

# Detection of Seoul virus (SEOV) in wild brown rats (*Rattus norvegicus*) from pig farms in northern England

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## Introduction

Seoul virus (SEOV) is associated with haemorrhagic fever and renal syndrome (HFRS) and is distributed globally due to the worldwide dispersal of the reservoir host, the brown rat (*Rattus norvegicus*). There have been several reports of the virus causing clinical disease in people in Great Britain, including a severe HFRS case in a pig farmer in Yorkshire.

However, little is known about SEOV in British wild rats in terms of prevalence, distribution or the public health risk. Therefore, this study was carried out to investigate hantavirus prevalence in wild brown rats on and around pig farms and other locations in Great Britain.

## Approach

Brown rats (n=68) were collected from various peridomestic locations across northern England and Wales, including pig farms (Fig 1). RNA was extracted from the kidney or lung tissue of each rat and screened using a published pan-hantavirus reverse transcriptase (RT)-PCR assay. Positive PCR products were Sanger sequenced and analysed.

## Results

Overall, 19 per cent of the brown rats tested were found to be PCR-positive for SEOV

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This is a summary of a paper that is published in full at [vetrecord.bvapublications.com](http://vetrecord.bvapublications.com)

Published Online First 5 April 2019

*Veterinary Record* (2019) 184, 525

Cite as doi: 10.1136/vr.105249

## KEY FINDINGS

- Seoul virus (SEOV) may be widespread in British wild rats, although not uniformly distributed.
- The SEOV strains circulating in British wild rats were found to be genetically similar.
- Wild rat populations are said to be increasing, which may increase the risk of SEOV transmission to people. As SEOV-associated disease can be severe, this is a potential public health concern.

RNA. Infected rats were detected at four sites (G, J, L and M) in the Yorkshire region, and at another site in Cheshire (H). The prevalence of SEOV infection in rats from pig farms (26 per cent) was significantly greater ( $P=0.047$ ) than that in rats from other sites (5 per cent).

Sequence analysis demonstrated that all the SEOV sequences generated in this study belonged to lineage 9, and were closely related (98 per cent nucleotide identity) to

the strain previously identified in British wild rats. However, one SEOV sequence (from site J) was distinguishable from the others in this study.

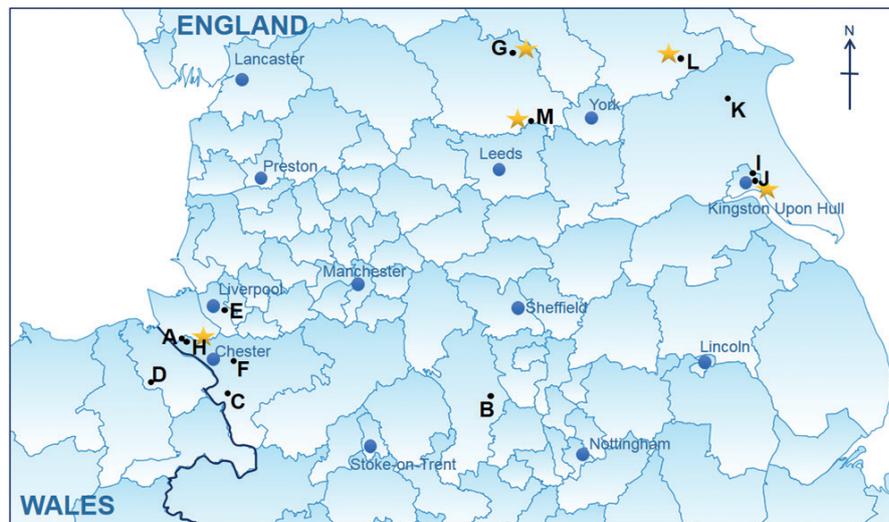
## Interpretation

This study has identified SEOV infected rats in two regions, indicating that SEOV may be widely dispersed among wild rats in Great Britain. This study only focused on northern England, so surveillance of other regions is necessary.

Although 77 per cent of the SEOV-positive rats were found on or near Yorkshire pig farms, there is not enough evidence in this study to comment on whether there is a higher risk of SEOV exposure either in Yorkshire or on pig farms.

## Significance of findings

The SEOV sequences detected in this study had a high genetic similarity to those detected in mainland Europe, which may be indicative of rat migration. The presence of SEOV in wild rats cannot be ignored as a potential public health concern as SEOV-associated disease can be severe.



**Fig 1: Locations of sites at which brown rat (*Rattus norvegicus*) samples were collected. Letters correspond to the sites where rats were collected and stars indicate the sites where Seoul virus-positive rats were detected**