

Assessing the economic impact of different bluetongue virus (BTV) incursion scenarios in Scotland

Gunn G.J. (1), Gubbins S. (2), Purse B. (3) & Stott A.W. (4)

- (1) Scottish Agricultural College, Inverness, Scotland UK
- (2) Institute for Animal Health, Pirbright Laboratory, UK
- (3) Centre for Ecology and Hydrology, Edinburgh, UK
- (4) Scottish Agricultural College, Edinburgh, Scotland UK

Bluetongue virus (BTV) is a significant pathogen of ruminant livestock transmitted by midge vectors. Recently the area affected by BTV has altered with disease occurring, and somehow over-wintering, in animals across Northern mainland Europe with eventual detection in England during autumn 2007. There was high likelihood that BTV would enter Scotland but there remains significant uncertainty about many aspects of the disease. Scottish Government (SG) required improved understanding of how both UK livestock and midge populations might respond to BTV and the effectiveness of existing disease control measures: vector control; vaccination and movement restrictions combined with surveillance for early detection. SG required this review of control strategies for Scotland with an evaluation of effectiveness in order to prepare for BTV incursion.

Economic analysis was based on expert knowledge, assumptions about how BTV will behave in Scotland and an integration of the work through epidemiological modelling. A multidisciplinary expert panel, including BTV and midge experts, agreed a range of feasible BTV incursion scenarios, patterns of disease spread and specific control strategies. This study combined quantitative methodologies with existing data already held by different members of the project team. We explored the most likely distribution of the disease given Scotland's agricultural systems, unique landscape and climate. We engaged with SG officials and livestock industry analysts to help inform decision making and prioritisation of disease control options should BTV spread to Scotland.

The incursion scenarios and control strategies agreed were:

- o Northwards spread of infected midges, BTV arriving April 2009;
- o Northwards spread of infected midges, BTV arriving July 2008;
- o Northwards spread of infected midges, BTV arriving September 2008;
- o import infected animals April 2009 and
- o import infected animals September 2008.

Where possible the impact of the following control strategies was investigated: 1) implementing minimal requirements; 2) vaccinating 100% holdings in Border protection zone (PZ); 3) vaccinating 80% holdings in PZ to Highland line; 4) vaccinating 50% (and later 80%) holdings in PZ comprising whole of Scotland and 5) vaccinating 80% of holdings in 100km PZ around first identified holding North of Highland line.

The science/government policy interface will be described emphasising the integrative nature of such research including sub-reports on ecological analysis (for vector, putative wildlife hosts, topographical and habitat data), meteorological data analysis, and epidemiological modelling output with economic analysis of the combined output. Ultimately economic evaluation indicated control option 4 was likely to yield the greatest economic benefit. Direct costs (approx. £30M per annum) were much smaller than indirect costs

(loss of markets, price effects etc.). Although indirect costs are difficult to estimate, our results suggested that they may exceed £70M per annum, reinforcing the importance of investment in baseline costs that reduces risk and limits incursions.