Member experience on prevention and control for Vector Borne Disease [Japan]

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Vector Borne Disease situations

- Akabane disease
  - ✓ Antibodies against Akabane virus have been detected in sentinel cattle almost every year.
  - ✓ Although commercial vaccines for Akabane diseases are available, its sporadic cases have been reported in recent years.
  - ✓ Akabane disease occurred in the northern tip of Hokkaido, indicating the expansion of its distribution.
- Bovine ephemeral fever
  - ✓ Outbreaks of bovine ephemeral fever have been reported periodically in the southwestern islands.
  - ✓ The outbreaks were likely linked to the virus spread in neighboring regions.
- Epizootic hemorrhagic disease
  - ✓ Any occurrence of Ibaraki disease has not been reported in Japan since 2014.
  - ✓ Multiple serotypes of epizootic hemorrhagic disease virus have been detected in Japan, but their relationship with cattle disease remains uncertain.

Detection capacity

- Disease covered:

  Akabane disease, Aino virus infection, bluetongue, epizootic hemorrhagic disease (Ibaraki disease), bovine ephemeral fever, Chuzan disease

- Type(s) of diagnostic tests:
  - ✓ Virus neutralization tests (VNTs) are available for Akabane disease, Aino virus infection, bovine ephemeral fever, Chuzan disease and Ibaraki disease.
    - ➢ Cross-reactivities are reported between related viruses.

      Chuzan virus – D'Aguilar virus, Ibaraki virus – EHDV serotype 7
    - ➢ It is difficult to cover all serotypes of BTV and EHDV by VNTs.
  - ✓ PCR and qPCR methods are used for surveillance and diagnosis for the above mentioned diseases.
    - ➢ Mutations on viral genomes affect the accuracy of PCR tests in some case.

Response to Vector Borne Diseases

- Surveillance (animal and vector surveillance)
  - ✓Fifteen vector borne diseases are listed as notifiable diseases in Japan.
  - ✓Nationwide surveillance has been conducted with sentinel cattle (serological tests for selected viruses).
  - ✓Genetic detection and virus isolation from bovine blood have been performed in high-risk areas.
- Responses and control
  - ✓ According to the results of surveillance, veterinary officers suggest vaccination.
- Preventive measures to avoid introduction
  - ✓ Animal quarantines check imported animals.
- Vaccination
  - ✓Commercial vaccines against several arboviruses are available. Vaccination is usually conducted before vector season.
- Contingency plans available
  - ✓Vector control by chemical insecticides may be used to prevent pathogens' spread.

Impact of the actions

- Vaccination would be most effective measures to prevent vector borne diseases.
- Vector control may be effective in some cases, but its cost-effectiveness should be considered.
- Animal quarantine system has prevented the incursion of exotic vector borne diseases so far.
- Viral and entomological surveillance in high-risk areas may contribute early warning before vector borne pathogens spread further.

Challenge and possible solutions

- Vaccines are not prepared for all arbovirus infections.
  → Effective vector control measures should be developed.
- Exact number of affected cases by vector borne pathogens are unknown.
  → Sensitive diagnostic measures should be developed.
  → Field clinical cases should be precisely diagnosed.
  → Functional reporting systems for affected cases should be constructed.
- Emerging pathogens were recently detected, but their pathogenicity to human and animals remains uncertain.
  → Etiological analysis for field cases should be promoted.
  → Their pathogenicity should be assessed by animal models.

Collaboration with other sectors under One Health approach

- National Institute of Animal Health and National Institute of Infectious Diseases share several arboviruses for each research purpose.
- Both institutes supported entomological surveillance each other.

Challenge and possible solutions to strengthen the collaboration

- A systematic reporting system between public health and veterinary sections may not be prepared.

→ First of all, information sharing should be promoted among scientists who are working on public health and veterinary regions.

Thank you

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