

Distribution and Prevalence of Hard Tick in Cattle and Around Gambella Town, SouthWest Ethiopia

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ABSTRACT

This study was conducted from year November 2013 to April 2014 in and around Gambella town with the objectives to assess the prevalence of major hard ticks and tick genera identification in the study area. A cross-sectional study implemented to assess the prevalence of hard tick on 384 cattle. A random sampling technique, method was applied for tick collection and genus identification. Tick samples were collected from left side of different body regions of the cattle and multiplied by two to get the total tick burden on the affected cattle. Collected tick samples transported to Bedele Regional Veterinary Laboratory for identification by labeling various necessary information on the sample collecting tubes. Totally, of 2005 adult ticks collected from left half body part of cattle. This study revealed hard tick prevalence of 89.58% with the most prevalent genera of Amblyomma, Hyalomma, Boophilus and Rhipicephalus. In all, the total ticks collected, Amblyomma, Hyalomma, Boophilus and Rhipicephalus constituted 32.62% 18.75%, 35.77% and 12.85%, respectively. Proportionally the predilections site of Amblyomma, Hyalomma, Boophilus and Rhipiciphalus were neck & head, perineum & brisket, belly, genital& anal, leg and udder & scorotum respectively. Female ticks were the highest proportions while the tick burden in relation to age were significantly in adult cattle than younger. Since this study revealed tick as important external parasites, it is necessitated for regular parasitological investigation and application of effective prevention, prophylactic and control measures. With the current study result, tick identification to species level on molecular technique bases is recommended.

Key words: Cattle, tick, prevalence, predilection site

INTRODUCTION

Ethiopia has a total cattle population estimated to be about 52.13 million, 24.2 million sheep, 22.6 million goats, 1.96 million horses, 6.4 million donkeys, 0.37 million mules, and about 0.99 million camels in the sedentary areas of the country. The total poultry population at country level estimated to be about 44.89 million (CSA, 2012). However, livestock production is low consequently impeding the overall agricultural development due to different constraints. One of the most important constraints is the infestation of tick and tick borne disease by affecting the

health and productivity of livestock (Wall and Shearer, 2001).

Ticks are the most important ecto-parasites of livestock in tropical and sub-tropical areas, and are responsible for severe economic losses both through the direct effects of blood sucking, toxins and indirectly as vectors of pathogens. Large numbers of ticks, causes damage on hides and predispose cattle to Myiasis and Dermatophilosis. In addition, reduction in live weight gain, milk yield and anemia, besides creating sites for secondary invasion by pathogenic organisms among domestic animals. Ticks also act as a vector in transmitting protozoan parasites such as, *Theileriosis*, *Anaplasmosis*, *Babesiosis* and *Rickettsiosis* (Heart water) which are the most economic constraints (Gates and Wescott, 2000; Mtshali *et al.*, 2004).

Gambella region endowed with a large number of livestock, but with this enormous number of livestock, the region did not get its best benefit due to many animal health problems, from which tick may play their role directly or indirectly. This study designed to assess the most prevalent hard ticks and tick genus identified in the study area, which is essential for the development of effective tick and tick borne disease control strategies.

MATERIALS AND METHODS

Study Area

Gambella town, Gambella people's Regional State located, South West Ethiopia was the study site, which is located at 766km far away from the main capital of the country, Addis Ababa. It is located at an approximate geographic coordinate of 6°20'N-8°30'N latitude and 33°10'-35°50'E longitude. The republic of South Sudan bound the Region on the west and South West by Southern nations, nationalities and people region; on the south and East by Oromiya regional states in the north. It covers a total area of about 34,063km square and Gambella is a name for both the region and the city, which is perched at an elevation of 526 meters above sea level. The town founded on the banks of the Baro River, Ethiopia's widest and the only navigable river. The major livestock diseases in the area comprised of Epidemic infectious diseases (*CBPP*, *Pasturolosis*, and *CCPP*). Arthropods, Arthropods borne diseases and endo-parasites are among the major livestock health problems (CSA, 2007). Based on the Central statistics report of Ethiopia (CSA, 2012), Gambella People National, Regional State has 251,367 cattle, 50,602 sheep, 79,623 goats, 729 horses and 301,735 poultry population and 58,402 beehives.

STUDY ANIMALS

The study animals were all cattle present in the study area, of all ages and sexes.

STUDY DESIGN AND SAMPLING

A cross-sectional study from November 2013 to January 2014 implemented in and around Gambella town. From 384 local cattle, breeds (*Abigar*) of all ages and sexes ticks were collected for this prevalence and tick genera identification study.

Purposively we selected four kebeles based on the cattle population and accessibility namely as *Baro Mado* (kebele 02), *Jejebe Terara*, (kebele 04), *Newland* (kebele 01) and *Addis sefer* (kebele 03). Then tick samples randomly taken from 384 cattle of all the total kebeles. From each *Kebele* 96 cattle were included and 25 cattle from four different sites of one kebele were selected.

We gathered general background information of the study population of the area from the nearby veterinary clinic. An interview conducted by cattle owners and information collected on the infestation and their management systems. Randomly ticks were collected from left half body part using forceps at six main sites (neck/head, belly, udder/scrotum, Anal, legs and perineum /brisket) (Okello-onen *et al.*, 1999).

The time ticks samples collected was between about 8:00 AM and 11:00 AM. Ticks collected from each body region and kept in a separate universal bottle containing 70% ethanol as a preservative. The universal bottle were labeled with animal sex, age, place of collections, owner's name, animal identification code, body sites of collection, and date and month of collection and the breed were made; and then transported to the Bedle Regional Veterinary Laboratory for tick genera identification. Tick identification is based on morphological and structural differences of the adult ticks of each genus by Stereomicroscope.

DATA ANALYSIS

For analysis, the half body tick counts doubled to obtain whole body tick burden. All data recorded in this study was entered into Microsoft excel and subsequently analyzed using SPSS 16.0 software. We used descriptive statistics to show the study results.

RESULTS

In this study, 2005 adult hard ticks of both sexes collected from 344 heads of cattle. Forty cattle found free of tick out of the sampled cattle population. The major tick genera found in this study were *Amblyomma* 32.62% (658), *Hyalomma* 18.75% (379), *Boophilus* 35.77% (713) and *Rhipicephalus* 12.85% (255). *Rhipicephalus* and *Hyalomma* were the least tick genus collected in this study representing 12.85% and 18.75 % respectively. Yet, *Boophilus* (35.77%) and *Amblyomma* (32.62%) were high prevalence in the study area (Table 1).

Table 1. Prevalence of tick genera identified in the study area

Tick genera	Total ticks (n)	Prevalence (%)
<i>Amblyomma</i>	658	32.62
<i>Hyalomma</i>	379	18.75
<i>Boophilus</i>	713	35.77
<i>Rhipicephalus</i>	255	12.85
Total	2005	100

The tick prevalence in the study area is 89.58%, with the least proportion found in New Land kebele 22.10% (Table 2).

Table 2. Proportion of tick with respect to the different kebeles in the study area.

Code kebele	N ^o Examined (n)	N ^o positives (n)	Prevalence (%)
<i>New Land</i>	96	76	22.10
<i>Baro Mado</i>	96	86	25
<i>Addis Sefer</i>	96	91	26.45
<i>Jejebe Terara</i>	96	91	26.45
Total	384	344	89.58%

Table 3 indicates the age wise tick distribution in adults and young cattle, which found to be similar 89.45 % and 89.79% respectively.

Table 3: The proportion of age wise cattle distribution included in during the study.

Age category of cattle		N ^o . Examined	N ^o positives	Prevalence
Age	Young	147	132	89.79
	Adult	237	212	89.45
Total		384	344	89.58

The highest female number was found in *Boophilus* ticks (females were highest compared to male *Boophilus*, *Amblyomma*, *Rhipicephalus* and *Hyalomma* respectively from higher to lower order) (Table 4), which shows hosts are losing blood due to females demand large blood for ovulation and reproduction.

Table 4. proportion and sex wise ratio of adult hard ticks.

Tick Genera	Male % (n)	Female%(n)	Total %(n)	Female to male ratio
<i>Amblyomma</i>	21.58(142)	78.42(516)	100 (658)	3.79
<i>Hyalomma</i>	46.17 (175)	53.83(204)	100 (379)	3.29
<i>Boophilus</i>	19.91 (142)	80.08(571)	100(713)	4.02
<i>Rhipicephalus</i>	43.92(112)	56.07(143)	100(255)	2.55
Total	28.47 (571)	71.52(1434)	100(2005)	16.76

Perineum and brisket, genital & anal, neck & head, udder and scrotum, belly and leg were the highest tick predilection sites from higher to lower order when the tick burden totally compared respectively (Table 5).

Table 5. Proportion of tick with respect to the different predilection site.

Tick genera	Neck and head	Udder and scrotum	Genital and anal	Belly	Leg	Perineum and brisket	Total
<i>Amblyomma</i>	144	279	72	48	59	152	754
<i>Hyalomma</i>	32	43	221	5	15	242	558
<i>Boophilus</i>	75	13	47	209	21	33	398
<i>Rhipicephalus</i>	119	7	89	20	4	3	242
Total	370	342	429	282	99	430	3904

DISCUSSION

The study revealed tick prevalence with 89.58 % that is higher for local breed cattle observed in the Haramaya district (58.18%) (Asrate and Yalew, 2012). The *Boophilus* comprises 35.77 % that were higher tick genus total collected in this study compared to *Boophilus* (18.13%) (Tiki and Addis, 2011). *Boophilus* is one of the most economic impact tick species in Ethiopia (De Castro, 1994). The *Boophilus* is important because it is an efficient vector of Bovine anaplasmosis and Red water transmission in cattle (Okello-Onen, *et al*, 1999). Different researchers in southwestern zones of Ethiopia (De Castro, 1994), and Bahir Dar (Fetiya, 2010) also frequently encountered *Boophilus*. Other parts of the continent *Boophilus* were also the most abundant tick identified in many parts of East Africa (Okello-Onen, 1999). From four collected hard ticks genera the prevalence of *Amblyomma* was 32.62 %, which was also one of the widely distributed cattle tick in Ethiopia (De Castro, 1994).

The genus *Hyalomma*, accounts 18.75 % of the total ticks collected in the study area, which, was the highest prevalence next to *Boophilus*, compared to a study done around Holeta town that

was 1.85 % (Tiki and Addis, 2011). *Haylomma* found in sub-Saharan Africa and rift valley and as far South Africa and the tick species is also commonly found throughout the drier Ethiopia faunal region (Okello-Onen, *et al.*, 1999). In a study conducted around Holeta town prevalence of *Amblyomma* (50.5%) was higher than current finding (Tiki and Addis, 2011). *Rhipicephallu* tick also comprises 12.85 % of the total tick collected that was lower prevalence rate than all other collected genera and then a study conducted around Holeta Town (29.49%) (Tiki and Addis, 2011). *Rhipicephalus* also widely distributed in Eastern Africa (Adena, 2008).

Male tick genera account 28.47% while females 71.52%. In all the four genera female ticks found to be in higher proportion compared to their counterparts that is similar in a study observed at in the Haramaya district (Surafel and Amsalu, 2012). This showed that, female infestation found to be greater than male ticks due frequent visiting of hosts for a fresh blood meal after mating. The female to male tick sex-ratios accounted *Amblyomma* (3.29:1), *Hyalomma* (3.79:1), *Boophilos* (4.02:1) and *Rhipiciphalus* (2.55:1) which is again similar to Surafel and Amsalu (2012), meanwhile in this study, *Hyalomma* and *Rhipicephalus* female ticks were lower compared to Mohamed *et al*, (2014) conducted at Haramaya district who recorded the highest female proportion.

Concerning the preference of ticks in selecting attachment sites in the perineum and brisket (430), genital and anal (429), neck and head (370), udder and scorotom (342), belly (282), leg (99) from higher to lower. A variety of factors such as density, interaction between tick genera, time and season determine the attachment sites of ticks. The attachment site of all the tick genera was neck & head, perineum & brisket, belly, genital& anal, leg and premium and brisket area. Udder& scorotom, perineum & brisket and neck & head where highly infested by *Amblyomma* than others and *Hyalomma* was highly infest premium and brisket and genital & anal. However, genus *Boophilos* and *Rhipiciphalus* were highly infest belly, neck and head area respectively.

CONCLUSION

This study indicated the problem of ticks in cattle in the study area as they were widely distributed in all the study sites. Four genera of the ticks were among the most commonly identified *Ixodidae*. The result of this study reflects the presence of tick borne diseases in the area, that demands further study of tick borne disease distribution. Besides, molecular level of tick species identification and implement integrated tick prevention and control methods application is essential. Hence, this high prevalence of ticks in the study area deserves serious attention at all levels in order to minimize the spread of infestation and improve the living standard of farmers. Besides molecular tick identification technique is remains essential.

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REFERENCES

- Asrate S, and Yalew, A (2012). Prevalence of cattle tick infestation in and around Haramaya district. *Journal of Veterinary Medicine and Animal Health*. 4(6), pp. 84-88
- Bedass M, Abebe B, Degefu H (2014).Species composition and seasonal variation of Ixodid

- cattle tick in around Haramaya town, *Journal of Medicine and Animal Health*. 6(5), pp.131-137
- CSA (2012). Central Statistics Authority of Ethiopia. Agricultural Sample Survey, Livestock and Livestock Characteristics, Statistical Bulletin (2)532: Addis Ababa, Ethiopia.
- De Castor JJ (1994). A survey of tick species in western Ethiopia, including the previous findings and recommendation, for further tick survey in Ethiopia. Technical report AG DP/ETH/83/023.FAO, Rome, pp. 1-83.
- De Castro JJ (1994). Sustainable tick and tick borne disease control in livestock improvement in developing countries. *Veterinary Parasitology*. 71, 77-97.
- De Castro, J.J. (1997). Sustainable tick and tick borne disease control in livestock Improvement in developing countries *Veterinary Parasitology*. 71, 69-76
- Fetiya R (2010). A Study on the prevalence and Identification of adult *Ixodidae* tick Species in and around Bahir Dar. DVM, thesis, Faculty of veterinary medicine, Haramaya University, Haramaya, Ethiopia.
- Gates NI and Wescott RB (200). Parasites of cattle. College of Veterinary Medicine, Washington State Univ., CE Publications/eb1742/eb1742.
- Mtshali MS, de Wall DT, Mbatia PA (2004). A sero epidemiological survey of blood parasites in cattle in the north-eastern Free State, South Africa. Onderstepoort *Journal of Veterinary Research*. 71: 67-75.
- Okello-Onen J, Hassan SM, Seaman S (1999). Taxonomy of African tick, an identification manual. International center for insect physiology and ecology press, Nairobi, Kenya, 1: 124.
- Tiki B, Addis M (2011). Microbiology and Veterinary Public Health Team, School of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Distribution of Ixodid Ticks on Cattle in and Around Holeta Town, *Global Veterinaria* 7 (6) Jimma University, Ethiopia.
- Wall R, Shearer D(2001). Veterinary entomology. Arthropod Ectoparasite of veterinary importance Chapman and Hall London, 96-146.