

## SCHMALLEMBERG VIRUS

Schmallenberg virus was discovered in November 2011 and epidemiological, immunological and virological investigations are on-going in several European countries. The information presented in this technical factsheet reflects the epidemiological observations and research done to date (May 2012), together with data extrapolated from genetically similar viruses of the same genus and serogroup.

### AETIOLOGY

#### **Classification of the causative agent**

The “Schmallenberg virus” is an enveloped, negative-sense, segmented, single-stranded RNA virus. It belongs to the *Bunyaviridae* family, within the *Orthobunyavirus* genus. The Schmallenberg virus is a member of the Simbu serogroup viruses, which includes Shamonda, Akabane, and Aino viruses.

Field and laboratory studies indicate a causal relationship between Schmallenberg virus infection and the reported clinical signs. .

#### **Resistance to physical and chemical action**

From extrapolation from the California serogroup of Orthobunyaviruses:

- Temperature:** Infectivity lost (or significantly reduced) at 50–60°C for at least 30 minutes.
- Chemicals/Disinfectants:** Susceptible to common disinfectants (1 % sodium hypochlorite, 2% glutaraldehyde, 70 % ethanol, formaldehyde)
- Survival:** Does not survive outside the host or vector for long periods

### EPIDEMIOLOGY

According to the epidemiological investigations, reinforced by what is already known about the genetically related Simbu serogroup viruses, Schmallenberg virus affects ruminants. Serological studies indicate that it is not zoonotic. Transmission in animals is by insect vectors and then vertically *in utero*.

#### **Hosts**

- Confirmed by PCR or virus isolation:
  - Cattle, sheep, goats
  - Bison
- Confirmed by serology only:
  - Red deer
  - Roe deer
  - Alpaca
  - Mouflons
- *Humans:* Epidemiological and virological studies of human populations considered to be at risk did not demonstrate evidence of zoonotic potential.

#### **Transmission**

- Epidemiological investigations indicate insect vector transmission.
- Vectors: Schmallenberg virus genome was detected in several Culicoides species. Further information is required to determine whether mosquitoes play a role. Vertical transmission across the placenta is proven.
- Direct transmission from animal to animal is very unlikely.
- Further research is still needed to confirm these transmission routes and to determine the competent insect species.

## ***Viraemia and incubation period***

Experimental infection in cattle and sheep showed no clinical signs or mild symptoms at 3 to 5 days post-inoculation with an incubation period of between 1 and 4 days and viraemia lasting for 1 to 5 days.

## ***Sources of virus***

*Material found to be positive in virus isolation (up to May 2012):*

- Blood from affected adults and brain from infected fetus.

*Material found PCR positive (up to May 2012):*

- Organs and blood of infected fetus, placenta, amniotic fluid, meconium.

## ***Occurrence***

Only some Orthobunyaviruses had been reported in Europe but viruses from the Simbu serogroup had never been isolated in Europe before 2011.

Schmallenberg virus was first detected in November 2011 in Germany from samples collected in summer/autumn 2011 from diseased (fever, reduced milk yield) dairy cattle. Similar clinical signs (including diarrhoea) were detected in dairy cows in the Netherlands where the presence of Schmallenberg virus was also confirmed in December 2011.

Since early December 2011, congenital malformations were reported in newborn lambs in the Netherlands, and Schmallenberg virus was detected in and isolated from the brain tissue. Up to May 2012, The Netherlands, Belgium, Germany, United Kingdom, France, Luxembourg, Spain and Italy have reported stillbirth and congenital malformations with PCR positive results.

## ***DIAGNOSIS***

### ***Clinical diagnosis***

Manifestation of clinical signs varies by species: bovine adults have shown a mild form of acute disease during the vector season, congenital malformations have affected more species of ruminants (to date: cattle, sheep, goat and bison). Some dairy sheep and cow farms have also reported diarrhoea.

- Adults (cattle)
  - Probably often inapparent, but some acute disease during the vector-active season
  - Fever (>40°C)
  - Impaired general condition
  - Anorexia
  - Reduced milk yield
  - Diarrhoea
  - Recovery within a few days for the individuals, 2–3 weeks at the herd scale
- Malformed animals and stillbirths (calves, lambs, kids)
  - Arthrogryposis/ Hydranencephaly
  - Brachygnathia inferior
  - Ankylosis
  - Torticollis
  - Scoliosis

The exact rate of malformation is not known and varies depending on the stage of gestation at the time of infection.

## **Lesions**

In malformed newborn:

- Hydranencephaly
- Hypoplasia of the central nervous system
- Porencephaly
- Subcutaneous oedema (calves)

The symptoms can be summarised as arthrogryposis and hydranencephaly syndrome (AG/HE)

## **Differential diagnosis**

*For the acute infection of the adults:*

The symptoms are not specific. All possible causes of high fever, diarrhoea and milk reduction should be taken into account.

*For the malformation of calves, lambs and kids:*

- Other Orthobunyaviruses
- Bluetongue
- Pestiviruses
- Genetic factors
- Toxic substances

The OIE will update this Technical Factsheet when relevant