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Occurrence of haemoparasites in cattle slaughtered at Jalingo abattoir, north-eastern Nigeria

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Abstract

Livestock plays a significant role in the economy of a nation but its productivity can be hampered by numerous haemoparasites thereby leading to economic losses to the livestock industry. The prevalence of haemoparasite in cattle slaughtered at Jalingo abattoir was investigated. A total of four hundred blood samples were collected at the point of slaughter, processed, and screened for haemoparasites by examining Giemsa-stained thin blood smears. An overall prevalence of 12.25% was recorded. Four haemoparasites of cattle with prevalence rates of 5.0%, 6.75%, 0.25%, and 0.25% for *Anaplasma, Babesia, Microfilaria* and *Trypanosoma* respectively were observed. The prevalence of haemoparasite in relation to sex, revealed higher infection in females (13.75%) than in males (10.0%) which were not found statistically different ($P > 0.05$). All breeds encountered during the study were infected with haemoparasites with the highest prevalence of 13.91 % recorded in White Fulani, Red Bororo (10.94%), and Sokoto Gudali (10.00 %), while Adamawa Gudali had the least prevalence of 0.5%. There was no statistically significant difference in the prevalence of haemoparasite in relation to breeds ($P > 0.05$). High prevalence was observed in the young (14.29%) more than the adult (11.59%) and older (12.14%). The current study has revealed the haemoparasites status in cattle slaughtered at Jalingo abattoir. Therefore, there is a need for effective preventive and control policy of these haemoparasites to enhance livestock productivity.

Keywords: Abattoir, cattle, haemoparasite, prevalence, slaughter

Introduction

Nigeria has about 10-15 million cattle, which accounts for one-third of agricultural gross domestic product (GDP), providing income, employment generation, food, draught power, hide and skin, farm

manure, transport, and major source of government revenue (Oluwafemi *et al*., 2001; NLS, 2009). Cattle in Nigeria may be infected with a wide range of vector-borne haemoparasites transmitted by ticks and tsetse flies (Soulsby, 1982; FAO, 1984). The most economically important genera are *Trypanosoma, Babesia, Anaplasma, Ehrlichia,* and *Theileria* (Kamani *et al*., 2010). Their negative impact on health, productivity, reproduction, and performance of affected animals accounts for economic losses to livestock producers in the tropics and subtropics (Soulsby, 1982; FAO, 1984; Abdullah *et al*., 2019). Parasitic diseases have debilitating effects on human and animal health worldwide, particularly in developing countries (Ellis *et al*., 2003). The direct losses caused by haemoparasites are connected to acute illness and death, premature slaughter and rejection of some body part at meat inspection, while indirect losses comprise of drop in production potentials, such as decreased growth rate, anemia, jaundice, infertility, anorexia, loss of weight in young growing animals and late maturity of reproducing and slaughter stock (Hansen & Perry, 1994; Ademola & Onyiche, 2013; Opara *et al*., 2016). In several studies carried out on haemoparasites of cattle in Nigeria Agu *et al*. (1990) and Enwezor *et al*. (2009) reported a prevalence of 9.4% and 13.5% both in Kaduna north-western part of Nigeria. In a similar study conducted in north-central Nigeria, Kamani *et al*. (2010) reported a prevalence rate of 25.7%. In cattle slaughtered from Gboko, Benue state, Zawua *et al*. (2015) reported a prevalence of 28.9% while Adua & Idahor (2017) in Lafiya reported a prevalence of 20.1%. In another study conducted in Ebonyi and Calabar states south-east and south-south parts of Nigeria, Agu & Amadi (2001) and Enogiomwan *et al*. (2019) reported prevalence of 3.9% and 7.78% respectively. 6.67% prevalence of haemoparasite in Ibadan, Oyo state, south-western Nigeria was also reported by Okorafor & Nzeako (2014). Although several studies have been carried out on haemoparasites of cattle in parts of Nigeria, there is a scarcity of information regarding haemoparasitic diseases in Jalingo. Hence, the present study was undertaken to determine the occurrence of haemoparasites of cattle slaughtered at the Jalingo abattoir, north-eastern Nigeria.

Materials and Methods

Study area

The study was conducted in Jalingo, the capital city of Taraba State, north-eastern Nigeria. Jalingo is located between latitudes 8º47' to 9º01'N and longitudes 11º09' to 11º30'E. To the north it is bounded by Lau Local Government Area and to the east by Yorro Local Government Area, to the south and west by Ardo Kola Local Government Area. It has an overall land area of about 195 km^2 with a population of 140,318, people according to the 2006 population census, with a projected growth rate of 3% (Shawulu *et al*., 2008). In 2014, the projected population was 165,774 (Oruonye, 2014). The study population consist of ruminant (cattle) slaughtered at the Jalingo abattoir. The abattoir has an average daily slaughter of 50-70 cattle (Orounye, 2015).

Sample collection and processing

Blood samples were aseptically collected randomly at the point of slaughter from 400 ruminants (cattle) of both sexes, different breeds, and age groups. About 5ml of blood sample from the jugular vein of each animal was collected into a well-labeled ethylene diamine tetra acetic acid (EDTA) tubes indicating sex, breed, and age of animal. Samples were then transported immediately in cooled box to the National Veterinary Research Institute (NVRI), Jalingo zonal office laboratory for analysis. In the laboratory, thin blood smears were prepared using the method described by Ademola & Onyiche (2013). The smears were examined at ×100 magnification (oil immersion) on an Olympus microscope for the presence and identification of blood parasites according to keys and descriptions as given by Soulsby (1982) and Taylor *et al*. (2016). Buffy coat concentration method was used for the detection of trypanosomes in the blood (Cheesewbrough, 2005).

Statistical analysis

Analysis using simple descriptive statistics for all parameters was conducted. Statistical package for social sciences (SPSS) was employed in analyzing the data in the study. A P-value of < 0.05 was considered as significant.

Results

Haemoparasite distribution found in cattle slaughtered at Jalingo abattoir as presented in Table 1 indicate that out of the 400 cattle examined, 49 (12.25%) were infected with different haemoparasites. Four haemoparasites of cattle were identified in this study; *Anaplasma, Babesia, Microfilaria* and *Trypanosoma* (Table 1).

Babesia spp was the most prevalent haemoparasite 27 (6.75%), followed by *Anaplasma* spp 20 (5.0%), while Microfilaria 1 (0.25%) and *Trypanosoma* spp 1 (0.25%) were the least prevalent recorded in the study (Table 1). Prevalence in relation to sex was

higher in the female 33 (13.75%) than in the male 16 (10.0%) (Table 2), even though there was no significant association $\chi^2 = 0.262$, df = 1, $p > 0.05$. Tables 3 and 4 show the prevalence of haemoparasite in relation to breeds and age. All breeds of cattle examined were infected with haemoparasites. The highest prevalence was observed in White Fulani 13.91% (37), followed by Red Bororo 10.94% (7), Sokoto Gudali 10% (2), and Adamawa Gudali 6% (6) in that order. Prevalence of haemoparasites in relation to breed had no significant association ($\chi^2 = 0.441$, df = 3, $p > 0.05$). Young cattle above 1-5 years of age recorded the highest prevalence 14.29% (8) followed by age group >10 years (older) with prevalence of 12.14% (25), while lowest prevalence of 11.59% (16) was recorded in adult animals of age group >6-10 years (Adult).

Table 1: Prevalence (%) of haemoparasites of cattle slaughtered in Jalingo abattoir

Animal examined	No. examined	Haemoparasite	No. positive	Prevalence %
Cattle	400	*Anaplasma* spp.	20	5.0
		Babesia spp.	27	6.75
		Microfilaria spp.	1	0.25
		Trypanosomes spp.	1	0.25
Total	400		49	12.25

Table 2: Sex related prevalence of haemoparasites of cattle slaughtered in Jalingo abattoir

Sex of cattle	No. examined	No. positive	Prevalence (%)
Male	160	16	10.0
Female	240	33	13.75
Total	400	49	12.25

($\chi^2 = 0.262$ df = 1, $p > 0.05$)

Table 3: Breed related prevalence of haemoparasites of cattle slaughtered in Jalingo abattoir

Breed	No. examined	No. positive	Prevalence %
Adamawa Gudali	50	3	6
Red Bororo	64	7	10.94
Sokoto Gudali	20	2	10
White Fulani	266	37	13.91
Total	400	49	12.25

($\chi^2 = 0.441$, df = 3, $p > 0.05$)

Table 4: Age related prevalence of haemoparasites of cattle slaughtered in Jalingo abattoir

Age (Years)	No. examined	No. positive	Prevalence (%)
>1-5 (young)	56	8	14.29
>5-10 (Adult)	138	16	11.59
>10 (Old)	206	25	12.14
Total	400	49	12.25

Discussion

The study has revealed the prevalence of haemoparasite in cattle slaughtered in Jalingo abattoir, north-eastern Nigeria. Haemoparasite exerts negatively on the health, reproduction, and performance of affected animals and this can be of major constraints to livestock productivity.

The overall prevalence of 12.25% in this study is higher than earlier reports conducted on haemoparasites of cattle in several studies in Nigeria by Agu *et al*. (1990) in Kaduna; Agu & Amadi (2001) in Ebonyi; Ademola & Onyiche (2013) in Oyo; Okorafor & Nzeako (2014) in Oyo; and Enogiomwan *et al*. (2019) in Calabar who reported prevalence of 9.4%, 3.9%, 6.67%, 5%, and 7.78% respectively in cattle. However, Adua & Idahor (2017), Kamani *et al*. (2010), Zawua *et al*. (2015) and Enwezor *et al*. (2009), reported higher prevalence of 20.1%, 25.7%, 29.9% and 13.5% across some states in Nigeria. The 12.25% haemoparasitemia observed in this study suggest an incessant challenge by parasites and existence of carrier state of most animals (Okorafor & Nzeako, 2014). The high prevalence of *Babesia* spp 6.75% and *Anaplasma* spp 5.0% recorded in this study could be attributed to the abundance of vector responsible for their transmission as both are tick-borne parasite. The fact that *Anaplasma* can be transmitted by several means (biologically by ticks and mechanically by biting flies) could have been the cause of its high prevalence in this study (Abdullah *et al*., 2019). Similar studies by Paul *et al*. (2016) in Maiduguri and Enogiomwan *et al*. (2019) in Calabar recorded prevalence of 9.9% and 5.8% of *Anaplasma* in cattle. The observed 0.25% of *Trypanosoma* was lower than the 8.4% reported by Enwezor *et al*. (2009) in Kaduna state, 8.0% by Kamani *et al*. (2010) in north-central Nigeria and 3.81% by Okorafor & Nzeako (2014) in Oyo state. The 0.25% prevalence of Microfilaria observed in the present study is lower than 1.4% reported by Kamani *et al*. (2010). Disparities in prevalence of haemoparasites of cattle recorded in this study could be attributed to the

difference in time of the study, breeds of animals sampled, differences in sample size, the diagnostic tool used, the management and nutritional status of animals sampled (Abdullah *et al*., 2019). Variations in geographical location (Velusamy *et al*., 2014) arbitrates the distribution of arthropod vectors of parasites (Agbede, 2013) and regular use of chemoprophylaxis and acricides by farmers could also account to local differences in the prevalence of haemoparasites (Ademola & Onyiche, 2013). In female 13.75% (33) than in males 10.0% (16) confirms the reports of previous studies in Nigeria (Agu *et al*., 1990, Agu & Amadi, 2001; Enwezor *et al*., 2009; Kamani *et al*., 2010 and Okorafor & Nzeako, 2014) who attribute the accumulation of parasites by the females due to the extended breeding for economic reasons such as calving and milk production. The susceptibility of cows might also be attributed to reduced immunity as a result of stress due to pregnancy and lactation (Okorafor & Nzeako, 2014). The effects of age on prevalence of haemoparasites has been previously reported (Kamani *et al*., 2010; Alim *et al*., 2012; Ademola & Onyiche, 2013; Okorafor & Nzeako, 2014; Enogiomwan *et al*., 2019). Adult and older cattle in this study had lower prevalence of haemoparasitic infection compared to their younger counterparts, which confirms report of Ademola & Onyiche (2013) who observed that prevalence of haemoparasites in ruminants decreased with increasing age. This is in contrast with report of Kamani *et al*. (2010) who reported a higher prevalence in older cattle and stated that this could be due to the fact that adults are readily more infected with haemoparasites than younger ones because of a longer period of exposure to the arthropod vectors. Restricted grazing of young animals which tend to reduce their chances of contacts with the vectors of their chances of contact with the vectors of these diseases may attributed to the lower prevalence as compared to the adult (Kamani *et al*., 2013). All the breeds examined in this study were infected with haemoparasite. This confirms the reports by Adua & Idahor (2017) indicating that there was a possibility of no breed related resistance among the animal species studied. The highest prevalence was observed in the White Fulani 37 (37.91%). This contradicts previous studies by Okorafor & Nzeako (2014) and Adua & Idahor (2017) who reported higher prevalence of haemoparasite in Sokoto Gudali and Red Bororo Breeds. Woolaston *et al*. (1991) reported that there could be genetic variations in resistance to parasites among ruminants. Therefore, a concerted effort to develop haemoparasite resistant species of cattle and goats is compulsory in order to boost animal production. Breed-related haemoparasite did not vary significantly (χ^2 = 0.441, df = 3, p > 0.05) in the study.

The result of the present study indicates that haemoparasites are prevalent among cattle in the study area affecting 12.25% of the different cattle breeds in the area. Four haemoparasites; *Anaplasma, Babesia, Microfilaria*, and *Trypanosoma* were identified. Thus, routine Screening of haemoparasites carrier status is essential for prompt diagnosis and implementation of control measures to prevent economic losses in cattle.

Conflicts of Interest

The authors declare no conflict of interest.

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