

# Epidemiological study of small ruminant mange mites in three agro-ecological zones of Wolaita, Southern Ethiopia

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## Abstract

An epidemiological study of small ruminant mange mites was conducted in three selected agro-ecological zones of Wolaita, Southern Ethiopia, from November 2007 to April 2008. A total of 352 sheep and 376 goats were examined for mange mites infestation, of which 7 (1.98%) and 22 (5.85%) sheep and goats were found positive respectively. The genres of mange mites identified with this study were *Demodex* (1.23%) and *Sarcoptes* (2.61%) of these the genus *Sarcoptes* was more prevalent in the study area. The prevalence of mange mites was significantly higher in goats than in sheep ( $F=7.141$ ,  $P=0.008$ ). But age ( $X^2=0.108$ ,  $P=0.743$ ) and sex ( $X^2=0.007$ ,  $P=0.79$ ) of the host animals not affected the prevalence of mange mite (There was higher infestation of small ruminant in the lowland area ( $F=7.463$ ,  $P=0.006$ )).

**Keywords:** small ruminant, mange mite, Agro-ecology

## Introduction

In Ethiopia there are about 24 million sheep and 19 million goats (FAO-WHO-OIE, 1993). Out of these 2.4 million sheep and 2.2 million goats are found in Southern Nation's Nationalities and People Region (SNNPR), which serve as important source of income for agricultural community and are one of Ethiopia's major sources of foreign currency through exportation of live animals, meat and skin. They are also a "living saving bank" and serve as insurance (financial reserve) for a period of economic distress and crop failure as well as a primary source of cash income (Jajasuriya, 1999; ILRI, 1999; Minjauw and McLeod, 2003). However, diseases have been stumbling block against the full utilization of this resource (2003; FAO, 2005). Although, small ruminants are known to adapt to harsh environments, the cumulative effects of overcrowding,

poor nutrition and diseases can result in serious production losses (Tilahun, 1995). Among the diseases of sheep and goats, infestation by mange mites and ticks, as well as dermatophilosis pose a considerable economic loss particularly to the skin and hide export due to various defects (Moges Woldemeskel, 2000).

The distribution of mites on animals varies according to season, the infection being quiescent in reservoir sites such as axillae, groin, infra-orbital fossa and auditory canal during spring, summer and early autumn (Urquhart *et al.*, 1996) and most outbreaks occur in cold months. Though mites are active in keratin layer and causes direct damage to skin, also cause indirect economic loss by decreasing /ceasing reproduction and production performance (Soulsby, 1998). A recent report showed that mange in sheep and goat killed about 60% of the affected animals in Amhara region (Amsalu Demissie *et al.*, 2000). In Ethiopia, 35% of sheep's and 56% of goat's skin are rejected annually due to various factors (Kassa Bayou, 1998), of which mange infestation account for 33% in sheep and 21% in goat.

Though, mange mites in small ruminants are prevalent in Southern nation nationalities people region (SNNPR), the distribution and identification of the disease was not well studied. Hence, the objectives of the present study were to determine the prevalence of mange mites in and around Wolaita Sodo and to identify the main species of manger mites in sheep and goats.

## Material and methods

### Study area

The study was conducted in three agro-ecological zones namely Humbo Lariena (wet lowland), around Sodo (midland) and Damota Sillasie (highland) of Wolaita Zone. Wolaita Zone has a total of 4471.3 Km<sup>2</sup> areas, and is located between 6.4° – 7.2° N and 37.4° – 38.2° E (Wolaita Zone Finance and Economic Development Department, 2003). The area has 51.7% cultivated land, 6.4% cultivable land, 11.9% grazing land and 30% others. The average crude population density is 342 Person/Km<sup>2</sup> (CSA, 2003). The area is characterized by bimodal, long rainy period (June to September) and short rainy period (March to April).

### **Study population and animals**

The study populations were selected from backyard production system that traditionally managed 352 sheep and 376 goats in the three agro-ecological zones. The study animals were selected by systematic random sampling technique from the sheep and goats population in the respective areas. Totally 246, 244 and 239 small ruminants selected from lowland, midland and highland areas respectively. The sample size for the study was determined based on Moges Woldemeskel (2000) who reported prevalence of 40.9% small ruminant mange mites. Then the sample size calculated using the formula given by Thrusfield (1995), and the study considers 95% level of significance.

### **Study design and methodology**

Cross sectional study design was employed to determine the prevalence of mange mites and to investigate the species of mange mite infesting sheep and goats. The study was conducted from November 2007 to early April 2008, dry season of the area. During this period following the procedure described by Kaufmann (1996) skin scrapping were collected from suspected cases of mange mites' as well as apparently healthy sheep and goats. Then the sample was taken to Sodo Regional Veterinary Laboratory; and identified according to the procedure described by Kaufmann (1996); Klayman and Schillhorn (1981) and Masharet and Russel (1978).

### **Data analysis**

After entry of collected data into Microsoft Excel sheet, it was summarized by descriptive statistics like mean and percentage, and then displayed by graph and table. The data was analyzed by  $X^2$  and ANOVA tests using Minitab 13 soft ware to compare affected animal species and the differences in sexes.

### **Results**

The overall prevalence of mange mite infestation was 3.98% of this 2.61%, 1.23% and 0.14% accounts for Sarcoptes, Demodex and mixed (Sarcoptes and Demodex) infestation respectively. A total of 352 sheep and 376 goats were examined, of which 7 (1.99%) sheep and 22 (5.85%) goats were found affected by mange mites. This study revealed that totally 3.84% adult and 4.39% young, and the total prevalence rate of 4.30% in male and 3.87% female small ruminant were affected by mange mites. There was no significant difference in mange mites prevalence between young and adult animals ( $X^2=0.108$ ,

P=0.743), and between the male and female study animals ( $X^2=0.007$ , P=0.79). The proportions of animals infected by mange mites in the different agro-ecological zones are shown in Table 1. The genus of mange mites identified in the different agro-ecological zones are shown on Figure 1. During this study significantly more goats were found to be infested by mange than sheep ( $X^2 = 7.091$ , P = 0.008). This study showed that there was higher infestation of small ruminant in the lowland area (F=7.463, P=0.006) following by midland and highland with prevalence rate of 6.5%, 3.7% and 1.7% respectively.

Table 1: The prevalence of mange mites genus identified in the study areas from Sheep and Goat

Identified mange genus	Animal species		Overall Prevalence
	Sheep	Goat	
Demodex	0.57%	2.13%	1.23%
Sarcoptes	1.42%	3.76%	2.61%
Demodex and Sarcoptes	0.28	-	0.14%

( $X^2 = 7.0910$ , P = 0.008)

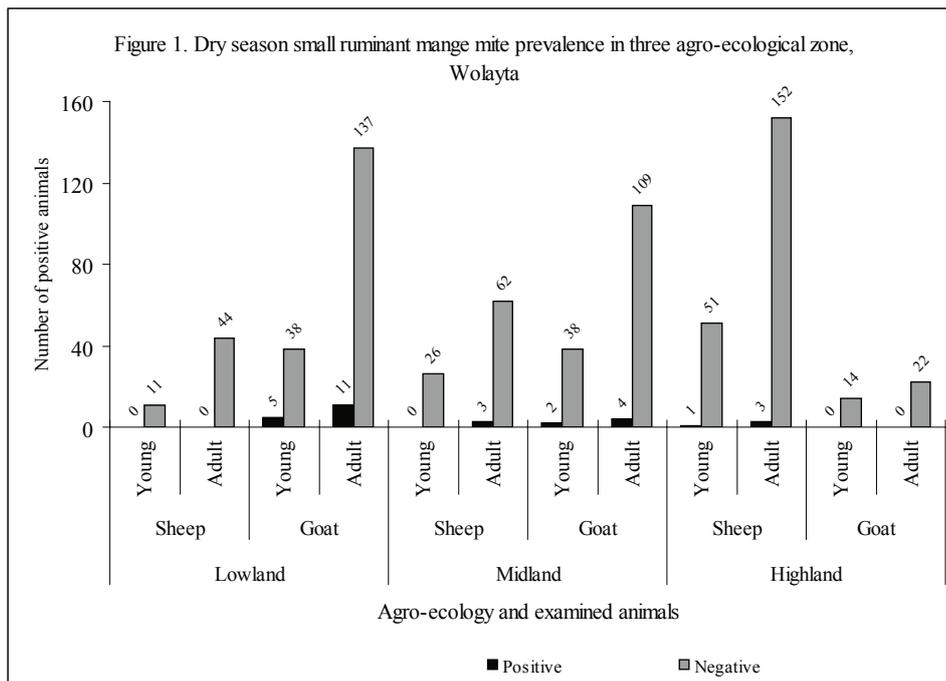


Table 2: Mange mite prevalence comparison between age, sex and species of small ruminant in Wolaita Zone

Factors for analysis	Age		Sex		Species of small ruminant	
	Young (<6 months)	Adult (>6 months)	Male	Female	Sheep	Goat
No of animals examined	182	546	186	542	352	376
Prevalence (%)	8 (4.39)	21 (3.84)	8 (4.30)	21 (3.87)	7(1.99)	22 (5.85)
X <sup>2</sup> and P-value	X <sup>2</sup> =0.1077, P= 0.743		X <sup>2</sup> = 0.0659, P = 0.79		X <sup>2</sup> =7.0910, P = 0.008	

## Discussion and conclusion

The finding of this study was in a general agreement with Haffize Mohammed (2001), Numery Abdulhamid (2001), and Tefera Sertse (2004) finding in Central Ethiopia, Kombolcha and Eastern Amhara respectively. Numery Abdulhamid (2001) reported 1.36% and 2.63% demodicosis in goats and sheep respectively. The annual report of Soddo Regional Veterinary Laboratory showed prevalence of 0.28% Sarcoptic mange in sheep, and 3.77% Demodectic mange in goats in three selected woredas' (Asnake Fekadu, 2006). But the finding of the current study was lower than the prevalence reported in Harraghe region, 7.85% in sheep and 11.8% in goat, (Gashaw Takele, 1986); in Robie areas, 67.65% in sheep, (Shenkutie Ashine, 1987); and in Southern range land of Oromia, 14.64% in sheep and 16.45% in goat, (Molu Nura, 2002). The finding of the current study is in agreement with Molu Nura (2002), Amsalu Demissie *et al.* (2000) and Gashaw Takele (1986) who reported more prevalence of goat mange infestation than sheep. Generally it is known that Sarcoptes occur more frequently on the sparsely-haired parts (Kettle, 1995), and demodectic mange is rare in sheep (Radostits *et al.*, 2000). Hence, as also reported by Sherman (1998) and Tefera Sertse (2004) the genus Sarcoptes was the most prevalent in the study area. The higher prevalence of mange mites in the lowland area attributed to the higher contact of the animals during shading from high temperature stress (Pangui, 1994) and also the existence of higher goat population in the area. Amsalu Demissie *et al.* (2000) observed that there is seasonal occurrence of mange infestation in small ruminants, the prevalence being highest during rainy season and lowest in the dry season (December and January). Mange mite infestation is independent of age and sex (Soulsby, 1998) as we also observed. From this study result it is possible to conclude that agro-ecology attributed to the variation in the distribution and abundance of mange mite in small ruminants. Whereas sex and age of the host animals are not determinant factors for the prevalence variation. But further study

should be done to have full picture of the distribution and seasonal occurrence of mange in Wolaita.

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