

Paramphistomum spp in Irish livestock

A previously unidentified *Paramphistomum* spp, has now been identified in sheep flocks and deer herds; Sharon Magnier, ruminant technical adviser, MSD Animal Health, looks at the impact this will have in Irish livestock

In the past, paramphistomosis (infection with rumen fluke) was not considered to be a significant parasitic disease in cattle in Europe. However, over the past few years the prevalence of rumen fluke has increased sharply and clinically significant outbreaks have been reported in several European countries, including countries with a temperate climate, such as Ireland.¹ Since 2012 cases of clinical paramphistomosis, severe enough to cause mortalities have been reported in both cattle and sheep.¹

LIFE CYCLE

The life cycle of rumen fluke has similarities to liver fluke in that it is indirect, involving the mud snail (*Galba truncatula*) as the intermediate host. Encysted fluke (metacercariae) on pasture are ingested by grazing ruminants. The cyst wall is digested releasing immature fluke larvae into the duodenum. These larvae, at only 1-3mm long, are tiny and feed on plugs bitten off the intestinal wall, causing severe fluid and blood loss if present in large numbers.² Feeding can last for up to six weeks on the mucosa of the duodenum.³ Larvae develop into adults as they pass through the rumen and reticulum and are visible on the wall of the reticulo-rumen as 15mm pink or red parasites.² The adults produce eggs that are shed out in faeces, contaminating pasture. The pre-patent period is seven to 10 weeks.³ Eggs hatch in water into miracidiae, which infect the mud snail and develop through several stages within the snail until emergence. Metacercariae then encyst on grass, ready to be ingested again by grazing livestock.

PREVALENCE OF RUMEN FLUKE VERSUS LIVER FLUKE IN CATTLE

Presence or absence of fluke eggs in faeces requires careful interpretation with regards to presence or absence of clinical disease. Pre-patent disease may still exist in cases where liver fluke eggs have not been detected in faeces. Conversely, rumen fluke eggs may be detected in cattle without any clinical signs of disease. According to the most recent *All-island Disease Surveillance Report*, between 2013 and 2015 rumen fluke eggs were consistently detected in approximately 40% of bovine faecal samples submitted, while the detection of liver fluke eggs fell from around 12% to 5% during this time period.⁴ It must be remembered that mortality due to rumen fluke is not correlated with prevalence of infection or detection of eggs in faecal samples.¹ The

species of rumen fluke that has been identified in cattle is *Calicophoron daubneyi*.

CLINICAL SIGNS

The immature stages of the fluke in the duodenum cause clinical disease including enteritis with diarrhoea anorexia dehydration and increased thirst.³ Youngstock are more vulnerable than older cattle and infection has been associated with high mortality in this group.

RUMEN FLUKE IN SHEEP

A recent study in Irish sheep flocks into the prevalence and risk factors associated with rumen fluke demonstrated an exceptionally high true flock prevalence of 85.7%.¹ This is considerably higher than the prevalence reported in other European countries and also higher than previously reported passive surveillance data in Ireland.¹ However, the economic impact of this is currently unknown. Similar to the pattern in cattle, rumen fluke eggs are more frequently detected in ovine faecal samples than liver fluke eggs.⁴

- Flocks grazing lowland pastures have been found to be more than twice as likely to be positive for rumen fluke compared to those grazing on the mountain.¹ Flocks grazing with other livestock species have been found to be at greater risk of heavy infection than segregated flocks.¹
- The predominant species found in the recent Irish sheep flock study was *Calicophoron daubneyi*, previously thought to be the only species affecting livestock in Western Europe and Ireland.¹ However, surprisingly, during the study, *Paramphistomum leydeni* was identified for the first time in Irish sheep.¹ The clinical significance of the identification of this species in Europe requires further research. However, *P leydeni* has been found in increasing levels over the past few years in some areas of Argentina¹ and is considered an emerging parasitosis.⁵
- Suffolk sheep have been found to be less resistant to nematode infection than other breeds.¹ This is now also thought perhaps to be the case with regards to infection with rumen fluke.¹ The sustainability of Irish farming is a continued focus in the country and breeding policies that take into account resistance to parasitism will become increasingly important.

Feature	Rumen fluke	Liver fluke
Lifecycle	Indirect	Indirect
Intermediate host	Mud snail (<i>Galba truncatula</i>)	Mud snail (<i>Galba truncatula</i>)
Infective stage	Encysted metacercaria	Encysted metacercaria
Final host	Ruminants	Ruminants
Site of damage within host	Duodenum	Liver

Table 1: Rumen fluke versus liver fluke in cattle.

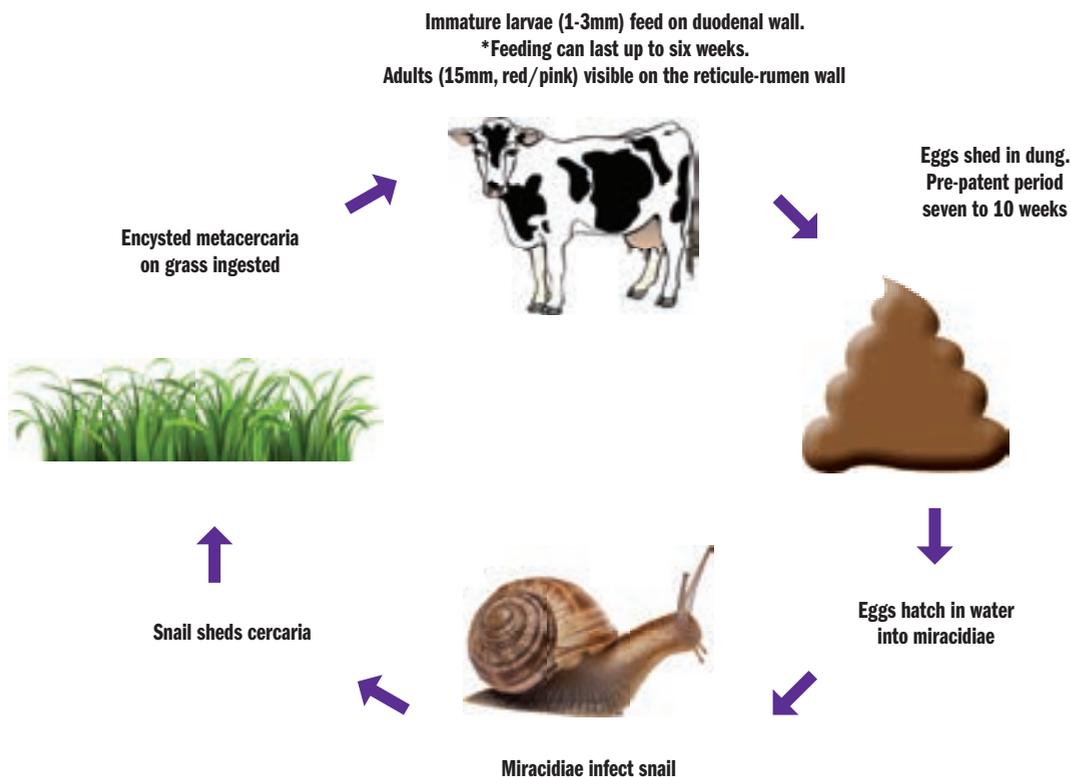


Figure 1: Rumen-fluke life cycle.

RUMEN FLUKE IN DEER

Calicophoron daubneyi and *P leydeni* have been identified as the species of rumen fluke found in Irish deer.⁵ Concurrent infection with *Fasciola hepatica* also occurs. The level of egg shedding in deer is far exceeded by the number of eggs shed by cattle suggesting that, while deer are a potential source of infection for livestock, they are unlikely to be a hugely significant source.⁵ Breed is also a risk factor for this species with fallow deer shown to have the highest fluke infection rates of the three deer species found in Ireland.⁵

Paramphistomosis should be on the differential list if clinical signs such as scour and weight loss in livestock are observed. Young stock are usually affected as older animals can develop resistance to reinfection but may continue to harbor numerous adult flukes.² The pathogenic stage of rumen fluke is the larval stage. Acute larval paramphistomosis can cause death in infected cattle. The pre-patent period for rumen fluke is seven to 10 weeks.³ Acute larval paramphistomosis, in the absence of patency, can be difficult to diagnose in the field as faecal samples, using a fluke egg sedimentation technique, will be negative. Faecal samples will only be positive in acute disease if the animal is co-infected with adult rumen fluke at the time of sampling. Larval fluke can be detected on post mortem. Generally, adult fluke that are found attached to the wall

of the rumen and reticulum do not cause clinical disease and appear to be well tolerated, even if present in large numbers.⁵ In suspected cases, very often it is the response to oxclozanide therapy that may confirm a diagnosis. This however, is far from ideal, particularly if the responsible use of medications is to be encouraged in order to reduce the likelihood of drug resistance developing. The Regional Veterinary Laboratories (RVLs) in Ireland have a method where they can take the standard fluke-egg sedimentation technique further by backwashing part of the sample and checking for *Calicophoron* larvae under a dissecting microscope. Using this technique, they can determine whether or not large numbers of larvae are present. They find a very good clinical correlation between their results and the response to oxclozanide therapy.⁶ How is it possible for larva to make it from the rumen, reticulum and duodenum to the faecal sample without becoming egg-laying adults? It is thought that larvae are flushed through the digestive tract in acute infestations as a result of a combination of the large numbers of larvae present, fluid diarrhoea and the resultant accelerated movement of ingesta through the tract.⁶ With current commercially-available coprological techniques, differentiation of egg species and identification of fluke down to species level is not possible.

TREATMENT

There is no product licensed to treat rumen fluke in Ireland. Oxclozanide, however, has been shown to be effective at reducing the fluke burden⁷ and remains the drug of choice to treat rumen fluke infections.⁸ Concomitant infections

Table 2: Risk factors for fluke in Irish sheep.¹

Pasture type grazed
Region of the country
Sharing of paddocks with other livestock
Breed

with rumen and liver fluke remain common in Ireland and it is important to choose a treatment that is effective against both parasites. Zaniil, containing oxyclozanide alone as the active ingredient, is available from MSD animal health and is licensed to remove adult flukes (*Fasciola spp*) present in the bile ducts of the liver. Tapeworm segments (*Moniezia*) are also removed when this product is used. Zaniil has a milk withdrawal in cattle of three days. Combination products containing oxyclozanide and levamisole are also available.

CONTROL

- Test bought-in stock. If positive for eggs on faecal examination dose with a product containing oxyclozanide prior to introduction to home pasture.⁹
- Manage wet ground – fence off flooded/water-logged areas. These habitats are attractive to the mud snail and will aid in transmission of the disease.
- Operate segregated grazing. It is thought that cattle may act as a reservoir for paramphistome infection for other livestock.¹

Calicophoron daubneyi is the predominant species of fluke found in livestock in Ireland. Research over the past few years has identified further species, namely *P leydeni* in sheep and deer. The clinical significance and economic impact of these findings however, requires further research.

REFERENCES

1. Martinez-Ibeas AM, Munita MP, Lawlor K et al. Rumen fluke in Irish Sheep: prevalence, risk factors and molecular identification of two paramphistome species. BMC Veterinary Research 2016; 12: 143
2. <http://www.merckvetmanual.com/digestive-system/fluke-infections-in-ruminants/paramphistomes-in-ruminants>, July 2017
3. Foster AP, Otter A, O'Sullivan T et al. Rumen fluke (paramphistomosis) in British cattle. The Veterinary Record 2008 162:528
4. Anon. DAFM/AFBI All-island Animal Disease Surveillance Report 2015
5. O'Toole A, Browne JA, Hogan S et al. Identity of rumen fluke in deer. Parasitol Res 2014;113(11): 4097-4103
6. Duignan G. Diagnosing acute larval paramphistomosis in ruminants. The Veterinary Record 2017; 180: 618
7. Rolfe PF, Boray JC. Chemotherapy of paramphistomosis in cattle Aus Vet J 64 1987; (11): 328-32
8. Malrait K, Verschave S, Skuce P et al. Novel insights into the pathogenic importance, diagnosis and treatment of the rumen fluke (*Calicophoron daubneyi*) in cattle. Veterinary Parasitology 2015; 207: 134-139
9. Animal Health Ireland Technical Working Group. Rumen fluke – the facts: for Irish farmers and their vets, 2011 www.animalhealthireland.ie/ckfinder/userfiles/files/Rumen%20Fluke%206pp%2025_8_11.pdf, July 2017



Intra Hoof-fit

**Intensive & Routine
Year Round Hoof Care**

- A Non-Antibiotic Product
- Contains Organic Chelate Copper & Zinc
- Intensive and Routine forms available (Gel, Liquid, Bath, Spray)





For more information call Agrihealth on 047 71800 or email info@agrihealth.ie
Distributed in Ireland by Agrihealth. www.agrihealth.ie