Study on Prevalence of Hard Ticks of Cattle in and Around Debub Bench District Bench, Maji Zone

Daniel Markos Seifu

Wolaita Sodo, Ethiopia

*Corresponding Author: *Daniel Markos Seifu,* Wolaita Sodo, Ethiopia

Abstract: *This study aimed at determine the status of hard ticks (Ixodidae) of cattle in and around Debub bench(southwestern Ethiopia), Debub bench Woreda which is selected purposively based on the extent of the existing problems, the complaints of farmers and the level of medium to high ticks challenge in the areas. The prevalence of bovine tick was studied over a period of 6 months from December 2016-June 2017. Ticks were collected from 450 local and cross breed cattle which were kept under extensive management system .A total of 1191 ticks were collected from body part of cattle, and were identified to both genus and species level. Two genuses, Boophilus, Amblyomma were identified, the total prevalence of tick infestation in the study area during this research was 80.6%, constituting of 47.8 % (570/1191) Amblyommaand 52 % (621/1191) Boophilus. All visible attached adult ticks of all species were collected from five body region (head, brisket, udder, tail, and scrotum) of each cattle. The study indicated that there was high prevalence of ticks in the area. The higher prevalence in the current study was due to agro climate condition (rainfall, humidity, and temperature), host density and poor management system. Therefore it is recommended that it's better to develop the best control strategies of tick.*

Keywords: *Debub bench, Hard tick, Prevalence*

List of Abbreviations: *SPSS...simple liner using statistical package for social service; SNNP ...south nation nationalities and people region; BSC...Bachelor of Science; DBDLFDO...Debub bench District livestock and fishery development office*

1. INTRODUCTION

Ethiopia is believed to have the largest population in Africa among them the total cattle population for the county is estimated to about 53.99 million. Out of this total cattle population, the female cattle constitute about 55.48 percent and the remaining 44.52 percent are male cattle. This livestock sector has been contributing considerable portion to the economic development of the country (SCA, 2013). In addition to the products of meat and milk, cattle provide drought power for cultivation of the agricultural lands of many peasants. Skins and hider are also important components of the livestock sector in generating foreign export (Drummed, 2007).

Ticks belong to the phylum arthropod, class arachnid, and order Acari. The families of ticks parasitizing livestock are categorized in to two, the ixodidae (hard ticks) and Argasidae(soft ticks) through sharing certain basic properties ,the differed in many structures, behavioral, physiological, feeding and reproduction pattern (Urquhart *et al*., 1996).

There are more than 889 species of tick in the world are important to man and domestic animals (Drummed, 2007). In Ethiopia, there are 47 species of ticks found on livestock and most of them have importance as vector and disease sousing agents and also have damaging effect on skin and disease occurring agents and also have damaging effect on skin and hide production. They are most numerous, particularly in tropical and sub-tropical regions, and their impact on animal health and production is greatest in these regions (Kassa, 2005).

Ticks besides being important vectors for disease, like the theilerosis, anaplasmosis, babesiosis and rickettsiosis (heart water) in domestic animals, they also cause non specific symptoms like anemia, dermatitis, toxicsis and paralysis (Solomon *et al*., 2001).

According to the numbers of host, ixodids ticks are classified as one –host ticks, two host ticks, three host ticks and argosid classified as multi- host ticks (Tylor*et al*., 2007).Ticks are usually large and long lived, Compared to times, surviving for up to several years(Kettle, 1995).

Ticks infestation is a local and global problem .Not only can they cause physical damage and discomfort due to their feeding behavior. They can also act as recto and reservoir of important pathogens of animals as well as humans (Lord, 2008). Ticks that are considered to be most important to domestic animals health in Africa comprise about seven general and forty species, among this tick general, the main ticks found in Ethiopia are Ambylomma (40%), Boophilus (21%), haemaphysalis (0.5%), Hyalomma (1.5%), and Repicephalus (37%) (Decastor 1997, Minjauw and Mcleod, 2003). Among these, A.varigatum and B.decoloratus are most important and widely distributed (Abebaw, 2004). Coherence, A. gemma, A. lepidium, Hylommamarginatum found in Ethiopia (Pegramet al., 2004, Solomon and Kaaya, 1996).But there was no any finding about tick prevalence in Debub bench district before this study that is why I wanted to do in this title. Hence determination of ticks species and its prevalence in field is very critical to prevent and control tick borne disease and it is also important in order to evaluate the impact of tick on animal hide and skin which result in decrement of productivity. Therefore, the objectives of this study are:

- To Determine the Prevalence of Ticks Infestation
- To Identify the Common of Hard Tick Species Affecting Cattle.
- To Assess the Spatial Distribution and Apparent Density of Ticks in the Area

2. MATERIALS AND METHODS

2.1. Study Area

The study was conducted from December 2016-to June 2017 at south nation nationalities and people region of Bench maji zone particularly, in Debub bench Woreda which is located 589 km south west of Addis Ababa and it has state between 1300m and 2250m above sea level. Due to a high altitudinal range, the area is characterized by diverse agro climatic distribution and vegetation cover. This district is divided in to two agro- ecological zones, namely Dega and Weynadaga, which account for about 82 and 18% of the total area respectively.

The annual rain fall distribution in the Woreda varies between 900mm to 1600mm.The minimum temperature in the Woreda ranges from 11 to 13 degree centigrade, while the maximum temperature is the range 18 to 23 degree centigrade. The Woreda is bounded on the south by meinitshasha, on the west by Guraferda, on the north by Sheko, on the north east by semen bench, on east by she bench, and on the south east by menit Goldiya Woreda. Also town of mizan Aman is surrounded by it. Farmers in the Woreda have an estimated total 46,083 head of cattle, 22,048 sheep, 11,045 goats, 425 horses, 1463 mules, 58,565 poultry of all species and 4,308 beehives (DBDLFDO, 2015).

2.2. Study Animals

The study was conducted on a total of 450 cattle on different age, sex and body condition category that in around debub bench Woreda of three selected Kebeles.

2.3. Study Design

Cross sectional type of study was conducted with an assumption that it was help of tick in relation to its identification and prevalence within a study area.

2.4. Methodology

Ticks were collected from cattle after being restrained using strong crushes, by physical handling to identify for tick species and for total tick burden counting. Ticks were manually collected by searching on different regions of animal body. They were collected from five body region (head, brisket, udder, tail and scrotum) of each animal. The skin of each study cattle was inspected for the presence of ticks. All adults were collected by using universal bottles, collected ticks were preserved in 70% ethyl alcohol and transported to Mizan Regional Veterinary laboratory. In the laboratory techniques for tick examination , ticks were seen grossly and classified to different genus and species level depending up on their morphology and identification structures they have, such as shape of scutum , leg color , body ,coxae one and venteral plates. During tick identification in the laboratory

the sample was put on petridish and examined under stereomicroscope then identifying the ticks. The additional material used in the laboratory was gloves, forceps and identification key.

2.5. Sample Size Determination

Tick sample were collected from local and few cross breed cattle. The total number of required for the study was determined calculated based on the formula given by according to Thrusfield (2005). By considering 50% expected prevalence and taking 95% confidence interval and 5% desired absolute precision (d=0.05). Accordingly, the calculated sample size was found to be 384 cattle; however a total of 450 cattle were sampled to increase the precision.

$$N= \frac{1.96^2 (p_{exp}) (1-_{Pexp})}{d^2}$$

Where N=required sample size

P exp= expected prevalence

D= desired absolute precision (usually 0.05)

2.6. Data Analysis

Data collected from field were entered in to Microsoft excel spread sheet (Microsoft corporation).The data were analyzed by SPSS version 20 statistical package. Descriptive statistics and chi square were used to describe the prevalence of different ticks association of risk factors with tick infestation. A statistically significant association between variable was said to exist if the calculated $p<0.05$ at confidence level.

3. RESULTS

Overall prevalence is 80. 6%, out of total 450 cattle examined, 363 were found to be interested with different genus of ticks.

As indicated in table 1 below, as to genus level Ambyoloma is abundant comprising of 621 counts out of 1191 total cont. while in causing of infestation individually in sample cattle, B.*decoloratus*has highest prevalence, 37.1 % and A.v*ariegatum*has the lowest (24.4%) in this study area.

Table1. *Prevalence of ticks and of percentage ticks species from the connected ticks*

Tick Spps	No. of infested	Percentage %	Total no. of collected ticks	Percentage of total ticks
A.*variegatum*	110	24.4	326	27.4
A.*lepidum*	86	19.1	295	24.8
B.*decoloratus*	167	37.1	570	47.8
Total	363	80.6	1191	100

Table2. *Relative ratio of male to female of tick species*

Tick Spps	Male count(no.)	Female count(no.)	Male to female ratio
A.*varigatum*	192	134	1.4:1
A.*lepidum*	163	132	1.2:1
B.*decoloratus*	348	222	1.6:1
Total	703	488	1.4:1

Considering risk factors and prevalence of hard ticks, only body conditions of cattle has statistically significance (P value = 0.002) showing different body condition affect the prevalence of ticks in the study area (Table 3).

Table3. *Prevalence of hard tick in association of different risk factors*

Variable		No. of examined	No. positive	Prevalence	×2	P- value
Sex	Male	159	103	64.7%	0.216	1.529
	Female	291	260	89.3%		
Age	>3 years	309	234	75.7%	0.867	0.212
	<3 years	141	129	91.5%		
Breed	Local	444	357	80.4%	0.33	0.665
	Cross	6	6	100%		

BCs	Good	135	85	63%	12.056	0.002
	Medium	225	190	84.4%		
	Poor	90	88	97.7%		
Origin	D/Work	150	130	86.6%	13.618	0.056
	Kob	150	106	70.6%		
	Zozo	150	127	84.6%		
Total		450	363	80.6%		

4. DISCUSSION

This study shows that out of 450 cattle, 363 were harboring at list by one species of tick with the overall prevalence of ticks in the area was 80.6%.

This finding is in agreement with the reports of Alemu et al (2014) with overall prevalence of 81.5% at Bedele district western Ethiopia. However, the prevalence of ticks in the current study is higher than the reports of Gedilu et al, (2014), Tadesse and Sultan (2014) and Abdissa (2012) who reported prevalence of tick with overall prevalence of 74.0, 59.4 and 53.2%, respectively. In addition, various researchers work has proven to find less prevalence of tick infestation than the present study including the reports of Tikit and Addis (2011) and Onu and Shiferaw (2013) who indicated tick prevalence of 25.64 and 14.5%, respectively. This difference could be due to the difference in the agro-climatic condition of the study areas, since tick activity was influenced by rainfall,altitude and atmospheric relative humidity(Pegram et al 1981).

The tick species identified in this study area were *A.verigatum, A.lepidium,* and *B.decolaratus.* Amblyomma was the most abundant tick genus in the area accounts (52.1%) from 1191 ticks collected during study period, and followed by Boophilus which account for 47.9% of total collected. This finding is greater than survey conducted at Bedele Ethiopia region Oromia (BWAB, 2006) which was found to be prevalence of31.25% infestation. At species level B. decolaratus is the most abundant tick species in this study area account 47.8% which is lower than the finding of Gedilu et al (2014) who reported 47.93%. The distribution of B. deolaratus is generally annual rain fall about 800mm according to Pegram et al,(1981). The second abundant tick species in study area was A.verigatum with the prevalence of 27.4%. The prevalence of the study was disagree with other report conducted 4.7 %. (Onu and Shiferaw, 2013). That reports low prevalence of this ticks which may be due to geographical location and weather condition (Yitabarek, 2004). A.lepidium is the third common tick species the study area during the period of study conducted with the prevalence accounts 24.8% and it has reported as prevalent in May other parts of the country like Sude Woreda Arsi zone Ethiopia(2016). This difference found is probably due to difference geographic location, climate conditions, and local management of cattle.

5. CONCLUSION AND RECOMMENDATIONS

The study on the identification of ticks species and its distribution in the area considered as an aid of improving tick control. Among ectoparasites tick cause the greatest economic loss in live stock production either by transmitting a wide variety of tick-borne disease or by affect in health of the animal as well as the quality of hides and skins. The study further presents the tick species identified in their veterinary value; the most important and abundant tick species belongs to B. decoloratus, A.vergatum and A. lepidium. Of these B**.** decoloratus is the abundantly distributed tick through the period of study due to conductive environmental factors prevailing in the area.

Based on the above conclusion, the following recommendations are forwarded:

Awareness creation and improved management systems practice should be given to stakeholders.

Appropriate tick control program should be implemented in the area.

Further studies in the distribution of pattern of tick and factors responsible for their distribution and tick-borne disease assessment and surveillances in the study area should also be conducted.

I would like to express my deepest gratitude to Dr, Zewdu head of mizan regional laboratory for his appreciable guidance, advice and help during my work in laboratory and supplying materials for the field.

Finally I express my special appreciation and great Love of my wife Tadelech Tariku who gave encouragement in my research process.

REFERENCES

[1] Abdias, R. (2012): Prevalence of ioxdid ticks on cattle in welmera district, west-showa zone, Ethiopia DVM thesis Haramaya University College of veterinary medicine, Haramaya, Ethiopia.

[2] Abebaw, G. (2004): Seasonable dynamics and hot preference of Boophilusdecolaratus on naturally infested cattle in Jimma Zone, southern eastern Ethiopia Vet. J.18 (1): 19-28.

[3] Census (2007): Southern nation nationalities and people's region Debub bench District livestock and Fishery Development office (DBDLFDO), (2015).

[4] Decastro, JJ. (1997): Sustainable tick borne disease control in western Ethiopia. J.S. Afr .vet. Assoc. 71(74): 240-243.

[5] Drummond, RO. (2007): Tick borne livestock disease and their vector. Word animal Review 3. Htm Ethiopia. FAO consultancy report 9 June-24 July 1979 FAO, Rome (Italy).

[6] Gedilu, M, Mohammed, A and Kechero, Y (2014): Distribution of prevalence of ixodid ticks of cattle breed, their predilection sites of variation and tick burden between different risk factors in Bahir Dar, Ethiopia. Global veterinary 13(4):520-529.

[7] Kassa, B. (2005): standard veterinary laboratory diagnostic Manual – vol – III-MOA Addis Ababa, Ethiopia

[8] Kelly, W. (1975): Age determination by teeth, in veterinary clinical diagnosis. 2nd ed., Bailliere Tindall, London. Pp. 12-15.

[9] Kettle, D. (1995): Medical and veterinary entomology, 2nd ed. Uk: CAB international. Pp. 420-460.

[10] LORD (2008): Brown dog tick, Rhiplcephalus sanguineous Laetrile (Arachandria: acari: ixodiade). featured. Creatures from entomology and Nematology Department

[11] Minjauw, B and Mcleod, A. (2003): Tick borne disease and poverty. The impact of Ticks and tick borne disease on livestock owners in India and. Eastern health program center for topical veterinary medicine, university.

[12] Moran, M and Nigaru, G. (2004): Tick control; new concept, w.w.w.Foo.org (AGA/AGAP/FRG).

[13] Onu, SH and Shiferaw, TZ. (2013): Prevalence of ectoparasite infections of cattle Bench Maji zone, southwest Ethiopia, veterinary World 6(6): 291-294.

[14] Pegram, PG., Tatchell,.J., De Castro, MJ., Mcchizyuka, PG.,.Costcer, MC.,Monar, MC and Nigarura, G.(2004): Tick control new concepts, WWW. FAO.org/ AGA/AGAP/Feedback .htm.

[15] Sharma, SN.,Gahlot, AK and Tanwar, RK.(2003):Veterinary Jurisprudences 5th. ed NBS publisher, India, Pp. 128-129.

[16] Solomon, G and Kaaya, G (1996): Studies on the Developmental and Survival of Rhipicephaluspulchelu and Amblyomagerma under Filed condition, Ethiopia vet, Assoc.

[17] Solomon, G., Nigist, M and Kassa, B. (2001): Seasonal variation of ticks on claves at sebeta in western shewa zone. At sebeta in, western shewa zone. Ethiopia veterinary journal, 7 (1&2): 17-30.

[18] Tadesse, B and Sultan, A. (2014): Prevalence and distribution of tick infestation on cattle

[19] Taylor, M., Coop, RH and Wall, RL. (2007): Veterinary, Parasitology.3rd ed. Black well publisdhing, London. Pp. 679-712.

[20] Urquhart, G., Armoun, J., Dunean, JI., Dunn, AM and Jennings, F. (1996): Veterinary parasitology, 2nd Ed. Black well science. The University of Glaskow, Scotland, UK. Pp. 181-188.

[21] Walker, AA.,Boutour, A., Camicas, JL., Estadapena, AA., Harok, IG., Hatif, AA., Pegram, RG and Perton, P (2003.):Ticks of domestic animals in Africa : A guide to Identification species. The University of Edinburg, UK. Pp. 67-80