8. LIVESTOCK DISEASES AND PUBLIC HEALTH

Livestock diseases cause heavy economic losses to farmers in terms of livestock deaths, loss of production, loss of body condition, poor growth rate and infertility. Thus for profitable dairy farming there is need to adopt proper health control measures for prevention of various livestock diseases and to upkeep the performance of animals.

8.1 Introduction to diseases

According to WHO, Health is defined as physical, mental and social wellbeing of an individual.

Disease means any deviation from normal state of health of an animal.

8.1.1 Classification of Diseases

The animal diseases are classified as follows -

1. On the basis of causes

i. **Infectious diseases :** These are caused by pathogenic organisms viz.Bacteria,Viruses, Fungi.

e.g. Foot and Mouth disease (FMD), Haemorrhagic septicemia (HS), Theileriosis.

ii. **Non-infectious diseases :** These are caused by physical, chemical or poisonous agents, nutritional deficiency or disturbed metabolism. e.g. Rickets, Milk fever, Pesticide poisoning

2. On the basis of mode of spread

i. Contagious diseases : They spread by means of direct or indirect contact with diseased animal e.g. FMD., HS.

Remember...

All infectious diseases may or may not be contagious but all contagious diseases are infectious

ii. Non-contagious diseases : They do not spread by means of direct or indirect contact with diseased animal e.g. Rickets.

3. On the basis of duration and severity

i. Per acute disease : It is characterized by very short course of time (few hours to 48 hours) and very severe symptoms. e.g. Anthrax.

ii. Acute disease : It is characterized by a sudden onset, short course of time (3-14 days) and severe symptoms. e.g. BQ, HS.

iii. Sub acute disease : It is characterized by longer course of time (2 - 4 weeks) and severity lesser than acute one. e.g. Sub acute mastitis.

iv. Chronic disease : It is characterized by very long course of time (more than 4 weeks) and milder signs. e.g. Tuberculosis.

8.1.2 Signs of Health and Disease

The signs of healthy and diseased animal are given in Table 8.1

8.1.3 General measures for prevention of contagious diseases

1. Identification, isolation and treatment of sick and in contact animals.
2. Slaughter the animals suffering from incurable disease by following prevailing laws in our country.
3. Disposal of dead animals either by burning or deep burial.
4. Proper disposal of contaminated feed and water.
5. Regular cleaning and disinfection of cattle shed and its premises with 1-2% phenyl.
6. Don't allow grazing in affected pasture land.
7. Close animal markets, cattle shows etc. during outbreak of disease
8. Restrict the movement of animals from affected to clean area.
9. Don't allow animals to drink water from ponds, rivers etc. during outbreak of disease.

Table 8.1 : Signs of Healthy and Diseased Animals

Sr.	Parameter	Healthy	Diseased
1.	Appetite	Normal	Reduced or absent
2.	Water intake	Normal	Usually reduced
3.	Milk yield	Normal	Decreased
4.	Rumination	More frequent	Less frequent or absent
5.	Body condition	Normal	Mostly weak
6.	Look of the animal	Active	Dull
7.	Gait	Move freely	Move slowly
8.	Head	Forward and raised	Downward
9.	Eyes	Bright	Dull
10.	Ears	Erect & move frequently	Drooping & move less frequently
11.	Mouth	Wet & without odour	Dry or profuse salivation & usually bad odour
12.	Nose	No discharge	May be some discharge
13.	Muzzle	Moist	Dry
14.	Skin / hair coat	Smooth & lustrous	Rough & dull
15.	Dung	Semisolid	Firm or loose
16.	Urine	Slightly yellowish	Dark yellow, coffee coloured or pinkish
17.	Tail movement	More frequent	Less frequent
18.	Temperature	Normal (101.6 ^{0}F)	Mostly increased
19.	Respiration	Normal	Mostly increased
20.	Pulse rate	Normal	Usually increased

10. Regular spraying of insecticides to control external parasites.
11. Regular deworming to control internal parasites.

8.2 Livestock diseases

8.2.1 Bacterial diseases

(1) Anthrax

Synonyms : Wool sorter's disease, *Fanshi*, *Kalpuli*

It is an acute widespread bacterial disease of all warm blooded animals especially cattle, buffalo, sheep and goat. It usually occurs after sudden climatic change

Do you know ?

Anthrax is communicable to human beings i.e. zoonotic disease.

Causative agent

- The disease is caused by spore forming bacteria called *Bacillus anthracis*.

Transmission

1. It is soil-borne infection.
2. It usually spreads through ingestion of contaminated feed and water.
3. Sometimes, it also occurs by inhalation and biting flies.

Symptoms

1. High fever (104-108 ^{0}F)
2. Loss of appetite
3. Severe depression
4. Suspended rumination
5. Increased heart rate
6. Bloat or tympany
7. Dyspnoea i.e. difficult breathing

8. Dysentery or diarrhoea
9. Blood in milk
10. Tarry black coloured bleeding from natural openings like anus, nostrils, vulva etc. (Fig: 8.1)
11. Sudden death in per-acute cases.

Fig: 8.1 Animal died of anthrax

Control

1. Identification and isolation of sick animal.
2. Plug the natural openings by cotton swab soaked in carbolic acid solution.
3. Movement of animals from infected area to clean area should be stopped.
4. Deep burial or burning of dead animals.
5. Destroy contaminated feed, fodder and bedding by burning.
6. Disinfection of cattle shed by using 10% caustic soda or formalin or 5% phenyl.

Never conduct post-mortem of the animal suspected to be died of anthrax.

6. Vaccination : Anthrax Spore Vaccine every year before onset of monsoon in areas where anthrax outbreaks are common. The immunity develops in 2 to 3 weeks and remains for 1 year.

2. Haemorrhagic Septicaemia (HS)

Synonyms : Pasteurellosis, *Ghatsurp*

It is an acute infectious disease of cattle, buffalo, sheep and goat. It is most common in buffaloes. It usually occurs during extreme environmental conditions, malnutrition and transportation for long distance.

Remember...

HS outbreaks generally occur during rainy season.

Causative agent

- It is caused by *Pasteurella multocida*

Transmission

The disease spreads through –

1. Contact with infected animal
2. Ingestion of contaminated feed and fodder
3. Inhalation

Symptoms

1. High fever (104 - 107 ^{0}F)
2. Loss of appetite
3. Suspended rumination
4. Dullness and depression
5. Increased heart rates
6. Salivation
7. Congestion of mucus membrane
8. Profuse nasal discharge
9. Rapid/difficult respiration
10. Swelling of throat region (Fig: 8.2)
11. Recumbency
12. Death within 12-24 hours

Fig: 8.2 : Haemorrhagic septicaemia in buffalo heifer

Control

1. Isolation and treatment of the sick animals.
2. Close animal markets, cattle shows etc.
3. Burning or burial of dead animals
4. Proper disposal of contaminated feed and water.
5. Disinfection of cattle shed where ailing animal is kept.
6. Protect animals from extreme weather.
7. Vaccination against HS should be carried out every year before monsoon. The immunity develops in 2 to 3 weeks and remains for 6 months (Alum ppt vaccine) to 1 year (oil adjuvant vaccine).

(3) Black-quarter (BQ)

Synonyms : Black -leg, *Farrya*

It is an acute infectious highly fatal, bacterial disease of cattle and buffaloes. Sheep and goats are also affected. It generally occurs following heavy rainfall.

Do you know ?

Young cattle between 6 to 24 months of age, in good body condition are mostly affected.

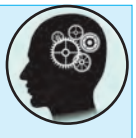
Causative agent

- It is caused by *Clostridium chauvoei*

Transmission

1. The disease spreads through contaminated soils.
2. The organisms gain entry through ingestion of contaminated feed and contamination of wounds.

Remember...



Black quarter is soil-borne infection.

Symptoms

1. High fever (104-107 ^{0}F)
2. Loss of appetite
3. Depression, dullness
4. Suspended rumination
5. Rapid heart rate
6. Difficult breathing
7. Lameness in affected leg
8. Crepitating swelling over hip, thigh and shoulder (Fig: 8.3)
9. Swelling is hot and painful in early stages becomes cold and painless later on
10. Recumbency
11. Death within 12-48 hrs

Fig. 8.3 : Black quarter in cattle

Control

1. Isolation of sick and in contact animals.
2. Disposal of dead animals either by deep burial or burning.
3. Disinfection of surgical instruments prior to operation.
4. Avoid grazing in affected area.
5. Vaccination against BQ should be carried out every year before rainy season. The immunity develops in 2 to 3 weeks and remains for 6 months.

4. Brucellosis

Synonyms : Contagious abortion, *Garbhpat*

It is an acute or chronic contagious bacterial disease of domestic animals. In India, disease causes heavy economic losses due to

abortion, infertility and reduced milk yield. It is common in sexually mature animals.

Do you know ?

Brucellosis is major zoonotic disease in India

Causative agent

- It is caused by *Brucella abortus*.

Transmission

1. The disease mainly spreads through ingestion of feed and water contaminated with discharges of aborted foetuses and vaginal discharge.
2. Sometimes the disease may spread through inhalation, vagina during coitus or abraded skin or conjunctiva.

Symptoms

1. Abortion usually during advance or late pregnancy.
2. Retention of placenta
3. Whitish vaginal discharge
4. Infertility i.e. low conception rate
5. Swelling of scrotum and joints in bull
6. Weak calves are born from affected cows

Control

1. Test entire herd for brucellosis at least once in a year.

Remember...

Plate and tube agglutination tests are used for screening and confirmation of brucellosis.

2. Culling of infected or carrier animal by following scientific method.
3. Adopt AI practice as far as possible to prevent spread of infection through natural service.
4. Proper disposal of aborted foetuses, placenta and uterine discharge.
5. Disinfection of infected premises.
6. Newly purchased animals should be tested for brucellosis twice at an interval of 30 days before introduction in a herd.
7. Pregnant animals should not be purchased without testing.
8. Vaccination : If incidence of disease in herd is more, then calves between 4-8 months of age should be vaccinated by using Brucella Cotton - 19 strain vaccine called as calf hood vaccination with due care to avoid zoonosis.

(5) Mastitis

Synonyms : Mammitis, *Dagadi kas*

Mastitis denotes an inflammation of the udder/ mammary gland. Mastitis is more common in high yielding cows and buffaloes.

This disease is responsible for heavy economic losses to dairyman due to discarding of abnormal milk, low milk production and milk fat, decreased market value of cow and cost of drugs and veterinary services.

Internet my friend

Find out causes of low milk fat.

In addition to this, the mastitic milk spreads diseases like tuberculosis, brucellosis, sore throat, food poisoning etc. in human beings.

Causative agents

1. **Bacteria :** *Streptococcus, Staphylococcus, E.coli*
2. Viral diseases : Pox, FMD
3. Fungus : Candida.
4. Mycoplasma
5. Trauma or injury to teat and udder
6. Incomplete or irregular milking
7. Improper milking techniques
8. Use of non disinfected milking machines
9. Pendulous udder and long cylindrical teats
10. Rough flooring
11. Unhygienic conditions of milkers and in milking parlour

Transmission

- It spreads through infected water, contaminated bedding, utensils, milkers hands and through wounds.

Symptoms

a. Acute form

1. Fever
2. Loss of appetite
3. Udder is swollen, hot and painful (Fig: 8.4)
4. Milk may be yellowish or reddish
5. Milk contains flakes or clots

b. Chronic form

1. No swelling of udder
2. Udder becomes hard due to fibrosis
3. Milk may show visible changes on careful examination
4. Reduced milk yield
5. Affected teat may become blind if not treated in time

Fig. 8.4 : Mastitis in cow

Control

1. Identification, isolation and treatment of affected dairy animals.
2. Regular testing of dairy cows for mastitis
3. Treatment of all teats of all cows/ buffaloes at drying.
4. The healthy non-infected cows should be milked first and known infected cows should be milked at last.
5. The udder of cow and hands of milker should be washed with antiseptic solution before and after milking.
6. Unsterile objects should not be passed in teat.
7. Teat sores/ wounds should not be neglected but treated at promptly.
8. Use of proper milking method i.e. full hand milking followed by stripping.
9. Maintain hygienic conditions in cattle shed /milking parlour .
10. The non-responsive quarter should be permanently dried up.
11. Culling of non-responsive cases.

8.2.2 Viral diseases

(1) Foot-and-Mouth Disease (FMD)

Synonyms: Apthous fever, *Khurkut*

It is highly contagious viral disease of cloven footed animals viz. cattle, buffalo, sheep, goat and pigs.

Do you know ?

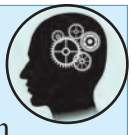
Crossbreds and young cattle are severely affected and are more susceptible for FMD.

In India, the disease is causing heavy economic loss due to reduction of milk, meat and working capability of draft animals. The disease outbreaks usually occurs at the end of winter i.e. in February and March.

Causative agent

1. It is caused by virus namely *Picorna virus* (Apthovirus)
2. There are 7 major strains of the virus namely O, A, C, Asia-1, SAT-1, SAT- 2 and SAT- 3.

Remember...



In India, O, A and Asia - 1 are responsible for foot and mouth disease.

Transmission

1. It usually spreads through ingestion of contaminated feed and water.
2. Air-borne infection can also occur.
3. Suckling calves may pick up infection from dam/mother.

Symptoms

1. Fever (104 - 106^{0}F) for 24 - 48 hours
2. Loss of appetite
3. Drop in milk yield
4. Vesicles and ulcers on tongue, dental pad and oral mucosa (Fig: 8.5)
5. Profuse salivation
6. Painful mastication
7. Vesicles and ulcers develop in inter-digital space and at coronet (Fig: 8.5)
8. Lameness
9. Stamping of feet
10. Recovery within 8 days, if complication doesn't occur

Fig. 8.5 : Foot-and-Mouth Disease in cattle

Control

1. Isolation of all affected animals immediately after detection.
2. Vaccination of all non-affected and in contact animals.
3. Restriction of animal movements by regulation.
4. Disposal of contaminated bedding and fodder by burning.
5. Disinfection of animal shed with 1-2% caustic soda or formalin.
6. Restrict human movement to and from infected premises.
7. Thorough disinfection of all the utensils, feeding pens in case of calves and cloths of the attendants.
8. Do not allow animals to graze on common grazing pasture or to drink water from ponds and rivers.
9. Do not allow calves to suckle affected mothers.
10. Vaccination : FMD vaccine should be given every six months i.e. in September/ October and March / April.

(2) Peste des petits ruminants (PPR)

Synonyms : Goat plague, PPR, *Bulkandi*

It is an acute highly contagious viral disease of sheep and goats. The disease most commonly occurs during rainy season. The morbidity rate is 100% while mortality rate is 25-90%.

Causative agent

- It is caused by *Morbillivirus*.

Transmission

1. It spreads primarily through inhalation and direct contact with infected animal.
2. It also spreads through ingestion of contaminated feed and water.

Symptoms

1. Fever
2. Loss of appetite
3. Dullness
4. Suspended rumination
5. Congested mucus membranes
6. Lacrimation
7. Nasal discharge
8. Coughing
9. Rapid/ difficult breathing
10. Erosions and bran like deposits on inner side of lips, on dental pad and tongue (Fig: 8.6)
11. Profuse diarrhoea-loose faeces (Fig: 8.6)
12. Dehydration
13. Death within 6-12 days

Fig. 8.6 : Peste des petits ruminants in goat

Control

1. Identification and isolation of sick animals.
2. Complete prohibition on import of small ruminants and animal products/ from affected area.
3. Restriction of animal movements.
4. Proper disposal of carcass.
5. Disinfection of contaminated shed and premises.
6. **Vaccination :** Give PPR vaccine at the age of 3 months and thereafter once in two years.

(3) Sheep and goat pox

Synonyms : *Devi*

It is most serious contagious viral disease of sheep and goats.

Lambs and kids are most susceptible.

Causative agent

- The disease is caused by *Capripox* virus.

Transmission

1. Disease mainly spreads through direct contact with infected animal.
2. It also spreads through inhalation.

Symptoms

1. High fever
2. Loss of appetite
3. Dullness and depression
4. Pock (papular, scabby) lesions on non-wooly / non-hairy parts of body like udder, scrotum, vulva, inside of thighs, under tail, axilla, face, eye lids and ears (Fig.8.7)
5. Nasal discharge, difficulty in breathing and coughing in some cases
6. Abortions in pregnant animals
7. Death or recovery within 3 to 6 weeks

Fig. 8.7 : Goat Pox : Teat lesions

Control

1. Movement of goat and sheep should be restricted.
2. Isolation of sick animals.
3. Strict hygienic measures should be adopted.
4. Vaccination against sheep and goat pox should be carried out annually, preferably in the month of December.

(4) Rabies

Synonyms : Hydrophobia, Madness, *Pisalne*

It is a highly fatal viral disease of all warm blooded animals. It is most common in dogs. It is **communicable** to man.

Remember...

Rabies is one of the most important zoonotic diseases of animals in India.

Causative agent

- It is caused by *Lyssavirus* virus.

Transmission :

1. It spreads almost always by the bite of rabid animal.
2. Through contamination of skin wounds by fresh saliva of infected animal.

Symptoms

a. Furious form

1. Change in behavior (Fig: 8.8 Buffalo)
2. Restlessness and excitement
3. Sexual excitement
4. Hypersensitive to sound and movement
5. Tendency to bite either animate or inanimate objects
6. Profuse salivation
7. Frequent and loud bellowing/barking with hoarse voice (Fig.8.9 cow)
8. Death within 2 - 4 days in cattle and 8-10 days in dog.

b. Paralytic/Dumb form

1. Decreased sensation
2. Hanging of lower jaw and protrusion of tongue
3. In-coordination in gait
4. Drooling of saliva
5. Voiceless attempts to bellow/bark (yawning movements) in late stage
6. Inability to swallow food and water
7. Progressive paralysis
8. Recumbency and death within 6-7 days

Fig. 8.8 : Rabies in buffalo

Fig. 8.9 : Rabies in cattle

Remember...

There is no specific curative treatment for clinical rabies, however after dog bite following treatment should be given-

- Thorough washing of the wound with soap water immediately after exposure.
- Treat wounds with antiseptics like tincture iodine.
- Post-bite vaccination with Antirabies vaccination on 0, 3, 7, 14, 28 and 90th day post bite in all animal species.

Control

1. Identification and euthansia of rabid animals.
2. Control of wild life vectors like foxes
3. Registration of dogs
4. Animal birth control programme in stray dogs
5. Compulsory prophylactic antirabies vaccination of dogs every year.

8.2.3 Protozoan Diseases

(1) Theileriosis

Synonym : Tick fever

It is an important protozoan disease of exotic and crossbred cattle. The disease is mostly observed during summer and rainy season. Young calves are more susceptible to this disease.

Causative agent

- It is caused by *Theileria annulata*

Transmission

- It is transmitted by ticks.

Symptoms

1. High fever for several days.
2. Loss of appetite
3. Increased heart and respiration rates
4. Dullness and weakness
5. Dyspnoea i.e. difficult respiration
6. Ocular and nasal discharge
7. Swelling of superficial lymph nodes (Fig: 8.10 Cow)
8. Anemia - pale mucous membranes (Fig: 8.11 Calf)
9. Jaundice - dark yellow coloured urine
10. Death within 7-10 days if not treated promptly

Fig. 8.10 : Enlargement lymphnode in theileriosis

Fig. 8.11 : Pale mucus membranes in theileriosis

Control

1. Control of ticks by spraying of insecticides on animal body and in animal shed.
2. Vaccination of cattle with Rakshavac - T vaccine @ 3ml SC every three year.

Keep in mind…..

- The vaccine should be stored in liquid nitrogen.
- Animals in advance pregnancy should not be vaccinated.

(2) Surra

Synonym : Trypanosomosis

It is an important protozoan disease found in cattle, buffalo, sheep, goat, horse and camel. It is more common in monsoon or rainy season.

Causative agent

- The disease is caused by a protozoa namely *Trypanosoma evansi*.

Transmission

- It is transmitted through the bites of flies mainly of *Tabanus* species.

Symptoms

(a) Acute form

1. Fever
2. Circling movements
3. In-coordination
4. Head pressing against hard objects
5. Blindness
6. Convulsions and death

(b) Chronic form

1. Intermittent fever
2. Poor appetite
3. Drop in milk production
4. Loss of body weight (Fig: 8.12)
5. Anaemia

Fig. 8.12 : Trypanosomosis in horse

Control

1. Control of vectors like flies.
2. Hygienic and sanitary measures
3. Detection, isolation and treatment of infected animals.
4. Prophylactic chemotherapy with quinapyramine in area where disease commonly occurs

8.2.4 Parasitic diseases

(1) Endoparasites

Do you know ?

Endoparasites are those parasites that live within animal body.

Endoparasites are divided into three groups as-

1. Round worms - They are elongated, cylindrical and tapered at both ends.

Fig. 8.13 : Roundworms

2. Tapeworms - They are flat, segmented or tape like worm.

Fig. 8.14 : Tapeworms

3. Flukes - They are flat, unsegmented leaf like worms.

Fig. 8.15 : Fluke

Transmission

1. Through ingestion of eggs or infective larvae (round worms).
2. Orbatid mites are the intermediate hosts of the tapeworms.
3. Fresh water snails are the intermediate hosts for flukes.

Symptoms

1. Loss of body weight.
2. Dry and rough hair coat
3. Poor growth rate
4. Pot-belly
5. Diarrhoea
6. Anaemia
7. Pica or depraved appetite - eating of soil and clothes, chewing of stones etc.

Fig. 8.16 : Poor body condition due to worm load in calf

Fig. 8.17 : Worm load in goat

Control

1. Isolation and treatment of affected animals.
2. Maintain cleanliness of animal shed.
3. Avoid contamination of feed and water with dung.
4. Keep young and old animals separately.
5. Avoid overcrowding.
6. Rotational grazing has to be encouraged
7. Carry out deworming twice a year i.e. before and after monsoon and once in a month up to 3 months in case of calves.
8. Provide balanced ration.
9. Screening of faecal samples of the animals at regular interval.
10. Spray intsecticide to control the orbatid mites.
11. Control of snails.
12. Avoid grazing in low lying or marshy areas like banks of river, ponds etc.

(2) Ectoparasites

Remember...

Ectoparasites are those parasites which live on the outside of animal body.

The ectoparasites found in animals are as follows.

1. Lice 2. Ticks 3. Fleas 4. Mites 5. Flies

Symptoms

1. Irritation/itching
2. Loss of hair i.e. alopecia
3. Restlessness
4. Anaemia
5. Loss of body weight
6. Decreased milk and meat production
7. Decreased growth rate
8. Some flies produce maggoted wound

Fig. 8.18 : Tick infestation in buffalo calf

Fig. 8.19 : Mange in goat

Do you know ?

Ectoparasites not only suck blood but also transmit various viral and protozoan diseases.

Control

1. Isolation and treatment of affected animals.
2. Spraying of insecticides in cattle shed at regular interval and on animal's body too.
3. Close cracks and crevices on the walls of animal shed.
4. Maintain sanitary conditions.
5. All vegetation surrounding the animal shed should be cleared.

8.3 Poultry diseases

Most of the poultry diseases are highly contagious in nature. Hence, they spread rapidly and cause heavy morbidity and mortality. Further there is no effective treatment for viral

diseases and most of the bacterial diseases are less responsive to treatment. Hence prevention is better and economical than controlling an actual outbreak of disease.

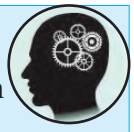
8.3.1 Bacterial diseases of poultry

1. Bacillary White Diarrhoea (BWD)

Synonyms : Pullorum Disease

It is an acute wide spread bacterial disease mostly of baby chicks, causing mortality up to 90 per cent.

Remember...



Bacillary white diarrhoea is an egg borne disease of poultry.

Cause

- It is caused by *Salmonella pullorum*.

Transmission

The disease spreads in two ways

1. Vertical transmission – It takes place through infected eggs.
2. Horizontal transmission – It usually takes place through contaminated feed and water.

Symptoms

1. Dead in shell chicks
2. Drowsiness
3. Weakness
4. Loss of appetite
5. Ruffled feathers
6. Gasping
7. Loose chalky white faeces
8. Soiling of vent

Keep in mind….

Adult birds do not show symptoms and remain as carrier.

Control

a. General measures

1. Periodical testing of breeding stock for Pullorum disease.
2. Culling of reactor / positive birds
3. Purchase of chicks from pullorum disease free flock
4. Infected eggs should not be used for hatching purpose
5. Adopt hygienic measures on farm.
6. Fumigation of incubators.

For fumigation, 355 ml of Formalin and 17.5 gm. of Potassium Permanganate per 100 cubic feet area is used.

b. Vaccination

- At present no commercial vaccine is available in India.

2. Chronic Respiratory Disease (CRD)

It is chronic slow spreading contagious bacterial disease of poultry. The disease is affecting birds of all age groups but more common and severe in young chicks. Mortality is up to 30-40 per cent in chicks.

The disease is causing heavy economic losses especially in broilers.

Cause

• It is caused by *Mycoplasma gallisepticum*.

Transmission

The disease spreads in two ways

1. Vertical transmission through infected eggs from chickens to chicks (egg borne).
2. Horizontal transmission takes place through inhalation (air borne).

Symptoms

1. Nasal discharge
2. Sneezing
3. Open beak breathing/ gasping
4. Loss of body weight
5. Reduced appetite
6. Drop in egg production up to 50%
7. Death in 3-8 weeks

Control

a. General measures

1. Periodical testing of breeding stock for chronic respiratory disease.
2. Culling of birds positive for chronic respiratory disease.

3. Purchase of birds from disease free farm
4. Dipping of eggs in tylosin solution before incubation.
5. Adopt hygienic measures on farm.
6. Prophylactic dose of tylosin to day old chicks

b. Vaccination

- At present no commercial vaccine is available in India.

8.3.2 Viral diseases of poultry

1. Ranikhet Disease (RD)

Synonyms : New Castle Disease, *Manmodi*

It is an acute highly contagious viral disease of poultry. The disease affects all age groups of birds. It causes heavy economic losses to poultry industry by way of high morbidity (100%) and mortality (50 – 90 %) and drop in egg production.

Do you know ?

First case of New Castle Disease was recorded in 1928 at Ranikhet near Almora (Uttarakhand) in India, hence it is named as Ranikhet disease.

Cause

- It is caused by *Paramyxovirus*.

Transmission

1. The disease spreads through infected feed, water or air.
2. Air borne transmission is the most important way of disease transmission.

Symptoms

1. Loss of appetite
2. Dullness and depression
3. Ruffled feathers
4. Respiratory rales
5. Gasping (difficult breathing)
6. Sneezing
7. Coughing
8. Nasal discharge
9. Greenish watery diarrhoea
10. Paralysis of one or both legs or wings
11. Tremors (twitching)
12. Torticollis i.e. twisting of neck (Fig.8.20)
13. Drop in egg production in layers
14. Finally death

Fig. 8.20 : Ranikhet disease

Control

a. General measures

1. Restrict the entry of visitors.
2. Depopulation of site.
3. Proper sterilization of poultry equipments.
4. Disinfection of poultry house.
5. Burial or burning of dead birds.
6. Control of rodents and free flying birds.
7. Isolation of affected birds.

b. Vaccination

1. LaSota vaccine @ 1 drop in each eye or nostril in first week of life.
2. R_2B Mukteshwar vaccine in 8^{th} and 18^{th} week.

2. Marek's Disease (MD)

Marek's disease is highly contagious viral disease, primarily of young chickens between 3-5 months of age.

Cause

- It is caused by *Herpesvirus*.

Transmission

- Infection is transmitted through inhalation of infective material from the environment.

Symptoms

1. Dullness
2. Inco-ordination.

3. Paralysis of one or both legs, neck and wings
4. Drooping or hanging of wings
5. One leg is extended forward and other backward (**Swimmer's posture**)

Fig. 8.21 : Marek's disease : One leg backward- one leg forward

6. Loss of body weight
7. Recumbency
8. Blindness in one or both eyes (ophthalmic form)
9. White nodules on skin (cutaneous form)
10. Sudden death in acute form

Control

a. General measures

1. Selection and breeding of genetically resistant stock.
2. Isolation of affected birds.
3. Disposal of dead birds by burning or deep burial.
4. Disinfection of poultry house.

b. Vaccination

- HVT (Herpes Virus of Turkey) vaccine is given to day old chicks.

3. Gumboro Disease

Synonym : Infectious Bursal Disease

It is an acute highly contagious viral disease of 3 to 6 week old chicks. It causes heavy economic losses to poultry industry by way of high morbidity (100%) and mortality (20 –30 %).

Do you know ?

Infectious bursal disease was reported for the first time from Gumboro in USA.

Cause

- It is caused by *Avian Reovirus* / IBD virus.
- Transmission
- The disease spreads through ingestion of contaminated feed and water.

Symptoms

1. Loss of appetite
2. Dullness and depression
3. Ruffled feathers
4. Diarrhea- loose faeces
5. Soiling of vent

Fig. 8.22 : Gumboro disease : Diarrhoea and soiling of vent

6. Pecking at vent
7. Tremors (twitching)
8. Inco-ordination
9. Death in 4 to 8 days

Control

a. General measures

1. Restrict the entry of visitors.
2. Depopulation of site.
3. Proper sterilization of poultry equipments.
4. Disinfection of poultry house.
5. Disposal of dead birds by burning or deep burial.
6. Isolation of sick birds.

b. Vaccination

- IBD vaccine should be given at the age of 2 to 3 weeks and repeated at 18*th* to 20*th* weeks of age.

4. Fowlpox

Synonym : Avian Pox

It is one of the most common slow spreading

viral diseases of poultry. The morbidity is high and mortality may be up to 50% in chicks.

Disease occurs in mild form in adults and in severe form in young chicks.

Cause

- It is caused by *Avipoxvirus*.

Transmission

- It spreads through direct contact, wounds or insect bites.

Symptoms

1. Scabs or wart like growths on featherless parts of the body such as comb and wattles (Fig. 8.23)
2. Yellowish cheese like deposits on tongue, in side of mouth and under eyelids
3. Lacrimation
4. Nasal discharge
5. Reduction in appetite
6. Loss of body weight
7. Decreased egg production
8. Death due to starvation as a result of blindness.

Fig. 8.23 : Fowl pox

Control

a. General measures

1. Isolation of sick birds.
2. Disinfection of poultry house.
3. Avoid overcrowding of birds.

b. Vaccination

- Fowl Pox Vaccine in 6th and 16th week of life by cutaneous scarification/wing web method.

5. Bird flu

Synonyms : Fowl plague, Avian influenza.

Bird flu is very dangerous and highly contagious viral disease of poultry. The disease affects all age groups.

Remember...

Bird flu is a disease of great zoonotic importance as it is transmitted to human beings.

Cause

- It is caused by H1N1 *influenza virus*.

Transmission

- The disease spreads through contaminated air, water and feed.

Disease is usually transmitted to domestic poultry by wild birds.

Symptoms

1. Loss of appetite
2. Dullness and depression
3. Bluish colouration of comb and wattles (Fig: 8.24)
4. Gasping (difficult breathing)
5. Sneezing
6. Nasal discharge
7. Diarrhoea-loose faeces
8. Egg production stops
9. Finally death

Fig. 8.24 : Bird flu

Control

a. General measures

1. Restrict the entry of visitors.
2. Depopulation of site.
3. Proper sterilization of poultry equipments.
4. Disinfection of poultry house.
5. Disposal of dead birds by deep burial or burning.
6. Control of wild birds.
7. Slaughter of affected and in contact birds.

b. Vaccination

- Vaccination is not practiced in India due to virus mutation.

8.3.3 Parasitic diseases of poultry

1. Coccidiosis

It is serious protozoan disease of young stock up to 10 weeks of age. Disease outbreak occurs in warm and humid climate and damp litter condition.

Remember...

Coccidiosis is most common in birds reared in deep litter system.

Cause

- It is mainly caused by *Eimeria tenella* and *Eimeria necatrix*.

Transmission

- Disease spreads through contaminated feed, water or litter.

Symptoms

1. Depression, weakness
2. Ruffled feathers
3. Reduced appetite
4. Bloody diarrhoea (Fig.8.25)
5. Soiling of vent
6. Loss of body condition
7. Poor egg production
8. Pale comb and wattles due to anemia
9. Death

Fig. 8.25 : Coccidiosis in poultry

Control

1. Isolation and treatment of affected birds.
2. Use of proper waterers and feeders.
3. Use of dry litter or regular changing of litter.
4. Provide good ventilation and sunlight in poultry houses.
5. Use of anti-coccidial drugs as control measure.

2. Internal Parasites

There are 3 types of internal parasites (endoparasites) found in poultry.

1. Round worms (Nematodes) - eg. *Ascaridia galli, Hetrakis gallinarum*.
2. Tapeworms (Cestodes) - eg. *Davainea proglottina, Raillietina species*.
3. Flukes (Trematodes) are of little practical importance in India.

Symptoms

1. Decreased growth rate
2. Reduced appetite
3. Weakness
4. Anaemia
5. Diarrhoea
6. Loss of body weight
7. Drop in egg production

Control

1. Give diet rich in proteins, Vit. A and B-complex.
2. Avoid dampness in poultry house.

3. Provide sufficient space, ventilation and sunlight in poultry house.
4. Good sanitation.
5. Do not mix birds of different age groups.
6. Avoid contamination of feeders and waterers.
7. Control of flies, earthworms, fleas, snails and grass hoppers etc.
8. Deworming should be carried out at 4-6, 6-8 and 12 weeks of age.
9. Regular treatment of affected birds

3. External Parasites

The external parasites (ectoparasites) of poultry are ticks, lice, mites, fleas and biting flies.

Symptoms

1. Itching or irritation
2. Restlessness
3. Reduced feed consumption
4. Anaemia
5. Drop in egg production
6. Retarded growth
7. Decrease in body weight
8. Loss of feathers in mange

Control

1. Isolation and treatment of diseased birds.
2. Maintain sanitary conditions.
3. Close cracks and crevices in poultry house.
4. Regular spraying of insecticides in shed.
5. Spraying or dusting of insecticides on birds.

Rudolf Ludwig Carl Virchow (1821-1902) is a German physician and pathologist. He is known as "The Father of Modern Pathology" and as the founder of social medicine, and the "Pope of medicine". In 1855, first time he used the term “Zoonoses”

8.4 Zoonosis

Definition

- A zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans.
- Zoonotic means infectious diseases that are spread between animals and humans.
- Zoonoses (Zoo – Animal, Nosos – disease).

Out of 1407, 816 (58%) human pathogens are zoonotic, i.e., capable of being transmitted naturally between animals and humans. Certain zoonoses are believed to be associated with the illegal slaughter and improper disposal of animals. Moreover, the large numbers of stray animals in India are also considered potential source for the spread of zoonotic infection.

Do you know ?

India is a hotbed of many zoonotic diseases that place a large burden on public health. About 40 zoonotic diseases are commonly reported from India

Fig. 8.26 : Zoonoses

Routes of transmission

1. Ingestion

a. Milk borne diseases: Through ingestion of milk. eg. TB, FMD, Brucellosis, Anthrax.
b. Meat borne diseases: Through ingestion

of meat. eg. TB, Brucellosis, Anthrax, Glanders.

c. Water borne diseases: Through ingestion of water. eg. Colibacillosis, Infectious Hepatitis, Leptospirosis.

2. Inhalation

- Air borne diseases eg. TB, FMD, Influenza.

3. Contact

- Through direct or indirect contact with diseased animal or its infectious materials. eg. Brucellosis, Anthrax, Leptospirosis, Plague, Pox, Glander.

4. Inoculation

a. Vector borne : Through bite of arthropode vectors

eg. Malaria, Dengue fever, Chikungunya etc. (Mosquito borne)

eg. Kaysnur forest disease etc. (Tick borne)

b. Dog Bite : eg. Rabies

Fig. 8.27 : Rabies in dog

Do you know ?

About 15 million people are bitten by dogs (mostly stray) in India every year and nearly 25,000-30,000 people are dying due to rabies annually.

Remember...

Some human infectious diseases that are transmissible from Human to animals and may again transferred to humans are termed as "Reverse Zoonosis or Retrograde Zoonoses". eg. Influenza, Ringworm, TB.

Zoonotic diseases of major public health importance in India

- **Endemic diseases :** Rabies, Anthrax, Brucellosis, Toxoplasmosis, Cysticercosis, Echinococcosis

Do you know ?

A disease that regularly found in a population and in a certain area is called as endemic disease.

- **Re-emerging diseases :** Japanese Encephalitis, Plague, Leptospirosis, Scrub Typhus, KFD (Kyasanur Forest disease)

Do you know ?

Diseases that once were major health problems globally or in a particular country, and then declined dramatically, but are again becoming health problems for a significant proportion of the population are known as re-emerging diseases.

- **Emerging diseases :** Avian Influenza, NiV (Nipah Virus), Trypanosomiasis, H1N1 (Swine flu), CCHF (Crimean-Congo haemorrhagic fever), Trichenellosis

Do you know ?

Infectious diseases or infections that have recently appeared within a population or those whose incidence or geographic range is rapidly increasing or threatens to increase in the near future are called as emerging diseases.

Do you know ?

Epidemic disease : A rapid spread of an infectious disease to a large number of population within a short period of time

Pandemic disease : An epidemic of a disease that spreads across a large region; continents to continents, or even worldwide

Internet my friend

Search for examples of epidemic and pandemic diseases.

Table 8.2: Important zoonotic diseases : their causes, mode of transmission and symptoms observed in human beings

Sr. No.	Name of the Disease	Cause	Mode of transmission	Common symptoms in humans
1	Bird flu	Avian Influenza virus H5N1, H7N9 and H9N2.	Direct or indirect contact with infected live or dead poultry	• Fever • Coughing • Difficult breathing • Death
2	Dengue fever	*Dengue virus*	Mosquito (*Aedes*) bite	• Fever • Headache • Severe joint/ muscle pain • Swollen lymph nodes • Skin rashes
3	Chikungunya	*Chikungunya virus – Alphavirus*	Mosquito (*Aedes*) bite	• Fever • Joints and muscle pains • Skin rashes
4	Kyasanur forest Disease (KFD)	*Kyasanur forest disease virus – Flavivirus*	Tick bite (*Haemaphysalis*)	• Biphasic fever • Haemorrhagic signs (GI bleeding, epistaxis) • In later stage neurological signs
5	Zika Virus Disease (ZVD)	*Zika virus*	Mosquito (*Aedes*) bite	• Mild fever • Skin rashes • Headache • Muscle and joint pain • Swollen eyelid.
6	Nipah Virus (NiV) infection	*Nipah virus*	Fruits contaminated by the saliva of fruit bats of the genus *Pteropus*.	• Fever • Muscle pain • Respiratory problems • Neurological signs in later stage.

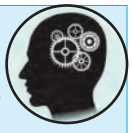
7	Ebola virus Disease (EVD)	*Ebola virus*	Contact with infected wild animals and humans	• Fever • Body aches • Diarrhoea • Sometimes bleeding inside and outside the body.
8	Swine flu	*H1N1, Swine influenza virus*	Contact with infected pigs	• Fever • Cough • Sore throat • Runny nose • Body aches • Headache and chills.
9	Scrub typhus	Rickettsial disease caused by *Orientiat sutsu gamushi*	Vector borne Larval mite (chiggers)	• Fever • Skin rashes • Lymphadenopathy • Pneumonia • Myocarditis • Meningio-encephalitis • Acute renal failure • Gastrointestinal bleeding
10	Glanders	Bacterial disease caused by *Burkholderia mallei*	Contact with tissues or body fluids of infected animals	• Fever with chills • Sweating • Chest pain • Muscle pain • Headache.
11	Leptospirosis	Disease caused by *Leptospira* spp.	Contact with water or soil contaminated by the urine of infected animals.	• High fever with chills • Headache • Muscle aches • Vomiting • Jaundice (yellow skin and eyes) • Red eyes • Abdominal pain • Diarrhoea • Skin rashes.

12	Brucellosis	Bacterial disease caused by *Brucella* spp.	• Contact with secretions • Ingestion of unpasteurized milk and undercooked meat of infected animals	• Fever with high "spikes" in the afternoon • Back pain and body aches • Headache • Poor appetite • Weight loss • Night sweats • Weakness and abdominal pain
13	Tuberculosis	Bacterial disease caused by *Mycobacterium* spp.	Contact with infected domestic and wild animals, inhaling infected droplets, ingesting raw milk or meat.	• Low-grade fever • Night sweats • Weakness or tiredness • Weight loss • Chest pain • Shortness of breath • Cough or coughing up blood
14	Anthrax	Bacterial disease caused by *Bacillus anthracis*	Soil-borne infection, ingestion of contaminated feed and water and sometimes by inhalation	• Sore throat • Mild fever • Fatigue • Muscle pain • Mild chest discomfort • Shortness of breath • Nausea • Coughing up blood • Painful swallowing.

Do you know ?

- KFD was first discovered in 1957 in and around the Sagar and Sorab talukas in the Shimoga district of Karnataka.
- Recently KFD was recorded in Dodamarg taluka in Sindhudurg district of Maharashtra in 2016.
- NiV was first recognized in India and Bangladesh in 2001; since then, nearly annual outbreaks have occurred in Bangladesh.
- In India, the first case of scrub typhus was reported in 2009 from Kerala.
- In recent years, outbreaks of scrub typhus have been reported from Maharashtra, Rajasthan, Punjab, Sub-Himalayan belt and southern Indian states of Tamil Nadu, Kerala and Karnataka.
- Glanders was used as a biological weapon against animals in Europe, Russia, and the United States during the First World War.

Remember...



- Swine flu was first isolated from pigs in the 1930s from USA.
- H1N1 caused the global pandemic in 2009
- More recently in 2015, swine flu spread across India with over 10,000 reported cases and 774 deaths
- Anthrax has been used in bioterrorism and warfare since World War First

- **Future Threat for India :** Yellow fever, Hanta Virus, Rift valley Fever, Ebola and Marburg virus, MERS CoV (Middle East Respiratory Syndrome Coronavirus), Zika virus disease

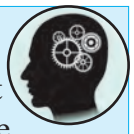
Prevention of zoonosis

Following measures be undertaken to prevent zoonotic diseases

A. Prevention of milk-borne infectious diseases

1. Don't drink raw milk. Drink only pasteurized milk and other dairy products.
2. Keep dairy products refrigerated within the expiration date marked on the package.
3. Do not leave dairy products outside of the refrigerator for more than two hours.

Remember...



Bacterial toxins may persist despite reheating of milk even if the bacteria themselves are killed.

B. Prevention of meat/food-borne infectious diseases

1. Wash your hands before handling food and often during food preparation
2. Wash and sanitize all surfaces and equipments used for food preparation
3. Protect kitchen areas and food from insects, pests and other animals
4. Wash fruits and vegetables, especially if eaten raw
5. Separate raw meat, poultry and seafood from other foods
6. Use separate equipment and utensils such as knives and cutting boards for handling of raw foods
7. Store food in separate containers to avoid contact between raw and prepared foods.
8. Cook food thoroughly, especially meat, poultry, eggs and seafood. Make sure that the food is washed and thoroughly cooked to get rid of harmful bacteria and other hazardous germs.
9. Do not leave cooked food at room temperature for more than 2 hours
10. Refrigerate promptly all cooked and perishable food (preferably below 5°C)
11. Keep cooked food piping hot (more than 60°C) prior to serving
12. Do not store food too long even in the refrigerator also
13. Do not use food beyond its expiry date

C. Prevention of water-borne infectious diseases

1. Make sure that the water is visibly clean and free from any sand and deposits etc.
2. Filter the water to get rid of any visible dirt.
3. Drink only clean and safe water which has been treated with water purifiers.
4. In bathing water, if it is not clear, put some antiseptic liquid to get rid of harmful bacteria.
5. As far as possible use disposable glass and plates while eating or drinking from outside.
6. Water treatment devices like filters, RO unit, etc. be serviced and maintained, regularly.

D. Prevention of vector-borne diseases

Mosquitoes/insects can spread serious diseases when they bite and currently there is NO VACCINE for vector-borne diseases. The only way to protect yourself and your family is to avoid being bitten by them

1. Use insect repellents or other methods to keep mosquitos, fleas, and ticks away.

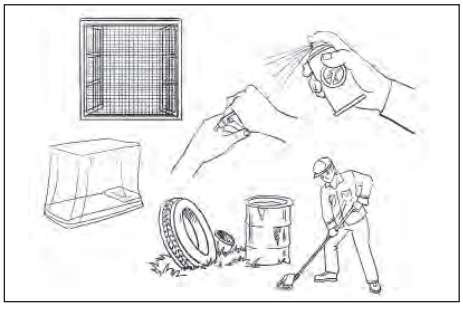


Fig. 8.28 : Measures to control vector borne diseases

(Cleaning, insect repellent, net for windows, bed etc)

2. Prevent bites from mosquitoes, ticks, and fleas by using bug sprays, wearing long trousers and sleeves.
3. Protect from mosquitoes, fleas etc by fitting mosquito nets to windows, beds.
4. Destroy mosquito breeding places by removing water from coolers, old tyres and other small containers, at least once in a week.
5. The surrounding area of house, colony and whole village/town should be kept clean
6. Regular spraying/fogging of gutters by using insect/mosquito repellents/killers (Permethrin, Pyrethroids cyfluthrin etc)

Fig. 8.29 : Mosquito fogging

E. Other general measures

1. Practice exceptional hand hygiene by washing hands meticulously with soap after using the toilet, before and after preparing food, before eating or drinking anything.
2. Children should always wash hands when they enter a home after playing games, and also everyone should wash hands while entering the home.

Fig. 8.30 : Hand washing

3. Cook food properly in clean areas and by washing dishes and pots before and after use.
4. Don't eat, drink, or touch your eyes or mouth while you're handling or in close contact with animals.
5. Use masks, spectacles, particularly during disease outbreak situation.
6. Avoid being bitten or scratched by an animal.
7. Vaccinate and deworm pets regularly.
8. Take appropriate measures for control of flea and ticks infestations to your pets.
9. Use gloves if you need to handle sick animal.
10. Keep area clean and sanitary, where animals are kept.
11. Above all, immunize yourself from vaccine-preventable diseases like Typhoid, Hepatitis A, Polio, etc.

Steps for proper hand wash

Steps to wash hands properly (National Health Portal))

- Wet hands with water
- Apply enough soap to cover all hand surfaces
- Rub hands with palm to palm
- Place right palm over left dorsum (back of hand) with interlaced fingers and vice versa
- Put palm to palm with fingers interlaced
- Backs of fingers to opposing palms with finger interlocked
- Rotational rubbing of left thumb clasped in right palm and vice versa
- Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa
- Rinse hands with water
- Dry thoroughly with a single use towel or clean towel

Internet my friend

Search for CCHF, MERS, and Marburg viral infections in humans.

8.5 Contingency planning for Livestock

India has been traditionally vulnerable to natural disasters such as flood, drought, earthquakes and landslides. The floods are common in states of Assam, Bihar, Uttar Pradesh, West Bengal, Orissa and Andhra Pradesh, whereas droughts are more common in Karnataka, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh and Tamil Nadu.

Disasters cause huge economic loss to animal husbandry segment. The economic losses result from death of livestock, management of livestock diseases, public health problems, production losses, habitat loss, nutritional insecurity and loss of bio-diversity.

Natural calamities like flood and drought can not be prevented, however losses can certainly be minimized by adopting following measures.

A. Management

This includes following aspects of planning and management required to be implemented prior to occurrence of flood or drought.

1. **Population data :** The data pertaining to livestock population and disease occurrence in the disaster prone districts should be collected and maintained. This will help in rescue operation, prevention of diseases and calculation of actual losses from such disasters.

2. **Human resource development :** The available technical man power and their competency to tackle disaster should be assessed from time to time. The veterinary doctors and supporting staff from disaster prone districts should be given training in disaster management of livestock
3. **Infrastructure development :** The hospitals from the areas should be well equipped with all necessary equipments, instruments, ambulance and animal transport facilities to combat emergencies
4. **Strengthening of extension institutes:** The technical staff of extension institutes should be trained in disaster management. The extension institutes i.e. NGOs , KVKs should be encouraged to provide information to farmers about dealing with situation of flood or drought
5. **Livestock Insurance :** It should be made mandatory in disaster prone areas.
6. **Animal incinerator :** The animal incinerator facilities should be developed in these areas for early disposal of animal carcass
7. **Temporary animal shed :** Arrangements for temporary shed at safe location be made.

B. Nutrition

During disaster majority of animals suffer from protein –energy malnutrition, dehydration and mineral deficiency diseases. Most of the forage crops stored straw and hay are washed away by the flash water. Even water becomes unsafe for drinking due to presence of animal/ human excreta, dead bodies and toxins. There is shortage of water as well as good quality fodder during draught.

To meet nutritional requirements of animals during disaster following measures should be adopted

1. **Fodder banks :** Establishments of fodder banks at each district in flood /drought prone districts during season when fodder is amply available.
2. **Relocation of stored fodder :** Farmers should be advised to relocate their fodder stores in view of situation arising due to flood.
3. **Unconventional feed stuffs :** Farmers from disaster prone area should be trained and encouraged for utilization of leaves, soft stems of locally available trees and plants as fodder after chaffing.
4. **Urea–molasses feeding :** Training and motivation of farmers to learn utilization of urea –straw –molasses feeding for nutritional support.
5. **Water :** Make necessary arrangements for whole some water supply. Stocking of water disinfectants such as chlorine tablets/bleaching powder be made.
6. **Mineral mixture :** Sufficient stock of mineral mixtures, vitamin supplements and salt blocks should be made at district level because deficiency diseases are very common during disasters
7. **Chaff cutter :** Supply of chaff cutter to each village to avoid feed and fodder losses.

C. Health control measures

During both drought and flood there are more chances of occurrence of various diseases, hence following measures should be adopted -

1. **Vaccination :** The cattle and buffaloes should be vaccinated against Black quarter, Haemorrhagic septicaemia, FMD and Theileriosis where as sheep and goats be vaccinated against PPR, Enterotoxaemia, Pox, FMD as per vaccination schedule in disaster prone districts. Sufficient stock of vaccines be made available during monsoon.
2. **Deworming :** During drought as well as flood, the animals are more prone to parasitic diseases. Therefore, deworming should be done at regular intervals

especially one month before monsoon in flood prone areas and before summer in draught prone areas. Sufficient stock of dewormers should be made available.

3. **Insecticidal spray :** In general during flood and drought the population of ectoparasites viz. ticks, lice, flies, mosquitoes increases. Therefore, it is essential to control these ectoparasites. Sufficient stock of pesticides /insecticides should be made available at district level.

Exercises

Q.1. Fill in the blanks

1. Vaccination against HS is carried out before the onset of…….....
2. Black quarter is caused by…….
3. Brucellosis is characterized by…….
4. Sudden death with bleeding from natural openings is a characteristic feature of……disease.
5. FMD is caused by .....
6. Goat plague is synonym of …….
7. Surra is caused by……
8. …….vaccine is used for prevention of Marek's disease.
9. Bird flu is synonym of ……
10. Scabs/ warts like growths are observed on comb and wattles in ……..disease.
11. Torticollis is typical sign of …….disease
12. Coccidiosis is ……disease.
13. Chronic respiratory disease is caused by……
14. Near about ….. number of diseases are zoonotic in India.
15. Influenza mainly transmit through…… route of transmission.

Q.2. Identify the odd one

1. HS, BQ, FMD, Anthrax
2. Mastitis, HS, FMD, RD
3. TB, Colibacillosis, Brucellosis, Anthrax
4. Ticks, Fleas, Fluke, Lice

Q.3. Answer the following in one sentence

1. What is contagious disease?
2. Name the causative agent of haemorrhagic septicaemia.
3. Give the appropriate time for vaccination against black quarter.
4. Mention any two zoonotic bacterial diseases of animals.
5. Enlist any two vector borne viral diseases of animals.
6. Write the typical symptoms of sheep pox.
7. Name the test used for detection of mastitis.
8. Give the use of LaSota vaccine.
9. Name the vaccine which is given to day old chicks.
10. Name the most important zoonotic viral disease of poultry.
11. Mention the synonym of infectious bursal disease.

12. Write the causative agent of chronic respiratory disease.
13. Give the cardinal symptom of coccidiosis.
14. Define zoonosis.
15. What do you mean by emerging diseases?

Q.4. Answer the following questions in brief

1. Differentiate between infectious and non-infectious diseases.
2. Enlist general measures for prevention of contagious diseases.
3. What are the symptoms of rabies?
4. Give the control measures for theileriosis.
5. Suggest measures for prevention of chronic respiratory disease in poultry.
6. Give vaccination schedule for Ranikhet disease.
7. Write a brief note on symptoms of fowl pox.
8. Write in brief about symptoms and prevention of Gumboro disease.
9. How bird flu is being transmitted? Give control measures.
10. Enlist the control measures to prevent water borne diseases.
11. List out the contingent strategies to be undertaken in view of drought/flood.

Q.5.Answer the following questions in detail

1. Describe in detail causative agent, transmission, symptoms and prevention of haemorrhagic septicaemia in buffaloes.
2. Explain in detail causes, transmission, symptoms and control measures of FMD in cross breed cattle.
3. What is mastitis? Enlist its causes, symptoms and control measures in dairy animals.
4. Write the cause, symptoms, control measures and vaccination of Ranikhet disease.
5. Discuss in details about the measures to be undertaken to prevent zoonotic diseases.