

Bluetongue in sheep

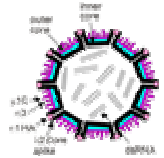
- Brief overview of the disease
- Impact on production
- Current epidemiological situation in Europe
- Control and prevention

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Bluetongue: brief overview of the disease

Etiology

- Family: Reoviridae
 - Genus (9): Orbivirus
 - Blue tongue (24 serotypes)
- Nucleic acid
 - Double strain RNA (10 fragments lineal)



Epidemiology

- Circumscribed in Africa (until 1950's)
Two cycles: Antelope-Culicoides / Cow-Culicoides
- Extension to America (1948) and Australia (1973)
- First outbreaks in Europe: Cyprus (1943) and Lesbos islands and Iberian peninsula (1956)

Epidemiology

Susceptible species

Artiodactyls: sheep, cow, goat, deer, antelope...

- In some species it is a severe disease (sheep, deer)
- In the others it is mild or unapparent

Epidemiology

Vectors

Midges of the genere *Culicoides*

- Europe, Asia, Africa: *C. imicola*, *C. obsoletus*, *C. pulicaris*
- America: *C. variipennis*
- Oceania: *C. fulvus*, *C. breviatilis*, *C. wadai*, *C. actoni*
(total: 27 species)



- Size: 1 - 4 mm
- Mean live: 20 - 90 days
- Optimal temperature: 15 - 29 °C
- Minimal temperature: 12,5 °C

Epidemiology

Virus Transmission

INFECTED ANIMAL
Viremia: 60 to 100 days



SUSCEPTIBLE ANIMAL
Incubation period: 4 to 6 days
Viremia: 50 days



The virus replicates in salivary glands (6-8 days)
Infective for live (20-70 days)
There is not transovarian transmission



Epidemiology

Conditions that allow midges to act as a vector:

- Feeding in a viremic animal
- To be competent to transmit the virus
- Survival to the extrinsic period of incubation
- To bite a receptive animal



The incidence in midges is very low

But... The population of midges can be extremely high depending on the climatic and environmental conditions

Epidemiology

Seasonality

End of summer and autumn

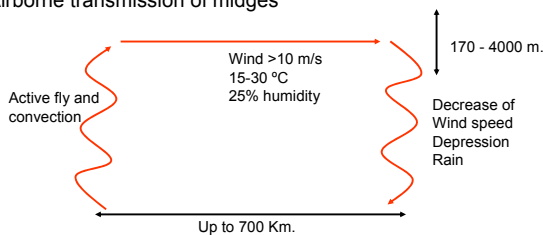
Overwintering:

- Survival in midges (areas with short and temperate winters)
- Latent infection in cows

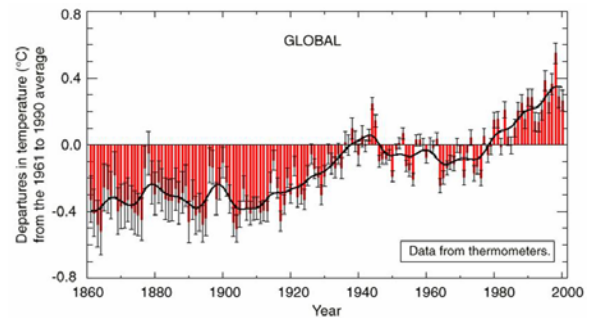
Epidemiology

Transmission between farms and countries

- Introduction of infected animals
- Vehicles containing the vector
- Airborne transmission of midges



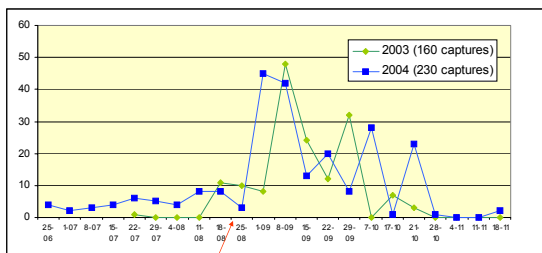
Temperature changes in the last 140 years



From: Intergovernmental Panel on Climate Change, Climate Change 2001, The Scientific Basis

Culicoides imicola

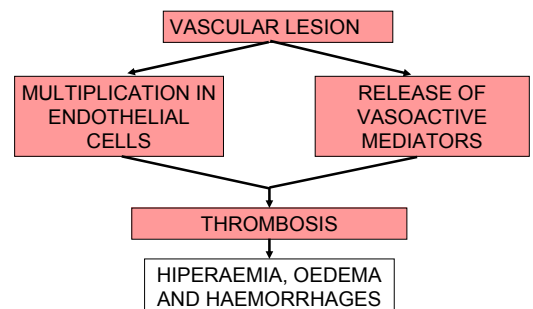
Captures in Catalonia 2002-2004



From: V. Sarto (CRISA)

2002: only one female was captured

Pathogenesis



Clinical signs

Nasal and
oral
secretions



Buccal scab



From: Adrover

Oedema



Clinical signs

Lingual oedema and
cyanosis



Gingival erosions

From IZS Teramo (Italy)

Clinical signs



Haemorrhagic lesions

From IZS Teramo (Italy)

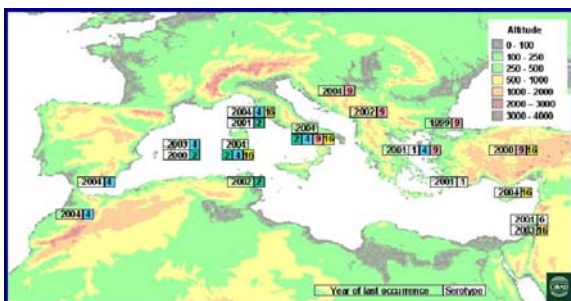
Bluetongue: impact on production

Economic losses

- direct effect of the disease on the animals
- indirect losses due to ruminant movement restrictions: heavy losses to the cattle and sheep industry.

	Affected farms	Morbidity	Mortality
Italy (2000)	6.869	18.2%	3.3%,
Spain (2000)	505	14.1%	3.8%.

Bluetongue: current epidemiological situation in Europe



ITALY. Clinical cases

2000 – 2001
(15/08/00-14/05/01)
6.889 cases



2001 – 2002
(15/05/01-14/04/02)
6.089 cases

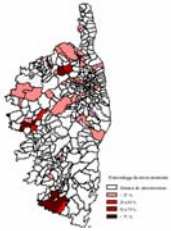


2002 – 2003
(from 15/04/2002)
416 cases



From: Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"

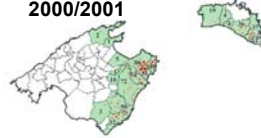
France. Corsica



- First outbreak: August 2000
- Last seroconversion detected: 2002
- Serotype 2
- Vaccination against serotype 2
- October 2003. Apparition of serotype 4

Spain. Balearic Islands

2000/2001



- 505 flocks and 4.106 animals affected
- Index case declared: 29.09.00. (Majorca)
- Last outbreak 04.12.00
- Last seroconversion detected: march 2001
- Serotype 2
- Vaccination against serotype 2

- 16 outbreaks, 3 municipalities affected
- First outbreak detected: 27.10.03
- Last outbreak: 25.12.03
- Morbidity: 10% Mortality 2%
- Serotype 4

2003



Bluetongue in SW Spain. October 2004-January 2005



Number of outbreaks

Cattle: 52
Small ruminants: 235
Mixed farms: 41
Total: 328

Portugal:
Alentejo: 10 outbreaks
Beira Interior: 1 outbreak

Bluetongue: control and prevention

- Free areas: The main goal is to avoid the introduction of the virus.
- After the presentation of the disease: eradication is very difficult, specially if climate allows survival of the vector during winter.

Vector control

a) Fumigation with pesticides

Only in adults (the larval habitats remain unknown)
Moderate effect (does not eliminate the vector)
Not selective
Toxicity risk
Social concern

b) Repellents

Adequate selection
Transient effect



Slaughter and immobilization

When an outbreak occurs:

- *Stamping out* of infected flocks
- Immobilization of ruminants in the area around the outbreak (up to 100 Km advised)

Vaccination

- In endemic zones, vaccination is a necessary measure
- Currently, attenuated vaccines are most often used
 - Annual revaccination
 - Colostral immunity: 6 months aprox.
- Applied to sheep, but not to cattle (effect on the disease but not useful to control the infection)

Risks related to vaccination:

Attenuated vaccines can produce fetal malformations (hidrancefalia)

There is a (low) risk of vaccine transmission. In this case there is a potential risk of reversion to virulence (extremely uncommon).

Epidemiosurveillance

Detection of clinical outbreaks in sheep

Serological surveys in cattle and other ruminants

Evaluation of the vector populations across the year