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Prevalence of *Rhipicephalus* and *Amblyomma* Ticks infestation among Cattle in Gombe cattle market, Gombe state, Nigeria

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ABSTRACT

Epidemiology of tick infestation was studied in cattle at Gombe cattle market and the surrounding from April to July, 2012. The study was to determine the prevalence of ticks in relation to age, sex and breed of the cattle. A total of 200 cattle were examined, of which 90(45%) were found to be infested. Two genera of ticks were identified alongside two other unidentified ones. The two identified genera were *Rhipicephalus* and *Amblyomma*. Mean tick burden was less in the case of *Rhipicephalus* 24(21%) than in *Amblyomma* 88(79%). The prevalence of ticks was significantly higher ($P < 0.01$) in the middle aged cattle 39(43.33%), followed by young cattle 37(41.11%) and adult cattle 14(15.56%). The infestation was also significantly higher in females 48 (53.33%) than in males 42(46.67%). With regard to the breed of cattle, the infestation was higher in White Fulani 49(54.44%), followed by Local breed 30 (33.33%), Red Bororo 11(12.22%) and Bokoloji (0%).

Introduction

Cattle play a significant role in the socio-economic life of people. In addition to the product of meat and milk they provide, cattle are used in the cultivation of much of the agricultural lands by many peasants. Hides and skins are also important components of the livestock in generating foreign exchange earnings (Kabir *et al.*, 2011). Factors that hinder the development of livestock production to its full capacity include poor management systems and diseases. Ticks infestation is a major problem in livestock production and if livestock production is to meet the world need for animal protein, the prevalence or incidence of species of ticks must be

controlled (Drummond, 2007). Over 79 different species of ticks are found in Eastern Africa but many of these appear to be of little or no economic importance (Cumming, 1999). There are about 47 species of ticks found on livestock and most of them serve as vectors of disease causing agents and also have damaging effects on hide and skin production (Bayu, 2005).

Ticks are very important and are the most common ectoparasites of mammals, birds and reptiles worldwide. Parasitic diseases are the most prevalent in the province of Northwest Frontier Province (N.W.F.P) causing huge loss of livestock wealth (Irfan, 1984).

Ectoparasites play a major role in the spread of different diseases of livestock and human beings (Hussain, 1980). Ticks, besides being important vectors of diseases like theileriosis, anaplasmosis, babesiosis (fever) and cowdriosis (heart water) in domestic animals, they also cause non-specific symptoms like anaemia, dermatosis, toxicosis and paralysis (Gebre *et al.*, 2001). Usually a tick or its instars can suck 0.0 to 2.0ml blood in 24 hours and one female tick can suck blood more than thirty times her weight (70.0mg) during engorgement (Sagwan, 1995). Ticks are also one of the major vectors of pathogens and viral encephalomyelitis to animals in the world (Soulsby, 1982).

Heavy infestation of tick causes severe irritation, which makes the animals rub and scratch the skin and that, might result in the loss of hair. The skin becomes inflamed, corrugated and scaly, which subsequently results in dermal lesions. Once being attached with the body of animals, in any of instars, the tick remain firmly attached until has time to leave for molting or ovipositing. Tick bites also damage hides and skin which are among the most profitable raw materials that are exported. But due to the damage of hides and skins by tick bite, the nation is deprived of its actual value (Basu, 1951).

All ticks undergo four basic stages in their lifecycle; egg, larva, nymph and adult, all of which might require from six weeks to three years to complete. Ixodids (the hard ticks) have only one nymphal instar, but agastids (the soft ticks) have as many as five. Copulation nearly always occurs on the host. A male tick produces a spermatophore, which it places into a female genital operculum. A blood meal is usually required for egg production, although exceptions are known (Larry and John, 2010).

The cattle tick is an external parasite, mainly of cattle and regarded as a

significant economic pest of cattle industry (Larry and John, 2010). *Rhipicephalus*, *Boophilus*, and *Microphilus* affected a large proportion of cattle population (Kabir, 2011). Prevalence of tick infestation was significantly ($P < 0.01$) higher in hilly areas (44.44%), followed by plain areas (30.27%). It is concluded that *Boophilus microplus* is the main tick specie identified that threaten the cattle population in Chittagong district irrespective of age, sex, breed of the animal, season of the year and topography (Kabir, 2011).

Bayu (2005) and Pegram *et al.*, (1981) reported that ticks are common on all agro ecological zones of the country. Razzak and Sheikh (1969) reported that the climate condition of Bangladesh is very conducive to a wide variety of parasites as well as ticks. Different tick species are widely distributed in Ethiopia and a number of researches reported the distribution and abundance of tick species in different parts of the country. *Amblyomma* tick is the most abundant tick genera and has been reported in many parts of the country (Assefa, 2004; Mizan, 2004).

Islam (2006) reported *Boophilus microplus* (42.4%), *Hyalomma bispinosa* (12.0%) and *Rhipicephalus sanguineus* (10.8%) from cattle in Bangladesh. Yakhchali and Hassan (2004) reported 44.5% tick infested in cattle in west Azerbaijan. Mamak (2006) reported 29.6% tick infestation in cattle in Turkey. Torina *et al.*, (2006) recoded *Rhipicephalus sanguineus* (19.3%) in cattle in Italy. Stutiv *et al.*, (2008) reported that the animals in India were infested with ticks throughout the year, with maximum infestation during the rainy season, during the summer and least during the winter. The aim of this research therefore was to determine the prevalence of *Rhipicephalus* and *Amblyomma* ticks infestation in cattle in Gombe cattle market, Gombe state, Nigeria with the following objectives:

to determine the overall prevalence of the *Rhipicephalus* and *Amblyomma* ticks in hosts, to determine the age and sex specific prevalence of the tick infestation in male and female host and finally, ascertain the level of tick infestation in the different breed of the cattle.

Materials and Methods

Study Area

This study was conducted in Gombe cattle market, Gombe town, Gombe State, Nigeria, located on latitude 9° 11' and 12° 30'N and longitude 8°45' and 11° 45'E. It has a land mass area of 20,265sqkm and is located at the centre of the north east region of Nigeria. It experiences warm climate not exceeding 30°C during the hottest months (March-May) and has an annual rainfall of about 850mm. The people therein are predominantly farmers; food and cash cropping and animals rearing.

Sampling of Cattle

Two hundred experimental animals were examined for the presence of ticks to determine the prevalence and distribution of various types of ticks, sexes and degree of infestation. Less than five(5) ticks is regarded as fair, between 5 to 10 ticks presence is regarded as moderate while above 10 is regarded as severe infestation. This study was carried out between April and July, 2012. The infestation rate was categorically determined by examining different body parts of the host species through naked eyes. Representative samples were obtained from 11 herds taking note of the Farmer's name, number of farm animals, breed of farm animals (White Fulani, Red Bororo, Bokoloji etc.), age and sex (Tamiru and Abebaw, 2010).

Ticks Collection and Preservation

Ticks were carefully removed using forceps without causing damage especially to the mouth parts which are useful in identification. This is achieved by first

bending the tick on its back and pulling it straight upward (Tamiru and Abebaw, 2010; Yakhchali and Hassan, 2004). The engorged females were picked by hand, held as close as possible to the skin (Kaiser, 1987). Ticks were collected from eight infested anatomical sites of the host body in labelled capped bottles.

Collection was made using hand and care was taken to avoid decapitulation. 70% Ethanol was added to the bottle containing ticks as preservative. The ticks collected were remained floating in the ethanol for unidentified period till identification. The ticks were subjected to identification process using atlas (Soulsby, 1982; Kaiser, 1987).

Identification of ticks to genus level

Each bottle containing ticks from the same animal was brought out and placed on a Petri dish. Identification was done on the basis of the features shown on the guiding atlas (Kaiser, 1987).

Results

It could be observed below that the research conducted to ascertain the prevalence of *Amblyomma* and *Rhipicepalus* ticks infestation among cattle in Gombe cattle market has yielded a result worthy of consideration.

The tables below indicated the prevalence on the basis of the of the species of the two genera of the ticks in question (Table 1), the age (Table 2), gender (Table 3) and the species of the cattle (Table 4). The results in table 1 show the various species detected in which the *Amblyomma* had only one species found while the *Rhipicepalus* had two genera as *A. cayannense* and *A. hebraeum*.

However on the basis of age and gender of the cattle examined, Table 2 and 3 represent the results obtained in which the age group 4-6 had the highest incidence with age group of 7-9 with the lowest.

Females were found to have a bit higher incidence of ticks infestation than their male counterparts as examined (Table 3).

For the breed of cattle however, the White Fulani had the highest infestation while Red Bororo had the least incidence with Bokoloji having none at all.

Table 1: Prevalence of *Amblyomma* and *Rhipicephalus*.

Tick species	Number of ticks found	Percentage positive
<i>Rhipicephalus evertsi</i>	24	21.43
<i>Amblyomma cayannense</i>	52	46.43
<i>Amblyomma hebraeum</i>	36	32.14
Total	112	100

Table 1 shows the number of tick species of the two genera, *Rhipicephalus* and *Amblyomma* with their respective percentage positive.

Table 2: Tick infestation based on age of the cattle

Age(years)	Positive	Negative	Total	Percentage positive
1-3	37	39	76	41.11
4-6	39	48	87	43.33
7-9	14	23	37	15.56
Total	90	110	200	100

The table above (Table 2) displays the tick infestation on the basis of the age of the cattle, and, it can be observed that the age group 4-6 years has the highest prevalence and the least prevalence recorded on the age group 7-9.

Table 3: Prevalence of infestation based on gender of the cattle

Sex	Positive	Negative	Total	Percentage positive
Male	42	47	89	46.67
Female	48	63	111	53.33
Total	90	110	200	100

Table 3 above shows the relationship of the tick infestation with the sex of the cattle examined. Female had a bit higher incidence than their male counterparts.

Table 4: Tick infestation based on the cattle breed

Breed	Positive	Negative	Total	Percentage positive
WF	49	51	100	54.44
RB	11	25	36	12.22
BKL	00	1	1	0
LB	30	33	63	33.33
Total	90	110	200	100

Key: WF=White Fulani, RB=Red Bororo, BKL= Bokoloji, LB= Local breed

Table 4 above, shows the breed of the cattle in relation to the infestation of the ticks. The White Fulani had the highest infestation in which 49 cattle out of 100 were found to be infested. However, Red

Bororo had the least infestation of the two tick genera; it was only 11 cattle out of 25 observed that were infested.

Discussion

The genus *Amblyomma* had a higher incidence than the *Rhipicephalus* with 88 ticks found out of 112 for the both genera (Table 1). This work corresponds with that of Tamiru and Abebaw (2010) who worked on the Prevalence of ticks on local and crossbred cattle in and around Asella town, southeast Ethiopia, Mehari (2004) who worked on distribution of livestock tick species in Awassa Area, AAU, Debrezeit, Ethiopia and Assefa (2004) who studied on the survey of ticks and tick-borne blood protozoa in cattle at Assela, Arsi Zone, Debrezeit, Ethiopia.

However, *Amblyomma cayennense* were found to be 52 and the remaining 36 were *A. hebraeum*. For the *Rhipicephalus*, it was only one species found to infest the animals in question, with only 24 *R. evertsi* out of the 112 tick detected (Table 1).

Table 2 shows that the prevalence of tick is relatively higher in middle aged cattle, 39 (43.33%) because they are the most active, followed by young cattle 37 (41.11%) and then, the older ones 14 (15.56%). This is at variance with the work of Yackhchali and Hassan (2004) who found out that the tick infestation was higher in adult cows than in young cattle in Oshnarich.

The prevalence of tick infestation was higher in females 48 (53.33%) than in male cattle 42 (46.67%) (Table 3); female cattle had higher infestation than male and this may be as a result of the presence of more hairless areas in female (e.g. vulva, teat, udder etc) than in their male counterparts. It may also be also be attributed to the fact that higher level of prolactin and progesterone hormones make individual more susceptible to infection. Moreover, stress of production

such as pregnancy and lactation might make the female animals more prone to infection.

In Table 4, the tick prevalence was significantly higher in White Fulani 49 (54.44%), followed by Local Breed 30 (33.33%), Red Bororo 11 (12.22%) and finally Bokoloji with 0%. This may not be unconnected with the thickness of their respective skins which gives the tendency for tick penetration. Among the four breeds of cattle examined, White Fulani is regarded as the breed with the thinnest skin as examined physically and palpably.

Conclusion

It can be deduced from the research conducted that *Amblyomma* was having higher prevalence in cattle than *Rhipicephalus* and that middle aged cattle are more prone to attack by ticks than any other age group. Moreover, female cattle seem to be more susceptible to tick infestation than their male counterparts and that White Fulani were the most infested breed of cattle as compared to Red Bororo, Local Breed and Bokoloji.

Recommendation

We appreciate the effort of Gombe cattle market, Dukku road, Gombe, for assistance rendered in allowing us to carry out part of the research therein as well as calming the cattle down for proper and efficient tick collection. Research should be conducted to find out if at all there is a relationship between production stress like pregnancy and lactation with tick infestation. Also, more research should be carried out to ascertain more facts on why female cattle are more prone to tick infestation than males.

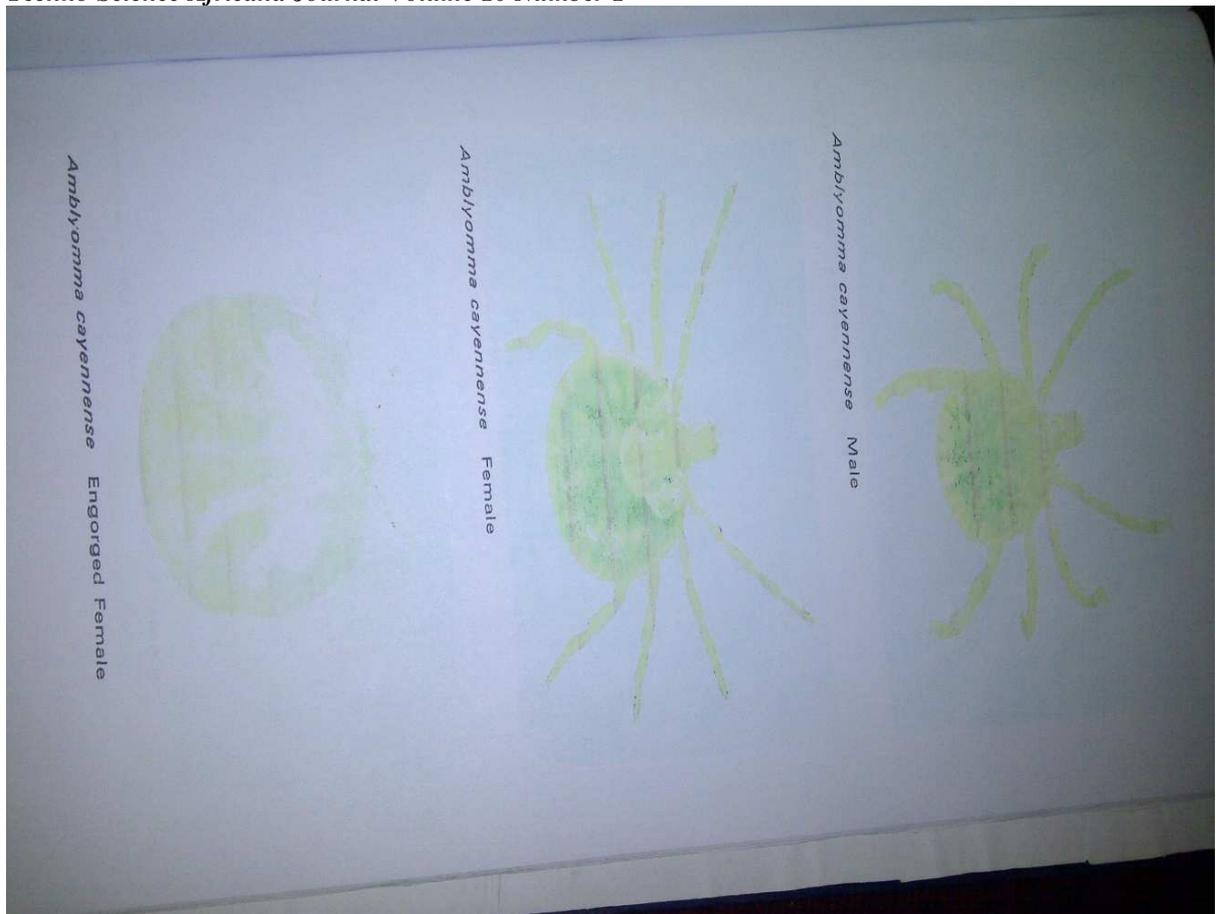


Figure 1: male and female *Amblyomma cayennense* ticks. The one below is the engorged female.

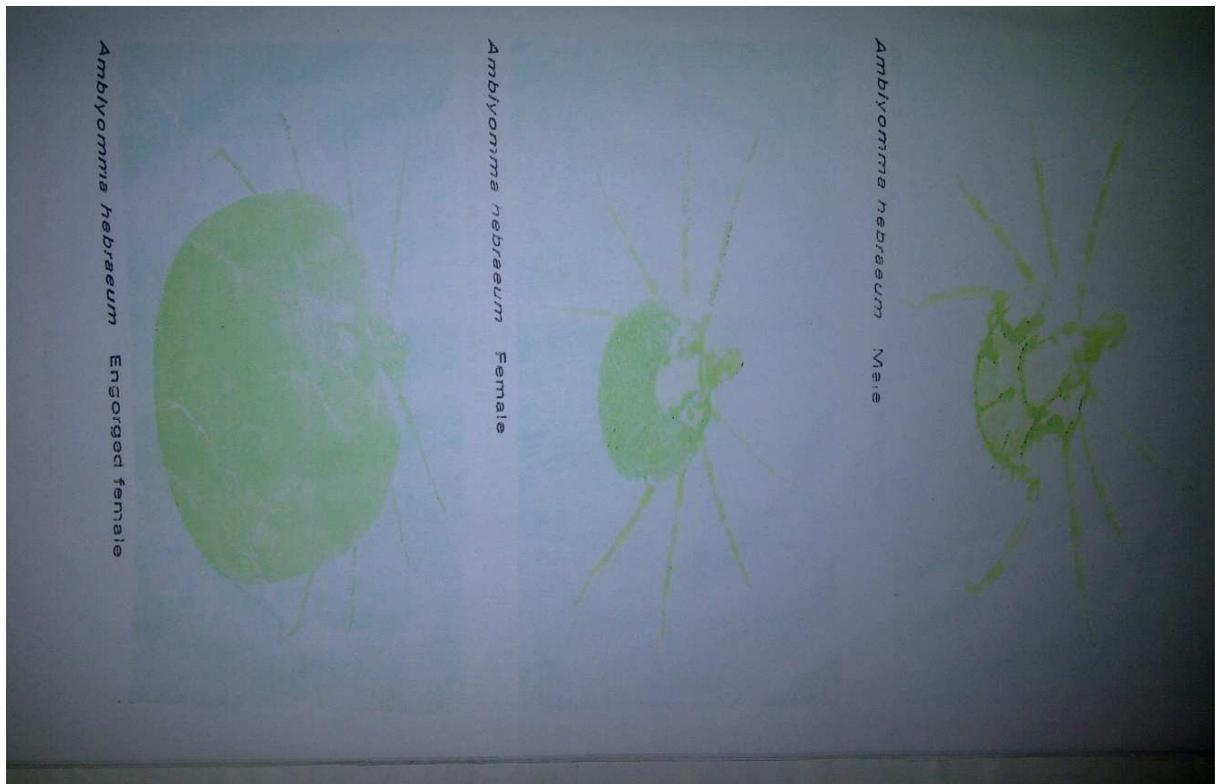


Figure 2: male, female and engorged female ticks of *Amblyomma hebraeum*

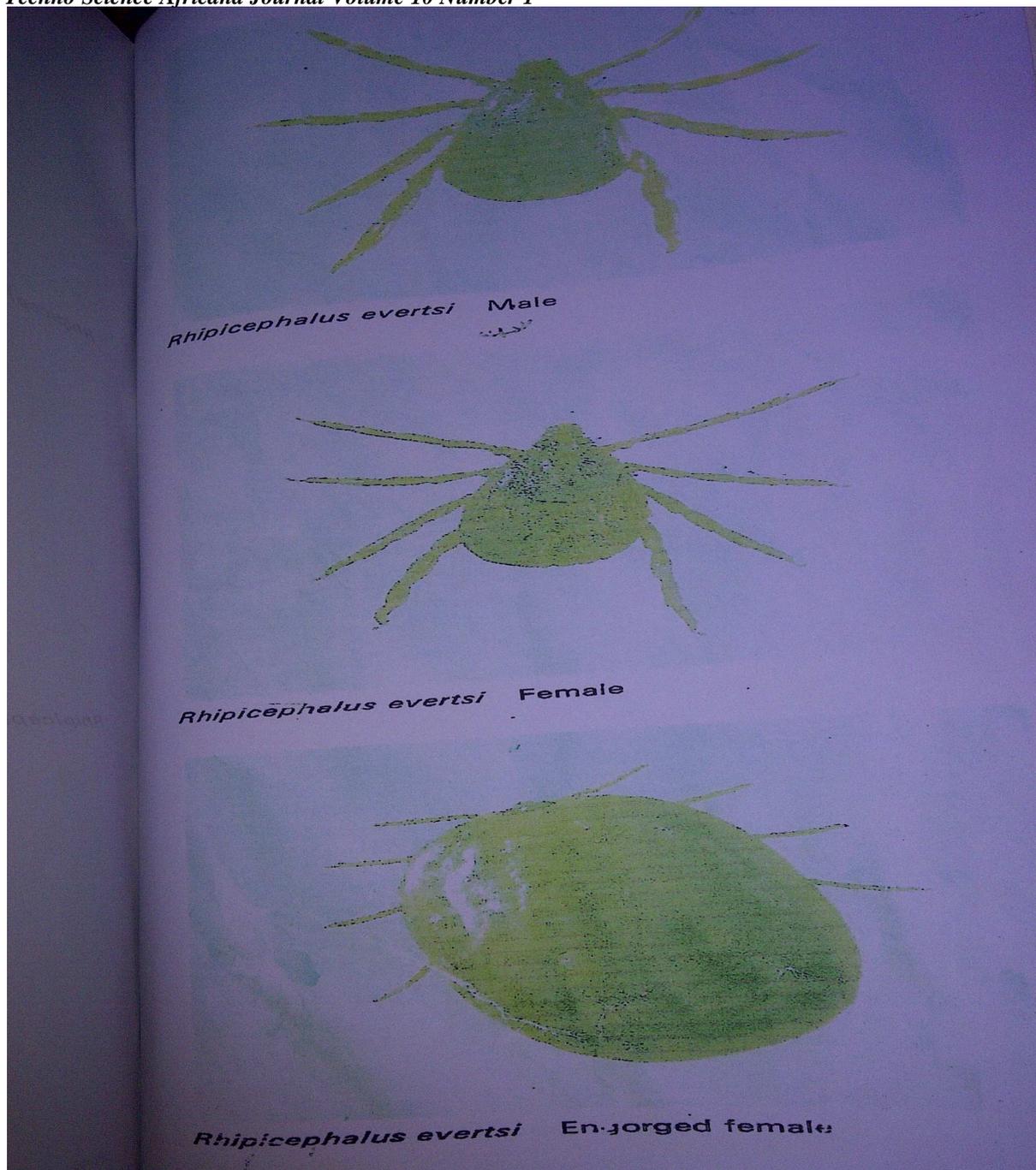


Figure 3: showing male and female as well as the engorged female of *Rhipicephalus evertsi*

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