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Infestastion of Lice in Shoats in and Around Lalo Qile District, Kellem Wollega Zone, Oromia Regional State, Ethiopia

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ABSTRACT

This study was conducted from November 2021 to April 2022 with the aim of studying the prevalence of lice of economic importance in small ruminants in and around Lalo qile district. A total of 384 (259 sheep and 125 goats) were investigated for lice infestation. Out of these animals 144 (37.50%) animals were infested by one or more species of lice. Of a total of examined animals; 102 (39.4%) of sheep and 42 (33.6%) of goats were positive for lice. The lice recorded 31.66% *Damalinia* species and 7.72% *Linognathus* species in sheep and 33.6% *Linognathus* species in goats. This study has revealed that lice were the predominant in sheep than in goats ($p<0.05$). The poor body condition score animals were higher infested by both species of lice ($p<0.05$). The present study has shown that lice are among important causes of skin damage which is likely to cause significant economic loss. To reduce this loss management practices should be put in the place to control infestations of valuable animals.

Keywords: Lalo Qile; Lice; Prevalence; Small Ruminants

Introduction

Ethiopia's economy is based mainly on agriculture, including crop and livestock production, which contributes 45% of the national Gross Domestic Product (GDP), more than 80% of employment opportunities and over 90% of the foreign exchange earnings of the country. The livestock sub-sector contributes an estimated 12% to total GDP and over 45% to agricultural GDP [1]. In Ethiopia, small ruminants comprise large proportion of livestock resources, constitute about 30% of the total livestock population of the country and are among important contributors to food production in Ethiopia, providing 35% of meat consumption and 14% of milk consumption [2]. At the national level, sheep and goat account for about 90% of the live animal/meat and 92% of skin and hide export trade value [3]. However, the Ethiopian economy, particularly agricultural development, is extremely vulnerable to external shocks like climate change, global price fluctuations of exports and imports and other external factors [1].

Ethiopia is believed to have the largest livestock population in Africa. The total sheep and goats population for the country is estimated to be 25 and 23 million respectively, as a result of this; leather has been at the core of Ethiopia's economy since many centuries [1]. And also in various areas of Ethiopia, sheep and goats play significant social and cultural functions including food security, poverty alleviation, ensuring gender equity, weed control and income generation [4]. They also play an important role by providing export commodities such as live animals, meat and skins to earn foreign exchange to the country. The sheep and goat skins rank among the largest export of commodities [5]. However, poor health and productivity of animal due to disease has considerably become the major stumbling block to the potential of livestock industry [6].

Lice are among the major disease of small ruminants and cause serious economic loss to farmers through mortality, decreased production and reproduction, down grading and rejection of skins which also affect the tanning industries. Tanneries reported that

35% of sheep skin and 56% of goats' skin are rejected due to external parasites, and out of the reject groups of the processed skin, about 80 to 90% defects were believed to be due to external parasites. The estimated economic loss due to drop in quality of sheep and goat skin is around USD 25.8 million per year [7]. Both biting and sucking lice affect small ruminants. The important species of lice found in sheep and goats are the genus Damalina and *Linognathus* and the important species in sheep being L. ovillus (sucking face louse), L. aficanus, L. spedalis (sucking foot louse) and Bovicolaovis(biting louse). In goats L. stenopsis (sucking blue louse), L. africanus, B. caprae (biting louse), B. alimbataand B. crassicepsare reported [8]. All species cause irritation of the skin, stimulate scratching, rubbing, and licking leading to restlessness, these have great effect on sheep production and skin quality [9], currently there is a paucity of information regarding to lice infestation of small ruminants in Lalo qile district Kellem Wollega zone. The present study was carried out to determine the prevalence lice of economic importance in small ruminants and to assess host-related risk factors in the study area.

Materials and Methods

Study Area

The present study was conducted in Lalo qile district from November 2021 to April 2022. Lalo qile is found in west wollega administrative one of Oromia regional state, Kellem wollega zone and lies at at 035o 26' E longitudes and 08o 45' to 08 59' latitude and north of equator [10]. Altitude of area ranges from 500-1800 m.a.s.l. The climatology alternates with long summer rain fall (June-Sep), short rainy seasons (March to April) and winter dry seasons (December to February). The livestock populations in study area are bovine 91723, ovine 29378, caprine 2538 and equine 10254 [11].

Study Animals

The study animals were sheep and goats of both sexes and different age groups (young and adult) in and around Lalo qile district.

Sample Collection

The survey of lice was conducted on small ruminants of both sexes and different age groups. Collection of lice was conducted after proper restraining of the animals. The adult lice were manually collected from the body surface by hand and brush. Hair coat was parted and examined for lice on five regions of the body surface namely; head, neck, thoracic, abdominal and tail region, both on the right and left sides of these areas and the collected parasites were preserved in properly labeled plastic containers containing 70% ethanol. The collection bottles were labeled with serial numbers while other data was written on specified register format prepared for this particular purpose (date, address, sex, age and species). Sample was then transported to Lalo qile veterinary clinic laboratory for further identification of the lice species. Identification of the collected lice was carried out at veterinary laboratory by the aid of stereo- and compound microscope by appreciation of its mouth part according to the procedure described by Wall and Shearer [12] and Soulsby [13].

Study Design

The study was conducted using cross-sectional study design to determine the prevalence of small ruminants' lice. The sample was collected from small ruminants kept under extensive production system. The lice were randomly collected from sheep and goat of different sex, body condition score and age group (young under one year of age and adult above one year of age for both sheep and goats [14,15]. The sample size was calculated according to Thrusfield [16] sample size calculation. Though, since the study have not been conducted in study area expected prevalence as 50%, the required sample size was computed to be 384, a total of 384 (259 sheep and 125 goats) of different species, age and sex group were examined.

$$n = \frac{1.96^2 P_{exp}\left(1 - P_{exp}\right)\pi}{d^2}$$

Where; n= required sample size

P_{exp}=expected prevalence

d= required precision

Data Analysis

The collected data was first entered and managed into Microsoft Excel worksheet and analyzed by a statistical software namely, SPSS version 22. Prevalence was determined by the formula described by Thrusfield [16] as the rate of number of infested animals and total number of animals in population. Associations between explanatory variables (species of animals, age and sex) and prevalence were done by chi-square test and $P<0.05$ were set to indicate significance.

Results

The overall prevalence of lice was 39.38% and 33.6% in in sheep and goats respectively. Overall 31.66% and 7.72% of examined sheep were infested with *Damalinia* and *Linognathus* species of lice respectively and 33.6% of examined goats were infested with *Linognathus* species of lice (Table 1). High prevalence of lice infestation in sheep than in goats ($P<0.05$) was recorded. Relative to poor body condition score small ruminants were higher significant infested by both species of lice ($p<0.05$) (Table 2).

Table 1: Prevalence of different genera/ species of lice infestation in sheep and goats.

Lice	Sheep (n=259)	Goats (n=125)	Total (n=384)
	No positive (Prevalence in %)	No positive (Prevalence in %)	No positive (Prevalence in %)
Damalina sp	82 (31.66)	0 (0.0)	82 (21.35)
Linognatus sp	20 (7.72)	42 (33.6)	62 (16.15)
Total	102 (39.4)	42 (33.6)	144 (37.50)

Table 2: Prevalence of lice infestation in small ruminants among risk factors.

Risk factors	Categories	Prevalence *Damalinia* species (%)	Prevalence *Linognathus* species (%)	Over all (%)	χ^2p-value
Species	Sheep (n=259)	82 (31.66)	20 (7.72)	102 (39.38)	76.3(0.000)*
	Goats (n=125)	0 (0.0)	42 (33.6)	42 (33.6)	
Sex	Male (n=145)	28 (19.3)	16 (11.0)	44 (30.3)	3.3 (0.172)
	Female (n=239)	54(22.6)	46(29.6)	100 (41.8)	
Age	Young (n=132)	24 (18.2)	25 (18.9)	49 (37.1)	3.9 (0.139)
	Adult (n=252)	58(23.0)	37(14.7)	95(36.4)	
BCS	Good (n=244)	51 (20.9)	34 (13.9)	85 (34.8)	10.2 (0.027)*
	Medium (n=114)	19 (16.7)	21 (18.4)	40 (35.1)	
	Poor (n=26)	12 (46.2)	7 (26.9)	19 (73.1)	

Discussion

The overall prevalence of lice infestation was 39.38% in sheep and 33.60% in goats. The result is lower than 57% and 47% in sheep and goats respectively in Gondar [17]. But this result is higher than the prevalence recorded in Tigray 1.3% and 6.1% in sheep and goats respectively [18]; 25.8% and 14.9% in sheep and goats respectively. Lice infestation was observed to significantly affect most animals in the flocks of sheep than goats ($p<0.05$). This is probably related to rubbing is a powerful indicator of infestation and choosing a sheep with rubbed fleece greatly increases the likelihood of detection and close contact between animals is important in the transmission of the parasites [19]. The overall prevalence of lice in the present study was 37.50% (Table 1). According to present study, two species of louse was identified in sheep. The prevalence of *Damalinia* and *Linognathus* species in sheep in present study was 31.66% and 7.72%, this result is similar with prevalence of 33.69% of *Damalinia* [17], 34.0%*Damalinia* [20] and higher than 3.2% *Damalinia* and 2.2% *Linognathus* reported by Tesfaye et al. [21]. Present study showed high prevalence of lice infestation in poor body condition small ruminants than medium and good body condition ($P<0.05$) it was similar to the report of Tesfaye et al. [21]. Relative to sex of animals *Damalinia* species was higher significant ($p=0.005$) prevalence in female animals (16.3%) than male once (3.9%) and poor body condition score small ruminants were higher significant infested by both species of lice ($p<0.05$) (Table 2) the same trend reported by Tesfaye et al. [21].

Conclusion and Recommendation

Present study showed that lice are infesting significant proportions of small ruminants in the study area. It was shown that two species of lice were the major small ruminants pests. Sheep were highly infested than goats and goats were infested only by *Linognathus* species of lice. All age groups and both sex of livestock were found infested by various type of lice. Pediculosis remains to cause skin damage in the area. Based on the findings of the current study, the following recommendations are suggested:

- Good veterinary services and management practices should be put in the place to control infestations of these valuable animals.
- Awareness should be created among the farmers and animal health assistances to indicate the extent of the problem.
- Further study with extensive area coverage should be carried out to identify parasite at species level.

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