



## The Prevalence of Ticks Infestation of Dogs in Runjin Sambo Area of Sokoto, Sokoto State, Nigeria

S. Y. Lema<sup>1\*</sup>, A. Haruna<sup>1</sup>, J. Ibrahim<sup>1</sup> and J. Suleiman<sup>1</sup>

<sup>1</sup>Department of Biological Sciences, Faculty of Science, Sokoto State University, Sokoto, Nigeria.

### *Authors' contributions*

This work was carried out in collaboration among all authors. Author SYL designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AH and JI managed the analyses of the study. Author JS managed the literature searches. All authors read and approved the final manuscript.

### *Article Information*

DOI: 10.9734/AJRIZ/2020/v3i330092

#### *Editor(s):*

(1) Dr. P. Murali, Tamil Nadu Veterinary & Animal Sciences University, India.

#### *Reviewers:*

(1) Gayatri Gautam Varma, University of Mumbai, India.

(2) Sampath Walgama, Lethbridge College, Canada.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/58833>

**Received 08 May 2020**

**Accepted 14 July 2020**

**Published 31 July 2020**

**Original Research Article**

### **ABSTRACT**

Ticks are still considered a major cause of zoonotic diseases most especially to dogs and other related animals. This study was conducted to assess the ticks infestation of dogs in Runjin Sambo area Sokoto. The sample was collected using hand picking and hair brushing method with the assistance of dog owners. A total of sixty dogs were randomly selected in four different sub areas in Runjin Sambo. The locality, sex and age of the dogs were noted. The ticks species were identified in the entomology laboratory using key devices. Four species of ticks namely, *Amblyomma variegatum*, *Rhipicephalus pulchellus*, *Boophilus decoloratus* and *Hyalomma excavatum* were identified. The 45 (75%) of dogs were found infected with prevalence of 11.67%, 21.67%, 25.00% and 16.67% in the four sub-areas respectively. The prevalence rate of infection was 31.67% in male dogs and 43.33% in female dogs. Similarly 55.00% and 20.00% in adult and puppy dogs respectively. Tick infestation of dogs seems to be due to poor and unhygienic condition of the dogs and can be reduced by proper sanitation, improve hygiene and health education.

*Keywords: Prevalence; ticks; infestation; dogs; Runjin-Sambo; Sokoto.*

\*Corresponding author: Email: [abusalima01@gmail.com](mailto:abusalima01@gmail.com);

## 1. INTRODUCTION

Ticks are invertebrate arthropods belonging to the class arachnida. They are generally obligate and temporary ectoparasites of vertebrates, feeding on blood and tissue fluid of their hosts. They are the second most important group next to insects of arthropod vectors of diseases transmissible to animals and human beings [1]. Tick borne diseases commonly transmitted to human beings include Lyme disease, Ehrlichiosis, *Babesiosis*, Rocky mountain spotted fever, Colorado tick fever, Tularaemia, Q-fever, tick-paralysis, spotted-fever and tick – encephalitis, all caused by tick borne haemopathogens [2]. Ticks can be considered as zoonic risk because, they can not only be found outdoors, but also in homes, where they may come in contact with human being while searching for favorable environmental condition to subsist. Dogs are mainly employed as watch agents in many households [3].

Ticks are generally known to be a major transmitter of organism responsible for several disease of man and other animals. They are host specific and do not tend to leave their preferred animals. Ticks are annoying arthropods, fortunately, they are not common in clean, healthy, well-fed and well maintained companion dogs. These parasites tend to thrive mostly on debilitated dogs that are old, rundown, malnourished or poorly cared dogs, when ticks are present, they are usually found in dirty areas under matted hair around the head, ears, neck shoulder and genitalia. Ticks cause intense itchiness, constant irritation and relentless-restlessness in affected dogs. This almost always causes to lick, rub, scratch, chew and bite at affected areas. They also develop a coarse, roughened hair coat and skin redness, rawness and inflammation (dermatitis). Some dogs become lethargic, lose weight and suffer poor growth. Owners of dogs infested with ticks may notice bare patches of skin where the hair has been rubbed off a result of the comfort caused by this parasite [4].

There has been increasing interest amongst resident of Runjin sambo area of Sokoto metropolis to keep dog as pets and/or security alert, this has consequently increased the population of dogs roaming the streets. However, the prevailing socio-economic conditions have made it difficult to many dog owners to adequately provide food, shelter and basic health need for their dogs. The dogs are therefore left to

scavenge for food on the street thereby increasing interactions among themselves and increasing the risk of ectoparasities infestation. The burden of ectoparasites on dogs belonging to resource-poor communities and affluent communities has been a subjects of research interest in many part of the world [5].

Dog keeping habit in Sokoto State is mainly for gardening to a minimal extent for security purposes, in which most of them were owned but not confined. This lack of confinements exposes them to a variety of hazards and infections which include parasites and their vectors. At the same time serving as reservoirs for transmission of infections to non-infected ones and the animals they hard. Sokoto located in the Sahel region of Nigeria, is endowed with a favorable climate suitable for the proliferation of ticks and tick-borne parasites. Similarly, there is need to identify the various types of ticks that affect dogs, their rate of infestation and also to provide possible ways of preventing and controlling the parasite [6]. This research work is therefore aimed at investigating the prevalence of ticks of dogs in Runjin Sambo area, Sokoto.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

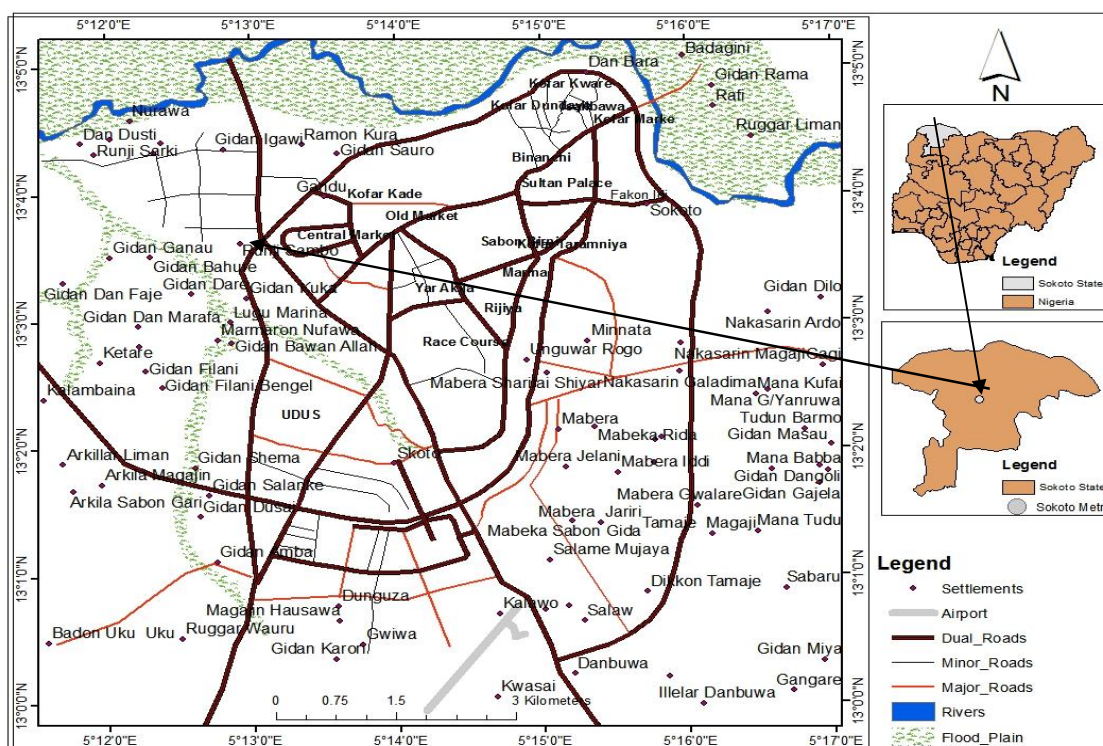
This study was conducted in Runjin-Sambo area Sokoto. Runjin-sambo is a highly populated area located in Sokoto North local government area of Sokoto state with about 268 m (879.27 ft) in length. The area (Runjin-sambo) was sub-divided into four (4) different sub-areas namely; Federal Housing estate, Gidan Igwai, Kato Bokwai, and Kangiwa housing estate at the course of the study. Rujin-sambo lies approximately between latitude 13.06 and longitude 5.20 and bearing 241 WSW as seen in Fig. 1. The people residing in the study area were mainly civil servants, however, some hunters and fisher men were also found the study area.

### 2.2 Study Population

A total of sixty (60) dogs were randomly selected for this study from Runjin Sambo area within Sokoto metropolitan, Sokoto State, Nigeria.

### 2.3 Study Design

This is an observational cross section study aimed at determining the prevalence of tick infestation of dogs in Runjin Sambo area,



**Fig. 1. A map of Sokoto metropolis showing Runjin Sambo area**  
 Source: Arc GIS. Drawn by GIS lab. Department of Geogaphy UDUS 2019

Sokoto. The research was conducted during the rainy season from March to November 2019. The procedure was explained to all the owners of the dogs and were each given the consent form to sign. Questionnaires were distributed to generate information on the bio-data of the dogs [7].

## 2.4 Sample Collection

Ticks were collected from dogs with the assistance of the Dog owners, Ticks were collected using the hand picking, and hair brushing, methods [8]. The entire Dog body was inspected and brushed with special attention paid to the ears, the area around the eyes, the axillae and the groin and other anatomical areas of the dog body as recommended by [9].

A total of 60 randomly selected dogs were examined which varies in colour, ages and sex from 4 different sub-areas in the study area. At least 15 dogs each were examined on different visit in each sub-area. All the selected dogs were examined for ticks through out there body. Dogs on which at least one tick was found were considered positive. Maximum care have been taken when collecting the ticks, because not all

dogs could allow removal of the ticks without reacting. For this reason, the dog attentions were diverted by giving them some food and sometimes playing with them with the assistance of the owners. Care was also taken in removing the parasite from the site of infection to avoid damaging them or losing their appendages as described by [3].

## 2.5 Ticks Identification

After collection, ticks were immediately transferred to specimen bottles which contain chloroform with the use of a dropper to prevent the ticks from constricting or breaking any of their appendages. The specimen was later preserved by a dilution of 10% formalin and 90% distilled water using a measuring cylinder and thoroughly mixed together. The diluted formalin was thus applied/put in each specimen bottle (about 4-8 drops) for a long lasting storage before identification/examination. After some days of preservation, the ticks were later put inside the Petri dish and later placed on a glass-slide with the use of a fine forceps for magnified identification using a compound microscope as described by [1].

## 2.6 Statistical Analysis

Data were analyzed using simple percentage and the prevalence values within each factor (Sex, Age, Location, Tick species and predilection sites of ticks on dogs) were statistically compared using chi-square test at  $P < 0.05$  significance level [9].

## 3. RESULTS

### 3.1 Prevalence of Ticks in the Study Area

Table 1 shows the distribution of ticks according to the number of dogs in the study area. Out of the 60 dogs examined, 45 (75%) were found positive with ticks. Where Kato-Bakoi recorded the highest prevalence (25%) followed by Gidan-Igwai (21.67%), Kangiwa housing estate (16.67%) while Federal housing estate has the lowest prevalence (11.67%). Statistically the result shows significant differences as seen in Table 1.

### 3.2 Prevalence of Ticks According to Sex of Dogs

Table 2 shows the distribution of ticks according to sex of the dogs. Out of 45 dogs tested

positive. The result shows that, females has the highest prevalence 26/60 (43.33%) and male were 19/60 (31.67%). The result statistically shows a significant difference as seen in Table 2.

### 3.3 Prevalence of Ticks According to Age of Dogs

Table 3 shows the distribution of ticks according to age of the dogs. Adult 33/60 (55.00%) has the highest rate of the infection and Puppy 12/60 (20.00%) has the lowest rate of parasite. Statistically the result shows insignificant difference as seen in Table 3.

## 4. DISCUSSION

From the results, one can see that three (3) out of four (4) areas are highly infected with ticks because of the areas being dirty (unhygienic condition) and the dogs are not looked after in respect to food and shelter. This is similar to the findings of [6] who reported that higher rate of tick infestation is due to unhygienic condition of the area. This is because 75% of them are street dogs. It is also clear from the results that the density of ticks found on different part of the host body also varies considerably. About 68% of the

**Table 1. Prevalence of ticks in the study area**

Sample Areas	No of Dogs Sampled	No Positive (+)	Prevalence (%)
A (Federal Housing)	15	7	11.67
B (Gidan Igwai)	15	13	21.67
C (Kato Bakwai)	15	15	25.00
D (Kangiwa Housing)	15	10	16.67
Total	60	45	75.00

$$\chi^2 = 7.8147, P = 0.3523, DF = 3$$

❖ Significant

**Table 2. Prevalence of ticks according to sex of the dogs**

Sex	No Examined	No Positive (+)	Prevalence (%)
Male	23	19	31.67
Female	37	26	43.33
Total	60	45	75.00

$$\chi^2 = 3.8415, P = 0.2967, DF = 1$$

❖ Significant

**Table 3. Prevalence of ticks according to age of dogs**

Age	No Examined	No Positive (+)	Prevalence (%)
Adult	41	33	55.00
Puppy	19	12	20.00
Total	60	45	75.00

$$\chi^2 = 3.8415, P = 0.0017, DF = 1$$

❖ Insignificant

total percentage of ticks collected were located in two (2) major areas namely pinnae (ear belly) and back (abdomen). The result of the parts recorded very low percentage, especially the face with about 14%. The high density of ticks recorded in these to region i.e pinnae (ear belly) and back (abdomen) may be probably due to the fact that, the two regions are very much protected against excessive heat (sun) and desiccation, thus provide absolute conducive environment to the ticks. Also, these regions come in contact with the ground when the animal is resting. This agreed with the findings of [4]. As a result, the larval, nymph, and adult stage of the ticks which have dropped to moult on the ground can easily get access to the host. These parts are also less hairy as compared to other; the ticks find it very easy to attach themselves to these parts. Moreover, capillaries here are superficial which enable them to suck blood easily. The ticks found on the dog legs were very few and this may be because bones are found in the leg region which hindered ticks from attaching themselves to this area.

There are various techniques in getting rid or reducing the population of ticks with varying degrees of success. This can be divided into behavioural/physical techniques and chemical techniques. The formal involve maintaining animals (dogs) in an uncrowded/hygiene condition to prevent the rapid spread of ticks. Chemical that kills ticks are called acaricides and its product is widely currently available. Acaricidal dusts, powders, ear tags, tail tags, collars, pours-ons, shampoo and tropical lotions are widely used veterinary products. Infected dogs destined to be incorporated into established herds or colonies should be quarantined until their ticks have been totally eradicated. Ticky dogs should be treated weekly for 2-4 weeks and their caging or bedding should be disinfected simultaneously [4]. Treatment with insecticides such as Carbaryl, Cypermethrin, Deltamethrine, Cyfluthrin, Diazinon, Lindane and Melathion is usually efficacious. Resin strip impregnated with insecticides can be used as neck collars, eggs tags, tail tags, or gut boluses or can simply be added to cages to control ticks. The chief effects of ticks on their host are due to the irritation, loss of weight, disease etc that they caused. They are most numerous in the water, possibly because of longer hair on the hosts coat closer contact of animals and also lack of general vigor. The host became restless and not feed or sleeps well and they may damage their hair by biting and scratching the parts of their bodies irritated

by the ticks and also the scratching may produce wounds or bruises on the host [2].

## 5. CONCLUSION

Ticks are the important vectors of a wider variety of pathogenic agents than any other group of arthropods. Based on the result, it is concluded that the prevalence of tick infestation in dogs in the study area is generally higher because most of the areas is unhygienic. Identified risk factors (age, sex etc) should enable veterinaries to prevent tick infestation in stray dogs although differences in risk of tick infestation may be related to outdoor activity of dogs in these areas.

## 6. RECOMMENDATIONS

It is therefore recommended that;

1. Individuals who manage dogs at homes should maintain the rules of their management by keeping their kennels clean and provides them with healthy foods and drinks.
2. Pets' dogs should be restricted from moving to dirty areas by providing adequate and clean kennels for them.
3. Also, proper quarantine measures should be taken by government on both the internal and external movement of dogs, to avoid mass spreading of the ticks to the non infected ones.
4. Excessive measures should be taken to establish the roles of ticks as vectors of diseases.
5. Campaign and Enlightenment programmes informing the general public on the importance of good maintenance, government sanction, policy and routine vaccination of dogs should be encouraged.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

Animal Ethic committee approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Adams DR, Anderson BE, Ammirati CT, Helm KF, Identification and disease of common U.S. ticks. *The Internet Journal of Dermatology*. 2003;2:12-15.
2. Bruno C. Tick-borne infections in dogs: An emerging infectious threat. *Veterinary Parasitology*. 2011;197:294-301.
3. Bryson NR, Horak IG, Hohn EW, Louw P. Ectoparasites of dogs belonging to people in resource poor communities in North West Province, South Africa. *Journal of South Africa Veterinary Association*. 2000; 71:175-179.
4. Dryden MW, Payne PA. Biology and control of ticks infesting dogs and cats in North America. *Vet Therapeutics*. 2004; 26:4.
5. Ekanem MS, Mbagwu HOC, Opara KN, Agbata QC. Tick infestation of domestic dogs (*Canifamiliaris lupus*) in UYO, Akwa Ibom State, Nigeria. *World Journal of Applied Science and Technology*. 2010;2 (2):191-196.
6. James-Rugu NN. A survey of ticks and tick borne parasites of sheep and goats from bassa local government area of plateau state, Nigeria. *Journal of Pure and Applied Sciences*. 2000;1:35-43.
7. Okubanjo OO, Adeshina OA, Jatau ID, Natala AJ. Prevalence of *Babesia canis* and *Hepatozoon canis* in Zaria Nigeria. *Sokoto Journal of Veterinary Science*. 2013;12:89-110.
8. Schlze TL, Jordan RA, Schluze CJ, Mixson T, Papaero M. Relative encounter frequencies and prevalence of selected *Borrelia*, *Ehrlichia*, and *Anaplasma* infections in *Ambomma americanum* and *Ixodius scapularies* (Acari:ixodiade) ticks from central New Jersey. *J. Med Entomol*. 2005;42(3): 450-6.
9. Silveria JA, Passos LM, Ribeiro MF. Population dynamics of *Rhipicephalus sanguineas* (Latrielle, 1806) in Belo Horizonate, Minas Gerais state Brazil. *Veterinary parasitology* 2009;161:270-275.

© 2020 Lema et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:  
<http://www.sdiarticle4.com/review-history/58833>