RUMEN FLUKE (or paraphilostomes) are digenean, 2-host trematode parasites that infect a broad range of mammalian definitive hosts, including sheep, cattle, goats, alpacas and llamas. They have a complicated life-cycle, similar to that of the liver fluke, Fasciola hepatica, involving a molluscian intermediate host and infection as a result of ingesting infective metacercarial cysts while grazing. However, they undertake a slightly different journey within the definitive host. After excysting in the small intestine, where they are thought to feed on the intestinal mucosa, the tiny immature rumen fluke migrate “upstream” and settle in the rumen and reticulum, where they mature and lay eggs.

There is still some controversy about what the adults actually feed on, but they are typically found attached through their large posterior sucker (acetabulum) with the mouth free to sample ruminal contents.

Adult rumen fluke look like small pink maggots on the surface of the rumen, whereas the immatures resemble tiny grains of rice on the mucosal surface of the intestine. The former appear to be relatively well-tolerated, clinical disease being exclusively associated with large infestations of immature parasites and accompanying intestinal pathology, which can be fatal.

Rumen fluke are common in tropical countries, where they thrive in the warm, wet climate, and are acknowledged to have a significant impact on livestock productivity. However, in recent years, they have become increasingly common in livestock in temperate countries and are already prevalent in many parts of Europe.

Typical host-level prevalence in mainland Europe would be in the region of 20-30% in sheep and cattle, whereas Ireland appears to be particularly badly affected, a recent study finding a herd-level prevalence of ~77% in sheep across the country.

Identification
Rumen fluke are most commonly detected using conventional coprological techniques, typically faecal egg count by sedimentation, exactly as performed for routine liver fluke diagnosis at regional Veterinary Investigation Centres.

However, rumen fluke eggs look very similar to those of liver fluke and for many years were probably counted as such; it was not until 2010 that a specific VIDA diagnostic code was first entered in the UK.

As with liver fluke, a positive rumen fluke egg count only indicates the presence of adult egg-laying parasites and not the more pathogenic immature fluke in the intestine. Unlike liver fluke diagnosis, there are currently no commercially available immunological tests for rumen fluke, e.g. serum and/or coproantigen ELISA.

Post-mortem examination and abattoir inspection both provide good opportunities to detect the adult parasites but there is, typically, no routine inspection of the rumen at slaughter in most abattoirs.

Clinical signs of rumen fluke disease (paraphilostomiasis) are relatively generic, e.g. ill-thrift, diarrhoea, poor body condition, etc., and could be mistaken for any number of other conditions.

Clinical relevance
The clinical relevance and production impact of rumen fluke in temperate regions are still under debate. Recent abattoir studies in Belgium, the Netherlands and the UK found little association between rumen fluke infection in cattle and production effects, other than an association with diarrhoea and a reduced carcass fat coverage.

To the best of my knowledge, there are no published reports of production effects in sheep. One of the main complications is that stock infected by rumen fluke are often also infected by liver fluke, so it is very difficult to separate the effects of the respective parasites on their hosts.

Also, we hear numerous anecdotal accounts from farmers who see dramatic improvements in condition having treated their stock with oxyclozanide.

However, oxyclozanide is a liver fluke drug in its own right, with acknowledged activity against rumen fluke (juvenile and adult) and that is oxyclozanide, although such products have no specific label claim for rumen fluke treatment, at least not in the UK. There have been reports from Spain claiming some activity of closantel against adult rumen fluke, but these have not been substantiated in other studies and would not be recommended here.

Prevention
Prevention of rumen fluke infection, as with prevention of liver fluke infection, requires a good working knowledge of the rumen fluke life-cycle to help inform when and where things may be happening on-farm.

It also requires an integrated parasite control approach aimed at reducing pasture contamination with rumen fluke eggs in spring, reducing snail habitat on-farm in summer (e.g. improved drainage, rolling poached areas, etc.), avoiding exposure of stock to potential cyst challenge in autumn (e.g. housing, fencing) and strategic treatment of stock in winter with oxyclozanide if and when required.

Treatment
Treatment options for rumen fluke are very limited, but advice from animal health specialists has been to not treat very limited, but advice from animal health specialists has been to not treat unless there are clear indications from farmer accounts who see dramatic improvements in condition having treated their stock with oxyclozanide.

Often in these cases, no specific diagnosis was obtained, nor any indication of actual treatment efficacy, so it is difficult to draw conclusions about the relative impact of the two fluke parasites on infected animals.

(Re)emergence of a new/old parasite?
Rumen fluke first came to our attention in the late 2000s, when their eggs started to appear in routine diagnostic samples submitted to regional Veterinary Investigation Centres. Diagnoses peaked in 2013, following the exceptionally wet summer and autumn of the preceding year.

For decades, it was assumed that the rumen fluke species infecting livestock in GB and Ireland was Paramphistomum cervi which, as the name suggests, has a natural definitive host in wild deer. This was based on an early morphological identification of adult specimens recovered from Scottish and Irish cattle at Glasgow Vet School in the 1950s. P. cervi was considered a relatively non-pathogenic and incidental finding at post-mortem. However, recent molecular analysis, initially carried out at Moredun, has shown that the predominant – if not only – rumen fluke species currently infecting GB livestock is actually Calicophoron daubneyi, the predominant species infecting livestock on mainland Europe.

It is distinctly possible that the original Glasgow species identification was correct; C. daubneyi may be a more recent (and more pathogenic) invader.

Various theories exist for how and when C. daubneyi entered GB livestock, but it is entirely possible that this happened with the importation of European livestock, most likely cattle, e.g. Limousin or Charolais from central France.

A detailed molecular phylogenetic analysis of livestock samples from Ireland revealed one large supra-population of rumen fluke across the whole country, indicative of a relatively early incursion and extensive spread by livestock movement.

A more recent study of sheep in Ireland found a small number of animals with Paramphistomum leydeni, another acknowledged rumen fluke species from deer, indicating that livestock can be infected by wildlife species.

Another interesting finding that overturns our pre-conceived ideas of the rumen fluke life-cycle is the identification of the liver fluke snail, Galba truncatula, as the intermediate host of rumen fluke, at least in GB, as it is in Europe.

It was originally thought that rumen fluke utilise planorbid pond snails as their preferred intermediate molluscan host, hence a possible explanation for the increased incidence and geographic spread of rumen fluke.