1.1 Introduction

Definition of Health and Disease

Health

Physical, physiological and mental well being of an individual. WHO (World health organization) definition of health indicates three components or dimensions of health i.e. physical, mental and social. These components are interrelated. Social health also applies to animals.
Disease

Any deviation from normal, physical, physiological conditions is considered as disease or inability to perform the normal physiological functions though nutrition and other environmental factors are maintained at optimum level.

1.2. Signs of Health and Ill Health

Signs of Health

Healthy animal looks alert and powerful with a glossy skin and a full stomach.

- Eyes appear bright and wide, clear and no excessive tearing.
- Coat is shiny.
- Healthy bowel movements. Faeces normal, no constipation or no watery diarrhoea.
- Normal respiration rates (10-30/minute)
- Normal digestive activity (cud chewing often)
- High energy levels (especially in calves)
- High (normal for the cow) milk production.
- Normal body weight (cow is not too thin)
- Normal eating and drinking habits.
- Muzzle wet and moist.
- Normal gait.
- Urine pale yellow.
- Behaviour – Animals stay in a group, actively curious.

Body temperature can be a good indicator of illness.

Sign of Ill Health

- Sunken eyes, dull or hopeless look in the eyes,
- Muzzle dry.
- Not looking around, disinterested in surroundings and disinterest in other cattle
- One of the most important signals of illness is appetite suppression that is manifested as off feed, not eating normally. If in a paddock or stall with access to hay, not eating, resting or chewing cud but standing doing nothing.

- Soiled tail, large amount of manure not just on the part of the tail that brushes over the anus but dribbled down the length of the tail.

- Skin stretched tight over bones. Dull and lifeless coat

- Very thin, ribs and pelvis stand out.

- Refuses to suckle calf.

- Physical symptoms like diarrhoea, sneezing etc.

- Depression is noted as drooping head and ears excessively slow movement, lagging behind the rest of the herds and reluctance to get up when approached.

- Copious and profuse eye and nasal discharges.

**1.3 Recording Body Temperature, Pulse and Respiration Rates**

**1.3.1 Temperature**

The internal temperature of the body, as measured by the clinical thermometer, reflects the steady state existing between heat production and heat loss. In farm animals, rectal temperatures are recorded. A short blunt bulb clinical thermometer with range of 36 °C (97 °F) to 42.5°C (108° F) is used.
**Procedure:** The Procedure for taking the temperature of an animal is to first shake the mercury column in the thermometer down below the lowest point likely to be recorded. This is achieved by means of a wrist flicking action with the thermometer held between the thumb and first two fingers of the hand. The bulb end of the thermometer should then be lubricated with soap or petroleum jelly prior to being gently inserted with a rotatory action through the anal sphincter into the rectum. Care should be taken to ensure that the bulb of the thermometer is inserted to the same depth in each particular species of animal and also that it makes contact with the mucous membrane of the rectum. In order to obtain an accurate determination of the body temperature, the thermometer should be left in situ for about two minutes. Whenever there is a atony of anal spincter or the presence of large masses of faeces in paralysis of the rectum, in female animals, temperature can be recorded at vagina, where it is approximately 0.5 °C (1.0 °F) higher than in the rectum. When the temperature has been taken the thermometer should be wiped clean with a piece of cotton wool and then placed in a beaker containing disinfectant fluid.

Fig. 1.2 Respiratory Disease

**1.3.2 Pulse**

Expansion and elongation of arterial wall imparted by the column of arterial blood due to contraction of left ventricle.

**Procedure:** The technique of taking the pulse consists of placing the ball part of one or more fingers on the skin over the coccygeal artery/facial artery at a point where it overlies bone and applying gentle pressure until the pulse wave can be detected. Where the artery is large and tends to roll away from beneath the finger tips, it may be helpful to place the tips of two or even three adjacent
fingers on the artery parallel to its long axis. In the examination of the pulse, rate, rhythm and quality should be considered.

1.3.3 Respiration

The physical actions by means of which air is brought into and is expelled from the lungs, is termed as respiration.

Procedure: The clinician should stand behind and to one side of the animal, so that both the thoracic and abdominal areas of the body are in view. It is advisable to observe the animal from both sides, in order to determine whether the respiratory movements are bilaterally similar or divergent. In quiet animals, determining the frequency and rhythm of the respiration facilitated by placing one hand on the lower part of the coastal arch region. The rate of respiration may also be determined by observing nostril movements. The rate or frequency (number/minute), type, rhythm (regularity) and quality (amplitude or depth of the respiratory movements) should be considered.

1.4 Normal Values of Body Temperature, Pulse, and Respiration Rates: Rectal Temperature

<table>
<thead>
<tr>
<th>Animal</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse</td>
<td>99-100 °F</td>
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<tr>
<td>Cattle</td>
<td>100-101 °F</td>
</tr>
<tr>
<td>Pig</td>
<td>101-102 °F</td>
</tr>
<tr>
<td>Sheep</td>
<td>102-103 °F</td>
</tr>
<tr>
<td>Goat</td>
<td>102-103 °F</td>
</tr>
</tbody>
</table>

Pulse: Number per minute

<table>
<thead>
<tr>
<th>Animal</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse</td>
<td>30-40</td>
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<tr>
<td>Cattle</td>
<td>60-70</td>
</tr>
<tr>
<td>Pig</td>
<td>60-90</td>
</tr>
<tr>
<td>Sheep &amp; Goat</td>
<td>70-90</td>
</tr>
<tr>
<td>Buffaloe</td>
<td>50-70</td>
</tr>
</tbody>
</table>

Respiration: Number per minute
### Animal Range

<table>
<thead>
<tr>
<th>Animal</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse</td>
<td>10-14</td>
</tr>
<tr>
<td>Cattle (Adult)</td>
<td>10-30</td>
</tr>
<tr>
<td>Cattle (young)</td>
<td>15-40</td>
</tr>
<tr>
<td>Sheep &amp; Goat</td>
<td>20-30</td>
</tr>
<tr>
<td>Pig</td>
<td>8-18</td>
</tr>
</tbody>
</table>

#### 1.5 Summary

Definition of health and disease are described along with the signs of health, and ill health of dairy animal. Recording body temperature, pulse and respiration rates are described with procedures. Normal values of body temperature, pulse and respiration rates of following animals: Horse, Cattle, Buffalo, Sheep, Goat and Pig.

#### Short Answer Type Questions

1. What is Health?
2. Define Disease.
3. What is the normal body temperature of cattle, pig, sheep and goat?
4. What is the normal pulse rate of cattle, buffalo, sheep and goat?
5. What is the normal respiration rate in cattle, buffalo, sheep and goat?

#### Long Answer Type Questions

1. What are the signs of health and ill health of animals?
2. Mention the procedure of recording body temperature of cattle?
3. Mention the procedure of recording pulse and respiration of cattle?
2.1 Definition of First Aid and its Principles

Definition

Emergency medical help given to a sick or injured animal before treatment is made available.

Principles

The first aider should get a history of the case that he has been summoned to attend, for his own guidance and for reporting to the voluntary surgeon. Other steps include,
- Removal of the cause.
- Arresting of severe haemorrhage
- Provision of plenty of fresh air to the patient.
- Provision of warmth to check fall in temperature and in shock.
- Provision of rest by changing the position of the animals into an easy posture.
- Covering with a clean dressing in all skin injuries.
- Keeping the animal immobile (especially when fractures occurred) by drugging or by diverting its attention towards some food.

The importance of providing an early veterinary aid cannot be over emphasized. Discernment is needed in deciding whether to take the animal to the veterinary hospital or send for a veterinarian.

### 2.2 Attending to Traumatic Conditions

The common traumatic conditions that can be encountered are bruises, open wound, teat injuries, feet injuries, eye injuries, horn injuries and haemorrhage.

Trauma is a result of physical injury due to fall, fight between animals or impact with stationary or moving objects. Basing on the intensity, there can be a simple skin cut or multiple fractures. The first thing to do in all these cases is to arrest bleeding.

#### Haemorrhage

Bleeding may occur from an injured capillary, vein or artery. Bleeding from capillaries stops as soon as clot has formed but bleeding from vein and artery must be arrested by keeping a pad over the injury by means of a bandage. On limbs a tourniquet must be applied. For this a folded cloth, cotton tape or a rubber tube can be used. Any one of the above material is looped around the limb and the two ends tied together with a knot. A stick is inserted into the loop and by twisting it the loop is tightened. After the bleeding is stopped the stick should be secured in position with another bandage.

#### Bruises

Bruise is characterized by rupture of capillaries in the skin following a blow or fall giving reddish blue or purplish colouration of skin. The area should be treated with cold water on first day then followed by two or three times a day with warm water.
Collection of blood may result in accumulation of blood known as haematoma. When haematoma is small in size it gets absorbed otherwise veterinary aid is desired.

**Open Wounds**

Open wound is a wound in which there is a break in the continuity of skin. The wound should be washed with clean cold water or with potassium permanganate and the wound to be dusted with antiseptic dressing powder.

**Eye injuries**

Eye injuries may be caused by any foreign body or physical trauma. The eye should be washed with 2-3% boric acid lotion and any antibiotic eye drops should be instilled into both the eyes.

**Horn injuries**

Separation of the horny cover of the horn core sometimes happens due to traumatic injury. This is called avulsion of horn. When the horn core is injured there will be bleeding from nostril on the corresponding side. The injury should be washed with cold antiseptic lotion and the horn protected by means of a pad or bandage and tincture benzoin should be poured on the injury.

**Teat injuries:**

Any small injury on the teats should be treated promptly to prevent mastitis. The injury should be washed with antiseptic lotion and antiseptic ointment should be applied.

### 2.3 Attending to Poisoning Cases

Poisoning in farm animals may be due to feeding of toxic plants and fodder treated with agricultural chemicals which are used by the farmers. The affected animals should be shifted to a place to prevent intake of more poison and to be provided with clean fodder and drinking water.

The poison in the stomach should be diluted by giving plenty of water through stomach tube. The alkaloid poison present in most of poisonous plants can be oxidized by dilute potassium permanganate solution or can be precipitated by using strong tea decoction or catechu. To decrease the irritation of stomach starch gruel, milk, eggs etc., should be given. Purgatives like Epsom salts can be given orally to promote excretion of poison from the body.
2.4 Attending to Obstetrical Difficulties

The obstetrical difficulties commonly encountered are dystocia, prolapse of vagina or uterus and retention of placenta.

Dystocia means difficulty in parturition. In case of dystocia in small animals attempt should be made to keep the animal quiet and comfortable. If needed gentle traction to the foetus may be applied to aid delivery. It is better not to introduce hands/fingers per vaginum but seek veterinary aid.

First aid during calving should be undertaken with utmost precaution. Hands and obstetric ropes should be clean especially the finger nails should be trimmed properly to avoid injury. The first aider should attempt simple obstetric conditions like flexion of legs but should never apply traction but await professional aid.

Prolapse of vagina occurs towards late pregnancy or immediately after calving and prolapse of uterus occurs after calving. The organ hanging outside should be washed with potassium permanganate solution (1 in 10000) then covered in a clean cloth and wait for the veterinary help. In few cases animal strains and during straining the organs are visible for some time and then withdrawn inside. In such conditions, the owner has to be advised to provide feed and water in small quantities in more number of times. The hind quarters of the animal should be at a higher level. This can be achieved by raising the ground below the hind feet.

In retained placenta cases, the hind quarters of the animal should be washed with warm water taking care to see that the hanging membranes (placenta) does not get entangled. Isolate the animal and seek veterinary help if the placenta does not fall even after 24 hours.

2.5 First Aid to Burns and Scalds

Burns and scalds are painful due to which controlling the animal becomes difficult. In case of burns burnt hair, skin and other tissues are visible. In case of scalds the hairs are struck together and scab covers the injury with discharge of serum. First aid consists of excluding hair from the burnt part covering it. Antibiotic or antiseptic ointments may be smeared on a clean piece of cloth and applied to the burns and then bandaged.

Acid burns should be treated with an alkali like washing soda 10gm in one liter of water and burns caused by alkalies must be treated with equal parts of vinegar and water. The animal should be offered plenty of water.
2.6 Attending to Fracture

Fracture is break in the continuity of hard tissue like bone, cartilage etc. it is better not to attempt to bring the fragments of fractured bone together and retain them in that position with a bandage unless the person attending is sufficiently experienced. The wound should be kept free from dirt and the animal kept as quiet as possible. Never attempt rubbing the area but wait for veterinary aid.

2.7 First Aid Kit

A box containing below mentioned items should be made available in all livestock farms and it should be kept handy so that it can be reached quickly in case of emergencies. The items used from the box should be replaced immediately after use. Care must be taken to see that children and animals may not be able to get near the first-aid kit.

- Absorbent Cotton
- Gauge bandages
- Bandage cloth
- Surgical scissors – curved and straight made of Stainless Steel.
- Forceps – rat toothed and plain
- Artery forceps
- Splints or split bamboos
- Clinical thermometers
- Rope/rubber tube for tourniquet
- Antiseptics – potassium permanganate, savlon
- Dry dressing powder (Zinc oxide + boric acid)
- Oil of turpentine (for maggoted wounds)
- Tyrel/Afanil or any antibloat preparations
- Surgical spirit
- Tincture iodine
- Tincture benzoine
- Antiseptic ointments for wound dressing


- Eye drops
- Boric acid
- Obstetric ropes, chains & hooks
- Cotton ropes for restraint
- Pocket knife
- Old cotton sheets
- Neem oil

### 2.8 First Aid During Natural Calamities

Tsunami, cyclone, floods, fire accidents, earthquakes are the common natural calamities that occur region specific. Tsunami, cyclones can cause flooding of the villages resulting in loss of animal life due to drowning. In such situations, animals should be moved towards elevated areas and any wounds, bruises or traumatic conditions should be attended immediately. The dead animals should be removed from the water as soon as possible and the carcasses should be burnt to avoid spread of diseases.

In case of fire accidents, the tied animals in the sheds should be let loose and be driven out of the sheds. The burnt animals should be attended to immediately. The animals should be protected from the smoke to avoid suffocation and respiratory problems.

### 2.9 Summary

Definition of first aid and its principles are described. The common traumatic conditions like bruises, open wound, teat injuries, feet injuries, eye injuries, horn injuries and hemorrhage for first aid treatment is given. Attending possoning and obstetrical difficulties are described in detail. Attending fractures, first aid kit, contains and first aid during natural calamities are described.

### Short Answer Type Questions

1. Define first aid.
2. What are the principles of first aid?
3. Mention the common traumatic conditions.
4. Define fracture.
5. What are Burns and Scalds?

6. What are the common natural calamities?

**Long Answer Type Questions**

1. What are the contains of first aid box? Mention its uses.

2. What are the traumatic conditions? Mention the procedures.

3. Write short notes on a) Poisoning cases  b) Fracture

4. Briefly write about the obstetrical difficulties.
Bacterial Diseases

Structure

3.1 Classification of Dairy Animal Diseases

3.1.1 Contagious Bovine Pleuropneumonia
3.1.2 Tetanus
3.1.3 Calf Hood Diseases
3.1.4 Common Bacterial Diseases of Sheep and Goat
3.1.5 Mastitis
3.1.6 Pneumonia
3.1.7 Actinomycosis
3.1.8 Summary

3.1.1 Classification of Dairy Animal Diseases

Bacterial, Viral, Protozoal, Helminthic, Metabolic Etc..

Basing on the causative agents, dairy animal diseases can be classified into the following.

1. **Bacterial Diseases**: These are the diseases that are caused due to the bacteria eg: Anthrax, Black quarter (BQ).
A bacterium is a normal inhabitant and sometimes during stress, proliferates and produces disease eg: Pasteurella causing Haemorrhagic Septicemia (H.S).

2. **Viral Diseases:** These are the diseases caused by the viruses. Eg: Foot and Mouth, Rinderpest etc.

3. **Protozoal Diseases:** Diseases caused due to protozoa. The protozoa which are in blood and cause disease are called haemoproteozoa and the diseases are called haemoproteozoa diseases. Eg: Theilariasis, Babesiosis, Trypanosomiasis etc. Other protozoan diseases are Balantidiosis, Trichomoniasis etc.

4. **Helminthic Diseases:** Diseases caused by helminthes are called helmenthic diseases. Helminthes are classified into three. 1. Round worms or nematodes eg: Ascarisis, Strongylosis. 2. Flukes: Diseases caused by flukes in the blood eg: Schistosomiasis, in liver fasciolasis and in stomach called amphistomiasis. 3. Tape worms: These cause disease like Moneiziasis in ruminants.

5. **Metabolic Diseases or Production Diseases:** Earlier, diseases which were a result of metabolic derangement are called metabolic diseases. Presently all diseases which result because of imbalance between input and output are termed production diseases. Eg: Milk fever, Ketosis etc.

6. **Deficiency Diseases:** Diseases which a result of deficiency in the diet, where in the specific requirement of the animal is not being met. Eg: Rickets, Hypovitaminosis A.

### 3.2 Anthrax

**Definition**

Anthrax is an acute infectious bacterial disease which can affect a wide variety of domestic and wild animals characterized by septicemia and sudden death with the exudation of tarry blood from the body or natural orifice. The disease usually occurs very suddenly in cattle and sheep. Affected animals are found dead often with no previous signs of illness.

Humans are also susceptible to anthrax. The risk of human infection occurs when examining, skinning or cutting up an infected carcass.

**Etiology**

Gram positive capsulated, rod shaped, aerobic bacteria Bacillus anthracis.
Transmission

Ingestion of spores. Transmitted through blood sucking insects and biting flies. In cutaneous form organisms gain entry through abrasions of skin.

Clinical signs

The disease may appear in three forms

1. **Peracute form:** This form is found in the beginning of an outbreak. The animals may be found dead without any premonitory signs.

2. **Acute form:** There is elevation of body temperature 104-108°F. Animal is depressed followed by respiratory distress. Staggering convulsions. Bloody discharges from mouth and nostrils shortly before or after death. Death takes place within 48 hours.

3. **Subacute form:** It is characterized by oedema. Oedema is predominantly noticed under the neck, brisket region, thorax, abdomen and flank. This edema produces respiratory distress. Jugular pulse is noticed at the terminal stage of the disease. Pregnant cattle may abort. Some may survive for 2 to 3 months.

Diagnosis

History of sudden death of animals with bloody discharges from mouth, nostrils and anus must be suspected to have died anthrax. Demonstration of anthrax bacilli in the blood smears. When blood films are stained with polychrome methylene blue will show the presence of large square ended blue rods in short chain with pink capsule (MC Fadyean’s reaction)

Treatment

Intravenous broad spectrum antibiotics like CephaTAXIME or Cephataxime with Tazobactum can be given for a period of five days. In less severe cases Penicillins or Oxytetracycline can be given for a period of five days.

Control

- Affected and suspected animals should be isolated and treated.
- Animals in contact with the affected may be treated with a Longacting antibiotic.
- Dead animals should be preferably burnt if not, buried deep with lime and common salt.
- Vaccination of the livestock in the outbreak areas with Anthrax spore vaccine.
- Fodder should not be purchased from Anthrax endemic areas.

### 3.3 Black Quarter (B.Q)

**Definition**

It is an acute infectious and highly fatal, bacterial disease of cattle. Buffaloes, sheep and goats are also affected. Young cattle between 6-24 months of age, in good body condition are mostly affected. It is a soil borne infection which generally occurs during rainy season.

**Etiology**

It is caused by gram positive bacteria Clostridium chauvoei.

**Transmission**

The disease spreads through ingestion of contaminated feed and contamination of wounds.

**Clinical Findings**

Disease starts suddenly and temperature rises (104-106°F), loss of appetite, depression, dullness, suspended rumination, difficult breathing, lameness in affected leg, crepitation swelling over hip, back and shoulder, swelling is hot and painful in early stages whereas cold and painless later. Recumbency followed by death within 12-48 hrs.

**Treatment**

Treatment with cephalosporin group of antibiotic cephtaxime @10mg/kg b.wt or cephtaxime with β-lactamase inhibitor @10mg/kg b.wt intravenous for 5 days. NSAIDS and antihistaminics to be used.

**Control**

Isolation of the infected animals from healthy stock. Disposal of carcass has to be done either by deep burial or burning. Proper disinfection of surgical operation instruments prior to operation. Don’t allow grazing in affected area. Alum precipitated Black quarter vaccine 5ml subcutaneously every year before rainy season.
3.4 Brucellosis

Definition

Brucellosis is a highly contagious disease bacterial infection characterized by abortion in females and infection of the testicles in bulls. Infected cattle will abort only once due to brucellosis and have apparently normal calving in subsequent years, but will continue to excrete large amounts of bacteria after calving.

Fig. 3.1 Brucellosis showing Orchitis

Etiology

The disease is caused by Brucella abortus.

Transmission

Natural transmission occurs by ingestion of organisms, which are present in large numbers in aborted fetuses, fetal membranes and uterine discharges. Cattle may ingest contaminated feed and water or lick contaminated genitals of other animals. Venereal transmission by infected bulls to susceptible cows and transmission may occur by artificial insemination. When Brucella contaminated semen is deposited in the uterus but not when deposited in mid cervix. Brucella may enter the body through mucous membranes, conjunctiva, wounds or intact skin.

Clinical findings

Abortion is the most obvious manifestation. Infection may also cause still born or weak calves, retained placenta, reduced milk yield. Infected bulls develop orchitis and testicular abscess. Chronic infections may result in arthritic joints or hygromas in some cattle.
Treatment

No treatment is allowed. All infected cattle and contacts that have been exposed to infection must be slaughtered.

Prevention

Regular screening of breeding bulls from frozen semen collection centres for brucellosis and use brucellosis free bulls for semen production. Hygienic production of raw milk and pasteurization of milk and milk products that is to be ingested by human beings. Prevention of brucellosis is accomplished by official calf hood vaccination (strain 19) of heifer calves at age 2-4 months or 4-12 months using above and strain k45 for pregnant ones.

![Fig. 3.2 Brucellosis Hygroma](image)

3.5 Vibriosis

Definition

Vibriosis is a venereal disease of cattle caused by bacteria spread at the time of coitus or at the time of artificial insemination and characterized by infertility with an improperly handled and treated semen increased number of services necessary per conception.

Etiology

The disease is caused by Campylobacter fetus.
Transmission

The disease transmitted from bull to cow and from cow to bull during natural service. During artificial insemination when infected semen is used the disease is transmitted to cow. Infection from bull to bull can occur at semen collection centre.

Clinical findings

In cattle, abortion is the chief sign of infection with greatest in first two months of gestation. Mild endometritis, failure to conceive- return to service at normal time. Early embryonic death- delayed return to service. Late embryonic death- abortion (usually 4-5 months)

Treatment

1. Infected cows can be treated with intrauterine infusion of broad spectrum antibiotics for elimination of organisms from female genital tract.

2. Infected bulls are treated with a course of broad spectrum antibiotic parenterally along with local treatment of preputial cavity for 5 days.

Control

In infected herd stop using natural service until at least two years after initial infection began. If a bull has to be bought the best policy is the younger the better. If mature bull, treat it with antibiotics before it is used to mate cows and use it on small number of cows only so that its fertility can be monitored before it is used for service in the main herd.

3.6  Hemorrhagic Septicaemia (H.S)

Definition

It is an acute, infectious disease of cattle and buffaloes characterized by sudden onset of disease, high temperature, edematous swelling of subcutaneous tissues particularly of throat.

Etiology

The disease is caused by gram negative bacteria Pasteurella multocida.
Transmission

The organisms are normal inhabitants of respiratory tract and any stress causes outbreak. Direct transmission from infected to healthy animals by ingestion of contaminated feed and water.

Clinical findings

Septicaemic pasteurellosis flares up as an outbreak during the environmental stress. There is high rise of temperature (104-107°F), with lacrimal and nasal discharges, visible mucus membrane profuse salivation, and death within 24 hours. Concurrent shivering sub mucosal petechiation are evident. Deep red, some cases show signs of abdominal pain, severe deartth

Edematous form: this form is more common in buffaloes. There is rise in temperature head, neck, dewlap become swollen due to infiltration of inflammatory exudate in the subcutaneous tissue. Profuse lacrymation. Buccal mucosa is congested, tongue swollen and protrudes out of mouth. Profuse salivation and difficulty in swallowing and dyspnoea due to obstruction of airway, respiratory distress and death occurs within 20-24 hours.

Treatment

- Antibiotic has to be given Sulphadimidine 150mg/kg b.wt or inj.Enrofloxacin 5mg/kg b.wt for 3 days or any broad spectrum antibiotics can be used. Route of administration is preferably I/V.

- Steroidal anti inflammatory drugs like dexamethasone-5ml may be given I/V or I/M.
Control

Adequate management and an effective prophylactic vaccination of all susceptible animals in the enzootic areas once a year before the onset of the monsoon.

H.S alum adjuvant vaccine VBRI 5ml-S/C

5 ml for 600 lbs b.wt. 10 ml if more than 600lbs b.wt.

3.7 Tuberculosis (T.B)

Tuberculosis in cattle is a chronic infectious bacterial disease of animals characterized by the progressive development of tubercles in any of the organs in most species.

Etiology

The disease is caused by Mycobacterium bovis.

Transmission:

Transmission is through inhalation of organism. Ingestion of the organism through contaminated feed and water. Direct transmission from infected to non infected animal and indirect through faeces, urine and other excretions.

Clinical Findings

Affected animals with extensive military tubercular lesions are clinically normal but progressive emaciation unassociated with other signs should always arouse suspicion of tuberculosis. Capricious appetite and fluctuating temperature. Hair coat is rough. Affected animals tend to become more docile and sluggish but eyes remain bright and alert.

Pulmonary involvement is characterized by a chronic cough. Cough is never loud, occurring only once or twice, suppressed and moist. Dyspnoea (difficulty in respiration) with increased rate and depth is noted. Alimentary involvement causes diarrhoea. Enlargement of lymph nodes i.e. chronic painless swelling of the tuberculous mastitis with prominent enlargement of supramammary lymph nodes. In early stages the milk is not abnormal but later fine floccules and amber fluid from udder.

Treatment

In cattle, it is not economically feasible. Hence detected cattle are culled because of public health concern.
Control

The disease is eradicated in many countries. Control in a herd is made by removal of the infected animals, prevention of spread of infection and avoidance of further introduction of the disease. Detection of infected animals is by use of tuberculin test. All animals over 3 moths of age should be tested and disposed. Hygienic measures to prevent the spread of infection. Feed troughs, water troughs should be thoroughly disinfected with hot 5% phenol. Screening of farm attendants for tuberculosis.

3.8 Johnes Disease (J.D)

Definition

It is a chronic infectious gastrointestinal disease of ruminants characterized by progressive emaciation and diarrhoea.

Etiology

The disease is caused by Mycobacterium Johnei also called as Mycobacterium paratuberculosis.

Transmission

Natural infection occurs through ingestion when the calves are very young. Calves may acquire the infection in their intra-uterine lives. Contaminated food and water with faecal materials are the potential ways of transmission. Milk may act as direct source of infection because the organisms are excreted in milk.

![Fig. 3.4 Sign of Johnes Disease](image-url)
Clinical findings

The disease is seen in cows in their 2nd or 3rd calving. The cardinal sign is diarrhoea. Diarrhoea may be intermittent or continuous in nature. Faeces dark in colour and contain bubbles. The animal is hidebound, dry coat; weight loss is prominent, appetite normal, loose skin develops in intermandibular space simulating oedema severe dehydration results in death of he animal.

Treatment

Treatment do not give encouraging result due to advanced course of the disease.

Control

All the animals should be tested by faecal culture once in 6 months. Intradermal Johnin test is used as a screening test in the herd. 0.1 to 0.2ml of Johnin is given on one side of the neck. Change in the skin thickness greater than 5mm is considered positive reaction. Positive animals should be disposed off. Faeces should be removed and heavy lime dressings are to be done to kill the bacteria. Proper disposal of dung is essential as faeces are the main source of infection.

3.9 Leptospirosis

Definition

It is an acute or chronic or clinically inapparent contagious disease of domesticated and wild animals as well as man. The disease is manifested as anaemia, fever, hemoglobinuria, icterus and in ruminants predominating abortion, still birth and reproductive disorders.

Etiology


Transmission

Transmission of Leptospira takes place through direct contact with the urine of infected animals or ingestion of urine contaminated water or food. Leptospiroa organisms may enter the animal’s body through contaminated pasture and soil. Transplacental infection has been considered as one of the ways of transmission in cattle.
Clinical findings

The disease in cattle and buffalo is manifested in three forms.

1. Peracute / Acute form: Sudden in onset and the first sign is an elevation of body temperature, followed by anorexia, lassitude, hemoglobinuria, dyspnoea, icterus and abortion may occur in 5-9 month pregnant cattle. Change in the colour of milk is noticed either yellow clotted or red in appearance due to the presence of blood.

2. Subacute/ Mild Form: The affected animals show signs of anorexia, depression, haemoglobinuria and colic. Reduced milk yield, Inco ordination of hind quarters, and blindness. Abortions are less common.

3. Chronic/ Recurrent Form: The affected animals show less marked signs for a longer period. Abortion is the prominent sign. Acute or chronic form of nephritis causing changes in urine like haematuria and anuria in severe cases that ends fatally. Liver damage can cause icterus.

Treatment

A course of antibiotic like penicillin and streptomycin or any broad spectrum antibiotics are recommended for a period of 5-7 days. If kidney is involved, supportive therapy should be given to monitor kidney function like fluid therapy and diuretics. Corticosteroids can be used.

Control

Bovine Leptospirosis has been regarded as a self limiting herd problem. Strict sanitary measures should be adopted in the farm to prevent contamination of food and water through urine of carrier animals. infected animals mist be segregated form rest of the herd. Rodents are the main carrier of Leptospirosis so effective rodent control should be undertaken.

3.10 Listeriosis

Definition

It is an infectious fatal disease of wide range of animals and characterized by signs of meningoencehalitis. It also causes abortion, endometritis and repeat breeding in farm animals.

Etiology

The disease is caused by Listeria monocytogenes.
Transmission

The disease is transmitted by infected feed and soil contaminated by urine, aborted fetus and uterine discharges of infected animals. Silage is considered as a potential source of transmission. Carrier animals and rodents may spread the disease.

Clinical Findings

The disease may be manifested in three types

1. Encephalitis: This is the prevalent form of disease in cattle. The affected animal is dull, depressed, high rise in temperature and dummy syndrome is noticed. Unilateral facial paralysis where head may be held to one side and drooling of saliva with circling either to left or right may be noticed.

2. Abortion: In cattle abortions between 4-7th month of pregnancy followed by retention of placenta are noticed.

3. Septicaemia: Only new born calves and lambs suffer with signs of depression, pyrexia, diarrhoea, emaciation and corneal opacity. Signs of dyspnoea, opisthotonus and nystagmus may appear with death occurring within 12 hours.

Treatment

The disease has to be treated with a broad spectrum antibiotic for a period of 5-7 days. Supportive therapy with fluids, nervine tonics, and anti-inflammatory drugs may be used.

3.11 Contagious Bovine Pleuropneumonia (CBPP)

Definition

It is an acute, Subacute or chronic disease of cattle and characterized by formation of massive pathological changes of lungs and pleura.

Etiology

The disease is caused by Mycoplasma mycoides var. mycoides.

Transmission

The infection spreads through inhalation of infected droplets. Exhaled breath contains large number of organisms and spread the infection to the close contact susceptible cattle. The infected animal excretes organisms through urine and inhalation of urine spread the disease. Inanimate objects do not transmit this disease.
Clinical Findings

The affected animals manifest the following signs: High rise of temperature (104-106 F) depression, anorexia, cough following exercise, reluctant to move, abducted elbow, arched back, extended head and neck, dilated nostrils, nasal discharges, oedematous swelling of throat and dewlap.

![Fig. 3.5 Contagious Bovine Pleuro Pneumonia](image)

Treatment

Treatment is effective in the initial stages. Tylosin tartarate – 5-10 mg/kg b.wt I/M for 5 days or drugs like enrofloxacin 5-10 mg/kg b.wt can be tried. Supportive therapy includes NSAID’s or corticosteroids to control edema, diuretics like furesemide may be used.

Control

Affected animals should be culled and strict hygienic conditions especially isolation of the suspect animal and treatment to be undertaken. Avoid overcrowding as the disease spreads rapidly were animals are kept in close association in the farm or during transit.

3.12 Tetanus

Definition

It is an acute infectious disease of mammals caused by toxin and characterized by hyperaesthesia, muscular spasms and rigidity.

Etiology

The disease is caused by the toxins produced by Clostridium tetani. Spore forming Gram positive bacteria.
Transmission

Transmission in all animals occurs as a result of wound infection. Occurs due to wounds of castration, docking, parturition and in young animals through umbilicus.

Clinical Findings

The initial signs consist of restricted movement, muscular stiffness and difficult in walking. Decreased in milk yield, lock jaw and hypersensitivity on little stimuli. Prolapse of the third eyelid, pump handle position of the tail are common feature. Bloat is a characteristic sign in ruminants and rumen appears drum like. The affected animal dies of asphyxia.

Treatment

- Neutralization of circulating toxin.
- Destruction of organisms
- Prevention of asphyxia

1. Antitoxin Therapy: To neutralize toxin this is indicated. Antitoxin at 12 hours interval. Intravenous normal saliva can be given to dilute the toxin.

2. Antibiotic Therapy: Pencillins or latest generation cephalosporins with beta –lactamase inhibitors to be given intravenous. Wound debridement: as the organism proliferates in anaerobic environment, removal of necrotic tissue and cleaning of the wound using Hydrogen peroxide is recommended.

3. Muscle relaxants: Use of Muscle relaxants to prevent asphyxia Chlorpromazine – 0.1mg/kg b.wt, Magnesium sulphate 10-25% solution can be given subcutaneous.

Control

- Through cleaning, removal of necrotic tissue and dressing of wounds.
- Animals should not be allowed to graze near barbed wire fencing.
- Sterile surgical instruments are to be used at the time of operation.
- Tetanus toxoid should be given once in 6 months.
3.13 Calf Hood Diseases

The period from birth to 6 months is called calf hood. Calves are at high risk for death in the first 2 weeks of life, in the first weeks of life. Septicemia and enteric diseases and respiratory diseases from second week.

The diseases that are commonly seen in calves are

1. Calf scours.
2. Calf diphtheria.
3. Joint ill or naval ill
4. White muscle disease
5. Calf septicemia
6. Calf pneumonia
7. Calf coccidiosis
8. Hypovitaminosis A
9. Contracted flexor tendons or knuckling at fetlocks
10. Ascariasis.

Calf scours is one the common condition seen in calves it is of three types

Digestive type scouring is due to excessive intake of colustrum/milk

White scours or Escherichia coli infection is due to bacteria. When calves do not get adequate immunity which is due to delayed or inadequate intake of colustrum, thin the E.coli takes an upper hand and produce diarrhoea and dysentery leading to death.

Calf diphtheria is caused by a bacteria fusiform necrophorus and forms a diptheric membrane in the buccal cavity.

Joint ill or naval ill is due to bacteria Streptococcus, Corynebacterium or E.coli. These organisms gain entry through umbilicus and may form abscess at umbilicus or they may gain entry in to circulation and then localize at joints causing joint ill.

White muscle disease or subacute muscular dystrophy is a result of vitamin E and Selenium deficiency and affected calves suffer from stiff gait.
Calf septicemia is a condition where the bacteria is rapidly multiplying and produce toxemia resulting in death of the calves. The bacteria commonly involved are Proteus morgani, Pseudomonas aeruginosa, Streptococci, Pasteurella multocida, Brucella abortus and Salmonella.

Calf pneumonia is commonly seen from 10 days to 4 months of age. The bacteria commonly involved are Pasteurella multocida, Corynebacterium pyogenes, Staphylo cocci and Streptococci. Bilateral nasal discharges initially serous and later on mucoid and mucopurulent, respiratory distress and high rise in temperature (103-105 F) are prominent signs.

Calf coccidiosis is seen in calves between 6-9 months of age and caused by Eimeria bovis, E.zurni and E.ellipsoidales, the affected animals show signs of dysentery, arched back and straining during defeation.

The deficiency disease that is commonly encountered in calves is Hypovitaminosis A. If dam receives deficient in vitamin A diet during pregnancy, the calf may be born with deformities. To counteract deficiency of vitamin A in calves 3,00,000 IU of vitamin A is given I/M at one month age and then at monthly intervals for 3 months.

Calf Ascariasis: This is more common in buffalo calves. If dam is not dewormed, the larvae of Toxocara vitulorum is transferred to the calf through colustrum and within 2-5 days of calf age the round worms are present and eggs are voided through faeces by 3 weeks. Most of the times, the calf is dull, pot bellied, constipated and sometimes may die of intestinal obstruction due to heavy worm load. The larvae may migrate internally and cause Pneumonia.

**Treatment**

1. Deworming as early as 7-10 days and then every 3 weeks with Piperazine salts till 3 months. Then monthly once with broad spectrum anthelminthic till 6 months of age.

2. If Pneumonia, septicemia or scours are seen in calves, a course of broad spectrum antibiotic should be given intravenously for at least 3 days then followed by intramuscular for 2 days.

3. In calf scours, dehydration should be prevented by giving Ringers lactate intravenous @ 30ml/ kg b.wt, depending on severity of dehydration.

4. Supportive therapy using B-Complex injection can be undertaken.
Control

1. The resistance of the calf depends on the colostrum feeding. The volume of colostrum to be fed to calf is 10% of the body weight during first 24 hours of life. Of which, 5% should be within 3-5 hours of birth.

2. The young ones should be reared away from the adult stock.

3. Maintainence of strict hygiene and better mangemental practices will reduce the mortality among calves.

3.14 Common Bacterial Diseases of Sheep and Goat

3.14.1 Entero Toxaemia (E.T)

Definition

Acute, highly fatal disease of sheep and goats and characterized by diarrhoea, nervous symptoms, paralysis, convulsions, sudden prostration and death.

Etiology

The disease is caused by Clostridium perfringens type D in the intestine and liberation of epsilon toxin.

Transmission

Transmission is by ingestion of contaminated feed.

Clinical findings

Symptoms which are noticed are pain, staggering, convulsions, champing of jaw, opisthotonus condition, bloat, salivation, exhibit blindness and dashing against objects. Temperate may increase upto 2-3°F more than normal. In cases showing cerebral symptoms, if the convulsions are too many and severe. In less acute cases there is diarrhoea, loss of appetite, weakness, Glycosuria, hyperglycemia. Adult sheep usually survive for longer period upto 24 hrs. They show staggering and knuckling, champing of jaws, salivation and rapid shallow irregular respiration. There may be bloat in terminal stages. Irritation signs including convulsions, muscular tremors, grinding of teeth and salivation may occur in lambs. Diarrhoea prominent in goats specially in those which survive. Emaciation, anaemia and chronic diarrhoea.

Treatment

Broad spectrum antibiotic initially parenteral in emergencies and followed by oral route. Intravenous dextrose saline to neutralize the toxin.
Control

- Annual E.T Vaccination in the month of may or before onset of monsoon.
- Feeding schedule should be monitored.
- Isolation of the affected and treatment to be undertaken.

3.14.2 Foot Rot

Definition

Foot rot is an infectious disease of animals characterized by inflammation, necrosis and ulceration of the inter digital space, coronary bands and posterior limbs resulting to lameness.

Etiology

The disease is caused by Sphaerophorus necrophorus (Fusiform necrophorus)

Transmission

The disease is influenced by factors which help in the breakdown of skin such as continuous wet and muddy condition, rough ground or damage by tick.

Clinical findings

Lameness is the cardinal sign. Rise in body temperature, anorexia, loss of body weight. The skin of the inter digital space shows ulcerative changes. Affected animals may kick on the ground and disincline to move or try to move on two legs due to pain. In sheep, affected hoof may be separated. Spontaneous recovery is also possible.

Treatment

Use of parenteral antibiotics like penicillins or cephalosporins for 5-7 days. Supportive therapy using B-complex injection and NSAIDS. Local treatment is by foot bath with 5% copper sulphate, 2% formalin and application of antibiotic ointments.

Control

Do not allow grazing of animals in low lying or water flooded areas. The ground should be smooth. Isolation of the affected animals and treatment to be undertaken with care that the animal is taking adequate feed. Provision of foot baths for the animals before they enter sheds after returning from grazing.
3.14.3 Anthrax

Definition

It is an infectious bacterial disease of herbivorous animals characterized by septicemia and sudden death with the exudation of tarry blood from the body orifices.

Etiology

The disease is caused by Bacillus anthracis.

Transmission

Mode of transmission is by ingestion of spores through contaminated food and water.

Clinical findings

Affected sheep and goat are found dead with dark blood oozing from natural orifices and bloated stomach. No rigormotis is observed. Less severe cases shows signs like staggering, grinding of teeth, rolling of eye ball, difficulty in breathing and collapse of animal.

Treatment

Treatment can be undertaken in less severe cases by giving a course of broad spectrum antibiotic for 5 days.

Control

Annual vaccination in endemic areas and when outbreak occurs using Anthrax spore vaccine-0.5 ml s/c. Proper disposal of carcass. Implementation of strict sanitary measures in the farm. Do not open the carcass.

3.15 Mastitis

Definition

Mastitis is the inflammation of the mammary gland, characterized by physical, chemical and microbiological changes in the milk and pathological changes in the glandular tissues of the udder.

Etiology

- **Infectious agents**: Predominantly include bacteria like Streptococci sps, Staphylococcus sps, Corynebacterium sps, Pseudomonas sps, Klebsiella sps, E.coli, Proteus, Mycobacterium sps, other infectious agents include virus(pox), fungi, Mycoplasma.
• Non Infectious agents: Include physical trauma caused by suckling calves and barbed wires.

Fig. 3.6 Mastitis

Transmission

The source of infective agents are udder and environment. Contamination of milkers hand, milking machine cup may spread disease from infected to non infected teats.

Clinical findings

Affected animals show changes in udder. Udder may be swollen, hot, painful and presence of abrasions, changes in milk is indicated by change in colour, consistency, presence of flakes, clots and blood. If systemic involvement is noticed, the affected animal shows loss of appetite, rise in body temperature, recumbency and all the four teats are involved.

Treatment

• Strip all the milk from the affected teat.
• Apply topical ointments like Mastilep, Wisprec ointment or Inflagel.
• A course of broad spectrum antibiotic for a period of 5-7 days.
• A course of NSAIDS for a period of 3-5 days.
• A course of antihistaminics for a period of 3 days.

• Udder supportives like uniselit-10 gm or mammidium or masticare for 4 days orally.

Control

Proper hygiene in the sheds and while milking the milkers hand to be washed thoroughly and use of teat dips after milking. Prompt attention to teat injuries, maintaining proper pressure in machine milking and suspected cases should be milked at the last.

3.16 Pneumonia

Definition

Inflammation of lungs manifested by respiratory distress, cough and nasal discharges.

Etiology

The disease has varied etiology

• Infectious agents: Predominantly include bacteria like Streptococci sps, Staphylococcus sps, CBPP, CCPP, Mycobacterium sps, Pasteurella etc other infectious agents include virus, fungal, and parasites.

• Physical agents includes inhalation of dust, pollen and smoke.

• Aspiration pneumonia occurs in farm animals due to faculty drenching of medicines and liquids.

Clinical findings

All affected animals show rise in body temperature, nasal discharges initially serous then mucoid and mucopurulent, moist painful productive cough, extension of head & neck, tendency to lie down, loss of appetite and severe respiratory distress.

Treatment

• Provision of a comfortable well ventilated environment and dusty feeds to be avoided.

• Use of specific antibacterial for a period of 7 days.

• A course of NSAIDs and anti histaminics.
Control

The disease can be controlled by isolation of affected animals and providing treatment to the sick. Proper managemental practices have to be adopted in the farm especially the stocking density and ventilation of the sheds. Dusty feeds to be avoided. The animals should be provided proper shelter during rainy and winter seasons. Following routine deworming and vaccination schedules in the farm.

3.17 Actinomycosis

Definition

It is a chronic suppurrative disease primary of cattle and characterized in cattle by rarefying osteomyelitis of skull bones mandible and maxilla.

Etiology

Actinomycosis is caused by Actinomyces bovis. The organism is known as fungus like bacteria.

Transmission

The organism remains as resident population and establish the infection through abrasion, injury or wounds. The abrasion of buccal mucosa induced by coarse feed or surface material while chewing may set up infection.

Clinical Findings

Actinomycosis affects cattle between 2 to 5 years age and the lesion appear initially as a hard, painless, circumscribed protuberance at the level of central molar teeth of the mandible or maxilla. The invasion damages the bony tissues and at the same time stimulates bony growth causing osteitis, leading to suppurrative and granulomatous changes. Mastication is affected leading to loss of general health. In some cattle, large granulomatous mass appear on the surface of the jaw followed by development of sinus tracts. The discharge from the tract is thick, mucoid and yellowish purulent exudate containing granules known as sulphur granules. The adjacent bones may be affected in long standing cases.

Treatment

A course of antibiotic for 5-7 days. Injection streptopenicillin- 2.5g-I/M can be used. NSAID’s and the lesion to be drained. Surgically and packed with povidine iodine.
Control

Isolation of the infected animals and treatment to be given. Avoiding sharp objects and offer good feed to the animals.

3.8 Summary

The definition of different dairy animal diseases are described under classification of dairy animal diseases. Under bacterial diseases Anthrax, Black quarter, Brucellosis, Vibriosis, Haemorrhagic septicaemia, Tuberculosis, Johnes disease, Leptosprosis, Contagious bovine pleuro pneumonia Tetanus, Actinomycosis, Calf hood mastitis diseases and common bacterial diseases of sheep and goat like enterotoxaemia foot rot, anthrax are described in detail.

Short Answer Type Questions

1. Name the caurative organism of Anthrax and Black quarter diseases.
2. Mention any two viral and metabolic diseases.
3. What is Haemoprotezoan disease?
4. Expand H.S and B.Q.
5. What is Johnes disease?

Long Answer Type Questions

1. Describe in detail the disease “Black Quarter”.
2. Write short notes on (a) Mastitis (b) Tuberculosis.
3. Describe in detail the disease “Haemorrhagic Septicaemia” in Cattle.
4. Write about the calf hood diseases.
5. Explain about the ‘Enterotoxaemia’ disease of Sheep and Goat.
4.1 Rinderpest / Bovine Plague

Definition

Rinderpest is an acute, highly contagious disease of ruminants and swine caused by a virus and characterized by high fever and focal erosive lesions confined to the mucosa and enteritis.

Etiology

RNA virus belonging to paramyxvo group of genus Moribili virus. It is related to measles and canine distemper virus.
Transmission

Natural infection occurs primarily by direct contact of susceptible animal with infected animal by method of inhalation. Ingestion of contaminated food and water.

Fig. 4.1 Rinderpest Diarrhea

Clinical Findings

The disease is manifested in the four stages.

1. Incubation stage: This stage is the period of entry of the virus to the producing of clinical disease in the animal and it ranges from 2-15 days.

2. Prodromal stage: In this stage there is appearance of mucosal lesions following a marked rise of body temperature more than 104°F. Animal becomes dull, depressed and anorectic. There is drop in milk yield and profuse nasal and lacrimal discharges.

3. Mucosal stage: There will be erosions and necrosis of mucus membrane of oral cavity. The chief sites of oral lesions comprise of inside of the lower lips and adjacent gums, commissures of the lips, under the tip of tongue and back of body temperature is followed by diarrhoea. Faeces is watery, dark contains mucus and blood and later necrotic epithelium. Signs of abdominal pain and dehydration are noticed. In female animals swollen vulva and mucopurulent vaginal discharges. Death may occur 3 to 9 days after clinical manifestation in most of the cases.
4. Convalescent stage: In this stage, the resolution of mucosal lesions take place and mucosa resumes integrity following healing of mucosal lesions and recovery takes place within few weeks.

**Treatment**

No effective treatment in Rinderpest. Antibiotics are used to control the secondary bacterial infections.

Large doses of fluids and electrolytes to be given intravenous to prevent dehydration.

**Control**

This disease has been controlled in India through National Eradication Progaramme i.e. Rinderpest zero programme, OIE has approved that India is free from Rinderpest. Slaughter of infected animals and vaccination of neighboring animals. Quarantine stations and check posts in the main cattle route to prevent spread of disease from one part to other .vaccination is done by Rinderpest tissue culture vaccine 1 ml through subcutaneous route.

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### 4.2 Foot and Mouth Disease

**Definition**

It is an extremely contagious acute infectious viral disease of cloven footed animals, characterized by fever and formation of vesicles in the mouth and on the feet. Cattle, buffaloes, sheep, goat, pig etc are susceptible animals.
Etiology

The disease is caused by RNA virus of family Picornaviridae. There are several strains and sub strains of the virus which are antigenically distinct and no cross immunity between strains and substrains. In India O, A, C and Asia-I and their substrains are prevalent.

Transmission

The disease spreads by inhalation and ingestion, direct contact between infected and susceptible animals and indirectly through inanimate objects milk, milk products from infected animals act as a vehicle. Infected cattle semen is also a means for spread. The virus is air borne and as far as 100km (62 miles) in most favourable circumstances. The virus is susceptible to changes in pH away from neutral. 1-2% sodium hydroxide, 1-2% formalin or 4% sodium carbonate can destroy the virus in few minutes.

Incubation period 1-7 days.

Clinical Findings

The animal shows high temperature 40-41°C (104-106°F). Anorexia followed by acute painful stomatitis, abundant salivation, saliva hanging in long ropey strings.

Smacking of the lips and the animal chews carefully vesicles (1-2cm in diameter) appear on buccal mucosa, dental pad and the tongue. These rupture within 24 hrs leaving a raw surface which heals in about a week. Concurrent to the oral lesions, vesicles appear on feet particularly in the clefts and on the coronet. Rupture of these cause acute discomfort and animal goes lame often recumbent. As virus circulate secondary lesions develop on udder, teats, mastitis. Drastic reduction in milk yield is also seen. Eating is resumed in 2-3 days.
as the lesions heal but the period of convalescence may be as long as 6 months. As an after effect due to endocrine damage, a chronic syndrome of dyspnoea, anemia, overgrowth of hair and lack of heat tolerance is described as panting.

**Control**

- Isolation of affected animals in the herd.
- Vaccination of healthy animals.
- Treatment of the sick animals.

**Treatment**

- Wash the mouth and feet lesions using potassium permanganate solution.
- Foot lesions to be applied neemlent and antiseptic ointments to prevent flies and maggoted wounds.
- Non steroidal anti inflammatory drugs like meloxicam- 0.2-0.5mg/kg b.wt- I/M for 3 days.
- A course of broad spectrum antibiotics for 3 to 5 day to prevent secondary bacterial infections.
- Prevention: Calves above 4 months age should be vaccinated. Adult annual vaccination against FMD using oil adjuvant against FMD once in six months can be given subcutaneous or intramuscular.

### 4.3 Rabies

**Definition**

Rabies is an acute, infectious highly fatal disease of mammals characterized by signs of abnormal behaviour, nervous disturbances such as increased excitability and irritability, impairment of consciousness, paralysis and death.

![Fig. 4.3 Rabies](image)
Etiology

Rabies is caused by RNA virus of the family Rhabdoviridae and genus lyssa.

Transmission

The disease is transmitted through the bite of rabid dog or cat or rodents or even if the saliva of the infected dog when deposited on cuts or abrasions. In India, dogs are the main transmitter of the disease (95%). Transmission of rabies requires direct contact with the infected one.

Clinical findings

Rabid cattle appear in coordinated. They show loss of appetite and sudden fall of milk yield. There is trembling of ears. There is excessive salivation and grinding of teeth with paralysis of muscles of deglutition. Such cases are mostly mistaken as choke and veterinarians or paravets or other people may be exposed to rabies virus in attempting to examine such animals for foreign bodies. Continuous bellowing in low pitched voice is noted in cattle. Increased sexual excitement which mimics estrum in cows.

Treatment

No specific treatment is available for rabies and once signs are noticed, the animal dies due to rabies invariably.

Control

Rabies can be controlled by following vaccination schedules in dogs. Both the domestic and stray dog population has to be vaccinated annually against Rabies. If cattle had a dog bite the animal should be given post bite therapy which includes vaccination against Rabies on 0, 3, 7, 14, 28 and 90th day. 90th day dose is optional. The bite has to washed immediately and thoroughly with plenty of normal water and then dressed with and antiseptic. Never attempt to suture the dog bite wound. Tetanus toxoid can be given. Never use corticosteroids along with vaccination.

Suspected animal should be isolated and the attendants exposed should go for post bite therapy.

4.4 Cow Pox/ Buffalo Pox

Cow pox is a contagious eruptive skin disease of cattle. It is mild cutaneous disease where the lesions are mostly confined to udder and teat. The disease is transmitted to human beings.
Buffalo pox is usually benign in nature and both localize and generalized form may occur in buffaloes. This disease has been recorded to be transmitted in human beings as milker’s nodule.

**Etiology**

The diseases are caused by DNA virus of variola vaccinia sub group of pox viruses. Cow pox virus is closely related to small pox virus. Both the viruses are related.

**Transmission**

The disease is transmitted by direct contact with the affected cows, milker’s hands, and mechanical transmission by insects and milking machine may transfer the infection from cow to cow in a herd.

**Clinical signs: In Cow pox**

The affected animals may show mild increase in temperature, suspended rumination, anorexia and depression. Udder is swollen, hot and sensitive typical pock lesions appear on the teat and udder.
Calf gets the infection while suckling its infected dam and pock lesions may be seen on the face of the calf. Lesions heal in two weeks. Mastitis may be noted due to secondary bacterial infection.

**Buffalo pox** in the virulent form of the buffalo pox, there is elevation of temperature (104-106°F), swelling of eyelids, lacrymation, mucopurulent nasal discharge, red spots on udder, teat, all visible mucosa and later pock lesions.

**Treatment**

Symptomatic treatment is undertaken. The affected animals are isolated and treated. Preparations that are anti-inflammatory can be applied to udder. Eg. Mastilep, inflagel or wisprec ointments can be used. A course of antibiotic to prevent secondary bacterial infection and in particular mastitis scabs to be painted with povidine iodine or any antiseptic ointment.

**Control**

To control pox in a herd, strict hygienic measures are to be adopted. Isolation and segregation of the affected cattle to be made and treated accordingly. Hands of the milker should be cleaned and washed with antiseptic and disinfection of milking machine has to be done. Teat dip may be used after milking. Calves should not be allowed to suckle infected mother. All the healthy animals should be milked first and diseased one at the last.

### 4.5 Common Viral Diseases of Sheep and Goat

#### 4.5.1 Peste Des Petits Ruminants (PPR)

**Definition**

PPR is a Subacute or acute highly contagious disease of small ruminants having resemblance to Rinderpest characterized by fever, loss of appetite, stomatitis, enteritis and pneumonia.
Etiology

PPR is caused by moribilli virus of paramyxovirus family.

Transmission

Transmission occurs through direct contact with infected goat or sheep indirect transmission occurs through contaminated food, water and other fomites.

Clinical findings

The disease may occur in acute or subacute manner. Acute form of the disease is characterized by high rise of temperature (104 -106°F), dullness, dry muzzle and congestive mucous membranes. There is profuse serous nasal discharge turns mucopurulent to purulent and signs of foul breath are evident.

The discharge matt the nasal and ocular surroundings and some animals show conjunctivitis and matting of eye lids. Necrotic lesions are seen in buccal mucosa, lips, gums, dental pad and tongue. Diarrhoeic faeces and contain mucus and blood. When signs of pneumonia become prominent, animal may die due to respiratory distress and because of diarrhoea, severe dehydration leads to death.

Subacute form is mostly seen in sheep and signs are observed in lower grade. Most of the animals recover few may die and pregnant animals abort.

Treatment

There is no specific treatment. A broad spectrum antibiotic like Enrofloxacin @ 5mg/kg b.wt or Cephataxime @ 5-10 mg/kg b.wt can be given for 5-7 days. Non steroidal anti inflammatory drugs (NSAID) like meloxicam @ 0.2-0.5mg/kg b.wt or Ketoprofen πmg/kg b.wt can be used.

Fluid therapy with intravenous Ringers lactate is indicated to prevent dehydration but care to be taken if severe respiratory distress is noticed. Mouth wash with potassium permanganate and boro glycerine paste is applied. The affected animals should be fed soft gruel diet.

Control

The disease can be controlled by adopting hygienic measured in a flock. Animals purchased from market should not be directly introduced in to the flock. Sick animals should be segregated and treated. PPR tissue culture vaccine-1ml- S/C every year has to be practiced.
4.5.2 Blue Tongue

It is an infectious, non-contagious arthropod borne viral disease predominantly of sheep and characterized by high fever, stomatitis, rhinitis, gingivitis and inflammation of intestine and sensitive laminae of the foot.

**Etiology**

The disease is caused by a RNA virus belonging to arthropod born Orbivirus of Reoviridae family.

**Transmission**

The disease is non – contagious and natural transmission occurs through biting insects. Blood sucking midges of genus Culicoides, sheep ked Melophagus ovinus, mosquitoes like aedes transmit the disease mechanically.

**Clinical findings**

The disease is characterized by high fever persisting for 5-6 days with progressive reddening of the buccal mucous membrane. The disease can be divided in to three forms.

1. Acute form: This is characterized by high rise in temperature, nasal and lacrimal discharges and swollen gums, tongue and lips which results in drooling saliva, followed by ulceration and necrosis of dental pad and bluish appearance of the tongue. Cracks in the coronary band and separation of hoofs leads to lameness. Diarrhoea and pneumonia may be a feature.

2. Sub acute form: Mostly seen in cattle and generally goes unnoticed.

3. Abortive form: Pregnant ewes when infected with the disease, abortions are common.

**Treatment**

There is no specific treatment to this disease. To check secondary bacterial infections, antibiotics may be given parenterally. NSAIDS may be used to reduce inflammation and lameness. Mouth wash with antiseptic solutions may be undertaken for quick healing of the oral lesions.

**Control**

Recovered sheep are immune for six months. Grazing should be avoided in areas where there are lot of vectors. Reduction of vector population should be done by using insecticides and also good water management. Since the virus is an arthropod borne, eradication of vectors is recommended. Tissue culture vaccine is under trail.
4.5.3 Sheep Pox / Goat Pox

Definition

It is a malignant acute viral disease of sheep and goat characterized fever and generalized development of pock lesions.

Etiology

The disease is caused by DNA virus of the genus Capri pox virus.

Transmission

The disease is highly contagious and transmission takes place due to direct contact of the infected animal with the healthy one. The disease is also transmitted through nasal inhalation, wounds and abrasions. The biting insects may inoculate the virus intradermally or subcutaneous. Food and water act as source and attendants spread the virus through mechanical ways.

Clinical findings

In goats first there is high rise in temperature (104-107°F) Macules followed by papules initially appear on hairless parts of the skin and then whole body, head and udder. Serous nasal and lacrimal discharges are seen. Swollen eye lids and later mucopurulent discharges from nostrils and eyes. Animals that survive develop scab with no vesicular or pustular stage. Pneumonia and enteritis are secondary complications which may result in death of the animals.

In sheep, the disease appears in three forms.

1. Malignant form: This is the most common form and in 50% of lambs die when they are affected. Affected animals are dull, depressed with high fever (106-107°F). Pock lesions appear on eyelids, lips, nostrils, ears, inner side of
thigh, under the tail, chest region and buccal mucosa. The lesions begin as macules then turn to papules which transform into large vesicles. Necrotic changes in vesicles lead to scab formation. Animals die due to respiratory distress.

2. Mild form: Seen in adults where the eruptions are confined around the eyes, lips and nose.

3. Abortive form: Affected ewe may abort and foetus shows pock lesions. Lactating ewe show the signs of mastitis due to the lesions in the udder.

**Treatment**

Antiseptic ointments to be applied on the pock lesions and a course of antibiotics to prevent secondary bacterial infections.

**Control**

Sick animals are to be segregated from healthy ones and strict sanitary measures are to be adopted. Animals from the infected area should not be allowed into healthy stock. Sheep pox freeze dried tissue culture vaccine-0.1 ml intradermal to be repeated every year.

**4.5.4 Contagious ecthyma of sheep and goat (Orf), Contagious pustular dermatitis**

**Definition**

Contagious ecthyma is a highly infectious viral disease of sheep and goats characterized by the development of pustular and scabby lesions on the muzzle, lips and on the teats.

Fig. 4.8
Etiology

The orf virus belongs to the genus para pox virus of the family pox viridae. The orf virus is readily transmitted to humans.

Transmission

The disease is transmitted by contact with affected animals or inanimate objects. Natural infections result due to invasion of the virus after skin damage. Suckling lambs or kids are affected from the udder of affected ewes or does. Scabs from affected animal fall off and act as a source of disease transmission.

Clinical findings

The initial signs of the disease are dullness, depression, anorexia and rise of temperature 106-108°F. Profuse salivation and lesions develop initially as papules and then pustules, then thick scabs covering a raised area of ulceration and granulation. The first lesion develops at the oral commissures and then muzzle, nostrils, the surrounding haired skin and to lesser extent onto the buccal mucosa. Secondary bacterial infections may cause enteritis and bronchopneumonia.

Treatment

Treatment is aimed at prevention of secondary bacterial infection. A course of antibiotics for 5-7 days may be used with povidine Iodine and other fly repellants.

Control

Affected animals should be segregated from rest of the flock. Strict hygiene and sanitary measures to be adopted in the farm. Animal attendants with the presence of wounds and abrasions on the hands are at risk of infection. Hands to be washed thoroughly after attending the affected flock.

4.6 Summary

Under viral diseases Riderpest, Foot and mouth disease, Rabies, cowpox / Buffalo pox diseases of cattle and buffaloes are described. The common viral diseases of sheep and goat like pestedes petits Ruminants (PPR), Blue tongue. Sheep / Goat pox and contagious ecthyma of sheep and goat, contagious pustular dermatitis is described. The details of these diseases i.e. Etiology, Transmission, Clinical findings, Treatment and control is described.

Short Answer Type Questions

1. What are the cardinal symptoms of Rabies?

2. Expand R.P and FMD.
3. What is the prevention method of foot and mouth disease?
4. What are the clinical sings in Cow pox?
5. Mention the common viral diseases of Sheep and Goat.

**Long Answer Type Questions**

1. Briefly write about the Sheep pox.
2. Explain about the PPR viral disease in Goat.
3. Write about the ‘Rabies’ disease in Buffalo.
4. Briefly write about ‘Rinderpest’ disease in cattle.
5.1 Anaplasmosis

**Definition**

Anaplasmosis is an intracellular haemoprotozoan disease also known as gall sickness. It is an infectious transmissible disease of cattle, sheep and goats characterised by progressive anaemia, icterus & debility.

**Etiology**

Caused by Anaplasma marginale, seen in red blood cells.
Transmission

Transmitted by blood sucking insects from infected to healthy animals. Mechanical transmission is by dehorning, vaccination etc; Bovine is the natural host and the organisms are located in R.B.C.

Clinical signs

Affected animals show high temperature 105°F as the disease progresses the temperature become normal or subnormal before dies. Exhaustion, lack of rumination and loss of appetite are general symptoms. Animals walk with stiff unsteady gait. Glands are enlarged and there is rough coat with edema around the eyes. Mucus membrane turns pale to yellow in colour. Constipation with dark blood coloured faeces covered with mucus, anaemia and edematous swelling of the body are noticed. Emaciation and frequent urination but no haematuria or haemoglobinuria. In late pregnancy, animal may abort. Recovered animals remain carriers for life but are resistant to further infection.

Treatment

Treatment is by using oxytetracycline @ 10mg/Kg.b.wt I/V or I/M for 3 to 5 days. Use of B-complex and haematenic drugs are recommended.

Prevention

Isolation and disposal of carrier animals. Insect control in the sheds and on animals by spraying insecticides and use of proper sterilized syringes and instruments.

5.2 Babesiosis

Definition: The disease is also known as Tick, Fever, Red Water disease and Bovine Piroplasmosis. Babesiosis is a tick transmitted intracellular haemoprotozoan infection of cattle, buffalo, sheep, goat, horse, dog, pig, wild animals and characterised by fever, anaemia and haemoglobinuria.
Etiology

The disease is caused by Babesia bigemina, Babesia bovis in cattle.

Transmission

Mostly exotic breeds of cattle are more susceptible. Transmitted from affected to healthy animals through ticks namely Bhoophilus, Rhipicephalus, Ixodes ricinus.

Clinical signs

The affected show high temperature (104-106°F) which lasts for 2-3 days only. Haemoglobinuria may be noted within about 48 hours of the appearance of the high temperature. If the animals survive the initial phase diarrhea precedes constipation. Mucus membranes are pallid and jaundice. Spasms of anal sphincter and ‘Pipe stem’ faeces are observed. In fatal cases, the animals are unable to stand on their feet despite support. Babesia infection may involve central nervous system leading to ataxia, paddling of limbs and coma.

Diagnosis

Diagnosis is made on the presence of parasites in the blood smear. Rod, comma shaped organisms are seen in the RBC.

Treatment

The drug of choice is Dimanazene aceturate 3.5mg/kg.b.wt deep intramuscular. Oxytetracycline @ 10mg/kg.b.wt- I/M or I/V for 5 days can be tried if the drug of choice is not available. Supportive therapy with Dextrose 20%- 1litre- I/V and haematinics should be considered.

Control

Affected animals should be isolated and treated. If animal is tick infested acaricides should be used and the animals should be allowed in the shed only after it is devoid of ticks as the infected tick are capable of transmitting the disease through its progeny.

Control of ticks in the sheds and on animals using cypermethrin, deltamethrin, flumethrin etc in recommended dilutions.

5.3 Theileriasis

The disease is also known as East cost fever, Tropical Theileriasis or Tropical Piroplasmosis.
**Definition**

It is an important, highly fatal intracellular hemoprotozoan disease in exotic and crossbred cattle characterised by high rise of temperature, anemia and swelling of lymph nodes.

![Image of a cattle](image)

**Fig. 5.2**

**Etiology**

The disease is caused by *Theileria annulata* in cattle.

**Transmission**

The disease is transmitted by nymph and adult ticks of *Rhipicephalus appendiculatus*. Once the infected tick feed on susceptible host, it gets rid of infection and can not spread further.

**Clinical signs**

The affected animals show high rise in temperature 104-106°F.

Enlargement of regional superficial lymph nodes, especially prescapular lymph nodes. During the early stages of disease the animals retain condition and continues to feed, pale conjunctival mucous membranes which later turn yellow. Haemorrhagic patches may occur in the mucosa and on serous membranes and there may be a general swelling of the subcutaneous tissues. Mortality may be as high as 80-90%.
Diagnosis

Diagnosis is made by detection of Theilaria annulata in red blood cells and demonstration of Koch’s Blue Bodies in the fluid obtained from a superficial lymph gland with a long needle.

Treatment

Drug of choice is Bupavarquone- 1ml/20kg.b.wt- I/M. Supportive therapy with 20% dextrose @ 0.5g/kg b.wt I/V, B-complex and hematanes should be under taken.

Control

Control is by systematic application of acaricides and rotational grazing.

Immuno prophylaxis by use of schizontal vaccine Raksha Vac-T which is stored in liquid nitrogen.

5.4 Trypanosomiasis

Definition

Commonly called as Surra, trypanosomiasis is an infectious disease which infect cattle, buffalo, goat, sheep, pig, horse, donkey, camel and dog characterized by high rise of temperature, anaemia, wasting and cutaneous eruptions.

Etiology

The disease is caused by Trypanosoma evansi which is an intercellular or extracellular haemoprotezoan.

Transmission

The disease is mechanically transmitted through the bites of flies, tabanus, hyperosia, stomoxys etc.

![Tryps Blood Smear](image)

Fig. 5.3 Tryps Blood Smear
**Clinical signs**

In cattle and buffaloes the disease is mild and may act as carriers. An acute form may occur as an outbreak. The signs shown are dullness, rise in temperature (103-106°F) animal may move in circles aimlessly and falls down, Frequent urination and defecation. Sub acute form is manifested as gradual loss of condition, edema of legs, intermittent fever and progressive anemia.

**Diagnosis**

Diagnosis is made by the detection of parasite in the fresh blood by their motility which can be viewed through 40X objective of the microscope. The organism can be detected in the stained blood smears.

**Treatment**

Treatment is by use of quinapyramine salts @ 3-5 mg/kg b.Wt-Subcutaneous. Supportive therapy is by giving 20% Dextrose @ 0.5g/kg b.wt I/V and B-complex injection.

**Prevention**

Prophylactic injections of quinapyramine salts can protect the animals from surra. Control of flies by maintaining cleanliness in the sheds . clearing bushes and preventing water logging around the cattle sheds to prevent flies. Use of insect repellants and insecticides on the animal and in the shed.

### 5.5 Leishmaniasis

**Definition**

The disease has been recorded in dogs and in a bovine in India. Leishmaniasis is a haemoproteozoan disease and the visceral form in which there is splenomegaly.

**Etiology**

The Visceral form of the disease is caused by Leishmania donovani and cutaneous form seen in adults caused by L.tropicana oriental sore or delhi Boil.

**Transmission**

Transmission of infection is through the saliva of the vector i.e sand fly.(Phlebotomus sps)

**Clinical Signs**

Visceral type,There is rise in temperature, loss of weight, anemia, enlargement of lymph glands, Ascites and paralysis may be seen.
Diagnosis

The only reliable means of diagnosis is by demonstration of parasite in the peripheral blood.

Control

By control of dog population where the incidence of the leishmania is high as the transmission is through the medium of the diseased and neglected dogs. By control to sand flies by using insecticides in the sheds.

5.6: Coccidiosis

Definition

Coccidiosis is a contagious enteritis characterised by diarrhoea, anaemia and emaciation.

Etiology

This is caused by Eimeria bovis, E.zurnii, E.ellipsoidales in all domestic animals.

Transmission

Main source of transmission is feces containing oocyst through ingestion of feed and water.

Clinical signs

The clinical signs are slight rise of temperature. Subsequently there may be normal or subnormal temperature. Sudden onset of bloody offensive diarrhoea with mucus. Animal evince considerable straining. Hindquarter and tail soiled by faeces. Finally dehydration, emaciation and death occur.

Diagnosis

Diagnosis is made by faecal examination for oocyst.

Treatment

The drugs used for treatment are gut acting sulpha drugs like sulphaguanidine or phthalyl sulpathiazola. Furazolidone or Furazolidone with Metranidazole bolus can be given orally.

Control

Control is by keeping adult animals away from calves, segregation according to age.
5.7 Amoebiasis

Amoebae are unicellular organisms, most of which are non-pathogenic. Entamoeba bovis in the intestines of cattle is non-pathogenic.

Transmission of infection is by ingestion of mature cysts.

Diagnosis: The disease is diagnosed by examination of faeces for the presence of trophozoites and cysts.

5.8 Summary

Under protozoan diseases the common diseases observed in cattle, buffalo, sheep, goat are described in detail which are Anaplasmosis, Babesiosis, Theileriaisis, Trypanosomiasis, Coccidiosis and Amoebiasis. The detail about the Leishmaniasis disease has been recorded in dogs are given.

Short Answer Type Questions

1. What is tick fever?
2. Mention the causative organisms of Theileriasis and Surra.
3. What is East cost fever?
4. How do you diagnosis “Babesiosis” disease?
5. What are the clinical signs of “leishmaniosis” disease?

Long Answer Type Questions

1. Write short notes on (a) Amoebiasis (b) Anaplasmosis.
2. Explain in detail about ‘Trypanosomiasis’ disease.
3. Briefly write about the Leishmaniasis disease.
6.1 Round Worms

Definition

Round worms are important with regard to young calves. Ascariasis is a parasitic infestation seen in calves. Especially buffalo calves.

Etiology

The disease Ascariasis is caused by Toxocara vitulorum or Neoascaris vitulorum.
Transmission

Transmitted by ingestion of ova and neonatal transmission through colostrum. So if the dam is not properly dewormed the colostrum may be a potent source of infection to the calf.

Clinical signs

Clinical signs are anorexia, pot belly, anaemia, stunted growth, rough coat, loss of condition, constipation and sometimes intestinal obstruction.

Diagnosis

Diagnosis is made by examination on faeces for the presence of Ascarid eggs.

Treatment

Treatment can be undertaken by Piperazine salts (Piperazine adipate—300 mg/kg b.wt, Piperazine hexahydrate 250mg/kg b.wt) or any broad spectrum anthelminthic. It is better to use Piperazine every 3 weeks or 21 days. Care to be taken to note whether the faeces is passed normally, if not mistura carminative, magsulph has to be given orally. Intravenous fluid therapy is necessary if the calf is off fed and dull.

Control

Application of muzzle to young calves and regular deworming and adoption of better management practices. Avoid overcrowding. Dam need to be dewormed so that worms are not voided through milk as colustrum is a potent source of infection.

6.2 Tape Worms

The common tape worm is Moneizia expansa.

Transmission

It is transmitted by ingestion of infective stage from the intermediate host i.e. oribatid mite. Calves below 6 months are mostly susceptible.

Clinical signs

Calf exhibits dullness, rough body coat, pot bellied, stunted growth, excretion of tape worm segment in the faeces, constipation and sometimes diarrhoea.
Diagnosis

Diagnosis is made by examination of faecal sample for detection of tape worm segments

Treatment

Treatment is with Niclosamide@ 50mg/kg b.wt or Praziquantal @ 5mg / kg b wt. Orally to be repeated every 3 months. Supportive treatment with B-Complex and iron preparations can be taken up.

Control

Control is by periodic deworming and by following good management practices. Number of oribatid mites can be reduced by thorough ploughing of permanent pastures.

6.3 Liver Flukes

Liver flukes Fasciola gigantica, Fasciola hepatica and Faasciola indica cause fascioliasis in cattle, sheep and goat.

Transmission

Mode transmission is by ingestion of metacercaria. Snails are intermediate hosts. (Lymnaea sps).

Clinical signs

The disease can be manifested in two different forms.

Acute Form

In acute form of disease, the affected animal exhibits anorexia, depression, anaemia and death.

Chronic Form

In chronic form of disease animal shows loss of appetite, constipation followed by diarrhoea, edema of dependant parts, edema below the mandible is known as bottle Jaw, purulent discharge from eyes, emaciation and death.

Diagnosis

Diagnosis is made by examination of faeces for fasciola ova, history of grazing near ponds and tank beds and clinical signs especially bottle jaw.
Treatment

Treatment is with Oxyclozanide- 10-15mg/kg b.wt or Triclabendazole 12mg/kg b.wt or closantel-10mg/kg b.wt orally.

Control

The disease can be controlled by periodical deworming with flukicides. Do not allow grazing on flood inundated pasture and snail population has to be controlled.

6.4 Stomach Flukes

Paramphistomiasis cause chronic disease of cattle, characterized by severe enteritis and edema of brisket region. (Cotylophoron cotylophorum, paramphistomum cervi and Gastrothylax cruminifer)

Transmission

Transmission is through ingestion of metacercaria.

Clinical signs

Clinical signs are due to immature flukes which cause severe enteritis accompanied by weakness, emaciation, depression, loss of appetite, edema of brisket region. Animal become very thirsty and drink frequently. There may be sub maxillary edema and pale mucus membrane. Death is due to severe dehydration.

Diagnosis

Diagnosis is made by presence of immature flukes in the faeces and also presence of amphistome eggs in the faeces.

Treatment

Treatment should be undertaken to replace the fluid and electrolytes lost by using Ringers lactate-I/V

Flukicides like Rafoxnide at 7.5mg/kg b.wt orally or closantel 5mg/kg b.wt orally.

Snail control

Snail control can be done by any one of the following methods.

1. Chemical: use of copper sulphate to control the snails.
2. Mechanical: removal of vegetation, drainage of swamp to reduce snails.

3. biological- propagation of plants like soapberry, shikakai which inhibit growth and reproduction of snails.

### 6.5 Flies

Flies cause annoyance to the livestock and results in reduced productivity. They have capacity for transmitting infectious disease. Common flies are housefly, buffalo gnats, buffalo flies, stable fly, iestrus ovis fly etc.

Unaattended wounds attract flies and results in maggoted wounds.

Control is by keeping the surroundings clean and dry. Quick and proper disposal of waste and dung. Use of fly repellants and neemoil is used as fly repellants. Valuable animals should be protected by mosquito nets.

Smoking the shed with dried neem leaves is effective against flies and mosquitoes.

### 6.6 Ticks and Mites

**Ticks**

Number of species affects cattle. Attack any part of the body but in cattle often found on ear, armpit, groin, ventral aspect of tail and other regions from where cattle cannot get rid off by licking and rubbing.

![Fig. 6.1 Soft tick](image)

Ticks are classified in to soft ticks (Eg: Boophilus annulata) and hard ticks (Eg: Ripicephalus appendiculatus). Infestation cause local irritation, resulting in wounds, causes loss of production of meat, and decrease value of hides. Ticks consume considerable amount of blood and cause anaemia and death. Ticks act...
not only as vectors but also reservoir for number of diseases like anaplasmosis, babesiosis and thileriosis.

Control is by spraying acaricides on the animals and also in the sheds. Injecting the animal with ectoparasiticides.

Mites

Mites are microscopic and cause mange in animals. Characterised by scratching, thickening of skin and wrinkled condition of skin.

![Mite-sarcoptes](image)

Transmission is by direct contact from infected to other animal. Indirect through inanimate objects like beddings etc.

Treatment is by clipping the affected area and applying benzylbenzoate as external application. Control is by immediate segregation and through cleaning of all parts of skin with acaricides and a course of antibiotics to prevent secondary bacterial infection.

6.7 Common Helminthic and External Parasitic of Sheep and Goat

6.7.1 Round Worm

The common round worm in sheep and goat is Haemonchus contortus, popularly known as stomach worm or wire worm. Haemonchosis is one of the most pathogenic blood sucker nematodal infestation of sheep and goat and occurs in the abomasum caused by various species.
Transmission

Transmission is by accidental ingestion of 3rd stage (infective) larva by the animals while grazing.

Clinical signs

Young animals suffer acute form of the disease. Clinical signs like dung like faeces or bloody diarrhoea, not putting on weight, dull, anaemia and going down in condition.

Diagnosis

Diagnosis of the disease is made by the faecal examination for detection of eggs.

Treatment

Treatment is undertaken by the use of anthelminthic drug like albendazole or fenbendazole @ 5-10 mg/kg b.wt orally. Albendazole should not be used in first trimester of pregnancy. Deworming should be done once in 3-4 months. Different groups of drugs have to be used as rotational deworming to prevent anthelminthic resistance.

6.7.2 Tape Worms

The common tapeworm found in sheep and goat is moneizia expansa, m.benedini.

Transmission is by ingestion of oribatid mites containing infective eggs by the animals while grazing.

Signs like stunted growth, not putting on weight, rough coat, digestive disturbances and passing of tape worm segments along with faeces.

Diagnosis

Diagnosis is made by the examination of faecal sample for tape worm segments and eggs.

Treatment

Treatment is by the use of anticestodal drugs like Niclosamide @ 150 mg/kg b.wt or Praziquantel 5mg/kg b.wt once in 3 months.

Control

Reducing number of mites by thorough ploughing of the permanent pasture and Periodical deworming.
6.7.3 Liver Flukes and Stomach Flukes

Sheep and goats reared near water reservours suffer from this disease.

Liver fluke inhabit liver of the animal and cause acute or chronic disease.

Acute fasciolasis in sheep causes sudden death with discharge of frothy blood through nostrils and anus confusing with anthrax. Other signs like dullness, pallor and lack of appetite. Chronic cases exhibit dullness, pale mucus membrane and bottle jaw condition.

Stomach flukes, mostly immature flukes cause severe enteritis, dehydration and death.

**Diagnosis**

Diagnosis of the disease is based on history of grazing animals near ponds and tanks and signs like edema of dependant parts especially bottle jaw and faecal examination for the presence of immature flukes and ova.

**Treatment**

Treatment is by using flukicides like oxyclozanide 10 mg/kg b.wt or Triclabendazole 12mg/kg b.wt or for immature flukes Niclosamide 150mg/kg b.wt or Rafoxanide 7.5 mg/kg b.wt orally.

**Control**

Control is by combating the snail population. Prevent animals to graze in flooded pastures or near water reservoirs.

6.7.4 Nasal Bots

Mostly in sheep caused by oestrus ovis fly. The fly lays eggs in the nasal cavity of sheep and goat and the larvae are present in the nasal cavity causing irritation which results in sneezing, unilateral nasal discharge and sometimes larvae expelled out while sneezing. Animal is dull, loss of appetite and trying to rub the nose bridge and face against hard objects.

Treatment is by injection of ivermectin 1ml/50 kg b.wt or 0.2 mg/kg b.wt subcutaneously.

6.7.5 Ticks and Mites

Various apecies of ticks are found on the face, groin, ear etc and cause irritation resulting in scratching, anaemia, decreased body weights and decreased value of hide.
6.7.5.1 Ticks

Ticks can be controlled in flock by application of acaricides to the animals and also in the sheds. Dipping tanks can also be used if the flock size is large. Tick control should be aimed both on the animal and in the sheds.

6.7.5.2 Mites

These are microscopic and cause mange. Several species affect sheep and goat. It is an infectious skin disease which spreads in the flock from one animal to the other. Sarcoptic mange is of zoonotic importance. Psoroptic mange is common among the sheep and goat.

Clinical signs like itching, rubbing against hard objects, loss of hair and white crusts all over the body and spreads rapidly.

The affected animals are to be segregated and topical application of Benzyl benzoate, Amitraz, flumethrine etc in recommended dilutions. Use of vitamin A injections and a course of antibiotics to prevent secondary bacterial infection.

6.8 Summary

Under helminthic and external parasitic diseases observed in cattle, young calves, sheep and goat (animals) are described in detailed which are Round worms, Tapeworms, Liver flukes, Stomach flukes, Flies, Ticks and Mites are described. The common helmenthic and external parasites of sheep and goat are also described.

Short Answer Type Questions

1. What are the symptoms of ‘Round Worm’ disease in young calves?
2. Mention the causative organisms of Liver flukes.
3. What are the methods to control snails?
4. Name the common tape worm found in sheep and goat.

Long Answer Type Questions

1. Explain about Liver flukes and stomach flukes of sheep and goats.
2. Briefly describe about ‘Round worms’ in Calves.
3. Describe in detail about ‘Tape worms’ in animals.
4. Write short notes on (a) Ticks (b) Mites.
UNIT 7
Mycotic Diseases

Structure

7.1 Ring Worm
7.2 Aspergillosis
7.3 Summary

7.1 Ring Worm

Definition

Ringworm is a fungal disease caused by various fungi of Trichophyton and Microsporum species and is characterised by round, sharply circumscribed scaly lesion on the surface of skin.

Etiology

In cattle the disease is caused by Trichophyton verrucosum, T. mentagrophytes and T. Megnini

Transmission

Transmission of the disease is by contact with infected animals and indirectly through inanimate objects like utensils, blankets etc.
Signs

Clinical signs include, loss of hair, itching and circumscribed lesions of 0.5-2” in diameter. Lesions are commonly seen around eyes, ears and extend up to the neck region.

![Fig. 7.1 Ring worm](image)

Diagnosis

Microscopic examination of skin scrapings reveal mycelia and rounded spores.

Treatment

Treatment is by clipping the hair and applying antifungal ointments like salicylic and benzoic acid preparations. Topical fungal lotions containing ketaconazole and miconazole can be applied for a week even after regression of lesions. Supportive therapy with antihistamines, vitamin A, B-complex and antibiotics can be undertaken.

Control

Control of Ring worm is by segregation of affected animals and treating them with oral and topical antifungal preparations. Maintaining hygiene and regular grooming of the animals.

7.2 Aspergillosis

Definition

Aspergillosis is a primary disease of the respiratory system characterized by granulomatous lesion in the lungs.

Etiology

Aspergillosis is caused by Aspergillus fumigatus.
Transmission

Transmission is through inhalation of dust containing fungal spores is the portal of entry for the fungi with primary focus on lungs.

Signs

In adults abortions occur during 6th -8th month of pregnancy. Calves in intense rearing units of 4-6 weeks old, subjected to the stress of diarrhea, poor ventilation and temperature control are predisposed to disease.

The pulmonary form of the disease appears as chronic, subacute or acute pneumonia. All the forms are fatal and characterised by open mouth breathing, profuse salivation and mucopurelent nasal discharge.

Diagnosis

Basing on the clinical signs wherein, respiratory complications without response to therapy should be suspected for Aspergillosis. Microscopic and examination of the nasal secretions will reveal the presence of mycelia.

Treatment

No effective treatment is available. Hamycin and flourquinolones can be used.

Control

Control is by avoiding overcrowding, proper ventilation and maintaining hygiene in the sheds.

7.3 Summary

Under the Mycotic diseases Ringworm and Aspergillosis i described in detail with their definition, Etiology, Transmission, signs, Diagnosis, treatment and control.

Short Answer Type Questions

1. What is the Etiology of ‘Ring worm’?
2. What is ‘Aspergillosis’?
3. Mention any two mycotic diseases.

Long Answer Type Questions

1. Describe in detail about the Ring worm.
2. Explain about the ‘Aspergillosis’.
UNIT 8
Production and Systemic Diseases

Structure

8.1 Bloat or Tympany
8.2 Ketosis
8.3 Milk Fever or Hypocalcaemia
8.4 Downer Cow Syndrome
8.5 Enteritis
8.6 Summary

8.1 Bloat or Tympany

It is an abnormal distension of the rumen and reticulum caused by excessive retention of the gases of fermentation. It can be broadly classified into:

a. Primary tympany or leguminous bloat or frothy bloat, which is dietary in origin and occurs in cattle on legume pasture and on high level grain diets. Gas is in the form of a persistent foam mixed with the rumen contents.

b. Secondary ruminal tympany or free gas bloat, which is due to failure of eructation of free gas because of a physical interference with eructation. Spasms of oesophagus and inability to eructate are seen in tetanus affected animal.

Signs

- Bloat is one of the common cause of sudden death in cattle. Sudden distension of upper left flank and sometimes whole of the abdomen is enlarged.
· The animal may get up and lie down frequently, kick at the belly and even roll.
· On striking the left flank (percussion) with fingers, drum like sounds are heard.
· Animal exhibits increased respiration, difficulty in breathing and protrusion of tongue.

First Aid
· Animal has to be made to stand with anterior elevation.
· Tying of neem stick in the mouth.
· Smearing of salt on the tongue to increase salivation.
· Drenching of sweet oil (cooking oil) 100 to 200 ml or antibloat preparations.

Control
· Roughage to the extent of 10-15% to be added to complete feed.
· Leguminous fodder to be restricted and not more than 1/3 of the total green fodder.

8.2 Ketosis

Ketosis in ruminants is a disorder of energy metabolism characterized by ketonemia, ketonuria, hypoglycemia and low levels of hepatic glycogen.

The disease is manifested in two forms:

1. Wasting type

Wasting type of ketosis is more common in buffaloes. Animal exhibits gradual and moderate decrease in appetite, refusal of concentrate and decrease in milk yield. Woody appearance of the skin is seen buffaloes. A characteristic odour of ketones is detectable on breath and often in milk.

2. Nervous Type

Sudden onset and common in cows. Nervous signs like walking in circles, aimless movements, this type is vigourous licking of the skin and inanimate objects. Moderate tremors and staggering gait.
Diagnosis

Presence of any other disease during or after parturition leading to decreased feed intake will result in negative energy balance. High yielders, good in body condition can also suffer with ketosis because of their increased production. Estimation of ketones in urine and milk by employing Ross Modified Rothra’s test will help in detecting subclinical ketosis.

Treatment

Treatment is by glucose replacement using Glycerine or Propylene glycol 225g twice daily for 2 days orally. Injection of 20% Dextrose @ 0.5 g/kg b. wt – I/V. Injection of catosal – 5 ml/100 kg b. wt – I/M or I/V. proper feeding of the animals during pregnancy. Prophylactic feeding of glucose precursors after calving.

8.3 Milk Fever or Hypocalcaemia

It is a production disease occurring most commonly in adult cows and buffaloes within 48-72 hours after calving. It may occur several weeks before or after calving.

Depression of the levels of ionized calcium in the tissue fluid is the basic biochemical defect. High milk yielders and especially Jersey breed of cattle is more prone to this disease.

The clinical signs are exhibited in three stages.

1. Stage of Excitement and Tetany

Animal is excited and hypersensitive, grinding of teeth muscular tremors, more in hind legs, stiffness, protrusion of tongue. Temperature is normal or increased by 1°F.
2. Stage of Sternal Recumbency

Animal sits down on sternum. Head and neck deviated towards the flank. ‘S’ shaped posture of the animal. Temperature is sub normal. Animal responds to treatment only till this stage. If untreated the animal goes to next stage.

![Fig. 8.2 Milk Fever](image)

3. Stage of Lateral Recumbency

Animal lies on lateral recumbency leads to Coma and death.

**Diagnosis**

By the history of recent parturition that is 48-72 hrs or high milk yielders and also animal exhibiting any one of the above signs. Estimation of calcium in the urine by suckowitch test will help in detection of subclinical hypocalcemia.

**Treatment**

Treatment is by giving Calciumborogluconate 25% 450 ml slow intravenous morning and evening or intravenous followed by subcutaneous injections or gel calcium orally.

**Prevention**

Prevention is by limiting calcium feeding during pregnancy and feeding of gel calcium before and after calving.
8.4 Downer Cow Syndrome

Definition

The Downer Cow Syndrome is a condition which occurs in cattle usually following milk fever. It is characterized clinically by prolonged recumbency even after two successive treatments with calcium.

Etiology

The Downer Cow Syndrome may be due to the following

Traumatic injuries of the medial thighs muscles and of the tissues around the hip joint and of the obturator muscles. This may be a result of oversized calf in the womb or when cow is forced to get up or walk on a slippery floor immediately before or following parturition.

Traumatic injuries to the nerves of the limbs. The sciatic and obturator nerves are vulnerable to injury by pressure from calf during parturition. Pressure injuries on the superficial nerves of the extremities readily occur in recumbent cows.

Clinical Findings

The disease can be manifested as two types.


Creeper cow: The animal is bright and alert. Moderate intake of feed and water. Temperature and respiration is normal. Daefecation and urination normal.

Proteinuria may be present which indicates muscle damage. 50% of cows will get up within 4 days or less if cured properly. Prognosis is poor if they are recumbent even after 7 days.

Non-Alert downer cow: Animal in lateral recumbency with the head drawn back and don’t eat or drink. Death may occur in 48-72 hours, following the onset and is usually associated with myocarditis.

Treatment

1. Provide comfortable bedding and turn the cow from side to side several times daily to minimize the degree of ischemic necrosis.

2. Attempts at slinging are usually unsuccessful unless the cow is partially able to get up on her own.

3. Corticosteroids, Nonsteroided Antiinflammatory Drugs, Nervine tonics and vitamin E selenium preparations can be tried.
4. Sand is an ideal form of bedding.

5. Physiotherapy to avoid muscle damage.

**Control**

Early detection and treatment of hypocalcemic/parturient paresis recumbent cows to be coaxed and assisted to stand if possible. If unable to stand, should be rolled from one side to another side. Dairy cows should be placed in a box for calving and left in that box until at least 48 hours after parturition in the event that milk fever develops.

### 8.5 Enteritis

**Definition:** An acute or chronic inflammation of the intestinal mucous membrane is known as enteritis and characterized by frequent passing of loose faeces with or without blood.

**Etiology**

Many causative agents may be encountered in development of enteritis. They are

1. Physical agents: Over feeding, mouldy food, decomposed food, excess colustrum feeding in calf, feeding of poisonous plants etc.

2. Chemical agents: Accidental feeding of corrosive chemicals, fertilizers, excess use of antibiotics etc.

3. Bacterial agents: Escherichia coli, Mycobacterium paratuberculosis, Clostridium perfringens type A, B, and C etc.

4. Viral agents: Rinder pest virus

5. Protozoal agents: Eg. Balantidium coli, coccidiosis

6. Helminths: Eg. Immune amphistomiasis, Monieziatis

**Clinical Findings**

Major clinical finding in enteritis is diarrhoea i.e. passing of loose watery faeces, if with blood called dysentery, abdominal pain, dehydration in few cases if systemic involvement is noticed. High rise in body temperature, congested conjunctival mucous membrane, sunken eyes & as the condition deteriorates, the animal is severely dehydrated and increased skin tenting time. Muscular weakness due to loss of electrolytes and dehydration leads to death. In chronic cases, the faecal consistency may be semisolid, animal is hidebound, rough hair coat, pale conjunctival mucous membrane.
Treatment

Treatment to be undertaken basing on the etiology. If due to helminths, Anthelminthic drugs to be used. If due to viral and bacterial agents only gut acting antibiotics to be used. Eg: Sulphadimidine, Gentamicin etc. To counteract dehydration, Ringers lactate should be given intravenous and the best way to asses rehydration is urine output. If the animal urinates, it is rehydrated.

Fig. 8.3 Diarhoea

Supportive therapy includes B-complex injections and if hypothermia prevails, calcium preparations may be used. Oral astringent powder can be given or Polus Becknor or Neblon power, Diaroak powder can be used. For dysentery combination of furazolidone and metronidazole can be used.

Control

Segregation and treatment of affected animals following routine deworming schedule basing on the result of random faecal examination.

8.6 Summary

Under the production diseases and systemic diseases Bloat or Tympany, Ketosis, Milk fever, Downer cow Syndrome and Enteritis described in detail with their symptoms, diagnosis, treatment and prevention methods.
**Short Answer Type Questions**

1. What is ‘Bloat’?
2. What is ‘Ketosis’?
3. What is the cause for milk fever?
4. What is Downer Cow syndrome?

**Long Answer Type Questions**

1. What is ‘Enteritis’? Explain in detail about Enteritis.
2. Write short notes on ‘Downer cow Syndrome’.
3. Describe about ‘Hypocalcaemia’.
4. Write about the ‘Ketosis’.
Reproductive Disorders

Structure

9.1 Anoestrus
9.2 Dystocia
9.3 Retained Placenta
9.4 Endometritis
9.5 Pyometra
9.6 Infertility - Causes and Prevention
9.7 Other Diseases Associated with reproduction
9.8 Summary

9.1 Anoestrum

It is a period of sexual rest in which there is absence of sexual cycle and no manifestation of heat symptoms depending on etiology we can divide anoestrus cows into 2 classes.

1. Anoestrum having functional CL (Corpus luteum).
2. Anoestrum without functional CL

1. Anoestrum having Functional CL

1. Pregnancy animals will have CL. So no estrus. It is a physiological anoestrus but not a problem.
2. Anoestrum due to retained or persistent CL
   • Persistent CL due to gross uterine pathology.
   • Retained CL due to early embryonic death/foetal death.
3. Anoestrus due to sub estrus/ weak estrus/ silent estrus.

4. Anestrous due to unobserved estrus/missed heats.

**Treatment**

- Improved managemental conditions
  
  (a) daily observation of each and every animal both morning and evening.
  
  (b) Educating the owners about identification of estrus symptoms in animals.
  
  (c) Maintenance of heat expectancy charts.
  
  (d) Daily examination of external genital for the presence of discharges, blood etc.

- Frequent rectal examination of genital tract by the veterinarians to decide the time of A.I in silent estrus cycles.

- Enucleation of CL by applying digital pressure per rectally, so that animal comes to heat with in 2-7 days. But the problem is development of adhesions and subsequent development of sterility.

- Administration of estrogens: estrogens cause regression of CL.
  
  (a) Estradiol valerate- 5mg single I/M on day 4 or day 8 will cause luteal regression.
  
  (b) Diethyl stilbesterol- 10- 100mg, 2-3 inj at 48 hrs intervals will cause luteal regression.

- Combination of estrogens and glucocorticoid will cause luteal regression in mucometra and mummified faetus.

- Estrus synchronization by using PG F2 alpha in silent estrus, sub estrus either single or double injections at 11 days interval.

- Estrus synchronization using progesterone preparations.

**2. Anoetrum due to absence of functional CL**

The animals are true anestrus cows and are non-cyclic, ovaries are small, inactive or quiescent with no functional CL.

- Apparent anestrus

- Anaestum due to debility or marked loss of weight i.e. low plane of nutrition
• Senility or old age with loss of teeth leads to cessation of estrus

• Season:
  
  (a) Winter sterility in temperate climate
  
  (b) Summer sterility in tropical climate

• Anestrus due to cystic ovaries.

**Treatment**

• Anestrus due to cystic ovaries - LH or HCG should be given.

• Freemartin, bilateral ovarian hypoplasia, ovarian tumours, tumours of pituitary gland - cull the animal by slaughter.

• Emaciated chronic debilitating conditions like Tuberculosis, Johnes disease - cull the animals.

• Correcting the nutritional deficiencies.

### 9.2 Dystocia

Difficult in parturition is known as dystocia

**Incidence**

• Maternal dystocia more common than foetal dystocia.

• Common in primipara than plueipara

• Male calves and in twinning condition dystocia is common.

• Abnormally low litter size in multipara due to fetal over size.

• In pregnancies that terminate early, dystocia is common due to uterine inertia and fetal malposture.

• Prolonged gestation, leads to fetal oversize that will cause dystocia.

• Close confinement and overfeeding of mother will lead to dystocia.

**Causes**

**I. Basic causes**

• Hereditary

• Nutritional and management

• Infections
• Traumatic
• Miscellaneous

II. Immediate causes

1. Maternal causes

2. Foetal causes

Fig. 9.1 Dystocia

1. Maternal causes

The maternal causes of dystocia include those factors that either cause narrowing of birth canal or that prevents normal entrance of foetus into birth canal. These include

• Fracture of pelvis
• Small size of pelvis due to breeding at very young age or stunted body growth
• Congenital hypoplasia of birth canal
• Compression of birth canal due to trauma
• Perivaginal fat
• Uterine torsion
• Persistant median wall of mullerian duct
• Failure of cervix to dilate/ ring worm in ewes
• Uterine inertia
• Hydropsy of faetal membranes
• Inguinal/ ventral hernia
• Rupture of prepubic tendon
• Uterine infections- abortions, fetal emphysema and dystocia
• Transverse presentations
• Twinning due to double ovulation.

2. Foetal Causes

• Postural abnormalities
• Excessive size of foetus.

The incidence of dystocia is high in posterior presentation in unipara. Postural abnormalities include presentation, position and posture of the foetus.

**Presentation:** The relation of the spinal axis of the foetus to that of dam. Presentation is either longitudinal or transverse.

The portion of foetus that is entering pelvic cavity/ birth canal. It is anterior or posterior in longitudinal presentation dorsal or ventral in transverse presentation

**Position:** The relation of dorsum (in longitudinal presentation) of foetus to the quadrants of maternal pelvis. These are sacrum, right illium, left illium and pubis.

**Posture:** The relation of extremities (Head, neck, limbs) to the body of fetus. The extremities may be flexed, extended or retained beneath or above the fetus.

The normal presentation-anterior longitudinal

**Position**- dorso-sacral

**Posture**- Head resting on pelvic cavity and extended forelegs.

Types of dystocia

1. Dystocia due to pathological presentation, position and posture of foetus
2. Abnormal size of fetus
3. P.M changes in the fetus
4. Uterine displacements
5. Uterine inertia
Fig. 9.2 Normal Anterior Presentation  
Fig. 9.3 Posterior Presentation  

Fig. 9.4 Anterior presentation with dog sitting posture  
Fig. 9.5 Breech Presentation  

Fig. 9.6 Transverse Ventral Presentation
Treatment: Using one of the following methods we can relieve dystocia

- Rotation
- Torsion
- Repulsion
- Faetotomy.

9.3 Retained Placenta

Retention of placenta is the most common condition subsequent to parturition observed mostly in buffaloes and cows, rarely in other species. Normally the foetal membranes are expelled within 3 to 8 hrs after parturition owing to hormonal and mechanical factors during the third stage of labour. However, if they are not expelled within 8 to 12 hrs they are considered as retained.

Retention of placenta denotes the failure of faetal villi to separate from the maternal crypts due to the placental dehiscence, and the aetiological factors include parturitions occurring much earlier or later than the expected days or due to seasonal factors, abortions, dystocia, stillbirths and other abnormal parturitions (low levels of progesterone or imbalance of estrogen and progesterone levels leading to weak contractions of uterus and placental retentions) deficiencies of Vitamin A and D or oxytocin or serum calcium and phosphorus, uterine inertia, etc.
Symptoms

The symptoms of retention of placenta are characteristic with the hanging placenta but in some cases the entire placenta may be retained inside the genital tract.

The pulse, temperature, appetite and milk yield may be normal if there is a low grade infection. In severe cases of longer duration, straining, high fever, accelerated pulse, reduced pulse and low milk yield may be seen. The placenta is discoulered, dry and the animal voids foul smelling discharge which may be blood stained.

Treatment

Most cases recover with prompt treatment. However, prognosis is guarded in severe cases which may lead to delayed involution, infertility and sterility due to pyometra, chronic endometritis, perimetritis, salpingitis, ovaritis etc.

Retention of placenta has been treated by a variety of techniques, drugs and hormones. The usual practice is manual removal of placenta and the best time for this is 24 to 48 hours after parturition. This should be done very gently by grasping each placentome between thumb and fingers and the two structures may be gently separated by rolling, pushing and screwing action and this can be coupled with traction by the other hand those in the cervical area of the uterus and vagina, should be removed first. The non-gravid horn should be cleared first and later on the gravid horn should be examined. After the manual removal of the placenta, sulpha and antibiotic pessaries may be introduced into the uterus. In severe cases parenteral administration of antibiotics can combat infection. However manual removal may be injurious to the endometrium. To avoid this, antibiotic preparations along with proteolytic enzymes were tried without placental removal and it yielded good results.

9.4 Endometritis

Endometritis is the most frequent cause of infertility commonly encountered in the field. It is caused by sporadic uterine infections by cornyebacterium pyogenes, coli forms, pseudomonas auroginosa, streptococci, Bacillus species, Proteus or combination thereof. A variety of factors may predispose the uterus to infection. It follows mainly parturitions, especially abnormal ones, abortion, dystocia, retained placenta, genital prolapse, uterine inertia and traumatic lesions in the uterus, cervix and vagina. Endometritis may also occur in cows and heifers after coitus or after artificial insemination under unhygienic conditions.
Endometritis is more prevalent in cows under village management as compared to farm cows more prevalent in buffaloes and poses a very serious problem of reproductive failure.

**Symptoms**

- Mucopurulent discharges from uterus may be seen in vagina.
- Presence of plaques of pus in estrus discharge.
- Mucus of estrus is cloudy or milky in appearance due to WBC or leukocyte infiltration.
- Per rectal examination reveals thick walled uterus.
- Length of the cycle is reduced to 18-12 days because of prevention of development of carpus luteum.
- Repeated services and failure of conception by a fertile bull.

**Treatment**

- The etiology of uterine infection is complex, so appropriate antibiotic treatment should be given only after the antibiotic sensitivity test.
- Lugols solution (2%) 20-30ml given through intra uterine route is the first choice where a clear cut diagnosis of the uterine infection is not known.
• Solutions of antibiotics as intrauterine infusions for 3 to 5 days will give satisfactory results.

• Combination therapy using antibiotics estrogens, corticosteroids and antihistamines are recommended in obstinate cases.

9.5 Pyometra

Definition

Pyometra is characterized by the failure of estrum and the retention of pus or mucopurulent material in the uterus. Pyometra can be seen as a specific form of chronic endometritis i.e. one with a Persistent CL. During the progesterone dominated phase the uterus has a reduced resistance to infection because,

• The pH is lower, which creates better conditions for the common uterine pathogens.

• The leukocyte activity is delayed and reduced.

• The uterine secretions has no detoxicating effect.

Symptoms

• Pus is observed when the cow lies down, urinates or defecates.

• The pus is usually thick mucoid and creamy and yellow, white or greenish-gray in color.

• On per rectal examination, usually in pyometra uterus will not be tonic, the feeling is doughy. The uterine horn enlargement is felt fully when the uterus is full but the swelling is seen at the dependent part and no bulging is seen at the base of the uterine horn immediately after cervix.

• The enlargement of pyometra may be unilateral or bilateral. No foetal bump is felt. When fingers are moved from one end of the uterine horn to the other end the slopping of foetus can not be appreciated.

Treatment

Prostaglandins are preferred to knock down CL activity. Once the uterus has opened intrauterine urea or furea solution is advocated with next prostaglandin injection 15 days after the first prostaglandin injection at 15 days after the first prostaglandin (PG) injection, followed by 2 more PG injections at every 12 days interval. Vit E and selenium injections are advised . Germinated horse gram has to be fed.
9.6 Infertility - Causes and Prevention

Infertility also known as temporary sterility.

Infertility is the inability to produce viable young ones within a stipulated period of time characteristic for each species.

Causes of infertility

I. Infectious causes: Trichomoniasis, Vibriosis, Brucellosis, Granular venereal disease, Infectious Pustular Vulvovaginitis due to IBR- IPV, Tuberculosis, Mycoplasma etc.

II. Hormonal causes: Cystic ovary, anaestus, Repeat breeding.

III. Nutritional causes: Under feeding or starvation, obesity due to overfeeding, vitamin and mineral deficiency.

IV. Hereditary and congenital: Anatomical defects of reproductive tract.
   (1) Ovarian hypoplasia
   (2) Agonadal condition
   (3) Developmental defects of tubular genitalia
      • White heifers disease
      • Congenital lack of endometrial glands
      • Congenital anomalies of cervix, vagina etc.

V. Pathological causes.
   • Ovary: ovarian tumours, oварitis, ovarian cyst
   • Oviduct: salphingitis, hydrosalphinx, pyosalphinx
   • Uterus: endometritis, pyometra, peri and para metritis, sclerotic metritis etc.
   • Cervix: cervicitis, cysts of cervix, complete stenosis of cervix, muco cervix, tumours of cervix
   • Vagina: vaginitis, cysts and tumours
   • Vestibule and vulva- vestibulitis, vulvulitis, cysts and tumours.
Hormonal causes of infertility

1. Cystic ovaries: The ovaries are said to be cystic when they contain one or more persistent fluid-filled structures larger than a mature follicle (>2.5 cms in diameter) on one or both the ovaries.

   There are three types of cystic ovaries.

   1. Follicular cyst / cystic degeneration of graffian follicle
   2. Luteal cyst / luteinized cyst
   3. Cystic corpora lutea

   Both follicular and luteal cysts are anovulatory cysts, whereas cystic corpora lutea is an ovulatory cyst.

   **Follicular cyst:** It is an anovulatory cyst that persists on ovary for about 10 days and is characterized by nymphomaniac or continuous irregular estrus and finally anestrus.

   **Luteal cyst:** It is also anovulatory follicle which is prolonged period and is characterized by anoestrus.

   **Cystic Corpora lutea:** This is an ovulatory cyst and following ovulation, a central fluid filled cavity is formed. This is most common of all the cystic conditions. In this condition, animal comes to cycle normally, ovulate normally and pregnancy is carried without any problem. So this condition is not pathological.

Causes of Cystic Ovaries

- Hereditary causes
- Incidence is more in high yielding dairy cattle at their peak level lactation
- High protein diets predisposes to cystic ovaries
- Incidence is more in summer than winter
- Stress of production and Husbandry: This leads to elevated ACTH from anterior pituitary which interferes with LH release.
- Continuous administration of steroids will interfere with ovulation.
- Fatty liver syndrome predisposes to cystic ovaries.
- Incidence is more between 2nd and 5th lactation.
- High protein levels leads to ovulatory failure and development of cysts.
• Deficiency of beta-carotene leads to reduced secretion of estradiol from the ovary and this may predispose to failure of LH surge.

**Symptoms of Cystic Ovaries**

Cystic ovaries are more common in non-pregnant dairy cattle between 15-45 days post-partum. Cows with cystic ovaries can be divided into two groups:

- Nymphomaniac group
- Anestrus group

**Symptoms**

**Nymphomaniac Group**

The animal exhibits frequent, irregular and prolonged signs of estrus. The animals are nervous, restless, vicious and bellowing frequently. Animals keep mounting on other animals and refuse mounting by other. Homosexual characters are highly aggrevated and the affected cows are called bullers. The animal loses weight and elevated estrogen levels causes relaxation of sacro-sciatic ligaments and elevation of tail head which is called Sterility hump.

**Anestrus Group**

The animals do not show signs of estrus of long periods of time, several months are more. In some animals the signs are mild and infrequent and few refuse to stand for bull or other cows to mount them.

**Treatment**

- LH- 1500-3000I/U or HCG-5000IU-I/V, 10000IU- I/M
- Administration of GnRH:
  a) Receptal and fertagyl- 5ml I/M
  b) Gonadorelin – 500-1000 micro grams.
- Administration of PGF 2 alpha is indicated in luteal cyst.

**2. Repeat Breeding Syndrome**

**Definition**

Repeat breeding animal is one which has normal or nearly normal estrous cycle but fails to conceive inspite of serving by fertile male or by A.I. with semen.
of good quality for three or more times consecutively. These animals show apparently normal genitalia and clear estrual genital discharge.

**Etiology**

The cause of repeat breeding syndrome are many.

- Ovarian causes: anovulatory estrus, delayed ovulation and progesterone
- Environmental causes: high temperature and high humidity.
- Uterine causes: uterine infection and biochemical changes in uterus.
- Genetic and heredity causes: Chromosomal defects and inbreeding.
- Artificial Insemination: Semen quality, Insemination technique, estrus detection and insemination time.

Any one of the above cases result in fertilization failure and embryonic mortality leading to repeat breeding.

**Treatment**

**Delayed Ovulation**

- In case of delayed ovulation the animals require to be inseminated more than once depending upon the time of ovulation to reduce repeat breeding syndrome.
- HCG or LH hormone preparations at a dose level of 1500 to 3000 I.U. on the day of A.I. by intravenous route.
- Bromocryptin 1 mg by intra muscular route on the day of estrus.
- In delayed ovulators when C.L. is palpable through per rectum examination of ovary, intramuscular injection of 25-50 mg natural prostaglandin or synthetic prostaglandin in the following heat may be administered and good result is obtained provided. A.I. is taken up about 80 hrs post injection.

**Anovulatory Estrus**

- HCG or L.H. at the dose of 1500 to 3000 IU may be used in next estrus to get good result.
- GnRH (Receptal or Fertagyl) preparation may be given I.M.

the other conditions along with findings, diagnosis and treatment of infertility in cows and she-buffaloes are given in the Table 1.
### Dairymen's History

<table>
<thead>
<tr>
<th>Findings on examination per rectum</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Irregular heats</td>
<td></td>
<td>Rupture of cysts per rectum; parenterally 1000 L.U. of luteinizing hormone.</td>
</tr>
<tr>
<td>(a) Chronic buller (comes into heat again and again) or nymphomania.</td>
<td></td>
<td>200 mg progesterone on 1st to 5th days of cycle</td>
</tr>
<tr>
<td>(b) Shorter cycles (less than 21 days)</td>
<td></td>
<td>Check for next heat. Improve method of heat diagnosis. Parenteral administration of estrogens.</td>
</tr>
<tr>
<td>(c) Longer cycles (24-29 days or longer)</td>
<td></td>
<td>Administration of estrogens and follicular stimulating hormone. Intrauterine infusion of antibiotic or sulpha drugs. Breed in next cycle.</td>
</tr>
<tr>
<td>B. Regular heats, but animals fail to conceive</td>
<td></td>
<td>Pre-or post-service antibiotic douche. Small doses of luteinizing hormone progesterone. Above treatment</td>
</tr>
<tr>
<td>1. No pathology on palpation.</td>
<td></td>
<td>Try to break the adhesion: if breaking is impossible cull the animal; if corpus luteum is small use of 200 mg progesterone at the time of heat. Parenteral and intrauterine antibiotic medication.</td>
</tr>
</tbody>
</table>
Prevention

- The infectious causes of infertility, when diagnosed in the herd, the animals have to be treated. If necessary, sexual rest or culling has to be undertaken.
- the animals should be offered balanced diet with all vitamins and minerals supplements that are required for reproductive health.
- animals with anatomical defects should be detected and culled.

<table>
<thead>
<tr>
<th>Dairyman’s History</th>
<th>Findings on examination per rectum</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Anoestrous (no heat)</td>
<td>1. Uterine horn gravid with foetus. 2. Thick spongy uterine horn, pits on pressure, exudate from posterior of cervix, corpus luteum present 3. Tract normal, large corpus luteum present, fibrous cover. 4. Large corpus luteum present, pits on pressure or large cysts with luteal tissue base.</td>
<td>Pregnancy</td>
<td>No interference</td>
</tr>
<tr>
<td></td>
<td>5. Tract normal, corpus luteum present. 6. No functional corpus luteum, small inactive ovaries, tract normal</td>
<td>Metritis</td>
<td>Enucleate corpus luteum; estrogen administration and Lugol’s Iodine or antibiotic uterine douches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i) Retained corpus luteum, result of silent heat.</td>
<td>Enucleate corpus luteum, check next beat; follow with follicular stimulating hormone if necessary. Difficult to treat. Rupture of cyst if possible, estrogen medication.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) May be a hormone imbalance. Cystic corpus luteum (malfunctioning of pituitary)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silent or missed heat</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-functional ovaries due to deficiency.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remove corpus luteum, check next heat. Nutrition - check the deficiency by feeding balanced rations; senility - cull old animals; disease.</td>
</tr>
</tbody>
</table>
• Good managemental and strict hygienic practices should be followed in the herd.

9.7 Other Diseases Associated With Reproduction

9.7.1 Prolapse of Vagina and Cervix

This is one of the major accidents of gestation in ruminants. It can also occur as a post partum accident.

Causes

• Due to confinement of cattle in byres without exercise.
• Feeding moldy feeds or grasses containing phyto oestrogens.
• Irritation of vagina, bladder and intestines leading to contractions of vagina and cervix.
• Increased intrapelvic pressure on account of over distension of abdomen or deposition of excessive amounts of loose pelvic fat.
• Cystic ovarian condition for a long period.
• Due to secretion of estrogenic hormones from placenta seen in the last two to three months of gestation.
• Too much back slope in the cow byre.

In post partum conditions in addition to the above, applying excessive, traction to relieve large factors or in a case with dry birth canal or when faetal membranes are pulled too much in cases of RFM or in cases of eversion of uterus. When the tips of uterine horns are not pushed into position the eversion occurs.

Symptoms

The prolapsed mass of vagina and cervix of a tennis ball size to that of large foot ball size is seen. The size will be large due to prolapse of bladder and retention of urine.

The animal expresses pain, anxiety, anorexia, increased respirations and pulse.

If bleeding is there from the cotyledons the animal may die due to shock.

Treatment

• A local anesthetic of 2%, 5-8ml should be given as epidural anaesthesia.
• The prolapsed portion is gently lifted towards base of the tail to relieve the pressure on the urinary bladder causes the bladder to become empty and in turn reduces straining.

• The mass washed with potassium permanganate lotion and suture the severe lacerations with chromic catgut.

• The genitalia is smeared with antiseptic cream and first the part or portion which is near to the vulval lips is pushed and finally the portion away from the vulval lips is pushed.

• A rope truss is applied if necessary by using ½ to ¾ inch thick cotton rope. The double loop falls at the brisket region and each end comes on either side of the neck and a knot is made at the withers or hump region, then both the ropes are passed along the back bone and get bifurcated at tail and passed below the tail and a knot is made below the anus. The ropes are then taken in between the thighs on either side of the udder and passed forwards and are tied to the ropes in front to the loop now just below the vulval lips both the ropes are sewed together with twine rope and tied tightly. This rope tuss is removed after straining has stopped.

• To prevent further prolapse, the animal is fed with gruel, hay water and fodder feeding is done in small quantities 3 times a day. The animal is tied in a an incline position such that hind feet is an elevated position.

• If progesterone deficiency or excess of estrogens have been suspected, daily 50-100mg of progesterone I/M or 500mg proluton depot in a fortnight is injected. In case of cystic ovaries with such prolapse it is advised to give 1500 to 3000 IU of hcG or LH or 1000mcq or natural GnRH.

• Caesarean operation can be indicated in last 2-3 weeks of pregnancy.

9.7.2 Prolapse of the Uterus

Occurs in all the large animal species. It is most common in the cow and ewe. In cattle the condition seems to be more common in fat animal with excessive slackening. Outbreak occurs on some farms during one calving season and may be associated with diet, possibly with high estrogen content.

Etiology

Uterine prolapse is essentially an eversion of the organ. Which turns inside out as it passes through the vagina as a prolapse. Many factors may be involved in the etiology, including:
Poor Uterine Tone (uterine inertia)- In cattle hypocalcaemia (a cause of primary uterine inertia) may predispose this condition. Lack of tone may allow the uterus to fold in and permit part of the wall to move towards the pelvic inlet. Straining then pushes the flaccid organ through the vagina.

Increased straining which may be caused by pain or discomfort after parturition.

Excessive traction at assisted parturition and the weight of retained fetal membranes have been suggested as other predisposing factors.

Other causes are increased intra-abdominal pressure, including tympany and recumbency.

Clinical signs

The cow or buffalo is usually found with her uterus already prolapsed. One or both uterine horns may be visible. The mucosal surface of the uterus- with its cotyledons- is visible and part of the chorioallantois may still be attached. The cow may be standing and apparently unconcerned or she may be shocked and recumbent. The uterus may be grossly contaminated with bedding and feces. It may also be lacerated, engorged, and edematous. If recently prolapsed it is warm to the touch but later becomes cold and discolored. Occasionally the cow is found dead. Death is often due to hemorrhage from the ovarian arteries, which may rupture as a result of the excessive tension placed on them by the prolapse.

Prognosis This depends on: 1. the duration of the problem: 2. the degree of damage and contamination sustained by the uterus: 3. the degree of shock in the cow: 4. the position and accessibility of the patient.
Treatment

On receiving a call, the obstetrician should give advice on first aid care. The uterus should be protected from further damage. Wrapped on a clean moist sheet, and, if possible, held above the level of the vulva and veterinary aid should be called for.

9.8 Summary

Under the reproductive disorders, Anoestrus is a period of sexual rest in which there is absence of sexual cycle. Difficulty in parturition is dystocia. Retention of placenta is the most common condition subsequent to parturition is observed mostly in buffaloes and cows. Endometritis is the most frequent cause of infertility commonly encountered in the field. Infertility - causes and prevention are described in detail.

Other diseases associated with reproduction like Prolapse of vagina and cervix, and prolapse of the uterus is also described with symptoms and treatment.

Short Answer Type Questions

1. Mention reproductive disorders.
2. What is ‘Anoestrus’?
3. What is ‘Retained Placenta’.
4. What is ‘Endometritis’?
5. What is Infertility?

Long Answer Type Questions

1. Write in detail about prolapse of Vagina.
2. Write about the causes and treatment of repeat breeding syndrome in cattle?
3. Write in detail about Dystocia.
4. What are the symptoms and treatment of Endometritis?
5. Explain the diseases associated with reproduction.
6. Write in detail about prolapse of the Uterus.
Prevention of Diseases

**Structure**

10.1 Surveillance of Animal Diseases  
10.2 Outbreak Reports  
10.3 Action plans for prevention of diseases for different seasons  
10.4 Isolation  
10.5 Quarantine  
10.6 Vaccination for Dairy animals, Sheep and Goat  
10.7 Deworming - Cattle, Sheep and Goat  
10.8 Disinfection  
10.9 Disposal of Carcasses  
10.10 Action plan during disease outbreaks  
10.11 Sterilization of equipment - Hot / Cold / Chemical Methods  
10.12 Summary

**10.0 Introduction**

Prevention is better than cure. Instead of treating sick animals, loss in productivity can be minimise by effective preventive measures.
10.1 Surveillance of Animal Diseases

Monitoring is routine collection of information on disease and productivity in animals. E.g.: Regular recording of mastitis cases and milk production in a dairy farm.

**Surveillance**

It is an extension of monitoring & it has three distinct features.

1. Gathering, recording and analysis of data;
2. Dissemination of information to interested Parties.
3. Action can be taken to control disease.

**Objectives**

1. Rapid detection of disease outbreaks.
2. Early identification of disease problems.
3. Assessment of health status of population.
4. Fixing up of priorities for disease control and prevention
5. Identification of new and emerging diseases.
7. Provide information to plan and conduct research.
8. To confirm disease free status in the population.

For example surveillance means, during outbreaks of Foot and mouth Disease, the origin of disease must be traced; isolation and removal of animals should be undertaken Vaccination of healthy stock should be undertaken.

Processed data is information. Basing on this, action should be taken is to reduce number of cases affected and deaths in the population.

**Surveillance includes**

1. Detection of cases.
2. Registration of cases.
3. Confirmation by laboratory methods.
4. Reporting to higher authorities
5. Analysis
6. Feed back

### 10.2 Outbreak Reports

In a population if disease is prevalent, detailed information has to be collected and furnished in the form of proformas and periodically sent to higher authorities.

**Proforma of outbreak report (OBR)**

<table>
<thead>
<tr>
<th>Registration ease number</th>
<th>_____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of occurrence of OBR</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Name of the village</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Source of report</td>
<td>_____________________________</td>
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<tr>
<td>No. of persons reported</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Date of report</td>
<td>_____________________________</td>
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<tr>
<td>Distance and direction from mandal Head quarter</td>
<td>____________</td>
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<tr>
<td>Name of the mandal</td>
<td>_____________________________</td>
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<tr>
<td>Name of the Disease</td>
<td>_____________________________</td>
</tr>
<tr>
<td>No. of attacks reported</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Date of first attack</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Date of first death</td>
<td>_____________________________</td>
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<tr>
<td>Date of last attack</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Date of last death</td>
<td>_____________________________</td>
</tr>
<tr>
<td>No. of total deaths reported</td>
<td>_____________________________</td>
</tr>
<tr>
<td>Date of visit be the officer during OBR</td>
<td>____________________</td>
</tr>
<tr>
<td>Remarks</td>
<td>_____________________________</td>
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</tbody>
</table>

Signature

Date and seal of Reporting officer.
### 10.3 Action Plans for Prevention of Diseases for Different Seasons

Seasons in A.P according to climate

1. Rainy season- June to September
2. Winter – October to February
3. Summer – March to May

Occurrence of probable bacterial diseases during rainy season in cattle are H.S, B.Q for only, Protozoan diseases like trypanosomes, Parasitic diseases like liver fluke & stomac.

In winter viral diseases like Foot and mouth and fungal diseases like may flare up ring worm.

In summer- viral diseases like IBR & Pox.

For effective disease prevention, cattle should be dewormed followed by timely vaccination according to seasons. Care should be taken while providing drinking water during rainy season, as most of the water bodies are flooded. Water logging should be avoided around animal dwellings to prevent fly & mosquito population.

Adequate housing should be provided to the animals during seasonal variations to protect it’s immunity to fight against diseases.

Balanced diet should be provided especially in summer as the pastures go dry, concentrate offered to the animal must be increased because poor nutrition predispose the animals to disease.

### 10.4 Insolation

Insolation means segregation of animals which are known to be or suspected to be affected with a contagious disease from the apparently healthy. Such segregated animals should be housed in a separate isolation ward situated far away from the normal animal houses.

If such a separate accommodation is not available, the segregated animals should be placed at one end of animals.

### 10.5 Quarantine

Quarantine is a Roman word which means forty days. It is an old method of disease control that is still very valuable.
Quarantine means isolation of animals that are either infected or suspected of being so or of non-infected animals that are at risk. Quarantine measures may be applied at the national or regional or herd level.

The period of Quarantine depends on

1. Incubation period of the disease agent.
2. Time taken for the infection to be confirmed. (Time taken for confirmation of lab reports)
3. Time taken for the infected animal to become non-infectious either with or without treatment.

10.6 Vaccination for Dairy Animals, Sheep and Goat

Vaccination in advanced pregnancy is not recommended.

**Haemorrhagic septicemia vaccine**- Once in 6 months Alum precipitate-sub/cutaneously

Calves above 4 months age should be vaccinated.

Last week of May or June before onset of monsoon.

**Black Quarter** - Only in white cattle.

Last week of May or June before onset of monsoon

Combined H.S & B.Q vaccines are available.

**Foot and Mouth Disease** –March or April and August or September

Alum precipitate to be given subcutaneously once in 6 months. Oil adjuvant annually to be given intramuscular.

**Anthrax**- spore vaccine-1ml-sub cutaneously

February to May in endemic areas only.

Vaccination against Theileriosis in crossbreds can be undertaken any time of the year.

**Sheep and Goat**

PPR- 1ml- Sub cutaneously January

Foot and Mouth Disease - 1-2ml- subcutaneously March and September

Sheep pox- 0.1ml- Intra dermal – March and November
Enterotoxaemia - 2-2.5ml subcutaneously — May — sheep and goat above 3 months age.

Anthrax- 1ml – sub cutaneous during Out breaks in endemic areas only.

10.7 Deworming - Cattle, Sheep and Goat

Deworming

Calves should be dewormed against round worms on day 7, 28, 60, 90, 120 and every 3 months till one year of age. After 3 months of age, a drug against tapeworms should be included within the routine deworming.

Adult cattle should be dewormed twice in a year and if the cattle grazing area is around ponds and tanks, a flukicide should be included.

Sheep and Goat

Deworming should be done basing on the type of helminths.

March – deworming against round worms and flukes.

June – deworming against round worms and flukes.

September – deworming against round worms and Tapeworms.

December – deworming against round worms and flukes.

However if the flock shows any clinical signs of worm infestation, faecal samples should be examined and deworming should be undertaken accordingly.

10.8 Disinfection

Disinfection means destruction of pathogenic micro organisms from a place so that the place becomes free from infection. Disinfectant, germicide or antiseptic is a substance able to kill organisms and their spores at appropriate concentrations.

Disinfectants

The common disinfecting agents available to the stock owner are sunlight, heat and chemical disinfectants. Sunlight possesses strong disinfecting properties. Animal houses must be so constructed that sunlight falls in the sheds at least for some time during the day.

Application of heat by steam, by hot water, by burning or by boiling is an effective method of disinfection. Though, sometimes it is not practicable to use heat. Utility strength, specificity etc of some common chemical disinfectants. It
should however be remembered that not all pathogens are susceptible to the same disinfectant. Also effectiveness of antiseptics is greatly reduced in the presence of organic matter hence the need to cleanse areas before using a disinfectant.

**Disinfection of Animal Houses**

Disinfection of animal houses is a laborious process and cannot always be resorted to in a routine way. Under ordinary conditions daily scrubbing and washing of houses and the action of sunlight falling in the houses are sufficient enough to keep them moderately germ free. But when a disease outbreak has occurred disinfection is a must and should be carried out scrupulously. All floors, walls up to a height of 1.5m, interior of mangers, water troughs and other fittings and equipments coming in contact with animals are all to be disinfected.

The first step in disinfection of animal houses is removal of all filth, as the power of disinfectants is greatly reduced in the presence of organic matter. Floors, walls up to a height of 1.5m, interior of water troughs and mangers should be well scrubbed and all dung, litter etc should be removed and stacked separately, where animals cannot reach. The heat generated within the stack in the course of time will kill all germs. In case of an outbreak of anthrax the dung, litter etc should first be disinfected in situ by thorough sprinkling of suitable disinfectant. If the floor is of earth which is generally the case in Indian villages, the top 10 cm earth should be removed and disposed off along with litter.

After the removal of filth the place should be scrubbed and washed with 4% hot washing soda solution (i.e. 4kg washing soda in 100 litres of boiling water). The approved disinfectant solution should then be coated liberally over the place by sprinkling or preferably by spraying and left so to act for 24 hours. After this period the animal house should again be washed with clean water and left to dry by wind and sunlight. The interior of water troughs and mangers should be white washed. (This can be done even routinely at fortnightly intervals.) The house is then fit for housing healthy animals.

**Disinfection of Pastures**

Use of chemical disinfectants on pasture is rather unpracticable. What can be done is removal of any obvious infective material, like carcass, aborted foetus, dung etc. from over the pasture and prevention of animals from grazing on the pasture under question for at least three to four months. The pasture can be ploughed up and left fallow for about six months during which period the pathogens would be destroyed by sun and wind.
10.9 Disposal of Carcasses

Proper disposal of carcasses of animals died of contagious diseases is of utmost importance in preventing the spread of disease and as in case of anthrax, to prevent human infection. Carcasses should never be disposed by depositing them in or near a stream of flowing water, because this will carry infections to points downstream. An animal died of a contagious disease should not be allowed to remain longer in sheds as biting insects, rodents etc can reach it. Unless approved by a veterinarian (even then only in disinfected place) it is not safe to open carcasses of animals that have died of a disease. All carcasses should be disposed off properly either by burying or by burning.

Burial of Carcasses

The most common method of carcass disposal is burial. This is a reasonably safe method if done deeply enough and in soil from which there is no drainage to neighboring places. Deep burial is necessary to prevent worms carrying bacterial spores to the surface as well as to prevent jackals from digging up the carcass.

The carcass should be carried to the burial place in a trolley and never by dragging it over the ground. The burial pit should be got ready before the carcass is taken there. The pit should be so dug that the highest part of the carcass must be at least 1.5m below the level of the surrounding terrain, the width and length of the burial pit depending on the size of the carcass. Bedding used for the dead animal, its excreta, feed left over by it and the top 5cm soil from where the dead animal was lying(if the floor is not cemented) should also be buried along with the carcass.

Drainage of water out of the burial place can be checked by seeing to it that the burial place is an area where the general water level is at least 2.5m below the ground. After the carcass is in the grave its skin should be slashed to discourage grave-diggers to exhume the carcass later for its skin. Then, in order to make it unpalatable to scavenging animals, it may be drenched with kerosene, crude phenol or a comparable odorous and bad tasting substance. The carcass is then covered with a thick layer of freshly burnt quicklime and then filled with work materials and topped with some rocks, to further prevent scavenging.

Burning of Carcasses

The most sanitary method of destroying carcasses is to burn them preferably close to the site of their death without dragging them. It is necessary use a trolley.
Site for burning having been decided upon, the trench should be dug. The trench should be at least 0.5m deep, shallower towards the ends, and comparing in width and length to the carcass size. General direction of the trench should be that of the prevailing wind direction. The trench is first fitted with wood, some iron bars placed across it and the carcass placed thereon. By firing the wood, the carcass will be completely consumed and with it all infections material.

In towns and cities the so called carcass utilization of carcass frying or rendering plants are usually available for industrial utilization of animal’s carcasses. In these the skins are removed with due regard for the dangers of disease dissemination. After removal the skins are usually disinfected by immersion in a disinfecting solution and the remainder of the carcass, fried out for its fat, the latter being used in manufacture of soap. Farmers can inform these plants whenever there is a carcass so that the same can be collected by these utilization plants.

10.10 Action Plan During Disease Outbreaks

Steps to be taken during an actual disease outbreak are,

- Segregate apparently sick animals. i.e. Isolation.
- Stop all animals, vehicles and persons coming into the farm.
- Call in a veterinarian for advice.
- Strict implementation of sanitation and hygiene.
- Vaccination of healthy stock.
- Treatment of the sick animals.
- Proper disposal of carcass.
- Implementation of disinfection and disinestation.
- Elimination of carrier animals and intermediate hosts of the disease.

10.11 Sterilization of Equipment - Hot/Cold/Chemical Methods

Sterilization is a process by which an article can be rendered free from all forms of living microorganisms. Sterilization can be achieved by three methods. Heat, chemical and radiation.

Heat: Sterilisation by heat is the oldest and most widely used and recognized process. A number of factors affect the process of heat sterilization. Higher the temperature lesser is the time required for sterilization. If the material to be sterilized
contains a higher number of microbes and spores, more time will be required for sterilization. Certain organic substances like gelatin, fats oil and grease, protect the microbes and spores against the action of heat. Spores show maximum resistance to heat at neutral PH and so increased acidity and alkalinity decrease this resistance. For this reason two percent sodium carbonate (washing soda) is added to water used for sterilization by boiling. Sodium carbonate reduces blunting and rusting of the instruments.

Heat Sterilisation involves either dry or moist heat. The dry heats Sterilisation include direct exposure of instruments to flame and the use of hot air oven. The flame method is not reliable and so hot air ovens are used. Sterilisation by dry heat is a slow process and long exposure time at a high temperature is required as spores are relatively resistant to dry heat. Various temperature and time combinations are given for dry heat Sterilisation. Exposure time relates to the time after specific temperature has been achieved. Selection of temperature depends upon the resistance of the material to the heat. Stainless steel items and glassware can be sterilized at 160°c in 60 minutes. Material which can be sterilized by dry heat in an oven include glass ware, glass syringes, dry material in sealed containers, powders, oils, swabs, drapes etc.

Moist heat Sterilisation includes boiling in water and use of an autoclave. Boiling of instruments in water at 100°c for 10-15 minutes can be used in an emergency as a lesser method of sterilisation.

Moist heat in the form of saturated steam under pressure is the most dependable and recognized method of Sterilisation. In routine, materials are autoclaved at 121°c under 15 pounds pressure for 30 minutes. Sharp instruments like scissors, needles and other routine instruments of a surgical pack, excluding sharp scalpel blades can be autoclaved. Proper loading and correct packing are the prerequisites for effective Sterilisation by autoclaving. If the items are tightly packed, steam fails to penetrate and results in ineffective Sterilisation.

Under field conditions, if an autoclave is not available a large capacity pressure cooker can be used to sterilize a surgical pack and pressure should be maintained for 45 minutes. Chemical sterilisation or cold sterilisation is used for sharp edged instruments like scalpel blades and hypodermic needles.

Absolute ethyl alcohol or one percent cetrimide can be used for continuous immersion of the needles for ready use. Preparations containing 2% gluteraldehyde or 1 or 2% formaldehyde are commercially available. Exposure time is few hours with gluteraldehyde and with formaldehyde. Due to irritant
nature of the solutions, instruments must be rinsed in saline before use. Instruments can be disinfected by immersion in 1:30 concentration of savlon in 70% ethyl alcohol for 2 minutes. Chemical sterilisation is not a substitute to autoclaving but used for disinfection of endotracheal tubes, plastic sheets and drainage catheters. A 70% ethyl or isopropyl alcohol has maximum germicidal action because of presence of water which easily denatures the protein.

Bulky rubber goods, gum boots etc. can be disinfected with a solution containing 135ml of (38%) formalin and 10g of sodium hydroxide in one liter of distilled water.

Sterilisation by using ethylene oxide can be considered as an alternative to autoclaving but is expensive.

Radiation

Non-ionizing radiation, e.g. from ultraviolet lamps, is generated by a special source of mercury vapor commonly known as germicidal lamp. Ultraviolet radiation from the lamp can be used to sterilize operation theatres. Ionizing radiations includes X-rays and gamma rays and are very lethal to living cells. Such radiations is used to sterilize prepacked items like disposable syringes, catheters, endotracheal tubes, intravenous sets etc

10.12 Summary

Under the prevention of diseases surveillance of animal diseases monitoring is routine collection of information as diseases and productivity in animals is described. In outbreak reports detailed information has to be collected and furnished in the form of proformas and periodically sent to higher authorities. Action plans for prevention of diseases for different seasons, Isolations, Quarantine, Vaccination for dairy animals, sheep and goat, disinfection and sterilization of equipment - hot, cold and chemical methods are described.

Short Answer Type Questions

1. Mention the objectives of Surveillance.
2. What is isolation of animals?
3. What is Quarantine?
4. Mention the vaccine for sheep and goat.
5. What is ‘Deworming’?
Long Answer Type Questions

1. Explain the procedures of sterilization of equipment.
2. What are the steps to be taken during an acteral disease outbreak?
3. Write short notes on disposal of Carcasses.
4. Explain the vaccination schedule of dairy cattle.
5. Write modal form of proforma of outbreak report (OBR).


(3) Veterinary Internal Medicine, Sinha R.P., Kalyani Publisher, New Delhi.

(4) Veterinary obstetrics and Genital Diseases (Theriogenology) Stephen J. Roberts CBS publisher and distributors.


(6) Veterinary Epidemiology Thrushfield 3rd Edition, Blackwell Publisher.

