

Control of important diseases of livestock and poultry

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General Disease Prevention and Control Measures

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1. Prevention of Environmental contamination

The premises (sheds, stables, and kennels) and pastures should be prevented from contamination. Elimination of parasites from the host at the most appropriate time by use of antiparasiticides thereby preventing pasture contamination. Destruction of adult parasites in hosts prevents expulsion of eggs or the larvae and the associated contamination of the environment. Ovicidal drugs should preferably be used to destroy the eggs, thereby preventing environmental contamination. Anthelmintic treatments prior to rainy seasons using larvicidal drugs will prevent contamination of pastures at a time when conditions are becoming favourable for egg and larval development. Proper faeces disposal will give satisfactory control of faecally transmitted monoxenous parasites of animals. Faeces or litter may be heaped to destroy the eggs/oocysts of parasites. Pens and pastures should not be overstocked. Reducing the stocking rate can significantly reduce the parasite burden in animals and the associated problem of contamination in sheds and pastures.

2. Control of Intermediate host, vectors and reservoirs

Limiting the contact between intermediate and final hosts by improvements in management. Direct action may be taken to reduce or eliminate intermediate host populations. Reduction in the number of snail intermediate host by chemical (molluscides) or biological control (ducks, *Maris* species of snails). Reduction in the number of snail intermediate hosts by drainage, fencing and other management practices. Reduction in the number of insect and tick vectors by chemical (insecticides/acaricides), biological control (hymenopterous insects, entomopathogenic fungi and *Bacillus thuringiensis*) and genetic control (sterile male technique, chromosomal translocation). Use of vaccines (Tickgard) at appropriate times may control the vector population. Destruction of reservoir hosts is important in controlling certain parasites, e.g., rodents for *Leishmania* and antelopes for African trypanosomes.

3. Control of internal parasites

Ridding the animal of internal parasites by periodical deworming, Preventing infestation of animals by keeping premises free from infective forms of parasite – disinfections, and Elimination of intermediate hosts.

4. Control of arthropod pests

Manure, filth, damp and dark corners, stagnant water etc. are all favorite breeding places of insects and these places should be concentrated for removal and cleaning periodically. Eggs of ticks and mites deposited in cracks and crevices in the walls, floors and wood work of the animal houses should be removed periodically. Periodical (once in April-June and once in July-September) dipping or spraying of animals with suitable insecticides to prevent lice, flies, fleas, mites and ticks on skin of animals. Inside of animal sheds should be scrubbed and cleaned daily to remove all filth. Areas around animal sheds should also be kept dry and clean. Interior of animal sheds (roofs, walls and corners) should be cleared regularly of cobwebs and spider webs and sprayed with insecticides at least once in a month. Dusting of animals with DDT, lorexane, gammexane or with some patent preparations available in the market can be tried to control cattle warble flies, etc. If the herd is small, individual animals can be dusted by hand.

For larger herds a gunny bag (or any other bag having sufficiently large pores through which dusting powder can escape out) filled with dusting powder can be hung at a convenient place and at a convenient height. As the animals pass under the bag they rub their backs against the bag, getting a dusting in the process. Such convenient places for hanging the bags are the entrances to stanchion barn, hay or straw feeding bunk, gates leading out on to the pasture etc.

Organophosphate insecticides like Malathion, Parathion, and Neguvon etc. are available which are very destructive to insects but are quite toxic to animals as well. Newer generation synthetic pyrethroids like Deltamethrin (Butox™), Cypermethrin (Cyprol, Tikkil) etc. are available in the market. Great care should be taken while using these chemicals and manufacturer's instructions regarding their usage should be scrupulously followed.

5. Control and reducing the infection as soon as an outbreak occurs

Segregate sick animals. Stop all animals, animal products, vehicles and persons coming into and out of the farm. Call a veterinarian for advice, adopt containment vaccination. Avoid

grazing in a common place. Ban all visitors to the farm. Provide foot dips containing disinfectants at the entry of the farm and gear up sanitation and hygiene.

6. Isolation of sick animals

Isolation means segregation of animals, which are known to be or suspected to be affected with a contagious disease from the apparently healthy ones. Segregated animals should be housed in a separate isolation ward situated far away from the normal animal houses. The isolation ward should never be at a higher level than that of the healthy shed. If a separate accommodation is not available the animals concerned should be placed at one end of normal animals' buildings, as far away from healthy stock as practicable.

Attendants working on sick animals and equipment such as buckets, shovels etc. used for them should not be used for healthy stock. If this is not practicable, the sick animals should be attended to daily, after the healthy stock. After this, the equipment should be thoroughly disinfected before they are used on healthy stock next day; the attendant too should wash his hands and feet in antiseptic and discard the clothes in which he worked. □ The isolated animals should be brought back into the herd only when the outbreak ends and they are fully recovered.

7. Quarantine for newly purchased animals

Quarantine is the segregation of apparently healthy animals (especially animals being brought into the herd for the first time), which have been exposed to the risk of infection from those animals, which are healthy and unexposed to the risk of infection.

The idea is to give sufficient time for any contagious disease that the quarantine animals may be having, to become active and obvious. Hence, the quarantined period depends on the incubation period of a disease. But in practice a quarantine period of 30 days covers almost all diseases.

For rabies, the quarantine period should be about six months.

During the quarantine period, animals should be thoroughly screened for parasitic infestation by faecal examination and de-worming carried out on the 23rd/24th day, if need be. The animals should also be subjected to dipping or spraying on the 25th/26th day for removing ectoparasites if any.

8. Vaccination of farm animals

Vaccination is a practice of artificially building up in the animal body immunity against specific infectious diseases by injecting biological agents called vaccines. The term vaccine is used to denote an antigen (substance from organisms) consisting of a live, attenuated or dead bacterium, virus or fungus and used for the production of active immunity in animals.

The term also includes substances like toxins, toxoids or any other metabolites etc. produced by microbes and used for vaccination. The farm animals and young ones should be vaccinated at regular intervals at appropriate times. Vaccination should be done with consultation of veterinarians.

9. Deworming of animals

It is essential to deworm livestock regularly. The individual farmer should also try to keep his herd worm-free. The most suitable time of deworming is the early stages of infection when the worm load is less. The local veterinarian should be consulted for all suggestions regarding dewormers and deworming. In adult animals deworming is done on examination of dung. It is good to deworm adult females after parturition. All the animals should preferably be fasted for 24 hours before giving the anthelmintic. Young animals should preferably be dewormed every month using a suitable anthelmintic. Older stock can be dewormed at 4-6 months' intervals. The National Dairy Research Institute, Karnal recommended the following deworming schedule for calves. Such a deworming schedule is very crucial for buffalo calves, in which species mortality due to worms is very high.

In places where heavy endo-parasite infestations are found (hot-humid regions) it is advisable to deworm heifers twice a year up to two years of age. Even adult stock can be drenched twice a year—once before monsoon season (May-June) and once during monsoon (August-September).

10. Elimination of carriers

An animal recovers from a disease, although apparently in good health the causative organism harbors in its tissues. Such germ carrying animals are known as 'carriers'. The carrier state may remain for years and the animal becomes a potential danger to susceptible animals.

Common diseases for which carriers have been observed in farm animals are Tuberculosis, Leptospirosis and Brucellosis. Carriers of diseases in the herd should be diagnosed and eliminated so that the herd may be completely free from diseases

Certain diagnostic screening tests can be used for spotting out carriers animals in the herd. These tests should be periodically conducted on all animals in the herd so that carriers can be diagnosed and culled. Some of the commonly used screening tests are tuberculin test, Johnin test, agglutination test and test for detection of subclinical mastitis.

11. Tuberculin test

On injection of tuberculin (purified protein derivatives (PPD) of *Mycobacterium tuberculosis* (tubercle bacteria)) into an infected animal, allergic symptoms are set up, and these constitute a 'reaction'. In healthy animals, tuberculin, even in large doses, gives no reaction. This is quite a reliable test for diagnosing non-clinical cases of tuberculosis in all species of farm animals. Tuberculin test should be carried out in animal farms once every six months in the initial stages and later on, depending on the health status of the herd, the test can be conducted annually.

January is the ideal month for conducting tuberculin test under Indian conditions. The important methods of test are intradermal, subcutaneous and ophthalmic, the former being most practicable, reliable and popular. Intradermal test can be used in all bovines. The best site is the side of neck. In bovines it can also be done in one of the folds of the skin by raising the tail, or on the vulva. In the neck, the sites for the middle third of the neck, as sites near the shoulder or mandible give less pronounced reactions. A small area of skin is clipped and cleansed with spirit. 0.1 ml of PPD is injected intradermally. If correctly done, the tuberculin creates a bead-like swelling detectable by the finger. The positive carrier animals should be culled and destroyed from the herd.

12. Johnin test

Johnin is (purified protein derivative of *Mycobacterium paratuberculosis* (Johne's bacterium)) used as a diagnostic test for Johne's disease in cattle and buffaloes. Johnin test is also done like single intradermal test done for tuberculosis. A painful indurated skin with an increase in skin thickness more than 4 mm is taken as positive. All positive animals are culled and destroyed.

13. Agglutination test for brucellosis

This is a serological test based on the principle of antigen (dead bacteria) and antibody (agglutinins present in the body fluids, mainly serum of infected animals) reaction, resulting in agglutination of bacteria. When the agglutinins present in the serum and other body fluids of animals suffering with brucellosis or carriers is added to a suspension of killed culture of *Brucella abortus* organisms, the latter will cluster together; the reaction being known as agglutination. Healthy animal in which agglutinins are absent, do not show such agglutinations.

Rapid plate agglutination test, which can be done at the site of the animal. Standard Tube Agglutination Test, which can be done in a laboratory. Agglutination can be conducted using whole blood, serum, milk, whey, semen, etc. Stockmen can only attempt to collect sterile samples of blood (from jugular vein) or milk of their animals periodically (say once in a year) and get them tested in the nearest laboratory. All positive reactors to the test should promptly be eliminated from the herd.

14. Test for mastitis-Strip Cup Test

Strip Cup test comprises of letting the first few streams of milk from each quarter on to the black disc of strip cup. This will show up any clots, which only occur in the fore-milk in mild cases of mastitis, and will permit early treatment. Addition of an anionic detergent (such as alkyl sulphates or sulphonates, Teepol) to mastitis milk results in formation of typical gel streaks or clumps, according to the degree of abnormality of milk.

15. Test for mastitis- California Mastitis Test (CMT)

Milk from each of the four quarters is drawn into separate cups within a plastic paddle fitted with a handle, the cups being marked A, B, C and D to correspond with the quarters so designated. By tilting the paddle to an almost vertical position, surplus milk is allowed to run over, leaving only desired quantity of about 2ml. To this is added approximately the same quantity of CMT reagent (sodium lauryl sulphate – 4g, Teepol – 15 ml, Distilled water – 100 ml, Bromocresol purple – 100 mg) from a plastic container, care being taken to avoid production of foam or bubbles. The milk and fluid are immediately mixed by rapid rotation of the paddle in a horizontal plane while the reactions are noted.

Formation of typical streaks and clumps indicate mastitis; the severity of reaction roughly indicating intensity of mastitis. After the cups have been emptied into a container and the paddle rinsed in clear water (the detergent quality of the test fluid ensures rapid and good cleaning) the apparatus may immediately be used for the next test without drying. All the milch animals should be screened for mastitis by strip cup test or CMT test at least once in a month, preferably more frequently. The sub clinically positive animals should be isolated from the herd and treated immediately.

16. Disposal of carcass

Proper disposal of carcasses of animals died of infectious disease is of utmost importance in preventing the spread of diseases to other animals and humans. Carcasses should never be disposed off by depositing them in or near a stream of flowing water, because this will carry infections to points downstream. An animal died of a infectious 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 a disinfected place) it is not safe to open carcasses of animals that have died of a disease. All carcasses should be disposed of properly either by burying or by burning.

17. Burial of carcass

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 carnivorous animals 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 1.5 m below the level of the land surface.

Bedding used for the dead animals, its excreta, feed left over by it and the top 5 cm soil form where the dead animals 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 2.5 m below the ground. The carcass is then covered with a thick layer of freshly burnt quicklime and then filled with dirt and topped with some rocks, to further circumvent marauders.

18. Burning of carcass

The most sanitary method of destroying carcasses is to burn them, preferably close to the site of their death, without dragging them any more than is absolutely necessary; even then only in 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's size. General direction of the trench should be that of the prevailing wind direction. The trench is first filled 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 infectious material.

In towns and cities the so-called carcass utilization or 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 these utilization plants can collect the same.

19. Disinfection of animal houses

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 height of 1.5 m, interiors 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 height of 1.5 m 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.

In case of an outbreak of anthrax, the dung, litter etc. should first be disinfected in situ thorough sprinkling of suitable disinfectant. If the floor is of earth, which is generally the case in Indian villages, the top 10cm earth should be removed and disposed off along with litter. After removal of filth, the place should be scrubbed and washed with 4 per cent hot washing soda solution (i.e., 4 kg 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 whitewashed. (This can be done even routinely at fortnightly intervals.)

20. Disinfection of pastures

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.

21. Common disinfectants and their usage

Bleaching powder (Chloride of lime).

It can be used for disinfection of animal houses when a contagious disease has occurred and for sterilization of water supplies. It should not be used in milking barns as its strong odour may taint milk. Concentration required is not less than 30 per cent available chlorine. Mode of application is dusting. Bleaching powder must be stored in airtight bins as damp surroundings, exposure light and air causes it decompose rapidly.

Boric acid

It can be used as an udder wash. It is a weak antiseptic and is likely to harm nervous system if absorbed into body in large quantities. It is used as wash for eyes and other sensitive parts of body. Concentration required is 6 per cent solution. Mode of application is splashing. Nowadays antibiotic solutions are replacing boric acid as eyewash solution.

Caustic soda (Sodium hydroxide)

For general use in farm buildings and animal houses, caustic soda is a very effective disinfectant as it is an excellent cleaning agent as well as a powerful germicide. It is highly destructive to virus of foot and mouth disease, hog cholera etc. It is not effective against tuberculosis and johne's disease organisms. Concentration required is 2 per cent solution for general use and 5 percent solution against spores of anthrax and black quarter.

Mode of application is splashing.

Rubber gloves, goggles and protective clothing should always be worn when caustic soda solution is being used as it burns skin and damages fabrics.

Cresols

- The cresols are only slightly soluble in water and are therefore generally emulsified with soap.
- Effective against a wide range of organisms including acid fast tuberculosis and Johne's disease bacteria but not effective against viruses and spores.
- Good for disinfecting floors, walls, equipment etc. but not in milking barns because of its phenolic odour.
- Concentration required is 2-3 per cent.
- Mode of application is splashing.
- Use only soft water for preparing solutions, hard water precipitates soap.
- Lysol is a solution of cresol with soap.

Lime (Calcium Oxide, quick lime)

It is a deodorant as well as a disinfectant.

It can be used for sprinkling on manure and animal discharges, on floors or as a whitewash or milk of lime (also known as slacked lime).

Mode of application is sprinkling, scrubbing or sometimes dusting.

Always use freshly prepared lime only.

Phenol (Carbolic acid)

Effective against several types of bacteria; not so effective on spores and viruses.

Its disinfectant value is not reduced by the presence of organic matter but oil or alcohol does so.

It is very toxic, corrosive and irritant.

Concentration required is 1-2 per cent.

Mode of application is splashing.

Great care should be taken in using phenol to protect eyes, skin and clothing.

Quaternary Ammonium Compounds (QAC)

These are cationic detergents.

They have no effect on spores and viruses.

They can be used to disinfect dairy utensils, udders, milkers' hands and towels for wiping udders.

Cetrimide, a white powder is an example for QAC.

Concentration requires is 0.1 per cent solution (0.5 per cent cream for applying on teats and hands to prevent mastitis).

Mode of application is wiping of udder with clothes wetted in 0.1 per cent solution; washing of milkers' hands.

Utensils should be scrubbed with boiling water before rinsing with QAC.

Soap

Soap is an anionic detergent.

It is a very weak germicide.

But its great usefulness in cleaning various surfaces including skin.

It can be used preparatory to the application of a disinfectant.

Mode of application is scrubbing.

It should preferably be used only as surface-sanitizing agent.

Sodium hypochlorite

It is a chlorine compound.

It is an excellent disinfectant but is not effective against T.B bacteria and its effectiveness is reduced by the presence of organic matter.

Concentration required is 200 parts per million of available chlorine about 300 ml sodium hypochlorite and about 200g of washing soda in 100 litres of hot water for washing utensils etc. For udder wash-about 60 ml in 10 litres of clean water.

Rinsing of utensils, wiping of udder.

Should be stored in air-tight containers as hypochlorites deteriorate rapidly when exposed to air.

Washing Soda (Soda ash, Sodium carbonate)

It is good for disinfection of barn premises upon which an outbreak of virus disease like foot-and-mouth disease has occurred.

It is a good detergent.

Concentration required is 4 per cent solution.

Mode of application is scrubbing.

Lye is better against Foot-and-mouth disease virus than soda ash.

It should be used as a hot solution.

22. General Disease Prevention Measures

Feed should be placed in troughs that cannot be contaminated by faeces and waterers should be kept clean and free of contaminants.

Good grazing management will control pasture or grassland borne helminthic infections.

Use of clean or safe pastures (not grazed for 6 to 12 months) will help to control helminths problems.

Rotational grazing of livestock species should be followed to minimize or limit the infection from pasture.

All new arrivals to the farm should be isolated for at least 30 days and dewormed.

Young animals are generally more susceptible to parasites than adults. Therefore young animals should be housed separately from adult animals.

Infected/Infested animals should be removed from the flock or herd and housed separately.

Treatment should be followed by chemoprophylaxis to prevent reinfection.

Vaccines may be used to prevent infection, if suitable vaccines are available.

Prompt and proper disposal of manure and other filth from the farm premises.

Regular scrubbing and cleaning of feed and water troughs as well as whitewashing their interior at least once in a week.

Leveling up all ditches, low marshy areas, pits etc. in and around animal houses so that water may not stagnate in them.

Filling up or fencing of all stagnant water pools, ponds etc. around the farm and on pastures so that animals may not get access to them. It is always better to have piped water supply to farm animals.

Housing animals in clean houses with paved floors.

Animals of different ages should be housed separately.

Younger animals should never be mixed with older ones.

Proper deworming of all such animals before putting them in a shed or bringing them into the farm.

If grazing is practiced-division of pasture into several blocks and practicing rotational grazing in these blocks.

Feeding of cultivated fodders is more helpful in checking pasture-borne infections.

Preventing humans from defecating on pastures or around the farm, as this may cause contamination with tape worm eggs.

Care should be taken to see that dogs (intermediate hosts), crows and other birds (mechanical carriers) do not gain access to the animal farm.

Control of snail population may result in control of liver fluke infestation to some extent.

It is worthwhile trying reduction of snail population by treating infected pastures, ponds, streams, etc. with copper sulphate.

A concentration of one part of copper sulphate in one million parts of water is generally recommended but stronger solution may be necessary when large quantities of decaying organic matter are present.