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Status of Tick Infestation in Small Ruminants of Bedelle District, Oromia Region, Ethiopia

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Abstract: A survey was conducted to identify tick species and determine the prevalence of tick infestation in small ruminants of Bedelle District, West Oromia Region. Collection and identification of the ticks were undertaken from November 2010 to March 2011. All visible individual adult ticks were collected from the body of 121 goats and 330 sheep. The prevalence of tick infestation in goats and sheep was found to be 66.12% and 80.7%, respectively. In this study, six species of ticks which grouped under three genera were identified. The most abundant species found in this study were *Amblyomma coherence* (35.25%), *Amblyomma gemma* (17.07%) and *Amblyomma lepidum* (18.48%), *Amblyomma variegatum* (15.96%), *Rhipicephalus evertsi evertsi* (2.44%) and *Boophilus decoloratus* (0.89%) *Boophilus decoloratus* is the minor species of tick observed on sheep and none these ticks were recorded in goats in the study area. The difference in the prevalence of tick infestation between sheep and goats was statistically significant (x^2=9.43, p=0.002) but found to be statistically significant between male and females (x^2=2.83, p=0.071). Attention should be given to the control and prevention of ticks, since they cause severe damage to the skins of small ruminants and thereby reduce the foreign exchange of the country; they also transmit some diseases which can cause severe loss to the productivity of these animals.

Key words: Small Ruminants · Survey · Tick · Bedelle · Ethiopia

INTRODUCTION

Small ruminants are important contributors to food production in Ethiopia, providing 35%of meat consumption and 14% of milk consumption [1]. In the central highlands of Ethiopia where mixed crop live- stock production system is practiced, small ruminants account for 40% of cash income and 19% of the household meat consumption [2]. Owing to their high fertility, short generation interval and adaptation even in harsh environments, sheep and goats are considered as investments and insurance to provide income to purchase food during seasons of crop failure and to meet seasonal purchases such as improved seed, fertilizer and medicine for rural households. Hides and skins accounts for 12-16% of the total value of exports in Ethiopia [1]. More than 60 species of ticks infesting both domestic and wild animals have been recorded in Ethiopia [3]. Among these about 37 species and sub-species are very wide spread and important parasites of livestock [4]. In Ethiopia, ticks and tick borne diseases cause considerable losses to the livestock economy, ranking third among the prevalent parasitic diseases, after trypanosomes and endoparasitism [5, 6].

The economic impact of tick infestations is enormous worldwide. In 1984, the United Nations Food and Agricultural Organization (FAO) estimated the global cost of Ixodidae tick infestations to be $US 7.0 billion annually. Ticks are directly or indirectly involved in causing substantial financial losses to livestock industry of Ethiopia accounts for 75% of the animal exports [5]. A conservative estimate of 1 million birr loss annually was made through rejection and down-grading of hides and skins in Ethiopia [6]. Apart from the direct effects of tick infestations on animal production and productivity, ticks are inevitably efficient vectors of many pathogens protozoa, viruses, bacteria and ricketssia to man and domestic animals [7]. The introduction of exotic breeds with high productivity to different administrative regions in Ethiopia revealed that ticks are important vectors of several fatal diseases of animals. Ticks are common in all agro ecological zones of the country [5]. In contrast to

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this huge economic loss caused by ticks, some of the farmers in the Bedelle district neglect ticks as animal health problem, most of them have little knowledge about effect of tick on their small ruminants and none of the interviewed farmers know diseases transmitted to domestic animals by ticks. Even though different studies were done on camel ticks, cattle ticks and other domestic animals in the Western Oromia, little attention was given to that of small ruminants especially in the study area. Therefore, the purpose of this study was to identify tick species and to determine their prevalence in the area.

MATERIALS AND METHODS

Study Area: The study was conducted in western Ethiopia, Illu Ababora zone, Bedelle district of Oromia state that is 480 km from the capital Addis Ababa. Bedelle is located at an altitude of 1900-2000m above sea level and 8-9° N latitude and 36-37° E longitudes. The mean annual temperature varies from 20-25°C from October to January and decline to a level of 15-25°C during the rest of the months [8].

Study Design: Peasant associations and about two to five households from each peasant association were selected on the basis of purposive sampling based on the accessibility and their distribution. A total of 451 small ruminants, (121 goats and 330 sheep) were examined during the study.

Parasitological Techniques: The selected small ruminants were examined from head to tail including legs for the presence of ticks on the body of the animals. The adult engorged visible ticks were collected from body of the animals and transferred in to universal bottles containing either 70% alcohol or 10% formalin for identification. The collected ticks were identified by using stereomicroscope at Bedelle Regional Veterinary Laboratory, according to Walker *et al*. [9] sited in Abunna *et al*. [10] and Sertse and Wossene [11]. Any animal presented with any life stage of the tick (s) was considered as positive.

Statistical Analysis: Simple descriptive statistics such as count, proportion and ratio were used for analysis of data generated from this study. Chi-square was used for comparison of binary variables. The analysis was made using STATA 9 software package [12].

RESULTS

Of the total 451 examined small ruminants, 76.50% were infested by one or more of tick species. The corresponding percentage of infestation in goats and sheep was 66.12% and 80.30%, respectively (Table 1). The difference in prevalence of tick infestation was found statistically significant between the two species of the study animals (i.e., goats and sheep) (p= 0.002) but not between the sex ($p > 0.05$). Overall, a total of 3496 ticks were collected from 330 sheep and 121 goats. Upon identification, the ticks were classified into three genera and six species. Examined animals were considered to be positive for a given tick infestation when at least one tick was collected from them (Table 2).

DISCUSSION

Higher prevalence of tick infestation in the study area was observed. The overall prevalence found in this study in sheep (80.30%) and in goats (66.12%) is in agreement with the study conducted by Abunna *et al*. [10], in sheep (89.9%) and in goats (87.5%) at Miesso district of Oromia Regional State. However it is higher than the previous works conducted by Sertse and Wossene [11] in North East Ethiopia (3.4%) and (22.2%) for goats and sheep, respectively. The difference in the prevalence might be due to the geographical difference, breed difference of the study animals and season of the study period.

The present study revealed that sheep and goats in the study area were highly infested with different genera of ticks namely *Boophilus*, *Amblyomma*, *Rhipicephalus* and *Hyalomma*. These all indicates that the bionomic situation of the study area is favorable for the successive perpetuation of the pathogens transmitted by ticks and for their subsequent transmission to susceptible host that necessitate regular parasitological investigation and application of effective prophylactic and control measures. The problem of ticks in small ruminants of the study area seems to be very important as they were widely distributed in all villages. Poor awareness of the animal owners about the negative impact of ectoparasites in general and ticks in particular might have resulted in negligence to take any measure for control. Considering the importance of skin and hide as a main source of foreign currency to Ethiopia, the high prevalence of ticks recorded in sheep and goats of the study area deserves serious attention at all levels in order to minimize the spread of infestation and improve the living standard of

Table 1: Overall prevalence of tick infestation in small ruminants of the study area

Variable	Category	Number of examined animals	Number of infested animals (%)	Significance
Species	Goats	121	80 (66.12)	x^2 =9.43
	Sheep	330	265 (80.30)	P= 0.071
Sex	Male	140	100 (71.430)	x^2.83
	Female	311	245 (78.78)	p= 0.002

Table 2: Animal-level prevalence of tick infestation in small ruminants

	Sheep No. (330)	Goats No. (121)	Overall prevalence
Tick species	Positive (%)	Positive (%)	Positive (%)
Amblyomma coherence	119 (36.06)	40 (33.06)	159 (35.25)
Amblyomma gemma	61 (18.48)	16 (13.22)	77 (17.07)
Amblyomma lepidum	61 (18.48)	21 (17.35)	82 (18.18)
Amblyomma variegatum	60 (18.18)	12 (9.92)	72 (15.96)
Rhipicephalus evertsi evertsi	10 (3.030)	1 (0.83)	11 (2.44)
Boophilus decoloratus	4 (1.21)	0 (0.00)	4 (0.89)

Table 3: Relative abundance of tick species during the study period

Tick species	Total (%)
Amblyomma coherence	41.08
Amblyomma gemma	15.07
Amblyomma lepidum	22.60
Amblyomma variegatum	19.71
Rhipicephalus evertsi evertsi	1.32
Boophilus decoloratus	0.23

Table 4: Total and average tick burden in small ruminants

Tick species	Female tick count	Male tick count	Female: Male ratio
Amblyomma coherence	1005	431	2.33
Amblyomma gemma	340	187	1.82
Amblyomma lepidum	502	288	1.74
Amblyomma variegatum	516	173	2.98
Rhipicephalus evertsi evertsi	24	22	1.09
Boophilus decoloratus	7	1	7

Amblyomma coherence was the most abundantly encountered with high burden followed by *Amblyomma gemma*, *Amblyomma lepidum* and *Amblyomma variegatum*. *Boophilus decoloratus* was the minor species observed on sheep and none of these ticks were recorded in goats (Table 3). In this study, female ticks dominated males (Table 4)

farmers which are dependent on their animals. Moreover, poor veterinary infrastructures in the study area and lack of appropriate knowledge by animal owners as well as control strategy on the ticks of small ruminants have a great contribution to the persistence of ticks.

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