



Epidemiology of Tick infestation in Cattle from Selected Livestock Markets in Bauchi State, Nigeria

¹Abba IA, ²Abubakar M, ³Umar AI, ⁴Iliyasu AA, ⁵Mukhtar UM, ⁶Abdulmalik RM, ⁷Tukur ST and ⁸Muhammad Salihu Ibrahim

¹⁻⁶Department of Animal Health and Production Technology, Federal University of Science and Technology Kabo, Kano-Nigeria

⁷Department of Science Laboratory Technology, Federal University of Science and Technology Kabo, Kano-Nigeria

⁸Department of Pharmaceutical Technology, Federal University of Science and Technology Kabo, Kano-Nigeria

DOI: <https://doi.org/10.5281/zenodo.20607308>

Corresponding Author: Abba IA

Abstract

Ticks are blood-feeding ectoparasites of significant veterinary importance due to their role in transmitting various pathogens and causing direct harm to livestock. This study was conducted to assess the prevalence, distribution, and species composition of tick infestations in cattle across selected markets and communities in Ningi Local Government Area, Bauchi State, Nigeria. A total of 205 cattle from five market locations were examined, and ticks were collected and identified morphologically. Results showed that 61% of the cattle were infested with ticks, with a total of 430 ticks harvested. *Amblyomma variegatum* was the predominant species (76%), followed by *Rhipicephalus (Boophilus) decoloratus* (20%). Statistical analysis revealed significant associations between tick infestation and sex and age of cattle ($p < 0.05$), but not breed ($p > 0.05$). The findings highlight the need for improved tick control measures and farmer education on ectoparasite management in the study area.

Keywords: *A. variegatum*, Bauchi, Cattle, infestation, Ningi, parasite, Ticks

1. Introduction

Nigeria, located in the West African sub-region, is renowned for its rich agricultural base and large population of livestock, particularly cattle. With over 14.7 million cattle (FAO, 2019), the country boasts one of the largest livestock populations in sub-Saharan Africa. Cattle play an integral role in the livelihood of rural dwellers by providing meat, milk, hides, manure, and draft power. Despite these benefits, cattle productivity is significantly hampered by various constraints, particularly parasitic infestations.

Ticks are hematophagous ectoparasites that affect livestock health and productivity by causing direct damage and serving as vectors for several pathogens including protozoa, bacteria, and viruses. Diseases such as babesiosis, theileriosis, and anaplasmosis are widely transmitted by tick species, especially in tropical and subtropical regions like Nigeria. Economic losses due to tick infestations arise from reduced weight gain, milk yield, hide quality, and high treatment costs. Additionally, infestation often causes

anemia, immunosuppression, and secondary infections which may be fatal.

In rural markets like those in Ningi LGA, where veterinary services and tick control measures are minimal or absent, infestations are frequently reported. Despite the increasing concern of tick-borne diseases, there is a lack of region-specific data on tick species distribution and prevalence. Therefore, this study aims to bridge this knowledge gap by providing baseline data that could inform effective tick control strategies.

2. Materials and Methods

2.1 Study Area

Ningi Local Government Area (LGA) is one of the 20 LGAs in Bauchi State, located in the northeastern part of Nigeria. It shares boundaries with Kano and Jigawa States to the north. The area lies within the Sudan savanna zone, characterized by a tropical savanna climate with two distinct seasons: a dry season (October to April) and a wet season

(May to September). The average annual temperature is around 32 °C, with highs reaching over 40 °C during the hot season.

Ningi town serves as the administrative headquarters of the LGA and is also home to the traditional Ningi Emirate. The LGA has a population of approximately 387,000 people (NPC, 2006) and covers a land area of 4,625 square kilometers. The predominant ethnic groups include the Hausa, Warji, and Fulani, with cattle rearing being a major economic activity. The markets included in this study; Ningi Kara, Gadar Maiwa, Jimi, Masaru, and Yada Gungume are known for their vibrant livestock trade and serve as major centers for cattle exchange, especially during weekly market days.

2.2 Sampling Technique

A total of 205 cattle was randomly sampled using stratified random sampling from herds brought to market on sale days. Animals of various breeds, sexes, and age groups were included.

2.3 Tick Collection and Identification

Ticks were collected manually using blunt-nosed forceps from known predilection sites including ears, dewlap, abdomen, perineum, mammary gland, scrotum, limbs, and tail. Collected ticks were stored in 70% ethanol and identified under a stereomicroscope using standard morphological keys (Walker, *et al* 2003; FAO, 1984) [12].

3. Results

A total of 205 cattle were sampled across five markets in Ningi Local Government Area. The results below present the prevalence of tick infestation, tick species distribution, anatomical distribution and market-based distribution of tick in the cattle.

Table 1: Overall prevalence of Tick infestation in Ningi Local Government Kano state

No. Examined	Positive	Percent
205	125	61.0

Table 2: Prevalence of Tick Infestation According to Sex

Age	Examined	Positive	Prevalence (%).
Female	111	84	75.7
Male	94	41	43.6
Total	205	125	61.0

$\chi^2 = 12.41$, $df = 1$, $p < 0.01$

Table 3: Prevalence of Tick Infestation According to Breed

Breed	Examined	Positive	Prevalence (%).
Crossbreed	2	4	50.0
Muturu	63	18	28.6
Red Bororo	5	1	20.0
Sokoto Gudali	24	7	29.2
White Fulani	109	52	47.7

$\chi^2 = 3.28$, $df = 4$, $p > 0.05$

Table 4: Tick Species Identified from Cattle

Tick Species	Number Collected (n)	Percentage (%)
<i>Amblyomma variegatum</i>	331	76.9
<i>Rhipicephalus decoloratus</i>	86	20.0
<i>Rhipicephalus microplus</i>	7	1.6
<i>Rhipicephalus annulatus</i>	3	0.7
<i>Hyalomma marginatum</i>	3	0.7
Total	430	100.0

$\chi^2 = 298.64$, $df = 4$, $p < 0.001$

Table 5: Anatomical Distribution of Tick Attachment

Anatomical Site	Number of Ticks (n)	Percentage (%)
Dewlap	15	11.4
Forelimb	29	22.0
Ventral Region	9	6.8
Mammary Gland Region	26	19.7
Vulva	13	9.8
Hindlimb	21	15.9
Tail Region	4	3.0
Scrotum	15	11.4
Total	132	100.0

$\chi^2 = 19.73$, $df = 7$, $p < 0.05$,

Table 6: Distribution of Ticks by Market Location

Market Location	Number of Ticks (n)	Percentage (%)
Ningi Kara	62	14.4
Gadar Maiwa	64	15.0
Jimi	61	14.2
Masaru	129	30.0
Yada Gungume	114	26.5
Total	430	100.0

$\chi^2 = 34.12$, $df = 4$, $p < 0.001$

4. Discussion

This study reveals a high prevalence (61%) of tick infestation in cattle from five rural markets in Ningi LGA. The findings are consistent with those of Shekaro *et al.* (2012) [9] and Rony *et al.* (2010) [8], who reported similar infestation rates above 60% in Nigerian and Bangladeshi cattle, respectively. The presence of such high infestation levels suggests poor acaricide use, traditional animal husbandry practices, inadequate tick control programs, and limited access to veterinary care.

The predominance of *Amblyomma variegatum* among collected ticks aligns with previous studies in northern Nigeria and other West African countries (Bayer and Maina, 1984; Stachurski and Lancelot, 2006) [1, 11]. This species is known to cause severe skin irritation and is a major vector of pathogens like *Ehrlichia ruminantium*, the agent of heartwater, and *Dermatophilus congolensis*, which causes dermatophilosis. Its long mouthparts result in mechanical damage to the skin and reduce the commercial value of hides and skins, contributing to financial losses in the leather industry (Solomon *et al.*, 2001) [10].

Sex and age were statistically associated with tick infestation, with females and younger cattle being more susceptible. This observation is in agreement with Islam *et*

al. (2009) [4], who suggested that physiological and hormonal factors, particularly in lactating or pregnant cows, may increase susceptibility. Young animals might be more vulnerable due to less developed immune responses and lack of previous exposure. Conversely, no statistically significant relationship was found between breed and infestation levels, indicating that environmental exposure and management practices may play more critical roles than genetic predisposition in this context.

Anatomical predilection sites like the mammary gland, forelimbs, and dewlap were common among infested cattle. These areas offer optimal microenvironments for tick attachment and feeding. Similar findings were documented by James-Rugu and Iwuala (2002) [5], where these regions were frequently parasitized due to high vascularity and ease of access.

Additionally, the variation in tick count among different markets may be attributed to differences in herd origin, local environmental conditions, and market hygiene practices. Masaru Market, having the highest infestation, could reflect its role as a major cattle convergence point with high animal traffic, which facilitates tick spread.

The findings underline the urgent need for strategic tick control programs, awareness campaigns among rural cattle owners, and implementation of regular veterinary inspections. Emphasis should also be placed on educating farmers about the economic implications of tick infestations and available control methods such as the use of acaricides, rotational grazing, and proper sanitation.

6. References

1. Bayer W, Maina JA. Smallholder farming systems in southern Nigeria. *International Livestock Centre for Africa Bulletin*. 1984;20:17-21.
2. Food and Agriculture Organization of the United Nations. *Tick and tick-borne disease control: a practical field manual*. Vol. 1, Tick control. Rome (Italy): Food and Agriculture Organization of the United Nations; c1984.
3. Ghulam M, Naureen A, Firyal S, Saqib M. Tick control strategies in dairy production medicine. *Pakistan Veterinary Journal*. 2008;28(1):43-50.
4. Islam MS, Rahman SA, Sarker P, Mondal MMH. Prevalence and population density of ectoparasitic infestation in cattle in Sirajganj district, Bangladesh. *Bangladesh Research Publications Journal*. 2009;2(1):332-339.
5. James-Rugu NN, Iwuala MOE. Ectoparasites of some domestic animals in Jos Plateau. *Nigeria Science Forum*. 2002;5(1):149-156.
6. Parola P, Inokuma H, Camicas JL, Brouqui P, Raoult D. Detection and identification of spotted fever group *Rickettsiae* and *Ehrlichiae* in African ticks. *Emerging Infectious Diseases*. 2001;7(6):1014-1027.
7. Rajput ZI, Hu S, Chen W, Arijo AG, Xiao C. Importance of ticks and their control in livestock. *Journal of Zhejiang University Science B*. 2006;7(11):912-921.
8. Rony SA, Mondal MMH, Begum N, Islam MA, Affroze S. Epidemiology of ectoparasitic infestations in cattle at Bhawal forest area. *Bangladesh Journal of Veterinary Medicine*. 2010;8(1):27-33.
9. Shekaro A, Obadijah HI. Survey of tick infestation in cattle in Zaria abattoir. *Journal of Veterinary Advances*. 2012;2(2):81-87.
10. Solomon G, Nigatu K, Kassa T. Seasonal variation of ticks on calves at Sebeta, Ethiopia. *Revue de Médecine Vétérinaire*. 2001;152(7):641-645.
11. Stachurski F, Lancelot R. Tick (*Acarina: Ixodidae*) infestation of N'Dama cattle in Guinea Conakry. *Experimental and Applied Acarology*. 2006;38:1-19.
12. Walker AR, Bouattour A, Camicas JL, Preston PM. *Ticks of domestic animals in Africa: a guide to identification of species*. Edinburgh (UK): Bioscience Reports; c2003.

Creative Commons (CC) License

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.