

Is a Protozoan Villain Robbing Your Dairy Calves and Yearlings?



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Benjamin Franklin coined the timeless phrase, “An ounce of prevention is worth a pound of cure”. Although Ben Franklin was referring to fire prevention, this concept holds true on dairy farms as it relates to the prevention versus treatment of clinical disease. One disease, in its clinical form, that is easily prevented in calves and yearling heifers is coccidiosis. Sound management practices along with the use of approved feed additives can help minimize the negative effects of this disease. However, we sometimes forget, decide to cut corners, or cattle are stressed more than usual, and this is when this easily managed disease can cause decreases in growth, and possibly death, in younger heifers. Through a better understanding of this disease, we can manage cattle better and prevent the detrimental consequences of this disease.

Coccidiosis is caused by a single-celled protozoan parasite, not a bacteria or virus as seen in other diseases. It can be seen in calves from 3 weeks of age through the first year of life and is often diagnosed in cattle under “stress”, such as at weaning. Cattle generally develop an immunity to this disease after a year of age, but can continue to shed coccidia that can cause disease in other young cattle. In its clinical or easily seen form, calves and yearlings have diarrhea, often bloody, as a result of damage caused by the ingested protozoa to cells found in the intestinal wall. Diarrhea occurs 16 to 23 days after infection. Even though one may not see the clinical signs of this disease, optimal heifer growth can be compromised if it is not kept in check.

Coccidiosis is considered a herd disease versus one associated specifically with an individual animal. Many individual cattle can be impacted over time. Young calves or yearlings acquire this disease when they ingest the eggs, known as “oocysts”, of the parasite, *Eimeria*, shed in feces of previously infected calves or to a much lesser extent from older cattle. Once swallowed, these parasites invade the cells lining the intestines. They replicate within these intestinal cells, producing hundreds to thousands of the next lifecycle stage of this parasite. The intestinal cell then ruptures, releasing its contents. Tissue damage results when the host intestinal cell ruptures which requires time to repair and can explain decreases seen in cattle growth during an infection. Then, each of these hundreds to thousands of newly released parasites can invade another healthy cell lining the intestine. This cycle can occur two to three times, thus resulting in much tissue damage and eventually the ability to infect many more cattle. Once the *Eimeria* parasite has gone through several lifecycle stages inside the intestinal cells, they are excreted in the feces. During this first infection, calves can shed more than a million oocysts per gram of feces and infect new, non-immune cattle introduced into this environment. Once shed into the environment in feces, the coccidia oocysts must be “activated” before they can infect another animal and this process takes 1 to 4 days or they can remain dormant if conditions are not favorable at this time and “activated” later.

As mentioned, calves acquire this disease from ingesting feces containing the parasitic oocysts. Specific species of this parasite, *Eimeria*, infect cattle and these species are different from those that infect sheep, goats, or chickens. Reducing the amount of oocysts that calves/yearlings are exposed to is one goal of prevention programs. Cleanliness of the calf’s environment, especially fecal contamination from previous calves, decreases a calf’s rate of exposure. Higher numbers of oocysts are generally found in areas cattle

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congregate, such as waterers or feeding areas. These oocysts also can be introduced into the calf's environment on contaminated boots, tools, tires, and feed. The excreted parasitic oocysts have a thick outer wall, making them resistant to extreme temperature and pH changes. Oocysts shed into the environment can remain infectious for at least 1 year. Oocysts are resistant to freezing, but are susceptible to direct sunlight and drying. In calf barns, disinfecting with bleach (after fecal material has been "removed") can help reduce infectious numbers of oocysts. Reduction of stresses, i.e. sound management practices around weaning, also help the calf's immunity and ability to fight disease challenges. Proper intake, timing and quality of colostrum is important to help decrease challenges from other pathogens that can help improve immunity, thus decreasing effects seen with coccidiosis.

Coccidiosis is commonly seen in cattle under 1 year of age. Young infected cattle stop excreting large numbers of oocysts in their feces about a week after the onset of clinical symptoms. After the first infection, cattle develop a partial immunity to that particular species of the *Eimeria* protozoa. Cattle are known to harbor 13 different species of *Eimeria* with each species being associated with varying degrees of illness or none at all. This immunity protects cattle against a future clinical coccidiosis episode. However, reinfection can occur and result in the shedding of parasite oocysts that contaminate the environment. Although, the numbers of parasite oocysts released into the environment is reduced substantially upon reinfection.

Prevention programs are designed not to eliminate the exposure of calves to *Eimeria*, but to reduce exposure to low doses that do not cause clinical disease and allow the calf to develop a natural immunity to coccidiosis. No vaccine exists. Reduction of exposure to manure is the first part of a successful preventative program, which includes the timely removal of manure and providing clean bedding, along with preventing overcrowding. Minimizing stresses associated with diet changes, regrouping, or shipping to the young animal are also important. Feed additives are used to decrease the numbers of coccidia in the digestive tract. Coccidiostats, ex. Deccox® (decoquinate), are added to milk replacer and calf starters and inhibit the development of coccidia at certain stages of their lifecycle. Coccidiocides, ex. Bovatec® (lasalocid) or Rumensin® (monensin), kill the parasites at certain lifecycle stages. Rumensin® and Bovatec® can be used in calf starters and are commonly included in grain mixes fed to older calves/heifers since they also allow for more efficient weight gain as well as prevention of coccidiosis. When calves become older and no longer are fed milk replacer and calf starter with Deccox®, Rumensin® or Bovatec® is substituted at the proper dosage to prevent calves/heifers from developing coccidiosis by preventing the arrested *Eimeria* parasite (seen with Deccox®) from completing their lifecycle.

Coccidiosis is a very common disease in young dairy calves and heifers. However, the detrimental results of clinical disease is preventable through good hygiene practices and the proper use of feed additives. Prevention starts at birth with the timely feeding of 4 quarts of colostrum, feeding and management programs for the young calf and all the way through 1 year of life. Prevention of clinical coccidiosis along with sound feeding and managing programs are the foundation of raising the next generation of income-generating cows on one's dairy operation.