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# Prevalence of Ixodid Ticks on Bovine of Werieleke Wereda, Tigray

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**Abstract:** Cross sectional study using random sampling with the aim of determining the prevalence and identification of tick genera in cattle in Worie-Leke Wereda, Central Tigray, Ethiopia, from January to June 2014 was conducted on 700 cattle. The study revealed that cattle in the study area were infested with single and multiple genus of ticks with an overall prevalence of 86.1% (603/700). Overall three genera of ticks which belong to *Amblyomma* (75.6%), *Rhipicephalus* (8.8%) and *Hyalomma* (3.0%) were identified. Age wise prevalence was 13.9% in 6 months up to 2 years old, 40.4% in 2-5 years old and 31.8% in greater than 5 years old cattle. With regard to the rate of ticks it was 82.8% in local breed and 3.3% in Begait breeds. At the same time, the prevalence of these tick genera was 8.9%, 71.0% and 6.3% in poor, medium and good body conditions respectively. In addition, 47.7% and 38.4% prevalence was recorded in male and female respectively. This indicates the presence of highly infestation of ticks on cattle of the study area. Hence; appropriate control measures for external parasites in the study area using spray and continuous surveillance of the parasite and its effect is essential.

**Key words:** Age · Body Condition · Breed · Cattle · Prevalence · Tick

## INTRODUCTION

Ticks are obligate, blood feeding ectoparasites of vertebrates, particularly mammals and birds [1]. These belonging to the class Arachnida, order Acari. The two families of ticks of veterinary important are ixodidae (Hard ticks) and Argasidae known as soft ticks; contain relatively small numbers of species of veterinary important. The ixodidae/hard ticks/usually have achitnous covering, or scutum, which expands over the whole dorsal surface of the male, but it covers only small surface behind the head of the larvae, nymph and female ticks [2]. Ixodidae ticks are relatively large, range 2-20 mm in length. The body of unfed ticks is flattened dorosventrally, divided into two sections, the anterior gnathosoma and the posterior idiosoma,which bears the legs [3]. Based on the number of hosts required to complete their development during their life cycle they can be classified as one-host, two-host and three-host ticks [4]. Species that complete molts without leaving the host are called one-host ticks, species whose engorged nymph drop off to molt are called two-host ticks and those whose nymph and larvae drop off to molt known as three-host ticks [5].

Ticks have adverse effect on livestock in several ways and parasitize a wide range of vertebrate hosts and transmit a wide variety of pathogenic agents than other group of arthropods [6].Ticks are the most common and harmful blood sucking ectoparasites of animals. Ticks bite can directly debilitating to domestic animals, causing mechanical damage, irritation, inflammation and hypersensitivity. The salivary secretion of some tick species may cause toxicosis and paralysis and when they feed, they capable of transmitting a numbers of pathogenic viral, bacterial, rickettsial and protozoal diseases to livestock. In addition, they may also cause damage to the quality of hides and skins [3, 7].

Argasid ticks are small belonging to four genera, *Argas*, *Ornithodoros*, *Otobius* and *Antricola*. Argasids live in nests burrows, building and sleeping places of their host animals and are distributed mostly in dried regions or in drier habitats in most regions [5]. Among the

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most important ixodid ticks species in Ethiopian cattle are *Amblyomma gemma*, *A. variegatum*, *A. cohaeruns*, *A. lepidum* and *Rhipicephalus* (*Boophilus*) *decoloratus* [8-10]. *Rhipicephalus pravus, R. evertsi, R. practextatus, R. muhasmae, R. bergeoni, R. simus* were also reported by Mekonen *et al.* [10] and Yilma *et al.* [11]. *Hyalomma drodarii*, *H. trucatum*, *H. rufipes H. excavatum*, *H. impelatum* were also previously identified by Walker *et al.* [4] and Yilma *et al.* [11].

However, in the study area no research has been carried out previously on the prevalence of ixodid ticks. Therefore the current study aimed to determiningthe prevalence rate of ixodid ticks on cattle.

## MATERIALS AND METHODS

**Study Area:** The study was conducted from January to June, 2014 in Worei-leke Woreda, central Tigray Located 164 km far from Mekelle the capital city of Tigray. It is found at an altitude of 1450-2350 meter above sea level. The agro-climate of the Woreda is almost Kolla (84%) and weyna-dega 16%. The average annual rain fall of the Woreda is 340-800mm.

**Study Population:** The study population was local breeds of Begait cattle (398 male and 302 female) of different age group, sex and body condition categories.

**Study Design:** Cross sectional study using random sampling was used to select animals for the identification of tick genera and the animals were grouped as 6 month-2 years, 2-5 years and greater than 5 years for the age animals and the body condition were classified as poor, medium and good.

**Sample Size Determination:** The sample size was determined by assuming the expected prevalence of 50% tick infestation as there was no previous research conducted in the study area. The desired sample size for the study was calculated using the 95% confidence interval and at 5% absolute precision using the formula indicated by Thrustfield [12].

$$n=\frac{1.96^2 * Pexp(1-Pexp)}{d^2}$$

Where

n = required sample size
Pexp = expected prevalence
d = desired absolute precision.

Using the above formula the sample size was known to be 384, but to increase the precision of the result the sample size was increased to 700 cattle.

**Sampling Procedure:** Physical examination to see the presence and absence of the ticks was conducted on the cattle. During sampling the age, sex and body condition of the cattle was recorded properly. Sample of ticks was collected for further identification of the genera of ticks and the collected tick samples were put in a universal sampling bottle containing 70% ethanol. Ticks were brought to the veterinary parasitological laboratory of Mekelle University College of veterinary medicine and identified to their genera (Genus) level by using stereo microscope.

**Data Analysis:** For data analysis descriptive statistics to determine the prevalence of the different tick genera was conducted and for testing the association between the different risk factor and the prevalence of the ticks Chi-square was used and significant association was considered when p-value is less than 0.05.

## RESULTS

The prevalence of different ticks in different age of cattle indicated that the genus *Ambylomma* was higher in all age groups of cattle as compared to other genus of the tick as indicated in (Table 1).

The rate of the different tick genera in different breed of cattle also revealed that *Ambylomma* was higher in both local and Begait breed of cattle as indicated in (Table 2).

Table 1 The distribution of different genera of tick in different age groups of cattle

| | Age | | | | |
|---|---|---|---|---|---|
| Genus | 6month-2years | 2-5 years | >5years | Total | p-valve |
| *Ambylomma* | 83(11.9%) | 250(35.7%) | 196(28%) | 529(75.6%) | .000 |
| *Rhipicephalus* | 11(11.3%) | 21(7.4%) | 21(9.4%) | 53(8.8) | |
| *Hyalomma* | 3(4%) | 12(1.7%) | 6(0.9%) | 21(3.0%) | |
| Total | 97(13.9%) | 283(40.4%) | 223(31.8%) | 603(86.1%) | |

Table 2: The prevalence of tick genera in local and Begait breed

| | Breed | | | |
|---|---|---|---|---|
| Genus | Local | Begait | total | p-value |
| *Ambylomma* | 506(72.3%) | 23(3.3%) | 529(75.6%) | .370 |
| *Rhipicephalus* | 53(8.8) | 0(0.0%) | 53(8.8) | |
| *Hyalomma* | 21(3.0%) | 0(0.0%) | 21(3.0%) | |
| Total | 580(82.8%) | 23(3.3%) | 603(86.1%) | |

Table 3: The prevalence of the different genera of ticks in different body condition of cattle

| | Body condition | | | | |
|---|---|---|---|---|---|
| Genus | Poor | Medium | Good | Total | p-value |
| *Ambylomma* | 52(7.4%) | 435(62.1%) | 42(6.0%) | 529(75.6%) | .000 |
| *Rhipicephalus* | 8(1.32%) | 43(7.1%) | 1(0.17%) | 53(8.8) | |
| *Hyalomma* | 2(0.3%) | 18(2.6%) | 1(0.1%) | 21(3.0%) | |
| Total | 62(8.9%) | 497(71.0%) | 44(6.3%) | 603(86.1%) | |

Table 4: The prevalence of the different genera of ticks in male and female cattle

| | Sex | | | |
|---|---|---|---|---|
| Genus | Famale | Male | Total | p-Value |
| *Ambylomma* | 241(34.4%) | 288(41.1%) | 529(75.6%) | .216 |
| *Rhipicephalus* | 21(3.5) | 32(5.3%) | 53(8.8%) | |
| *Hyalomma* | 7(1.0%) | 14(2.0%) | 21(3.0%) | |
| Total | 269(38.4%) | 334(47.7%) | 603(86.1%) | |

Similarly, the result of the rate of the tick genera in the different body condition of the cattle showed that the rate of *Ambylomma*, *Hyalomma* and *Rhipicephalus* was higher in medium body condition animals compared to poor and good body condition animals as indicated in (Table 3).

The finding of the different genera of ticks in male and female also revealed that the rate for the different genera of ticks was higher in male animals as compared to female cattle as shown in Table 4.

## DISCUSSION

In the current finding all types of tick genera was observed in the cattle of the study area with the overall prevalence of 86.1%. The prevalence of the different *Ambylomma* in all age groups was higher compared to the other genera.. But the high rate of *Hyalomma* was observed in 6 month to 2 years old cattle and in those greater than 5 years old cattle. But regarding the tick genera *Rhipicephalus* it was higher in the age groups 0f 6 month to 2 years with the rate of 11.3% compared to the age groups ranging from 2-5 year and in these age group greater than 5 years with the rates of 7.4% and 9.4% respectively.. However there was statistical variation of the different tick genera among the age groups of cattle ($p<0.05$). Similarly high rate of *Amblyomma* species were identified in Assela by Behailu [13], who reported prevalence of 75.6%. At the same time all the tick genera were identified by Mehari [14], in Awassa, Sied [15] in Mizan Teferi, Etsay [16] in Bedelle and Yitbarek [17] in Jimma. At the same time, Nibret *et al.* [18] reported that *Amblyomm variegatum* was the most abundant tick species encountered.

With regard to breed difference *Amblyomma* tick was identified in local and Begait breed with the rates of 72.3% and 3.3%, respectively. But that of *Hyalomma* and *Rhipicephalus* was higher in local breed cattle with the rate of 4.6% and 6%, respectively compared to that of Begait. The current finding revealed that there was no significance statistical difference of the tick genera in the two breeds of cattle ($p>0.05$). Similarly, Hilina *et al.* [19] reported that highest in local breeds compared to exotic breeds.

Based on the body condition of the animals high rates of all tick genera identified in this study were observed in medium body condition animals with the rates of 62.1%, 2.6% and 7.1% of *Amblyomma*, *Hyalomma* and *Rhipicephalus,* respectively followed by medium body conditioned animals with significance statistical difference among the different body condition cattle ($p<0.05$). The current finding was in agreement with that

of Hilina *et al.* [19] who reported that moderate body condition cattle were highly affected compared to poor and good body condition.

At the same time the rates of the different tick genera in male and female indicated that higher rates i.e 41.1%, 2% and 4.6% of *Ambylomma*,, *Hyalomma* and *Rhipicephalus* was identified in male animals compared to that of female cattle. However there is no statistical significance difference between male and female cattle ($p>0.05$). In line with the current finding [19] also o reported high rate of the parasites in male compared to female cattle in Mekelle.

## CONCLUSION

The present study showed high prevalence ixodid tick genera in Worie-leke cattle. The important and abundant tick genera were *Amblyomma*, *Rhipicephalus* and *Hyalomma*. However, the attentions given to the infestation were not sufficient. Acaricide application when the prevalence is aggravated is the only method of tick control in the Woreda. Tick should be managed at an economically acceptable level by a combination of techniques and this requires knowledge of the tick genera prevalence and an understanding of their epidemiology. Because there is no single method that would guarantee complete control of ticks, combination of available methods of tick control is necessary. This encompasses the selection of tick resistant cattle, acaricide treatment and appropriate livestock management. Therefore, standing from the above conclusion the following recommendations were forwarded:-

- Further studies in the distribution pattern of generas and species are necessary for the continuous understanding of the problems and to use improved control strategies.
- Special attention should be considered on the seasonal abundance of tick genera and species and identified in the study area.
- Tick control attention has to be developed to reduce the burden of tick infestation in the cattle of the study area.

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