Planned worm control: helping farmers select best treatment options

HELMINTH infections can have serious economic impact, as well as animal welfare implications. With resistance reported to all classes of broad-spectrum anti-nematode anthelmintics and some flukicides, control programmes that use management approaches to reduce contamination of the environment and use diagnostics to inform treatment decisions have never been more important.

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GASTROINTESTINAL (GI) roundworms and flukes can have considerable impact on the welfare, growth and productivity of beef and dairy cattle. Helminth infections cost the UK cattle industry millions of pounds in production and treatment costs (AHDB Beef and Lamb, http://bit.ly/2G5pSHZ), with most animals infected with several worm species at some point.

For some infections, strong immunity does not develop, even after worm exposure, so infection can affect adults as well as youngstock. Generally, helminths cause reduced appetite and lower feed intake and nutrient use, leading to poor growth rate and performance.

Where parasites are not controlled to an extent that high burdens persist, clinical disease develops. For decades, control has been based on interval treatment regimens involving regular administration of anthelmintics to all animals. These programmes create strong selection pressure for resistance – indeed, resistance to all classes of broad-spectrum anti-nematode anthelmintics and some flukicides (notably, triclabendazole) has been reported in cattle in several regions.

It is, therefore, imperative anthelmintic use is reduced, and this can be achieved by implementing control programmes that:

- use management approaches to reduce contamination in the environment
- use diagnostics to inform treatment decisions

In the cattle sector, improved uptake of these programmes is required to prolong efficacy of the existing anthelmintics as, although under study, anti-helminth vaccines are a long way off.

Panel 1. How to apply "best practice" when performing faecal egg count (FEC) tests

- Collect samples as fresh as possible, preferably within one hour
- Ensure sample is representative – take three to four sub-samples from across the dung pile and mix
- Place samples in a labelled airtight container or plastic bag
- Keep samples cool (4°C)
- Transport to a diagnostic laboratory ASAP (within 48 hours)
- Mix samples well at the laboratory before taking any sub-samples for the test
- Use a counting method with the highest sensitivity possible

Helminth threats

The principal helminth threats to UK cattle are summarised in **Table 1.**

Table 1. Principal helminth threats to UK cattle

	Species	Colloquial name	Host predilection site
Nematodes	*Ostertagia ostertagi*	Brown stomach worm	Abomasum
	Cooperia species	Watch spring worm	Small intestine
	Trichostrongylus species	Black scour worm	Abomasum, small intestine
	Dictyocaulus viviparus	Lungworm	Lung
Flukes	*Fasciola hepatica*	Liver fluke	Liver
	Calicophoron daubneyi	Rumen fluke	Rumen

GI nematode infections

Youngstock can be infected with substantial numbers of GI nematodes while grazing, with disease most likely in the second half of the season. The primary pathogen is *Ostertagia ostertagi*, which can cause disease in late summer (type one disease) or during the subsequent housing period (type two disease).

Type one disease results from accumulations of larvae over the grazing period, most commonly in first season grazing (FSG) calves that have not received anthelmintics or have been administered anthelmintics the parasites are resistant to. Type two ostertagiosis results from emergence of immature larvae from the gastric glands. Clinical signs can be severe and untreated animals can die.

Other gastrointestinal nematodes are invariably encountered with *O ostertagi*. In temperate regions, these tend to be less pathogenic and have an additive effect to the impact of *O ostertagi*. However, high burdens of *Cooperia oncophora* have been shown to have negative effects on production.

Studies have indicated cattle require two grazing seasons of exposure before they are fully immune to *O ostertagi*, while immunity to *Cooperia* develops after one season. Risk of disease depends on when calves were born and whether they co-graze with dams, with weaned animals grazing fields populated by cattle in the past 12 months at highest risk of disease.

A good indicator of exposure, when adequate nutrition and no concurrent disease is seen, is live weight gain. Therefore, regular weight monitoring should be central to all control programmes. Anthelmintic treatments can be administered to all calves strategically during the first half of the season, with the frequency depending on persistency of the product used.

Early season administration ensures few nematode eggs are shed up to mid-summer, by which time the majority of overwintered larvae have died. However, all-group treatments provide strong selection pressure for anthelmintic resistance. An alternative is to take an evidence-based approach and administer anthelmintics on information obtained from growth monitoring and faecal egg count (FEC) analysis (**Figure 1**).

At housing, FSG calves – and, where pasture contamination risk is estimated as high, second-season grazers – require anthelmintics that target inhibited *O ostertagi* larvae. Macrocyclic lactones (MLs) are licensed against these larvae (use of these products has the added value of activity against common ectoparasites).

Cattle will not become reinfected while housed, so effective treatment will reduce contamination on pasture the following season and, in reducing infection load, will have a positive effect on performance.

Dictyocaulus viviparus

Dictyocaulus viviparus (bovine lungworm; **Figure 2**) is very pathogenic. Compared to GI nematodes, ingestion of relatively few larvae can result in clinical signs.

This parasite has a broadly similar epidemiology to GI nematodes, with disease being more likely from July onwards. However, the presence of larvae on pasture is more variable, and outbreaks can be difficult to predict.

On farms with a history of lungworm, all animals should be immunised using the Bovilis Huskvac vaccine (MSD Animal Health). If not vaccinated, cattle develop resistance when exposed to lungworm, but lung damage can be severe before immunity develops. In such cases, production losses can be substantial.

As a carrier state (leading to larval shedding) can develop in vaccinated and/or exposed cattle, all stock should be considered for anthelmintic treatment at housing where an identified risk of lungworm is seen, or if animals have been brought from at-risk areas.

The ML products recommended for treatment of *O ostertagi*-inhibited larvae are effective against *D viviparus*. No reports have been seen of anthelmintic resistance in the latter.

Flukes

Liver fluke and rumen fluke are found in UK cattle, with the former by far the more serious threat. *Fasciola hepatica* causes disease and/or production loss in cattle of all ages. Generally, it is encountered as a seasonal disease; infective stages that develop from cercariae released from the intermediate mud snail host reach peak pasture levels in autumn.

Housing time is, therefore, an important checkpoint for anti-fluke treatment. Fluke is a particular problem after a wet spring and summer, as these conditions promote snail survival and population size, leading to high

Table 2. Risk by month in the UK posed by various helminths

	J	F	M	A	M	J	J	A	S	O	N	D
GI nematodes	L	M*	M*	L	L	M	H	H	H	M	L	L
Lungworm	L	L	L	M	M	H	H	H	H	M	L	L
Liver fluke	H	H	M	M	L	L	L	M	H	H	H	H

Risk of infection/disease in UK generally accepted as low (L), medium (M) or high (H).
*Type two ostertagiosis.

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