**PRINCIPLES OF ANIMAL HEALTH**

**Health**, refers to the state when all body organs and systems are functioning normally

**Disease**, refers to a deviation from the normal functioning of the animals body organs and systems

**BENEFITS OF KEEPING HEALTHY ANIMALS AT THE FARM**

* It ensures high production leading to high income
* Healthy animals grow fast and mature quickly
* Healthy animals remain productive a little longer compared to unhealthy ones
* Leads to obtaining of high quality products
* Reduces costs of production since the farmer will not spend a lot of money on drugs
* Ensures high efficiency in work type animals

**PRE-DISPOSING FACTORS OF LIVESTOCK DISEASES**

These are factors which make it easy and convenient for diseases to attack farm animals

* Climate, warm and moist weather favors multiplication of pathogens which cause animal diseases
* Age of the animal, young animals are easily attacked by disease causing organisms. Also old animals tend to have frequent digestive disorders that the young ones.
* Sanitation, animals kept in dirty quarters are easily attacked by diseases this is because dirty quarters act as a good breeding ground for pathogens.
* Heredity (congenital), young animals may get some diseases from their parents during gestation. The disease condition can only be seen when the animal is born E.g. white heifers condition
* Type of feeds, some diseases may occur when animals eat feeds lacking some nutrients leading to deficiencies
* Contaminated feeds, animal feeds contaminated with pathogens can make the animal sick. This may be in form of dirty water or mouldy feeds.

**CAUSES OF DISEASES IN LIVESTOCK**

There are six major causes of diseases in livestock, namely

* Pathogens, these include bacteria, protozoa, fungi and viruses. These are the major causes of diseases in livestock
* Parasites, these include external and internal parasites they suck the hosts’ blood leading to anaemia. Internal parasites absorb digested food nutrients from the digestive tract of their hosts hence depriving them of nutrients for proper growth and production.
* Nutritional deficiencies, these are also referred to as deficiency diseases. They show up when animals are not given properly balanced feeds. They include, milk fever, piglet anaemia etc.
* Hereditary disorders, these are diseases that are inherited by offspring from parents. Offsprings born with such diseases die early.
* Poisons, these are dangerous substances such as agro chemicals, when swallowed they can interfere with the normal functioning of the body.
* Physical injuries, injuries to animal bodies lead to wounds which act as entry points for pathogens, and severe bone fractures can lead to death of the animal.

**Signs of healthy animals**

* Bright and clear eyes with no tears.
* Smooth and pliable skin with a shiny appearance and a clean hair coat with no standing hair.
* Normal body temperature which varies from animal to animal eg in cattle 37.5-39.5, chicken 40.5-43.0, pigs 38-40 and sheep 38.5-40.
* Normal pulse rate which varies from animal to animal eg cattle 40-60, chicken 120-160, pigs 30-50.
* Good appetite
* Moist muzzle, health animals have moist mucous membranes
* Discharge, normal animals do not have discharges inform of tears, saliva, and pus from body openings.
* Upright posture, this enables the animal to move without difficulty
* Urine, pale straw urine without foul smell, blood or pus indicates good health.
* Good response to stimuli
* Normal breathing
* Dung, the dung should be soft neither excessively hard nor watery and without blood stains.
* Productivity of healthy animals is consistent.

**Signs of ill/poor health in livestock**

* High body temperature
* Discharge from the mouth and nostrils or may be dry.
* Loss of appetite
* Reduced production
* Poor posture, that’s to say, the animal stands with the head down.
* Dullness
* Lameness, this is when the animal walks with difficulty or completely fails to walk.
* Frequent coughing
* Poor condition of the coat i.e when the hair on the coat is standing or brittle.
* Teary eyes
* Very watery, blood stained or hard dung
* Dark coloured urine which might contain some blood stains
* Dry and rough skin
* High pulse rate
* Too high or too low respiratory rate
* Emaciation
* Swellings on the body
* Yellowish discharge from the vulva which indicates contagious abortion.

**Classification of livestock diseases.**

Livestock diseases are classified according to

1. Causal agent
2. Mode of spread

**Causal agent**, under this livestock diseases are classified in to four groups namely

Bacterial diseases, viral diseases, fungal diseases and protozoan diseases.

|  |  |  |
| --- | --- | --- |
| CAUSAL AGENT | GROUP OF DISEASES | EXAMPLES |
| Bacteria | Bacterial | Mastitis, anthrax, T.B, fowl typhoid. |
| Protozoa | Protozoan | Coccidiosis, east coast fever, trypanosomiasis. |
| Virus | Viral | Newcastle, rinderpest, fowl pox, foot and mouth |
| Fungus | Fungal | Ringworm |

**Mode of spread,** under this, diseases are classified as

* Infectious diseases, these are diseases caused by entrance of pathogens into the body of the host. They include, bacterial, viral, and fungal diseases.
* Non infectious diseases, these are diseases caused by something else other than a pathogen. They include metabolic diseases, hereditary diseases and deficiency diseases. E.g. milk fever.
* Contagious diseases, these are diseases that can be directly passed on from one animal to another through contact. They include all infectious diseases.
* Notifiable diseases, these are highly contagious and spread very fast within livestock herds. Once they break out, they cause heavy losses to farmers. Notifiable diseases are also known as reportable diseases. E.g. rinderpest, foot and mouth, African swine fever, anthrax, etc.
* Vector transmitted diseases, these are diseases whose causal organisms are spread from animal to animal by another organism. E.g. trypanosomiasis.
* Communicable diseases, this is a disease transmitted from one animal to another by direct or indirect contact e.g. foot and mouth disease.
* Zoonotic disease, this is a disease that can be transmitted from animal to humans. E.g. tuberculosis, brucellosis, and anthrax.

**Ways through which germs enter the body.**

* Through the digestive system either in water or food
* Through wounds, fractures and cuts
* Through the reproductive system by way of mating
* Direct contact with affected animals
* Through mammary glands
* Through the umbilical cord at birth
* Through the eyes

**Effects of diseases**

* Retardation of growth, affected animals grow slowly and reach the reproductive stage late
* Lowering quality of products
* Lowering quantity of products
* Poor feed conversion rate
* Death
* Increase in cost of production since the farmer spends a lot of money to control diseases
* Decreased reproductive efficiency
* Madness for example mad cow disease
* Lameness eg foot and mouth
* Blindness especially those that attack the eyes
* Risk to public health especially the zoonotic diseases that can be transmitted by animals to humans
* Lack of market for products from diseased animals

**Transmission/spread of diseases on a farm**

* Introducing a diseased animal into the herd
* Contaminated feeds, this can occur when infected bags have been used to pack livestock feeds
* Contamination by infected human clothing especially from those who move from farm to farm
* Vector transmission, especially blood sucking vectors like tsetse flies
* Air transmissions e.g. pathogens of T.B and swine fever can be carried from herd to herd by wind.
* Contaminated water, healthy animals can be infected if they drink water contaminated by sick animals
* Introducing carrier animals on the farm though they may look healthy
* Contaminated excreta, this is from infected animals.
* Poor disposal of dead animals which have died of dangerous diseases like anthrax
* Contact with soil which can harbor pathogens of diseases like those for anthrax.
* Contact with body fluids of sick animals
* Contaminated feeds and water troughs
* Genital infections during mating such as contagious abortion.

**General methods of disease control**

* Good hygiene
* Quarantine, this is restriction imposed by the government, banning the movement and sale of livestock and livestock products from an area where a notifiable disease has been reported
* Isolation of sick animals
* Vaccination, this helps animals to develop resistance against diseases
* Proper carcass disposal, this involves burning at the site of animals that have died of a notifiable disease.
* Destroying vector breeding places like bushes.
* Providing animals with good quality feeds
* Keeping good health records to enable the farmer know the diseases that are recurrent on his farm and take measures against them and cull animals that are persistently sick.
* Restricting and/or regulating visitors.
* Providing good and adequate housing to animals
* Careful selection of breeding stock, animals for rearing should be selected from reliable sources and should be kept separate from the rest of the herd for some time and monitored to find out if they are not suffering from any disease.
* Regular drenching to kill internal parasites
* Draining swampy areas to kill alternate hosts for parasites e.g. water snails
* Controlled breeding and use of artificial insemination to control venereal disease
* Treating animals promptly when a disease breaks out
* Regular dipping and spraying to control external parasites

**IMMUNITY**

This is the ability of the body to resist disease attack. It may be active or passive.

1. Active immunity, this is obtained by giving an animal a vaccine either by injection or orally. A vaccine is an infective agent either bacteria or virus which has been weakened. When the vaccine is introduced the body immune system will produce antibodies to fight off the weakened infective agent. In case the infective agent enters the body, the system will be able to destroy them easily.
2. Passive immunity, this is immunity arising from introduction of antiserum, this is the type of immunity imparted to the new born calves through suckling colostrum.

**IMPORTANT ANIMAL DISEASES.**

**Category .A.** **BACTERIAL DISEASES**

1. **ANTHRAX**

This is caused by a bacteria called bacillus anthracis. It’s a dangerous notifiable disease, its incubation period is between 1-3 days it affects cattle, sheep, goats, pigs and humans its spores can survive in soil for many years.

Symptoms.

* Sudden death within 24 hours
* Bloody discharge from body openings which does not clot and is dark coloured
* Rapid respiration
* Shivering
* Loss of appetite
* Dullness
* Bloating in dead animals
* Bloody stained diarrhea
* Sudden increase in temperature if it becomes mild
* Absence of rigor mortis

**Control**

* Quarantine
* Regular vaccination with blanthrax
* Do not cut open an animal that has died of anthrax
* Burn carcass at site and insitu
* Treat early with antibiotics
* Report any suspected case to veterinary staff immediately

1. **MASTITIS**,

This is the inflammation of the udder. It’s a bacterial disease.

**Causes of mastitis**

* Its caused by bacteria known as staphylococcus aureus, streptococcus agalactiale e.t.c
* Improper use of milking machine or use of faulty milking machines
* Poor milking techniques e.g stripping of teats
* Milk man having sharp nails

**Symptoms**

* Blood stains and pus in milk
* Swollen udder and teats
* Animal reject being milked due to pain
* Reduced milk yield
* Affected udder quarters may stop giving milk
* Salty taste in milk
* Milk going bad on boiling or change in normal smell
* Milk secreted is either thick or watery

**Prevention**

* Ensure that the milking shed or quarters are swept and scrubbed clean
* Washing hands before milking
* Use of plain wires instead of barbed wires in animal herding areas
* Use of disposable towels
* Regular servicing and checking of the milking machine
* Use of dry cow therapy at drying off
* Cutting finger nails short
* Stripping of the udder completely after milking
* Culling cows with chronic mastitis infections

**Treatment**

* Use of antibiotics by infusing them in the teat canal after milking e.g. penicillin, tetracycline
* A combination of intra mammary and intra muscular treatment cures mastitis better than intra mammary

**Factors affecting occurrence of mastitis in animals**

1. Age, older animals are more susceptible than young animals probably due to longer exposure to bacteria
2. Season of the year, the incidence tends to increase during dry season
3. Stage of lactation, incidence increase during dry period
4. **BRUCELLOSIS.**

its caused by brucella abortus. It affects the reproductive organs of animals. Brucellosis is also known as contagious abortion or bangs disease. It affects sheep, goats, cattle, pigs, horses and man.

Transmission, it’s transmitted through

* Contaminated food and water by discharges from affected animals
* Through mating
* Through introducing diseased stock in the herd

**Symptoms**

* Yellowish discharge with a bad smell before abortion.
* Retention of the after birth.
* The conception interval is very long as there are several services per conception (infertility).
* Swelling of the testicles in boars.
* Swelling of joints and lameness.
* Abortion.

**Prevention and control**

* Regular vaccination
* Blood testing of the herd annually
* Culling and slaughtering the affected animals
* Aborted fetus should not be touched with bare hands
* Use of antibiotics on the affected animals
* Buying disease free stock from trusted sources

1. **FOOT ROT.**

It’s caused by the bacteria of the fusiformis group.

**Symptoms**

* Lameness
* Puss in the hooves
* Foul smell in the hooves

**Control**

* Hoof trimming regularly
* Treat with antibiotics
* Footbath of copper sulphate

1. **BLACK QUARTER (BLACK LEG)**

It’s caused by a bacteria clostridium chauvoei

**Symptoms**

* Increased temperature
* Lameness
* Swelling and pain in muscles
* Dullness
* Death

**Control**

* Treat early with antibiotics
* Annual vaccination
* Dispose of dead animals by burning the carcass or burying the carcass
* Avoid continuous parteuring of livestock

1. **TUBERCULOSIS**

Caused by tubercle bacilli. It attacks cattle, goats, sheep, pigs and humans

Can attack the abdomen, uterus or respiratory system

**Symptoms**

* Persistent cough
* Respiratory difficulties
* Loss of weight
* Enlargement of lymph nodes
* Loss of appetite
* Diarrhea
* Vaginal discharge and sterility in the case of the uterine type

**Prevention**

* Diagnose animals and cull those which are positive
* Keep proper sanitation at the farm

1. **CONTAGIOUS BOVINE PLEURO-PNEUMONIA** (CBPP)

Caused by bacteria called mycoplasma mycoides

**Symptoms**

* Rise in body temperature
* Rapid respiration
* Rough coat
* Dry cough which later becomes moist
* Anorexia

**Prevention**

* Annual vaccination for at least 3 years
* Restrict animal movements
* Treat animals promptly but this is discouraged as diseased animals may become carriers

1. **VIRAL DISEASES**

Examples of viral diseases include

1. **RINDERPEST**

This mostly attacks ruminants. It mainly attacks the alimentary canal membrane

**Symptoms**

* High temperature or fever of over 40
* Blood stained faeces
* Wounds or ulcers in the mouth
* Eye discharge (shedding of tears)
* Nasal discharge (running nose)
* Persistent thirst due to dehydration
* Twitching of muscles
* Rough coat
* Loss of appetite
* Difficult breathing
* Loss of body condition and sunken eyes

**Prevention and control**

* Regular vaccination
* Quarantine until the disease has been contained
* Slaughtering of all affected animals

1. **NEWCASTLE DISEASE**

This disease is capable of wiping out the entire flock within a short period of time

**Symptoms**

* Difficulty in breathing
* Sneezing and coughing
* Strained neck usually leading to bending
* Discharge from the mouth and nostrils
* Birds walk in a staggering manner
* Dropping wings
* Yellowish white diarrhea with a bird smell
* Birds stand with closed eyes
* Rise in body temperature
* Dullness

**Prevention and control**

* + - Regular vaccination
    - Proper disposal of dead birds by burying or burning
    - Disinfecting the premises before a new batch of birds is introduced
    - Culling the whole flock once there is an outbreak
    - Ensuring high standards of hygiene in the house
    - Restricting visitors to the poultry unit
    - Buy chicks from reliable sources
    - Introducing a footbath at the entrance of the poultry house
    - Provide clean water and feeds to the birds

1. **FOOT AND MOUTH DISEASE**

This is a highly contagious viral disease

**Symptoms**

* Painful water blisters or wounds on tongue and hooves
* Difficulty in chewing
* Lameness due to wounds between the claws and hooves
* Excessive salivation
* Loss of appetite
* Fever or high temperature
* Reduction in milk yield
* Emaciation

**Prevention and control**

* Quarantine measures
* Slaughtering and burying all the affected animals
* Vaccination every after 3-6 months

1. AFRICAN SWINE FEVER

It’s the most serious disease in pigs

**Symptoms**

* Emaciation
* Sudden deaths in pigs
* Blood stained Diarrhea
* Loss of appetite
* Difficulty in breathing
* Rapid rise in body temperature
* Dullness
* Paralysis
* Muscular tremors
* Chilling and coughing
* Body weakness

**Prevention and control**

* Pigs should be housed to prevent contact with wild pigs
* Keep high standard of hygiene in the pig houses
* Slaughter affected animals and burry the pork
* Restrict movement of pigs to prevent contact between sick and healthy pigs
* Quarantine and disinfect animal premises
* If infection occurs, cull all pigs and disinfect

1. **GUMBORO (infectious bursal disease)**

Affects mainly chicks aged 2-6 weeks

**Symptoms**

* Depression
* Diarrhea
* Unsteady gait
* Ruffled feathers

**Prevention**

* Vaccination of day old chicks
* Proper disposal of dead chicks by burying or burning
* Disinfect poultry premises
* Prevent any contact between healthy and sick birds
* No restocking should be done for at least 3 months

1. **PROTOZOAN DISEASES**

These include

1. **EAST COAST FEVER**

It’s a vector transmitted disease caused by a protozoa. Its transmitted by the brown ear tick

**Symptoms**

* High fever
* Swollen lymph nodes
* Difficulty in breathing
* Frothing
* Watery eyes and nasal discharge
* Emaciation
* Loss of appetite
* Hemorrhages seen in the vulva and oral mucus membranes
* General weakness shown by the animal lying down
* Blood stained diarrhea

**Treatment**

Treat early with clexon

**Control**

* Dipping/spraying
* Rotational grazing to break the life cycle of ticks
* Bush burning during the dry season
* Double fencing
* Hand picking of ticks if the animals are few

1. **ANAPLASMOSIS (gall sickness)**

It’s caused by protozoa known as anaplasma marginale and spread by blue tick

**Symptoms**

* High body temperature
* Aneamia and jaundice
* Constipation
* Loss of appetite
* Blood in urine or faeces
* Loss of body condition
* Enlarged gall bladder

**Treatment**

Treat early with tetracycline

**Prevention**

* Rotational grazing
* Dipping/spraying
* Bush burning
* Double fencing

1. RED WATER

**Symptoms**

* Loss of appetite
* Blood in urine
* High body temperature
* Anaemia and jaundice
* Body weakness
* Depressed respiration

**Treatment**

Treat promptly with diminazene

**Control**

* + - Rotational grazing
    - Bush burning
    - Double fencing

1. **TRYPANASOMIASIS (NAGANA)**

Its transmitted by tsetse flies

**Symptoms**

* Fluctuating high body temperatures
* Anaemia
* Progressive body weakness
* Loss of body condition
* Rough coat
* Swollen lymph nodes
* Post mortem shows enlarged lymph glands and spleen
* Loss of appetite
* Paralysis of hind quarters
* Running eyes that end in blindness
* Pale mucus membranes

**Treatment**

Treat with trypanocidal drugs

**Prevention**

* Spray against tsetse flies
* Destroy bushes where tsetse flies hide
* Use tsetse fly traps

1. **COCCIDIOSIS**

It affects poultry, rabbits, lambs, calves and kids

**Symptoms**

* White yellow coloured Diarrhea
* Blood stained faeces
* Emaciation
* Rough feathers
* Dullness
* Drop in egg production
* Aneamia
* Drooping wings
* death

1. **NUTRITIONAL/METABOLIC/DIFICIENCY DISEASES**

These are diseases caused by taking insufficient amounts of certain nutrients. They are not caused by pathogens. They include

1. **MILK FEVER (parturient paresis)**.

This is due to insufficient calcium in the diet of the farm animal. It affects heavy milkers 5-9 years old.

**OCCURRENCE**

* + - It occurs within a week or do after calving usually because the cow is being milked too heavily too soon.
    - In the last few days of pregnancy or during calving
    - Occasionally several weeks after calving

**Symptoms**

* + Muscular spasms
  + Loss of appetite and severe depression
  + Paralysis
  + Inability to stand
  + Low body temperature
  + Uncoordinated body movements
  + Unconsciousness, coma and death
  + Saliva discharge from the mouth
  + The animals fail to ruminate

**Treatment**

Giving an injection of calcium borogluconate

**Prevention**

* + - Feeding high calcium diets during steaming up
    - Delayed or incomplete milking in the early stages of lactation
    - Give adequate mineral supplements i.e feeding calcium and phosphorous in a ratio of 1:1.
    - Seek professional veterinary advice
    - Always give lactating cows a dry period of 2 months prior to parturition
    - Provide acidic feeds like silage
    - Inject affected cows with calphon

1. **BLOAT (TYMPHANITIS/HOVEN)**

This is the distention of the rumen due to accumulation of gasses. This is due to fermentation of feedstuffs by microorganisms in the rumen. The rumen becomes distended especially on the left hand side.

**Causes**

* Feeding animals on young succulent grasses with a high moisture content. These are rapidly fermented leading to formation of gasses.
* Feeding animals on feeds having a high protein content such as legumes

**Symptoms**

* Lack of appetite
* Swelling of the rumen
* Difficulty in breathing due to pressure exerted by the distended rumen on the diaphragm, lungs and the heart
* Animal lies down and fails to stand up
* Animals stand with their legs wide apart

**Treatment**

* Use trocar and canula to create a passage for gasses to escape the rumen
* Use the broom stick method to make the animal belch
* Drench the animal with turpentine or vegetable oil to act as anti-foam agent.

**Prevention**

* + - Avoid feeding animals on succulent feeds
    - Avoid feeding animals on young pastures
    - Using anti bloat drugs such as proxalene
    - Strip grazing and zero grazing to reduce selective grazing
    - Remove objects causing obstruction by hand or using a stomach tube
    - Allow animals consume good quality roughage before grazing on lush or young grass

**Factors that predispose animals to bloat**

* Feeding animals on fresh young pastures
* Feeding animals on a lot of succulent feeds
* Feeding animals on high concentrate rations with protein supplements
* Obstruction of the gullet due to presence of a large object

1. **KETOSIS (ACETONEMIA OR PREGNANCY TOXAEMIA)**

This is a disease of ruminants occurring most commonly in high milking cows. It occurs during the first two months of lactation when the milk production exceeds their feeding capacity. Its due to low blood glucose levels (hypoglycemia) leading to break down of lipids to get enough energy but accumulation of ketone bodies occurs.

**Causes**

* Malfunctioning of the liver
* Inadequate feed intake to meet milk yield requirements

**Symptoms**

* Milk yields drop and the cow fails to return to full lactation
* Emaciation
* Nervousness
* Apparent blindness
* Animal walks in circles

**Prevention**

* Adequate and proper feeding of lactating animals
* Seek veterinary assistance
* Animals should have enough green feeds

1. **CURLED TOE PARALYSIS (peculiar lameness)**

This occurs in poultry due to insufficient vitamin B2 (riboflavin) in the diet

**Symptoms**

* Poor growth of feathers in chicks
* Retarded growth of chicks
* Diarrhea
* Poor hatchability of chicks

Control is by providing chicks diet rich in vitamin B2 such as green forage

1. **PIGLET ANAEMIA**

This is caused by lack of enough iron in the diet. It commonly attacks piglets fed exclusively on mother’s milk. The mother’s milk lacks iron.

**Symptoms**

* Ears and belly of piglet become pale
* Listless or body weakness
* Rapid breathing
* Diarrhea
* Pale mucus membranes

**Treatment and prevention**

* Smearing the sows teats with clean anthill soil
* Injecting piglets with iron solution 3 weeks after birth
* Placing fresh and clean anthill soil in the pens of piglets
* Spreading ferrous sulphate powder on the floor of piglet pens so that piglets can lick it

1. **GRASS TETANY (GRASS STAGERS)**

This is caused by insufficient magnesium in the diet.

**Symptoms**

* The animal becomes nervous suddenly
* Staggering or abnormal gait
* Convulsions
* Twitching of muscles especially those around the head and the neck
* Accelerated respiration

**Prevention**

Provide animals with a diet rich in magnesium through providing mineral lick

**PARASITISM IN FARM ANIMALS**

A parasite is an organism which derives its food from another organism.

**Effects of parasites on a host**

* Skin irritation and as a result the host rubs against wood and walls
* They transmit disease causing organisms for example the brown ear tick transmits protozoa which causes east coast fever (E.C.F)
* They rob food nutrients from the host e.g tape worms and round worms
* There is loss of weight
* Cause stunted growth especially in young ones
* They cause anaemia due to the sucking of blood
* They bore holes in body organs e.g the liverfluke
* They lead to loss of appetite
* Some damage the skin/hide of the host
* They cause wounds on the animals which act as entry points for pathogens

**Types of parasites**

Parasites can be grouped into various types namely.

1. External parasites/ecto parasites, these feed from outside the body of a host. Examples include lice, ticks, fleas, mites. Etc.
2. Internal parasites/endo parasites, these live and feed from within the body of the host. E.g. tape worms, liver flukes, round worms. Etc.
3. Periodic parasites, these live on the host for a short period of time or only occasionally. E.g. fleas.
4. Obligatory parasites, these live an absolutely parasitic life and for their entire lives are dependent on the host. E.g. tape worms.
5. Facultative parasites, these are able to exist also as non-parasites. E.g. fleas

**EXTERNAL PARASITES**

These include, ticks, lice, fleas, mites.

**TICKS**

These belong to the class arachinida and order acarina. So they have eight legs. Ticks are grouped according to softness of the body or life cycle

According to softness of the body, ticks are grouped as

* Hard ticks (ixodidae)
* Soft ticks (argasidae)

According to the life cycle, ticks are grouped as

* One host
* Two host
* Three host

**Drawing of a tick**

**Adaptations /features that enable a tick to live as a parasite**

* Four pairs of legs which enable it to move easily searching for the host
* Pointed mouth parts (hypstome) for sucking blood from the host
* Pointed mouth parts (chelicera) for attachment to the host
* Hard coat to protect it from damage (desiccation)
* Flat body for ease of hiding in the fur/hair
* Dull Colour to camouflage with the coat colour of the host

**Effects of ticks on the host**

* Suck blood from the host leading to anaemia
* Skin irritation leading to loss of fur due to rubbing against the walls
* Transmit tick borne diseases such as east coast fever
* Damage hides and skins
* Loss of weight
* Small wounds on the body which act as entry points for pathogens
* Reduce production in terms of milk

**LIFE CYCLES OF TICKS**

**The general life cycle of a tick is as below**

* Adult female ticks lay fertilized eggs on the ground
* The eggs hatch into larvae which climb onto an animal passing by
* Larvae feed on the animals’ blood and become engorged
* The engorged larvae moults into a six legged nymph
* The nymph feeds on host blood
* The engorged nymph moults into eight legged adult
* The adult male and female ticks feed on the hosts’ blood and later mate while on the host
* The engorged female full of eggs drops to the ground to lay eggs. There after it dies.

**LIFE CYCLE OF A ONE HOST TICK**

* Fertilized eggs are laid on the ground by the adult female tick
* Eggs hatch into six legged larvae which climb on the host
* Larvae attach and feed on blood of the host
* Engorged larvae moult and nymphs emerge on the same host
* Nymphs feed on blood of the host
* Engorged nymphs moult and adults emerge on the same host
* Adult males and females mate on host and feed on blood
* Engorged females drop to the ground to lay eggs

Example of a one host tick is blue tick.

**LIFE CYCLE OF A TWO HOST TICK**

This requires two hosts to complete its life cycle

* Fertilized eggs laid on the ground hatch into larvae which climb on the first host
* Larvae feed on the blood
* Engorged larvae moult and nymphs emerge
* Nymphs feed on blood, become engorged and drop to the ground. They moult and adults emerge
* Adults climb on second host feed and mate
* Engorged females drop to the ground to lay eggs

Examples include, red legged tick.

**LIFE CYCLE OF A THREE HOST TICK**

This requires three hosts to complete its life cycle.

* Fertilized eggs laid on the ground hatch and larvae emerge
* Larvae climb on the first host and feed on blood
* Engorged larvae drop to the ground, moult and nymphs emerge
* Nymphs climb on the second host and feed on blood
* Engorged nymphs drop to the ground and adults emerge
* Adults climb on third host, feed and mate
* Engorged females drop to the ground to lay eggs

Examples include brown ear tick, bont tick.

Common ticks and diseases they transmit

|  |  |  |
| --- | --- | --- |
| **SPECIES OF TICK** | **GROUPING** | **DISEASE TRANSMITTED** |
| Brown ear tick | Three host | East coast fever |
| Blue tick | One host | Gall sickness (anaplasmosis) |
| Bont tick | Three host | Heart water |
| Red legged tick | Two host | Red water |

**CONTROLLING TICKS**

1. Dipping and spraying animals with recommended acaricides
2. Hand spraying.

**Steps followed during hand spraying (procedure for hand spraying)**

* Restrain the animal
* Spray the entire back
* Spray the brisket, front legs
* Spray the belly and udder
* Spray the rear, anus, vulva and switch of the tail
* Spray the head, face and inside ears
* Release the animal

In summary the formula for hand spraying is BBBRH

B= Back, B= Brisket, B= Belly, R= Rear, H= Head

1. Rotational grazing, this breaks the life cycle of ticks by starving them.
2. Practicing double fencing, this is when boundaries have two fences with a space of 1 meter between the fences, this space is kept free of any grass. Any tick trying to cross from one side will turn back as it can’t walk on bare ground for long.
3. Controlled burning of old pastures during the dry season to kill the ticks
4. Hand picking of ticks and killing them more so if the herd is small
5. Fencing to keep away strange animals
6. Ploughing the pasture to bury the larvae and nymph stages

**INTERNAL PARASITES/ENDO PARASITES**

Some parasites feed from inside the host. They are found in body organs like lungs, liver, kidneys and intestines. Examples include, round worms, liver flukes and tape worms.

**ROUND WORMS**

Round worms are small cylindrical and unsegmented living organisms with both ends pointed.

**Adaptations of round worms to parasitic mode of life.**

* They have a pointed anterior for penetrating into the intestines.
* There cuticle is covered with a slimy discharge to protect them from being digested by the enzymes of the host.
* Possess a mouth for ingestion of food
* Their smooth unsegmented body protects them from being removed from the intestines by moving food material
* Production of many fertilized eggs enabling it to multiply fast

**Symptoms of attack**

* Stiff dry hair coat
* Loss of weight
* Retardation in growth
* Rough, standing hair/fur
* Diarrhea
* Live worms in droppings of animals
* Drop in yield
* Anaemia
* Pot belly

**LIFE CYCLE OF A ROUND WORM**

* Adult worms lay eggs which are passed out in faeces
* Eggs hatch into larvae or develop cysts under adverse conditions but remain viable
* Encysted larvae or eggs are eaten by the host through water or pasture
* Encysted larvae emerge out of the cyst
* Larvae penetrate the walls of the intestines
* They later penetrate into the blood stream, move to the lungs, coughed out and swallowed again into the alimentary canal where they develop into adults.
* Mature male and female mate within the stomach of the host.

**Control of round worms**

* Calves should graze ahead of mature cattle in rotational grazing
* Deworming (drenching) every 4-6 weeks especially the rainy season
* Rotational grazing to break the life cycle of the worms
* Provision of clean drinking water
* Harrowing pastures in dry seasons to destroy eggs
* Controlled burning of pastures during the dry season
* Proper disposal of animal wastes especially in zero grazing

**TAPE WORMS**

Tape worms are long and segmented worms. They feed from inside the host. The segments of the tape worm are also called proglottides. Mature segments are found at the end of the tape worm. When mature, a tape worm can measure up to four meters.

**Examples of tape worms include,**

* Beef tape worms (taenia saginata)
* Pork tape worms (taenia solium)

Tape worms have a small head called a scolex. On the scolex, hooks for attachment and suckers for sucking food nutrients from the host are located.

**Adaptations of the tape worm to its mode of life**

* They are hermaphrodite hence don’t need to look for mates
* They produce many eggs to ensure their survival
* It’s flat and long giving it a large surface area for absorbing food
* It has hooks and suckers for attachment into the alimentary canal of the host

**Signs and symptoms of attack**

* Diarrhea
* Anaemia
* Mature segments in droppings of a secondary host
* Excessive appetite
* Rough hair coat
* Emaciation
* Potbellied or swollen stomach in calves

**Life cycle of a tape worm**

The tape worm requires two hosts to complete its life cycle. For the beef tape worm the first host is cattle and for the pork tape worm the first host is a pig and for both the final host is man.

* Adult tape worms live in the intestines of man. Mature proglottides containing fertile eggs break off the worms into the intestines and are passed out with faeces
* Eggs hatch into oncospheres
* Oncospheres are consumed by grazing animals which act as intermediate host (first host)
* Each oncosphere contains six hooked embryo called hexacanth
* The wall surrounding the hexacanth is digested in the duodenum to release bladder worms
* The bladder worms bore through the walls of the intestines and enter into the muscles
* When man eats poorly cooked meat, the bladder worms are taken in
* The bladder worms attach on the walls of the intestines and develop into a tape worm.

**Diagram of a tape worm**

**Control of tape worms**

* Through proper cooking of meat
* Proper disposal of faeces by man
* Deworming animals with drugs like nilzan
* Inspection of carcasses before selling meat
* Burning pastures to destroy oncospheres

**LIVER FLUKE**

These are flat worms with dorsal ventrally flattened bodies. They are shaped like a leaf.

**Damage caused by liver fluke**

* Make tunnels in the liver and spleen
* Cause liver rot due to tunnels formed
* Block the bile duct hence affecting digestion

**Diagram of a liver fluke**

**Adaptations of liver flukes to their way of life**

* Possess suckers for sucking nutrients
* Possess a cuticle with slimy substance for protection against the digestive enzymes of the host
* They are hermaphroditic for easy fertilization

**Signs and symptoms of liver fluke attack**

* Emaciation
* Retarded growth
* Anaemia
* Dullness and sluggish movement
* Flukes in the liver of slaughtered animals
* Diarrhea
* Coughing in case of lung worms
* Increased breathing rate

**Life cycle of a liver fluke**

* Adult produces eggs in liver of host
* Eggs pass to the intestines and are then passed out together with faeces
* The eggs develop into the first larval stage called miracidium
* The miracidium swims in water with the help of cilia on its body and penetrates into the body of a water snail which is its intermediate/primary/first host
* While in the water snail, miracidium changes into a mass of shapeless cells called sporocyst
* Each sporocyst develops into 5-8 new types of larvae called radiae
* The radiae grows into another larval stage called cercaria
* The cercaria leaves the snail and enters water where it can swim using its tail
* Cercaria swim and attach themselves to grass. When conditions are unfavourable, the cercaria develops protective cysts and it develops into metacercaria.
* The animals eat and pick up the encysted cercaria (metacercaria)
* The cysts around cercaria dissolves once eaten by grazing animals and develops into young liver flukes
* Young liver flukes burrow into the tissue of the liver where they mature and begin to lay eggs.

**Control of liver flukes**

* Deworming animals regularly using drugs like nilzan
* Draining swampy areas which are near to grazing land
* Fencing to keep away animals from swampy areas
* Burning infested areas to kill water snails
* Spraying affected areas with copper sulphate
* Rearing ducks to pick and eat the snails
* Hand picking the snails and killing them

**General measures to control internal parasites**

1. Eradication of alternate hosts such as the water snails by spraying
2. Regular deworming
3. Draining swampy areas to kill water snails
4. Burning affected pastures and swamps
5. Keeping proper sanitary measures within animal houses
6. Rotational grazing at not more than 3 days interval
7. Fencing off marshy areas where there is stagnant water
8. Avoid overcrowding in calf pens
9. Harrowing pastures in dry season to expose eggs
10. Graze calves ahead of adults or graze calves alone in their paddocks
11. Proper disposal of human faeces

**STOCKMANISHIP**

This is the act of looking after animals

**Stockman,** is a person who cares and looks after animals

**Qualities of a good stockman**

* Should be kind to the animals and should be able to care for them
* Should have a lot of knowledge about animal health and management practices.
* Should be able to work with minimum supervision
* Should be able to make prompt and good decisions by himself
* Should be able to design a regular routine of activities
* Should be able to keep good farm records
* Should be health, free from zoonotic diseases such as tuberculosis
* Should be energetic enough
* Should have high standards of personal hygiene
* Should be able to ensure proper feeding of the animal
* Should be able to keep the environment in buildings and fields free of any situation that predispose animals from diseases

**Management and care given to sick animals**

* Hygiene, ensure regular cleanliness in animal quarters by scrubbing, replacing dirty beddings etc.
* Isolation, remove the sick animals from the rest. This gives them a chance to be given special care such as special feeding
* Feeding, provide highly nutritious feeds to the sick animals
* Water, provide clean water adlib to diseased animals to aid in digestion
* Housing, animal houses should be leak proof, with a rough floor to avoid accidents. It should also have plenty of clean beddings.
* Treatment, treat sick animals promptly as advised by a veterinary doctor
* Monitoring, constantly check on the diseased animals to see if there is any improvement.