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Assessment of tick infestation rate among local and exotic dog breeds in Kano municipal, Kano state, Nigeria

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Abstract

Presence research was designed to carry out assessment of ticks infestation rate and risk factors among local and exotic breed of dogs with the aims of determining the prevalence of ticks infestation and its demographic factors among local and exotic breed of dogs in Kano. Total of six hundred and five (605) dogs were sampled. The breed, age, sex and months were recorded. The overall Infestation of ticks in the 605 dogs examined was 352 (58.1%). Breed wise, Ticks prevalence was recorded higher in local breed 74.7% than exotic breed 33.1%. Sex wise, tick prevalence was higher in male dogs than female. Age wise, there was high infestation rate of ticks in adult dogs 81.5% than 31.0% young dogs. Prevalence of ticks was higher in the month of December 62.4% and January 58.5% followed by February 55.1%, November 57.4% and October 53.3%. Two genera of ticks were identified with *Boophilus* (91.6%) having the highest prevalence followed by *Rhabicaphalus* (8.3%). In conclusion, the overall tick's infestation rate is very high compared to other studies. Regular and effective medical care, improve hygiene and fumigating there environment with effective acaricide will help control ticks and a tick borne disease is recommended.

Keywords: Ticks, infestation, assessment, dogs, breeds

1. Introduction

Ticks as obligate haematophagous arthropods and have been said to be next in importance only to mosquitoes among arthropods as vectors of bacterial, viral, and protozoan disease agents (Opara & Maxwell, 2012) [11]. Ticks can parasitize every class of vertebrates in most regions of the world and occasionally bite humans (Parola & Raoult, 2001) [13]. They attach to hosts for a substantial amount of time allowing sufficient opportunity for disease transmission (Parola & Raoult, 2001, Liyanaarachchi *et al.*, 2015) [13, 10]. This makes their presence a potential risk for disease spread (Salih *et al.*, 2015) [16]. Ticks are important vectors of diseases of dogs and humans, many of which are zoonotic (Otranto *et al.*, 2009; Singla *et al.*, 2016) [12, 17]. Ticks have the potential to transmit a range of zoonotic pathogens among which tick-borne encephalitis, Lyme disease, rickettsiosis, and ehrlichiosis are emerging as international human health threats (Hudson *et al.*, 2002; Sumbria *et al.*, 2016) [6, 18]. These arthropods can also harbour blood parasites such as intraerythrocytic Babesia species, Rocky Mountain spotted fever, granulocytic anaplasmosis and tularaemia. Tick bites cause irritations, redness, swellings, itching and self-trauma. One of the most harmful impacts of tick bites is the release of neurotoxins from the tick saliva leading to tick paralysis, systemic illness and hypersensitive reactions (Taylor *et al.*, 2007) [23].

In general, different parasitic infestations including tick infestations are prevalent in stray and hunting dogs (Sahu *et al.*, 2013) [19]. Many dimensions of tick development, behavior and disease transmission are directly linked to environmental conditions (Singh *et al.*, 2000) [20]. Climatic conditions in the hot humid southwest Nigeria favor the growth and multiplication of parasites including arthropods. Higher temperatures yield faster development rates of larvae, nymphs, and adults, with the precise rate of development varying depending on stages and species. Diapause, or a period of rest between stages, has latitudinal relationships

corresponding to photoperiod in the tropics and temperature-linked physiological aging in temperate regions (Randolph, 2004; Sumbria & Singla, 2017) [14, 22, 17]. Among different species of ticks infesting dogs, the brown dog tick (*Rhipicephalus sanguineus*) is the most common worldwide (Agbolade *et al.*, 2008, Troyo *et al.*, 2009; Dantas-Torres, 2010) [2, 24, 3]. 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 (James-Rugu & Jidayi, 2004, Ekanem *et al.*, 2010; Wells *et al.*, 2012) [8, 4, 25]. *Otobius megnini* is the only soft tick specie found in dogs (Soundararajan *et al.*, 2000) [21]. As this may serve as vectors for the spread of diseases, this present study was conducted to assess the tick's infestation among local and exotic breed of dogs with the aim of determining the tick's infestation rate and it's species in dogs.

1.1 Statement of the problem

Dogs can be described as man's best animal friend. They are kept as pets and also used for many different purposes such as guarding and hunting. This creates a bond that brings man into constant contact with dogs thereby forming a special form of relationship between them. In such relationships, health issues may sometimes become paramount especially when it comes to zoonotic diseases. Tick infestation in dogs predisposes them to a number of diseases which may sometimes be of zoonotic importance and may make their presence a potential risk for disease spread (Salih *et al.*, 2015) [16]. Ticks are important vectors of diseases of dogs and humans, many of which are zoonotic (Otranto *et al.*, 2009; Singla *et al.*, 2016) [12, 17]. Ticks have the potential to transmit a range of zoonotic pathogens among which tick-borne encephalitis, Lyme disease, rickettsiosis, and ehrlichiosis are emerging as international human health threats (Hudson *et al.*, 2002; Sumbria *et al.*, 2016) [6, 18].

3. Results

Table 1: Prevalence based on breed

Breeds	Number of Dogs Examined	Percentage	Infected Dogs	Percentage
Exotic	241	39.8%	80	33.1%
Local	364	60.1%	272	74.7%
Total	605	100%	352	58.1%

Out of 605 dogs sampled comprising of local breed 364 (60.1%) and exotic breed 241 (39.8%). 352 (58.1%) were found to harbour ticks. Breed wise, ticks infestation rate was

Considering the intimacy of man to dogs as well as the threat posed by tick induced zoonotic diseases especially in Kano necessitated the conduct of this research aimed at assessing the prevalence rate of tick infestation among both local and exotic breeds as well as assessing the common tick genera affecting the dogs.

2. Methodology

2.1 Study Area

Assessment of tick's infestation rate among local and exotic breed of dogs was carried out in Kano municipal of Kano state, Nigeria. Kano state is located in north-western part of Nigeria and lies between latitude 12° 00' 0.43" N and longitude 8° 31' 0.19" E.

2.2 Ticks Collections

Samples of the ticks were collected from 605 dogs comprising of 364 local breeds as well as 241 exotic breeds brought to Gwale and Kundila Veterinary Clinics for medical consultation while the laboratory identification of the ticks was carried out at the Department of Veterinary Parasitology and Entomology laboratory, University of Maiduguri. Characteristics observed and recorded for each tick included age, Sex and breed (Local and exotic breed). Sex differentiation was based on appearance of external genitalia while breed identification was based on morphology. Ticks were collected from all infected body of dogs using forceps and preserved in labelled bottles containing 1% formalin.

2.3 Tick identification and Data analysis

The ticks collected were then transferred into petri dish and Microscopic examination was done using proper keys. Permanent mounts of ticks were prepared on glass slide using Canada balsam as sticking agent. A cover slip was applied over the slide to make it permanently mounting. Data obtained was analysed using descriptive statistics basically frequency and percentages.

significantly higher 272 (74.7%) in local breed of dogs than exotic breed of dog 80 (33.1%) was presented in above table 1.

Table 2: Prevalence based on Age and Sex

		Number of Dogs Examined (%)	Percentage	Infected Dogs	Percentage
Sex	Male	409	67.5%	240	58.6%
	Female	196	32.3%	112	57.1%
	Total	605	100%	352	58.1%
Age					
	Adult	325	53.6%	265	81.5%
	Young	280	46.2%	87	31.0%
	Total	605	100%	352	58.1%

Sex wise, ticks infestation rate among male and female dogs was significantly recorded higher in male 240 (58.6%) than female 112 (57.1%). Age wise, ticks infestation rate was

higher 265 (81.5%) in adults than young 87 (31.0%) was presented in above table 2.

Table 3: Monthly prevalence rate

Months	Number Examined (%)	Number infected	Percentage
October	75	40	53.3%
November	101	58	57.4%
December	165	103	62.4%
January	157	92	58.5%
February	107	59	55.1%
Total	605	352	58.1%

Ticks infestation rate was recorded higher in the month of December 103 (62.4%), January 92 (58.5%), February 59

(55.1%), November 58 (57.4%), and October 40 (53.3%) respectively was presented in above table.

Table 4: Tick genera identified

Breeds	Number of ticks harvested	Rhabiccephalus	Percentage	Boophilus	Percentage
Exotic	1,610	184	11.4%	1,426	88.5%
Local	4,440	322	7.2%	4,118	92.7%
Total	6,050	506	8.3%	5,544	91.6%

The various general of ticks among local and exotic dog breeds was presented in table 4. Two genera were identified in this research *Rhabiccephalus*, and *Boophilus*.

4. Discussion

Ticks infestation among local and exotic breed of dogs in this study was 58.1% this was higher than 52.3% (Ekanem *et al.*, 2010) [4], and 56% (Akande *et al.*, 2018) [1] in Nigeria. Infestation rate in this study was higher than 55.3% (Rani *et al.*, 2011) [15] in India and 46% (Sahu *et al.*, 2013) [19] in Bhubaneswar. This finding may be due to poor attention given to the dogs by the owners and seasonal activity of the ticks in the environment. In local and exotic dog breeds, this research recorded highest prevalence rate in local dogs breeds 272 (74.7%) than exotic dog breeds 80 (33.1%). These coincide with report by Akande *et al.*, (2018) [1] who reported high prevalence on indigenous breed of dog. This may be attributed by poor attention given to local breed of dogs and allowing them to go for hunting and move freely without control. With respect to sex, this finding recorded highest infestation rate in 240 (58.6%) male dogs than female dogs 112 (57.1). This finding is similar to the work done by Akande *et al.*, (2018) [1] who observed highest prevalence in male dogs than female dog. This Finding contrast to the report by Konto *et al.*, (2014) [9] who reported that female dogs are more infected than male. This may be due to the fact that male dogs usually move and roam around in search of female dogs for sexual intercourse as a result of which they can come into contact with ticks easily. Ticks infestation was significantly recorded higher in adult dog 265 (81.5%) when compared to the young dog 87 (31.0%). This finding is similar to the report by Akande *et al.*, (2018) [1], James-Ragus, (2001) [7], Shittu, (2009) and Arong *et al.*, (2011) who observed that adult and adolescent dogs were more infested by ticks than young animals. In this study, among these two genera of tick encounter, *Boophilus* (99.6%) was found to have the highest prevalence followed by *Rhabiccephalus* (1.3%). This finding is similar to work done by Konto *et al.*, (2014) [9] who reported highest prevalence of *Boophilus* (88.0%). Ticks infestation rate in different month was recorded higher in the month of December followed by January, February, November, and October with prevalence of 62.4%, 58.5%, 55.1%, 57.4% and 53.3% respectively. This finding contrast with the report by Konto *et al.*, (2014) [9] who reported highest prevalence in August 11.3% and September 11.2%.

5. Conclusion

This research revealed the overall tick's prevalence in Kano is very high with male 58.6%, adult 81.5%, local breed (74.7%) and *Boophilus* (91.6%) genera having the highest tick prevalence. Based on the results presented here, it can be concluded that local breeds of dogs were mostly infected (74.7%) more than the exotic breeds. This may be attributed to the fact that exotic breeds might be receiving the required care in terms of feeding and medication more than the local breeds. Similarly, infection rate found to be higher among adult dogs could also be attributed to their increased movement more than the younger ones especially in terms of hunting and interaction with other dogs. Prevalence rate was found to be higher in the month of December through January and continued to decrease through February. This could possibly be because the month of December happens to be the wettest which favours the growth and spread of these parasites.

6. Recommendations

Based on the conclusion drawn from the results obtained, the following recommendations are proffered:

1. Improved hygiene
2. Good feeding
3. Controlled interaction with other dogs
4. Regular and effective medical care
5. Fumigating there environment with effective acaricide will help control ticks and tick borne diseases

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Female *Boophilus*

B. Male *Boophilus*



C. Ticks infestation

D. Tick infestation

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