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Gastrointestinal Parasites in Sheep in Gemechis and Boke Districts, West Harerghe Zone, Ethiopia

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Abstract: A cross-sectional study was conducted from November 2008 to April 2009 with the objectives of determining the prevalence, identifying the species involved and assessing risk factors of gastrointestinal parasites in sheep in Gemechis and Boke districts of west Harerghe zone, Ethiopia. Faecal samples were collected from 384 sheep and examined coprologically. The study found that 86.2% sheep were found to harbor one or more gastrointestinal parasites. The prevalence of various types of parasites in sheep were found to be infected with *Strongloid* species (79.9%), *Eimeria* species (31.5%), *Fasciola* species (28.38%), *Paramphistomum* species (15.9%), *Moneizia* species (13.8%) and *Trichuris* species (8.6%). Using the modified MC Master method, an attempt was made to classify the severity of infection based on the level of Eggs Per Gram (EPG). From studied animals 8(5.5%) sheep were severely infected, 50(34.2%) were highly infected and the rest 60(41.1%) and 28(19.2%) were medium and lightly infected. There was statistically significant difference ($p<0.05$) in infestation rate between the districts, age and body condition groups and no significant difference ($p>0.05$) was observed between sex groups. The current study suggests that high prevalence of gastrointestinal parasites in sheep and therefore we recommend that supplementation of important nutrient feed in dry season is important to avoid stress conditions that affect the host resistance and susceptibility to parasitic diseases and awareness creation to the farmers on the effect of gastrointestinal parasites of sheep and its control.

Key words: Boke · Gemechis · Parasites · Prevalence · Sheep · West Harerghe

INTRODUCTION

Ethiopia has the largest livestock inventories in Africa, including more than 38,749,320 cattle, 18,075,580 sheep, 14, 858,650 goats, 456,910 camels, 5,765,170 equines and 30,868,540 chickens with livestock ownership currently contributing to the livelihoods of an estimated 80% of the rural population [1]. In Ethiopia, sheep are the dominant livestock providing up to 63% of cash income and 23% of food substance value obtained from livestock production. Despite the animal and the contribution of this sub-sector to the nation's economy is relatively low. Endo-parasitic infection and management problems are known to be the main factors that affect productivity.

Helminth parasites of ruminants are ubiquitous, with many tropical and sub-tropical environments of the world providing nearly perfect conditions for their survival and development. Although these parasites are widely prevalent, the clinical signs they showed in infected animals can be less obvious than signs of other livestock diseases [2].

The various species of gastrointestinal and pulmonary nematodes, trematodes and cestodes are known to be prevalent in Ethiopia [3].

Studies on the gastrointestinal parasites in sheep were not so far conducted in Gemechis and Boke districts of west Harerghe zone, Oromia regional state. And therefore, the objectives of this study were to determine the prevalence and assess the potential risk factors associated with the prevalence of gastrointestinal parasites of sheep in the study area.

MATERIALS AND METHODS

Study Area: Study was carried out in two selected sites of west Hararghe zone, namely, Gemechis and Boke.

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Generally, Hararghe is found in the south eastern corner of Ethiopia. It lies between 5° and 12°N, 40° and 48°E.longitudes. The zone occupies 21% of the national area, i.e. covering an area of 266, 198km^2. The region has rugged topography with an altitude range of 2000 meters to over 3,400 meter above sea level. There are two rainy seasons in Hararghe. These rainy seasons occur in the springs i.e. From March to May and in the winter, from July to September. The annual rainfall in these two seasons varies from 250 to 600mm. In the region the majority of animals kept by the farmers are cattle, sheep, goat, camel and equine.

Study Animals: The study animals were sheep kept under extensive and intensive management system in the two districts were used for the study considering different age groups (Young and adult), sex groups (Male and female) and body condition scores (Poor and good). During physical examinations the age group (Young and adult) and body condition score of the animal (Poor and good) was performed as described by Gatenby [4].

Study Design: A crossectional survey was conducted selecting 2districts randomly from west Harergae zone Oromiya regional state. These include Gemechis and Boko districts. The sampling method used was simple random sampling to select the districts and individual sheep in the districts. To determine the sample size an expected prevalence of 50 % was taken in to consideration since there was no previous study conducted in the area. The desire sample size for the study was calculated using the formula given by Thrusfield [5] with 95% confidential interval and 5% absolute precision and it was 384.

Study Methodology: Coproscopy was used to determine positivity of the animals for the disease. Faecal samples for parasitological examination were collected directly from the rectum of each animal.

The degree of infection was categorized as light, moderate and severe (massive) according to their egg per gram of faeces (EPG) counts. Egg counts from 50-799, 800-1200 and over 1200 eggs per gram of feces were considered as light, moderate and massive infection, respectively [2, 6, 7].

Data Analysis: All raw data generated from this study were coded and entered in MS Excel database system. Using SPSS version 16.0 computer program, data were analyzed. Chi-square (X^2) test was used to determine the variation in infection, prevalence between sex, age, body condition score and deworming history. Statistical significance was set at $P < 0.05$ to determine whether there are significant differences between the parameters measured between the groups.

RESULTS

The overall prevalence of gastrointestinal parasites in sheep was 86.2% (331/384). Out of 331 positive animals 79.9%, 31.5%, 28.38%, 15.9%, 13.8% and 8.6% were found to be infected with *Strongloid* species, *Eimeria* species, *Fasciola* species, *Paramphistomum* species, *Moneizia* species and *Trichuris* species, respectively. The higher prevalence was revealed in Gemechis district (93.5%) and lower prevalence was revealed in Boke district (18.95%) and statistically significant difference observed between districts ($P<0.05$) (Table 1).

Prevalence by Age of Host: From 151 young animals examined 147(97.4%) cattle were positive for gastrointestinal parasites and among the 233 adults examined 184 (79%) of them were positive for gastrointestinal parasites. A statistically significant difference ($P<0.05$) was observed in age groups (Table 2).

Prevalence by Body Condition Score of the Host: The prevalence of gastrointestinal parasites in body condition groups (Good, medium and poor) was determined in coproscopy. From the 103 animals with good body condition cattle examined, about 80(77.7%) cattle were positive for gastrointestinal parasites, among the 128 examined medium body condition cattle, about 111 (86.7%) cattle were positive for gastrointestinal parasites and from the 153 animals with poor body condition cattle

Table 1: Prevalence of ovine gastrointestinal parasites as compared with two districts

District	No examined	Positive	GIT strongyle (%)	Trichuris (%)	Monezia (%)	Fasciola (%)	Eimeria (%)	Paraphistomum (%)	Total (%)
Gemechis	199	186	170 (85.4)	21 (10.6)	68 (34.17)	68 (34.17)	72(36.2)	72 (36.2)	93.5
Boke	185	145	137 (74.1)	12 (6.5)	27 (14.6)	41 (22.16)	49(26.5)	49 (26.5)	78.4
Total	384	331	307 (79.9)	33 (8.6%)	53 (13.8)				86.2%

X2 = 18.347 df = 1 P= 0.001

Table 2: Prevalence of ovine gastrointestinal parasites based on age category

Age	number of animals examined	Positive	P (%)
Young	151	147	97.4
Adult	233	184	79.0
Total	384	331	86.2

$X^2 = 26.020$ df 1 P= 0.000

Table 3: Prevalence of bovine gastrointestinal parasites based on body condition score

Body condition	Number examined	Positive	Prevalence
Poor	15 3	140	91.5%
Medium	128	111	86.7%
Good	103	80	77.7%
Total	384	331	86.2%

$X^2 = 9.945$ df = 2 $P < 0.05$

Table 4: Prevalence of bovine gastrointestinal parasites based on sex

Sex	Number examined	Positive	Percent
Male	177	154	87.0%
Female	207	177	85.5%
Total	384	331	86.2%

examined, about 140(91.5%) cattle were positive for gastrointestinal parasites. Statistical analysis revealed that significant difference (P<0.05) in prevalence between the body condition scores (Table 3).

Prevalence by Sex of Host: From the total of 177 male animals examined 154 (87%) of them were positive for gastrointestinal parasites and from 207 female animals 177(86.2%) of them were positive for gastrointestinal parasites. Statistical analysis showed that no significance (P>0.05) difference in prevalence between the sex groups (Table 4).

The Degree (Severity) of Parasitic Infection: Assessment of the severity of infection was made on 146 sheep based on the level of EPG count using McMaster egg counting technique. 58 (39.7%), 50 (34.2%) and 60 (41.1%) were massively, moderately and lightly infected, respectively.

DISCUSSION

The present study revealed the overall gastrointestinal (GI) parasites prevalence of 86.2% which is in agreement with previous reports by Yoseph [8], Getachew [9] and Bikila *et al*. [10] who reported prevalence of 85.8%, 88.1% and 84.3% in and around Asella, in and around Mekele and in Gechi district, respectively. However, the prevalence result of the current study appeared to be slightly lower than the prevalence reports of Hailelul [11], Genene [12], Gebreyesus [13], Tesfalem [14], Melkamu [15], Bayou [16] and Tefera *et al.* [17]. They have reported a prevalence of 90.41% in and around Wolayita Soddo, 91.4% in and around Kombolcha, 90.9% in Gonder, 92.2% in Mendayo district of Bale, 93.2% in four Awrajas of Eastern Showa, 90.2% in Buno province and 91.32% in and around Bedelle, respectively. These variations are due to the difference in deworming practices, management, altitude and climate. Tekleye [18] stated that the distribution of endoparasite depend on the ecology (rainfall, temperature and soil type).

79.9%, 31.5%, 28.38%, 15.9%, 13.8% and 8.6% of animals were found to be infected with *Strongloid* species, *Eimeria* species, *Fasciola* species, *Paramphistomum* species, *Moneizia* species and *Trichuris* species, respectively.

Among the different parasites, the prevalence of *Strongloid* species was 79.9% followed by *Eimeria* species (31.5%) using coprological examination. This is in line with the work of Yosef [19] Fikru, *et al*. [20] and Bikila, *et al*. [10] who reported *Strongloid* species and *Eimeria* species to be the most prevalent parasites encounteredin semi arid zones of Ethiopia and in Gechi District, Southwest Ethiopia.

The higher prevalence was revealed in Gemechis district (93.5%) and lower prevalence was revealed in Boke district (18.95%) and statistically significant difference observed between districts (P<0.05), this may be due to a variation in deworming practices, management, altitude and climate.

Age wise observation revealed statistically significant difference ($P < 0.05$) in infestation of parasites between ages. The present finding in line with most literatures [20-23] that young sheep are more susceptible to parasite infection than sheep and goats older than 1 year of age. This finding disagrees with reports from Gambia and Semi-arid part of Kenya that indicated that GI helminthes affect both ages equally [24, 25]. Report of Asanji and Williams [26] supports our finding that young animals are susceptible due to immunological immaturity and immunological unresponsiveness.

The analysis result also showed that there was no statistically significant difference (($P > 0.05$) in prevalence between sex of animals, with prevalence rate of 87.0% and 85.5% in males and females, respectively. The present finding, however, agrees with reports [9, 20] which showed that sex of the animals did not show significant

association with the prevalence of GI helminthes. Our result not in agreement with the work of [27-31] who reported higher prevalence of gastrointestinal parasites in females than in males.

Study was carried out on prevalence of gastrointestinal parasites on the basis of body condition. The results of our study indicated that infection rates in poor body condition animals were significantly higher ($P < 0.05$) than that of good body conditions animals which is in line with Keyy *et al*. [32]. This signifies that the importance of gastrointestinal parasites in causing weight loss and is a characteristic sign of the disease. Sheep of poor body condition are vulnerable to parasitic diseases.

CONCLUSION AND RECOMMENDATION

This study revealed that gastrointestinal parasites occurring in Gemechis and Boke districts were *Strongloid* species, *Eimeria* species, *Fasciola* species, *Paramphistomum* species, *Moneizia* species and *Trichuris* species. In the light of our results we consider that the infections caused by gastrointestinal, especially the *Strongloid* species and *Eimeria* species are significantly common in the region of study, so that greater importance should be given to this situation. Grazing management and Regular strategic deworming of the whole flock (especially when infected sheep are present) with broad spectrum anthelimenthics rather than treating individuals is recommended.

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