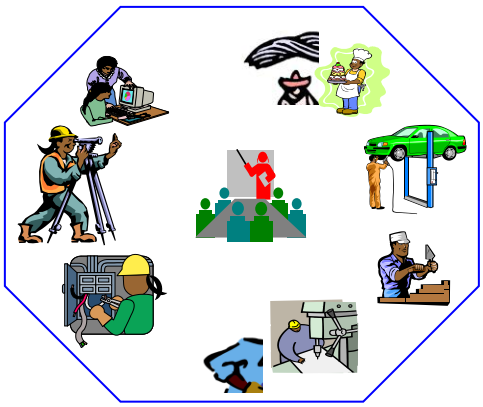


Animal Health Care Service

Level –III

Based on March 2018, Version 3 Occupational Standard

Module Title: - Identifying Reproductive Diseases and Other Fertility Problems

LG Code: AGR AHC3 M16 LO (1-3) LG (62- 64)

TTLM Code: AGR AHC3 TTLM 1921V1

Adama, Ethiopia

June 2021

East Africa Skills for Transformation and Regional Integration Project (EASTRIP)

Table of Contents

LG #62	LO #1- Identify and diagnose reproductive diseases and fertility problems

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Recognizing, assessing and controlling existing and potential risk and hazards in the workplace
- Identifying infectious and non-infectious reproductive diseases and fertility problems of farm animals
- Diagnosing reproductive diseases and fertility problems
- Using appropriate tools and equipment for the diagnosis of reproductive diseases of farm animals
- Selecting, using and maintaining PPE clothing and equipment are
- Gathering an observed and appropriate information for clinical diagnosis of reproductive abnormalities of farm animals
- Collecting, packing and shipping proper sample

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Recognize, assesses and control an existing and potential risk and hazards in the workplace
- Identify infectious and non-infectious reproductive diseases and fertility problems of farm animals
- Diagnose reproductive diseases and fertility problems
- Use appropriate tools and equipment for the diagnosis of reproductive diseases of farm animals
- Select, use and maintain PPE clothing and equipment.
- Gather an observed and appropriate information for clinical diagnosis of reproductive abnormalities of farm animals
- Collect, pack and ship proper sample

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Recognize, risk assesses and control an existing and potential hazards in the workplace

1.1 Identify potential hazards

Farmers and farm workers suffer from increased rates of respiratory diseases, noise-induced hearing loss, skin disorders, certain cancers, chemical toxicity, and heat-related illnesses. There are precautions that can be taken to minimize or eliminate these potential hazards. Every farm is different, but hazards common to most farms include:

- **Animals**: injuries inflicted by animals can include bites, kicks, crushing, ramming, trampling, and transmission of certain infectious diseases such as giardia, salmonella, ringworm and leptospirosis
- **Chemicals**: pesticides and herbicides can cause injuries such as burns, respiratory illness or poisoning.
- **Confined spaces**: such as silos, water tanks, milk vats and manure pits may contain unsafe atmospheres, which can cause poisoning or suffocation
- **Electricity**: dangers include faulty switches, cords, machinery or overhead power lines
- **Heights**: falls from ladders, rooftops, silos and windmills are a major cause of injury
- **Machinery**: hazards include tractors without roll-over protection structures (ROPS), power take-off (PTO) shafts, chainsaws, augers, motorbikes and machinery with unguarded moving parts
- **Noise pollution**: noise from livestock, machinery and guns can affect your hearing
- **Vehicles**: crashes or falls from motorbikes, two-wheel and quad bikes, tractors, utes and horses can result in major injuries
- **Water**: drowning can occur in as little as five centimeters of water. Dams, lakes, ponds, rivers, channels, tanks, drums and creeks are all hazards. Young children are particularly at risk
- **Weather**: hazards include sunburn, heat stroke, dehydration and hypothermia.

1.2 Risk assessment at farms

Broadly speaking, a risk assessment is the combined effort of: identifying and analyzing potential events that may negatively impact individuals, assets, and/or the environment; and making judgments "on the tolerability of the risk on the basis of a risk analysis" while considering influencing factors.

Making your farm a safer workplace as follows:-

- Regularly walk around your farm and assess potential dangers.
- Consult with farm safety advisers from the Victorian Work Cover Authority – they may provide free consultations.
- Create a safe and contained play area for young children close to the house and away from hazards.
- Make sure everyone working on the farm is properly educated on farm risks and trained in first aid.
- Keep all equipment in good repair.
- Store dangerous items such as machinery, firearms and chemicals behind locked doors and remove keys to a safe place.
- Find ways to improve safety, such as fitting roll-over protection (ROPS) and seatbelts to tractors, or replacing dangerous chemicals with less toxic varieties.
- Keep a log of injuries and near-misses to pinpoint areas for improvement.
- Consult with other workers and family members on how to improve safety.
- Write a safety plan together that includes ways to identify hazards and minimise potential risks.
- Always use appropriate safety equipment, such as machinery guards and shields, helmets, gloves, goggles or breathing apparatus.
- Make sure everyone understands and uses safety procedures, especially children.
- If using four-wheel motorbikes, make sure you are using them in line with the recommendations – remember they are not all-terrain vehicles.

1.3 Draw up an emergency plan

An emergency plan is vital. Some suggestions include:

- Make sure there is easy access to a suitable and well-stocked first aid kit.
- Make sure at least one person on the farm is trained in first aid.
- Keep emergency numbers and correct addresses next to the telephone. If you or someone else needs to call 09, they need the correct address.
- Plan routes to the nearest hospital – make sure it has an emergency department.
- Regularly talk through your emergency plan with your family and other workers.
- Make sure your children understand what to do in an emergency.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. List and explain the types of hazard at farm animal's area? (4pts).
2. How we can control the risk occurred in farm? (2pts)
3. Write the method of safe workplace area? (1pts).
4. What are the differences between hazard and risk at farm area? (4pts).

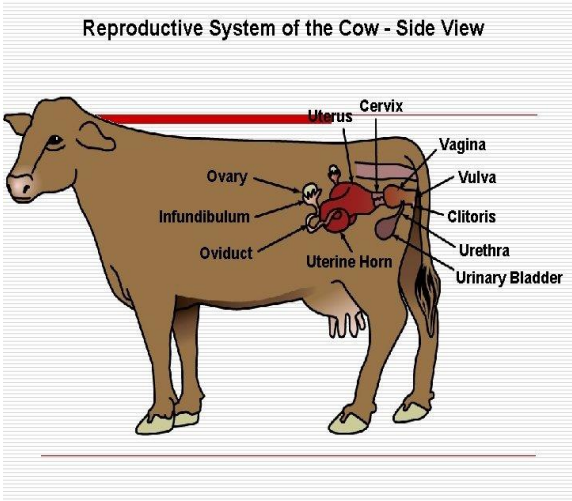
Note: **Satisfactory rating - 6 points** **Unsatisfactory - below 5 points**

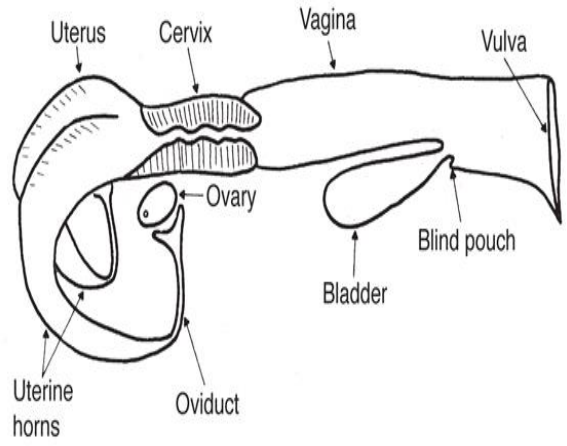
- ✓ **You can ask your teacher for the copy of the correct answers**

Information Sheet 2- Identify infectious and non-infectious reproductive diseases and fertility problems

2.1 Animal Physiology and Reproduction organs

Farm animal's means livestock that domesticated animals raised in an agricultural setting to produce commodities such as meat, milk, leather, and wool. Reproductive organs: the system of organs and parts which function in reproduction consisting in the male especially of the testes, penis, seminal vesicles, prostate, and urethra and in the female especially of the ovaries, fallopian tubes, uterus, vagina, and vulva. While reproductive physiology is the science concerned with the normal processes of organismal reproduction.





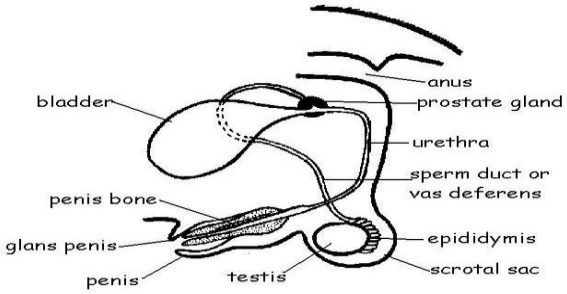


Figure 1: Examination of reproductive organs

Fertility is one of the key determinants of the life of a cow. For beef cows and for pastoral dairy cows, it is necessary for a calf to be produced every365 days. Regular breeding depends upon the normal function of the reproductive system In order to breed regularly, the cow has to have functional ovaries s, display oestrous behaviour, mate, ovulation, fertilization, conceive, sustain the embryo through gestation, calve and resume oestrous cyclicity and restore uterine function after calving.

Infertility in farm animals is due various causes such as nutrition, physiological disturbances and infectious causes, which may work separately or in combination. Economic losses can be considerable, both in terms of the cost of keeping a cow and the lost cash opportunity from fewer calves available to market. Additional losses occur if the subsequent calving period is extended, resulting in higher production costs and lighter calves weaned in the following year. Major infertilities are anoestrus and repeat breeding.

Types of infertility

1. **Anestrous**

- Anestrous is considered as a problem when cows are not seen in heat. Failure to observe heat and heat detection must always be ruled out as the primary problem. Review the heat detection procedures and heat detection efficiency with the producer. Pregnancy can be a prominent cause of anestrous and must always be ruled out before anything else.
- Other reasons for anoestrous are ovarian aplasia. Which is a rare condition when one or both ovaries are absent? It is caused when the gonadal ridge does not form correctly. Palpation is the best diagnostic method. There may be partial aplasia, when 'only one ovary' does not form.
- ***Ovarian Hypoplasia***: Where one or both ovaries are smaller than normal. This is a recessive trait in the Swedish Highland breed and is caused by a single autosomal recessive gene with incomplete penetration. True anestrus must be ruled out. There may be partial hypoplasia with this condition. Sucking by the calf inhibits cyclic activity in the cow by decreasing LH release. Summer heat stress occurs, when the

combined effects of heat and humidity produce a high "apparent temperature". If you compare estrus duration at 33.5°C vs 18.2°C, then the estrous cycle is longer and the estrus duration is shorter and estrus intensity is less.

- ***Ovarian Atroph***: Ovarian atrophy is caused from nutritional problems and is most often seen in dairy cows with high production.
- ***Mummy:*** A mummy in the uterus simulates a pregnancy and prevents the normal luteolytic mechanism. This results in anestrous. Treatment for this condition is administration of prostaglandin to lyse the corpus luteum.

2. Non-Infectious Infertility

Although infectious agents affect fertility, many non-infectious factors cause infertility in dairy cows. Thus, major non-infectious causes of infertility in dairy cattle include congenital abnormalities, acquired lesions, nutritional, seasonal and environmental causes. The most diseases that affect farm animals are:

A. Managemental causes

Breeding health can be judged from the conception rate within the herd. High conception rates within the herd can be maintained to certain extent by making adequate provisions for timely services from high fertile bulls over a suitably long period of time to give enough chance to the cows to express their fertility at proper time. The conception rate of a herd should be estimated as the percentage of females becoming pregnant to the first service. The conception ability of the individual animals and of the herd thus can be known and is not vitiated by the presence of individuals having sporadic type of transient forms of infertility. It is possible to ascertain the accuracy of the conception rate by subjecting all females to pregnancy diagnosis within 6 to 8 weeks after service. A satisfactory conception rate in a herd can only be maintained with the high degree of breeding fitness in majority of animals in the herd. It is usually observed that draught type breeds have better conception rates than the dairy type.

Conditions of overstocking, lack of spacious accommodation and poor hygiene predispose the stock to known and unknown infections. In the assessment of herd infertility a detailed history should be obtained from the owner, which should include

- size of the herd
- name of the breed
- the management practices
- feeding standards
- data on all calving's, service dates and
- Reproductive disorders - abortions, retained placenta, abnormal discharges and infertility treatments. Cognizance should also be taken of all the fresh introductions to the herd. The clinician should make a comprehensive study and then examine each cow irrespective of the symptoms of breeding inefficiency.

B. Nutritional causes of infertility

Post-partum nutrition is most important for fertility. If TDN is low both prepartum and postpartum, fertility suffers. Vitamin A had no effect on fertility, but may cause irregular cycles. Vitamin D deficiency suppresses signs of estrus and delays ovulation. Vitamin E deficiency may cause reproduction problems.

If the Blood Urea Nitrogen (BUN) is greater than 20 mg/dl cows may have low conception rates. The high BUN is from excess dietary protein. True anoestrus, lack of ovarian activity may be caused by anemia due to anaplasmosis, internal or external parasites, and deficiency of protein, iron, copper, cobalt or selenium. Impaired reproduction is also found in phosphorus deficiency, energy deficiency, cows losing flesh due to high production and/or underfeeding. Selenium or vitamin E deficiency may be associated with metritis. Vitamins and minerals are often suspected in infertility and anestrus but little hard evidence supports these claims.

Urea has no effect on reproduction. Carotene is needed by the Corpus Lntuem (CL) If it is low the cow may have low progesterone and irregular cycles. Copper requirement is

10 ppm. Less than this level may cause anestrus. Similarly, a cobalt deficiency may cause a delayed first estrus and irregular heats. Manganese requirement is 40 ppm. Less than this level may cause anestrus or irregular heats. Phosphorus is hard to separate from energy. It is associated with the seed portion of plant. Over feeding may predispose cows to many health problems at the time of calving or during early lactation; these include retained placenta, metritis, acetonemia and displaced abomasum.

C. hormonal cystic

- ✓ **Silent Heat**: Silent heat is generally not a problem and usually is manifested by unobserved heats by farmer. However, the first postpartum heat is normally silent, because there are no estrogen receptors. This is a result of the low postpartum progesterone.
- ✓ **Delayed Ovulation:** If a cow ovulates more than 18 hours after end of heat, then ovulation is said to be delayed. This may be diagnosed by palpation and can be treated with GnRH. This only occurs in < 2% of cows and is more likely to be a heat detection problem.

D. Cystic Ovarian Disease or Follicular Cysts

Follicular cysts are also known as benign ovarian cysts or functional cysts. Essentially they're fluid-filled pockets of tissue that can develop on or in your ovaries. Follicular cyst is fluid filled structure on the ovary greater than 2.5 cm in diameter. The cyst may persist for more than 10 days or regress and be replaced by another cyst. There are two types of cysts, follicular and luteal. A follicular cyst consists of a fluid filled cavity (unovulated follicle) lined by a small layer of thecal cells. The cells produce progesterone, but do not have prostaglandin receptors. If there are no prostaglandin receptors, the normal luteolytic cascade cannot occur, resulting in anestrus. If the granulosa cells persist in an untransformed state (not large luteal cells), the cow shows signs of constant estrus because of the estrogen production.

Etiology: It is a hereditary disease. The cysts are caused by a lack of LH surge. The LH may actually be present, but may not be released. This results in no ovulation, minimal luteinization. Aberrant estrogens in cotton seed meal, or possibly in poultry litter fed to cows may' cause a large number of cysts in a dairy. Stress may also contribute to lack of LH release.

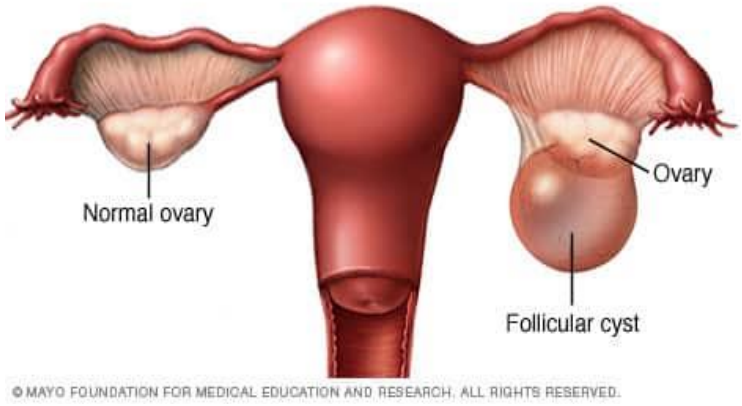


Figure 2: The difference between health and follicular cyst ovaries

3. Infectious Infertility

Diseases resulting in bovine reproductive failure can be an infection with a bacterium, virus or parasite. Symptoms are usually similar and diagnosis requires the services of a trained veterinarian and often the veterinary laboratory. The symptoms of infections in most animals are similar regardless of the cause of infection. Cows may return to heat regularly after breeding or may miss a few heats only to start cycling again early in. the season. Aborted fetuses are usually not found, but cows may have a creamy white discharge from the vulva. Some farmers may not even realize that there is a problem until an unusually large number of cows are diagnosed "empty" at the time of pregnancy checking. Some of the important causes are discussed below.

I. Repeat breeder

A repeat breeder is defined as a cow that has calved before, is less that 10 years old, has normal heat cycles, has no palpable abnormalities has been bred 3 or more times and is not pregnant. Also if you look at fertility expectations in normal animals you see

that 9% of normal cows would be repeat breeders. We normally assume a problem exists when the incidence is 10-15 %.

II. Fertilization failure

In normal heifers 100 % fertilization has been found one day after breeding. This drops to 85 % in cows, and to 60-70 % in repeat breeders. Therefore, repeat breeders seem to have more of a fertilization failure. If embryos are fertilized and transferred, one can have normal pregnancy rates. Release of PGF from inflammatory conditions such as mastitis can cause luteolysis and pregnancy loss. Inability to prevent PGF release (shown experimentally in a repeat breeder in response to oxytocin administration) causes return to estrus.

Fertilization rates are normal in heat stressed cows, but day 1 to 2 embryos are affected most by the heat. As blood flow to uterus decreases to shunt it to the rest of the body for cooling, the uterine temperature rises, nutrients decrease, and waste products increase. Salpingitis, metritis and cervicitis can cause a change in the uterine environment that leads to infertility.

III. Metritis

Inflammation of the uterus is known as metritis. Cows normally have a red-to-brown discharge during the first two weeks after calving. If discharge persists beyond 2 weeks or if the discharge is foul-smelling, this is evidence of metritis. Possible factors involved are retained placenta, injury to the reproductive tract can occur due to a difficult calving or excessive force used to assist at calving. Injuries can also occur at the time of breeding or uterine treatment. Post breeding infusion in these cows is not routinely helpful.

IV. Pyometra

A pyometra is a uterus filled with pus that has a closed cervix and a corpus luteum on the ovary. The pus prevents the normal luteolytic mechanism from happening. This

results in anestrus. The fluid in the uterus mimics a pregnancy, so the cow does not return to heat. Treatment for this condition is administration of prostaglandin to lyse the corpus luteum.

4. Abortions

Definition and incidence

Abortion is defined as fetal death and expulsion between 42 (an estimated time of attachment) and 260 days (the age at which a fetus is capable of surviving outside the uterus) of gestation. The condition does not include fetal maceration and mummification. Pregnancies lost before 42 days are usually referred to as early embryonic deaths, whereas a calf that is born dead between 260 days and full term is defined a stillbirth.

A rate of 3 to 5 abortions per 100 pregnancies per year is often considered "normal." However, the loss of any pregnancy can represent a significant loss of (potential) income to the producer and appropriate action should therefore be taken to prevent abortions and to investigate the cause of abortions that may occur.

Abortion is the most important condition that limits cow's ability to produce a calf and considerably erodes the profit. The greatest risk of fetal loss is during the first trimester of gestation and then progressively decreases as gestation advances with a slight increase in the risk toward the last month of gestation.

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Causes abortion

1. Infectious
2. Non-infectious

Either infectious or non-infectious agents may cause abortion. The infectious causes include bacterial, mycotic, viral, and protozoal. Historically, it has been suggested that 50-65%, 20-25% and 15-25% of infectious abortions were caused by bacterial, fungal, and viral causes respectively. The non-infectious causes include nutritional factors, chemicals, drugs, toxins, poisonous plants, and hormonal agents.

1. **Infectious causes of abortion**

Bacterial abortions result from brucellosis, leptospirosis, campylobacteriosis (vibriosis), listeriosis, Haemophilus somnus complex, and ureaplasmosis. Bacteria like Salmonella, Actinomyces, Escherichia coli, Streptococcus, Staphylococcus, Bacillus, Pseudomonas, Proteus, Pasteurella, Nocardia, and chlamydia species, as determined by the microbiological findings, can cause abortion. All these organisms and few others that are not listed have been isolated from sporadic cases of abortion. These are secondary to either a septicemia in the dam or ascending infection through the vagina and cervix or due to persistent endometritis.

A/ Bacterial Diseases

1. **Brucellosis, Undulant Fever, Contagious Abortion, Bang's Disease**

A zoonotic bacterial disease affecting cows buffaloes, goats, sheep, horses and dogs causing late gestation abortions in cattle and orchitis in bulls many times seen in the form of outbreaks.

The Organism

- Brucella abortus
- Gram negative coccobacillus

- Facultative intracellular pathogen
- Nine biovars
- Additional Brucellae that affect cattle
    - ✓ B. melitensis and B. suis
- Can persist in the environment

Populations at Risk

- Occupational disease
    - ✓ Cattle ranchers/dairy farmers
    - ✓ Veterinarians
    - ✓ Abattoir workers
    - ✓ Meat inspectors
    - ✓ Lab workers
- Hunters
- Travelers
- Consumers
    - ✓ Unpasteurized dairy products

Geographic Distribution

- Distribution
    - ✓ Worldwide
    - ✓ Eradicated in some countries
- Notifiable disease in many countries
    - ✓ World Organization for Animal Health (OIE)
- Poor surveillance and reporting due to lack of recognition

Center for Food Security and Public Health, Iowa State University, 2012

Mode of infection:

- Ingestion of contaminated pasture/water licking aborted fetuses

- Organisms shed in milk & uterine discharges
- Uterus of pregnant cows gets infected from blood.
- The erythritol sugar in uterus is a good medium for growth of Brucella
- After abortion and uterine involution organisms
- colonize the udder

Disease in Cattle

- Cows
  - ✓ Abortion, stillbirth
  - ✓ Weak calves
  - ✓ Retained placenta
  - ✓ Decreased lactation
- Bulls
  - ✓ Epididymitis, orchitis
- Infertility, arthritisLaboratory Diagnosis
- Direct examination
- Serology
  - ✓ Brucella antigen tests, complement fixation, ELISA, others
- Milk testing
- Culture and identification
- PCRStained smears from aborted material Koster & Zeihl Nelson method Orgs can be cultured from fetal stomach/placenta which has a Morrocan leather appearance

ELISA

- **Serological tests**

Rose Bengal Plate Test CFT/FAT/MRTThe Rose Bengal plate test can be used as an initial screening test of serum samples. All positive samples are re-examined using the serum agglutination test or complement fixation test. Rose Bengal negative samples are

not normally retested. A Serum Agglutination Test (SAT) is very widely used but detects non-specific antibodies as well as specific antibodies from Brucella infection and vaccination.

The Compliment Fixation Test is a more definitive test than the SAT, especially in differentiating titers arising from infection from vaccination.

The Milk Ring Test (MRT), which detects Brucella antibodies in milk, is very useful in screening the presence of brucellosis in herds by collecting bulk milk samples or in individual animals. Positive results can then be followed up by using other diagnostic tests on individual animals.

Post Mortem Lesions

- Granulomatous inflammatory lesions
  - ✓ Reproductive tract
  - ✓ Udder
  - ✓ Lymph nodes
  - ✓ Joints
- Abnormal placenta
- Enlarged liver
- Bulls: swollen scrotum

Control

- B. abortus 19 vaccination calf hood vaccination 4-8 months RB 51

Eradication: Notification, Isolation of aborting animals, disposal of aborted fetuses, placenta Genital Mycoplasmasmosis/ Ureaplasmosis

Cell wall deficient organisms

Brucellosis is a particularly difficult disease as there is no sure way to identify infected cattle by their appearance; all infected cattle do not abort.

2. Leptospirosis

Leptospirosis is a contagious, bacterial disease of animals and humans. In cattle, horses, pigs, sheep, goats, and dogs, it has been characterized by a wide variety of conditions including fever, icterus (jaundice), hemoglobinuria (bloody urine), abortion, and death. However, the concept of this disease has recently changed. It is used to be considered a highly fatal disease, but is now thought to be a widespread, mostly subclinical infection of many species of wild and domestic animals.

Signs of leptospirosis in cattle range from mild, unapparent infections to acute infections that end in death Clinical signs that precede abortions may suggest leptospirosis, highest abortion rate occurs in the last 3 months of gestation. Antibodies first appear in the serum of infected animals by the sixth or seventh day, and titers rise rapidly to a high level. Titers then decline to a more or less constant level and may persist for months. Samples sent to the laboratory for culture must be collected and shipped as rapidly as possible because leptospiras do not survive long in dead tissue.

3. Campylobacteriosis, Vibriosis

Caused by a Mobile, complex, three-haired, single-celled protozoan, called Tritrichomonas foetus; Organism survives in microscopic folds of skin that line the bull's penis and internal sheath.

Prevalence

- World over Insidous disease causing sterility abortion and pyometra

Transmission

- Transmitted from cow to cow by the bull – nearly always a disease of cattle who are naturally bred
- Transmitted via sexual contact with an infected mate

- Rare cases of transmission through artificial insemination

Clinical signs in cows

- Repeat breeding, Abortion in 1st half of gestation, Post service pyometra, Cow does not appear ill, Infected during breeding,
- The cow may show a subtle, mild, vaginal discharge, 1 – 3 weeks later (pyometra)
- Protozoa attach to the lining of the reproductive tract
- An inflammatory response occurs, resulting in the death of the embryo and hence repeated breedings

Trichomoniasis in the bull

- No signs: semen quality and sexual behavior are not affected
- Trich lives in the crypts (folds) inside the sheath.
- Crypts deeper in older bulls
- As the bull ages, the skin grows, folds increase in the penis and sheath, creating additional places for the organism to thrive
- Older bulls (over 3 years) more likely to become chronically infected than younger bulls

Diagnosis

- Bull becomes lifetime carrier
- Best to test after 2 weeks of sexual rest
- Sometimes observed under scope immediately
- Usually culture for 1 to 7 days
- If even one bull is positive, you have to assume that the herd has been exposed!
- Cows usually clear infection rapidly Test soon after embryo death or pyometra
- History of new bull introduction

Direct smear: abomasal contents of aborted fetus

Wet smear: vaginal discharge/ prepeutial washings

Org culture: Diamonds/ Tobies media transport at 4 degree C

Vaginal mucus agglutination test / FAT

Virgin heifer test mating

Prevention and control

It is easier to prevent the infection than to try to control it after it enters the herd; Avoid contact of uninfected cattle to other cows & new bulls

- For infected cows give Sexual rest for 8-12 weeks
- Avoid renting or leasing bulls/ replace culled bulls with young bulls
- Use AI for breeding
- Therapy of infected animals: Imidazole derivatives, Sodium Iodide, local application in bulls, Vaccination

Control:

Widespread use of AI has limited the disease

- Vaccine is available
- Avoid renting or leasing bulls
- Replace culled bulls with young bulls
- Test all new bulls

Disinfection

- Campylobacter spp. susceptible to:
  - ✓ 1% sodium hypochlorite – 70% ethanol
  - ✓ 2% glutaraldehyde
  - ✓ Iodine-based disinfectants
  - ✓ Phenolic disinfectants
  - ✓ Formaldehyde

- ✓ Moist or dry heat
- ✓ Gamma irradiation and UV radiation

4. Listeriosis

Listeria monocytogenes is a well-recognized cause of abortion, encephalitis and septicaemia in cattle. L. ivanovii has also been implicated as a cause of abortion in cattle but occurs less frequently than L. monocytogenes. Listeric infections and abortions usually develop in the late winter or early spring.

5. Mycotic

Fungal or mycotic infection of the placenta is one of the most common causes of sporadic bovine abortion. Providing good health (via good management and nutrition) and avoiding moldy feeds can reduce the incidence. When possible, depending on the availability and demand decrease the period of confinement, decrease cow density, and improve ventilation.

B/ Viral

1.1. IBR (Infectious Bovine Rhinotracheitis or "Red Nose") :

Infectious Bovine Rhinotracheitis virus is the cause of respiratory disease of cattle. However, in cows and heifers, this virus can also cause vulvovaginitis (inflammation of the vulva and vagina) and abortion. Abortion typically occurs about 20 to 45 days after infection. The control of IBR infections can be accomplished by the use of vaccines.

1.2. BVD (Bovine Virus Diarrhea)

Bovine Virus Diarrhea virus infection can cause abortion, weak calves at birth, calves with brain damage (cerebellar hypoplasia) or other abnormalities of fetal development. Clinical signs in newborn calves infected with BVD can include fever, nasal discharge,

diarrhoea and inability to move about normally (ataxia). A diagnosis of BVD virus infection requires laboratory examination of the fetus or calf. A blood test may aid in the identification of infected cattle.

C/ Protozoal

Protozoal diseases causing abortion are Trichomoniasis, Sarcocystosis ("Sarcosporidiosis") and Neosporosis.

1.1. Trichomoniasis

Trichomoniasis, is a venereal disease of cattle. It is caused by the protozoan, Trichomonas fetus. These organisms are harbored in the reproductive systems of infected animals, and are transmitted from one cow to other cow by infected bulls. Cows will generally get rid themselves of the disease after 60 to 90 days of sexual rest, but infected bulls appear to be unable to develop immunity. Infertility is the most common clinical sign of a trichomoniasis infection. Abortion generally occurs early in gestation (first 3 months). Because little tissue is shed during these early abortions, they often go undetected. Commercial vaccines are now available. Proper immunization requires two injections, usually administered two to four weeks interval. Annual revaccination may be recommended.

1.2. Sarcocystosis (Sarcosporidiosis)

Sarcocystosis is an intracellular protozoan infection that is generally asymptomatic but can cause mild gastrointestinal signs, including diarrhea, in cattle, sheep, pigs, horses, dogs, cats, and people. Abortions can be regularly induced experimentally in large and small ruminants and in pigs by the oral inoculation of sporocysts of certain Sarcocystis species. Cattle are susceptible to fertilizer nitrites and nitrates or the nitrates found in plants under certain conditions (e.g. drought-stress). If a cow is exposed to sufficiently high levels of nitrates/nitrites (~. 55 % or greater nitrate in forage), abortions may occur, especially in late gestation. T. gondii is considered to be a major cause of abortions in sheep and goats.

Diagnosis is based on the characteristic lesions in the cotyledons, histologic and immunohistochemical examination, and on the detection of specific antibodies in body fluids or serum of aborted fetuses. Whether abortions in swine due to T. gondii are of practical importance is still unclear. The most important causative protozoal agent of abortions in cattle is Neospora caninum. This protozoon was found in 19 per cent of cattle fetuses submitted for examination in USA. Occasionally it was found also in aborted lambs, kids and foals. Fever, anemia, ataxia, symmetric lameness, tremors, tail-switch hair loss, excessive salivation, diarrhea, and weight loss are clinical signs. Abortions in cattle occur during the second trimester and in smaller ruminants 28 days after ingestion of the sporulated oocysts.

1.3. Neosporosis

Neosporosis is caused by infection with the protozoa Neospora caninum. Neospora has been found world-wide and in many species other than cattle. Currently abortion due to Neospora has been shown in cattle, sheep and dogs. The dog and other canids (such as foxes) are the definitive host. That is they are the animals in which the parasite becomes sexually mature and reproduces.

Clinical Signs

- Abortion, between 3 and 9 months of pregnancy (particularly 5 to7 months)
- Still birth or premature calf
- Occasionally, calves will have brain disease at birth
- No other signs seen in the mother
- Repeat abortions possible in the same cow

Diagnosis

- Clinical signs of little help
- Characteristic heart and brain damage in aborted calf
- Identification of parasite in the calf tissue
- Antibodies in the mother's blood

Treatment

- No treatment of any proven benefit

Prevention

Dogs are potentially a source of disease. So prevention must include:

I. Keeping cattle food and water away from dogs and foxes
II. High hygiene standards at calving. Dispose of placental membranes and aborted or dead calves before dogs can get them

However, transmission from mother to calf (known as vertical transmission) is far more important. Over 90% of calves born to mothers with antibodies to Neospora will have been infected in utero. The importance of transmission between cattle is less clear. Nevertheless, vertical transmission alone can maintain infection in a herd. To eliminate Neospora you need to:

1. **Identify infected cattle and cull them**: All cattle with antibodies to Neospora are sources of infection to their calves, have a significantly increased risk of abortion, and, on average, produce less milk than antibody negative cows.
2. **Select only seronegative cattle for breeding**. Heifers with antibodies should be sold for meat not bred.

2.2. Non-infectious causes of abortion

2.2.1. Nutritional

Starvation may result in placental insufficiency and abortion; however, it rarely occurs in a modern dairy practice. Vitamin A deficiency has been suggested to result in thickening and degeneration of placenta and abortion in late gestation. Iodine deficiency has also been suggested as a cause of abortion.

2.2.2. Chemicals, drugs, and toxins

Toxic agents may also cause abortions or early embryonic deaths. Cattle are susceptible to fertilizer nitrites and nitrates or the nitrates found in plants under certain conditions (e.g. drought-stress). If a cow is exposed to sufficiently high levels of nitrates/ nitrites (-.55 % or greater nitrate in forage), abortions may occur, especially in late gestation. Mycotoxins from the fungal agents are suspected to cause abortion. Bacterial endotoxin is responsible for sporadic abortions. Among the hormonal agents, estrogen, glucocorticoids, and prostaglandin are important. They cause abortion depending on the dose and the stage of gestation they are used. Stress may also cause abortion.

Self-Check – 2	**Written test**

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Write the types of infertility? (4pts)
2. Define farm animals from other animals? (2pts).
3. List atleast 5 both female and male reproductive organs? (6pts).

You can ask you teacher for the copy of the correct answers.

Note: **Satisfactory rating - 6 points** **Unsatisfactory - below 6 points**

Information Sheet 3- Diagnose reproductive diseases and fertility problems

4.1 Reproductive Diseases of Domestic Animals

Disease is an aberrant process affecting an organism or any of its parts and is generally associated with a negative influence on the organism. Reproductive diseases are those that have a primary or significant negative impact on fertility. Venereal diseases are a special class of reproductive disorders. They are infectious diseases that are primarily transmitted through coitus.

Infertility is the inability to produce offspring. Subfertility is a condition of less than normal or desired fertility, that is, a relative infertility. In common veterinary parlance however, the terms are used interchangeably to describe less than optimal functioning of a reproductive system and we will make no distinction between them here. Sterility is a term generally reserved for cases of profound, permanent infertility in individual animals.

It is important to keep in mind that while producing a single offspring defines a male or female animal as fertile; this level of performance is seldom satisfactory for livestock systems. We require that our animals reproduce rapidly and efficiently, that is, they must be fecund. Fecundity defines a system that is functioning well from a reproductive point of view and infertility /subfertility (I/S) describes a system in need of improvement. In many breeding systems involving domestic animals, human-imposed constraints often create the potential for less than optimal fertility. These managerial issues are more appropriately considered limitations on the fecundity of the system rather than reproductive diseases and are the subject of the production medicine discipline.

4.2 Diagnosis

The etiology and pathophysiology of diagnosis are often complex. As a necessity then, management of fertility problems is a highly reductive process. Initial problem identification and refinement must account for all three elements of the fertility equation:

- The male animal
- The female animal
- The human/management element

As well as the fundamental nature of the problem – usually expressed as:

1. Failure to copulate (mate)
2. Failure to conceive (fertilization failure following copulation)
3. Failure to maintain pregnancy (abortion or stillbirth following fertilization)

Initial diagnostics involve assessment of the signalment such as species (Bovine Camelid, Canine, Caprine, Equine, Feline, Ovine and Porcine) and history, including careful analysis of reproductive records. In addition to the general physical examination, a specific breeding soundness examination (BSE) is conducted. The basic aspects of the BSE vary with the species and sex of the patient.

Many approaches are used to further develop a diagnosis, but expert systems tend to focus on:

- Pathophysiology of the disease (the DAMNIT system, for example)
- Timing of the problem within the reproductive lifecycle
- Anatomic localization.

Additional diagnostic testing is often necessary to make a specific etiological diagnosis. Familiarity with local diseases prevalence and access to a diagnostic laboratory are essential components of a diagnostic plan.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Define what is infertility means? (2pts).
2. How we can diagnosis animals? (4pts).
3. Write the differences between physical and systemic examination? (4pts).

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 4- Use appropriate tools and equipment for the diagnosis of reproductive diseases of farm animals

4.1 Introduction

Any livestock farmer in Africa is aware that livestock need tender loving care in order to benefit the owner. There is no point in having animals around that just die without any benefits. So since there are so many health challenges to keeping healthy livestock, it is essential to also know the basics of good animal health care. Ticks and fleas have to be controlled so they do not spread diseases, worms and flukes have to be controlled so as not to eat the animals from inside and it is also important to take care that animals are happy and comfortable. It may not come as much of a surprise that animals respond to tender loving care by becoming more productive. To take good care of animals, to diagnose if animals are diseased and to treat animals there are some tools that can be useful and practical to have within reach in the following some of the more common tools are listed which are widely available in Kenya and East Africa.

Important tools for good care of animals: Not all the mentioned tools are strictly necessary, but come in useful in emergencies or when the veterinarian is not available.

1. Thermometer - check body temperature

A thermometer is very useful to check body temperature. A veterinary thermometer is very cheap and can be found in most agro-vet shops. It is an essential tool for the serious livestock farmer to help her or him in judging animal health. Normal body temperature varies a little bit during the day and according to climate. If the body temperature is significantly (<0.5-1^{0}C) higher or lower than indicated below, there is usually a problem to be solved.

Table 1: Body temperature in healthy animals

Type of Animal	Normal Body temperature in °C	Upper limit in °C (any higher temperature is fever*)
Cattle	38.5	39.5
Calves	39.0	40.0
Horses, mules, donkeys	38.0	39.0
Foals	38.5	39.5
Sheep	39.0	40.0
Goats	39.5	40.5
Pigs	39.0	40.0
Piglets	39.5	40.5
Rabbits	39.0	
Dogs	38.5	
Birds	40.5	

2. Stethoscope – respiration and pulse taking

The stethoscope is an acoustic medical device for auscultation, or listening to internal sounds of an animal or human body. It typically has a small disc-shaped resonator that is placed against the skin, and one or two tubes connected to two earpieces. A stethoscope can be used to listen to the sounds made by the heart, lungs or intestines, as well as blood flow in arteries and veins. In combination with a manual sphygmomanometer, it is commonly used when measuring blood pressure. The following figure is explain where pulse taking and respiratory in farms animal.

Figure 3: Site respiration and heart rate taking site

3. Mastitis testing tools: Strip Cup and California Mastitis Test (CMT)

3.1. Strip cup techniques

A strip cup is a very useful tool and a must for all dairy farmers. Milking the first few strips into a strip cup will show if there are any lumps present indicating beginning or advanced mastitis, which should be controlled urgently. It is a tool that should be in use in the milking parlour of every serious dairy farmer. If actual strip cups cannot be found, a normal cup with black plastic tied onto the top can be used instead. The main thing is to observe the quality of the first milk streaks when starting to milk.

Figure 4: A farmer testing the udder for mastitis by using a strip cup.

3.2. California Mastitis Test (CMT)

A more efficient tool for early detection of mastitis is the California Mastitis Test (CMT). This test consists of a paddle with 4 cups, one for each quarter. Hold the handle in one hand (the handle representing the tail of the animal). Then milk a streak of milk from each quarter into the corresponding cup of the padddle (Front-Left, Front-Right, Hind-Left, Hind-Right) and remembering that the handle of the paddle points towards the tail of the cow. Next add a roughly equal or slightly higher volume of test solution from the CMT bottle and gently rotate the paddle to mix milk and test solution. (Please follow instructions on the CMT bottle for diluting the test solution to working strength before use). If the mix of milk and test solution stays liquid, the quarter is healthy. But if the mix shows varying degrees of stickiness or sliminess this is an indication of mastitis in the

quarter where the milk came from. (That?s why it is important to remember which teat or quarter was stripped into which cup of the test paddle!)

California mastitis test kits are sometimes available from agro vet shops, but more often have to be ordered. Although affordable and very useful they are not yet widely used. For larger farms, dairy processing enterprises and veterinary clinics there are (more expensive) electronic testers indicating the cows somatic cell count.

Figure 4: California Mastitis testing kit

4. Hoof trimming tools

In some areas and especially where the ground is soft, the hooves of animals grow faster than normal exercise can wear them down. Hoof trimming becomes necessary in order for the animal to be able to walk normally. The problem of overgrown hooves is particularly important for cows kept in zero grazing that do not exercise or walk on pasture at all. Also donkeys working on rough ground must be trimmed regularly to keep the hoofs in normal shape. Deformed hoofs makes normal walking difficult and painful for the animal. The legs may twist in different directions. The hooves become deformed and soft and prone to infections like foot rot. Overgrown long hooves are also dangerous for the udder because they may damage the teats when the cow stands up. An animal that only walks with difficulty and pain and has infected hooves has low animal welfare and cannot be a productive animal.

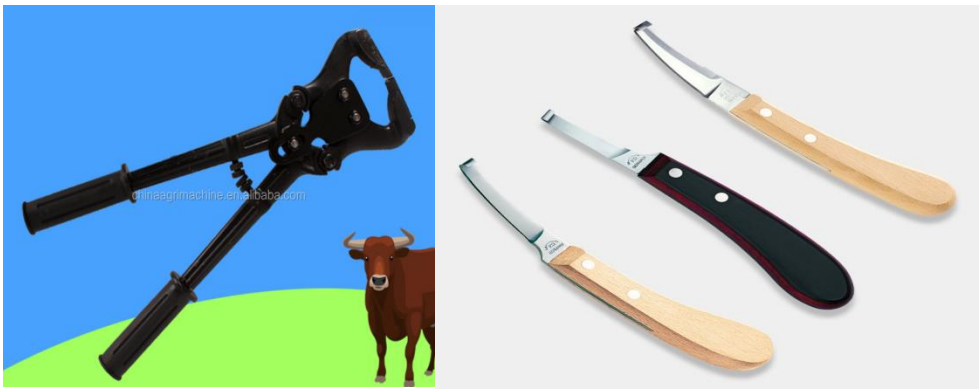

Figure 5: hoof trimmer of both hoof cloven and equines

Hoof trimming is however a specialized procedure and proper instructions and training from qualified livestock officers will be extremely useful for any livestock farmers. Offering hoof trimming as a paid service is a profession in Europe and could also become an income generating activity for keen young people who train on hoof trimming.

Hoof trimming knives are usually available from most well stocked agro veterinary shops but if not so, any good sharp knife can assist. In addition to hoof trimming knives professional hoof trimmers will also make use of more sophisticated tools like a hoof pincer (for clipping the dew claws), hoof shears (for cutting overgrown edge of the claw), toeing knife and a hoof rasp.

5. Glass slides for making blood smears

Blood samples are very useful for examining diseases in cattle. Many diseases such as ECF, Babesiosis and Anaplasmosis are caused by organisms which will show up under the microscopic in a good blood smear. Farmers only need glass slides, a needle or fine knife and a bit of training to make blood smear. Glass slides are available from pharmacies and from slme ago-vet shops, they are cheap and help in getting a diagnosis from a vet who does not even have to visit the farm. Treating a cow against the wrong disease will not only cost you the drug but also the value of the whole cow if it dies.

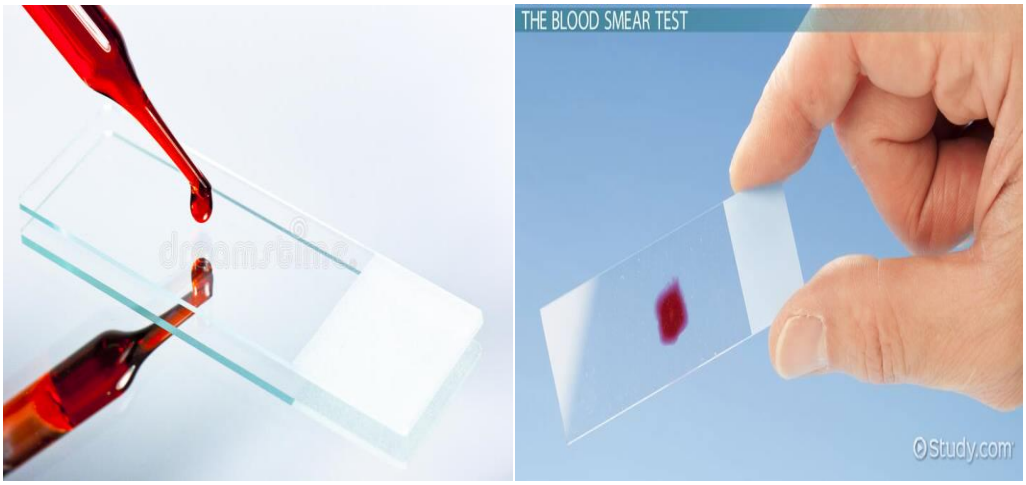

Figure 6: Glass slides for making blood smears

6. Other useful tools

- **Bandages and clean clothes** for cleaning wounds and covering them and for holding broken legs in place
- **Bottle** for giving medicine by mouth. If a glass bottle is used, it is useful to put a rubber tube over the end to stop it breaking
- **Container for sterilizing equipment**. A cooking pot with a lid will do. Sterilize equipment by boiling it in water
- **A sharp knife or scalpel**. Scalpels have sterile blades that can be thrown away after use
- **Pen and notebook** for keeping records
- **Ropes are essential for any livestock keeper!** They are very useful for tying up animals, for making halters to lead animals during transport; fine clean ropes (sterilised in boiling water) can also be useful when assisting a cow with difficult birth
- **Soap or soap flakes** - for washing hands and arms and for washing the cows rear end when assisting with difficult births
- **Syringes and needles for injection**. With the very great distance between vets, skilled farmers can learn to do basic treatment before the vet is called. Most useful sizes are 10ml, 20ml, and 50ml. Some syringes can be boiled to

sterilize them for reuse - others cannot be boiled so need to be thrown away after use

- A **syringe** without needle is useful for measuring liquids such as dewormers or medicines given by mouth, and for flushing wounds and abscesses
- **Castration rings** - mostly for goats and sheep but can also be used for small new born calves
- A **Burdizzo** castrator (no blood) is the best and cleanest tool for castrating bulls, rams and bucks - farmers can share in the costs of buying this tool from an agro-vet shop; two different sizes are available (14" for bulls and a smaller size for sheep and goats). The Burdizzo should be used on the young animal. There are Burdizzos for animals of different sizes. You should always remember that the Burdizzo is a valuable instrument and keep it clean and oiled. Do not drop it.
- **Needles and stitching material** (thread = suture) for stitching wounds.
- **Tape measure** for measuring animals to estimate their weight. When treating animals it is very important to know the approximate body weight in order to give correct dosage of medicine
- A **Trocar** for making a hole into the rumen to treat serious cases of bloat. Trocars come in two sizes, for cattle and for sheep.
- Bandages and clean clothes for cleaning wounds and covering them and for holding broken legs in place
- Bottle for giving medicine by mouth. If a glass bottle is used, it is useful to put a rubber tube over the end to stop it breaking
- Container for sterilizing equipment. A cooking pot with a lid will do. Sterilize equipment by boiling it in water
- A sharp knife or scalpel. Scalpels have sterile blades that can be thrown away after use
- Pen and notebook for keeping records
- Rope. Ropes are essential for any livestock keeper! They are very useful for tying up animals, for making halters to lead animals during transport; fine clean

ropes (sterilised in boiling water) can also be useful when assisting a cow with difficult birth

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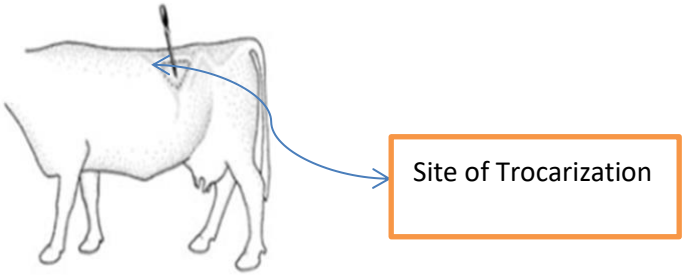


Self-Check – 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. List the types of infertility diagnosis diseases? (5pts)
2. Explain the main difference between hoof trimmer and wool cutter? (2pts).

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 5- Select, use and maintain PPE clothing and equipment

5.1 Select, use and maintain Personal proactive equipment's.

You can carry disease on your clothes and boots, hands, hair and even in your throat. You can therefore take positive action to protect your animals from these risks. This may include provision of Personal Protective Equipment (PPE) and facilities for those visiting and working on your farm.

- Facilities
- Overalls
- Boots
- Disposable gloves
- Hand Washing

Facilities

- To promote positive hygiene standards on your farm, it is important that you provide adequate facilities where everyone on farm can access them easily.
- These should be located at appropriate sites around your farm, in particular next to animal handling areas, and should include the following.

Hand washing facilities

- Hot running water
- Permanent sinks
- Liquid soap
- Paper towels

Facilities for cleaning and disinfection

- Hoses or pressure washers
- Brushes and buckets

- Disinfectant supplies with clear instructions for use
- Disinfectant footbaths, where appropriate

Depending upon the disease status of your animals, you may have to provide

- Showers
- Clean overalls and boot
- Disinfectant footbaths placed at the entrance to your farm and at entrances to areas where vulnerable or high risk animals are kept

Overalls

- Keep a set of overalls for use on each of your farms
- Keep a set of overalls for visitors, if visiting animal accommodation
- You may require additional changes of overalls for use within your farm
- Waterproof overalls are practical as they are easy to clean and disinfect

Always change your overalls

- When moving between different animal areas
- Before tending vulnerable animals, e.g. those giving birth and newborn animals
- After tending sick and quarantined animals

When visiting a market or show

- Wear clean overalls
- Clean any contamination from your overalls before leaving animal areas
- Change overalls before going back to your own animals
- It is important to keep fabric overalls free from contamination and laundered after use

Overalls should be washed separately from all other laundry at the highest temperature suitable for the fabric as per the care label

- Ironing or tumble drying fabric overalls provides additional heat treatment to help control organisms which can cause disease
- Use clean containers (e.g. plastic bags) for storing and transporting overalls which ensure effective separation from regular laundry
- Ensure all overalls are kept separate from all other laundry before, during and after laundering

Boots: In general

- Clean and disinfect your boots between work on each of your farms
- You may require to clean and disinfect your boots when moving within areas of your farm
- Wellington boots are practical as they are easy to clean and disinfect

Always clean and disinfect your boots

- When moving between different animal areas
- Before tending vulnerable animals, e.g. those giving birth and newborn animals
- After tending sick and quarantined animals

When visiting a market or show

- Wear clean and disinfected boots
- Clean and disinfect your boots before leaving animal areas
- Clean and disinfect your boots going back to your own animals

Many visitors to farms have their own boots

- Ensure their boots are clean before allowing access to animal areas
- Have a spare pair of clean Wellington boots available for visitors

Disposable Gloves

- The use of disposable gloves can minimize transfer of disease throughout your farm, however their use does not replace hand washing
- Dispose carefully of gloves after each animal, especially after any internal examination (for example, pregnancy diagnosis or assisted births)

Hand Washing

Hand washing is an important practice in reducing spread of disease. You can protect the health of your animals by encouraging everyone on your farm, including all visitors, to wash their hands regularly. This is particularly important for those handling animals closely. You should wash hands frequently as a routine.

- Before and after touching animals and their immediate surroundings
- After exposure to dung or body fluids
- When moving between groups and types of animals
- When moving between and within farms and holdings
- Whenever your hands are visibly soiled or dirty
- When tending sick animals in isolation or those in quarantine
- After administering medication
- Before and after assisting at births and tending neonatal animals
- Before eating, drinking or smoking

To make hand washing more effective

- Expose forearms
- Remove all hand and wrist jewellery
- Ensure fingernails are clean, short and free from varnish
- Cover all cuts or abrasions with a waterproof dressing

Important points

- Hand washing sinks should have both hot and cold running water, as:
  - ✓ It is easier to create soap lather with running warm water

- ✓ It will encourage more thorough hand washing, particularly in cold weather

- Provide liquid soap, as soap bars can be dropped on the ground
- Dry hands thoroughly after hand washing using disposable paper towels
- Cleansing wipes or antibacterial gels complement, but don't replace proper hand washing

Self-Check – 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. What is PPE? (2pts).
2. Write atleast 5 PPE that used in farm animals? (6pts**).**

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 6- Gather the clinical signs observed and appropriate information for clinical diagnosis

5.1 Clinical Examination and Diagnosis of reproductive problems

The diagnosis, treatment, and control of diseases of food-producing animals are heavily dependent on the results of the clinical examination of animals on the farm and the careful examination of the environment and management techniques. This means that the veterinarian must become highly skilled in obtaining an accurate and useful history on the first visit to an animal or group of animals and in conducting an adequate clinical examination to make the best diagnosis possible, and economically, so that the treatment and control measures can be instituted as soon as possible.

On the farm, during the day or in the middle of the night, the veterinarian will not have ready access to a diagnostic laboratory for the rapid determination of a cow's serum calcium level if milk fever is suspected. The practitioner must become an astute diagnostician and a skillful user of the physical diagnostic skills of:

1. Visual Observation,
2. Auscultation,
3. Palpation,
4. Percussion,
5. Succession,
6. Ballottement, and
7. Olfactory Perception.

On the farm, the clinical findings, including the events of the recent disease history of an animal, are often much more powerful, diagnostically, than laboratory data. It therefore becomes increasingly important that the clinical examination should be carefully and thoughtfully carried out so that all clinically significant abnormalities have been detected.

- The correlation of the clinical findings with the clinical pathology date, if available, is also an excellent method of evaluation but is not routinely available in most private practices.
- The food producing-animal practitioner must also be a competent field pathologist and be able to do a useful necropsy in the field, usually under less-than-desirable conditions, and to make a tentative etiologic diagnosis so that additional cases in the herd can be properly handled or prevented.
- Doing necropsies on the farm or having them done by a local diagnostic laboratory can be a major activity in a specialty pig or beef feedlot practice, where clinical examination of individual animals is done only occasionally, compared with dairy practice.

Self-Check – 6	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Which animal is included in farm animals? (2pts).

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 7- Collect, pack and shipping sample properly

Collecting, packing and shipping sample

Before taking samples, careful consideration should be given to the purpose for which they are required. This will determine the type and number of samples needed to provide valid results.

- When samples are taken from live animals, care should be taken to avoid injury or distress to the animal or danger to the operator and attendants.
- It may be necessary to use mechanical restraint, tranquillisation or anaesthesia. Whenever handling biological material, from either live or dead animals, the risk of zoonotic disease should be kept in mind and precautions taken to avoid human infection.
- Post-mortem examinations should be carried out under as aseptic conditions as is practicable.
- Care should be taken to avoid environmental contamination, or risk of spread of disease through insects or fomites.
- Arrangements should be made for appropriate safe disposal of animals and tissues.

Sample collection rule

- Use universal precautions for collecting and handling all specimens.
- Whenever possible, collect all culture specimens prior to administration of any antimicrobial agents.
- Avoid contamination with indigenous flora.
- Swabs are convenient but inferior to tissue and fluid. Tissue and fluid are essential for fungal and mycobacterial culture.
- All specimens must be appropriately labeled with two patient identifiers.

- Deliver all specimens to the laboratory as soon as possible after collection. Specimens for bacterial culture should be transported at room temperature. If transport is delayed the following specimens should be refrigerated: urines (within 30 min), stool (within 1 h), and respiratory specimens. Specimens for viral culture must be transported to the laboratory immediately on ice. See specific specimen and culture type for detailed collection and transport guidelines.
- Specimens may be hand delivered to the laboratory or transported via the runners from Technical Services if the specimens are not indicated as deliver immediately. Specimens may be transported through the pneumatic tube system if approved by Pneumatic Tube Administration. This includes blood culture bottles (if placed in plastic carrier), Vacutainer® tubes and swabs.
- Specimens should be in tightly sealed, leak proof containers and transported in sealable, leak-proof plastic bags. Specimens for TB should be double bagged. Specimens should not be externally contaminated. Specimens grossly contaminated or compromised may be rejected.
- If anaerobic culture is requested, make certain to use proper anaerobic collection containers.

Self-Check – 7	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Write how we collect samples? (2pts)
2. Write types of samples from farm animals? (3pts).
3. What is the rule of sample collection? (2pts).

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

LG #63	LO #2- Take appropriate measures to prevent and control reproductive diseases or infertility of animals

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying, treating, isolating and caring Sick animals
- Undertaking prevention and control activities for reproductive and fertility problems of farm animals
- Taking appropriate measures to prevent the occurrence and transmission of reproductive diseases among animals, and zoonosis diseases.
- Providing advice to beneficiaries

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, **you will be able to**:

- Identify, treat, isolate and care Sick animals
- Undertake prevention and control activities for reproductive and fertility problems of farm animals
- Taking appropriate measures to prevent the occurrence and transmission of reproductive diseases among animals, and zoonosis diseases.
- Providing advice to beneficiaries

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Identify, treat, isolate and caring sick animals

1.1 Early Identification of Sick Animals

Finding and treating sick animals early is the key to maintaining a safe, nutritious food supply. On farm animal, this begins with a basic physical exam one. Frequently a staff member, trained by the herd veterinarian, identifies animal that appear abnormal and conducts a basic exam. The goals of a Physical Exam Program include:

1. Identify sick animals early,
2. Treat sick animals early,
3. Prevent spread of diseases,
4. Protect the food supply and
5. Improve animal welfare.

Besides these common goals, dairy employees may be the first to see abnormal symptoms that may indicate a foreign or emerging disease. Anytime unfamiliar symptoms areseen, the herd owner, veterinarian or manager should be notified. To conduct a basic physical exam, learn the normal characteristics of a animals. For example, the cow's normal heart rate is 60-70 beats per minute; respiration rate is 30 breaths per minute; temperature is 101.5 to 102 °F; and rumen motility occur once or twice per minute.

Figure 8: Use a stethoscope to check heart, lungs and rumen for abnormalities.

Once you determine that a cow is “abnormal”, use your powers of observation to determine what the problem is. Some potential disorders include: ketosis (urine or milk analysis), displaced abomasum (DA), mastitis, metritis and endometritis, lameness (feet and legs), lesions (mouth, feet, or teats), other common diseases (IBR, BVD, leptosporosis, PI_3, etc.), and unusual symptoms that could indicate foreign or new diseases.

1.2 Grouping of Animals

Depending upon the dairy there are a number of different groups of animals that require differing amounts of attention. Typically, calving and recently calved or “fresh” cows receive the most attention on dairies. Today many animals conduct a brief physical exam on every female for the first ten days after they calve.

After the initial intense observation, most animals enter the lactating pens, where they continue to be observed on a daily basis for abnormal behavior. If any abnormal signs are detected, these “non-stressed” animals will then be evaluated further. Each dairy has its own guidelines for isolating and monitoring recently purchased animals as well as those that have undergone some type of stress. Increased monitoring and evaluation are indicated whenever an animal is subject to a stressor. Some common stressors include: weaning, weather changes, pen moves, and other management changes.

Whether the stress comes from metabolic stress, grouping changes, heat stress, overcrowding or unsanitary conditions; the cow uses more and more of her resources to deal with the stress. As a result there are decreasing resources for her to use for production. As these multiple stressors are stacked upon each other, the cow finally reaches a breaking point where she becomes ill. Fresh cows are even more susceptible to disease because their immune system is depressed. This makes them more likely to be infected by disease causing organisms such as salmonella, clostridium, and pneumonia.

1.3 Identifying Diseases

For daily monitoring, focus your attention on four main areas:

1. Temperature,
2. Appetite,
3. Uterine discharge (particularly fresh cows), and
4. Hydration status.

Develop a systematic approach to check the following:

Attitude: Look at the eyes and ears. Sunken eyes and droopy ears indicate a sign of something wrong. Sick cows typically seek solitude, lie down in corners of the corral and move slower with less energy than healthy cows. Grade her as alert, mildly depressed or depressed.

Appetite: Watch for cows that don't come up to the feed bunk to eat. Look at how much of the feed in front of a cow was eaten. Compare her to herd mates in the same pen. Grade her as aggressive, normal or not eating.

General Appearance: Panting and excessive salivation can be signs of the animal not feeling well. Compare her behavior to other animals.

Hydration: Use a skin test to check for hydration. Look at her eyes, if they are sunken she is dehydrated.

Temperature: Digital thermometers provide rapid readings. In most herds, temperatures between 101 and 103 °F are considered normal. Temperatures less than 100 °F are too low and over 103 °F are too high. These values may be adjusted for particular conditions, such as summer heat stress. The first 10 days after calving is particularly critical. Frequently, temperatures are taken daily for these animals. Temperature increases can be the first sign of illness such as metritis, mastitis, or pneumonia. Cows with milk fever, DA, ketosis, or indigestion may have abnormally low temperatures.

Feet and Legs: Look to see if the cow is standing and walking normally, if not identify the cause. Check for lesions. Hoof warts occur frequently. If you don't recognize the lesion, contact the herd owner, veterinarian or manager as this could be a sign of Foot and Mouth Disease, which is a highly contagious, reportable disease.

Udder: Check the udder for abnormal signs. Swelling indicates the cow may have mastitis or it could be udder edema in cows that recently calved. Lesions on the udder again need to be identified and the herd owner or veterinarian should diagnose what they are. Examine the teats for lesions. Tell the herd owner or veterinarian about blister like lesions.

Figure 9: Look for abnormal lesions among the tongues, nose or on the muzzles, which might indicate Foot and Mouth Disease.

Uterus: Particularly for fresh cows, check to see if there are visible signs of discharge. Some discharge, called lochia, is common immediately after calving. Investigate the cause of any foul smelling discharge, an indication of a problem. Follow standard protocols for cows with abnormal discharge.

Heart Rate: Determine the heart rate by using a stethoscope. Check both sides and listen for sounds that could indicate a heart murmur.

Lungs: Check the respiration rate and listen for signs of congestion that might indicate the cow has pneumonia. Observe for nasal discharges or coughing.

Rumen - Determine the number of contractions per minute. Look for abdominal distension or bloating.

Manure: Look at the manure and decide if it is similar in appearance to that of other animals in the group. Cows that have diarrhea may be infected with salmonella, E. *coli*, or Johne's.

Record the disease diagnosis and treatment for each animal. At a minimum these records should include the date, cow identification, symptoms, diagnosis and treatment. Follow set protocols for treatment developed by the herd veterinarian. If antibiotics are necessary, follow withdrawal times for both milk and meat.

Do not stop the clinical exam at the first findings: you can miss other signs of disease. Try to associate all normal and abnormal signs found during the exam with common diseases. If you don't recognize something talk to your supervisor and/or herd veterinarian immediately. Follow the treatment indicated in the dairy's protocols for each specific illness. In case of no response to treatment contact your supervisor immediately.

Figure 10: Keep records of illness, treatment, and other events on each individual animal.

Keeping animal healthy goes beyond routine physical exams. Proper nutrition throughout the animal's life is needed to maintain her immune system. Nutrition from the close-up period immediately before calving through early lactation is particularly important. Providing early assistance in calving, if needed, is critical. Also providing a clean, comfortable environment helps minimize disease. Keeping cows standing for at least 30 minutes after milking by providing fresh feed can reduce mastitis by allowing time for the teat sphincter to close.

Routine evaluation of the cows in a herd with the basic physical exam helps identify sick animals early so that they can be treated. When treatment is needed, follow herd specific protocols and adhere to the label for meat and milk withdrawal periods.

Abnormal symptoms, which could indicate a new disease in the herd, should be reported to the herd owner, veterinarian or manager immediately. These new diseases could be a foreign or emerging disease. Rapid identification is the key to preventing spread of these diseases.

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Write the goals of physical examination programs? (4pts).
2. Write the mainly daily follow up of monitor reproductive health? (3pts).
3. Which organs are checked during animals developed systemic reproductive diseases? (6pts).

Note: **Satisfactory rating - 7 points** **Unsatisfactory - below 6 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Information Sheet 2- Undertake Prevention and control activities for reproductive and fertility problems of farm animals

2.1 General Disease Prevention and Control Measures

Prevention or prophylaxis: - consists of measures taken for disease prevention. Disease and disability are affected by environmental factors, genetic predisposition, disease agents, and lifestyle choices and are dynamic processes which begin before individuals realize they are affected.

Disease Control: When animal health experts talk about controlling a **disease**, they mean reducing the number of new infections, the number of animal currently infected, and the number of people who become sick or die from a **disease** in local settings.

Elimination: Elimination means stopping the transmission of a disease in a specific geographic area or country, but not worldwide. Often, the first step toward disease elimination is disease control.

Eradication: Disease eradication is the permanent reduction of a disease to zero cases through deliberate measures such as vaccines. Once a disease has been eradicated, intervention measures are no longer needed. The only disease to ever be fully eradicated in human history has been small pox from human and render pest from hoof cloven animals. ***General disease prevention and control measures may include:-***

1. Prevention of Environmental contamination
2. Control of Intermediate host, vectors and reservoirs
3. Control of internal parasites
4. Control of arthropod pests
5. Control and reducing the infection as soon as an outbreak occurs
6. Isolation of sick animals
7. Quarantine for newly purchased animals
8. Vaccination of farm animals

9. Deworming of animals
10. Elimination of carriers
11. Tuberculin test
12. Johnin test
13. Agglutination test for brucellosis
14. Test for mastitis-Strip Cup Test
15. Test for mastitis- California Mastitis Test (CMT)
16. Disposal of carcass
17. Burial of carcass
18. Burning of carcass
19. Disinfection of animal houses
20. Disinfection of pastures
21. Common disinfectants and their usage

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.
- Anthelmentic 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 (Tick guard) 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 – disinfestations, 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 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 (ButoxTM), 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 form 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 anthelmentic.
- Young animals should preferably be dewormed every month using a suitable anthelmentic.
- 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 ethiopian 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.

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 of 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 wing 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 equipment's 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 of 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

A. 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.

B. Boric acid

- It can be used as an udder wash.
- It is a week 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.

C. 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.

D. 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.

E. 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.

F. 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.

G. 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.

H. Soap

- Soap is an anionic detergent.
- It is a very week 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.

I. 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 hypochlorite's deteriorate rapidly when exposed to air.

J. 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.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Explain clearly what prevention by disease concept? (2pts).
2. Explain clearly what control by disease concept? (2pts).
3. Explain clearly what elimination by disease concept? (3pts).
4. Write atleast and explain the 6 general disease prevention and control measures? (4pts).

Note: **Satisfactory rating - 6 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Information Sheet 3- Take an appropriate measures to prevent the occurrence and transmission of reproductive diseases among animals, and zoonosis diseases

3.1 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.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. What is an appropriate precaution measure to prevent an animal's reproductive health and infertility? (2pts).
2. How we minimize animal diseases in concepts of rotational grazing and modifying? (2pts).

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Information Sheet 4- Providing advice to beneficiaries

4.1 Advice to Veterinary care

Veterinary care is an essential part of an animal care and use Program. The primary focus of the veterinarian is to oversee the well-being and clinical care of animals used in farm, testing, teaching, and production. This responsibility extends to monitoring and promoting animal well-being at all times during animal use and during all phases of the animal's life. Well-being is determined by considering physical, physiologic, and behavioral indicators, which vary by species. The number, species, and use of animals housed in an institution may influence the complexity of the veterinary care program, but a veterinary program that offers a high quality of care and ethical standards must be provided, regardless of the number of animals or species maintained.

An adequate veterinary care program consists of advice assessment of animal well-being and effective management of:

- animal procurement and transportation
- preventive medicine (including quarantine, animal biosecurity, and surveillance)
- clinical disease, disability, or related health issues
- protocol-associated disease, disability, and other sequelae
- surgery and perioperative care
- pain and distress
- anesthesia and analgesia
- Euthanasia.

The veterinary care program is the responsibility of the attending veterinarian (AV), who is certified or has training or experience in laboratory animal science and medicine or is otherwise qualified in the care of the species being used. Some aspects of the veterinary care program can be conducted by persons other than a veterinarian, but a mechanism for direct and frequent communication should be established to ensure that timely and accurate information is conveyed to the responsible veterinarian about issues associated with:-

- Animal health
- Behavior, and well-being
- Appropriate treatment or
- Euthanasia is administered.

The AV should provide guidance to investigators and all personnel involved in the care and use of animals to ensure appropriate:-

- Husbandry,
- Handling,
- Medical Treatment,
- Immobilization,
- Sedation,
- Analgesia,
- Anesthesia, and
- Euthanasia.

In addition, the AV should provide guidance and oversight to surgery programs and perioperative care involving animals.

4.2 The nature of veterinary services

Veterinary services fall into four main categories:

- Clinical services (treatment of diseased animals and control of production limiting disorders).
- Preventive services (avoiding the outbreak of diseases).
- Provision of drugs, vaccines and other products (such as artificial insemination).
- Human health protection (inspection of marketed animal products).

4.3 Veterinary care beneficiary and their role

Different veterinary services fall into various categories of economic goods. Clinical health services and the provision of veterinary drugs are the closest to being pure

private goods but there are various types of externalities in the provision of several types of services.

- The economic and institutional framework of the livestock industry is quite different in several respects in developed and developing countries.
- The subsistence nature of the livestock industry in developing countries, market failure problems, transhumance production systems and the threat of serious outbreaks of contagious diseases are all problems that need to be confronted in designing decentralization reforms.
- There is scope for the deconcentration and/or delegation of some functions from central government, but the pace of reforms needs to recognize the need to develop the private veterinary service and to phase in cost recovery measures.
- Para-veterinary technicians can play an important role in the privatization process in developing countries.

Self-Check – 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. What is veterinary care means? (4pts)
2. What is advice given by veterinary care? (2pts).
3. Which part of social are more beneficiaries by veterinary care? (2pts).

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Operation Sheet 1- Taking pulse rate from farm animals

Purpose: Taking the pulse is important when examining an animal. In man the pulse can be easily taken but in animals it is more difficult and requires practice.

Material: Live shoats, thermometer,

Step:

1. In sheep and goats, you can feel the pulse on the inside of the top of the back leg. The rate of the pulse is 70 - 130 per minute in the adult.
2. The pulse of cattle is taken at a point on the underside of the base of the tail; the normal rate is 40 - 80 per minute in the adult. In buffalo the pulse rate is 40 - 60 per minute.
3. The pulse of the horse is taken on the inside of the cheek. The normal rate is 35 - 40 per minute.
4. The pulse of the camel is taken at a point on the underside of the root of the tail. The normal rate is 35 - 45 beats per minute.

LAP TEST	Performance Test

Name……. ID……..
Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **30** minutes. The project is expected from each student to do it.

Task: taking pulse rate

LG #64	LO #3- Record data and clean up on completion of work

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Keeping Infertility information
- Disposing waste and farm hygiene

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Keep infertility information
- Dispose waste

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Keep and report infertility information

1.1 Infertility

- Infertility is a temporary disturbance in reproductive function wherein the animal cannot become pregnant. Normally an animal with a healthy reproductive function should calve every 12-14 months.
- Infertility causes economic losses to the farmers due to delay in maturity, calving and milk production. The farmer also incurs losses by maintaining an unproductive animal.
- Infertility may be due to various reasons like:
  - ✓ Diseases of genital organs
  - ✓ Infectious diseases
  - ✓ Physiological causes like absence of heat, repeat breeding, silent heat, cystic ovary
  - ✓ Anatomical causes
  - ✓ Faulty AI technique.

1.3 Management of infertility problems

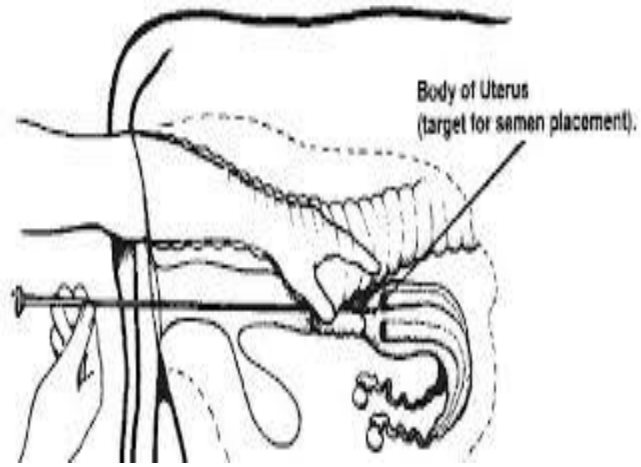
- Inseminate at appropriate time of the heat.
- Repeat AI may be required in cases of prolonged heat for conception to occur.
- Close observation is required to detect silent heat, especially in buffaloes.
- Provide proper nutrition right from birth of the animal.
- Provide adequate quantities of mineral mixture.
- Reduce heat stress on the animal by providing clean drinking water at all times and adequate shade or cooling systems.
- Ascertain whether the personnel providing AI services are adequately qualified.
- Consult a veterinarian if a regularly cycling animal has not conceived even after 3 inseminations to identify the problem. Repeated inseminations may cause permanent damage to the reproductive organs.
- Animals with anatomical conditions may not conceive.

- Infection/diseases of reproductive tract also may lead to infertility. Consult a veterinarian for proper advice and treatment.

1.2 Factors Responsible for Conception during a Normal Heat Cycle

- Only timely heat detection is in the hands of the farmer.
- Proper handling of semen, proper time of insemination, proper AI technique and site of deposition of semen are in the hands of trained personnel (vets or AI technicians).
- It is therefore very important to ensure that AI is being done only by trained personnel to avoid complications or problems later on.
- A healthy cross bred heifer should come into heat by 18 months or earlier.
- Buffaloes and local breeds may take more time to mature (around 24 months).

Figure 11: Clinical examination of both live animal and their semen related to reprodctive problems


Body of Uterus
(target for semen placement).

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer

1. _____ is a temporary disturbance in reproductive function wherein the animal cannot become pregnant (2pts).

   A/ Disease

   B/ Tools and equipment

   C/ Diagnosis

   D/ All

2. A factor which does not Responsible for Conception at farm (4pts).

   A/ only timely heat detection is in the hands of the farmer

   B/ Proper handling of semen, proper time of insemination, proper AI technique and site of deposition of semen are in the hands of trained personnel (vets or AI technicians)

   C/ A healthy cross bred heifer should come into heat by 18 months or earlier

   D/ All

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 2- Dispose waste

2.1 Effective Animal Waste Management Systems

Animal waste contains many beneficial constituents that if recycled effectively, can be used as fertilizer for crops, fodder for animals and to produce energy. Animal manure is rich in nitrogen, phosphorus and potassium. In addition to providing supplemental nutrients for crop growth, manure has several beneficial effects on soil properties. Application of organic waste decreases the bulk density of the soil by increasing both the organic fraction of the soil and the stability of aggregates.

Organic wastes also improves water filtration rate, water holding capacity and the hydraulic conductivity of the soil. All these properties of animal waste will be available only if they are carefully managed. If not they might cause detrimental effects on the environment.

The most common environment concern with animal wastes is that it affects the atmospheric air with offensive odors, release of large quantities of CO_2 and ammonia which might contribute to acid rain and the greenhouse effect. It could also pollute water sources and be instrumental in spreading infectious diseases. If the disposal of water is not properly planned it might create social tension owing to the release of odors and contamination of water sources.

Animal farms are bound by strict regulations to control environmental pollution, especially water pollution and offensive odor evolution. Animal wastes which are taken out from the farm are classified into 3 types:

1. Solid (Dung)
2. Slurry
3. Waste Water.

Different methods for disposing solid waste and slurry are used. Handling and utilization of slurry is more difficult. Various methods for the disposal of these wastes along with its efficient utilization are shown in Fig. 12

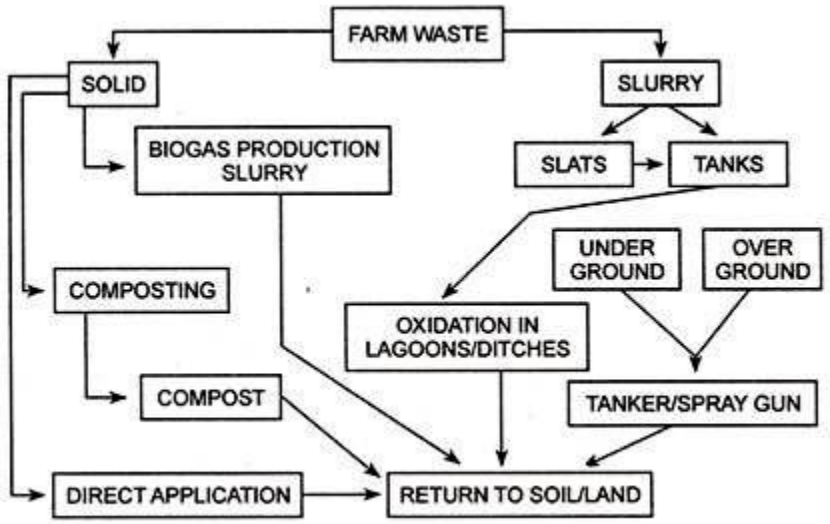


Fig. 50.1. Farm waste disposal and utilisation.

Figure 12: Method of waste disposing.

Various techniques used disposing farm wastes are:

1. Composting.
2. Biogas production (anaerobic fermentation).
3. Aerobic oxidation in ditches/Lagoons/lakes.
4. Direct application in field.
5. For growing algae (diluted slurry).
6. Other techniques (less popular) recycling as filler in animal feed (i.e. poultry waste in cattle feed, etc.).

Disposal of Manure

- Frequency of Removal of Manure: Twice daily
- Solid Manure:

- ✓ By means of wheel barrow and shovel, disposed into a pit for decomposition. Such manure will return 75 per cent of its fertilizing value to soil. Manure pits should be about 200 meters away in a place where no foul smell would pass through buildings.
- ✓ The production of manure from each dairy cow is about 20 kg per day. The volumetric capacity of fresh manure is 700 to 900 kg/cu.m.

Effect of solid waste pollution:

1. Health hazards:

Improper handling of solid waste is a health hazard especially for then workers who come in direct contact with the waste. Rat spread many diseases like Plague, Salmonellosis, anaemic typhoid through direct bite. These feed on refuse dumps; human forces etc. from where they migrate to food and water and result in transmission of many diseases like diahoerrea, dysentery and amoebic dysentery in human being.

2. Environmental impacts:

The organic solid wastes undergo decomposition and the air with obnoxious odor, burning of these waste produce smokes and causes air pollution specially the noxious gases given off by the burning of plastic containers.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Define waste disposing means? (3pts).
2. Write the method of waste removal from farm animals? (2pts).

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

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