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# An introduction to vectors of African horse sickness virus

**An overview of *Culicoides* biology, ecology and vector status.**

# AHSV Geographic Distribution

- For AHSV to circulate in new regions:
  - Hosts of AHSV (Horses; Donkeys; Zebra)

  (approx. 12 000 horses)
  - Active adult insect vectors of AHVS

  (Evidence of Transmission)
  - Temperatures ≥12ºC

  (Exceeded)
  - An introduction event

  (Under Investigation)

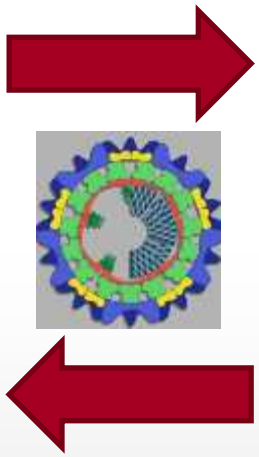
# Implicated vectors of AHSV

- *Culicoides* biting midges (Confirmed)
  - Epidemiology
  - Transmission Experiments
- Mosquitoes (Suspected, but low importance)
- Ticks (Unknown, but low importance)
- *Mechanical transmission (Suspected, but low importance)*




# Transmission of AHSV: 1

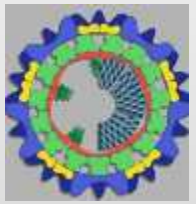
Inefficient (1: 100-1000)



Efficient (1:1)

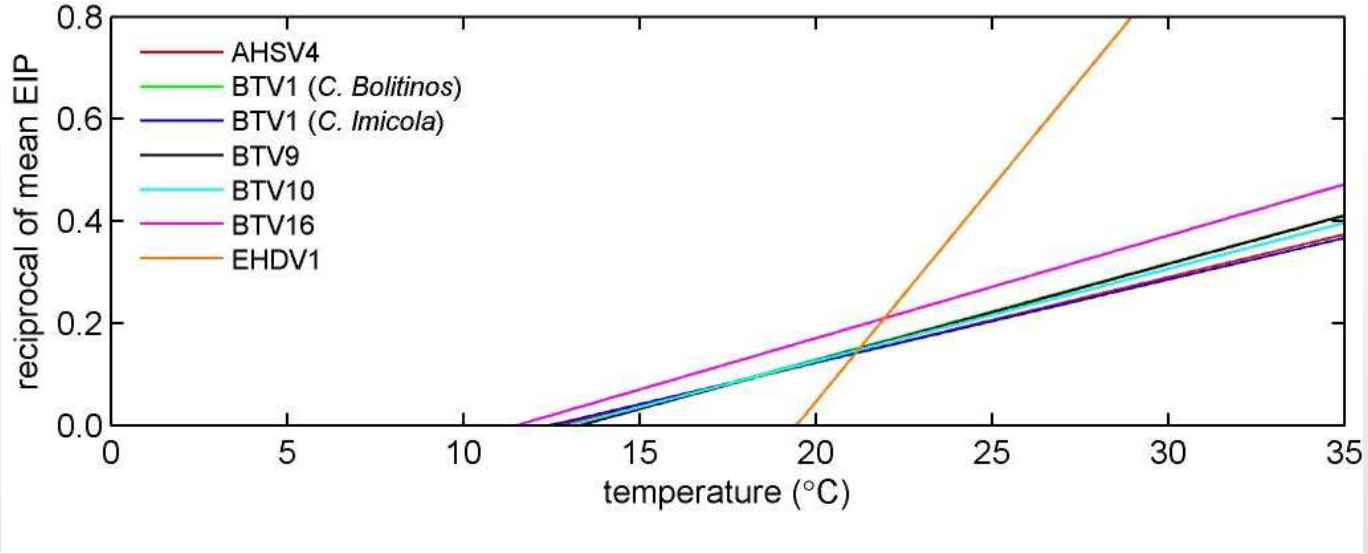
Intrinsic Incubation Period
2-4 days horses
Temperature independent

Extrinsic Incubation Period
3-28 days
Temperature dependent



# Transmission of AHSV: 2

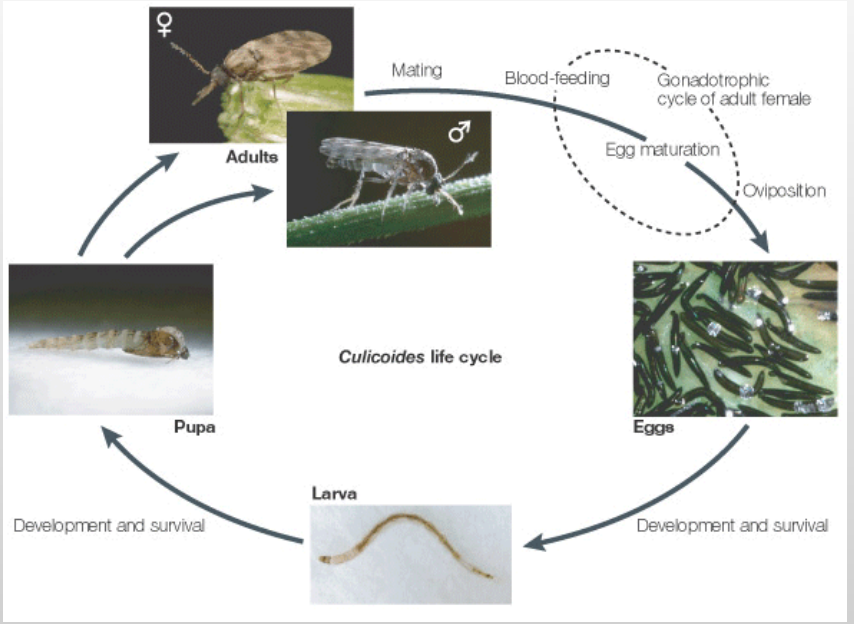
- Rate of extrinsic incubation period is directly related to temperature:




- *Culicoides* are infected for life
- No evidence of transovarial transmission

# Lifecycle of *Culicoides*

- Very small: wings 0.5-2 mm
- Very abundant near horses
- Egg-Larva-Pupa-Adult lifecycle
- Only females blood feed
- Mostly active at dusk/dawn



# Seasonality of *Culicoides*

- Adult populations vary according to rainfall (monsoons) and temperature
- Potential for reduced seasonal risk of transmission of AHSV during dry season
- Severity of outbreaks of BTV in India varies from year to year according to monsoon conditions
- Artificial water sources that result in wet soil/dung (e.g. leaking taps; water troughs; irrigation systems) can create habitats

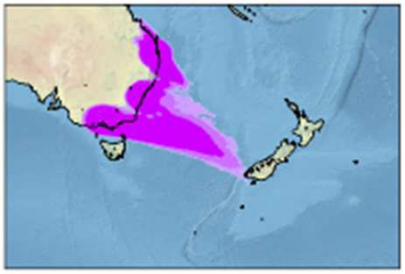
# *Culicoides* blood-feeding

- Feeding has been recorded on:
  - Horses
  - Donkeys/Mules
  - Zebra
  - Other wildlife (e.g. Elephants; Giraffe; Deer)

- Locate their hosts primarily by smell
- Will usually feed on the closest animal
- Clear divergence between mammal and avian feeders

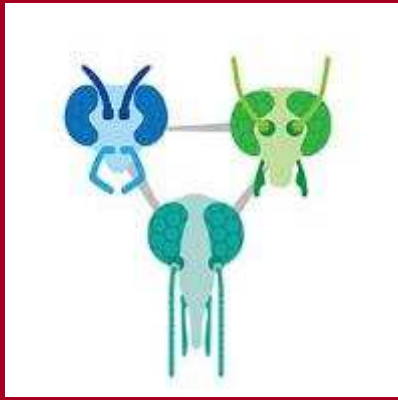
# Dispersal of *Culicoides*

- Long distance flight over sea (100's km)
  - Disease outbreaks/*Culicoides*
  - Probability of finding host?
- Local movement over land
- Primarily short distance (<100m)
- Occasional long distance (>1km)
- Movement in horse transport
- International movement



# Other Information

- Strain does not = Serotype (epidemiological characteristics can vary within a serotype)
- *Culicoides* do not develop in container habitats (e.g. car tyres etc)
- There is evidence of transmission by *Culicoides* of live attenuated vaccines
- The epidemiology of arboviruses can be unpredictable in new areas of transmission



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