**Prevalence of antibodies to bluetongue, bovine herpesvirus 1 and bovine viral diarrhea/mucosal disease viruses in water buffaloes in Minas Gerais State, Brazil**

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### Key words
Water buffalo - Bluetongue - Bovine herpesvirus 1 - Bovine viral diarrhea - Mucosal disease - Brazil.

### Summary
A serological survey to detect water buffaloes with antibodies to bluetongue virus (BTV), bovine herpesvirus 1 (BHV 1) and bovine viral diarrhea/mucosal disease virus (BVD/MDV) was performed in Minas Gerais State, Brazil. Precipitating antibodies against BTV were detected by the agar gel immunodiffusion test (AGID) in 54.4 % of the serum samples tested. Microplate serum-neutralization tests revealed that 14.7 % and 52.7 % of the water buffaloes had antibodies to BHV 1 and BVD/MDV, respectively. The prevalence of antibodies to BTV in water buffaloes under two years old was significantly lower than in adults.

### INTRODUCTION

In Brazil, serological surveys have shown that the bluetongue virus (BTV), the bovine herpesvirus 1 (BHV 1) and the bovine viral diarrhea/mucosal disease (BVD/MDV) virus are widespread in cattle in Minas Gerais State (6). Furthermore, antibodies against BTV (5, 8), BHV 1 and BVD/MDV (5, 7) have been reported in ruminants other than cattle in other states.

Little attention has been given to viral diseases of buffaloes and information on BTV, BHV 1 and BVD/MDV infections in buffaloes is scanty. In Brazil, there is only one serological report on BHV 1 antibodies in water buffaloes in São Paulo State (9).

The present paper reports the results of a survey on the prevalence of antibodies to BTV, BHV 1 and BVD/MDV in water buffaloes in Minas Gerais State, Brazil.

### MATERIALS AND METHODS

The survey was performed between 1989 and 1990 in counties located in the most important buffalo producing areas of Minas Gerais State. A total of 329 serum samples were collected and stored at -20°C. Later, the 329 sera were thawed and tested for BTV antibodies by agar-gel immunodiffusion using a group-specific antigen of BTV* (11). Sets of 220 and 238 sera were examined by a microplate serum neutralization test, using the MDBK cell line, for the presence of antibodies to BHV 1 (Los Angeles strain), BVD/MDV (NADL strain) (3) and BHV 1 (Los Angeles strain), respectively (2, 3). The samples were stratified by age (< 2 years and > 2 years) and analyzed by the Chi-square test (χ²).

### RESULTS

The respective seropositive rates for BTV, BHV 1, and BVD/MDV were 54.4 %, 14.7 % and 52.7 % (Table I). No difference was found in the prevalence of antibodies to BHV 1 or BVD/MDV in water buffaloes under and over two years. However, antibodies against BTV were significantly more prevalent in older animals (26.4 % versus 59.8 %, χ² = 18.63, p < 0.001).
Prevalence of antibodies to BTV, BHV 1 and BVD in buffaloes

Table I

Prevalence of antibodies to bluetongue, bovine herpesvirus 1 and bovine viral diarrhea/mucosal disease viruses in water buffaloes in Minas Gerais State, Brazil

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>BTV pos./total (%)</th>
<th>BHV 1 pos./total (%)</th>
<th>BVD/MDV pos./total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2</td>
<td>14/53 (26.4)</td>
<td>07/37 (18.9)</td>
<td>19/41 (46.3)</td>
</tr>
<tr>
<td>&gt; 2</td>
<td>165/276 (59.6)</td>
<td>28/201 (13.9)</td>
<td>97/179 (54.2)</td>
</tr>
<tr>
<td>Total</td>
<td>179/329 (54.4)</td>
<td>35/238 (14.7)</td>
<td>116/220 (52.7)</td>
</tr>
</tbody>
</table>

Rates marked with the same superscript letter in the same column are significantly different ($\chi^2$, p < 0.05).

DISCUSSION

Water buffaloes seropositive for the viruses studied were widespread in the sampled population indicating active infection as no vaccines against these viruses have been used in water buffaloes in Brazil. The prevalence of seropositive water buffaloes to BTV and BHV 1 were lower than those reported in cattle (1, 6). The BHV 1 antibody prevalence, however, was lower than that reported in buffaloes in São Paulo State (9). In contrast, the prevalence of BVD/MDV antibodies was higher than that found in cattle in Minas Gerais State (6).

The hypothesis that BTV, BHV 1 and BVD/MDV are actually infecting water buffaloes must be considered with caution. The BTV antigen used in the agar-gel immunodiffusion test was group-specific and can cross-react with antibodies to the virus of epizootic hemorrhagic disease of deer, which is known to infect cattle, goats and sheep in Brazil (8). It is also known that herpesviruses isolated from buffalo cross-react with antibodies to BTV antigen used in the agar-gel immunodiffusion test was infecting water buffaloes must be considered with caution. The hypothesis that BTV, BHV 1 and BVD/MDV are actually infecting water buffaloes must be considered with caution. The BTV antigen used in the agar-gel immunodiffusion test was group-specific and can cross-react with antibodies to the virus of epizootic hemorrhagic disease of deer, which is known to infect cattle, goats and sheep in Brazil (8). It is also known that herpesviruses isolated from buffalo cross-react with antibodies to BTV antigen used in the agar-gel immunodiffusion test was infecting water buffaloes.

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REFERENCES

Résumé

Lage A.P., Castro R.S., Melo M.I.V., Aguiar P.H.P., Barreto Filho J.B., Leite R.C. Prévalence d’anticorps dirigés contre les virus de la fièvre catarrhale ovine, de l’herpès virus bovin de type 1 et de la diarrhée bovine/maladie des muqueuses chez le buffle d’eau dans l’Etat de Minas Gerais, Brésil

Une étude sérologique visant à identifier les buffles porteurs d’anticorps dirigés contre les virus de la fièvre catarrhale ovine (BTV), de l’herpès virus de type 1 (BHV 1) et de la maladie des muqueuses (BVD) a été réalisée dans l’Etat de Minas Gerais, au Brésil. Dans 54,4 p. 100 des sérums testés, des anticorps précipitants anti-BTV ont été mis en évidence par immunodiffusion en gelose. Le test de séroneutralisation sur microplaque a montré que 14,7 p. 100 et 52,7 p. 100 des buffles présentaient respectivement des anticorps anti-BHV 1 et anti-BVD. La prévalence d’anticorps dirigés contre BTV était, de manière significative, inférieure chez les buffles d’eau âgés de moins de deux ans à celle observée chez les adultes.


Resumen

Lage A.P., Castro R.S., Melo M.I.V., Aguiar P.H.P., Barreto Filho J.B., Leite R.C. Prevalencia de anticuerpos de lengua azul, herpesvirus bovino 1 y diarrea viral bovina/enfermedad de las mucosas en búfalos de agua, en el estado de Minas Gerais, Brasil

Se llevó a cabo un estudio serológico, con el fin de detectar búfalos de agua con anticuerpos al virus de lengua azul (BTV), de herpesvirus bovino 1 (BHV 1) y de diarrea viral bovina/ enfermedad de las mucosas (BVD/MDV), en el estado de Minas Gerais, Brasil. Se detectaron los anticuerpos precipitantes contra BTV mediante el test de inmunodifusión en agar-gel (AGID), en 54,4 p. 100 de los sueros examinados. Los tests de sero-neutralización en microplaca revelaron que 14,7 p. 100 y 52,7 p. 100 de los búfalos de agua presentan anticuerpos a BHV 1 y BVD/MDV, respectivamente. La prevalencia de los anticuerpos a BTV en los búfalos de agua menores de dos años fue significativamente más baja que en los adultos.

Palabras clave : Búfalo de agua - Lengual azul de los ovinos - Herpesvirus bovino 1 - Diarrea viral bovina - Enfermedad de las mucosas - Brasil.