Epidemiologic study of pestivirus infection in both wild and domestic ruminants: A survey in the Ubaye Valley (Alpine mountains, France)

Claire Martin1, Véronique Duquesne1, Gilbert Adam1, Jean-Luc Champion1, Eric Belleau1, Claude Saegerman4, Richard Thiéry1, Eric Dubois1
1Unité Pathologie des ruminants, Arves, Laboratoire de Siglopa-Antipodes, France
2Coopérative de l’Agneau de Haute-Provence, Digne Les Bains, France
3Cabinet Vétérinaire, Barcelonette, France
4Epidemiology and Risk Analysis Applied to Veterinary Sciences, Faculty of Veterinary Medicine, University of Liège, Belgium

Background

Since several years, Pestivirus infections have been widely documented among wild ruminants1,2. Earlier epidemiologic studies often incriminated interspecies transmission between wild and domestic ruminants. In order to assess this statement, this study was carried out to investigate the apparent prevalence of pestivirus infection in both wild and domestic ruminants in the Ubaye valley.

Material and Methods

- **Geographic areas**: inside the Ubaye Valley (figure 1), sampling of animals was done in five areas identified for their high contact rates between wild and domestic ungulates.
- **Samples, laboratories analysis**: 
  - Wild ruminants: Blood and spleens were collected by voluntaries wild game societies and by the Forest National Office. For virologic study: samples based on local veterinarian clinical suspicion (swabs and spleens).
  - Domestic ruminants: For serum: 1 out of 10 among sera collected for national prophylaxis of brucellosis.
- **Virological analysis**: RT-PCR directed on the 5'UTR sequence (on RNA extracted from spleens or swabs) followed by sequencing.
- **Serological analysis**: 
  - Synbiotics SERELISA (on animal sera).
- **Statistical analysis**: Welch test was used to compare distributions of ELISA optical densities obtained between the different species.

Virological results

- Wild ungulates: no pestivirus was found in 77 samples tested.
- Domestic flocks: a strain was isolated and was clustered within the BDV-6 group (figure 2).

Serological results

- Apparent seroprevalence was calculated:
  - 28.9% (CI95%: [19.1-40.5%]) for chamois.
  - 25.9% (CI95%: [11.1-46.3%]) for roe deer.
  - 9.1% (CI95%: [0.2-41.3%]) for mouflons.
  - 76.5% (CI95%: [74.2-79.4%]) for sheep.

- OD values were significantly higher in sheep than in all other wild species (Welch test, figure 3).

- For chamois, apparent seroprevalence was significantly higher in females than in males (OR=3.15 [1.11-8.95]).
- Oldest animals (>8 years old) were significantly more seropositive (OR= 3.73 [1.09-12.84]).
- 6 out of 15 young animals (from 0.5 to 2 years old) were found seropositive.

Discussion and Perspectives

- These results do not allow us to clearly conclude about transmission direction between wild and domestic ruminants.
- An active circulation of pestiviruses has been demonstrated among wild and domestic ruminants in this area.

To determine the epidemiological roles of both wild and domestic ruminants in pestivirus transmission, we need to:

- Perform comparative virus neutralization test in order to:
  - determine the specificity of serological reactions
  - confirm ELISA results concerning differences between species.
- Isolate and characterize circulating viral strain(s) from wild animals.

- 6 out of 15 young animals (from 0.5 to 2 years old) were found seropositive.