VIRUS TOPOTYPES AND THE ROLE OF WILDLIFE IN THE EPIDEMIOLOGY OF FOOT AND MOUTH DISEASE IN AFRICA

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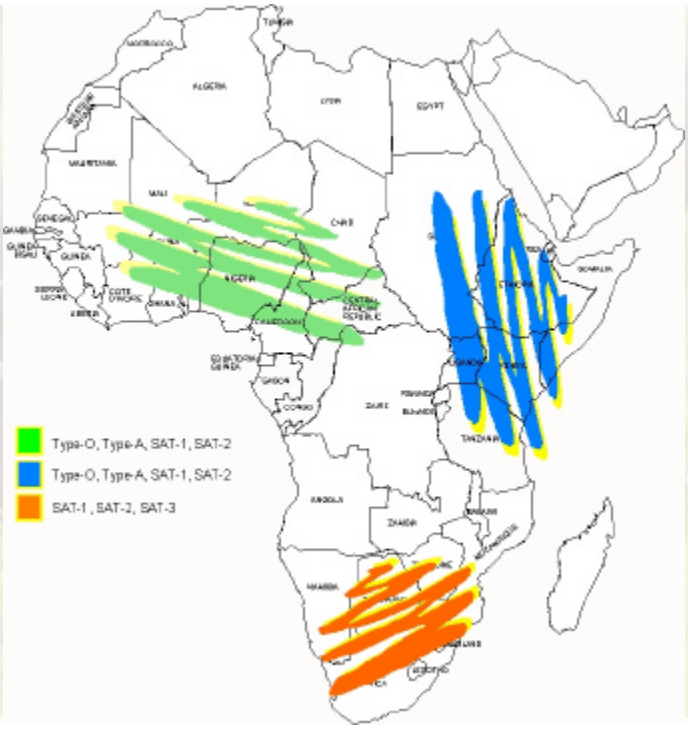
Introduction

- FMD is endemic to most of Africa and affects over 70 cloven hoofed species
- Six of the seven serotypes of FMD occur on the African continent
- The SAT serotypes predominate in southern Africa, while serotypes O and A also occur in other parts of sub-Saharan Africa
- Different “patterns” of FMD occur - dependant on wildlife and/or on domestic animals



Role of African buffalo in the epidemiology of FMD in southern Africa

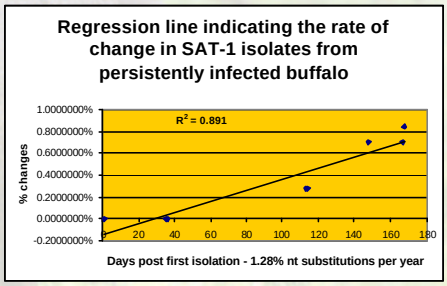
- Most buffalo populations are persistently infected by more than one SAT serotype and act as maintenance hosts
- calves born free of infection - protected for 2-6 months by colostrum
- thereafter infection is rapid: in KNP > 80% develop antibody to SAT1-3 by 12 months of age

Features of the interaction between buffalo and the SAT type viruses

- VERY FEW animals, if any, develop clinical disease
- During acute infection, lasting about a week, there is considerable excretion of virus in all secretions
- Following recovery - persistence of virus in approximately 60% in pharynx, ie. carriers
- Carrier status may persist for 5 years or longer in a single animal and up to 24 years in an isolated herd

Features of the interaction between buffalo and the SAT type viruses

- Mode of transmission between carriers and susceptible animals is not known
- Two theories:
  - Childhood infection in young calves
  - Sexual transmission
- FMD viruses change during persistent infection and may give rise to new antigenic variants



It is not known whether buffalo in East Africa are carriers of the O and A type viruses

The role of impala in the epidemiology of FMD in southern Africa

- In the KNP approximately bi-annual outbreaks in impala over the last 20 years (mostly SAT-2)
- These outbreaks are derived from buffalo herds
- Impala do not become carriers
- While infected, they can transmit the disease to other species

The role of wildlife/domestic stock in the epidemiology of FMD

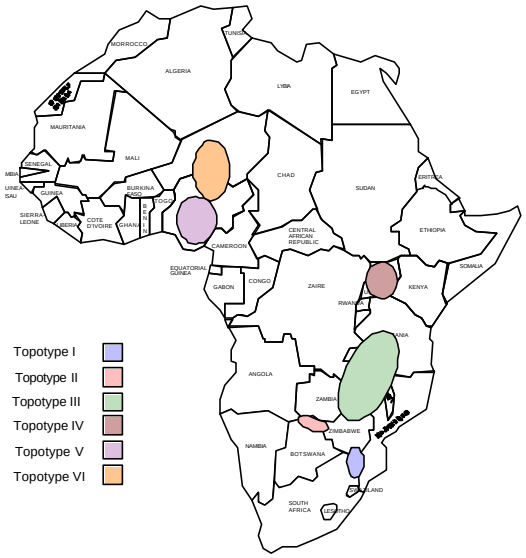
Species/animal	Duration of viral persistence
Domestic animals:	
Cattle	2.5 to 3.5 years
Sheep	9-12 months
Goats	2-3 months
Wildlife:	
Wildebeest (*Connochaetes taurinus*)	28 days
Sable (*Hippotragus niger*)	28 days
Eland (*Taurotragus oryx*)	32 days
Fallow deer (*Dama dama*)	63 days
Kudu (*Tragelaphus strepiceros*)	104-160 days
Water buffalo (*Bubalis bubalis*)	2-24 months
African buffalo (*Syncerus caffer*)	5 years

Molecular epidemiology of FMD in Africa

- Nucleotide sequencing of the VP1 gene is used to determine the molecular epidemiology of FMD
- For all serotypes geographically distinct topotypes occur
- This has serious implications for vaccination policies

Molecular epidemiology of FMD in Africa

Serotype	Number of topotypes identified to date
SAT-1	6
SAT-2	14
SAT-3	6
O	8
A	6
C	3



Conclusions

- The epidemiology of FMD on the African continent is complex
- A large number of topotypes exist for each serotype, complicating control using vaccination
- The African buffalo is the most important wildlife species in FMD epidemiology in southern Africa

Conclusions

- **More research is urgently needed to better understand the epidemiology of FMD and devise control policies**
  - **Molecular epidemiology of current viruses (both wildlife and domestic stock) needs to be determined**
  - **The role of small stock in the epidemiology needs to be clarified**
  - **The "patterns" of FMD in different regions of the continent need to be studied**