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Determination of the Prevalence of Ixodid Ticks of Cattle Breeds, Their Predilection Sites of Variation and Tick Burden Between Different Risk Factors in Bahir Dar, Ethiopia

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Abstract: A cross sectional study was conducted from October 2013 to April 2014 in and around Bahir Dar town with the objectives of determining the prevalence of ixodid ticks and assessing the difference in infestation among the different risk factors such as breed, age, sex, body condition score and management systems. A total of 1500 adult Ixodid ticks were collected from cattle (*Bos indicus* vs., *Bos indicus* × *Bos taurus*).A total 404 cattle were randomly selected and examined. Results showed that the overall prevalence of tick infestation was found to be 74% (299/404). Four tick genera were identified with the constituents of *Rhipicephalus* (formerly *Boophilus*) (47.93%), *Hyalomma* (33.13%), *Amblyomma* (18.47%) and *Rhipicephalus* (0.47%). The five tick species identified with their respective prevalence were *R.* (*B.) decoloratus* (47.93%), *H. rufipes* (33.13%), *A. variegatum* (18.27%), *R. evertsi evertsi* (0.47%) and *A. cohaerens* (0.20%). Among others, *R.* (*B.) decoloratus* and *A. cohaerens* were the most and least abundant tick species, respectively. The sex ratio of all ticks identified was skewed towards male except for *B. decoloratus*. The prevalence of tick infestation was found significantly different (x^2=12.976, P<0.05) between breeds with higher prevalence in local breed (*Bos indicus*) (78.5%) than cross (*Bos taurus*) (60.4%). Similarly, tick infestation was significantly higher (x^2=11.1242, P<0.05) in cattle under extensive (91.7%) than both those under semi-intensive (66.3%) and intensive (32.9%) management systems. Statistical analysis showed significant difference (x^2=93.040, P<0.05) in the prevalence of tick infestation among age groups with higher prevalence in cattle with age >3 years (85.1%) than both 1-3 years (62.7%) and <1year (22%). Furthermore, statistically significant difference (x^2=63.066, P<0.05) in tick infestation was found among cattle breeds having different body conditions with a highest prevalence scored in poor (99.2%) followed by medium (65%) and good (22.2%), respectively. The prevalence of tick infestation was observed between male and females (P>0.05). The high prevalence of tick infestation in the study area might be associated to lack of community awareness about the impact of ticks, health care services and management practices of cattle. It is strongly suggested that the need to implement community awareness together with the setting up of tick prevention and control strategies.

Key words: *Rhipicephalus* · *Amblyomma* and *Hyalomma* · Infestation · Bahir Dar · Ethiopia

INTRODUCTION

Ethiopia represents various climatic zones and livestock production systems in tropical Africa [1]. The total cattle population for the country is estimated to be about 52.13 million. Out of this total cattle population, the female cattle constitute about 55.57 percent and the remaining 44.43 percent are male [2]. All these cattle are at risk from the effects of ticks and tick-borne diseases [3].

The tick-borne diseases of livestock constitute a complex of several diseases whose etiological agents may be protozoal, rickettsial, bacterial or viral; their single common feature is that they can all be transmitted by ticks [4]. Ticks and tick borne disease (TBD) are widely distributed throughout the world particularly in tropical and sub tropical countries, which causes a tremendous economic importance in livestock production [5]. Over 79 different species are found in eastern Africa but many of these appear to be of little or no economic importance [6].

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In Ethiopia, there are 47 species of ticks found on livestock and most of them have importance as vector and disease causing agents and also have damaging effect on skin and hide production [7]. Ticks, besides being important vectors for diseases like theilerosis, anaplasmosis, babesiosis and rickettsiosis (heart water) in domestic animals; they also cause non specific symptoms like anemia, dermatosis, toxicosis and paralysis [8]. In Ethiopia ticks are common in all agro ecological zones of the country [9]. Ticks and tick-borne diseases cause considerable losses to the livestock economy, ranking third among the major parasitic diseases, after trypanosomosis and endoparasitism [10].

Ticks have many effects on animals which may include loss of blood (anemia), Tick toxicosis, tick worry, bite wound, wounds and myiasis, tick-borne diseases [11-13].

Numerous studies have been conducted on the ticks and tick-borne diseases of cattle in various parts of Ethiopia and several species of ticks belonging to genus *Amblyomma*, *Boophilus*, *Rhipicephalus*, *Hyalomma* and *Haemaphysalis* have been reported [10]. However, in the study area, to the best of the current knowledge, no research has been conducted that indicates the prevalence of Ixodid ticks among cattle. Therefore, this study was designed to determine the prevalence of ixodid ticks among cattle in and around Bahir Dar town, Ethiopia with the objectives of determining the prevalence of tick genera including species and identifying the major risk factors for tick infestation in the study area.

MATERIALS AND METHODS

The Study Area: The study was conducted in Bahir Dar city, from November 2013 to April 2014. Bahir Dar is located in the North Western part of Ethiopia at a physical distance of 565 kilometers from Addis Ababa, the capital city of Ethiopia. The study area is located at 11°29' – 11°41' N latitude and 37°16' – 37°27'E longitude. The landscape is flat with some small hills to the East and West. The average elevation in the town is about 1795 meters above sea level (m.a.s.l). The town covers an area of about 16,000 hectares. The mean annual precipitation depth recorded at Bahir Dar Station in 37 years period from 1962 to 1999 is about 1437 mm [14]. The study area experiences average annual rainfall that ranges from 1200-1600 mm and it has mean annual temperature of 26°C [2].

Study Population: The study population consisted of cattle which were brought from different areas to Bahir Dar veterinary clinic and cattle kept under individual households. Cattle were categorized under different groups. Based on management practices (extensive (free grazing), semi-intensive and intensive (zero-grazing)), breed (local and cross), age (<1year, 1-3 years,>3 years), sex (male, female) and body condition score (poor (<4.5), medium (4.5-6.5), good >7)).

Study Design: A cross-sectional study design was used to determine the prevalence of tick genera and species, their predilection sites of variation and tick burden between different risk factors. The study population were categorized based on age (<1year, 1-3ears and >3years), breed (local and cross) [5, 15]. The risk factors which were under consideration were sex, age and management systems, body condition. The body condition scores (good, medium and poor) were classified according to the classification method used by [16] in and around Bahir Dar.

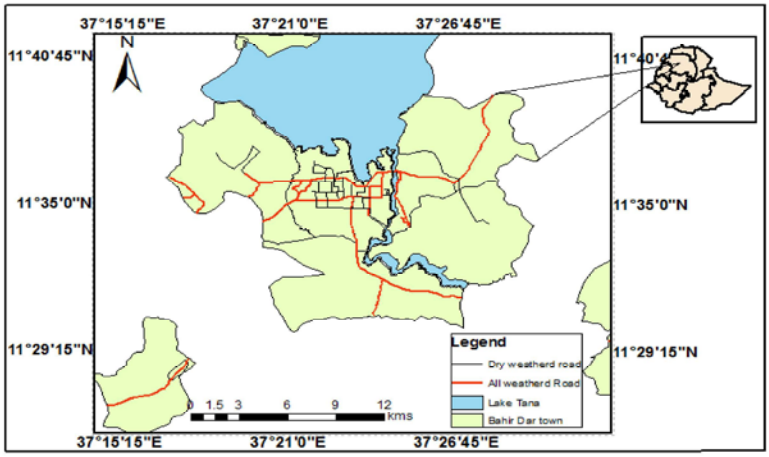

Fig. 1: Location map of the Study Area, Source: [14].

Sample Size Determination: The desired sample size was determined by assuming 50% expected prevalence of tick infestation at 95% confidence interval and 5% absolute precision. Therefore, the relevant formula for the desired sample size was based on Thrustfield [17] would be:

$$n = \frac{Z^2 \, Pexp \, (1 - Pexp)}{d^2}$$

where;

n = Required sample size, P^{exp} = expected prevalence and
d^2 = Desired absolute precision.
Z = Constant from normal distribution table at a given confidence level.

So, the calculated sample size can be:

$$N = \frac{(1.96)^2 \text{ x } 0.5(1-0.5) = 384.16}{(0.05)^2} = n = 384.$$

To increase precision, the sample size was increased to an appropriate number. In all the analysis, statistical analyses was considered significant at $P<0.05$. Prevalence was calculated as the proportion of examined cattle with positive results.

Tick Collection: Ticks were carefully removed from the host for identification using quality steel forceps [18] following standard tick collection techniques [19]. Cattle were restrained in a cattle race for tick counts and tick collections. Counting of ticks was done on one side of the animal [20]. Half body tick collection method on the alternative side was made. The collected ticks were placed in to universal bottle containing 70% ethanol [21]. Collected adult ticks from each body regions (head, dewlap, brisket, belly, udder/scrotum, anal/genital region, leg and tail [22] were kept separately in to separate well leveled (date, sex, breed, body condition, management system, age, site of collection, predilection site) sample bottles and transported to Bahir Dar animal health investigation and diagnostic laboratory centre for further identification using stereomicroscope.

Tick Identification: Tick identification was performed based on identification keys adopted by Kassa and Yalew[15] and Mesele [23] and reference ticks from Bahir Dar Animal Health Investigation and Diagnostic Laboratory Centre was used. Investigation procedure requires both field work and laboratory identification techniques. The collected ticks were identified based on generically distinguishing features of adult Ixodid ticks (mouth parts, basis capitulli, ornate, eyes, festoon, adnal plates, adnal groove, caudal process, coxae I, coxae IV, leg) [21].

Statistical Analysis: All data was analyzed using SPSS version 21 computer software. Chi-square test was used to determine the significant variation on tick burden among different age, sex, body condition and breed and management system. Descriptive analysis was used to show favorable predilection site of tick. $P<0.05$ was set to indicate the presence of significant statistical associations between variables.

RESULTS

Overall Prevalence and Distribution of Tick Genera and Species among Cattle: A total of 404 cattle were examined out of which 168 (41.58%) and 236 (58.42%) were males and females, respectively (Table 1). Two hundred and ninety nine (74%) of the cattle were positive for one or more tick genera and/or species. A total of 1500 ixodid ticks were collected from which four genera *Rhipicephalus* (formerly *Boophilus*), *Amblyomma*, *Hyalomma* and *Rhipicephalus*) and five species (*B. decoloratus, A. variegatum, A. cohaerens, H. rufipes* and *R. evertsi evertsi*) of ticks were identified.

Rhipicephalus (formerly *Boophilus*) (48.10%) was recorded as the most abundant and the least prevalent tick genera respectively. *Rhipicephalus* (*Boophilus*) *decoloraus* (47.93%) and *A. cohaerens* (0.20%) were found the most and least tick species identified respectively (Table 2). Each tick species tended to prefer a site of attachment on the animal body. The most favorable predilection site for *R.* (B.) *decoloratus* was dewlap, axillae, groin/belly, udder/scrotum but it was also found on the rest of body parts, *Hyalomma rufipes* was collected from under tail and ano-genital, *A. variegatum* favors ano-genital, udder/scrotum, groin/belly and axillae. The species of *R. evertsi evertsi* was mostly collected from under tail and ano-genital and site for *A. cohaerens* was ano-genital and groin/belly. At the species level the male to female ratio was *R.* (B.) *decoloratus* (0.007:1), *H. rufipes* (10.295:1), *A. variegatum* (12.047:1), *A. cohaerens*(3:0), *R. evertsi evertsi* (7:0).

Table 1: Distribution of tick genera and/or species with predilection sites

Tick genera (species)	No. ticks (%)	Sex ratio (M:F)	Predilection sites
Rhipicephalus (formerly *Boophilus*)	719 (47.93)	0.007:1	dewlap, axillae, groin/belly, scrotum/udder
Hyalomma (H. rufipes)	497 (33.13)	10.295:1	under tail, ano-genital
Amblyomma	277 (18.47)		
A. vareiegatum	274 (18.27)	12.047:1	axillae,scrotum/udder, groin/belly, ano-genital
A. cohaerens	3 (0.20)	3:0	groin/belly, ano-genital
Rhipicephalus (R. evertsi evertsi)	7 (0.47)	7:0	Ano-genital, under tail
Total	1500 (100)		

Table 2: Prevalence of tick genera and species among age groups of cattle

	Age, No. of positive (prevalence in%)					
Tick genera (species)	<1 year (n= 50)	1-3 years (n=59)	>3 years (n=295)	Total (N=404)	X^2	P-value
R. (B.) decoloratus	11 (22.0)	23 (39.0)	142(48.1)	176 (43.6)	12.468	0.002
Amblyomma	0 (0)	18 (30.5)	74 (25.8)	94 (23.3)	17.923	0.000
A. variegatum	0 (0)	18 (30.5)	74 (25.1)	92 (22.8)	17.648	0.000
A. coherens	0 (0)	0 (0)	3 (1)	3 (0.7)	1.117	0.572
Hyalomma (*H. rufipes*)	1 (2.0)	18 (30.5)	113 (38.3)	132 (32.7)	25.764	0.000
Rhipicephalus (*R. evertsi evertsi*)	0 (0)	0 (0)	7 (2.4)	7 (1.7)	2.632	0.268

Table 3: The overall infested cattle among age groups

Age	Nº of examined	Nº of positive	Prevalence (%)	X^2	P-value
<1 year	50	11	22	93.040	0.000
1-3 years	59	37	62.7		
>3 years	295	251	85.1		
Total	404	299	74		

Table 4: Prevalence of tick genera and species among management systems of cattle

	Management system, No. of positive (prevalence in%)					
Tick genera (species)	Extensive (n= 230)	Semi-intensive (n=92)	Intensive (n=82)	Total (N=404)	X^2	P-value
R.(B.) decoloratus	106 (46.1)	45 (48.9)	25 (30.5)	176 (43.6)	7.368	0.025
Amblyomma	73 (31.7)	20 (21.7)	1 (1.2)	94 (23.3)	31.693	0.000
A. variegatum	71 (30.9)	20 (21.7)	1 (1.2)	92 (22.8)	30.290	0.000
A. cohaerens	3 (1.3)	0 (0)	0 (0)	3 (0.7)	2.287	0.319
Hyalomma (*H. rufipes*)	98 (42.6)	29 (31.5)	5 (6.1)	132 (32.7)	36.704	0.000
Rhipicephalus (*R. evertsi evertsi*)	6 (2.6)	1 (1.1)	0 (0)	7 (1.7)	2.708	0.258

Prevalence of Tick Genera and Species among Age Groups of Cattle: In the study, the overall prevalence of *Rhipicephalus* (formerly *Boophilus*) (43.6%) and cattle >3years and <1year of age scored the highest and least prevalence (48.1%, 11%), respectively and the difference was found statistically significant (P<0.05). The species *A. variegatum* and *A. cohaerens* had scored the overall prevalence of (22.8%, 0.7%) and the highest prevalence among the age groups was recorded in animals > 3years (25.1and 1%) respectively. The species *H. rufipes* had the overall prevalence of (32.7%) and (38.3%, 30.5% and 2.0%) prevalence was recorded in animals >3years, 1-3years and <1year respectively. The total prevalence *R. evertsi evertsi* was (1.7%) and the highest prevalence scored in cattle >3years (2.4%). Prevalence differences in *R.* (B.) decoloratus, *A. variegatum and H. rufipes* were statistically significant (P<0.05) among these age groups (Table 3).

From the total of 404 examined cattle for tick infestation, 299 (74%) of cattle under different age groups were found positive for one or more tick species of which 50, 59 and 295 cattle of <1-year, 1-3 years and >3 years, respectively scored an overall prevalence of 22%, 62.7% and 85.1%. The difference in prevalence among the age groups were statistically significant (P<0.05) (Table 4).

Prevalence of Tick Genera and Species among Management Systems of Cattle: Of the 230, 92 and 82 cattle from extensive, semi-intensive and intensive management system respectively, an overall prevalence of 91.7%, 66.3% and 32.9% were recorded and the difference in prevalence of tick infestation was statistically significant (P<0.05) between the management systems (Table 6). Regarding to tick species from the study, the highest prevalence of *B. decoloratus* (48.9%), *A. variegatum* (30.9%) were recorded in semi-intensive and

Table 5: The overall infested cattle within management system

Management System	Nº of examined	Nº of positive	Prevalence (%)	X2	P-value
Extensive	230	211	91.7	1.1242	0.000
Semi-intensive	92	61	66.3		
Intensive	82	27	32.9		
Total	404	299	74		

Table 6: Prevalence of tick genera and species among body conditions of cattle

	Body condition, No. of positive (prevalence in%)					
Tick genera (species)	Poor (n=118)	medium (n= 277)	Good (n=9)	Total (N=404)	X^2	P-value
R. (B.) decoloratus	67 (56.8)	107 (38.6)	2 (22.2)	176 (43.6)	12.795	0.002
Amblyomma	49 (41.5)	45 (16.2)	0 (0)	94 (23.3)	32.412	0.000
A. variegatum	49 (41.5)	42(15.2)	0 (0)	9 (22.5)	35.632	0.000
A. cohaerens	0 (0)	3 (1.1)	0 (0)	3 (0.7)	1.386	0.500
Hyalomma (*H. rufipes*)	54 (45.8)	78 (28.2)	0 (0)	132 (32.7)	16.125	0.000
Rhipicephalus (*R. evertsi evertsi*)	5 (4.2)	2 (0.7)	0 (0)	7 (1.7)	6.168	0.046

Table 7: The overall Prevalence of positive cattle with body condition

Body condition	Nº of examined	Nº of positive	Prevalence (%)	X^2	P-value
Poor	118	117	99.2	63.066	0.000
Medium	277	180	65		
Good	9	2	22.2		
Total	404	299	74		

Table 8: Prevalence of tick genera and species between sexes of cattle

	Sex, No. of positive (prevalence in%)				
Tick genera (species)	Male (n=168)	Female (n=236)	Total (N=404)	X^2	P-value
R. (B.) decoloratus	71 (42.3)	105 (44.5)	176 (43.6)	0.198	0.565
Amblyomma	43 (25.6)	51 (21.6)	94 (23.6)	0.873	0.350
A. variegatum	40 (23.8)	51 (21.6)	91 (22.5)	0.272	0.602
A. coherens	3 (1.8)	0 (0)	3 (0.7)	4.246	0.039
Hyalomma (*H. rufipes*)	52 (31.0)	80 (33.9)	132 (32.7)	0.387	0.534
Rhipicephalus (*R. evertsi evertsi*)	1 (0.6)	6 (2.5)	7 (1.7)	2.185	0.139

Table 9: The overall tick infested cattle within sex of animal

Sex	Nº of examined	Nº of positive	Prevalence (%)	X^2	P-value
Male	168	118	70.2	2.127	0.145
Female	236	181	76.7		
Total	404	299	74		

H. rufipes (42.6%) was recorded extensive management system and their difference in prevalence were found statistically significant (X^2=11.1242) 1between the management systems. The species *A. cohaerens* (1.3%) and *R. evertsi evertsi* (2.6%) was scored both in extensive management system but their prevalence was found statistically insignificant (P>0.05) (Table 5).

Prevalence of Tick Genera and Species among Body Conditions of Cattle: Out of 118, 277 and 9; poor, medium and good body conditioned cattle, 177(99.2%), 180(65%) and 2(22.2%) of tick infestation prevalence were recorded respectively and the difference in prevalence were found statistically significant (X^2 = 63.066) and (P =0.000) (Table 8). On this study the prevalence of *R.* (B.) decoloratus (56.8%) showed the highest, *H. rufipes* (45.8%) the second and *A. varegatum* (41.5%) the third in poor body conditioned cattle. The prevalence in medium body conditioned cattle for *R.* (B.) decoloratus, *A. varegatum* and *H. rufipes* was 38.6%, 15.2% and 28.2% respectively which showed statistically significant difference (*P*<0.05) (Table 7).

Prevalence of Tick Genera and Species Between Sexes of Cattle: Out of one hundred and sixty-eight (168) male cattle and of 236 female cattle 118 (70.2%) and 181(76.7%) were positive for one or more of the tick genera and/or species respectively (Table 10). Regarding tick genera

Table 10: Prevalence of tick genera and species between breed of cattle

Tick genera (species)	Breed, No. of positive (prevalence in%)			X^2	P-value
	Local (n=303)	Cross (n=101)	Total (N=404)		
R. (B.) decoloratus	126 (41.6)	50 (49.5)	176 (43.6)	1.933	0.164
Amblyomma	81 (26.7)	13 (12.9)	94 (23.3)	8.152	0.004
A. variegatum	78 (25.7)	13 (12.9)	91 (22.5)	7.191	0.007
A. coherens	3 (1.0)	0 (0)	3 (0.7)	1.007	0.316
Hyalomma (*H. rufipes*)	108 (35.6)	24 (23.8)	132 (32.7)	4.861	0.027
Rhipicephalus (*R. evertsi evertsi*)	6 (2.0)	1 (1.0)	7 (1.7)	0.436	0.509

Table 11: An overall Prevalence of positive cattle within breed

Breed	Nº of examined	Nº of positive	Prevalence (%)	X^2	P-value
Local	303	238	78.5	12.976	0.000
Crossbred	101	61	60.4		
Total		404	299	74	

and species infestation, their difference in prevalence was found statistically insignificant (X^2 = 2.127) and (P = 0.145) between sex of cattle (Table 9).

Prevalence of Tick Genera and Species Between Breed of Cattle: A total of 303 local and 101 cross breeds of cattle were examined for tick infestation out of which 238 (78.5%) and 61 (60.4%) of the local and cross cattle respectively were found infested by one or more tick genera/species and the difference in the overall prevalence of tick infestation between breed was statistically significant (P<0.05) (Table 11).

From the examined cattle, the highest prevalence of *B. decoloratus, A. variegatum and H. rufipes* (49.5%, 25.7% and 35.6%) was recorded in cross and local breed respectively and the difference was found statistically significant (P<0.05) between this two breeds (Table 11).

DISCUSSION

Accoding to the order of performance *R.* (B.) decoloratus Boophilus, *Hyalomma*, *Amblyomma* and *Rhipicephalus* were major generas of ticks identified in the study area. These genera are comment to Bahi Dar area [24]. The five tick species identified for each genus were *R.* (B.) decoloratus, *H. rufipes*, *R. evertsi evertsi*, *A. variegatum* and *A. cohaerens. A. lepidum* and *H. truncatum* were reported by Mesele [24], however, their presence was not yet approved in the present study. In contrary, one new tick species *(A. cohaerens*) was identified in the present study.

R. (B.) decoloratus was found to be the most abundant tick species in and around Bahir Dar (47.93%) and this result was in agreement with the reports of other authors (Assosa region, [5]; in Somali, Awubere district [22], Rift valley [25], Bale [26]; Girana vally: of North wollo [27]. According to these authors *R.* (B.) decoloratus are often collected in Ethiopia and are highly abundant in the tropics.

Hyalomma rufipes was the second most abundant tick in the study area that covered 33.13% of the total count. This prevalence was higher than reports of different authors for different agro-ecological zones of Ethiopia. For instance in Bako area [28], Assella [29], Bahir Dar [24] and Somali [22] have reported a 1.2%, 2.5%, 0.59% and 2.83%, respectively, prevalence of *H. rufipes*. According to Hoogestraal [30], *H. rufipes* is widely distributed in the most arid parts of tropical Africa, receiving 250 to 650 mm annual rainfall and rare in the western highland area. The same author reported the meager availability of this parasite between 1000-2000 m elevations. The current result disagrees with Hoogestraal's statement because the study site was found on the average elevation of 1795 m and this tick species was widely distributed in the study area.

Amblyomma variegatum was the third most abundant tick collected and it represented (18.27%) of the total count. This result was lower than results of previous works recorded by different authors: Mesele [24] in Bahir Dar (75.91%), Belete and Mekonnen [31] in Holeta (45.49%), Kassa and Yalew [15] in Hararamaya district (38.87%).

Amblyomma variegatum is the most widely distributed cattle tick in Ethiopia [32] and has a great economic importance, because it is the efficient vector of *Cowdria ruminatum*, the organism causing cowdrosis or heart water in cattle [33]. *Amblyomma variegatum* also causes the greatest damage to hides and skins because of its long mouth structure which renders the commodity valueless on world market if the infestation is high [34].

Furthermore, ulcer caused by this tick species becomes favorable site for secondary bacterial infection like *Dermatophilus congolensis*.

Amblyomma cohaerens was the fifth and least abundant tick species identified in the study area represented (0.20%). In tick survey conducted in western Ethiopia. *Amblyomma cohaerence* was founded to be the most prevalent in Mezan Teferi [35] and Jimma [36] with a prevalence of 50.5% and 83.1%, respectively [31]. In Holeta, (5.02%) [15], in Hararamaya district (8.30%), [16] in Benchi Maji Zone (4.2%). However, in western Ethiopia, where the climate is humid much of the year, *A. cohaerens* is the most prevalent and abundant tick on cattle Pegram *et al*. [9].

In all cases except for *R.* (B.) decoloratus males outnumbered females; this is most probably because fully engorged female ticks drop off to the ground to lay eggs while males tend to remain on the host up to several months later to continue feeding and mating with other females on the host before dropping off. Host grooming easily remove semi-engorged or engorged females as compared to males. The females of *R.* (B.) decoloratus outnumbered males in this study probably due to the small size of the male which could not be seen and is considered as one of the contributory factors for missing males. Similar reports were indicated in the country by Kassa andYalew [15] and Tesfaheywet and Simeon [16].

Regarding to tick infestation in relation to age groups, from the total of 404 examined cattle for tick infestation 74% (299) of cattle under different age groups were found positive for one or more tick species. Of which 50, 59 and 295 cattle of <1-year, 1-3 years and >3 years respectively scored an overall prevalence of 22%, 62.7% and 85.1%. The difference in prevalence among the age groups were statistically significant (P<0.05, X^2=93.040). The higher prevalence were recorded in animals >3years (85.1%). This is due to the management they were kept. In the study area, older cattle were kept under extensive management system (communal grazing land). The effect of age on the burden of tick were statistically significant (P<0.05) and adult cattle presented higher burden of *R.* (B.) decoloratus than calves. The calves were kept apart from adult animals at population density and were thus possibly exposed to lower parasite burden on the pasture and almost graze on zero grazing. Calves generally more resistant to infestation of tick than adult [37, 38].This study is inline of the above authors.

Tick infestation regarding to different management systems, of the 230, 92 and 82 cattle from extensive, semi-intensive and intensive management system respectively, an overall prevalence of 91.7%, 66.3% and 32.9% were recorded and the difference in prevalence of tick infestation was statistically significant (P<0.05, X^2=11.1242) between the management systems. The higher prevalence was recorded on animals which were kept under extensive management system (91.7%). In Holeta [31] found the higher prevalence of ticks of cattle kept under extensive production system with a prevalence of 45.40% than on cattle kept under semi-intensive farming system where the prevalence was 10.06%. This situation could be hypothesized that regular washing and cleaning of barn and animal, regular treatment of animals with acaricides can reduce the susceptibility of tick infestation in semi intensive animal. Extensively kept cattle are kept in the communal grazing land often without pasture treatment can also create a conducive environment for ticks towards their host while they are questing, so susceptibility of tick infestation is higher.

From this study, *R.* (B.) decoloratus (56.8%) and *A. varegatum* (41.5%) in poor body conditioned cattle and *H. rufipes* (45.8%) in medium body conditioned cattle were recorded. The difference in prevalence among BC groups was statistically significant (P<0.05) but the other tick species different was statistically insignificant (P>0.05)**.** This result is in line with other researcher's results performed in different parts of Ethiopia [5, 31].

The difference in prevalence was found statistically insignificant (P>0.05) between sex of cattle. This result is in line with the other author in Benchi Maji [16] but it disagreed with the previous works in Assosa by Bossena and Abdu [5] that the difference in prevalence was found statistically significant between sex groups. In the study area, the female population is higher than males which were kept for dairy purpose and males were kept for fattening purpose and slaughtered in younger age. This result is in line with Ayana *et al*. [39] in semi-arid Borana plateau of southern Ethiopia.

The current finding is in line with the reports by Kassa andYalew [15] in Hararamaya district of east Ethiopia and stated as the prevalence of tick infestation was found significantly higher (P<0.05) in local breed cattle (58.18%) than cross breed ones (10.55%).

The significant variation in tick infestation of different cattle breeds in the current survey might be attributed to differences in management systems, lack of supplementary feeding to local cattle breeds or lack of control measures against tick on local cattle breeds. Furthermore, it can be assumed that it might be due to lack of interest of farmers to give care to local cattle than cross breed. This result disagree with the statement given by Kassa andYalew [15] and Tesfaheywet and Simeon[16]because there existed no statistical significant

difference (P>0.05) in the prevalence of ticks between the different sex, age and body condition score categories of cattle breeds. This could be related to the management system where animals are allowed to graze together in communal fields in the mixed farming system of the study area.

The highest and lowest prevalence of *R.* (B.) decoloratus (47.93%), *H. rufipes* (33.13%), *A. variegatum* (18.27%), *R. evertsi evertsi* (0.47%) and *A. cohaerens* (0.20%) recorded in the present study were disagrees to previous study performed in the study area [24]. This difference in the prevalence of different tick species may be due to ecological changes in the environment after long time. At the previous study period, the study area had experienced an annual average temperature of 20°C and 1220-1800 mm. annual rain falls. But know it is changed to 26°c and 1200-1600mm of annual temperature and rainfall respectively. In general, it is very important to prevent animals from being infested with ticks as this may lead to loss of production, poor meat and hide (skin) quality [40-43]. Thus, the main reasons for tick control are to protect hosts from irritation and production losses, formation of lesions that can become secondarily infested, damage to hides and udders, toxicosis, paralysis and of greatest importance, infection with a wide variety of disease agents [44-45].

CONCLUSION

The present study identified the distribution of five ixodid tick species *R.* (B.) decoloratus, H. rufipes, A. variegatum, R. evertsi everts and, *A. cohaerens*) that belongs to four tick genera *R.* (B.) decoloratus, *Hyalomma*, *Amblyomma* and *Rhipicephalus*). In this study, *R.* (B.) decoloratus was the most abundant and widely distributed tick genus in the study area and *Rhipicephalus* was the least prevalent. The community, in the study area, has limited interest of giving attention for medication in case of tick infestation, especially on local breed.

Recommendations: There should be seasonal pasture treatment and cattle before and after rainy season. An awareness creation on routine investigations of tick species and their control measures should be adopted by various groups of cattle producers.

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