



## Evaluation of the efficacy of commercial vaccines against bluetongue virus serotypes 1 and 8 in experimentally infected red deer (*Cervus elaphus*)

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### ABSTRACT

Red deer (*Cervus elaphus*) is a widespread and abundant species susceptible to bluetongue virus (BTV) infection. Inclusion of red deer vaccination among BTV control measures should be considered. Four out of twelve BTV antibody negative deer were vaccinated against serotype 1 (BTV-1), and four against serotype 8 (BTV-8). The remaining four deer acted as unvaccinated controls. Forty-two days after vaccination (dpv), all deer were inoculated with a low cell passage of the corresponding BTV strains. Serological and virological responses were analyzed from vaccination until 28 days after inoculation (dpi).

The vaccinated deer reached statistically significant ( $P < 0.05$ ) higher specific antibody levels than the non vaccinated deer from 34 (BTV-8) and 42 (BTV-1) dpv, maintaining stable neutralizing antibodies until 28 dpi. The non vaccinated deer remained seronegative until challenge, showing neutralizing antibodies from 7 dpi. BTV RNA was detected in the blood of the non vaccinated deer from 2 to 28 dpi, whereas no BTV RNA was found in the vaccinated deer. BTV was isolated from the blood of non vaccinated deer from 7 to 28 dpi (BTV-1) and from 9 to 11 dpi (BTV-8). BTV RNA could be identified by RT-PCR at 28 dpi in spleen and lymph nodes, but BTV could not be isolated from these samples. BT-compatible clinical signs were inapparent and no gross lesions were found at necropsy.

The results obtained in the present study confirm that monovalent BTV-1 and BTV-8 vaccines are safe and effective to prevent BTV infection in red deer. This finding indicates that vaccination programs on farmed or translocated red deer could be a useful tool to control BTV.

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### 1. Introduction

Bluetongue (BT) is an arthropod-borne disease caused by bluetongue virus (BTV), an Orbivirus (BTV) transmitted

by *Culicoides* midges (Mellor and Wittmann, 2002; Mertens et al., 2004). Currently, 24 BTV serotypes have been recognized worldwide, with an additional probable 25th serotype, Toggenburg orbivirus, recently identified (Chaïgnat et al., 2009; Hofmann et al., 2008). Since 1998, BTV serotypes 1, 2, 4, 6, 8, 9, 11 and 16 have been circulating through Europe causing the most severe outbreak of BT on record (MacLachlan and Guthrie,

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