

## Possible overwintering mechanism of bluetongue virus in vectors

D.M. White<sup>(1,2)</sup>, W.C. Wilson<sup>(1)</sup>, C.D. Blair<sup>(3)</sup> & B.J. Beaty<sup>(3)</sup>

- (1) United States Department of Agriculture (USDA)-Agricultural Research Service (ARS), Arthropod-Borne Animal Diseases Research Laboratory, Dept. 3354, 1000 E. University Avenue, Laramie, WY 82071, United States of America
- (2) Present address: Centers for Disease Control and Prevention, NCID/DVRD/Special Pathogens Branch, 1600 Clifton Rd NE, Building 15-SB, Mailstop G14, Atlanta, GA 30333, United States of America
- (3) Arthropod-borne and Infectious Diseases Laboratory, Department of Microbiology, Immunology, and Pathology, Colorado State University, Fort Collins, CO 80523-0100, United States of America

### Summary

The overwintering mechanism of bluetongue virus (BTV) has eluded researchers for many years. While overwintering in the vertebrate host has been the main hypothesis, it has been shown that several arboviruses overwinter in their invertebrate vectors. Overwintering *Culicoides sonorensis* larvae were collected from long-term study sites in northern Colorado and examined for the presence of BTV nucleic acid by reverse transcriptase (RT)-nested polymerase chain reaction (PCR). Sequences from the S7 segment of BTV RNA were detected in 17 of 56 (30%) pools comprised of larvae and pupae collected in 1998, and in 32 of 319 (10%) pools comprised of adults reared from larvae collected in 1996. BTV was not isolated from the adult pools. Additionally, cell lines derived from culicoid embryos collected at the same site, or derived from material collected during a BTV outbreak, were positive for BTV nucleic acid. Interestingly, in contrast to the S7 segment, the L2 RNA segment could only rarely be detected in any of the field-collected larvae, and was not detected in the culicoid cell lines. These data suggest that BTV may not require abundant expression of the outer coat genes to persist in the insect vector. This could also explain the low rate of isolation of virus from insects. If the vertebrate cell receptor ligand VP2 (which is encoded by L2) is expressed at very low levels in the insect, traditional vertebrate cell-based isolation methods would be inefficient until the virus had amplified itself sufficiently to express all virus genes required for vertebrate cell infection. Further research in this area will define and characterise the role of the vector in the overwintering of BTV, and will help in focusing control efforts.

### Keywords

Bluetongue – *Culicoides sonorensis* – Overwintering – United States of America – Vectors – Virus.

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