Early detection of Bovine Brucellosis to facilitate deployment of strategic control measures

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Background: Brucellosis is a commonly encountered zoonotic disease among smallholders and pastoralists, transmitted through contact with infected fluids at parturition, retained placenta, dead foetuses, feed and still births. Its economic burden among smallholder farmers results into reduced success of poverty reduction initiatives (MAAIF, 2010).

Although smallholder farmers have patronised indigenous cattle for their various degrees of agro-ecological fitness, there brucellosis status remains largely unknown. Yet these cattle provide opportunities for upgrading to improve productivity for better rural farmers' incomes in Uganda.

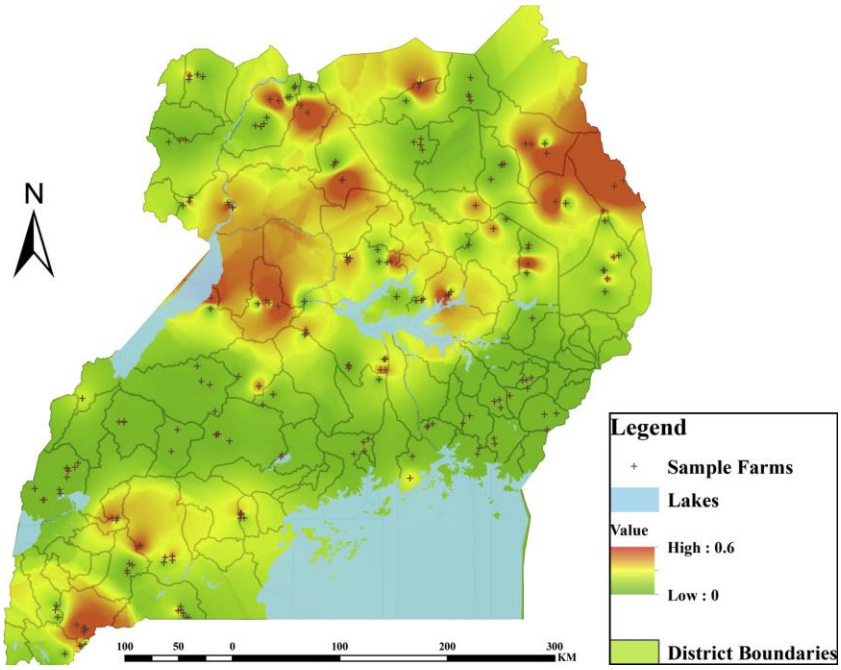
Brucellosis maybe diagnosed early by:-

- Laboratory detection of Brucella antibodies
- History of abortion (in the previous 12 months) with the herd
- Farmers' poor hygienic practices (lack of protective gear during assisted delivery, unsanitary disposal of retained placenta and feeding of retained placenta and dead foetuses to dogs) by district extension officers.

A recent nationwide survey determined the spatial distribution of brucellosis through laboratory determination of Brucella antibodies, records of abortions within farmers' herds and farmers' hygienic practices during and after parturition among indigenous cattle in the different AEZs to inform improved control strategies.

Methods: Sera from a total of 925 indigenous cattle (410 Ankole, 50 Nganda and 465 East African Shorthorn Zebu (EASZ) obtained randomly from 209 herds were sequentially analysed for Brucella antibodies using the indirect (I) and competitive (C) enzyme linked Immuno-sorbent assays (ELISA). Age, AEZs, breed, recent incidences of abortion (within the previous 12 months) and routine hygienic practices (lack of protective gear, unhygienic disposal of retained placentae and feeding retained placenta, dead foetuses to dogs) were interrogated in a logistic regression model (95% confidence interval) for influences of disease occurrence.

Results: Brucella antibodies occurred in approximately 8.64% (80/925) and 28.70% (95% CI) of the sampled individual cattle and herds, respectively. Indigenous cattle from the different agro-ecological zones (AEZs) exhibited varying seroprevalences ranging from 1.78% (95% CI) to 19.67% (95% CI) in the Lake Victoria Crescent (LVC) and North Eastern Drylands (NED), respectively. Significantly higher odds for Brucella antibodies occurred in the NED (OR: 3.40, 95% CI, $p = 0.01$) inhabited by EASZ cattle compared to the Kyoga Plains (reference category) AEZ. Recent incidences of abortions within the previous 12 months and older cows more than 72 months were more significantly ($p < 0.001$) associated with seropositive herds. Poor hygienic practices significantly influenced the occurrence of Brucella antibodies.



The spatial distribution of Brucella antibodies among indigenous cattle populations in Uganda (January 2011–April 2012).

The spatial distribution of Brucella antibodies was interpolated using 209 herd seroprevalences to create a nation-wide spatial effect

Implications for control: Brucellosis occurs widely strategic control measures could be deployed through:-

1. Creation of awareness on brucellosis occurrence.
2. Creation of awareness on good hygiene practices such as use of protective gear during assisted births.
3. Testing for brucellosis among human patients from cattle keeping household with prolonged fever
4. Testing of cattle before sale and issuance of health certificate by local veterinarians before sold cattle are allowed to be transferred to new areas
5. Culling of older cattle more than 72 months only
6. Culling of cows which have had an abortion during advanced gestation
7. Enforcement of hygiene practices including disposal of retained after birth, aborted foetuses and still births
8. Carrying out mass vaccination especially in northeastern and semi-arid AEZs where brucellosis incidence was found to be high.

Reference

1. Kabi, F., Muwanika, V., Masembe, C., (2015). Spatial distribution of Brucella antibodies with reference to indigenous cattle populations among contrasting agro-ecological zones of Uganda. Preventive Veterinary Medicine 121: 56-63. doi 10.1016/j.prevetmed.2015.06.007

2. MAAIF, (2010). Agriculture for food and income security, agriculture sector development strategy and investment plan: 2010/11-2014/15.