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Prevalence of Ovine Gastro Intestinal Nematodes in Haromaya District Eastern Hararghe Zone, Oromia, Eastern Ethiopia

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Abstract

Across sectional study was conducted from June- September 2015 on 384 randomly selected sheep Haromaya district East Hararghezone, EasternEthiopia with the objective of determining the major Gastro Intestinal (GIT) parasites and their prevalence in sheep. Fecal samples were collected from all animals and subjected to floatation, sedimentation and fecal smear techniques. The study found that the overall prevalence of gastrointestinal parasites in ovine was 60.4% (232/384). Different types of helminthes parasites were identified with prevalence of 43.8% strongyle spp, 8.9% strongholds spp, 5.4%mixed and 2.6% Trichuris sppin sheep was recorded. There was a significant difference ($P<0.05$) in prevalence of GIT parasites between different ages and sex of animals. However, there was no significant difference ($P>0.05$) in the prevalence of GIT parasites between peasant associations. Out of 384 sheep examined strongylespp eggs dominated the spectrum of infections where the prevalence was 43.8% in sheep that indicates strongyle parasites are major health problem of small ovine species in the study area. Therefore, further study is required to quantify the prevailing parasites species and assess for seasonal dynamics of the gastro-intestinal parasites in the study area and thereby to design appropriate control methods that enable to overcome the existing problem.

Keywords: Cross-sectional; GIT Parasites; Haromaya; Ovine; Prevalence

Introduction

Parasites of livestock cause diseases of major socioeconomic importance worldwide. Helminth infections remain one of the most important diseases limiting small ruminant production in tropical Africa (FAO, 1992). About 95% of sheep and goats are reported to be infected with helminths with *Haemonchus*and *Trichostrongylus*being the key species involved [1].

Sheep and goats are the most numerous of man's domesticated livestock and are especially important in more extreme climates of the world. Over two-thirds of the total population of sheep and goats occur in the less developed countries where they often provide major contribution to farming enterprises [2]. Ethiopia is the second in Africa, and the sixth in the world, in terms of sheep population. Its great variation in agro-climatic zones represents a good reservoir of small ruminant genotypes [3]. With its great variation in climate and topography, the country possesses one of the largest livestock populations in the world, which is managed by smallholder farmers under extensive low input traditional management system and adjunct to crop production [4].

Ethiopia is the second in Africa, and the sixth in the world, in terms of sheep population. In spite of huge population and importance of small ruminants, the country has benefited little from this enormous resource owning to a multitude of problems like poor nutrition, poor animal production systems, reproductive inefficiency, management constraints, lack of veterinary care, and disease being the most important. Disease alone accounts for mortality of 30% in lambs and 20% in adults [5,6].

Gastrointestinal helminth infections are recognized as a major constraint to livestock production throughout the tropics and elsewhere [7,8]. They cause lowered productivity [9], mortality and high economic lossesaffecting the income of small holder dairy farming communities. For successful formulation and implementation of an efficient and effective strategic helminth control regime, a periodic surveillance of the prevalence of gastrointestinal helminthiasis within given environment and associated risk

factors that influence their transmission is required[10].

There are many associated risk factors influencing the prevalence of gastrointestinal helminths including age, sex, weather condition and husbandry or management practices[11,12]. In Ethiopia, several studies have been conducted on ruminant helminthiasis of various regions reporting a prevalence range from 50.4-84.1% [13]. However,surveys were entirely restricted to the vicinity of veterinary institutions which may not be representative to the various geographical regions in Ethiopia which are unknown before as documentation of helminths of different animal species is concerned.

Therefore, the current study was conducted

- To generate baseline data on the prevalence of gastrointestinal parasites in small.
- Ruminants of Haromaya, East Hararghe zone, Oromia, Ethiopia.
- An attempt was made to identify risk factors in relation to parasitism.

Materials and Methods

Study Area

The study was conducted from July 2015 toSeptember2015 in 4 selected peasant association Dirre Kabso, Korke,Dada, and-Tarkanfiof Haromaya Woreda, Eastern Haraghe, Ethiopia. Haromaya wereda is 527km far from Addis Abeba. The total geographical area of the region is about 343.21 km2. It is geographically located between 42.03-42.16 north of latitude and 9.110-9.240 last of longitude. The area is mainly categorized in two agro-ecological zones. 90% of the land area of the region is estimated to be mid-high land (weyna dega), between 1400-2200 meter above sea level, while the remaining 10% is kola (approximately found below 1500 meter above sea level.

In Haromaya woreda the mean annual temperature varies from 10 in high lands and 26 in low lands. However generally the temperate of the region with a little variation among seasons, the metrological data of 1997-2000 E.C. indicates the mean annual maximum temperature of the region ranges from 28 in high land and 22 in the low lands. The mean annual minimum temperature is 10 in high lands and 15 in low lands. The duration and intensity of rainfall in the region vary considerably. Generally, it decreases from west and North West to south east wards. The last four years' record of rainfall shows that ranging from 700m.m in the south east and over 900ml in the western part of the region [14].

Study Population

The study populations were local sheep kept under traditional extensive management system consisting of different age, sex and body condition groups from four purposely selected peasant associations (PAs), of Haromaya woreda.

Sample Size Determination and Sampling Method

The sample sizes were determined by the formula described by[15].Accordingly, at 95% confidence level and precision of 5% the total sample size determined were 384. Since there was no Research carried out previously in the study area. Four (PAs) were purposively selected and equal proportions of samples was collected from each PAs, but the house hold and animals were selected by simple random sampling method. The fecal samples were collected from individual study animals using simple random sampling.

$N=\frac{1.962 \times pexp\ (1-pexp)}{}$

d^2=desired absolute precision

N=numbers of individuals tobe sampled

Pexp=expected prevalence

d^2=desired absolute precision

1.96=95% confidence level

Study Design and Study Methodology

A cross-sectional type of study was used for prevalence determination of sheep GIT nematode by carpologicalexamination. The samples were collected from different age and sex. Age was determined for both sexes based on dentition**.**Those animals with the age of less than one year were considered as young while those greater than or equal to one was considered as adults according to the classification of age groups by [16].

Parasitological Study

A fresh fecal sample of approximately 10 grams was collected directly from the rectum of 384 sheep using gloved finger. Each sample was clearly labeled with animal identification, date and place of collection. The fecal samples were placed in a universal bottle, labeled and 10% formalin were added to preserve parasite eggs and transported to Haromaya university Veterinary Parasitology Laboratory for analysis. Those samples which were not examined within 24 hr of arrival at laboratory were stored at +4˚C and examined the next day early in the morning. The collected samples were subjected to qualitative flotation and quantitative McMaster egg counting parasitological techniques using saturated sodium chloride (specific gravity of 1.2) as flotation fluid. The eggs of different parasite species were identified using keys given by [17].

Descriptive statistics was used to quantify the problems and Chi-square test was used to compare association between independent variables (sex, age,) and parasitism. Confidence interval was set at 95% and statistically significant association between variable was considered to exist if the computed p-value is less than 0.05.

Data Management and Analysis

The raw data was entered into Microsoft excel spread sheet and analyzed using SPSS statistical software version 11.

Results

The overall prevalence of ovine gastrointestinal nematodes was 60.4% of all the sheep examined in the four PAs, samples showed the GIT nematode infection prevalence showed slightly similar infection pre-valence recorded (232/384). A prevalence of 61.2% in females, 38.8% in males, 70.1% in young, 29.9% in Adult, were observed in (Table 1).

Animals	Frequency	Overall prevalence (%)
Positive	232	60.4
Negative	152	39.6

Table 1: Overall prevalence of ovine gastrointestinal nematodes in the study area.

There was no statistically significant difference ($P > 0.05$) in prevalence of gastro-intestinal nematode infection of sheep between the all study sites in (Table 2).

Pas	No. of examined samples	No. of positive	Prevalence (%)
Korke	96	57	62.5
D. Kabso	96	60	65.6
Dada	96	58	63.5
Tarkanfi	96	73	66.7
Total	384	248	60.4

Table 2: Prevalence of gastrointestinal nematodes of sheep at different PAs of the study area.

The predominant GIT nematodes identified in sheep in study area were strongyle, Strongyloides and Trichuris and mixed with overall prevalence of 43.8%, 8.9% and 2.3%,5.4 respectively. (Figure 1).

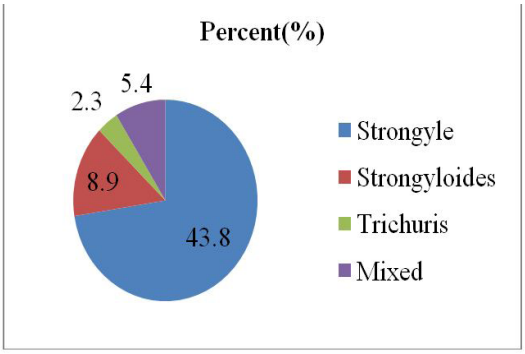

Figure 1: The predominant GIT nematodes identified in the study area.

Current study revealed that the overall prevalence of ovine gastrointestinal nematodes was 60.4% (232/384). With a prevalence of 61.2% in females, 38.8% in males, this finding agree with the reports of [18] and [19] who found higher infections in female animals than males with a significant difference between them. It is assumed that sex is a determinant factor influencing prevalence of parasitism [18] and females are more prone to parasitism during pregnancy and per-parturient period due to stress and decreased immune status [19,20].However, present study disagrees with [21]who reported that. Male and female animals were found to be equally susceptible to infection with gastrointestinal nematode parasites.

Present study illustrates young's were more frequently infected than adult sheep. The statically significant difference ($P < 0.05$) was recorded between the two age groups. The reason is that as new born and younger sheep, they lack strong immunity as in the adults. The possible explanation is that in adult sheep, after primary infection, rapid solid immunity is acquired. This result is consistent with [22]who stated that sheep continually exposed to infection are at low risk provided the rate of acquisition of infective larvae is sufficient to stimulate satisfactory response,And no cause of clinical illness. Similarly, a number of authors have demonstrated that Young animals are more susceptible to parasite infection than adult sheep than 1 year of age, because adult animals may acquire immunity to the parasite through frequent challenge and expel the ingested parasite before they establish infection [23]. Similarly stated that young animals are susceptible due to immunological immaturity and immunological unresponsiveness[24].

The study reveals the predominant GIT nematodes identified in sheep in study area were strongyle, *Strongyloides* and *Trichuris* and mixed with overall prevalence of 43.8%, 8.9% and 2.3% ,5.4 respectively(Table 2). Therefore, the current prevalence of gastrointestinal nematodes results agrees with reports of previous studies conducted in Ethiopia as 56.6% strangles, 8.2% *Strongyloides* and 5% *Trichuris*in Debre Zeit [25]; 66.6% strangles type and 3.3% *Trichuris* species in Bedele [26]; 64% strangles type and 7.4%strongyloides and 3.7 *Trichuris*[22] in asella, southeastern Ethiopia and 42.25% strangles type in Kelela. This difference could be due to the sample size considered and types of techniques utilized as well as prevalence varies greatly from region to region, corresponding to ecological and climatic diversity as well as the existing host ranges.

This study showed that strangles were the most prominent among those gastrointestinal nematode parasites of sheep. This finding is in accordance with a number of findings obtained by different researchers in which Strongyles species were dominant. [27-29] reported a high prevalence rate in strangles infection in Western Oromia, Gechi district of south West Ethiopia, Eastern part of Ethiopia and South Eastern Nigeria, respectively. The current prevalence of gastrointestinal Strongyles agrees with reports of previous studies conducted in different parts of Ethiopia by [25] and [26] who reported prevalence of 56.6% and 66.6% respectively. Therefore, strangles are gastrointestinal nematodes of greatest importance in sheep, and causes serious direct and indirect losses in most parts of the country by[30] in Wolayta Soddo and [22, 31]

in Asella.The high prevalence of strangles may be due to the suitability of the climatic condition of Haromaya district for survival and transmission of the parasites. *Strongyloides* and *Trichuris* species were poorly represented. This agrees with the idea of [19,22] which indicate only Young's are more susceptible to these parasites while adults usually develop certain immunity.

Conclusion and Recommendations

The present study was based solely on coproscopic examination for detection of gastrointestinal nematode eggs; it has provided an insight to the current prevalence and associated risk factors. It suggested that ovine gastrointestinal nematodes are of the major helminthosis in Haromaya district. Age, sex and geographic changing aspects are the most prominent risk factors associated with gastrointestinal nematode infection. In addition, weak status of animal health services and lack of proper management, especially in the study area, crop-livestock mixed farming is highly practiced, and most land is cultivated so that many species of animals are kept together on marginal and a piece of land. However, they give low priority to sheep in respect to the value they obtained from them. They give the first

Line to draught animals and forced sheep to graze behind on overstocked areas which lead them to graze close to the ground and on faecal materials, resulting in the uptake of higher numbers of infective larvae.

On the basis of the above conclusion and the present findings, the following recommendations are forwarded:

- Detailed study should be conducted to clearly identify parasitic fauna using faecal culture and post-mortem examination in the study area.
- Strategic anthelminthic treatments: Treat sheep with broad spectrum anthelminthic at the beginning of rain season and at the end of dry season to reduce the worm burden and minimize pasture contamination with larvae, and treat flock with special consideration to those sheep in poor condition rather than individual animal separately. To prevent anthelmintic resistance, regular study should be carried out on the efficacy and resistance of the anthelminthic drugs directed to the subject area
- Using pasture management: Applying rotational grazing system for different seasons would reduce pasture contamination, separating the most susceptible young animals from adults, which is a possible source of contamination. Maintaining the stocking rate to reason-able level avoids consequent pasture contamination.
- Education of farmers on the importance of the parasitic diseases, its economic losses and the correct ways to improve animal husbandry system need to be applied.
- Support role of veterinarians and animal healthy extensions in giving professional advices regarding preventive and control measures against gastrointestinal helminthic parasites and prevention of drug misuses.

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