



## SURVEY OF TICK (ACARI: IXODIDAE) INFESTATIONS OF CATTLE IN FEDERAL COLLEGE OF WILDLIFE MANAGEMENT, NEW BUSSA, NORTH CENTRAL NIGERIA

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### ABSTRACT

Ticks and Tick borne diseases are major constraints to the development of viable livestock industries in tropical and sub-tropical countries including Nigeria. Little is known about the incidence of ticks in New Bussa. This study was therefore carried out at the Federal College of Wild life Management to investigate the degree of tick infestation of cattle in the college farm. A total of eighteen (18) cattle from two breeds of cattle (Sokoto Gudali and Fulani breeds) were randomly sampled out and grouped into three viz Colored Fulani (A), Sokoto Gudali(B) and White Fulani (C). Ticks were collected using a manual picking method over a period of eight months covering both dry (Jan-April) and wet (May-August) seasons in 2014. Ticks collected were sorted out as hard (Ixodidae) and soft (Argasidae) ticks. Results revealed that the college farm is endemic with ticks especially the soft ticks (55.17%) than hard ticks (44.83%) and higher numbers were recorded during wet season (soft ticks, 93.39%; hard ticks 6.61%) than dry season (Soft ticks 14.29%; hard ticks 85.71%). Furthermore, Colored Fulani had more affinity to ticks than Sokoto Gudali and White Fulani. There is a significant difference between the dry and wet season as the calculated value was 18.68 against the tabulated value 5.19. Tick infestations are strategically controlled through acaricide application either by hand spray or bath on regular basis. This study has implication on sustainable beef production for human consumption.

**Keywords:** Acaricides, Ectoparasites, Sokoto Gudali, Fulani breeds, New Bussa, Incidence.

### INTRODUCTION

Cattle are one of the major protein suppliers to human populace globally and have a population of about 13.9 million in Nigeria (Girei *et al.*, 2013). In tropical countries including Nigeria, Cattle (*Bos indicus*) production is constrained by ecto and endo parasites (Tamerat *et al.*, 2015; Patel *et al.*, 2015; Abdela, 2016). Among the ectoparasites, ticks are typically known to cause losses in productivity through irritation, mortality due to blood loss, destruction to hides and skin of infested animals, injection of toxins and serve as vectors of important protozoa, rickettsial, bacterial and viral diseases (Mohammed and Agbede, 1980; Agbede, 1981; Tongjura *et al.*, 2012; Brites-Neto *et al.*, 2015; Periyaveeturaman *et al.*, 2016). Ticks are therefore the most important ectoparasites of cattle and are responsible for severe economic losses in livestock production (Alemu *et al.*, 2014; Eyo *et al.*, 2014). In Nigeria, the suitable conditions such as climatic factors of rain and temperature favor tick development and growth (Mohammed and Agbede, 1989;

Ahmed and George, 2002). The serious impact of ticks and tick-borne diseases (TBD) on cattle production and national economies necessitate application of appropriate tick control strategies (Eyo *et al.*, 2014; Gedilu *et al.*, 2014). Despite reported cases of tick infestations of cattle in the college farm, no significant research on the families of ticks and their seasonal variation have been reported. Monitoring of tick infestation is quintessential for the development of effective control strategies for ticks and tick-borne diseases. The present study therefore was undertaken to determine the incidence of ticks in relation to the family of ticks and seasons of the year of the cattle population.

### MATERIALS AND METHODS

#### *Study area*

The study was conducted in the College Farm of Federal College of Wildlife Management, New Bussa, Niger state North Central Nigeria. New Bussa sits at 9° 53'N 4°31'E Coordinates: 9°53'N 4°31'E, and the original town of Bussa was located about 40 km North of New Bussa at 10°13'51"N 4°28'31"E (altitude 561 ft or 170 meters) (Fig. 1).

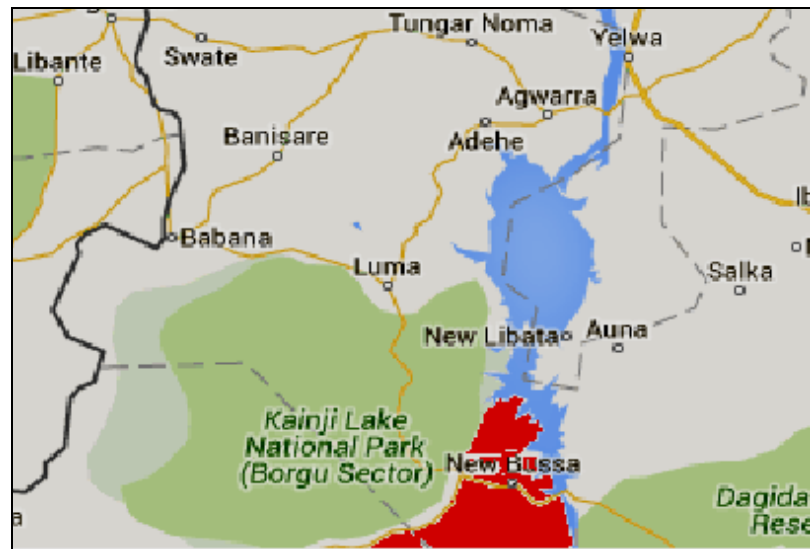


Fig. 1. Map of New Bussa (indicated red) the study area. Adopted and modified from [http://www.postcodesdb.com/AlphabeticSearch.aspx?country=Nigeria&city=New% 20 Bussa &zip=912105](http://www.postcodesdb.com/AlphabeticSearch.aspx?country=Nigeria&city=New%20Bussa&zip=912105).

It has a tropical continental climate characterized by a shorter wet season (May to September) and a longer dry season (October to April) with a temperature of 15°C to nearly 40°C. Annual rainfall is about 1000mm but there's considerable variation in amount and distribution of rainfall among years. Rainfall is concentrated in the months of June, July and August. The town is bordered by the Kainji Lake created by the damming of River Niger at Kainji. The vegetation in New Bussa is Guinea Savanna which is characterized by undistributed woodland with trees 15m – 18m tall (Nnaji and Omotugba, 2014).

#### **Study population**

Between January and August 2014, a total of 18 heads of cattle sampled from the college farm were subjected to detailed examination for the presence of ticks. Two breeds of cattle were identified in the college farm viz Fulani Breed and Sokoto Gudali. The Fulani Breed was further divided into; Colored and White.

#### **Data collection**

The survey was conducted over the course of two seasons viz dry season (January- April) and wet season period (May-August). Ticks were collected three times in each month for both seasons. Eighteen heads of cattle were sampled out from the college farm and grouped into three, in each group six heads of cattle were sampled out at random and tagged as A (for Colored Fulani), B (for White Fulani) and C (for Sokoto Gudali). For the purpose of clarity, the animals were further labeled as A1-A6, B1-B6 and C1-C6 for the Colored Fulani, White Fulani and Sokoto Gudali respectively. The animals were physically restrained with strong rope. This is usually done with the help of herdsman and the animals are physically inspected

for complete deticking using a pair of hand forceps. Care was taken in removing the ticks intact to avoid the destruction of mouth parts. After each sample collection, the entire flock was fumigated with acaricide (Asuntol).

#### **Ticks identification and preservation**

Ticks were collected manually by hand picking from different parts of the cattle without damaging their mouth parts (Soulsby, 1982), identified and sorted out as Ixodidae (hard ticks) and Argasidae (soft ticks) using the standard taxonomic keys description by Walker *et al.* (2003). Ticks collected were preserved in sample bottles containing 70% alcohol solution and labeled according to the tags on the cattle and date of collection.

#### **Data analysis**

The data was subjected to statistical analysis using the chi-square to determine the significant level of the tick infestation in the study area; percentile was equally used to determine the group of cattle with high infirmity to tick infestation.

## **RESULTS AND DISCUSSION**

Table 1 showed that the number of ticks collected from the various groups of cattle in dry season indicate that group A had a total of tick collection of 24, 20, 24 and 20 in the months of January, February, March and April respectively. Whereas group B had 24, 20, 26 and 6 respectively and group C had 18, 22, 19 and 10 for the respective months.

Table 2 showed that the number of ticks collected from the various groups of cattle in the wet season indicating

Table 1. Distribution of the collected ticks during the dry season.

	January	February	March	April	Total	%
A1-A6(Colored Fulani)	24	20	24	20	88	37.7
B1-B6(White Fulani)	24	20	26	6	76	32.62
C1-C6(Sokoto Gudali)	18	22	19	10	69	29.61

Table 2. Distribution of the collected ticks during the wet season.

	May	June	July	August	Total	%
A1-A6(Colored Fulani)	228	266	251	267	1012	50.35
B1-B6(White Fulani)	100	102	113	138	458	22.54
C1-C6(Sokoto Gudali)	117	133	149	146	645	27.11

that group A had 228, 266, 251 and 267 for the months of May, June, July and August respectively. Whilst group B had 100, 102, 113 and 138 and group C had 117, 133, 149 and 146 for the respective months.

Figure 2 shows the percentage distribution of ticks collected throughout the two periods of the study with soft ticks having 14.29% and hard ticks 85.71% during the dry season whilst during wet season had 93.39% and 6.61% for the soft and hard ticks respectively.

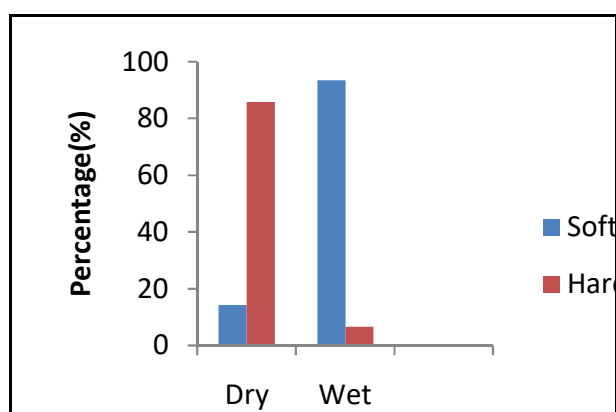


Fig. 2. Percentage distribution of ticks in the study area over the dry and wet seasons.

Figure 3 shows the percentage distribution of soft and hard ticks collected over the two seasons in respect to the two types of ticks. For the dry season, 140 (55.17%) soft ticks and 840 (44.83%) hard ticks whilst during the wet season 1,187 (55.17%) soft ticks and 84 (44.83%) hard ticks were recorded.

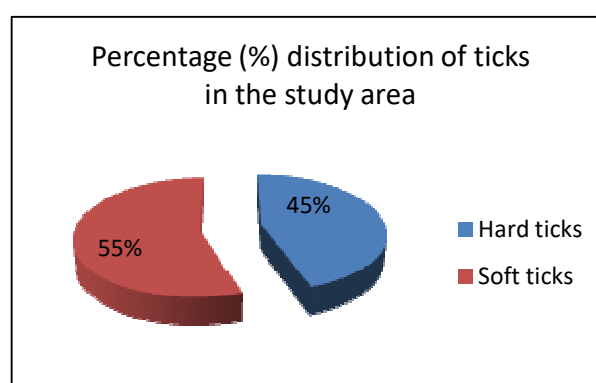


Fig. 3. Percentage distribution of the types of ticks in the study area.

Ticks are responsible for huge economic losses in livestock production through transmission of wide range of tick-borne diseases (TBD) and direct damage to hide and skin (Bedasso *et al.*, 2014; Gedilu *et al.*, 2014; Tamerat *et al.*, 2015). In the current study, it was revealed that cattle group A (Colored Fulani) had the highest affinity to ticks during the dry season period (37.77%) whilst C (Sokoto Gudali) has the lowest affinity to ticks (29.41%). During wet season, it was observed that cattle in group A (Colored Fulani) had the highest affinity to ticks with 50.35% followed by C (Sokoto Gudali) which has 27.11% and B (White Fulani) has the lowest tick affinity with 6.61%. During the dry season, hard ticks were more abundant with 85.71% compared to soft ticks which have 14.29%. During the wet season, soft ticks were more abundant than the hard ticks with 93.39% compared to soft ticks which were 6.61%. This is sequel to the fact that hard ticks are more resistant to dry season conditions of high temperature and high solar radiations are low. This concurs with the study of Okaeme, 1984. The abundance of hard ticks could also be attributed to the presence of their hard dorsal plate (Scutum) which

enables them to resist the harsh environmental dry season conditions. It was further revealed that soft ticks are the commonest (55.17%) of the samples collected on the college farm (Fig. 3). This could be attributed to the fact that the ticks need to hide whilst on the body of their hosts. Consequently, colored animals provide a good camouflage for the ticks.

### CONCLUSIONS AND RECOMMENDATIONS

The present study revealed that cattle in the college farm are infested with different types of ticks which could be due to wide vegetation coverage of the study area, climatic and host factors. This potentially poses huge economical constraint to the college in particular and the extended community in the study area as a whole. Therefore, systematic intervention and control of tick infestation should be put in place to control the menace of ticks. Further research should be carried out to identify the various tick species in the study and possibly identify the various ticks' related diseases in the area.

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Received: June 8, 2016; Accepted: Oct 24, 2016

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