Theileriosis in antelope:
Epidemiology and control

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World Organisation for Animal Health | Organisation mondiale de la santé animale | Organización Mundial de Sanidad Animal

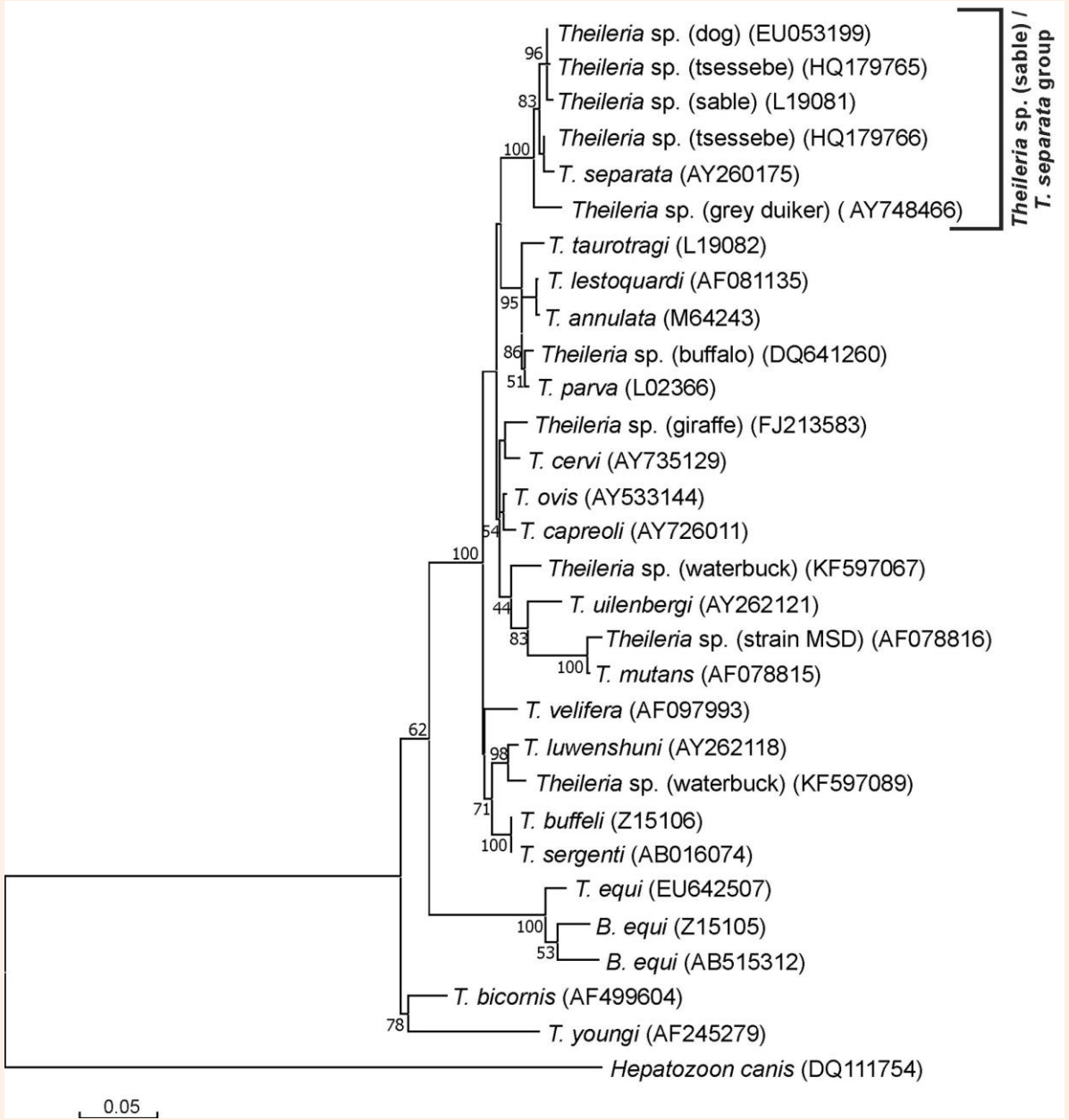
6th cycle Training of National Wildlife Focal Points
6e cycle de formation des Points focaux nationaux pour la faune sauvage
Africa Region Afrique
World Organisation for Animal Health
Organisation mondiale de la santé animale

Author Introduction

- Graduated in 2001: BVSc(pret)
- Contract research: Theileriosis in roan & sable antelope (*Hippotragus* spp.)
- MSc in 2012
- Academia: Veterinary pathology
  - ✓Research in veterinary pathology
  - ✓Under &post graduate training
  - ✓Diagnostic pathology services
- Head of Section: Veterinary Pathology 2022
- Interests: Wildlife pathology (terestrial & aquatic)

Background / Contexte

- Limited literature available on theileriosis in wildlife
- Theileria vs. Cytauxzoon
- Multi-species antelope infected with multi-theileria sp.
  - Clinical disease vs carrier state
- Clinical infection reported in: Roan, Sable, Tsessebe, Duiker, Eland, Kudu, Giraffe, Waterbuck, Bongo. (most recently also Impala, Wildebeest, Lechwe and African buffalo)
- Some non-African species appear to be highly susceptible (Bison); others show resistance (Fallow deer)


Theileria sp. (dog) (EU053199)
Theileria sp. (tsessebe) (HQ179765)
Theileria sp. (sable) (L19081)
Theileria sp. (tsessebe) (HQ179766)
T. separata (AY260175)
Theileria sp. (grey duiker) (AY748466)
Theileria sp. (sable) / T. separata group
T. taurotragi (L19082)
T. lestoquardi (AF081135)
T. annulata (M64243)
Theileria sp. (buffalo) (DQ641260)
T. parva (L02366)
Theileria sp. (giraffe) (FJ213583)
T. cervi (AY735129)
T. ovis (AY533144)
T. capreoli (AY726011)
Theileria sp. (waterbuck) (KF597067)
T. uilenbergi (AY262121)
Theileria sp. (strain MSD) (AF078816)
T. mutans (AF078815)
T. velifera (AF097993)
T. luwenshuni (AY262118)
Theileria sp. (waterbuck) (KF597089)
T. buffeli (Z15106)
T. sergenti (AB016074)
T. equi (EU642507)
B. equi (Z15105)
B. equi (AB515312)
T. bicornis (AF499604)
T. youngi (AF245279)
Hepatozoon canis (DQ111754)
96
83
100
95
86
51
54
100
44
83
100
62
98
71
100
100
53
78
0.05

Background / Contexte

- Pathogenic *Theileria* sp.: *T. sp. (sable), T. taurotragi, T. annulata, T. sp. (duiker / tsessebe / kudu / giraffe / waterbuck)*

- Vector spp.:
  - *Rhipicephalus spp. (R. evertsi / appendiculatus); Amblyomma; Haemaphysalis & Hyalomma*
  - Transmission = transstadial; NOT transovarial (general rule?)

Problem

1. **International relocation of carrier antelope = international relocation of parasites (*Theileria* spp. and/or vectors)**

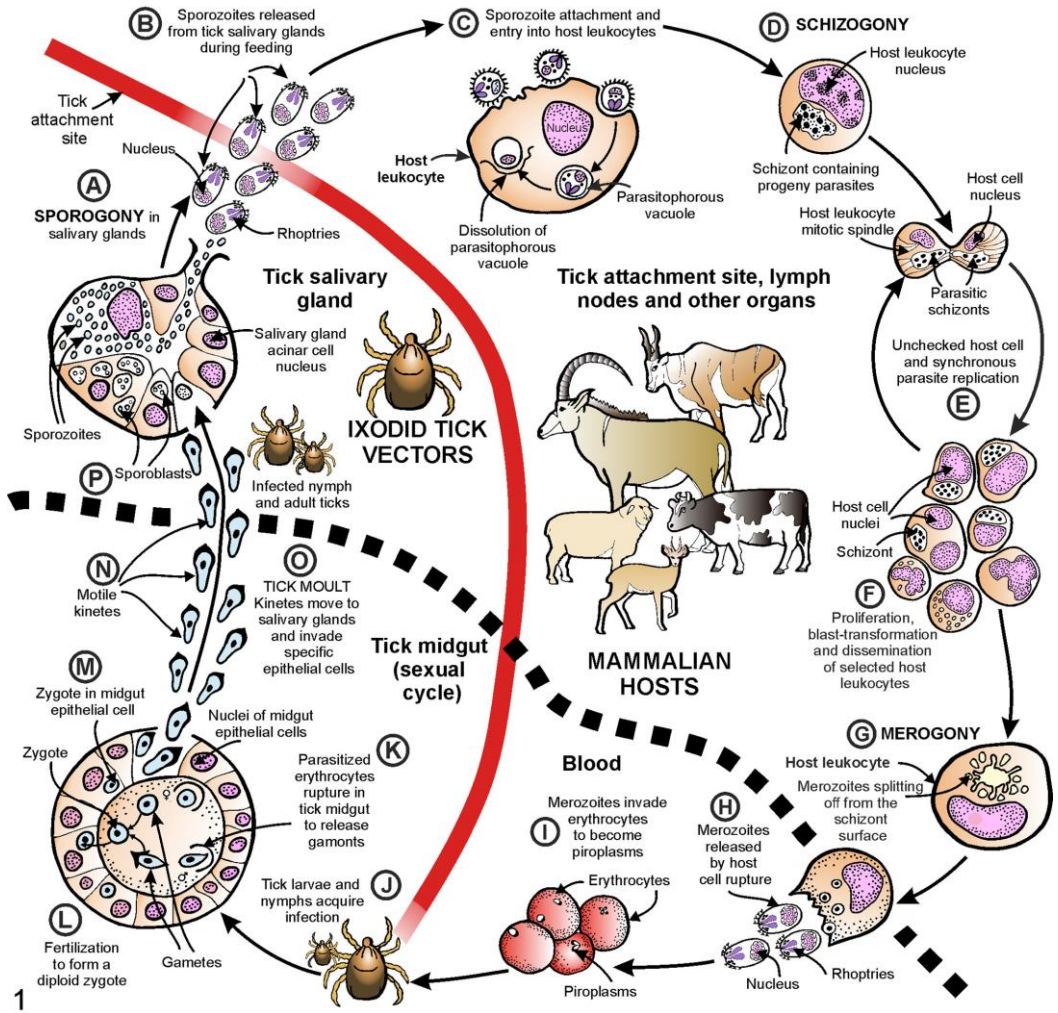
2. **Limited control through molecular screening of “unknown” / less pathogenic *Theileria* spp.**

3. **Potential for introduction of pathogenic *Theileria* spp. to endangered wildlife & *visa versa* is rarely recognized**

4. **Limited knowledge / experience in diagnosis and treatment of clinical vs carrier cases in wild antelope**

Theilerial life cycle

72h BEFORE TRANSMISSION OCCURS



Ova

GENETIC RECOMBINATION

Clift SJ, Collins NE, Oosthuizen MC, Steyl JCA, Lawrence JA, Mitchell EP. The Pathology of Pathogenic Theileriosis in African Wild Artiodactyls. Veterinary Pathology. 2020;57(1):24-48. doi:10.1177/0300985819879443

Diagnosis

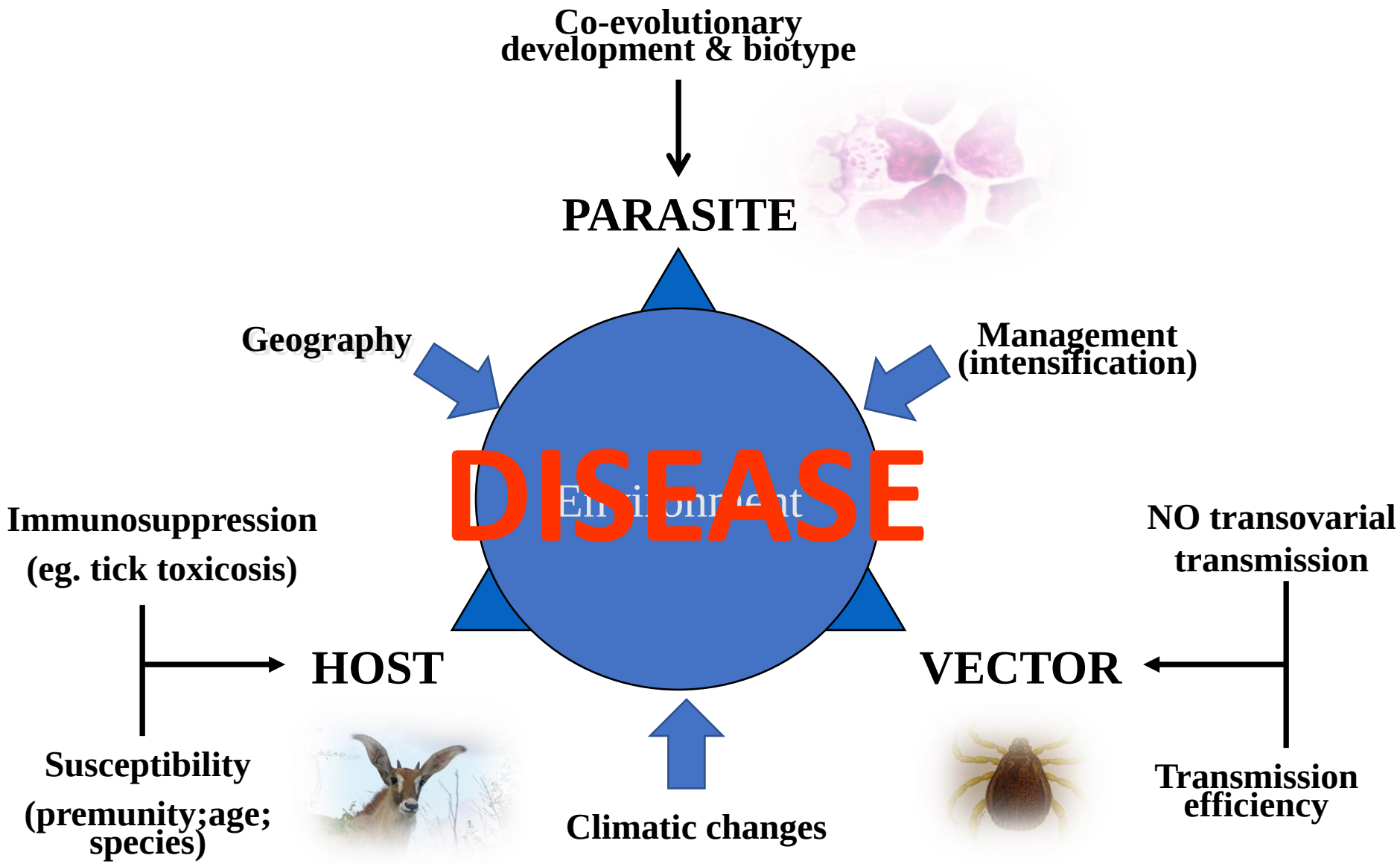
- History (epidemiology)

- Clinical Dx:
  - Fever
  - BLSM & FNA of Lnn. (Theilerial schizonts (Koch's bodies) and piroplasms) & clinical path.
  - PCR (real time & RLB) – Carrier vs. Disease

- Necropsy Dx:
  - BLSM and Lnn/liver/spleen impression smears
  - Macroscopical lesions
  - Histopathology- diagnostic (non-specific)


Schizonts in
lymphoblasts
Piroplasms
In RBC’s

Epidemiology




Premunity
30 13:00

Treatment

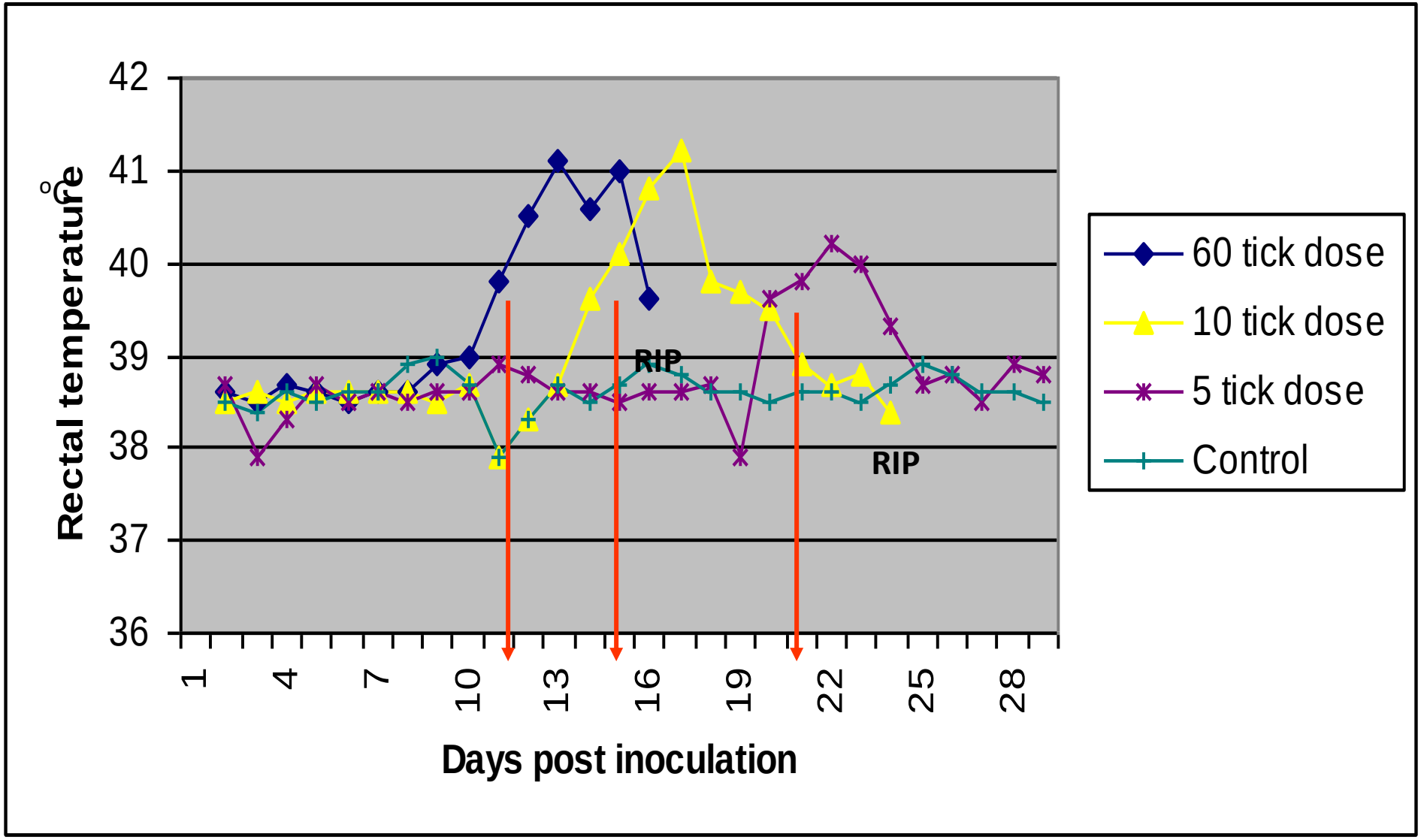
- Once organs are infiltrated - Poor therapeutic success rate
- Recumbency on approach – prognosis = hopeless
- Anti-theilerial drugs: ***Buparvaquone*** effective: IF administered early *(other drugs to be tested for efficacy)*
- Others: Doxycycline
- Supportive therapy: blood transfusion, osmotic diuretics, cortisone.

Control

- Tick control (acaricide dips vs. cattle): ***Disease = dose dependent***
  - *Intensive breeding – build up of high infection rates in ticks: only one tick needed to cause disease in susceptible hosts*
- Tick infection control through rotational grazing – 18 month camp resting principle
- Breeding in areas where vectors does not occur OR tick free conditions (zero-grazing = zoo)
- Breeding for genetic resistance
  - *Select genetic resistant males (males that survived exposure without veterinary intervention)*
- Infection and treatment using a tick derived stabilate

Development and testing of tick derived stabilate

Theileria sp. (sable) immunization of Roan antelope using *R. evertsi* stabilate



Conclusions

- *Theileria* spp. infection is ubiquitous among various species in the wild, dependent on endemic stability
  - Relocation of *Theileria* sp. free antelope is almost impossible unless born in vector free environment
- Risks associated with trans-boundary relocation of antelope:
  - Introducing new Theileria species
    - ✓ Potential to initiate & establish disease outbreaks
    - ✓ Provide opportunity for theilerial recombination from apathogenic => pathogenic
  - Expose susceptible animals to local pathogenic theilerial species
    - ✓ Genetic susceptible antelope
    - ✓ Exposure outside the premunity stage
- Risk assessment concerning Theileriosis is very important to limit potential disasterous losses
  - Currently mainly African buffalo and *T. parva* considered

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