

# Climate change fears for deadly virus outbreaks in livestock

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Global warming could have chilling consequences for European livestock, warned Professor Peter Mertens from the Institute for Animal Health, at this week's meeting of the Society for General Microbiology in Harrogate.

Since 1998, rising temperatures have led to outbreaks of bluetongue (BT) across most of Europe, which have killed over 2 million ruminants (mainly sheep). The outbreak (the largest on record) caused by Bluetongue [virus](#) serotype 8 (BTV-8), which started in the Netherlands and Belgium during 2006, has since spread to most European countries, including the UK in August and September 2007. This outbreak, the first ever recorded in northern Europe, was not an isolated event. There are also fears that related viruses, such as African horse sickness virus, which can have a fatality rate of more than 95% and shares the same insect vectors as bluetongue, could also be introduced.

Bluetongue is spread by the biting midge, *Culicoides imicola*, which has recently colonised the northern Mediterranean coast, leading to outbreaks in affected regions. However, BT outbreaks have also been spread by other novel vector species of midge (*C. pulicaris* and *C. obsoletus* groups), which are abundant across the whole of central and northern Europe. In experiments, a single bite from a fully infected midge can transmit the virus and as midges are blown across Europe "like aerial [plankton](#)" it is almost impossible to prevent them getting to the United Kingdom.

Warmer weather increases the rate of infection and [virus replication](#) in the midge itself, and increases their activity in more northern areas. Indeed, the 2006 outbreak started in the Netherlands when temperatures were six degrees higher than previously recorded. Mild winters may also play a significant part in the problem, as the midges that are not killed by the cold (in the absence of frosts) may survive in sufficient numbers to maintain a reservoir of the disease. It is clear that BTV-8 can also be transmitted directly between cattle, providing an overwintering mechanism for the virus to survive from one midge season to the next.

"We have seen outbreaks caused by twelve strains, from nine distinct serotypes of bluetongue virus, which have arrived in Europe via at least four different routes since 1998", said Professor Mertens, "This indicates that there has been a fundamental shift in bluetongue epidemiology, linked to climate change. In 2008 the UK vaccinated over 10 million sheep and cows against BTV-8 and was the only country in Europe to successfully suppress the disease outbreak. However different BT virus types have subsequently arrived in northern Europe which represent further threats to the UK for 2009 and beyond."

"These events demonstrate that the whole region is now at risk from further incursions of BT virus, as well as other insect transmitted viruses, many of which can also affect humans. Although the vaccines against BT virus currently available for use in northern Europe are relatively crude, as they are made from inactivated virus grown in tissue culture cells, it is clear that they can work against BTV-8. However, more advanced vaccines, made from the protein-subunits of the virus, along with diagnostic tests that can distinguish vaccinated from infected animals, are urgently needed. Vaccines are also needed for other related viruses, including African horse sickness virus, and potentially both Epizootic haemorrhagic disease virus and *Equine encephalosis* virus."

Source: Society for General Microbiology

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