**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. Since 2012 cases of clinical paramphistomosis, severe enough to cause mortalities have been reported in both cattle and sheep.

**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 of 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. It must be remembered that mortality due to rumen fluke is not correlated with prevalence of infection or detection of eggs in faecal samples.

**Clinical signs**

The immature stages of the fluke in the duodenum cause clinical disease including enteritis with diarrhoea, anorexia, dehydration and increased thirst. 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%. This is considerably higher than the prevalence reported in other European countries and also higher than previously reported passive surveillance data in Ireland. 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.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Rumen fluke</th>
<th>Liver fluke</th>
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<tbody>
<tr>
<td>Lifecycle</td>
<td>Indirect</td>
<td>Indirect</td>
</tr>
<tr>
<td>Intermediate host</td>
<td><em>Mud snail (Galba truncatula)</em></td>
<td><em>Mud snail (Galba truncatula)</em></td>
</tr>
<tr>
<td>Infective stage</td>
<td>Encysted metacercaria</td>
<td>Encysted metacercaria</td>
</tr>
<tr>
<td>Final host</td>
<td>Ruminants</td>
<td>Ruminants</td>
</tr>
<tr>
<td>Site of damage within host</td>
<td>Duodenum</td>
<td>Liver</td>
</tr>
</tbody>
</table>

Table 1: Rumen fluke versus liver fluke in cattle.
Rumen fluke in deer

Calicophoron daubneyi and *P. leydeni* have been identified as the species of rumen fluke found in Irish deer. Concurrent infection with *Fasciola hepatica* also occurs. The level of egg shedding in deer is far exceed 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. 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.

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. 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. 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. In suspected cases, very often it is the response to oxyclozanide 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 oxyclozanide therapy. 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 the large numbers of larvae present, fluid diarrhoea and the resultant accelerated movement of ingesta through the tract. 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. Oxyclozanide, however, has been shown to be effective at reducing the fluke burden and remains the drug of choice to treat rumen fluke infections. Concomitant infections

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**Figure 1: Rumen-fluke life cycle.**

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

<table>
<thead>
<tr>
<th>Region of the country</th>
<th>Sharing of paddocks with other livestock</th>
<th>Breed</th>
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<tr>
<td>Pasture type grazed</td>
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with rumen and liver fluke remain common in Ireland and it is important to choose a treatment that is effective against both parasites. Zanil, 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. Zanil has a milk withdrawal in cattle of three days. Combination products containing oxyclozanide and levamisole are also available.

**REFERENCES**

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