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Prevalence of tick infestation of Bovine in Janamora Wereda

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ABSTRACT: A cross- sectional study was conducted from January to October, 2018 in Janamora Wereda with the objective of determining the prevalence of ticks and assessing the level of infestation by considering different risk factors such as breed, sex, age, body condition scores, management system and the origin of the animals. Adult ticks were randomly collected from 384 local 109(48.44%) and cross 83(52.20%) breed cattle. Out of the total 384 cattle examined, 192/384(50%) were found to be infested by tick of different genera. From the total ticks collected, Amblyomma, Rhipicephalus, Hyalomma and Boophilus were accounted 56.77%, 23.96%, 11.46% and 7.81% respectively. The risk factors breed such as local 109 (48.44%), and cross 83(52.20%) (p=0.744, χ^2=1.955), sex such as female 83(50.92) and male 109(49.93) were (p= 0.674, χ^2= 2.339, and the origin of animals such as Deresgie 36 (50%), Wasel 42 (53.16%), Atgeba 24 (47.06%), Derona 63 (47.73%), and Enchet Kab 27 (54%) were (p=0.686, χ^2= 2.823) of cattle did not show any statistical significant difference in the infestation rate though there was statistical significant difference in the infestation rate with the body condition score of poor 101(64.74%), medium 45 (46.39%), and good conditioned 46 (35.11%) were (p= 0.000, χ^2= 29.387), management such as extensive 82 (65.68%), semi intensive 63 (43.92% and intensive 47 (41.72) were (p= 0.006, χ^2= 21.631), and age such as young 83 (47.98%), and adult 109 (51.66%) were (p= 0.045, χ^2= 9.742) of the animals.
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1. INTRODUCTION

Ticks are arachnids in the sub class acari which are relatively large and long lived parasite. They are blood feeding external parasites. They maintain their parasite existence by feeding on vertebrate host. Tick bites can be directly debilitating to domestic animals causing mechanical damage, irritations, inflammations and hypersensitivity. When ticks are present in large numbers, feeding may cause anemia and reduction of productivity [1]. A complex of problems related to ticks and tick-borne diseases of cattle created a demand for methods to control ticks and reduce losses of cattle production and productivity [2]. Control of tick infestations and the transmission of tick-borne diseases remain a challenge for the cattle industry in tropical and subtropical areas of the world. Tick control is a priority for many countries in tropical and subtropical regions [3].

Ticks and tick borne diseases causes enormous losses all over the world, however, their importance is felt in the tropics south of sahara where fatal diseases such as east coast fever (ECF) transmitted by *Rhipcephalus appendiculatus.* The society who lives in Janamora Wereda has not good knowledge about the risk factor of tick on the animals' health and on their general product. Especially the farmers do not think the tick disease as diseases. Even if there any veterinarian around them, they do not take their animals towards the clinic. Due such misunderstanding condition, animals are suffering in tick disease. Therefore, I wanted to study tick prevalence's on this area.

The main objective of the work is

- ✓ To determine the existing tick and their spatial distribution
- ✓ To study the infection rate of animals in the area

2. MATERIAL AND METHODS

2.1. Study area

Janamora Wereda is located in North Gondar Zone of Amhara region, at the latitude and longitude of 12º59'N 38º07'E at a distance of about 180km from Gondar town. Janamora Wereda is welknown with Semien

mountain National Park, Ras Dashen i.e the highest point in Ethiopia and it is a home to a number of endangered species including the Ethiopian Wolf, waliya ibex, and a wild goat which no found in elsewhere in the world. The area has an altitude range of 2900 meters above sea level. The region is marked by numerous mountains, hilly, and sloppy areas, plateaus, rivers, and many streams. Livestock population of the area comprises 100,386 cattle, 32,975 sheep, 131,041 goats, 2,540 horses, 634 mules, 7758 donkeys, 119,347 poultry [4].

2.2. Study design

A cross sectional study was conducted in randomly selected cattle's for prevalence tick infestation. Information about the animals breed, sex, age, body condition, management system and origin of the study animals were gathered and examined carefully for the presence or absence of ticks on their body parts. Then the collected ticks were carefully examined to group them in to their genera [5].

2.3. Study population

The study subjects were cattle of different breed, age, and sexes. The origins of these animals were from Deresgie, Derona, Atgeba, Wasel, and Enchet Kab kebeles. A total of 384 animals (local and cross breed) were randomly selected and examined. The age, sex, breeds and body condition scores of each animal were also recorded.

2.4. Sample size determination

The sample size required for this study was determined carefully. Since there was no previous work done in this study area, 50% prevalence has been taken as expected prevalence for sample size determination. The other determinants considered in sample size determination have been 95% confidence interval and 5% desired absolute precision. Hence the sample size is estimated as

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

Where, N=required sample size
Pexp=expected prevalence
d^2=desired absolute precision

$$n=\frac{(1.96)^2\, 0.5(1-0.5)}{(0.5)^2}=\mathbf{384}$$

From the confidence interval d=5%=0.5
Using the above formula, the minimum sample size will be about 384.

2.5. Samples and sampling methods

Ticks was collected manually from their attachment site in the host animal by using sampling bottle containing 70% alcohol for prolonged storage. Then, the sample was transported to Janamora Wereda parasitology laboratory for the identification of the major ixodid ticks genera [3]. Categorizing system, cattle were categorized into two age groups young and adult, breed (local and cross) and the body condition score divide as poor, medium and good [6].

2.6. Tick collection and identification

After the selected animals were restrained properly, all visible adult ticks were collected from their body part manually by wearing gloves. They were preserved in 70% alcohol [7].Then it was labeled with the date of collection, age, sex, breed, body condition scores, origin and management system, and of the hosts. They were identified by using a microscope according to standard identification keys [5]. During processing, the tick sample in each sampling bottle was transferred to a Petridis, but unwanted foreign materials were removed.

2.7. Data management and analysis

The data obtained from history, clinical examination, tick identification and observations was entered to Microsoft worksheet excels. Then descriptive statistics was used to analyze the data using statistical package for social sciences (SPSS) software version 16. Chi-Square test (x^2) with computed p-value of less than 0.05 was used to determine the statistical significance association of tick infestation rate with sex, breeds, ages, management, body condition score and origin.

3. RESULTS

3.1. Prevalence

In this study, 384 animals were examined. Among these 225 animals were local and 126 were cross breeds. The overall prevalence was calculated by dividing the number of positive samples by the total sample size and multiplied by 100. Then the overall prevalence of the tick is 192/384 (50%). The prevalence of ticks in young, and adult was found to be 83/192 (51.66%) and 109/192 (47.98%) respectively. With regard to sex variation it was 83/192 (50.92%) in female and 109/192 (49.32 %) in males animals. Variations in breed also were cross breeds; 83/192 (48.44%) and 109/192 (52.20%) respectively.

Based on their body condition score variation, Poor body conditioned, medium and good body condition

animals were; 101/192 (64.74%), 45/192 (46.39%) and 46/192 (35.11%) respectively were stastically significant with χ^2=29.387 and p-value = 0.000. According to their management, animals kept in extensive, semi intensive and intensive farming system were 82/192 (65.08%), 63/192 (43.09%) and 47/192 (41.72%) respectively were statically significant (χ^2=21.632, and p =0.006).

In terms of their origin the prevalence of animals which found in Deresgie, Wasel, Atgeba, Derona and Enchet Kab kebeles were 36/192 (50%), 42/192 (53.16%), 24/192 (47.06%),63/192 (47.73%) and 27/192 (54%) respectively were stastically non significant with χ^2=2.823 and p= 0.686 as seen in (Table 1).

Table 1 Prevalence of ticks in relation to different risk factors in both cross and local cattle in Janamora Wereda.

Risk factors	Animals examined	Animals positive	Prevalence (%)	P-value	χ^2
Breed					
Local	225	109	48.44	0.744	1.955
Cross	159	83	52.20		
Age					
Adult	211	109	51.66	0.045	9.742
young	173	83	47.98		
Sex					
Male	221	109	49.32	0.674	2.339
Female	163	83	50.92		
Body condition					
Poor	156	101	64.74		
Medium	97	45	46.39	0.000	29.387
Good	131	46	35.11		
Management					
Extensive	126	82	65.68		
Semi-intensive	151	63	43.92	0.006	21.631
Intensive	107	47	41.72		
Origin					
Deresgie	72	36	50		
Wasel	79	42	53.16	0.686	12.823
Atgeba	51	24	47.06		
Derona	132	63	47.73		
Enchet Kab	50	27	54		

3.2. **Tick Identification**

Four general of ixodid ticks namely Amblyomma, Rhipicephalus, Hyalomma and Boophilus were identified in the study period. The total ticks collected in the study period Amblyomma, Rhipicephalus, Hyalomma and Boophilus was accounted 56.77%, 23.96%, 11.46% and 7.81 % respectively (figure 1).

Figure 1 Identification of tick genera and their proportion

Table 2 prevalence of each tick genus on different factors

Factor	Categories	No of positives	Prevalence (%)					χ^2	p-Value
			AM	RP	HY	BP	Total		
Breed	Local	83	26.56	8.85	4.69	3.13	56.77		
	Cross	109	30.21	15.10	6.77	4.69	43.23	1.955	0.744
	Total	192	56.77	23.95	11.46	7.82	100		
Sex	Male	109	33.85	11.98	5.73	5.21	56.77		
	Female	83	22.92	11.98	5.73	2.60	43.23	2.339	0.674
	Total	192	56.77	23.96	11.46	7.81	100		
Age	Adult	109	20.31	14.56	5.73	2.60	56.77		
	Young	83	36.46	9.38	5.73	5.21	43.23	9.742	0.045
	Total	192	56.77	23.96	11.46	7.81	100		
BCS	Poor	101	28.13	13.54	6.25	4.69	52.61		
	Medium	45	13.54	6.77	1.56	1.56	23.43		
	Good	46	15.10	3.65	3.65	1.56	23.96	29.387	0.000
	Total	192	56.77	23.96	11.46	7.81	100		
Management	Extensive	82	21.87	10.42	6.77	3.65	42.71		
	Semi intensive	63	18.75	8.33	3.13	2.60	32.81	21.631	0.006
	Intensive	47	16.15	5.21	1.56	1.56	24.48		
	Total	192	56.77	23.96	11.46	7.81	100		
origin	Deresgie	36	8.85	4.69	2.08	3.13	18.75		
	Wasel	42	12.5	6.25	2.080	1.04	21.87		
	Atgeba	24	8.85	2.08	1.56	0	12.49	2.823	0.686
	Derona	63	18.75	6.25	4.69	3.13	32.83		
	Enchet Kab	27	7.81	4.69	1.04	0.52	14.06		
	Total	192	46.76	23.96	11.45	7.82	100		

Keys: AM= Amblyomma, RP= Rhipicephalus, HY= Hyalomma, BP= Boophilus

4. DISCUSSION

In this study, the total tick infestation prevalence was found 192/384 (50%). This finding is greater than the reports of Kassa and Yalew [8] with a prevalence of 33.21% in Haramaya district and Tesfaheywet and Simeon [9] a prevalence of 16.0% in Benchi Maji Zone of the Southern Nations and nationalities of Ethiopia. In contrast to this, Nigatu and Teshome [10] were reported a higher prevalence of ticks (89.4%) from Western Amhara Region.

Amblyomma, Rhipicephalus, Hyalomma and Boophilus were the four common genera of ticks encountered with a total prevalence of 56.77, 23.96, 11.46 and 7.81% respectively. This result agrees with tick survey conducted in Western Shoa at Bako district by Husen [11] that indicated the distribution of these tick genera as the most abundant in that area with a prevalence of 54.3%. Husen [11] also indicated that this prevalence was similar to that of Tigray [12] and South Wollo [13].

The proportion of tick infestation was higher in adult animals109/192 (56.77%) as compared to the young one 83/192 (43.23%). However, there was statically significant difference (χ^2 =9.742 and p< 0.05) and the higher proportion may be due to outdoor management and long distance movement of adult animals to search feed and water as compared to younger animals. Therefore, the chance of exposure is higher. This finding

is also in agreement with the finding of Gashew [14],Tiki [15] who reported a higher proportion of tick infestation in adult cattle than younger.

Local breeds 109/192 (56.77%) were affected more than the cross breeds 83/192 (43.23%) but with no statistical significance differences (χ^2= 1.955 and p>0.05). This idea is disagreed with the idea of of Kassa and Yalew [8] who reported the prevalence of tick infestation was significantly higher (P<0.05) in local breed cattle (58.18%) than cross breed ones (10.55%). The non significant variation in tick infestation of cattle of different breeds might be due to identical management system, supplementary feeding, sufficient tick control measures and good caring habit of the farmers.

Male animals 109/192 (56.77%) were found more affected than female 83/192 (50.92%) animals with no statistical significance (P>0.05 and χ^2 = 2.339). This result is concurred with the results of Tesfahewet and Simeon [9] and Kassa and Yalew [8] where the p-values were > 0.05. This might be due to equal opportunities of oxen and cows to tick infestation in their production and allowed together in communal fields in their management condition.

The prevalences were 52.61%, 23.43% and 23.96% in poor, medium and good body conditioned cattles. It appears with statistical significance association where the p< 0.05 and χ^2= 29.387. Similar finding was indicated in Bossena and Abdu [16]. The higher prevalence of ticks in the poor body condition scores than medium and good could be due to less resistant to tick infestation and lack of enough body potential to build resistance.

Cattle tick infestation was significantly (p< 0.05) higher in cattle kept under extensive production system (42.71%) than those kept under semi-intensive (32.81%) and intensive (24.48%) farming system. This finding agreed with the finding of Tiki [15].This situation might be due to regular washing of barns and animals, regular treatment of animals with acaricides will reduce the susceptibility of tick infestation in semi-intensive and intensive animals where as extensive cattle are move anywhere for feeding, staying and drinking, so susceptibility of tick infestation is higher.

The highest prevalence (54%) of tick infestation was observed in Enchet Kab kebele followed by Wasel kebele (53.16%), where as the lowest prevalence of tick infestation was seen in Atgeba kebele with a specific prevalence of (47.06%).The stastical analysis of the infestation rate of ticks showed as it there was no statically significant difference (p> 0.05) among the different farming system. This finding is agrees with the finding of Mekonnen et al [17]. This might be due to the unrestricted movement of animals for searching of feed and water for long distance as well as due to the presence of careless owner.

5. CONCLUSION AND RECOMMENDATIONS

From ectoparasites, ticks cause the greatest economic loss in livestock population by affecting on the health of animals, on the quality of hide and skins, on the productivity of the animals, on the economy of farmers and the country at large. Therefore, relevant data on the distribution of ticks is essential for the development of effective tick and tick born disease control strategies. Studying ticks on livestock under their natural conditions without any control measure is also useful for understanding the host parasite relationship and variation of tick population in different agro ecological zone. The distribution of ticks in Janamora Wereda in this research is ranking first and second Hyalomma and Boophilus follow Amblyoma and Rhipicephalus. The study indicated that there was high tick infestation in the area. However, the attention given to the infestation had not been sufficient. The control method necessary for tick and tick born disease were selection of tick resistance cattle, acaricides treatment, appropriate livestock management, evaluation and incorporation of traditional practices. Therefore, effective tick control program should be formulated and implemented based on the distribution pattern of ticks and factors responsible for their distribution. To control and prevent ticks infestation the following recommendations have been forwarded;

- Very good veterinary services should be present into the area.
- Selection of tick resistance breeds for production activities**.**
- Application of acaricides should be occurs in a regular manner.
- Appropriate pasture management should be available.
- Restrict animal's movement from place to place.
- Regularly cleaning of the animal's house.
- Regularly mow lawn grasses.

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