

## SEROLOGICAL EVALUATION OF VIRUS EXPOSURE IN BEIRA ANTELOPES (*DORCATRAGUS MEGALOTIS*) AND SPEKE'S GAZELLES (*GAZELLA SPEKEI*) AT AL WABRA WILDLIFE PRESERVATION (AWWP), QATAR

LECHENNE M<sup>1</sup>, DEB A<sup>2</sup>, HAMMER S<sup>2</sup>

<sup>1</sup>Clinic for Zoo Animals and Exotic Pets, Vetsuisse Faculty, University of Zurich, Winterthurerstrasse 260, CH-8057, Zurich, SWITZERLAND

<sup>2</sup>Al Wabra Wildlife Preservation, P.O. Box 44069, Al Wabra, Doha, STATE OF QATAR;  
[awwp.director@alwabra.com](mailto:awwp.director@alwabra.com)

### Summary

*A retrospective evaluation of data on antibodies to respiratory viruses in Beira antelopes was conducted due to the occurrence of chronic "Fibrinous Pleuropneumonia Syndrome" (FPPS) in Beira antelopes at Al Wabra Wildlife Preservation, to detect an indication for a virological problem contributing to the susceptibility of Beiras to infection with Mycoplasma spp. Data on Speke's gazelles at AWWP were evaluated for comparison. From the 5 tested respiratory viruses BHV-1, BVD, ADENO-3, PI-3 and BRSV, significant antibody titres were only found for BRSV and PI-3. Speke's gazelles were found to have higher antibody titres for both viruses than the Beira antelope, with respiratory signs noted in accordance with virological findings. In Beira, the often fatal respiratory syndrome appears unlikely to be related to any of these viruses.*

### Introduction

AWWP holds the only known captive self-sustaining Beira population of about 40 animals (HECKEL et al., 2004) as of March 2008. The continuing occurrence of a „Fibrinous Pleuropneumonia Syndrome" (FPPS) in Beira antelopes (*Dorcatragus megalotis*) at Al Wabra Wildlife Preservation (AWWP) (HAMMER et al., 2007; NAGY et al., 2008) poses a considerable threat to the conservation of this species. The species is listed as "vulnerable" by the IUCN (IUCN, 2008) and remaining wild populations are found at the Horn of Africa in Somalia, Ethiopia and Djibouti (HECKEL et al., 2004). The rarity of the species along with the political instability in the regions where it occurs makes in-situ research and conservation very difficult. The current status of the Beira antelope is therefore unknown, protected areas are currently not available for the species, and very little information exists about its behaviour and ecology in the wild. The most recent study on this dwarf antelope in Southern Djibouti (GIOTTO et al., 2008) found that Beira antelopes are rarely solitary and make up small mixed sex groups of 1 - 5 individuals, including only 1 male. Bachelor groups were not observed and the animals show a predilection for hilly terrain. These behavioural aspects clearly differ from other antelopinae and could be indications that this species is of a monospecific genus, and could therefore play a particular role in the understanding of bovine evolution (GIOTTO et al., 2008).

Lung problems in AWWP started in 2004 with cases of Contagious Caprine Pleuropneumoniae (CCPP) in several ungulate species (ARIF et al., 2007). Beira antelopes did not seem to be affected initially but were nevertheless vaccinated as a prophylactic measure against CCPP with an inactivated Mccp vaccine (CAPRIVAX®) (NAGY et al., 2008). First losses of Beira antelopes due to Fibrinous Pleuropneumonia Syndrom (FPPS) occurred in January 2006, and despite implementing various bio-security measures to prevent the disease from spreading - such as separation of sick animals and

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movement control of staff and objects-, the population decreased rapidly. In 2007 the lung problems became more chronic (VERHOEVEN et al., 2008). Although much diagnostic effort has been made since, the aetiologic agent(s) causing FPPS in Beira antelopes could not yet be identified, with only *Mycoplasma ovipneumoniae* being detected by PCR in a few cases (NAGY et al., 2008).

## Methods

In 2007 a retrospective evaluation of data on virus antibodies in the Beira antelope population at AWWP was initiated to investigate whether there was any indication of a virological problem underlying the susceptibility of Beira antelopes to *Mycoplasma* infection. As a comparison to the Beira population, data on virus antibody test of Speke's gazelles (*Gazella spekei*), a species kept at AWWP which also suffered from chronic respiratory infections in 2007, were used.

Serum samples were tested by ELISA for Bovine Herpesvirus (BHV-1), Bovine Viral Diarrhoea virus (BVDV), Adenovirus (ADENO-3), Bovine Respiratory Syncytial virus (BRSV) and Parainfluenza-3 (PI-3) antibodies. The laboratory reports on these tests and the stock list of AWWP were used as data sources for this survey. For the Beira antelope data set, 8 serum samples from 2006 and 55 from 2007 were available. The Speke's gazelle data set included 30 serum samples taken in 2007.

## Results

All samples were tested negative for BHV-1 and BVD antibodies. Adenovirus antibodies prevalence was very low (< 5 %) in both species. PI-3 antibody prevalence in Beira was 38 % in 2006 and dropped to less than 10 % in 2007. The same was observed for BRSV antibodies in Beira antelopes, which showed a prevalence of 25 % in 2006 but only 6 % the following year (figure 1). Speke's gazelles showed a prevalence of 28 % for PI-3 antibodies and a high prevalence of 60 % for BRSV (figure 2), even though signs of respiratory infection, such as nasal discharge, rough lung sounds and coughing, were only observed in two of the tested individuals (figure 3).

Antibody titres of PI-3 and BRSV in 2006 could be remnants of a vaccination with BOVIGRIPP<sup>®</sup>, a combined PI-3/BRSV vaccine, administered to the Beira antelopes regularly until 2005, which would also explain the drop of antibody prevalence in 2007 since detectable levels of antibodies only persist until 14 months after vaccination (VAN GAMPEN and EARLY, 2001). Speke's gazelles were never vaccinated with BOVIGRIPP<sup>®</sup>.

Three Speke's gazelles, which were taken from their mothers within less than 24 h after birth and were kept together with Beira antelopes in the same facility as sentinel animals, were negative for all tested virus antibodies. From the 17 Beira antelopes living in the same group of enclosures at the time of blood sampling in November 2007, only 1 was tested positive for BRSV antibodies and 2 for PI-3 antibodies. The sentinel Speke's gazelles so far showed no signs of infection with mycoplasma, although 41 % (7 out of 17) of the Beira antelopes showed rough lung sounds on auscultation indicating either a previous or chronic infection. In addition, at the time of sampling, 29 % (5 out of 17) suffered from an active respiratory infection as concluded by overt clinical signs of nasal discharge and coughing. Two of these five died later of FPPS as confirmed by macro- and histopathological findings. Medical records (indicating either rough lung sounds on auscultation, or apparent respiratory infection assumed by clinical signs described above) of the animals whose blood was tested for virus antibodies showed that in Beira antelopes, there was no evident association between BRSV antibody titres and clinical signs of lung problems, (figure 3), whereas a tendency towards such an association

is observable between BRSV and respiratory infection in Speke's gazelles (figure 4). However, the data available in this case are still too few to allow definite conclusions.

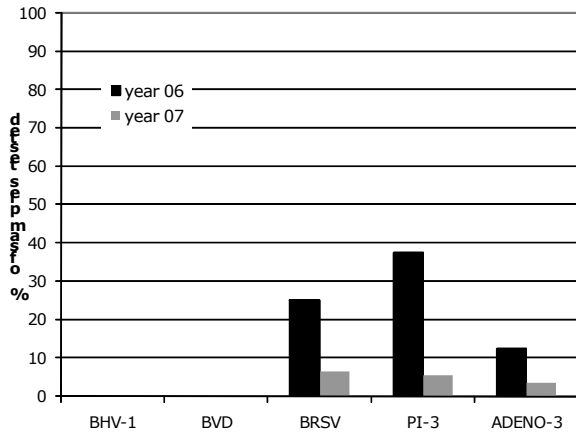


Figure 1: Antibodies to 5 respiratory viruses in Beira antelopes, comparison of year 2006/2007. Bars indicate % of antibody positive samples.

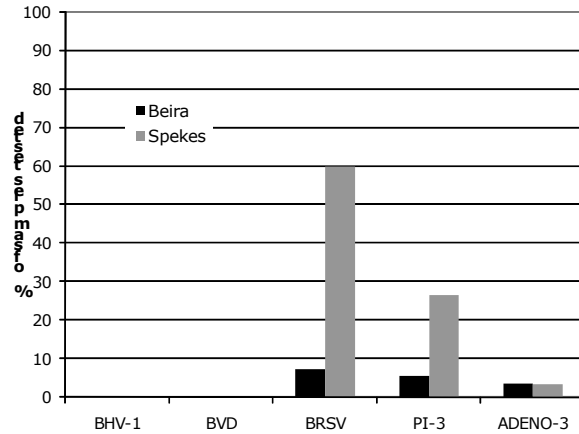


Figure 2: Comparison of BRSV antibody titres in Beira antelopes and Speke's gazelles in 2007. Bars indicate % of antibody positive samples.

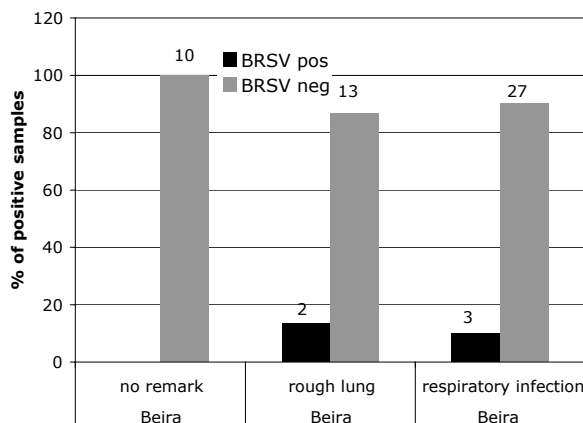


Figure 3: BRSV antibodies and reported lung problems in Beira antelopes.

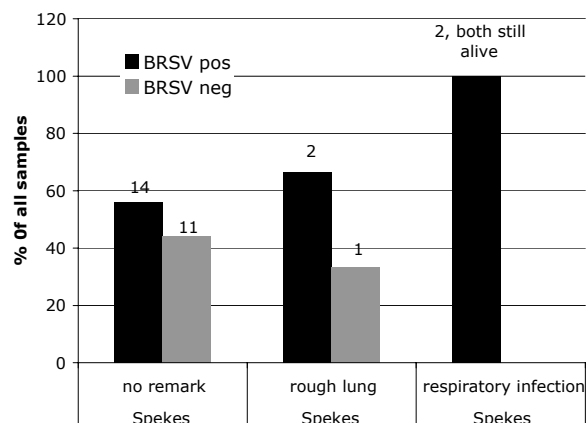


Figure 4: BRSV antibodies and reported lung problems in Speke's gazelles.

## Discussion

BRSV and PI are suspected to be a precursor of bacterial infections due to their negative effect on the mucociliary clearance by deranging ciliar growth. Secondary bacterial infection to these viruses is associated with severe respiratory disease. Both viruses are highly infectious, but most infections are subclinical (VAN GAMPEN and EARLY, 2001). As BRSV seems to circulate among the Speke's population, whereas Beira antelopes are suffering from Mycoplasma infections, it is suggested to hold Beira antelopes and Speke's strictly apart since transmission in both these viruses is airborne. Although few studies on efficiency of vaccination in wild ruminants exist, it could be advisable to

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reintroduce vaccination of Beira antelopes, as well as starting to vaccinate Speke's with BOVIGRIPP®. Immunity acquired from natural infection, as seen in Speke's gazelles, is short-lived and reinfections are common (VAN GAMPEN and EARLY, 2001). The efficacy of these measures will have to be evaluated in the near future.

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