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## Assessment of Small Ruminants External Parasites in Selected Districts of East Bale and Bale Zones of Oromia Regional State, Ethiopia

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### Abstract

Assessment of small ruminants' external parasites was conducted in East Bale and Bale zones of Oromia Region in April 2022. The overall prevalence was 76.17%, which were 89.60% in Legahidha, 56.89% in Raitu and 79.01% in HarenaBuluk. Prevalence infested parasites were 79% tick, 13% lice, 7% mange mites and 1% fleas. Sex, age, body condition and species of animals is the risk factors for existence of external parasites for this survey ( $p < 0.05$ ). The result analysis of this survey shows that the prevalence is still high through the period which needs the campaign programmer. Regular assessment of the prevalence status external parasites of small ruminant and continuous controlling of the parasites at regular programmed with strongly awaring the farmers/ pastorals about the effect and controls recommendable to reduce the infestation and maintain below the existing prevalence.

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### Keywords

Assessment, Small Ruminant, Parasite, Prevalence, Bale.

### Introduction

Ethiopia with its greatest variation in climate and topography possesses one of the largest small ruminant populations in the world, which is kept extensively mostly by small holder farmers and adjacent to crop production. Small ruminants represent an important segment of the Ethiopian livestock system. They are important sources of income for the agricultural communities and are one of the country major sources of foreign currency through skin and meat export and are among important sources of animal protein, providing 35% of meat and 14% of milk consumption. The national small ruminant population is estimated to be 63 million heads, which are raised in different agroecological regions of the country. Among these population 8, 75 million (34%) Sheep and 7.6 million (31.4%) Goat is

found in Oromia region (CSA, 2013). However, the contribution from this huge population to food production and export income is far below the expected potential. This would be due to the compound effects of several factors among which is ectoparasitism.

Infestation by ectoparasites could lead to considerable economic losses to farmers due to loss of productivity, mortality, and skin diseases. Ectoparasites including lice, sheep keds, ticks, fleas, and mange mites are reported to cause a wide range of health problems such as mechanical tissue damage, irritation, inflammation, hypersensitivity, abscesses, weight loss, lameness, anaemia, and in severe cases death of infested animals with the consequent socioeconomic implications. In addition, ectoparasite infestations could induce great economic losses due to reduction of wool quality, meat

and milk yield, and losses as a result of culling and related with cost of treatment and prevention of the problem. They are also responsible for great preslaughter skin defects, resulting in downgrading and rejection of small ruminant skins. According to tanneries reports, skin defects due to ectoparasite effects cause 35% of sheep and 56% of goat skin rejections in Ethiopia. According to the information obtained from sheep and goat skin produced every year in the country about 40-45% was from Oromia region. All these established facts imply that ectoparasites cause serious economic losses to the farmer, the tanning industries, and the country as a whole. In addition Selale sheep skin for its first quality due to its fine grain and compact structure and Wellega skin for its large size have a high demand in national and international market, also skin from Jimma, Arsi and Bale are competent for its good quality (Desta, 2009).

Small ruminants' skin has long been regarded as the second, next to coffee for its largest foreign exchange earning source for the country (Bayou, 2005). However, in recent years this rank has been relegated mainly because of rejection and down grading inflicted on skin defects due to various causes as infestation by external parasites and diseases (Desta, 2009).

Therefore to combat this problem shoat's external parasite control campaign have been designed and implemented in different districts of Oromia region by OLDHA since 2003EC, which was also undergone in the operational areas of ARVL.

Accordingly in the year 2022 OLFRO was planned to carryout shoat's external parasite control campaign in two zones of ARVL working areas. This control campaign was carried out to reduce external parasite infestations to a minimum level and as a result to improve the quality and quantity of sheep & goat skin in particular and production and productivity in general.

Thus, it needs to get the pre-control Campaign prevalence assessment should be required to calculate the prevalence (80% reduction) set by government after impact assessment of the campaign.

Therefore the objective of this study was:

- To determine sheep and goat external parasites prevalence in the districts
- To obtain post control prevalence of external parasites prevalence in the districts and used to assess the effectiveness (benefit) of the intervention campaign.

## **Materials and Methods**

### **Study methodology**

A cross sectional prevalence study of external parasites was carried out on small ruminants of local breed, different age group, and both sex. During the study the distribution of ecto-parasites species was considered. Also a collected raw data was carefully recorded and stored in Microsoft Excel database system used for data management.

### **Considered Parasites and body parts**

For ticks- head, ear, sides and ventral body parts, under tail, udder/testicles and intra digital space were considered and put into universal bottle containing 70% ethanol for further species identification. For lice and ked- neck, shoulder, wither, flunk and ramps are sites of concern. In each of the mentioned body parts both on the either sides /left and right/ a place 10 cm long was parted for the presence of both lice and ked.

One parasite is considered as positive and recorded as low infestation, 2 to 5 parasites are considered moderate infestation and six and above are considered severe infestation if found in all or one of the 10cm long place. For mange mites- head region, backline, ribs region and legs. Any mange-like lesion was removed using scalpels and collected onto Petri dish and put into universal bottle for further species identification and confirmation.

### **Clinical and laboratory examination**

The animals were randomly selected then recorded and clinically examined for presence or absence of the ecto-parasites and/or eggs and lesions. Prior to clinical examination, the sex, age and body condition of the animals was recorded. By modifying the system described in Gatenby (1991).

The clinical examination was performed by multiple fleeces parting in the direction opposite that in which hair or wool normally rests and visual inspection and palpation of the skin for parasites and/or lesion on all parts of the animals including the ears and digits.

Those shoats found infested by single parasite was considered positive (Kumsa and Bekele, 2008). The sites of infection on the animal body were recorded and the parasites identified on the basis of their morphological structure as described in Wall and Shearer (1997).

## Specimen collection and examination

Those ecto-parasites and their larvae unidentified during clinical examination and scrapings of mange like lesions from clinically suspected animals were collected in a clean container, for detailed laboratory examination.

Samples of mange like lesions were collected by cutting the hair around affected area, scrapping the edges of the lesion with scalpel as described by Soulsby (1982) until capillary bleeding is seen in such a way that the bleed is being held at an angle that the material scraped falls on Petri dish held underneath.

The lesions then dressed and the scrapped, material was transferred to a clean container and unreserved carried for laboratory examination. Ecto-parasites such as ticks and lice were collected by forceps/ hand picking, respectively from their attachment site, put into container and preserved with 70% alcohol as described by Urquhart *et al.*, (1996).

Collected ecto-parasites were examined under stereomicroscope and identification was performing according to the identification key described by Okello-onen *et al.*, (1999) for tick; and wall and shearer (1997) for lice.

According to this method, a few drops of 10% potassium hydroxide was added to the sample, allowed to stand for 30 minutes and the sediment was examined under different microscopic magnifications for mites, their eggs and fragments. Mites were identified according to the identification key described by Wall and Shearer (1997).

## Study area

The survey was conducted in Legahidha and Raitu districts of East Bale zone and HarenaBuluk of Bale zone of Asella Regional Veterinary laboratory operational areas. Legahidha is found in southeastern 632 km from Addis Ababa Ethiopia.

Located in the East Bale Zone of the Oromia Region has latitude and longitude of 7°45'N 41°15'E and Beltu is the administrative center of Legahidha district and East Bale Zone. And Raitu is found southeastern of Addis Ababa 592 km away has latitude and longitude of 6°50'N 41°15'E and an Located in the East Bale Zone of the Oromia Region. DhedechaBela is the administration center of Raitu. HarenaBulukis found in Bale zone and the center of administration is Angetu 572 km from

Addis Ababa. In the two districts, 3 kebeles/PA were selected 2 kebel in HarenaBuluk based on their agro ecological situations which are denoted as kola and availability of small ruminants and accessibility of transportation was considered.

East Bale

Selected Districts ----- >Raitu, Legahidha,

Bale Zone

Selected Districts ----->HaranaBuluk,

## Study animal

The study animal was randomly selected sheep and goat managed under extensive management system in the selected areas and with different age category, sex and body condition.

## Study Period

The study was conducted in April 2022 GC

## Sample size

The sample size was determined according to Thrusfield (2018) based on maximum expected prevalence of 50%; at 95% level of significance. A total of 1150 sheep, Goats will be examined to determine the prevalence of major ecto parasites of small ruminants.

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

Where, n=required sample size

P<sub>exp</sub>=expected prevalence (50%)

d=desired absolute precision

## Data Storage and Analysis

Individual animal data collected by interviewing the owners or attendants by using a semi-structured data collection format for this purpose. Individual animal level data (age, sex, breed and body condition) was obtained. Data generated from questionnaire survey and laboratory investigations was recorded and coded using Microsoft® Excel for Windows 2007 and then transferred to Statistical Package for the Social Sciences (SPSS) version 20.0 (IBM SPSS, 2011).

**Results and Discussion**

The survey was designed to be carried out in April 2022, on extensive livestock rearing system of East Bale and Bale Zones. A total of 1150 shoats were randomly selected and assessed the prevalence of ectoparasites of shoats.

Out of 8 districts four were selected purposively by considering their agro ecology and based on their campaign program. These were Legehidha, Raitu and Harena Buluku (lowland) areas of the two bale zones. The result showed that 76.17% of overall external parasites of shoats, and 89.60%. 56.89 And 79.01% of prevalence in Legahidha, Raitu and HarenaBuluk districts, respectively (Table 2).

In this survey the types of parasites identified were constituted that the tick 79%, lice 13%, mence mites 7%

and fleas 1% (Fig.1). The infestation level of each parasite was different based on the parasites.

In case of lice infestation, 1% low, 8% moderate and 4% high infestation but in case of fleas infestation very low infestation about 1%. In this survey the infestation of tick is very high, which is 38% of the infestation is high, 26% is moderate and 14% low infestation (fig.2).

Overall prevalence of Small ruminants’ external parasites shows that there is high infestation which is 76.17% and the percent indicate that it needs the control campaign.

The overall parasites infestations is high as previous prevalence the result revealed high prevalence of dominant ectoparasites is tick shoats that are 79% infestation of the total which is causes significant economic loss.

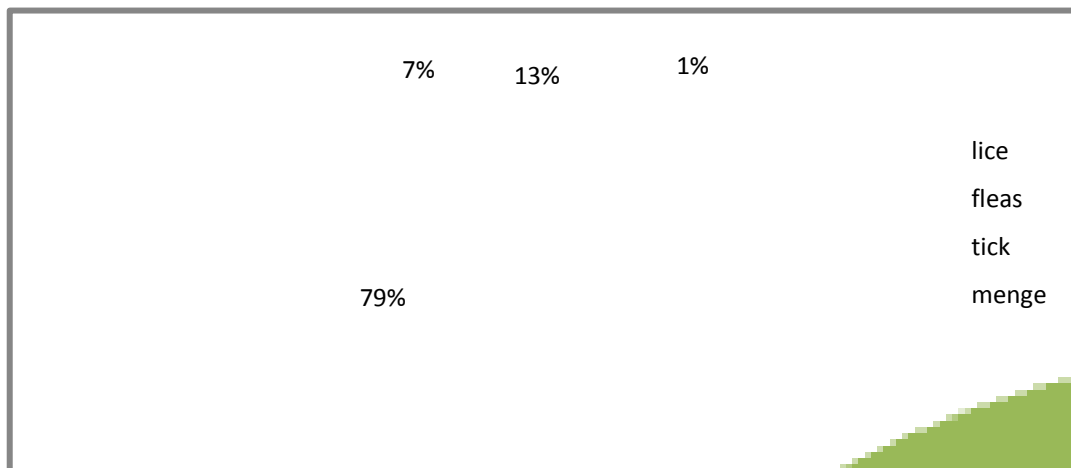
**Table.1** Number of samples from Zones and districts included in the prevalence assessment, 2022

Activities	Zones			Total
	East Bale/ Districts		Bale/District	
	legahidha	Raitu	HarenaBuluk	
No of PAs	3	3	2	8
Total shoats	404	341	405	1150

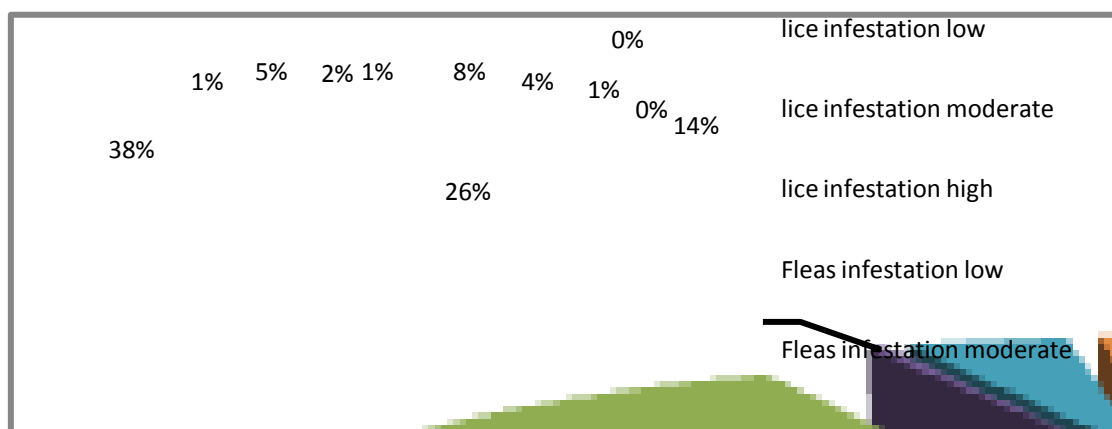
**Table.2** Small ruminants External parasites by Districts and Peasant Association of E/Bale and Bale Zones, 2022

District	Peasant association	Frequency of external Parasites	Parentage (%)
Legahidha	MumichaNadi	120 (125)	96
	D/gubisa	62 (62)	100
	LukuKiltu	180(217)	82.94
	<b>Subtotal</b>	<b>362(404)</b>	<b>89.60</b>
Raitu	Falte	125(217)	57.60
	Harbucha	31(62)	50
	Hardube	38(62)	61.29
HarenaBuluk	<b>Sub-Total</b>	<b>194(341)</b>	<b>56.89</b>
	Shawe	113(155)	72.90
	MelkaArba	207(250)	82.8
	<b>Sub-Total</b>	<b>320(405)</b>	<b>79.01</b>
<b>Total</b>		<b>876(1,150)</b>	<b>76.17</b>

**Fig.1** Proportion of Identified external parasites of small ruminant in E/Bale and Bale Zones, 2022.



**Fig.2** Infestations of different external parasites of small ruminant in E/Bale and Bale Zones, 2022.



Small ruminants' external parasites have drawn serious attentions now a days due to their impact on the quality of skin & hides letting the products to be downgraded & to be rejected at the tannery. In addition, their role in disease transmission, blood sucking & skin irritation effects are also intolerable in the context of productive & reproductive efficiency.

**Recommendations**

Attention should be given and continue the control activity against these parasites as regular basis; Farmers should be aware their effect in the study area. Ectoparasites control is difficult with just a single insecticide application since they will not kill the louse eggs. Retreatment is recommended 2 weeks after the first pesticide application for most insecticides.

Egg hatch requires 9 to 12 days, and the entire life cycle averages 1 month.

Regular follow up will be recommendable to know the status of the parasites every year.

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