

Tick Infestation of Cattle in Three Markets in Makurdi, North-Central, Nigeria

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To cite this article:

Obadiah Happiness Igwe, Onah Isegbe Emmanuel, Ugochukwu Joy Uju, Gbinde Alfred Kegnhen. Tick Infestation of Cattle in Three Markets in Makurdi, North-Central, Nigeria. *American Journal of Entomology*. Vol. 1, No. 1, 2017, pp. 6-10.
doi: 10.11648/j.aje.20170101.12

Received: April 27, 2017; Accepted: May 5, 2017; Published: June 28, 2017

Abstract: Ectoparasites infestation is one of the major veterinary problems affecting livestock industries in Nigeria. A survey of tick infestation was carried out on cattle reared in three popular cattle markets in Makurdi, Benue State, Nigeria. 1959 ticks were recovered from the 142 cattle examined. Types of ticks found were *Boophilus decoloratus* 66(3.4%), *Amblyomma variegatum* 1090(55.6%), *Hyalomma spp* 8(0.4%) and *Boophilus microplus* 795(40.6%). The infestation of ticks in North bank cattle market was highest 870(44.4%) compared to Wadata market 838(42.8%) and Oracle farm 251(12.8%). *Hyalomma* species was recorded as the least abundant. There was no observed significant difference ($P > 0.05$) in the rate of infestation according to sex of the cattle. The high prevalence of tick infestation recorded in this research has serious economic implication as it has the potential of inflicting pathological effect on both cattle and humans. There is the need to create awareness among livestock owners on the effects of tick infestation and the need to improve animal health extension services in Nigeria.

Keywords: Cattle, Tick, *Amblyomma*, Infestation, Makurdi

1. Introduction

Ticks are obligate ectoparasites, they infest a variety of vertebrate hosts and are worldwide in distribution [1]. The medical and economic importance of ticks has been recognized a long time ago, to be worldwide and due to their ability to transmit diseases to humans and animals. The major losses caused by ticks are due to their ability to transmit pathogens such as: protozoan, rickettsia and viral diseases of livestock [2].

Ticks as the most important pests of cattle and other domestic species of tropical and subtropical countries, serving as vectors of pathogenic microorganisms such as protozoans (*Babesiosis*, *Theileriosis*), rickettsiae (*Anaplasmosis*, *ehrlichiosis* and typhus) and viruses (kyasanur forest disease) [3]. Ticks are hematophagous arthropods belonging to the phylum: Arthropoda; class: *Arachnida*;

order: *Acari* and three major families viz: *Ixodidae* (hard ticks), *Argasidae* (soft ticks) and *Nuttallellidae* (of which little is known about), with approximately 899 species [4].

Ectoparasites infestation is one of the major veterinary problems affecting livestock industries in Nigeria and other parts of the world. Ticks act not only as potential vectors but also as reservoirs of certain infectious agents such as *Pasteurella multocida*, *Brucella abortus* and *Salmonella typhimurium* in man and animal [5].

Weight loss, low hide quality and reduced milk production are direct consequences of ectoparasitism in domestic animals [6]. Tick infestation affects appetite, body condition, blood composition and respiratory rate of animals [7]. Feeding by large number of ticks causes reduction in weight and anaemia among domestic animals. Apart from irritation or anaemia in case of heavy infestation, ticks can cause severe dermatitis. These parasites generate direct effect in

cattle in terms of milk production and reduced weight gain [8]. The systemic effects of tick bites can be extremely serious. Many species of ticks can cause debilitating or even fatal paralysis in their hosts [9].

Livestock production is a source of employment and livelihood in Nigeria. A large percentage of rural people satisfy their subsistence need through livestock production. It involves rearing and marketing of livestock which include mainly cattle, sheep, goats, pigs, camels and poultry but the cattle are the most prominent of all domestic animals in Nigeria [10]. Pests and diseases are the greatest threats to the realization of the productivity of potentials of the cattle herds in Nigeria amongst which tick constitute 80% of the infections and disease [11].

Heavy infestation of ticks causes severe irritation which makes the animals to rub and scratch the skin that might result in loss of hairs. Tick bite causes discomfort and damage to the hides and skin which constitute one of the most profitable raw materials in Nigeria for making bags, shoes, wristwatches, mats and leather cloths leading to loss of these materials. Too often cattle farmers tend to regard tick infestation as a minor problem of cattle but it is really a serious problem [9]. Tick infestation in cattle in Nigeria and around the globe has been on the increase [12].

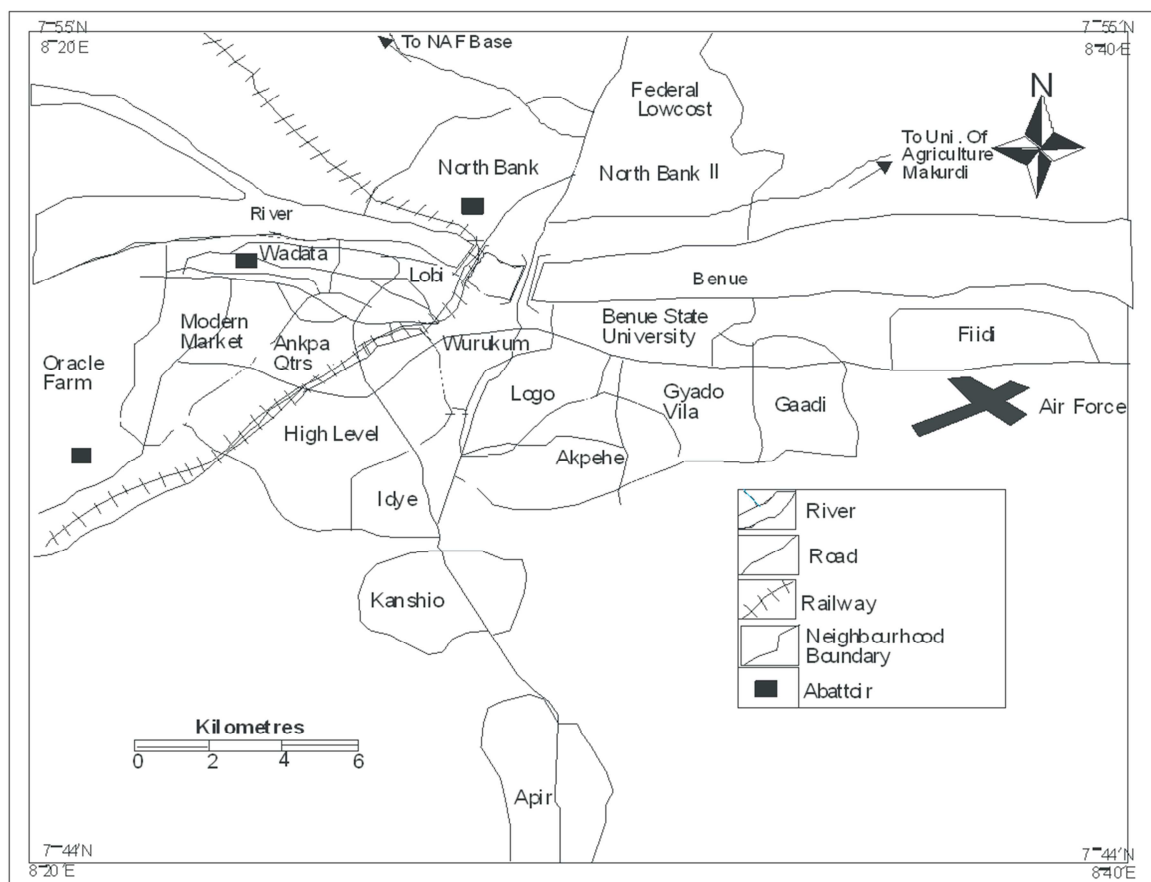
With the background knowledge of the debilitating effects of tick on livestock production and cattle in particular and with the increasing rate of cattle rearing across Nigeria, it is

important to survey the infestation of ticks in some markets where cattle are sold to update the information status in these areas. This will support enlightenment campaigns against the spread infestation among cattle farmers.

2. Materials and Method

2.1. Study Area

This study was carried out in Oracle farm, North bank cattle market, and Wadata Market, all in Makurdi Benue State, Nigeria. Benue State is located in the middle belt area of Nigeria and is bordered by Nassarawa State to the North, Taraba to the East, Ebonyi and Cross River to the South and Kogi State to the West. These areas are characterized by warm climate with mean annual temperature range of 35°C - 21°C in the rainy season and 37°C-16°C in the dry season, respectively. The town is located in latitude 7°30':7°23'N and longitude 8°30':8°35'E. Annual rainfall ranges from 150mm - 180mm. Maximum precipitations occurs during the months of June through August, with minimum rainfall in October and November. Benue State is in rainforest zone of Nigeria. These areas were chosen because of their popularity in cattle rearing and are good for agricultural activities. All kinds of farming thrive in these areas, although majority of farmers are into subsistence farming.



Source: Ministry of Lands and Survey Makurdi

Figure 1. Map of Makurdi showing the sampling sites.

2.2. Sample Collection

142 cattle were randomly selected from the sampling sites and ticks were collected using the hand picking and hair brushing methods. All parts of the body of the cattle were examined by parting the hair on the skin using brush. Precautions were taken to avoid damage to the body parts of the ticks and skin of the host. Specimens collected were put in folded white paper. The specimen containers were labeled indicating: breed of cattle, site of tick location on the body of the animal and sex. Ticks collected were transferred to the laboratory in labeled specimen bottles containing 70% alcohol [12].

2.3. Morphological Identification

Samples were taken to the Veterinary Anatomy laboratory of the Federal University of Agriculture Makurdi, for identification. The ticks were placed in a petri dish with the aid of forceps. The samples were examined with a USB digital microscope X 200 (made in China). Identification key of morphological characters was used to identify the ticks [13].

2.4. Statistical Analysis

Prevalence was presented as simple percentages. Chi Square and ANOVA were used to compare means (SPSS-Statistical Package for Social Sciences version 21.0). P-values less than 0.05 were considered significant.

3. Results

1959 ticks were recovered from the 142 cattle examined. The tick species identified were *Boophilus decoloratus* 66(3.4%), *Amblyomma variegatum* 1090(55.6%), *Hyalomma spp* 8(0.4%) and *B. microplus* 795(40.6%)

(Table 1). In relation to the sex of the cattle, males had a higher infestation rate of 73(72.3%) compared to the female cattle 27(65.9%) (Table 2). However, there was no observed significant difference ($P > 0.05$) on the rate of infestation among the sex. Cattle aged 1-2 years had the highest infestation of 82(57.7%) compared to ages 3-4 years 44(31.0%), 5-6 years 11(7.7%) and 7-8 years 5(3.5%) (Table 3). The prevalence of tick infestation was significant ($P < 0.05$) among the different age groups (Table 3). The infestation of tick in North bank cattle market was highest 870(44.4%) compared to Wadata market 838(42.8%) and Oracle farm 251(12.8%) (Table 4).

Table 1. Prevalence of tick species in cattle in Makurdi Metropolis.

Tick Species	Number recovered	Prevalence (%)
<i>Amblyomma variegatum</i>	1090	55.6
<i>Boophilus decoloratus</i>	66	3.4
<i>Hyalomma spp</i>	8	0.4
<i>B. microplus</i>	795	40.6
Total	1959	100.0

Table 2. Prevalence of tick infestation in relation to sex of the cattle.

Sex	No Examined	No Infested (%)
Male	101	73(72.3)
Female	41	27(65.9)
Total	142	100

$P > 0.05$

Table 3. Prevalence of tick infestation in relation to age.

Age (in years)	No. Examined	No. Infested (%)
1-2	82	82(57.7)
3-4	44	44(31.0)
5-6	11	11(7.7)
7-8	5	5(3.5)
Total	142	142(100.0)

$P < 0.05$

Table 4. Prevalence of tick infestation in relation to location.

Location	Species (%)				Total (%)
	<i>A. variegatum</i>	<i>B. decoloratus</i>	<i>Hyalomma spp.</i>	<i>B. microplus</i>	
Wadata Market	32(3.8)	804(95.9)	2(0.2)	0(0.0)	838(42.8)
Oracle farm	34(13.5)	213(84.9)	4(1.6)	0(0.0)	251(12.8)
N/bank cattle market	73(8.4)	0(0.0)	2(0.2)	795(91.4)	870(44.4)
Total	139	1017	8	795	1959

4. Discussion

The findings in this study showed that *B. decoloratus*, *A. variegatum*, *Hyalomma spp*, and *B. microplus* where the tick species infesting cattle in Makurdi metropolis and it is in line with reports from other parts of Nigeria. These 3 tick species in addition to *Dermacentor variabilis* were identified in Borno and Yobe States, Northeastern Nigeria and South-western, Nigeria, South-western Nigeria and North central Nigeria [14, 15, 16, 17 and 18]. They identified and described them as vectors of livestock and haemoparasitic

diseases. Similar observations were reported from other parts of the world [19, 20].

The highest percentage abundance of *Amblyomma* species recorded for both breeds of cattle in this research was to be expected because it has been established in literature that it is the most important species of the African continent, being adapted to domestic livestock and widespread throughout tropical and sub-Saharan Africa. Males were found to have a high tick infestation rates compared with the female cattle. This results agrees with reports by Hitchcock [14] who reported that males are more infested with ticks than female cattle, because most of the males in the tropics are mainly

used for most of the farming activities and moved from place to place in search of food and in the process get infested with ticks, while the females are mainly confined for breeding purposes and therefore are less exposed to tick infestations in the tropics [14].

Larvae of ticks are known to climb blades of grasses and shrubs to attach themselves to passing hosts mostly males during grazing [21]. However, it is not in agreement with some other reported works [20, 22, 23] where they reported a significantly higher prevalence of ectoparasitic infestations in female than the male cattle.

Infestation rate was higher in younger animals aged ≤ 3 years and the lowest was seen in older animals aged > 7 years. This is in concordance with the work of Manan [24], who found that resistance in the animals was building up as the animals grow up and the animals became more resistant and adoptable than in younger stage irrespective of the farm species.

The infestation of ticks in Wadata market was higher than that of Oracle farm, probably because the vegetation and dirty environment where the ticks thrive are readily found in Wadata market area than in Oracle farm with a cleaner environment, more so, the farm is owned by an individual who takes care of the environment. *A. variegatum*, *B. decoloratus* and *H. marginatus* (hard ticks) have been identified to be prevalent among cattle in Wadata Market and Oracle Farm. Similar findings were reported a prevalence of (61.1%) of hard tick [9]. The study attributed the prevalence of *Ixodid* ticks to favourable climatic conditions such as moisture provided by light and moderate rainfall. In the same vein, the high prevalence of ticks recorded in this research could be due to similar favourable climatic condition in Makurdi metropolis.

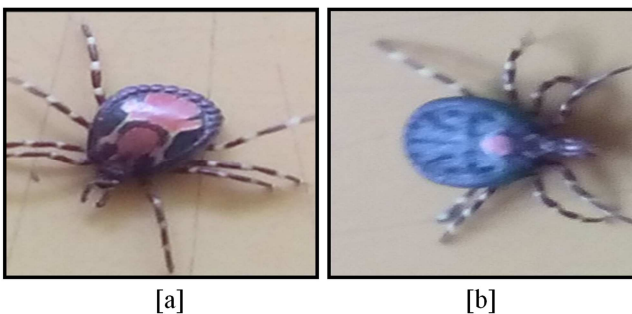


Figure 2. *Amblyomma variegatum*. Female [a] and male [b].



Figure 3. *Boophilus decoloratus*.



Figure 4. *Hyalomma marginatum*.



Figure 5. Tick infestation in the skin of white Fulani cattle in Wadata market in Makurdi metropolis.

5. Conclusion

This study recorded a high tick infestation rate in Makurdi, with, North bank cattle market recording the highest prevalence 870(44.4%). This may be as a result of the vegetation and dirty environment where the ticks thrive. Four species of tick namely; *A. variegatum*, *B. decoloratus*, *Hyalomma spp* and *B. microplus* were identified with *A. variegatum* having the highest prevalence 1090 (55.6%). *B. microplus* was only found on cattle in North bank market. Younger cattle have a higher prevalence of tick infestation than adult and older cattle. This may be because they have a softer skin than the adult. There is non-significant different in their sex ($p>0.05$). Tick infestation can cause damages to the hides and skin of cattle. The high prevalence of tick infestation recorded in this research has serious economic implication as it has the potential of inflicting pathological effect on both cattle and humans. There is the need to create awareness among livestock owners on the effect of tick infestation and the need to improve animal health extension services. Good sanitation habit should be ensured at all times across markets in Makurdi. More elaborate survey of tick infestation should be carried out in Makurdi Local Government Area (LGA) to establish the level of prevalence of tick infestation in a broader sense.

Acknowledgements

The research team is most grateful to all the staff of Department of Biological Sciences, Benue State University, for all the support rendered. Also worthy of thanks is Dr Byanet Obadiah (The Head, Department Veterinary Anatomy, Federal University of Agriculture, Makurdi) for his

assistance at the cattle market, allowing the use of the laboratory for part of this work and viewing/identification of the ticks.

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