

Mange Mites Infestation on Small Ruminants in and around Bale Robe, South Eastern Ethiopia

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ABSTRACT

The study was carried out between November, 2013 and March, 2014 to estimate the prevalence of sheep and goat mange mite infestation and identify the dominant mange mites in and around Bale Robe town, South Eastern Ethiopia. Skin scraping was the method employed to collect mange mites for identification. A total of 470 animals were examined and only 8 (1.7%) of them were infested with mange mites. From 350 sheep and 120 goats examined for mange mites infestation, 5 (1.4%) and 3 (2.5%) were found positive, respectively. The difference in the prevalence between the two host species was not statistically significant ($P>0.05$). Likewise age, body condition status and sex of the animals had no significant ($P>0.05$) effect on the prevalence of mange mite infestation. The genera of mange mites infesting the animals were *Demodex* (0.86%), *Sarcoptes* (0.62%) and *Psoroptes* (0.21%). Of these genera, *Demodex* was the most prevalent in the study area. In conclusion, the prevalence of mange mite in the current study is low. Extensive epidemiological investigations that considers agro-ecology and other non-host factors are required to further minimize the prevalence of infestation and design appropriate control strategies.

Keywords: Bale Robe, Ethiopia, mange mite, sheep, goat

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INTRODUCTION

Live stock production is an important sector of Ethiopia agriculture economy, providing a significant contribution to gross domestic and export products and raw materials for industries. The estimated Ethiopian sheep and goats population is approximately 24.2 and 22.6 million, respectively (CSA, 2012). Owing to their high fertility, short generation interval and adaptation even in harsh environment, sheep and goats are considered as investments and insurance that provide income to purchase food during season of crop failure and to meet seasonal purchase such as improved seed, fertilizers and medicine for rural households (Demissie et al., 2000).

The quality of hides and skins deteriorates due to pre and post slaughter defects by lice, ticks and mange mites that cause downgraded and rejection of hide and skin (Bayou, 1988). Among the diseases of sheep and goats, infestation by mange mites and ticks as well as dermatophilosis causes a considerable economic loss particularly to the skin and hides export due to various defects (Woldemeskel, 2000). Mites are active in keratin layer and cause direct damage to the skin, also cause indirect economic loss by decreasing reproduction and production performance (Soulsby, 1982). According to tannery reports, skin disease due to external parasites causes 35% and 56% sheep and goat skin rejection, respectively. In Ethiopia 56% of goat and 35% of sheep skin are rejected annually due to various factors, of which mange infestation accounts for 33% in sheep and 21% in goats (Bayou, 1998). Mange, a contagious disease of animals, is characterized by a variety of

clinical signs depending on the species of mites. Four genera of parasitic mites can cause mange in sheep and goats, namely: *Chorioptes* species, *Demodex* species, *Psoroptes* species and *Sarcoptes* species (Urquhart, et al., 1996). Though the magnitude of the problem created by mange mite is believed to be huge, studies conducted in this regard in different parts of the country and information available are little in general. Moreover, no studies on the subject have been conducted in and around Bale Robe area. Hence, it would be essential to have a base line data on the prevalence of mange mites of small ruminants, the species of mites circulating and potential risk factors in the study area. Therefore, the objectives of the study were to estimate the prevalence of mange mites of sheep and goats, and identify the major risk factors in and around Bale-Robe.

MATERIALS AND METHODS

Study area and study animals

The study was conducted in and around Bale-Robe, South East of Oromia Region, Ethiopia. Geographically, Bale-Robe is located around 7°7' N and 40°E. The annual mean temperature of the area ranges from 5°C to 23.5°C. It is characterized by bimodal rainfall and annually receives rainfall greater than 1150 mm. The short rainy season is from March to May, while the long rain season is from July to October. The study animals were sheep and goats managed under extensive husbandry system, which were grazed freely. Sheep and goats presented to Bale-Robe Veterinary clinic and in kebeles' around the clinic were included in the study. The age of the study

sheep and goats was determined as described by Steel (1996) and Gatenby (2002), respectively.

Study design, sample size and sampling methods

A cross-sectional study was employed to estimate the prevalence of mange mite infestation and to identify the genera of mange mites prevalent in sheep and goats. A systematic random sampling method was used to select the study animals. The sample size needed for the study was calculated by using the formula given by Thrusfield (2005). The study considered 50% expected prevalence, 95% confidence level and 5% level of precision. Accordingly the sample size calculated, both for sheep and goats, was 384. Therefore, by taking in to account the proportion of study animals' 350 sheep and 120 Goats were sampled from the study area.

Selected animals, sheep and goats, were thoroughly examined by palpation and observation for any skin lesions. Animals suspected for mange mite were isolated and clinically examined for presence of skin lesions such as erythema, pruritis and scales. Then samples of skin scrapping were collected from the edge of a visible lesions and its surrounding as described by Chauhan and Agrwal (2006) in to a clean universal bottle. The samples

were labeled and then transported to Bale Robe Veterinary Clinic. In the clinic a few drop of 10% KOH was added to the samples and allowed to stand for 25 minutes. Finally, the samples were examined under stereomicroscope for mange mites. The genera of mange mites were identified as described by Kaufmann (1996), Wall and Shearer (2001) and Taylor et al. (2007).

Data analysis

The data were summarized by descriptive statistics such as proportion and mean using Microsoft Office Excel software. The summarized data were analyzed using Chi-square test and different risk factors compared. All analyses were performed using STATA 11 software.

RESULTS AND DISCUSSION

From a total of 470 small ruminants (350 sheep and 120 goats) examined 8 animals (1.7%) were positive for mange mite infestation, of which sheep and goats accounted for 5 (1.4%) and 3 (2.5%), respectively. The analysis for the risk factors considered during the study and species of mange mites have been identified shown in table 1 and 2.

Table 1. Prevalence of mange mite infestation and presumed risk factors

Risk factors	Level	Number examined	Prevalence number positive (%)	χ^2	p-value
Species	Sheep	350	5 (1.4)	0.61	0.40
	Goat	120	3 (2.5)		
Age	Young	160	3 (1.9)	0.04	0.84
	Adult	310	5 (1.6)		
Sex	Female	327	4 (1.2)	1.47	0.23
	Male	143	4 (2.8)		
Body condition	Good	124	0	3.14	0.21
	Medium	239	5 (2.1)		
	Poor	107	3 (2.8)		
Overall		470	8 (1.7)		

Table 2. Genera of mange mites infesting sheep and goats in the study area

Genera of mange mites	Species of Animals		Overall	Std. Er	χ^2	p-value
	Sheep	Goat	Prevalence			
Demodex	3 (0.86%)	1 (0.83%)	4 (0.85%)	0.004	470	0.000
Sarcoptes	1 (0.29%)	2 (1.7%)	3 (0.64%)	0.004		
Psoroptes	1 (0.29%)	-	1 (0.21%)	0.002		

This study revealed an overall mange mite prevalence of 1.7%, of which 1.4% and 2.5% were in sheep and goats, respectively. This finding is in a general agreement with reports from Eastern Amhara Region (Sertse and Wossene, 2007), Central Ethiopia (Haffize, 2001; Yacob et al., 2008), Kombolcha (Numery, 2001), in and around Mekelle (Habte, 1994; Kassaye and Kebede, 2010) and Sidama (Teshome, 2002). In contrast, the current study finding was considerably lower than the prevalence reported from the Southern range land of Oromia: 14.64% in sheep and 16.45% in goats (Molu, 2002), Hararghe: 7.85% in sheep and 11.8% in goats (Takele, 1986), Robe areas: 6.7% in sheep (Shenkutie, 1987) and Wolaita zone: 5.85% and 8.11% (Sheferaw et al., 2010). The discrepancy in prevalence between the present and other studies is likely attributed to difference in management, the prevailing ecological factor, breed of the study animals and the awareness of farmers to use of acaricide and related control practices. The other reason for the difference could be the intervention made by Oromia Regional State i.e. application of acaricide to control small ruminant ectoparasites. According to Asmare et al. (2016) the prevalence of mange mite is higher in lowland and lower in highland. This is possibly associated with differences in the optimum climatic conditions required for the breeding and survival of mites (Pangui, 1994). The review done by Asmare et al. (2016) revealed that some studies done in Ethiopia reported as low as 0.2% apparent prevalence both in sheep and goats.

During the current study three genera of mange mites, namely *Sarcoptes*, *Demodex* and *Psoroptes*, were detected in the study area. These genera of mange mites were also commonly reported from different parts of Ethiopia (Numery, 2001; Yacob et al., 2008; Kassaye and Kebede, 2010; Sheferaw et al., 2010; Yasmine et al., 2015; Seid et al., 2016). The overall prevalence of *Sarcoptes*, *Demodex* and *Psoroptes* was 0.62 %, 0.86% and 0.21%, respectively. This study showed that goats (1.7%) were predominantly infested by *Sarcoptes* species than sheep (0.29%) as similar results were also reported previously from various parts of country (Numery, 2001; Kassaye and Kebede, 2010, Sheferaw et al., 2010; Yasmine et al., 2015). There was no significant difference in mange mites prevalence between age group, species and body condition status of studied animals. This finding is in a general agreement with the report of Sheferaw et al. (2010) and Seid et al. (2014). Therefore, sex and age of the host animals are not contributing factors for the differences in the prevalence of mange in the study area. It has been stated that mange mite infestation is independent of age and sex (Soulsby, 1982). *Demodex* was the most dominant mange mite that was followed by *Sarcoptes* in the current study area. It

was also reported as the dominant genera in earlier studies conducted in various parts of the country (Sertse and Wossene, 2007; Sheferaw et al., 2010 and Fentahun et al., 2012).

CONCLUSIONS AND RECOMMENDATIONS

The present study revealed low level of mange mite infestation in sheep and goats in and around Bale Robe, South Eastern Ethiopia. Three genera of mange mites, namely: *Demodex*, *Sarcoptes* and *Psoroptes* were found in the area. *Demodex* and *Sarcoptes* are burrowing mites, which affect sheep and goats; and cause skin damage (Urquhart et al., 1996). Taking in to consideration the importance of sheep and goats skin as one of the most important source of foreign currency to Ethiopia, the infestation of mange mites recorded in the study area deserves due attention to all levels in order to further minimize the spread of infestation. Hence, strategic control has a great contribution to minimize the infestation and to prevent the spread. Awareness creation among animal breeders and/or farmers through planned animal health extension program is recommended on treating sick animals, reducing transmission from animal to animal and avoiding the associated economic losses.

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