allowed to sit in a darkened, vermine proof, simple laying box or a quite place for the 21 days.

The hen may leave the eggs for about 10-15 minutes for exercise and feeding each day. It sits on the eggs to provide heat. It controls the temperatures and ventilation by periodically leaving the eggs.

It turns the eggs by instinct using the beace and provides humidity by wetting its chest with dew.

HOW CAN ONE IMPROVE NATURAL INCUBATION

- The egg nest should be placed in a cool quite corner and endorsed
- The hen and the nests should be dusted with insecticides
- The hen should be provided with enough drinking water and feeds (grit and greens)
- Wash eggs that get soiled (dirty) using a clean cloth eocued in warm water.

Signs of Broadness in poultry

Broadness is a state when a hen, duce or turkey wants to sit and incubate its eggs. It is usually after laying a good number of eggs.

Signs of broadness include;

- A hen will not like the company of a cock and it will run away from a cock
- A hen will be making queer noise
- A hen will stay longer in the nest than normal
- There will be moulting and loss of feathers around the breast bone
- There is a slight rule in body temperature

Advantages of natural incubation

- No maintenance cost required as far artificial incubators
- The system is cheap
- There is no major loss due to power or machine failure
- Suitable for small scale farmers
- It requires no skills to carryout

- Labour requirement is low compared to artificial incubation
- It requires very little capital to construct laying boxes and feeding the hen

Disadvantages

- It is not suitable for commercial production where a large number of eggs hatch at the same time.
- Parasites may force the broody hen not to sit on its eggs.
- Egg eating is common in many broody hens.
- Hatchability is low
- Controlling incubation conditions is difficult

Artificial incubation

This is done by use of a machine called an incubator. The incubator are commonly used on large scale poultry farms for hatching eggs. they provide the necessary conditions to enable the development of the embryo into chicks that finally hatch out.

An incubator should have a source of heat, thermometer, hatchery trays, water troughs/trays fan and wired floor.

Points to observe when using artificial incubators

- Locate the incubator in a well ventilated room whose temperature can be kept constant and where the incubator is not exposed to direct sunshine (drought).
- The incubator and room should be properly cleaned and disinfected.
- Start the incubator two days before the eggs are installed to make sure that it is functioning efficiently.
- Put the selected eggs in the incubator and leave the door open for the first 6 hours.
- But the eggs are first cleared and fumigated with potassium formaldehyde to reduce infection.
- In the first week of incubation, maintain incubation temperatures of 37^0c which should be raised to 39^0c in the 2^{nd} week.
- Reduce the temperatures slightly by 1^0c in the last 2 days of incubation to increase hatchability
- Maintain a relative humidity of 60%.

- Eggs should be turned at least 2 times a day from the 4th to the 18th day of incubation. This prevents the developing embryo from getting stick to the shell and continually exposing the same side of egg to cold or hat areas in the incubator.
- During incubation, some ducks may die and such eggs give out hydrogen sulphide which is poisonous. Such eggs should be removed immediately when detected.
- Eggs are candled on the 7th and 18th day to cheek for infertile eggs and those with dead embryos respectively. An infertile egg is clear and those with dead embryos are partly dark both are removed.

Advantages of artificial incubation

- It is most ideal for hatching large number of eggs.
- It is more efficient than natural incubation
- The problem of the hen abandoning eggs due to itchy pests and parasites is eliminated.
- It is easy to maintain sanitary conditions in incubators.
- It ensures continuous supply of chicks as there is no dependency broadness.
- There is high egg laying since the layer is not interfered with the process of egg incubation.

Disadvantages

- It is not economical for small scale farmers.
- There is loss due to faculty machines.
- It requires ample skilled labour.
- It is expensive to buy the manures
- Operational costs are higher such as buying a standby generator and feel in case of power failure.

Factors affecting incubation of eggs

There are several factors affecting hatchability of eggs during incubation. They include;

Temperature: It should be suitable or controlled i.e. 40^0C above the eggs and 32^0C below the eggs.

Proper ventilation to allow free airculation of air avoiding accumulation of carbondioxide

Controlled humidity of about 60% <80% to ensure proper hatching of eggs in the incubator.

Proper turning of eggs i.e. the eggs should be turned 4.5 times a day to avoid sticking to one side and proper temperatures on all sides.

The eggs should be fertile and this can be achieved by have the hen stay with a cock for a week
The eggs should not have any defeat e.g. cracks

Presence of pests like mites, fleas and mange make the broody hen uncomfortable and force the hen net to sit on eggs for long time.

SEXING CHICKS

This is the selection of male birds from female birds especially when layers are needed.

It is usually done immediately the chicks hatch from the hatchery. Sexing chicks can be done in the following ways;

1) Sex linkage method

This is commonly used where cross-breeding is done, some feathers colours are always attached to a particular sex e.g. Rhode Island red X light sunsex, the resulting chicks will be all males while and all females brown. The farmer will distinguish chicks immediately they appear. It is 100% correct and it is used in commercial breeding farms.

2) Vent method

In this method, the vent or cloacae is examined chicks with protruding vents are mates. This method is 90% correct.

Characteristics of good chicks

- They are uniform in size (40g of weight)
- They look alert and bright eyes
- They should be able to stand and value normally
- They should be disease free
- They should have a normal beak
- They should have open vent or cloacae
- They should have normal feathers

Brooding of chicks

This is the care and management of young chicks from one day old up to 4-6 weeks. Day – old chicks should be given proper-feeds, favorable temperature and above all protection from predators.

Brooding chicks means looking after young chicks during early period of growth when they cannot maintain their body temperature without aid of supplementary heat.
Brooding can be done in two ways i.e.

- Natural brooding and
- Artificial brooding

Natural brooding

If natural incubation has been done, the hen is then left to rear her chicks.
The hen covers her chicks with her wings to provide warmth and also to protect them.
A hen should be put in a cage where chicks mash and clean drinking water have been provided.
The mother hen trains her chicks so that they can lock after themselves without assistance.
Provide a coccidstat in drinking water and vaccinate chicks regularly to reduce chick mortality and also deworm chick regularly.

Artificial brooding

This is caring and management of young chicks from one day up to 4-6 weeks in a brooder.

A brooder is a form of house made especially to keep chicks comfortable.

A good brooder should have;

- A heat source
- A thermometer
- A confinement ring
- A light source
- Feeders and drinkers
- Litter on the floor
- Rain proof roof
- Vermin proof structures

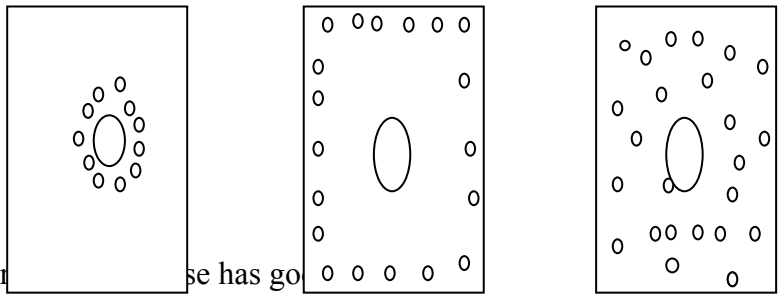
Brooder preparation and management

While preparing a brooder in order to receive chicks, the following should be done;

- Prepare the brooder 2 weeks before the arrival of the chicks
- Scrub the room with plenty of water and soap before arrival of ducks
- Disinfect the room/brooder
- Wash the equipment with hot water and put them out to dry in sunshine.
- Allow the house and equipment to rest for a few days
- Put fresh litter 7-10cm thick on the floor.
- Put a neat source
- Insert a confinement ring around the heat source which should b e 45-60cm high to prevent chicks from straying from the warmth.
- Cover the litter with paper to avoid chicks eating the litter and change if when it gets wet or dirty.
- Ensure that the brooding room is well ventilated.
- Ensure that the room is verm in proof
- Provide heat in the brooder overnight before the arrival of chicks
- Arrange the water and feed through around the heat source in the confinement ring
- Hang a thermometer near the floor and read off the temperatures periodically.

Management of chicks from day are up to 6 weeks

- One the day of arrival, count the chicks to ascertain their number
- Isolate the weak ones
- Provide plenty of water mixed with glucose. Delay /do not provide mash on that day
- Vaccinate the chicks on the day of arrival
- Provide light all the time
- Gradually reduce the brooding temperatures by 2.5^0C each were until the room temperature is obtained.
- Sprinted chick mash/pellets on the papers covering the litter during the first few days or use egg trays.
- Remove the paper covering the litter after 4 days.
- Provide fresh clean drinking water adlib and distribute water fountains well in the confinement ring.
- Mix a cocadiostat in water to prevent coccidiosis.
- Provide a chick mash in chick troughs or egg trays during the first weeks
- Check the chicks regularly for abnormalities dispose off dead chicks.
- Avoid extreme temperatures. At high temperature chicks will stop feeding and run away to the sides, at low temperature they will crowd around the heat sources while at ideal temperature chicks will be evenly distributed in the brooder.



- Ensure the house has good ventilation
- Ensure high standards of hygiene by removing dead chicks and having a foot bath at the entrance into the poultry house.
- Fellow strict vaccination programme i.e. vaccinate against Gumboro after 2 weeks, new castle at 3-4 weeks of age, fowl typhoid at 7 weeks
- Clean the feeders and drinkers regularly
- Isolate sick birds
- After six were transfer the chicks to growers house but continue feeding them on chick mash.

Managementof layers

- House birds on well ventilated houses
- Provide laying nest boxes
- Provide perches for birds to roost on
- Provide enough feeders and drinkers to avoid over crowding
- Have a breeding coup to lock birds that show signs of breeding so that they forget the habit and go back laying
- Collect eggs 2.3 times daily to avoid damage due to egg eating and breakages
- Cull non-layers every month
- Carryout debeaking to avoid egg eating
- Hang greens in order for birds to get plant protein and stamins
- Provide the birds with enough feeds (layers mash) and clean drinking water
- Vaccinate regularly against disease e.g. Gomboro, Fowl pox
- Have a footbath at the entrance of the poultry house to avoid spread of diseases
- Birds start laying when they are around 4-5 months of age

Qualities of a good layer

- A good layer has a bleaching cloacae, it is no longer yellow
- It has a moist active, large cloaca while a non –layer has a dry small, inactive one.
- The shank and beak of a good layer are yellow and not pigmented.
- A good layer has a large, moist, warm, bright red wattles, and combs
- Good layers rarely go broody.
- Has rough ton feathers
- The pelvic bones of a good layer are thin and pliable
- The space between the pelvic bones fita 2-3 fingers in good layers and only one for poor layers.

Management of broilers

Brooding principles is the same as fer pullet chicks but management practices differ.

Broiler chicks are fed on broiler starter mash for a period of 3-4 weeks of age.

After this age, they are fed on broiler “finishers” mash.

Plenty of clean water should be provided adlib

Broiler chicks stay in the brooder for 4 weeks and they are provided with light 24 hours per day. However, the number of light hours should be reduced gradually as birds grow older.

During the 6th week broilers are introduced to broilers "finishers" mash by giving them a ratio having ½ broiler starter and ½ broiler "finishers" mash. From 6 weeks on wards, they should be fed on broiler finishers' mash only.

Space required for broilers is 1 square foot per bird

The vaccination programme is similar to that of pullet chicks for the first 28 weeks.

Broilers are ready for sale from 7 weeks of age.

SYSTEMS OF POULTRY REARING

There are three basic systems i.e.

- Extensive system
- Semi –intensive system
- Intensive systems

1) Extensive system

This system is characterized by;

- Large area of land
- Low stocking rate
- Low management practices
- Use of local birds

Free range system

In this system, birds are left to move /room in an area with or without a perimeter fence, they look for their own food and greens all day long and in the evening, they return to a simple structure or kitchen to provide shelter at night.

Advantages

- It cuts down the feeding costs as birds look for their own food i.e. (it is cheap to operate)
- Birds are exposed to their choice of food i.e insects and greens.

- Birds tend to develop immunity to diseases and worm burden
- Since birds are not fully confined, they suffer less from coccidiosis
- Low labour requirements
- Birds get enough exercise
- Vices are not common

Disadvantages

- Promotes dispute among neighbors due to spilling of crops and mulches
- Birds are exposed to weather hazards
- Requires a lot of land
- It is difficult to have close inspection of the birds
- Low growth rate due to poor nutrition
- High rises of predators like eagles, wild cats, foxes, etc
- A lot of thefty is experienced
- Loss of eggs because birds lay where they find convenient
- It is difficult to control breeding
- Disease spread is common due to mixing with other hens.

2) Semi Intensive

In this system, birds are slightly supplemented with mash depending on the types of birds or any other feed but obtain their ratio on range.

A house with runs and enclosed wire mettings is set up

Birds lay eggs in the house and take shelter there too

Feeds and water are put in the runs

Advantages

- Birds get enough exercise
- Birds get enough greens hence do not suffer from vitamin deficiencies
- Less land is required compared to free rage
- Close supervision of the birds is possible.
- Birds are protected from bird weather like rainfall.
- Loss of eggs is reduced.

Disadvantages

- Relatively high costs due to fencing and supplementary feeds.
- Predators eat the birds.
- Build up of parasites/worms in the runs.

Fold unit system /fold pen

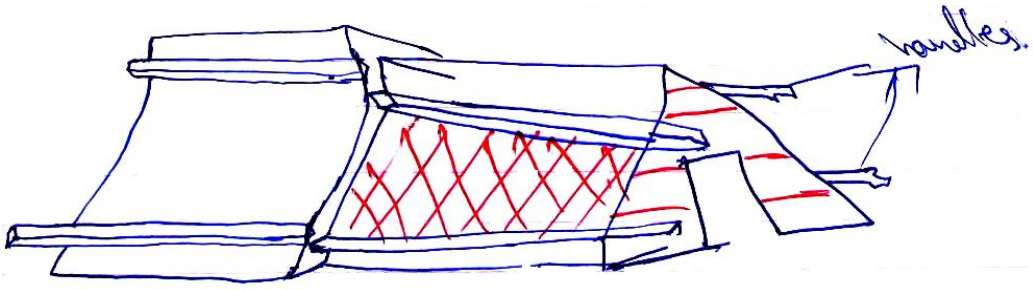
In this system, birds are confined in small movable houses called arises or folds. Folds are movable daily or after several days in an enclosed area known as run.

Each fold can accommodate about 25 birds. Such a fold will measure 1.5m x 1.7m long.

The feld has a covered part where birds may take shelter from bird weather. The floor of the folds must be metted to enable birds get greens and droppings to reach the ground.

Nest boxes, feed and water troughs are put in the covered part

Illustration



Advantages

- Birds are under close control and supervision
- Losses due to predator attacks are minimized
- Disease control may be easy because in case of disease out breaks, a unit can be isolated
- Birds are protected from weather hazards
- Dangers of vitamin deficiencies are minimized
- Egg loses are reduced as birds lay in nest boxes provided.
- No need of fencing off land.
- Manure is evenly distributed in the field.
- Vices are controlled

Disadvantages

- Labour intensive as folds are moved regularly
- Folds are expensive to buy
- Folds are not long lasting
- The system is not suitable on hilly areas
- The system is not suitable for swampy areas
- Eggs get siled during wet seasons lowering their quality.

Battery cage system

In this system, birds are kept in individual cages which are stacked one above the other and are inside a permanent building.

The cages are made of wires and each cage has a sloping floor to allow easy flow and collection of eggs.

Eggs are collected from the behind part of the cage
Droppings drop to the ground
Water and feed troughs are fixed in front of the cages.

Advantages

- A large number of birds can be kept in a small area
- It is easy to detect and isolate sick birds
- It makes it easy to keep individual records of a bird making culling easy
- Minimizes common poultry vices e.g. cannibalisms and egg eating
- There is no contamination of feeds and water and also droppings and eggs are collected in a clean condition.
- Saves labour as few personnel can manage a huge project

Disadvantages

- The initial costs are high at cages are expensive to buy as well as constructing a buildings
- Birds lack exercise as there is restricted movement
- The system requires high level of management
- High number of cracked eggs due to hitting the metallic parts

Deep litter system

In this system, birds are kept indoors throughout their life time.

Feeds and water are provided regularly

A good deep litter house should have the following features

- 1 metre solid front wall from the foundation and the rest of the wall
- Floor should be covered with litre such as coffee husles, wood sharing, crashed maize cobs and groundnut shells
- It should have a vermin proof door
- It should have a leak proof roof
- It should have adequate space to avoid overcrowding

Uses of litter material in the house

- It dries of droppings to prevent foul smell
- It helps to keep birds busy by scratching
- It prevents breakage of eggs
- It provides warmth to the birds
- Bathing of birds when temperature is house is high

Characteristics / qualities of good litter

- Does not cake up easily (form elites)
- Should be able to absorb enough moisture from the droppings to facilitate drying
- Should be relatively cheap
- Should be locally available
- Should not be toxic
- Should not be too dusty as dusty litter may lead to pneumonia

Regularmanagement practices done to maintain the quality of litter

- Regular racing /turning
- Repairing any leaveages on the roof
- Ensuring correct depth of litter to absorb moisture from droppings
- Having optimum stocking rate
- Regular replacement of old litter

- Providing enough water troughs to avoid overcrowding
- Even distribution of perches in the house
- Avoid using leaking water troughs

How is the quality of litter roof?

- Leaving roof
- Poor ventilation
- Over crowding
- Leaving water troughs
- Flooding due to surface run offs
- Accumulation of birds droppings
- Capillary action from the floor
- Overfilled drinkers leading to spillage
- Condensed water from the roof in areas where temperatures are low

Management practices carried out to look after birds in a deep litter house

- Provide enough feed troughs and water fountains in the house
- The food troughs should be hanged about 30.cm so that mash is not mixed with litters as birds are scratching.
- Also drinkers should be put on bricks or blocks
- Provide oyster shells to supply calcium and phosphorous for strong eggs.
- Provide grit (lace sand) to and digestion
- Present disease outbreak by fellowing a regular vaccination programme. Addition of a coccidiostat in feeds and water also prevents disease out break.
- Hang greens to provide vitamins and exercise to birds
- Provide enough clean laying/resting nests/boxes which should be dark to prevent egg eating
- Ensure adequate space to avoid over crowding
- Provide perches for birds to rest on

Advantages of the deep liter system

- A large number of birds can be kept in a unit area
- Comfortable for both the birds and farmers

- Sick birds can easily be identified, isolated or culled
- Low labour requirements
- Provide high quality manure
- A small area of land is required
- Birds are protected from hazards such as weather
- Birds and eggs are protected from predators (thefty)
- The system can be adapted for young chicks, growers, layers, and broilers
- Record keeping is easy
- It is possible to clearly inspect birds and indentify disease outbreak
- Production is relatively higher with good management

Disadvantages

- Birds tend to develop vices like cannibalism, egg eating etc due to boredom and poor feeding
- Dusty litter pre-dispose birds to preumonia
- Initial costs is high
- It has relative high labour requirements
- There are high risks of disease spread in case of poor management since birds are confined
- Birds lack adequate exercise
- Litter occasionally contaminate feeds reducing feeds intake

Chicken feeds

- Birds are fed on a daily basis on a ratio for the following reasons;
- To maintain maximum
- For production of eggs (layers) and meat (broilers)
- To maintain the body processes through provision of energy

Note

Incorrect feeding should be avoided because it is indirectly responsible for;

- Low productivity in birds
- Vices in birds
- Many diseases out breaks in poultry farms

The ratio provided to chickens should supply basis nutrients like carbohydrates, proteins, minerals, vitamins, fats and oils. In addition birds should be provided with plenty of clean H_20.

Feeding of broilers

Broilers are fed on broiler starter which is about 21% protein, has less fibre and is more digestible. It makes birds to grow faster.

Growers mash is about 16% protein, has more fibre and gives more energy

Broiler finisher has less than 14% protein, has more energy and more fibre.

Effects of excess animal protein to birds

It is uneconomical

It is injuries to the birds as more loads is put to the liver and kidney to get rid of the excess

Layers put on more fat which reduces laying ability

Animal protein should not exceed 10.15%. However, low –protein levels in a ratio may lead to poor growth rate of poor production.

Minerals and carbohydrates are derived from ingredients used e.g. maize, wheat brain and maize brain.

Vitamins are obtained from greens supplied to birds or manufactured pre-mix

Provide birds to plenty of clean water adlib.

Feeding layers

Layers are fed like broiler birds in the first month. They are fed on chick mash which is 21% protein.

Later growers mash is introduced at 8-16 weeks which contains 17% protein and 3% mineral

Sometimes minerals can be provided in form of oyster shell on egg shells grounded and put in a separate hopper.

The hopper should be portioned into two; one hopper for insoluble grit and another for ground shell.

This should be done when birds start laying to ensure constant supply of calcium.

Digestion in birds

(i) The beak

The beak pices and selects food secrets saliva to mix whit the feed to ease swallowing. Birds lack teeth and swallow food wholly. Food goes to the crep

(ii) Que crop

This is a thin, elastic and sac-like structure where it is partially stored.

The crop also allows softening of stored feed by saliva

(iii) The gullet

This is made up of elastic cartilage which enables the birds to swallow food and big things

(iv) The glandular stomach

It is also calledthe proventiculus. It secrets HCL and pepsin. HCL activates the pepsin enzyme and wills germs in the food.

Pepsin converts protein to peptides and peptones. The food them moves to the gizzard.

(v) The gizzard

This has tough muscles, small stones (grt) and a thin horny tissue.

The small stones perform the role of the teeth

The movement of the tough muscles and small stones enables the grinding of food and after here the food moves to the duodenum.

(vi) Duodenum

In the duodenum food is mixed with pancreatic juice and bile.
Bile neutralizes the acid (HCL) from the gizzard and makes pancreatic enzymes active.

Bile also emulsifies (bureaus) lipids into small droplets.

Pancreatic juice contain enzymes trypsin, amylase, and lipase which convert; peptides and peptones, starch and lipids to amino-acids, maltose and fatty acids plus glycerol respectively.

The food then moves to the small intestines

(v) The small intestines

Here absorption of food into the blood stream takes place

(vi) Caeca (Caecum)

The pair of caecoa habors micro-organisms which act on cellulose. This leads to the production of volatile fatty acids (VFA) which are absorbed to yield energy.

(vii) Colon

From the caeca, the undigested food moves to the colon where water is re-absorbed

(viii) Vent (Cloacae)

The waste products are passed out through the cloacal vent.

POULTRY DIEASES

A disease is any condition that makes a living organism unhealthy.

Signs of sick birds

- Loss of appetite
- Blood stained droppings
- Chicks huddle together with dropping wings
- Tears and wetness occur around the eyes and nostrils
- Sneezing of birds
- Coughing
- Difficult in breathing
- General weakness
- Loss of weight

Some important poultry diseases in Uganda

Disease	Cause	Signs & symptoms	Control
Coccodiosis	Protozoan called (Eimeria Epp)	- Loss of appetite - Birds stand listless with closed eyes - Blood stained droppings - High mortality can occur	- Supply cocadiostats in drinking H_20 regularly e.g. coccid, Embazin etc
Fowl pox	Virus transmitted by contact with infected birds, flies or mosquitoes	- Birds loose appetite - Discharge from the eye & nostril - Wounds in combs, wattles, inside beate etc	- Vaccinate unaffected birds - Mix vitamins and antibiotics in drinking water
Gumboro	Virus that is shed in droppings	- Waterly diarrhea - Soiled vent feathers - Sudden death after 3 days	- Regular vaccination using eye drops or drinking water or injection
New castle	Virus It affects the respiratory system	- Coughing - Sneezing - Difficult breathing - Bending of the neck - Sudden death	- Vaccination - Proper ventilation - Kill and burry infected birds - Avoid visitors in the houses
Fowl typhoid and bacillary while diarrhea (BWD)	Bacteria	- White yellowish or green yellowish diarrhea - Respiratory problem - Dullness - Dropping wings - Sleepy eyes - Anemia i.e. combs and wattle shrine and become pale yellow - Sudden death	- Testing and killing affected birds - Keep poultry houses clean, dry and well ventilated - Treatment with furazalidone

General control measures of poultry diseases

POULTRY VICES:

- Vices are bad habits developed by birds usually in a deep litter house. These include;
- Cannibalism
- Feather pecking
- Toe pecking
- Egg eating (egg drinking)

Identification of vices in poultry

An outbreak of vices in poultry is characterized by;

- Birds eating eggs implying that total egg collection will be low
- Broken egg shell are left around
- Some birds will have wounds on toes and vent
- Birds that are cannibals will have blood stains on the beak.
- Some birds will not have feathers on the wings, neck and legs as a result of feather pecking.

Egg eating

Causes

- Bright light in the nesting places
- Exposed eggs on the litter
- Presence of broken egg shells on the litter
- When birds are bored
- Inadequate feeding
- Soft shelled eggs due to lack of calcium
- Mineral litter in the nests causing egg breakage

Control

- Ensuring regular collection of eggs twice or three times a day
- Nesting boxes should be made slightly done so that hens do not see the eggs
- Feed birds with calcium rich diet since egg shell is made up to Ca
- Provide a balanced ration
- Carryout debeaking at 3 ½ months

- Cull off offending layers
- Hang greens in the house to minimize boredom
- Scatter grains in the litter to keep birds busy

Canibalism and toe piecing

Cannibalism is a situation where birds pecie the flesh of other birds

Some times the toes are pecked at and result into bleeding and general lameness

Causes

- Over crowding of birds in poultry hose. This makes birds so close to each other leading to reduction of feeding and catering space
- Irritation by external parasites like lice and fleas, making birds to start piecing at imitating sites.
- Blight light in a poultry house or brooder makes toes of chicks' shines so other chicks will piece on them.
- Feeding birds on poor quality feeds, leading to nutritional deficiencies
- Too much light in the nesting boxes where birds can see the cloacae of laying hen.
- System of rearing where cannibalism is common in intensive systems like deep liter system.
- Introduction of new birds in the existing floce which will be bullied.
- Starvation where birds take too long without feeding
- Prolapse; is where the oviduct is pushed out after laying an egg. Other birds will start to pecie on it.

Control

- De-beaking of the entire flocie
- A farmer should keep birds according to age grop.
- Reduce the amount of blight light in poultry houses.
- Give birds a balanced diet
- Use the correct stocking rate to avoid overcrowding
- Provide feeds to birds at the right time
- Control external parasites by regular dusting.
- Hang greens in the house to keep birds busy

- Provide birds with adequate food and water
- Provide perches for roosting

Hysteria

This is a condition whereby birds are excessive frightened. When birds are under hysteria, they run and pile in the corners or jump onto the perches and make a lot of noise.

Causes

Loud noise due to abrupt banging of the door or something falling on the roof.

Rapid change of light intensity e.g. reflection of mirror of a car passing near the poultry house.

General control of vices

- Regular collection of eggs
- Making the laying nests dark
- Feeding birds on balanced ratios
- Debeaking
- It anging greens to keep birds busy
- Having optimum stocking rate to avoid overcrowding
- Control external parasites
- Culling the cannibals
- Isolate birds with prolapsed

  Scattering grains in litter

  Provide enough feeders and drinkers

Stress in chicken

This refers to general discomfort in birds which may affect growth rate and even egg yield.

Identification of stress in birds

- Making queer noise
- Busy trying to pick parasites from within feathers
- Birds having wounds on wattles and comb
- Sudden drop in egg yield
- Birds look frightened

- Birds will try to fly and may crush if freighted by strangers

Causes

- Sudden and sharp noise around the poultry house
- Sudden change in routine e.g. debeaking evaccinate
- Sudden changers in weather
- Badly balanced feeds
- Parasite infestation
- Presence of rats in the unit
- Inadequate feed and water space
- Lack of grit

Control of stress

- The poultry unit should be sited for from noisy places, busy roads and workshops to minimize noise
- The poultry house should be constructed in such away to avoid drought and should be well ventilated.
- Control external parasites by dusting.
- Provide enough feed and water troughs to reduce over crowding.
- Provide birds with well balanced adequate food and clean water.
- Use clean feeders and drinkers to avoid contamination and disease spread.
- Avoid sudden changes in routine
- Provide enough grit and at correct size

CATTLE PRODUCTION

Importance of keeping cattle

- Cattle provide milk and meat which are sources of animal protein, fats and minerals salts to humans.
- Milk and meat are also sold to generate income for most families.
- Cattle provide bi-products like hides and skins which are raw-materials in turning industries
- Horns, bones and hooves are processed crushed an dmixed with animal feeds
- Cattle provide dung and urine which are used to produce biogas

- Dung and urine are decomposed to form farm –yard manure which improve soil fertility
- Bulls and oxen provide labour on farm by pulling implements such as ox-ploughs
- In some areas cattle is an indicator of the respect one earns in society.

Breeds of cattle

Cattle are classified into two i.e.

Local breeds (bos indicus)

Exotic breed (Bos Taurus)

Bes indicus /local breeds

These are humped cattle to tropical origin

E.g.

- Zebu
- Boran
- Nganda
- Nsagala

Characteristics

- Are generally small and body weight is less than 400kg
- They take long to mature
- They are tolerant to heat
- Produce milk with high butter –fat content
- Generally tolerant to tick borne diseases
- They have long legs for fast movement
- They have a well developed novel flap and prominent hump to increase surface area for cooling
- They have long ears and long faces

Advantages of BOS indicus

- Can tolerate strong meat
- Are able to walk long distances in search for H_20 and pastures
- Are relatively tolerant to the borne diseases

- Have tough muscles and are good for work
- Produce milk with a high butter fat content (BFC)
- Have fewer reproductive problems and can be for along time
- Are cheaper to buy and maintain

Disadvantages

- Produce less carcus (low live weight)
- Take long to grow hence reach puberty late
- Have poor temperament
- Production is low in terms of milk and meat

Exotic breeds (Bos indicus)

These are of temperate origin, they include, Galloway, Aberdeen Angus, Jersey, Holliston Friesian, Guernsey, brown Swiss etc.

Characteristics

- They are humpless
- They grow very fast and are heavy
- They thrive in temperate areas with temperature 5 -20^{0}c
- They have short ears, wide heads and short horns while some are usually polled
- They have small dewlap
- Are note tolerant to tick borne diseases

Advantages of exotic breeds over local cattle

- Diary exotic breeds produce a lot of milk. On average, a lactating cow produces 20 litres of milk a day compared to local cattle which gives 2.5 litres a day.
- Beef exotic cattle produce a lot of meat on slaughter. Average weight is 1000kg compared to local cattle with 150 – 200kg average weight
- Exotic cattle grow very fast and reach slaughter age quickly
- Exotic cattle mature very fast, a heifer is ready for service at age of 2 years
- Exotic cattle is either hornless or have short horns which makes it easy to transport and handle them.
- They have a high calving rate (fecundity)

- They have low temperament making them easy to control
- They have a high feed conversion ratio than the local ones

Disadvantages of exotic cattle over local cattle

- Are very expensive to buy and maintain
- They require a high standard of management
- They have many reproductive problems
- They are susceptible to diseases
- Cannot tolerate strong heat

TYPES OF CATTLE

This refers to a group of cattle whose characteristics maker them suitable for particular purposes they include;

- Diary cattle
- Beef
- Dual purpose
- Work /drought animals

i) Dairy cattle

These are meant for milk production

Characteristics of dairy cattle

- The have a wedge /triangular shape
- They have a large belly /abdomen to contain a lot of food
- They have a well developed udder
- Have prominent milk veins
- They produce high milk yields
- Have thin bodies with little flesh
- Have well suspended udders

Factors considered in establishing a diary farm

- Availability of land for grazing and construction of structures like milking parlor
- Availability of capital required for investment

- Availability of market
- Presence of shade where animals rest from during extreme temperatures
- Parasites, pests and diseases in the area
- Bred of the animal to be reared i.e. exotic /local
- Technology available i.e. use of milking machine

ii) Beef cattle

These are meant for meat production

Characteristics of beef cattle

- They have a blocky /square shape
- They have small head
- They have short legs to carry the weight
- Are fast growing and put on weight quickly
- Have the ability to breed regularly
- Produce a lot of meat/have high carcus weight
- Are able to survive drought without losing weight

iii) Dual purpose

These are meant for both milk and meat

They produce good quality milk and good quality meat

iv) Work type cattle /drought cattle

These are cattle used to perform farm work like ploughing

They are characterized by:

- Being strong and sound
- Having free moving limbs
- Having quite temperament
- Having sharp ears to pick instructions
- Having tough muscles

LIVESTOCK IMPROVEMENT

The productivity of farm animals is determined by the genetic make up but modified by the environment.

The environment in which an individual animal grows determines how much of the inherited potential is going to be realized.

The environment refers to all the non-genetic factors which influence the animal such as climate, feeding,

The environment refers to all the non-genetic factors which influences the animal such as climate, seeding, management, housing pests and diseases.

Livestock improvement therefore is the improvement of animals' genetic potential and the environment in which they are kept.

Aims of livestock improvement

- To create better yielding animals
- To create efficient converters of feeds into utilizable animal products like milk, meat and eggs
- To get hardy animals for work
- To improve on the quality of livestock products
- To produce animals that resist diseases and parasites
- To produce early maturing animals
- To get animals that reproduces /multiply faster
- To improve on production capacity of animals e.g. in terms of eggs, wood etc
- To get heat resistant animals

METHODS OF THE LIVESTOCK IMPROVEMENT

The methods of improvement include;

- Introduction
- Selection
- Breeding

A. INTRODUCTION

Annals that are not natives to a place /region but are known to have good qualities are brought into an area. E.g. the Friesian and jersey from Europe have been introduced to Africa.

This is usually done through importation of physical animals or importation of semen into a country.

B. SELECTION

This is the picking /choosing of animals from a herd with desirable characteristics to be parents of the future generation.

Animals with good characteristics pass them to their offspring's (progeny). This results into improvement of the herd.

Animals with bad traits should be removed and sold or slaughtered. This is known as **culling.**

Factors considered when choosing /selecting a breeding stock

For selection to be carried out effectively, the former should consider the following;

Productivity of the parents: select animals whose parents are good producers of meat, milk, wool and eggs.

Adaptability: Animals chosen should be able to adapt to the environment without loosing weight.

Age: Select animals which are still young but have reached sexual maturity. Avoid old animals as there productivity level decreases with increase in age and young animals will stay in production for a long time.

Physical appearance: Animals chosen should conform to the characteristics of dairy, beef, dual-purpose, broiler or layer.

Feed conversion rate: Chosen animals should have the ability to change food eaten into useful products like eggs and milk etc.

Health status: Choose animals that are free from health problems. Avoid animals whose parents have inheritable diseases.

Resistanceagainst diseases: Animals which show resistance to common diseases should be selected since these can survive in case of an outbreak.

Productivity: Chooseanimals that can produce enough and for a long time in terms of milk, eggs, etc.

Maturity period: Select animals which have a high growth rate since these can reach the product ion or breeding stage quickly.

Fecundity: Animals chosen should calve down easily and regular.

Temperament: In case of daily breeds, choose those with good temperament since this enables easy handling during milking.

Methods of selection

As stated earlier, selection is aimed at preserving the good traits and eliminated bad ones. This is accomplished by studying the production and reproduction records of the animals to be selected. The various methods of selection include;

- Mass – selection
- Progeny testing
- Contemporary comparison
- Collateral relative
- Tandem selection
- Pedigree selection

i) Mass selection

Selection based on gene influence e.g. skin colour. Other than environmental.

Mass selection is the choosing of individuals purely on the basis of their appearance and allows them to mate randomly.

This is the most reliable method when considering inheritable characteristics in dairy animals like batter-fat content.

ii) Contemporary comparison

This is selection based on the performance of individual bills and heifers in a herd. The animals compared are of the same age. However, the method requires a high level of record keeping.

Comparison is normally carried out between sires which have produced offspring's through mating

iii) Collateral relative selection

This method is based on the performance of many animals that are closely related.

iv) Progeny testing / performance testing

This is the selecting of animal basing on the performance of its off springs. It is common when selecting breeding bills.

v) Tandem selection

This is selection based on one trait at a time until it is improved and then another selected. E.g. B.F.C then disease resistance.

vi) Pedigree selection

This is the choosing of an animal basing on the performance of its parents (ancestors). It requires presence of well kept records. It is common when the animal selected is too- young.

C. BREEDING

Breeding is the process through which mature animals give rise to off springs through mating. For a good stock, a farmer should select good farm animals for breeding basing on the factors stated earlier.

Terms used in breeding

Genes

Genes are units found in the chromosomes and are responsible for carrying characteristics of an individual animal. Animals are therefore able to pass on their characteristics through genes.

Genes contain a pair of alleles which are actual corners of characters e.g. skin colour. Like black, and brown.

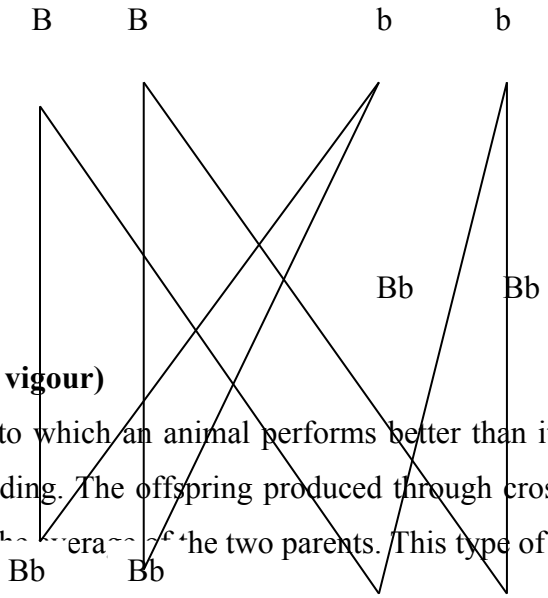
Genes /alleles are carried in the sperm's nucleus and the nucleus of an egg (females)

Dominant and recessive genes

A dominant gene is one which outward appearance and suppress all other genes i.e. it is stronger and will dominate others.

A recessive gene is weaker and will not appear in the presence of a dominant gene; for example; Suppose black is dominant over brown, lets use B to represent black and b for brown.

If a black animal is crossed with a brown animal all offspring will be Bb (black) since black (B) is dominant over brown.



Heterosis (hybrid vigour)

This is the extent to which an animal performs better than its parent. Such situation is reached through cross breeding. The offspring produced through cross breeding will be able to produce more than double the average of the two parents. This type of offspring is called **a hybrid.**

Breeding systems

Breeding in farm a s c carried out through cross-breeding, up-grading, in breeding, line breeding and out crossing.

i) Cross breeding

This is the mating of animals that are not related. The animals should be pure breeds. This result into offspring called **hybrid**and these have characteristics of both parents and their productivity is usually better than that of parents.

Advantages

- It leads to introduction of good genes formerly missing in the herd
- It leads to production of hybrid
- There is diluting of the effect of bad traits found in a particular breed e.g. genetic diseases

ii) Up grading

This is the continuous back crossing of superior exotic sires with the load types.

It is done by making proven good bulls (normally exotic breeds) to mate with cows of less productive breed (local breed) and with their daughters successively generation after generation with the purpose of improving the inferior type (local breed). In the first generation, F_1 the off spring will be 50% exotic, in the F_2generation, it will be 75% n the F_3 it will be 87.5% and the F_4 generation, the offspring will be 93.75% exotic. After 4 or 5 generations the offspring will be as good as a pure breed.

100% local breed cow ╳ 100% exotic bull

F_1 50% local, 50% exotic ↓ 100% exotic bull

F_2 25% local, 75% exotic 100% exotic bull

F_3 12.5% local 87.5 exotic 100% exotic bull

F_4 6.25% local 93.7% exotic ╳ 100% exotic bull

F_5 3.17% local 96.8% exotic ↓ 100% exotic bull

Advantages

- There is introduction of good traits in the herd
- Improvement of the herd is faster
- Offspring can adapt to environmental conditions better than the superior sires

Disadvantages

The process takes very many years as it relies on getting female offsprings from each generation.

iii) In breeding

This is the mating of closely related animals e.g. a parent is allowed to make with its offsprings or close relatives.

Advantages

- It maintains production of pure line or breed (uniformity)
- The good genes are concentrated and this improves productivity
- It helps to maintain good characteristics in a herd

Disadvantages

- Bad traits /characteristics hidden in ancestors may show up in offsprings
- It decreases vigour in offsprings.
- Productivity of the animals may easily decline in case the annual has bad characteristics

iv) Line breeding

This is the mating of distantly related animals e.g. mating of causing or grand sires with grand daughters. It aims at keeping the good traits of an ancestor and avoiding undesirable ones at the same time.

Out crossing (out breeding)

This is the mating of animals without a family connection (mating of the related animals).
At times these animals are of the same breed.

Advantages

- It improves productivity of animals
- It helps to maintain good breed characteristics

METHODS OF SER VICE IN LIVESTOCK

The major aim of serving an animal on heat is to enhance reproduction. The following are the methods of serving animals:

As natural mating

a) Artificial mating
b) Embryo transfer

Natural mating

This is where a bull is allowed to service a cow physically. Male animals have the natural ability to detect cows on heat.

Once detected, the male animal mouths the female and deposits the sperms in the vagina.

Advantages

- Animals which have silent heat can easily be detected by bulls
- The animal can be mounted before the farmer detects signs of heat
- It eliminates the costs of artificial insemination
- The animal on heat is served at the right time
- Conception rate is higher than in artificial insemination
- It is less labourers since the bull detects the females on heat

Disadvantages

- There is easy spread of veneral diseases e.g. brucellosis and vaginitis
- There is wastage of semen unlike in A.I
- It may lead to production of offsprings with bad characteristics if the bull is not selected
- Heavy male animals may injure small/weak female animals by breaking their pelvic bones.
- Once the male dies, it usefulness is no more
- It is costly to transport good bulls for mating

ARTIFICIAL INSEMINATION

This is breeding by artificial means.

It is a method of breeding where semen is collected from a male animal and introduced into the female reproductive tract of an animal on heat using insemination equipment.

In cattle semen is collected from a bull using an artificial vagina (AV), screened to chick whether it is safe, diluted and stored in plastic straws.

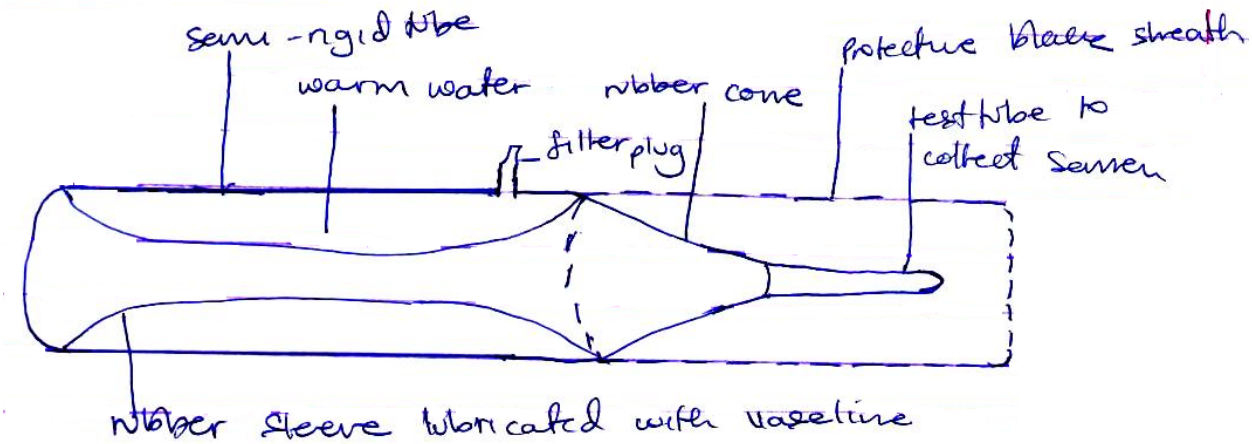
SEMEN COLLECTION

Semen is collected from the bull using an artificial vagina and a teaser animal.

The bull is made to mount a leaser put in a crutch.

The operator catches the base of the penis of the bull and diverts it into the artificial vagina where the bull ejaculates and the semen flows down in a test tube attached to the rubber cone.

Artificial vagina



SEMEN HANDLING

This includes, examination, dilution and storage

Examination

After semen is collected, from a male animal, samples of it are examined to judge its suitability for insemination. In the routine examination, the colour, volume and mass activity are examined under a microscope. Individual mortality and sperm density are also examined.

Dilution

Semen is diluted to increase the volume of sperm fluid in order to multiply the number of doses from the semen sample and a good diluted helps to preserve the viability and fertility of spermatozoa's.

Glucose may be added to provide energy to the sperms and antibiotics to prevent infection by bacteria

Storage

Semen is stored in plastic straws at a little above freezing point. i.e. at 5^0C. However, now semen is stored or deep frozen in carbondioxide at -79^0C or in liquid nitrogen at -193^0C.

Insemination

There is 2 method (i) Recto-vagina (ii) Speculum method

Recto –vaginal method

- The animal on heat is restrained in a crush.
- The inseminator washes hands before the operation using soap and water
- The inseminator put on clean gloves
- The inseminator pushes one of his/her hands in the rectum to remove dung
- A straw of semen is removed from the nitrogen flask and thawed by putting it is warm water to activate the sperms.
- Sterilized equipment such as a catheter tube is assembled.
- The straw of semen is put into the catheter tube
- The inseminator pushes one of the hands through the return to locate the cervix
- He /she uses he other hand to gently push the inseminating equipment through the vagina up to the cervix
- The semen is then released at the entrance of the cervix
- The inseminating equipment is removed and cleared
- The animal is then let free

Advantages of A.I

- It eliminates random mating and in –breeding since semen is got from proven bulls.
- It eliminates the spread of venereal diseases like brucellosis which are spread by bulls from one cow to another.
- Semen from one bull can be used to serve many female animals i.e. it reduces semen wastage.
- Semen can be stored for a long time unlike in natural mating
- It helps to avoid injuries to small/weak female animals by heavy/big male animals.
- The cost of keeping a good male animal on a farm is eliminated.
- It is cheaper and economical to transport semen than transporting a male animal from on place to another.
- A-I services are cheaper than buying or maintaining a male animal.
- It enables farmers to introduce good breeds in an area where there is no exotic breeds.

- Semen from different animals can be used to improve the herd.
- It ensures planned and controlled breeding.
- It enables the farmer to accurately keep breeding records which can later be used for accurate selection.
- Semen from good breeds which are lame can be used.
- It prolongs the reproductive life of a male animal since semen can be used even if the animal died long ago.

Disadvantages

- It can only be carried by trained personnel's who are few in most of the parts of Uganda.
- The equipments used in artificial insemination like insemination gun, are expensive.
- Semen storage requires expensive and delicate machines
- It may be difficult for insemination to reach farms in remove areas where there are poor roads.
- It is impossible to use A.I where grazing is done communally.
- Farmers may fail to identify animals on heat if they have short heat periods or silent heat
- Infertility may occur due to poor semen storage or poor insemination skills.
- Many rural farmers have not been well sensitized about artificial insemination so they do not know whether to use it or not.
- Poor transport and communication in rural areas makes it difficult for farmers and insemination to be in close contact.

Breeding efficiency

This is the poor of the animal to reproduce and multiply over time.

OR

The fertility of the animals in a herd

Breeding efficiency starts from conception through gestation up to calving.

Breeding efficiency is measured basing on;

- Number of service carried out for the animal to conceive
- How long an animal takes to conceive after calving
- Percentage of animals that have not gone on heat after service

How to improve/maintain breeding efficiency

- Giving cows a rest period of 2-3 month before they are served again after calving /giving birth.
- Carryout pregnancy diagnostic /test 2 months after service so that the animal is served again if it did not conceive.
- Detect heat signs early to ensure service in time.
- Keep good breeding records to determine whether the service was successful or not.
- Control reproductive diseases as they are responsible for failure to conceive and abortion.
- Proper feeding of the animals to ensure good health
- Used skill personnel when carrying out A.I
- Buy replacement animals from health herds

REPRODUCTIVE ANIMALS

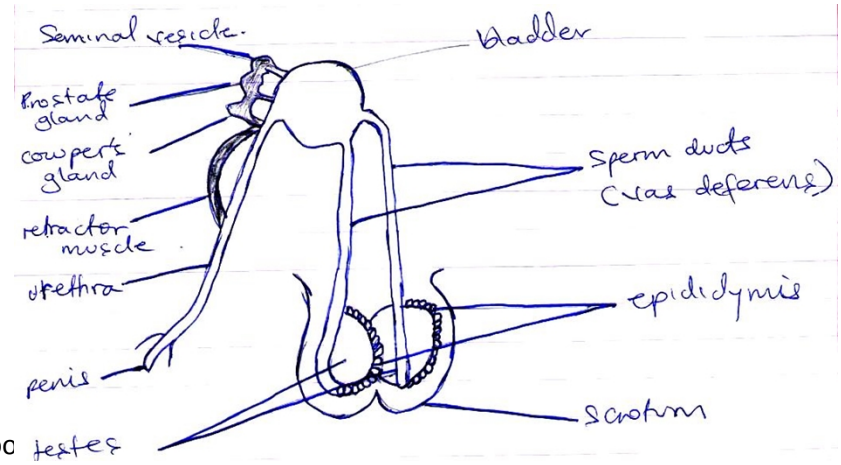
Reproductive is the process through which new offsprings are produced.

There are two types of reproduction i.e. a sexual reproduction and sexual reproduction.
All animal reproduce sexually and this is possible when animals reach sexual maturity.
Sexual reproduction involves males and females which produce gametes i.e. sperms and ova (eggs) respectively.

The male gamete meet the female gamete (oval), fertilization takes place and a zygote is formed which then develop into a young animal.
Fertilization takes place internally in the body of a female animal.

Reproductive system of a bull

It is composed of testes, sperm duct, epididyms, accessory glands, urethra and penis.



The testes

There are two testes which are oval in shape.

They are made up of consulated somniferous tubules where sperms are produced when the animal has reached puberty stage.

They also provide the male hormone testosterone (androgen) which stimulates the development of male secondary characteristics and formation of sperms in the process of spermatogenesis

The scrotum

This is a sac-like structure that hangs outside the body where tests are found.
Its main function is to act as a thermo-regulator so that the sperms produced remain viable.

Epidermis

These are very long tubes which surrounds the testes. After spermatogenesis, the sperms move away from the somniferous covulated nebulas and a stored in the epidymis from where they mature.

Cowpers gland: Produces liquid which neutralizes urine in the urethra. This protects the sperms from damage.

Prostate gland: Secretes seminal fluids in which sperms are mixed to form semen.

Seminal vesicle: Produces acids, enzymes, and sugars to ensure that sperms remain viable

NOTE:

The cowpers' gland, prostrate gland and seminal vesicle ferm altogether the **accessory glands** found attached to the urethra.

Urethra

This is tube running through the penis from the accessory glands.

- It is a passage of semen to the vagina during copulation
- It is also a passage of urine from the bladder

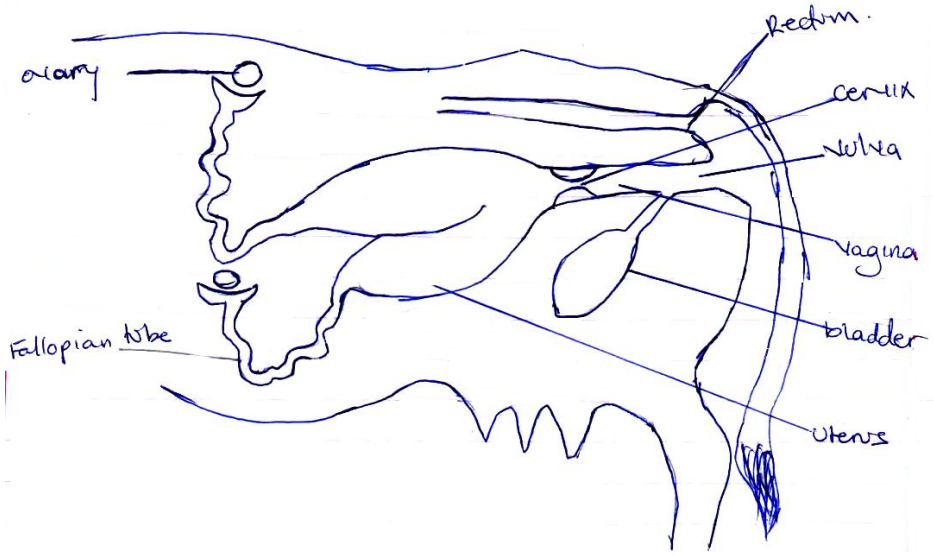
Penis

This is an organ for copulation. It is spongy and flaccid when at rest but it gets filled with blood and becomes erect and hard just before mating. During mating, the male animal pushes the erect penis into the vagina where it releases the semen

Vas deferens

These convey sperms from the tests.

THE FEMALE REPRODUCTIVE SYSTEM



The ovaries

These are two oval shaped structures located above the kidweys. The ovaries become functional when the animal has reached puberty stage and they have two main functions

Production of female gamates known as ova (eggs/ootids) in the process called Oogenesis

Production of sex hormones responsible for the sexual cycle e.g. Oestrogen responsible for the s start of heat period and progesterone which sustains pregnancy by reducing the effect of Oestrogen so that the animal does not go heat again when pregnant.

NB: Ovulation is the shading or release of the ova to the oviduct.

The fallopian tubes (oviduct)

These are tubes that connect the ovary to the uterus (womb). During ovulation, the ovum is released from the ovary through the oviduct to the uterus with the help of the to and fro

movement of cilia and the muscle contraction.This is the site of fertilization if the sperms are introduced during the heat period.

The uterus (womb)

This is a sac- like organ where the foetus develops.

After fertilization, the zygote moves down the uterus and gets attached to the uterine walls. This is referred to as **implantation**

After implantation, the placenta and umbilical cord develop.

The uterus also provides room for the development of the foetus during pregnancy /gestation period.

The cervix

It is a ring-like structure at the point of entry to the uterus. The glands in the cervix wall secrete hormones during the sexual cycle which influence some events, e.g. during oestrus, oestrogen leads to the relaxation of the cervix to allow entry of sperms.

After fertilization the cervix closes and towards parturition, it relaxes to allow the release of the foetus.

Vagina

It is a tube-like structure that connects the vulva to the uterus. It plays the following roles in reproduction.

Receives and passes over semen during copulation

It is a birth canal i.e. receives and passes the foetus from the uterus to the outside during partortion

The vaginal walls secrete mucus which reduces friction during copulation and also reduce entry to micro-organisms into the tract.

The vulva

It is the female external genitalia which guide the penis during mating and it is the passage of the foetus out during birth.

PROCESS OF REPRODUCTION

During reproduction, the following processes occur but under the influence of hormones.

- Spermatogenesis
- Oogenesis
- Fertilization: The onion of the male and female gamates
- Implantation: The attachment of the zygote onto the uterine wall
- Partition
- Oestrus cycle: The period between two heat periods

REPRODUCTIVE HARMONES

Hormone	**Source**	**Function**
Oestrogen	Developing follicle in ovary and the uterus	- On set of heat - Development of mammary glands and uterine walls - Increase mucus secretion in oviduct - Relaxation and opening of cervix - Stimulation of the growth of duct system in the udder - Thickening of vaginal walls
Progesterone	Corpus luteum	- Complete uterine wall development - Hinders animal from coming on heat when pregnant - Maintains pregnancy
Testosterone	Testes	- Development of secondary sex characteristics like wide chest, aggressiveness etc - Stimulates spermatogenesis
Relaxin	Ovary	- Causes widening of cervix and relaxing of pelvic igaments towards parturition
Oxytocin	Posterior pitotary gland	- Contraction of uterine walls during birth - Promotes sperm transportation with

		female animals - Releasing of milk from the olive oil and milk bet down
Follicle stimulating hormone (FSH)	Anterior pituitary gland	- Stimulate growth of follicles in ovary - Spermatogenesis and release of oestrogen from the ovary
Leutenising hormone (L.H)	Anterior pituitary gland	- Brings about ovulation - Initiates production of progesterone
Lactogen	Anterior pituitary	- Initiates production of milk - Influence growth of bornes and tissues - Stimulates functioning of corpus luteum development of maternal behavior

NOTE:

A hormone is a chemical substance produced is one part of the body, transported through the blood stream and controls body activities in another part of the body

OR

A chemical messenger which control behavior of the body.

Oestrus cycle

This is the period or interval between teh4 end of one heat period and the start of the next heat period.

The cycle starts with the release of the FSH by the anterior pituitary gland into the blood stream which stimulates the development of follicles into ova when it reaches the ovary.

Heat period and signs of heat

Heat refers to the time when female animals are ready for mating. If normally occurs when ovulation is about to occur. This serves as an alert to the male animal of the same species to mate

with this female animal and it the female animal mates with the mate during this period, fertilization may occur.

Heat in farm animals can be classified into:

Silent heat

This is when the animal goes on heat and it did not show any sign of heat. The stockman fails to identify it for several months and it may become infertile however, bills under natural mating can identify such animals.

False heat

The animal shows signs of heat but ovulation does not occur and if served, such animals do not conceive.

Standing heat

This is a period during heat, when a female animal stands still and allows to be mounted. Before and after standing heat, the animal does not allow to be mounted.

Signs of heat in cattle

- A cow on heat allows others to mount her
- It mounts others
- There is continuous bellowing /mooing
- There is reduction in milk production in lactating cows
- There is loss of appetite
- Frequent urination
- The animal becomes excited (restless)
- There is slight rise in body temperature
- Swelling of the vulva
- The vulva changes colour from pink to red
- The cow twitches her tail on the side exposing the vulva

The uterus cycle in cattle lasts between 18-24 hours and occurs every after 21 days if not pregnant

Signs of heat in pigs

- The vulva swells and become red
- Clear mucus is seen on vulva
- The animal loses appetite
- The sow gilt becomes excited
- It makes a lot of noise (grunting)
- When touched at the backline, the sow stands still
- The sow mounts other pigs
- It allows other pigs to mount it

Oestrus cycle occurs every after 21 days and last for 48-72 hours

Fertilization and implantation

Fertilization is the union of the sperm and ova to produce a zygote

Implantation is when the zygote attaches its self into the uterine walls by the placenta

The zygote soon becomes an embryo and it is through the placenta and umbilical cord that it exchanges gases, waste product and obtains nutrition from the mother.

Fertility

This is the ability of an animal to become reproductive. This terminology puts more emphasis on female animals but the role of male animals is equally important.

A female animal which becomes pregnant after viable spermatozoa are introduced during service and within the correct time is said to be fertile. However, female animals may fail to conceive after mating and these are **infertile.**

Causes of infertility

- Poor feeding affecting physiological reproductive function
- Immature and infertile spermatozoa inseminated
- Infections in the re productive system or reproductive diseases.
- Poor insemination techniques
- Free martins: When twin calves of different sex are born, the male is fertile while the female is infertile because its reproductive system is deformed an d it cannot conceive.

- The corpus luteum failing to degenerate after a cycle thus continues to release progesterone's, keeping the animal in a state of false heat.
- Abnormal foetus that fail to implant (dead foetus)
- Suckling by young ones delays onset of oestrus
- Extreme PH of the reproductive system of the female which may kill sperms
- Deposition of fats which block the fallopian tubes.

Signs of pregnancy

The period between conception and birth is referred to as gestation/pregnancy. Signs of pregnancy include;

- Failure to return on heat after service
- Increase in body weight
- Enlarged womb
- Smooth and shinny skin
- Sticky and thice mucus seals the cervix
- Thick secretion from the teats after 4-5 months
- Signs of life of het foetus
- Development of udder tissues in heifers/first pregnancy animals
- Increase in pulse rate
- Slight increase in body temperature

Care for the animal during pregnancy

- Carryout pregnancy diagnosis /test after 2 months
- It should be given adequate nutritious feeds to cater for both mother and foetus
- It should not be made to move/walk long distances
- The stalls /houses should be rough to avoid sliding
- It should be isolated from since animals especially those that have aborted
- It should be given enough clean drinking water and food
- Provide a balanced ratio throughout the pregnancy
- Dry off lactating animals in time (7 months)
- Steaming up is recommended for cattle and dry off stage
- Consult a qualified veterinary personnel before any treatment is administered

- The animal should be protected from heat stress
- Regular deworming to control internal parasites
- Regular control of external parasites esp by spraying
- Assist animals with calving difficulties during calving
- Provide warm water to the animal after calving down to ease the release of the after birth
- Call a veterinary doctor for help in case of difficult

Drying off

This is the practice of stopping milking a lactating pregnant cow in preparation for the next parturition and lactation. It is normally done at 7 month of pregnancy.

Importance's

- To cater for the increasing nutritional demands of the foetus
- Allow the cow gain some weight after lactating
- It helps to replace nutrients used up in the current lactation especially calcium and phosphorus
- Allows under tissues to re-build before the next lactation

  If the animal is not dried off, the following may happen
- A low milk yield of about 25%
- Nutritional disorders like milk fever due to lack of Ca
- Continued loss of weight
- The cow may fail to deliver which may lead to its death and the foetus

Methods of drying off

(i) Incomplete milking: The cow is milked half way for 3-4 days after which milking is completely stopped.

(ii) Intermittent milking: The cow is milked at alternate days for 3-5 days after which milking is completely stopped.

(iii) Secession: This is complete stopping of milking

(iv) Dry cow therapy: Milk depressants /antibiotics like obrenin are added to the food given to an animal.

Steaming up

This is the feeding of a pregnant cow on extra nutritious feeds two months before calving. This is normally done after drying off.

Reasons for steaming up:

- To cater for high nutrient demands of het foetus
- To avoid nutritional disorders like ketosis, milk fever etc
- To make animals become familiar with the milking parlour milk
- To make animals ready physiologically for milk secretion rich in colostrums
- For the animal to put on weight
- To repair worm out body tissues
- To enable the production of heavy and health young ones
- To increase milk production in cattle

CALF REARING

Both good management, a calf grows into a productive bull or cow. It is therefore important for one to get acquainted with handling of calves.

Calf rearing begins when the calf is getting born, (calving)

Signs of calving down (Parturition)

Calving s a physiological process within the body of a pregnant cow, that leads to the expulsion of a fully grown foetus form the uterus.

If the cow is yet to calve down, it shows the following signs.

- The vulva swells, becomes soft and flabby
- The animal isolates itself
- The animal becomes restless
- There is continuous breathing
- The amnion bag appears and bursts eventually a few hours to giving birth
- The udder enlargers as if is filled with milk
- Frequent urination
- The animal turns and looks at the flame region

- Colostrums secretion from the leafs
- The vulva ahs thick clear mucus
- The animal looses appetite

NOTE: After successful insemination, patrician is expected after,

- ✓ 275 – 285 days in cattle
- ✓ 150 days – in goats
- ✓ 3 months 3 weeks PB days in pigs
- ✓ 30 days in rabbits

Care during calving

The expectant animal should be isolated a few days to the expected date and watched closely.

The following events take place during parturition

- The ligaments of the tail base relax and the canal widens the mucus plug previously sealing the cervix flows out and hangs as a clear translucent structure
- It intervals the dam (cow) strains and contractions are visible (labour)
- The amnion (water) bag appears but care should be taken not to piece it.
- The bag eventually bursts revealing 2 feet and the muzzle of the calf.
- In normal situations, the foetus should just slide out and later followed by the placenta and amnion tissues.
- A few problems have been identified and need the farmers' attention or even a veterinary surgeon as seen below.
- If the calf appears hind legs first, it should be gently pulled downwards and not towards yourself.
- Calf fails to appear, however much the dam strains, this could b e due to;
    - A twisted head backwards or downwards
    - Fore legs facing backwards
    - Breech position (side ways)
    - Fore legs and head appear but the dam ceases to strain probably due to fatigue. Assist by pulling using a rope on the legs.

The following need attention of a veterinary surgeon

- ✓ The after birth appears and hangs from the vulva before giving birth
- ✓ The after birth fails to appear even after birth
- ✓ One leg appears after bursting of the "water bag"
- ✓ A foul smell is released as the water bag bursts, signifies death of the foetus.

NOTE

After calving, the after birth must be expelled within 24 hours, and the animal should not consume it. You can accelerate expulsion of the after birth by allowing the dam to exercise (walle around) and provide it with warm water. Expulsion of the after birth is know as cleansing and if it is retained, the dam may die or become infertile due to rotting.

Care of the calf after calving (management of a calf from birth to weaning)

- ➢ Clean mucus from the calf or ensure that the cow likes its calf to dry.
- ➢ Clear the nostrils off foetal membranes, rub the chest region with dry straw to stimulate breathings
- ➢ Tie and cut the umbilical cord
- ➢ Disinfect the cord with iodine or dettol to prevententry of germs
- ➢ Take the weight of the calf at birth.
- ➢ Help the calf to stand and to suckle colostrums in the first and hours
- ➢ Transfer the calf of a calf pen prepared in advance
- ➢ Feed the calves on colostrums for the first 4 days there after commence feeding it on whole milk.
- ➢ Observe strict hygiene in the calf pen
- ➢ Keep individual calves in individual pens to prevent suckling of the umbilical cord
- ➢ Castrate male animals 3-14 days after calving since young animals heal faster than old ones.
- ➢ Carryout dehorning using an appropriate method.
- ➢ Carryout identification using the appropriate method so that proper records of the animal can be kept
- ➢ Deworming is done regularly by drenching to control internal parasites like liver fluees, tape worms etc
- ➢ Spray calves against external parasites especially ticks

- Weigh the calves regularly to monitor and evaluate their performance
- Wean calf at 8 weeks or 10 weeks.

A calf pen:

This is a special structure for housing young calves.

- A rough floor to avoid sliding
- Leave proof roof
- Have individual pens for each calf to prevent sucleling of the navel
- Should have adequate space
- There should be water and feed though provision
- Well ventilated and well it (have enough light)
- Short walls for calves to see each other
- A drainage channel to lead away urine and water.

Feeding calves

All newly born calves must be fed on colostrums for the first 3-4 days

Colostrum is the first milk produced by a cow in the first 4 days after calving. It plays the following notes.

- Contains antibodies from the dam which provide immunity up to a time when the young animal makers it own
- It is highly nutritious and in liquid from which young ones can easily consume
- It is highly digested
- It is a laxative which helps to remove the first food from the stomach thus avoiding constipation.

Therefore, the calf is given enough milk every day.

In young ruminants, the numen is not developed; they have to depend only on milk for the first 2 weeks.

Provide water adlib (all the time)

At 7 days of age, early weaner pellets are introduced alongside milk

At about 2 weeks, young, good quality pastures are cut and provided to the calves

At 10 weeks, calves are taken to paddocks to start direct grazing but should be ahead of the mature animals to avoid worm infection.

Methods of feeding calves

They include;

- Natural /mother raising
- Bucket feeding
- Foster mother /nurse cow feeding

(i) Natural /mother feeding

This is where are calf societies milk from the dam and in most cases the dam is not milked at all.

(ii) Multiple suckling /foster mother/norse mother system: In this method, the cow is used to suckle several other calves not her own. She may rear as many as twelve. The cow should be fed as calves suclele to avoid it from rejecting the calves.

(iii) Bucket feeding: This is when calves suclele colostrums for 3 days and then separated from the mother and fed on milk in a bucket.

Procedure of training a calf of drink milk from a bucket

- ❖ Starve the calf for two to 4 hours to set up appetite
- ❖ Obtain warm milk from the mother and dilute 25% of its volume by water.
- ❖ The diluted milk should be 35-37^{0}C
- ❖ Put the milk in a bucket
- ❖ Wash your hands with soap/disinfectant
- ❖ Dip your first 2 fingers into milk
- ❖ Withdraw the fingers from the milk and allow the calf to suclele the fingers
- ❖ Gently lower the calf's head into the bucket as it sucles the fingers to drive the milk
- ❖ Carefully and slowly withdraw the fingers as the calf continues to drink milk
- ❖ Repeat the procedure every other day tell the calf automatically comes and drives milk on its own
- ❖ Feed calves 2 times a day at regular intervals

Precautions to take

- Use clean milk buckets all times to avoid spread of diseases
- Use fresh milk daily
- Milk should be at body temperature as cold milk may en courage stomach disorders.
- The bucket should be kept at knee height for milk to bypass the rumen when swallowed.
- The procedure is repeated for a few days for the calf to grasp.
- The trainers hand must be clean

Advantages

- It allows early weaning of the calf
- There is no wastage of feeds
- A calf can depend on bucket feeding if the mother dies.
- Calves are fed according tog their individual needs hence avoiding underfeeding
- It enables good dairy herd management as milking starts immediately and calves a fed according to production
- It is easy to determine milk yield per animal
- It reduces risks of disease transmission from the mother to the calf.

Limitations /disadvantages

- Requires a lot of labour especially with large farms
- Dirty buckets can spread diarrhea (scours)
- Milk may not be at body temperature by the time it reaches the calf

Weaning

This is the gradual process of introducing the calf to feeds other than milk and stopping them from suckling.

It is a stage when the young ones steps depending on the mother. In cattle, weaning age is 8-10 weeks after calving weaning enables the dam/mother to prepare for the next gestation period.

Types of weaning

i) Early weaning

This is when the calf is fed on colostrums for 4 days and then early weaner concentrates (calf ballets) are introduced. The amount of milk is gradually reduced until the calf stops being fed on milk at 35 days of age.

ii) Late weaning

The calf is allowed to sucele /drink milk up to 6 months

CALF MORTALITY

This is the death of calves at early age due to a number of causes.

The causes may be: - disease, navel infection and worms

Calf diseases

i) Calf scours:

This is a bacterial disease spread from one calf to another from 2-5days of age ad some calves may die quickly.

Signs and symptoms

- Severe diarrhea
- Wood stained feaces with a fool smell

Control / Prevention

- Feed calves on colostrums
- Proper hygiene in the calf pen
- Use of anti – biotics in the feeds

ii) Common scours

These are common diseases caused by feeding errors and poor management.

Causes

- Feeding calves on sour milk
- Feeding calves on too much milk
- Feeding calves on cold milk

- Using dirty buckets especially in bucket feeding
- Feeding calvese at irregular intervals
- Keeping calves in dirty pens

Control

- Ensure that calves are given clean, adequate milk in clean buckets
- Keep calf pens clean
- Regular disinfecting calf pens
- Use antibiotics
- Give calves warm water for one day

iii) Pneumonia: This is caused by;

- In hauling poisonous gases
- Painful and dry coughing
- High body temperatures

iv) East cost fever

This is a disease caused by protozoa. (Theireria parava) transmitted by the brown ticie

Signs

Swelling of lymp nodes along the dewlap

Weakness and dysentery in the later stages

Control

Hand spraying to control ticks

Graze calves in the free paddocks

v) Navel infection

After 2-3 days of birth, germs may enter into the body through the navel if it is not disinfected. As a management practice at calving, the navel should be tied, cut and dipped in iodine or coppet sulphate

vi) Calf cocciodiosis

This is caused by coccidian bacteria. The germs spread from feaces which have accumulated. Regular removal of beddings and feaces from the calf pen prevents the disease.

vii) Worm infestation

Worms are internal parasites which rob food from the blood stream of the animals. Eggs of worms are eaten along with the pastures while grazing. They include, tape worms, liver flukes and round worms etc.

Signs of worm infestation

- A swollen belly
- Rough standing hair
- Loss of weight
- Retarded growth
- Coughing
- Damage of intestinal linning
- Anemia in case of blood sucleing worms
- Worm segments seen in feaces

Control of worms

Carryout rotation grazing at not more than 3 days interval
Regular deworm /drenching with antihleminths
Good sanitation in the calf pen
Avoid overstocking in the calf pen
Burning of affected pastures during the day season
Application of copper sulphate in affected areas.

TOPIC LIVESTOCK REARING /MANAGEMENT PRACTICES

These are practices carried out in order to get good products or increase on the number of farm and animals.
They also ease management
They are subdivided into:

- Feeding practices
- Parasite and disease control practices
- Breading practices
- General management practices

A) FEEDING PRACTICES

These include special ways of feeding some special animals. They include;

- Flushing
- Steaming up
- Creep feeding

i) Steaming up

This is the feeding of a pregnant animal on extra nutritious feeds two months before parturition. We have already seen the reasons for steaming up in the previous chapter.

ii) Flushing

This is the giving /feeding of extra nutritious feeds to female animals before they are served to ensure that they release many eggs during ovulation. As a result many eggs are fertilized and many offsprings are produced. It is common in sheep and cows.

Reasons

- ❖ To increase the number of litter during farrowing
- ❖ To enable cows produce twins during lambing
- ❖ To prepare cows and gilts ready for mating
- ❖ To some extent reduce barrenness in cows

iii) Creep feeding

This is the feeding of piglets on extra nutritious feeds from 10 days to about 2 months from a special room called a creep area.

Only piglets can access the creep area and the nature pigs can not enter into it.

B) PARASITE & DISEASE CONTROL PRACTICES

i) Vaccination (inoculation)

This is the introduction of vaccines either orally or intravenously to induce immunity. Vaccines can be bacterium, virus or toxins which are weak and cannot cause disease to the animal once introduced.

It is important to note that vaccination be done on a regular basis to prevent outbreaks.

Precautions taken when vaccinating

- Do not mix two vaccines together when administering
- Avoid exposure of vaccines to high temperature during transit
- Store vaccines in deep freezers, refrigerators or ice in flasks
- Vaccination should be done in cool hours of the day
- Vaccinate all animals or birds at once
- Use clean and disinfected equipment
- Follow manufacturers instructions regarding use of vaccines
- Give antibodies /vitamins 3 days to animals to reduce stress after vaccination

ii) Deworming : (drenching)

This is the giving of drugs to animals orally using a drenching gun or bottle to overcome internal parasites like tape worms, liver fluces, round worms etc.

The animal is restrained, it mouth open and the drug gently or slowly released into the mouth.

iii) Dusting

This is when powdered chemicals are dusted on the animals skin to kill external parasites.

iv) Dipping /spraying

Dipping is the total submergence of the animal into a dip containing acaricide to control external parasites.

The acariacide can be poured directly on to the back of the animals' body. This is spraying.

C) General management practices

i) Hoof trimming

This is the cutting short of the hooves that have grown too long and out of shape. It is carried out using a hoof trimmer or sharp knife. This helps to control laizeness

ii) Docking

This is the removal of the tail from the lamb.

It is done at 1-3 months of age using either a sharp knife or a rubber ring

Docking enables making process to become easy for the rain

iii) Culling

This is the removal of unproductive animals from the herd and are either sold or slaughtered

Culled animals may be;

- Of old age
- Have failed to conceive or mount
- Of slow growth rate
- Have bad habits e.g. egg eating

iv) Round up

This is the practice of bringing together all animals especially cattle, goat and sheep on the farm regularly.

Reasons for round up

- Physical counting of the animals
- Willing unproductive animals
- Carryout vaccination
- Find out general condition of the animals
- To separate breeding animals from dry ones
- To separate animals that are about to give birth and take action

v) Grooming

This is the cleaning of the hair coat of an animal by brushing using a brush. It is normally done at the hind quarters of the animal.

Reasons

- To ensure general cleanness of the animal
- To massage the animal and stimulate the coetaneous blood circulation
- Remove waste products and loose hair
- For clean milk production

Breeding practices

These are practices carriedout on a farm animal that have reached sexual maturity (puberty). They include;

a) Crutching

This is the removal of fleece (wool coat) from the area under the tail and hind legs in sheep.

b) Raddling

This is the practice of identifying a male animal that have mated with females in a flocie by attaching an apron with a particular die on it.

Each male animal has a different colour and this colour is tinted on the females it matese with.

The purpose of raddling is to attribute good or poor performance to a given male animal e.g;

If all females returning on heat were mated by a given male means the male is poor and should be culled off

If offsprings have good traits and were from a particular male, it means the male has to be retained.

c) Topping and serving

Topping is the practice of feeding cows property prior to mating. Very fat animals are fed on poor pastures and kept indoor to reduce the fats.

Serving is the process through which female animals on heat receive semen.

d) Identification

This is the practice of putting marks, labels or numbers of farm animals

It includes branding, ear notching, totooing, ear tragging etc

Reasons of identification

- For proper record keeping
- To avoid disputes among neighbours in case of loss of animals
- To enable farmers claim lost/stray animals

Methods of identification

i) Branding

This is the putting of letters or numbers on the skin or hide of an animal. It is commonest and permanent method of identification.

Methods of branding

Branding can be done in 3 ways /methods i.e.

i) Hot iron branding

- The animal is confined in a crush/restrained
- A branding iron rod with letters/numbers is put in five for some time
- The hot iron is then removed and quickly placed on the body of the animal for a very short time.
- The hot iron destroys the hair follicle and a scar remains at the branded part
- Some oil is sweared over the part to increase healing.

ii) Chemical branding

- The animal is confined
- A branding iron is put in a branding liquid
- The area to be branded is dipped /shaved
- The branding rod/iron is removed from the liquid
- The extra liquid is drained off before placing the non on the clipped area
- The branding iron is then placed on the clipped area
- A mark remains on the clipped area

Freeze method

NOTE: Branding is done using branding iron

2) Ear notching

This is a method of identification where a V-shaped cut called a notch is put on the edges of the ear. The animal is restrained, and an ear notcher is used to cut the notches. Thereafter a discomfectant is put on the natched area to prevent entry of germs into the wounds.

3) Ear tagging

This is the putting of a tag with number/letters on the ears of the animal. The tags commonly used are plastic and of blight colours.

Steps:

- Restrain the animal and cast it down if possible
- An ear tag applicator is used to make a hole in the ear
- A tag is then fixed in the made hole

4) Ear tattooing

This is the practice of putting identification marks on the inside part of the ear using ink and a tattooing pincer.

The plincer has letters on it and once the handle is pressed, the letters get inscribed on the ear.

Dehorning

Dehorning is the removal of horns from farm animals

Disbudding is the practice of arresting the growth of the horn by destroying the root of the horn bud

Disbudding is carried out on calves at 3-4 weeks of age

Reasons for carrying out dehorning

- To prevent injuries to workers and farm animals
- To reduce damages caused on hides and skins
- To reduce damages to farm structures like fences
- To create more space in feed and water troughs

- To create more space when transporting animals within the same truck
- Nutrients wasted in the formation of horns can be used in other body proceses
- It makes it easy for the animals to pass through crushes, spray race and deeps
- Hornless animals are easy to handle
- Polled/hornless animals look better than horned ones.

Methods of dehorning

i) Using a hot iron

The animal is restrained and casted down. The hind and front legs are held.

The dehorning iron is put in fire until it is red hot.

The hot iron is passed over the growing buds of the horn

The hot iron burs off the horn bud

NOTE: Take care not to burn deep into the head

ii) Chemical dehorning

The chemical commonly used are KOH or caustic potash pencil or dehorning paste.

- The animal is confined in a crush or casted down.
- The horn buds are cleaned and disinfected
- The area around the horn bud is dipped or shaved
- Vaseline is applied below the dipped area to prevent the chemical from entering into the eyes
- Caustic potash pencil is rubbed hard around the shaved part until blood comes out or applies a dehorning paste onto the button with a flat stick.
- When the chemical enters blood, it destroys the cells responsible for growth of horns
- The small horns fall off after some time
- The animal is kept indoor for sometimes to limit rotting
- The method is perfect and the animal remains polled

iii) Using a saw

This is commonly carried out on hard and old horns

The animal is confined in a crush

Apply anesthesia to prevent pain

A saw is used to cut off the horns

A disinfectant should be used to prevent the screw worms that attack open wounds.

Note:

- It is advised to avoid dehorning during hot or dry season to minimize bleeding.
- Alternatively, a wire saw can be used to cut the horns and as it gets hot, it seals off the blodd vessels.

iv) Use of an Elastrator

A strong rubber ring is stretched using an elastrator. The stretched rubber rung is placed at the base of the horn buds.

The rubber ring gradually cuts through the horn and the horn falls off after 3-6 weeks.

However, this method is not permanent as the horn will grow again.

g) CASTRATION

This is the removal of testes of het male animal to make it incapable of fertilizing a female animal.

Reasons for castration

- ❖ To prevent inferior males from breeding
- ❖ To make animals docile and easy to handle
- ❖ To make animals more suited for work since they become quieter
- ❖ Castrated animals grow faster than uncastrated ones since they use the proteins they would use for sperm production for growth.
- ❖ To avoid bad smell/odour in males especially goats
- ❖ To improve the quality of wool especially in sheep
- ❖ To control verereal diseases since castrated animals cannot mount females and pass over several diseases.

Methods of castration

i) Open castration /surgical method/knife operation

This is where a knife is used and the testes are completely removed.

The following steps are followed;

- ❖ The animal is restrained and costed down. Hold the hind and front legs

- Disinfect the scrotum using a disinfectant
- Wash your hands
- Apply localized anaesthesia on the scrotum to reduce pain
- Pull and squeeze the scrotum
- Use a sterilized surgical blade/knife/razor blade to make a vertical slit/cut on the scrotum
- Squeeze out the testes
- Pull out the spermatic cord and tie it
- Cut the spermatic cord after the knot towards the testes
- Repeat the process to remove the second testes
- Disinfect the open wound using dettol, ash and cream to prevent infection
- Apply a gly repellant
- Let the animal free

Advantages

- It is cheap since cheap tools are used e.g. razor blade
- It is quick i.e. it takes a few minutes for a skilled person to accomplish the task
- It is a sure method since the farmer is always sure that the testes have been removed.

Disadvantages

- There may be a lot of bleeding if not carried out properly
- Infectious may arise since a wound is created
- The procedure may need anesthetics to reduce the amount of pain felt by the annual during the operations which may not be available.

ii) The burdizzo method

This is a bloodless method. The burdizzed is a hard tool used to clamp and crush the blood vessels which supply blood to the testis. The tests degenerate (shrive up and die) due to absence of blood supply.

Procedure

- Restrain the animal properly and cast it down
- Apply pain killer/anesthesia on the scrotum

- The handles of the burdizzo are opened and the blunt blade of the burdizzo placed at the neck of the scrotum.
- A fence is applied on the handles for about 30-45 seconds and this leads to the crushing of blood vessels and sperm ducts.
- The tests finally become shall and function less.
- Treat the animal with antibiotics

iii) Rubber ring method /Elastrator method)

In this method, an elastrator is used to stretch a strong rubber ring which is placed at the neck of the scrotum. It cuts of blood supply to the testes which results in shriveling up of the testes.

Procedure

- Restrain the animal /put it in a crush
- Stretch the rubber ring using an elastrator
- Pass the scrotum through the stretched rubber ring.
- The stretched rubber ring is then put at the neck of the scrotum
- Release the stretched ring so that it squeezes the neck of the stratum.
- The rubber ring stops the circulation of blood to the scrotum
- Release the animal
- The testes shrive and eventually fall off after sometime.

iv) Caponisation

This is a castration method common with poultry. Remember that the testes of a cock are enclosed inside the body.

A chemical hormone inform of pellets in injected under the skin at the back of the neck.

This chemical hormone suppresses the effect of the hormones produced by the testes (the male characteristics) e.g. the cock stops crowing and puts on weight.

The castrated cock is called a **capon.**

However, the effect of the hormone lasts for 6 weeks.

TOPIC:

ANIMAL NUTRITION

This is the science, practice and economics of feeding livestock.

It involves feeding animals on adequate good quality feeds that are able to make the animal survive and then produce.

Food is need by animals for;

- Body repair
- Body maintenance
- Production
- Growth

Food given to an animal in a body is called **ration**

Amantanance ratio is given to an animal to keep its metabolic activities and live weight while **a production ration** is given to an animal over and above the mantanence ratio for production purpose.

Food given to animals should provide the necessary food values such as proteins, carbohydrates and fats etc.

Feeds and feeding

Feeding is the act of living in or providing feeds

Animal feeds exist in different forms, some are of plant origin e.g. hay, stage and fedder while others are prepared in the factory e.g. fish meal.

Examples of animal feeds

- Chick and duck mash
- Growers mash
- broiler finisher
- layers mash
- daily meal

Classification of feeds

- Feeds are classified into two major groups' i.e.
- Concentrates
- Roughages

i) CONCETRATES

These are commercially prepared foods usually rich in food value and energy.

Concentrates can be made from;

- Grains and grain by-products e.g. maize brain
- A mixture of blood and bones
- Oil extraction factories where cotton and groundnut seed residues are obtained
- Sugar refineries bi-products like molasses

Classification of concentrates

a) Protein concentrates: Such as cotton seed cave, fish meal, simsim cave, groundnut cave, skimmed milk, condemned meat or fish can be processed into animal meals.

b) Energy concentrates: such as molasses, make bran and wheat bran rich in energy. they are usually mixed with protein concentrates to balance the feeds.

c) Mixed concentrates are usually prepared animal feeds such as layers' mash, growers' mash, and dairy meal etc.

Characteristics of concentrates

- ❖ They have high food value both in energy and proteins
- ❖ They have low mature content
- ❖ they have high digestibility
- ❖ They are highly palatable
- ❖ their feeding value is fairly constant (known)
- ❖ They have low fibre content
- ❖ Originate from both plants and animals

ii) ROUGHAGES

These are bulky feeds of plant origin which have a low value content.

They include fodder, silage, hay and pasture

Roughages enable the proper functioning of the digestive system and they make up the largest portion of the ruminants diet.

Classification of roughages

- **Succulent roughages:** Contain a good amount of moisture such as green pastures, Guatemala, Petato vines, banana peelings and silage etc.
- **Dry roughages:** have a low moisture content, high fibre content, low digestibility and nutritive value e.g. Hay.

Characteristics of Roughages

- Most of them have a high moisture content except hay
- They have a high fibre content
- the have low digestibility
- Their feeding value is not known
- They have low protein and energy content
- They are mainly derived from green fodder, have and silage
- They have low palatability and acceptability

FEED ADDITIVES

These are substances added to feeds in order to improve the performance of livestock or feed utilizability.

They include;

- Growth hormones e.g. thyroxin
- Antibiotics added to feeds and water to protect animals against disease outbreaks e.g. perucillin
- Womicides to control internal parasites
- Mineral licies provide minerals to the animals
- Flavourings to improve palatability and intake of feeds.

Vitamin supplements to over come vitamin deficiencies.

Terms used in Expressing Feed Values

- **Metabolisable Energy (ME)**

  Proportion of energy used in animal metabolism.

  It can also be viewed as the digestible energy left after all the energy lost in removal of waste products is subtracted
- **Digestible Energy (DE)**

  Energy in food minus energy lost in feaces
- **Dry mother (DM)**

  Food material minus all the water or component of food left after drying.
- **Crude fibre (F)**

  Undigestible fibre made of cellulose
- **Total digestible nitrogen (TDN)**

  Total energy get from digestible protein, nitrogen free extract (NFE), either extract (EE) and soluble carbohydrates
- **Either Extracts (EE)**

  Is the oil and fat fraction of feeds
- **Nitrogen free extract**

  It is the soluble portion which includes sugars, starches and more soluble forms of volatile fatty acids (VFA)
- **Growth ratio**

  given to growing animals
- **Digestibility**

  Proportion of food which is digested and is of value to the animal after absorption
- **Crude Protein (CP)**

  This is the amount of protein which can be digested in a feed i.e. protein which can b e broken downinto a simpler substance
- **Starch equivalent (SE)**

  This is the measure of the amount of energy requirement which animal can deliver from a certain feed.

Nutrients needed by farm animals

For animals to grow well and produce good products and yield, the ration provided should supply the following: **as proteins**

These are organic compounds made up of carbon, hydrogen, oxygen, sulphur and phosphorus

Importance

- Body building or growth
- Most hormones are portentous in nature
- Proteins act as enzymes in many body reactions
- They are metabolized to yield energy
- They are used in milk production

b) Carbohydrates (CH_20)

These are made up of carbon, hydrogen and oxgyen in a ratio of 1:2:1. They are sugars and starches. Sugars and starches make up the biggest part of food eaten by animals.

Carbohydrates are grouped into;

- **Monosaccharide's**e.g. glucose, fructose
- **Disaccharides:** e.g. sucrose, maltose; lactose
- **Polysaccharides:** e.g. cellulose, ligum, etc

Importance's

- Are major sources of energy for body metabolism
- Excess carbohydrates are oxidized and stored as fate
- They help in absorption of minerals such as Ca and phosphorus
- Are found in body structures e.g. connective tissues

c) Fats and oils (Lipids)

These contain carbon, hydrogen and oxygen.

Fats originate from animal products such as fishmeal while oils originate from plant e.g. groundnut seed, coffee, cotton seed calve etc.

Fats are solids at room temperature while oils are liquids at room temperature.

Uses /importance's

- Help in formation of plasma membranes
- Are metabolized to yield water
- Help in excretion of waste products
- Help to transport fat soluble vitamins

Vitamins

Vitamins are organic chemical substances needed in small quantities to promote and maintain health in animals. They are got from forage animal eat e.g. legumes, fedder, etc vitamins are grouped into

- Water soluble vitamins like vitamin B – Complex and Vitamin C
- Fat soluble vitamins e.g. A, D, E, K

Functions

- They promote growth in animals
- Help to maintain proper functioning of all parts of body
- Protect animals against diseases
- Improve fertility in animals
- Are components of enzymes

Common differences associated with vitamins

- Rickets (soft and referred bones) – Vitamin D
- Night blindness - Vitamin A
- Sterility - Vitamin E
- Scurvy - Vitamin C

Water

Water is not a food nutrient but animals have to take it on a daily basis to make use of food eaten.

The main sources of water are;

- Through drinking
- Through eating succulent feeds
- Metabolic H_20 get from breakdown of CH_2O, fats, and proteins

Uses of H_20

- Provides a medium for translocation of nutrients in the body
- Help in removal of waste products from the body
- Maintains the structure of shape of body cells (turgidity)
- Regulate body temperature through sweating and evaporation
- It is a component of body fluids and cells
- Activates chemical reactions through hydrolysis

Factors governing water intake by farm animals

- Size of the animal: big animals drunk more water than small ones
- Dry matter content: Animals drink m ore water when fed on dry feeds like Hay than when given succulent feeds
- Accessibility: Water intake is high when water is supplied all the time
- Environmental temperature: Animals take more water during dry seasons than during cold weather
- Salinity of water: Saline water encourages more uptake
- Temperature of water: Cold water is less taken while more water is taken when warm
- Productivity of the animal
- Physiological state
- Physical exercise

Minerals

Animals can obtain minerals when provided with salt lice, blocks or rock salt

Minerals needed by animals are grouped into;

- Macro –elements like magnesium, phosphrous, iron, potassium, chlorine, calcium, sodium and sulphur
- Micro –elements like iodine, zinc, boron, manganese, cobalt and molybdenum

Functions of minerals

- Bores and teeth are formed from minerals like Ca PP
- Iron and copper are components of haemoglobin
- Sulphur helps to formation of amino acids

- Osmotic pressure of body fluids is regulated by sodium, chlorine and phosphorous
- Calcium is a component of milk and eggs
- Help in proper function of muscles (potassium P Na)
- Are components of hormones e.g. iodine in thyroxin formation

Common differences associated with minerals

No.	Minerals	Differences
1.	Calcium	- Rickets - Milk fever - Soft shelled eggs - Soft borne
2.	Phosphorus	- Deprived appetite - Milk fever - Rickets
3.	Iodine	- Goiter
4.	Iron	- Piglet aenemia
5.	Sulphur	- Poor growth of feathers hair and wool
6.	Magnesium	- Grass tetany

COMPUTATION OF LIVESTOCK RATIOS

Different farm animals have different nutrient requirements. Therefore, farmers as they are mixing animal feeds, they should put this in consideration so that animals are well fed.

Mixing of different ingredients to get a particular feed is called rationing

A farm animal should be fed on a balanced ratio, daily

Factors to consider when mixing feeds

- The age of the animal: Young animals require higher amounts of proteins than old ones.
- Health of the animal; Diseased animals and those recovering from disease require higher amounts of vitamins than normal ones
- Physiological stage of the animal e.g. pregnant animals require more energy intake than empty ones.

- Productivity of the animal e.g. heavy milkers require a lot more minerals like Ca and P than low milkers
- Type of animal i.e. Ruminants can be able to handle large amounts of course roughage than n non ruminants therefore ratios for non –ruminants do not have large amounts of course feeders.
- Nutrient composition of the material: The materials should be balanced to provide collect composition of protein, energy etc
- Palatability of the feed material: The different materials used to make a ration should be mixed such that the final mixture is palatable to the animals.
- Availability of the feeds: Rations are mixed out of available materials.
- The cost of the feed staffs: In ration mixing choose mixtures that are cheapest and yet meet the animals' nutritive requirements.
- Wholesomeness: The feed staff mixed should not cause harm to animals or spoil the animal product.

Computing livestock feeds

Computation of animal feeds can be done using:

(i) Pearson square method

(ii) Algebric method

(iii) Linear programming /try and error/computer programming

Our major concern is with the Pearson square method

NOTE:

- Feed ingredients (feeds) are categorized into:
- Protein seeds like cotton seed, calve, fish meal etc
- Basal/energy feeds like maize bran, wheat bran etc

Using the Pearson square method

- Draw a square
- Put the protein content of the required feed in the centre
- Put the protein content of the basal feeds at het top left corner and that of protein feed s at the bottom left corner

- Subtract diagonally but ignore negative signs
- The figure got on the right represents the proportion of each feed ingredient to use mix
- Add up all parts at the right hand corners. This represents the total parts to mix in a ration
- Calculate accordingly using the total

Example 1

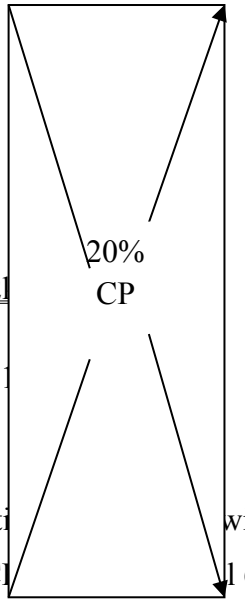
A farmer would like to make a 20% (P ration using maize 16% CP and cotton seed cake 38%(P in what proportions would the maize and cotton seed calve be mixed to get 100kg chick mash.

Soln:

Using a Pearson square

18 parts of maize

Maize 16% CP



Proportion of maize = $\frac{18}{22}$ x 100kg = 82

Proportion of cotton seed calve = $\frac{18}{22}$ x 1

Example II

A farmer wa Cotton seed calve 38% ti wi $\frac{4}{22}$ e

bran 14% C $\frac{4}{22}$Parts of cotton seed calve total

In what proj dients be mixed if parts l

and cotton seed calve to fish meal is 2:1 to be used to mak

Solution

Basal /energy/feeds:	Parts	CP%	Total
Maize	2	10	20%
Maize bran	1	14	14%
Total			34%

Total ratio = 2 + 1 = 3

Total average for basal feeds = $\frac{34\%}{3}$ = 11.3%

For protein feeds:

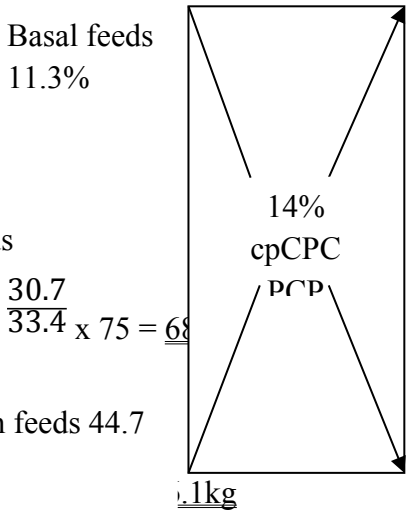
Protein fee	Parts	CP%	Total
Cotton seed calve	2	35	70%
Fish meal	1	64	64%
Total			134%

Ratio = 2:1, total ratio = 2 + 1 = 3.

Total average for protein feeds = $\frac{134}{4}$ = 44.7%

NOTE: Then use the average CP for the basal P protein feeds on the Pearson square.

30.7parts



$\frac{2.7\ parts}{33.4\ total\ parts}$

Proportion of basal feeds

= $\frac{30.7}{33.4}$ x 75 = 68

Proportion of p

.1kg

But for

Maize = $\frac{2}{3}$ x 68.9

= 45.9kg

Maize bran = $\frac{1}{3}$ x 68.9

= 23.0kg

Cotton seed calve = $\frac{2}{3}$ x 6.1

= 4.1kg

Fish meal = $\frac{1}{3}$ x 6.1

= 2.0kg

Factors affecting utilization of ratios by animals

- Age of the animal: Young animals effectively use the proteins for growth and minerals for bone formation compared to mature animals.
- Health status: health animals utilize ratios better than diseased animals.
- Digestibility: feeds with low digestibility are less utilized than seeds with high digestibility
- Physiological state of the animal: dry animals do not effectively use ratios as compared to pregnant and lactating animals.
- Type of animal: Non ruminants effectively utilize concentrates while ruminants are good converters of coarse ratios like roughages.
- Processing: reduces bile and eases utilization
- Amount of food given per day; excess feeds are poorly utilized while adequate feeds given are more utilized
- Additives: Flavourings, antibiotics and hormones improve fed in take
- Nutrient content: balanced feeds have a higher digestibility and utilization than poorly balanced feeds.

Digestive system /Digestion in livestock

Digestion is the process through which food digested by the animal is broken down into simple, soluble substances which can be taken into the blood stream. This is carried out with the assistance of het enzymes.

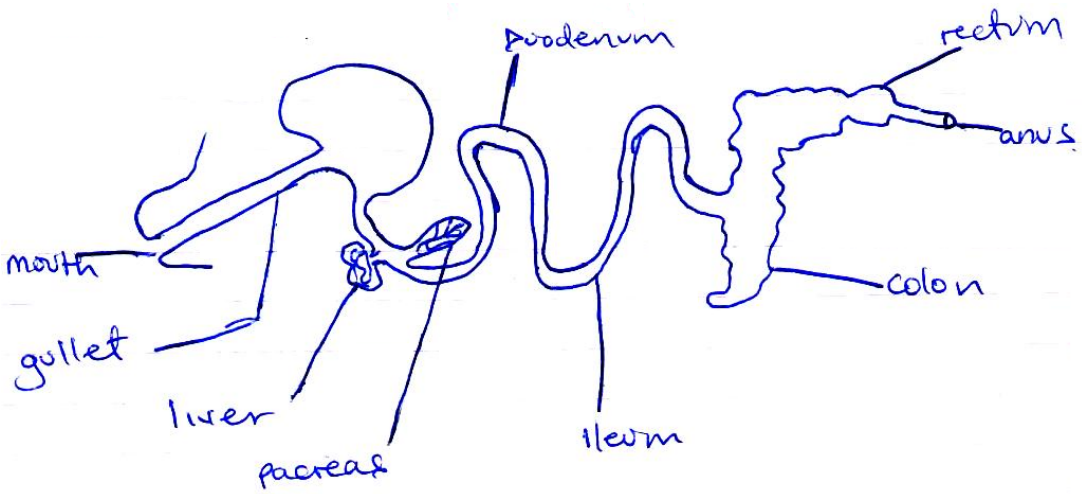
Farm animals are grouped into 2 major groups according to their digestive systems i.e.

- Ruminants like goats, cattle and sheep
- Non ruminants e.g. pigs, rabbits and horses etc

DIGESTION IN NON-RUMINANTS (e.g. PIG)

A pig is a non ruminant with only one stomach and do not depend on living organisms for digestion in the stomach.

Digestive system of a pig



In the mouth mastication of food to break it up takes place. Food is mixed with saliva to form a chime. Saliva contains salivary amylase which starts with digestion of starch into maltose.

Food is then swallowed into the stomach through the gullet /oesophagus

In the stomach, Food is mixed with gastric juice produced by gastric glands on the stomach walls. The gastric juice contains hydrochloric (HCL) acid which kills bacteria's and provides the right PH for enzyme action.

The gastric juice also contains which breaks down proteins to peptides.

Food them moves to the duodenum

In the duodenum, food is mixed with pancreatic juice produced by the pancreas and passes through the pancreatic duct. Pancreatic juice contains enzymes amylase, lipase and trypsin

- Amylase speeds up the hydrolysis of starch to maltose
- Lipase converts fats to fatty acids and glycerol
- Trpsin converts proteins into peptones and protease into peptides

Bile is also added to the food. It is made in the liver and stored in the gall bladder. It's green, alkiealine and contains bile salts which neutralize the acids and emulsify fats.

In the small intestines

Food mixes with the intestinal juice produced by intestinal glands; the juice contains the following enzymes.

- Maltase – converts maltose to glucose
- Sucrase – converts lactose to glucose
- Lactose – converts lactose to glucose
- Peptidase – converts peptones to amino acids
- Lipase – converts undigested fats to fatty acids and glycerol

Most of the digested food is absorbed in the ileum with the assistance of finger like projections called villi

In the colon: This is the large intestines; here mineral salts and water are absorbed into the blood stream.

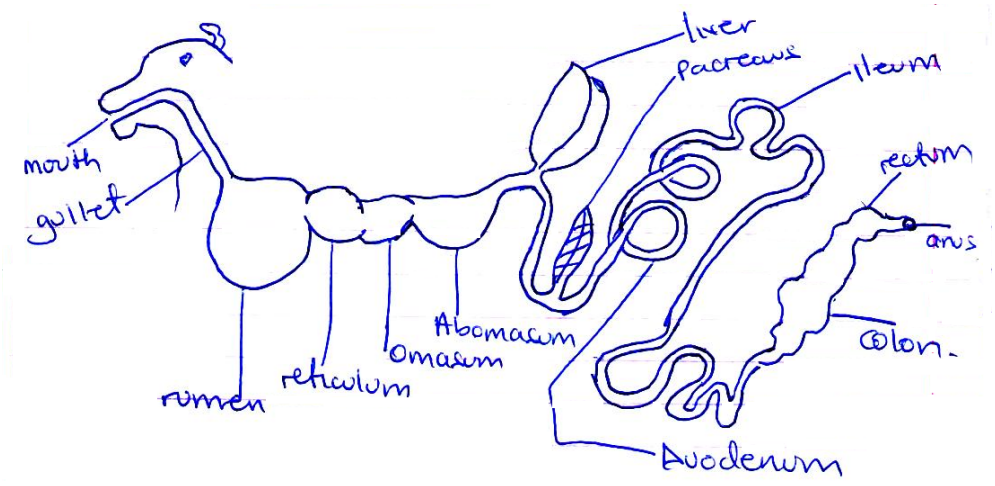
In the rectum

This is where feaces are collected before expulsion through the **anus**

Digestion in Ruminants

Ruminants have a four chambered stomach. The four stomachs are; rumen, reticulum, omasum and abomasums. The grass eaten is regurgitated for proper chewing when the animal is resting. This is called chewing the cord.

Digestive system of a ruminant



The mouth

This is the organ for prehension (collecting) food, chewing and insalivation and rumination. The ruminant saliva contains less little salivary amylase (ptyalin).

The gullet (esophagus)

This is a muscular tube extending along the trachea and opens into the rumen. Its function is passage of food and water to the stomach by **peristalsis.**

The rumen (Towel – like)

This is the first and largest chamber of the stomach. Food is stored in the rumen and it undergoes **fermentation** with the help of bacteria and protozoa. The animal has a symbiotic relationship with the organisms since it provides shelter and food and the bacteria produce cellulose enzyme.

The rumen also churns the food and the partly digested food is sent back to the mouth for further chewing.

The macro-organisms perform the following roles;

- The build up proteins from non-protein nitrogen consumed by the animals
- They make vitamins for the animals especially K,CP B^{+}
- They manufacture essential amino-acids for the animal
- They produce enzymes e.g. cellulose which breakdown coarse fibre to volatile fatty acids.

The Reticulum (Honey comb)

- This is the second chamber
- It acts as a sieve allowing only fine materials that have been properly chewed to pass.
- All foreign things cater by the animal are trapped here e.g. polythene and nails
- It looks like a honey –comb found in bee-hives
- The reticulum has other roles
- Regulation of the amount of food to be regurgitated
- Regulation of the amount of food from the rumen to the omasum
- Absorption of the volatile fatty acids
- Microbial activity continues to the digested food.

The Omasum (many plies or Psalterium)

This chamber consists of many rough surfaced layers which look –like a book.

Water is squeezed out and absorbed into the blood stream together with the volatile fatty acids (VFC)

In the Abamasum

This is the last chamber and it is the 'true stomach.'

Enzymatic digestion starts here

Food is mixed with gastric juices, secreted by the walls of the abomasum that contains HCL and pepsin in adult animals and Renin in young animals.

- HCL kills germs and creates an ideal PH for Pepsin action
- Pepsin and Rennin digest proteins to peptides

The small intestines

It is a point where digestion is completed and absorption of food occurs. It is subdivided into;

i) Duodenum

This is where bile and pancreatic juice are mixed with food

- Bile emulsifies /breaks down fats
- Pancreatic juice contains enzymes
- Amaylase which acts on starch to yield maltose
- Lipase which act on fats to yield fatty acids glycerol
- Trypsin which act on proteins to peptides

Jejunum

Intestinal walls secretes enzymes;

- Peptidase which breaks down peptides to amino acids
- Maltose which breakdown maltose to glucose
- Sucrose converts sucrose to glucose and fructose

Ileum

This is where absorption takes place with the help of villi.

The colon

This is where water is absorbed from waste food.

The ceacum

Has bacterias which help in bacteria digestion

The Rectum

This is where dung /waste food collects before it is passed out.

The Anus: Is the passage of undigested food out of the animals' body.

Differences between digestion in ruminants and non ruminants

Ruminants	**Non –ruminants**
Have a complex stomach (polygastric)	- Have a simple stomach
Chew cud	- Do not chew cud
Microbes digest cellulose	- Lack microbes and cannot digest cellulose effectively
Microbes synthesise vitamins B, K and ϵ	- No microbes to synthesize vitamins
Volatile fatty acid is the major source of energy	- Glucose is the major source of energy
Small ceaum	- Large caceum
Fermentation of food in the rumen by microbes	- No fermentation of food
Absorption starts in the rumen	- Absorption starts in the ileum
Digestion starts in the rumen due to absence of amylase in saliva	- Digestion starts in the mouth due to amylase in saliva

Similarities

- Final absorption of food in the ileum
- Water absorption in the colon
- Enzymatic reaction yield the same end product for the different food
- Only one functional stomach in ruminants in young animals similar to that of monogastirc.