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Pre-slaughter coproscopic and abattoir prevalence of GIT parasites of sheep and goats at Bishoftu ELFORA export abattoir, Oromia, Ethiopia

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Abstract

A cross sectional study was conducted from November 2019 to April 2020to determine the pre-slaughter prevalence of GIT parasites in sheep and goats slaughtered at Bishoftu ELFORA export abattoir. A total of three hundred and eighty-four (384) faecal samples were collected and analyzed for the presence of gastrointestinal parasites using floatation techniques. An overall prevalence rate of 249 (64.8%) was recorded. Postmortem examination of slaughtered animals revealed a prevalence rate of 104 (61.9%) and 145(67.1%) was obtained for sheep and goats respectively. Six gastrointestinal parasite species were detected; these were *Strongyloides* spp*, Trichuris spp, Haemonchus* spp*, Sthelizia* spp*, Moniezia* spp and *Fasciola* spp. Among the parasite detected, the highest prevalence was for *Haemonchus*spp, 59 (23.6%) followed by *Fasciola*spp 54(21.6%) while the least prevalence was recorded for*Trichuris*spp15 (6%). The older ruminants were found to be more infected (sheep: 72.2% and goats: 63.2%). The results of this study suggest high prevalence of gastrointestinal parasitic burden shoats presented for slaughter both during coproscopic and postmortem examination

Keywords: Abattoir, GIT parasites, Goats, Sheep, ELFORA, Bishoftu

Introduction

Ethiopia possesses the highest number of livestock population in Africa. Small ruminants (sheep and goats) are among the major economically important livestock in Ethiopia; in which there are 23.62 million sheep and 23.33 million goats, playing an important role in the livelihood of resource poor farmers and provide a vast range of products and services such as meat, milk, skin, hair, horns, bones, manure and urine, security, gifts, religious rituals and medicine (Welemehret *et al*., 2012).

Sheep and goats are particularly important resources for their owners, because they require smaller investments, have shorter production cycles, faster growth rates and greater environmental adaptability than cattle. Therefore, they form an important economic and ecological niche in all agricultural systems throughout the country (Sissay, 2007).The proximity of Ethiopia to large Middle Eastern markets demanding export quality sheep and goat carcasses and an increase in the domestic demand for small ruminant meat is leading to a change in the importance and scale of sheep and goat production (Yami and Merkel, 2008). However, the full exploitation of these resources is hindered due to prevailing diseases, poor nutrition, poor genetic potential of the animals and the traditional system of husbandry (Rahmeto *et al*., 2010).

Parasitic diseases plays detrimental role in hampering small ruminant production leading to serious economic loss due to the associated morbidity and mortality (Nwosu *et. al*, 2007).Sheep and goats are extremely susceptible to awide range of GIT helminthsof three genera (Nematodes, trematodes and cestodes) such as Haemonchus, Triostrongylus, Bunostomum, Oesophagostomum, Trichuris, Fasciola, Paraphistomum, Monezia and Sellesia(Tembely and Hansen,1996).

There are many associated risk factors influencing the prevalence of gastrointestinal helminthes including age,sex, weather condition and husbandry or management practices (Khan et al., 2009). Gastrointestinal parasite infections have greater impact in Ethiopia due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and parasite species (Fikru *et al*., 2006).

Therefore the present study was designed to [1] determine pre-slaughter coproscopic prevalence of GIT parasites of shoats [2] see the postmortem adult parasite burden in animals slaughtered at Bishoftu ELFORA export abattoir.

Materials and Methods

Study area

The study was conducted from November 2019 to April 2020at the ELFORA and ORGANIC export Abattoir in Bishoftu, Oromia.

Study animals

The present study was conducted in sheep and goats that are originated from four different parts of the country (Borana, Bale, Jinka and Somali region)for slaughter at rexport abattoir inBishoftu. The animalswere randomly selected for pre-slaughter coproscopic examination and further examined after slaughter toidentify the adult helminthes using postmortem examination.

Sample size and Sampling method

The total number of small ruminants required for the current study was calculating using the formula given by (Thrusfield, 2005).A systematic random sampling procedure wasemployed to select sheep and goats brought from different parts of the country to ELFORA and ORGANIC abattoir at Bishoftu and Modjorespectively for slaughtering to be included in the study.

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

Where: n = required sample size; Pexp = expected prevalence

d = desired absolute precision.
Z = 1.96 for 95% confidence interval.

Thus, by using previous overall prevalence of 47.67% reported by Shimelis et al (2011) the total number of small ruminants included in the study was 384.

Study Animals

Sheep and goats slaughtered at ELFORA export abattoir were examined. The animals brought to the abattoir were from Borana, Somale, and Jinka. Borana is located around 600 km south of Addis Ababa. The climate is semi-arid with an annual mean daily temperature from 19°C to 24°C with moderate seasonal differences. Study animals were also from Jinka, South Omo zone of Ethiopia. This area has a temperature range between 15.7°C and 38°C. Another source of the slaughtered animals was Somali, which is found in the Eastern part of Ethiopia at 9° 20N. It is one of the semiarid parts of the country.

Study Design

The study design used was cross-sectional. A total of 384 respective small intestines of sheep (216) and goats (145) were carefully collected from ELFORA export abattoir during the study period.

Sample Collection and Laboratory Analysis

Worm Recovery

Laboratory work was conducted at Addis Ababa University College of Veterinary Medicine (Parasitology laboratory). A classical method (Jacquie et al., 1997) was employed for small intestine worm recovery, counting, and species identification.

Species Identification

Preserved worms were poured into petri dishes for examination using stereo microscope Identification of the species and determination of the degree of

infection were done using keys developed by various researchers (Hansen and Perry) and MAFF.

Adult parasite identification

Active abattoir survey was conducted during routine meat inspection on randomly selected sheep and goats. During ante-mortem examination of each study animal was given an identification number and its sex, age, body condition, origin and other parameters were recorded. After slaughtering, post-mortem examination of sheep and goats was carried out using standard procedures recommended by FAO/UNEP/WHO (FAO/UNEP/WHO, 1994; Swai and Schoonman, 2012). During post-mortem examination the rumen, abomasum, liver, small intestine and large intestine of both sheep and goat were carefully examined using visual inspection and palpations for the presence of adult GIT parasites according to the standard procedure.

Fecal sample collection and examination

Fecal samples were directly collected per rectum with new, unused gloves from each randomly sheep and goat brought for slaughtering to ELFORA export abattoir. Each sample was put in plastic containers with lids and labeled with animal identification record including the age, sex,and body conditions (tin, moderate and good). Then transported by using ice box to Addis Abeba University Veterinary parasitology laboratory, the sample was immediately examined or stored in refrigerator at $+4^0$c for later examination. The collected samples were processed by direct floatation using floatation fluid and sedimentation technique. Eggs of the different helminthes were identified on the basis of morphological appearance and size of eggs (Forit, 1999).

Data Management and Analysis

All collected data were entered into an Excel sheet and later analyzed using SPPS 20 version. Descriptive statistics were computed and χ^2 values were used to test the association.

Results

Prevalence of gastrointestinal helminthes

Of the 384 faecal samples examined from 168(43.8%) sheep and 216 (56.2%) goats, 249 (64.8%) were found parasitized. Goats 145 (67.1%) were more infected by gastrointestinal parasites than sheep 104 (61.9%) (Table 1).

Prevalence of ova in sheep and goats

Six (6) parasites of various genera were encountered in both the samples examined. These include; *Strongyloides* spp, *Trichuris* spp, *Haemonchus* spp, S*thelizia* spp, *Moniezia* spp and *Fasciola*spp. *Haemonchus* spp was the most prevalent 59 (23.6%) intestinal parasite encountered followed by *Fasciola*spp. 54 (21.6%), while *Trichuris* spp 15 (6%) were the least prevalent parasites encountered. In Sheep, *Fasciola* spp had the highest prevalence 28 (26.9%) of gastrointestinal parasites followed by *Haemonchus* spp. 23 (22.1%), while *Trichuris* spp. were the least prevalent 6 (5.8%) parasite recorded. *Haemonchus* spp. was the most prevalent 36(24.8%) intestinal parasite in goats followed by *Sthelizia* spp. 33 (22.8%), while *Trichuris* spp. and *Moniezia* spp. were the least prevalent 9 (6.2%) and 13(9%) intestinal parasites encountered respectively (Table 2).

Table 1. Prevalence of adult gastrointestinal helminthes

species	No. examined (%)	No. positive (%)	X^2-value	p-value
Sheep	168(43.8%)	104(61.9%)		
Goat	216(56.2%)	145(67.1%)		
Total	384(100%)	249(64.8%)		

Table 2. Prevalence of helminthes ova in sheep and goats

Helminthes Ova (%)	no. of positive sheep (%)	no of positive goat (%)	total positive
Strongyloides spp	19(18.3%)	28(19.3%)	47(17.7%)
Trichuris spp	6(5.8%)	9(6.2%)	15(6%)
Haemonchus spp	23(22.1%)	36(24.8%)	59(23.6%)
Moniezia spp	11(10.6%)	13(9%)	24(9.6%)
Fasciola spp	28(26.9%)	26(17.9%)	54(21.6%)
Sthelezia	17(16.3%)	33(22.8%)	50(20.08%)
Total	104	145	249

Table 3. Age prevalence of gastrointestinal helminthes based on age of animals

Parameters	**Sheep (n=168)**		**Goat (n=216)**		**Total(384)**	
	No. of Examined	No. of +ve	No. of examined	No. of + ve	No. of examined	No. of +ve
Age						
Young	60(35.7)	26(43.3)	72(33.3)	54(75)	132(34.4)	80(32.1)
Adult1	08(64.3)	78(72.2)	144(66.7)	91(63.2)	252(65.6)	169(67.9)
Total	168(43.8)	104(61.9)	216(56.3)	145(67.1)	384(100)	249(100)

Discussion

Gastrointestinal parasites infection is a worldwide problem for both small and large scale farmers. Infection by gastrointestinal parasites in ruminants including sheep and goats can result in severe loses. Economic losses are caused by gastrointestinal parasites in a variety of ways. They cause loses through infertility, reduced work capacity, a reduction in food intake and lower weight gains, treatment costs, and mortality in heavily parasitized animals (Waller, 2006).

With regards to the level of parasitic infection revealed by the parasitological examination of 384 faecal samples, the result showed that 249 (64.8%) were infected. The prevalence of gastrointestinal parasites among the ruminants studied revealed that goats had the highest prevalence rate of infection of 145 (67.1%) than sheep with 104(61.9%).The high prevalence of these intestinal parasites observed in goats is in agreement with the findings of Solomon-Wisdom et al. (2014) and Nwigwe et al. (2013) who in their independent studies reported that gastrointestinal parasites are dominant in goats and are among the successful parasites of animals because of their sufficient life cycle ranging from the very simple to the extremely complicated stage. The high prevalence might be due to the system of management that these goats were subjected to as they were always left to wander about scavenging and feeding indiscriminately on anything they come in contact with and then return to their poorly kept sheds. These findings agree with the work of Forse et al. (1999) and Adejinmi et al (2015) who stated that animals are exposed to massive parasitic infections when they are kept in poor ranches/conditions and also when they are fed with contaminated food and water.

The study revealed that presence of six (6) gastro-intestinal parasites which include *Strongyloides* spp., *Trichurais* spp., *Haemonchus* spp., *Thelizia* spp., *Moniezia* spp., and *Fasciola*spp. This agrees with the findings of Gadahi et al. (2009) who reported that these parasites are the most pathogenic gastrointestinal parasites of small ruminants. The highest number of intestinal parasites was composed of *Haemonchus* spp. 59(23.6%), followed by *Fasciola*spp.,with 54 (21.6%) while *Trichuris spp.* had the least infection rate with 15(6%). The high prevalence of *Haemonchus*spp. in this study was in agreement with the findings of Osakwe and Angigor (2007).

In respect to age of the animals studied, adults recorded the highest number of gastrointestinal parasites 92 (65.71%). This finding agrees with the reports of Nwosu et al. (2007) and Ntonifor et al. (2013) which clearly showed that adult animals could have been harbouring matured worms.

Conclusion and Recommendations

The findings of this study revealed high prevalence of gastrointestinal helminthes in shoats slaughtered at ELFORA export abattoir. Species and age were considered, indicating sheep were more infected than goats. Six months up to 1 year old animals were more infected than greater than 1 year. Thus, appropriate control methods such as strategic vaccination with more detailed investigation is necessary to minimize further losses associated with helminth infections.In conclusion, appropriate control methods such as strategic treatment with anthelmintic at farm level should be implemented. Furthermore, detailed investigation is necessary at farm level in order to minimize further losses associated with helminth infections.

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