

### Serological evidence of foot-and-mouth disease virus serotype C & SAT-1 infections in Eritrea

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*Eufmd, 2010 programme  
30 September 2010, Vienna, Austria*

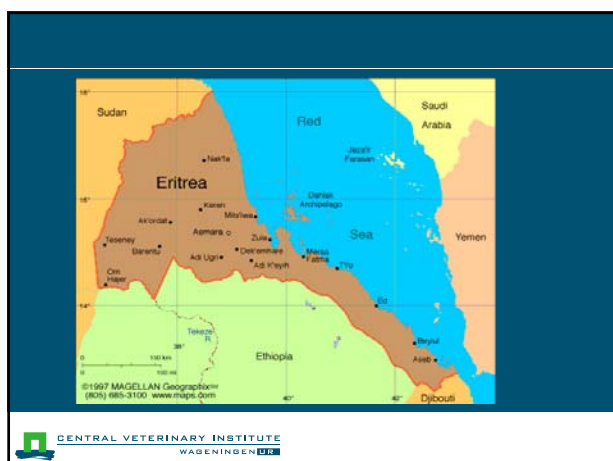


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### Objectives of this study

- Information on the distribution and prevalence of antibodies against FMDV serotypes
- Design future plan to conduct country wide FMD sero-surveillance study
- Enable and improve the capacity of FMD diagnosis in Eritrea

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### Livestock Population in Eritrea

- Cattle: 2.1 million
- Sheep: 2.3 mil.
- Goats: 5.0 mil.
- Camels (Dromedary): 0.4 mil.
- Equine: 0.5 mil.

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### History of Foot-and-mouth disease in Eritrea

- Repeated waves of infection every year;
- ✓ in the traditional extensive transhumance and pastoralist cattle herds
- ✓ uncontrolled animal movement is key factor for the spread of FMD across the permeable borders.
- The national indigenous cattle herd has **never been vaccinated against FMD**.

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### FMDV genotyped at OIE/FAO WRLFMD Pirbright, U.K. from outbreaks in Eritrea 1996 – 2009

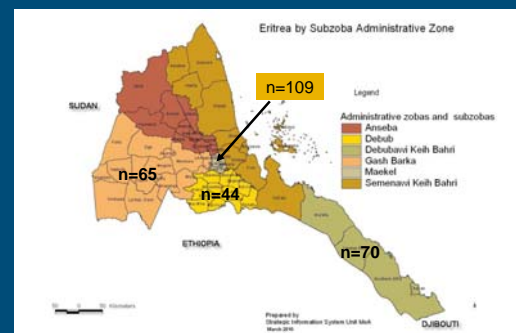
Serotype	Year	Lineage / Topotype
O	1996	Not known
A	1997-1998	Central Africa 2 / V
SAT-2	1997-1998	VII
O	2004	EA-3/I
A	2006-2009	AFRICA / G-IV

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## Conti.

- In outbreaks of 2006 - 2009, the VP1 gene sequence and phylogenetic analyses of type A viruses showed **high sequence identity** with **Sudanese (>96.4%)** and **Cameroon (>89.83%) virus isolates** indicating transmission of FMDV within the Sahelian region between East and West Africa (WRLFMD, Pirbright Report, 2010).

## Materials &amp; Methods: Serum sample collection sites



## Materials and Methods

## FMD NS ELISA:

- All sera (n=218 + 70) were screened for non-structural protein (NSP) antibodies using the FMDV NS kit (PrioCHECK FMDV NS, Prionics)

## Materials and Methods

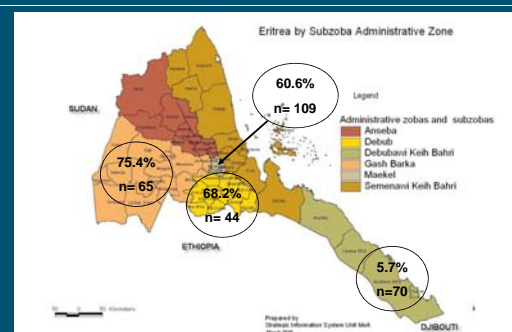
- Serum samples (n=74 CVI Lelystad):** from experimentally vaccinated and/or challenged animals tested using virus neutralization test (VNT) to validate possible cross-neutralization reactions.

## VNT:

## Materials and Methods

- The neutralizing activity of serum samples against 100 TCID<sub>50</sub> of virus was determined in BHK-21 cells for the 7 FMDV serotypes.
- Each test was performed in duplicate and results were recorded as the mean 10 log titres of the serum dilution.
- Interpretation of VNT results for FMD as described in OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, 2008.

## Results: FMD NS ELISA positives



Percentage of positive field serum samples  $\geq 10 \log 1.65$  VNT titres

Region	Total sera	A	O	C	SAT-1	SAT-2	SAT3	Asia1
Debub	44	14	17	31	12	8	-	4
G. Barka	65	13	50	32	15	3	-	3
Maekel	109	45	79	65	51	6	1	7
<b>Total</b>	<b>218</b>	<b>72</b>	<b>146</b>	<b>128</b>	<b>78</b>	<b>17</b>	<b>1</b>	<b>14</b>

VNT Results on experimentally vaccinated and/or challenged animals to FMDV (n=74)

No. of sera	A	O	C	SAT-1	SAT-2	SAT-3	Asia1	Vacc.	Chall.
2	2	2	2	0	0	0	2		A, C & Asia1
17	8	4	0	0	2	0	1	A	A
6	0	0	2	0	1	0	6	Asia1	Asia1
49	0	40	1	1	11	0	1	O	O

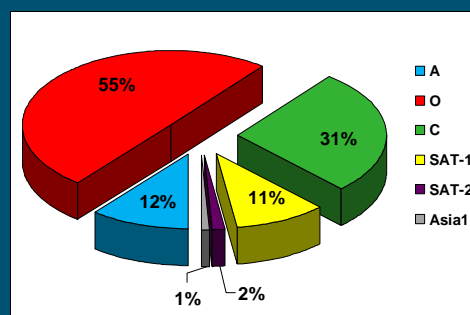
Cross-neutralization reactions indicated with red colour

### Results of VNT from the 74 experimental serum samples

- Significant cross-neutralization reactions was observed among the FMDV serotypes
- Some sera showed higher VNT titre with the heterologous than the homologous virus.

### Results

No. of field sera with the highest positive VNT titre



### Conclusion

- Most field serum samples were positive for more than one FMDV serotype which could be due to repeated rounds of infection with the different FMDV serotypes.
- Nevertheless, cross-neutralization reactions can not be overlooked as it has been observed in experimental challenge infections.

### Conclusion

- FMD serotype C and SAT-1 viruses, however, have never been detected in Eritrea, but the VNT demonstrates that infections with type C and SAT-1 could have been occurred.
- Further FMD surveillance with extensive epidemiological investigation including virus isolation from probang and epithelial tissue samples is imperative for a detailed image on the disease in Eritrea.

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