

## Common Cattle Diseases: Symptoms, Treatment And Prevention

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### Introduction

Cattle diseases cost millions of rupees losses every year. In addition to death, they cause loss of production and frequently a loss of body condition. Unhealthy animals require more food and take longer time for growth than healthy ones. Generally, animals are born free of diseases or parasites. But, they usually acquire these maladies either through contact with diseased animals or due to improper sanitation, feeding, care and management. One should be vigilant against cattle diseases as dairy cattle are affected by a variety of diseases. Knowledge of cattle diseases is necessary from public health point of view also as many diseases can be transmitted to man through milk. Keeping animals healthy by confining purchases to healthy herds, by proper quarantine at the time of bringing in new animals, by employing sound principles of sanitation, management and feeding and by judicious use of appropriate and dependable vaccines are the practical and economical ways to avoid losses from the disease. By proper management and feeding, the dairy farmer can, to a great extent, prevent disease out-breaks. Good housing assists in maintaining the health of the herd, whereas judicious feeding not only builds up body resistance to disease but also helps in speedy recovery in case there is a disease attack.

### 1 Anthrax

There are three types of anthrax which affect skin, lungs and the digestive system. Generally, outbreaks of this disease occur in areas where animals have previously died of anthrax, due to the presence of spores which remain viable for decades. Cattle infected with anthrax will progress from a normal, healthy state to death in a matter of hours. Anthrax is a critical disease which is caused by *Bacillus anthracis*. Anthrax is a highly infectious and fatal disease of mammals. The bacterium is a spore-forming micro-organism that forms many more bacterium if right conditions are available. Humans can also become infected with anthrax by dealing with products from infected animals or by breathing in anthrax spores.

**Common Symptoms:** Definite signs of weakness in herd cattle, difficulty in breathing, convulsions, bloody discharges from natural openings of the body, mild fever & muscle aches & stomach pain. Anthrax is primarily a disease of domestic and wild animals, particularly herbivorous animals, such as cattle, sheep, horses, mules, and goats. Outbreaks in swine, dogs, cats, and wild animals held in captivity generally result from consumption of contaminated food. The disease may occur in an acute or sub acute form. Anthrax typically causes an unusual rise in body temperature followed by depression, cardiac distress, staggering and death. Affected animals sometimes die of suffocation. Prophylactic vaccination is extensively used in preventing anthrax in livestock. Bloody discharges sometimes come from the natural body openings, and fluid swellings may appear on different parts of the body. During outbreaks, strict quarantine measures should be adopted. In horses and pigs, anthrax spreads more gradually with progressive swelling of the throat and neck. The disease is highly contagious. Extreme caution should be used in handling infected and dead animals.

**Treatments:** Fluoroquinolones like ciprofloxacin, levofloxacin, or ofloxacin are preferred treatments for anthrax. Ciprofloxacin, Tetracycline and Doxycycline are to be used only as second-line of defense.

**Vaccines & Prevention:** Vaccination is very effective in preventing further occurrence of anthrax in animals. This is useful even after an outbreak has occurred but the time for resistance is about 14 days. Antibiotics should not be used together with vaccines.

### 2. Black-quarter

This disease is widespread amongst cattle in certain parts of India, particularly in Karnataka, Tamil Nadu, Andhra Pradesh and Maharashtra. Sporadic cases occur in the northern and eastern states of the country. The disease is common in areas with moderate rainfall and where dry-crop cultivation is common. Young animals in the prime of condition and six months to three years old are affected more than others. Buffaloes usually suffer from a milder form of the disease. Outbreaks generally occur with

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the onset of rains. True black-quarter is caused by *Clostridium chauvoei*. It affects mostly start and sturdy animals. Fever with redness of eye. Hot painful swelling in the affected leg. Crepitating sound on pressing the affected part of muscle. Death may occur in severe cases in 1 or 2 days

**Symptoms:** The disease usually occurs in an acute form, affected animals dying within 24 to 48 hours of the onset of symptoms. There is high fever with a hot, tense, painful swelling usually in one of the quarters, more often a hind-quarter, although such swelling may also occur in other before death, the swelling becomes cold and painless and crepitates on pressure due to the presence of gas in it.

**Prevention and control:** To prevent the spread of infection and contamination of the soil with spores of the causal organisms, carcasses of animals dead of black-quarter should be either buried deep and covered over with lime or should be cremated. Administration of penicillin in repeated doses may be effective if injected before muscle damage has been caused. Use of black-quarter vaccine protects animals against the disease for about a year. Animals should be vaccinated with this about three to one month before the onset of rains.

### 3 .Brucellosis

Brucellosis is an infectious disease caused by the bacteria of the genus *Brucella*. *Brucella* is passed among animals such as cattle, sheep, pigs, goats, deer, dogs, and humans. Brucellosis is spread when an otherwise healthy animal comes in contact with an infected animal or an area which has been contaminated by an infected animal. Drinking, eating, or inhaling the bacteria will cause infection. *Brucella* is the causative organism of the disease. The microbes enter the bodies of cattle and other animals through skin wounds and inhalation. Any bodily fluids, discharges, aborted fetuses, afterbirth, unpasteurized milk, or carcass from an infected animal can contain the infectious bacteria.

**Common Symptoms:** If a pregnant animal is infected, it might give birth to weak or lame calf, or the calf may be aborted, milk production is reduced, enlarged joints with arthritis, uterine infections after a birth & reduced rates of conception Brucellosis causes considerable damage to cattle. Milk production is reduced to low levels and the animals steadily lose weight. The animals have problems while moving and grazing. Brucellosis is one of the most critical diseases of cattle. The speed of infection is fast and amount of damage caused by the disease is expensive. Brucellosis is transmitted to susceptible animals by direct contact with infected animals. Risks are too great when the disease is carried from one herd to another by an infected or exposed animal.

**Treatments:** Repeated attempts to develop a cure for Brucellosis in animals have failed. Some animals may recover after a period of time but they pose more dangers. They can be powerful sources of infection.

**Vaccines & Prevention:** Vaccination is a must for cattle. There is an approved *Brucella* vaccine which can be easily given to animals by an authorized veterinarian. Vaccination is most effective if it is done during 4 to 6 months of age. As control measures, Brucellosis may be avoided with good sanitation and management practices.

### 4 Haemorrhagic Septicaemia

This acute septicaemic disease of cattle is widely prevalent in India. It occurs generally in low-lying areas periodically inundated by rainwater and in areas where irrigation facilities have developed. The causal organism, *Pasteurella multocida*, is a small gram-negative coccobacillus, commonly called bipolar organism on account of the intensity with which it stains at the poles. Redness of eye and laceration along with fever. Severe dyspnoea. Hot painful swelling at head, jowl region or brisket region. In severe cases sudden death may occur due to high fever and severe dyspnoea

**Common Symptoms:** The disease generally runs an acute course. Cattle and buffaloes often develop a highly septicaemic condition and die within the course of about 24 hours of infection. Affected animals show a high rise in body temperature. The lesions comprise haemorrhagic spots in the lymph nodes, on the serous membranes and in other organs, including the inner lining of the heart; spleen is normal in size. The entire gut is highly inflamed and intensely red with bloody contents.

**Treatment and prevention:** Early cases of the disease are amenable to treatment with sulphonamides, notably sulphadimidine coupled with antibiotics, such as penicillin, but on account of the short course of the disease and its termination in sudden death, animals are seldom available in good time for treatment. Vaccination with the improved type of adjuvant vaccine, carried out about a month before the onset of rains, will protect animals against the attack of the disease for about one year. In endemic areas such vaccination should be carried out every year.

### 4 Mastitis

This disease is characterized by the inflammation of the udder, resulting in changes in the udder tissue and its secretion. Infectious mastitis results from infection with one or more of the many organisms associated with cattle in all countries where dairy industry is well developed, and the disease is of great economic importance to the milk producer. The disease is also widely prevalent in milch animals in India. Clinically, the disease may be recognized as acute, sub-acute or chronic, and these forms may depend on the type of the causal organism concerned. It may be accompanied by systemic disturbance, with a rise in body temperature of the affected animal and other febrile symptoms, but usually it occurs in the form of a localized involvement of the udder, with a progressive damage to the udder tissue. The milk is affected both in quality and in quantity, and as a

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result of permanent impairment of the function of one or more quarters milk production may cease altogether. Both cows and she-buffaloes suffer from the disease.

**Treatment:** Success depends on the nature of the aetiological agent involved, the severity of the disease and the extent of fibrosis. Complete recovery with freedom from bacterial infection can be obtained in cases of recent infection and in those where fibrosis has taken place only to a small extent. Such drugs as acriflavine, gramiddin and tyrothricin have now ceased to be in use, and have given place to the more effective drugs, such as sulphonamides, penicillin and streptomycin.

**4 Tuberculosis:** Tuberculosis is an ancient disease of man, animal and birds. Only a few countries are free of this disease. It is an infectious disease, characterized by slow development of tubercles in almost any organ of the body except the skeletal muscles. The incidence of tuberculosis depends upon a variety of factors related to husbandry, hygiene and environment. The incidence is high where intensive cattle breeding programmes are carried out in countries where animals are housed indoors during the winter months. Tuberculosis in cattle and buffaloes is caused by the bacterium *Tuberculosis bacilli*. The bacteria enter the body usually through food, sometimes they are directly breathed into the lungs. The diseased animal may contaminate the drinking water and vessels. The excretions like faeces, urine, sputum, etc. of the diseased animal may contain the bacteria and be a source of infection.

**7 Symptoms:** The symptoms of tuberculosis depend on the organ affected as any of the organ may be involved. Moreover, an affected animal may show no clinical signs even though it may be severely affected. However, following symptoms may be observed in an affected animal. The infected animal gets weaker day by day and becomes inactive and dull. Hard, dry cough occasionally but not very pronounced in cows. If intestine is affected there will be tympany and diarrhoea. If udder is affected, there will be swelling of one or more teats with no pain. The symmetry of the udder may be lost. The milk becomes watery, the quantity reduced and gets curdled on boiling. When there is tuberculosis of reproductive system, the abortions occur late in pregnancy. The conception rate is very low. There is thick yellow discharge from the vagina of infected animal.

**4 Treatment:** The treatment of tuberculosis is not recommended, as it is very prolonged and the results are unreliable. The animals under treatment are liable to disseminate organisms in milk for human consumption. The tuberculin is widely used throughout the world for the control of tuberculosis in animals. In India where control by test and slaughter is not possible, Bang's method of control has been found to be useful. This method is based on disposing of all the clinical cases. The calves born of tuberculosis-infected cows are free of infection. The animals not showing the clinical sign are subjected to

tuberculin testing. The reactors and non-reactors are kept separately. The healthy group is tested every 3 - 6 months. Calves born of healthy animals are allowed to remain with mothers while those from reacting mothers are weaned immediately after birth. This method leads to a progressive increase in the number of healthy animals and decrease of reactors. For preventing the spread of the disease. Hygienic cattle sheds with adequate space ventilation, fresh air, etc. must be provided. The carcasses of affected animals should be bunt or burned, six feet deep with lime.

**9 Johne's Disease:** Johne's disease is a usually fatal and persistent infection that affects the small intestine of ruminants. Ruminants are cud-chewing hoofed animals such as cows, buffalo or bison. Johne's disease is a type of Para tuberculosis of the cattle in which there is considerable loss of production. The disease affects young calves but the symptoms appear only after 2 years of age. The disease is caused by *Mycobacterium paratuberculosis*, a bacterium related to tuberculosis. The Johne's disease germ is very persistent. It has the ability to live for a period of up to 12 months on the ground. As the bacterium prefers to live in the ground, most of the infection comes from the ground.

**Common Symptoms:** Unexplained weight loss, strange diarrhoea with normal appetite, soft swelling under the jaw, nursing cows have reduced milk production & production losses may be up to 10% for each affected animal. Johne's disease typically starts as an infection in calves. Visible signs do not appear until the calf is little older. The infection is difficult to detect in its early stages. The most common method of animal-to-animal spread is to the calf from its dam. The udder becomes a reservoir of germs and more calves can get infected if there is cross-suckling. Some calves may also be born infected. Once there is protein loss from the bloodstream into the digestive tract - the days of the affected animals is numbered. The cattle will not live very long, perhaps for only a few weeks.

**Treatments & Prevention:** A permanent cure for Johne's disease hasn't been developed as yet. But the spread of the disease can be effectively managed and for this a veterinarian should definitely be consulted. Calves should be born in a healthy environment. There should be a positive effort to reduce the newborns exposure to manure from adult animals. Collecting milk from different animals and then feeding them to young calves should be avoided. All the affected as well as healthy females of the herd should be identified. Since the mothers spread the disease at an early stage, precautions should be high for them. All the affected animals should be separated from the herd and preferably cullled.

**8 Foot-and-mouth disease:** The food-and-mouth disease is a highly communicable disease affecting cloven-footed animals. It is characterized by fever, formation of vesicles and blisters in the mouth, udder, teats and on the skin between the toes and above the

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hoofs. Animals recovered from the disease present a characteristically rough coat and deformation of the hoof. In India, the disease is widespread and assumes a position of importance in livestock industry. The disease spreads by direct contact or indirectly through infected water, manure, hay and pastures. It is also conveyed by cattle attendants. It is known to spread through recovered animals, field rats, porcupines and birds. Foot-and-mouth disease occurs in a relatively milk form in India and is seldom fatal. It occurs practically all the year round.

**Common Symptoms:** Fever with 104-105.0 F, profuse salivation ropes of stringy saliva hangs from mouth, Vesicles appear in mouth and in the inter digital space, lameness observed, cross bred cattle are highly susceptible to it. Quick spread and the occurrence of lesions in the mouth and feet of affected animals are characteristic symptoms. It presents some similarity to rinderpest, from which it can be readily differentiated by the absence of diarrhoea and by the presence of the foot lesions. It can be cured by severe antibiotic therapy and topical application of ointments

**Treatment:** The external application of antiseptics contributes to the healing of the ulcers and wards off attacks by flies. A common and inexpensive dressing for the lesions in the feet is a mixture of coal-tar and copper sulphate in the proportion of 5:1.

**Control and prevention:** Heavy milk animals and exotic breeds of cattle bred for milk should be protected regularly. It is advisable to carry out two vaccinations at an interval of six months followed by an annual vaccination programme. Isolation and segregation of sick animals. It should be informed immediately to the veterinary doctor. Disinfection of animal sheds with bleaching powder or phenol. Attendants and equipments for sick animals should be ideally separate. The equipments should be thoroughly sanitized, proper disposal of left over feed by the animal. Proper disposal of carcasses & control of flies.

**9. Rinder pest:** Rinderpest is the most destructive of the virus diseases of cloven-footed animals, such as cattle, buffaloes, sheep, goats, pigs and wild ruminants. Its control was a major issue till recently all over the world. Organised efforts over half a century have brought about a total eradication of the disease in the Western Hemisphere. The disease still persists in the Asian countries. The virus is found notable in the saliva, discharge from eyes and nostrils, and in the urine and faeces. It is present in the circulating blood during the febrile stage and is later concentrated in different organs, especially in the spleen, lymph nodes and liver. Outside the animal body, the virus is rapidly destroyed by direct sunlight and disinfectants. Cold preserves the virus. The virus is usually spread by contaminated feed and water. Rise in temperature upto 104 - 107.0 F. Lacrimation and redness of eye. Foul odour from mouth. Discrete necrotic foci develop in the buccal mucosa, inside lip, and on the tongue. Bloody mucoid diarrhoea is noticed.

**Treatment:** Symptomatic treatment with penicillin, streptomycin, sulphadimidine and intestinal antiseptics has no action on the virus, but may help in the recovery of less severe cases of rinderpest, as these control secondary complications caused by bacteria.

**10. Bloat:** Cattle's stomachs have two compartments. One is the rumen and the other one is the reticulum. Bloat is a digestive disorder in which gas is accumulated in the compartments. Foam sometimes forms when livestock consume highly digestible legumes such as alfalfa. The build up of gas causes discomfort to the animal. The lining of inside walls may get extended due to pressure. This can lead to severe breathing problems and even heart failure. Under normal circumstances the gases are expelled by belching. In the case of bloat, the gases are sometimes stuck under layers of foam. This causes difficulty whenever the animal wants to eliminate air. Bloat is not caused by any microorganism. It occurs as a result of feeding on any forage that is low in fiber and high in protein.

**Common Symptoms:** Swelling of the left side of the animal, the affected cattle show their discomfort by stamping of feet, alternatively they can also kick their belly, cattle usually also experience difficult breathing, frequent urination and defecation & in advanced cases, cattle have been known to collapse almost completely. In bloat, the stomach of the cattle swells up. This creates a large bulge in the stomach. Pressure builds up behind the rib-cage. The cattle soon stop eating and continue to show their discomfort. As the gas builds up more pressure, the cattle sometimes produce a lot of saliva. The difficulty in breathing will lead to a bluish tinge to the skin inside the mouth. Convulsions may occur quickly and heart-failure is a possibility. In some cases, bloat affected cattle have died within 30 minutes after consuming clover-rich forage.

**Treatments:** During bloat, dry hay should be offered to all the cattle. Making affected cattle walk also causes movements in the stomach, which might reduce discomfort. Anti-foaming agents or anti-bloat gives excellent results. All of treatment should be given under the guidance of a veterinarian.

**Vaccines & Prevention:** Bloat is not caused by any microbe, there is no vaccine for prevention. The best way to avoid bloat is to reduce the factors that can cause it. Anti-foaming agents can be sprayed onto suspected pasture before your cattle graze on it. Anti-bloat capsules which stay in the stomach for up to 100 days are now available. This can give long-term protection to your cattle from bloat.

**11. Calf Scours:** Calf scours is caused by bacterial, viral and sometimes even by parasitic infections. Newborn dairy animals are especially susceptible to calf scours because their immunity systems are not fully developed. Severe fluid loss due to calf scours results in dehydration and often leads to death. Unfortunately, even animals that survive calf scours often remain weak and perform poorly throughout their lives. Calf scours is also called calf diarrhea, or

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neo-natal diarrhea. Many consider calf scours as not a specific disease with a specific cause, but actually as a clinical sign of a complex disease. Whatever the truth may be, Calf scours is the primary cause of death in calves from 2 to 30 days of age. According to a leading research organization, the causative organisms of calf scours may be Coronavirus, Rotavirus, K99 E. coli bacteria or Clostridium perfringens Type C.

**Common Symptoms:** Discharge of more fluid than normal from the bowel, a discharge that is white, yellow, grey or blood-stained, or is foul-smelling, calves that do not nurse, calves that drool excessively & calves that look depressed and do not gain weight. Experts say that as a calf is approximately 70 percent water at birth, loss of body fluids through calf scours can produce fast dehydration. Dehydration and the loss of certain electrolytes produce a change in body of the calf. Calves die more due to dehydration than to the actual infection. Calf scours is one of the most important diseases of the beef cattle industry. Death losses of 50% or more can happen in severe episodes. Due to the mystery behind the real cause of calf scours, it is not easy to pinpoint the locations or climate that favors the causative organisms. The disease usually draws attention only after a few calves have died.

**Treatments:** Treatment for scours is through hydration, and replenishing the electrolyte loss. Antibiotic treatment should also be given simultaneously with the treatment for dehydration. Dehydration can easily be overcome with simple fluids given by mouth. Intravenous fluid treatment becomes necessary only when all the other types of treatment bear no result. The chances of recovery from calf scours are extremely low if the calf is very young. **Vaccines & Prevention** According to one source, research has indicated that many calf scour cases are related to lack of colostrum intake by the newborn calf. The more colostrum a calf takes, the greater are its chances to be protected from calf scours.

**12. Mad Cow Disease (BSE):** Bovine Spongiform Encephalopathy is also known as BSE. The disease is most commonly referred to as Mad Cow Disease. BSE is a progressive degenerative disease that affects the central nervous system of cattle. BSE has an incubation period of four to five years. The disease can go undetected for years as there may be no outward signs. BSE is fatal for cattle and death results within weeks to months of its onset. BSE first came to the attention in November 1986 with its appearance in cattle of United Kingdom (UK). Scientists have not found the exact cause of BSE but it is believed to be caused by abnormal proteins called prions. Other experts say that BSE can be caused by a virus-like organism. New forms of BSE have been affecting cattle around the world.

**Common Symptoms:** Nervousness or aggression, change in attitude and behavior, abnormal posture, coordination problems, difficulty in walking or getting

up off the ground, reduced milk production, acute muscular twitching, unexplained loss of body weight in spite of a good appetite & severe moaning and ultimately death BSE takes from two to eight years from the time of infection, to appear as a full-blown case. BSE-affected animals resemble those of rabies. But rabies progresses rapidly over a few days while the symptoms of BSE develop over a period of two to six months. Once the clinical symptoms are in place, the animal deteriorates until it either dies or is destroyed to prevent more instances of BSE. The disease is found almost exclusively in cattle over 2 years old. The incubation period for this disease ranges from 2-8 years and is always fatal. The disease is believed to have been transmitted through the feeding of animal by-product feeds, such as meat and bone meal, made from cattle infected with BSE.

**Treatments:** There is no treatment for cattle affected with BSE. The disease is fatal.

**Vaccines & Prevention:** There are no tests for the disease in live animals. Prevention can only be done by culling affected animals. Their remains should be properly disposed of. Cattle should be continuously monitored for BSE symptoms. There are no available vaccines for BSE.

**13. Anaplasmosis:** Anaplasmosis is an infectious disease of cattle that affects the red blood cells that transport oxygen in the blood. Affected red blood cells are not able to take part in circulation and die. Once they have died, they are removed by the body and from circulation. *Anaplasma marginale* and *Anaplasma centrale*. They are commonly found inside ticks, biting insects and houseflies. Any instrument with infected blood on it can also transmit the disease. However Anaplasmosis does not affect humans.

**Common Symptoms:** Severe Anemia (Gums and eyes are pale), breathlessness (Short breaths), Loss of appetite (Rejecting fodder), less milk production, abortion in expecting cattle (Occasional), depression (General mood is low), constipation, jaundice (Yellowing of the eyes) & strange movements (Due to uneasiness). Affected cattle begin to die or start a recovery within 4 days of when the first signs appear. Younger cattle have a higher chance of survival than aged cattle. As mentioned earlier, Anaplasmosis causes very little oxygen to be sent into the blood which creates problems when cattle become stirred up. Use caution while moving affected cattle from one place to another. It has been found that animals that recover from Anaplasmosis are carriers and can again spread the disease. In the initial periods of the disease with the introduction of Anaplasma, there are no signs of the disease except for mild fever. As the days pass by and temperature rises, the risks become real. In the next 4 to 5 days, if the cattle do not recover – they will likely die. The yellowing of eyes and skin are the first tell-tale signs that an animal may not make it. Generally it has been seen that animals who recover from a severe bout of Anaplasmosis are not able to produce at their maximum. The risks can be fairly high for infection, if any of the survivors becomes a carrier. Carrier tests

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need to be done on such an animal, although it may have recovered fully.

**Treatments:** Treatment is only effective if the drugs are given in an early stage. Tetracycline and Imido Propionate are the two most popular drugs known to cure Anaplasmosis.

**Vaccines & Prevention:** Today there is only one commercially available vaccine against Anaplasmosis in the United States. The vaccines cannot prevent the disease but reduces chances of cattle deaths. The disease can also be prevented with effective insect control with sprays etc.

**14. Coccidiosis:** Coccidiosis is an intestinal disease that affects several different animal species. The causative agent is a protozoan that has the ability to multiply rapidly. Coccidiosis is seen most commonly in calves that are six to twelve months of age. Calves become infected when placed on pastures contaminated by older cattle or by other infected calves. Coccidiosis in cattle is one of the five most economically devastating diseases of the cattle industry, and is projected to cost the industry \$100 million annually. Coccidiosis is a virus caused by bovine coccidian. The organism has stages both within the host animal as well as outside it. In the developmental stages in the animal, the virus gives rise to a microscopic egg called an oocyst. This is passed onto the manure. Eimeria zuernii and Eimeria bovis are associated with the disease

**Common Symptoms:** Diarrhea, Rough coat, loss of appetite and weight, weakness may cause the calf to defecate without rising, manure may contain blood and mucus, pneumonia & death may occur during the acute period. Coccidiosis occurs in all breeds of cattle. Calves acquire infection as soon as they begin grazing or eating food other than their mother's milk. Although the disease is seen more normally in calves six to nine months of age, it may occur in yearlings and adults. Cattle experiencing severe bouts of Coccidiosis may never perform as well as non-infected pen-mates. Infection also heavily affects the calf's immune system and makes it more vulnerable to other diseases. Coccidiosis is frequently called as an opportunistic infection which develops when the cattle is affected by other conditions. The ingestion of oocyst may not produce the disease but some animals constantly carry them without being affected.

**Treatments:** Treatment of infected animals is necessary. Individual treatment should be used when possible; but herd applications are more practical. Sulfa antibiotics are useful for secondary bacterial infections. Therapeutic doses of amprolium are also quite effective in treating the disease. Proper herd management can reduce exposure to disease by reducing stress.

**Vaccines & Prevention:** Good management practices are vital when establishing parasite control programs. The primary concern in Coccidiosis outbreaks is the possibility of spreading the disease to other susceptible animals in the herd. Drinking water and feed should be protected from contamination with manure. Infected animals should

be isolated to avoid exposure to other cattle. Heavily parasitized animals should be secluded from the rest of the herd and then treated.

**15. Wooden Tongue:** Wooden tongue is a well-defined disease that affects the soft tissues of the mouth region in adult cattle. The disease is fairly acute. It causes swelling in the affected area as well as under the jaw which makes food intake difficult, so animals weaken quickly. Wooden Tongue disease is the trivial name of Actinobacillosis. The disease is also known by names like Pig Wooden Tongue or Chicken Wooden Tongue – indicating other species that can also be affected. Wooden tongue is an infection caused by the bacterium Actinobacillus lignieresii. This microbe lives only in the presence of oxygen which is why it occupies only the upper part of the mouth. Many other Actinobacillus spp like actinoides, suis, pleuropneumoniae and equuli are also pathogens which affect the soft tissue.

**Symptoms:** The most common symptom is that the tongue becomes stiff, puffy and sore. The animals drool excessively and chew gently. Small nodules can be seen on the surface of the tongue. Animals cannot eat or drink properly. The condition of affected cattle deteriorates quickly. The causative bacteria live in the mouth and so can easily invade tissue through breaks in the lining of the mouth. Rough feeds like sticks or straw or barley awns can also cause wounds that are big enough for infection in the tongue. In sheep, the lips, nose, jaw and neck are usually affected. Animals occasionally die from starvation and thirst in the acute stages of the disease. If the infection is not treated properly, soft tissue is deposited and the tongue becomes small. This makes eating much more difficult. The causative organism enters the tissues of the mouth. It is important to mention that A. lignieresii is considered to be a normal inhabitant of the stomach of the sheep and cattle. The disease condition is seen as an outbreak in several animals. Single cases of wooden tongue are relatively rare. The risk of the disease becomes progressive, if it is untreated.

**Treatments:** The most common treatment of wooden tongue consists of iodine therapy or use of tetracycline. In advanced cases, veterinarians can drain the tongue and apply an iodine solution for several days. The treated animals should be observed regularly so that relapses can be prevented.

**Vaccines & Prevention:** No vaccines are currently available in the market. The control of wooden tongue disease can only be achieved by early recognition and on time treatment of cattle. The animals that have been affected should be separated and preferably be culled.

**16. Leptospirosis:** Leptospirosis occurs in animals and man in almost all parts of the world. Serological evidence indicates the prevalence of leptospire among domesticated animals in different parts of the country. The damage done to animal industry results from the death of animals in the acute stage of illness, stillbirth, abortion, stunning, decrease in weight (loss of meat), reduced milk production and

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unthriftiness. The causative organisms of leptospirosis belong to the genus *Leptospira*.

**Common Symptoms:** In cattle it is an acute, often fatal, disease characterized by haemorrhage, haemoglobinuria and icterus. Non-fatal infections are often characterized by fever, anaemia, abortions, sterility, decreased lactation and mastitis. The principal methods used for the diagnosis of leptospirosis are direct microscopical examination of tissue preparations and body fluids, bacteriological culture, animal inoculation and serological tests.

**Treatment:** In cattle treatment with antibiotics may result in considerable diminution of even temporary cessation of urinary excretion of leptospire.

**Metabolic Diseases:** Dairy cattle require minerals in their diet for optimal productivity. These are derived from the feed and fodder. The input of minerals through feed and water must balance their output through faeces, urine and milk to maintain the animal's health. If the output exceeds input, the animals meet out their normal requirements by mobilization from its body reserves for a shorter period. But continuous imbalances develop into productivity related problems. Nutritional imbalances, deficiencies, or erratic management of feeding programs for dairy cows can create large numbers and various types of health problems generally categorized as metabolic diseases. High producing dairy cows are most susceptible to metabolic diseases during the periparturient period. In cattle, metabolic diseases which produces an acute, temporary, but potentially fatal deficiency includes

**1. MILK FEVER:** Milk fever is a condition of older, third to sixth lactation, high-producing dairy cows. It is associated with parturition, usually within 72 hours of giving birth. Because of the high volume of milk produced during this time, and subsequent demand for calcium, these cows often develop hypocalcaemia, or abnormally low levels of calcium in the blood. Since calcium is required for the release of acetylcholine at the neuromuscular junction, affected animals will begin to experience muscle weakness. As this hypocalcaemia worsens, the cow will become too weak to stand and will eventually become comatose over a matter of hours. Calcium is the most common mineral in the body and the major extra-cellular divalent cation. Is a structural component of bones and teeth. Over 98% of Ca present in the body is found in bone. Is also important in muscle contraction (this is the main reason cows suffering from milk fever go down). Also plays a role in blood clotting and nerve impulse transmission. Calcium is critically important to normal nerve and muscle function. Acetylcholine, a neurotransmitter substance acting at the neuromuscular junction, requires calcium to properly stimulate muscle movement. At or near the time of parturition, the onset of lactation results in the sudden loss of calcium through milk. The total circulating calcium in the blood of the cow is about 1.5 to 2.0 gm.

**Common Symptoms:** There are three progressive stages of parturient paresis. During stage one, cows

are able to stand but show signs of hypersensitivity and excitability. Cows may appear restless and bellowing. If calcium therapy is not instituted, cows will progress to stage two. In stage two, cows are unable to stand but can maintain sternal recumbency. Depression, anorexia, dry muzzle, subnormal body temperature, and cold extremities are seen. Cows often tuck their heads into their flanks or, if the head is extended, an S-shaped curve to the neck may be noted. In stage three, cows lose consciousness progressively to the point of coma. They are unable to maintain sternal recumbency, unresponsive to stimuli, and can suffer severe bloat. Cardiac output worsens, heart rate can approach 120 beats/min, and pulse may be undetectable. Cows in stage three may survive only a few hours. An older dairy cow near calving or that has recently calved that shows clinical signs and symptoms is highly diagnostic. Serum calcium levels will reveal hypocalcaemia, or low blood calcium. However, because of the rapid nature of this illness and the often-slow return of laboratory results, treatment is usually initiated based on clinical signs only.

**Treatments:** Treatment is directed toward restoring the serum calcium level to normal as soon as possible to avoid muscular and nervous damage and recumbency. This would minimize the associated problems of hypocalcaemia. Recommended treatment is IV injection of a calcium gluconate salt, although SC and IP routes are also used. A general rule for dosing is 1 g calcium/45 kg body wt. The response to properly administered calcium therapy is quite characteristic. The cow's symptoms will appear to reverse themselves as they had previously progressed. The laterally recumbent cow will sit up to sternal position, and then it will often begin to have tremors over its body. As all bodily functions affected by hypocalcaemia begin to reverse, the affected animal may urinate, belch, and then begin the wobbly effort to rise. Cows generally rise within one hour. Repeated treatment may be necessary in 12 hours if the cow is still unable to rise. Replacement of calcium by parenteral administration is the most important initial step, which should not be delayed in severely hypocalcaemic animals. Most solutions are available in single-dose, 500 ml bottles that contain 8-11 g calcium. The thumb rule is when the animal is showing signs of peripheral vascular failure, hypothermia and cold extremities; calcium borogluconate should be administered intravenously.

**2 .Hypomagnesaemia:** Magnesium is a widely distributed metal and is prominent body constituent. Almost half of the magnesium in the body is present in the bones. The normal concentration range in plasma is 1.8-3.5 mg dl-1. The magnesium ion is essential for normal bone metabolism, normal nerve function and muscle irritability. Magnesium also plays an essential part in the coenzyme system which links normal carbohydrate metabolism with phosphate metabolism and the provision of energy for muscle contraction. Magnesium ions are by no means efficiently absorbed from the gastrointestinal tract and only 7 to 25% is absorbed under usual dietary conditions. But resorption mechanisms are very efficient. Excretion of magnesium absorbed in excess

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of needs is renal. The kidneys exert an appreciable degree of control over magnesium excretion. A deficiency of magnesium occurs commonly in cattle. All in all lactating cows on an unsupplemented diets is in a precarious position with regard to magnesium balance because of the narrow margin between daily intakes and overall needs exacerbated by variable bioavailability.

**Common Symptoms:** Low magnesium blood levels can be asymptomatic or be accompanied by tetany and convulsions – ‘milk tetany’ in calves, ‘grass tetany’, ‘stomach staggers’ or ‘Hereford disease’ in adult cattle. Serum magnesium levels fall below 1.5 mg. Percent. The signs of magnesium deficiency are those of neuromuscular hyperirritability, culminating in titanic seizures and death. The typical hypomagnesaemic milk fever case shows what is known in some areas as ‘the blinks’ – a fluttering of the eyelids. The animal is extremely hypersensitive, shows muscular tremors and may move in circles, occasionally appearing to ‘attack’ attendants. The pupil is often constricted and the anal sphincter flaccid. Convulsions may occur and the animal falls to the ground. Hypomagnesaemia can be complicating factor in milk fever but is less commonly associated with calving than are hypocalcaemia and hypophosphataemia. Two types of clinical hypomagnesaemia may be distinguished. There is an acute, often fatal type, which usually follows abrupt changes of diet, especially from indoor feeding to outdoor grazing on fresh leys (hence the term ‘grass staggers’). The subacute type is usually recurrent and indicates borderline deficiency of magnesium. In both cases the condition is one of inadequate intake and/or absorption of magnesium. Treatment and prophylaxis In most cases of grass tetany moderate hypocalcaemia accompanies the hypomagnesaemia. Grass tetany may also accompany ketosis. Hypomagnesaemia cases can be treated by combine calcium, phosphorus and magnesium injections, by magnesium-dextrose injections, by calcium borogluconatemagnesium injections or by plain 25% magnesium sulphate injections.

**3 Ketosis:** Ketosis or acetoneuria is a common metabolic disease of lactating cows occurring during the first 10 to 60 days after calving in high-producing cows. The three-week period after calving seems to be the most critical time. The disease results from a lowered blood sugar in the circulating blood, which causes the formation and release of ketone bodies. Ketone bodies (specifically acetone) are volatilized and account for the “sweetish” smell detectable on the breath, and in the milk or urine of affected cows. The incidence of ketosis is higher in older cows and high-producing cows. As cows produce milk, they become more susceptible.

**Common Symptoms:** Symptoms of ketosis in dairy cattle include dullness, depression, a staring expression, rapid loss of weight, a drop in milk production, constipation, mucus covered faeces, incoordination and partial paralysis. A few cows may become highly excitable. Breathing is shallow with an acetone smell in the breath. Cows will usually consume hay, straw or other roughage but generally

refuse grain or concentrates. About two-thirds of the cases are primary or uncomplicated ketosis. The other third are secondary cases, complicated by such things as retained placenta, metritis, displaced abomasum, nephritis, hardware or the other problems causing cows to go off-feed. An elevated temperature may indicate that other factors are involved. Since ketosis is only a practical problem in ruminants, changes in the rumen have been investigated. Fatty acids (acetic, propionic and butyric) arising from microbial rumen fermentation furnish from 40 to 70 percent of a ruminant animal’s energy requirements. Of these acids, propionic is by far most vital to the prevention of ketosis, and high-energy rations favor propionate production. An increase in butyric acid would be undesirable since this acid is a potential source of ketone bodies. Other suggestions for the prevention of ketosis include the addition of sodium propionate and propylene glycol to the dairy ration. Generally, the response to either system is slow and treatment must be extended over a period of time. Sodium propionate creates a palatability problem whereas propylene glycol is completely palatable. Twice daily feeding of 120ml of propylene glycol, beginning 14 days prior to the anticipated calving date and continued for 7 weeks postpartum, reduced the incidence of ketosis by 18 percent. The ketone test is a simple diagnostic tool for determining the presence of ketone bodies and is used by veterinarians and is also available to dairymen. The test is used for determining the presence of acetone in milk and urine. Colostrum milk does not give accurate results. The urine test shows positive results before the milk test does. Even so, do not be concerned until a positive test is obtained from milk. The blood level of ketone bodies is the best test for determining the degree of ketosis.

**Treatments:** Most accepted ketosis treatments attempt to increase blood sugar levels. Usually, about 500 ml of a 50 percent glucose solution is used. When this is the sole treatment, relapses are frequent. As a result, most veterinarians recommend intravenous injection of glucose with the incorporation of insulin as a part of the therapy. Also, some veterinarians supplement corticosteroids for a few days following treatment to boost blood glucose levels.

**External Parasites:** Horn flies, face flies, stable flies, ticks, lice and mites are the major external parasites in cattle. Horn Flies are about half the size of house flies and are dark gray. They are blood-sucking flies that stay on the shoulders and backs of cattle almost continuously. There are many options to assist in control. Backrubbers allow cattle to treat themselves while loafing and scratching. Dust bags are most effective when used where cattle have to pass under them daily to get to water or mineral. Feed additives target horn fly maggots breeding in fresh animal manure. High pressure sprays can be used to treat cattle thoroughly and inexpensively on a per head basis. An insecticide bolus is a large pill-like formulation that is given to the animal with a standard balling gun. Insecticide-impregnated cattle ear tags release small amounts of an insecticide which are distributed over the animal during



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grooming or rubbing. Pour on insecticides. Face Flies closely resemble house flies. They cluster on the faces of cattle and feed on secretions from the mucus membranes of the eyes, nose, and lips. Face flies do not suck blood. They do irritate the surface of the eyeball and carry and spread bacteria and viruses that contribute to pinkeye problems. They spend only a small portion of their life on cattle which makes them more difficult to control than horn flies. Stable flies are sometimes called biting house flies. They look very much like house flies. They feed primarily on legs and lower abdomen of cattle. The blood loss and pain associated with the bite of stable flies results in substantial economic loss. Ticks cause blood loss, discomfort, and spread diseases like anaplasmosis described above. Tick control is extremely difficult in areas with high tick populations. Control on cattle through persistent use of approved pesticides is achieved by spraying, dipping, ear tags, pour-ons, dust, and backrubs. Lice cause skin irritation and itching. Both biting and sucking lice infest cattle. Infested cattle can experience reduced appetite and appear unhealthy. Sprays and pour-ons are common methods to treat cattle lice. Mite infestation is called mange in cattle. A serious form of mange is called scabies. Scabies is caused by sarcoptic and psoroptic mites and must be reported to the disease control authorities. Cattle infested with mites suffer hair loss and a thickening of the skin. Severe infestations can weaken cattle and make them vulnerable to diseases. Mite control works best with injectable products or pour-on products with systemic activity.

**Conclusion:** Livestock has played a very important role in the Indian economy ever since civilisation. With the increasing human population in India, demand for animal protein is increasing, due to social and economic reasons. Milk and milk products are important constituents of human diet. Some of the population also take animal meat, especially of buffaloes, due to low cost and taste. Thus control and eradication of diseases of cattle and buffaloes are very important considerations. Now with the introduction of some of the foreign breeds of cattle and their crosses, which are highly susceptible to diseases, the demand for efficient health cover has increased considerably in order to maintain them in good health and production. For this, control and eradication programme for these cattle diseases has become very important considering the economies of cattle and buffalo industry. Prevention, control and eradication are the three basic methods used in dealing with any disease in the cattle population. These three methods are applied depending upon the economic importance of disease and investment cost available for the control programme. For prevention, control and eradication of all contagious diseases (which are mainly caused by virus or bacteria), a potent vaccine is very essential. For most of these contagious diseases, vaccines are available (see table. 1). In susceptible areas or herds, vaccination programme should be carried out well in advance. It is also imperative that cattle and buffalo owner should know all the signs of good health and understand the condition of his animals especially when they manifest symptoms of diseased condition,

so that he can take effective steps in time to get his animal treated or to control the spread of infection. Every time it may not be possible for the owner to attend his sick animal and as such, he should take the help of a qualified veterinary doctor in proper time. However, there are certain diseases for which there is no any vaccine or scientific treatment course. In such a case, improvement in hygienic conditions, management practices and feeding standards is very important.

### Transgenic Livestock:

Transgenic animals are animals that have been genetically modified, through the introduction of foreign DNA or RNA, so that they overproduce, under produce, lack the production of, or have modified expression of particular protein. Transgenic animal may be defined as one whose genome has been permanently altered by the addition, deletion or modification of specific genes. The term transgenic was first used by J.W. Gordon and F.H. Ruddle (1981). Transgenic animals were first produced nearly two decades ago. Most transgenic animals studies involve mice, other transgenic species, such as rabbits, rats, hamsters, sheep, goat, swine, Often mice are not suitable transgenic models, for example in some human genetic disorders or for the production of large quantities of biopharmaceuticals, where larger more closely related species would be more effective.

During the 1970s, the first chimeric mice were produced (Brinster, 1974). The cells of two different embryos of different strain were combined together at an early stage of development (eight cells) to form a single embryo that subsequently developed into a chimeric adult, exhibiting characteristic of each strain. This technology allows the transfer of genes of interest from one species to another, thus permitting genetic improvements as well as better understanding of how genes function with an individual. Transgens can also be expressed in a specific tissue at a given time or at a particular stage of development. Moreover, transgenic offers the potential for great genetic advances in livestock production through improvements in animal health and production traits such as growth, milk, meat & wool production.

Transgenic animal system combines the virtues of cells culture and congenic breeding strategies while avoiding the negative aspects of each system. Using transgenic techniques, a characterized genetic sequence may be evaluated with in the specific genomic background of whole animal. Genes can be transferred across species boundaries and can be modified to function very differently than they do in their native have application in both food production & biomedical arena. As efficiencies of this technology improve, other species of transgenic will become more commonplace and form (gene products, tissue specificity & timing of expression can be altered). The ability to redirect expression of genes to another organ has spawned the transgenic bioreactor industry. For the most part, transgenic bioreactors are farm animals designed to produce new proteins in their milk or other body fluids. It is envisioned that this approach will enhance our lives through their contributions to medicine