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A preliminary study on the Monthly dynamics of cattle tick infestation in Sokoto, north western Nigeria

[1*]Lawal, M. D.,[1]Fabiyi, J. P., [2]George, B. D. J.,[3]Adamu,Y.,[4] Kabir, A.,[1]Alayande, M. O., [4]Raji, A. A., [1]Mahmuda, A.,[1]Usman, M. and [5]Aminu, S.

[1] Dept. of Vet. Parasitology and Entomology Usmanu Danfodiyo University, Sokoto.

[2]Dept. of Vet. Parasitology & Entomology, A.B.U. Zaria.

3Dept. of Vet. Medicine, Usmanu Danfodiyo University, Sokoto.

4 Dept. of Vet. Pathology,Usmanu Danfodiyo University, Sokoto

5 Dept. of Biological sciences, Usmanu Danfodiyo University, Sokoto.

*Corresponding Author email: Lawal_bibi@yahoo.com

Abstract

The distribution and monthly dynamics of bovine ixodids in Sokoto Township and environs were recorded between Jan 2009 and Dec 2010. Monthly tick collections were performed on 400 animals from which a total of 12, 296 ticks were collected. Ticks from each cattle were collected separately using a pair of blunt forceps, into labelled universal bottles containing 70% ethanol into which 5% glycerine was added to keep specimens better preserved. On each label, the location, breed of the animal, number of ticks and date of collection were recorded. In the laboratory, Ticks were placed into petri dishes, counted, examined and identified with the aid of a dissecting stereoscope based on morphological Characteristics and aided by the use of standard keys according to Hoogstraal (1956) and Walker et al. (2003). These include Hyalomma truncatum (15.5%), Hyalomma dromedarii (13.3%), Boophilus decolaratus (11.3%) Amblyomma variegatum (10.6%), Hy. impeltatum, (10.1%), Hy. rufipes (9.4%), Hy. impressum (7.4%), Boophilus annulatus (4.4%), B. geigyi (4.3%), Rhipicephalus sanguineus (4.1%) Amblyomma hebraeum (3.4%), Rh. evertsi (2.6%), A. pomposum (2.0%), Rh. lunulatus (1%) and Rh. senegalensis (0.5%). Hyalomma. truncatum, Hy. impeltatum, Hy. Impress B. annulatus, A. hebraeum, A. pomposum, Rh. lunulatus and Rh. senegalensis were recorded for the first time in the Study area. The distribution and dynamics of cattle ixodid ticks has not been hitherto chronicled in the study area.

Key words: Population, dynamics, cattle ticks, Sokoto township and environs.

Introduction

Cattle are some of the more important assets possessed by many farmers in the tropics. In Nigeria, for example, it is capable of generating annual revenue of up to U.S. $ 2 billion and provide valuable animal protein for human consumption; it will also provide occupation for over one million families engaged in livestock trade (Fabiyi, 1987). Ticks are common in all agroecological zones of the country (Mohammed, 1977) necessitating collection of relevant information and data on their distribution for the purpose of developing effective tick and tick-borne control strategies (Tanasak *et al*., 2009). This will also serve as a means of understanding the host/parasite relationship and variation of tick population in different agroecological zones. The distribution of tick-borne diseases corresponds with the seasonal activity of their vectors such that the tropical climate, together with cattle raising practices produces a conducive environment for tick survival and growth. This is the case in Nigeria (Dipeolu, 1983). Researches carried out on monthly fluctuations of cattle ticks in Nigeria have been

Confined almost entirely to the Guinea vegetation zone in Northern Nigeria

(Mohammed, 1974) and the Southern vegetation zone (Dipeolu, 1983).Several studies have been carried out in other West African countriessuch as Senegal, Cote deivoire, Mali, and Benin Republic (Vercruysse *et al*., 1982; Teel *et al*., 1988; Camicas *et al*., 1990; Knopf *et al*., 2002; James-Rugu and Jidayi, 2004 and Tamiru and Abebaw, 2010). To date, only scanty information is available on cattle tick distribution and dynamics in Sokoto, the study area.

Materials and methods

The study Area

The climate of the study area, as in other parts of Sokoto state, is tropical with rainfall between mid- June to September and a dry season between October to May. The mean monthly relative humidity ranges between 10% in February and 90% in August. Between November and February is the period of Harmattan characterized by cold, dust laden wind and often accompanied by thick sand storm of alarming intensity. Minimum mean temperature is about 15˚c in December and part of January and in the months of March to mid June between 35-42˚c (Adelana *et al*., 2003).Tick samples were collected from Semi settled Fulani herds and cattle from the university Farm situated at Dabagi monthly from January 2009 to December2010.

The desired sample size for this study was collected by using a 95% confidence interval at 5% absolute precision (Thrusfield, 1995). All data recorded in the study were entered into Microsoft excel and subsequently analyzed using SPSS Computer programme.

Tick collection

Ticks from each cattle were collected separately using a pair of blunt forceps, into labelled universal bottles containing 70% ethanol into which 5% glycerine was added to keep specimens better preserved. On each label, the location, breed of the animal, number of ticks and date of collection were recorded. In the laboratory, Ticks were placed into Petri dishes, counted, examined and identifiedwith the aid of a dissecting stereoscope based on morphological Characteristics and aided by the use of standard keys according to Hoogstraal (1956) and Walker *et al.* (2003).

Results

A total of 12,296 ticks were collected and identified. Out of the 400 cattle sampled, 102 were infested with different species of ticks, representing an overall prevalence of 25.5%. Identified tick species comprised of four genera and fifteen species. These include *Hyalomma truncatum* (15.5%), *Hyalomma dromedarii* (13.3%), *Boophilus decolaratus* (11.3%); *Amblyomma variegatum* (10.6%), *Hy. impeltatum*, (10.1%), *Hy. rufipes* (9.4%), *Hy. impressum* (7.4%), *Boophilus annulatus* (4.4%), *B. geigyi (4.3%), Rhipicephalus sanguineus (4.1%), Amblyomma hebraeum (3.4%), R. evertsi (2.6%), A. pomposum (2.0%), R. lunulatus (1%) and R. senegalensis (0.5%)*. From these*, H. truncatum, H. impeltatum, H. impressum, B. annulatus, A. hebreum, A. pomposum, Rh. Lunulatus* and *Rh. Senegalensis* were recorded for the first time in the Study area. The prevalence of *Amblyomma* species was significantly higher from mid June to mid August. Monthly fluctuations of *Boophilus* species were higher in August. *B. decolaratus* was the predominant spp (11.3%). Although this spp (*Hyalomma*) were recorded year round, they were however abundant during the rainy season from early June to late August. Highest counts of *Rhipicephalus* spp were recorded in early July and late August with a sharp decline from September to December (Fig 1).

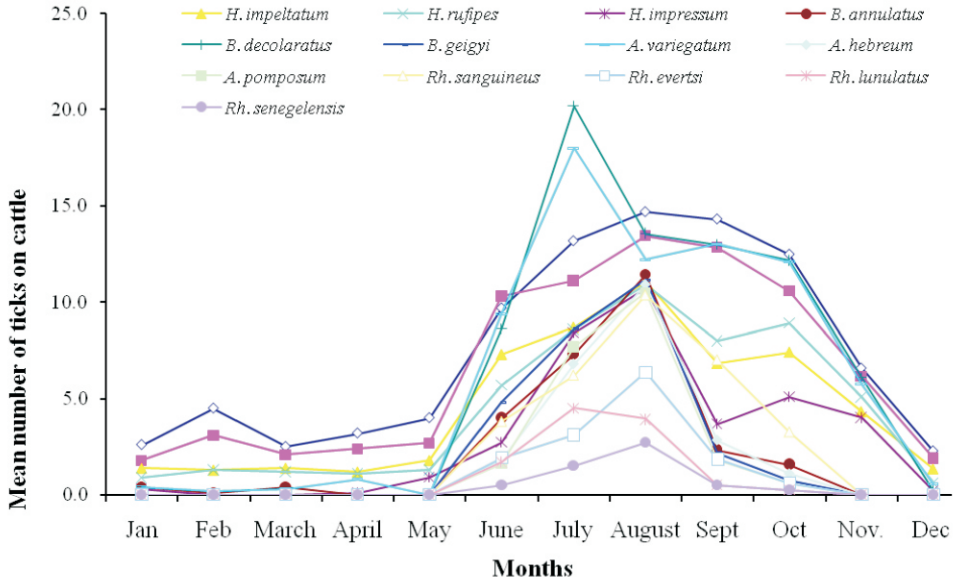

Fig 1 Mean number of tick species on cattle between January 2009 to December 2010

Discussion

Ticks were collected throughout the study period with peak collections recorded between July to September which corresponded with the months of highest rainfall and humidity, while in the cold and dry months of October to January, very few specimens were recorded.This corroborated with works done by Surafel, 1996; Zenenbe 2005; Shiferaw and Abebe, 2006. The commonest species of ticks on cattle were *B.decolaratus* and *H. truncatum* similar to the report of Yacob *et al*. (2008). *B. decolaratus* and *H.truncatum* were identified throughout the study period making them the most common tick species on cattle in the two study sites. Strickland (1961) observed that these species could only be found in Kano and Maiduguri in far north during the wet season. Nevertheless, the researcher suggested that further wet season surveys be conducted in the Sudan zone and must include many towns especially the marginal areas into consideration. *B. annulatus* was reported by Kaiser *et al*. (1991) from the derived savannah zone of Nigeria, even though Unsworth (1952), Jamesrugu and Jidayi (2004) and Yacob *et al*. (2008) did not find this species in their collections. Dipeolu (1983) identified three species of Boophilid ticks on cattle from western part of Nigeria. Mohammed (1974) could not confirm the presence of this species in the Sudan savannah vegetation zone, the researcher was, however able to identify very few specimens in the Northern Guinea savannah zone during the onset of rains. This finding agrees with this study as few *B. annulatus* were identified only during the early rains. Generally, it was observed that all the *Hyalomma* species reported in this study were found in the two study sites, even though some collections were made at Kofar kware and Dabagi, the latter more than the former. This is probably because cattle at Kofar kware were bought from Ilella and trekked to Sokoto during which they may have acquired various species of ticks along the route, unlike the cattle at

Dabagi that were bought and transported in a vehicle and therefore not exposed to new ticks, consequently, carrying fewer ticks. The tick species found on them are therefore probably representative of their source. The identification of some species in this study that were not, hither-to, reported in parts of Sudan savannah may probably be due to factors such as climate change, movement of migratory birds that carry immature stages of ticks from one continent to another, and trans - border movement of transhumant Fulani herdsmen. Gray *et al*. (2009) asserted that migratory birds serve as carriers of immature tick species and could potentially introduce them into initially tick free areas.

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