

Rumen fluke

Rumen fluke (stomach fluke, or paramphistomes) 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 snail* as an intermediate host. Infection is the result of ingesting metacercarial cysts while grazing. However, rumen fluke take 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 seem 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. Herd-level prevalence in mainland Europe is in the region of 20-30% in sheep and cattle, with infection levels in cattle typically higher than in sheep.

*The 'liver fluke snail', *Galba truncatula*, has now been identified as the intermediate host of rumen fluke in GB and Europe, not a pond snail as originally thought. This may explain the increased incidence and geographic spread of rumen fluke and a parallel increase in incidence with that of liver fluke, if they share many of the same environmental risk factors.



(a) Adult rumen fluke in the stomach, (b) immature rumen fluke washed from intestines, (c) histological section of immature rumen fluke clamping onto intestinal mucosa. Images © Harbro Ltd, Heather Stevenson SAC, Sandra Scholes APHA



Epidemiology

Rumen fluke first came to our attention when their eggs started to appear in routine diagnostic samples submitted to regional VI Centres in the late 2000s and 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*, whose natural definitive host is wild deer. However, recent molecular analysis, initially carried out at Moredun, has confirmed that the predominant, if not only, rumen fluke species currently infecting GB livestock is actually *Calicophoron daubneyi*, the same species as in mainland Europe. *C. daubneyi* may be a more recent (and more pathogenic) invader being imported with livestock, most likely cattle e.g. Limousin or Charolais from Central France.

There is no doubt that rumen fluke has become more common in UK livestock in recent years. However, that does not make it more important and the clinical and production impacts of rumen fluke are still a matter of debate and it should not deflect from the fact that liver fluke is the acknowledged pathogen.

Diagnosis

Rumen fluke are most commonly detected using conventional coprological techniques, typically faecal egg count (FEC) by sedimentation. Rumen fluke eggs look very similar to liver fluke and for many years were probably not differentiated until in 2010 a specific VIDA diagnostic code for rumen fluke was first used 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, there are currently no commercially available immunological tests for rumen fluke. Post-mortem examination and abattoir inspection both provide good opportunities to detect the adult parasites but there is no routine inspection of the rumen at slaughter in most abattoirs.



Rumen fluke egg (A, left) and liver fluke egg (B, right). Image $\[mathbb{C}$ Danielle Gordon, Moredun Research Institute.

Clinical relevance

The clinical relevance and production impact of rumen fluke in temperate regions are still under debate Clinical signs of rumen fluke disease (paramphistomosis) are relatively generic e.g. ill-thrift, diarrhoea, poor body condition etc., and could be mistaken for any number of other conditions. There are no published reports of production effects in sheep and recent abattoir studies in cattle in Belgium, The Netherlands and UK found little association between rumen fluke infection in cattle and production effects, other than an association with diarrhoea and reduced carcase fat coverage. One complication is that animals infected by rumen fluke



are often also infected with liver fluke, making it difficult to separate the effects of the two parasites. There are anecdotal accounts from farmers who see dramatic improvements in condition having treated their stock with oxyclozanide, the only flukicide with acknowledged activity against rumen fluke. However, oxyclozanide kills adult liver fluke, so they may be treating an underlying liver fluke rather than rumen fluke, making it difficult in these cases, where no specific diagnosis was obtained, to draw any conclusions about the relative impact of the two fluke parasites.

Treatment

Treatment options for rumen fluke are very limited and the advice has been <u>not</u> to treat for rumen fluke unless there are clear clinical signs and a positive diagnosis of rumen fluke infection. There is only one flukicide with acknowledged activity against rumen fluke, (juvenile and adult), oxyclozanide, though it is not licensed nor is there a label claim for rumen fluke treatment in the UK (as such, it should only be used for rumen fluke under veterinary direction). Oxyclozanide is a liver <u>flukcide</u> but is only able to kill adult fluke at least 10 weeks of age. While there are no reports of oxyclozanide resistance in rumen fluke, there is always the risk of this developing unless we avoid over-use. There is also a risk that if oxyclozanide is used for example in the autumn, it will leave animals unprotected against acute liver fluke.

Prevention

Prevention of rumen fluke infection, as with prevention of liver fluke infection, requires a good working knowledge of the rumen fluke life-cycle and an accurate diagnosis of rumen fluke infection (positive FEC and/or post mortem reports). An integrated parasite control plan involves reducing pasture contamination in spring, reducing snail habitat on-farm in summer, 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.