Science Media Centre Fact Sheet

Schmallenberg virus

Background

- Schmallenberg virus, aka SBV, is an emerging livestock disease that has been detected in Belgium, Germany, the Netherlands, France, Italy, Luxembourg, Switzerland, Spain and the UK.
- Outbreaks of disease in adult cattle and birth complications in cattle, sheep and goats were first reported between August and November 2011 in both the Netherlands and Germany.
- A new virus was identified in December 2011 as the cause of both conditions, named ‘Schmallenberg virus’ after the German town where the virus was identified.
- In early 2012, the first cases were suspected in the south and east of England, diagnosed following the testing of deformed lambs.
- With colder weather and loss of adult insects, the outbreak subsided so that very few cases of transmission (if any) occurred during the early months of 2012.
- There is evidence of new infections this season in French cattle since May 2012, and English sheep and cattle since March 2012.

The Virus

- The Schmallenberg virus is of the family Bunyavirus, genus Orthobunyavirus.
- Several viruses in the genus cause diseases in cattle and are transmitted by insects.
- Schmallenberg virus is in the Simbu serogroup of the Orthobunyavirus genus, which includes many different viruses that occur in Asia, Africa and Australia, but have not previously been identified in Europe.
- Genetic characterisation has shown that SBV is closest to several viruses known to cause disease in animals.
  - Shamonda, Aino and Akabane viruses in the Simbu serogroup are known to cause low-risk infections in a large proportion of infected animals.
  - The Akabane virus appears to cause similar outbreaks of disease (e.g. in Australia)
- There is no evidence that the Schmallenberg virus causes disease in humans (see Public health risk).

Detection

- The SBV can be identified using several methods, some based on its genetic sequence and some based on its specific interactions with antibodies, however the virus is detectable in the blood of infected animals for only a very short period (4-6 days post infection), making identification in live animals difficult.
  - Antibodies that are generated in response to infection are much longer lived, though methods to detect them are laborious and time consuming, taking several days to develop a result.
  - However, a method of detection (an ELISA assay) that may be more suitable for mass surveillance studies is now commercially available, and further improved methods could be developed.
- The virus is present for a longer time in infected foetuses than the 4-6 days of infection in adult live animals and can be detected in malformed newborns.
- Infection has also been detected in camelids (alpaca) in the UK.

The Disease

The Schmallenberg virus causes brief, mild/moderate symptoms in adult cattle, and life threatening defects in unborn cattle, sheep and goats. For adult cattle populations, outbreaks of disease last two to three weeks.

Clinical Signs:
- **Adult cattle**: reduced milk yield (up to 50%), fever, loss of appetite, loss of body condition and diarrhoea.
- **Newborn/foetal livestock**: late abortion, stillbirths or major birth defects including bent limbs and fixed joints, brain deformities and marked damage to the spinal cord. Some animals are born with a normal outer appearance but have nervous signs such as a ‘dummy’ presentation or blindness, ataxia (loss of full control of bodily movements), recumbency, an inability to suck and, occasionally, fits. The foetal deformities vary depending on when infection occurred during pregnancy.

Transmission:
- It is likely that the virus is transmitted via *Culicoides* midges.
- The frequency of direct transmission, live animal to live animal, is thought to be low. So insect transmission is regarded as the primary route, although it can also be transmitted across the placenta.
- It is possible that the seasonality of the infection cycle would not entail a second epidemic next year
  - However, newborns infected with the virus may provide a source of infection (for insects or adults) to restart the outbreak, providing a potential ‘overwintering mechanism’.

Immunity:
- Immunity can possibly be acquired naturally against SBV.
- Vaccine companies have developed candidate vaccines, but these will need to be appropriately tested and licensed before they can be sold commercially.

Public health risk

- Surveys of blood samples and health questionnaires in Europe have provided no evidence for infection of humans
- It is very unlikely there will be a risk to human health from Schmallenberg virus (see risk assessments in links below). No human cases have been detected in any country.
- The ability to infect humans is thought to be due to a gene sequence which is not present in Schmallenberg virus, and those viruses most closely related are not ‘zoonotic’ – i.e. the disease cannot pass from animals to humans.
Sources / further information

‘Analysis of the epidemiological data of the Schmallenberg virus outbreak in Europe’ in the EFSA Journal, published on 14-06-12:

Defra website, with links to periodic outbreak assessments:
http://www.defra.gov.uk/animal-diseases/a-z/schmallenberg-virus/

The Animal Health and Veterinary Laboratories Agency, with updated figures of infection numbers by county:
http://www.defra.gov.uk/ahvla/tag/schmallenberg/

Health Protection Agency, includes a Q&A and risk assessments:
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/EmergingInfections/SchmallenbergVirus/

European Commission documents, including a risk assessment for public health:
http://ec.europa.eu/food/animal/diseases/schmallenberg_virus/index_en.htm

Institute of Animal Health:
http://www.research.iah.ac.uk/schmallenberg/

World Organisation for Animal Health fact sheet:
http://www.oie.int/fileadmin/Home/eng/Our_scientific_expertise/docs/pdf/A_Schmallenberg_virus.pdf

Information on orthobunyaviruses
http://viralzone.expasy.org/all_by_species/250.html

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