

# COCCIDIOSIS in Sheep and Goats

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Throughout my years in practice, all too often I would get a call from a producer who said, “My goat has scours”. I would go through the long list of potential causes of diarrhea. When I got to the most common cause, parasites, the next question would be “What is the best dewormer?” Well, that depends.

Often the words “parasites” and “worms” are used synonymously, but they are not always the same thing. While the worms we refer to as infecting goats and sheep (such as the barber pole worm and tape worm) are parasites, organisms like coccidia are also considered parasites, but not worms. This is important to remember because treatments for coccidia are different because coccidia are not affected by dewormers. Coccidiosis can also be more difficult to diagnose since it does not affect the color of mucous membranes, which many producers use to diagnosis parasitic disease.

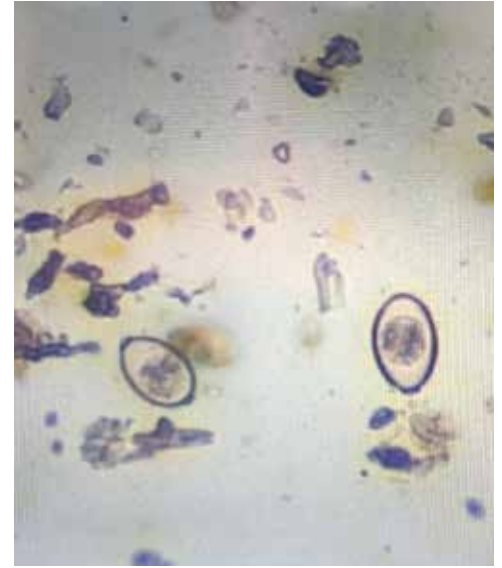
Coccidia is a very small intracellular parasite that invades and destroys the cells lining the intestines. These cells have a vital role in animal nutrition because they help the animal absorb the nutrients they eat. When this area of the small intestine becomes inflamed and damaged, weight loss is common even if the animal seems to be eating normally. If the inflammation is severe, the inability of the animal to absorb nutrients will cause diarrhea. In cases of prolonged disease, scarring may occur, which can cause irreversible damage and chronic weight loss.

Most of our domestic species, including sheep and goats, are affected by coccidia. However, it is important to note that coccidia are species-specific, which means that each species of coccidia only infects specific species of domestic animals and these coccidia cannot be transmitted to

other species. For example, chickens with coccidia will not transmit the disease to sheep or goats. In small ruminants, the most common coccidia are *Eimeria* species. There are multiple types within this genus and some will cause more disease or more severe symptoms than other strains.

The life cycle of coccidia is very complex since it involves both endogenous and exogenous phases (inside and outside the animal) as well as stages of asexual reproduction and sexual reproduction. The important thing to remember is animals that are infected or carrying coccidia will pass oocysts (microscopic egg-like structures) through their feces. The oocyst will go through a process of sporulation or hatching, which takes 2-7 days depending on temperature and moisture. The transmission then occurs by the infective stage when an animal ingests oocysts from the environment. After reaching the small intestines, the organism has two phases. In the first phase, the organism will replicate and infect cells surrounding it, which increases the infection within an animal. The second phase will involve a different process whereby the organism makes new oocysts that pass through the feces to other animals.

Coccidia is generally considered a disease of young animals, although occasionally there are a few exceptions. Most animals will be exposed to coccidia when they are young and develop immunity. Older animals that have been exposed to coccidia earlier in life that have developed immunity against them may still be infected and pass the organism through feces; however, older animals usually do not develop disease from this later exposure. Even though these adults only shed oocysts in small numbers, this is enough to contaminate the environment and expose young animals to coccidia. Because of this possible source of exposure, sanitation in kidding/lambing pens is very important. It is believed that



microscopic view of Coccidiosis

some immunity to coccidia is passed to young animals through colostrum since very young animals exhibit a little more resistance and susceptibility gradually increases after 4 weeks of age, which is when the maternal antibodies begin to fade. “Bottle babies” are also very susceptible to coccidiosis; however, this could be related to stress or their being raised in confinement.

The rare cases of adult goats that develop coccidiosis are usually animals with a weakened immune system. It is important to note that this may include stressed animals or those facing nutritional issues. This means that high-producing adult dairy goats may develop coccidiosis since the stress from lactation may make them more vulnerable to disease. Anything that may cause stress in animals, including weaning, adverse weather conditions, overcrowding, and transporting the animals to livestock shows, can weaken the immune system and make the animal more vulnerable to disease. If these stressors cannot be avoided, animals should be monitored closely and fecal flotation exams performed quickly if coccidia exposure is suspected.

Nutrition also plays a crucial role in the immune system and determining whether infected animals will develop clinical disease or not. Since coccidia is more common in young animals, providing a high-quality creep feed is recommended. Creep feeding also will decrease the stress of weaning since it reduces the effects of a sudden change in the diet. It is also important for the immune system function

to ensure the animal has sufficient dietary minerals like copper, selenium, and zinc.

Environmental conditions also play a large role in coccidiosis. As mentioned earlier, coccidia are transmitted when an animal ingests fecal material. If animals are ingesting large amounts of oocysts, they will be more likely to develop disease. This means animals kept in pens that are overcrowded or not cleaned regularly will be more susceptible. When the oocyst first passes through the feces, it is not infective to other animals and is relatively easy to eliminate from the environment. However, once the oocyst becomes sporulated (which takes 2-7 days), it becomes very difficult to kill and is resistant to many common cleaning chemicals. This means cleaning pens of young animals every 24-48 hours is very important to preventing infections. Also, you should keep feed and water troughs clean from fecal matter. It takes extreme heat or cold (above 63 °C or below -30 °C) or direct sunlight to kill the oocyst once it is sporulated. Whenever possible, it is recommended after cleaning to leave feed troughs, water buckets, and any other equipment in direct sunlight to kill any residual organisms. Also recommended is elevating feed troughs and preventing animals from defecating in feed or water troughs.

Infections may be described as clinical or subclinical. Animals with clinical infections may show severe symptoms, including severe, watery diarrhea (sometimes bloody), dehydration, anorexia, low protein levels, depression, and abdominal pain. In some cases, severe straining may lead to rectal prolapses. Animals may also exhibit subclinical disease, which is generally characterized as unthriftiness. These animals will have lower growth rates, lower body weight, or lower performance. They often have a dull hair coat and are often the animals considered “poor doers”.

If an animal is suspected to be infected by coccidia or is at high risk for this disease, a fecal floatation test may be performed to detect oocysts. Since many animals may have the parasites without it causing clinical disease, diagnosis is based on both confirming the presence of the oocyst in the feces as well as the animal showing clinical signs of diarrhea or poor growth.

Coccidia may be treated with a few medications; however, the use of these medications in sheep and goats is considered “off-label” because these medications

have not been approved for this use in these species. Legally, off-label use of any medications on animals intended to be food must be at the direction of your veterinarian to ensure that there are no issues with medication residue in meat or milk. The most common treatments for coccidiosis are sulfonamides, amprolium, and toltrazuril/ponazuril. For specific directions and use of these medications, consult your veterinarian. If caught early, treatment of coccidiosis is generally successful although in severe cases the organism could cause enough tissue damage and scar tissue formation so nutrient malabsorption is a chronic issue.

Depending on individual farm plans and the environmental conditions, some farms will elect to treat animals prophylactically or in mass-treatment. If a farm has a history of kids with coccidiosis or an aggressive species of coccidia, it is recommended to treat the kids/lambs at the time of weaning or before. In many instances, exposure to coccidia in small amounts is needed for the animals to develop immunity, so mass treatment is often not needed on many farms. You should consult with your veterinarian about your farm history and management techniques.

Coccidiostats are common additives used in livestock feeds. Monensin is approved by the Food and Drug Administration (FDA) for goats, lasalocid is a FDA-approved product for sheep and decoquinatate is approved for both species. These products are available in many commercial feeds and should be labeled as “medicated”. These products are sometimes added to creep feeds and starter feeds however, they have a bitter taste so some feeds for young animals will not contain them; be sure to read all feed labels. Also, feed with coccidiostats may be fed to adults during the kidding/lambing season to decrease the amount of oocysts shed by the adults and reduce or prevent infections in their offspring. If you have animals that are in high risk for coccidia, discuss the use of these products with your local veterinarian.

Coccidiostats are designed to help control coccidia by preventing transmission, but they cannot be used as a treatment in animals that already have coccidiosis. If animals have consumed oocysts, coccidiostats will not kill the organisms. Instead, these medications will only decrease the shedding of oocysts and interfere with specific parts of the lifecycle.

Worldwide, coccidiosis has a severe

economic impact on small ruminant production. Most goat herds in Kentucky are relatively small, which means any losses are even more devastating. There are the obvious losses due to death of animals, but infection with coccidia can cause animals to decrease performance (i.e., have slower rates of growth, reduced milk production, etc.) and make animals more vulnerable to other illnesses, which can cause even more economic losses.

However, it is a manageable disease. Understanding how it is transmitted and the effects this disease has on infected animals is important so producers can be aware and monitor herds closely. Coccidiosis is harder to diagnose than other types of parasites, which makes diagnostic fecal flotation examinations very important. To prevent coccidiosis, all farms should practice good sanitation and provide animals proper nutrition while minimizing stress. If your herd has issues with this disease, consult your farm veterinarian for medications to treat and prevent new infections.

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