

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

A.P. Lage¹ R.S. Castro² M.I.V. Melo¹
P.H.P. Aguiar¹ J.B. Barreto Filho¹ R.C. Leite¹

Key words

Water buffalo - Bluetongue - Bovine herpesvirus 1 - Bovine viral diarrhoea - 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 diarrhoea/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 diarrhoea/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 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 (χ^2).

■ 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 %, $\chi^2 = 18.63$, $p < 0.001$).

1. UFMG, Escola de Veterinária, Departamento de Medicina Veterinária Preventiva, Caixa Postal 567, CEP 30161-970, Belo Horizonte, MG, Brasil

Fax: +55 31 441 02 66
E-mail: alage@dedalus.lcc.ufmg.br

2. UFRPE, Departamento de Medicina Veterinária, Rua D. Manoel de Medeiros s/n, Dois Irmãos, CEP 52171-300, Recife, PE, Brasil

* Veterinary Diagnostic Technology, Inc. 4890-USA

Table I

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

Age (years)	BTV pos./total (%)	BHV 1 pos./total (%)	BVD/MDV pos./total (%)
≤ 2	14/53 (26.4) ^a	07/37 (18.9)	19/41 (46.3)
> 2	165/276 (59.8) ^a	28/201 (13.9)	97/179 (54.2)
Total	179/329 (54.4)	35/238 (14.7)	116/220 (52.7)

Rates marked with the same superscript letter in the same column are significantly different (χ^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 in the sera of other ruminants in serum-neutralization tests and *vice-versa* (12) despite having distinct DNA fingerprints (4). Finally, our understanding of the antigenic relationships among pestiviruses isolated from ruminants other than cattle is rudimentary (10).

Acknowledgements

The authors are grateful to Dr. I.S. Ventura and Mrs. C.A.C. Vicente for technical assistance and Dr. Z.I.P. Lobato for reviewing the manuscript. This work was supported by Fundação de Estudo e Pesquisa em Medicina Veterinária e Zootecnia (FEP-MVZ) - Coordenação Preventiva.

REFERENCES

- ANUNCIACÃO A.V.M., LEITE R.C., MOREIRA E.C., REIS R., LOBATO Z.I.P., 1989. Presença de anticorpos para o Herpesvirus bovino 1 (HVB 1) em bovinos nos Estados de Minas Gerais, Goiás e Rio de Janeiro, através da prova de Hemoaglutinação passiva. *Arq. Bras. Med. vet. Zootec.*, **41** : 433-442.
- BITSCH H.V., 1978. The p 37/24 modification of the infectious bovine rhinotracheitis virus-soro neutralization test. *Acta vet. Scand.*, **19**: 497-505.
- BLACK J. W., 1971. Use of the microtiter serum neutralization test for the diagnosis of IBR, BVD and other bovine and porcine viral diseases. *Proc. USA Anim. Health Assoc.*, **74**: 515-521.
- BRAKE F., STUDDERT M.J., 1985. Molecular epidemiology and pathogenesis of ruminant herpesvirus including bovine, buffalo and caprine herpesvirus 1 and bovine encephalitis herpesvirus. *Aust. vet. J.*, **62**: 331-334.
- BROWN C.C., OLANDER H.J., CASTRO A.E., BEHYMER D.E., 1989. Prevalence of antibodies in goats in North-eastern Brazil to selected viral and bacterial agents. *Trop. Anim. Health Prod.*, **21**: 167-169.
- CASTRO R.S., LEITE R.C., ABREU J.J., LAGE, A.P., FERRAZ I.B., LOBATO Z.I.P., BALSAMÃO S.L.E., 1992. Prevalence of antibodies to selected viruses in bovine embryo donors and recipients from Brazil, and its implications in international embryo trade. *Trop. Anim. Health Prod.*, **24**: 173-176.
- CASTRO R.S., SILVA F.A.G., FRUTUOSO E.M., NASCIMENTO S.A., 1994. Anticorpos contra Pestivirus e Herpesvirus em caprinos leiteiros no Estado de Pernambuco. *Arq. Bras. Med. vet. Zootec.*, **46** : 577-578.
- CUNHA R.G., 1990. Anticorpos neutralizantes em soros de ruminantes domésticos do Brasil frente aos diferentes serotipos do vírus da língua azul. *Rev. Bras. Med. vet.*, **12** : 3-7.
- IKUNO A.A, MACHADO J.S., MUELLER S.B.K., RIBEIRO L.O.C., CHIBA S., 1984. Presença de anticorpos contra o vírus da Rinotraqueite Infeciosa dos bovinos/Vulvovaginite Pustular Infeciosa (IBR/IPV) em búfalos (*Bubalus bubalis*) do Estado de São Paulo. *Biológico*, **50** : 131-138.
- NETTLETON P.F., 1990. Pestivirus infection in ruminants other than cattle. *Revue sci. tech. Off. int. Epizoot.*, **9**: 131-150.
- PEARSON J., JOCHIN M.M., 1979. Protocol for the immunodiffusion test for bluetongue. *Proc. Am. Assoc. vet. Diagn.*, **22**: 463-471.
- ST. GEORGE T.D., PHILPOTT M., 1972. Isolation of infectious bovine rhinotracheitis virus from the prepuce of water buffalo bulls in Australia. *Aust. vet. J.*, **48**: 126.

Reçu le 1.8.95, accepté le 8.10.96

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'herpèsvirus 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'herpèsvirus 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.

Mots-clés : Buffle d'eau - Fièvre catarrhale du mouton - Herpèsvirus bovin de type 1 - Diarrhée bovine - Maladie des muqueuses - Brésil.

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 mas 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.