

## Prevalence of Ticks among Indigenous Breeds of Local Dogs in Kano Metropolis

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### Abstract

Ticks are one of important vectors of diseases of animals and humans, many of which are zoonotic, thus predisposing humans and animal to risk. The study was aimed to determine the prevalence of ticks among indigenous breeds of local dogs in Kano Metropolis. The study was conducted between February, 2021 and September, 2021. A total of 80 (42 male and 38 female) dogs were sampled for the study. The dogs were thoroughly examined for ticks which were collected into properly labeled plastic containers and were transported to the laboratory for identification. The result showed that 55% of the dogs were infested with ticks. From the results, more female (28.75%) were infested with tick while 18.75% of the female were non-infested. On the other hand, 26.25% of the male dog were infested where as 26.25% were non-infested. However, the infestation rate between male and female dog is significant at  $p < 0.05$ . The relevance abundance of different tick species encountered indicated that four (4) different species of tick were found. *Rhipicephalus sanguineus* was the abundant specie with total frequency of 117 which accounted for 49.6% of the total tick encountered, followed by *Haemaphysalis laechei* with 30.5%, *Boophilus decoloratus* (13.6) and *Amblyomma variegatum* recorded the least frequency 15 which accounted for 6.3%. It is concluded that tick is one of the ectoparasites infesting domestic dogs

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**Keywords:** Dogs, Kano, Nigeria, Prevalence, Ticks

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### Introduction

Ticks are vectors of important haemoparasitic diseases of dogs leading to weakness, depression, irritation and splenomegaly, surpassing all other arthropods, apart from mosquitoes, as disease agents (James-Rugu 2001). These haemoparasitic disease such as *Haemobatonella sp* and *Babesia canis* constitute some identified diseases that poses a lot of challenge to the health and productivity status of these important animal (Zelege and Beleke 2004). Africa, as in other tropical and sub

regions of the world, ticks and tick disease in addition to other socio parameters have constituted impediments to the development of the livestock industry (George, 2003).

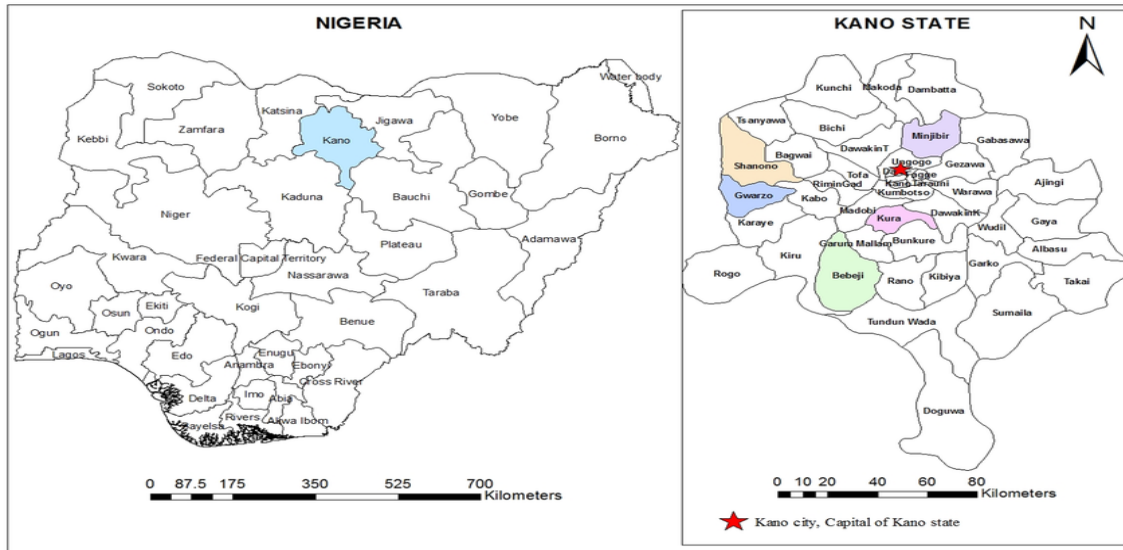
Tick is the most common ectoparasites of dogs in Nigeria, which transmit a wide range of protozoa, bacterial and rickettsial pathogens to susceptible hosts. In Nigeria, other ticks of dogs identified include; *Boophilus* spp., *Hyalomma* spp. and *Amblyoma variegatum* (Adamu *et al.*, 2014; Greay *et al.*, 2016; Abdulkareem *et al.*, 2018). However, *R. sanguineus* is the most common and its ubiquitous distribution has been facilitated by increase in dog population and movement. The distribution has been reported to be affected by season, with its abundance more prominent in the wet season. Earlier studies have reported the collection of *R. sanguineus* from both exotic and local dogs in several part of the country (Kamani *et al.*, 2013). They have been observed to infest humans in Nigeria (Okoli *et al.*, 2006), while Mediterranean spotted fever (*Rickettsia conorii*) were reported to be transmitted *R. sanguineus* in tropical and sub-tropical countries (Beninati *et al.*, 2002; Kamani *et al.*, 2013).

More than half of dogs examined in a study in Nigeria were infested with ticks (Amuta and Houmsou, 2010), but there was higher prevalence in free roaming dogs. Dogs also serve as a food source and their meat is considered as a delicacy among some groups in Nigeria. These can expose humans to zoonotic diseases emanating from tick-borne pathogens. This study was aimed to determine the prevalence of ticks among indigenous breeds of local dogs in Kano Metropolis.

## **Materials and Methods**

### **Study area**

The study was conducted in total of eight (8) Local Government Councils that makes up Kano Municipal. Kano State (figure 3.1) is located in the North-western Nigeria, it is coordinated at latitude  $11^{\circ} 30'$  N and longitude  $8^{\circ} 30'$  E (Wikipedia, 2021). It shares borders with Kaduna State to the South-West, Bauchi State to the South-East, Jigawa State to the East and Katsina State to the North. It has a total area of  $20,131\text{km}^2$  ( $7,777\text{sqm}$ ) and estimated population of 13.4 million (NPC, 2014).



**Figure 1:** Maps of Nigeria Showing Study Area

**Source:** <https://www.google.com/showing-Kano-State-local-government-areas->

### **Samples and samples collection**

This study was conducted between February, 2021 and September, 2021. Domestic dogs were sampled for this study. A total of 80 (42 male and 38 female) dogs were sampled for the study. In the study, 10 samples were screened from each Local Government under study. The age and sex of the sampled dogs were recorded, with the age been classified as either young or adult, the young dogs sampled ranged from less than one year to a year while adult dogs were from greater than one year upwards (Leticia *et al.*, 2013). Each dog was baited with meat with the assistance of the owner or handler for thorough examination of the entire body for the presence of ticks. Ticks were collected and kept in properly labeled plastic containers for easy identification and were then transported to the Biology laboratory of the Department of Laboratory Science Technology, Kano State Polytechnics for identification. The collected ticks were washed, sorted and transferred into plain plastic tubes containing 70% ethanol for preservation prior to identification. Harvested ticks were morphologically identified under the stereo microscope according to Walker *et al.* (1999).



**Figure 2:** Black dog sample



**Figure 3:** Brown dog sample

### Statistical analysis

The proportions obtained in this study were compared using Chi-square test. The confidence level for the analysis was set at 95%, and level of significant difference at  $p < 0.05$ .

### Results

#### Characteristics of dogs

The study involved total of 80 samples out of which 52.5% were males and 47.5% female. Majority of the dogs (55%) under study were young i.e. less than 1 year of age while 45% of them were above 1 year and considered as adult. Caged dog were only 33.75% and non-caged accounted for 66.25% of the total dogs.

**Table 1: Characteristics of the dog samples**

Variables	Frequency	Percentage
<b>Sex</b>		
Male	42	52.50
Female	38	47.50
<b>Total</b>	<b>80</b>	<b>100</b>
<b>Age</b>		
< 1 year (young)	44	55
> 1 year (Adult)	36	45
<b>Total</b>	<b>80</b>	<b>100</b>
<b>Caged</b>		
Yes	27	33.75
No	53	66.25
<b>Total</b>	<b>80</b>	<b>100</b>

#### Prevalence of Tick

The infestation rate of the dog with ticks is presented below. The result showed that 55% of the dogs were infested with ticks. From the results, more female (28.75%) were infested with tick while 18.75% of the female were non-infested. On the other hand, 26.25% of the male dog were

infested where as 26.25% were non-infested. However, the infestation rate between male and female dog is significant at  $p < 0.05$

**Table 2: Prevalence of Ticks based on the Sex of the dog samples**

Sex	No examined	Infested (%)	Non-infested (%)	P-value
Male	42	21(26.25%)	21(26.25%)	0.1745
Female	38	23(28.75%)	15(18.75%)	
<b>Total</b>	<b>80</b>	<b>44(55%)</b>	<b>36(45%)</b>	

### Relevance Abundance of Tick Species

The relevance abundance of different tick species encountered indicated that four (4) different species of tick were found. *Rhipicephalus sanguineus* was the abundant specie with total frequency of 117 which accounted for 49.6% of the total tick encountered, followed by *Haemaphysalis laechei* with 30.5%, *Boophilus decoloratus* (13.6) and *Amblyomma variegatum* recorded the least frequency 15 which accounted for 6.3%.

**Table 3: Relevance Abundance of Tick Species on the Dog Samples**

Species	Frequency	Percentage
<i>Rhipicephalus sanguineus</i>	117	49.6
<i>Haemaphysalis laechei</i>	72	30.5
<i>Boophilus decoloratus</i>	32	13.6
<i>Amblyomma variegatum</i>	15	6.3
<b>Total</b>	<b>236</b>	<b>100</b>

### Discussion

Ticks can parasitize every class of vertebrates in most regions of the world and occasionally bite humans. The study was aimed to determine the prevalence of ticks among indigenous breeds of local dogs in Kano Metropolis. The result showed that 55% of the dogs were infested with ticks which indicated a high prevalence of ticks among local dogs in Kano Municipal. The high prevalence of 55% from this study is very similar to the 55.4% prevalence result from Makurdi, Nigeria (Amuta and Houmsou, 2009). However, the prevalence is quite lower than a study from Ilorin and Maiduguri with 71.2% and 96.0% prevalence, respectively (Konto *et al.*, 2014; Abdulkareem *et al.*, 2018). Finding of the present study is lower than that of Kumisa *et al.* (2019) which reported 45% in Ethiopia. The higher prevalence of tick in the study area may be attributed to the hot climate with average temperature greater than 30°C, which favored tick breeding.

The result showed that 55% of the dogs were infested with ticks. From the results, more female (28.75%) were infested with tick while 18.75% of the female were non-infested. On the other hand, 26.25% of the male dog were infested where as 26.25% were non-infested. In the present study, female dogs were observed to be more infested with ticks than the male dogs. This finding was in conformity with those of Shitta *et al.* (2018) James-Rugu and Jidayi, (2004); Arong *et al.* (2011) who all reported higher infestation of tick on female dogs. On the other hand, this finding was contrary to the findings of Moghaddar *et al.* (2001); Silveira *et al.* (2009) and Akande *et al.* (2018) who reported higher infestation among male dogs. Higher infestation of ticks among female dogs in this study may be attributed to the fact that female dogs usually form a sedentary



habit during the care of their new born where they are easily infested by ticks. Another possible reason could be the feeding habit of the female dogs. They feed more than their male counterparts during pregnancy. As they search for food, they come in contact with the ticks thereby getting infested (Shitta *et al.*, 2018).

The relevance abundance of different tick species encountered indicated that four (4) different species of tick were found. *Rhipicephalus sanguineus* was the abundant specie with total frequency of 117 which accounted for 49.6% of the total tick encountered, followed by *Haemaphysalis laechei* with 30.5%, *Boophilus decoloratus* (13.6) and *Amblyomma variegatum* recorded the least frequency 15 which accounted for 6.3%. This finding agrees with the reports by James-Rugu and Idu (2008) and Shitta *et al.* (2018) who all reported the dominance of these species of ticks on dogs particularly *R. sanguineus*, in their studies. Among different species of ticks infesting dogs, the brown dog tick (*Rhipicephalus sanguineus*) is the most common worldwide (Dantas-Torres, 2010). Other ixodid ticks infesting dogs include *Haemaphysalis*, *Ixodes*, *Boophilus*, *Dermacentor* and *Amblyomma* species and occur at varying level of prevalence in different parts of the world (Ekanem *et al.*, 2010; Wells *et al.*, 2012).

## Conclusion

In conclusion, there is high prevalence of tick infestation in domestic dogs recorded in this study with a higher infestation rate in female dogs when compared to male dogs. From the study, four different species of tick were found among sample dogs with *Rhipicephalus sanguineus* having the highest frequency. It is recommended that control of ectoparasites of dogs, especially ticks which is known to be vectors of zoonotic infection is very important.

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