

Haemoparasites of Bovine Species Slaughtered In Port Harcourt Metropolis, Rivers State, Nigeria

ABSTRACT

Background: The haemoparasitemia of cattle slaughtered in three abattoirs in Port Harcourt metropolis, Rivers State, Nigeria were determined in the department of Animal and Environmental Biology parasitology research laboratory in the University of Port Harcourt between the months of July and September, 2016.

Methods: One hundred and five (105) blood samples were obtained from healthy Sokoto Gudali breed of cattle from three abattoirs (Trans-Amadi, Rumuokoro and Eastern-by-Pass) and were processed for microscopic examination. Giemsa Stained thick and thin smear preparations of the samples were examined.

Results: An overall parasitemia of 11.43% accounting for 12 positive cattle out of 105 cattle examined was obtained. Abattoir specific prevalence indicated 5.71%, 3.81% and 1.90% for Trans-Amadi, Rumuokoro and Eastern-by-Pass respectively. The three species of parasites identified showed that *Anaplasma* spp., *Theileria* spp. and *Babesia* spp. recorded a prevalence of 5.71%, 3.81% and 1.90% respectively. Sex related parasitemia showed that females had higher prevalence of 6.67% than males (4.76%) which was statistically significant ($P < 0.05$). Age related prevalence showed that older cattle recorded higher prevalence of 12.72% than the younger ones (10.00%), which was not statistically significant ($p > 0.05$). The study showed a higher prevalence of haemoparasites in slaughtered cattle at Trans-Amadi followed by Rumuokoro and Eastern-by-Pass slaughter respectively with a low prevalence.

Conclusion: The study provides information on the haemoparasites status of cattle slaughtered in Port-Harcourt metropolis. Ectoparasites are known to be the primary vectors to haemoparasites therefore, level of ectoparasites should be controlled and management practices should be improved upon in order to maximize wholesome beef for the general populace.

Keywords: *Haemoparasites*; cattle; abattoirs; Port Harcourt

1. INTRODUCTION

The Nigerian livestock population was estimated at about 50 million apart from pigs, rabbits and guinea pigs [1]. The value of Nigeria livestock resource in monetary terms was estimated to be \$6 billion. Nigeria livestock population; cattle contributed about 10%. This in monetary terms accounted for about 40% of the total livestock revenue of Nigeria [2]. 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.

Cattle, sheep and goats in sub-saharan African may be infected with a wide variety of parasites, most importantly vector-borne haemoparasites such as *Anaplasma*, *Theileria*, *Babesia* and bovine trypanosome [3; 4]. The tropical environment is for various reasons suitable for the development of these parasitic diseases [5].

Outbreak of protozoan disease may occur if cattle are moved from humid area to semi-arid region where the vectors are prevalent. Haemoparasites have generally been shown to cause lysis of red blood cells resulting in anaemia, jaundice, anorexia, loss of weight and infertility [6]. This parasitic diseases have weakening effect on human and animal health worldwide especially in developing countries [7].

Cattle are very important economically because they are source of animal protein and income. Their by-products such as hoof, bones, blood, hides and skin are also variously used [8]. Beef is the third most widely

48 consumed meat in the world, accounting for about 25% of meat production worldwide, after pork and poultry at
49 38% and 30% respectively [9 ;10]. Beef is an excellent source of complete protein, minerals such as zinc,
50 selenium phosphorus and iron and the B vitamins. Haemoparasitic infections are major public health, veterinary
51 and socio-economic problem in Africa, where they impose a burden on the health care infrastructure of both
52 animals and animal handlers in endemic area.

53 Prevalence of Haemoparasites in Cattle in various studied carried out on the haeparasitic infections of cattle;
54 [11], reported a prevalence of 3.9% in Ebonyi State. In a study conducted among 180 cattle [12], reported a
55 prevalence rate of 6.67% also in Oyo state. [13] in a study in Benue state, reported a prevalence rate of 28.9%.
56 In a study investigated among 637 cattle [14] for haemoparasitic infections in North-central, Nigeria, 25.7%
57 prevalence rate was reported.

58 The breed is a short-horned and short-legged animal. They are also known as the zebu in west and central
59 Africa. Gudali originated from Persia gulf and south Arabia. Arabia invaders spread the zebu to the south and
60 was over the continent from 669BC [15]. The breed is also known as Yola gudali, Adamawa gudali and
61 Ngaundere gudali. The sokoto gudali is the strain found in Nigeria, Northern Benin, Ghana and Mali, They have
62 multiple coat colour although the most common one is black and white. They have deeper body than the white
63 Fulani breed [16].

64 It is similar in conformation, size and origin to the large East Africa short-shorn zebu. About 90% of the sokoto
65 gudali cattle are owned and managed by Fulani and Hausa pastoralist and trans humant herders [17], who feed
66 their cattle on communally owned grazing lands and browse especially in the dry season [16]. They are known
67 for their hardiness to the Arid Northernly environment. The cattle are known for their meet and milk. Mature
68 weights range from 495-660kg for males and 240-355kg for females. There also known for their beef quality
69 among indigenous breed.

70 In spite of several studies that have been conducted on the haemoparasitic infections of cattle in parts of
71 Nigeria; there is little or no information on the haemoparasitic infections in Port Harcourt metropolis.

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73 **2. MATERIALS AND METHODS**

74 **2.1. Study Area**

75 The study was carried out at three selected abattoirs in Port Harcourt metropolis, the capital of Rivers State of
76 Nigeria. The study areas include; Trans-Amadi, Eastern-By-Pass Rumuokoro abattoirs respectively. Trans-
77 Amadi abattoir is the biggest abattoir in Rivers State with an average daily slaughter of 50-60 cattle. Trans-
78 Amadi is a thousand hectare (2,500 acre) industrial area, as well as a diverse residential neighbourhood in the
79 city of Port Harcourt; situated at $4^{\circ} 48' 53''$ N latitude and $7^{\circ} 21' 14''$ E longitude. Tras-Amadi lies in the North and
80 is bordered by D/line in the South West, Woji Township to the East and Rumuola to the North West.

81 Rumuokoro is a town in Obio-Akpor Local Government Area of Rivers State, Nigeria, situated at $4^{\circ} 45' N$ latitude
82 and $6^{\circ} 50' E$ longitude. It is the meeting points of five major roads in Nigeria economy and the gate way to and
83 from the city of Port Harcourt. It consists of five communities; Rukpoakwolusi, Eligbolo, Awalema, Rumuagholu
84 and Elieke.

115 2.2. **Collection of Blood Samples**

116 Blood samples were randomly collected aseptically from 105 apparently healthy cattle of both sexes of Sokoto
117 Gudali breed. The blood samples from each animal was put in an Ethy-lene diaminetetracetic acid (EDTA) tube
118 which was appropriately labeled and placed in an ice pack. The blood samples were sent to the department of
119 Animal and Environmental Biology Parasitology research laboratory in the University of Port-Harcourt for
120 analysis within five hours of collection. The blood samples were collected for a period of 10 weeks between 13th
121 July and 28th September, 2016.

122 2.3 **Examination of Blood Samples**

123 2.3.1 **Preparation of Thick Blood Smear**

124 A large drop of blood was taken into a grease free glass slide and was spread on an area of 12mm square with
125 another slide and then allowed to thoroughly air-dry. The thick smear was thereafter stained with 10% Giemsa
126 stain for 25-30 minutes. The stain was washed off from staining rack with clean water by flushing the stain from
127 slides. These were placed in a draining rack to air-dry [18]. When the thick film was completely dried, a drop of
128 immersion oil was applied to an area of the film and the oil was spread to cover the film and examined first at a
129 lower magnification and then with x 100 objective of the microscope.

130 131 2.3.2 **Preparation of Thin Blood Film**

132 This technique was prepared by dropping a pin head of blood on a grease free glass slide. The edge of a glass
133 spreader was placed on the drop of blood at an angle of 45⁰ and pushed gently and swiftly forward until a thin
134 film with a staggered tail is produced. This was allowed to air dry at room temperature. The air dried blood
135 smear was fixed in 100% methanol and stained with 10% Giemsa stain. This was immediately rinsed in
136 buffered water and allowed to dry on a staining rack [18]. The stained blood smears were examined using the x
137 100 oil immersion objective. The identification of the parasites is based upon morphological forms and
138 structures within the Giemsa stained blood film.

139 2.4 **DATA ANALYSIS**

140 The prevalence rates among sex and age of the animals were expressed as percentage of the total numbers of
141 animals sampled. Chi-square test was used to evaluate relationships between the prevalence of the disease,
142 sex and age of the cattle studied. A p-value of $p = .05$ was considered significant.

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146 **3. RESULTS**

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148 The study revealed that out of 105 blood samples examined, a total of 12 (11.43%) samples were positive for
 149 haemoparasites. Abattoir-specific prevalence is as follows; 6(5.71%), 4(3.81%) and 2(1.90%) animals infected
 150 for Trans-Amadi, Rumuokoro, and Eastern-by-pass abattoirs respectively as in table 1 and Fig. 1.

151 The distribution of the parasites based on age indicated were 5(10%) as follows; 3 (6.00%), 1 (2.0%) and 1
 152 (2.00%) of the younger cattle in Trans-Amadi, Rumuokoro and Eastern-by-pass abattoirs respectively. Older
 153 cattle had 7(12.73%) parasites as follows; 4(7.27%), 2(3.64%) and 1 (1.82%) respectively for Trans-
 154 Amadi, Rumuokoro and Eastern-by-pass abattoirs (Table 2 and Fig. 2).

155 During the study, 12 (11.43%) of the cattle were positive for haemoparasites as follows; 5(4.76%), 7(6.67%)
 156 for male and females respectively (Table 3 and Fig.3).

157 Twelve haemoparasites of three genera were identified during the study as follows; 6 (5.71%), 4
 158 (3.81%) and 2 (1.90%) for *Anaplasma* spp., *Theileria* spp., and *Babesia* spp respectively. *Anaplasma* spp.
 159 showed a prevalence of 3 (2.86%), 2 (1.90%) and 1 (0.95%) at Trans-Amadi, Rumuokoro and Eastern-by-pass
 160 abattoirs respectively. *Theileria* spp. showed a prevalence of 2 (1.90%), 1(0.95%) and 1 (0.95) at Trans-Amadi,
 161 Rumuokoro and Eastern-by-pass abattoirs. While *Babesia* spp. showed a prevalence of 1(0.95%) at both
 162 Trans-Amadi and Rumuokoro abattoirs. There was no record of Babesia spp at Eastern-by-pass abattoir (table
 163 4).

164 **Table 1: Prevalence of haemoparasites based on study location (Abattoir specific**
 165 **prevalence)**

Abattoir	No. examined	No. Infected (%)
Trans-Amadi	35	6 (5.71)
Rumuokoro	35	4(3.81)
Eastern-by-pass	35	2(1.90)
Total	105	12(11.43)

166 ($\chi^2 = 5.99$, $df = 2$, $p > 0.05$)

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174 **Table 2: Prevalence of haemoparasites based on age**

Location	Younger Cattle		Older Cattle	
	No. Examined	No. Infected (%)	No. Examined	No. Infected (%)
Trans-Amadi	20	3(6.00)	25	4(7.27)
Rumuokoro	15	1(2.00)	15	2(3.64)
Eastern-by-pass	15	1(2.00)	15	1(1.82)
Total	50	5(10.00)	55	7(12.73)

Age ($\chi^2 = 3.84$, $df = 1$, $p > 0.05$)

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176 **Table 3:**177 **Prevalence of haemoparasites based on sex**

Sex	No. Examined	No. Infected (%)
Males	70	5(4.76)
Females	35	7(6.67)
Total	105	12(11.43)

178 Sex ($\chi^2 = 3.84$, $df = 1$, $p < 0.05$)

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181 **Table 4: Prevalence of haemoparasites infection in the three study locations**

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Parasites	Trans-Amadi Abattoir TVC (%)	Rummokoro Abattoir TVC (%)	Easter-by-pass Abattoir TVC (%)	Total
Anaplasma ssp.	3(2.86)	2(1.90)	1(0.95)	6(5.71)
Theileria spp.	2(1.90)	1(0.95)	1(0.95)	4(3.81)
Babesia spp.	1(0.95)	1(0.95)	-	2(1.90)
Total	6(5.71)	4(3.81)	2(1.90)	12(11.43)

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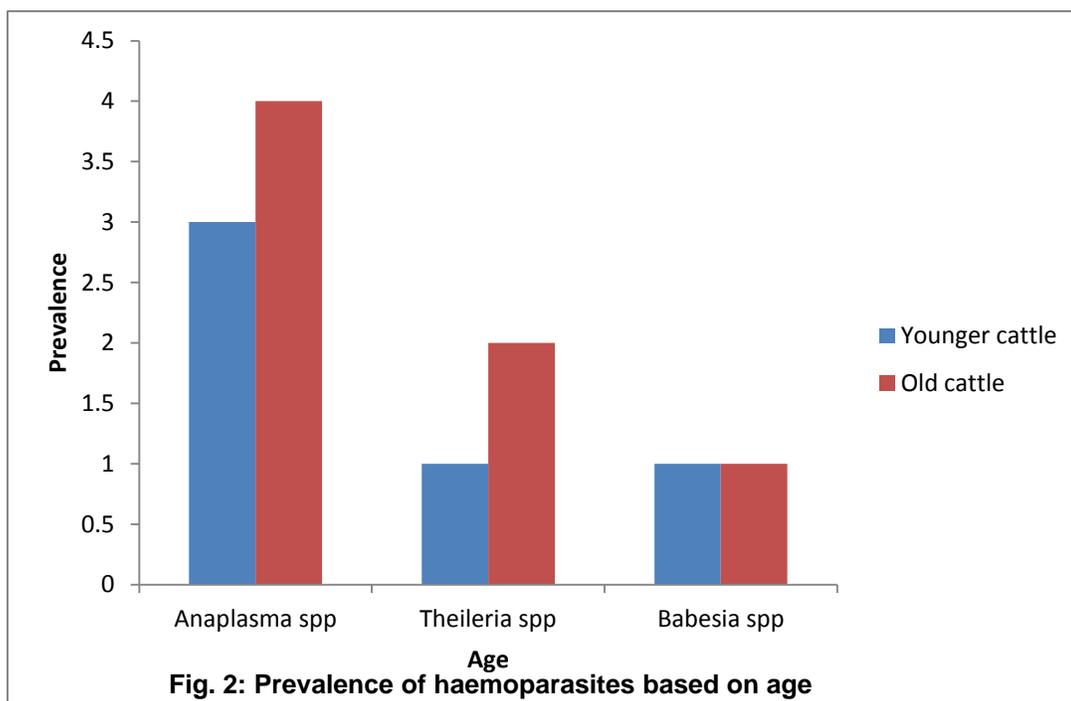
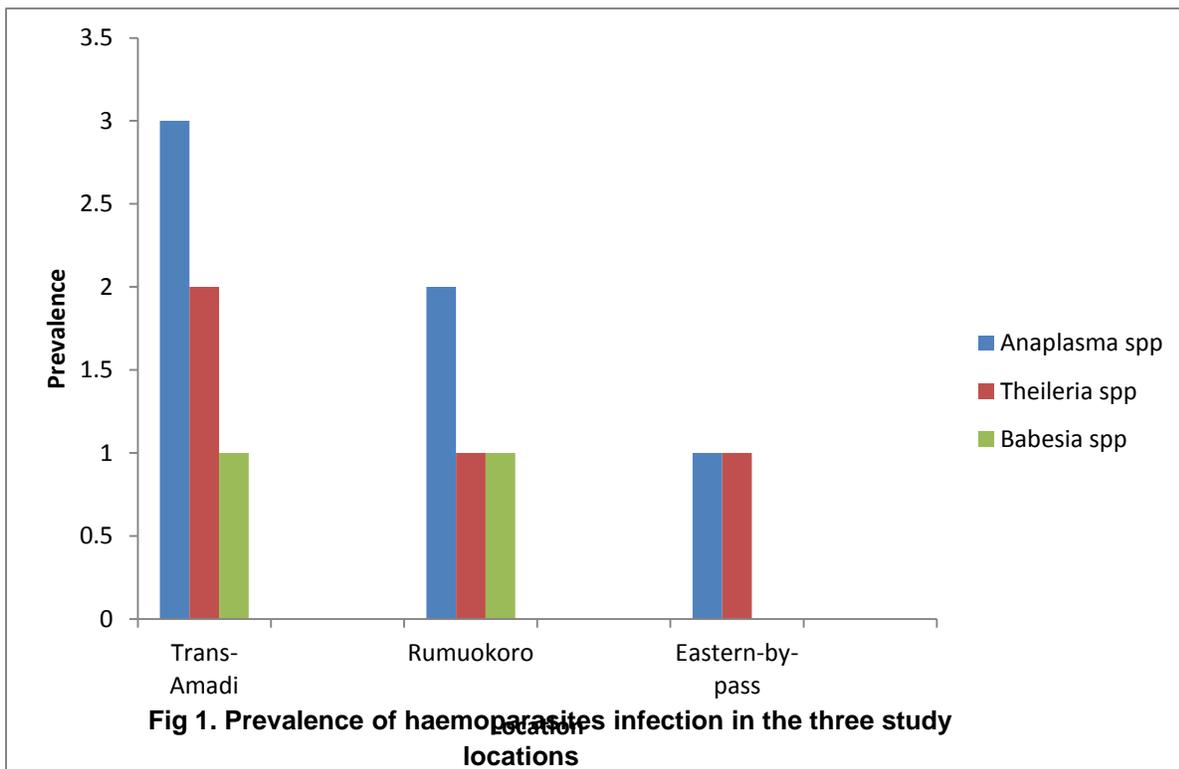
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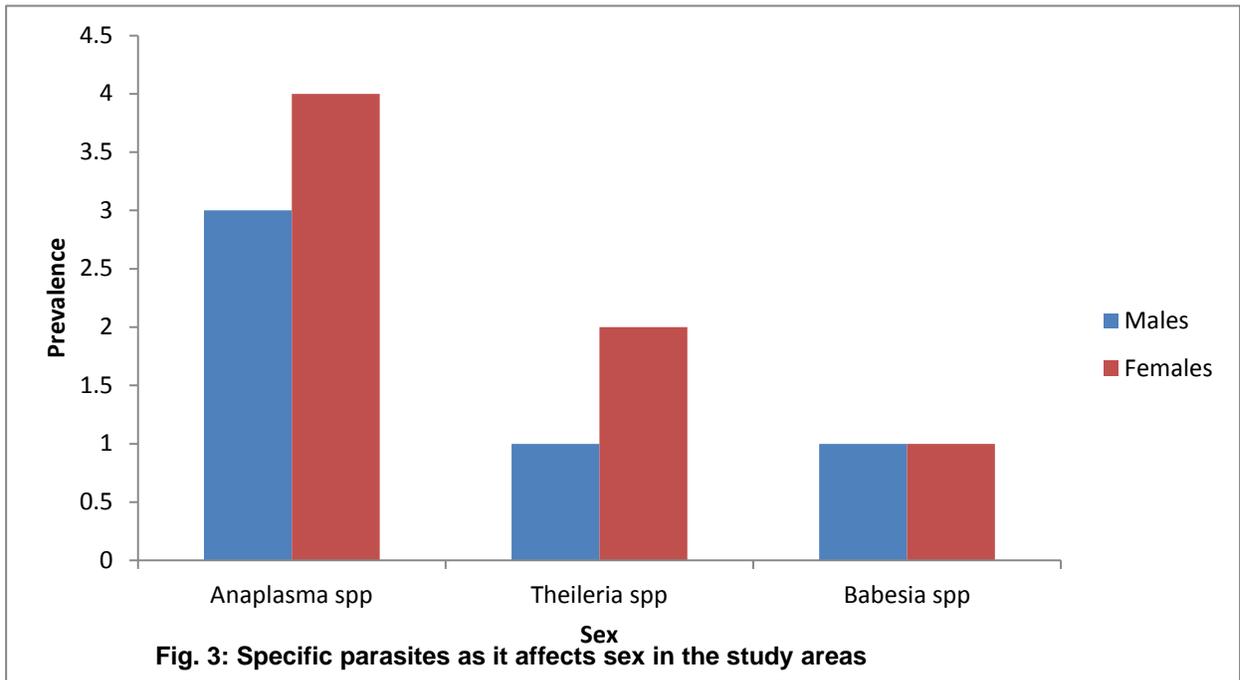
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4. DISCUSSION

241 The present study confirms the reports of previous studies on the range of haemoparasites found in cattle in
242 Nigeria. [19; 20; 21; 22]. The infection rate of 11.43% by haemoparasites reported in this study suggests a
243 continuous challenge by parasites and the existence of carrier state in most animals. The haemoparasitemia
244 reported in this study indicated that parasitism is one of the major challenges that hinder cattle production in
245 Port Harcourt metropolis.

246 The high parasitemia reported in this study could probably be as a result of poor sanitary condition, nutritional
247 challenges and lack of routine treatment. *Anaplasma* spp. (5.71%) accounted for most of the parasites seen
248 followed by *Theileria* spp. (3.81) and *Babesia* spp. (1.90%). This is in contrast with the work of [3] who observed
249 a reverse trend in a survey conducted in livestock in Ghana. The observed 5.71% parasitemia for
250 anaplasmosis was lower than the 9.9% reported by [13] in Benue State, Nigeria. The low prevalence recorded
251 in the study could be attributed to the improvement in husbandry system, better veterinary care and climate
252 change; contrary to the report of higher prevalence (28.9%) of parasitemia in cattle in Gboko metropolis of
253 Benue State, Nigeria. *Theileria* spp. showed occurrence of 3.81%, which was similar to the earlier work of [14]
254 in North central Nigeria. The low parasitemia observed in *Babesia* spp. (1.90%) contradicts earlier studies by
255 [14] where 16% prevalence in cattle in Nigeria was reported. The lower parasitemia observed in *Babesia* spp.
256 and *Anaplasma* spp. may be associated with difference in sample number. However, [11] showed that fatal
257 infection of the parasites could occur in nutritionally challenged breed and poor sanitary condition that promote
258 vector abundance.

259 The prevalence of parasitemia was higher in females than male animals possibly due to the fact that females
260 are kept much longer for breeding and milk production purposes [14] The lower prevalence in young animals
261 compared to adults can be attributed to restricted grazing of young animals which tends to reduce their
262 chances of contact with the vectors of these diseases. [14].

5. CONCLUSION

264 The result of this study clearly shows that 11.43% of the cattle slaughtered in the study area were infected with
265 haemoparasites. This is one of the challenges that hamper cattle production in Port-Harcourt metropolis and
266 elsewhere. The effect is usually manifested in production losses, late maturity, weight loss, still birth and
267 increased susceptibility to other diseases.

COMPETING INTERESTS

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269 Authors have declared that no competing interests exist.
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