Integrated parasite control on cattle farms

This document is part of the COWS Technical Manual aiming to provide a sound basis for advice to industry. The manual also comprises chapters on controlling liver and rumen fluke, parasitic gastroenteritis, lungworm, and ectoparasites and insect pests

COWS is an industry initiative promoting sustainable control strategies for parasites in cattle

Section 1: Top 10 tips for integrated parasite control on cattle farms

Identify Risk	1. Know which parasites are on the farm, when and how they impact the cattle enterprise.
	2. Dedicate some time at housing, at turnout and in mid-summer to reflect on the effectiveness of parasite control over the previous months and plan for the next 6 months.
	3. Map the farm at the start of the grazing season to determine the use of pastures, particularly in terms of parasite risk, when aftermaths will become available and which classes of stock will be moved there.
Treat Appropriately	4. Each spring decide whether the parasite control plan will be strategic, i.e. will use vaccination, anthelmintics and/or grazing management or whether a therapeutic (wait-and-see) policy is followed.
	5. If wait-and-see is the choice, then ensure that effective, regular monitoring and diagnostic programmes are in place in order to act quickly when required
	6. Set growth targets for young stock at grass, manage and feed accordingly and use anthelmintics and/or grazing management to ensure targets are met. Cattle should be weighed regularly, as it is the only way to accurately monitor performance.
	7. Determine which products work well on your farm through consultation with your local vet or suitably qualified person (SQP). It may be necessary to do some lab tests to measure product efficacy.
Avoid Resistance	8. Use parasite control products as recommended; do not compromise on dosing equipment or measuring live weight to ensure the correct dose is given; read the labels and packet inserts.
	9. Housing is an opportunity to get a high level of control in both helminths (parasitic worms) and ectoparasites.
	10. Implement a quarantine programme appropriate to the known parasite infection of the resident and potential infections in bought-in cattle.

Section 2: Introduction

In the previous COWS manual chapters the main parasites of cattle and their control have been covered in a systematic way. However, under typical farming conditions, cattle are frequently infected by several parasite species simultaneously, which can affect clinical manifestations, their impact and control options. In addition, the seasonality and epidemiology of different parasites frequently overlap, so it may be appropriate to address their control simultaneously.

Understanding interactions

- Cattle often infected by several different parasite species
- Impact can be greater with mixed species
- Seasonal overlaps are common with parasite co-infections

Parasite interactions

A number of examples of parasite interactions in cattle can be found in the scientific literature. For example, in northern Europe the two most common nematode species associated with parasitic gastroenteritis (PGE) are *Ostertagia ostertagi* and *Cooperia oncophora.* Experimentally, it has been shown that co-infections with these species cause a larger reduction in growth rate in calves than either species does individually. One explanation for this is that the interference with abomasal protein digestion that occurs in Ostertagiosis cannot be compensated for in the small intestine as proteolytic enzymes are also affected in cooperiosis, with villus damage also leading to reduced absorption of nutrients. Young grazing cattle on all UK grassland farms will be parasitized by both these nematode species, so it is important to address both in control programmes. Although the life cycle and epidemiology of *O. ostertagi* and *Cooperia* spp. are broadly similar, their sensitivity to commonly used anthelmintics does vary and so attention must be paid to the respective labels with regard to efficacy profiles, particularly the worm stages affected and duration of activity.

There are also notable interactions in co-infections with *O. ostertagi* and liver fluke, *Fasciola hepatica*. Unlike the previous example, fluke are found in the liver and interactions must be indirect and may result in more profound effects than either parasite

Parasite co-infections are often found in cattle

Photo courtesy of Andy Forbes

individually. As *O. ostertagi* is present on all grass-based cattle farms, if liver fluke is also present, then inevitably many animals will harbour both parasites at some time in their lives. A strict control programme needs to consider both parasites, particularly in the autumn when infection rates of each parasite are high.

A further example of co-infections is that between the lungworm, *Dictyocaulus viviparus*, and the abomasal parasite, *O. ostertagi*. The severity of lungworm infection is exacerbated in the presence of *O. ostertagi*; again there is no evidence for a direct interaction between the parasites, which clearly do not share the same sites of infection. It is possible this is an example of the additive effects of two different parasites occupying different niches, although it can be speculated that the host responses to one species may affect those to the other.

There are few explicit examples of interactions involving external parasites, although in sheep it has been observed that lice are rarely found in large numbers on sheep with scab (*Psoroptes ovis*). The explanation could be that the loss of wool seen in scab removes the habitat for lice. It would not be surprising if the same observations were made in cattle. There is circumstantial evidence that lice tend to proliferate on cattle in poor condition, which can occur as a result of chronic infections with helminths (parasitic gastroenteritis and fasciolosis).

As a general rule, the impact of parasitism is greater in undernourished animals, as they are less able to fight infections. Conversely, there is some evidence, mainly in sheep, that high levels of nutrition, particularly protein-rich diets, can enable animals to mitigate the adverse effects of parasites.

These examples illustrate a scientific rationale for the control of different parasite species in cattle simultaneously. This can be achieved through management, vaccines and parasiticides (which include anthelmintics, flukicides, acaracides and insecticides) either alone or more commonly in combination.

Use the product most suitable for the time of year and management of the cattle involved.
See www.cattleparasites.org.uk for products available

Section 3: Seasonality of parasites in relation to control

There has been some scepticism regarding calendar-based approaches to parasite control and yet, strong underlying seasonal trends in temperate climates with respect to plant growth, parasite epidemiology, cattle husbandry, farm management and housing, means parasite control is inevitably related to the time of year.

At the start of any grazing season, following winter housing, pasture will typically harbour small populations of infectious larval nematodes, the actual numbers depending on the weather over winter. Paradoxically, larval survival for some parasites can be greater following a cold winter than a warm one. However, in the case of liver fluke, infection levels in spring may be higher following a mild winter.

Parasite infections

- Quickly acquired after turnout
- Control measures need planning
- Treat cattle around housing time to cut winter infections

Once cattle start to graze, they quickly acquire new helminth infections and through a combination of mechanisms (such as auto-infection and higher speed of development of free-living stages). Parasite populations typically increase from mid-July onwards for parasitic gastroenteritis and from late summer for liver fluke. Lungworm infections are also more common from July onwards, but there is more year-to-year, farm-to-farm and pasture-to-pasture variation than is seen with parasitic gastroenteritis and liver fluke.

Helminth control

These seasonal patterns of exposure and infection underpin three broad approaches to control:

1. Ensure that the rise in pasture infectivity, which naturally occurs as the grazing season progresses, is reduced
2. Move cattle from highly infected to minimally infected pastures before there is a major effect on performance
3. Mitigate the impact of parasitic helminths in cattle grazing infected pastures.

1. A number of options are available to limit the typical increase in parasite populations observed in cattle when no control measures are in place:

- If newly seeded fields or pastures not grazed by cattle for at least a year are available, then cattle can be grazed with little risk of acquiring significant new nematode infections. If such fields contain suitable habitats for *G. truncatula* and/or have been previously grazed by sheep, then fasciolosis remains a risk.
- Mixed or alternate grazing with cattle and sheep can reduce the infectivity of pasture with host-specific nematodes, but these practices will not help control liver fluke and may even increase fluke risks for cattle, as sheep are good hosts for *F. hepatica*.
- Vaccination of at-risk cattle against *D. viviparus* provides protection against clinical disease, but also limits the number of patent infections, which decreases the number of lungworm larvae on pasture and diminishes the subsequent risk of disease.
- Early season administration of anthelmintics ensures that few gut worm eggs or lungworm larvae are deposited on pasture up to mid-July, by which time the majority of overwintered infective larvae will have died. This renders these pastures as relatively low-risk for the remainder of the year. These approaches are most appropriate for weaned calves in the first or second grazing season.
- Treatment of cattle that grazed the previous year with a flukicide at housing and/or over winter to ensure that no adult fluke survive means that no fluke

eggs will be deposited on pasture in the spring, so snails cannot acquire new infections. On heavily infected farms, an additional flukicide treatment 2-3 months after turnout will help reduce the infectivity of snails and pastures throughout the year.

2. The second option is to graze cattle on infected pasture up to mid-July. These animals will probably not grow as well as anthelmintic-treated animals, but they are unlikely to encounter pasture infection levels that will result in clinical ostertagiosis. Similarly, they are at low (but not no) risk of husk and fasciolosis. Once silage or hay aftermaths become available, cattle can be moved to these fields, which should be low risk for parasites, providing they have not been grazed by cattle (or fluke infected sheep) since the previous year.

Ideally, an effective anthelmintic should be given prior to moving cattle onto aftermaths to ensure the fields are not immediately re-contaminated with worm eggs or larvae, as they develop rapidly at this time of year and aftermaths could quickly become high risk for parasitic worms.

The barrier to this practice is that if anthelmintic resistance is present, then there can be a strong selection in favour of the resistant worms; this has been demonstrated in sheep and has a theoretical basis in cattle too. One solution that has been shown to work in sheep is to a leave a small (~10%) proportion of the heaviest animals untreated. This should limit the number of parasites that contaminate the new field and allow reasonable growth rates.

3. If cattle, particularly young stock, remain on infective pasture and have not been vaccinated or treated with anthelmintics strategically, they will normally be at high risk of parasitic gastroenteritis and husk from July to housing.

Under constant larval challenge, the options are to monitor closely and treat individuals or groups as soon as clinical signs appear. However, this approach will inevitably result in poor performance and may compromise animal welfare.

From July onwards, regular anthelmintic treatments every 4-6 weeks (depending on product) can help maintain growth rates, although performance is rarely as good as on pastures with low infectivity. It should also be noted that grass quality and sometimes quantity decline on permanent pastures in the second half of the grazing season, so the impact of parasites on livestock performance can be compounded by poor nutrition.

For more information on specific helminths see the relevant COWS manual chapter.

Helminths at housing

Irrespective of parasite control options used during the grazing season, housing provides an opportunistic and epidemiologically relevant time for parasite control. Although there are occasional rare exceptions, it can be assumed that acquisition of new helminth infections ceases after housing, as the infectious stages survive poorly in hay and silage. Thus appropriate treatment(s) at or around housing should ensure cattle are wintered free of both negative effects of helminth parasites and ostertagiosis Type II. Effective treatments should also ensure cattle are uninfected when turned out to graze in the following year and so will not be a source of pasture contamination.

Control opportunity around housing

Photo courtesy of Andy Forbes

Ectoparasite seasonality

The seasonality of the common, permanent, arthropod parasites of cattle – lice and mange mites – is relatively uncomplicated. Housed cattle are in close contact, which facilitates the transmission of lice and mites between susceptible animals. Furthermore, high humidity in houses and winter coats provide a good habitat for these parasites to complete their life cycles and to reproduce, so populations can build quite quickly and result in clinical disease within a few months of housing – typically from January onwards.

See the COWS chapter on Ectoparasites for information on individual parasites and their control options.

Ectoparasite control

Somewhat similar to the case with helminths, there are two approaches to ectoparasite control, strategic and therapeutic:

1. Treat cattle at housing in order to remove the cryptic lice and mite populations so that infestations do not build up over winter. This may be incorporated with other treatments within a preventative approach, almost by default with the use of macrocyclic lactones (MLs) to treat endoparasites.
2. Monitor the cattle over winter for signs of lice or mange and treat groups when necessary – this will normally be from January onwards. Conventionally, all animals in the group must be treated, plus in-contacts unless complete isolation can be achieved. However, an alternative of Targeted Selective Treatment may be considered appropriate in some situations, as outlined in the COWS Ectoparasite chapter.

When cattle are turned out, the lack of close contact and humid conditions in housing, loss of winter coats and exposure to ultra-violet light typically lead to a rapid recession of lice and mite populations, so it may not be necessary to treat mildly affected cattle that are to go out to grass within a couple of weeks.

Ectoparasiticides

There are two groups of ectoparasiticides available for cattle:

1. Topical pyrethroids, which are licensed for lice control but not for mites, except for permethrin, which is. These products do not have any anthelmintic activity.
2. Macrocyclic lactones (MLs), which also have anthelmintic activity, are licensed for the control of lice and mange mites. Their efficacy profile is influenced by the formulation; injectables are less effective than topicals against surface living species, such as biting lice and Chorioptic mange mites.

Section 4: Parasiticide resistance

Resistance to anthelmintics and ecto-parasiticides has become a central pivot around which much of veterinary parasitology revolves and in particular current approaches to treatment and control. Within the UK cattle population, the most important parasites in which reduced sensitivity and/or incomplete efficacy to certain parasiticides have been observed include:

- *Cooperia* spp to macrocyclic lactones (MLs)
- *Fasciola hepatica* to triclabendazole (TCBZ)
- *Psoroptes ovis* to macrocyclic lactones (MLs).

Correct dose rates are important

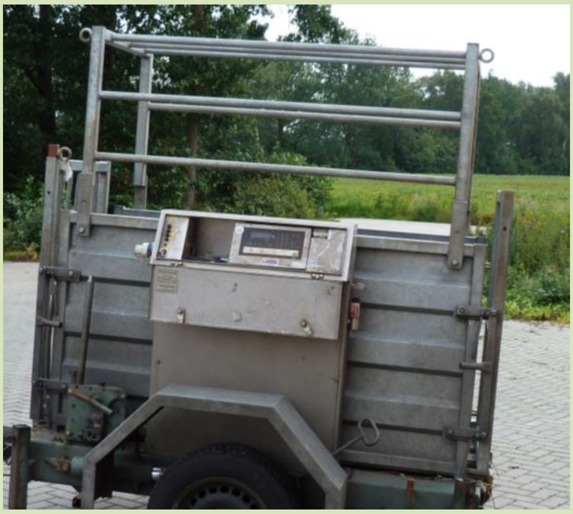

Photo courtesy of Andy Forbes

Cooperia species

Cooperia spp commonly infect young cattle in their first grazing season (FGS) and, together with *O. ostertagi*, are the main causes of PGE. For several macrocyclic lactones (MLs), *Cooperia* spp are one of the dose-limiting species and this means that even in sensitive isolates, efficacy at the recommended dosage can be ≤95% and also any under-dosing will allow a higher proportion of worms to survive.

This is normally considered to be non-selective escape, that is to say the worms that survive treatment have not necessarily been subject to genetic selection for resistance. Efficacy of <95%, as measured by faecal egg count reduction test, was observed on half the farms that participated in early field studies with topical ivermectin and it is not unusual to find some *Cooperia* eggs in faecal samples following treatment with topical MLs.

However, there is no room for complacency and these reports should be seen as early warnings that anthelmintic resistance in cattle nematodes is a threat and actions which mitigate the risk should be given serious attention. In New Zealand, where ML-resistant *Cooperia* spp in cattle were first identified over 20 years ago and are now widespread, it appears that clinical problems have not arisen, though sub-optimal growth rates have been suspected.

If poor ML efficacy against *Cooperia* spp. is observed, then treatment with either levamisole or a benzimidazole can be used in conjunction with an ML to get prolonged control of *O. ostertagi*, to which most UK isolates appear to still be sensitive. *O. ostertagi* populations that are resistant to MLs have been identified abroad and this highlights the risk of this happening in the UK.

Liver fluke

Whilst triclabendazole (TCBZ) resistance has been described in liver fluke isolates from sheep, treatment failures have also been observed on cattle farms, including those with no sheep.

As with macrocyclic lactone (ML) resistant *Cooperia* spp, in the absence of nationwide random surveys, it is impossible to know the true prevalence of triclabendazole resistance, but there have been reports from many parts of the UK and Ireland. It is not clear if the genes for resistance in *F. hepatica* are expressed in all life cycle stages, but clinical observations and research indicate that adult infections, as well as juvenile fluke infections, are not controlled when TCBZ-resistance is present.

Treatment failure in acute fasciolosis in sheep is serious as there are no other single flukicides with activity against juveniles <6-8 weeks of age, which cause this manifestation of liver fluke disease.

In cattle, clinical signs and production losses are more commonly associated with adult fluke and chronic infections and hence other flukicides can be used if TCBZ resistance has been diagnosed. The timing and frequency of treatment with flukicides other than TCBZ may have to be adjusted to take account of their limited efficacy against juvenile fluke.

Psoroptic mange

P. ovis infestations in cattle appear to have been (re-)introduced into the UK via imported cattle within the last five years and the disease has proved difficult to treat.

Licensed products for treatment and control of psoroptic mange in cattle are the macrocyclic lactones (MLs). A single treatment can be effective in eliminating the mites, but in some animals in some herds, repeat treatments are required. Permethrin is not licensed for the treatment of *P. ovis*, but it is effective against other types of cattle mange, and it has been used off-label to treat some intractable cases of psoroptic mange. This does not always appear to be a straightforward example of resistance because studies in Belgium showed that Holstein cattle responded well to a single ML treatment, while efficacy was incomplete in Belgian Blues infected with the same isolate, suggesting a complex host-parasite-parasiticide interaction.

Current approaches, based on clinical experience, in an outbreak of psoroptic mange in cattle include simultaneous treatment of all cattle in the infected group and all in-contacts, then isolation and re-treatment of non-responders at 7-10 day intervals until clear.

Section 5: Quarantine in relation to parasite infections

There are international and national regulations that include quarantine procedures for cattle imported from outside the UK and these include treatments for parasites such as warble flies (*Hypoderma* spp.), which have been eradicated from the UK. Even at this level of control, quarantine may not be fully effective, as the re-emergence of psoroptic mange in cattle in the UK bears testament. It is strongly suspected that this parasite (*Psoroptes ovis*) arrived in imported breeding cattle from European countries where the parasite is prevalent.

Therefore, all the parasites described in the previous COWS manual chapters may need to be considered in quarantine programmes and/or their sensitivity to anthelmintics or ecto-parasiticides. Some common parasites such as *Ostertagia ostertagi, Cooperia oncophora* and lice are essentially ubiquitous, so it makes no sense to target them specifically in quarantine programmes. However, if cattle arrive heavily infected with parasites, they should be treated to benefit their health and productivity. Of the remainder, potential target parasites for quarantine include:

- Macrocyclic lactone-resistant *Cooperia* spp.
- Lungworm, *Dictyocaulus viviparus*
- Liver fluke, *Fasciola hepatica*
    - Triclabendazole-resistant *F. hepatica*
- Psoroptic mange, *Psoroptes ovis*

A prerequisite for planning quarantine measures is that, ideally, the parasite status of the animals on the recipient farm must be known, including their resistance profile relating to the parasite species listed above. To complement this knowledge, the same information for incoming cattle would be helpful, but it may be more difficult to obtain. Extensive testing would provide much of this information, but at a cost, which would need to be included in a risk assessment.

Why quarantine cattle?

- To minimise the risk of importing novel and unwanted infectious agents, including parasites
- To ensure newly arrived stock are protected against endemic diseases they may encounter on the new farm

In essence, if both the incoming and resident animals have the same status with respect to a particular parasite, then there may be little to gain from quarantine. For example, if bought-in cattle have liver fluke and the receiving farm already has this parasite and suitable snail habitats, then the fluke-status of the farm will not be changed by quarantine treatment. However, as with other parasites, it makes good sense to treat incoming animals with a flukicide, so they do not add to the existing fluke populations and to ensure the cattle are healthy and perform well.

One aspect of the cattle industry that can help in quarantine is that many breeding stock sales take place in the autumn. This means cattle can be housed on arrival, so the whole winter is available for the control/elimination of helminth infections before turn out in the following spring, when they will be exposed to the endemic parasite populations. Conversely, winter is the time when lice and mange are common, so they may need attention.

Table 1 gives some examples of approaches to quarantine, taking into consideration the infection status, either positive (+) or negative (-), of both bought-in and resident cattle. The examples are drawn from what is currently important, but could obviously change in the future in response to a ‘new’ parasite such as rumen fluke (*Calicophoron daubneyi*) or if resistance emerges as a problem in other parasite genera.

Table 1. Potential courses of action when bought-in and resident cattle have different parasite infections (no specific quarantine procedures are needed if their status is the same)

Parasite	Bought-in	Resident	Action
Macrocyclic lactone (ML) -resistant *Cooperia*	+	-	Treat bought-in with levamisole (LEV) or a benzimidazole (BZD)
	-	+	Nothing
Lungworm	+	-	Treat bought-in with an ML, LEV or BZD
	-	+	Vaccinate bought-in cattle
Liver fluke	+	-	Treat bought-in with triclabendazole (TCBZ) or another flukicide and keep off pasture until fluke-free
	-	+	Nothing; monitor
Triclabendazole (TCBZ) -resistant liver fluke	+	-	Treat with another flukicide once or twice and house until fluke-free
	-	+	Nothing; monitor
Psoroptes ovis	+	-	Treat with ML (and/or permethrin) until free of living mites
	-	+	Keep separate from resident cattle; treat if they become infected

In addition to the use of diagnostics in determining the initial parasite status of different groups of cattle, they can also be used to determine the success of any quarantine treatments and judging when bought-in cattle can join the main herd. For evaluating efficacy, a suitable interval between treatment and examination of dung samples for fluke eggs and nematode eggs or larvae and for doing skin scrapes for *Psoroptes ovis* would be two weeks. The only exception to this would be checking for fluke eggs after treatment against triclabendazole (TCBZ) resistant fluke, when sampling should be delayed until eight weeks after the first treatment or two weeks after the second, depending on the product used.

Quarantine is an important measure in the control of the spread of infectious diseases and the ability of bought-in cattle to acclimatise to their new surroundings, which include endemic parasitic diseases. Realistic objectives should be set and these are determined by the infection status of resident and bought-in stock; if unknown, diagnostics can be used. In the absence of this knowledge, vets and farmers have to rely on educated judgements and subjective risk management.

Section 6: Completing the cycle

Cattle can be infected by several different parasites at the same time, because some elements of the parasites' epidemiology overlap and because some of the control measures cover more than one species. However, achieving an evidence-based, but practical, level of control need not be overly complicated.

As this COWS manual chapter has already outlined, parasiticide treatments given at or during the housing period can be the fulcrum around which control over the rest of the year can be based. This is because all the major parasites of cattle can be controlled through the application of appropriate parasiticide treatments to animals at risk, to alleviate the effects of existing burdens and to remove the risk of subsequent diseases such as Type II ostertagiosis and mange. In addition, cattle that will be grazed the following year can be turned out in the knowledge that they will not immediately contaminate pasture with parasite eggs or larvae.

During the grazing season, parasite control should be farm and farmer specific in order that the farm type, topography and facilities can be matched to the owner's objectives and attitudes. Risk assessment is one of the keys to developing parasite control programmes that remain current and flexible enough to adapt to changing circumstances. In monitoring livestock for parasite infections, it is important to incorporate a number of different measurements, so a full picture can be constructed. Over-reliance on single measurement parameters can lead to misleading advice. Table 2 provides some examples of useful components of a risk assessment for helminth parasitism on a cattle farm.

The final word is on the parasiticides (which can include anthelmintics, flukicides, acaracides and insecticides) that frequently form the basis for control measures. In the first instance it is important that advisors, suitably qualified persons (SQPs) and vets, either know the technical properties of the various products or where to find the information quickly. Otherwise, it is irresponsible to offer advice on parasite control. Information on aspects such as spectrum of activity, persistent activity, withdrawal periods, dosage, use recommendations and precautions can also change, so should not be guessed. In addition, local knowledge of important information, such as resistance status, can be incorporated into advice, as can farmer preferences with respect to options such as method of administration.

Planning treatments

- Must be evidence-based
- Must be practical for farmer
- Must consider farm system
- Should have some flexibility
- Ensure accurate dosing
- Measure the success

Farmers must also take responsibility in terms of checking labels, particularly to confirm dosage rates and to check dosing equipment for accuracy. Equally important is that the weight of cattle is measured as accurately as possible for correct dosing, as both over or under-dosing can lead to problems. It is not always necessary to compromise parasite control for convenience, but if farmers do not follow advice because of impracticality, then the parasites will win some battles, if not the war.

Further information on correct administration of different product types is given in the COWS manual Appendix: Administering Anthelmintics

Information on individual products is available in the NOAH Compendium of Data Sheets for Animal Medicines at www.noahcompendium.co.uk or from the product manufacturer. Duration of activity of products can vary widely. Always check the latest product data sheet and/or product label before advising or administering products.

Table 2. Grid for assessing risk of disease and production losses from parasitic helminths in cattle

Risk factor	High	Medium	Low
Age (grazing seasons)	<1 year (First grazing season)*	1-2 years (Second grazing season)	>2 years (adult)**
Age at turnout for weaned calves (First grazing season)	<6 months	6-8 months	>8 months
Weight gain (<2 years old) two months after turnout	<0.7 kg/day	0.7-0.8 kg/day	>0.8 kg/day
Faecal worm egg count (epg) (in weaned calves) two months after turnout	>200	50-200	<50
Herbage mass, kg DM/ha Sward height, cm	<1000 <4	1000-2000 4-8	>2000 >8
Field type	Permanent pasture	Silage/hay aftermath	Newly sown, ungrazed leys
Grazing history	Grazed by cattle <1 year old within last year	Grazed by cattle 1-2 years old within last year	Grazed by adult cows, sheep*** or other species within last year
Bulk milk tank *O. ostertagi* antibodies (Optical Density Ratios) (dairy herd)	>0.8	0.5-0.8	<0.5
Snail habitats	Widespread	Patchy	Isolated/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****

* Weaned calves in their first grazing season are high risk, but beef suckler calves grazing with their dams are at low risk of parasitic gastroenteritis (PGE)

**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

****Be aware of bought-in animals that could bring in infection (Fluke and/or lungworm) or be immunologically naïve (lungworm)

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See www.cattleparasites.org.uk for products available