

Zoonotic Diseases in Small Ruminants

Introduction

Zoonotic diseases in small ruminants are often overlooked during times such as lambing, kidding, and general care and management. It is easy to forget that humans are vulnerable to some of the same diseases that sheep and goats are, no matter how healthy our animals seem. It is important to be aware of these diseases and cautious of exposure during critical times and daily management. A producer may think it is in a ewe's best interest for them to pull lambs, to get them out quickly, without stopping to put on appropriate personal protective equipment (PPE) such as gloves, but that is far from the truth. Most zoonotic diseases that can affect small ruminants are passed to humans via membranes, aerosol, urine, blood, fecal material and newborn kids/lambs. Although people try their best to stay clean in the barn by washing their hands frequently and avoiding manure and urine, sometimes that is not enough. This publication will explore small ruminant zoonotic diseases, especially those that are not always noticeable, and ways to avoid exposure. Producers will inevitably be exposed to these diseases when raising sheep and goats, but adequate knowledge and proper management can help avoid serious illness. The diseases are listed by mode of transmission: oral and direct contact.

Direct Contact Transmission

Brucellosis

(Undulant fever, Contagious Abortion, Bang's Disease, Malta Fever, Mediterranean Fever)

Members of the *Brucella* genus are responsible for brucellosis. In small ruminants, it is commonly caused by *B. melitensis* or *B. ovus*, and rarely *B. abortus* (goats exposed to infected cattle) (USDA). Only *B. melitensis* and *B. abortus* are considered to be a threat to the health of humans. Humans can become infected via direct contact with infected animal fluids, but there are other ways a person can become infected. Veterinarians, livestock producers, etc. (people in close contact with animals) are at greater risk for exposure to brucellosis. Human symptoms of brucellosis include re-occurring fever, night sweats, headaches, and back and joint pain. Small ruminant symptoms of brucellosis include late-term abortion, stillbirth, orchitis (inflammation of the testicles), epididymitis (inflammation of the epididymis), arthritis, fever, depression, weight loss and diarrhea (Ganter, 2015).

Direct Contact

Chlamydiosis

Chlamydomphila abortus is the bacterium responsible for chlamydiosis. The placenta and any uterine discharges have large amounts of *C. abortus* present whether the animal is aborting or giving birth, so care should always be taken during each situation. Direct contact with birthing tissues is a rare source of infection, but there are other ways to be infected. Humans come down with flu-like symptoms (fever, body aches, headache), pneumonia and reddened eyes. Small ruminant symptoms of *Chlamydomphila* infection include late term abortion, retained fetal membranes, stillbirths, epididymitis, pneumonia and conjunctivitis (pinkeye, irritation of the eyelid lining) (Ganter, 2015). Handling contaminated tissues during lambing/kidding is not recommended, especially for pregnant women, due to the high risk of disease transmission.

Direct Contact

Caseous Lymphadenitis (CL)

Corynebacterium psuedotuberculosis is the bacterium responsible for caseous lymphadenitis, or CL for short. This bacterium causes lymph node abscesses, usually quite large, either internally or externally on the animal, often around the jaw. Infection to humans can occur via direct contact with the discharge from such abscesses, and care should be taken to avoid contact with the discharge at all. Human symptoms include painful skin wounds with purulent material and necrosis, and lymph node abscesses. Small ruminant symptoms include lymph node abscesses and weight loss (Ganter 2015).

Direct Contact

Oral Transmission

Campylobacteriosis

Campylobacter coli and *Campylobacter jejuni* are both causative bacteria responsible for campylobacteriosis, often called “campy” for short. Campylobacteriosis causes severe enteritis (inflammation of the small intestine) in humans and can be transmitted in a variety of ways. Transmission can occur from eating contaminated or undercooked meat and unpasteurized dairy products or milk (oral transmission). Contact with infected animals or feces can also transmit the disease, as well as consumption of or contact with untreated water. Human symptoms of campylobacteriosis are diarrhea, fever, nausea, abdominal pain, headache and abdominal pain. People with compromised immune systems are at greater risk for severe infection, as well as recurrent infections. Sheep symptoms of campylobacteriosis include abortion, stillbirth, weak lambs at birth and increased neonate mortality. Adult goats are often asymptomatic, while kids suffer from diarrhea, fever and arthritis (Ganter, 2015).

Oral

Cryptosporidiosis

Cryptosporidium parvum is the causative agent for cryptosporidiosis. This coccidian parasite is very common in the environment and is carried by many different animals without symptoms. Oral transmission is most common and typically occurs after ingestion following contact with contaminated objects. Feces or unwashed hands are often times responsible after contact with ill animals. Human symptoms include stomach cramps, water diarrhea, nausea and decreased appetite. Additional symptoms may occur and include vomiting, fever and muscle aches. Small ruminant symptoms include diarrhea, decreased weight gain and occasionally death (Foreyt 1990).

Oral

Leptospirosis

Leptospirosis can affect humans and small ruminants, as well as other animal species. It is a bacterial disease that can be transmitted through infected urine or contaminated water. Direct contact with infected animals can also cause infection in humans. Human symptoms of leptospirosis include flu-like symptoms (fever, headache, body aches), vomiting, weakness, mental confusion, jaundice and stiff neck. Small ruminant symptoms of leptospirosis include abortion, stillbirth, weak newborns, hemoglobinuria (excess hemoglobin in the urine), hemolytic anemia (a disorder where red blood cells are destroyed quicker than they can be made) and jaundice (Ganter, 2015).

Direct Contact

E. Coli

Escherichia coli is the bacteria responsible for E. coli infections and most are harmless bacteria that are part of the normal intestinal flora. However, some serotypes such as E. coli O157:H7 can cause food poisoning (intestinal disease) in humans resulting in symptoms like bloody diarrhea, kidney failure and death. Humans can become infected following contact with feces of infected animals (as well as humans) in contaminated food and water. Animals are natural reservoirs for E. coli and will still appear healthy and clean, despite shedding the bacteria in their feces (CDC).

Oral

Giardiasis

Giardiasis is an intestinal protozoan infection seen mostly in young lambs and kids. *Giardia duodenalis* is the only species of giardia that is infective to humans and can be transmitted via contaminated water or direct contact with infected animals (Siwila 2017). Human symptoms of giardiasis include abdominal pain, diarrhea and weight loss. Small ruminant symptoms include transient diarrhea, but cysts are shed for many weeks although animals appear clinically normal (Pugh 2002).

Oral

Listeriosis

The bacteria *Listeria monocytogenes* is responsible for listeriosis which can occur in ruminants and humans. Most infections in humans occur via oral transmission, i.e., eating raw meat or unpasteurized dairy products. However, there are other ways that humans can become infected and care should be taken when handling milk, uterine discharges and feces. All of these can contain *L. monocytogenes*. Unpasteurized dairy products are not safe for pregnant women or immunocompromised individuals and care should be taken to avoid consumption of these products. While most bacteria cannot grow in cold temperatures such as the refrigerator, *L. monocytogenes* can. There is also a skin infection that can occur in humans who handle animals sick with listeriosis. Small ruminant symptoms of listeriosis include meningoencephalitis (inflammation of the brain), facial paralysis, abortion, septicemia in lambs and kids, iridocyclitis (inflammation of the iris, colored part of the eye) and mastitis (Ganter, 2015).

Oral

Q-Fever (Coxiellosis)

Coxiella burnetii is the causative bacterium responsible for Q-fever. Exposure can occur via inhalation of aerosols or by other methods of transmission. A critical time when most human infections occur is around the time of birth of livestock, and it is mostly associated with small ruminants and cattle. Human symptoms are fever, chills, night sweats, headache, fatigue and chest pains. It is important to note that Q-fever can cause human abortion or premature delivery, both of which are serious pregnancy complications. Pregnant women should not assist in delivery of lambs or kids, or handle membranes, dirty towels or supplies, aborted tissues, etc. Small ruminant symptoms include abortion, stillbirth, weak lambs/ kids at birth, jaundice, hemoglobinuria (excess hemoglobin in the urine) and hemolytic anemia (a disorder where red blood cells are destroyed quicker than they can be made) (Ganter, 2015).

Oral, Inhalation

Salmonella

Bacteria within the genus *Salmonella* cause salmonellosis. The most common form of infection for salmonellosis is oral transmission from eating raw or undercooked food like meat, eggs, and unpasteurized milk and dairy products. Having direct contact with diarrhea/feces from infected animals is also a way to contract salmonellosis. Human symptoms of salmonellosis include diarrhea, fever and abdominal cramping. Small ruminant symptoms include abortion, and in lambs and kids diarrhea, fever and arthritis (Ganter, 2015).

Oral

Toxoplasmosis

Toxoplasma gondii is a microscopic protozoal parasite that causes toxoplasmosis. Mode of infection is consumption of undercooked meat, but it can also be transmitted through pregnant or aborting animals. Human symptoms include flu-like signs (fever, body aches, headache, sore throat). Toxoplasmosis can cause abortion or birth defects in pregnant women; therefore, care should be taken to avoid contact with pregnant or aborting animals. People with compromised immune systems should also avoid contact with pregnant and aborting animals. Small ruminants can become infected with *T. gondii* through contact with infected cat feces or ingesting food or water contaminated by the feces. Cats often bury their feces in hay and food storage areas. Small ruminant symptoms include late term abortion, stillbirth, weak newborns and fetal mummification. Toxoplasmosis can occur in successive pregnancies as well (Metzger, 2012).

Oral

Conclusion

It is important to note that this is not an all-inclusive list of zoonotic diseases that can be contracted from small ruminants. Skin diseases (contagious ecthyma, ringworm) are not mentioned here, but are still relevant causes of zoonotic disease transmission. All the diseases listed above can be contracted during intensive management times such as lambing and kidding. Take care to avoid contact with infected animals, and keep in mind sometimes the animal appears healthy and leaves producers wondering how they got sick. The best way to prevent illness is to wear appropriate personal protective equipment such as gloves (latex, nitrile, OB sleeves or a combination) and avoid contact with birth fluids, placental membranes, etc. and contaminated items such as towels, bedding and equipment. Always take the time to put on PPE, and after assisting a ewe/doe lamb/kid, wash your hands thoroughly, put on clean clothes, etc. It is also important not to eat or drink in these situations due to increased risk of exposure to the pathogens mentioned above. If you are pregnant, DO NOT handle any placental membranes, contaminated towels or supplies, newborn kids/lambs, or assist with any lambing/kidding difficulties. The same goes for immunocompromised individuals. Taking precautions during critical management times can lead to healthier animals and humans. If you have any questions or concerns, please do not hesitate to contact your county Extension agent or veterinarian.

References

- Foreyt W. J. (1990). Coccidiosis and cryptosporidiosis in sheep and goats. *The Veterinary clinics of North America. Food animal practice*, 6(3), 655–670. [https://doi.org/10.1016/s0749-0720\(15\)30838-0](https://doi.org/10.1016/s0749-0720(15)30838-0)
- Ganter, M. (2015). Zoonotic risks from small ruminants. *Veterinary Microbiology*, 181(1-2), 53–65. doi:11-20-2020
- La Ragione, R. M., Best, A., Woodward, M. J., & Wales, A. D. (2009). *Escherichia coli* O157:H7 colonization in small domestic ruminants. *FEMS microbiology reviews*, 33(2), 394–410. <https://doi.org/10.1111/j.1574-6976.2008.00138.x>
- Metzger, M. (2012). Toxoplasmosis can cause abortion in sheep and goats. Michigan State University Extension. doi:11-20-2020
- Pugh, D. G., & Baird, A. N. (2012). *Sheep and goat medicine*. Maryland Heights: Elsevier.
- Robertson L. J. (2009). *Giardia and Cryptosporidium infections in sheep and goats: a review of the potential for transmission to humans via environmental contamination*. *Epidemiology and infection*, 137(7), 913–921. <https://doi.org/10.1017/S0950268809002295>
- Siwila, J. (2017, December 13). *Giardiasis: Livestock and Companion Animals*. Retrieved November 20, 2020, from <https://www.intechopen.com/books/current-topics-in-giardiasis/giardiasis-livestock-and-companion-animals>



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