

Liver fluke risk and agri-environment schemes

Philip Skuce¹, Gillian Mitchell¹, Grace Cuthill¹, Ruth Zadoks¹, Davy McCracken² & Justin Irvine³

¹Moredun Research Institute, Pentlands Science Park, Edinburgh EH26 0PZ; ²Scotland's Rural College (SRUC) Hill and Mountain Research Centre, Kirkton & ³James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH; e-mail philip.skuce@moredun.ac.uk

Background

The liver fluke is a parasitic flatworm that causes significant disease and production loss in grazing livestock. Fluke eggs shed in the faeces of infected animals are picked up by the tiny mud snail. Animals become infected by picking up microscopic fluke cysts shed by infected snails. The snail host lives on boggy ground and is key to the liver fluke life-cycle.

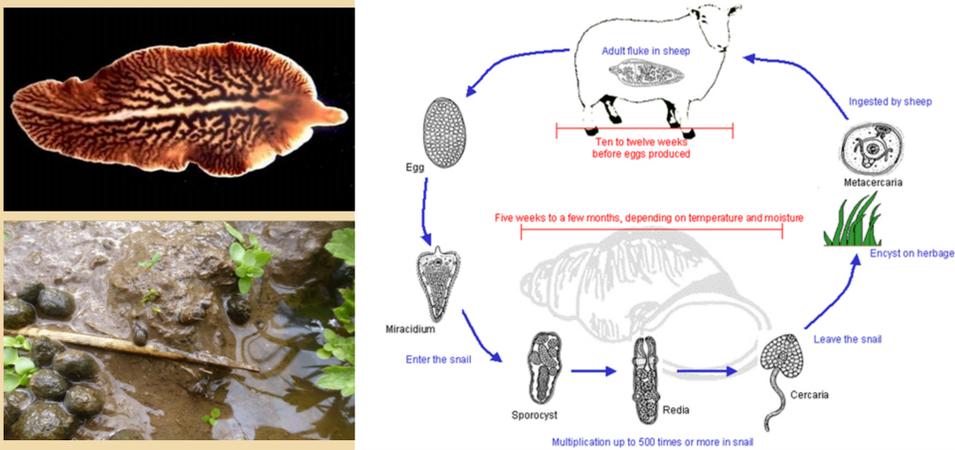


Fig.1. (a) The liver fluke parasite, (b) its mud snail intermediate host and (c) its complicated life-cycle (© SCOPS, Sustainable Control of Parasites in Sheep)

Fluke management has typically focused on routine treatment of stock with chemical flukicides coupled with reducing livestock access to boggy ground by either fencing it out or draining. However, some agri-environment options promote the grazing of wetland areas on farms because of the other environmental benefits associated with these habitats. As a result, there is some perceived reluctance amongst livestock farmers to engage in such schemes for fear of increasing the liver fluke risk to their livestock.

Approach

To address this issue we aim to quantify the risk of fluke infection to grazing livestock from three different agri-environment scheme options. For each of these options we have selected sites where we will:

- determine the liver fluke infection status of animals grazing these areas using non-invasive faecal egg counting (FEC) methods
- determine the species identity and liver fluke infection status of snails collected at the 3 sites using PCR/DNA sequencing methods



Fig. 2. Sheep grazing at Auchnerran © Marlies Nicolai, GWCT

Acknowledgements

The authors wish to acknowledge the Scottish Government Rural and Environmental Science and Analytical Services (RESAS) Division, for funding this work through the Strategic Research Programme, 2016-2021. We would also like to acknowledge the support of Chris Baillie (RSPB), Francois Chazel (SNH), Pete Minting (ARC-Trust), Dave Parish and Marlies Nicolai (GWCT) and Sarah Allison (Soil Association).

1. Fluke and Wader Scrapes

What? – wader scrapes are small, shallow water features, introduced to promote feeding and nesting sites for key wetland bird species e.g. curlew, lapwing, snipe, oystercatcher, which are in serious decline nationally.

Risk? – grazing these boggy areas could put livestock at risk of fluke infection, but is essential to keep the vegetation down for nesting habitat as well as maintain muddy areas on the margins to promote invertebrate food supply for chicks.

Where? – in and around wader scrapes at SRUC's Kirkton/Auchtertyre farm in collaboration with RSPB



Fig. 3. (a) Newly installed wader scrapes at SRUC Kirkton, with in-bye fields beyond (b) Lapwing chicks © Marlies Nicolai, GWCT

2. Fluke and Natterjack toad conservation

What? – Natterjack toads need short grass and heathland with areas of open water. In particular, they hunt at night on grazed and bare areas of the marginal saltmarsh (or merse) and nearby farmland.

Risk? – grazing these marshy areas could put livestock at risk of fluke infection, but is essential to maintain the characteristics favourable for these rare and protected animals.

Where? The only populations in Scotland are on the Solway Firth and the work is in collaboration with SNH & ARC-Trust.



Fig. 4. Mud snail sampling on the Solway Firth. Inset, natterjack toad

3. Fluke and liming

What? – raising the pH of extensively managed grassland using lime can improve the sward productivity by altering soil processes and may also benefit invertebrate food supply for wading birds.

Risk? – mud snails also benefit from a neutral pH, so liming may increase snail abundance on boggy or poached areas, potentially increasing the fluke risk to grazing livestock

Where? – monitoring the effect of liming on sward productivity and invertebrates, including mud snails is taking place at the Game & Wildlife Conservation Demonstration Farm at Auchnerran in collaboration with JHI.



Fig.5. Lapwing nesting site at Auchnerran, image © Marlies Nicolai, GWCT.