Preventive Veterinary Medicine 147 (2017) 17–25

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

Serological evidence of vaccination and perceptions concerning Foot-and-Mouth Disease control in cattle at the wildlife-livestock interface of the Kruger National Park, South Africa

D.D. Lazarus[a,f,*], G.T. Fosgate[a], O.L. van Schalkwyk[b], R.E.J. Burroughs[a], L. Heath[c], F.F. Maree[c], B. Blignaut[a], B. Reininghaus[d], A. Mpehle[d], O. Rikhotso[d], G.R. Thomson[e]

[a] University of Pretoria, Faculty of Veterinary Science, Department of Production Animal Studies, Onderstepoort, 0110, South Africa
[b] Office of the State Veterinarian, Department of Agriculture, Forestry and Fisheries, Government of South Africa, South Africa
[c] Transboundary Animal Diseases Programme, Agricultural Research Council, Onderstepoort Veterinary Institute, Onderstepoort, 0110, South Africa
[d] Mpumalanga Veterinary Services, Department of Agriculture, Land and Environmental Affairs, South Africa
[e] TAD Scientific, Pretoria, South Africa
[f] National Veterinary Research Institute, Foot-and-Mouth Disease Research Laboratory, Vom, Nigeria

ARTICLE INFO

Keywords:
Foot-and-mouth-disease
Vaccination
Control
Wildlife interface
Communal farming

ABSTRACT

Communal livestock farming areas adjoining the Greater Kruger National Park Area within South Africa are part of the Foot-and-mouth disease (FMD) Protection Zone with Vaccination due to the proximity to wildlife reservoirs. FMD and its control affect the productivity of resource-poor farmers who often depend on livestock for their livelihoods. A cross-sectional study was performed with the objectives to evaluate the perceptions of farmers concerning FMD control, estimate the proportion of cattle with presumed protective antibody titres against FMD, as well as the proportion of herds with adequate herd immunity at the wildlife-livestock interface within Mpumalanga Province. One hundred and four farmers were interviewed with 73% (76/104) being cattle owners and the remainder hired cattle herders. The majority of respondents (79%, 82/104) reported a high level of satisfaction with the current animal health programmes in general. The educational level of the respondents varied by satisfaction level: the median (interquartile range; IQR) education level was standard 9 (2–12) for non-satisfied respondents, standard 3 (0–6) for little satisfied and standard 7 (2–11) for very satisfied respondents (P = 0.036). Animals are not always treated at FMD inspections points, but satisfied respondents were more likely to seek veterinary assistance (P = 0.001). The majority of respondents (92%, 96/104) identified the African buffalo (*Syncerus caffer*) as a risk factor for FMD outbreaks. Liquid-phase blocking ELISA antibody titres $\geq 1.6\log_{10}$ were used to indicate positive serology secondary to FMD vaccination. At the time of sampling and relative to this threshold, 23% (95% confidence interval (CI): 12%–34%) of the sampled cattle had positive serology to SAT-1, 41% (95%CI: 33%–48%) to SAT-2 and 29% (95%CI: 19%–39%) to SAT-3. The median (IQR) time between the previous vaccination and sampling was 189 (168–241) days. The sampled cattle had a longer inter-vaccination interval as scheduled by state veterinary services and antibody levels were low at the time of the study. The majority of respondents expressed high satisfaction with the currently applied FMD vaccination programme, which provides an opportunity for progressive adaption of animal health programmes within the study area.

1. Introduction

Foot-and-mouth disease (FMD) is an economically important disease of livestock in the tropics (Tanya et al., 2003) and is considered endemic in much of sub-Saharan Africa (Vosloo et al., 2002b; Jori et al., 2009). In South Africa, FMD is endemic in the Kruger National Park (KNP) and adjoining nature reserves (Greater KNP Area), due to the presence of African buffaloes (*Syncerus caffer*) and hence adjoining areas have been classified as FMD Protection Zones with Vaccination (Department of Agriculture, Forestry and Fisheries, Directorate: Animal Health, 2012). All three South African Territories serotypes (SAT-1, SAT-2 and SAT-3) of the FMD virus have been identified in African buffaloes in the KNP and adjacent nature reserves (Vosloo et al., 1995; Vosloo et al., 2002b; Thomson et al., 2003). African buffaloes carry and

* Corresponding author at: University of Pretoria, Faculty of Veterinary Science, Department of Production Animal Studies, P/Bag X04, Onderstepoort, 0110, South Africa.
E-mail addresses: lazdav2003@yahoo.co.uk, dlazarus@nvri.gov.ng (D.D. Lazarus).

http://dx.doi.org/10.1016/j.prevetmed.2017.08.016
Received 19 July 2016; Received in revised form 16 August 2017; Accepted 18 August 2017
0167-5877/ © 2017 Elsevier B.V. All rights reserved.

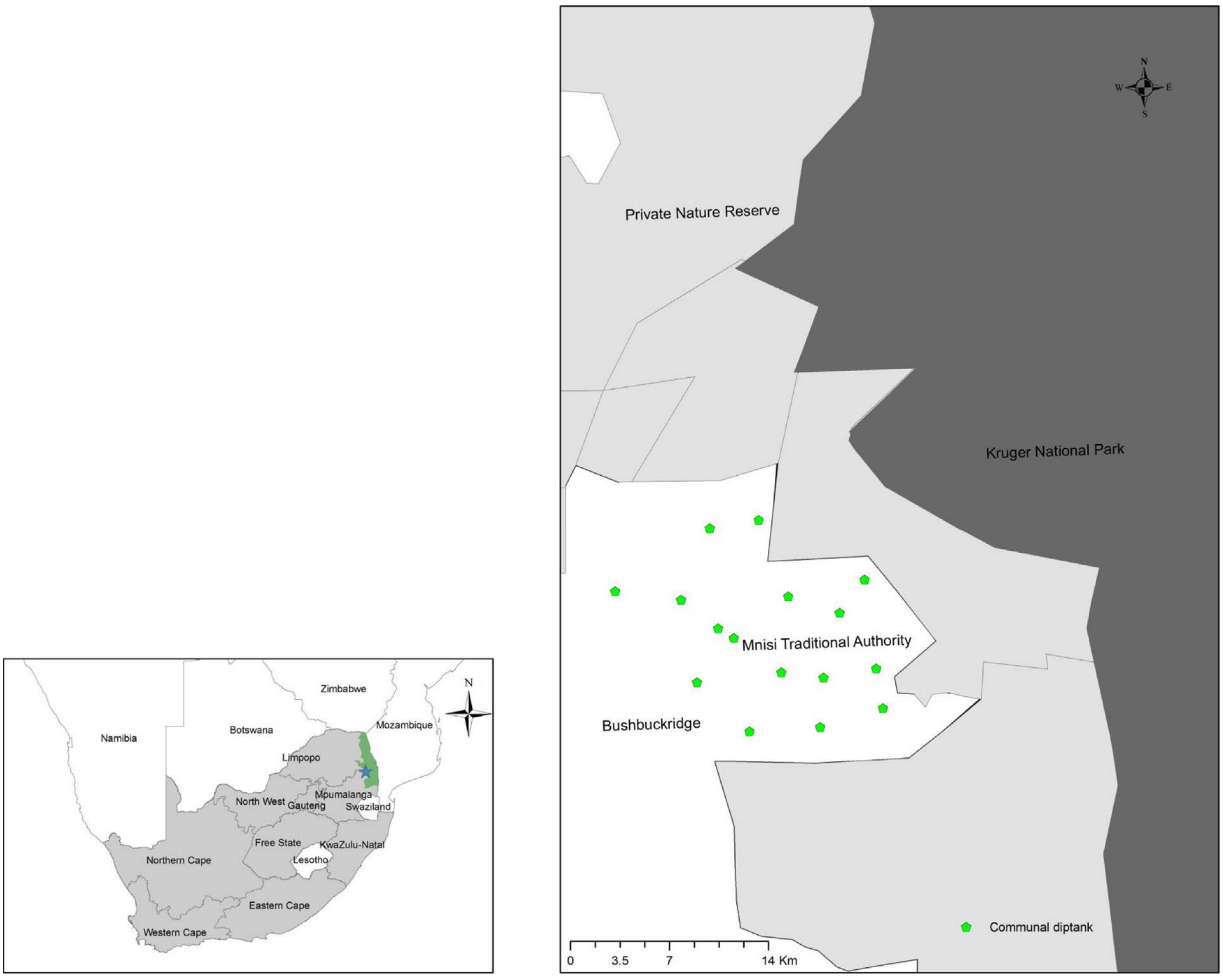

Fig. 1. Map of the study area showing the distribution of the 15 communal dip tanks sampled.

maintain FMD virus and have been associated with outbreaks in impala (*Aepycerus melampus*) within the KNP and in cattle within the bordering communal farming areas (Vosloo et al., 2009).

Resource-poor farmers frequently employ communal livestock production systems at interfaces with protected wildlife areas (Osofsky, 2005). The production outputs of these systems are often low because of husbandry practices, pasture quality and transmission of infectious diseases (Caron et al., 2013). Communal farmers raise livestock to produce milk, meat, hides and manure that can be used to fertilise crops (Barrett, 1992; Chimonyo et al., 1999; Dovie et al., 2006). Cattle also provide draught power for the cultivation of crops and transportation of goods and services (Bayer et al., 2004; Shackleton et al., 2005). More importantly, cattle have been described as “inflation free banking” for resource-poor people and can be sold to pay for school fees, medical bills, village taxes and other household expenses (Dovie et al., 2006).

Disease control at the wildlife-livestock interface often employs vaccination and must consider issues related to vaccine delivery (Holden et al., 1998; Heffernan and Misturelli, 2000) and characteristics of the affected farmers including perceptions and awareness of the affiliated technology (Bhattacharyya et al., 1997; Bolorunduro et al., 2004; Fandamu et al., 2006; Homewood et al., 2006). Important aspects related to the practicality of animal health interventions among the poor farming communities are access, affordability and acceptability (Heffernan and Misturelli, 2000). The overall goal of vaccination campaigns is a wide-scale adoption and establishment of protective immunity at the community, national and even regional levels (Mason and McGinnis, 1990; Humair et al., 2002). Therefore these programmes must consider the perceptions of resource-poor farmers to ensure effective implementation (McLeod and Rushton, 2007; Heffernan et al., 2008).

Cattle in the Protection Zone with Vaccination of South Africa, being at the interface with the wildlife of the Greater KNP Area, are scheduled to be vaccinated against FMD every four months using a trivalent inactivated vaccine containing vaccine antigens for all three SAT serotypes. The vaccinations are a governmental funded programme and carried out by the state veterinary service at no cost to the local farmers. Based on an assumed basic reproduction number of four for FMD, at least 75% of the cattle population should be immunised (vaccinated and developed sufficient neutralising antibodies) during vaccination campaigns to achieve herd immunity and prevent FMD virus epidemics (Woolhouse et al., 1996). Chemically inactivated FMD vaccines induce short-lived antibody responses similar to other inactivated vaccines (Hunter, 1998; Maree et al., 2015). Therefore, vaccine manufacturers typically recommend that cattle in an endemic setting be revaccinated at least three times a year after an initial double primary course (Woolhouse et al., 1996; Lubroth et al., 2007), which is consistent with the four-monthly vaccination frequency as scheduled by the South African Veterinary Services in the Protection Zone with Vaccination within South Africa (DAFF, 2012).

The objectives of the present study were to evaluate the perceptions of farmers concerning FMD control and estimate the proportion of cattle with presumed protective antibody levels against SAT serotypes and thereby determine the prevalence of herds with adequate herd immunity at the wildlife-livestock interface within Mpumalanga Province, South Africa.

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
✓ امکان دانلود نسخه ترجمه شده مقالات
✓ پذیرش سفارش ترجمه تخصصی
✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
✓ دانلود فوری مقاله پس از پرداخت آنلاین
✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات