



Royal Veterinary College
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African Horse Sickness (AHS) and Equine Encephalosis (EE) in The Gambia 2007- 09

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Outline

- African Horse Sickness and Equine Encephalosis Virus
- AHS Vaccination Program 2007
- Questions raised
- 2009 Serology Survey Method
- Results
- Conclusions

AHS and EE

- Noncontagious, infectious, insect-born diseases of equids transmitted by midges – *Culicoides spp.*
- Viral diseases – *Orbivirus* in the family Reoviridae
- Nine serotypes of AHS.
- Vaccines available for AHS – monovalent and polyvalent.

African Horse Sickness

Clinical Signs

Pulmonary Form

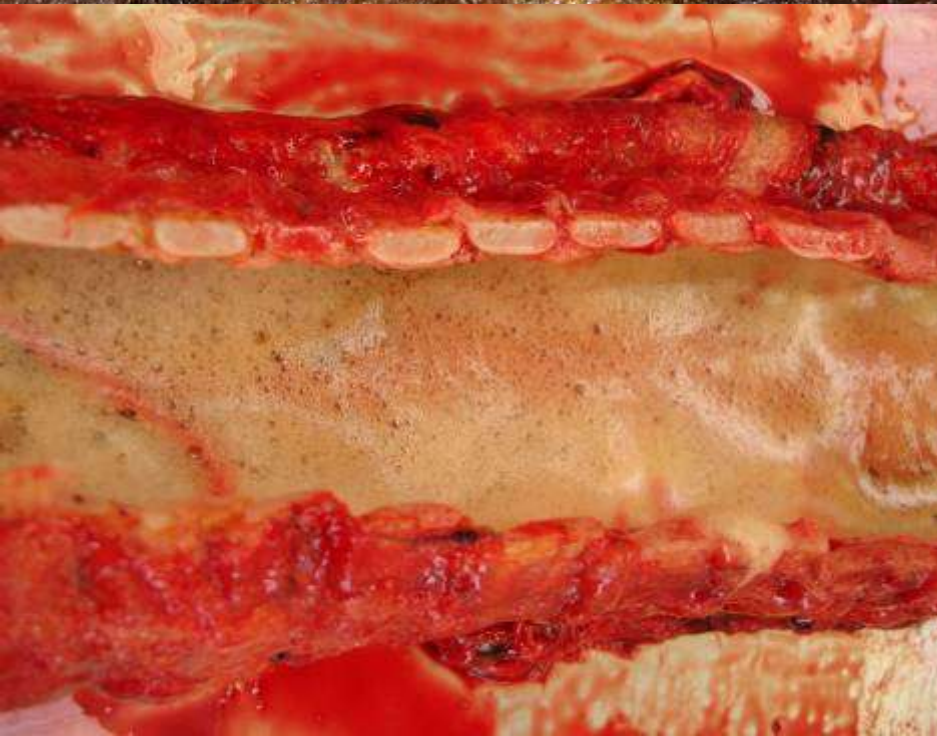
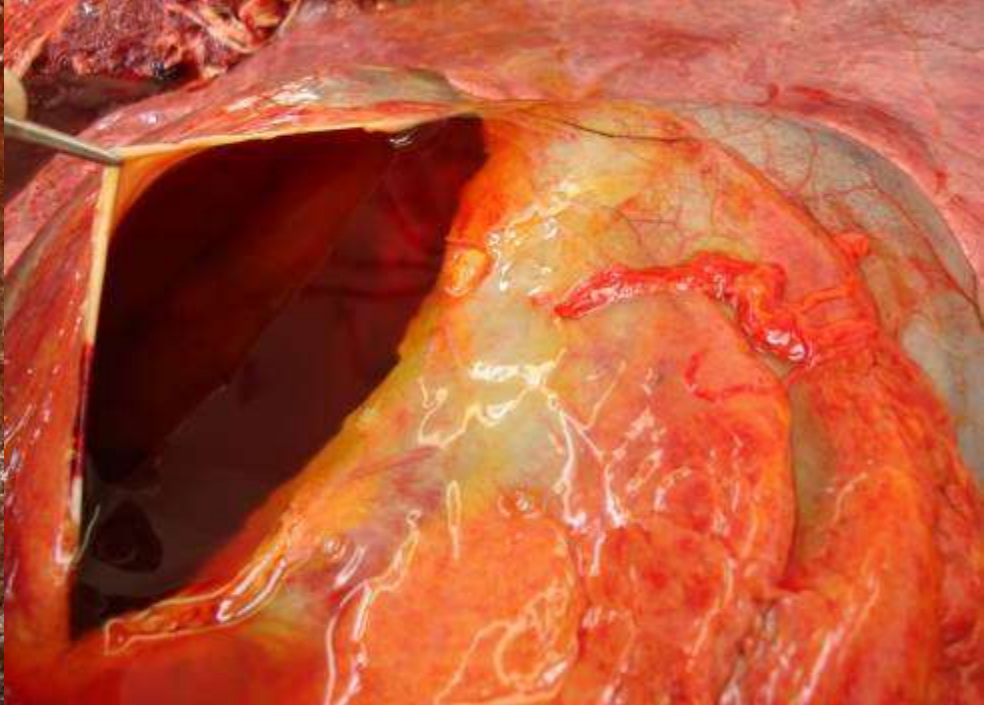
- Usually fatal
- Progressive respiratory failure
- RR>50bpm
- Forelegs spread, head extended and nostrils dilated
- Profuse sweating
- Paroxysmal cough – terminally frothy fluid from nostrils



Cardiac Form

- Supraorbital fossa swell.
- Oedema spreads to conjunctiva, lips, cheek, tongue.
- As swelling increase, dyspnoea and cyanosis.
- Petechiation of conjunctiva and tongue px guarded.
- Some horses show colic signs
- Mortality – 50% and slower

Pictures courtesy of Pretoria Vet School



Pictures courtesy of Pretoria Vet School

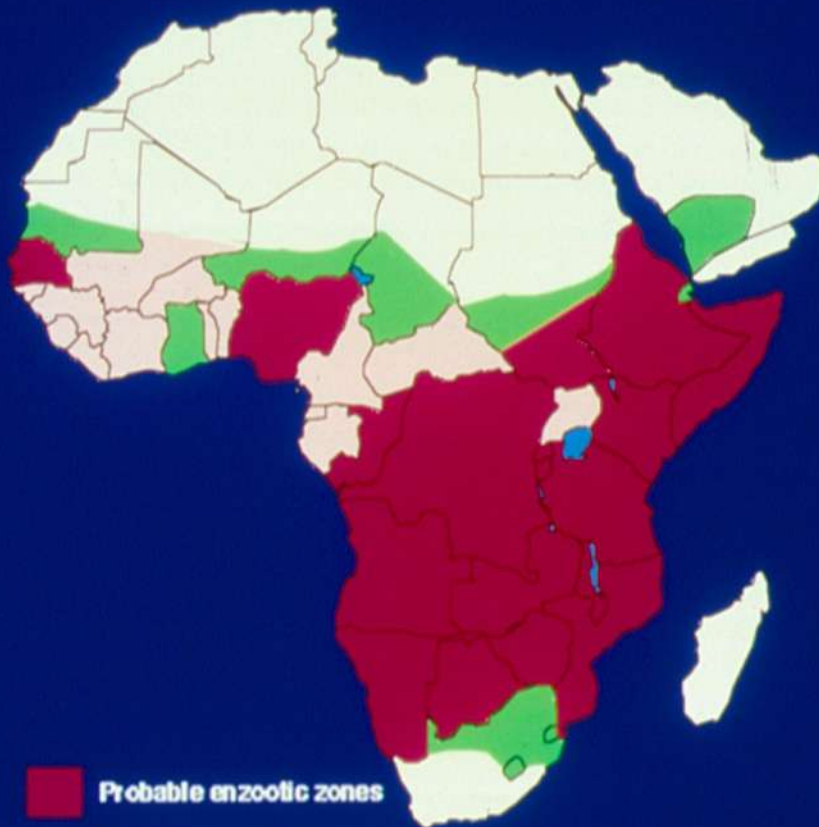
Equine Encephalosis

- 90% of affected horses show no/mild clinical signs.
- Fever, increase in heart and respiratory rate
- Occ swellings of the eyelids and supraorbital fossa
- CNS, respiratory distress, abortion and cardiac failure have been reported – not reproduced experimentally
- N.B. On clinical signs alone can NOT differentiate from mild forms AHS

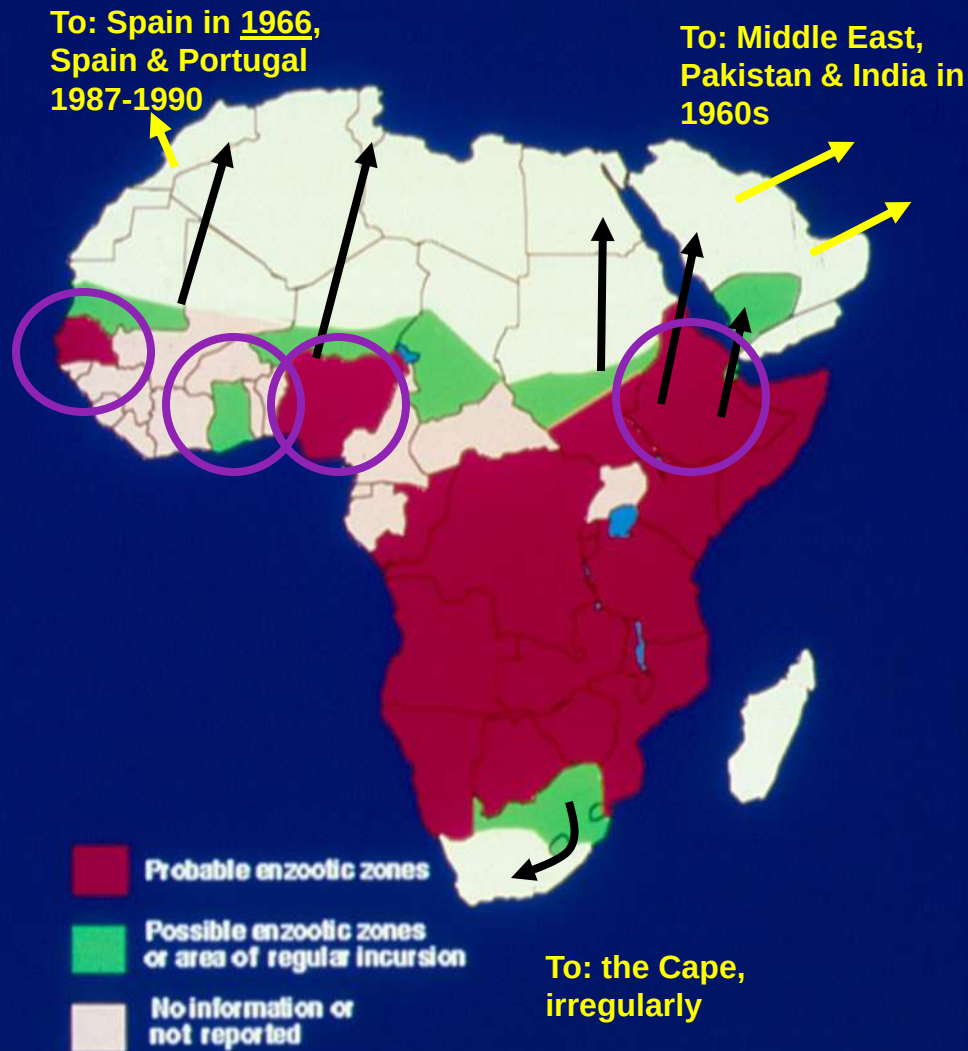
North and West Africa



African Horse Sickness Virus, Enzootic and Regular Epizootic Zones



African Horse Sickness Virus, Enzootic and Regular Epizootic Zones



Recent outbreaks of AHS in Africa:

1. Nigeria 2007 – AHS-2
2. Senegal 2007 – AHS-2,7
3. Ethiopia 2008 – AHS -2
4. Ghana 2010 – AHS -2

South Africa – multiple serotypes circulating.



Vaccination Campaign 2007

- Summer 2007 The Gambia suffered many deaths from horses with signs consistent with AHS.
- The Gambia Horse and Donkey Trust instigated an emergency vaccination campaign – Donkey Sanctuary, ILPH, RSPCA international and BEVA trust.
- Predominately the Senegalese monovalent AHSV-9 was used but some polyvalent vaccine was used towards the end of the outbreak.

Vaccine

MONOEQUIPESTE

VACCIN CONTRE LA PESTE

EQUINE SÉROTYPE 9

FLACON DE 2 DOSES

VOIE SOUS CUTANÉE

A CONSERVER A $+4^{\circ}\text{C}$ / 20°C



USAGE VETERINAIRE

LABORATOIRE NATIONAL DE L'ELEVAGE

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LOT N° M - 0407

UTIL. AV. SEP. 2008

Vaccination Protocol



Questions Raised?

- Was the disease truly AHS?
- If so what serotype and was one vaccine effective?
- Which areas of The Gambia were most affected?
 - North Bank vs South Bank
- Need for a serological survey was recognised
 - BEVA Trust – see BEVA website – www.beva.org.uk



Serological Survey - 2009

- 122 Equids - 7 villages North of the river Gambia in the North Nianija district of mid Gambia – **Group 1**
- 22 Equids - 10 villages in the district of Fulladu from South of the river Gambia – **Control Group**
- 101 horses and 43 donkeys – Median age 7yrs (1-20)
- 22 vaccinated animals in group 1 non on control group

Geography



Places Sampled: North Bank

22/10/2009 – Kataba Omar (30),
Tanu (8), Jamally Babu (12)
23/10/2009 – Jallow Kunda (15),
Njoben Tukolor (18), Kass (25),
Dingirai (14)

Places Sampled: South Bank

Brikamaba Livestock Market - Fulladu
24/10/2009 – Sincha madado, Boirami,
Sare Babu, Njoben, Aloulie, Fass,
Brikamaba, Sare Bakaru, Kerewan
Samaba Sira, Kerr Ousman Boye

RVC



23/10/2009 – Jallow Kunda (15), Njoben
Tukolor (18), Kass (25), Dingirai (14)

Brikamaba Market

24/10/2009 – Sincha madado,
Boirami, Sare Babu, Njoben, Aloulie,
Fass, Brikamaba, Sare Bakaru,
Kerewan Samaba Sira, Kerr Ousman
Boye

Practicalities



Institute of Animal Health Pirbright – Surrey England

- The serum was separated from RBC and kept chilled.
- The samples were packaged according to UN3373 and stored in Banjul with kind help by MRC laboratory
- The samples were sent as UN category B pathogen to IAH.



Laboratory Work

- Serology – looking for antibodies to the virus
- Real-time polymerase chain reaction (RT-PCR) was used for detecting live virus
- Virus isolation
- Sequence analysis of the VP-2 gene

Results - AHSV

- 96% of both groups were seropositive to AHSV
 - 100% of control group (all unvaccinated)
 - 8 equids from group 1 were RT-PCR positive
 - Live virus was isolated from two of these sample (both unvaccinated)
 - PCR and sequence analysis showed ASHV-9.
 - Sequence is identical to Pakistan reference strain.



Results - EEV

- 100% of both groups were seropositive for EEV
- Six donkeys in group 1 were positive on RT-PCR
 - Indicating current infection
 - In two of these samples live virus has been recovered
 - The virus is currently being serotyped and sequenced.



Conclusions

- EEV is endemic to The Gambia
- AHS ref. strain is used to make monovalent vaccine
- Probable that monovalent live attenuated AHSV-9 vaccine is circulating in the equid population.
- Unvaccinated and vaccinated horses were seropositive and live virus was recovered from unvaccinated horses indicate live vaccine virus circulating in the midge population.

Conclusion (2)

- This seroconversion to AHSV-9 is likely to protect horses against field AHSV-9.
- Young horses are being vaccinated against AHSV-9 by the vaccine spreading in the midge population.
- This transmission makes reversion to virulence more likely – must monitor but no evidence that this is case
- Will not protect against other AHSV serotypes.

Recommendations

- Seroconversion to AHSV-9 is likely to protect against serotype 9
- Must monitor for reversion to virulence
- AHSV-2 circulating in Senegal in 2007
- West Africa – increase in serotypes
- Serotype new outbreaks – use OIE listed laboratories

Future

- Senegalese vaccine is being DNA sequenced
- EEV is being serotyped
- What is the role of EEV?
 - Does EEV cause neurological signs?
 - Interplay with other pathogens/disease syndromes?

One Medicine One World

- Medical and veterinary collaboration and interplay
- International co-operation
- Collaboration between governments and NGOs
- Multi-disciplinary approach

Acknowledgements



BEVA Trust



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Any Questions?



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