



RESEARCH ARTICLE

Ectoparasite infestations of sheep and goats

Tesfaheywet Zeryehun*, Muluneh Atomsa

Özet

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Amaç: Araştırmanın amacı Etiyopya'nın batı Shoa bölgesi küçük ruminantlarının ektoparazit tip ile prevalansını belirlemektir.

Gereç ve Yöntem: Toplam 434 küçük ruminant (307 koyun, 127 keçi) fiziksel ve laboratuvar muayenesine tabi tutuldu.

Bulgular: Genel ektoparazit prevalansı %34.1 (148/434) olarak belirlenirken, koyunların 135 (%43.9)'i ve keçilerin 13 (%10.2)'ü enfeste belirlendi. İki tür arasındaki prevalans istatistikî olarak önemli ($p<0.05$) belirlendi. Sinek, bit ve keneye ait yedi ayrı tür belirlendi. Koyunlarda en fazla *Damalina ovis* (%19.5) belirlenirken, bu paraziti *Boophilus decoloratus* (%14.9) ve *Linognathus ovillus* (%11.1)'un takip ettiği belirlendi. Keçilerde en fazla *Boophilus decoloratus* (%4.4) belirlenirken, bu paraziti *Linognathus stenopsis* (%3.1)'un takip ettiği belirlendi. Ctenocephalides prevalansının genç keçilerde yaşlılara göre istatistikî olarak önemli ($p<0.05$) oranda yüksek olduğu belirlendi. *Amblyoma variegatum*, *Hyaloma*, *Damalina ovis*, *Linognathus ovillus* ile Ctenocephalides prevalansının kondisyon skoru düşük koyunlarda ve *Linognathus stenopsis*'in kondisyon skoru düşük keçilerde yüksek ($p<0.05$) olduğu belirlendi.

Öneri: Araştırma yüksek oranda prevalans ve parazit farklılığının varlığını gösterdi. Araştırma alanında ciddi ilgiye ihtiyaç duyulmaktadır.

Abstract

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Aim: To determine the prevalence and type of ectoparasites fauna in small ruminants in Western Shoa Zone, Central Ethiopia.

Materials and Methods: Physical examination and laboratory investigations were employed in the 434 small ruminants (307 sheep, 127 goats).

Results: The overall prevalence of ectoparasite was 34.1% (148/434) accounting for 135 (43.9%) in sheep and 13 (10.2%) in goats. The difference in prevalence between the two species was statistically significant ($p<0.05$). Overall, seven species of ectoparasites which belong to lice, ticks and fleas were identified. Among the external parasite identified, in sheep *Damalina ovis* (19.5%) was predominant followed by *Boophilus decoloratus* (14.9%) and *Linognathus ovillus* (11.1%) while in goats *Boophilus decoloratus* (4.4%) was the dominant external parasite followed by *Linognathus stenopsis* (3.1%). The prevalence of Ctenocephalides species was significantly higher ($p<0.05$) in the young goats than adults. The prevalence of *Amblyoma variegatum*, *Hyaloma* species, *Damalina ovis*, *Linognathus ovillus* and Ctenocephalides species in sheep, and *Linognathus stenopsis* in goats was higher ($p<0.05$) in animal with poor than good body condition scores.

Conclusion: The present study demonstrated a high prevalence and diverse ectoparasite fauna; hence a serious attention is warranted in the study area.

Department of Parasitology and Pathology, College of Veterinary Medicine, Haramaya University, Haramaya, P. O. Box 301, Ethiopia
Received: 31.07.2012 Accepted: 07.08.2012
*tesfahiwotzerihun@yahoo.com

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► Introduction

Livestock production in Ethiopia's agricultural economy is an important sector providing a significant contribution to gross domestic and export products and raw materials for industries (CSA 2009). Sheep and goats are 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 (Shiferaw et al 2010). Ectoparasites cause serious economic loss in small holder farmers (Tefera and Abebe 2004, Bekele et al 2011), and they are one of the most important cause of loss in production and mortality of animal in various part of the country (Kassa 2005).

Ectoparasites commonly ticks, mites, lice and ked are important parasites because of their disease transmission ability, blood feeding habit and skin damage in most of the livestock population (Tadesse et al 2011). Tick bites can be directly debilitating to domestic animals, causing mechanical damage, irritation, inflammation and hypersensitivity and, when present in large numbers, may cause anemia and reduced productivity. The salivary secretion of some tick species may cause toxicosis and paralysis (Walker et al 2003). Heavy louse infestations may cause pruritus, alopecia, excoriation and self-wounding. A disturbance caused by lice may result in lethargy and loss of weight gain. Heavy louse infestations (Pediculosis) are usually associated with young animals or older animals with poor health, or those kept in unhygienic conditions (Wall and Shearer 2001, Kassaye and Kebede 2010). Blood feeding due to fleas may have damaging effects causing inflammation, pruritus or anemia (Wall and Shearer 2001).

Aim of this study was to determine the prevalence and kinds of ectoparasite in Ambo town of Western Oromia Region, Ethiopia.

► Materials and Methods

The study was conducted in selected sites in Ambo town of Western Shoa Zone, Oromia National Regional State, Ethiopia. Indigenous sheep and goats were used for the study considering different age (<2 years, >2years) (Gatenby 1991, Steele 1996), sex groups and body condition score (good and poor). A cross-sectional study was carried out from November, 2011 to March, 2012 by collecting external parasites from sheep and goats. The study was carried out by parasitological examinations of samples taken during field visits. The required sample size was determined using the formula described by Thrusfield (1995). In this study 434 sheep and goats were examined. Collected ectoparasites were preserved in labeled universal bottles containing 70% alcohol (Serte 2004) and they were taken to Ambo Veterinary Laboratory Technology Laboratory for identification using stereomicroscope according to standard identification keys given by Urquhart et al (1996), Wall and Shearer

(2001) and Walker et al (2003).

Association of prevalence and explanatory variables such as age, sex and body condition score was done by way of chi-square (χ^2) test (SPSS 20.0). In all cases significant difference was set at $p < 0.05$.

► Results

The present study revealed that both sheep and goats were infested with one or more ectoparasite. Single infestation was higher ($p < 0.05$) in both infested hosts compared with multiple (two or more) infestation (Table 1). Ticks and lice (24.8%) were the predominant ($p < 0.05$) ectoparasite in infested sheep while ticks (6.3%) were predominant ($p < 0.05$) ectoparasite in infested goats (Table 2).

Table 1. Intensity of occurrence of ectoparasites in infested sheep and goats.

Intensity of infestation	Sheep (n=307)		Goats (n=127)	
	Infested	Prevalence (%)	Infested	Prevalence (%)
Single	81 ^a	26.4	11 ^a	8.7%
Multiple	54 ^b	17.6	2 ^b	1.6%
Total	135	43.9	13	10.2%

^{a, b}; Different letters in the same column are statistically significant (Chi square, $p < 0.05$).

Table 2. Overall prevalence of ticks, lice and fleas in sheep and goats.

Ectoparasites	Sheep		Goats	
	No. infested	Prevalence (%)	No. infested	Prevalence (%)
Ticks	69 ^a	22.5	8 ^a	6.3
Lice	76 ^a	24.8	4 ^{ab}	3.1
Fleas	25 ^b	8.1	2 ^b	1.6
Overall	135	43.9	13	10.2

^{a, b}; Different letters in the same column are statistically significant (Chi square, $p < 0.05$).

Damalina ovis (19.5%) was identified the most abundant ectoparasite species in sheep while *Boophilus decoloratus* (4.41%) was identified as the dominant external parasite in goats (Table 3). The overall prevalence of ectoparasite was 40.8% and 45.9% in young and adult sheep, respectively (Table 4). Young sheep had significantly higher prevalence of Ctenocephalidus species than adults. The overall prevalence of ectoparasite was 55.43% and 28.79% in sheep with poor and good body condition scores. On the other hand goats with poor body condition scores had significantly higher ($p < 0.05$) prevalence of Linognathus species (Table 5).

► Discussion

The overall prevalence of ectoparasites infestation in Ambo town was 34.10%, where 43.9% was recorded in sheep and 10.24% in goats (Table 1). Different prevalence of ectoparasites was reported in different

Table 3. Overall prevalence of ectoparasites in sheep and goats.

Ectoparasites	Sheep (n=307)		Goats (n=127)	
	No. infested	Prevalence (%)	No. infested	Prevalence (%)
<i>Amblyoma variegatum</i>	14	4.6	1	0.8
<i>Rhipicephalus evertsi</i>	13	4.2	2	1.6
Hyaloma species	10	3.3	-	-
<i>Boophilus decoloratus</i>	46	14.9	6	4.7
<i>Damalina ovis</i>	60	19.5	-	-
<i>Linognathus ovillus</i>	34	11.1	-	-
<i>Linognathus stenopsis</i>	-	-	4	3.1
Ctenocephalides species	25	8.1	2	1.6
Overall	135	43.9	13	10.2

parts of the country by various authors (Yacob et al 2008a, Yacob et al 2008b, Abunna et al 2009). These variations could arise from the management and ectoparasite control practices in the different study areas.

The overall prevalence of lice in sheep and goats were 24.8% and 3.1% respectively and there was a significant difference ($p < 0.05$) between the two hosts (Table 2). Prevalence of lice was reported from 9.09% to 89.5% in the country (Yesehak 2000, Sertse 2004, Tadesse et al 2011). This discrepancy could arise from differences in management, agro-ecological and climatic conditions. The most important lice species identified in the present study were *Damalina ovis* and *Linognathus ovillus* in sheep while *Linognathus stenopsis* was the only lice identified in goats (Table 3). These lice species have commonly been identified in small ruminant (Sertse 2004, Abunna et al 2009, Bekele et al 2011). In sheep, *Damalina ovis* was the dominant lice followed by *Linognathus ovillus*. This finding was in consent with other similar reports studies in the country (Sertse 2004, Bekele et al 2011). The prevalence of *Damalina ovis* and *Linognathus ovillus* was significantly higher ($p < 0.05$) in the poor than the good body condition sheep (Table 4); likewise, in goats poor body condition goats was highly ($p < 0.05$) infested with *Linognathus stenopsis* (Table 5). This was consistent with the finding of Sertse (2004). The prevalence of ectoparasites was found to be indepen-

dent of age and sex of animals (Bekele et al 2011, Tesfahaywet and Misgana 2012) similar to our finding.

The overall prevalence of ticks in this study was 22.5% in sheep and 6.3% in goats (Table 2). Yakob et al (2008a) and Yacob et al (2008b) reported from 4.77% to 31.8% in sheep and from 0.0% to 18.6% in goats. This might be due to the ability of goats in ridding off the ticks from their body because of less air coat compared with that of sheep (Yacob et al 2008b). In this study four species of ticks (*Boophilus decoloratus*, *Amblyoma variegatum*, *Rhipicephalus evertsi* and *Hyaloma* species) in sheep and three species of ticks (*Boophilus decoloratus*, *Amblyoma variegatum*, *Rhipicephalus evertsi*) in goats were identified with overall prevalence of 22.5% and 6.3% in sheep and goats, respectively (Table 3). Infestation with similar compositions of tick species was reported (Sertse 2004, Abunna et al 2009, Bekele et al 2011) in sheep and goats in Ethiopia.

The overall prevalence of Ctenocephalidus species was 8.1% and 1.6% in sheep and goats, respectively (Table 3). This finding was in consistent with Tadesse et al (2011). The presence of few flea infested goats in the study area could be associated with the short hair coat of goats where they would be getting rid-off easily from the body of the animals. The overall prevalence of Ctenocephalidus species was higher in sheep than in goats (Table 3). This was in contour with the

Table 4. Prevalence of external parasites in sheep by age, sex and body condition score.

	Age		Sex		Body condition score	
	Young (n=120)	Adult (n=187)	Male (n=119)	Female (n=188)	Good (n=132)	Poor (n=175)
<i>Amblyomma variegatum</i>	3 (2.5%)	11 (5.9%)	5 (4.2%)	9 (4.8%)	2 (1.5%)	12 (6.9%)
<i>Rhipicephalus evertsi</i>	3 (2.5%)	10 (5.3%)	7 (5.9%)	6 (3.2%)	7 (5.3%)	6 (3.4%)
Hyalomma species	7 (5.8%)	3 (1.6%)	5 (4.2%)	5 (2.7%)	0 (0.00%) ^b	10 (5.7%) ^a
<i>Boophilus decoloratus</i>	12 (10.0)	34 (18.2%)	19 (16%)	27 (14.4%)	21 (15.9%)	25 (14.3%)
<i>Damalina ovis</i>	23 (19.2%)	37 (19.8%)	27 (23.7%)	33 (17.6%)	13 (9.8%) ^b	47 (26.9%) ^a
<i>Linognathus ovillus</i>	11 (9.2%)	23 (12.3%)	15 (12.6%)	19 (10.1%)	7 (5.3%) ^b	27 (15.4%) ^a
Ctenocephalides species	15 (12.5%) ^a	10 (5.3%) ^b	13 (10.9)	12 (6.4%)	4 (3.0%) ^b	21 (12.0%) ^a
Total	49 (40.8%)	86 (45.9%)	59 (49.5%)	76 (40.4%)	38 (28.8%) ^b	97 (55.4%) ^a

^{a, b}; Different letters in the same line are statistically significant (Chi square, $p < 0.05$).

Table 5. Prevalence of external parasites in goats by age, sex and body condition score.

Ectoparasites	Age		Sex		Body condition score	
	Young (n=74)	Adult (n=53)	Male (n=41)	Female (n=86)	Good (n=94)	Poor (n=33)
<i>Amblyomma varigatum</i>	0 (0.0%)	1 (1.9%)	0 (0.0%)	1 (1.2%)	1 (1.1%)	0 (0.0%)
<i>Rhipicephalus evertsi</i>	1 (1.4%)	1 (1.9%)	0 (0.0%)	2 (2.3%)	1 (1.1%)	1 (3.03%)
<i>Boophilus decoloratus</i>	5 (6.8%)	1 (1.9%)	2 (4.9%)	4 (4.7%)	5 (5.3%)	1 (3.03%)
<i>Linognathus stenopsis</i>	2 (2.7%)	2 (3.8%)	1 (2.4%)	3 (3.5%)	0 (0.0%) ^b	4 (12.12%) ^a
Ctenocephalides species	2 (2.7%)	0 (0.0%)	1 (2.4%)	1 (1.2%)	0 (0.0%)	2 (6.1%)
Total	9 (12.16%)	4 (7.5%)	4 (9.8%)	9 (10.5%)	6 (6.4%)	7 (21.2%)

^{a,b}; Different letters in the same line are statistically significant (Chi square, $p < 0.05$).

finding of other authors (Tadesse et al 2011, Bekele et al 2011). The present finding revealed lower prevalence of Ctenocephalidus species in goats (1.6%) when compared with other findings in different parts of the country. Bekele et al (2011) reported 32.31% in Wolmera district, and Sertse (2004) reported 8.1% at Amhara Regional state. In sheep, the prevalence of Ctenocephalidus species (8.1%) in the present finding was a higher than the observation made by Sertse (2004) who reported 0.2% at Amhara Regional State and Bekele et al (2011) who reported 6.83% in Wolmera district of Oromia Region. These disparities in the prevalence of Ctenocephalidus species may be due to differences in management, agro-ecological and climatic conditions. Prevalence of Ctenocephalidus species is said to increase if the humidity is higher, usually above 70% which is required for oviposition of their eggs (Wall and Shearer 2001).

The present study has revealed that there is a significant association ($p < 0.05$) between prevalence and the body condition of the ruminants (Table 4, 5). This might be due to suppressed immunity in poor body condition animals but further study should be carried out to come up with a plausible explanation.

► Conclusions

In general sheep and goats in Ambo town were found to be infested with single or multiple external parasites suggesting that ectoparasites are among the major constraints in the small ruminant production in the area. Although the prevalence of external parasite in the study area is relatively low, serious attention should be given to further reduce the burden of ectoparasites and maximize the productivity of sheep and goats. In this connection, effective extension programs that raise public awareness on effect of ectoparasites should be instituted and appropriate control practice and improved management system should be implemented in the study area. Moreover, further epidemiological investigations that consider the agro-ecology and other non-host related risk factors should be carried out for appropriate control of ectoparasites.

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