Prevalence Study of Endemic Diseases in the Scottish National Sheep Flock

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Introduction

Endemic viral diseases impact on livestock productivity and welfare. In order to initiate appropriate disease control baseline prevalence estimates are essential.

- **Ovine Pulmonary Adenocarcinoma (OPA)**: Lung cancer (Fig 1), with some Scottish farms experiencing extensive losses; neither a commercially available diagnostic nor a control method is available for pre-clinical cases.
- **Louping Ill**: disease of nervous system, transmitted by ticks (Fig 2), primarily affecting sheep and red grouse, but also other species such as cattle and, rarely, man; vaccine developed in late 1930s.
- Traditional movement of sheep from hill to upland to lowland farms may act as a relevant transmission route between different regions of the country.

Figure 1: (left) ewe exhibiting clinical signs of OPA (Photo D.Griffiths).

Figure 2: (right) engorged sheep tick Ixodes ricinus.

Methods

- Data were collected from **125 flocks** using a stratified random sampling design based on Scottish agricultural census data.
- 27 breeding ewes were tested from each flock.
- Face to face interviews were conducted to collect information on management practices and the farmers' disease awareness.
- Nationwide and regional prevalence was calculated and risk factors for exposure to each pathogen were evaluated.

Results

Prevalence

- **38% of study farms** were found to be infected with the causative agent of OPA **(JSRV)** (Fig 3), but only a few farms reported clinical disease.
- **23% of study farms** had been exposed to the causative agent of Louping Ill **(LIV)** and strong regional variation were observed (Fig 4). Although a vaccine is available, only 4 study farms used it.

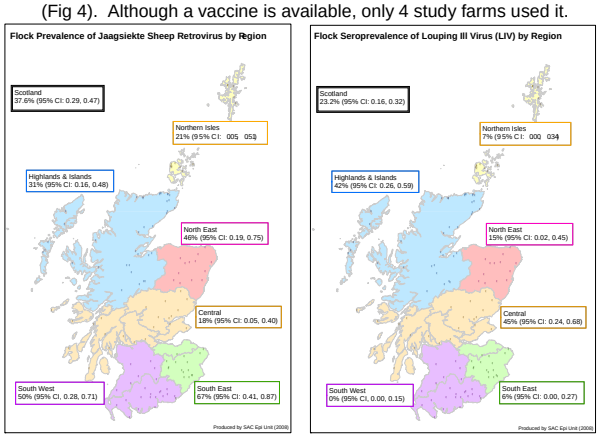

Figure 3 and 4: the geographic pattern of prevalence for JSRV and LIV infection respectively.

Transmission

- Statistical analysis failed to find quantitative evidence for commonly assumed risk factors for transmission of JSRV.
- LIV infection was generally associated with extensively grazed hill flocks and associated characteristics of such flocks including common grazing and joint gathering events.

Improved uptake of biosecurity measures

- **Traditional system of sheep movements** were not found to be an important factor in the study population.
- When farmers were asked what were the most important means of **keeping their flocks free of disease**, the top three answers were:

1. Careful selection of bought in animals

   ↳ Animals which are bought in should only be taken from **trusted sources**.

2. Minimising the number of bought in animals

   ↳ A majority of farmers try to maintain a **"closed flock"** by breeding their own female replacements and preventing unnecessary contact with other farms.

3. **Good husbandry** practices

   ↳ Farmers were strongly inclined to maintain the health of their animals by looking after them well.

Conclusions

- JSRV infection is found to be widespread across Scotland suggesting greater significance than previously thought. However, many of the farmers surveyed were unaware of OPA in their flocks and it is known that many infected sheep do not show clinical signs of OPA.
- Infection with **LIV is found mainly in hill flocks** which are more often extensively grazed on moorland and therefore are more likely to come into contact with ticks carrying the virus. Further work is being carried out at the Macaulay Land Use Research Institute into environmental risk factors for LIV infection.
- A general trend towards increased understanding and uptake of biosecurity measures was revealed. Firstly, farmers do understand that introducing livestock can put flock health at risk. Secondly, some practices, such as the **traditional flow of sheep between farms**, have become less relevant because most farmers breed their own female replacements.
- One major issue that remains is the **source of tups**: the majority of farms buy tups to prevent inbreeding. Tup purchase is therefore a potential route of infection which could undermine the biosecurity measures imposed by farmers. One solution might be health schemes for accredited flocks to reduce disease transmission.

Acknowledgements

This work was supported by a Scottish Government Flexible Fund, commission number MRI/843/04.
Testing of samples for LIV was funded by the Scottish Government Rural Environmental Research and Analysis Directorate through MULRI and EPIC.
Thanks also go to the SAC VIO's who carried out sampling and all the farmers involved.

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