Brucellosis at the rural community and wildlife interface in Africa

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Brucellosis in Africa

- Commercial farming
  - Brucellosis commonly reported
  - *B. abortus* & few *B. melitensis* cases
  - Abortion in ruminants
  - Vaccination
  - Human brucellosis

- Traditional sector
  - Rarely reported
  - Absence of control
  - Unknown zoonotic risk
  - *B. abortus*?, *B. melitensis*?

- Wildlife:
  - Hygromas
  - Serological evidences
  - *B. abortus* (buffalo) and *B. melitensis* (sable antelope)
  - Reservoir or spill-over?

Research questions

- Which domestic animal species are truly infected?
- Which animal species present the highest risk of transmission to humans?
- Which *Brucella* species are present?

- What is the brucellosis zoonotic risk in communal rural Africa?

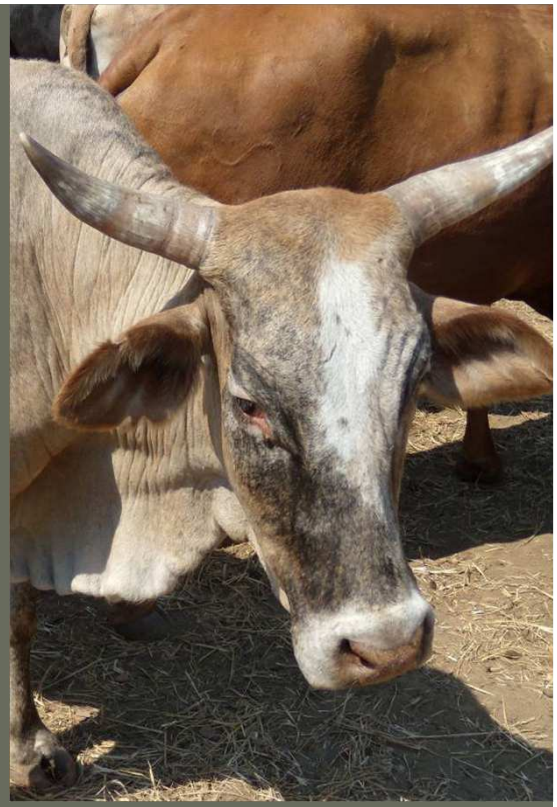
Material and methods

Different farming settings in Africa:

- Abattoir serological survey in Kenya
  - Animals from the whole country mostly from traditional sector
  - 500 cattle, 100 sheep & 100 goats
- Village serological survey in East Zambia
  - Local survey
  - 400 cattle, 250 goats and 250 pigs
- Wildlife interface serological survey in SA (communal cattle)
  - Western border of Kruger National Park
  - 400 adult cattle (>3 years)

Seroprevalence in cattle

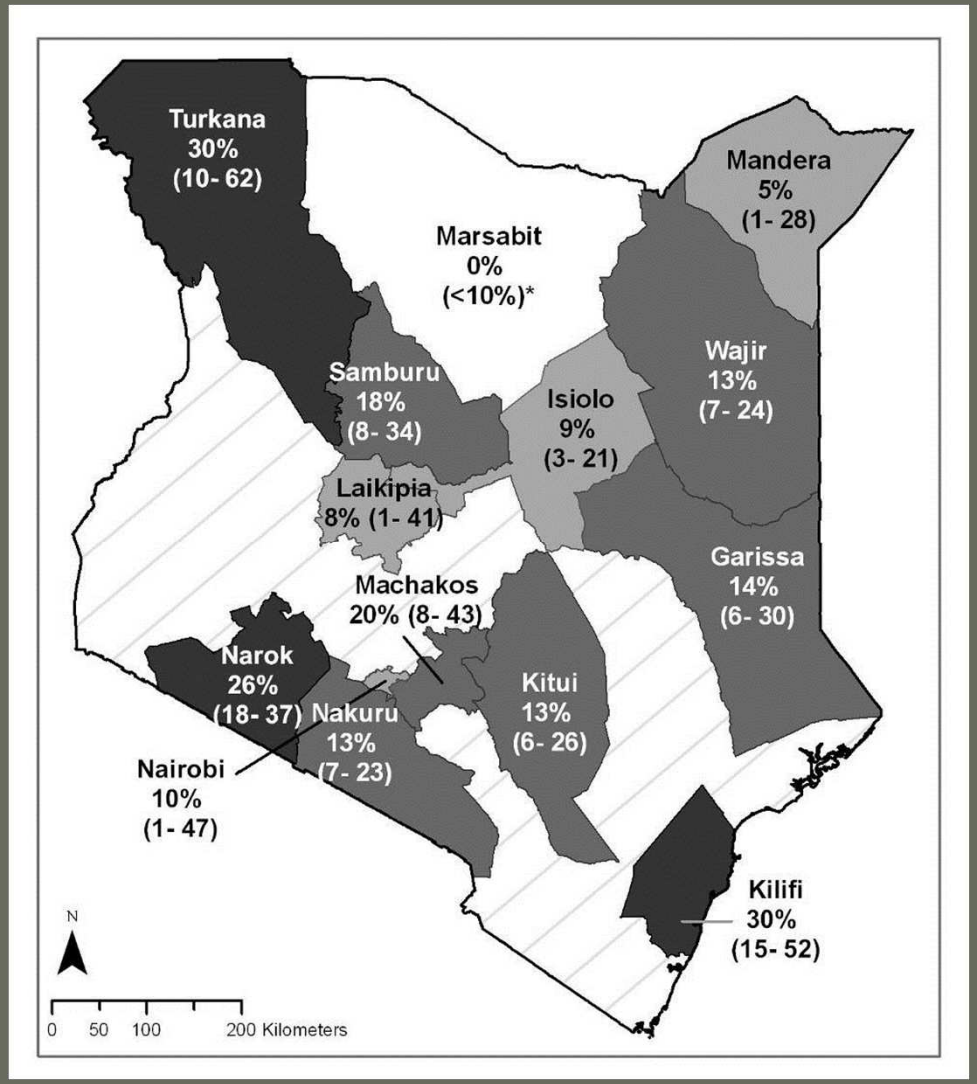
	Seroprevalence
Kenya	15% (12-19)
Eastern Zambia	9.2% (7-12)
Kruger (SA)	1.8% (0.8-3.6)



- Endemicity in Zambian and Kenyan cattle (*B. abortus*)
- Extremely low values in SA cattle
  - Females: 1.8% (0.9-3.6) - Males: 1.5% (0.2-10.3)
  - Negatives due to effective vaccination?
  - Positives due to residual Ab titres following vaccination?
  - True brucellosis or false positive serological reactions?

Cattle seroprevalence in Kenya

High brucellosis prevalence in pastoral communities (Massai and Turkana)



Seroprevalence in small ruminants

	Seroprevalence
Kenyan sheep	4% (1.5 - 10%)
Kenyan goats	1% (0.1 - 7%)
Zambian goats	0.4% (0 – 3%)

- Very low prevalence in goats
  - ⇒ Unlikely to be caused by *B. melitensis*
  - ⇒ *B. abortus* spill-over or false positive serological reactions
- Seroprevalence in Kenyan sheep
  - ⇒ Unlikely to be caused by *B. melitensis*
  - ⇒ *B. abortus* spill-over or false positive serological reactions

Seroprevalence in Zambian pigs

- 16% (12 – 21%)
- High seroprevalence caused by:
  - *Yersinia enterocolitica* O:9?
    - Commonly reported serological cross-reactions in pigs
  - *B. suis ?*
  - *B. abortus ?*
    - Spill-over from cattle

Yersinia enterocolitica O:9 serology in Zambian pigs

Brucella	*Y. enterocolitica* 0:9 titre				
serology	< 200	200	400	800	Total
Neg.	39	7	0	1	47
Pos.	28	7	1	1	37

- No correlation between *Brucella* and *Yersinia* serology in pigs
- This strongly suggests infection with *Brucella spp.*
- *B. suis* or *B. abortus*: need for isolation!

Conclusions

- Brucellosis at the interface, which interface?
  - Cattle – buffaloes (SA)
  - Cattle – sheep – goats (K, Z)
  - Cattle – pigs (Z)
  - Cattle – humans (K, Z)
  - Small ruminants – humans (K, Z)
  - Pig – humans (Z)

Interfaces

- Cattle – buffaloes (Kruger)
  - No risk of spill-over from cattle (*B. abortus*) today
  - High seroprevalence in buffalo:
    - Origin?
    - Effect on wildlife health and reproduction?
    - Low risk of transmission to cattle
- Cattle – sheep – goats (Kenya & Zambia)
  - *B. melitensis* probably absent
  - *B. abortus* spill-over from infected cattle
- Cattle – pigs (Zambia)
  - Enzootic *B. suis*?
  - *B. abortus* spill-over from cattle?

Zoonotic risk

- Cattle – humans (Kenya & Zambia)
  - Higher risk in pastoral communities
  - *B. abortus* spill-over to pigs indicative of zoonotic risk in Zambia
- Small ruminants – humans (Kenya & Zambia)
  - Probably lower risk than in cattle
- Pig – humans (Zambia)
  - Important risk if *B. abortus* or *B. suis* biovar 1
  - No risk if *B. suis* biovar 2

Recommendations

- *Brucella* isolation and characterisation in all species
- Investigations in pigs
- Improved diagnosis and surveillance in humans

Thank you for your attention