

Herd-level prevalence of bovine leukaemia virus infection and associated risk factors in commercial dairies in five provinces of South Africa

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INTRODUCTION

Bovine leukaemia virus is an exogenous, oncogenic retrovirus which is the cause of enzootic bovine leukosis (EBL) in cattle. The infection is associated with significant economic losses to dairy farming enterprises (Pelzer, 1997). The most apparent losses are those due to clinical disease. These include loss of production, death and culling of affected animals, veterinary costs associated with diagnosis and attempted treatment, and condemnation of affected carcasses. Further costs arise from restrictions on the export of cattle or cattle products from herds which are not free from BLV (Acaite *et al.*, 2007).

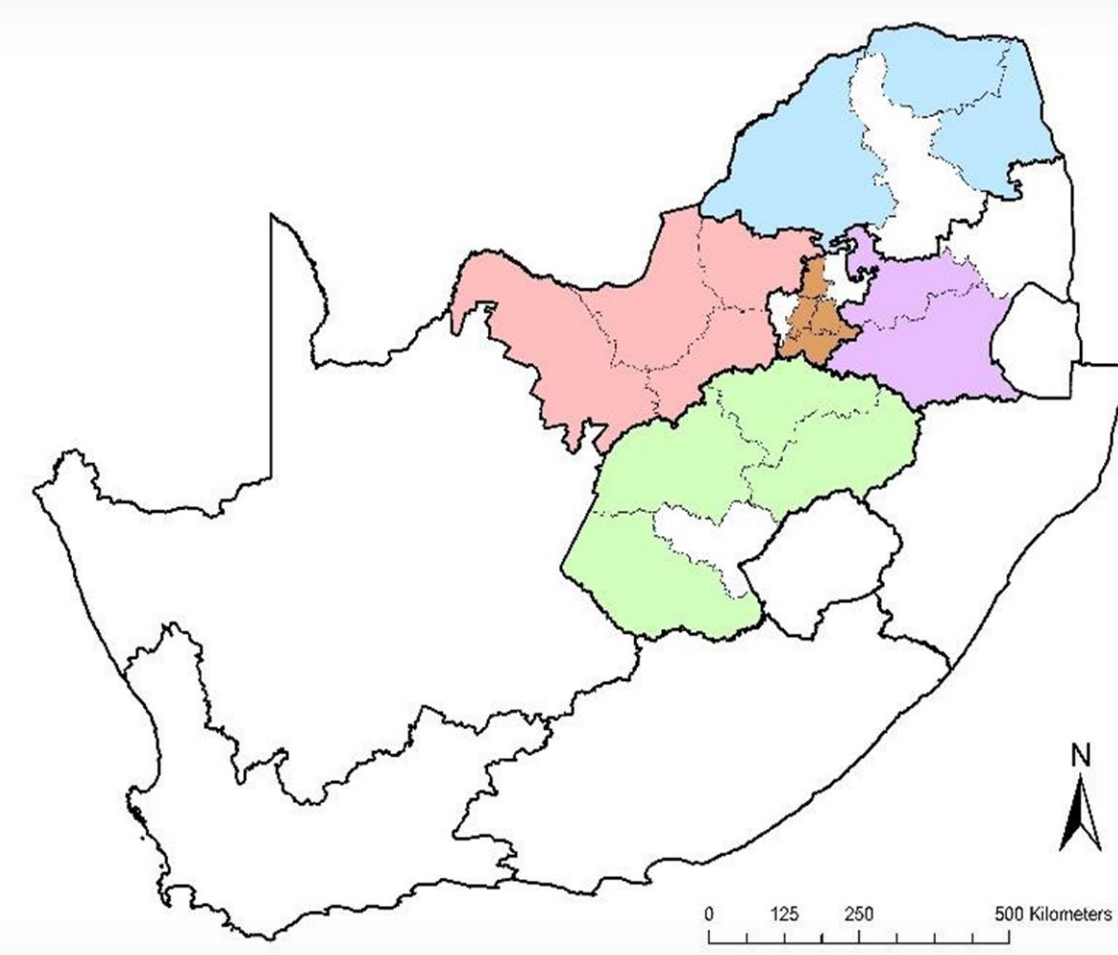
Localised studies carried out in South Africa using individual animal serology have demonstrated the presence of BLV in the country (Morris *et al.*, 1996; Moola, 2000; Ndou *et al.*, 2011). Anecdotal evidence suggest that infection is widespread, but no large-scale studies have been done to estimate herd-level prevalence of infection in South Africa.

AIM OF THE STUDY

- To estimate the proportion of commercial dairy herds infected with BLV in the northern region of South Africa
- To identify factors associated with herd-level BLV infection
- To identify factors associated with within-herd prevalence in BLV-infected herds

MATERIALS AND METHODS

Bulk tank milk (BTM) from 155 dairy herds randomly selected from the Limpopo, North West, Mpumalanga, Gauteng and Free State provinces of South Africa was tested for BLV infection using an indirect enzyme-linked immunosorbent assay (ELISA). A questionnaire was used to collect data regarding management practices and herd specific factors.



Logistic regression was used to assess risk factors for the presence of BLV on the farm. Multiple linear regression was used to identify risk factors for within-herd prevalence of BLV infection, using as a proxy the quantitative outcome of the BTM ELISA (E_{quant}).

RESULTS: Prevalence

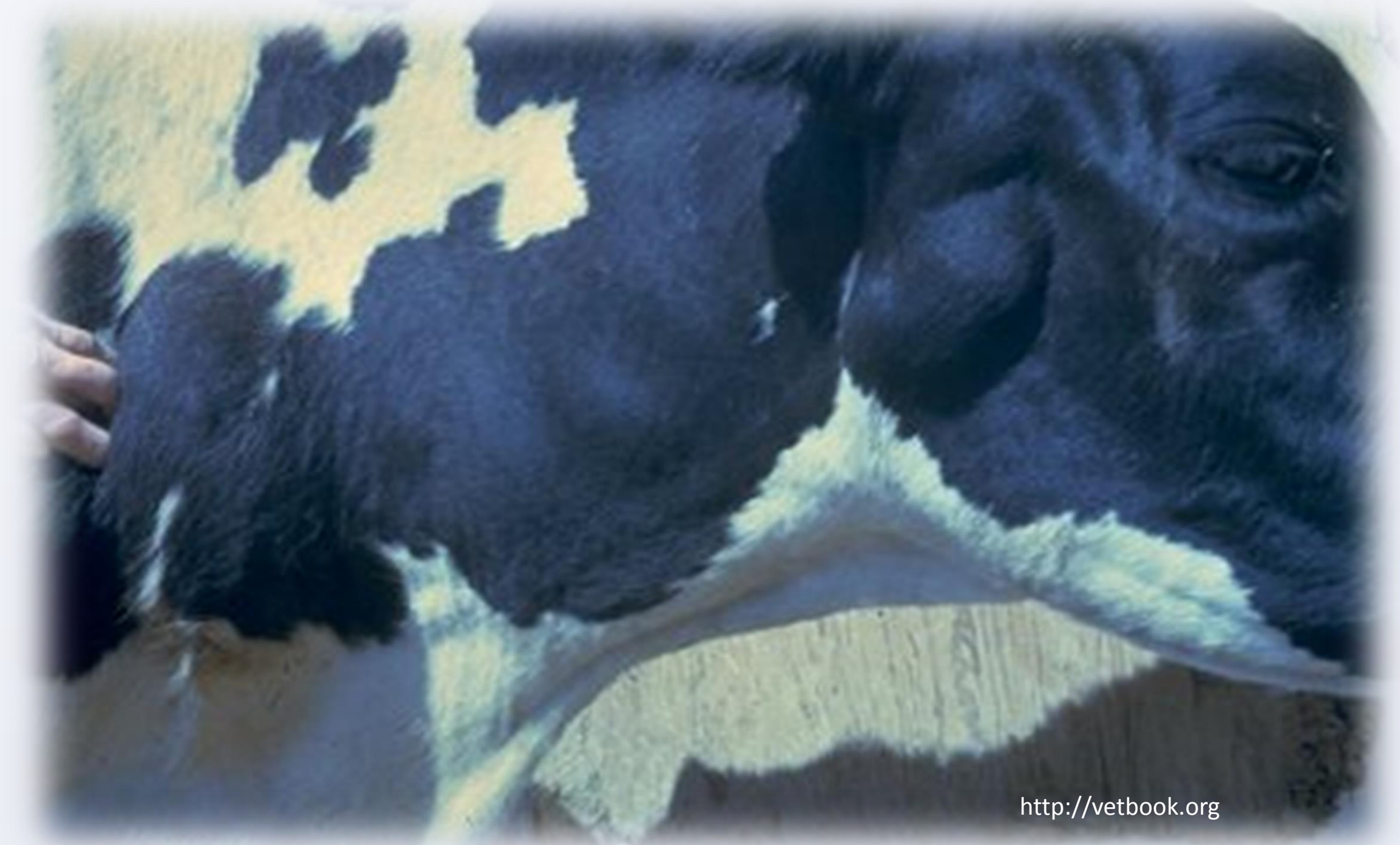
The vast majority of herds (149/155) tested positive for BLV, giving an estimated herd-level prevalence of 96% (95% confidence interval: 92 - 99%). Prevalence was high in all five provinces, although somewhat lower in Mpumalanga (77%).

Table 1. Prevalence of antibodies to bovine leukaemia virus in bulk tank milk

Province	No. of farms	Prevalence (%)	95% CI
Mpumalanga	17/22	77	55 - 92
Gauteng	34/35	97	85 - 99.9
North West	65/65	100	94 - 100
Free State	26/26	100	87 - 100
Limpopo	3/3	100	29 - 100
Total	149/155	96	92 - 99

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RESULTS: Risk factors

Questionnaire data were obtained from 125 herds. A multiple logistic regression model did not identify any significant associations between herd factors and the presence of BLV in the herd, likely due to the very small number of negative herds. The multiple linear regression model (Table 2) did demonstrate an association between the E_{quant} and various herd and management factors:

- The use of communal calving camps, reuse of rectal gloves without disinfection and the use of artificial insemination (AI) in cows were associated with a higher E_{quant}
- Regular treatment against flies was associated with a lower E_{quant}

Table 2. Multivariable regression model of factors associated with the quantitative outcome of bulk milk ELISA test (E_{quant}) in 118 BLV-infected herds

Variable and level	n	Coefficient	95% CI	P-value
Calving management				
Communal yard/camp	92	0	–	–
Pasture	16	–0.047	–0.082, –0.011	0.010
Individual pens	16	–0.046	–0.080, –0.012	0.080
AI used in cows				
No	36	0	–	–
Yes	88	0.051	0.023, 0.079	<0.001
Use of rectal gloves				
No rectals or single use	42	0	–	–
Disinfect between animals	25	0.007	–0.025, 0.039	0.675
Reuse without disinfecting	57	0.027	0.001, 0.054	0.040
Fly treatments per year				
0 - 2	42	0	–	–
2 - 5	40	–0.035	–0.061, –0.008	0.010
>5	43	–0.032	–0.059, –0.004	0.026

CONCLUSIONS

- Infection with BLV is widespread amongst commercial dairy herds in the northern region of South Africa, with between 92% and 99% of herds infected.
- Improved management of the calving process in order to limit the risk of infection of heifer calves during the peri-parturient period, changing of gloves between rectal examinations and improved control of biting flies of the *Tabanidae* family are likely to form useful additions to a herd programme for control of BLV.
- Further research is required to investigate the role of AI in the spread of the disease in South Africa.

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