

Dairy Cattle Health Management

Training Package For Dairy Extension Workers



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SNV



DAIRY TRAINING CENTRE
Developed with
Dairy Training Centre

Dairy Cattle Health Management

Part I Training manual

Part II Training Guideline

Preface

SNV Ethiopia, through EDGET project (Enhancing Dairy Sector Growth in Ethiopia, 2013-2018), engages in the capacity building, extension services and innovative support to the Ethiopian dairy sector particularly working with smallholder dairy farmers. The aim of the project is to increase milk production and productivity in order to double the income of the smallholder dairy farmers. EDGET is operational in the regions Oromia, Amhara and SNNP, and working with 65,000 dairy farming households.

The project works closely together with livestock regional bureaus and their respective zonal, woreda and kebele staff in delivering extension and other supports. One area of collaboration is the development of practical training and coaching tools and materials for extension workers based on a need assessment.

SNV has engaged the Netherlands based Dairy Training Centre (DTC) for the development of the Training package for extension workers. The documents were more elaborated and validated with the utmost contribution of high level experts from regional Livestock and Fisheries resources Development Bureaus/Agencies and Research Centers from the three operational regions of EDGET.

Overall nine training packages were developed on Breed Improvement and Fertility Management; Dairy Cattle Feeding and Nutrition Management; Dairy Cattle Health Management; Dairy Farm Management; Dairy Housing and Manure Management; Farm Economics; Forage Production and Management; Hygienic and Quality Milk Production; Young Stock Management.

This training package is on **Dairy Cattle Health Management**.

SNV, also on behalf of the experts that contributed and DTC, would hope to see the materials widely used outside the project areas by all interested dairy development practitioners. The materials will be available in hard copies and soft copies including on SNV website www.snvworld.org and other relevant websites.

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I. Dairy Cattle Health Management Training Manual

1. Introduction

In Ethiopia Dairy cattle industry is becoming the main source of food and income for both urban and rural societies. It has an important economic significance, especially in rural areas. But there are constraints affecting the dairy cattle extension system like shortage of feed, non-standardized housing system, poor genetic makeup and lack of regular health management package which will be discussed in this manual.

Health management is one of the most important factors influencing the development of dairy cattle industry Ethiopia. It is one of the critical factors in maintaining optimum milk yield, keeping normal calving intervals and ensuring the generation to continue through caring and reducing mortality in calves and other young dairy stocks. This manual is not intended to describe all dairy cattle diseases; however, the manual has been prepared to be used as a reference for farm extension workers to support dairy cattle farmers on most common health issues which are commonly encountered at a dairy farm level through offering knowledge and teaching basic skills on recognizing and solving dairy cattle health problems.

Good dairy health management practices is based on good nutritional supply, housing, genetic improvement and close follow up which discussed in dairy cattle feed management and dairy cattle fertility management manuals. To avoid health problems in dairy cattle routine health care procedures should be followed. It is important to recognize the dairy cattle herd in general and then the individual cows in particular for any health issues. This can be done through attentive observation, touching individual cows, smelling and even by hearing sounds from cows. These are important points to identify health problems in the herd and to take appropriate action on time. The most common dairy cattle diseases discussed in this manual are Infectious Diseases, Diseases of the Reproductive system, Diseases of Digestive system, metabolic diseases, and parasitic diseases.

2. Infectious Diseases

2.1 Anthrax

Anthrax is a per acute, acute or sub acute soil borne bacterial disease affecting mammals. It is characterized by exudation of dark tarry blood from natural orifices. It is fatal zoonotic disease affecting humans and animals resulting in huge economic loss. The bacteria can survive for long period of time by undergoing sporulation and be source of infection.

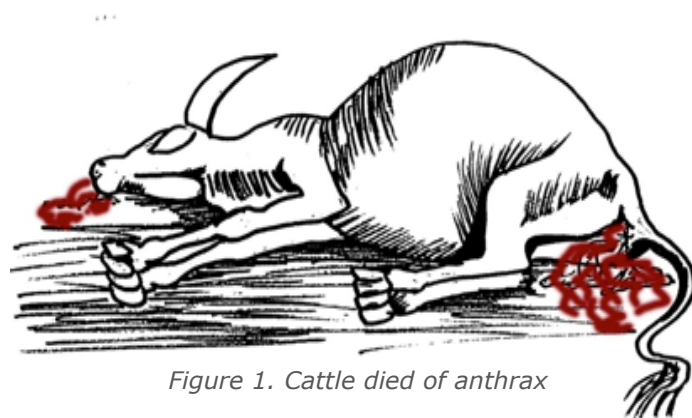


Figure 1. Cattle died of anthrax

2.1.1 Clinical Signs

In per acute case animals die suddenly without showing any signs. There is high fever, tremors, depression, convulsion, respiratory distress, abdominal oedema, bloody milk, rumen atony, abortion is observed in acute and sub-acute cases.

2.1.2 Transmission

Anthrax does typically not spread from animal to animal nor from person to person. The bacteria produce spores on contact with oxygen. These spores are extremely resistant and survive for years in soil, or on wool or hair of infected animals. Then if ingested or inhaled by an animal, or on entering through cuts in the skin, they can germinate and cause disease.

Because the blood of infected animals sometimes fails to clot and may leak from body orifices, insects can spread the bacteria to other animals. Typically animals become infected by ingesting spores which are in the soil or in feed.

2.1.3 Prevention and control

- Undertaking regular vaccination programs based on the Anthrax season in the area
- Proper disposal of dead animals is critical; – the carcass should not be opened, since exposure to oxygen will allow the bacteria to form spores
- Premises are to be quarantined until all susceptible animals are vaccinated and all
- Carcasses disposed of preferably by incineration or alternatively by deep burial with quick lime.
- Cleaning and disinfection are important as is control of insects and rodents.
- Treatment of sick animal with appropriate antibiotics;

2.1.4 Public health risks

In humans anthrax manifests itself in three distinct patterns. The most common is a skin infection, where people become infected handling animals or animal products that contain spores. This can happen to livestock producers or butchers dealing with sick animals, or when infection has been spread by wool or hides. The spores enter the body through cuts or scratches in the skin and cause a local infection that if not controlled may spread throughout the body. The digestive form occurs when the spores are eaten. Tragically people who lose their animals may also lose their lives trying to salvage something and consuming the meat from an animal that died. Potentially the most deadly form is by inhalation. This has been called 'wool sorters disease' since spores on hides or hair could be inhaled. Clearly, preventing the disease in animals will protect human public health.

2.2 Blackleg

It is also a soil born bacterial disease mostly affecting animals with 2-4 years of age. It affects animals in good body condition especially with good nutrition management. Infection occurs through contamination of the environment from infected faeces and decomposition of carcass. The same to anthrax, it undergoes sporulation in the soil and serve as source of infection for long period of time.

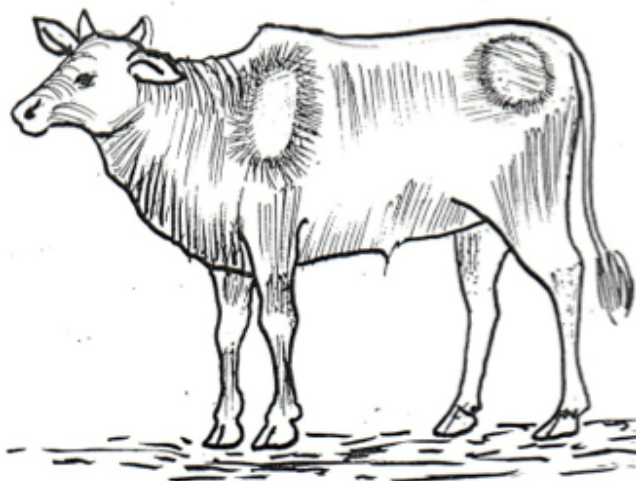


Figure 2. Sites affected by Blackleg

2.2.1 Clinical signs

- Swelling of one the limbs commonly around the shoulder on heavy muscle.
- Characteristic oedematous and crepitating sound on palpation of affected areas in the hip, shoulder, chest, back, neck, or elsewhere
- Febrile, inappetance, rough coat, depression, lameness, etc can be observed.

2.2.2 Prevention and control

- Regular vaccination
- Treatment of sick animals with appropriate antibiotics

2.3 Pneumonic Pasteurellosis

It is a highly contagious bacterial disease affecting bovines and characterized by bronchitis and pleurisy. The principal route infection is inhalation where cattle are overcrowded and transmission is by direct contact between infected and susceptible animals by means of infected aerosols from exhaled air.

2.3.1 Clinical signs

The major clinical signs are excessive nasal discharge, sudden rise in body temperature, absence of rumination, extension of head and neck, open mouth breathing with grunting, coughing and sneezing.



Figure 3. Case of Pneumonic pasteurellosis

2.3.2 Prevention and control

- Do not mix animals from un known sources
- Avoid stress conditions
- Proper ventilation
- Regular vaccination
- Treatment of sick animals depending the primary cause of the disease using antibiotics;.
- For parasitic pneumonia: Broad spectrum anthelmintic;

2.4 Foot and Mouth Disease

Foot and Mouth Disease is a highly communicable viral infection of cattle, pigs, shoat, buffalo and artiodactyls wildlife species characterized by fever, vesicles in the mouth, on the muzzle, gums, pharynx, teat and interdigital cleft. It is transmitted by contact and through milk. Recovered animals remain carriers for up to 2 and half years.

2.4.1 Clinical signs

Drooling and vesicle on the nares, in the buccal cavity and between the claws are the most common. Dullness, in appetite, fever, shaking and kicking of the feet, abortion of pregnant animal, death of calves are also clinical signs.

2.4.2 Prevention and control

- Vaccination
- Test and quarantine
- Supportive treatment

2.5 Lumpy Skin Disease

Lumpy skin disease is a highly infectious viral disease cattle and buffalo characterized by pox like intracutaneous firm nodules, edema of the limbs, superficial lymph nodes swelling, and lymphangitis.

2.5.1 Clinical signs

Painful swelling, fever, lacrimation nasal discharge and hyper salivation followed by characteristic eruption on the skin and other parts of the body, swollen lymph nodes, secondary infection leading to suppuration and sloughing.

2.5.2 Prevention and control

- Vaccination
- Supportive treatment against secondary infection

2.6 Tuberculosis

Tuberculosis is an infectious, granulomatous disease of animals and man caused by bacteria called mycobacterium.

2.6.1 Transmission and spread

The disease is contagious and spread by contact with infected domestic and wild animals. The usual route of infection is by inhaling infected droplets which are expelled from the lungs by coughing. Calves and humans can also become infected by ingesting raw milk from infected cows. Because the course of disease is slow, taking months or years to kill an infected animal, an animal can spread the disease to many other herd mates before it begins to manifest clinical signs. Therefore, movement of undetected infected domestic animals and contact with infected wild animals are the major ways of spreading the disease.

2.6.2 Clinical signs

Emaciation, weakness, anorexia, fluctuating fever, chronic cough, difficulty of breath, enlargement of lymph nodes

2.6.3 Control and prevention

- Keep herd free by testing and slaughter of reactors
- Boiling of milk before drinking
- Routine meat inspection
- There of no treatment for animals (Expensive, long time)

3. Diseases of the Newborn

Diseases of the newborn and neonatal mortality are the major cause of economic loss in livestock production in general and dairy farm in particular. The major causes of calve mortality in dairy cattle are fetal disease (disease of the fetus during the intra uterine life, eg prolonged gestation, intrauterine infection, abortion, fetal death with resorption or mummification, goiter) and the post natal diseases (Early-with 48 hours; delayed 2-7 days of age; late 1-4 weeks) due to septicemic, enteric and respiratory diseases.

General principles for care of new born

- The new born should be kept in a sanitary environment to minimize the risk of infection
- Systemic supportive care should be provided to maintain haemostasis until the new born is capable of separate and independent existence.
- There should be frequent and comprehensive re-evaluation of the body system in order to detect signs of deterioration and allow early correction.
- Provisions should be made to ensure passive immunity to prevent secondary infection or to combat that may be present.
- The efficacy of transfer of passive immunity should be evaluated.

4. Diseases of reproductive system

Major diseases of the reproductive system in dairy cattle discussed in this manual are Bovine Mastitis, Brucellosis, Trichomoniasis, Vibriosis, Leptospirosis, Cystic ovarian diseases, persistent corpus luteum, delayed ovulation, retained placenta, dystocia and metritis.

4.1 Mastitis

It is an inflammation of the udder/mammary gland almost always due to the effects of infection by bacterial or mycotic pathogens. Inflammation can be recognized by the following four characteristics: Redness, Swelling, Heat, and Pain. Inflammation caused by bacteria in the case of mastitis damage the udder tissue. Dead tissue and toxins released during inflammation cause adverse reaction to the body of the animal. Blood vessels will be damaged resulting in more blood flow to the affected area, which causes a more red color, and increase affected area. This causes a painful swelling due to accumulation of liquids and blood.

The bacteria which cause Mastitis could be present and live literally everywhere in the dairy farms like on the stable floor, in dung, on the skin of cattle and on the milker's hands. Dirty, warm and wet environments with plenty of food and water are favorable conditions for multiplication and survival of these microorganisms.

4.1.1 Factors that predispose to Mastitis

- Most important predisposing factor increasing the chance of mastitis is poor hygienic management. The presence of more bacteria around the area is the higher the chance of infection. There are other factors for the development of mastitis:
- Cattle with a high milk yield will develop mastitis more easily. Their udder tissue is more active and has longer milking time. This makes the teat canal open for a longer period of time. High milk production is also connected with more energy demand which possibly decreases resistance against infections.

- Poor milking technique: Force milking can cause injury to the teat and teat canal making the entrance of bacteria to the udder easier. Incomplete milking is another factor for multiplication of bacteria.
- Unhygienic milking procedure: lack of cleaning utensils, hand of the milker's and the udder.
- Unhygienic housing system: Just after milking it takes about 20 minutes before the teat canal is fully closed so lack of clean floor and resting places increases the chance of gating mastitis.
- Teat injuries and teat sores: This could be due to different factors which lead to would formation on the teat.
- Exposure to environmental pathogens: Contamination of the environment where the dairy cattle lives by pathogenic bacteria which would enter the teat and cause mastitis.

4.1.2 Transmission of mastitis

The teat canal is the lowest part of the udder and easily in contact with sources of bacterial contamination like: the skin of the milkers hand, the skin of the cow, the dirt on the skin of the cow, the floor where the cow is standing/lying on, the milking bucket



Figure 4: How bacteria enter the teat canal

4.1.3 Clinical signs of mastitis

Depending on the severity and stage of infection there are;

- Per acute mastitis: There is swelling, heat, pain, and abnormal secretion in the gland, accompanied by fever and other signs of systemic disturbance like depression, weakness, complete loss of appetite
- Acute/sub acute mastitis: Similar to per acute mastitis but the fever, loss of appetite, depression, systemic change and changes in the gland are slight to moderate

- Subclinical mastitis: The inflammatory reaction is detectable only through tests, the milk will not change visibly, but taste of milk will become salty.
- The most clear and often first sign of mastitis is characterized by the changes in the milk such as there can be flakes and lumps in the milk, color change of milk, the milk can become watery, instead of creamy yellow or blueish, milk can contain blood clots and looks pink

4.1.4 Mastitis Detection Techniques

Strip cup technique

The strip cup has a black enameled plate and a cup. Milk the first three spades of milk from each quarter on the plate and checks for lumps, flakes and cloths. After testing store the milk in the cup and dispose in a proper hygienic way.

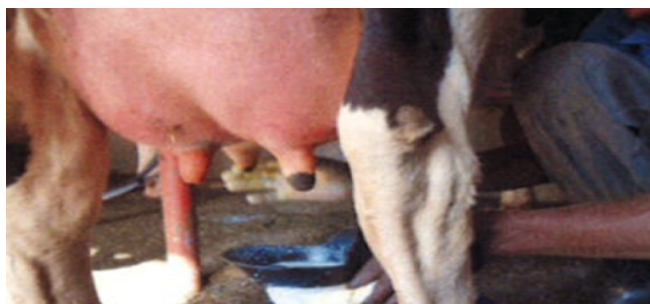


Figure 5: A farmers checking the milk on clinical signs of mastitis

California Mastitis Test (CMT)

CMT is used to measure the status of udder for subclinical mastitis. It measures the amount of dead cells in the milk. There are always dead cells in the milk due to natural continuous renewal process in milk producing and other udder tissue. Under this condition the amount of dead cells are low and stay under 100,000 cells per milliliter of milk which is undetected by CMT. When there is a subclinical infection, the number of cells increases over 250,000 cells per milliliter of milk and changes will be detected with CMT.



Figure 6:A strip cup

Procedure of CMT:

1. Milk and discard the first three spades of milk from all four quarters
2. Take a few millilitres of milk from each quarter into different CMT rack quarters (petridishes can be used) and mark with its respective quarters.
3. Mix equal amount of CMT reagent with milk samples (T-pol and often normal dish wash detergent will also be suitable) to each rack quarters.
4. Stir gently and observe the following changes:
 - ✓ When milk is affected it will start to aggregate and become a gel.
 - ✓ More viscosity of the milk indicates more dead cells and severe subclinical infection.
 - ✓ Color change from purple to pink is also observed.
 - ✓ The milk will be thick and cloth.



Figure 7: The California Mastitis Test

Milk sample analysis

Milk sample analysis in the laboratory is important to identify the specific causative agent (bacteria) for the application of the right antibiotic therapy.

Procedure of milk sampling for laboratory analysis:

- First disinfect the teats with methylated spirit (alcohol over 80%) using a cotton gauze or when not available a clean cloth dissolved in alcohol.
- Use latex gloves. When not available wash your hand with detergents.
- Put milk in a sample bottle after milking away the first three spades of milk. This reduces the risk of contaminating the milk with bacteria around and in the teat canal.
- Close the bottle as soon as the milk is sampled.
- Mark a clear identification on the sample bottle. Use the name or Identification Card (ID) of the cow and write down from which quarter the sample was taken (left front (LF), right behind (RB), etc.)
- Bring the milk to the laboratory and store properly. Freezing is recommended for further laboratory examination if the first treatment has failed

Note: Taking a sample after administration of antibiotics will not give proper laboratory results.

4.1.5 Mastitis prevention and control measures

Prevention measures

Step 1: Check the milk equipment

- The milk equipment should be clean and dry. Buckets are preferably stored upside in the sun, so the inside will be dry and doesn't give a suitable climate for bacterial multiplication.

Step 2: Clean the barn

- The cleaner the barn is, the fewer bacteria will be present. Avoid wet barn and keep clean and dry to reduce favourable condition for bacteria.

Step 3: Wash and dry your hands

- Most of the time hand of a milker is in touch with all kinds of objects contaminated with bacteria. So Proper washing and keeping dry their hands always is important to decrease bacterial contamination.
- Wash and keep dry the skin around the udder and teats before starting milking. This is important to remove contaminating microorganisms. When the cow is visibly clean, a dry paper towel will be sufficient.

Step 4: Check the first milk

- Use a strip cup and observe if the cow has mastitis infection or not.

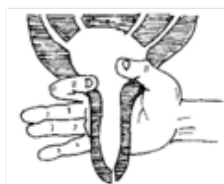


Figure 8: Checking milk sample by strip cup

Step 6: Milk the udder empty

- A good milking technique is crucial for the health of the teat. Complete milking has to be done gently not to injure the teats. Another important technique is a 'full hand' milking.

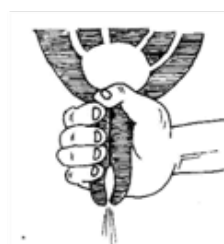
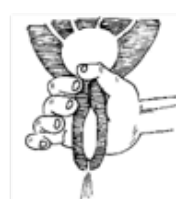
Milking technique



Grasp the teat with the thumb and first finger .



In order to close the second and the third finger, and milk will squirt out



Close the little finger and squeeze the teat with the whole hand



Release the teat so that will be filled with milk. Feel the teat again to see if all the milk has come out



Again, grasp the teat with your thumb and first finger



Run your fingers down to the tip of the teat to force some milk still in it to come out

Figure 9:Milking techniques

Step 7: Dipping the teat

By applying disinfectant to the teat after milking, bacteria can be removed while the teat canal is still open. This can be done commonly by dipping with an iodine solution in a dip cup as soon as possible after milking. This protects the teats from bacteria to enter the teat canal.

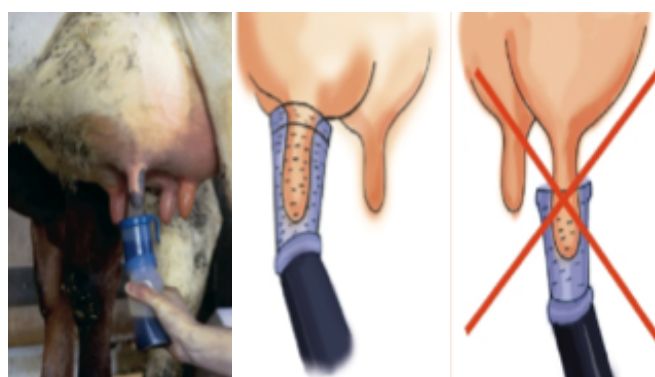


Figure 10:Dipping technique of teats after milking

Step 8: Keep the cow standing

- It takes a few minutes for the teat canal to close properly. When a cow would lie down in this period on dirty floor bacteria will have the chance to enter the teat canal. Keeping cattle standing, for instance by offering them fresh feed, can reduce the risk mastitis infection.

Step 9: Clean the milking equipment

- Cleaning the milking equipment is also important reduce the bacterial contamination. Good cleaning consists of several aspects:
 - ✓ First removal of dirt by brushing. The better and longer brushed the more dirt will be removed.
 - ✓ Using detergents with hot water will help to dissolve the dirt.
 - ✓ Removed detergent by rinsing with clean water.
 - ✓ Treat milking utensils with disinfectants preferably chlorine solution.
 - ✓ Then the utensils should be rinsed again dried by putting them upside down in the sun.

Note: - Bacteria cannot be killed by detergents; so disinfection is done only by disinfecting chemicals.

Treatment measures

Steps to be followed during treatment of mastitis

1st step: Complete milking of affected cow

- By milking the cow as often as possible, preferably every two hours; at least three times a day bacteria and dead cells are removed from the udder. This method is the best and very important to rinse away the infection.

2nd step: Disinfecting the teats

- After milking the mastitis affected cows, their teats should be clean and disinfect with disinfectants like alcohol.

3rd step: Application of appropriate the drugs

- Direct intramammary infusion of the special antibiotic tubes prepared for the treatment of mastitis twice a day for three consecutive days.

Note:

- In case of systemic infection consult veterinarian for additional treatments like antibiotic injection or anti-inflammatory drugs to stop inflammation and reduce the pain.
- Read the manufacturers leaflets for veterinary drugs to be used in dairy cattle concerning withdrawal periods for human consumption.



Figure 11: Intramammary drugs (antibiotics).

4.2 Cystic Ovarian Disease

Cystic ovarian disease in cows is usually seen in the first two months post calving. It occurs most frequently during the post partum period, 30 to 60 days after calving, when normal ovarian activity usually resumes.

4.2.1 Clinical signs of cystic ovarian disease

The major signs are Hyperestrogenisation, Nymphomania – permanent estrus behavior (8-10 days), Mounting of other cows, Decreased milk production, Cow is not observed in heat, Prolonged intraoestrus interval, Anoestrus

4.2.2 Treatment of cystic ovarian disease

Modern treatment in cattle addresses the correction of factors responsible for the development of the condition like nutritional and metabolic disorders and Hormonal imbalances.

4.3 Persistent corpus luteum

Persistence of corpus luteum on the ovary beyond day 20 leading to functional disturbance of corpus luteum which is characterized by absence of heat and pregnancy. Uterine infections, including pyometra, high milk production especially in early post partum period, prolonged treatment with glucocorticoids, High level of Concentrated feed, Obesity or Emaciation, Dystocia, Retention of fetal membrane, Uterine distention (Fetal Mummification, maceration, pyometra) and Decreased endocrine activities.

4.3.1 Clinical signs

Complete absence of heat signs.

4.3.2 Treatment

- Elimination of all predisposing factors more over massage of ovaries and Uterus, vitamin, and hormonal therapy.
- Administration of Luteolytic doses of PGF_{2α} combined with a dose of GnRh analogue approximately 48-56h later to stimulate ovulation.

4.3.3 Prevention:

It's recommended to conduct rectal examination of anestrus cow after 50-60 days of parturition and at 15-18 month of age (age at first service) to curb the problem as early as possible.

4.4 Delayed ovulation in cattle

It occurs due to negative energy balance, heat stress, certain infections such as Bovine Viral Diarrhea (BVD) and Infectious Bovine Rhinotracheitis (IBR), sub luteal levels of progesterone (treatment with progesterone/progestagen releasing devices, inadequate luteal function)

4.4.1 Prevention of delayed ovulation

- It is important to ensure a timely ovulation in relation to service. By making sure that ovulation occurs within 7-18 hours after AI, a satisfactory conception rate can be achieved.
- Administration of GnRH around even during time of AI service
- Infantilism(lack of maturity)
- Is a condition characterized by under developed reproductive organs of young heifers or functional disturbance in physiologically growing heifers. It can be caused due to inadequate feeding in newborn calves, Poor health management of sick young's, debility conditions, and Isolation from stimulant opposite sex.

4.4.2 Prevention and control

Can be achieved through sensible management of young heifers and skillful veterinary interference of diseased young animals. Allowing teaser bull, free exercise, and massage and stimulating reproductive Organs.

4.5 Abortion

Is expulsion from the uterus of a living fetus before it reaches a viable age or expulsion of a dead fetus of recognizable size at any stage of the gestation period. The cause of abortion could be infectious or non infectious. Non-infectious causes of abortion include heat stress, hypoxia, and acidosis. Severe trauma may rarely cause abortion. The most important causes of abortion area infectious in nature.

Prevention of abortions

- Proper hygienic and bio-security measures in the cow's environment and feed storage
- Isolation of aborting cows and immediate removal of aborted materials
- Systematic evaluation of the feed for mycotoxins and other phytotoxins
- Adequate immunization against infectious diseases causing abortion
- Maintenance of adequate breeding and treatment records to avoid insemination of pregnant cows and administration of drugs that may cause abortion.
- A balanced nutritional program
- Genetic selection and a functional record keeping system

4.6 Retained placenta

Failure to expel the fetal membranes within 12 to 24 hours after calving. Abortion, stillbirth, twin birth, dystocia, induction of parturition with PGF2alpha and metabolic disorders, especially milk fever and high environmental temperature, advancing age of cows, premature birth, placentitis and nutritional disturbance increases the incidence of retained fetal membrane. It predisposes cows to acute puerperium metritis and endometritis post partum through bacterial multiplication and impairment of immune function.

4.6.1 Clinical signs

Macerating and discolored member are seen hanging from the vulva after 24 hours. Occasionally there is foul smelling, discharge, inappetance and decreased milk yield. Systemic infection is not common.

4.6.2 Treatment

- Non drug treatment such as daily gentle traction of the membrane is recommended to see if the detachment has occurred.
- Drug treatment such as immediate post partum administration of PGF2alpha, oxytocin or calcium and Anti microbial therapy (Intrauterine bolus or systemic antibiotics)
- Prevention of retained placenta is appropriate pre parturition management

4.7 Vibriosis

Vibriosis in cattle is an infectious bacterial disease of the genital tract causing infertility and occasional abortions. It is a venereal disease spread by infected bulls when they mate susceptible cows and heifers. Infection introduced into a non-exposed or non-vaccinated herd will spread rapidly during breeding. Vibriosis is somewhat self-limiting as most of the cattle recover within a year. Disease carriers are common, however, and new infection can spread to non-exposed animals.

4.7.1 Clinical signs

The major clinical signs are in female – infertility, Irregular heat, Early embryonic death

4.7.2 Prevention and Control measures

- Only bulls free from infection should be used for semen production/ reproduction (natural mating).
- Treating the semen with antibiotics reduce the risk of spreading the disease through AI.
- There is a vaccine against the disease.

4.8 Trichomoniasis

Trichomoniasis is a venereal disease of cattle that causes early embryonic death, prolonged breeding, occasional abortions and infertility. It is caused by a small motile protozoan found only in the reproductive tract of the bull and cow. It is transferred to the cow's vagina from the bull during breeding migrate up to the uterus and cause the infection.

4.8.1 Clinical signs:

The key clinical signs are low conception rate, profuse discharge from the vulva, early abortion (2-4 months of pregnancy), pyometra- accumulation of pus in the uterus.

4.8.2 Prevention and control

No vaccines are available for its prevention, but using artificial insemination and virgin bulls aid in control. Bulls are the main carriers of Trichomoniasis and, once infected, remain infected for life but show no signs of disease.

4.8.3 Treatment

Infected animals should be culled

4.9 Leptospirosis

It is a contagious disease caused by a bacterium leptospira interrogans which is transmitted through contact to skin or mucous membrane and intake of contaminated urine, feed and water.

4.9.1 Clinical signs

Clinical signs in acute form in calves signs include fever, anemia, Inappetance, high mortality; chronic form in adults abortion, stillbirth, weak infected calves and kidney failure, Blood in the milk and reduced milk yield, Bitter test of the milk

4.9.2 Prevention and control

- Strict sanitary condition has to be performed
- Avoid contact with rodents
- All new animals should be isolated before introducing them to the herd
- Vaccination

4.9.3 Treatment

Treatment of sick animals with antibiotics like tetracycline, streptomycin and combined streptomycin and ampicillin could be used.

4.10 Brucellosis

Brucellosis is a contagious bacterial disease affecting mainly dairy cattle. It is an important disease of animals and humans with serious economic loss and health hazard in human beings. The disease in animals is characterized by abortions or reproductive failure. While animals typically recover, and will be able to have live offspring following the initial abortion, they may continue to shed the bacteria. Infection occurs through contaminated feed and water with discharges of aborted animal, fetal membrane, and insemination of semen from infected bull and consumption of unpasteurized milk.

4.10.1 Clinical Signs

Arthritis, early abortion specially in first calving, retained fetal membrane, abnormal vaginal discharge, birth of weak calves and infertility.

4.10.2 Prevention and control:

- Test and cull positive animals
- Vaccinating animals starting from 4-8 months of age.

4.10.3 Public health risks of Brucellosis

Brucellosis is a zoonosis highly infectious for humans causing a disease often called undulant fever or Malta fever, since it was first recognized in Malta during the 1850s. Symptoms in humans include intermittent or irregular fever, headache, weakness, profuse sweating, chills, weight loss and general aching. Infections of organs including the liver and spleen may also occur. Veterinarians, farmers, and abattoir workers are vulnerable to infection as they handle infected animals and aborted fetuses or placentae. The disease can also spread to people through consumption of unpasteurized milk coming from infected animals.

4.10.4 Prevention & Control

- Proper disposal of aborted foetus
- Disinfection of contaminated site
- Isolation of aborted animal
- Test and cull positive animals

4.10.5 Treatment

No satisfactory treatment

4.11 Dystocia

Dystocia is difficult to give birth in animals. It arises from different causes like myometrial defects, metabolic abnormalities like hypocalcaemia, fetal over size, physical and anatomical immaturity of the dam, abnormal presentation of the fetus, lack of labor due to nutrition deficiency, insufficient dilation of the birth canal, fetal hormone deficiency, fetal death and other miscellaneous causes.

Clinical Signs

- It is suspected 2-3 hours after burst of amniotic fluid
- Force full straining without fetal presentation
- Presentation of only single leg
- Lying down by stretching legs away

Management: Emergency veterinary assist is needed when the case happens.

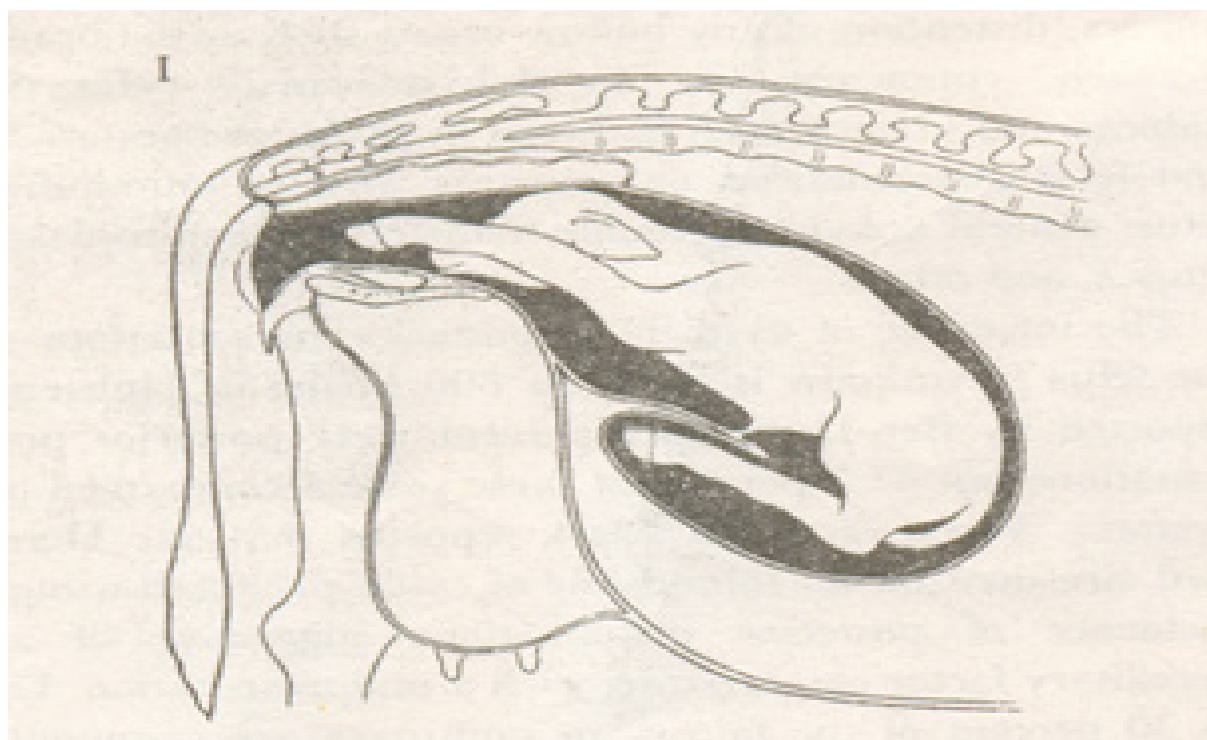


Figure 12: Normal presentation of the foetus

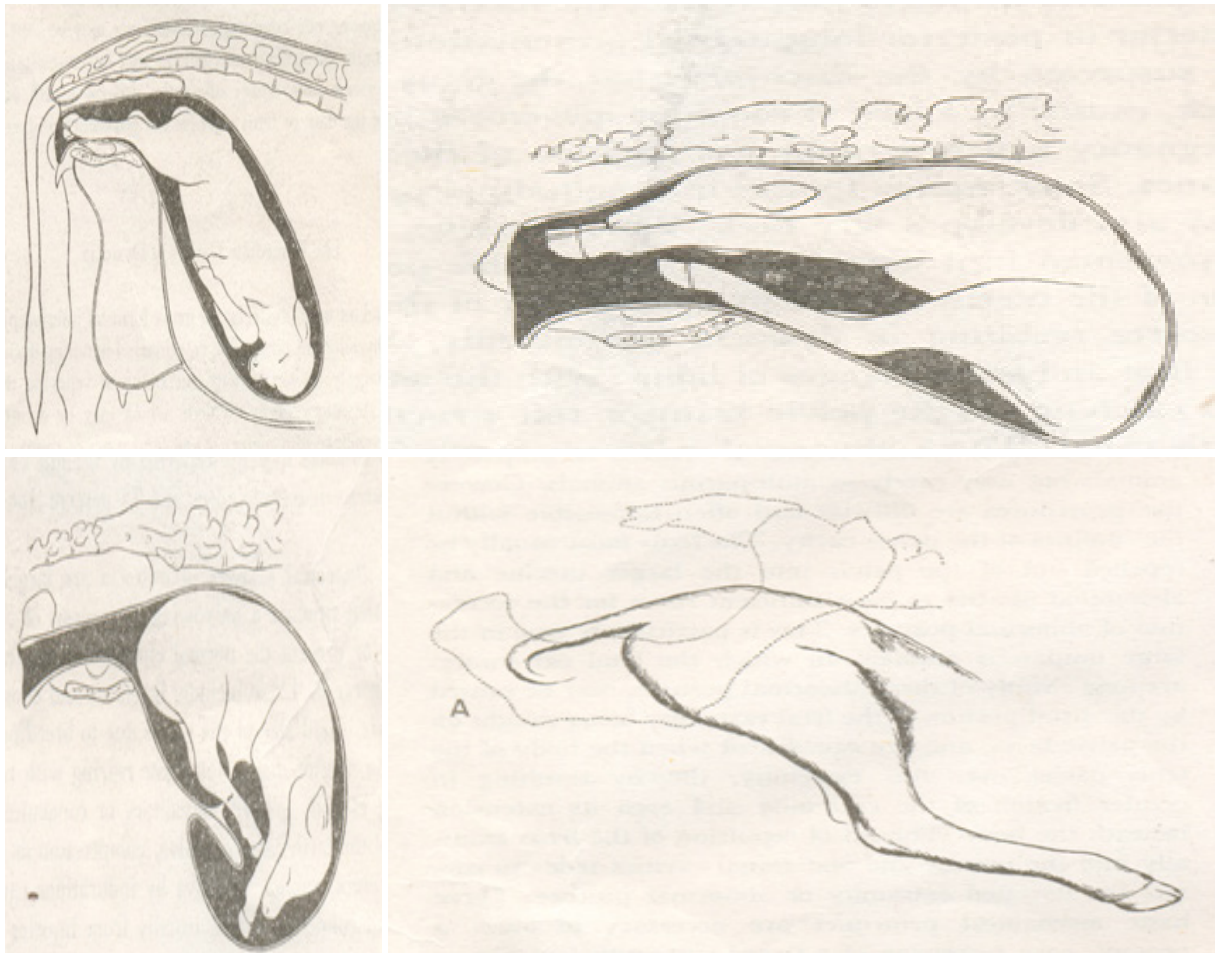


Figure 13: Abnormal presentations of the foetus

4.12 Metritis and endometritis

It is the inflammation of the muscular and endometrial layers of the uterus. Retained placenta, dystocia, trauma to the reproductive tract. Abortion, concurrent systemic infection unsanitary conditions at parturition are the predisposing factors to metritis

4.12.1 Clinical signs

Fetid uterine discharge, systemic signs like fever, anorexia, depression and swollen and friable uterus are the common clinical signs of metritis

4.12.2 Prevention and control

- Strict sanitary conditions during parturition
- Treatment of sick animals using antibiotics and hormones like PGF2alpha.

4.13 Vaginal and uterine prolapses

Vaginal and uterine prolapses are the major health problems in dairy cattle. vaginal prolapse occurs in mature cows during the last trimester of pregnancy. It is associated with increased size of pregnant uterus, rumen distention. Similarly, recumbence with the hindquarter lower than the forequarters, excessive traction to relief dystocia/fetal membrane hypocalcaemia are contributory factors to uterine prolapsed.

Treatment

Report to the nearby animal health centre and get help.

5. DISEASES OF DIGESTIVE SYSTEM

5.1 Simple indigestion

Simple indigestion is characterized by accumulation of indigestible feed in the rumen. It is caused by sudden change of feed like addition of urea to a ration, turning cattle on to a lush cereal grain pasture, introducing cattle to a high level grain ration which may lead to excessive fermentation and impairs rumen function for 24-48 hours.

Moreover, sudden change of diet from low to high concentrate, supplying frozen feed, cold/chilled water affecting normal micro flora in the rumen are factors which could lead to simple indigestion.

5.1.1 Clinical signs of simple indigestion

Partial to complete loss of appetite, reduced milk yield, reduced rumen motility, the rumen becomes full, firm and doughy. But body temperature, respiration and pulse rate are all normal.

5.1.2 Prevention and control

- Do not supply animals with abnormal ration;
- Introduce high grain level rations slowly.
- Treatment of sick case with drugs that increase rumen motility like Epsom salt, magnesium sulphate and saline purgatives.

5.2 Bloat

Bloat is over distension of the rumen and reticulum with the gases of fermentation, either in the form of persistent foam mixed with the ruminal contents or in the form of free-gas separated from the ingesta. due to accumulation of the gas with or without ingested feed material.

There are two types of bloat:

- i. **Free gas bloat:** is interference of gas eructation due to oesophageal obstruction, reduced exercise and prolonged recumbence.
- ii. **Frothy bloat:** is caused due to accumulation of feed material in the rumen containing bubbles.

5.2.1 Clinical signs

Distension of the left flank (Rumen), enlarged abdomen, discomfort, difficulty of breathing, mouth breathing, extension of the head, protrusion of the tongue and loss of rumen motility.

5.2.2 Prevention and control

- Highly leguminous plants should wilt before being fed for cattle
- Feed cattle with hay before turning on to leguminous pasture
- Adapt to high performance ration gradually

5.2.3 Treatment of bloat: in frothy bloat:

- Vegetable oil 250-300 ml orally for large cows or equal amount of detergents by emulsifying in water orally.
- Polyxalanes 25-50 gm orally.
- Emergency rumenotomy or use trocar and cannula at the left flank behind last rib.

Note: for further information related to feed refer to nutrition management manual.

5.3 Grain overload/Rumen Acidosis

Grain overload is an acute disease of ruminants characterized by indigestion, rumen stasis, dehydration, acidosis, toxemia and in coordination, collapse and frequently death. It occurs when animals accidentally gain access to large quantities of readily digestible carbohydrate, particularly grains. Feeding a lot of concentrates at once affects the normal rumen microflora resulting in rumen acidosis. This disturbs rumen contraction absorption of valuable feed ingredients.

5.3.1 Clinical Signs

Body temperature is usually below normal; however, it may be increased to $>40^{\circ}\text{C}$ if the animal is exposed to hot weather. Respiration is shallow and rapid, in severe case rumen motility is completely absent, and content of the rumen may feel firm and doughy, sudden drop in milk production and drop in fat content of milk are indicative.

5.3.2 Prevention and control

- Adapt to high performance ration gradually
- Restricting animals from accessing grains and the feed should at least contain 10% roughage
- Treatments like surgical procedures to remove the contents, fluid therapy should commence if the case is not severe; otherwise slaughter is the animal.



Figure 14:Over grown hoof

5.4 Laminitis

It is a disease related to rumen acidosis. Due to the disturbances in the rumen certain substances migrate into the blood and lead to swelling of the laminae in the hooves. This swelling causes pain and discomfort for the cow due to pressure within the hooves. This pain full walking leads to over growth of hooves thereby causing laminitis.

Prevention of laminitis: Regular hoof trimming with appropriate equipment (take care of touching nerves it may cause paralysis).

5.5 Traumatic Reticuloperitonitis

It occurs as a result of the reticulum by sharp foreign objects such as nails or pieces of wire which leads to the inflammation of the peritoneum and adhesion. Sometimes the object can penetrate the diaphragm and enters the thoracic cavity and causes pleuritis, pneumonitis followed by myocarditis and endocarditis.

5.5.1 Clinical signs

Reticulorumen atony, reluctance to move, arched back, careful gait, lying down/getting up, groaning when stepping over barriers.

5.5.2 Treatment

- Supportive therapy with antibiotics, oral/intravenous fluids
- Surgical interventions by a professional

6. METABOLIC DISEASES IN DAIRY CATTLE

Metabolic diseases are caused by physiological disturbances of the cow due to imbalanced feed supply. They are common in dairy cattle with poor feeding management system.

6.1 Milk fever

Milk fever is a metabolic disease of mature high lactating cows and caused by calcium deficiency in the body of the animal which is important for contraction of muscles. The disease occurs just before 12 hours, during calving or even 24-48 hours after calving. The disease is associated with hypocalcaemia and characterized by general muscle weakness, circulatory collapse and depression. The disease contributes to dystocia, retained placenta and uterine prolapse. Deficiency of calcium is associated with excess secretion of calcium in colostrums, decreased absorption and mobilization of calcium from intestine and bones, respectively.

6.1.1 Clinical Signs

Depression, loss of consciousness, dry muzzle, cold ear, pupil might be dilated, muscle tremor, grinding of teeth, subnormal body temperature, loss of muscle tone, circulatory collapse, sterna recumbency with curvature of the neck, drowsy appearance and flaccid paralysis.

6.1.2. Prevention and control

- Supply more phosphorus and low calcium during late stage of pregnancy (1:3 ratio).
- Administration of calcium chloride 120-150 ml orally 24 hours before calving.
- Supply the cow with balanced diet during pregnancy.(refer nutrition manual).
- *Treatment:* Calcium borogluconate 25-30 % solution = 100-200gm calcium borogluconate in 400-800 ml solution respectively

6.2 Ketosis

Ketosis is a metabolic disease of heavy lactating cows. It is characterized by weight loss, pica, inappetence, decreased milk production, neurological abnormalities that usually occurs during the first 6 weeks of lactation. It occurs during peak milk production when more energy is needed. High milk production low glycogen level resulting in negative energy balance called ketosis.

6.2.1 Clinical Signs

Weight loss, constipation, loss of skin elasticity, head pressing, walking in circle, abnormal gait, deviation of neck and champing of jaw, the breath has acetone odor.

6.2.2 Prevention and control

- Cows at calving should not be too fat or in very poor condition
- Avoid sudden change of feed
- Add sufficient protein to the ration

6.2.3 Treatment of sick animals

- Glucose 50% solution; 500ml intravenous followed by 20% solution subcutaneous.
- Propylene glycol 125-250gm mixed with equal volume of water

7. PARASITIC INFESTATION

7.1 Ectoparasite Infestation

External parasites like ticks, lice, fleas and mange mites have huge effects on the animals by inducing irritation, discomfort, feeding on the blood. Both external and internal parasites are very important disease problems in dairy cattle. Hence, the manual deals with important external and internal parasites infestations as follows.

Ticks

-Adult ticks wait in small bushes and high grass for a host to pass by

-While biting a cow the tick can transmit diseases

Different types of ticks and the diseases they can carry:

- Brown ear tick (East Coast Fever)



- Bont tick (Heart water, Anaplasmosis)

- Southern cattle tick (East Coast Fever, Anaplasmosis, Babesiosis)



- Blue tick (Anaplasmosis, Babesiosis)

- Red legged tick (Anaplasmosis)

- Bont legged tick (Tickparalysis, Sweating sickness)

Figure 15: Some species of ticks and diseases they transmit

Ticks cause direct damage to the skin of the animals. Moreover, ticks are intermediate hosts of several livestock diseases. They are obligatory parasites that feed on blood. They transmit diseases like Theileriosis, Anaplasmosis, Babesiosis and Cawdriosis through blood feeding. Exotic cattle breeds are more sensible for tick-borne diseases. Therefore; regular control measures of tick infestation is recommended in dairy farms especially in tropic and sub-tropic areas.

Ticks have four development stages in their life cycle. These are egg, larvae, nymphs, adults. In all these stages the larvae, nymphs and adult will feed on animals. Ticks infest cattle from bushes, long grasses, and pasture and grazing areas.

Control Measures of Tick Infestation

Tick prevention depends on the local situations concerning presence of ticks, farm health management, cattle breed, rainfall, etc. Set tick prevention program according to expert advice.

- Keep the animals in the house to decrease the risk of being infected with tick-borne diseases.
- Cleaning animal housing will also reduce the number of ticks on the farm.
- In grazing system, pasture management by double fencing prevents animals from tick infestation by contact with neighbors or wildlife.

- Burning dry pastures and cutting bushes minimizes tick burden.
- Barb wire alongside hedges will avoid that cattle pick up ticks from these hedges.
- All measures can be achieved by making good pastures like more parcels, regular mowing, etc. will decrease tick pressure.
- Application of acaricide once a week in areas with high tick prevalence especially during rainy season.
- Keep sprayed cows in house during rain fall to avoid flushing off the acaricide.
- The choice of the acaricide depends on the sensitivity and species of ticks.
- Another option is to use pour on medicine which has two advantages:-
- ✓ It acts for long period of time.
- ✓ It has less environmental pollution. But it is costly.



Figure 16: Spraying a cow

Note:

- In zero grazing system treating for ticks is not necessary while on open grazing system regular spraying is recommended.
- For efficient use of acaricides, read the manufacturers manual for how to prepare the right amount of concentration to apply.
- Wear appropriate protective clothes (face mask, plastic gloves) to avoid inhaling and direct contact with the acaricide.
- Make sure that the cow is completely covered, when spraying
- Check the proper functioning of spraying device and that the acaricide reaches the skin and does not stick on the outside of the hair.

7.2 Internal parasite infestation

There are many species of internal parasites infecting cattle thereby inducing diseases which affect the productivity of dairy cattle. Among the major internal parasites of dairy cattle, parasites of the stomach/intestinal parasites, lung worms and liver flukes are discussed in this manual. Infections with internal parasites happen when cattle are grazing a contaminated pasture. Pasture contamination occurs when infected cattle graze in the pasture. In case of calves infection occurs while grazing with adult cattle, feeding on mowed grass or hay from infected pastures. It is important to know the life cycle of worms to break the infection channel (figure 6). Worm infestation affects different organs in the body of the animal like liver, lung or gut. They damage intestinal wall and disturb digestion and absorption process of feed resulting in severe diarrhea. For liver fluke it is more complicated, because larvae can live for a long time in intermediate host snails. This makes prevention of flukes more difficult.

7.2.1 Life cycle of Intestinal parasites

Worms live in the intestines of cattle and produce eggs. Eggs are excreted with the manure and hatch till larvae. Larvae live on the grass leaves and are eaten by cattle. Larvae develop to egg producing worms in the intestine of the cow. This can give severe damage to the intestines and infected calves and cattle will not be able any more to digest food in a proper way.



Figure 17: Life cycle of an intestinal worm

7.2.2 Clinical Signs

There are many different symptoms depending on the species of worm infestation. The common symptoms observed in dairy farm are: Delayed growth in young stock because of their more susceptibility for worm infections due to their lack of resistance. Moreover, there is Weight loss, Rough hair coat, Diarrhea, Coughing, Emaciation, Drop in milk production



Figure 18: Rough hair coat

7.2.3 Lung worms

The life cycle from lungworms is slightly different from intestinal parasites. The adult worms live in the lungs of the animal and produce eggs. Eggs hatch to larvae and excreted through feces. Larvae climb on top of fungi living on the manure and are spread over the pasture with help of these fungi. The cow will eat the larvae and the larvae will migrate from the intestines to the lungs.

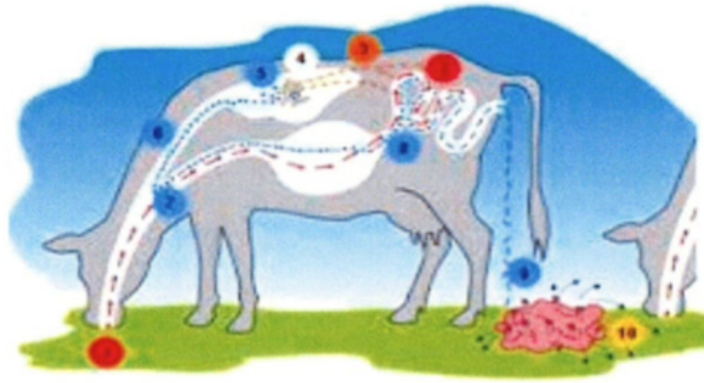


Figure 19: Pasture contamination

7.2.4 Liver flukes

Liver fluke has a more complex life cycle consisting of an intermediate host. Adult liver flukes live in the liver tissue of the animal. They produce eggs which will be excreted in the feces of the animal and hatched to miracidium. These larvae are ingested by snails and develop to cercaria and are excreted by the snails. The cercaria living on the grass will be eaten by animals and move to the liver.

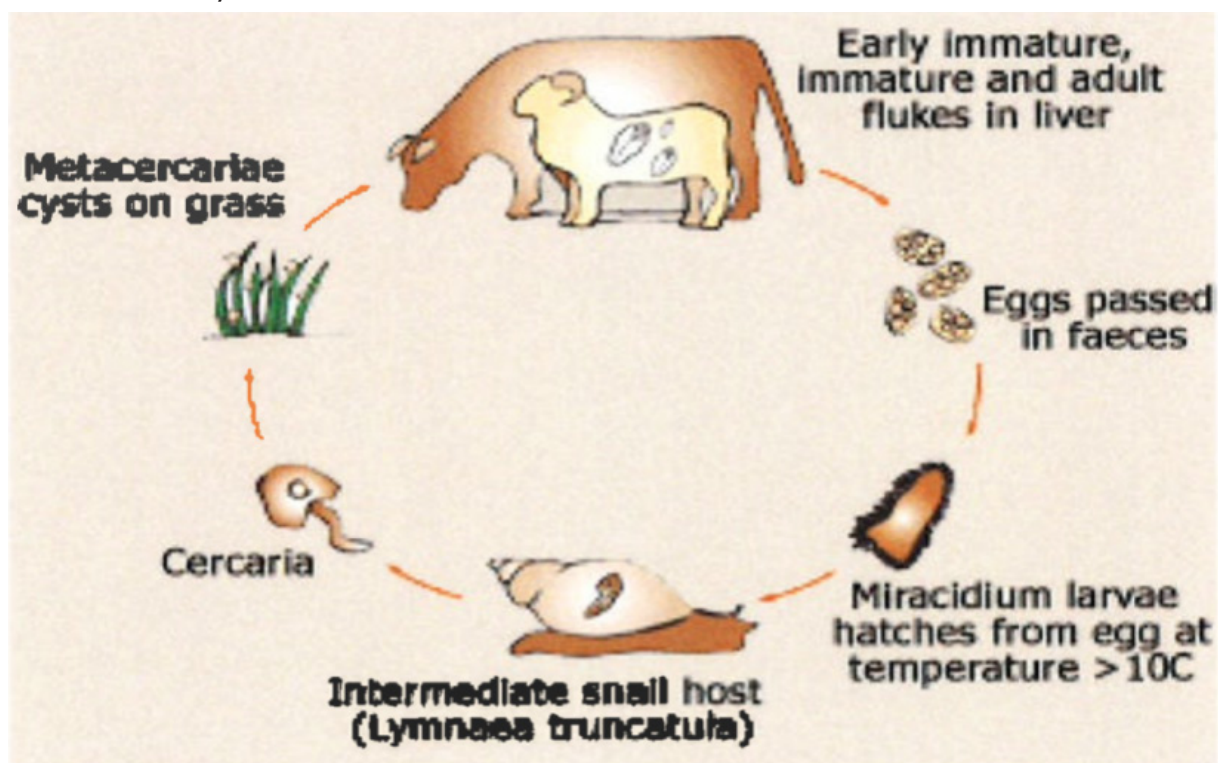


Figure 20: Life cycle of liver flukes.

7.2.5 Control measures of internal parasites infestation

- Paddock and rotational grazing is recommended to allow grazing young animals separately to reduce contamination of grazing land by worm larvae.
- Controlling intermediate hosts of worms (snails) by drying up or fencing swampy areas.

- Use drinking water from boreholes or fast flowing streams instead of ponds.
- Keep animals away from marshy areas and when necessary use biological control by allowing ducks.
- Use zero grazing system and feed uncontaminated forage.
- Make Silage (drying the grass in the sun) to avoid larvae.(refer nutrition manual)
- Do not graze young stock and dairy cattle on the same pasture at the same time.
- Cutting or mowing grass will decrease the infection risk.
- When grazing on unsafe /infected land regular deworming is recommended every three months.
- In case of infection with liver flukes drug of choice for treatment is Trichlabendazole and Levamisole. (*Read the manufacturers leaflet for withdrawal period and dosage of the drugs*).

Note: In a zero grazing system, grazing on non-infected land and rotational grazing system deworming is not necessary.



Figure 21: Drenching medicine

Group Assignments

1. Develop prevention plan for ticks to decrease the risk of tick-borne diseases and worms.
2. Discuss when and where to use acaricides and deworming drugs in areas of free grazing.

8. General principles of farm health management

Regular vaccination program is crucial for the healthy dairy farm management. In most cases after the first vaccination a second vaccination has to be given within a short period. This is called a booster. Then after a certain period, often a year, the vaccination has to be repeated to keep the resistance against infectious agent on a protective level. To develop effective vaccination schedule it is important to consult veterinarian. This is important to regulate the risk of disease in the farm, the price and availability of the vaccines, the vaccination scheme and the effectiveness of the vaccine.

The common vaccines for dairy cattle in Ethiopia are Anthrax, Blackleg, Lumpy Skin Disease, Bovine Pasteurellosis, Food and Mouth Disease, Contagious Bovine Pleuropneumonia Pneumonia.

Table 1 Vaccination schedule of Dairy Cattle

Type of vaccines	Age of vaccination	Route of administration	Dosage	Immunity development after vaccination	Immunity lasting period	Revaccination time
Anthrax	>3 months	Subcutaneous	1ml	After 10 days	1 year	Every year
Black Leg	>3months	Subcutaneous	2ml	After 10 days	1 year	Every year
B.Pasteurellosis	>3months	Subcutaneous	2ml	After 10 days	6-8 months	6 months
CBPP	>6months	Subcutaneous	1ml	After 2 weeks	1 year	Every year
FMD	>6months	Subcutaneous	4ml	After 2 weeks	6 months	Every year

Source: NVI, 2016.

9. Checklist for dairy cow health management

A. Behaviour

- ✓ Observe the individual cows from distance for how they are eating, ruminating, walking, attentive etc. standing away from the herd, lying down and depression are signs of sick and need detail clinical examination.

B. Posture and gait

- ✓ Check for lameness, abnormal gait, the back should be straight (bending upward indicates pain), hoof over growth, laminitis, foot rot.

C. Rumen fill

- ✓ Normally the rumen of healthy cow is full as seen in (picture 27) if not cheek either the cow is sick or not supplied with feed.

D. Body condition score

- ✓ Body condition scores also an important procedure in cow health management. At the starting point of lactation a cow may lose some weight, but preferably you never should count more than three ribs at the end of the breast.
- ✓ The body condition score for Holstein cattle is scored from 1 to 5. 1 indicates emaciation while 5 is fat.

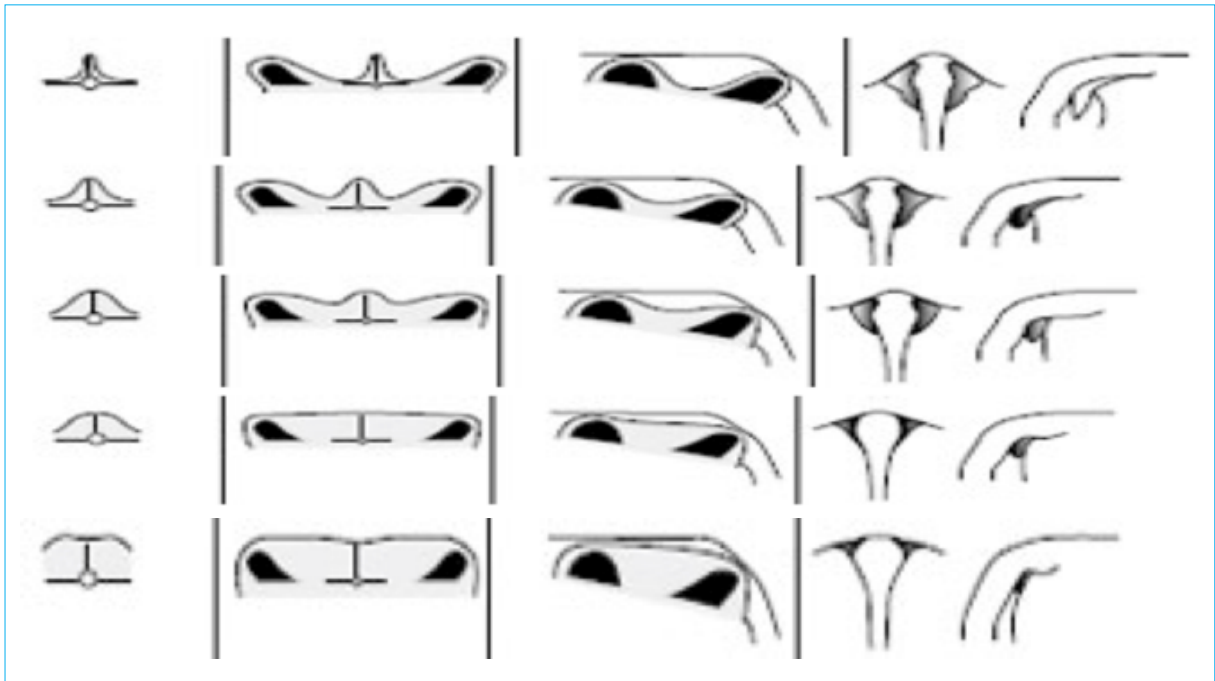


Figure 22: Body condition score

E. Legs

- ✓ Normally the legs should stand straight. If not, the cow likely will have a hoof problem and hoofs need to be trimmed. A common way to look at the legs is by staying behind the cow and measure hoof score (score 1 is good; score 3 needs a hoof trimming).

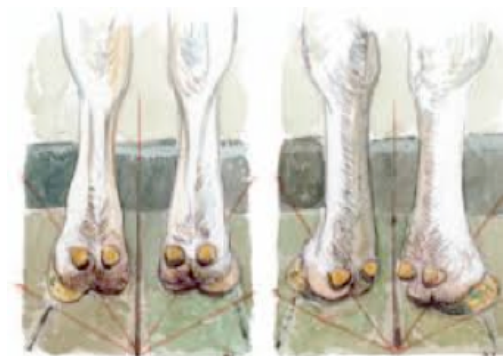
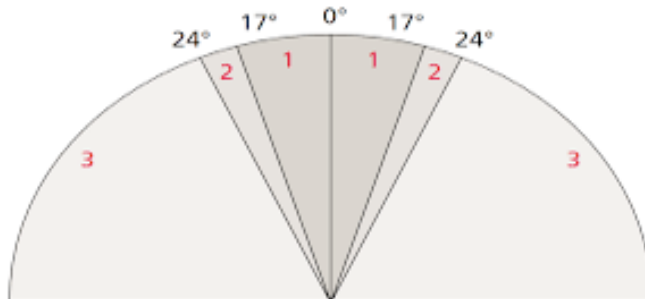


Figure 23: Hoof score



F. Haircoat

- ✓ The hair of a healthy cow should be shiny and smooth. Animals with poor nutrition, worm infestation, and systemic diseases develop a rough hair coat.

G. Breathing rate

- ✓ The breathing rate of normal cow is between 12 and 16 breathings per minute. This can be counted by up and down chest movement during breathing. Any deviation from normal rate indicates presence health problem.

H. Ear temperature

- ✓ Ear temperature is another parameter used to check health status of the animal. It can be done by touching ear of individual cows. Very low ear temperature some clues for some diseases like milk fever.

I. Body temperature

- ✓ The normal body temperature varies from 38 to 39 degrees Celsius. Measuring the body temperature is the most important step to check presence of any infection.

Note: in case of very high temperature emergency veterinarian contact is needed.

J. Pulse rate

- ✓ Normal cow pulse rate varies between 40 and 60 pulses per minute. Pulse rate measurement can be done by palpation of the jugular vein or under tail or by using stethoscope.

K. Mucosa

- ✓ Visual examination of mucus membrane around the eye, vulva and mouth is used to indicate diseases like babesiosis, anaemia or liver disease. Whitish mucus membrane indicates anaemia.

L. Rumen motility

- ✓ Rumen motility is important for continuous proper functioning of digestive system. Normal rumen motility varies from 2-3 movements per minute. It is done by applying gentle pressure on the left flank of the cow. Absence of rumen movement is a sign of serious health problem.

Group Assignments

Form four groups

1. Mention and discuss in groups about common symptoms that observed in sick animals around your community dealing with dairy cattle.
2. List 10 common diseases in a local dairy farm and grade the diseases in order of economical importance for the farmer and severity of the diseases.
3. Discuss the best way of milking a cow and how to prevent mastitis.
4. Discuss the role and responsibility of a dairy farmer in the control and prevention of dairy cattle diseases

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Annexes

Annex 1 Normal parameters of Healthy animal

Parameters	Benchmark
Body temperature .1	39°C - 38
Breathing frequency .2	min/10-30
Pulse rate .3	min/60-80
Hair coat .4	Shiny and smooth
Mucosa .5	Pink and shiny
Leg score .6	to 3 1
Rumen fill .7	Filled
Body Condition Score .8	Depending on lactation period
Rumen motility .9	per minute 1-2
Appetite .10	Willing to eat
Posture and gait .11	Straight, not crippled
Behavior .12	Attentive
Body condition score.13	In average ≥3
Area around vulva.14	Clean

Annex 2 Farm Evaluation Sheet.

	Good	Satisfactory	Improvements required	Immediate action necessary
Milking				
Milking place				
Quality of the floor				
Hygiene of the floor				
Hygiene of the walls				
Pest & insect control system				
Hygiene of milk equipment				
Hygiene of milk storage equipment				
Level of personal hygiene				
Preparation of udder				
Milking technique				
Post milking				
Stable				
Quality of floor				
Quality of bedding				
Hygiene of floor				
Hygiene of bedding				
Cleanliness of cattle				
Drinking water				
Quality of drinking water				
Quality of drinking troughs				
Hygiene of troughs				
Cleanliness of water				
Feed				
Storage facility				
Cleanliness of storage facility				
Freshness of concentrates				
Freshness of forage				
Pest control system				
Presence of moulds in feed				
Calving				
Quality of calving place				
Quality of bedding				
Hygiene of calving place				
Hygiene around calving				
Disinfection of umbilical cord				
Quarantine facility				

Dairy Cattle health management

Training guideline for dairy Extension workers



II. Dairy Cattle Health Management Training Guideline

A. Module Book

Introduction

This module is part of the Working Packages introduced by SNV Ethiopia as part of the EDGET Project. One of the EDGET project objectives is to make small holder dairy farms more aware about “commercial farming”. This Module will help the EDGET Project extension workers to acquire the knowledge and skills to recognize the differences between a healthy and a sick cow. Basic information on common diseases at dairy farms will be given including practical advice how to handle and when possible to prevent these diseases.

Dairy health management is important to contribute for efficient production and reproduction. It consists of routine day to day follow up of each animal in the farm. Everywhere around the farm hazards are threatening animal health. Bacteria, which are present everywhere on a farm, can cause infection and other inflammations common on dairy farms. The presence of ticks can be a source of vector borne diseases, which are a serious hazard for cattle especially in East Africa. In appropriate feeding not only has direct effect on milk production and growth, but can also lead to metabolic diseases. Every farm has to deal with cattle diseases and its consequences in its best way to achieve optimal economic results.

Professional situation

Extension workers in the EDGET Project have to should be able to advise small holder farmers how to manage their crops and livestock in optimal way particularly the dairy enterprise. The farmer has to determine the objectives of his or her dairy enterprise in order to develop action plans for achieving these objectives and has to develop tools for monitoring and evaluation.

As an extension worker you should have the knowledge, skills and innovations to judge the health status on a dairy farm and to advice a dairy farmer how to prevent common dairy cattle diseases like mastitis, tick born diseases, infectious diseases, parasitic infestations and metabolic diseases. Also you are able to advice a farmer about what to do when cattle health issues arise on a farm.

As an extension worker you should be able to advice the dairy farmer when and if it is necessary to consult veterinarian or another expert to solve health problems in a farm. They will be a partner for the farmer to discuss the health issues the farmer encounters and to support him in making management decisions to improve farm management in a way to solve or control the cattle health issue.

This course cannot cover the wide range of cattle diseases but will discuss diseases which the farmer encounters in his day to day management of the farm; Mastitis, Tick born diseases, parasitic infestations and Metabolic (feed related) diseases. Furthermore the course focused on prevention of diseases, not only by vaccination but also by hygiene measures and proper feed management.

Special attention will be given to recognize the dairy cattle health problem signs and how to interpret these signs. Lying down, un ability to stand, inappetance and having cold ears are signs of a sick cow and requires immediate attention and treatment. Rough coat sudden drop in milk yield, absence of rumination and abnormal gait are also recognized during early disease problem and used to take treatment action earlier.

Required entry qualification

To take part in this module on Dairy Health Management you should comply with the following entry requirements:

- Competent in the English language
- Have completed other EDGET Program training modules successfully
- Have basic insight/experience in managing small holder dairy farms
- Have motivation for the well being of dairy cattle

Specific objectives and related topics

a. At the end of the course participants should be able to judge the signs related to dairy health and describe the animal health management status in the farm.

- Cow health signals
- Farm hygiene
- Tick and worm prevention program
- Vaccination program
- Feed management (mostly discussed in another module)

b. At the end of the course participants are able to make a mastitis prevention program together with the farmer. Related topics are:

- Cow health signals
- Performing the Californian Mastitis Test
- Farm hygiene

c. At the end of the course participants are able to develop together with the farmer a prevention plan for parasitic diseases (External and internal). Related topics are:

- Basic insight in the lifecycle of ticks and worms
- Knowledge about major vector diseases
- Prevention of tick borne diseases and worm diseases

d. At the end of the course participants are able to understand the basic principle of vaccinations.

Related topics are:

- Dairy cattle vaccinations
- Infectious diseases (bacterial and viral) in cattle

Assessment

During the course one assessment will be conducted to measure the competence level of the participants to advise a small holder farm on dairy cattle health. The assessment will be a group assignment. The group with maximum 4 persons will visit an assigned small holder dairy farm and implement the following tasks:

- a. Making a checklist for monitoring the animal health.
- b. Making a checklist for monitoring animal health hazards on the farm.
- c. Visit of the assigned small holder dairy farm, monitor the herd health and the health hazards and fill out this checklist.
- d. Perform a Californian Mastitis Test on milk from at least three dairy cattle.
- e. Assess the cattle health status on the farm by analyzing the checklists.
- f. Assess the cattle health management by judging the tick prevention measures, vaccinations given and deworming measures taken at the farm.
- g. Assess medicine use and storage at the farm.
- h. Develop at least three advices for improving the health management on the assigned farm.
- i. Presentation of results.

Activities

Below an overview of all activities related to this module are presented:

Day	Time	Subject
Mon	1 st	-Introduction Module/ participants/ trainer and introduction into dairy health management
	2 nd	-Cow signs related to animal health -Animal health hazards at the dairy farm
	3 rd and 4 th	Visit of small holder farm and implement following practical lessons: -Judging the animal health status of the cattle -Judging animal health hazards at the farm -Assess the health status on the farm -Homework (study relevant chapters of the manual)
Tue	1 st	-Principles of bacterial infections -Mastitis -Explanation of the Californian Mastitis Test
	2 nd	-Prevention measures at farm level to reduce mastitis -Treatment of mastitis and antibiotic use at the dairy farm
	3 rd and 4 th	Visit of small holder dairy farm -Assessment of hygiene around milking and milk technique -Performing a Californian Mastitis Test at minimally three dairy cattle -Assess medicine use and storage -Homework
Wed	1 st	-Tick born diseases, the life cycle of ticks and the diseases they can spread -Prevention of tick born diseases -Treatment of tick born diseases - Prevention and treatment of worms
	2 nd	-Basics of cattle vaccination -Available vaccines in Ethiopia -Discuss available vaccination programs -Metabolic diseases -Treatment and prevention of metabolic diseases
	3 rd	-Visit of assigned small holder dairy farm and assess, tick prevention measures, vaccinations done, worm prevention and treatment actions
	4 th	-Analyze findings
Thur	1 st	Prepare for presentation
	2 nd	Presentation in presence of farmers
	3 rd	Brainstorm on farmer training in dairy cattle health management and how to improve it
	4 th	Course evaluation and closing

Notes:

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B. Lesson Matrix

Lesson Matrix	
Topics	
Practical Lesson	Lesson 1
Date	
Venue	
Duration	1 day/ Day 1 of the Course Health Management (General introduction)
Type of students	EDGET Extension Workers
Suggested number of students	16
Starting situation	Students have very little or no experience with Dairy Cattle Health Management
Learning Objectives:	The student is able to:
Skills	<ul style="list-style-type: none"> - Assess the health status of an individual cow - Assess the health status of the dairy herd - Assess the possible risk factors threatening animal health at a farm - For the health status of an individual cow, the student is able to determine temperature, pulse rate, breathing frequency and general condition of the cow. - For the health status of the herd, the student is able to give an opinion about the health status according to behaviour, posture and gait, body condition score, manure score. - For the possible health risk factors on the farm, the student is able to judge the condition of the farm on hygiene and cattle welfare conditions. - To gain this knowledge the students should be able to fill in checklists and to analyze the results - Present found findings and recommendations to farmers in order to prevent health problems and or to decrease health problems
Knowledge	<ul style="list-style-type: none"> -Be able to determine body temperature, pulse rate, breathing frequency and general condition of the individual cow. -Be able to determine the health status of the herd on body condition score, behavior of the herd, rumen fill, manure and leg score. -Explain to the farmer in which way the used criteria are relevant for prevention and treatment of cattle with clinical health problems. -Be able to pin point possible health risk factors at the farm by judging hygiene and stable conditions.
Attitude	<ul style="list-style-type: none"> -Teach farmers to recognize health disorders and possible risk factors, which can cause these disorders. -Teach farmers that even small disorders can have impact not only on cattle health, but also on the economical performances of the farm.

Time (minutes)	Brief Content	Role trainer /didactical methods	Teaching aids	Role/activities Participants
30	-Opening of the Course, getting acquainted with each other, explanation Module Book and Course Objectives	-Explaining/ guiding/ making trainees feel at ease	-Module Book	-Listening, introduction of themselves, asking questions, answering questions
30	-Sharing experiences with dairy cattle health management -Distribution Dairy Health Management Manual	-Asking for experiences to get an idea about student level -Introduction to dairy cattle health management	-Dairy Cattle Health Management Manual	-Sharing experiences -Check contents of Manual
60	-Giving the theoretical knowledge on how to judge cow health on an individual cow to prepare for practice at the farm - Give special attention to skills to measure <ul style="list-style-type: none"> • Body temp • Pulse rate • Breathing frequency 	-Sharing experiences -Demonstrating skills -When possible show pictures in PPT -If possible visit small holder dairy farm and demonstrate on farm	-Manual -Checklist -Thermometer -Stethoscope -PPT Dairy Cattle Health	-Sharing experiences/ listening/ asking questions/ assessing
30	Break			
60	-Give theoretical background on checklists for judging herd health status and health hazards	-Sharing experiences/ lecturing/ PPT/ assignment -If possible visit small holder dairy farm and demonstrate on farm	-Manual -PPT - Workshop animal health	-Sharing experiences/ listening/ asking and answering questions
60	Lunch			
180	Visit of small holder farm and implement fill in: -The checklist on individual cow health and practice manual skills to measure body temperature, check pulse rate and breathing frequency and judge mucosa -The checklist on herd health -The checklist on possible health hazards	-Travel to farm -Explain checklists -Demonstrate skills -Help and guide participants	-Small holder farm	-Visit small holder farm/ practice skills/ fill in checklists

Time (minutes)	Brief Content	Role trainer /didactical methods	Teaching aids	Role/activities Participants
30	-Summary/ reflection/ homework	-Summary theory/ testing knowledge -Common made mistakes -Study chapter 1/2/3 -Finish assignment rumen function	-PPT -Manual -Assignments -Homework study Manual	Answering and asking questions

Lesson Matrix	
Topics	
Practical Lesson	Day 2 Dairy Cattle Health Management (Infectious Diseases)
Date	
Venue	
Duration	1 day/ day 2 of the Course
Type of students	EDGET Extension Workers
Suggested number of students	16
Starting situation	Students have very little or no experience with Dairy Cattle Health Management. At the first day of the course basic health signs were discussed and taught.
<u>Outcomes</u>	The student is able to:
Skills	<ul style="list-style-type: none"> -Practical skills which are taught at the first lesson -Practice how to milk a cow correctly -Practice to use the Californian Mastitis Test -How to store medicines -How to clean and store milk equipment -Present findings and recommendations to farmers
Knowledge	<ul style="list-style-type: none"> -Describe health signs of cow and possible disturbances -Understanding of the life and hazard potential of bacteria -To observe and judge hygiene on a dairy farm -Background in etiology, epidemiology, prevention and treatment of mastitis -Explain to a farmer how hygienic measures can reduce the chance on mastitis at a dairy farm -Explain to a farmer how to use and store medicines and the working and effects of antibiotic use
Attitude	Convince farmers that prevention of mastitis is better than treatment of mastitis. Do this in a pro-active way to demonstrate the Californian Mastitis Test and to show possible health hazards concerning mastitis at his or her farm.

Time in minutes	Brief Content	Role trainer/ didactical methods	Teaching aids	Role/activities Participants
120	-Discussion Homework -Introduction in etiology, epidemiology, clinical signs, prevention and treatment of mastitis	-Discussion results assignment -Repeating the use of checklists -Answering questions	-Manual -Workshop mastitis	-Answering/ asking -Listening -Making assignments
30	Break			
120	-Demonstration on the use of the Californian Mastitis Test -Introduction in farm hygiene and milking technique -Explanation on medicine and medicine storage -Explanation for the afternoon assignment		-Presence of Californian mastitis test and milk -PPT mastitis	
60	Lunch			
120	Visit of small holder dairy farm -Practice and rehearse cow signs on individual cow -Fill in checklist on herd health and health hazards -Check procedures around milking -Practice hand milking -Practice use of Californian Mastitis Test -Practice cleaning of milk equipment	-Guidance and coaching -Demonstrate skills	-Excursion farms -Presence Californian Mastitis Test, thermometer, stethoscope, utensils and detergents to clean milk equipment	-Practice skills -Fill in checklists
30	-Summary/ reflection/ homework	-Summarize theory -Discuss skills required		-Analyze findings -Answering and asking questions

Lesson Matrix	
Topic / Serial #	
Practical Lesson	Day 3 Dairy Cattle Health (Prevention Measures)
Date	
Venue	
Duration	1 day/ Day 3 of the Course
Type of students	EDGET Extension Workers
Suggested number of students	16
Starting situation	Students have very little or no experience with Dairy Cattle Health Management
Outcomes	The student is able to:
Skills	<ul style="list-style-type: none"> -Fill in the checklists and assess the health situation of the farm and its cattle -Able to measure the health signs of an individual cow -Able to observe the health signs related to the dairy herd -Assess the farm situation around tick prevention and support the farmer in making a tick prevention plan -Assess the farm situation on presence and prevention of worms and to help the farmer to make worm prevention plan -Assess the farm situation on cattle vaccination and help the farmer to make a vaccination plan
Knowledge	<ul style="list-style-type: none"> -Understand and explain the principles of cattle vaccination -To have understanding of tick born diseases, its etiology, epidemiology, major clinical signs, prevention and treatment - To have understanding of diseases related to worm infections, its etiology, epidemiology, major clinical signs, prevention and treatment -To have understanding of metabolic diseases, its etiology, major clinical signs, prevention and treatment -Understand and explain how items on the checklist are related to the health situation on the farm. -To support farmers in making a farm health management plan
Attitude	Convince farmers that dairy cattle health management deserves continuous attention from the farmer and that prevention is more important than treatment of diseases.

Time in minutes	Brief Content	Role trainer /didactical methods	Teaching aids	Role/activities Participants
120	-Discussion homework -Presenting the background on infectious diseases, its causes and epidemiology -Present the basic principles on vaccination		-Manual -Workshop tick borne diseases and worms -Workshop vaccination	
60	Break			
120	-Introduction on tick born diseases -Introduction on diseases caused by worms -Introduction on metabolic diseases		-Manual -Assignment	-Listening/ asking/ making assignment/ discussing -Working on assignment
60	Lunch			
120	-Visit of assigned small holder dairy -Rehearse skills as presented in the first two days of the module -Assess the farm and interview the farmer on: *Tick prevention *Controlling worm infections *Vaccination of cattle *Presence of metabolic diseases	Guiding/ coaching	-Assignment	-Students collecting and processing information
30	-Summary	-Finish assignment	-PPT -Manual -Assignment -Homework study Manual	Answering and asking questions

C. Assignment Dairy Health Management

The participants are to carry out an assessment of the dairy cattle health and its management as a result of the three small holder dairy visits that week. In groups of four persons the participants have to evaluate and analyze the animal health on the farm and the possible risks on cattle diseases.

- For the first visited farm they look to health in general.
- For the second visited farm they look to health in general, but specifically to mastitis.
- For the third visited farm they look to health in general, but specifically to tick prevention, worm prevention, vaccinations and metabolic diseases.

They develop recommendations and advice for farmer how to improve dairy cattle health on their farms. On the last day of the Dairy Cattle Health Module the group presents their findings to the trainer, the other participants and the farmers involved in the assignment. A summary of the advice is handed in as report (max. 1 pages per farm A4). The report is handed in as hard-copy or by e-mail on the evening before the presentation.

Assignment:

1. Groups work out a checklist for monitoring the cattle health signs at the farm, see also Annex 1.
2. Groups work out a checklist for monitoring the cattle health hazards at the farm with special attention to hygiene, tick prevention, vaccination and worm prevention, see also Annex 1.
3. The curriculum of four days includes three days theoretical training in the morning session followed by a farm visit in the afternoon, in which the theory gained during the morning can be practised and or rehearsed. On the fourth day the experience will be presented and recommendations to the farmers will be given.
4. Groups visit the assigned small holder dairy farm, monitor animal health and health hazards at the farm.
5. During the first visit the group does a general health assessment to practice the knowledge gained at first morning of the training session, at the second visit the group will do again a general assessment, but will give special attention to mastitis and during the third farm visit the group will practice again the general health assessment and will give special attention to vaccination, tick prevention, metabolic diseases and worm prevention.
6. During the first visit the participants give special attention to measuring body temperature and rumen movement.
7. During the second visit the participants will practice the Californian Mastitis Test and observe milking. Also the group will give attention to medicine use and medicine storage.
8. During the third visit the group will give special attention to tick prevention, worm prevention, vaccination and metabolic (feed related) diseases.
9. Presentation of results to course participants, trainer and assigned farmers. Each group member presents a part of the assignment.

Time available:

The program developed is tightly planned. Do not consider this program rigid. It is possible to expand the program with an extra day to go a little more in depth on theoretical background and/or to have time to prepare the presentations in a better way.

If the program is followed accordingly, participants will require time in the evening to rehearse and practice knowledge gained to optimize use of presented knowledge.

Approach:

Make groups of 4 persons, each group:

- Studies and analyses information provided
- Makes checklists of information to be collected during farm visit
- Checks attached benchmarking worksheet
- Prepares questions for interview

Monitoring Dairy Health:

For regular monitoring of dairy cattle health the following signs and their benchmarks can be used. Benchmarks are based on international accepted standards. The checklists underneath are a guideline for use and can be adapted to local circumstances and skills of extension workers.

Criteria dairy cattle health signs (individual cow)	Score	Benchmark
1. Body temperature		38 - 39°C
2. Breathing frequency		12- – 16 times per minute
3. Pulse rate		40 – 60 pulses per minute
4. Hair		Shiny and smooth
5. Mucosa		Pink and shiny
6. Legscore		1 to 3
7. Rumenfill		Filled
8. Body Condition Score		Depending on lactation period
9. Rumen movements:		2 per minute
10. Appetite		Willing to eat concentrate
11. Posture and gait		Straight, not crippled
12. Behaviour		Attentive
13. Temperature ears		Warm

Criteria dairy cattle health signs (herd (group))	Score (1 to 5)	Benchmark
1. Average Body Condition Score		In average ≥ 3
2. Posture and gait		No cripple cattle
3. Rumenfill		Filled
4. Hair		Shiny and smooth
5. Manuel score		Smooth, consistent and shiny
6. Leg score		1 to 3
7. Rumenfill		Filled
8. Body Condition Score		Depending on lactation period
9. Behaviour		70% resting and laying down Majority ruminating
10. Appetite		Willing to eat concentrate
11. Posture and gait		Straight, not crippled
12. Behaviour		Attentive
13. Area around vulva		Clean

Farm Checklist Health hazards	Good	Satisfactory	Improvements required	Immediate action necessary
Milking				
Milking place				
Quality of the floor				
Hygiene of the floor				
Hygiene of the walls				
Pest and insect control system				
Hygiene of milk equipment				
Hygiene of milk storage equipment				
Personal hygiene				
Preparation of udder				
Milking technique				
Post milking				
Stable				
Quality of floor				
Quality of bedding				
Hygiene floor				
Hygiene bedding				
Cleanliness of cattle				
Drinking water				
Quality of drinking water				
Quality of drinking troughs				

Farm Checklist Health hazards	Good	Satisfactory	Improvements required	Immediate action necessary
Hygiene of troughs				
Cleanliness of water				
Feed				
Storage facility				
Cleanliness of storage facility				
Freshness of concentrates				
Freshness of forage				
Pest control				
Presence of moulds in feed				
Calving				
Quality of calving place				
Quality of bedding				
Hygiene of calving place				
Hygiene around calving				
Disinfection of umbilical cord				
Cattle traffic				
Entrance of bought animals				
Exit of sold animals				
Disposal of carcasses				
Prevention of diseases				
Vaccination scheme				
Tick control				

Assignments Day 1 of the course

Workshop cattle health symptoms

Before showing the Power Point about animal health a workshop can be organized. Divide the participants in three or four groups and let them discuss, which kind of symptoms cattle show when having a health problem. Give them 20 to 30 minutes for the exercise and spend also 20 to 30 minutes on presentation and discussion. Also ask them to grade the symptoms in how they appear on ordinary dairy farm.

This can be done like:

- | | |
|------------|--|
| 1. Often | Can be seen on the majority 90% of the farms |
| 2. Common | A symptom what appears regularly on a farm and most farms have experience with it. |
| 3. Regular | Farmers see this symptom at least once a year on the farm |
| 4. Rare | This is a symptom only seen once a year or once in a few years |

Next to that ask them to grade the severity of the symptoms

- | | |
|----------------|---|
| 1. Very severe | Can be lethal |
| 2. Severe | Cow gets seriously sick |
| 3. Less severe | Cow will have a small drop in milk production or difficulty getting pregnant. |
| 4. Not severe | Cow can be cured easily and will not suffer from the symptom |

Purpose of the exercise is to find out how familiar the participants are with health problems in cattle and to make the huge variety in symptoms clear and to get an understanding about the importance of cattle health.

Home work day 1

Let the participants preferably in three to four groups make a list of the 10 most common diseases on a local dairy farm. Let them grade the diseases in order of economical importance for the farmer and let them grade them on severity for the cow. Discuss this on day 2. Let each group presents its results and discuss the differences in opinion between the groups. All answers can be correct, but the groups should give good argumentation how they reached their grading.

Purpose of this exercise is to show the difference in severity. For instance anthrax has lethal consequences for the cow, but the risk for it to happen is small. Mastitis is a common disease but has because of the loss of milk much impact on the income of the dairy farmer. Also by discussing the diseases, the participants will share information on the diseases and teach each other.

Assignments day 2 of the course

Workshop mastitis

Before starting to present the Power Point on mastitis, divide the participants again in three to four groups. Try to make different groups than the day before.

Give them 20 to 30 minutes to describe the best way of milking a cow and thereby to avoid mastitis. Let the groups present the results in about 5 minutes per group. Purpose is to trigger the participants to think about the subject and to share already knowledge with each other. By receiving this knowledge, the teacher giving the presentation on mastitis can emphasize the gaps with the content in the presentation and gives less attention on the knowledge already present in the group.

Homework day 2

Let the participants make a list of the three most important things the local farmers should change in their farm management to prevent mastitis. List the results the next day on a white board or flip over and discuss the results. Purpose of this exercise is to give participants tools for their extension job.

Assignment day 3 of the course

Workshop tick-borne diseases and worms

After having giving the presentations on tick-borne diseases and worms let the participants form groups and let them develop a prevention plan to decrease the risk on tick-borne diseases and worms. They not only should make a plan based acaricides and deworming medicines, but they should try to make a plan where reduction of

the use of medicine should be important and grazing still be possible. Give them 45 minutes for it and take 30 minutes for presentation and discussing the results Purpose of the exercise is to let the participants use their knowledge to make a prevention plan with as less medicine as possible in order to save cost for the farmer and to spare the environment.

Workshop vaccines

Ask the group which vaccines for cattle are available on the Ethiopian market or which vaccines possibly can be imported and list them on whiteboard or flip over. Discuss the severity of the diseases with the participants. Try to make clear what the damage will be if the infection appears on a dairy farm. Secondly discuss the risk of the diseases to appear on a local dairy farm. Gathered this information try to decide if vaccination for the disease is necessary or worthwhile to do. Purpose of the exercise is to get better insight in vaccination programs and its purpose.

Homework day 3

There will be no homework for day 3. Participants have to prepare their presentations to the farmer for day 4.

D. Assessment

I. Assessment form for written report (group score)

Group members:

Subject / title:

Group Score (out of 60, each item can score from 1 to 10 points, 1 = very poor/ 10 = excellent)

	Excellent	Good	Average	Poor	Very poor
1. Introduction <ul style="list-style-type: none"> - Objective of the report was indicated - Method of work is explained - Content of the report is introduced 					
2. Description of the actual situation <ul style="list-style-type: none"> - Description of the herd health - Description of farm hazards 					
3. Data collection and analysis of the actual situation <ul style="list-style-type: none"> - Use of checklists - Analysis of data - Identification & Relative importance of constraints 					
4. Proposal for improvement <ul style="list-style-type: none"> - Technical description of the proposal - Feasibility of recommendations - Health impact of the proposal on the overall farm - Organisational aspects of the proposal 					

	Excellent	Good	Average	Poor	Very poor
5. Conclusion					
- Based on the contents on gathered information					
- Clear and well formulated					
6. Quality of the Report					
- Language					
- Level (for farmer)					
- Lay out					
- General impression					

Assessment is passed with a score of minimum 35 points

II. Assessment (individual score)

Name trainer:.....

Enterprise presented:.....

Observer:.....

Date:.....

Behaviour criteria: The participant:	Remarks and score by observer (range from 0 (insufficient) to 5 (very good))
1. Has prepared the correct and required teaching aids	
2. Presentation can be followed by all including farmers	
3. Presentation follows a logical path and is divided in clear steps if required	
4. Links the level of knowledge and skills instructed to the level of the farmers	
5. Can execute the basic skills required for the lesson	
6. Speaks clearly and is pleasant to listen to	
7. Makes contact with the group and keeps this momentum during the lesson	
8. Stimulates interaction with the participants	
9. Stimulates interaction among the participants	
10. Provides for feedback during the presentation to check if message comes through	
11. Can describe to which extend outcome was realised	
Further Remarks and final score :	

Minimum score for passing the assessment will be 30



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