Prevalence of Haemoparasites of Cattle from Three Abattoirs in Ibadan Metropolis, Oyo State, Nigeria

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Abstract. The haemoparasitemia of cattle slaughtered in three abattoirs in Ibadan, Oyo State, Nigeria were determined between the months of March and May, 2013. Blood samples were obtained from 180 apparently healthy cattle from three abattoirs (Bodija, Akinyele and Olorunsogo), using standard field and laboratory techniques. An overall parasitemia of 6.67% accounting for 12 positive cattle out of 180 cattle examined was recorded. Abattoir-specific prevalence indicated 3.33%, 2.22% and 1.11% for Bodija, Akinyele and Olorunsogo abattoirs respectively. The three species of parasites identified showed prevalences of 3.81%, 2.22% and 0.56% for Trypanosoma brucei, Babesia bigemina and Theileria parva respectively. Sex-related parasitemia revealed that females had higher prevalence 8(4.44%) than males 4(2.22%) which was not statistically significant (P>0.05). Breed-specific prevalence showed 2.78%, 2.22% and 1.67% for Sokoto Gudali, Red Bororo and White Fulani respectively, which was statistically significant (P<0.05). This study provides information on the haemoparasitism status of cattle that arrive for slaughter in Ibadan metropolis and calls for more control/preventive measures to eradicate haemoparasites to enhance more wholesome beef for the general populace.

Keywords: Prevalence, haemoparasites, cattle, Abattoirs, Sex distribution, Breed distribution

1. INTRODUCTION

Haemoparasitic infections have a global distribution, stretching from the polar circle to the equator. This is due to the fact that their vectors; ticks and blood-sucking flies, also have a global distribution. The worldwide incidence of haemoparasitic infections in cattle has been severely reported by different workers (Laha et al., 1989; Luckins, 1992; Thach et al., 1996). In Nigeria there are about 10-15 million cattle, 1.2 million of these are in Ibadan, South West, Nigeria (NLS, 2009) and approximately half of these belong to the communal and commercial farmers (Palmer et al., 2006). Cattle owned by resource-poor farmers are kept on communal rangelands where they are grazed extensively (Masika and Mafu, 2004).

Communal grazing is characterized by poor management of cattle and low productivity. Consequently, diseases and parasitism are rife and constitute major threats to cattle production in communal areas (Kaewthamasorn and Wongsamee, 2006, Rajput et al., 2006). Cattle in Nigeria may be infected with a wide variety of vector-borne haemoparasites (Callow, 1978, Swallow, 2000). The most economically important genera are the trypanosomes (Trypanosoma vivax, T. congolense and T. brucei), Babesia (Babesia bigemina, B. bovis) Anaplasma and Ehrlichia (Cowdria), and to a less extent Theileria (Theileria parva and T. veilifera) (Makala et al., 2003; Mtshali et al., 2004; Kamani et al., 2010). African animal trypanosomosis, Babesiosis and Cowdriosis are considered as the most important constraints to the health and improved productivity of cattle in sub-Saharan Africa (FAO, 1984; Young et al., 1988, Bell-sakyi et al., 2004). Haemoparasites have generally shown to cause destruction of red blood cells resulting in anaemia, jaundice, anorexia, weight loss and infertility (Mtshali et al., 2004; Kaufman et al., 2006, Jonsson, 2006; Justin, 2008).

1.1. Significance of Cattle in Nigeria

Cattle are very important economically because they are sources of animal protein and income. Their by-products such as hoof, bones, blood, hides and skin are also variously used (Sansoucy, 1995). Beef is the third most widely consumed meat in the world, accounting for about 25% of meat production worldwide, after pork and poultry at 38% and 30% respectively (Dreyer et al., 1998; Dold and Cocks,
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2.1. Study Area

The study was carried out at three selected abattoirs in Ibadan metropolis; including Bodija abattoir (Ibadan North Local Government Area), Akinyele abattoir (Akinyele Local Government Area) and Olorunsogo abattoir (Ona-Ara Local Government Area), Oyo state, Nigeria. Bodija abattoir is the second biggest abattoir in Western Nigeria. Akinyele abattoir is about 19 kilometers north of Ibadan on the Ibadan-Oyo-Illorin road. Olorunsogo abattoir is about 170 kilometers from Ibadan, along the Ibadan-Sawia-Olorunsogo-Akanran road, off Lagos-Iwo expressway. The abattoir has an average daily kill of 20-30 cattle (Osibanjo and Adie, 2007).

2.2. Blood sample collection

Blood samples were randomly collected aseptically from 180 apparently healthy cattle of both sexes consisting of three breeds; 94 White Fulani, also called ‘Bugani’ (78 males and 16 females), 42 Sokoto Gudali (16 males and 26 females) and 44 Red Bororo (34 males and 10 females). The blood from each animal was put in an Ethylene diamine tetra acetic acid (EDTA) tube which was then labelled and placed in an ice pack. The blood samples were taken to the laboratory for analysis within six hours of collection. The blood samples were collected for a period of 12 weeks between March, 2013 and May, 2013.

2.3. Parasitological Examination

Haemoparasites were detected using the techniques of wet mount, stained thin blood smear and buffy coat as prescribed by Cheesbrough, (1998). The wet mount specimens were examined using the X40 objective lens while the thin blood smears were examined with the X100 objective lens. Theuffy coat was also examined under the X10 and X40 objective lenses for motile parasites. A minimum of 50 fields were searched per slide in each of the procedures adopted. Haemoparasites were identified to species level based on structural and morphometric criteria (Purnell, 1981; Norval et al., 1991).

2.4. Statistical Analysis

Descriptive and inferential statistics were employed in analyzing the data in the study. The prevalence rates among breeds and sex of the animals were expressed as percentage of the total number of animals sampled. Chi square test was used to evaluate relationship between the prevalence of the disease and the breed and sex of the cattle studied. A P-value of P<0.05 was considered significant. Inferential statistics was done using SPSS version 17.

3. RESULTS

The study showed that a total of 12 (6.67%) samples were positive for different haemoparasites out of the 180 blood samples examined. Abattoir-specific prevalence showed variability with Bodija abattoir recording 6 (3.33%) infected animals out of the 60 cattle examined, Akinyele abattoir had 4( 2.22%) infected animals out of the 60 cattle examined while 2(1.11%) infected animals were recorded at Olorunsogo abattoir out of the 60 cattle examined (Table 1).

Three genera of haemoparasites were identified, namely; Trypanosoma spp; Theileria spp and Babesia spp. Trypanosoma brucei had the highest prevalence of 3.81%, Theileria parva, 0.56% and Babesia bigemina, 2.22%. T. brucei showed a prevalence of 2.22%, 1.11% and 0.56% at Bodija, Akinyele and Olorunsogo abattoirs respectively. Theileria parva showed a prevalence of 0.56% at Bodija abattoir and 0.0% prevalence at both Akinyele and Olorunsogo abattoirs. Babesia bigemina showed prevalence of 0.56%, 1.11% and 0.56% in Bodija, Akinyele and Olorunsogo abattoirs respectively (Table, 2 and 3).
Sex-related haemoparasitemia did not vary significantly ($X^2 = 8.755$, df = 1, $P>0.05$) in the study, however, parasitemia was higher in cows (4.45%) than in bulls (2.22%). Breed-specific parasitemia showed that Sokoto Gudali had the highest prevalence (2.78%) followed by the Red Bororo (2.22%) and White Fulani (Bujani) having the lowest prevalence (1.67%). The study also showed that breed specific parasitemia varied significantly ($X^2 = 5.386$, df = 2, $P<0.05$).

**Table 1: Prevalence of haemoparasites in the study area**

<table>
<thead>
<tr>
<th>Abattoirs</th>
<th>No. Examined</th>
<th>No. infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodija</td>
<td>60</td>
<td>6 (3.33)</td>
</tr>
<tr>
<td>Akinyele</td>
<td>60</td>
<td>4 (2.22)</td>
</tr>
<tr>
<td>Olorunsogo</td>
<td>60</td>
<td>2 (1.11)</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td><strong>180</strong></td>
<td><strong>12 (6.66)</strong></td>
</tr>
</tbody>
</table>

**Table 2: Species prevalence of haemoparasites in the study area**

<table>
<thead>
<tr>
<th>Species of Parasites</th>
<th>Bodija</th>
<th>Akinyele</th>
<th>Olorunsogo</th>
<th>Overall parasitemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trypanosoma brucei</td>
<td>4 (2.22)</td>
<td>2 (1.11)</td>
<td>1 (0.67)</td>
<td>7 (3.81)</td>
</tr>
<tr>
<td>Theileria parva</td>
<td>1 (0.56)</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
<td>1 (0.56)</td>
</tr>
<tr>
<td>Babesia bigemina</td>
<td>1 (0.56)</td>
<td>2 (1.11)</td>
<td>1 (0.56)</td>
<td>4 (2.22)</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td>6 (3.33)</td>
<td>4 (2.22)</td>
<td>2 (1.11)</td>
<td>12 (6.67)</td>
</tr>
</tbody>
</table>

4. DISCUSSION

This study confirms the reports of previous studies on the range of haemoparasites found in cattle in Nigeria (Agu et al., 1990; Agu and Amadi, 2001; Enwezor et al., 2009; Kamani et al., 2010). The 6.67% haemoparasitemia reported in this study suggests a continuous challenge by parasites and the existence of carrier state in most animals. *Trypanosoma brucei brucei* (3.81%) accounted for most of the parasites seen followed by *B. bigemina* (2.22%) and *Theileria parva* (0.56%). This is in contrast to the work of Bell-Sakyi et al. (2004) who observed a reverse trend in a survey conducted in livestock in Ghana, a coastal country in Africa. The observed 3.81% parasitemia for trypanosomes was lower than the 8.4% reported by Enwezor et al (2009) in Kaduna state and 8.0% reported by Kimani et al. (2010) in North-Central Nigeria.

*Theileria parva* showed a low occurrence of 0.56% in the study. This observation contradicts earlier study by Kimani et al. (2010) where 12% prevalence in cattle in Nigeria was reported. The low parasitemia observed in *T. parva* may be associated with difference of sampling strategy and sample numbers. However, Agu et al. (1990) showed that fatal infections of *T. parva* could occur in nutritionally challenged breeds and poor sanitary conditions that promote the abundance of *Amblyomma variegate*; the tick vector. The higher haemoparasitemia recorded in cows (4.44%) than bulls (2.22%) could be attributed to accumulation of parasites by the females due to the extended breeding for economic reasons such as calving and milk production. This confirms previous reports of sex dimorphism in the incidence of haemoparasitism in Nigeria (Agu et al. 1990, Agu and Amadi, 2001; Enwezor et al., 2009; Kamani et al., 2010). The susceptibility of cows might be attributed to reduced immunity as a result of stress due to pregnancy and lactation. The variability in breed specific parasitemia was in line with observations made by Agu and Amadi (2001) that attributed this variability to host specific factors peculiar to individual breeds.
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Table 3: Sex prevalence of haemoparasites in relation to breed of cattle in the study area

<table>
<thead>
<tr>
<th>Breeds</th>
<th>Cattle</th>
<th>Bulls</th>
<th>No. Examined</th>
<th>Positive (%)</th>
<th>Cows</th>
<th>No. Examined</th>
<th>Positive (%)</th>
<th>Over all infection (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sokoto Gudali</td>
<td>16</td>
<td>1(0.56)</td>
<td>26</td>
<td>4(2.22)</td>
<td>42</td>
<td>5 (2.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Fulani</td>
<td>78</td>
<td>1(0.56)</td>
<td>16</td>
<td>2(1.11)</td>
<td>94</td>
<td>3 (1.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Bororo</td>
<td>34</td>
<td>2(1.11)</td>
<td>10</td>
<td>2(1.11)</td>
<td>44</td>
<td>4 (2.22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>128</strong></td>
<td><strong>4 (2.22)</strong></td>
<td><strong>52</strong></td>
<td><strong>8 (4.44)</strong></td>
<td><strong>180</strong></td>
<td><strong>12 (6.67)</strong></td>
<td></td>
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</tr>
</tbody>
</table>

5. CONCLUSION

The present report confirms the presence of carrier populations of haemoparasite-infected cattle which both serve as a reservoir of infection for tick-vectors, susceptible livestock and humans. We recommend routine screening of animals to effectively reduce to the barest minimum the prevalence of haemoparasites in the study areas.

Acknowledgement

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