

Managing Parasites in Sheep

LIVER FLUKE



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MANAGING LIVER FLUKE

What's the problem?

The liver fluke, *Fasciola hepatica* is a parasitic flat worm that affects sheep, cattle and other grazing animals, and is often associated with wetter pastures.

However, fluke is no longer just a problem for the wetter, western areas of the UK and Ireland. Movement of animals and a generally wetter climate - even in traditionally drier, eastern areas - means that liver fluke infection is a major threat across all sheep farms. Recent studies found that 50% of Irish¹ and 54% of Welsh² sheep farms were positive for fluke infection.

Liver fluke infections can cause either, acute, subacute or chronic disease in sheep. Outbreaks of acute disease can be very impactful as it can cause sudden deaths in a large proportion of affected sheep. However the effects of all forms of disease can be costly, causing; ill thrift and reduced growth rates in lambs and poor reproductive performance and reduced milk production in ewes.

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Why does it matter?

Animals do not develop protective immunity to liver fluke, and there are no vaccines available for the prevention of fasciolosis (liver fluke disease). Unless an effective treatment programme is implemented on affected farms, sheep may suffer from clinical disease and reduced productivity.

Outbreaks of acute fasciolosis typically occur during late summer and autumn when pasture challenge is at its highest. It occurs when large numbers of juvenile fluke migrate through the liver, causing extensive damage to the tissue and blood vessels. Affected sheep rapidly become weak and may die suddenly.

Acute disease has a major negative impact on sheep welfare and productivity. The cost of diagnosis, treatment, death losses and disposal costs have a negative impact on farm profitability. In addition to this, managing outbreaks of acute fasciolosis can be distressing for farmers.

Chronic fasciolosis is less likely to result in death, but can cause significant production losses. The disease occurs three to five months after ingestion of fluke cysts (metacercariae) from pasture, and the resulting juvenile fluke migrate to the bile ducts to complete their maturation into egg-laying adults.

Sheep with chronic fluke infection show signs of ill-thrift, bottle jaw, anaemia, abdominal pain and have poorer wool quality³.

If left untreated, chronic fasciolosis can result in death. During an outbreak of chronic fasciolosis the cost per ewe was estimated at £8.73/€10.00³. The cost of subclinical disease may also significantly impact on farm profitability. In one study, lambs with a chronic sub-clinical fluke infection showed 15% reduction in feed intake and a corresponding reduction in liveweight gain⁴.

Sheep carrying adult egg-laying fluke are also contributing to pasture contamination, continuing the lifecycle of the parasite.

Lifecycle of the liver fluke

The adult stage of *Fasciola hepatica* lives in the liver of infected animals, specifically in the bile ducts. Adult fluke lay thousands of eggs each day which are passed along the bile ducts and into the intestine and excreted in dung. Once outside the animal, eggs can survive for several months, but usually hatch within 2-20 weeks depending on soil type and ambient temperature.

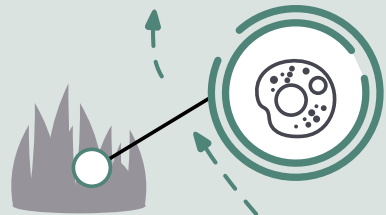
Freshly hatched larvae, called miracidia, depend on a secondary host - the mud snail *Galba truncatula* - to complete their life cycle. After entering the snail, the miracidia multiply several times and develop into cercariae. After around six weeks the developed cercariae exit the snail and attach to blades of grass on the pasture, where they form cysts, called metacercariae, ready to be ingested by grazing animals. Each individual miracidium can produce hundreds of cercariae, meaning pastures can become rapidly contaminated.

After ingestion by the host the cyst breaks open to release the immature liver fluke. This migrates through the animal's gut wall and abdominal cavity to the liver. The maturing fluke tunnels through liver tissue, enters the small bile ducts, and eventually reaches the large bile duct where it develops into an egg-laying adult, to complete the cycle. Without appropriate treatment, adult liver fluke can survive in sheep for many years.

The immature fluke tunnel through the liver tissue and enter the small bile ducts.

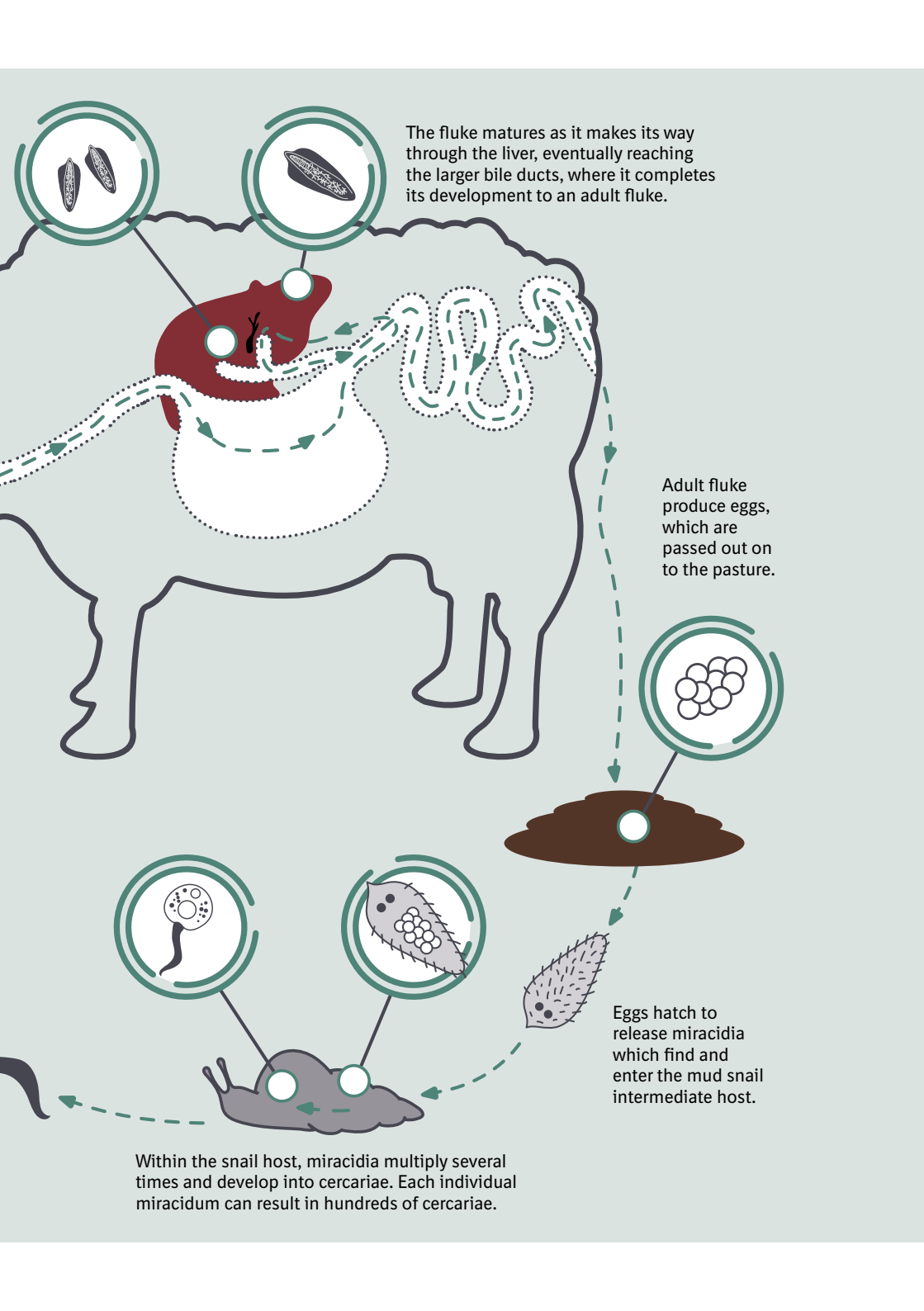
Once ingested, the metacercariae break open to release the immature fluke which migrate through the gut wall and abdominal cavity to the liver.

Metacercariae ingested with grass.



Cercariae attach themselves to blades of grass, where they encyst to form metacercariae.





The fluke matures as it makes its way through the liver, eventually reaching the larger bile ducts, where it completes its development to an adult fluke.

Adult fluke produce eggs, which are passed out on to the pasture.

Eggs hatch to release miracidia which find and enter the mud snail intermediate host.

Within the snail host, miracidia multiply several times and develop into cercariae. Each individual miracidium can result in hundreds of cercariae.

How to control liver fluke

Liver fluke control programmes must take into account the farm history, topography, geographical location and the prevailing weather.

Most programmes will rely heavily on flukicidal treatments, but due to the risk of selecting for triclabendazole-resistant fluke it is important that other active ingredients and techniques such as pasture management and good quarantine procedures are also included.

The choice of flukicide and frequency of use will depend on the level of fluke challenge, the time of year, and the management and husbandry systems on the farm.



Pasture management

Sheep are most likely to be infected when grazing near to the habitat of the mud snail, the intermediate host for liver fluke. Mud snails feed on algae that can be found in wet, muddy areas around water troughs, gateways, tractor ruts and other poached areas. They can also be found in slow moving water such as ponds and boggy low-lying areas of land. Management techniques such as limiting poaching and restricting access to high-risk, wet pastures, particularly during high risk periods, will help reduce infection.

Diagnostic testing should be used to help assess the need for flukicide treatments. To get the most out of this approach it is important that the most appropriate test is used and that the results are correctly interpreted.

- **Faecal samples** can be tested for the presence of fluke eggs. A positive fluke egg count indicates the presence of a chronic, adult fluke infection but does not provide information on the earlier, immature stages. Faeces can also be tested for coproantigen, a protein secreted by the liver fluke. This test can detect the presence of liver fluke around 2-3 weeks before they reach maturity and begin to lay eggs. Both tests can also be used after treatment has taken place, to assess efficacy of the active ingredient.
- **Blood samples** can be tested for the presence of antibodies. A positive result indicates that an animal has been exposed to the parasite. Antibody levels will remain elevated after treatment.
- **Post-mortem examination** can conclusively diagnose liver fluke infection. Similarly, abattoir feedback can provide valuable information on farm level fluke dynamics and the effectiveness of control measures.

Bought-in animals

Fluke control should form a part of a farm's quarantine plan in order to reduce the risk of fluke being introduced to uninfected farms, reduce the spread of triclabendazole-resistant fluke, and protect the health of bought-in animals. SCOPS provides detailed guidance on quarantine strategies.⁴

Sequential treatments may be required as part of a quarantine strategy to ensure that all stages of the fluke carried by an animal are effectively removed. Farmers should discuss this with their vet to determine the most appropriate approach for their farm.



Treatment

Treatment strategies should take into account farm-level risk factors and climatic conditions. Regional fluke forecasts such as those prepared by NADIS in the UK and the DAFM in Ireland can also provide useful guidance on seasonal risk.

Product selection should be based on the stage of fluke most likely to be present at the time of treatment; acute fasciolosis is generally seen during the late-summer and autumn, whilst sheep are more likely to be affected by chronic fasciolosis during late winter and spring, from January to April.

Most flukicides on the market are effective at killing adult liver fluke and are therefore suitable to control chronic fasciolosis. However, triclabendazole is the only compound that will treat the early immature fluke that are the cause of acute fasciolosis.

Resistance to triclabendazole is a real threat to the sheep industry so appropriate steps must be taken to use it only when needed, to preserve its long-term use. Repeated and frequent use of triclabendazole should be avoided, and alternative active ingredients should be used wherever possible, particularly in late winter and spring when the risk of acute fasciolosis is lower and treatments are targeted at the later fluke stages.

Combination fluke and worm products should only be used when there is an identified need to treat worm species at the same time as fluke. Anthelmintics should be targeted specifically at the parasites to be treated, to avoid selection for resistance.

As always, alongside product selection, correct dosing and administration is key to ensuring that treatment is effective.



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References

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3. Sargison and Scott (2011) Diagnosis and economic consequences of triclabendazole resistance in *Fasciola hepatica* in a sheep flock in south-east Scotland. *Veterinary Record*. 168(6): 159-164
4. SCOPS <https://www.scops.org.uk/>

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