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Survey on External Parasites of Small Ruminants after the Control Campaign in East Bale Zone of Oromia Region

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Abstract

Assessment of small ruminants' external parasites was conducted in East Bale zone of Oromia Region in February 2022. The overall prevalence was 39.93%, which were 49.10% in Sewena, and 20.84% in Gindhir. Prevalence infested parasites were 88% tick, 9% lice, and 2% 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 decreasing trend and the prevalence reduction through the period are good which results from impact of 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 about the effect and control is recommendable to reduce the infestation and maintain below the existing prevalence.

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Gindhir, Prevalence, Sheep, Ectoparasite, East Bale.

Introduction

Small ruminants are among the major economically important livestock in Ethiopia. The latest estimate gives the total numbers of 27.6 millions sheep and 23.3 millions goats in the country. Among these population 8.75 million (34%) Sheep and 7.6 million (31.4%) Goat is found in Oromia region (CSA, 2004).

These ruminants and their products are important export commodities contributing to the national economy in addition to supporting the livelihood of millions of farmers. Skin from sheep and goat is also the main stay of the Ethiopian tanning industries. According to the information obtained from sheep and goat skin produced every year in the country about 40-45% was from Oromia region.

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 Hamito, 2009). Small ruminant's skin has long been regarded as the second, next to coffee for its largest foreign exchange earning source for the country (Coles, 1996). 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 (Gatenby, 1991). Therefore to combat this problem sheep's external parasite control campaign have been designed and implemented in different districts of Oromia region by OLDHA since 2003 EC, which was also undergone in the operational areas of ARVL. Accordingly in the year 2008 OLDHA

was planned to carry out sheep's external parasite control (chemo prophylactic) campaign in almost all districts of 7 zones located in ARVL working areas. This control campaign has been 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 to evaluate the benefits of the control Campaign a regular impact assessment should be required. Based on this in order to facilitate the future impact assessment of the above mentioned control campaign that was carried out in districts of ARVL working area the laboratory was designed to conduct the post Control (intervention) sheep and goat external parasite prevalence survey in the selected districts of East Bale zone.

Therefore the objectives of the present study includes to determine sheep and goat external parasites prevalence in the districts and also 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 (Okello-onen *et al.*, 1999) until capillary bleeding is seen in such a way that the blood 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 Thrusfield (2018).

Collected ecto-parasites were examined under stereomicroscope and identification was performing according to the identification key described by for tick; and (Soulsby, 1982) 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 (Soulsby, 1982).

Study area

The survey was conducted in Gindhir and sawena districts of East Bale zone of Asella Regional Veterinary laboratory operational areas. Gindhir is found in southeastern 560 km from Addis Ababa Ethiopia.

Located in the East Bale Zone of the Oromia Region has latitude and longitude of 7°08'N 40°42'E and an elevation between 1750 and 1986 meters above sea level. The maximum and minimum temperature is 27.8C⁰ and 8.3C⁰ respectively. Gindhir is the administrative center of Gindhir district and East Bale Zone.

And Sawena is found southeastern of Addis Ababa 620 km away has latitude and longitude of 7° 23' N 41° 15' E and an Located in the East Bale Zone of the Oromia Region has elevations extend from 400 to 1850 meters above sea level. In each district, minimum of 3 kebeles/PA were selected 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 ----->Gindhir and Sawena

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 the 2021-2022 GC

Sample size

The sample size for the study was determined using (Urquhart *et al.*, 1996) based on maximum expected prevalence of 40.9% and 26.42% at Gindhir and Sawena from in 2008 and 2003 (UN published survey by ARVL) respectively. But also purposively a sample were added to the expected sample for the strong result and then from the previous reports the prevalence of major ectoparasites of small ruminants. The above mentioned expected prevalence was used to calculate the sample size. The minimum required sample size for this study was 372 for Gindhir and 300 for Sawena of total 672

Shoat by using confidence level of 95% and 5% of precision. But there were about 570 other sample size added to it and the total sample size were 1242.

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 February 2022, on extensive livestock rearing system of East Bale Zone. A total of 1242 shoats were randomly selected and assessed the prevalence of ectoparasites of shoats. Out of 7 districts two were selected purposively by considering their agro ecology. These were Sewena and Gindhir (lowland) areas of the zone.

The result showed that 39.93% of overall external parasites of shoats, and 49.10% and 20.84 % of prevalence in Sewena and Gindhir districts, respectively (Table 2). In this survey the types of parasites identified were constituted that the tick 88%, lice 9%, fleas 2% and munge 1% (Fig.1). Based on these survey risk factors such as sex, age body condition and species of the small ruminants were considered. However, all risk factors were significantly related for occurrence of these parasites on small ruminants (Table 3). Overall prevalence of Small ruminants' external parasites was reduced from 85.1% to 39.93% and the percent reduction may be shows it compile the control campaign. Even though the overall parasites infestations low relative to previous prevalence the result revealed high prevalence of dominant ectoparasites is tick shoats that are 88% infestation of the total which is causes significant economic loss.

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.

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

Zones	No of Districts		Total
	Gindhir	Sewena	
East Bale			
No of PAs	3	3	6
Total shoats	403	839	1242

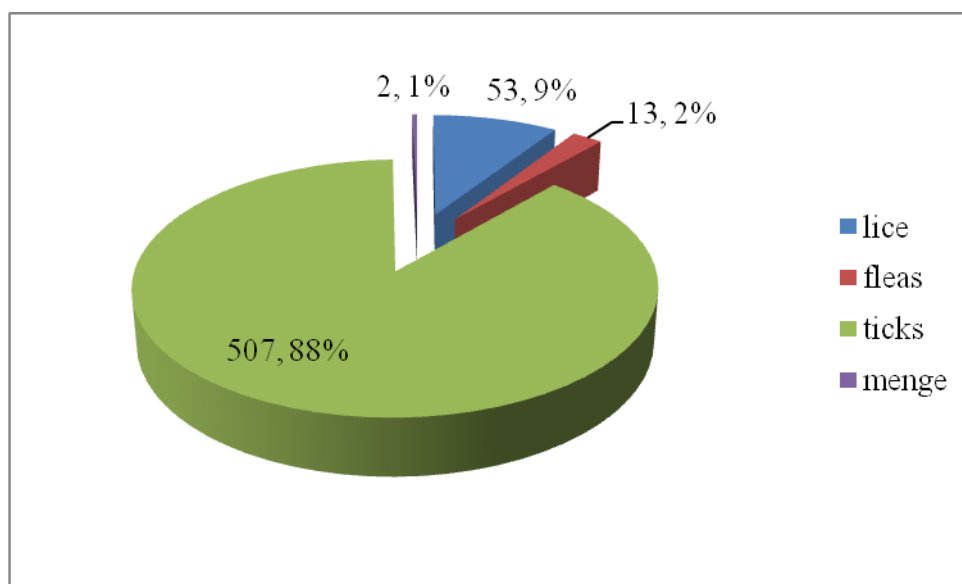
Table.2 Small ruminants External parasites by Districts and Peasant Association of E/Bale Zone, 2022

District	Peasant association	Frequency of external Parasites	Parentage (%)
Sewena	Chopi	121 (248)	48.79
	Boditi	56 (281)	19.92
	Laku	235(310)	75.80
	Subtotal	412(839)	49.10
Gindhir	Dodo	38(124)	30.64
	Melkaoda	1(155)	0.64
	Arda tare	45(124)	36.29
	Sub-Total	84(403)	20.84
Total		496(1,242)	39.93

Table.3 External Parasites of Small ruminates in E/Bale zone, 2022

Risk factors	Categories	X^2	Odds Ratio	P-value
sex	Male		1.032318	
	Female	0.05		0.8233
age	Young	1.33		0.2483
	Adult		1.147616	
Body Condition Score	Good	1.38	.8446162	0.2398
	Poor			
species	Ovine	6.2759	1.421604	0.012
	Caprine			

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



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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