Akabane Virus – Risk Management in Australia

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Understanding the epidemiology of Akabane virus is the key to:

- Disease control
- Risk management
- Disease diagnosis
Key aspects:

- Regular, annual transmission of Akabane virus within range of C. brevitarsis
- Annual transmission patterns regular and ‘predictable’
- High prevalence of Akabane virus infection in young cattle;
- High level of herd immunity
- ? Some cross protection from infection with related viruses
Akabane virus epidemiology

- Annual transmission patterns regular and ‘predictable


Akabane Disease

- Disease is ONLY observed with a disruption or alteration to the endemic cycle (females become immune prior to breeding age);

- Disease can occur as a result of:
  - a reduction in the size of the ‘normal’ endemic zone (eg following adverse climatic conditions - drought) due to reduced vector activity;
  - an expansion of the distribution of vectors (following favourable climatic conditions).
  - the introduction of susceptible animals into the endemic zone.
Akabane disease outbreaks

- Disease outbreaks have occurred at long intervals (10-15 years);
- Most due to favourable conditions resulting in an expansion of the vector range into susceptible livestock populations;
- Occasionally disease due to a temporary contraction in the vector range.
- Movement of pregnant animals into vector area during transmission period presents a high risk.
Akabane virus surveillance

- Vector distribution and virus transmission patterns well known;
- Vector-borne viruses have been systematically monitored for >30 years
- Research projects for virus-vector surveillance resulted in the development of the National Arbovirus Monitoring Program (NAMP)
What is NAMP and how is it managed?

- NAMP is a nationally co-ordinated program for the monitoring of selected vector-borne viruses of importance to animal health in Australia.
- The monitoring program is managed by a group representing state and federal governments and the major livestock industries and co-ordinated by Animal Health Australia (AHA).
- AHA is a company owned by the livestock industries in partnership with the state and federal governments.
How is NAMP funded?

- NAMP is funded through AHA by the company members in proportion to the benefits that are gained from NAMP.
- Collectively the livestock industries pay 50% of the direct operating costs;
- The federal government meets 25% of the cost
- Collectively the states pay 25% with an individual state share determined by cattle and sheep numbers
What are the objectives?

- Trade support – to define the distribution of viruses and their insect vectors to assist the development of export protocols and meet certification requirements
- Early warning – to detect incursions of new viruses and vectors into Australia
- Risk management – to detect changes in virus and vector distribution that may lead to disease outbreaks
Which viruses and insects are monitored?

There are 3 main virus groups that are monitored:

- Akabane virus
- Bluetongue – 10 different serotypes have been detected in Australia
- Bovine ephemeral fever virus

Vector monitoring of the biting midges – *Culicoides* spp
How and where is monitoring conducted?

- Groups of young cattle are strategically located around Australia throughout the known range of the principal Culicoides species.
- Insects are collected in light traps.
What testing is carried out?

- 10-15 animals (6-9 mths in spring)
- Blood samples collected regularly
  (monthly in coastal locations – weekly at CPRS, NT)
- Synchronised sampling between sites
- Tested for Akabane, Bluetongue and Ephemeral Fever virus antibodies – ELISA and VNT
- Bluetongue virus isolation – ID of serotype and topotype
- Insects sorted to species
Management of NAMP data

- AHA website
- Unique property identifiers
- Web-based data submission – interactive error checking
Outputs from NAMP

- BTV zone maps (static and interactive)
- Zone maps dynamic, auto-notification system
- Synoptic annual reports
Availability of NAMP data

BTV zone maps and reports available online
BTV free zones
BTV free zones - interactive

NAMP data can be used to define Akabane or BTV distribution
Akabane disease control

- Vector distribution and virus transmission patterns well known;
- Impact of infection can be managed:
  - Farmers limit movement of pregnant animals into vector regions during virus transmission period;
  - Joining delayed if new stock introduced in vector season;
  - Vaccine was used at & beyond margins of endemic area;
  - Vaccine not commercially available any longer.
Akabane virus impacts

Although vector distribution and virus transmission patterns well known and disease is absent:

- Farmers still experience economic loss due to export restrictions arising from:
  - need for testing of live animals;
  - testing of semen and embryo donors;
  - Vector free regions not recognised;
  - Seasonal freedom not recognised;
- Very short viraemia should provide safety for the movement of seropositive animals.
Schmallenberg virus – will it continue to be a problem?

Many obvious parallels with Akabane, however (a personal opinion):

- An evolving situation at present – may take some years to reach equilibrium
- Different vectors to Akabane – more tolerant to adverse climatic conditions; capacity to survive indoors;
- Probably much more difficult to eradicate than BTV;
- Origins and annual epidemiology not yet known;
- Can stable endemic patterns become established?
- Should not be a major obstacle to trade
Thank you for your attention