



Elements of the FMD control problem in Southern Africa: 1

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Commodity-based trade of beef and enhanced market access: The vital role of the Department of Veterinary Services

Gaborone; 6-7 January 2018

Point of departure

- FMD management in Botswana is the preserve of the Government of Botswana; projects like this can only make technical suggestions for consideration
- Observations made here are based on trends of FMD occurrence in southern Africa generally; they do not relate to Botswana specifically
- Although policies related to animal disease management need to take technical realities into account, policy is ultimately shaped by a wide range of interacting factors
- In southern Africa FMD control in areas where wildlife are prevalent has deteriorated since about the year 2000
- The major differences between SAT and Eurasian serotypes are:
 - Relationships with (African) wildlife
 - Pathogenicity for different species & relationship with virus excretion
 - Natural rate of transmission (related to rate of virus excretion)
 - Antigenic variation → efficacy of vaccines



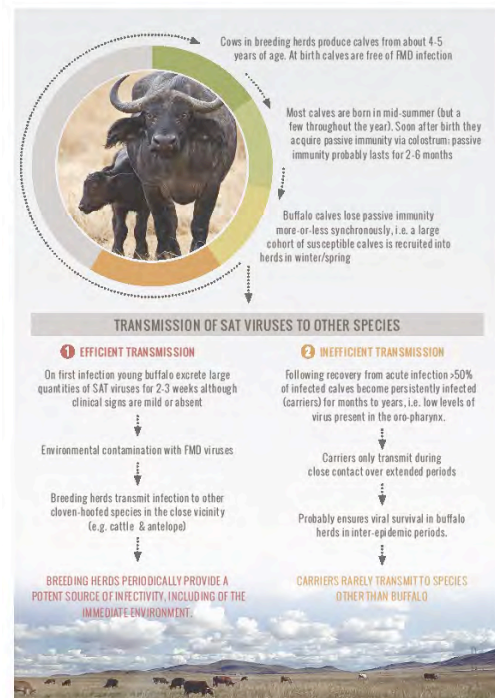
Buffalo: herd animals

Cycle of SAT virus transmission in buffalo herds

- In KNP >98% of buffalo 12-18 months of age are serologically positive to all 3 serotypes (evidence of efficient transmission)
- Cows first calve at 4-5 years of age
- Calves mostly born in mid-summer & free of infection: protected by colostral immunity for 2-6mths (i.e. buffalo are seasonal breeders)
- Most calves probably become infected through contact with other calves in acute stage of infection; initial infection of calves probably occurs via 'carrier transmission' derived from adult buffalo in the herd
- Acutely infected calves excrete SAT viruses by similar routes & quantities to cattle ⇒ environmental contamination (up to 15% of herd are calves)
- Calves very gregarious ⇒ 'calfhood epidemics' (like chicken pox in school children)

Cycle of SAT virus transmission in buffalo herds (cont.)

- After recovery from acute infection ± 50% ⇒ persistently infected (carriers); virus persists in oro-pharyngeal mucosa & associated lymph nodes for years
- Carriers provide infection for next cohort of calves the following year ⇒ cyclic repetition (without carrier transmission infection 'dies out' in the herd)
- 'Calfhood epidemics' → environmental contamination → major source of infection for other species, including cattle
– the major risk factor for other species!
- Carriers can also infect cattle but carrier transmission to cattle is inefficient and therefore probably very rare
- **Cattle differ from buffalo: No evidence that persistently infected cattle are able to transmit FMDV!**

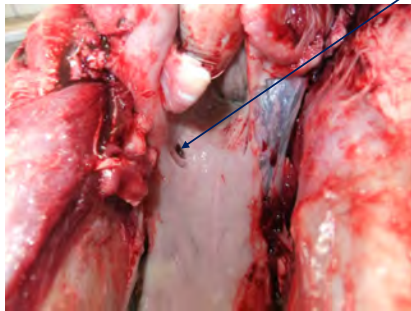


Detection of persistent infection

New method of sampling carriers: swabs taken from crypt of the palatine tonsil using a laryngoscope (referred to as 'tonsillar brush technique')

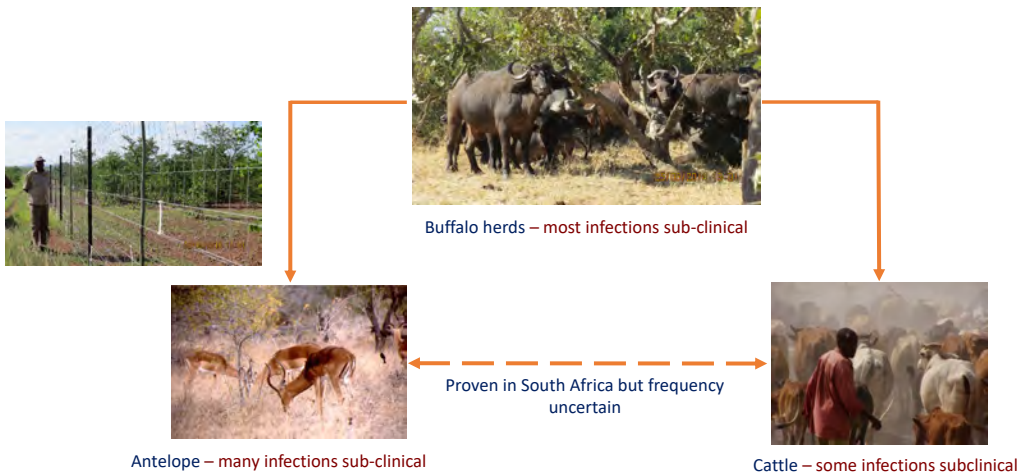


Crypt of palatine tonsil



Transmission of FMV between African wildlife & livestock

Only African buffalo & cattle populations appear to be able to maintain SAT serotype viruses independently



Ten year longitudinal (serological) study of SAT infection of impala in KNP - South Africa

- **Shingwedzi** – no infection of impala detected
- **Orpen** – frequent infection of impala detected
- **Crocodile Bridge** – occasional infection of impala detected

Buffalo & impala were present in the three areas but the ratio of buffalo: impala varied → possible explanation for the frequency of infection



Kruger National Park (KNP)

Disquieting reports

- Historically, the SAT topotypes in South Africa/south-eastern Zimbabwe were different from those in north-western Zimbabwe and northern Botswana
- Recent evidence for SAT topotypes having migrated back & forth between Kavango-Zambezi & Great Limpopo TFCAs, i.e. across Zimbabwe
 - probably through the agency of cattle but also possibly through translocation of buffalo within Zimbabwe

References:

- UP/ARC, 2011. SADC FMD Bulletin # 3
- Brito et al., 2016. Frontiers of Microbiology



Topotype interchange

