

Impact of sub-clinical coccidiosis in cattle

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Coccidiosis in cattle is a ubiquitous disease that is known to cause moderate to severe and sometimes lethal, enteritis with fever, loss of appetite and haemorrhagic diarrhoea, especially in young calves between the ages of three weeks and 10 months.

Adult cattle are usually the asymptomatic carriers of the disease and 16-27% are said to excrete low levels of oocysts which contaminate the environment for calves to become infected. Calves show higher levels of oocyst excretion when infected and contaminate the environment further for new calves to become infected.

This environmental contamination results in almost all calves becoming infected by 10 months of age. Even on severely infected farms only about 20% of the calves that become infected show actual clinical symptoms of the disease.

This means that 80% or more of the calves are subclinically infected and it has been stated in many publications that this subclinical disease will cause severe production losses in calves, but this has seldom, if ever, been quantified. Impaired growth rates and reduced feed conversion have been stated to be the most common result of subclinical coccidiosis in calves.

There are more than 20 *Eimeria* species that have been found in cattle but only three are considered to be pathogenic. *E. bovis* and *E. zuernii* are the most commonly found, while *E. alabamensis* is known to cause clinical symptoms in pasture cattle in Scandinavian and other European countries.

Because the clinical symptoms of coccidiosis are only seen in cattle after severe damage to the intestinal mucosa has already occurred, treatment of the disease is not the best method of control. Metaphylactic

Group	Day one Mean weight (kg)	Day 21 Mean weight (kg)	Mean weight gain	Difference (kg)	p-value
Treated	91.5	107.8	16.4	+2.7	0.003
Control	94.0	107.6	13.7		

Table 2. Body weights at day one and 21.

treatment with an oral diclazuril 0.25% suspension has been shown to prevent the clinical disease in young calves when given before the suspected clinical symptoms develop.

The timing of this dose is based upon previous history of the disease on a particular farm and the stress factors involved in the development of clinical disease.

This multicentre study on six separate sites in three different countries studied the effect of subclinical coccidiosis in both beef and dairy calves on farms where clinical coccidiosis was known to occur.

Materials and methods

Six separate farms where clinical coccidiosis was suspected were identified in Belgium (two farms), France (three farms) and Germany (one farm) and the presence of *E. bovis* and/or *E. zuernii* was proven by means of faecal isolation and identification on each of the six farms prior to the start of the study.

Both male and female calves between the ages of three weeks and four months were included in the study and were of different breeds (Belgian Blue Whites, Charolais, Salers and Holstein-Friesians). Body weights varied between 67-126 kg at the start of the study.

At each site the calves were allocated to two groups of similar size and one group was treated orally with 0.25% diclazuril (Vecoxan, Janssen Animal Health) at a dose level of 1 mg/kg body weight. The other

group was left as controls and not treated at all or else given a placebo treatment of water or skimmed milk.

No calves had received any anticoccidial treatment prior to the trial and they were weighed at the time of treatment and again three weeks later.

Faecal samples were collected daily for three weeks on one site in Germany but every second day on the other trial sites and the number of oocysts per gram of faeces (OPG) was determined on each sample as well as identification of the species of *Eimeria* present.

A total of 231 calves were involved in the study, of which 116 were in the treated group and 115 in the control group.

Results

● Faecal OPG counts.

No difference in oocyst counts was present between the groups at the start of the trial but by day four after treatment the treated group showed a statistical difference ($P < 0.0001$) in OPG compared to the control group. The species of coccidiosis present at all the sites except one were predominantly *E. bovis*. The one site was mainly due to *E. zuernii*.

The long term effect of treatment, such as, the mean area under the curve for the sum of *E. bovis* and *E. zuernii* for the 21 days of the trial for the six sites ranged from 1062 to 197 344 for the control group and nine to 3271 OPG for the treated group respectively. The overall analysis showed that the total *E. bovis* and *E. zuernii* oocyst excretion was reduced by 98% by metaphylactic diclazuril treatment.

● Weight gains.

Initial bodyweights differed considerably between sites and according to breeds and

Continued on page 11

Table 1. Oocyst count per gram of faeces at day one and five.

Group	Day one Geometric mean (range)	Day five Geometric mean (range)	p-value
Treated	22.2 (0-97.2)	0.2 (0-150)	<0.0001
Control	13.7 (0-16.2)	9.8 (0-110.4)	

Group	Status	Mean weight gain per head (kg)	Weight gain loss per calf (kg)
Treated	Reference	16.4	
Control	Sub-clinical	14.4	-2.0
Control	Clinical	9.6	-6.8

Table 3. Weight gains in clinical and subclinical calves.

Continued from page 9

ages of calves and so weight gains were considered to be more important than the initial weights.

At all but one of the trial sites the treated calves had a better weight gain than the control calves.

When the data of the six farms is pooled, the treated calves had a significantly higher average weight gain of 2.7kg compared to the untreated calves which represents a 20% increase.

● Subclinical disease.

Haemorrhagic diarrhoea was only seen in 2.2% of the calves.

A wider definition of calves suffering from clinical disease was taken as any calf that showed some diarrhoea for three consecutive days and at least a positive faecal oocyst count during an eight day span in the same period. The rest of the calves were considered to be suffering from subclinical coccidiosis.

According to this definition 15.7% (18 of 115) of the calves in the control group were considered to be suffering from clinical coccidiosis and the remaining 84.3% (97 of 115) of the calves were suffering from subclinical coccidiosis.

The weight gains in these clinically and subclinically affected calves compared to the weight gains in the treated calves (Table 3).

Effective treatment

The metaphylactic treatment of the diclazuril was effective in reducing the OPG count considerably within four days of treatment and also over the full 21 days of the trial.

Clinical coccidiosis, as can be expected, results in greater weight losses (6.8kg per calf) than those seen in calves suffering from subclinical coccidiosis (2.0kg per calf).

The effect of subclinical coccidiosis, when defined as calves shedding oocysts in the faeces for three consecutive days, on weight gains, however, is considerable, when we consider that a far greater number of calves are suffering from subclinical coccidiosis than

the number that suffer from clinical disease (84.3% versus 15.7% respectively). The total weight losses due to the subclinical disease is calculated in Table 4.

From Table 4 it can be clearly seen that the majority of the weight loss seen in a calf herd suffering from coccidiosis is due to the high number of calves (84.3%) suffering from subclinical coccidiosis, namely 61% of the losses and although clinical disease results in higher individual calf weight losses, the total weight loss due to the clinical cases (15.7%) is only 39% of the total weight lost in the herd.

Conclusion

In calf herds where clinical coccidiosis is seen it is usually only the clinical cases that are treated, by which stage severe damage to the intestine has already occurred resulting in poor performance and often stunted calves.

Because the total weight loss in the herd is greater in the subclinical cases of the disease and because the numbers suffering from this latter form of coccidiosis is always greater than the clinical cases, more attention should be paid to treatment of subclinical cases than has been done in the past. Some 0.25% diclazuril when used as a metaphylactic treatment reduces the losses due to clinical and subclinical coccidiosis in the herd and will result in far lower economic losses than when only clinical cases are treated.

The timing of this metaphylactic treatment is important and should be given as close to the expected outbreak as possible.

This, in practice, is often difficult to achieve but should be based on the previous history of the farm and is often linked to periods of stress in the farm management.

If the metaphylactic treatment is not given on time then it is suggested that when the first cases of coccidiosis are seen the clinically affected calves should be treated and at the same time all the remaining calves in the group are given a metaphylactic treatment to reduce the severe losses that could occur from the subsequent clinical and subclinical disease. ■

Table 4. Weight losses in all animals.

Group	Status	Number of calves	Weight loss per calf (kg)	Lack of weight gain (kg)	Losses (%)
Treated	Reference	115	0.00.0	0	
Control	Sub-clinical	97	-2.0-194	61	
Control	Clinical	18	-6.8-122	39	