

Coccidiosis in Lambs

Dr Fiona Lovett BVSc DSHP DipECSRHM MRCVS

Out of the fifteen different types of coccidia that may affect sheep there are only two that are recognised as causing disease in the UK.

These "pathogenic" species are *Eimeria ovinoidalis* and *Eimeria crandallis*.

How does disease occur?



The common presenting signs of coccidiosis are a rapid loss of weight and diarrhoea containing mucus and flecks of blood, causing staining of the perineum and tail. Affected lambs are very dull and lifeless.



Straining with partial eversion of the rectum is often accompanied by painful vocalisation. There is considerable staining of the perineum.



Diarrhoea containing much mucus in a lamb with coccidiosis.

Lambs take in coccidia oocysts (eggs) by mouth. Inside the gut, the oocysts hatch, invade the gut cells and multiply dramatically with two results: damage to the inside lining of the lamb's gut as the coccidia emerge by bursting the cells and a dramatic increase in the number of oocysts shed in the lamb's faeces. It takes two to three weeks from infection to the passing oocysts in the faeces. In this time, the number of oocysts shed in the faeces can be many million-fold higher than the number that were ingested.

Significant damage to the cells lining the ileum, caecum and colon results in diarrhoea which may contain mucus or blood, and be accompanied by straining, pain, weight loss and possibly the death of the lamb. Even in animals that show no obvious clinical signs, sub-clinical disease can lead to poor weight gain as the gut has a reduced ability to absorb nutrients from food.

What is the source of oocysts?

Ewes will shed low numbers of oocysts and oocysts from the previous season's lambs will survive overwinter on pastures or in buildings (see figure 1).

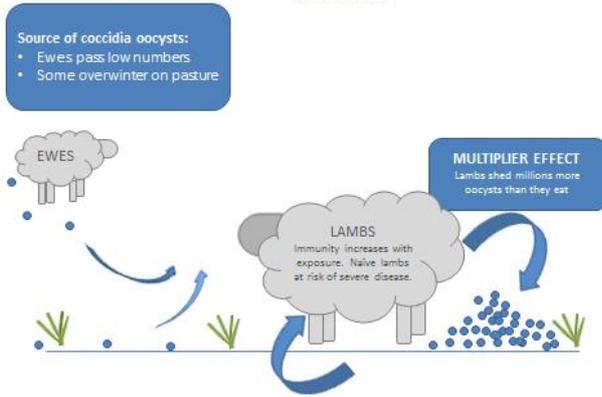
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Figure 1 shows the source of coccidia oocysts & how lambs increase the levels of contamination



Are all lambs at risk of coccidiosis?

In the UK, clinical coccidiosis is most often seen in lambs aged four to eight weeks old and it is not common in animals over three months old. However, the knock-on effects of subclinical disease, such as poor growth rates, may be apparent in older lambs. It has been shown that coccidial oocyst output is highly correlated with reduced weight gains.[1]



Diarrhoea with the presence of fresh blood highly suggestive of coccidiosis

Lambs are able to mount a good immune response to coccidia so there is generally little clinical disease in

lambs that were exposed to a low level of oocysts early in life. However lambs will pass out very large numbers of oocysts in their faeces due to dramatic multiplication of coccidia in the gut, so rapidly they contribute to environmental contamination (see figure 1). Severe disease is seen when naïve lambs are suddenly exposed to high numbers of oocysts. Such high risk situations include when:

1. Susceptible lambs are moved onto fields or into a contaminated building where older lambs have been.
2. Lambs, which have been kept housed in well-bedded clean conditions for an extended period after birth, are turned out onto contaminated pasture.
3. Lambs which have been fed on medicated creep feed (or had access to their mothers' medicated feed) if that medication is suddenly withdrawn.

Note that there is no cross-protection or immunity provided by exposure to a different species of coccidia. This can have implications when lambs from different flocks are mixed or moved into previously used fields.

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What are the main risk factors for coccidiosis?

| High oocyst challenge | Susceptible lambs |
|---------------------------------|--|
| Faeces in water or food supply | 4-12 weeks old |
| Dirty conditions | No previous exposure to that species of coccidia |
| Heavily stocked | Stress due to cold wet, weather |
| Older lambs previously in field | Stress due to poor nutrition |

What should you do if you are worried about coccidia?

1. Understand the disease

It is important to understand which lambs are at high risk so that appropriate treatment is targeted at these lambs. It is particularly important to consider the immunity of the lambs compared to the challenge from the environment.

2. Understand your farm

It is important to think about lambing patterns, which lambs may be at highest risk and which pastures may have contamination left from last year.



Coccidiosis can become a problem when there is heavy contamination around feed troughs during warm, wet weather. Moving the hopper would help prevent disease.

Be aware of turning lambs into these pastures or turning young lambs into pastures where older lambs have been.



Avoid faecal contamination of, and around, feed troughs

As part of the routine management for many diseases, sheds and buildings which have held lambs should be thoroughly cleaned and disinfected before the next group of lambs. However, coccidia are not destroyed by many of the commonly used disinfectants.

3. Get a diagnosis

It is advisable to know whether pathogenic species of coccidia are present which means asking your vet to send faecal samples from 4-12 week old lambs to the laboratory and requesting coccidia speciation (to indicate which coccidia species are present). Note that, without speciation, a high faecal coccidia count may not be significant.



The major differential diagnosis for scouring lambs grazing contaminated pasture is nematodiosis

Nematodirus is another common cause of diarrhoea and death in 6-12 week old lambs at grass and it may occur in a mixed infection with coccidiosis. Any deaths should be taken to the vet for a post mortem so appropriate treatment and control measures can be implemented.

4. Use targeted medication

Traditionally decoquinate was used in the ewe ration to suppress the number of oocysts shed by the ewes [2]. However, such blanket approach is not ideal for a number of reasons:

- The ewes are medicated despite the fact they are unaffected by coccidia.
- Some of the original source of coccidia for the lambs comes from those which overwintered on the pasture so medicating the ewes does not remove the need to consider control in the lambs.
- There are benefits of very young lambs having access to low levels of coccidia to build immunity.



In order of increasing size, oocysts (clear 'egg-shaped' structures shown at the 12, 2 and 6 o'clock positions), strongyle (clear) egg to the right hand side, Nematodirus battus (brown) egg in centre. Decoquinatate can be mixed into the lamb creep over the period of risk at a rate of 1mg decoquinatate per kilogram body weight per day for at least 28 days. Each 10kg

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lamb must ingest 100g of creep a day to maintain adequate decoquinat levels. This may be an issue for a sick lamb, possibly suffering from Nematodirus, which would not have the appetite to eat medicated creep and thus be at risk of also developing clinical coccidiosis. Decoquinat is active only in the small intestine. This means that lambs may still shed oocysts despite eating medicated feed and showing no clinical signs of coccidiosis.

Diclazuril and toltrazuril are also licensed for the treatment and prevention of clinical coccidiosis in lambs. The dose rate for either product is 1ml per 2.5kg lamb body weight administered by mouth. When using such products it is important to distinguish between lambs by age and risk factors so that treatment can be targeted at specific lambs at the correct time. Treatment timings are very important so it is rarely appropriate to treat every lamb on the farm on the same day.

On any one farm, clinical disease will appear to affect lambs at progressively younger ages as the season progresses. Thus, at the beginning of the season, clinical disease may not be seen until the lambs are eight weeks old but by the end of the season clinical disease might be seen in four week old animals due to the increase in pasture contamination. This does not mean that very young lambs should be automatically treated at the start of the following season but treatment timings should follow careful risk assessment.

Group treatment in the face of an outbreak:

When some lambs are showing clinical signs, most of the rest of the group will be infected to some degree. Immediately that coccidiosis is diagnosed in a single lamb in a group, either diclazuril or toltrazuril should be given to all lambs over three weeks old in that group . It may be necessary to repeat the diclazuril dose after three weeks.

Group treatment in the face of expected high coccidia challenge :

In this situation there are no lambs yet showing clinical disease, but history and screening have indicated that the lambs will be exposed to a high level of oocysts.

Diclazuril has no residual activity so the timing of treatment is critical and it is rarely appropriate to be used on the day of turn-out. When susceptible lambs are moved onto contaminated land, the product should be given 10-14 days later and it may be necessary to give a second dose three weeks after the first.

Toltrazuril has a longer duration of action so one dose is all that is necessary. Timing is less critical but the ideal timing of treatment has been shown to be a week after turn-out onto contaminated land or a week before expected clinical disease.

Various studies have shown that, in the face of a coccidia challenge, lambs treated with either diclazuril or toltrazuril shed fewer coccidia oocysts, have less or no diarrhoea and grow faster than untreated lambs [3]. A single dose of toltrazuril has been shown to be more effective at reducing the numbers of oocysts shed than either a single or double dose of diclazuril [4-7], resulting in less contamination of the pasture and thus a lower challenge facing the next batch of lambs.

All images courtesy of Dr Phil Scott

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