STAKEHOLDERS

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Department of Agriculture, Fisheries and Food

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AIBP
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Cork Cooperative Marts Ltd.
Irish Cattle and Sheep Farmers' Association (ICSA)
Irish Cooperative Organisation Society (ICOS)
Irish Creamery Milk Suppliers' Association (ICMSA)
Irish Farmers' Association (IFA)
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BREED SOCIETIES

Irish Holstein Friesian Association
Pedigree Cattle Breeders' Council of Ireland

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Irish Cattle Breeding Federation (ICBF)
Teagasc
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A Guide to Parasite Control at Turn-out
For Irish Farmers and their Vets

THIS GUIDE IS THE SECOND IN A SERIES OF THREE, MATCHED TO KEY PERIODS OF FARM MANAGEMENT

- Parasite Control at Housing
- Parasite Control at Turn-out
- Parasite Control 2 months after Turn-out

Introduction

Calves are born free of parasites. They pick up infection while grazing pastures harbouring the infective stages of these parasites i.e. the larvae and metacercariae (encysted stage of fluke that causes infections). Thus, turn-out marks the start of exposure to parasites on pasture, such as:

- Stomach and intestinal worms; collectively called gut worms
- Lungworms
- Liver fluke and rumen fluke*

When cattle are turned out, a combination of shorter summer coats, higher temperatures, less humidity and exposure to ultra-violet light leads to a marked decline in lice and mite populations – thus the control of these skin parasites is generally not considered an issue during the grazing season.

* The management of Rumen Fluke is covered in a separate AHI leaflet **Rumen Fluke – The Facts,** copies of which are available from the AHI website.

GUT WORMS

Gut worms cause parasitic gastroenteritis (PGE) – clinical signs of which are diarrhoea and weight loss. *Ostertagia* (Round Worms) and *Cooperia* are the two worms that cause most problems for Irish cattle. The control of gut worms depends on:

1. Grazing management
2. Good nutrition
3. Appropriate use of anthelmintics

Picture courtesy of Donal Toolan, RVI, Kilkenny, DAFF.

Ostertagia Type II.

Grazing Management

The objective is to reduce the concentration of infective larvae on pasture and so reduce the parasite challenge to grazing cattle.

- New or reseeded pastures should have very low numbers of infective larvae initially.
- Pastures that have not been grazed by cattle from the previous housing to mid-season (June/July) may carry lower numbers of infective larvae.
- Pastures that have been grazed by sheep alone for 1-2 months should carry lower numbers of bovine infective larvae.
- Pastures that have been co-grazed with sheep and cattle should carry lower numbers of bovine infective larvae.
- Pastures subject to rotational grazing generally have lower numbers of infective larvae than those under continuous grazing.
- Pastures that contain legumes, e.g. clover and chicory may carry lower concentrations of infective larvae than ryegrass.

Good Nutrition

Appropriate supplementation of cattle diets at pasture can offset some of the negative effects of poor quality herbage and parasites.

Appropriate Use of Anthelmintics

Anthelmintic resistance is a key consideration in sustainable control of parasites. Therefore, these drugs must be used carefully in order to benefit both animals and farmers. Because of differences in susceptibility resulting from acquired immunity to worms, it is best to consider cattle in three different age categories: adults, second grazing season (SGS) and first grazing season (FGS).

1. **Adult cows**

   It is rare for adult cows to show any clinical signs of gut worm infestation, yet many studies, particularly in dairy cows, have shown evidence of subclinical infections with production losses. Reported benefits from treatment generally relate to milk yield; however, in a few studies, beneficial effects on body condition and fertility have also been observed.

2. **Second season grazers**

   These animals are not fully immune to gut worms and can experience production losses and occasionally disease. Lack of exposure to infection during the FGS, as seen in late-born calves, beef suckler calves or under intensive anthelmintic treatment regimes may result in lower levels of immunity at the start of the SGS.

3. **First season grazers**

   These calves initially have no immunity to parasites and are at risk of clinical, as well as subclinical gut worm infestations. Suckler calves and dairy calves must be considered separately in terms of risk factors.

Beef Suckler Calves

Initially Beef Suckler calves are at a low risk as they are grazing with their mothers and have low herbage intake. There is also an apparent mitigating effect of milk on parasitic round worms meaning that the effects of these worms are minimised. Their greatest risk periods are after weaning in late summer and autumn.

Body condition and growth rate should be monitored during the season and faecal samples from 10-15 calves (which can be pooled) should be checked to determine how many worm eggs are present. If nutrition appears adequate, significant numbers of worm eggs are present and growth rates are below target, then the use of anthelmintics is justified.

Preliminary results of recent research indicate that satisfactory group performance can be maintained by treating only those animals with growth rates that fall below target.

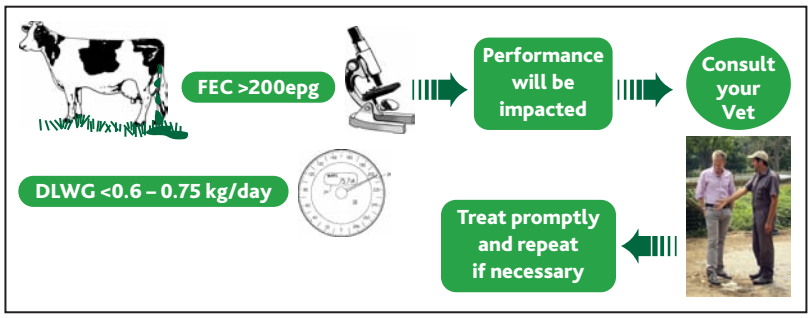
Dairy Calves

Dairy calves are exposed to infection as soon as they are turned out. Clinically significant infections can be evident within a couple of months of turn-out, calves can suffer subclinical losses even earlier.

The use of anthelmintics in dairy calves falls into three categories –

1. **Strategic Management** – aim is to limit egg contamination of pastures:
   Initially calves should be grazed on the cleanest possible pasture. Treat within the first 3 weeks of grazing and repeat throughout the grazing season at appropriate intervals depending on the residual activity of the drug used (see Table 3 as a guide) until mid-July. Treated calves should be kept on the low risk pasture throughout the treatment period and ideally for the rest of the grazing season. If calves are subsequently moved to different paddocks, it may be necessary to continue treating throughout the grazing season.

2. **Tactical Management** – monitor and only treat when appropriate:



   Grazing aftergrass will reduce the need for repeated treatment

3. **Therapeutic Management**:
   Animals are monitored until they show signs of clinical disease, such as weight loss and diarrhoea, and are then treated.

   This may be the only option in systems such as organic farms.

   There is a high risk of poor animal performance through subclinical PGE and of severe clinical problems if animals are not treated early enough to prevent severe diarrhoea, dehydration and weight loss.

LUNGWORMS

Clinical signs of lungworm infection ('hoose', *Dictyocaulus viviparus*) include coughing and difficulty in breathing. Affected cattle have an increased susceptibility to viral and bacterial pneumonia. Immunity to lungworm develops quickly but is relatively short-lasting (approx. 6 months) in the absence of further infection.

At the start of each grazing season, following housing, cattle may have very little or no immunity to lungworm and thus are susceptible to new infections again. The highest challenge risk periods for animals are late summer and autumn.

Picture courtesy of Donal Toolan, RVI, Kilkenny, DAFF.

Hoose worms in airways of a 3-yr-old cow.

Table 1 Control of lungworms (LW)

	Control	Objectives	Comments
FGS Calves	Observation Monitoring Strategic or therapeutic treatment with anthelmintics	Reduce pasture contamination with infective larvae Ensure that immunity is maintained Prevent clinical disease	Sick calves must be spotted quickly – failure to do so will result in ill-thrift and death
SGS Calves and Adult Cattle			In adult cows a phenomenon known as the re-infection syndrome occurs in which cows show clinical signs of lungworm disease

Reinfection Syndrome

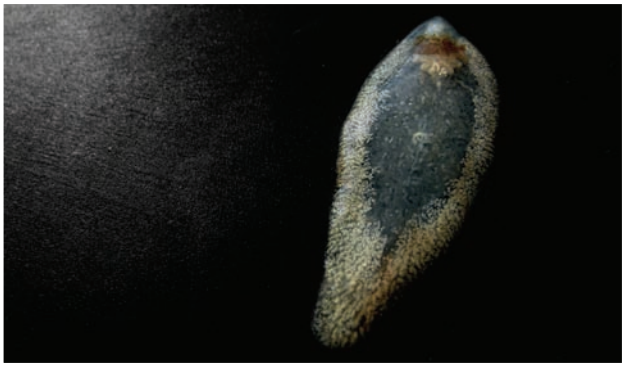
If cows that are partly immune to hoose are exposed to heavy larval challenge from pasture (e.g. pasture recently grazed by FGS animals), they may develop severe coughing and/ or milk drop as their immune system kills the migrating larvae. Such animals will not have hoose larvae detectable in faeces. Diagnosis may be supported by clinical signs, grazing history and by a blood test to measure circulating eosinophils in blood. The ELISA (Enzyme Linked Immuno Assay) test on blood or milk may also be useful.

Cows that have lost their immunity can develop typical hoose as seen in calves, with severe pneumonia and death. These animals can be diagnosed by finding hoose larvae in faeces or by post mortem examination.

LIVER FLUKE

Liver fluke *(Fasciola hepatica)* is a common infection in cattle and sheep. Disease is seen in animals of all ages. Typical symptoms are condition loss, lower productivity and increased susceptibility to other diseases.

It takes approximately 10–12 weeks before fluke eggs appear in the faeces following infection, so the cycle of infection is much longer than in gutworm or lungworm infestations.



Picture courtesy of Dr. Orcun Hacariz, UCD Veterinary Sciences Centre.

Liver Fluke (Fasciola hepatica).

1. First season grazers (FSG Calves)

It may be unnecessary to treat with flukicides until the autumn and/or at housing as spring-born calves will initially carry no liver fluke. However, if they graze heavily infested pastures they can be exposed to fluke from early on in the season. Advice may vary depending on weather, fluke forecast and farm history so farmers should discuss control with their vet.

Beef suckler calves born in spring will be at a lower risk than dairy calves as their herbage intake is relatively low for the first few months of life while they are suckling their dams, thus their risk is highest later in the grazing season.

2. Second Season Grazers (SGS Calves) and Adult Cattle

Older cattle are commonly treated at housing (see AHI ***A Guide to Parasite Control at Housing***). When the cattle are turned out the following spring, they should not be infected and will therefore not contaminate the pastures with fluke eggs. There should be a delay before snails can acquire new infections and continue the life cycle; however, over-wintering infection in snails is a possibility. If cattle have not been treated at housing, then treatment with a flukicide effective against adult liver fluke before turn-out will ensure that contamination of the pasture with fluke eggs is kept to a minimum.

Between turn-out and housing, the need for treatment depends on the severity of the risk of liver fluke on the farm: if severe, then additional treatments 2–3 months after turn-out and again in the early autumn may be indicated in order to limit the overall level of challenge on the farm.

3. Sheep

If sheep are present on farm, they must be included in a liver fluke control programme – the fluke is exactly the same as that seen in cattle.

Sheep are highly susceptible to liver fluke disease, and infected sheep generate high levels of pasture contamination with fluke eggs, so they must also be treated if the disease is to be kept under control.

Dosing failure, possibly due to resistance to triclabendazole appears to be quite widespread in sheep in Ireland, therefore, it may be worthwhile checking faecal samples for liver fluke eggs two weeks after treatment to evaluate if the treatment has been effective.

WHAT IS THE RISK OF PARASITIC INFECTION?

Signs of parasitism include reduced growth rates, reduced fertility, decreased milk yields, and animals that are coughing or scouring. Affected animals can be treated, however, prevention is a better strategy on farm. There is no single diagnostic test and parasite control should be based on consideration of numerous risk factors and observations.

Table 2 provides a guide to assessing the risk of parasites on your farm. The changeable Irish weather also has a large impact – warm, wet weather is conducive to parasite development on pastures, so higher challenges can be expected under these conditions. Furthermore, if dry weather predominates for a few weeks, followed by a period of heavy rain, the parasite challenge from pasture can increase significantly.

Table 2 **Risk assessment matrix for disease and production losses from parasites in cattle**

RISK FACTOR	RISK		
	HIGH	MEDIUM	LOW
Age (grazing seasons, GS)	<1 year (First GS)	1-2 years (Second GS)	>2 years (adult)*
Weight gain (<2 years old) 2 months after turn-out	<0.7 kg/day	0.7-0.8 kg/day	>0.8 kg/day
Faecal worm egg count (FGS) 2 months after turn-out (epg)	>200	50-200	<50
Herbage mass kg DM/ha	<1000	1000-2000	>2000
Sward height	<4 cm	4-8 cm	>8 cm
Field type	Permanent pasture	Silage/hay after grass	Newly sown, ungrazed leys
Grazing history within the last year	Grazed by cattle <1 year old	Grazed by cattle 1-2 years old	Grazed by Adult cows, sheep** or other species
Last anthelmintic treatment	>8 weeks	4-8 weeks	<4 weeks
Condition score (adults)	<2.0	2.0-3.0	>3.0
Bulk milk tank *O. ostertagi* antibodies (ODR) (dairy herd)	>0.8	0.5-0.8	<0.5
Snail habitats	Widespread	Patchy	Fenced off /none
Faecal fluke egg count (epg)	>20	1-20	0
Fasciolosis diagnosed	Previous year	>5 years previously	Never
Lungworm diagnosed	Previous year	>5 years previously	Never

* Adult cattle rarely suffer from clinical PGE, but are susceptible to lungworm (if immunity is low) and to liver fluke.

** If sheep are infected with liver fluke, they can increase the risk of liver fluke in cattle.

The use of bulk milk samples as a monitoring tool for parasites is currently being examined in Ireland. Milk samples can be analysed to see if they contain antibodies to *O. ostertagi (Roundworms), D. viviparus (hoose) and F. hepatica (liver fluke)* and, if so, what the levels and trends are. While *O. ostertagi* is present on all farms, the impact of the parasite on production (and thus the value of treatment) can be estimated from the concentration of antibodies found. The other two tests are in earlier stages of development, but they may indicate whether or not the parasite is present on your farm.

Interpretation of results from these tests needs to be done in the context of the overall herd health and milk production pattern. At the present stage of testing development, it is important to note that using the results from these tests alone will not be enough to design a comprehensive parasite control plan. Ideally, this should be done in consultation with the farm vet who understands the herd health and production history.

Table 3 **A guide to anthelminthic and flukicide treatments available in Ireland, their efficacy against important stages of parasites and their persistency of action**

	Anthelminthic			Flukicide					Combination Treatments				
	Benzimidazoles	Levamisole	Macrocyclic lactone	Closantel	Nitroxynil	Triclabendazole	Rafoxanide	Oxyclozanide	Ivermectin + clorsulon	Ivermectin - closantel	Levamisole + oxyclozanide	Levamisole + triclabendazole	Rafoxanide + Fenbendazole
Formulations	o	o/inj/po	inj/po[1]	o/inj	inj	o	o	o	inj	inj/po	o	o	o
Round Worm *(Ostertagia)*													
Adults	√	√	√						√	√	√	√	√
Larvae	√		√						√	√			√
Inhibited larvae	√		√						√	√			√
Persistency			√ 3-6 weeks[3]						√[3]	√[3]			
Cooperia													
Adults	√	√	√						√	√	√	√	√
Larvae	√	√	√						√	√	√	√	√
Persistency			√[2], 2-4 weeks[3]					√[3]	√[3]				
Lungworm *(Dictyocaulus)*													
Adults	√	√	√						√	√	√	√	√
Larvae	√	√	√						√	√	√	√	√
Persistency			√ 4-6 weeks[3]						√[3]	√[3]	√[3]		
Liver fluke *(Fasciola hepatica)*													
Adults	√ (Albendazole only)			√	√	√	√	√	√	√	√	√	√
Immature – Early						√[3]						√[3]	
Immature – Late				√[3]	√[3]	√[3]	√[3]	√		√[3]		√[3]	√[3]

[1] eprinomectin only as pour-on, [2] except moxidectin, [3] see data sheets for more details

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