

INFERTILITY IN FARM ANIMALS: CAUSES AND REMEDIES

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भाकृअनुप
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INTRODUCTION

Goa is a coastal state situated in Western Ghats. Goa is bounded by Arabian Sea, states of Karnataka and Maharashtra. Along with the agricultural activities livestock raising is one of important occupation of many farmers and landless poor. State has sizeable cattle population i.e. about 1.5 lakhs, 80 thousand buffaloes, 1 lakh pigs, and 40 thousand goats. Production is closely related with reproduction. Therefore in the economics of livestock industry, great importance is attached to the maintenance of fertility in animals.

Infertility in farm animals causes heavy economic losses to livestock industry. Artificial breeding program depends on the inherent fertility, health, nutrition and management of cow as well as the ability of handlers to preserve store and deliver healthy semen dose to cow/buffalo at proper time during the estrus. Due to infertility if open span is increased by one estrous cycle, this accounts loss of production of 20-25 days in addition to cost of treatment and vacant days, labor, etc.

Infertility in farm animals is due to various causes such as nutrition, physiological disturbances and infectious causes, which may work separately or in combination. For this reason each cause must be accurately diagnosed and treated according to

conditions found in examination. Recent studies showed that some metabolites and nutritional factors are responsible for infertility. The energy shortage in postpartum period led to decrease in luteinizing hormone secretion frequency and dynamic follicle diameter, however, it increases calving interval time.

Absence of periodic manifestation of estrous without pregnancy is anoestrus. In this condition there is insufficient stimulus from pituitary for secretion of FSH or LH resulting in failure of maturation and rupture of Graafian follicle. Malnutrition due to non-availability of feeds or physiological problems in assimilation may lead to anoestrus.

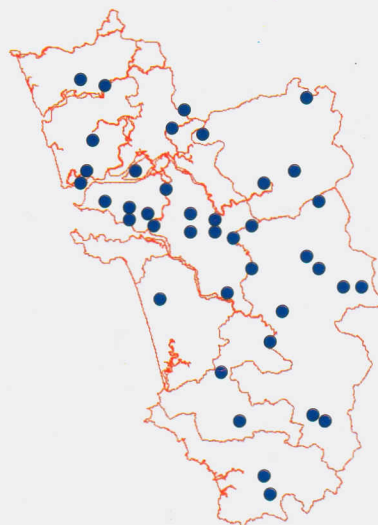
Infectious infertility is necessarily caused by venereal infections and mostly through sexual passage i.e. natural or artificial breeding. Spread of these infections is due to movement of livestock from different regions of the country. Cystic ovarian degeneration is multi-glandular degeneration showing nymphomania, irregular estrus cycle and it is mostly permanent degeneration.

It is possible to detect infertile, subfertile and sterile animals by thorough investigations of management and health. There are different aspects such as nutrition, management, infectious agents that

affect the infertility. Nutritional aspects include green fodder, balanced feeding, mineral supplementation. Management aspects include breeding strategies, timely detection of estrus, care of pregnant animals, care of post parturient dams, vaccination schedule for important diseases. Infections include bacterial, viral, protozoal and fungal infections affecting genital tracts.

In Goa there is frequent movement of animals from neighboring states for replacing stock as well as meat animals. This invites risk of various infections as well as problem of adaptability to environment and feed habits. Due to all these reasons there are serious infertility problems in farm animals.

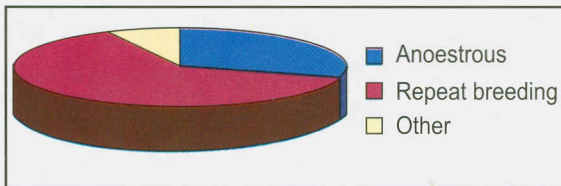
Study was conducted by ICAR Research Complex for Goa and 743 infertile animals were screened in 50 infertility camps in collaboration with Department of Animal Husbandry and Veterinary Services, Government of Goa and Goa State Milk Producers' Co-operative Union Limited, Curti, Ponda, Goa. Breeds of cattle reared in Goa and examined for infertility were local nondescript, Gir, Red Sindhi, Sahiwal and crosses of Jersey and Holstein Friesian. Most of the animals from the age group 4-6 years were reported for infertility and they were mostly from first to fourth lactation. Cervical swabs were subjected to culture and sensitivity for antibiotics and blood serum was tested for antibody titre against diseases like brucellosis.



Places where Infertility camps were attended

Types of infertilities

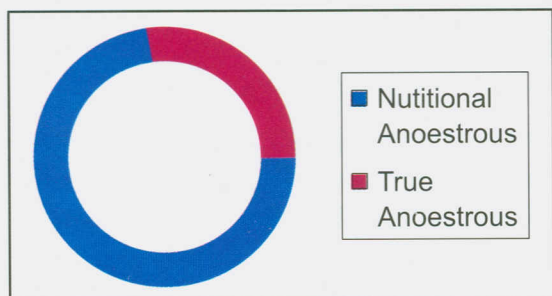
Economic losses can be considerable, both in terms of the cost of keeping a cow and the lost cash opportunity from fewer calves available to market. Additional losses occur if the subsequent calving period is extended, resulting in higher production costs and lighter calves weaned in the following year. Major infertilities are anoestrus and repeat breeding.



Anestrus

Anestrus 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 anestrus and must always be ruled out before anything else.



Other reasons for anoestrus 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.

Investigations in Goa revealed anoestrus cases, 73% due to nutritional problems and 27% true anoestrus cases.

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.

Suckling 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 Atrophy : Ovarian atrophy is caused from nutritional problems and is most often seen in dairy cows with high production.

Mummy : A mummy in the uterus simulate a pregnancy and prevent the normal luteolytic mechanism. This results in anestrus. Treatment for this condition is administration of prostaglandin to lyse the corpus luteum.

1. NONINFECTIOUS IN FERTILITY

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 1) size of the herd. 2) name of the breed 3) the management practices 4) feeding standards 5) data on all calvings, service dates and 6) 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

During the recent years, large number of animals are being bred by artificial insemination to accrue the benefits of superior germplasm. In such instances, difficulties have been experienced in the assessment of herd infertility since the bull's ability to fertilize is not clearly known and the infertility investigations are mainly focused on the females without reference to male relationship. Artificial

insemination has practically eliminated the fear of transmission of coital infections. One should not ignore the likely possibility of transmission of other types of infections through semen when large number of cows are involved. The presence of mixed infections is also a likely factor.

Anoestrus, or failure to show signs of estrus is in most cases a failure to detect estrus. In one study of cows reported to be anestrus, 90% were determined to be cyclic but not detected in estrus and only 10% were truly anoestrus (no ovarian activity). Undetected estrous signs in cows with normal ovarian activity resulting from:

- ♦ Inadequate estrous detection since 66% of estrous signs are shown between 6 p.m. and 6 a.m. Cows with short estrus (less than 12 hours in length) may be missed even with twice-a-day estrous detection. This is particularly true when cows are observed for estrus during a time when they are unlikely to exhibit standing behavior.
- ♦ Inadequate animal identification and/or inadequate records.

b) Nutritional 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 Luteum (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.

By feeding cows after they calve, you cannot expect to improve the number of cycles. Feeding pre-partum is the best way to assure early return to cyclicity in cows. By providing good pre-partum nutrition, it is easy to maintain adequate pre-partum condition, so the stress of postpartum lactation produces a shorter duration of negative energy balance.

C. Hormonal infertility

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.

Cystic Ovarian Disease or Follicular Cysts

The definition of a follicular cyst is: A 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 thecal cells produce progesterone, but do not have prostaglandin receptors. If there are no prostaglandin receptors, the normal luteolytic cascade can not 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.

Treatment

Manual rupture. Possible side effects of manual rupture include bleeding and adhesions. Manual rupture is not better than no treatment and should not be considered as a treatment at all. HCG is a glycoprotein and can result in antibody formation. Administration of hCG at dose rate of 10,000 IU or 5000 IU IM results in heat in 80% of cows treated and the animal comes in heat in 15-30 days. GnRH - Cystorelin, Factrel. GnRH is a decapeptide and does not cause antibody formation. The dose of Cystorelin is 100 mg IM. Check the

feed program to ensure that the calcium-phosphorus ratio is between 1.5:1 and 2:1 in the total diet.

Possible factors involved are: excessive calcium intake or wide calcium-phosphorus ratio, high estrogen given by injection, through fresh legume forage or from some mold toxins, genetic predisposition, stressful conditions or health problems at calving or early postpartum. Avoid use of injectable estrogen products. These are potent drugs for use only by or under the direction of a veterinarian.

Do not use feedstuffs containing high levels of other estrogenic mold toxins or plant estrogens to breeding stock. Since genetic predisposition to ovarian cysts can occur, reduce herd incidence of cystic ovaries by selective culling of cows known to produce cystic daughters and avoid use of bulls known to sire cystic daughters.

2. 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.

Repeat breeder

Out of cases examined in Goa, 63 % cases were repeat breeding, 29% were anoestrous and others 8%. A repeat breeder is defined as a cow that has calved before, is less than 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 %.

In case of repeat breeding cases 42% cases were infectious, 36% were due to management problems and 22% were due to hormonal imbalance.

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

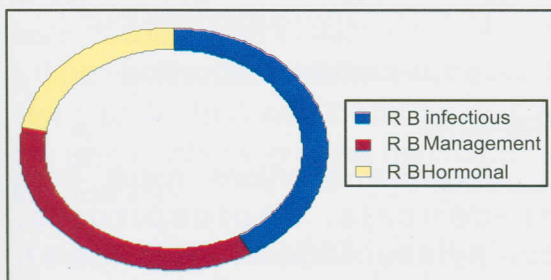
breeders. Therefore, repeat breeders seem to have more of a fertilization failure. If embryos are fertilized and transferred, one can have normal pregnancy rates.

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.

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.



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 do not return to heat. Treatment for this condition is administration of prostaglandin to lyse the corpus luteum.

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.

Causes : infectious and noninfectious

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. Under modern systems of dairy management cows continue to experience a seemingly high risk of abortion, despite intensive efforts toward immunization against infective agents. It should be remembered that because of the endemic nature of abortion occurring in vaccinated cattle, factors other than the infectious agents might contribute to the risk of abortion.

Many abortions go unnoticed or undiagnosed and we always suspect fertility problems when cows are found open rather than embryo/fetal loss.

Infectious causes of abortion

Bacterial

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.

Brucellosis

Bovine brucellosis is the well known and most controversial infection of the bovine reproductive system. Brucellosis generally has been thought of as a cattle disease, but it is also seen in swine, sheep, goats, dogs, horses, and wildlife, and can be readily transmitted to humans. The disease represents a real occupational hazard for veterinarians, slaughter men, and cattle producers.

Brucellosis is caused by the bacterium *Brucella abortus*. The organism has an affinity for certain body tissues such as the udder, uterus, lymph nodes, testicles, and accessory sex glands. Because of its affinity for the uterus, abortion is the usual sign of the disease.

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. In addition, the incubation period for brucellosis is variable. Brucellosis is primarily transmitted to susceptible animals by direct contact with infected animals. Essentially, the only time an infected cow transmits the organism is at or around calving or abortion. Aborted fetuses, placental membranes, placental fluids, and the vaginal discharges that persist for several days after an infected cow has calved or aborted contaminate surroundings all around with virulent *Brucella* organisms. The organism may be transmitted to other animals that contact the environment that has been contaminated with discharges from infected animals. Milk and colostrum from infected cows are the readily available source of infection for calves and the human population.

Because brucellosis can easily be transmitted to people, aseptic procedures such as using disposable gloves when examining or assisting cows at calving are highly recommended. Cattle can generally be moved interstate from brucellosis free states without testing. However, cattle moved from non-free states must be tested before moving across state lines. Just because an animal or group of animals has been tested and declared free of infection does not ensure that some are not in the incubation stage of the disease. Therefore, any newly purchased cattle

should be quarantined and retested in 45-120 days. This may be the most important part of a preventive program, and one over which the buyer has complete control.

A relatively new RB51 vaccine has replaced the old Strain 19, the only vaccine available for many years. The biggest advantage of the RB51 vaccine is almost total elimination of false positives observed with use of Strain 19. Use of Strain 19 often resulted in antibody titers that were difficult to differentiate from actual infection titers. Heifer calves can be vaccinated between the ages of 4 and 12 month; about 6 months of age is best. Brucellosis vaccine can only be administered by licensed veterinarians.

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.

Vaccination with killed bacteria protects against clinical leptospirosis for up to a year, but the bacterin must contain the antigens of the strain to which the cattle are exposed.

Campylobacteriosis, Vibriosis

Campylobacteriosis (vibriosis) is a venereal disease of cattle caused by the organism *Campylobacter fetus* subspecies *fetus*. Before 1973, this organism was known as *Vibrio fetus* subspecies *venerealis*. Campylobacteriosis is characterized by infertility with an increased number of services necessary for conception. Early embryonic deaths are common. In a herd that has never been exposed, and where no immunity exists, an acute type of infertility problem develops. In this case, infertility caused by endometritis results in early embryonic death and a prolonged period (up to 120+ days) passes before successful conception occurs. Spread of the organism to the male is primarily

by way of copulation with an infected female.

A definite diagnosis of genital campylobacteriosis can be difficult and laboratory test results are often disappointing. Although blood tests are available, they are not reliable because it is not a systemic disease and antibodies are rarely found in the blood stream.

Most infected heifers rid themselves of the organism within 6 months of sexual rest, thus a reduction of demonstrable antibodies occurs. Bacteriological examination of aborted fetuses appears to be the only practical method of confirming the diagnosis later in gestation.

Without vaccination, control and prevention of this disease can be difficult. Both killed and modified-live vaccines are available. Vaccination of bulls has been reported to be effective for both prevention and also as a cure for *Campylobacter fetus* infection. Initial vaccination should consist of two injections before breeding time.

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. Abortions are most commonly recognized in the last trimester of

pregnancy, frequently in the absence of other clinical signs. As well as being recovered from the environment, listeriae have also been frequently isolated from animal faeces, and various animal sources including meat and milk from cattle and buffaloes. The faeces of healthy animals often contain *L. monocytogenes*, so cross-contamination with pathogenic species is likely to occur.

L. monocytogenes and *L. ivanovii* were isolated from buffaloes, cows, does and ewes with reproductive disorders (endometritis, repeat breeding). The organism is, so far, usually sensitive to a wide range of antibiotics. Ampicillin, amoxicillin, tetracyclines, chloramphenicol, β -lactum antibiotics, together with an aminoglycoside, trimethoprim and sulphamethoxazole are recommended. Culling infected animals should be advocated as they secrete the organisms in secretions and excretions, especially in the cases of mastitis. Care in the use and preparation of silage is important as the pathogen grows luxuriantly at a pH greater than 5, particularly when fermentation is ineffective and moulds grow. The silage, which lies within a few inches from the front top and sides of a clamp should not be fed to animals, especially sheep. So far no vaccine is available against listeriosis.

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.

Viral

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.

A diagnosis of IBR-induced abortion is made by laboratory examination and testing of fetal tissues. A blood test may aid in the identification of infected cattle. The control of IBR infections can be accomplished by the use of vaccines.

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.

Protozoal

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

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.

Noninfectious causes of abortion

Nutritional

Starvation may result in placental insufficiency and abortion, however, it



Investigation of Infertile animals



Investigation of Animal House and Surrounding



Collection of sample from an animal

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.

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.

Important points to improve fertility

When reproductive efficiency reduces there is need to take help of veterinarian, artificial insemination (AI) technician, feed company representative and other resource people to troubleshoot the causes and determine solutions to the problem.

Management causes of infertility

1. Surveys and infertility camps in field by field veterinarians will

provide information about fertility status. This will also help to plan future reproduction and production programs in livestock industry.

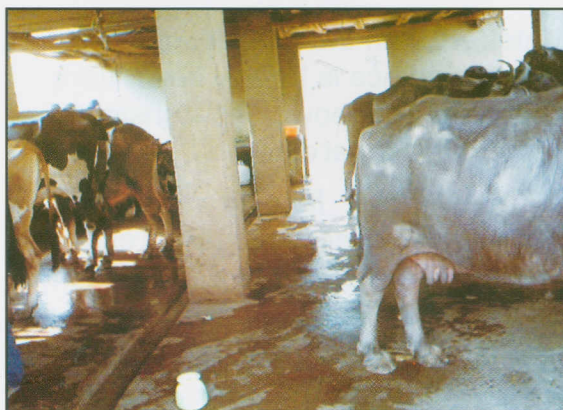
2. As reproduction is directly related with production, better fertility will reduce the production loss and improve the economy of dairy industry.
3. Use of advance scientific knowledge to reach root causes of the problem and use of technologies like synchronization of estrous, ultrasonography, culture and antibiotic sensitivity test for diagnosis etc by field workers will help to improve fertility status.

There is need of training farmers for estrous detection. AI is an important biotechnology available at door step of farmers but well trained technician/veterinarian is essential to get optimum results. Untrained/ raw inseminator is responsible for not only low conception rate but also for increase risk of damaging reproductive system of animals, hence this job should be assigned to a well trained professional. Proper timing of AI can enhance the conception rate.

For the maintenance of high breeding efficiency, it is primarily essential to maintain good level of general health, and thus prevent the onset of debilitating diseases. Animals do resist adverse influences which might



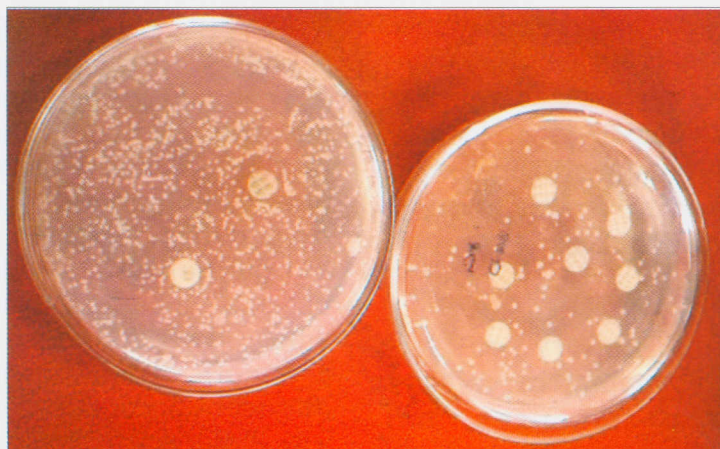
Unhygienic housing



Moderate housing



Ideal housing



Culture sensitivity to antibiotics

interfere with the genital functions, but the resistance is largely dependant on the inherent power of constitutional fitness to a great extent.

Balanced feeding including greens and mineral mixture is essential for normal reproductive performance. Sufficient greens, mineral supplementation and correction of negative energy balance improve fertility. Additional feed allowance and mineral supplementation during last trimester of pregnancy and peak of lactation i.e. steaming up is advised to get a healthy calf and consistent yield.

In selenium-deficient areas provide supplemental selenium as dry feed or injection to all dry cows. Provide about 160,000 units of vitamin A (One milligram of carotene is equivalent to 400 units of vitamin-A from all sources (natural and supplemental).

Endocrinological (Hormonal imbalance) infertility

Feeding of Areca leaves/ waste should be avoided. In delayed ovulation chlomiphen citrate can be used from day of expected estrous for 3 days. HCG can help to get conception in cystic ovarian degeneration. Use of hormones should be limited and only be done when unavoidable.

Infectious Infertility

Maintain a history of herd vaccinations, movement of cattle to and from other premises, and management and origin of bulls. Keep reproductive history records of cows, including number of abortions,

conception rate, and approximate breeding dates.

Whenever there is abortion identify aborting cows and isolate them from the rest of the herd. This helps to prevent spread of infection. Testing for *Brucella* should always be a part of every pre-breeding evaluation. Always conduct test for specific infections. Use blood tests as well as bacterial or viral cultures in diagnosing specific infections. If an infection is identified, treat, vaccinate or cull infected cows as indicated.

CAUTION: Most of the diseases that cause abortions in cattle are zoonotic and can be easily transmitted to humans. Aseptic procedures in handling aborted fetuses and associated tissues, when examining the animal's reproductive system is essential. Use of disposable sterilised plastic gloves protects both the technician and animal from contamination.

Conclusion

By only thorough investigations of management and health examination it is possible to detect infertile, subfertile and sterile animals. There are different aspects such as nutrition, management and infectious agents that affect the infertility. Nutritional aspects includes, green fodder, balanced feeding, mineral supplementation. Managemental aspects includes breeding policy, timely detection of estrus, care of pregnant animals, care of post parturient dams, vaccination schedule for important diseases. Infections include bacterial, viral, protozoal and fungal infections affecting genital tracts.