Serological surveillance of caprine brucellosis in western Kenya

By James Miser Akoko

University of Edinburgh summer school
Makerere University, Kampala, Uganda
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Presentation outline

People, Animals and their Zoonoses project

Brief overview of brucellosis in Kenya

Serological survey of caprine brucellosis in western Kenya
Brucellosis in camels?

- Waghela et al. (1978): 172 camels were sampled from Northeastern province. 11 of 172 sera tested reacted in RBPT, 11 in SAT and 21 in CFT.

- Saudi Arabia 8% prevalence *B. melitensis* (Radwan 1992)
People, Animals and their Zoonoses (PAZ) project

- Partners involved: UE, KEMRI & ILRI

- Study site: western Kenya. www.zoonotic-diseases.org/home/research/paz

- The caprine brucellosis work was added as a component of the PAZ project. I am very grateful for the opportunity and support offered by Professor Eric Fèvre (PI. PAZ Project)
Study site
Brucellosis in Kenya

- According to WHO report, under-reporting of brucellosis in Africa is probably higher than 99%, since almost all diagnosed cases are a result of special studies on the disease (WHO 2011, P.15).

- Brucellosis persists more in the pastoral systems (Radoz et al. 2013). This is a true reflection in Kenya.

- Brucellosis recognized as a notifiable disease in 2011.

- ZDU formed in 2008 to enhance One Health approach and co-ordination.
### Some of the prevalence studies done in Kenya

<table>
<thead>
<tr>
<th>Author &amp; year of study</th>
<th>Sample</th>
<th>Place</th>
<th>Test (s)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namanda (2009)</td>
<td>Milk (cattle)</td>
<td>Eldoret</td>
<td>MRT</td>
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<tr>
<td>Waghela et al. (1978)</td>
<td>Serum (camel)</td>
<td>Northeastern</td>
<td>RBT &amp; SAT</td>
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<tr>
<td>Waghela et al. (1978)</td>
<td>Serum (camel)</td>
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<td>CFC</td>
<td>12.2</td>
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<tr>
<td>Kang’ethe et al. (2000)</td>
<td>Milk (cattle)</td>
<td>Nairobi</td>
<td>ELISA &amp; MRT</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kiambu</td>
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<td>Nakuru</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Narok</td>
<td></td>
<td>3.4</td>
</tr>
<tr>
<td>Waghela (1986)</td>
<td>Serum (blue wildebeest)</td>
<td>Maasai Mara</td>
<td>SAT and CFT</td>
<td>18</td>
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<tr>
<td></td>
<td>Serum (African buffalo)</td>
<td></td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>
Brucellosis laboratory data recorded from 2003 to 2010 (Olwande 2013)

**Distribution of brucellosis cases by province, DVS, 2003-2010**

- **Central**: 24%
- **Rift Valley**: 23%
- **Coast**: 20%
- **Nairobi**: 17%
- **North Eastern**: 11%
- **Western**: 0%
- **Eastern**: 5%
- **Nyanza**: 0%

**Brucellosis cases by species, DVS, 2003-2010**

- **Bovine**: 600 cases
- **Camel**: 50 cases
- **Canine**: 10 cases
- **Caprine**: 100 cases
- **Ovine**: 100 cases
Why the study?

- *B. melitensis* causes more prolonged, severe and debilitating illness than that caused by *B. abortus* or *B. suis* (McDevitt 1973)

- No data (study) on the role of goats in the epidemiology of brucellosis in western Kenya

- Farmers in western Kenya are slowly adopting dairy goat rearing, therefore consuming goat milk
Study objectives

- Estimate the seroprevalence of caprine brucellosis in western Kenya
- Assess the spatial distribution of the sero-positive cases of caprine brucellosis in western Kenya
- Assess the risk factors associated with the transmission of brucellosis
### Sample size calculation

**Population survey or descriptive study**

For simple random sampling, leave design effect and clusters equal to 1.

<table>
<thead>
<tr>
<th></th>
<th>Confidence Level</th>
<th>Cluster Size</th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population size:</td>
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<tr>
<td>Expected frequency:</td>
<td>50 %</td>
<td>164</td>
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<tr>
<td>Confidence limits:</td>
<td>90%</td>
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<td>95%</td>
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<td>99%</td>
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<tr>
<td>Clusters:</td>
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</tbody>
</table>
Sampling design

Division  Since we had no sampling frame, the number of households to be sampled per sub-location depended on the divisional livestock population. E.g. sub-locations falling in highly populated livestock divisions were given more households than those with lower populations.

Sub-location  GPRS to select households

Household  Goats - questionnaire and jugular blood collection
Pictorial presentation of data collection and laboratory sample processing

Data collection/tegording in hand palm computer

Data analysis
Laboratory work

1. Sample recording at the lab
2. Centrifuged at 3000 rpm for 20 minutes
3. Kept at -20°C
4. Test using RBT
5. Confirmatory testing (ELISA)
Results

Map of Kenya

Map showing the location of the sampled households

Key:
Dots represent the sampled households
Results contd.

- A total of 412 homesteads were selected for sampling
- 27% (112/412) of the selected households kept goats
- 4.29% goats sampled had experienced abortion
- Rose Bengal Test: No positive results (n = 355)
Discussion & conclusion

- The RBT results gave a prevalence of zero, suggesting that goats in western Kenya may be free from *B. melitensis*. Since RBT has a sensitivity of 80.2% and a specificity of 99.6%, unlike ELISA that has specificity of 92.9% and is 99.6% specific (Rahman et al. 2013), there is need for this result to be confirmed with ELISA to rule out the 19.8% chance of a false negative. We will therefore use ELISA to confirm the results before making a final conclusion of this result.

- There is need for regular surveillance and education on the prevention and control of brucellosis to reduce or avoid the risk of transmission in animals and people.
Parting shot

- Goats can easily pass zoonotic infections due to their close interaction with people
- Let’s join hands in controlling brucellosis for a better future!
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Thank you

better lives through livestock

ilri.org