A survey of Tuberculosis and Brucellosis in wildlife and cattle in the South-East Lowveld of Zimbabwe

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A thesis submitted in partial fulfilment of the requirements for the degree of Master of Philosophy (Veterinary Science)

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Declaration

1. BY CANDIDATE

This thesis is my own original work and has not been presented for a degree in any other University.

..............................................................

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2. BY SUPERVISORS

This thesis has been submitted for examination with our approval as University supervisors.

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<thead>
<tr>
<th>Acronym</th>
<th>Expanded form</th>
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<tbody>
<tr>
<td>AFB</td>
<td>Acid Fast Bacilli</td>
</tr>
<tr>
<td>AHEAD</td>
<td>Animal Health for the Environment and Development</td>
</tr>
<tr>
<td>ARC-OV1</td>
<td>Agriculture Research Council-Onderstepoort Veterinary Institute</td>
</tr>
<tr>
<td>bTB</td>
<td>Bovine Tuberculosis</td>
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<tr>
<td>CA</td>
<td>Contagious Abortion</td>
</tr>
<tr>
<td>c-ELISA</td>
<td>Competitive Enzyme Linked Immunoabsobert Assay</td>
</tr>
<tr>
<td>CIRAD</td>
<td>French Agricultural Research Centre for International Development</td>
</tr>
<tr>
<td>DTH</td>
<td>Delayed Type Hypersensitivity</td>
</tr>
<tr>
<td>GLTFCA</td>
<td>Greater Limpopo Trans-frontier Conservation Areas</td>
</tr>
<tr>
<td>GNP</td>
<td>Gonarezhou National Park</td>
</tr>
<tr>
<td>HNP</td>
<td>Hwange National Park</td>
</tr>
<tr>
<td>KNP</td>
<td>Kruger National Park</td>
</tr>
<tr>
<td>IFN-γ</td>
<td>Interferon Gamma</td>
</tr>
<tr>
<td>OIE</td>
<td>Office International Des Epizooties</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>PPD</td>
<td>Purified Protein Derivative</td>
</tr>
<tr>
<td>SCITT</td>
<td>Single Comparative intradermal Tuberculin skin Test</td>
</tr>
<tr>
<td>SA</td>
<td>South Africa</td>
</tr>
<tr>
<td>TFCAs</td>
<td>Trans-frontier Conservation Areas</td>
</tr>
<tr>
<td>TST</td>
<td>Tuberculin Skin Test</td>
</tr>
</tbody>
</table>
Abstract

A cross-sectional study was conducted to determine the seroprevalence of bovine brucellosis and the prevalence of bovine tuberculosis (bTB) in cattle and wildlife at a wildlife-livestock interface in the south-east lowveld of Zimbabwe. Study areas were selected to include those with close proximity to wildlife from GNP and KNP and those without a wildlife-livestock interface area. For both cattle and wildlife, sera were screened for anti-Brucella antibodies using the Rose Bengal test as a presumptive test and the competitive-ELISA as a confirmatory test. The Single Comparative Intradermal Tuberculin Skin Test was used to identify reactor cattle for bTB and positive animals were confirmed using the gamma interferon test, culture and histopathology. For wildlife, bTB was tested in African buffaloes by using the gamma interferon test, culture and histopathology. Age, sex, location, abortion and grazing history were considered as risk factors for Brucella seropositivity while age, sex, location and grazing history were considered as risk factors for bTB in cattle. A total of 1158 cattle were tested and the overall seroprevalence of brucellosis was 9.9%. A total of 97 wild animals (47 buffaloes, 33 impala, 16 kudu, and 1 giraffe) were tested and only one animal (giraffe) (1%) was seropositive for brucellosis. In the interface area, cattle with a history of grazing in the park recorded a significantly (P<0.05) higher Brucella seroprevalence (13.5%) compared to those with no history of grazing in the park (4.9%). A total of 477 cattle were tested for bTB and only five (1%) reactors were recorded. The five cattle reactors were all found to be negative on the confirmatory test, culture and histopathology. Of the 38 buffaloes tested for bTB and 4 (10.5%) were positive and bacterial culture of two gamma interferon-positive buffaloes yielded *Mycobacterium bovis*. The results of the present study established the presence of brucellosis in communal cattle in the studied areas and of bTB in GNP African buffaloes for the first time.