

Herdsure[®] protocol for liver fluke infection in cattle herds



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Introduction

This protocol describes the processes used to determine the liver fluke status of a cattle herd and for the control and subsequent monitoring.

This protocol is suitable for both dairy and beef herds.

The three main elements of this Herdsure® protocol for liver fluke are:

- sampling and testing to determine status.
- advice on appropriate treatments, if any, following test results.
- advice on appropriate management measures, if any, to reduce the risk of liver fluke infection following test results.

This protocol refers only to the control of liver fluke infection in cattle. Liver fluke can affect other species of animal such as deer, South American Camelids (SAC) and especially sheep. Liver fluke monitoring, and if necessary control measures, should also be applied to these animals if they are present on the farm, especially if they share grazing with cattle. Your AHVLA Regional Laboratory is able to provide appropriate testing and advisory services for this purpose.

The liver fluke protocol comprises three levels of 'health status':

Level 1	Establishes the liver fluke infection status of the herd.
Level 2	Aims to reduce the burden of liver fluke in the herd to a level at which it does not significantly affect cattle production or welfare.
Level 3	Monitors and aims to maintain the improved (or established as satisfactory at Level 1) health status of the herd for liver fluke infection.

The disease

Introduction

The liver fluke *Fasciola hepatica* is a parasite that infects the liver of grazing animals, including cattle, sheep, deer, llamas, alpacas and some wildlife such as rabbits. The parasite causes liver damage by the migration of immature larvae and blood loss by the feeding activities of the adult parasite. The term for diseases caused by the liver fluke is *fasciolosis*.

Knowing how to control this parasite requires an understanding of its lifecycle and how it spreads.

Lifecycle

The liver fluke has a lifecycle that includes a species of snail as an intermediate host, with grazing animals being the final host. Adult liver flukes in the liver of cattle or sheep lay eggs that pass out onto the pasture in faeces. Each egg hatches to produce a larva that infects the snail species where it multiplies. The next stage of the parasite then leaves the snail and makes a cyst on the grass to be eaten by grazing animals. Larvae in the cyst hatch out in the intestine of the animal and migrate to the liver where they mature and lay eggs for the lifecycle to begin again.

Warm wet weather conditions are necessary for the lifecycle and for the snails to multiply. This is why there is more fluke infection in very wet years such as experienced in 2007, 2008 and 2009.

Animals become infected in the autumn and early winter by grazing infective pasture. Wet pasture (where the snails breed) poses more risk to grazing animals as there are more encysted larvae to be eaten. Infection is also commonly acquired in May and June but, because of changing weather patterns, infection should not be ruled out at other times of the year as well.

Spread of infection

Fasciolosis is commonly diagnosed by AHVLA in the wetter western half of Great Britain. Over the past 15 years, there has been significant spread to other parts of the UK. It is now found with increasing regularity in the east of Scotland and East Anglia.

This spread has been made possible by:

- the greater movement of infected animals, particularly sheep, to farms that operate poor biosecurity.
- changing weather patterns, with increased rainfall and milder winters throughout the UK which benefits the lifecycle of the parasite and its intermediate snail host.

Eradication of the liver fluke is difficult because wildlife reservoirs can maintain infection on many farms. The objective, therefore, is to reduce infection to a manageable level that does not affect the economics of farm production or impair cattle welfare.

Impact of the disease

The parasite can cause significant economic loss. One estimate in 2001 for the economic loss caused by liver fluke infection worldwide was \$200 million. Another study of the financial loss in Switzerland in 2005 was estimated as €299 per infected animal. A more recent study involving bulk tank milk samples estimated the loss of production in dairy cows as a decrease in annual average milk yield of 0.7 kg per cow per day and an increase in the mean inter-calving interval of 4.7 days.

Many farmers will have first-hand experience of liver fluke infection from the condemnation of livers in cattle and sheep sent for slaughter. Infected livers have scarring and fibrous reactions that make them unsuitable for human consumption. In addition, live animals can show signs of disease.

Acute fasciolosis occurs when the migration of large numbers of immature flukes cause liver damage, leading to blood loss. It can lead to the death of the animal. The symptoms of acute fasciolosis are seen more commonly in sheep and only rarely in cattle because the bovine liver is larger and more able to withstand this challenge.

Chronic fasciolosis is more common in cattle and occurs when small numbers of encysted larvae are eaten over several weeks. Clinical signs in cattle are associated with chronic inflammation and the blood feeding of the adult parasite. Animals show weight loss and reduction in milk yield. In severe cases, animals develop fluid accumulation under the jaw ('bottle jaw'). Chronic fasciolosis is commonly associated with diarrhoea in cattle and can occur with other infections such as Salmonellosis and Johne's disease.

Sub-clinical infection is also recognised in cattle. Growing animals with sub-clinical infection have poorer weight gains, while dairy cows have lower milk yields. Metabolic disease and 'downer cow syndrome' associated with chronic fasciolosis have also been reported.

Testing for the disease

The main difficulty with some of the diagnostic tests is proving the animal is infected at the time of sampling, i.e. 'current infection'. The gold standard for diagnosis is post-mortem examination and finding the parasite in the liver.

Fluke egg detection in faeces is a widely used test, but has a sensitivity of 60%. This means there is only a 60% chance of detecting infection by this method if it is present. There are a number of reasons for this:

- faecal egg detection cannot confirm immature fluke infection where no eggs are produced.
- when mature flukes produce eggs, only low numbers are produced (one to two eggs per gram of faeces).
- fluke eggs can also accumulate in the gall bladder and are excreted intermittently.

To maximise the chance of detecting fluke eggs, composite faeces samples (where a number of individual samples are added together) are used for the Herdsure® service.

The composite fluke egg detection test, as used in the Herdsure® protocol, is a screening method to detect fluke eggs in 10 faeces samples: 40 faeces samples will be collected randomly, from fields or pens, which will be used to make up four composite samples to look for fluke eggs.

The detection of fluke antibodies in blood samples is also a reliable way to demonstrate exposure to infection. Animals that eat encysted larvae develop antibodies in the blood about 2 weeks later. Antibodies can persist for up to 9 months after treatment, so this test does not prove that an individual is currently infected.

However, by blood sampling a statistically valid number of animals, we will have a good idea whether there is infection in the group tested. Blood sampling can be done when your veterinary practitioner is taking blood samples for other diseases such as BVD.

The bulk milk tank ELISA detects liver fluke antibodies that dairy cows excrete in their milk. This is a good screening test for lactating dairy cows that contribute their milk to the bulk milk tank.

Biosecurity

Farmers who subscribe to the Herdsure® service must ensure that they operate biosecurity measures that prevent the introduction or re-introduction of fluke infection onto their farm. Owing to the difficulty in proving current infection, purchased animals should be treated with a flukicide drench before or after arrival on the farm.

Treatment before arrival is best; treating 10 days before arrival allows time for any fluke eggs in the intestinal tract to be expelled so that eggs are not present to seed the pasture on the farm.

If treatment before arrival is not possible then animals should undergo a period of quarantine and treatment after arrival. Any faeces should not be put on the land because of the risk of seeding the pasture with fluke eggs.

Resistance to one of the most important flukicides, triclabendazole, is now increasingly reported. Your veterinary practitioner can advise you which products contain it. There is a risk of introducing infected animals with fluke that are resistant to triclabendazole. Wherever possible, animals should be sourced from farms where the disease status is known and there is no possibility of introducing triclabendazole-resistant fluke. If there is a risk of introducing triclabendazole-resistant fluke then animals must be treated with a flukicide that does not contain triclabendazole. Your veterinary practitioner can advise you which product to use.

Keeping track of your herd's progress in Herdsure®

An **annual herd progress report** will be issued to Herdsure® members. The progress report will detail the level achieved for each protocol for which the herd is enrolled on the date of issue.

For a small fee, an updated progress report can be produced. The updated progress report, like the annual report, will detail the level achieved for each protocol for which the herd is enrolled on the date of issue.

Adding cattle – avoiding buying in disease

The Herdsure® service recommends that all added animals are isolated and tested before joining the herd.

Treatment and control

Suggested treatment strategies are explained below. These should be discussed with your veterinary practitioner to ensure the correct choice of flukicide and the correct timing of treatment.

(i) Non-milking cattle

The period of greatest risk is the autumn and early winter. A minimum of two treatments should be given. The first treatment should be given at housing or, if cattle are not housed, during late autumn or early winter. A product that kills immature and adult fluke, such as triclabendazole, is advisable.

A second treatment in the spring will kill fluke that have either survived the housing treatment or, in the case of out-wintered cattle, is the result of re-infection. A product that kills only adult fluke will suffice for this second treatment for housed cattle. For outwintered cattle that have grazed pastures that may be contaminated with liver fluke metacercariae, use a flukicide effective against both adult and immature liver fluke.

In heavily fluke endemic areas, a third treatment can be given in July.

In time, it may be possible to reduce the numbers of treatments given to a single annual dose at housing. Owing to the likelihood of wildlife reservoirs, this treatment should continue.

(ii) Milking cattle

There are no flukicide products available with zero milk withholding time. In endemic areas, individual cows are treated at drying off and with a variety of products.

For spring-calving herds, other possibilities include a treatment at drying off in the winter using triclabendazole, as this removes both mature and immature flukes. Triclabendazole cannot be given to lactating cows so you must consult your veterinary surgeon for advice about the timing of treatment in order to avoid lengthy periods of milk withdrawal. Treatment after housing has the benefit that dairy cows will not ingest significant numbers of encysted larvae when housed, although some will be present in hay and silage.

In cases where a heavy challenge and clinical disease is likely, you may want to consider synchronising the calving pattern so that animals are not lactating during the autumn.

(iii) Mixed grazing (cattle and sheep)

On mixed cattle and sheep farms where fluke infection has been diagnosed, treatment of sheep is advised. In the autumn, treatment with a compound effective against immature fluke is recommended. Farmers should avoid combined products to avoid unnecessary treatment of sheep for roundworms, as this can select for resistance in roundworms. Sheep brought onto the farms for winter grazing should be treated with a flukicide 10 days before arrival to avoid introduction of infection.

(iv) Other control measures

There is a greater risk of infection in wetter areas of the farm, and around ponds and streams, because of the presence of the intermediate snail host. These areas can be fenced off, particularly if there is a forecast of a high risk of infection (see below).

It is advisable to keep lactating cattle on the drier areas of the farm in the autumn because of the difficulties in treating the dairy herd.

The protocol

Level 1

Objective of Herdsure® testing

Level 1 establishes the liver fluke infection status of the herd. This may be achieved by one of two options:

- detection of liver fluke infection in the herd by following the Herdsure® Level 1 protocol.
- evidence of recent liver fluke infection by another means such as diagnostic testing of clinical cases, *post mortem* examination or meat inspection.

The Herdsure® Level 1 protocol gives a number of different testing options depending on the herd makeup and the following steps should be followed:

1. Determine (with your veterinary practitioner) which groups of animals are at risk of encountering liver fluke and which are not (see below).
2. Decide (with your veterinary practitioner) which of the following two options you will use for sampling – you may use different sampling methods for different groups:
 - faecal sampling
 - blood sampling.
3. Dairy herds have the additional option of testing the milking cows using a bulk milk test.

At-risk animals are those that have grazed pastures on the farm where there is significant risk of harbouring fluke-infected snails and where the interval between earliest exposure on pasture and sampling is at least 12 weeks. This category of animals should *exclude* the following:

- the main cow herd (this is sampled separately).
- any cattle treated for liver fluke within the 3 months prior to sampling.
- bought-in cattle (please seek advice from your veterinary practitioner).
- suckler calves that graze with their dams.

Sampling

Faecal sampling can be carried out by farm staff (see Appendix 7 for an example of the sampling method). It involves taking 40 separate faecal samples from the floor of the shed or the pasture. These are combined at the laboratory into four groups of 10 and each is tested for the presence of liver fluke eggs.

Blood sampling should be carried out by your veterinary practitioner. It involves the collection of blood samples from sufficient animals to give confidence to determine whether disease is present or not. This test measures antibodies to liver fluke.

Bulk milk sampling can be carried out by farm staff (see Appendix 7 for an example of

the sampling method) but please note that this test should only be used when at least 75% of the milking cows are contributing to the bulk milk tank. Please consult your veterinary practitioner for further advice if this is not the case.

All the above testing regimes should be carried out in the period from November to January as this is the time when adult, egg-producing flukes are likely to be present and when levels of immunity are likely to be highest.

If all the tests carried out are negative, the herd can progress directly to Level 3. If any of the tests are positive or inconclusive, this indicates that significant liver fluke is present in the herd and the herd progresses to Level 2. Level 2 aims to reduce the burden of liver fluke in the herd to a level at which it does not significantly affect production or welfare.

Level 2

Objective of Herdsure® testing

- Level 2 aims to reduce the burden of liver fluke in the herd to a level at which it does not significantly affect cattle production or welfare. Herds can enter Level 2 if the Level 1 protocol results indicate significant liver fluke infection in the herd or if there is other evidence of recent liver fluke infection (see above).

Procedure

Level 2 covers a period of 12 months during which the following steps are carried out:

- the herd is treated for liver fluke (see guidance in the treatment and control section above).
- biosecurity measures are followed to reduce the risk of introducing liver fluke.
- management practices are carried out to reduce the risk of exposure of cattle to liver fluke (see guidance above in 'other control measures').
- the herd is sampled as in Level 1 during the next winter period November to January.

If all of the test results are negative, the herd can progress to Level 3, which aims to monitor and maintain the improved fluke status of the herd. If any of the tests are positive or inconclusive, the herd remains in Level 2 for a further 12-month period.

Level 3

Objective of Herdsure® testing

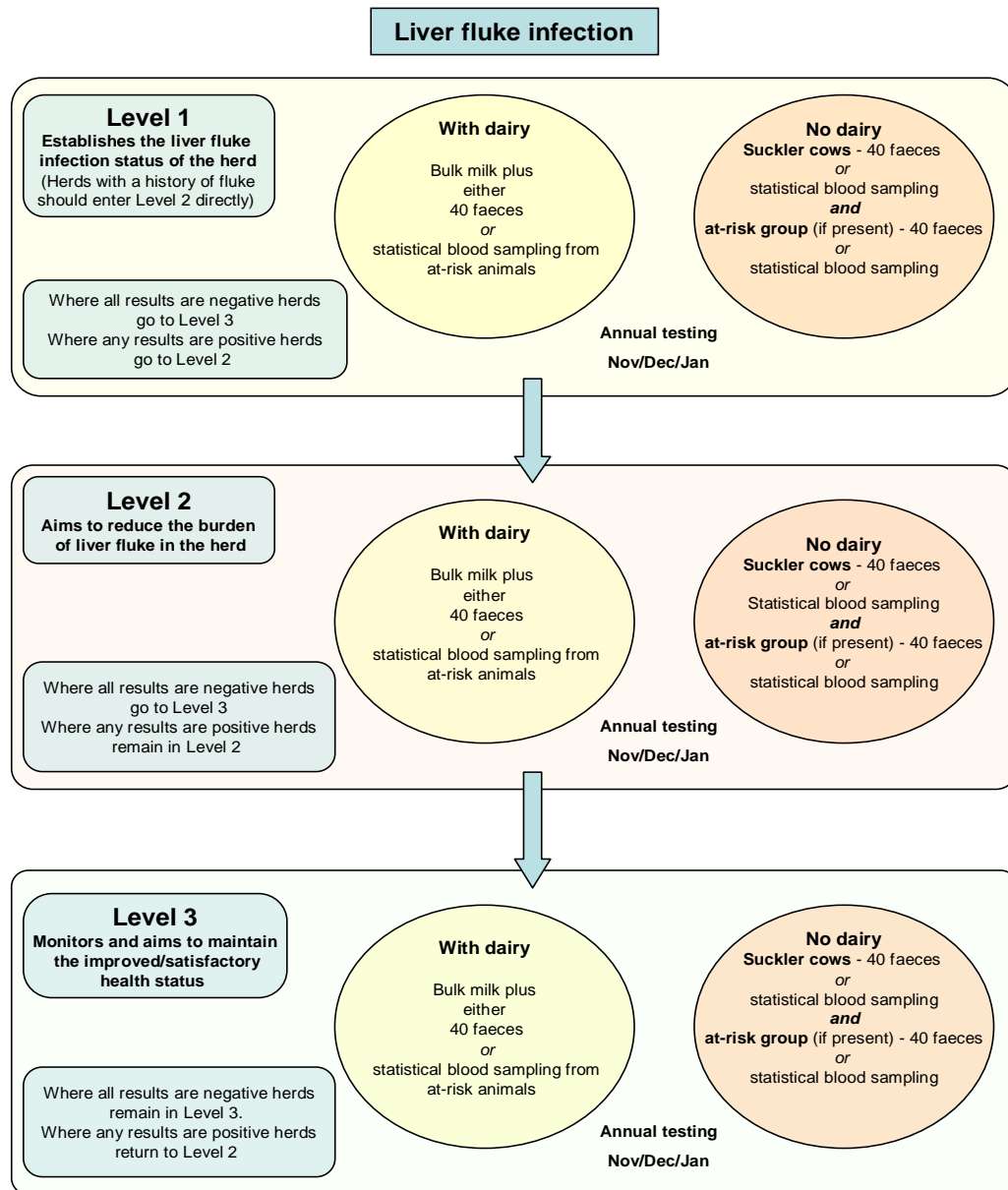
- Level 3 aims to monitor and maintain the improved (if moving from Level 2) or satisfactory (if moving from Level 1) liver fluke status of the herd.

Entry to Level 3 can be achieved either direct from Level 1 or from Level 2, in both cases where all testing has proved negative for liver fluke.

Procedure

Level 3 covers a period of 12 months during which the following steps are carried out:

- the herd is treated for liver fluke (see guidance in the 'treatment and control' section above).
- biosecurity measures are followed in order to reduce the risk of introducing liver fluke.
- management practices are carried out in order to reduce the risk of exposure of cattle to liver fluke (see guidance above in 'other control measures').
- the herd is sampled as in Level 2 during the next winter period November to January.



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