

Bovine Coccidiosis - The Facts



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PARASITE CONTROL PROGRAMME

Animal Health Ireland, 2-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27



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Contributing to a profitable and sustainable farming and agri-food sector through improved animal health

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Introduction

Coccidiosis in cattle results from infection with one or more species of protozoan (single-celled) parasite of the genus *Eimeria*. These parasites affect the small and/or large intestine where they damage the intestinal wall. If numbers of parasites are high, this damage results in changes that lead to diarrhoea (scours), dysentery (bloody diarrhoea) and tenesmus (straining). *Coccidia spp.* are widespread in cattle farming, though they cause clinical disease mainly in calves from 3 weeks to 9 months of age.

The parasites

Coccidia are single-celled parasites that can infect a wide range of animals. These organisms are host specific i.e. coccidia from one animal cannot affect another species. This applies even to species as closely related as sheep and goats. Therefore birds do not transmit coccidiosis to cattle. There are over a dozen *Eimeria* species that can infect cattle, but only three species are considered to be pathogenic: *Eimeria bovis*, *E. zuernii* and *E. alabamensis*. The last species, *E. alabamensis*, has been shown in European studies to be an important pathogen of grazing calves, particularly within 10 days of turnout, but its status in Ireland is unknown at present.

Life cycle

Coccidia oocysts (similar to eggs) are excreted in the dung where, under suitable conditions of temperature, moisture and oxygen), they develop into sporulated oocysts, which are then capable of infecting cattle. Once ingested by a susceptible calf, the oocyst releases the sporozoites, which penetrate the cells lining the small or large intestine. Development continues in the gut wall through various stages until the coccidia mature and produce oocysts. A single ingested oocyst develops into thousands of new parasites, each of which destroys the epithelial cell in which it is growing, resulting in very rapid and severe damage to the gut. The pre-patent period (time between infection of the animal and the first appearance of oocysts in faeces) is typically about 21 days for *E. bovis* and *E. zuernii*, whilst it is shorter for *E. alabamensis* (8-12 days).

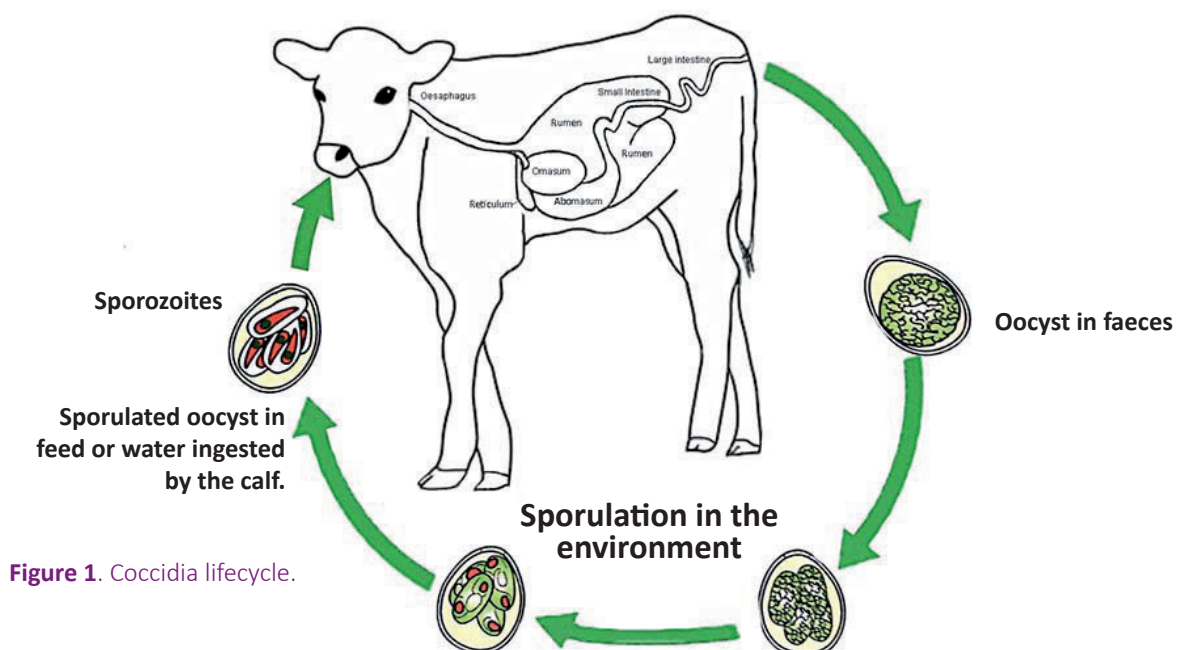


Figure 1. Coccidia lifecycle.

Immunity

There are currently no vaccines available for cattle and so they typically acquire immunity through natural exposure to infection. Immunity appears to be specific for each species of coccidium, so there is little or no cross-immunity between *E. bovis* and *E. zuernii*, for example. Immunity is acquired quite rapidly following exposure, so, because coccidia are so common, many cattle become infected as calves and clinical disease is uncommon in animals over a year old.

Clinical signs

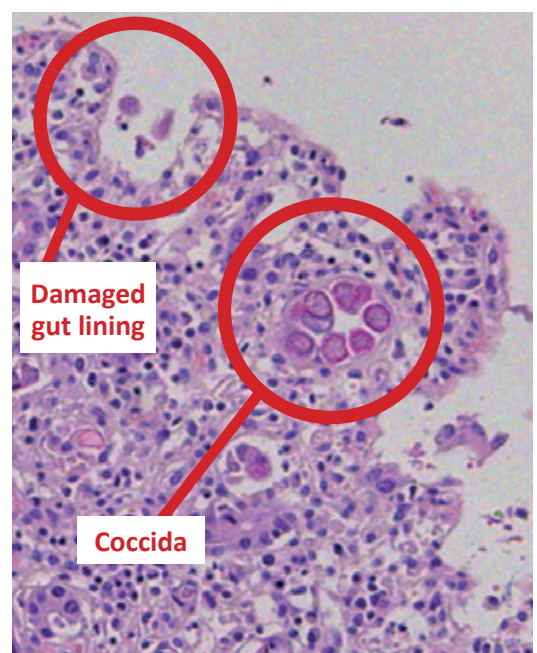
Clinical disease is mainly seen in calves up to 6 months of age, with some cases seen as early as 3-4 weeks after birth. The damage to the gut lining in heavy infections in non-immune calves leads to diarrhoea, dehydration, dysentery, tenesmus and loss of condition and deaths can occur, especially if treatment is delayed. Subclinical infections, which by definition produce no obvious visual signs of disease, are common in young cattle and may reduce growth rates and lead to poor feed utilisation.

How disease occurs

Infective oocysts are highly resistant to environmental conditions, both in housing and on pasture, so premises and fields can remain contaminated for a year or more. Thus calves are commonly infected through ingestion of oocysts from bedding or pasture, which previously have carried infected cattle (possibly including adult cows). There is circumstantial evidence that various stressors, such as weaning, turnout, change of diet and poor weather can precipitate outbreaks of disease. As warm, damp conditions are necessary to allow oocysts shed in faeces to become capable of infecting animals, it is important to avoid dampness in bedding or around water bowls/drinking troughs

Diagnosis

Though the clinical signs of diarrhoea and dysentery (bloody diarrhoea), sometimes accompanied by tenesmus (straining), are characteristic of coccidiosis, other conditions can cause similar signs and so a definitive diagnosis cannot be reached on clinical presentation alone. Dung samples should be taken from several animals (with and without clinical signs) in the group and examined for the presence of coccidial oocysts. As large numbers of oocysts can sometimes be observed in dung samples from cattle in the absence of disease, diagnosis is frequently based on history, the age of the animals, clinical signs and response to treatment. In addition, differential diagnostic tests should be performed in order to distinguish between viral, bacterial and parasitic causes of diarrhoea and ill-thrift. (See AHI leaflets on calf disease for further information). As the parasite can be seen in the gut under the microscope, post mortem examination of animals that die from scour will also aid in the diagnosis of coccidiosis.



Microscopic examination of gut showing coccidia in the cells of the lining of the gut

Treatment and control

Diarrhoea usually develops at the end of the parasitic life cycle which means that severe damage to the intestines has already occurred and specific treatment at this stage is usually unrewarding. It is therefore recommended to use drugs prophylactically, i.e. during the risk period (see table below), to prevent the development of clinical disease. There are three narrow-spectrum anticoccidials registered for use in cattle in Ireland:

- Decoquinate (60.6 g/kg premix for medicated feeding stuff).
- Diclazuril (2.5 mg/ml oral suspension).
- Toltrazuril (50 mg/ml oral suspension).

Various sulphonamides have also been used in the treatment of coccidiosis. They have limited efficacy against coccidia but may help to suppress secondary infections which may at least partially explain the apparent benefits of sulphonamide treatment in coccidiosis outbreaks.

Active	Formulation	Dosage	Recommendations	Withdrawal Period
Decoquinate	Premix	1 mg/kg bodyweight (50-100 ppm in feed)	Feed for 28 days over risk period	0 days
Diclazuril	Oral suspension	1 mg/kg bodyweight (1 ml/2.5 kg)	Treat 14 days after entering high risk environment	0 days
Toltrazuril	Oral suspension	15 mg/kg bodyweight (3 ml/10 kg)	Treat during the pre-patent period Do not use in calves weighing more than 80 kg or in fattening units	63 days

Table 1. Key features of anticoccidials for cattle.

As can be seen in the table, these products are primarily indicated for the prevention of coccidiosis by administering them strategically in anticipation of disease. This requires either local knowledge of the history of outbreaks on a particular farm in order to time the treatment appropriately or be based on the knowledge of the age groups most at risk allied to the occurrence of trigger factors such as weaning, adverse weather or turn out to pasture.

Treatment of the scouring calf (Pre-weaning)

- Ensure all ill calves are isolated and housed in a clean, warm and dry environment.
- Give one or two extra feeds (2 litres each) of a good quality oral rehydration solution.
- Continue to offer scouring calves normal amounts of milk or milk replacer as long as they want to drink. Suckler calves should be left with their dams.

Please refer to AHI leaflet: *Management of the scouring calf* for further information on the treatment of the scouring calf.

As coccidial oocysts are robust and long-lived, calf buildings should be maintained as hygienically as possible; this should include the use of appropriate disinfectants (see table below). It should be noted that many of the disinfectants commonly used on farms are ineffective. Feed and water troughs should be clean and raised from the ground in order to limit faecal contamination and reduce the risk of exposure to heavy levels of challenge. Bedding should be kept dry; ensure there are good falls on floors to avoid pooling of water or dampness of bedding; plumbing should be maintained to avoid leakage at drinking bowls/troughs.

Active Ingredient	Trade Name	Manufacturer
Amine based	Keno™ Cox	CIDLines N.V., Belgium
Ammonium Hydroxide		
Chlorocresol	Interkokask	Hysolv Ltd
p-chloro-m-cresol	Neopredisan	Vertriab GMBH, Germany

Table 2. Disinfectants effective against coccidial oocysts

Conclusion

Coccidiosis is a common infection of cattle, but the disease is largely self-limiting as the parasites are active in calves for a relatively short time (3-4 weeks) while they complete their life cycle in the host animal. The onset of immunity is quite rapid and disease is uncommon in cattle over 6 months of age. If calves can be protected from excessive levels of exposure to coccidian oocysts by avoiding faecal contamination of feed or water, by keeping bedding dry and if necessary by using prophylactic drug treatment, then they can develop immunity without suffering from disease or experiencing production losses and can grow without any checks.

THIS DOCUMENT HAS BEEN PREPARED BY THE ANIMAL HEALTH IRELAND PARASITE CONTROL TECHNICAL WORKING GROUP.

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