
Short Communication

DISTRIBUTION OF RIFT VALLEY FEVER AMONG CATTLE IN ZAMBIA

Kenny L. SAMUI, Shingo INOUE¹, Aaron S. MWEENE, Andrew M. NAMBOTA, James E. D. MLANGWA, Pius CHILONDA, Misao ONUMA² and Chiharu MORITA³*

Department of Disease Control, University of Zambia, School of Veterinary Medicine, P. O. Box 32379, Lusaka, Zambia, ¹Department of Veterinary Public Health, Obihiro University of Agriculture and Veterinary Medicine, Nishi 2-sen 11, Inada-cho, Obihiro, Hokkaido 080, ²Laboratory of Infectious Diseases, Hokkaido University Graduate School of Veterinary Medicine, Kita 18, Nishi 9, Kita-ku, Sapporo-shi, Hokkaido 060, and ³Department of Veterinary Public Health, Rakuno-Gakuen University, Bunkyodai-midori-machi 582, Ebetsu-shi, Hokkaido 069

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SUMMARY: In the present study, 1,421 cattle in 32 herds within nine districts, which are important cattle-producing centers in the nine provinces of Zambia, were tested for Rift Valley fever by the indirect immunofluorescence assay. One hundred and forty-seven cattle (10.5%) in 28 herds (88.9%) in the nine districts tested were positive for Rift Valley fever implying a country-wide distribution. In districts associated with flood plains and/or "dambos" (low lying areas of perpetual flooding), high herd and individual positive rates (100% and >10%, respectively) were found, suggesting a significance of these features in the distribution of the disease.

井上真吾(帯広畜産大学獣医公衆衛生学教室 帯広市稲田町西2線11)
小沼 操（北海道大学大学院獣医学研究科感染症学教室 札幌市北区北18条西9丁目）
森田千春（酪農学園大学獣医公衆衛生学教室 江別市文京台総町582）
Rift Valley fever (RVF) is an acute, febrile, arboviral, zoonotic disease that causes high rates of abortion and neonatal mortality, primarily in sheep, goats and cattle (1). In Zambia the disease was first reported in 1974 when an epizootic involving cattle and sheep occurred in the Chisamba (Central Province) and Mazabuka (Southern Province) districts and in some parts of Copperbelt (2). Since then, several epizootics have occurred in the same areas (2,3). The disease in humans, involving deaths, has also been reported (4). All these reports indicated that the disease may be more or less endemic in the above-mentioned areas and could be contributing to the low livestock productivity and public ill-health in Zambia.

Although seroepidemiological studies have been conducted in the past, these studies have tended to be limited to the areas of repeated RVF occurrences and have, therefore, not indicated how widely the disease is distributed in Zambia. This article reports the results of a seroepidemiological study conducted in various parts of the country to determine the disease’s country-wide distribution, factors influencing this distribution as well as to gain an insight on its possible impact on cattle productivity in the affected areas.

Between January 1990 and March 1991, serum samples were collected from commercial and emerging herds in nine districts (Fig. 1) representing important cattle-rearing centers in the nine provinces of Zambia. One district in each province was sampled. Sample herds were selected on the basis of their accessibility, the likely level of cooperation by the owners or managers and the likely availability of animal health and other relevant records. Information regarding the vaccination status of the herd, its reproductive performance and natural surroundings, was obtained from the owners or managers by use of appropriate questionnaires. All vaccinated herds and individual cattle were excluded from the study. The sera were kept at $-20\,^\circ\text{C}$ until required for testing.

The antigens and indirect immunofluorescence assay used in the present study were as described by Morita (5). In brief, Vero-E6 cells infected with ZH548-M12 strain of RVF virus were used as antigen. The sera showing titers higher than 1:16 against the antigen were considered as positive. Table I shows the districts sampled, the numbers of herds and individual cattle within these herds tested in each district and the results of the testing. A total of 1,421 individual cattle in 32 herds were tested for RVF in all the nine sample districts. All the tested herds in six districts and five out of six herds in Choma, three out of six in Chingola, two out three in Chipata districts were positive to RVF. Altogether, 147 individual cattle (10.5%) in 27 herds (88.9%) tested were positive for RVF.
These herds or individual cattle had, reportedly, never been vaccinated against RVF in the past.

Field observations as well as farmer responses indicated that the tested herds in Kabwe, Lusaka, Solwezi, Mongu and Mansa districts were located adjacent to flood plains and/or dambos and grazed in and around these geographic features. (Dambos are shallow streamless depressions that can be seasonally waterlogged and are grass-covered) (5a). All the positive herds had a history of abortion and still-birth although they had annual vaccination programs against bovine brucellosis.

Zambia is composed of nine provinces and the current study included at least one district from each province. These districts are important livestock production centers in these provinces although the productivity is low (6). The results indicate that RVF exits in all the districts studied, implying that the disease may have a country-wide distribution. The results also indicate high positive rates (100% herd rate and greater than 10% individual cattle rates) in the Kabwe,
Table I. Distribution of Rift Valley fever among cattle in Zambia.
Results of a seroepidemiological study in nine districts

<table>
<thead>
<tr>
<th>District</th>
<th>Number of herds tested</th>
<th>Number positive</th>
<th>% herds positive</th>
<th>Number of cattle tested</th>
<th>Number of cattle positive</th>
<th>% cattle positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kasama</td>
<td>1</td>
<td>1</td>
<td>100</td>
<td>30</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Mansa(d)</td>
<td>1</td>
<td>1</td>
<td>100</td>
<td>198</td>
<td>24</td>
<td>12.1</td>
</tr>
<tr>
<td>Chipata</td>
<td>3</td>
<td>2</td>
<td>66.7</td>
<td>162</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Chingola</td>
<td>6</td>
<td>3</td>
<td>50</td>
<td>202</td>
<td>11</td>
<td>5.4</td>
</tr>
<tr>
<td>Solwezi(d)</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>181</td>
<td>25</td>
<td>13.8</td>
</tr>
<tr>
<td>Kabwe(d)</td>
<td>6</td>
<td>6</td>
<td>100</td>
<td>215</td>
<td>24</td>
<td>11.2</td>
</tr>
<tr>
<td>Lusaka(d/fp)</td>
<td>1</td>
<td>1</td>
<td>100</td>
<td>15</td>
<td>3</td>
<td>20.0</td>
</tr>
<tr>
<td>Mongu(fp)</td>
<td>6</td>
<td>6</td>
<td>100</td>
<td>206</td>
<td>47</td>
<td>22.8</td>
</tr>
<tr>
<td>Choma(d)</td>
<td>6</td>
<td>5</td>
<td>83.3</td>
<td>212</td>
<td>10</td>
<td>4.7</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>27</td>
<td>88.9 av.</td>
<td>1.421</td>
<td>147</td>
<td>10.5 av.</td>
</tr>
</tbody>
</table>

av.: average, d: dambos, fp: flood plain.

Lusaka, Solwezi, Mongu and Mansa districts. These districts are characterized by the presence of either large flood plains and/or dambos and the positive herds were located adjacent to and grazed within and around these features. The results, therefore, suggest that these geographic features may be significant in the distribution and epidemiology of the disease in this country. Previous publications on the status of RVF in the Chisamba, Mazabuka and Lusaka areas expressed the belief that the disease is endemic in these areas (2,5,7,8). The results of the present studies seem to strengthen the previous reports and suggest that RVF could be endemic throughout most of the cattle producing parts of the country. Any future attempt to study the epidemiology and impact of the disease in Zambia should, therefore, involve samples that would represent the whole country.

The objective of this study was to determine the distribution of RVF in Zambia as well as factors influencing the disease distribution. The results indicate that the disease may have a country-wide distribution, that the presence and
proximity of flood plains and/or dambos to cattle-producing areas could be significant to the disease's distribution in those areas, and that the disease may be significantly contributing to the low productivity of cattle in Zambia. Finally, the results suggest that the disease may be endemic in most cattle-producing parts of the country.

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REFERENCES