Parasite Control leaflet series

ANIMAL HEALTH IRELAND

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

Practical guidance in providing advice on Farm-specific Parasite Control

PARASITE CONTROL LEAFLET SERIES VETGUIDE V1, 28032017

PARASITE CONTROL PROGRAMME

Parasite Control
Animal Health Ireland.ie

Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27

AHI gratefully acknowledges the financial and other contributions of our stakeholders.

PARASITE CONTROL PROGRAMME

Parasite Control
Animal Health Ireland.ie

Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27

INTRODUCTION

Parasites are one of the most important constraints on livestock production at local, regional and global levels, yet they seem to receive little attention from many clinicians unless things go badly wrong. This may be because parasites do not always have an immediate and dramatic impact, but it may also be because parasite control is often farmer-led and driven by the relatively easy access to anti-parasite treatments. However, this picture is changing as veterinary practitioners are becoming more involved with parasite control on livestock farms for reasons such as herd/flock health plans, unsatisfactory control, emerging parasitic infections or disease patterns and anthelmintic resistance.

The purpose of this leaflet is to provide a framework and aide-memoire for veterinary practitioners to assist the drawing up of a parasite control plan. It is assumed that the veterinary practitioner has a good knowledge of the scientific evidence that underpins parasite control, but has no prior knowledge of the farm. The latter will often not be the case for experienced practitioners and long-standing clients; nonetheless this approach should help young graduates or vets starting in a new practice.

SCOPE AND OUTLINE

The advice provided in this document focuses on the common helminth and arthropod infections of cattle in Ireland. It includes only limited information on protozoal diseases, such as coccidiosis, cryptosporidiosis and redwater, and nothing on neosporosis, important though these infections are. Animal health advisors are referred to the AHI web-site where specific information on these parasites can be found. Complementary information on key elements of parasite control at different times of year, along with the use and interpretation of diagnostic tests, can be found on the AHI web-site **click here**.

Three steps to an on-farm assessment can be considered:

1. **What you (the vet) should know**
2. **What you can observe on farm**
3. **What you can learn from the farmer**

WHAT YOU (THE VET) SHOULD KNOW

Knowing and understanding the science behind the biology and impact of parasites and their control underpins evidence-based advice; the table below give some examples of useful facts.

Parasite biology	Helminths	Values	Relevance
Pre-patent periods (period between infection with a parasite and the recovery of an egg, oocyst or larva from the faeces)	GI Nematodes* Lungworm Liver fluke Rumen fluke**	~3 weeks ~3-4 weeks ~3 months ~3 months	Population dynamics Strategic use of anthelmintics
Minimum time from egg/larva in dung to infective stage on pasture, includes time in snail for liver fluke	GI Nematodes Lungworm Liver fluke Rumen fluke**	<1 week in summer ~2-4 weeks spring & autumn <1 week in summer ~2-4 weeks spring & autumn ~2 months in summer >3 months spring & autumn ~3 months	Seasonality of exposure Risk assessment of pastures Rotational grazing Rate of build of infection pressure on pasture
Survival of infective stages on pasture	GI Nematodes Lungworm Liver fluke Rumen fluke**	Susceptible to desiccation and ultra-violet light, but even so, typically survive for 12 months or more	Risk assessment of pastures Quarantine Refugia Carry over of infection from year to year

Table 1. Helminth biology

*GI Nematodes = Stomach and gut worms.

**Information on the biology of *Calicophoron daubneyi* in Ireland is currently sparse, so these values are extrapolated from the scientific literature for other species of rumen fluke in other countries.

Another important aspect of parasite biology is host specificity as this will determine to what extent mixed or sequential grazing (commonly with sheep) can be used in parasite control.

Host (cattle) species-specific	Less fastidious (generalist) species
Ostertagia ostertagi (Parasitic gastritis)	*Trichostrongylus axei* (Parasitic gastritis)
Cooperia oncophora (Parasitic enteritis)	*Fasciola hepatica* (Liver fluke)
Dictyocaulus viviparus (Lungworm)	*Calicophoron daubneyi* (Rumen fluke)
Lice & mange mites	*Ixodes ricinus* (Tick)
Eimeria spp. (Coccidia)	*Cryptosporidium* spp.

Table 2. Host specificity

THE IMPACT OF PARASITES

The effects of parasites at farm level can range from sub-optimal performance – lowered growth rates in youngstock and reduced milk yield in dairy cows - to serious clinical disease as can be seen in hoose (lungworm) and mange. Whilst the necessity to treat clinical cases and prevent their recurrence is self-evident, it is more difficult to assess the magnitude of subclinical production losses as these normally require comparative data on the performance of infected and non-infected animals, which is not available on most commercial farms.

Vets should therefore be familiar with the results of controlled studies that have been carried out in order to explain the impact of subclinical infections. For example, even in the absence of clinical signs such as diarrhoea, parasitic gastroenteritis (PGE) in weaned, first-grazing season calves can result in average reductions in daily live weight gain of 20% or more over the grazing season. Similarly, in dairy cows, subclinical ostertagiosis can account for a reduction in daily milk yield of an average of ~1kg/day over the lactation. The magnitude of these losses can vary in line with parasite challenge and farm-level factors. If other parasites such as liver fluke and lungworm are also present, then their impact on performance will typically be additive to that of PGE and can sometimes be greater.

DIAGNOSTICS AND MONITORING

There are a number of methods that can be used to diagnose and/or monitor parasitism in cattle, some examples of which are given in the table below. The signs of clinical disease are not included here, but, if present they would obviously be included in a diagnostic work-up. It is important that veterinary practitioners are aware of what methods are readily available from diagnostic laboratories, which ones are appropriate to a particular farm, how much they cost and, perhaps most importantly, how to interpret the results. Laboratories carrying out diagnostic tests for parasites are listed on the AHI website **click here**.

Parasite	Parasite markers	Immune response	Pathophysiology	Pathology	Effect on performance
O. ostertagi	Faecal eggs	Antibodies in serum or milk	Plasma pepsinogen	Abomasal lesions	Growth retardation Milk yield depression
D. viviparus	Faecal larvae	Antibodies in serum or milk	Eosinophilia	Lung pathology	Milk yield depression Growth retardation
F. hepatica	Faecal eggs, coproantigen	Antibodies in serum or milk	Liver enzymes: GLDH, GGT	Liver pathology	Growth retardation Milk yield depression Immuno-suppression
C. daubneyi (Rumen fluke)	Faecal eggs		Serum protein	Duodenum (juveniles)	Ill-thrift
Mange	Scrapings			Dermatitis	Growth retardation Milk yield depression
Lice	Visual ID		Anaemia *(L. vituli)*	Dermatitis	Growth retardation Inferior hide quality

Table 3. Parasite diagnostics

For some parasites, such as lungworm, confirmation of presence or absence of the parasite may provide sufficient information for veterinary practitioners to advise on treatment and control. For others such as PGE, which is ubiquitous, some degree of quantification is required to determine the magnitude of the risk and/or impact. In this respect, measures of pathophysiology or direct measurements of performance are likely to be more informative than measures of the parasites alone, such as faecal egg counts (FEC). Additional, valuable information can be gained from post-mortem material and investigation by diagnostic laboratories.

CONTROL OPTIONS

On many farms, the control of endemic parasites rests on the responsible use of parasiticides to limit selection for resistance, allied to grassland management and protein supplementation, where appropriate and feasible. The control of lice and mange currently rests solely on the use of insecticides and acaricides, so the emphasis here is on accurate identification of the parasites, selection of an appropriate product, accurate dosing (weight of stock, calibrated equipment) and prevention of cross- or re-infection.

For helminth infections acquired while grazing, it may be possible to mitigate, limit or avoid the risk of infection by appropriate pasture and stock management; this approach is particularly important on organic farms. Complementary to this is the prudent use of anthelmintics, which can be used strategically, tactically (targeted) or therapeutically according to the farm infrastructure, policies and farmer aspirations.

- Strategic treatments are given in advance of the predicted risk period and are administered in order to prevent a build-up of infection to dangerous levels. Examples are:
  - Administration of anthelmintic boluses or other treatments after turnout in order to limit contamination of pasture and reduce the risk of subsequent worm scours and hoose.
  - Administration of parasiticides at housing to prevent ostertagiosis type II and lice infections in late winter.
- Tactical treatments are given when monitoring indicates that animals may benefit from the removal of their parasites, for example:
  - Closely observing body condition and weighing animals regularly so that treatment can be given early in the course of infection.
- Therapeutic treatments are given when animals are showing signs of clinical disease such as coughing, diarrhoea or scratching.

Veterinary practitioners should be familiar with the properties and profiles of the parasiticides that are used in cattle; this knowledge should include spectrum of activity, persistent activity (if any), formulations available, withdrawal periods and resistance status.

For hoose there is a vaccine available. It is ideally suited to autumn-born, weaned dairy calves, but can be used in calves from spring-calving herds, though this may require delayed turnout until vaccination is complete. The vaccine can also be used to boost immunity in older cattle. For all these interventions, it is helpful if the relative costs are known so that a meaningful dialogue with farmers can be conducted.

Anthelmintics can be used strategically, tactically (targeted) or therapeutically

WHAT YOU CAN OBSERVE ON FARM

Compiling a profile of a farm can be thought of as merely an extension of the veterinary practitioner's powers of observation and deduction, which are routinely used in diagnosis, but in this case directed towards factors that could have a direct or indirect bearing on parasites and their control.

Ostertagia ostertagi and *Cooperia oncophora,* the most common nematodes in PGE, are present on all grassland farms, so the focus for these parasites would be on field layout, grassland management and forage conservation as they relate to possible evasion or avoidance strategies. The management of different age-groups/classes of stock should also be considered as this can determine priorities for grazing (e.g. after-grass) and flexibility in the use of paddocks. In addition, the presence of sheep or other stock such as horses should be determined to see if mixed grazing is an option for helping to control PGE.

There are no specific farm-level indicators for lungworm, but for liver and rumen fluke, the presence of suitable habitats for the mud snail, *Galba truncatula,* would indicate a risk. Mud snails breed on mud in shallow, still or slow moving water where the algae on which they feed grow; the most common indicator species for this habitat are rushes, *Juncus spp,* which are easy to identify. Similarly, the rough grazing that is associated with tick habitats and the risk of redwater can usually be readily identified.

The quantity and quality of the available pasture and feed can be assessed visually or through the use of sward sticks or plate meters to get an idea of grazing and forage management and to see if nutrition is adequate. This can be complemented by a superficial inspection of the stock for rumen fill, condition and coat, the focus depending on the time of year and the class of stock.

In addition, the slurry/manure storage and disposal system needs to be assessed, as spreading slurry – even after storage over winter- on fields that will be grazed can increase the risk of helminthosis.

More specific to parasite control and the use of parasiticides would be an assessment of handling systems; the presence or absence of weigh scales will determine the ease with which animals can be handled for sampling or weighing, and the level of precision in treatment that is achievable. At the same time, the inventory and storage of anthelmintics and other veterinary products should be checked alongside their administration equipment.

It should also be possible at this or the next stage to determine if high risk practices for parasitism or anthelmintic resistance are being followed. These could include: using the same pastures each year for young stock rearing; releasing calves in batches of different ages through the grazing season; contract rearing of replacements on other farms and a history of recent outbreaks of clinical disease, such as hoose.

Weighing scales allow farmers to measure animal performance and precisely treat animals according to weight.

WHAT CAN YOU LEARN FROM THE FARMER?

Of pivotal importance in compiling a profile for parasite control is to understand farmers' knowledge, objectives, attitudes and aspirations in order that advice on parasite control is appropriate and likely to be accepted and acted on. A first step in the process is to gather further information from the farmer on the parasites known to be present and current control practices to complement and confirm what you have observed. This could include (if you don't already know it) the presence of parasitism other than PGE on the farm along with any details of seasonality, age of stock affected and overall impact. It is also worth finding out the results of any diagnostic procedures that have been conducted, such as abattoir feedback for liver fluke*, the results of any post-mortems and laboratory tests.

*Beef HealthCheck programme; abattoir feedback on liver fluke

The Animal Health Ireland Beef HealthCheck programme provides farmers with paper reports on liver and lung lesions from cattle slaughtered in the majority of Irish meat factories. The information is also available online on the ICBF website. Farmers can share the information with their vet through the ICBF website. A step by step guide to show farmers how to view this information, what it means and how to share it with their vets is available on the AHI website: **click here**.

Next the farming system and objectives need to be understood insofar as they provide the framework into which parasite control must be slotted. Herd type (beef or dairy), calving season, duration of housing, open or closed herd and biosecurity measures are all relevant. The main production targets in the various classes of stock that are present need to be defined, and these can also serve as thresholds for monitoring parasite impact.

Non-breeding youngstock	DLWG, slaughter age/weight, carcass quality
Replacement heifers	Age & weight at 1st mating & calving
Adult cows	Milk yield & composition, fertility

Table 4. Production targets that are subject to the impact of parasites

All the common helminth and arthropod parasites of cattle can be found in all ages of stock, though in general, PGE, rumen fluke, hoose and lice are more common and have greatest impact in young stock less than 2 years of age, while liver fluke and tail chorioptic mange are more typically seen in adult cattle. All parasites, particularly helminths, can interfere with the achievement of the targets tabled above and close inspection of available production records may help determine if, when and where parasites are causing problems. The farmer can also explain what the current control practices are and how successful they appear to be.

Finally information on some of the more subjective aspects of the farmer's behaviour needs to be gathered. This might include things like attitudes towards the use of veterinary medicines in general and anthelmintics in particular; preferences in terms of mode of administration – drenches, injections, pour-ons or long-lasting formulations (injections or boluses); interest in grazing management and other potential means of parasite control; willingness to invest in diagnostics or handling/weighing equipment; and response to advice.

CONCLUSION

A farm visit that is focussed on parasite control can provide a solid base for advice on disease control and optimisation of production tailored to the specific characteristics of the land, the stock and the farmer. The objective is to provide a framework for parasite control that can be adapted to accommodate the unpredictability of livestock farming.

TECHNICAL WORKING GROUP

Andrew Forbes (Chairperson)- School of Veterinary Medicine, Glasgow University, **Charles Chavasse** - Zoetis, **Bosco Cowley** - MSD Animal Health, **Martin Danaher** - Teagasc Food Research Centre Ashtown, **John Gilmore** - Veterinary Practitioner, **Barbara Good** - Teagasc, Athenry, **Fintan Graham** - Veterinary Practitioner, **Ian Hogan** - DAFM, Veterinary Laboratory Services, **Mark Magee** - Teagasc, Grange, **Jennifer McClure** - Irish Cattle Breeding Federation, **Grace Mulcahy** - UCD School of Veterinary Medicine, **Tom Murphy**- Parasitology Specialist, **James O'Shaugnessy** - DAFM, Veterinary Laboratory Services, **Maresa Sheehan** - DAFM, Veterinary Laboratory Services, **Donal Toolan**- recently retired from DAFM Regional Veterinary Laboratory, Kilkenny, **Theo de Waal** - UCD School of Veterinary Medicine

TECHNICAL WORKING GROUP RAPPORTEUR

Rebecca Carroll - Animal Health Ireland

4-5 The Archways, Carrick-on-Shannon, Co Leitrim N41 WN27.
Phone 071 9671928
Email nmorgan@animalhealthireland.ie
Web www.animalhealthireland.ie