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Coccidiosis of Cattle

This NebGuide contains information on the identification, treatment, and prevention of coccidiosis in cattle.

Donald L. Ferguson, Parasitologist

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Coccidiosis continues to be one of the major disease problems for cattle producers. It is caused by microscopic, one-celled parasites, chiefly of the genus *Eimeria*. Twenty-one species of *Eimeria* have been reported in cattle. Only two, *Eimeria bovis* and *Eimeria zuernii*, are regularly associated with clinical infections in the field.

Coccidiosis occurs more frequently in calves from one to six months of age, but older cattle, especially those from one to two years, are often affected. Young calves are usually infected when they are placed in pastures or lots contaminated by older cattle or other infected calves. Occasionally, mature cattle are infected when they are brought in from large pastures and crowded into small feedlots or barns.

Outbreaks of coccidiosis have been observed frequently in yearlings and two-year-olds grazing on native range pasture during the summer. In the majority of these outbreaks, *Eimeria zuernii* has been the species of coccidia identified. In addition, clinical cases of coccidiosis have been observed in a number of cow-calf operations.

Coccidiosis usually is sporadic during the wet seasons of the year, but may occur at any time in animals confined in feedlots. Severe losses have been reported in cattle confined in feedlots during periods of extremely cold weather.

Life Cycle

Bovine coccidia have a complex life cycle, with several generations included in a single cycle. The stage found in the manure is the oocyst. It is covered by a protective shell, resistant to physical, chemical, and

bacterial action.

Oocysts freshly discharged in the manure must undergo a developmental process called sporulation before they become infective. This process, occurring outside of the animal, requires 2 to 3 days and results in the formation within each oocyst of 8 infective sporozoites.

When a susceptible calf swallows infective oocysts, the sporozoites are released, penetrate the epithelial cells lining the intestine, and begin to divide into many intermediate stages. These continue to divide and each division produces stages that cause damage to the host cells.

Male and female parasites unite to produce the oocyst, which is passed out of the animal's body in the manure.

Because of the multiplication of parasite stages within the cells of the intestine of the calf, the potential for destruction of large numbers of intestinal cells exists. If this potential is fully realized, then the ingestion of only 1,000 sporulated oocysts could result in the destruction of 24 billion intestinal cells.

Clinical Signs

Typical signs of coccidiosis are diarrhea, rough coat, loss of appetite and weight, and general emaciation. The general weakness may cause the calf to defecate without rising, thus soiling its tail and hindquarters. In more severe cases the manure may contain blood, mucus, and stringy masses of tissue. This occurs because the destruction of the epithelial cells results in the sloughing of the epithelium lining the intestine.

Severe straining at defecation may be observed in the more advanced stages. Death may occur during the acute period, or later from secondary complications, such as pneumonia.

Calves which appear to be free of coccidiosis may pass low numbers of oocysts in the manure without showing the typical clinical signs of the disease. Consequently, large numbers of oocysts accumulate on the ground and these infect susceptible calves when they are placed on the contaminated lots.

Diagnosis

Diagnosis of clinical coccidiosis can be made from a combination of herd history, clinical signs, gross lesions at necropsy, and microscopic examination of scrapings of the intestinal mucosa and manure.

Usually, diarrhea precedes the heavy discharge of oocysts by a day or two, and the diarrhea may continue after the oocyst discharge has returned to low levels. Therefore, it is not always possible to confirm a clinical diagnosis of coccidiosis by finding oocysts in the manure.

Certain coccidia may cause severe illness and even death before any oocysts have been produced. This occurs most often with *Eimeria zuernii* in calves. Consequently, failure to find oocysts in feces in a diarrhea disease does not necessarily mean the disease is not coccidiosis.

The most accurate way to diagnose coccidiosis at necropsy is to examine material from suspicious areas in the small intestine or colon under the microscope. To do this, scrapings of these areas are examined for oocysts and other life cycle stages.

It is advisable to consult your veterinarian in suspected outbreaks of coccidiosis, as other disease entities

sometimes manifest similar signs.

Treatment

Treatment of bovine coccidiosis is difficult, because clinical signs of the disease do not become noticeable until the disease is advanced. The first signs in coccidiosis caused by *Eimeria bovis* usually occur about 17 to 18 days after ingestion of oocysts. At this time, the portion of the life cycle within the host has been nearly or entirely completed, and much of the invasion of intestinal mucosa has already occurred. Thus, treatment administered at this time can at best result in a lessening of the signs of coccidiosis. However, if drugs are given at an earlier stage of the disease, the clinical signs of infection can be largely or entirely prevented.

Sulfonamides are generally recommended in the treatment of coccidiosis. Enteric sulfonamides, such as sulfaguanidine, or the readily absorbed sulfonamides, such as sulfamerazine or sulfamethazine, may be used. Sulfaquinoxaline has given excellent results.

Sulfonamides are available in varied formulations and treatment schedules. Therefore, it is important that you prepare and administer them according to the manufacturer's directions.

Amprolium, a drug that has been highly effective against avian coccidiosis, has been found to be of value in controlling and preventing coccidiosis in cattle. Amprolium is an antagonist of thiamine (vitamin B₁), one of the essential vitamins, and thus interferes with the metabolism of the parasites.

Amprolium can be administered in the drinking water or as a drench. To treat clinical cases in cattle the drug is given at a rate of 10 mg/kg body weight daily for 5 days. To prevent coccidiosis the level of treatment is 5 mg/kg body weight daily for 21 days.

Control and Prevention

Management practices play a critical role in the establishment of effective parasite control programs. Coccidiostats currently available to cattle producers possess activity against the economically important species of bovine coccidia.

As in many diseases, it is easier to prevent coccidiosis than it is to treat it. Because several days are required for sporulation, the oocyst stage in manure is the weakest link. Separating a cow and calf from a contaminated lot interrupts the life cycle and helps control the disease.

Since moisture favors the development of parasites and dryness kills them, practices that reduce the moisture on pasture will decrease parasitic contamination. Pastures should be well-drained, watering troughs raised above the ground, and grazing should be kept to a minimum on lush grass along the edges of ponds and streams. In these areas where cattle congregate, overgrazing should be avoided. Otherwise, animals will be forced to graze to the roots of plants where they may ingest large numbers of parasites.

Segregate severely parasitized animals and treat them with a coccidiostat. Follow recommended feeding practices. The effects of parasites are less severe in well-nourished cattle.

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