

GOAT DISEASES AND FARM HERD-HEALTH SAFETY



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This publication is a summary of descriptions of infectious diseases goat producers need to be aware of as possible threats to their herds.

An infectious disease is a disease which is transmitted from animal to animal, animal to human, or from equipment/clothing to animal. These diseases can be very resilient. Many of these disease organisms (pathogens) are considered *zoonotic*, which means they pose a threat to man.

It is possible that 75% of the emerging and re-emerging pathogens are zoonotic. Therefore, the effect of these diseases on public's health must always be considered. In many instances sick animals can serve as a cause of infection for humans. At times both animals and humans may become ill from a common source. Illness in animals is often used as a possible warning sign that people becoming sick can be prevented or lessened through effective intervention programs.

In addition to the spread of disease by natural means, the introduction of infectious disease by mechanical means also must be considered. Therefore it is important to be aware of what you can do to protect yourself, your farm, and your livestock from contamination. This practice is called *biosecurity or bio-risk management*. This publication covers the necessary steps recommended by the Missouri Veterinary Medical Association; and the Missouri Department of Health and Senior Services, Division of Community and Public Health.

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What is Biosecurity?

Biosecurity is protecting the health of livestock by preventing the spread of disease on the farm and from farm to farm.

- Any disease that can endanger the health of your livestock is considered a threat to the economics of the farm and safety of the herd
- Infectious diseases are spread by numerous agents. Anything that is dirty is considered contaminated (clothing, shoes, needles, equipment, insects, wildlife, feed and water, unwashed hands) and thus could transmit diseases.

How to manage and protect your herd:

- Keep all new animals away from the other animals in the herd on the farm for at least 21-30 days
- Vaccinate your farm animals against common diseases in the area
- Vaccinate new animals to match the program already on your farm
- Do not reuse dirty, contaminated needles; always use new disposable needles.
- Clean all equipment in between uses
- Purchase new animals from well known healthy herds
- Purchase livestock feed from trustworthy sources
- When visitors visit your farm, ask that they have on clean clothing, clean shoes, and clean equipment, (including the veterinarian)
- Supply a tub of disinfectant, freshen daily, and a brush for scrubbing footwear. Or provide plastic over-boots for visitors.
- Identify all animals with identification tags on each animal
- Keep accurate records of each and every animal, bought and sold, medications given, vaccinations, breeding dates, birthing dates and death dates, and means of disposal of dead animals
- Ask for help from your veterinarian or extension agent when needed

- Keep all fences in good condition to keep your animals in and animals from neighboring farms and wildlife out
- Always work on the sick animals after working the healthy animals
- Report any unusual signs of animal sickness or death to your veterinarian.

Individual Animal Identification:

Good management and proper identification of animals can make managing disease outbreaks and sick animals much easier. All animals on the farm should have an individual ear tag or neck tag for identification if it becomes sick. This will help identify and treat the animal(s) appropriately.

Accurate Record Keeping

Good record keeping is vital for successful treatment and control of disease and the health of your animals. Records of animal identification numbers, offspring, breeding, vaccinations, deworming schedule; and record of any illness and all medications given are important when disease outbreaks occur. Information of where animals are purchased and sold is also often helpful in disease outbreaks when questions have to be answered.

What is a Reportable Infectious Disease

Reportable Infectious Diseases are those which are highly infectious and controlled by the USDA (United States Department of Agriculture). It is required to report these diseases to the State Veterinarian and the USDA Veterinarian. These diseases are controlled due to the economic threat they pose to the agricultural industry in the United States.

Scrapie:

Scrapie is the most common reportable disease of goats and sheep in the United States today. Scrapie is a difficult disease to diagnose and it is always fatal. It can take up to six years or more to show clinical signs. Scrapie is in the same category as BSE or “mad cow disease” (bovine spongiform encephalopathy) and chronic wasting disease (CWD) of deer and elk. There is no evidence that Scrapie or CWD can spread to humans, either through eating of the meat or dairy products or by the handling of animals; however the industry can still be

subject to the negative public perceptions affecting the cattle industry. Scrapie is a disease of both sheep and goats; however it is rare in goats.

Clinical Signs: Scrapie is spread through direct contact between sheep and goats. The infective cause is a prion, which is an organism smaller than bacteria or a virus. It is transferred through contact with the placentas or fetal fluids of infected sheep. The prion first invades the lymph nodes and then the nervous system.

Clinical signs have not been seen in goats less than 2 years of age and usually progress slowly over 1-6 months. Scrapie suspected animals will show characteristic changes in gait, tremors of the head and neck, behavioral changes, lip smacking, loss of coordination, increased sensitivity to noise, rubbing against fences or feed bunks, skin/ wool biting, and progressive weight loss with a normal appetite, go down and unable to stand, and death. Genetic testing can be used in sheep to identify a scrapie susceptibility gene; however such a gene has not yet been identified in goats.

A video of clinical signs and information on the eradication program is available at http://www.aphis.usda.gov/animal_health/animal_diseases/scrapie/

Brucellosis

This disease results from infection by various species of *Brucella*. Six species occur in humans and animals. *B.melitensis* is the most important species in sheep and goats, and *B. ovis* causes infertility in rams.

Brucellosis is found worldwide but it is well controlled in most developed countries. The disease is still common in Africa, the Middle East, Central and Southeast Asia, South America and some Mediterranean countries. *B. melitensis* is rare in the United States, but *B. ovis* is seen in Australia, New Zealand and many other sheep-raising regions, including the United States.

Brucellosis is spread among animals by contact with the placenta, fetus, fetal fluids, and vaginal discharges from infected animals. Animals are infectious after either an abortion or full term birth. The organism is found in blood, urine, milk, and semen; it can be shed in milk and semen (which can be prolonged or lifelong). *Brucella* can be spread on equipment, clothing, etc. In conditions of high humidity, low temperatures and no sunlight, these organisms can live for several months in water, aborted fetuses, manure, wool, hay, equipment and clothes. The *Brucella* organism is killed by several hours of exposure to direct sunlight.

Clinical signs: *Brucella abortus* is found in cattle; and occasionally sheep, goats, and dogs. *B. melitensis* is the most important cause of brucellosis in sheep and goats. It can cause abortion, retained placenta, and swelling of the testicles.

Abortions usually occur in late pregnancy in sheep, and during the fourth month of pregnancy in goats. In goats, mastitis and lameness may be seen. Arthritis is rare in sheep.

Communicability: **Brucellosis is contagious to humans.** Bacteria are present in milk, placenta, fetal fluids, fetus, vaginal discharges, semen, and urine. Ruminants and other animals can shed bacteria long-term or lifelong.

Diagnosis: By blood tests and culture of tissues listed above.

Treatment: There is no practical treatment that is successful. Long-term antibiotic treatment can eliminate *B. ovis* infections in valuable rams but the fertility may remain poor.

This is a reportable disease.

Tuberculosis

An infectious disease caused by the bacteria *Mycobacterium*. Before extreme control programs and testing, this was a major disease of humans and domestic animals. Tuberculosis can be a chronic, debilitating disease but can also become a very progressive disease. It is zoonotic to humans as well as other animals. Breathing of aerosol droplets from a cough or drinking of contaminated milk are the primary routes of infection.

Clinical signs: The clinical signs reflect the location and severity of the infection. Weight loss, lack of energy, loss of appetite, depression, weakness, and fluctuating fever are common symptoms. The respiratory form of the disease causes a chronic, intermittent, moist cough that may progress to difficulty breathing.

Diagnosis: The Intradermal Caudal-fold skin test is the most reliable diagnostic test for tuberculosis in goats and sheep. This test must be done by a veterinarian.

Control: Control of this disease in the United States is by test and eradication of positive animals in a herd.

Prevention: Purchase animals from a tuberculosis-free herd.

This is a reportable disease.

Anthrax

This disease results from infection by the bacteria *Bacillus anthracis*. This bacteria forms spores and requires oxygen to survive. Anthrax is found worldwide. In the United States areas of concern in which infection occurs are in South Dakota, Nebraska, Mississippi, Arkansas, Texas, Louisiana, and California with smaller areas in other states.

Anthrax is usually spread by the animals eating the *Bacillus* spores on plants in pastures. Outbreaks occur in neutral or alkaline (calcium/ limestone rich) soil and are often associated after heavy rainfall, flood, or drought. Under optimal levels of moisture, temperature and other favorable conditions; the spores in the soil can return to the vegetative form and grow to infectious levels. Carnivores (such as dogs, coyotes, wolves, etc) can become infected after eating contaminated meat. Scavengers and flies spread anthrax after feeding on infected carcasses.

The Anthrax bacteria require oxygen in order to develop into spores. The disease is spread when large numbers of bacteria are exposed to oxygen then develop into spores and contaminate the soil. Therefore it is not wise to open an infected carcass for a necropsy. Anthrax spores remain viable for decades in the soil or on animal products such as dried or processed hides, or wool. Spores can survive for 2 years in water, 10 years in milk and up to 71 years on silk threads. Vegetative organisms are thought to be destroyed within a few days during the decomposition of unopened carcasses. If you suspect an animal dying of anthrax, contact your veterinarian immediately.

Species affected: Goats, sheep, cattle and horses are susceptible. Pigs can become infected from eating contaminated meat. Rats and chickens are relatively resistant.

Incubation period: Typically 1-20 days. Most infections are noticeable after 3-7 days. Incubation is only 1-2 weeks in pigs.

Clinical Signs: In ruminants (cattle, goats, and sheep) sudden death is the only sign. Staggering, trembling, and difficulty breathing may be seen in some animals, followed by rapid collapse, terminal convulsions, and death. Bloody discharges from natural openings (nose, mouth, ears, penis, and rectum) in the body are sometimes observed. Humans can become infected through the skin leading to a dark scab. Infections obtained by inhalation or ingestion can be highly fatal if left untreated.

Diagnosis: Typically by clinical signs. Official diagnosis is made by laboratory identification of the organisms in samples of body fluids, skin lesions, lymph node or spleen.

This is a highly communicable disease. However, this is NOT a highly transmissible disease between animals. Treatment is possible with antibiotics if started early. Vaccines are available for livestock.

This is a reportable disease.

Foot and Mouth Disease (FMD)

This is a highly contagious disease that can rapidly spread through a region if control and eradication practices are not put into place as soon as the disease is identified. It primarily affects cloven-hoofed domestic and wild animals including cattle, pigs, sheep, and goats.



Figure 1 Goat, lower lip, ulcer of Foot and Mouth Disease.
<http://www.cfsph.iastate.edu/DiseaseInfo>

The last outbreak in the US was in 1929. It does not currently exist in the US. This disease is spread primarily by respiratory spray and direct or indirect contact with infected animals. For this disease to spread in the respiratory spray it takes the form of an aerosol droplet (from a cough or sneeze) and requires proper temperature and humidity. Feeding of infected animal products such as meat, milk, bones, glands and cheese can also spread the disease. Contact with contaminated objects such as boots, hands or clothing can be a primary source of infection. Other sources of infection are artificial insemination, and contaminated medications and hormone preparations.

Sheep and goats are considered maintenance hosts. They can have very mild signs; therefore, delaying diagnosis. This can allow time for environmental contamination by aerosol or direct contact. In pigs, FMD virus can spread rapidly due to thousands of times higher virus particle concentration in air droplets as compared with other species therefore pigs are considered “amplifying hosts”. Cattle are considered “indicators” of this disease because they generally are the first species to show signs of infection. Their lesions are more severe and progress more rapidly.

Animals that have had contact with clinically infected animals generally show signs of disease in 3-5 days. The virus is shed most often and the disease is spread when the blisters rupture.

Clinical signs: Foot and mouth disease is characterized by fever and blisters which progress to ulcers in the mouth, nostrils, muzzle, feet, or teats. Symptoms include depression, poor appetite, excessive salivation, clear nasal discharge, decreased milk production, lameness, and reluctance to move. Abortion may occur in pregnant



Figure 2 Teat, ruptured blister. Foot and Mouth Disease.
<http://www.cfsph.iastate.edu/DiseaseInfo>

animals due to high fever. Young animals die due to severe heart damage.

Sheep and goats show very mild, if any, signs of fever, oral lesions, and lameness. Animals generally recover in about 2 weeks with very low death rate in adult animals.

Differential diagnosis: In sheep and goats other diseases that may look like FMD include Vesicular stomatitis, Bluetongue, Contagious Ecthyma (Orf or Sore Mouth), and Lip and Leg Ulceration.

This is a reportable disease. Containing a suspected outbreak of foot and mouth disease is vitally important. State and federal veterinarians should be immediately informed of any suspected vesicular disease.

Vesicular Stomatitis

Another important contagious vesicular disease found in North and South America. This disease has almost identical clinical signs to Foot and Mouth Disease in cattle and pigs. The signs of Vesicular Stomatitis are also very similar to Swine Vesicular Stomatitis and Vesicular Exanthema of swine. It affects South American Camelids (Llamas, Alpacas, and Vicuñas), but sheep and goats are resistant and rarely show clinical signs.

Clinical signs: Horses are affected most severely with oral and coronary band blisters that progress to signs of drooling, chomping, rubbing the mouth, and lameness. Cattle and pigs are very similar to Foot and Mouth Disease. Vesicular Stomatitis is most likely to have lesions isolated to one part of the body such as the mouth or feet. Recovery is within two weeks, longer in the presence of a secondary infection.

This is also a reportable disease.

***** Before collecting or sending any samples from a vesicular disease suspect the proper authorities should be contacted (your veterinarian, state veterinarian, or federal USDA veterinarian). Samples should only be sent under secure conditions and to authorized laboratories to prevent spread of the disease. Since vesicular diseases cannot be distinguished clinically, and some are zoonotic, samples should be collected and handled with all appropriate precautions and only by a veterinarian.**

Self Limiting Infectious Diseases:

The following diseases are highly infective within a herd and require intense management for proper control; however these diseases are not reportable. These diseases can be very costly to producers and also have a zoonotic (contagious to man) potential.

Sore Mouth (Contagious Ecthyma, Orf)

This disease affects sheep and goats and is caused by a *Parapoxvirus*. Lesions most commonly occur on the mouth and face, but can also occur on the feet, teats, and genitalia. The poxvirus is present worldwide and can remain infective in the scabs in the environment for months to years.

The virus is spread by direct or indirect contact from environmental contaminants. The virus enters through abrasions (scrape) or wounds of the mouth, teat, feet, or genitalia. It then localizes in the tissues and is shed in the scab. Animals that are kept in the same area are at the greatest risk.

The infection is self-limiting, with most animals developing protective immunity, however reinfection is possible.



Figure 3 Sore Mouth (Contagious Ecthyma, Orf) sores on lips and muzzle of young goat.
<http://www2.luresext.edu/goats/index.htm>

Clinical signs: Early signs are small bumps or blisters on affected skin, usually around the mouth. Thick brown to black crusts form and are most evident. Lesions typically resolve in 14-21 days. Nursing lambs or kids are most likely to spread the disease to udders of susceptible ewes or does. Oral lesions may become so severe as to cause the animal to stop eating.

Diagnosis: Observation of clinical signs and skin biopsy.

Treatment: Treatment of individually affected animals is not provided unless lesions are severe. Consult a veterinarian.

Prevention: Put into practice control measures immediately. Affected animals should be separated from all the other animals. Prevent the scabs from falling off into the environment. Vaccines are available, but not recommended in disease free herds because the vaccine contains live virus and poses a contamination threat.

Contagious ecthyma is **highly zoonotic** and may produce lesions on the hands or fingers of the person(s) handling infected animals. Therefore it is extremely

important to practice good hygiene. Disposable gloves should be worn when handling these animals, and then properly disposed off in a trash can. Hands should be cleaned with an antimicrobial cleanser after handling.

Pinkeye

Pinkeye also known as *Viral Keratoconjunctivitis* has been reported in goats. It can be a sequel to Bluetongue Virus infection.

Pinkeye in goats is a mycoplasmal disease. A surface infection with the mycoplasma organism in the eye can cause pinkeye in goats and

sheep. The organism can also enter the blood stream and cause septicemia, abortion, respiratory problems and arthritis in multiple joints. Flare-ups occur in times of stress, overcrowding, kidding or lambing. Pinkeye can be spread by direct or indirect contact with infected animals or body fluids from infected animals. Newborn goats/lambs can spread the organisms from the mother's mouth to her udder and in turn become infected by ingesting contaminated milk.



Figure 4 Cloudy cornea of the eye in a goat. Photograph provided by Terry Hutchins, University of Kentucky Goat Program. These materials are the property of Goat Dairy Library, www.goatdairylibrary.org. (July 9, 2008)

Clinical signs: Cloudiness of the cornea. A mycoplasma infection should be suspected in goats and sheep with severe pneumonia.

Diagnosis: *Mycoplasma* strains can be identified by bacterial culture or staining of discharges from the eye. Examiners must be careful in interpreting results of positive cultures as nonpathogenic mycoplasma is common (D.G. Pugh, *Sheep & Goat Medicine*). Consult a veterinarian for diagnosis and treatment.

Prevention: There is not a vaccine available in the US. Provide good fly control, preventing stress, overcrowding, and separating infected animals from healthy ones will help prevent the spread of disease.

Ringworm

This disease is also known as *dermatophytosis*, lumpy wool, or club lamb fungus. It is transmitted by direct or indirect contact with contaminated equipment or environment. It is a fungus, caused by one of four species. The fungi invade the skin and hair fibers. Breaks in the hair and hair loss occur due to the breakdown

of the hair shaft. Close shearing and washing practices used at shows leave show animals at risk.



Figure 5 Ringworm lesions
www.ext.vt.edu

Clinical signs: Crusty circular raised lesions on the skin's surface. Animals may be very itchy.

Diagnosis: Positive culture of skin and hair samples, or a wet mount examination by a veterinarian.

Treatment: Treatment helps limit the spread of the disease to other animals and humans. Topical iodine compounds (2%-5%), chlorhexidine (2%), lime sulfur (2%-5%), and topical antifungal medications are useful for local treatment of lesions. Some severe cases require administration of medications. This requires the help of a veterinarian.

People treating animals should always wear gloves and protective clothing to prevent from getting this disease from the animals. This is considered a zoonotic disease.



Figure 6 Ringworm lesion on an arm of a handler

Prevention: Proper cleaning and disinfection of clippers, blankets, and other equipment with antiseptic solutions, along with good sanitation practices of animal handlers will help control the spread of this disease.

Internal Parasites:

Sheep and goats are susceptible to the same parasites and tend to share a resistance to those that infect cattle and horses. The major gastrointestinal worms that parasitize goats and sheep on pasture are: Haemonchus, Ostertagia, Trichostrongylus, Cooperia species. Therefore the acronym HOTC is a reference to the main parasites of concern. The severity of infestation of specific parasites varies from farm to farm. Factors affecting infestation of a herd depends on climate, age of the animal, overcrowding and pasture management. In the United States, Haemonchus is the most common significant parasite causing clinical disease and parasite resistance in herds resulting in economic loss.

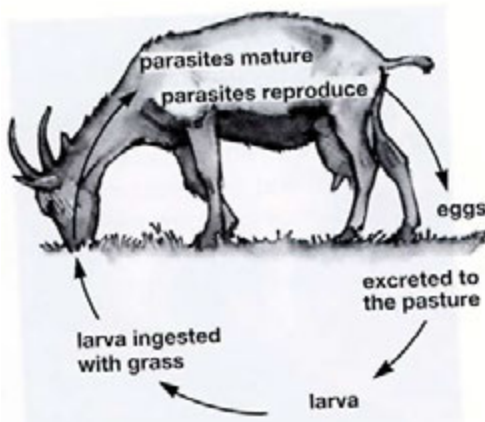


Figure 7 General Parasite Life Cycle

Life cycles of most of these parasites are very similar, and become significant when the larvae hatch under favorable conditions, are eaten by the host animal while grazing grasses in pasture, completes its life cycle within the host animal, and produces more eggs. These nematodes affect the abomasums and small intestine of the young weaned animals, and adults.

If infested with significant numbers, the animals will show poor growth, decreased weight gain, decreased milk production, weight loss, diarrhea, anemia, lower jaw swelling (bottle jaw), midline (under-belly) swelling, and death. Diagnosis by fecal examination and counting eggs per gram (EPG) of feces is the best way to determine parasite load and can be done by a veterinarian.

A deworming program should be carefully designed to reduce the EPG by 90% and use of the effective product for at least 1 year, then changing products to avoid building resistance. A combination of strategic deworming and tactical deworming seems to provide the best results. A veterinarian or extension agent can help you design a program best suited for your farm.

Tapeworm (Cestode) infestation of goats in North America is most commonly *Monesia* species. Tapeworms rarely cause disease in kids less than 6 months of age but are seen in combination with other parasite infestations.

Coccidia (Protozoan) infestation of goats commonly affects young goats under the stress of being weaned and sold. This parasite can cause severe diarrhea, pneumonia-like symptoms, depression, weight loss, anemia, loss of appetite, and even death. It can be easily controlled with coccidiostats added to the feed or water. Consult a veterinarian or livestock extension agent for help.

Miscellaneous Diseases of Importance, **Not reportable in the state of Missouri.**

Johne's disease: (Paratuberculosis)

A chronic disease, that causes a wasting body condition, without diarrhea, in goats. It is caused by the bacteria *Mycobacterium avium paratuberculosis* and is spread by the fecal-oral route. Young animals are more susceptible to the disease than adults. It is also transmitted through milk and placenta, therefore predisposing the young of infected animals to the disease, especially those showing symptoms. After an animal is exposed it will either clear the organism or develop a chronic persistent infection, depending on its immune status.

The most consistent clinical sign is chronic weight loss despite a good appetite in sheep and goats that is not caused by parasite infestation and eventually death. Clinical signs of this disease are so subtle that it may take months or years to realize there is a problem. Meanwhile an infected animal can be shedding the

organism in its feces, contaminating the environment and other animals in the herd.

Diagnosis: Culture of the organism from feces is the official test; however this process takes up to 8 weeks or longer. Newer diagnostic methods available are blood testing by the enzyme-linked immunosorbent assay (ELISA) and agar-gel immunodiffusion (AGID). Both these tests are rapid and results are available in 48 hours. These tests can be useful as screening tools for whole herd management, ELISA as a whole herd test and AGID as an individual test.

Treatment: There is no effective treatment so prevention and control are very important. Preventing the introduction of Johne's into a herd can be very difficult. The best prevention is by maintaining a "closed herd" but may not be practical. Blood testing of animals is helpful when purchasing non-infected animals, but is not 100%. It is recommended to ask about the herd history before purchasing and culture newly purchased animals every 6 months due to the subclinical nature of the disease.

Control: Control is a combination of management, education, and screening periodically. Control of the fecal-oral route of infection is a vital part of any herd management plan. Consult a veterinarian or livestock extension agent to help develop effective management plans, and confirm / cull any suspect animals. A clean environment is important especially the kidding barn and pastures. Using above ground feeders and waterers; cleaning the doe's udder before nursing young are a couple way that will help control the fecal-oral route of infection.

Caprine Arthritis-Encephalitis Virus (CAEV)

CAE is a chronic multi-systemic disease in goats. Infection is widespread and arthritis in more than one joint is the most common clinical signs. Infection occurs by ingestion of fluids that contain infected cells from an infected animal to an uninfected animal. The most common means of transmission is the ingestion of colostrum by kids nursing infected does. CAE can also be spread by breeding, contaminated dehorning equipment and needles, and at parturition, has all been documented.

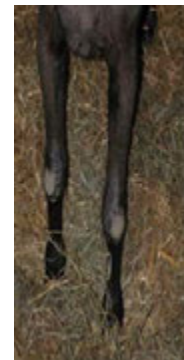


Figure 8 Swollen arthritic knees

The target tissues of CAE virus are the joints, mammary glands, lungs, and brain. The disease results from inflammation induced by the reaction of the immune system to the virus. Goats can develop a blood titer in 2-8 weeks but may not show clinical signs for years.

Clinical signs: A progressive arthritis in goats over 6 months of age, usually noted in the front pastern joints, with chronic progression over the years.

Diagnosis: Routine diagnosis is based on specific serological (blood) testing called agar gel immunodiffusion test (AGID) or polymerase chain reaction assay (PCR).

There is no treatment; affected animals are a source of infection to others. It is recommended to cull infected and positive animals in order to eradicate the disease on the farm, otherwise rigorous management is required.

Caseous Lymphadenitis (CLA)

This can be a devastating disease caused by the bacteria *Corynebacterium pseudotuberculosis*. It is more common in sheep than in goats. It causes abscesses of the skin and subcutaneous lymph nodes that will break open to the skin's surface and contaminate the environment. This disease may affect the animal internally, most commonly the respiratory system causing long-term respiratory problems, it can also spread to the abdominal lymph nodes (weight loss), central nervous system (neurological signs), and mammary glands (mastitis).

This organism can survive for prolonged periods of time in dark, damp areas, soil and manure. Most common means of infection is by injury with contaminated shears, tail docking equipment, dip tanks, needles, and puncture wounds. Abscesses form, then break and drain into the environment (feed bunk, or water buckets, or on the ground), predisposing the next animal to come along and become infected through a wound.

Clinical signs: Superficial lymph node swellings with draining tracts; an "onion ring" appearance to the abscess if surgically removed; a pale greenish-cream colored pasty discharge drains from the abscess when ruptured.

Diagnosis: Based on serological (blood) testing and culture of organism from abscesses.



Figure 9 Abscess in a goat. Courtesy of Gary Pfalzbot, <http://www.GoatWorld.com>

Treatment: The abscesses should **not** be opened within the vicinity of the other animals. Isolate affected animals for treatment. If possible, it is recommended to have the abscesses surgically removed to reduce contamination of the environment. If the abscess(es) has/have already ruptured, the animal should be isolated, the abscess flushed with an antiseptic solution (3% iodine or 2% chlorhexidine) and packed with antiseptic saturated gauze (it is best to seek the help of your veterinarian).

Control: Affected animals should be identified and culled for best control and prevention. Housing should be kept free of objects that can cause injury; all equipment should be properly cleaned and disinfected after use. When handling the contents of the abscess it is highly recommended to wear disposable exam gloves and protective clothing to prevent spreading the organism. Abscess contents need to be properly disposed.

Vaccination is controversial but has shown to be beneficial in reducing the incidence of abscesses within a flock or herd already infected, but will not result in complete disease eradication.

Foot Rot, Foot Scald:

This is a crippling infection commonly caused by bacteria that live in the soil and can be easily carried onto a farm on the soles of shoes, or the feet of infected animals. Two types of bacteria are commonly associated with this condition, *Dichelobacter nodosus* (formerly *Bacteroides nodosus*), and *Fusibacterium necrophorum*. Both of these bacteria thrive in moist soil conditions and are very difficult to control or eliminate once the soil is contaminated.

Clinical Signs: Foot scald usually affects one foot and can lead to Foot Rot. The common lesion seen is a moist raw infection of the skin between the toes which becomes painful.

Foot Rot is a more aggressive progression of foot scald and can occur in one or more feet causing severe lameness. It occurs when both bacteria together cause a dual infection of the tissues of the foot. The foot will become very pink to almost red; the skin between the toes will be slimy and smell foul. This infection can become severe enough to penetrate the hoof wall and sole of the foot resulting in the hoof wall loosening and detaching from the foot if not treated early.



Figure 10 Foot Rot Infection

Treatment: Both conditions are treatable but may take time and can be very expensive and labor intensive. Correct hoof trimming, Koppertox®, Medicated foot baths (10% Copper sulfate or Zinc sulfate). Consult with a veterinarian or extension specialist if more aggressive treatment is needed.

Control = Prevention: This is key.

- All new animals should be kept separate (quarantined) and hooves trimmed and inspected before introduction into the farm herd after 20-30 days.
- All show animals or any animals that have left the farm and possibly exposed to contaminated soil should be quarantined.

- Avoid buying animals from the sale barn; most animals that have failed treatment are taken to the sale barn.
- Provide good drainage to all areas in pastures and paddocks where water tends to pool (around waterers, low lying areas) this is where the bacteria tend to collect.
- Keep barns dry and clean.
- Practice good hoof care and management. Check the feet each time you work the herd.

Q-Fever:

Q-fever results from infection by *Coxiella burnetti*. This is an unusual spore-like organism that is highly resistant to environmental conditions. Found worldwide except in New Zealand. It is transmitted to humans and other animals by aerosol, direct contact with reproductive discharges, or infected milk. Ticks can spread infection among ruminants and people.

Since the organism is so resistant in the environment it can become airborne and travel ½ mile or more. It can survive up to 30 days in dried saliva, and 120 days in dust.

The most common farm animal reservoirs for Q-fever are goats, sheep, and cattle. Ticks and wild birds can also harbor this organism. It is also transmitted to humans. Reproductive failure is sometimes the only symptom in animals.

Clinical signs: Abortion in late pregnancy, still births, retained placenta, endometritis (inflammation of the lining of the uterus), infertility, and small or weak offspring in ruminants.

- Animals may appear asymptomatic (without signs of disease).
- Goats will have decreased appetite and may be depressed 1-2 days before an abortion.

Diagnosis: With the aid of your veterinarian or extension agent submit milk, feces, fetal tissue, placenta, vaginal discharge, blood (serology) for polymerase chain reaction assay (PCR).

Treatment: Isolate infected animals. Antibiotics may decrease the risk of abortion and suppress infection but not eliminate infection.

Vaccination is not available in US; it will not eliminate shedding of organism.

This disease is communicable to humans. Use extreme care when handling these animals.

- Wear protective clothing, disposable gloves, and a face mask to prevent inhalation of organism when handling suspect or known infected animals and fluids.
- Correctly dispose of placenta, birth products, fetal membranes, and aborted fetuses at farms housing sheep and goats.
- Use only pasteurized milk and milk products.
- Large numbers of organisms are present in placenta, fetal fluids, aborted fetuses, milk, urine, and feces. Serologically negative animals may shed the organisms.
- Diagnosis in humans is done by serology (blood test), within the second week of illness. Most cases occur in people exposed to farm animals or their products.
- Q-fever is a self-limiting illness, most cases resolve on their own within 2 days -- 2 weeks.
- Clinical signs in humans include fever, chills, severe headache, fatigue, non-productive cough.

Bluetongue

A severe viral disease caused by an orbivirus transmitted mainly by gnats of the genus *Culicoides*. Transmission sexually and across the placenta can also occur. Because the vector is a gnat, the spread of this disease occurs primarily in the late summer and fall. The virus is endemic in many areas and cattle and wild ruminants (white-tailed deer) act as reservoirs. Goats are commonly infected with the virus but rarely show any signs of clinical disease, it is a self-limiting disease in goats.

Clinical signs: Affects sheep of all ages; goats rarely show clinical disease. Clinical signs range from transient fever and swelling of the face, muzzle, and ears; large amount of nasal discharge which may cause crusting around the nose; oral mucus membranes become dark pink and as the disease progresses, small hemorrhages and ulcers may form on the roof and corners of the mouth. The tongue may become cyanotic (blue) but not as common as the name indicates. Laminitis can develop caused by inflammation of the coronary band and tissues of the foot to the point that some animals may slough their hooves. Diarrhea and wool break will also occur in infected animals. Bluetongue virus will cause abortions, stillbirths and weak lambs.

Diagnosis: By the presence of clinical signs similar to those reported in sheep have been documented in goats.

Treatment: Minimize animal stress and antibiotic treatment for secondary infections.

Prevention: Controlling breeding areas for biting gnats. Keeping animals away from areas where biting gnats are present. Vaccine is available for sheep.

This publication addresses the most commonly diagnosed reportable infectious diseases of goats in the state of Missouri. There are other diseases that affect goats in other parts of the world not covered in this publication. This publication was designed to provide information to help goat producers identify certain diseases and protect their herds from infection.

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NOTES:



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